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Bridge 1-159 on James St. over Christina River

Contract T201207101

Foundation Report

Final – November 2014

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FINAL FOUNDATION REPORT (REV. November 2014)
BR 1-159 - Newport Bridge
James Street Over Christina River
New Castle County, Delaware

EXECUTIVE SUMMARY

This report summarizes the results of the subsurface exploration program, laboratory test data and geotechnical analyses for the proposed 393'-11 7/8", 5-span bridge on James Street over Christina River in New Castle County, Delaware. The report was prepared in accordance with the DelDOT Bridge Design Manual [(1)], AASHTO LRFD Bridge Design Specifications[(2)] and Drilled Shafts: Construction Procedures and LRFD Design Methods – Publication No. FHWA-NHI-10-016 - May 2010[(3)].

The recommendations for foundation design include:

1. Recommended Foundation Design Features

Recommended Drilled Shaft Foundations at Abutments A&B

	Abutment A	**Abutment B**
Recommended Foundation Type	**48" Diameter Cased Drilled Shafts**	**48" Diameter Cased Drilled Shafts**
Applicable Boring	JS-2	JS-9
Bottom of Drilled Shaft Cap Elevation, ft.	+1.5/+4.5	+4.0
Top of Casing Elevation, ft.	+1.5/+4.5	+4.0
Load Carrying Mechanism	Friction and End bearing in Rock	Friction and End bearing in Rock
Min. Bottom of Drilled Shaft Elevation, ft.	-94.0	-46.0
Assumed Top of Rock Elevation, ft.	-109.5	-92.5
Estimated Bottom of Drilled Shaft Elevation, ft.	-111.5	-94.5
Estimated Shaft Length, ft.*	113.0/116.0	98.5
Factored Axial Resistance (R_R), Kips	516	415
Factored Lateral Resistance, Kips	105.6	229.3
Factored Service Lateral Resistance, Kips	67.40	146.9
Service Limit State Lateral Deflection, inches	0.69	0.19
Service Limit State Allowable Deflection, inches	1.0	1.0
Minimum Shaft spacing, ft.	12	12

**Drilled Shaft Length measured from the top of permanent casing to estimated bottom of drilled shaft.*

Recommended Drilled Shaft Foundations at Piers 1, 2, 3 & 4

	Pier 1	**Pier 2**	**Pier 3**	**Pier 4**
Recommended Foundation Type	**48" Diameter Cased Drilled Shafts**	**48" Diameter Cased Drilled Shafts**	**48" Diameter Cased Drilled Shafts**	**48" Diameter Cased Drilled Shafts**
Applicable Boring	JS-3 & JS-4	JS-5	JS-6	JS-7 & JS-8
Bottom of Pier Cap Elevation, ft.	+7.25	+9.22	+8.83	+6.29
Top of Casing Elevation, ft.	0.0	-12.0	-1.0	+3.0
Load Carrying Mechanism	Friction and End bearing in Rock	Friction and End bearing in Rock	Friction and End bearing in Rock	Friction and End bearing in Rock
Min. Bottom of Drilled Shaft Elevation, ft.	-104.0	-103.0	-99.0	-93.0

Recommended Drilled Shaft Foundations at Piers 1, 2, 3 & 4

	Pier 1	Pier 2	Pier 3	Pier 4
Assumed Top of Rock Elevation, ft.	-107.0	-107.0	-107.0	-100.5
Estimated Bottom of Drilled Shaft Elevation, ft.	-109.0	-109.0	-109.0	-102.5
Estimated Shaft Length, ft.*	109.0	97.0	108.0	105.5
Factored Axial Resistance (R_R), Kips	778	703	695	1044
Factored Lateral Resistance, Kips	67.79	30.73	22.81	81.31
Factored Service Lateral Resistance, Kips	52.67	19.25	15.79	46.59
Service Limit State Lateral Deflection, inches	0.08	0.42	0.70	0.23
Service Limit State Allowable Deflection, inches	1.0	1.0	1.0	1.0
Minimum Shaft spacing, ft.	12	12	12	12

**Drilled Shaft Length measured from the top of permanent casing to estimated bottom of drilled shaft.*

2. The drilled shafts will be installed using a permanent steel casing and using the rotating or oscillating methods to minimize vibration. The minimum steel casing thickness is ½ inch at the abutments and Piers 1, 2 and 4 and ¾ inch at Pier 3. After the casing has been filled with concrete, fill all void space occurring between the casing and drilled shaft excavation with a material which approximates the geotechnical properties of the in-situ soils. Testing using crosshole sonic log is recommended. Access tubes for crosshole sonic log testing shall be steel pipe of 0.145 inches minimum wall thickness and at least 1-1/2 inch inside diameter. A minimum of four tubes per shaft are recommended. One Bi-Directional Load cell Test at a technique shaft located at Wing A is recommended.

3. The effects of construction activity on the 72-inch forced sewer main should be minimized. The area in the immediate vicinity of the pipe should be delineated to restrict construction activity around the pipe. Vibration Monitoring is recommended at the 72-inch forced sewer main. A threshold value of 0.2 inches/sec should not be exceeded. Installation of drilled shafts should proceed from Abutment B, towards Abutment A.

4. The contractor is responsible for stability of excavated slopes. The contractor is also responsible for providing dewatering of the excavation to allow for inspection and construction. Any dewatering sumps or wells should be located at least three feet away from the footing excavation.

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New Castle County, Delaware

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1.0 INTRODUCTION

The existing bridge BR1-159 carries James Street over Christina River, in New Castle County. This report summarizes the results of the subsurface exploration program, laboratory test data and geotechnical analyses. The report also specifies the foundation design and construction recommendations. The foundation design requirements for the structure include recommendations for bottom of Drilled Shaft elevations, axial and lateral capacities for Drilled Shafts and approach embankment treatment to mitigate settlement. The conclusions and recommendations are based on soil and groundwater information gathered during the geotechnical exploration program and subsequent laboratory analysis of samples. The report was prepared in accordance with the DelDOT Bridge Design Manual [(1)], AASHTO LRFD Bridge Design Specifications[(2)] and Drilled Shafts: Construction Procedures and LRFD Design Methods – Publication No. FHWA-NHI-10-016 - May 2010[(3)].

The following tasks were performed for the preparation of this report:

- Drafting of the Subsurface Profile.
- Interpretation of the subsurface exploration and the laboratory test data.

2.0 SITE AND PROJECT DESCRIPTION

2.1 Site Description

The project site is shown in **Figure 1 – Project Location Map.** The Boring Location Plan- **Figure 2** indicates that the existing ground surface elevations in the vicinity of the proposed structure range from Elev. -25 (channel elevation) to Elev. +11 feet above mean sea level. Industrial and commercial areas are adjacent to the proposed structure.

2.2 Proposed Structure

The proposed structure will be constructed just east of the existing bridge alignment and will be 393'-11 7/8" long, with 5 spans. The span lengths varies from 55'-5 1/2" (Span 5) to 88-1 1/8" (Span 2). The structure will have a curb-to-curb width of 28 feet and a 10-foot wide bike and pedestrian way. The out-to-out width of 42'- 5 ½" consists of two 12-foot lanes, two 2-foot shoulders, two 1'-8 1/4" parapets and 1'-1" for a handrail. The proposed bridge structure type, size and location are shown on the Boring Location Plan provided in **Figure 2.** The proposed deck elevation at the centerline is 12.76 feet at Abutment A and 12.5 feet at Abutment B. The maximum embankment height is approximately 9 feet at Abutment A and 5.5 feet at Abutment B.

3.0 SUBSURFACE EXPLORATION AND LABORATORY TESTING

The subsurface exploration and laboratory testing data are included in **Appendix B.**

3.1 Subsurface Exploration

During the months of May through August 2012 Walton Corporation completed ten (10) Standard Penetration Test (SPT) borings (JS-1 thru JS-10) at the structure and approach roadway. The structure test boring locations are shown on the Boring Location Plan in **Figure 2**. Borings JS-1 and JS-10 were drilled as roadway borings. A summary of the boring program is shown in **Table 3.1**.

Table 3.1 Summary of Boring Program

Boring No.	Ground Surface Elevation (ft.)	Substructure Unit	Ave. N_{CORR}-Value (bp 1.0 ft.) [(1)]	Groundwater Elevation (ft.)	Remarks on Subsurface Material
JS-1	9.0	Roadway	N/A	Dry	Medium/dense fill over saturated soft silts/clays with alternating layers of medium dense to dense/stiff sands, silts and clays below
JS-2	8.5	Abutment A and Wing A	25	-19.5	Medium/dense fill over saturated soft silts/clays with alternating layers of medium dense to dense/stiff sands, silts and clays below
JS-3	11.0	Pier 1	27	1.0	Medium/dense fill over saturated soft silts/clays with alternating layers of medium dense to dense/stiff sands, silts and clays below
JS-4	4.0		21	-15.8	Medium/dense fill over saturated soft silts/clays with alternating layers of medium dense to dense/stiff sands, silts and clays below
JS-5	11.0	Pier 2	26	*4.6	River mud/saturated clayey silts overlying alternating layers of medium dense to very dense/stiff sands, silts and clays below
JS-6	11.0	Pier 3	20	*4.6	River mud/saturated clayey silts overlying alternating layers of medium dense to very dense/hard sands, silts and clays below
JS-7	11.0	Pier 4	27	-3.8	Medium/dense fill over alternating layers of medium dense to dense/stiff sands and silts
JS-8	1.0		26	-5.5	Medium/dense fill over alternating layers of medium dense to dense/stiff sands and silts
JS-9	4.5	Abutment B and Wing D	27	-1.5	Medium/dense fill over alternating layers of medium dense to dense/stiff sands and silts
JS-10	8.5	Roadway	N/A	Dry	Medium/dense fill over alternating layers of medium dense to dense/stiff sands and silts

[(1)] Averaged over the length of the boring
****Assumed at Mean High Water Elevation***

3.2 Standard Penetration Test Boring

The borings were typically advanced using 3.25-inch O.D. hollow-stem augers. Samples were captured using the Standard Penetration Testing (SPT) procedure. Split-barrel samples, in accordance with ASTM D 1586, were taken at intervals with a 2.0-inch outer-diameter split-barrel sampler. For each 2-foot sampling interval, the number of blows required to drive the sampler six inches using a 140-pound weight dropped 30 inches was recorded. The soil obtained from the sampling sequence was visually classified by type, texture and color. Boring logs, recording blow counts, sample depths and material descriptions were maintained throughout the drilling operation. Graphic interpretations of these logs are presented on the Subsurface Profile in **Appendix A - Figure 3.**

3.3 Laboratory Testing Program

The Laboratory testing results are shown in **Appendix B.** Testing included: Classification and Index tests, undisturbed soil sample tests and corrosion tests. The soil samples were tested at laboratories of Geo-Technology Associates, Inc. and DelDOT.

Corrosion tests included: pH (ASTM G-51), Earth Resistivity (ASTM G-57), Redox Potential (ASTM D1498), Qualitative Test for Sulfide and Natural Moisture Content.

A summary of the laboratory tests on undisturbed samples is shown in **Table 3.2**

Table 3.2 Summary of Laboratory Tests on Undisturbed Samples

Boring No	Undisturbed Sample Depth (ft.)	Laboratory Testing	Laboratory Test Results
JS-2	16.0	Consolidation Test	P_c=1.15tsf, C_c=0.65, C_r=0.08, e_0=1.659, C_v=0.1ft^2/day
JS-2	26.0	CU with Pore Pressures	C=0.346tsf, C'=0.236 tsf ϕ= 10 deg, ϕ'=24.7 deg
JS-3	22.0	CU with Pore Pressures	C=0.056 tsf, C'=0.035 tsf ϕ= 16.1 deg, ϕ'=35.3 deg

3.4 Groundwater

Groundwater readings were made during the course of the boring operations and after completion of the borings. The groundwater elevations are shown in **Table 3.1**. The groundwater readings are for the times shown on the boring logs and may not be indicative of seasonal or long-term fluctuations in groundwater levels. The Mean High Water elevation of Christina River is 4.64 feet. A design groundwater elevation of 5.0 feet was therefore assumed.

4.0 SUBSURFACE CONDITIONS

4.1 Geology

According to the map of the *Geology of Wilmington Area, Delaware* (1975), prepared by the Delaware Geological Survey (DGS), the area is situated in the Potomac Formation. The Potomac Formation is characterized by variegated red, gray, purple, yellow, and white, frequently lignitic silts and clays containing interbedded white, gray, and rust-brown quartz sands and some gravel. Individual beds usually restricted laterally in northern Delaware.

The Potomac Formation is of the Early to Late Cretaceous age. Potomac sediments are of continental origin and consist mainly of vari-colored clays and silts with some interbedded sands. Encroachment of the sea and marine deposition apparently took place from Late Cretaceous time up to Late Eocene time but no sediment record of these events remains in the map area. Fluvial sands and gravels of the Columbia Formation (Pleistocene age) unconformably overlie the Potomac Formation in most of the map area. In some cases, Pleistocene streams cut deep valleys into the Potomac; the thickness of Holocene fluvial materials may exceed fifty feet.

4.2 Subsurface Conditions

The surface elevations of the structure borings (JS-2 thru JS-9) range from elevation +4.5 feet to +11.0 feet. The soil profile at the approach to the south abutment (Abutment A) and Pier 1 consisted of medium/dense fill over saturated soft silts/clays with alternating layers of medium dense to dense/stiff sands, silts and clays below. Bedrock was not encountered. The corrected N-values of the soils in borings JS-2 thru JS-4 ranged from 21 to 27, with the N-values generally increasing with depth. The soft silts/clays are susceptible to consolidation.

Pier 4 and the north abutment (Abutment B)/approach soil profile consisted of medium/dense fill over alternating layers of medium dense to dense/stiff sands, silts and clays below. The corrected N-values of the soils in borings JS-7 thru JS-9 ranged from 26 to 27, with the N-values generally increasing with depth. Bedrock was encountered in borings JS-8 and JS-9 at elevations -100.5 feet and -93.5 feet respectively. RQD ranged from 58% to 84.8%.

The soil profile at Pier 2 (Borings JS-5) consisted of river mud/saturated clayey silts overlying alternating layers of medium dense to very dense/stiff sands, silts and clays below. The soil profile at the Pier 3 (Borings JS-6) consisted of River mud/saturated clayey silts overlying alternating layers of medium dense to very dense/hard sands, silts and clays below. Bedrock was not encountered in these borings.

The Subsurface Profile is included in **Appendix A - Figure 3.**

4.3 Soil Parameters for Design (Abutments)

The recommended design soil parameters for the abutments are given in **Appendix C-1**, and are summarized in **Table 4.1**. The parameters are based on SPT blow-count correlations.

Table 4.1 Recommended Foundation Design Features for Abutments

Parameters	Abutment A	Abutment B
Recommended Foundation Type	**48" Diameter Cased Drilled Shafts**	**48" Diameter Cased Drilled Shafts**
Applicable Boring	JS-2	JS-9
Bottom of Drilled Shaft Cap Elevation (ft.)	+1.5	+4.0
No. of Soil Layers	7	6
Bearing Stratum	Medium dense to dense/stiff sands, silts and clays	Medium dense to very dense/stiff sands, silts and clays over Schist bedrock
Unit Weight, γ (lb./ft^3)	135/100/130/125/130/125/135	120/135/135/125/135/150
Soil Cohesion, c (psf)	0/400/0/1000/0/1000/0	750/0/0/1000/0/200,000
In-situ Soil Friction Angle, ϕ_f (°)	Layer 1 - 34, Layer 2- N/A, Layer 3-32, Layer 4 - N/A, Layer 5 -32, Layer 6-N/A, Layer 7-34	Layer 1 – N/A, Layer 2- 34, Layer 3-32, Layer 4 - N/A, Layer 5 -34, Layer 6-46
Drilled Shaft Bearing Resistance Factor, (ϕ,) Side/End	0.55/0.5 (Sand) and 0.45/0.4 (Clay)	0.55/0.5 (Sand) and 0.45/0.4 (Clay)

4.4 Soil Parameters for Design (Piers)

The recommended design soil parameters for the piers are given in **Appendix C-2**, and are summarized in **Table 4.2 and Table 4.3**. The parameters are based on SPT blow-count correlations.

Table 4.2 Recommended Foundation Design Features for Piers

Parameters	Pier 1	Pier 2
Recommended Foundation Type	**48" Diameter Cased Drilled Shafts**	**48" Diameter Cased Drilled Shafts**
Applicable Boring	JS-3 & JS-4	JS-5
Top of Casing Elevation (ft.)	0.0	-12.0
No. of Soil Layers	4	6
Bearing Stratum	Medium dense to dense/stiff sands, silts and clays	Medium dense to dense/stiff sands, silts and clays
Unit Weight, γ (lb./ft^3)	100/130/125/135	110/120/130/125/135/150
Soil Cohesion, c (psf)	300/0/1000/0	0/0/0/2000/0/0
In-situ Soil Friction Angle, ϕ_f (°)	Layer 1 - 0, Layer 2- 32, Layer 3-0, Layer 4 -35	Layer 1 – 30, Layer 2-32, Layer 3-32, Layer 4-N/A, Layer 5-36, Layer 6-46
Drilled Shaft Bearing Resistance Factor, ($\phi_{}$) Side/End	0.55/0.5 (Sand) and 0.45/0.4 (Clay)	0.55/0.5 (Sand) and 0.45/0.4 (Clay)

Parameters	Pier 3	Pier 4
Recommended Foundation Type	**48" Diameter Cased Drilled Shafts**	**48" Diameter Cased Drilled Shafts**
Applicable Boring	JS-6	JS-7 & JS-8
Top of Casing Elevation (ft.)	-1.0	+3.0
No. of Soil Layers	4	7
Bearing Stratum	Medium dense to very dense/hard sands, silts and clays below	Medium dense to dense/stiff sands, silts and clays over Schist bedrock
Unit Weight, γ (lb./ft^3)	105/120/125/135	120/135/115/135/125/135/150
Soil Cohesion, c (psf)	600/0/2000/0	750/0/750/0/1000/0/200,000
In-situ Soil Friction Angle, ϕ_f (°)	Layer 1 – N/A, Layer 2 – 32, Layer 3- N/A, Layer 4- 36	Layer 1 – N/A, Layer 2-34, Layer 3-N/A, Layer 4 -34, Layer 5- N/A, Layer 6 -34, Layer 7-46
Drilled Shaft Bearing Resistance Factor, ($\phi_{}$) Side/End	0.55/0.5 (Sand) and 0.45/0.4 (Clay)	0.55/0.5 (Sand) and 0.45/0.4 (Clay)

5.0 EVALUATION AND RECOMMENDATIONS – ABUTMENTS

5.1 Abutment Foundation Alternative Analysis

Deep and shallow foundation alternatives were considered. A shallow foundation was not recommended because of the presence of soft soils just below the anticipated bottom of footing elevation. A cast-in-place reinforced concrete cantilever abutment on driven piles was also ruled out in order to minimize vibration, which could affect the nearby 72-inch diameter forced sewer main. As indicated in the Boring Location Plan, **Figure 2**, the abutments will consist of stub abutments on 48-inch diameter cased drilled shafts. The drilled shafts will be installed using a permanent 49" OD minimum steel casing, using the rotating or oscillating methods, where necessary, to minimize vibration.

5.2 Summary of Analysis and Recommendations – Abutments

The abutments will consist of stub abutments on 48-inch diameter cased drilled shafts. The Bottom of Drilled Shaft Cap Elevation (BDSCE) was determined based the superstructure depth and the drilled shaft cap thickness. The minimum bottom of drilled shaft elevation (MBDSE) was determined based on the required penetration depth needed to support the factored applied axial loads. In order to insure that the axial capacities of the shafts are achieved during construction, all drilled shafts will be terminated two feet into rock. The estimated bottoms of drilled shaft elevations (EBDSE) are shown in **Table 5.1** and on the boring profile in **Figure 3.**

The Factored Geotechnical Resistance (R_R) of a single drilled shaft was determined using the Ensoft computer program SHAFT. The resistance factors outlined in AASHTO Table 10.5.5.2.3-1 were used. The strength axial capacity calculations are included in **Appendix C-1** and the results are shown in **Table 5.1**. A resistance factor of 0.45 and 0.4 for side and end respectively was used for clay soils and 0.55 and 0.5 for side and end respectively, in sand. The lateral capacities at the strength and service limit states were determined using the Ensoft computer program LPILE. The calculations are included in **Appendix C-1** and the results are shown in **Table 5.1**. The minimum spacing of the shafts should be 3 diameters, or 12 feet.

5.3 Abutment Foundation Recommendations

The drilled shaft foundation recommendations at the abutments are shown in **Table 5.1**.

Table 5.1 Recommended Drilled Shaft Foundations at Abutments A&B

	Abutment A	**Abutment B**
Recommended Foundation Type	**48" Diameter Cased Drilled Shafts**	**48" Diameter Cased Drilled Shafts**
Applicable Boring	JS-2	JS-9
Bottom of Drilled Shaft Cap Elevation, ft.	+1.5/+4.5	+4.0
Top of Casing Elevation, ft.	+1.5/+4.5	+4.0
Load Carrying Mechanism	Friction and End bearing in Rock	Friction and End bearing in Rock
Min. Bottom of Drilled Shaft Elevation, ft.	-94.0	-46.0
Assumed Top of Rock Elevation, ft.	-109.5	-92.5
Estimated Bottom of Drilled Shaft Elevation, ft.	-111.5	-94.5
Estimated Shaft Length, ft.*	113.0/116.0	98.5
Factored Axial Resistance (R_R), Kips	516	415
Factored Lateral Resistance, Kips	105.6	229.3
Factored Service Lateral Resistance, Kips	67.40	146.9
Service Limit State Lateral Deflection, inches	0.69	0.19
Service Limit State Allowable Deflection, inches	1.0	1.0
Minimum Shaft spacing, ft.	12	12

**Drilled Shaft Length measured from the top of permanent casing to estimated bottom of drilled shaft.*

6.0 EVALUATION AND RECOMMENDATIONS – PIERS

6.1 Pier Foundation Alternative Analysis

Deep and shallow foundation alternatives were considered. A shallow foundation was ruled out because of the potential for scour and/or because of the presence of soft soils immediately below the anticipated bottom of footing elevation. Steel H-piles driven to very stiff/hard sandy clay were ruled out in order to minimize vibration, which could affect the nearby 72-inch diameter forced sewer main. Also the use of cofferdams in the river was not permitted. Drilled shafts continuous with the pier columns were therefore chosen.

6.2 Summary of Analysis and Recommendations – Piers

The piers will be supported on 48-inch diameter cased drilled shafts. The MBDSEs were determined based on the required penetration depth needed to support the factored applied axial loads, with the 100-year design flood scour taken into account. In order to insure that the axial capacities of the shafts are achieved during construction, all drilled shafts will be terminated two feet into rock. The EBDSEs are shown in **Table 6.1** and on the boring profile in **Figure 3.**

The Factored Geotechnical Resistance (R_R) of a single drilled shaft was determined using the Ensoft computer program SHAFT. The resistance factors outlined in AASHTO Table 10.5.5.2.3-1 were used. The strength axial capacity calculations are included in **Appendix C-2** and the results are shown in **Table 6.1**. A resistance factor of 0.45 and 0.4 for side and end respectively was used for clay soils and 0.55 and 0.5 for side and end respectively, in sand. The lateral capacities at the strength and service limit states were determined using the Ensoft computer program LPILE. The calculations are included in **Appendix C-2** and the results are shown in **Table 6.1**. The minimum spacing of the shafts is 3 diameters or 12 feet.

6.3 Pier Foundation Recommendations

The foundation recommendations at the piers are shown in **Table 6.1**.

Table 6.1 Recommended Drilled Shaft Foundations at Piers 1, 2, 3 & 4

	Pier 1	Pier 2	Pier 3	Pier 4
Recommended Foundation Type	**48" Diameter Cased Drilled Shafts**	**48" Diameter Cased Drilled Shafts**	**48" Diameter Cased Drilled Shafts**	**48" Diameter Cased Drilled Shafts**
Applicable Boring	JS-3 & JS-4	JS-5	JS-6	JS-7 & JS-8
Bottom of Pier Cap Elevation, ft.	+7.25	+9.22	+8.83	+6.29
Top of Casing Elevation, ft.	0.0	-12.0	-1.0	+3.0
Load Carrying Mechanism	Friction and End bearing in Rock	Friction and End bearing in Rock	Friction and End bearing in Rock	Friction and End bearing in Rock
Min. Bottom of Drilled Shaft Elevation, ft.	-104.0	-103.0	-99.0	-93.0
Assumed Top of Rock Elevation, ft.	-107.0	-107.0	-107.0	-100.5
Estimated Bottom of Drilled Shaft Elevation, ft.	-109.0	-109.0	-109.0	-102.5
Estimated Shaft Length, ft.*	109.0	97.0	108.0	105.5
Factored Axial Resistance (R_R), Kips	778	703	695	1044

Table 6.1 Recommended Drilled Shaft Foundations at Piers 1, 2, 3 & 4

	Pier 1	Pier 2	Pier 3	Pier 4
Factored Lateral Resistance, Kips	67.79	30.73	22.81	81.31
Factored Service Lateral Resistance, Kips	52.67	19.25	15.79	46.59
Service Limit State Lateral Deflection, inches	0.08	0.42	0.70	0.23
Service Limit State Allowable Deflection, inches	1.0	1.0	1.0	1.0
Minimum Shaft spacing, ft.	12	12	12	12

**Drilled Shaft Length measured from the top of permanent casing to estimated bottom of drilled shaft.*

7.0 DRILLED SHAFT GROUP RESISTANCE

No reduction in resistance for group efficiency is anticipated, since the permanent casing will be advanced in front of the excavation heading, and the drilled shaft spacing will be three diameters, or 12 feet. The drilled shafts will also penetrate a layer of stiff or hard cohesive material, at the piers.

8.0 DRILLED SHAFT SETTLEMENT

Short-term settlement was computed using the computer program SHAFT. The program computes settlement of the top and base of the shaft as a function of axial loading. The drilled shafts were within tolerable settlement limits (1 inch) for the predicted service loads. Long-term settlement is not anticipated, since the drilled shafts will be terminated in bedrock.

9.0 EVALUATION AND RECOMMENDATIONS - WINGS

Wing A and Wing D will be Cast-in-Place Reinforced Concrete Cantilever Walls with spread footing on soil. The soil parameters for Wing A will be the same as for Abutment A and the soil parameters for Wing D will be the same as for Abutment B. The bottom of footing elevations for Wings A and D should be a minimum of 3 feet below finished grade to prevent damage due to frost heave.

10.0 APPROACH EMBANKMENT SETTLEMENT

In order to mitigate embankment settlement which may affect the 72-inch forced sewer main at the south approach, lightweight aggregate fill will be used. The lightweight aggregate fill producer shall submit verification of a compacted density of less than 60 pcf when measured by a one-point compaction ("Proctor") test conducted in accordance with ASTM D698. A special Provision is provided in **Appendix D**. At the north approach, approximately 5 feet of fill will be placed. Based on the soil profile at borings JS-9 and JS-10, long-term settlement is not anticipated.

11.0 SPECIAL CONSIDERATIONS

11.1 Drilled Shaft Construction and Testing

The drilled shafts will be installed using a minimum 49” OD permanent steel casing and by the rotating or oscillating method to minimize vibration. After the casing has been filled with concrete, fill all void space

occurring between the casing and drilled shaft excavation with a material which approximates the geotechnical properties of the in-situ soils. Testing using crosshole sonic log is recommended. Access tubes for crosshole sonic log testing shall be steel pipe of 0.145 inches minimum wall thickness and at least 1-1/2 inch inside diameter. A minimum of four tubes are recommended. One Bi-Directional Load cell Test at a technique shaft is recommended. The technique should be abandoned after testing. Other requirements for testing are included in the drilled shaft special provisions in **Appendix D**.

11.2 Seismic Design Considerations

Based on the SPT blow counts and the soil profile and in accordance with AASHTO Table 3.10.3.1-1, a Site Class E should be used for seismic design.

11.3 Corrosion Protection

Based on the AASHTO Section 10.7.5, the results of the laboratory chemical testing which is included in **Appendix B** indicate the absence of a corrosive environment. Protection against corrosion is therefore not necessary.

11.4 Temporary Cut Slope and Support of Excavation

Excavation for the foundations should be carried out in a manner that will ensure the stability of the sides of the excavations. The sides of the excavations may have to be sloped to prevent slope failure. Where there is inadequate room to accommodate the necessary sloping of the excavation sides, temporary shoring should be installed. All excavation safety measures, including sloping and shoring should conform to current OSHA and local standards. Care should be exercised when excavating at the toe or on the side of existing fill or cut slopes so that the stability of the slope is not affected. A qualified engineer registered in the state of Delaware should design all temporary sheeting and shoring.

11.5 Scour Analysis

Results of the scour analysis are included in **Appendix C-3.** It is anticipated that scour will not affect the abutments. The anticipated total scour for the 100-Year flood at Piers 1 and 2 is 0 feet and 7.28 feet, respectively. The anticipated total scour for the 100-Year flood at Piers 3 and 4 is 7.3 feet and 6.63 feet, respectively.

11.6 Environmental Concerns

Because of the proximity of the proposed structure to a Superfund Site care should be taken to avoid disturbance of the landfill cap, during construction of the south abutment.

11.7 Dewatering and Drainage

Groundwater may be encountered during excavation at the abutments. Any groundwater that flows into the excavation can be removed using a sump and pump. The contractor is responsible for maintaining dry conditions during construction.

11.8 Protection of Existing Utilities

Overhead utilities were observed at east side of the existing structure, along the relocated alignment. Underground utilities in the vicinity of the proposed structure should be located by calling Miss Utility prior to excavation. The effects of construction activity on the 72-inch forced sewer main should be

minimized. The area in the immediate vicinity of the pipe should be delineated to restrict construction activity around the pipe.

11.9 Preconstruction Survey for adjacent structures

Vibration Monitoring is recommended at the 72-inch forced sewer main.

12.0 BASIS FOR RECOMMENDATIONS

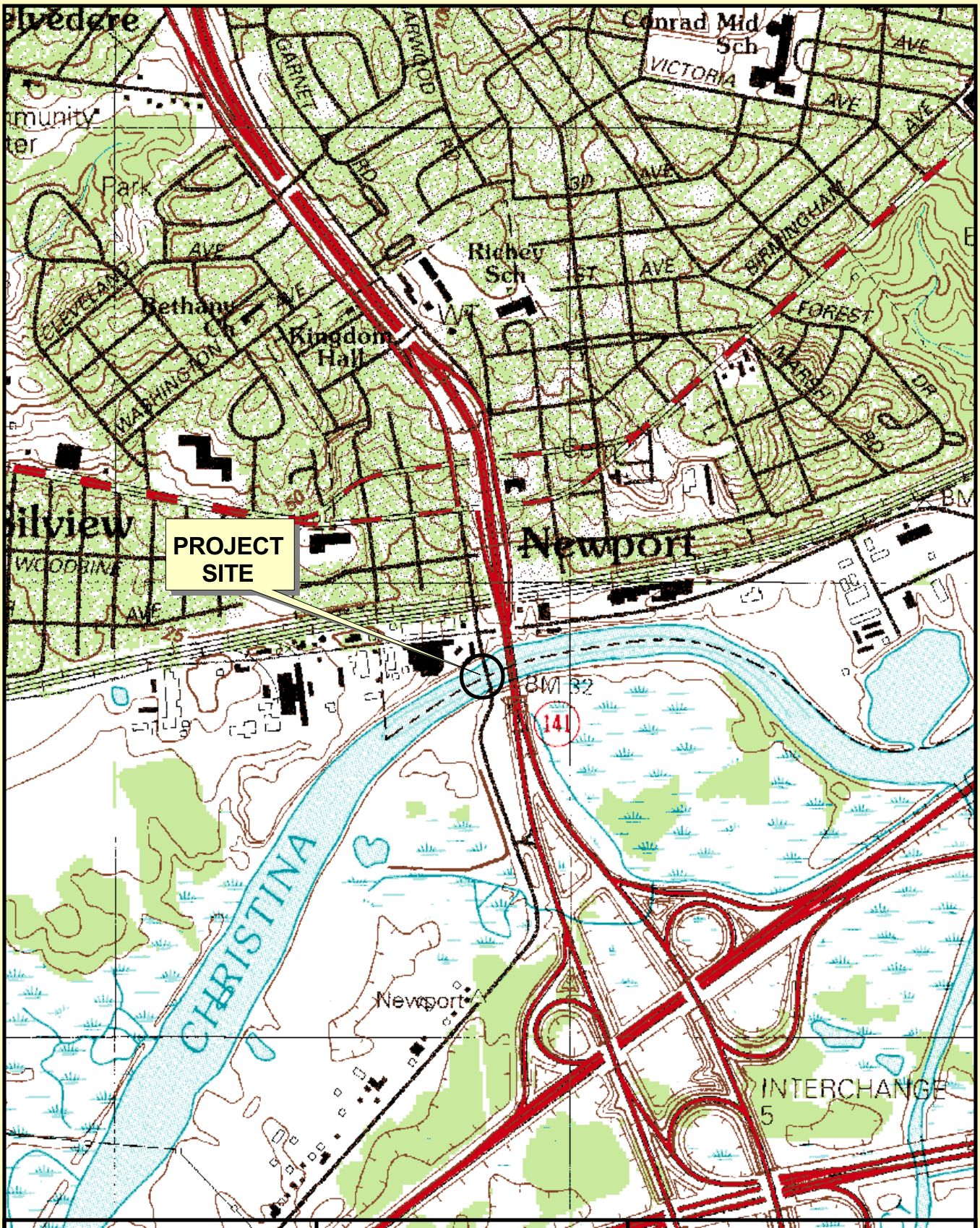
The recommendations are based on the information available at the time of writing this report. The report should be revised as new information becomes available. Stub abutments and piers on drilled shafts were the most suitable substructure options, given the concerns about vibration affecting the 72-inch forced sewer main.

13.0 REFERENCES

1. DelDOT Bridge Design Manual.
2. AASHTO LRFD Bridge Design Specifications, 5th edition, 2010.
3. Drilled Shafts: Construction Procedures and LRFD Design Methods – Publication No. FHWA-NHI-10-016 - May 2010.
4. Final Foundation Report for Bridge 1-159, James Street over Christina River, by McCormick Taylor, Inc. dated November, 2012.

APPENDIX A

Figures



McCormick Taylor
Engineers & Planners Since 1946

0 1000 Feet

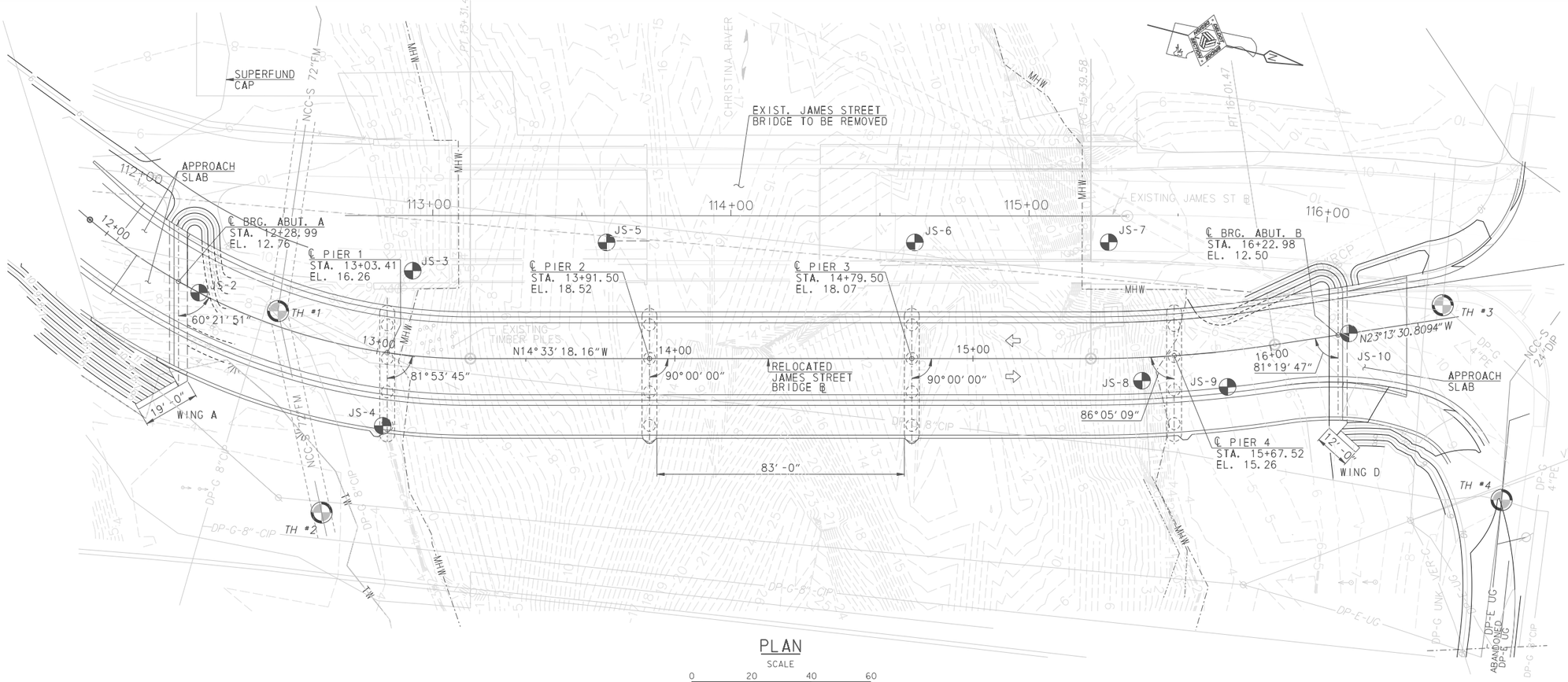
N

FIGURE 1

PROJECT LOCATION MAP

BRIDGE NO. 1-159

Newport, New Castle County, Del

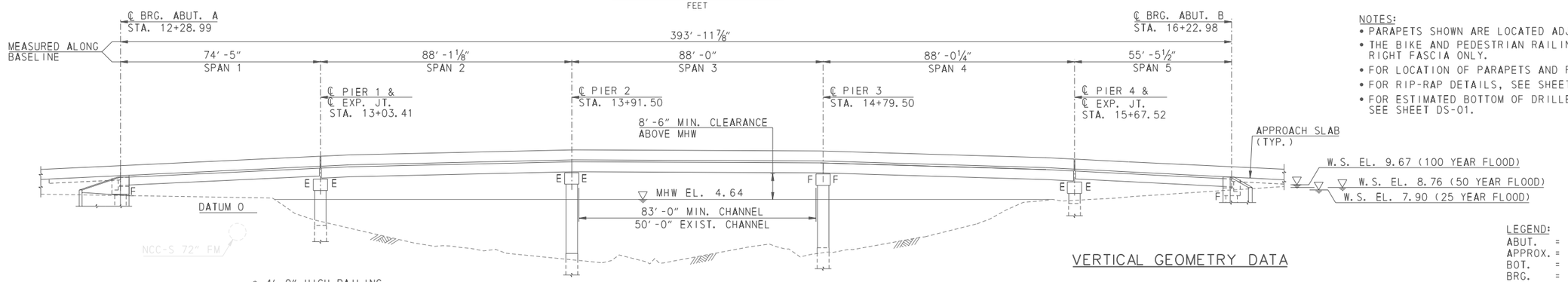


PLAN

SCALE

0 20 40 60

FEET



* 4'-0" HIGH RAILING NOT SHOWN FOR CLARITY

ELEVATION

SCALE

0 20 40 60

FEET

HORIZONTAL GEOMETRY DATA

P.I. STA.	12+65.05
Δ	= 40° 07' 44.3396" LT.
D	= 28° 56' 14.1446"
T	= 72.3186'
L	= 138.6758'
R	= 198.0000'
E	= 12.7937'

P.I. STA.	15+70.59
Δ	= 8° 40' 12.6464" LT.
D	= 14° 00' 31.4930"
T	= 31.0048'
L	= 61.8912'
R	= 409.0000'
E	= 1.1735'

VERTICAL GEOMETRY DATA

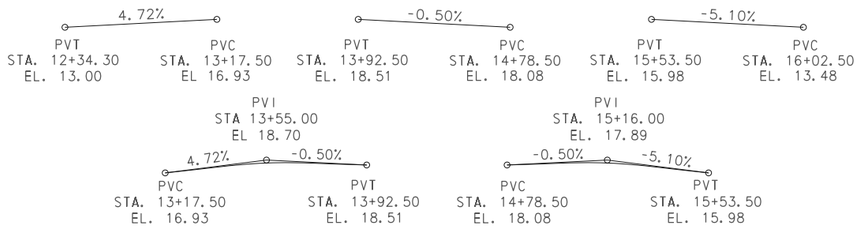


FIGURE 2

CORE BORINGS

BORING	STATION	OFFSET
JS-2	12+36.88	0.00
JS-3	13+08.78	28.40' L
JS-4	13+05.16	24.51' R
JS-5	13+77.10	39.00' L
JS-6	14+80.50	39.00' L
JS-7	15+46.19	39.00' L
JS-8	15+56.40	7.78' R
JS-9	15+84.19	12.00' R
JS-10	16+26.25	0.00

NOTES:
- PARAPETS SHOWN ARE LOCATED ADJACENT TO THE ROADWAY.
- THE BIKE AND PEDESTRIAN RAILING IS LOCATED AT THE RIGHT FASCIA ONLY.
- FOR LOCATION OF PARAPETS AND RAILING, SEE SHEET PE-02.
- FOR RIP-RAP DETAILS, SEE SHEETS EC-01 AND EC-02.
- FOR ESTIMATED BOTTOM OF DRILLED SHAFT ELEVATIONS, SEE SHEET DS-01.

LEGEND:

ABUT.	=	ABUTMENT
APPROX.	=	APPROXIMATE
BOT.	=	BOTTOM
BRG.	=	BEARING
BSPW	=	BOTTOM SHEET PILE WALL
DIA.	=	DIAMETER
E	=	EXPANSION
EL.	=	ELEVATION
EXIST.	=	EXISTING
EXP.	=	EXPANSION
F	=	FIXED
JT.	=	JOINT
MHW	=	MEAN HIGH WATER
MIN.	=	MINIMUM
MPTE	=	MINIMUM PILE TIP ELEVATION
STA.	=	STATION
TYP.	=	TYPICAL
W.S.	=	WATER SURFACE
⊕	=	SOIL BORING

PLOTTED: 10/28/2014
FILE NAME: Y:\BRIDGES\DELDOT\BR1-159_JAMES ST BRIDGE\SEED FILES & BDRS\159_NEWPORTGPE BORDER.DGN
USER NAME: brg.bo
REV. DATE: 10/28/2014 3:27:33 PM

DELAWARE DEPARTMENT OF TRANSPORTATION

ADDENDUMS / REVISIONS

SCALE: AS NOTED

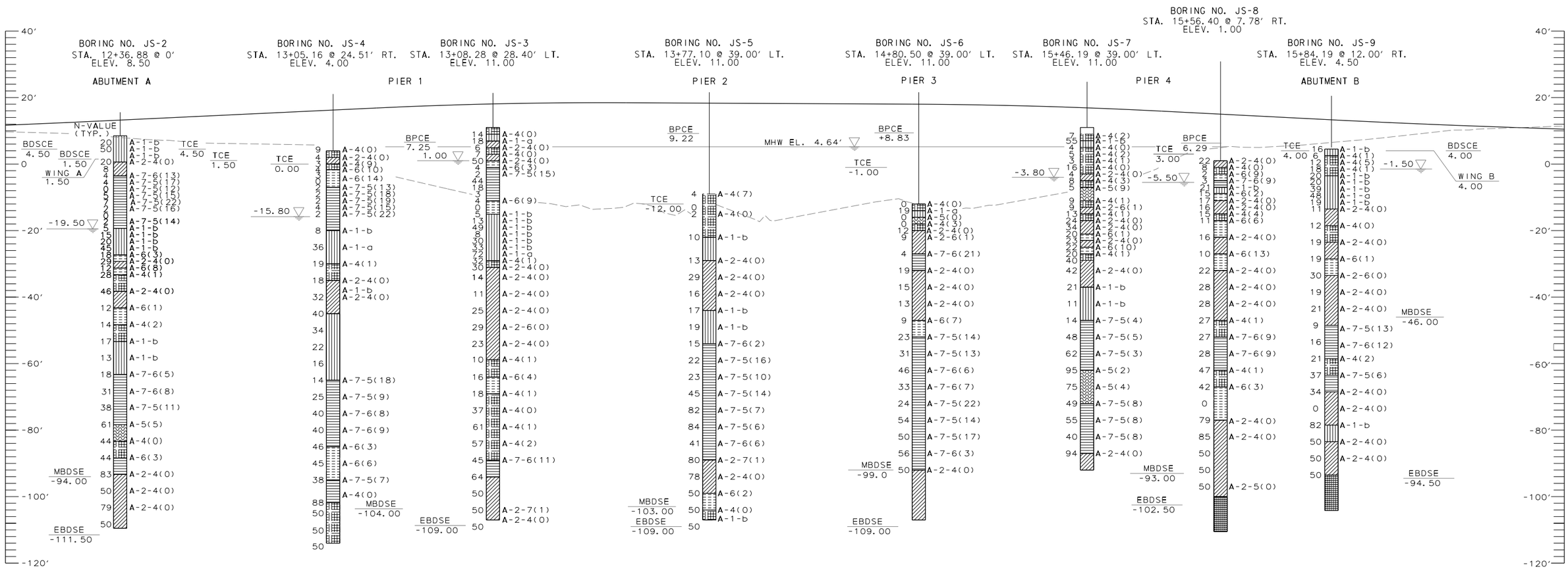
BR 1-159 ON JAMES STREET OVER CHRISTINA RIVER

CONTRACT	T201207101
COUNTY	NEW CASTLE
BRIDGE NO.	1-159
DESIGNED BY:	ZME
CHECKED BY:	BJH

BORING LOCATION PLAN

SHEET NO.

TOTAL SHTS.



LEGEND

- WELL GRADED GRAVELS AND SANDS
- POORLY GRADED, SILTY OR CLAYEY SANDS AND GRAVEL
- EXPANSIVE PLASTIC CLAYS
- PLASTIC CLAYS
- PLASTIC CLAYS
- SILTY SOILS
- ELASTIC SILTS
- SCHIST

BDSCE - BOTTOM OF DRILLED SHAFT CAP ELEVATION
BPCE - BOTTOM OF PIER CAP ELEVATION
EBDSE - ESTIMATED BOTTOM OF DRILLED SHAFT ELEVATION
MBDSE - MINIMUM BOTTOM OF DRILLED SHAFT ELEVATION
N-VALUE - SAMPLE BLOWS PER FOOT
TCE - TOP OF CASING ELEVATION
TYP. - TYPICAL
▽ - GROUND WATER ELEVATION AT ZERO HOURS

FIGURE 3

PLOTTED: 11/5/2014
FILE NAME: Y:\BRIDGES\DELDOT\BR1-159_JAMES ST BRIDGE\SEED FILES & BDRS\159_NEWPORTGPE BORDER.DGN
USER NAME: brg_bo
REV. DATE: 11/5/2014 1:58:39 PM

DELAWARE DEPARTMENT OF TRANSPORTATION

ADDENDUMS / REVISIONS

NOT TO SCALE

BR 1-159 ON JAMES STREET OVER CHRISTINA RIVER

CONTRACT	BRIDGE NO.	1-159
T201207101	DESIGNED BY:	SJM
COUNTY	CHECKED BY:	XXX
NEW CASTLE		

SUBSURFACE PROFILE

SHEET NO.

TOTAL SHTS.

APPENDIX B

Geotechnical Data
Boring Logs and Laboratory Testing Summary

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

BORING JS-2

Project Name: James Street Bridge
Location: Newport, DE
State Contract #: T201207101
Federal Contract #:
Station/Offset:
Northing:
Easting:
Boring Surface Elev.:
Reference:
Date Started: 5/31/12
Date Completed: 6/5/12

Wt. of Sample Hammer: 140 **Lbs.**
Type of: **D-Sampler:** Split Barrel **O.D.**
S-Sampler: **O.D.**
U-Sampler: **O.D.**
Core Bit: **O.D.**

Average Fall: 30 **IN.**
O.D. of Sampler: 2 **IN.**
O.D. of Samp. Tube: **IN.**
O.D. of Samp. Tube: **IN.**
O.D. of Rock Core: **IN.**

Hollow Stem Auger Diameter: 3 1/4" **Inches** **From Depth of:** 0.0 **To:** 28.0
Mud Rotary: **From Depth of:** 28.0 **To:** 118.2

Water Level Readings

Date	Depth to Water (ft)	Caved Depth (ft)
5/31/12	28.0	

Boring Contractor: Walton Corporation
Equipment/Rig Type: CME 55 ATV
Driller: Jason Truver
Logged By: Meghan Lester and Chris Costanzi

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
2.53		1	2.0'	6 10 10 9	Moist loose brown coarse sandy fine gravel w/ some fine sand, trace of silt.	A-1-b	6" hot-mix and 18" crushed stone. Fill
			4.0'		6" RECOVERY		
5.06		2	4.0'	7 50	Moist very dense gray coarse to fine sand w/some fine gravel and silt.	A-1-b	Fill
			6.0'		3" RECOVERY		
7.59		3	6.0'	2 4 8 7	Moist medium dense grayish tan silty fine to coarse sand and fine gravel.	A-1-b	Fill
			8.0'		16" RECOVERY		
10.12		4	8.0'	6 11 9 6	Moist medium dense black silty fine gravel and coarse sand w/some fine sand, trace of clay.	A-2-4(0)	Fill
			10.0'		15" RECOVERY		
		5	10.0'	4 4 4 8	No sieve analysis - Indication of moist loose gray clayey sand, trace of fine gravel.		Fill
			12.0'		7" RECOVERY		
12.65		6	12.0'	3 2 2 3	Saturated soft gray clay w/trace of coarse to fine sand, fine gravel and silt.	A-7-6(13)	
			14.0'		20" RECOVERY		
15.18		7	14.0'	2 2 2 2	Saturated soft tan organic clay w/some coarse sand, trace of fine sand and silt.	A-7-5(17)	Casing set @ 15'
			16.0'		18" RECOVERY		

Remarks: Concrete slab @ 4' +/-

Reviewed By: Hany Fekry
Soils Supervisor: Aaron Wieczorek

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

Project Name: James Street Bridge **Boring No.:** JS-2
State Contract: T201207101

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
		U-1	16.0'		Saturated dark gray organic clay w/some fine gravel, trace of fine to coarse sand and silt.	A-7-5(12)	Shelby Tube - Press Sample
17.71			18.0'		24" RECOVERY		
		9	18.0'	1 2 3 3	Saturated firm dark gray organic clay w/some coarse to fine sand, trace of silt.	A-7-5(15)	
20.24			20.0'		24" RECOVERY		
		10	20.0'	4 3 4 3	Saturated firm gray organic clay w/trace of coarse to fine sand and silt.	A-7-5(22)	
			22.0'		24" RECOVERY		
		11	22.0'	1 1 1 2	Saturated soft gray organic coarse sandy clay w/ trace of fine sand and silt.	A-7-5(16)	
22.77			24.0'		24" RECOVERY		
		U-2	24.0'				Shelby Tube - Press Sample
25.3			26.0'		24" RECOVERY		
		12	26.0'	1 1 1 2	Saturated soft gray organic coarse sandy clay w/ trace of fine sand and silt.	A-7-5(14)	
27.83			28.0'		24" RECOVERY		
	▽	13	28.0'	1 2 3 7	Saturated soft tannish gray coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	
30.36			30.0'		20" RECOVERY		
		14	30.0'	7 9 6 8	Saturated medium dense tannish gray fine gravelly coarse to fine sand w/trace of silt.	A-1-b	
			32.0'		20" RECOVERY		
		15	32.0'	9 8 12 10	Saturated medium dense gray coarse to fine sand w/some fine gravel, trace of silt.	A-1-b	
32.89			34.0'		14" RECOVERY		
		16	34.0'	9 15 30 40	Saturated dense gray coarse sandy fine gravel w/ some fine sand, trace of silt.	A-1-b	
35.42			36.0'		12" RECOVERY		
		17	36.0'	1 3 15 19	Saturated very stiff tan fine sandy clay w/some silt, trace of coarse sand and fine gravel.	A-6(3)	Potomac Formation at 37'
37.95			38.0'		21" RECOVERY		
		18	38.0'	16 13 16 15	Saturated medium dense tan fine to coarse sand w/ some silt, trace of fine gravel.	A-2-4(0)	
			40.0'		12" RECOVERY		

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

Project Name: James Street Bridge **Boring No.:** JS-2
State Contract: T201207101

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
40.48		19	40.0'	3 5 7 10	Saturated stiff red silty fine sandy clay w/trace of coarse sand.	A-6(8)	
			42.0'		19" RECOVERY		
		20	42.0'	16 14 14 15	Saturated very stiff red clayey fine sandy silt w/ some coarse sand and fine gravel.	A-4(1)	4" Casing set @ 42'
43.01							
			44.0'				
45.54							
48.07		21	48.0'	4 16 30 21	Saturated dense brown clayey fine sand w/some fine gravel and silt, trace of coarse sand.	A-2-4(0)	
			50.0'		20" RECOVERY		
50.6							
53.13		22	53.0'	7 7 5 4	Saturated stiff brown fine to coarse sandy clay w/ trace of fine gravel and silt.	A-6(1)	
			55.0'		24" RECOVERY		
55.66							
58.19		23	58.0'	5 6 8 8	Saturated stiff brown clayey fine sandy silt w/some fine gravel, trace of coarse sand.	A-4(2)	
			60.0'		20" RECOVERY		
60.72							
63.25		24	63.0'	4 5 12 15	Saturated medium dense brown silty coarse to fine sand and fine gravel.	A-1-b	

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

Project Name: James Street Bridge
State Contract: T201207101

Boring No.: JS-2

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
			65.0'		18" RECOVERY		
65.78							
68.31		25	68.0'	2 3 10 5	Saturated medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			70.0'		20" RECOVERY		
70.84							
73.37		26	73.0'	5 8 10 11	Saturated very stiff brown fine sandy clay w/trace of coarse sand, fine gravel and silt.	A-7-6(5)	
			75.0'		24" RECOVERY		
75.9							
78.43		27	78.0'	12 11 20 28	Saturated hard brown fine sandy clay w/trace of coarse san, fine gravel and silt.	A-7-6(8)	
			80.0'		24" RECOVERY		
80.96							
83.49		28	83.0'	9 15 23 28	Saturated hard brown clay w/some fine sand, trace of coarse sand, fine gravel and silt.	A-7-5(11)	
			85.0'		24" RECOVERY		
86.02							

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

Project Name: James Street Bridge
State Contract: T201207101

Boring No.: JS-2

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
88.55		29	88.0'	11 23 38 45	Saturated hard grayish red clayey fine sandy silt w/ trace of coarse sand and fine gravel. Weathered Rock.	A-5(5)	
			90.0'		24" RECOVERY		
91.08							
93.61		30	93.0'	10 17 27 50	Saturated hard grayish red fine sandy silt w/trace of coarse sand. Weathered Rock.	A-4(0)	
			95.0'		21" RECOVERY		
96.14							
98.67		31	98.0'	18 20 24 29	Saturated hard grayish brown fine sandy clay w/ some silt, trace of coarse sand and fine gravel. Weathered Rock.	A-6(3)	
			100.0'		24" RECOVERY		
101.2							
103.73		32	103.0'	26 33 50	Saturated very dense grayish brown silty fine sand w/some coarse sand and fine gravel. Weathered Rock.	A-2-4(0)	
			105.0'		15" RECOVERY		
106.26							
108.79		33	108.0'	37 50	Saturated very dense gray silty fine sand w/some coarse sand and fine gravel. Weathered Rock.	A-2-4(0)	
			110.0'		7" RECOVERY		
111.32							

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

Project Name: James Street Bridge
State Contract: T201207101

Boring No.: JS-2

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
		34	113.0'	18 34 45 50	Saturated very dense gray silty fine gravelly fine sand w/trace of coarse sand. Weathered Rock.	A-2-4(0)	
113.85							
			115.0'		21" RECOVERY		
116.38							
		35	118.0'	50	No sieve analysis - Indication of saturated hard gray weathered rock.		
118.91					End Boring		
			120.0'		2" RECOVERY		
121.44							
123.97							
126.5							
129.03							
131.56							
134.09							

KEY TO SYMBOLS

Symbol	Description
Strata symbols	
	Well graded gravels and sands
	Poorly graded, silty or clayey sands and gravel
	Expansive plastic clays
	Plastic clays
	Silty soils
	Elastic Silts
Misc. Symbols	
	Water table during drilling

Notes:

1. Exploratory borings were drilled using a 3 1/4 - inch diameter hollow stem auger.

2. No free water was encountered at the time of drilling or when re-checked the following day, unless recorded on 1st page.

3. Boring locations were taped from existing features and elevations extrapolated from survey unless otherwise reported.

4. These logs are subject to the limitations, conclusions, and recommendations in this report.

5. Results of tests conducted on samples recovered are reported on the logs.

6. All blow counts are uncorrected.

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

BORING JS-3

Project Name: James Street Bridge
Location: Newport, DE
State Contract #: T201207101
Federal Contract #:
Station/Offset:
Northing:
Easting:
Boring Surface Elev.:
Reference:
Date Started: 5/31/12
Date Completed: 6/6/12

Wt. of Sample Hammer: 140 **Lbs.**
Type of: D-Sampler: Split Barrel **O.D.**
S-Sampler: **O.D.**
U-Sampler: **O.D.**
Core Bit: **O.D.**

Average Fall: 30 **IN.**
O.D. of Sampler: 2 **IN.**
O.D. of Samp. Tube: **IN.**
O.D. of Samp. Tube: **IN.**
O.D. of Rock Core: **IN.**

Hollow Stem Auger Diameter: 3 1/4" **Inches**
From Depth of: 0.0 **To:** 36.0
Mud Rotary:
From Depth of: 36.0 **To:** 118.0

Water Level Readings

Date	Depth to Water (ft)	Caved Depth (ft)
5/31/12	10.0	

Boring Contractor: Walton Corporation
Equipment/Rig Type: CME 55 Truck
Driller: Bill Holden
Logged By: Chris Costanzi

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
		1	0.0'	4 7 7 23	Moist very stiff brown coarse sandy silt w/some fine sand, trace of fine gravel and clay.	A-4(0)	4" hot-mix. Fill
			2.0'		18" RECOVERY		
2.53		2	2.0'	20 11 7 9	Moist medium dense gray fine gravel w/trace of fine to coarse sand and silt.	A-1-a	Fill
			4.0'		10" RECOVERY		
		3	4.0'	3 3 3 4	Moist loose brown clayey fine gravel w/some coarse to fine sand and silt.	A-2-4(0)	Fill
5.06			6.0'		20" RECOVERY		
		4	6.0'	3 4 3 3	Wet firm grayish brown coarse to fine sandy silt w/ some clay, trace of fine gravel.	A-4(0)	
7.59			8.0'		20" RECOVERY		
		5	8.0'	3 9 41 3	Wet dense gray silty fine gravel w/some coarse to fine sand and clay.	A-2-4(0)	
10.12	▽		10.0'		6" RECOVERY		
		6	10.0'	2 2 2 2	Saturated soft grayish brown fine gravelly clay w/ some silt and fine sand, trace of coarse sand.	A-6(3)	
			12.0'		6" RECOVERY		
12.65		7	12.0'	WH 1 1 2	Saturated soft gray clay w/some coarse sand and silt, trace of fine sand.	A-7-5(15)	
			14.0'		24" RECOVERY		

Remarks:

Reviewed By: Hany Fekry
Soils Supervisor: Aaron Wieczorek

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

Project Name: James Street Bridge **Boring No.:** JS-3
State Contract: T201207101

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
		8	14.0'	32 32 12	No sieve analysis - Indication of saturated hard gray wet very stiff silt.		
15.18			16.0'		4" RECOVERY		
		9	16.0'	8 11 7 5	No sieve analysis - Indication of saturated hard gray organic wet very stiff silt.		
17.71			18.0'		6" RECOVERY		
		10	18.0'	5 2 1 1	No sieve analysis - Indication of saturated hard gray organic wet very stiff silt.		
			20.0'		2" RECOVERY		
20.24		11	20.0'	2 2 2 1	Saturated soft gray organic silty clay w/some fine to coarse sand.	A-6(9)	
			22.0'		24" RECOVERY		
		U-1	22.0'				Shelby Tube - Press Sample
22.77			24.0'		24" RECOVERY		
		13	24.0'	WR 3 2 8	Saturated loose gray coarse to fine sand w/trace of silt and fine gravel.	A-1-b	
25.3			26.0'		24" RECOVERY		
		14	26.0'	1 5 8 16	Saturated medium dense gray coarse to fine sand w/trace of fine gravel and silt.	A-1-b	
27.83			28.0'		24" RECOVERY		
		15	28.0'	23 28 21 25	Saturated dense gray coarse sand w/some fine gravel, trace of fine sand and silt.	A-1-b	
			30.0'		24" RECOVERY		
30.36		16	30.0'	4 3 5 12	Saturated loose gray coarse to fine sand w/trace of fine gravel and silt.	A-1-b	
			32.0'		24" RECOVERY		
		17	32.0'	10 15 15 17	Saturated medium dense gray fine gravelly coarse to fine sand w/trace of silt.	A-1-b	
32.89			34.0'		20" RECOVERY		
		18	34.0'	14 17 16 15	Saturated dense grayish brown coarse sandy fine gravel w/some fine sand, trace of silt.	A-1-b	
35.42			36.0'		18" RECOVERY		
		19	36.0'	16 22 50	Saturated medium dense grayish brown coarse sandy fine gravel w/some fine sand, trace of silt.	A-1-a	
37.95			38.0'		16" RECOVERY		

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

Project Name: James Street Bridge
State Contract: T201207101

Boring No.: JS-3

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
		20	38.0'	7 12 20 16	Saturated hard reddish brown clayey fine to coarse sandy silt w/trace of fine gravel.	A-4(1)	
			40.0'		24" RECOVERY		
40.48		21	40.0'	9 12 18 22	Saturated medium dense reddish brown clayey fine sand w/some coarse sand, fine gravel and silt.	A-2-4(0)	
			42.0'		10" RECOVERY		
43.01		22	43.0'	5 6 8 10	Saturated medium dense brown clayey fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
			45.0'		15" RECOVERY		
45.54							
48.07		23	48.0'	6 7 4 6	Saturated medium dense brown silty fine to coarse sand.	A-2-4(0)	
			50.0'		20" RECOVERY		
50.6							
53.13		24	53.0'	19 14 11 17	Saturated medium dense brown silty fine sand w/ some coarse sand, trace of fine gravel.	A-2-4(0)	
			55.0'		20" RECOVERY		
55.66							
58.19		25	58.0'	11 12 17 9	Saturated medium dense brown clayey fine to coarse sand and fine gravel w/some silt.	A-2-6(0)	
			60.0'		20" RECOVERY		
60.72							

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

Project Name: James Street Bridge
State Contract: T201207101

Boring No.: JS-3

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
63.25		26	63.0' – 65.0'	10 10 13 11	Saturated medium dense brown silty fine to coarse sand w/trace of fine gravel. 18" RECOVERY	A-2-4(0)	
65.78							
68.31		27	68.0' – 70.0'	4 5 5 5	Saturated stiff grayish brown clayey fine sandy silt w/some coarse sand, trace of fine gravel. 20" RECOVERY	A-4(1)	
70.84							
73.37		28	73.0' – 75.0'	5 6 10 9	Saturated very stiff grayish brown fine to coarse sandy clay w/some silt. 24" RECOVERY	A-6(4)	
75.9							
78.43		29	78.0' – 80.0'	11 7 11 20	Saturated very stiff gray clayey fine to coarse sandy silt. 24" RECOVERY	A-4(1)	
80.96							
83.49		30	83.0' – 85.0'	15 20 17 27	Saturated hard gray fine sandy silt w/some coarse sand, trace of fine gravel. 24" RECOVERY	A-4(0)	

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

Project Name: James Street Bridge
State Contract: T201207101

Boring No.: JS-3

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
88.55		31	88.0' – 90.0'	13 23 38 50	Saturated hard gray clayey coarse to fine sandy silt w/trace of fine gravel. (Weathered Rock) 24" RECOVERY	A-4(1)	
91.08							
93.61		32	93.0' – 95.0'	15 23 34 50	Saturated hard gray clayey fine sandy silt w/some coarse sand. (Weathered Rock) 24" RECOVERY	A-4(2)	
96.14							
98.67		33	98.0' – 100.0'	14 22 23 34	Saturated hard grayish brown fine sandy clay w/ some coarse sand and silt, trace of fine gravel. (Weathered Rock) 24" RECOVERY	A-7-6(11)	
101.2							
103.73		34	103.0' – 105.0'	23 24 40 50	Saturated very dense bluish gray clayey fine to coarse sand w/some silt, trace of fine gravel. (Weathered Rock) 23" RECOVERY	A-2-7(1)	
106.26							
108.79		35	108.0'	33 50	Saturated very dense bluish gray clayey fine sand w/some coarse sand and silt, trace of fine gravel.	A-2-4(0)	

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

Project Name: James Street Bridge
State Contract: T201207101

Boring No.: JS-3

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
			110.0'		11" RECOVERY		
111.32							
		36	113.0'	50	No sieve analysis - Indication of blue grey weathered rock.		
113.85			115.0'		2" RECOVERY		
116.38							
		37	118.0'	50	End Boring.		
118.91			120.0'		NR" RECOVERY		
121.44							
123.97							
126.5							
129.03							
131.56							

KEY TO SYMBOLS

Symbol	Description
Strata symbols	
	Silty soils
	Well graded gravels and sands
	Poorly graded, silty or clayey sands and gravel
	Plastic clays
	Expansive plastic clays
Misc. Symbols	
	Water table during drilling

Notes:

1. Exploratory borings were drilled using a 3 1/4 - inch diameter hollow stem auger.

2. No free water was encountered at the time of drilling or when re-checked the following day, unless recorded on 1st page.

3. Boring locations were taped from existing features and elevations extrapolated from survey unless otherwise reported.

4. These logs are subject to the limitations, conclusions, and recommendations in this report.

5. Results of tests conducted on samples recovered are reported on the logs.

6. All blow counts are uncorrected.

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

BORING JS-4

Project Name: James Street Bridge
Location: Newport, DE
State Contract #: T201207101
Federal Contract #:
Station/Offset:
Northing:
Easting:
Boring Surface Elev.:
Reference:
Date Started: 8/21/12
Date Completed: 8/23/12

Wt. of Sample Hammer: 140 **Lbs.**
Type of: **D-Sampler:** Split Barrel **O.D.**
S-Sampler: **O.D.**
U-Sampler: **O.D.**
Core Bit: **O.D.**

Average Fall: 30 **IN.**
O.D. of Sampler: 2 **IN.**
O.D. of Samp. Tube: **IN.**
O.D. of Samp. Tube: **IN.**
O.D. of Rock Core: **IN.**

Hollow Stem Auger Diameter: 3 1/4" **Inches** **From Depth of:** 0.0 **To:** 23.0
Mud Rotary: **From Depth of:** 23.0 **To:** 118.1

Water Level Readings

Date	Depth to Water (ft)	Caved Depth (ft)
8/21/12	19.8	

Boring Contractor: Walton Corporation
Equipment/Rig Type: CME 55 Truck
Driller: Bill Holden
Logged By: Kat Kershaw

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
		1	0.0'	4 4 5	Wet stiff brown fine to coarse sandy silt w/trace of fine gravel.	A-4(0)	
			2.0'		18" RECOVERY		
2.53		2A	2.0'	4 4	Wet loose brown silty fine to coarse sand w/some fine gravel.	A-2-4(0)	
			3.0'		6" RECOVERY		
		2B	3.0'	5 3	Saturated firm gray clayey silt w/trace of fine to coarse sand and fine gravel.	A-4(9)	
			4.0'		12" RECOVERY		
		3	4.0'	1 2 2 2	Saturated soft gray silty clay w/trace of fine to coarse sand and fine gravel.	A-6(10)	
5.06			6.0'		6" RECOVERY		
		4	6.0'	2 1 2 2	Saturated soft gray silty clay w/trace of fine to coarse sand.	A-6(14)	
7.59			8.0'		14" RECOVERY		
		U-1	8.0'				Shelby Tube - Press Sample
10.12			10.0'		24" RECOVERY		
		5	10.0'	WH 1 1 1	Saturated soft gray organic clay w/some silt, trace of fine to coarse sand.	A-7-5(13)	
			12.0'		24" RECOVERY		
12.65		6	12.0'	WH 1 1 1	Saturated soft gray organic clay w/some silt, trace of fine to coarse sand.	A-7-5(18)	
			14.0'		24" RECOVERY		

Remarks: 5' of 8" casing set, 48' of 4" casing set.

Reviewed By: _____ **Soils Supervisor:** _____

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

Project Name: James Street Bridge **Boring No.:** JS-4
State Contract: T201207101

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
		7	14.0'	1 1 1 2	Saturated soft gray organic clay w/some silt, trace of fine to coarse sand.	A-7-5(19)	
15.18			16.0'		24" RECOVERY		
		8	16.0'	1 2 2 2	Saturated soft gray organic clay w/some silt, trace of fine to coarse sand.	A-7-5(15)	
17.71			18.0'		24" RECOVERY		
		9	18.0'	1 1 1 1	Saturated soft gray clay w/some silt, trace of coarse to fine sand.	A-7-5(22)	
20.24	▽		20.0'		24" RECOVERY		
22.77							
		10	23.0'	1 3 5 8	Saturated loose gray coarse sand w/some fine sand and fine gravel, trace of silt.	A-1-b	
25.3			25.0'		24" RECOVERY		
27.83							
		11	28.0'	22 28 8 8	Saturated dense orange fine gravel w/some coarse to fine sand and silt.	A-1-a	
30.36			30.0'		12" RECOVERY		
32.89							
		12	33.0'	7 8 11 23	Saturated very stiff yellow clayey fine sandy silt w/ trace of coarse sand and fine gravel.	A-4(1)	
35.42			35.0'		24" RECOVERY		
37.95							

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

Project Name: James Street Bridge
State Contract: T201207101

Boring No.: JS-4

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
		13	38.0'	8 9 9 9	Saturated medium dense tan silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
			40.0'		22" RECOVERY		
40.48							
43.01		14	43.0'	11 14 18 19	Saturated dense tan silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
			45.0'		24" RECOVERY		
45.54							
48.07		15	48.0'	28 20 20 20	Saturated dense tan coarse to fine sand w/some fine gravel and silt.	A-1-b	
			50.0'		24" RECOVERY		
50.6							
53.13		16	53.0'	18 19 15 12	No Recovery		
			55.0'		NR" RECOVERY		
55.66							
58.19		17	58.0'	8 10 12 14	No Recovery		
			60.0'		NR" RECOVERY		
60.72							

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

Project Name: James Street Bridge
State Contract: T201207101

Boring No.: JS-4

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
63.25		18	63.0' 65.0'	5 7 9 9	No Recovery NR" RECOVERY		
65.78							
68.31		19	68.0' 70.0'	6 6 8 12	Saturated stiff yellow clay w/some silt and fine sand, trace of coarse sand. 24" RECOVERY	A-7-5(18)	
70.84							
73.37		20	73.0' 75.0'	6 10 15 40	Saturated very stiff gray clay w/some fine to coarse sand and fine gravel, trace of silt. 24" RECOVERY	A-7-5(9)	
75.9							
78.43		21	78.0' 80.0'	10 15 25 29	Saturated hard gray fine sandy clay w/trace of coarse sand and silt. 24" RECOVERY	A-7-6(8)	
80.96							
83.49		22	83.0' 85.0'	13 20 20 26	Saturated hard gray fine sandy clay w/trace of coarse sand and silt. 24" RECOVERY	A-7-6(9)	

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

Project Name: James Street Bridge
State Contract: T201207101

Boring No.: JS-4

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
88.55		23	88.0' – 90.0'	15 18 28 36	Saturated hard gray fine sandy clay w/some silt, trace of coarse sand. 24" RECOVERY	A-6(3)	
91.08							
93.61		24	93.0' – 95.0'	15 17 28 29	Saturated hard gray silty fine sandy clay w/trace of coarse sand. 24" RECOVERY	A-6(6)	
96.14							
98.67		25	98.0' – 100.0'	12 13 25 48	Saturated hard green fine sandy clay w/some coarse sand, trace of silt. 24" RECOVERY	A-7-5(7)	
101.2							
103.73							
106.26		26	104.7' – 106.7'	19 40 48 50	Saturated hard greenish brown fine sandy silt w/ some coarse sand and clay. 21" RECOVERY	A-4(0)	
108.79		27	108.0'	50	No sieve analysis - Indication of saturated dense gray silty sand.		

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

Project Name: James Street Bridge
State Contract: T201207101

Boring No.: JS-4

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
			110.0'		2" RECOVERY		
111.32							
113.85		28	113.2'	50	No sieve analysis - Indication of saturated dense gray silty sand. (Weathered Rock)		
			115.2'		2" RECOVERY		
116.38							
118.91		29	118.0'	50	No Recovery		
			120.0'		NR" RECOVERY		
121.44							
123.97							
126.5							
129.03							
131.56							

KEY TO SYMBOLS

Symbol	Description
Strata symbols	
	Silty soils
	Poorly graded, silty or clayey sands and gravel
	Plastic clays
	Expansive plastic clays
	Well graded gravels and sands
Misc. Symbols	
	Water table during drilling

Notes:

1. Exploratory borings were drilled using a 3 1/4 - inch diameter hollow stem auger.

2. No free water was encountered at the time of drilling or when re-checked the following day, unless recorded on 1st page.

3. Boring locations were taped from existing features and elevations extrapolated from survey unless otherwise reported.

4. These logs are subject to the limitations, conclusions, and recommendations in this report.

5. Results of tests conducted on samples recovered are reported on the logs.

6. All blow counts are uncorrected.

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

BORING JS-5

Project Name: James Street Bridge
Location: Newport, DE
State Contract #: T201207101
Federal Contract #:
Station/Offset:
Northing:
Easting:
Boring Surface Elev.:
Reference:
Date Started: 8/7/12
Date Completed:

Wt. of Sample Hammer: 140 **Lbs.**
Type of: D-Sampler: Split Barrel **O.D.**
S-Sampler: **O.D.**
U-Sampler: **O.D.**
Core Bit: **O.D.**

Average Fall: 30 **IN.**
O.D. of Sampler: 2 **IN.**
O.D. of Samp. Tube: **IN.**
O.D. of Samp. Tube: **IN.**
O.D. of Rock Core: **IN.**

Hollow Stem Auger Diameter: 3 1/4" **Inches** **From Depth of:** 0.0 **To:** 28.0
Mud Rotary: **From Depth of:** 28.0 **To:** 120.0

Water Level Readings
Date **Depth to Water (ft)** **Caved Depth (ft)**

Boring Contractor: Walton Corporation
Equipment/Rig Type: CME 55 Truck
Driller: Bill Holden
Logged By: Meghan Lester

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
20.24		1	20.0'	1 2 2 2	Saturated soft gray clayey silt w/some fine sand, trace of coarse sand and fine gravel.	A-4(7)	River Mud
			22.0'		4" RECOVERY		
		2	22.0'	6 WH	No Sample		River Mud
22.77							
			24.0'		NR" RECOVERY		
		3	24.0'	WH	No Sample		River Mud
25.3							
			26.0'		NR" RECOVERY		
		4	26.0'	1 2	Saturated soft gray clayey fine sandy silt w/some coarse sand and fine gravel.	A-4(0)	
27.83			28.0'		WH" RECOVERY		
30.36							
32.89							
		5	33.0'	8 6 4 6	Saturated loose tan fine gravelly coarse to fine sand w/trace of silt.	A-1-b	

Remarks: Mudline @ 20'

Reviewed By: Hany Fekry **Soils Supervisor:** Aaron Wieczorek

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

Project Name: James Street Bridge
State Contract: T201207101

Boring No.: JS-5

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
			35.0'		14" RECOVERY		
35.42							
37.95		6	38.0'	7 6 7 7	Saturated medium dense red silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	
			40.0'		11" RECOVERY		
40.48							
43.01		7	43.0'	7 14 15 15	Saturated medium dense tan fine to coarse sand w/ some silt.	A-2-4(0)	
			45.0'		20" RECOVERY		
45.54							
48.07		8	48.0'	9 8 8 8	Saturated medium dense tan silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
			50.0'		15" RECOVERY		
50.6							
53.13		9	53.0'	9 8 9 15	Saturated medium dense yellow coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			55.0'		20" RECOVERY		
55.66							

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

Project Name: James Street Bridge
State Contract: T201207101

Boring No.: JS-5

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
		10	58.0'	12 11 8 11	Saturated medium dense yellows coarse to fine sand and fine gravel w/some silt.	A-1-b	
			60.0'		12" RECOVERY		
60.72							
63.25		11	63.0'	13 6 9 14	Saturated stiff yellow coarse sandy clay w/some fine sand and fine gravel, trace of silt.	A-7-6(2)	
			65.0'		18" RECOVERY		
65.78							
68.31		12	68.0'	6 9 13 17	Saturated very stiff grayish tan fine sandy clay w/ some silt, trace of coarse sand.	A-7-5(16)	
			70.0'		21" RECOVERY		
70.84							
73.37		13	73.0'	5 12 11 15	Saturated very stiff grayish brown fine sandy clay w/some coarse sand and silt.	A-7-5(10)	
			75.0'		24" RECOVERY		
75.9							
78.43		14	78.0'	9 19 26 37	Saturated hard reddish brown fine sandy clay w/ some coarse sand and silt.	A-7-5(14)	
			80.0'		24" RECOVERY		
80.96							

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

Project Name: James Street Bridge
State Contract: T201207101

Boring No.: JS-5

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
83.49		15	83.0'	21 32 50	Saturated hard grayish fine sandy clay w/some coarse sand and silt.	A-7-5(7)	
			85.0'		18" RECOVERY		
86.02							
88.55		16	88.0'	15 34 50	Saturated hard grayish brown fine sandy clay w/ some coarse sand and silt.	A-7-5(6)	
			90.0'		24" RECOVERY		
91.08							
93.61		17	93.0'	16 19 22 30	Saturated hard reddish brown fine sandy clay w/ some silt, trace of coarse sand.	A-7-6(6)	
			95.0'		24" RECOVERY		
96.14							
98.67		18	98.0'	18 28 52	Saturated very dense grayish brown clayey fine to coarse sand w/trace of silt and fine gravel. (Weathered Rock)	A-2-7(1)	
			100.0'		18" RECOVERY		
101.2							
103.73		19	103.0'	26 28 50	Saturated very dense grayish brown silty fine sand w/some coarse sand, trace of fine gravel. (Weathered Rock)	A-2-4(0)	
			105.0'		16" RECOVERY		

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

Project Name: James Street Bridge
State Contract: T201207101

Boring No.: JS-5

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
106.26							
108.79		20	108.0' – 110.0'	50	Saturated hard green fine to coarse sandy clay w/ some silt, trace of fine gravel. (Highly Weathered Rock) 2" RECOVERY	A-6(2)	
111.32		21	113.0' – 115.0'	50	Saturated hard green clayey fine sandy silt w/trace of coarse sand. (Highly Weathered Rock) 2" RECOVERY	A-4(0)	
116.38		22	118.0' – 120.0'	50	Saturated dense green silty coarse to fine sand w/ some fine gravel. (Highly Weathered Rock) 2" RECOVERY	A-1-b	
118.91							
121.44							
123.97							
126.5							
129.03							

KEY TO SYMBOLS

Symbol Description

Strata symbols

Silty soils

Well graded gravels and sands

Poorly graded, silty or clayey sands and gravel

Expansive plastic clays

Plastic clays

Notes:

1. Exploratory borings were drilled using a 3 1/4 - inch diameter hollow stem auger.

2. No free water was encountered at the time of drilling or when re-checked the following day, unless recorded on 1st page.

3. Boring locations were taped from existing features and elevations extrapolated from survey unless otherwise reported.

4. These logs are subject to the limitations, conclusions, and recommendations in this report.

5. Results of tests conducted on samples recovered are reported on the logs.

6. All blow counts are uncorrected.

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

BORING JS-6

Project Name: James Street Bridge
Location: Newport, DE
State Contract #: T201207101
Federal Contract #:
Station/Offset:
Northing:
Easting:
Boring Surface Elev.:
Reference:
Date Started: 8/16/12
Date Completed: 8/20/12

Wt. of Sample Hammer: 140 **Lbs.**
Type of: **D-Sampler:** Split Barrel **O.D.**
S-Sampler: **O.D.**
U-Sampler: **O.D.**
Core Bit: **O.D.**

Average Fall: 30 **IN.**
O.D. of Sampler: 2 **IN.**
O.D. of Samp. Tube: **IN.**
O.D. of Samp. Tube: **IN.**
O.D. of Rock Core: **IN.**

Hollow Stem Auger Diameter: 3 1/4" **Inches**
Mud Rotary:

From Depth of: 23.0 **To:** 118.0
From Depth of: **To:**

Water Level Readings
Date **Depth to Water (ft)** **Caved Depth (ft)**

Boring Contractor: Walton Corporation
Equipment/Rig Type: CME 55 Truck
Driller: Bill Holden
Logged By: KK, JL and CC

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
		1	23.0'	WH	River Mud.	A-4(0)	River Mud
			25.0'		4" RECOVERY		
25.3		2	25.0'	17 13 6 WH	Saturated medium dense gray coarse sandy fine gravel w/some silt, trace of fine sand.	A-1-a	
			27.0'		24" RECOVERY		
		3	27.0'	WH	Saturated soft dark gray organic fine sandy silt w/ some coarse sand.	A-5(0)	
27.83			29.0'		24" RECOVERY		
		4	29.0'	WH	Saturated soft dark gray clayey fine sandy silt w/ trace of coarse sand.	A-4(3)	
30.36			31.0'		24" RECOVERY		
		5	31.0'	7 5 7 6	Saturated medium dense orange fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
32.89			33.0'		13" RECOVERY		
		6	33.0'	3 3 6 7	Saturated loose orange clayey coarse to fine sand w/some silt, trace of fine gravel.	A-2-6(1)	
			35.0'		14" RECOVERY		
35.42							

Remarks: Boring performed through bridge deck. 8" casing set to 20', 4" casing set to 40'.

Reviewed By: Hany Fekry **Soils Supervisor:** Aaron Wieczorek

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

Project Name: James Street Bridge
State Contract: T201207101

Boring No.: JS-6

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
37.95							
		7	38.0'	WH 1 3 8	Saturated soft pinkish white clay w/some silt and fine sand, trace of coarse sand.	A-7-6(21)	
			40.0'		16" RECOVERY		
40.48							
43.01		8	43.0'	12 11 8 7	Saturated medium dense orangish tan coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	Hole Caved up to 40'. Rewash
			45.0'		17" RECOVERY		
45.54							
48.07		9	48.0'	7 8 7 7	Saturated medium dense orange organic silty fine sand w/some coarse sand, fine gravel and clay.	A-2-4(0)	
			50.0'		20" RECOVERY		
50.6							
53.13		10	53.0'	6 6 7 10	Saturated medium dense tannish orange silty coarse to fine sand w/some fine gravel.	A-2-4(0)	
			55.0'		16" RECOVERY		
55.66							
58.19		11	58.0'	4 4 5 7	Saturated stiff gray silty fine sandy clay w/trace of coarse sand and fine gravel.	A-6(7)	Boring Advanced using roller bit. Quick gel/soda ash water mud mix.
			60.0'		17" RECOVERY		
60.72							

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

Project Name: James Street Bridge
State Contract: T201207101

Boring No.: JS-6

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
63.25		12	63.0' – 65.0'	7 10 13 13	Saturated very stiff green fine sandy clay w/some silt, trace of coarse sand. 21" RECOVERY	A-7-5(14)	
65.78							
68.31		13	68.0' – 70.0'	10 13 18 19	Saturated hard green fine sandy clay w/some silt, trace of coarse sand. 20" RECOVERY	A-7-5(13)	
70.84							
73.37		14	73.0' – 75.0'	11 22 24 28	Saturated hard green fine sandy clay w/some silt, trace of coarse sand. 24" RECOVERY	A-7-6(6)	
75.9							
78.43		15	78.0' – 80.0'	11 17 16 19	Saturated hard grayish brown fine sandy clay w/ some silt, trace of coarse sand. 24" RECOVERY	A-7-6(7)	
80.96							
83.49		16	83.0'	8 9 15 15	Saturated very stiff green clay w/some fine sand and silt, trace of coarse sand.	A-7-5(22)	

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

Project Name: James Street Bridge
State Contract: T201207101

Boring No.: JS-6

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
			85.0'		24" RECOVERY		
86.02							
88.55		17	88.0'	13 22 32 40	Saturated hard green fine sandy clay w/some silt, trace of coarse sand.	A-7-5(14)	
			90.0'		24" RECOVERY		
91.08							
93.61		18	93.0'	22 26 24 32	Saturated hard reddish brown clay w/some coarse to fine sand and silt.	A-7-5(17)	
			95.0'		24" RECOVERY		
96.14							
98.67		19	98.0'	22 28 28 22	Saturated hard bluish gray fine sandy clay w/trace of coarse sand and silt.	A-7-6(3)	
			100.0'		24" RECOVERY		
101.2							
103.73		20	103.0'	50	Saturated dense bluish gray silty fine to coarse sand.	A-2-4(0)	
			105.0'		5" RECOVERY		
106.26							
					50" RECOVERY		
108.79		21	108.0'		No Sample		

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

Project Name: James Street Bridge
State Contract: T201207101

Boring No.: JS-6

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
111.32					50" RECOVERY		
113.85		22	113.0'		No Sample		
116.38					50" RECOVERY		
118.91		23	118.0'		End Boring.		
121.44							
123.97							
126.5							
129.03							
131.56							

KEY TO SYMBOLS

Symbol	Description
Strata symbols	
	Silty soils
	Well graded gravels and sands
	Elastic Silts
	Poorly graded, silty or clayey sands and gravel
	Expansive plastic clays
	Plastic clays

Notes:

1. Exploratory borings were drilled using a 3 1/4 - inch diameter hollow stem auger.

2. No free water was encountered at the time of drilling or when re-checked the following day, unless recorded on 1st page.

3. Boring locations were taped from existing features and elevations extrapolated from survey unless otherwise reported.

4. These logs are subject to the limitations, conclusions, and recommendations in this report.

5. Results of tests conducted on samples recovered are reported on the logs.

6. All blow counts are uncorrected.

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

BORING JS-7

Project Name: James Street Bridge
Location: Newport, DE
State Contract #: T201207101
Federal Contract #:
Station/Offset:
Northing:
Easting:
Boring Surface Elev.:
Reference:
Date Started: 6/7/12
Date Completed: 6/14/12

Wt. of Sample Hammer: 140 **Lbs.**
Type of: D-Sampler: Split Barrell **O.D.**
S-Sampler: **O.D.**
U-Sampler: **O.D.**
Core Bit: **O.D.**

Average Fall: 30 **IN.**
O.D. of Sampler: 2 **IN.**
O.D. of Samp. Tube: **IN.**
O.D. of Samp. Tube: **IN.**
O.D. of Rock Core: **IN.**

Hollow Stem Auger Diameter: 3 1/4" **Inches** **From Depth of:** 0.0 **To:** 42.0
Mud Rotary: **From Depth of:** 42.0 **To:** 103.0

Water Level Readings

Date	Depth to Water (ft)	Caved Depth (ft)
6/8/12	14.8	

Boring Contractor: Walton Corporation
Equipment/Rig Type: CME 55 Truck
Driller: Jason Truver
Logged By: Chris Costanzi

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
		1	2.5'	2 4 3	Wet firm brown clayey silt w/some coarse to fine sand, trace of fine gravel.	A-4(2)	6" hot-mix, 2' GABC. Fill
			4.0'		12" RECOVERY		
		2	4.0'	2 5 50	Wet very dense brown fine gravel w/some fine to coarse sand and silt.	A-1-b	Fill
5.06			6.0'		10" RECOVERY		
		3	6.0'	3 2 2 3	Wet soft brown clayey coarse sandy fine gravelly silt w/some fine sand.	A-4(0)	Fill
7.59			8.0'		16" RECOVERY		
		4	8.0'	2 2 3 4	Wet firm brown clayey silt w/some fine to coarse sand, trace of fine gravel.	A-4(2)	Fill
10.12			10.0'		24" RECOVERY		
		5	10.0'	3 2 1 1	Saturated soft gray clayey silt w/some coarse to fine sand and fine gravel.	A-4(1)	Fill
			12.0'		20" RECOVERY		
12.65		6	12.0'	17 9 7 6	Saturated very stiff gray clayey fine gravelly silt w/ some fine to coarse sand.	A-4(0)	Fill
			14.0'		16" RECOVERY		
		7	14.0'	3 2 2 1	Saturated loose gray clayey fine gravel w/some fine to coarse sand and silt.	A-2-4(0)	Fill
15.18	▽		16.0'		15" RECOVERY		
		8	16.0'	3 5 3	Saturated firm gray clayey fine gravelly silt w/	A-4(3)	Fill

Remarks:

Reviewed By: Hany Fekry
Soils Supervisor: Aaron Wieczorek

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

Project Name: James Street Bridge **Boring No.:** JS-7
State Contract: T201207101

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
				2	some fine sand, trace of coarse sand.		
17.71			18.0'		20" RECOVERY		
		9	18.0'	3 2 3 2	Saturated firm gray clayey silt w/trace of fine to coarse sand and fine gravel.	A-5(9)	
			20.0'		20" RECOVERY		
20.24		U-1	20.0'				Shelby Tube - Press Sample
			22.0'		24" RECOVERY		
		11	22.0'	2 3 6 10	Saturated firm brown clayey fine sandy silt w/some coarse sand, trace of fine gravel.	A-4(1)	
22.77			24.0'		14" RECOVERY		
		12	24.0'	2 3 6 10	Saturated loose tan clayey fine sand w/some coarse sand, fine gravel and silt.	A-2-6(1)	
25.3			26.0'		20" RECOVERY		
		13	26.0'	6 7 6 7	Saturated stiff reddish brown clayey fine sandy silt w/trace of coarse sand and fine gravel.	A-4(1)	
27.83			28.0'		24" RECOVERY		
		14	28.0'	5 10 14 13	Saturated medium dense reddish brown silty fine sand w/some coarse sand and fine gravel.	A-2-4(0)	
			30.0'		24" RECOVERY		
30.36		15	30.0'	9 14 20 22	Saturated dense brown clayey fine sand w/some coarse sand and silt, trace of fine gravel.	A-2-4(0)	
			32.0'		24" RECOVERY		
		16	32.0'	3 8 12 17	Saturated very stiff brown fine sand clay w/some coarse sand and silt, trace of fine gravel.	A-6(1)	
32.89			34.0'		20" RECOVERY		
		17	34.0'	8 10 13 15	Saturated medium dense brown clayey coarse to fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
35.42			36.0'		24" RECOVERY		
		18	36.0'	11 13 9 8	Saturated very stiff brown silty clay w/some fine sand, trace of coarse sand and fine gravel.	A-6(10)	
37.95			38.0'		24" RECOVERY		
		19	38.0'	8 10 10 13	Saturated very stiff reddish brown clayey fine sandy silt w/trace of coarse sand and fine gravel.	A-4(1)	
			40.0'		20" RECOVERY		
40.48		20	40.0'	8 15	No sieve analysis - Indication of saturated dense		

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

Project Name: James Street Bridge **Boring No.:** JS-7
State Contract: T201207101

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
				25 20	brown sand.		
			42.0'		24" RECOVERY		
43.01							
		21	43.0'	15 20 22 16	Saturated dense brown silty fine to coarse sand w/ some fine gravel.	A-2-4(0)	
			45.0'		20" RECOVERY		
45.54							
48.07							
		22	48.0'	7 8 13 20	Saturated medium dense gray coarse to fine sand w/some fine gravel and silt.	A-1-b	
			50.0'		20" RECOVERY		
50.6							
53.13							
		23	53.0'	10 6 5 11	Saturated medium dense tan fine gravel and coarse to fine sand w/some silt.	A-1-b	
			55.0'		20" RECOVERY		
55.66							
58.19		24	58.0'	5 7 7 13	Saturated stiff tan fine sandy clay w/some coarse sand, trace of silt and fine gravel.	A-7-5(4)	
			60.0'		24" RECOVERY		
60.72							
63.25		25	63.0'	15 24 24 28	Saturated hard grayish brown fine sandy clay w/ some silt, trace of coarse sand. (Weathered Rock)	A-7-5(5)	

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

Project Name: James Street Bridge **Boring No.:** JS-7
State Contract: T201207101

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
			65.0'		24" RECOVERY		
65.78							
68.31		26	68.0'	14 23 39 37	Saturated hard grayish brown fine sandy clay w/ some coarse sand, trace of silt. (Weathered Rock)	A-7-5(3)	
			70.0'		24" RECOVERY		
70.84							
73.37		27	73.0'	27 45 50	Saturated hard bluish gray clayey fine to coarse sandy silt. (Weathered Rock)	A-5(2)	
			75.0'		15" RECOVERY		
75.9							
78.43		28	78.0'	24 25 50	Saturated hard bluish gray clayey fine sandy silt w/ trace of coarse sand. (Wea t hered Rock)	A-5(4)	
			80.0'		18" RECOVERY		
80.96							
83.49		29	83.0'	19 25 24 50	Saturated hard bluish gray clay w/some fine to coarse sand and silt. (Weathered Rock)	A-7-5(8)	
			85.0'		23" RECOVERY		
86.02							
		30	88.0'	21			

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

Project Name: James Street Bridge
State Contract: T201207101

Boring No.: JS-7

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
88.55				27 28 41	Saturated hard bluish gray fine sandy clay w/some silt, trace of coarse sand. (Weathered Rock)	A-7-5(8)	
			90.0'		24" RECOVERY		
91.08							
93.61		31	93.0'	15 20 20 25	Saturated hard bluish gray fine sandy clay w/some silt, trace of coarse sand and fine gravel. (Weathered Rock)	A-7-5(8)	
			95.0'		24" RECOVERY		
96.14							
98.67		32	98.0'	23 44 50	Saturated very dense bluish gray silty fine sand w/ some coarse sand.(Weathered Rock)	A-2-4(0)	
			100.0'		16" RECOVERY		
101.2							
103.73		33	103.0'		End Boring.		
			105.0'		NR" RECOVERY		
106.26							
108.79							
111.32							

KEY TO SYMBOLS

Symbol Description

Strata symbols

Silty soils

Well graded gravels and sands

Poorly graded, silty or clayey sands and gravel

Elastic Silts

Plastic clays

Expansive plastic clays

Misc. Symbols

Water table during drilling

Notes:

1. Exploratory borings were drilled using a 3 1/4 - inch diameter hollow stem auger.

2. No free water was encountered at the time of drilling or when re-checked the following day, unless recorded on 1st page.

3. Boring locations were taped from existing features and elevations extrapolated from survey unless otherwise reported.

4. These logs are subject to the limitations, conclusions, and recommendations in this report.

5. Results of tests conducted on samples recovered are reported on the logs.

6. All blow counts are uncorrected.

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

BORING JS-8

Project Name: James Street Bridge
Location: Newport, DE
State Contract #: T201207101
Federal Contract #:
Station/Offset:
Northing:
Easting:
Boring Surface Elev.:
Reference:
Date Started: 5/21/12
Date Completed: 5/29/12

Wt. of Sample Hammer: 140 **Lbs.**
Type of: D-Sampler: Split Barrel **O.D.**
S-Sampler: **O.D.**
U-Sampler: **O.D.**
Core Bit: **O.D.**

Average Fall: 30 **IN.**
O.D. of Sampler: 2 **IN.**
O.D. of Samp. Tube: **IN.**
O.D. of Samp. Tube: **IN.**
O.D. of Rock Core: **IN.**

Hollow Stem Auger Diameter: 3 1/4" **Inches** **From Depth of:** 0.0 **To:** 28.0
Mud Rotary: **From Depth of:** 28.0 **To:** 98.0

Water Level Readings

Date	Depth to Water (ft)	Caved Depth (ft)
5/21/12	6.5	

Boring Contractor: Walton Corporation
Equipment/Rig Type: CME 55 ATV
Driller: Bill Holden and Truver
Logged By: Tom Kane

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
		1	0.0'	10 10 12 12	Moist medium dense brown silty coarse sandy fine gravel w/some fine sand.	A-2-4(0)	Topsoil 2". Fill
			2.0'		12" RECOVERY		
2.53		2	2.0'	5 4 4 3	Saturated firm black coarse sandy fine gravelly silt w/some fine sand.	A-4(0)	
			4.0'		14" RECOVERY		
5.06		3	4.0'	2 1 1 3	Saturated soft gray silty clay w/some fine gravel, trace of fine to coarse sand.	A-6(9)	
			6.0'		10" RECOVERY		
7.59	▽	4	6.0'	2 2 1 2	Saturated soft gray clay w/some coarse to fine sand and silt, trace of fine gravel.	A-7-6(9)	
			8.0'		14" RECOVERY		
10.12		5	8.0'	5 10 11 12	Saturated medium dense brown fine gravelly coarse sand w/some fine sand and silt.	A-1-b	
			10.0'		14" RECOVERY		
12.65		6	10.0'	7 8 7 10	Saturated stiff brownish red fine to coarse sandy clay w/some silt, trace of fine gravel.	A-6(2)	
			12.0'		18" RECOVERY		
		7	12.0'	5 8 9 9	Saturated medium dense orange silty fine sand w/ some coarse sand.	A-2-4(0)	
			14.0'		15" RECOVERY		

Remarks: 8" casing set @ 18', 4" casing set at 23'.

Reviewed By: Hany Fekry
Soils Supervisor: Aaron Wieczorek

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

Project Name: James Street Bridge **Boring No.:** JS-8
State Contract: T201207101

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
		8	14.0'	5 8 8 8	Saturated medium dense orangish brown silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
15.18			16.0'		12" RECOVERY		
		9	16.0'	5 7 8 9	Saturated stiff reddish orange clayey fine sandy silt w/trace of coarse sand and fine gravel.	A-4(4)	
17.71			18.0'		12" RECOVERY		
		10	18.0'	3 4 7 8	Saturated stiff red silty fine sandy clay w/trace of coarse sand.	A-6(6)	
20.24			20.0'		20" RECOVERY		
22.77							
		11	23.0'	7 6 10 8	Saturated medium dense brownish orange silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
25.3			25.0'		16" RECOVERY		
27.83							
		12	28.0'	3 4 6 6	Saturated firm red silty clay w/some fine sand, trace of coarse sand.	A-6(13)	
30.36			30.0'		24" RECOVERY		
32.89							
		13	33.0'	6 10 12 16	Saturated medium dense orange silty fine to coarse sand w/some fine gravel.	A-2-4(0)	
35.42			35.0'		16" RECOVERY		
37.95							

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

Project Name: James Street Bridge
State Contract: T201207101

Boring No.: JS-8

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
		14	38.0'	14 15 13 16	Saturated medium dense brown silty fine sand w/ some coarse sand and fine gravel.	A-2-4(0)	
			40.0'		18" RECOVERY		
40.48							
43.01		15	43.0'	7 14 14 15	Saturated medium dense gray clayey fine to coarse sand w/some silt and fine gravel.	A-2-4(0)	
			45.0'		21" RECOVERY		
45.54							
48.07		16	48.0'	10 12 15 17	Saturated very stiff brownish tan fine sandy silt w/ some clay, trace of coarse sand.	A-4(1)	
			50.0'		22" RECOVERY		
50.6							
53.13		17	53.0'	6 8 19 24	Saturated very stiff brownish gray fine sandy clay w/trace of coarse sand, fine gravel and silt.	A-7-6(9)	
			55.0'		22" RECOVERY		
55.66							
58.19		18	58.0'	8 10 18 19	Saturated very stiff brown fine sandy clay w/some silt, trace of coarse sand.	A-7-6(9)	
			60.0'		24" RECOVERY		
60.72							

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

Project Name: James Street Bridge
State Contract: T201207101

Boring No.: JS-8

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
63.25		19	63.0'	12 19 28 27	Saturated hard brownish gray clayey fine sandy silt w/some coarse sand.	A-4(1)	
			65.0'		24" RECOVERY		
65.78							
68.31		20	68.0'	12 18 24 18	Saturated hard grayish green fine sandy clay w/ some silt, trace of coarse sand.	A-6(3)	
			70.0'		24" RECOVERY		
70.84							
73.37		21	73.0'	50	No Sample		
			75.0'		NR" RECOVERY		
75.9							
78.43		22	78.0'	17 36 43 50	Saturated very dense greenish gray silty fine to coarse sand.	A-2-4(0)	
			80.0'		20" RECOVERY		
80.96							
83.49		23	83.0'	23 35 50	Saturated very dense greenish gray silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
			85.0'		16" RECOVERY		

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

Project Name: James Street Bridge
State Contract: T201207101

Boring No.: JS-8

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
88.55		24	88.0'	50	No sieve analysis - Indication of saturated dense greenish gray highly weathered rock.		
			90.0'		2" RECOVERY		
91.08							
93.61		25	93.0'	50	No sieve analysis - Indication of saturated dense greenish gray highly weathered rock.		
			95.0'		3" RECOVERY		
96.14							
98.67		26	98.0'	25 50	Saturated very dense greenish gray clayey fine to coarse sand w/some silt, trace of fine gravel.	A-2-5(0)	
			100.0'		7" RECOVERY		
101.2							
103.73		CR-1	101.5'		Schist, gray fine grained, thin bedded, slightly weathered, hard.		RQD - 58
106.26			106.5'		44" RECOVERY		
		CR-2	106.5'		Schist, gray fine grained, thin bedded, slightly weathered, hard.		RQD - 68
108.79							

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

Project Name: James Street Bridge
State Contract: T201207101

Boring No.: JS-8

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
111.32			111.5'		51" RECOVERY		
					End Boring.		
113.85							
116.38							
118.91							
121.44							
123.97							
126.5							
129.03							
131.56							

KEY TO SYMBOLS

Symbol	Description

Strata symbols

	Poorly graded, silty or clayey sands and gravel
	Silty soils
	Plastic clays
	Expansive plastic clays
	Well graded gravels and sands
	Schist

Misc. Symbols

	Water table during drilling

Notes:

1. Exploratory borings were drilled using a 3 1/4 - inch diameter hollow stem auger.

2. No free water was encountered at the time of drilling or when re-checked the following day, unless recorded on 1st page.

3. Boring locations were taped from existing features and elevations extrapolated from survey unless otherwise reported.

4. These logs are subject to the limitations, conclusions, and recommendations in this report.

5. Results of tests conducted on samples recovered are reported on the logs.

6. All blow counts are uncorrected.

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

BORING JS-9

Project Name: James Street Bridge
Location: Newport, DE
State Contract #: T201207101
Federal Contract #:
Station/Offset:
Northing:
Easting:
Boring Surface Elev.:
Reference:
Date Started: 5/21/12
Date Completed: 5/29/12

Wt. of Sample Hammer: 140 **Lbs.**
Type of: D-Sampler: Split Barrel **O.D.**
S-Sampler: **O.D.**
U-Sampler: **O.D.**
Core Bit: **O.D.**

Average Fall: 30 **IN.**
O.D. of Sampler: 2 **IN.**
O.D. of Samp. Tube: **IN.**
O.D. of Samp. Tube: **IN.**
O.D. of Rock Core: **IN.**

Hollow Stem Auger Diameter: 3 1/4" **Inches** **From Depth of:** 0.0 **To:** 42.0
Mud Rotary: **From Depth of:** 42.0 **To:** 98.0

Water Level Readings

Date	Depth to Water (ft)	Caved Depth (ft)
5/21/12	6.0	

Boring Contractor: Walton Corporation
Equipment/Rig Type: CME 55 ATV
Driller: Bill Holden
Logged By: Tom Kane/Chris Costanzi

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
		1	0.0'	15 8 8 12	Moist medium dense brown coarse to fine sand and fine gravel w/some silt.	A-1-b	Topsoil 2". Fill
			2.0'		10" RECOVERY		
2.53		2	2.0'	3 3 3 2	Wet firm brownish gray silt w/some fine to coarse sand, trace of fine gravel and clay.	A-4(1)	Fill
			4.0'		18" RECOVERY		
		3	4.0'	6 6 6 5	Wet stiff tan clayey silt w/trace of fine to coarse sand and fine gravel.	A-4(5)	
5.06							
	▽		6.0'		13" RECOVERY		
		4	6.0'	6 7 11 9	Wet very stiff tan silt w/some fine sand and clay, trace of coarse sand and fine gravel.	A-4(1)	
7.59			8.0'		18" RECOVERY		
		5	8.0'	6 8 12 12	Wet medium dense brown coarse to fine sand w/ some fine gravel and silt.	A-1-b	
10.12			10.0'		14" RECOVERY		
		6	10.0'	8 11 9 6	Wet medium dense brown fine gravelly coarse to fine sand w/some silt.	A-1-b	
			12.0'		14" RECOVERY		
12.65		7	12.0'	9 19 20 20	Wet dense brown coarse sandy fine gravel w/some fine sand, trace of silt.	A-1-b	
			14.0'		16" RECOVERY		

Remarks:

Reviewed By: Hany Fekry
Soils Supervisor: Aaron Wieczorek

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

Project Name: James Street Bridge **Boring No.:** JS-9
State Contract: T201207101

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
		8	14.0'	25 29 19 27	Wet dense orange coarse sandy fine gravel w/some fine sand and silt.	A-1-a	
15.18			16.0'		10" RECOVERY		
		9	16.0'	25 8 11 10	Wet medium dense orange silty fine sand and fine gravel w/some coarse sand.	A-1-b	
17.71			18.0'		12" RECOVERY		
		10	18.0'	12 3 8 9	Wet medium dense orange silty fine sand w/some coarse sand, trace of fine gravel.	A-2-4(0)	
			20.0'		10" RECOVERY		
20.24							
22.77							
		11	23.0'	5 5 7 12	Wet stiff brown clayey fine sandy silt w/some coarse sand, trace of fine gravel.	A-4(0)	
			25.0'		16" RECOVERY		
25.3							
27.83							
		12	28.0'	10 11 8 10	Wet medium dense brownish orange silty coarse to fine sand w/trace of fine gravel.	A-2-4(0)	
			30.0'		21" RECOVERY		
30.36							
32.89							
		13	33.0'	2 6 13 12	Wet very stiff reddish brown fine sandy clay w/ some coarse sand and silt, trace of fine gravel.	A-6(1)	
			35.0'		16" RECOVERY		
35.42							
		14	37.0'	6 16 14 16	Wet medium dense brownish gray clayey fine to coarse sand w/some fine gravel, trace of silt	A-2-6(0)	
37.95							

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

Project Name: James Street Bridge
State Contract: T201207101

Boring No.: JS-9

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
			39.0'		24" RECOVERY		
40.48							
		15	42.0'	4 7 12 19	Wet medium dense reddish brown silty fine sand w/some fine gravel and clay, trace of coarse sand.	A-2-4(0)	
43.01			44.0'		18" RECOVERY		
45.54							
		16	47.0'	8 11 10 14	Wet medium dense gray silty fine sand w/some coarse sand and fine gravel.	A-2-4(0)	
48.07			49.0'		24" RECOVERY		
50.6							
		17	52.0'	2 3 6 5	Saturated firm grayish brown fine sandy clay w/ some silt, trace of coarse sand and fine gravel.	A-7-5(13)	
53.13			54.0'		24" RECOVERY		
55.66							
		18	57.0'	7 7 9 13	Saturated very stiff grayish brown fine sandy clay w/some silt, trace of coarse sand and fine gravel.	A-7-6(12)	
58.19			59.0'		24" RECOVERY		
60.72							

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

Project Name: James Street Bridge
State Contract: T201207101

Boring No.: JS-9

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
		19	62.0'	9 10 11 23	Saturated very stiff grayish brown clayey fine sandy silt w/trace of coarse sand and fine gravel.	A-4(2)	
63.25			64.0'		24" RECOVERY		
65.78							
		20	67.0'	10 17 20 22	Saturated hard bluish gray fine sandy clay w/some coarse sand, trace of silt and fine gravel.	A-7-5(6)	
68.31			69.0'		24" RECOVERY		
70.84							
		21	72.0'	18 16 18 50	Saturated medium dense bluish gray silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
73.37			74.0'		18" RECOVERY		
75.9							
		22	77.0'	50	Saturated very dense bluish gray silty fine sand w/ some coarse sand, trace of fine gravel.	A-2-4(0)	
78.43			79.0'		5" RECOVERY		
80.96							
		23	82.0'	28 38 44 50	Saturated very dense bluish gray coarse to fine sand and fine gravel w/some silt.	A-1-b	
83.49			84.0'		18" RECOVERY		

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

Project Name: James Street Bridge
State Contract: T201207101

Boring No.: JS-9

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
		24	87.0'	50	Saturated dense gray silty fine sand w/some coarse sand, trace of fine gravel. (Weathered Rock)	A-2-4(0)	
88.55			89.0'		4" RECOVERY		
91.08							
		25	92.0'	50	Saturated dense gray silty fine sand w/some coarse sand, trace of fine gravel. (Weathered Rock)	A-2-4(0)	
93.61			94.0'		4" RECOVERY		
96.14							
		26	97.0'	50	Schist, wet, very dense weathered rock.		No Recovery
		CR-1	98.0'		Schist gray fine grained thin bedded, mod-slightly weathered rock.		REC - 81.7%. RQD - 46.3%
98.67			99.0'		NR" RECOVERY		
101.2							
103.73			104.8'		67" RECOVERY		
		CR-2	104.9'		Schist gray fine grained thin bedded, slightly weathered rock.		REC - 93.4%. RQD - 84.8%
106.26							
108.79			108.7'		End Boring.		
					43" RECOVERY		

KEY TO SYMBOLS

Symbol	Description
Strata symbols	
	Well graded gravels and sands
	Silty soils
	Poorly graded, silty or clayey sands and gravel
	Plastic clays
	Expansive plastic clays
	Schist
Misc. Symbols	
	Water table during drilling

Notes:

1. Exploratory borings were drilled using a 3 1/4 - inch diameter hollow stem auger.

2. No free water was encountered at the time of drilling or when re-checked the following day, unless recorded on 1st page.

3. Boring locations were taped from existing features and elevations extrapolated from survey unless otherwise reported.

4. These logs are subject to the limitations, conclusions, and recommendations in this report.

5. Results of tests conducted on samples recovered are reported on the logs.

6. All blow counts are uncorrected.

Boring/Trench/Test Pit number	SAMP_NUM	Depth (ft. or m.)	Material description	Liquid limit	Plasticity index	Natural moisture %	USCS	AASHTO classification	Percent < than the #10 sieve	Percent < than the #200 sieve	Blow count #1	Blow count #2	Blow count #3	Blow count #4
JS-1														
	1	2	Moist medium dense brown clayey fine gravel and coarse sand w/some fine sand and silt.	24	7.4	8.6	SC-SM	A-2-4(0)	76.6	34.2	10	14	16	11
	2	4	Moist very stiff brown fine gravelly silt w/some clay, trace of coarse to fine sand.	20.7	5.1	8.3	SC-SM	A-4(0)	57.4	44.7	7	8	13	50
		5.5	End Boring											
JS-2														
	1	2	Moist loose brown coarse sandy fine gravel w/some fine sand, trace of silt.	NV	NP	4.8	SP-SM	A-1-b	54.2	9.4	6	10	10	9
	2	4	Moist very dense gray coarse to fine sand w/some fine gravel and silt.	NV	NP	7.2	SM	A-1-b	80	16.4	7	50		
	3	6	Moist medium dense grayish tan silty fine to coarse sand and fine gravel.	18.3	NP	10.8	SM	A-1-b	67	24	2	4	8	7
	4	8	Moist medium dense black silty fine gravel and coarse sand w/some fine sand, trace of clay.	17.8	2.1	10.9	SM	A-2-4(0)	68.5	26.8	6	11	9	6
	5	10	No sieve analysis - Indication of moist loose gray clayey sand, trace of fine gravel.	24.2	6.3	15					4	4	4	8
	6	12	Saturated soft gray clay w/trace of coarse to fine sand, fine gravel and silt.	41.8	14.7	41.9	ML	A-7-6(13)	94.5	80.4	3	2	2	3
	7	14	Saturated soft tan organic clay w/some coarse sand, trace of fine sand and silt.	59.3	18.3	73.9	MH	A-7-5(17)	100	74.8	2	2	2	2
	U-1	16	Saturated dark gray organic clay w/some fine gravel, trace of fine to coarse sand and silt.	48.1	13.1	17.3	ML	A-7-5(12)	85.2	78.1				
	9	18	Saturated firm dark gray organic clay w/some coarse to fine sand, trace of silt.	58.1	17.6	78.7	MH	A-7-5(15)	100	71.6	1	2	3	3
	10	20	Saturated firm gray organic clay w/trace of coarse to fine sand and silt.	54.6	19.3	72.7	MH	A-7-5(22)	100	86.6	4	3	4	3
	11	22	Saturated soft gray organic coarse sandy clay w/trace of fine sand and silt.	49.8	19.6	64.9	MH	A-7-5(16)	100	76	1	1	1	2
	U-2	24												
	12	26	Saturated soft gray organic coarse sandy clay w/trace of fine sand and silt.	50.5	19.8	68.1	MH	A-7-5(14)	100	71	1	1	1	2
	13	28	Saturated soft tannish gray coarse sand w/some fine sand and silt, trace of fine gravel.	NV	NP	23.6	SM	A-1-b	91.4	12.7	1	2	3	7
	14	30	Saturated medium dense tannish gray fine gravelly coarse to fine sand w/trace of silt.	NV	NP	17.2	SW	A-1-b	77.8	4.5	7	9	6	8
	15	32	Saturated medium dense gray coarse to fine sand w/some fine gravel, trace of silt.	NV	NP	18.8	SP	A-1-b	81.4	4.6	9	8	12	10
	16	34	Saturated dense gray coarse sandy fine gravel w/some fine sand, trace of silt.	NV	NP	9.5	SP	A-1-b	50.6	4.9	9	15	30	40
	17	36	Saturated very stiff tan fine sandy clay w/some silt, trace of coarse sand and fine gravel.	26.2	10.8	18.7	CL	A-6(3)	94.9	53.1	1	3	15	19
	18	38	Saturated medium dense tan fine to coarse sand w/some silt, trace of fine gravel.	NV	NP	18.6	SM	A-2-4(0)	99	18.2	16	13	16	15
	19	40	Saturated stiff red silty fine sandy clay w/trace of coarse sand.	30.1	14.8	17.8	CL	A-6(8)	100	71.5	3	5	7	10
	20	42	Saturated very stiff red clayey fine sandy silt w/some coarse sand and fine gravel.	24.8	9.9	17.4	SC	A-4(1)	89	43.2	16	14	14	15
	21	48	Saturated dense brown clayey fine sand w/some fine gravel and silt, trace of coarse sand.	24.2	8.7	15.1	SC	A-2-4(0)	82.1	30.9	4	16	30	21
	22	53	Saturated stiff brown fine to coarse sandy clay w/trace of fine gravel and silt.	25.6	11.8	16.9	SC	A-6(1)	93.7	36	7	7	5	4
	23	58	Saturated stiff brown clayey fine sandy silt w/some fine gravel, trace of coarse sand.	20.8	6.5	17	CL-ML	A-4(2)	86.4	63.3	5	6	8	8
	24	63	Saturated medium dense brown silty coarse to fine sand and fine gravel.	NV	NP	14.9	SM	A-1-b	73.9	20.5	4	5	12	15
	25	68	Saturated medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	NV	NP	33.1	SM	A-1-b	98.9	15.7	2	3	10	5
	26	73	Saturated very stiff brown fine sandy clay w/trace of coarse sand, fine gravel and silt.	41.8	15.9	24.9	SC	A-7-6(5)	99.2	49.4	5	8	10	11
	27	78	Saturated hard brown fine sandy clay w/trace of coarse san, fine gravel and silt.	42.1	16.2	28.8	CL	A-7-6(8)	99.1	61.1	12	11	20	28
	28	83	Saturated hard brown clay w/some fine sand, trace of coarse sand, fine gravel and silt.	49.4	15.3	31.1	ML	A-7-5(11)	95.8	69.6	9	15	23	28
	29	88	Saturated hard grayish red clayey fine sandy silt w/trace of coarse sand and fine gravel. Weathered Rock.	42.2	8	29.8	ML	A-5(5)	96	62.2	11	23	38	45
	30	93	Saturated hard grayish red fine sandy silt w/trace of coarse sand. Weathered Rock.	29.5	0.2	29.5	ML	A-4(0)	99.5	69.8	10	17	27	50
	31	98	Saturated hard grayish brown fine sandy clay w/some silt, trace of coarse sand and fine gravel. Weathered Rock.	35	14	19.9	SC	A-6(3)	95.9	45.1	18	20	24	29
	32	103	Saturated very dense grayish brown silty fine sand w/some coarse sand and fine gravel. Weathered Rock.	NV	NP	23.8	SM	A-2-4(0)	89.4	30.7	26	33	50	
	33	108	Saturated very dense gray silty fine sand w/some coarse sand and fine gravel. Weathered Rock.	NV	NP	26.2	SM	A-2-4(0)	88.2	25.8	37	50		
	34	113	Saturated very dense gray silty fine gravelly fine sand w/trace of coarse sand. Weathered Rock.	NV	NP	34.3	SM	A-2-4(0)	79.2	28.2	18	34	45	50
	35	118	No sieve analysis - Indication of saturated hard gray weathered rock.	NV	NP	15.8					50			
		118.2	End Boring											

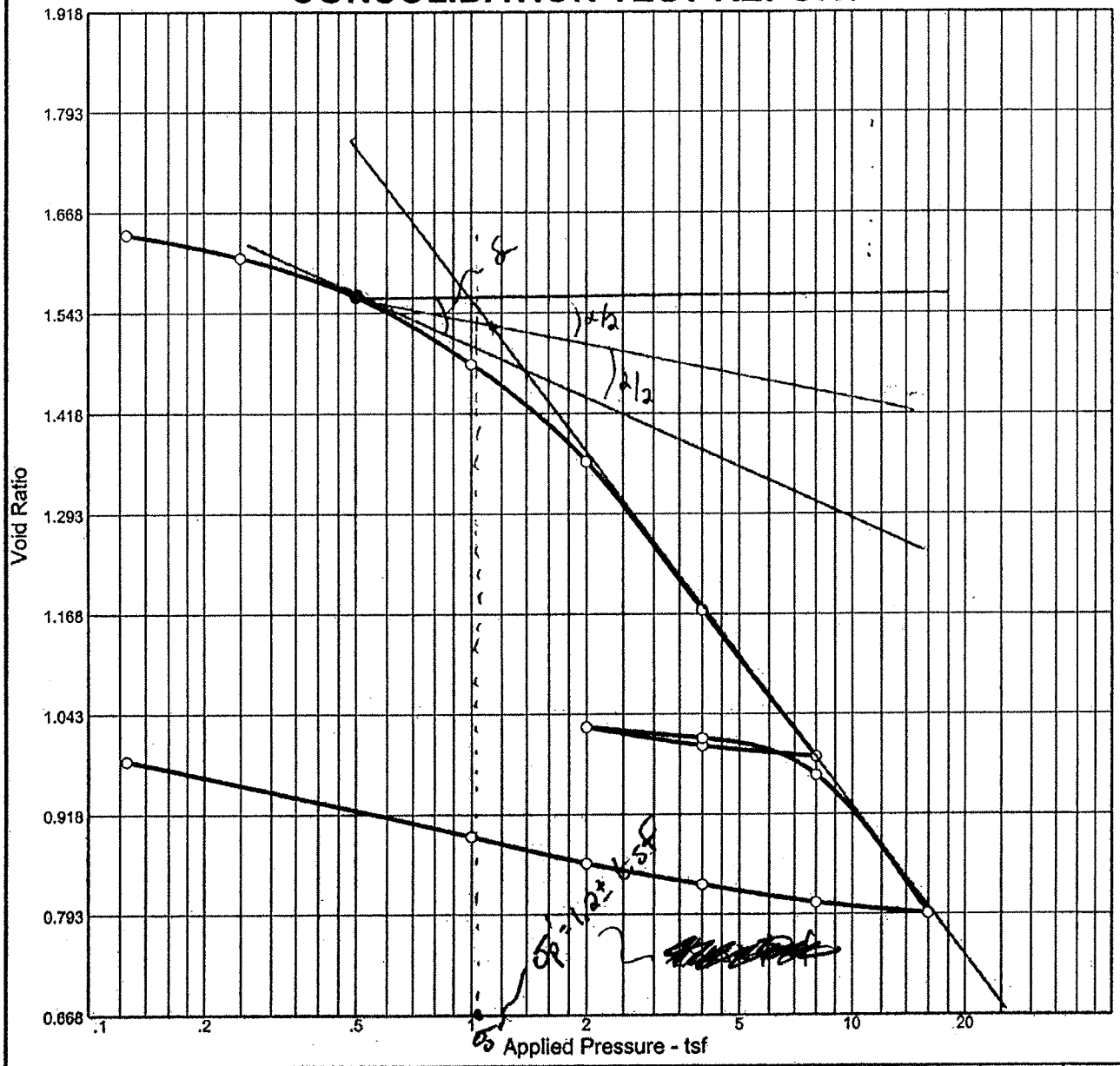
Boring/Trench/Test Pit number	SAMP_NUM	Depth (ft. or m.)	Material description	Liquid limit	Plasticity index	Natural moisture %	USCS	AASHTO classification	Percent < than the #10 sieve	Percent < than the #200 sieve	Blow count #1	Blow count #2	Blow count #3	Blow count #4
JS-3														
	1	0	Moist very stiff brown coarse sandy silt w/some fine sand, trace of fine gravel and clay.	19.3	1.5	10.4	SM	A-4(0)	85.9	42.1	4	7	7	23
	2	2	Moist medium dense gray fine gravel w/trace of fine to coarse sand and silt.	NV	NP	3.1	GP-GM	A-1-a	18.1	5.1	20	11	7	9
	3	4	Moist loose brown clayey fine gravel w/some coarse to fine sand and silt.	26	8.1	10.7	SC	A-2-4(0)	53.2	21	3	3	3	4
	4	6	Wet firm grayish brown coarse to fine sandy silt w/some clay, trace of fine gravel.	22.4	3.7	16.1	ML	A-4(0)	98	51.8	3	4	3	3
	5	8	Wet dense gray silty fine gravel w/some coarse to fine sand and clay.	26.3	4.3	24.1	SC-SM	A-2-4(0)	66.4	28.4	3	9	41	3
	6	10	Saturated soft grayish brown fine gravelly clay w/some silt and fine sand, trace of coarse sand.	40.2	11.2	43.1	SM	A-6(3)	66.7	48.1	2	2	2	2
	7	12	Saturated soft gray clay w/some coarse sand and silt, trace of fine sand.	50.4	18.1	68.3	MH	A-7-5(15)	100	77.4	WH	1	1	2
	8	14	No sieve analysis - Indication of saturated hard gray wet very stiff silt.	33.3	9.6	135.9					32	32	12	
	9	16	No sieve analysis - Indication of saturated hard gray organic wet very stiff silt.	37.8	8.5	66.4					8	11	7	5
	10	18	No sieve analysis - Indication of saturated hard gray organic wet very stiff silt.	NV	NP	96.9					5	2	1	1
	11	20	Saturated soft gray organic silty clay w/some fine to coarse sand.	40	11.4	64	ML	A-6(9)	100	75.8	2	2	2	1
	U-1	22												
	13	24	Saturated loose gray coarse to fine sand w/trace of silt and fine gravel.	NV	NP	23.6	SP-SM	A-1-b	91.9	6.6	WR	3	2	8
	14	26	Saturated medium dense gray coarse to fine sand w/trace of fine gravel and silt.	NV	NP	17.5	SW	A-1-b	90.9	4.6	1	5	8	16
	15	28	Saturated dense gray coarse sand w/some fine gravel, trace of fine sand and silt.	NV	NP	15.8	SP	A-1-b	80.6	3.3	23	28	21	25
	16	30	Saturated loose gray coarse to fine sand w/trace of fine gravel and silt.	NV	NP	20.8	SW-SM	A-1-b	92.2	6.5	4	3	5	12
	17	32	Saturated medium dense gray fine gravelly coarse to fine sand w/trace of silt.	NV	NP	15.8	SW-SM	A-1-b	74.9	8.3	10	15	15	17
	18	34	Saturated dense grayish brown coarse sandy fine gravel w/some fine sand, trace of silt.	NV	NP	9.1	SP-SM	A-1-b	51.1	8.3	14	17	16	15
	19	36	Saturated medium dense grayish brown coarse sandy fine gravel w/some fine sand, trace of silt.	NV	NP	10	SP	A-1-a	43.7	3.5	16	22	50	
	20	38	Saturated hard reddish brown clayey fine to coarse sandy silt w/trace of fine gravel.	25.5	9.8	16.5	SC	A-4(1)	98.1	39.4	7	12	20	16
	21	40	Saturated medium dense reddish brown clayey fine sand w/some coarse sand, fine gravel and silt.	22	6.4	13.7	SC-SM	A-2-4(0)	86.1	31.4	9	12	18	22
	22	43	Saturated medium dense brown clayey fine to coarse sand w/some silt, trace of fine gravel.	20.9	6.8	14.2	SC-SM	A-2-4(0)	96.6	30.4	5	6	8	10
	23	48	Saturated medium dense brown silty fine to coarse sand.	19.7	NP	16.9	SM	A-2-4(0)	99.6	26	6	7	4	6
	24	53	Saturated medium dense brown silty fine sand w/some coarse sand, trace of fine gravel.	NV	NP	15	SM	A-2-4(0)	98.6	26.4	19	14	11	17
	25	58	Saturated medium dense brown clayey fine to coarse sand and fine gravel w/some silt.	34.3	17.9	13.9	SC	A-2-6(0)	76.5	19.7	11	12	17	9
	26	63	Saturated medium dense brown silty fine to coarse sand w/trace of fine gravel.	NV	NP	21.1	SM	A-2-4(0)	91.9	21.6	10	10	13	11
	27	68	Saturated stiff grayish brown clayey fine sandy silt w/some coarse sand, trace of fine gravel.	28.3	9.5	23.5	SC	A-4(1)	94.4	41	4	5	5	5
	28	73	Saturated very stiff grayish brown fine to coarse sandy clay w/some silt.	37.4	13.9	17.9	SC	A-6(4)	99.9	49.6	5	6	10	9
	29	78	Saturated very stiff gray clayey fine to coarse sandy silt.	34.8	8.8	28.4	SM	A-4(1)	100	43.6	11	7	11	20
	30	83	Saturated hard gray fine sandy silt w/some coarse sand, trace of fine gravel.	15.1	NP	25.9	SM	A-4(0)	99.4	47.2	15	20	17	27
	31	88	Saturated hard gray clayey coarse to fine sandy silt w/trace of fine gravel. (Weathered Rock)	39.4	8.1	19.1	SM	A-4(1)	98.7	42.1	13	23	38	50
	32	93	Saturated hard gray clayey fine sandy silt w/some coarse sand. (Weathered Rock)	33.3	9.6	34.3	CL	A-4(2)	100	50.2	15	23	34	50
	33	98	Saturated hard grayish brown fine sandy clay w/some coarse sand and silt, trace of fine gravel. (Weathered Rock)	52.4	30.7	17	CH	A-7-6(11)	96.8	50.6	14	22	23	34
	34	103	Saturated very dense bluish gray clayey fine to coarse sand w/some silt, trace of fine gravel. (Weathered Rock)	53.3	17	19.6	SM	A-2-7(1)	95.1	28.5	23	24	40	50
	35	108	Saturated very dense bluish gray clayey fine sand w/some coarse sand and silt, trace of fine gravel.	40.3	6	26.5	SM	A-2-4(0)	96.1	27.3	33	50		
	36	113	No sieve analysis - Indication of blue grey weathered rock.	34.8	NP	31.7					50			
	37	118	End Boring.								50			

Boring/Trench/Test Pit number	SAMP_NUM	Depth (ft. or m.)	Material description	Liquid limit	Plasticity index	Natural moisture %	USCS	AASHTO classification	Percent < than the #10 sieve	Percent < than the #200 sieve	Blow count #1	Blow count #2	Blow count #3	Blow count #4
JS-4														
	1	0	Wet stiff brown fine to coarse sandy silt w/trace of fine gravel.	22.6	NP	15.1	SM	A-4(0)	91.2	38.6	4	4	5	
	2A	2	Wet loose brown silty fine to coarse sand w/some fine gravel.	NV	NP	13.2	SM	A-2-4(0)	83.3	23	4	4		
	2B	3	Saturated firm gray clayey silt w/trace of fine to coarse sand and fine gravel.	35.6	10	40.2	ML	A-4(9)	97.5	86.7	5	3		
	3	4	Saturated soft gray silty clay w/trace of fine to coarse sand and fine gravel.	35.3	11.7	39.5	CL	A-6(10)	96.8	90.2	1	2	2	2
	4	6	Saturated soft gray silty clay w/trace of fine to coarse sand.	38.7	12.4	48.6	ML	A-6(14)	99.7	94.9	2	1	2	2
	U-1	8												
	5	10	Saturated soft gray organic clay w/some silt, trace of fine to coarse sand.	41.5	10.9	74.3	ML	A-7-5(13)	100	90.8	WH	1	1	1
	6	12	Saturated soft gray organic clay w/some silt, trace of fine to coarse sand.	53.9	14.6	84.8	MH	A-7-5(18)	100	87.7	WH	1	1	1
	7	14	Saturated soft gray organic clay w/some silt, trace of fine to coarse sand.	47.9	16.5	71.3	ML	A-7-5(19)	100	93.2	1	1	1	2
	8	16	Saturated soft gray organic clay w/some silt, trace of fine to coarse sand.	45.8	14.9	72.9	ML	A-7-5(15)	100	84.4	1	2	2	2
	9	18	Saturated soft gray clay w/some silt, trace of coarse to fine sand.	50.7	18.2	75.1	MH	A-7-5(22)	100	93.2	1	1	1	1
	10	23	Saturated loose gray coarse sand w/some fine sand and fine gravel, trace of silt.	NV	NP	19.5	SW	A-1-b	87.8	3.6	1	3	5	8
	11	28	Saturated dense orange fine gravel w/some coarse to fine sand and silt.	NV	NP	10.9	GP-GM	A-1-a	44.1	10.8	22	28	8	8
	12	33	Saturated very stiff yellow clayey fine sandy silt w/trace of coarse sand and fine gravel.	21.3	8.3	14.1	SC	A-4(1)	98.3	49.8	7	8	11	23
	13	38	Saturated medium dense tan silty fine to coarse sand w/trace of fine gravel.	NV	NP	18.6	SM	A-2-4(0)	91.9	26	8	9	9	9
	14	43	Saturated dense tan silty fine to coarse sand w/trace of fine gravel.	NV	NP	15.1	SM	A-2-4(0)	96.5	27.7	11	14	18	19
	15	48	Saturated dense tan coarse to fine sand w/some fine gravel and silt.	NV	NP	16	SM	A-1-b	81.6	20.2	28	20	20	20
	16	53	No Recovery								18	19	15	12
	17	58	No Recovery								8	10	12	14
	18	63	No Recovery								5	7	9	9
	19	68	Saturated stiff yellow clay w/some silt and fine sand, trace of coarse sand.	54.2	20.1	46.6	MH	A-7-5(18)	100	76.7	6	6	8	12
	20	73	Saturated very stiff gray clay w/some fine to coarse sand and fine gravel, trace of silt.	71.6	37.3	30	SC	A-7-5(9)	80.2	40.6	6	10	15	40
	21	78	Saturated hard gray fine sandy clay w/trace of coarse sand and silt.	45.3	16.2	29.6	ML	A-7-6(8)	100	60.4	10	15	25	29
	22	83	Saturated hard gray fine sandy clay w/trace of coarse sand and silt.	43.2	17.3	28.7	CL	A-7-6(9)	100	62.6	13	20	20	26
	23	88	Saturated hard gray fine sandy clay w/some silt, trace of coarse sand.	35.3	12.7	23.1	CL	A-6(3)	100	50.3	15	18	28	36
	24	93	Saturated hard gray silty fine sandy clay w/trace of coarse sand.	35.8	12.1	23.3	CL	A-6(6)	100	60.7	15	17	28	29
	25	98	Saturated hard green fine sandy clay w/some coarse sand, trace of silt.	57.4	24.3	30.7	SM	A-7-5(7)	99.6	44.7	12	13	25	48
	26	104.7	Saturated hard greenish brown fine sandy silt w/some coarse sand and clay.	37.3	4.3	27.3	SM	A-4(0)	100	39	19	40	48	50
	27	108	No sieve analysis - Indication of saturated dense gray silty sand.	25.1	NP	15.5					50			
	28	113.2	No sieve analysis - Indication of saturated dense gray silty sand. (Weathered Rock)	23.3	6.2	21.2					50			
	29	118	No Recovery								50			
JS-5														
	1	20	Saturated soft gray clayey silt w/some fine sand, trace of coarse sand and fine gravel.	39.4	10.2	49.6	ML	A-4(7)	90.4	68.9	1	2	2	2
	2	22	No Sample								6	WH		
	3	24	No Sample								WH			
	4	26	Saturated soft gray clayey fine sandy silt w/some coarse sand and fine gravel.	30.7	8.5	42.5	SC	A-4(0)	81.5	36.1	1	2		
	5	33	Saturated loose tan fine gravelly coarse to fine sand w/trace of silt.	NV	NP	19.7	SW	A-1-b	76.1	4.4	8	6	4	6
	6	38	Saturated medium dense red silty coarse to fine sand w/trace of fine gravel.	NV	NP	19	SM	A-2-4(0)	92.2	25.3	7	6	7	7
	7	43	Saturated medium dense tan fine to coarse sand w/some silt.	NV	NP	18.9	SM	A-2-4(0)	99.6	20	7	14	15	15
	8	48	Saturated medium dense tan silty fine to coarse sand w/trace of fine gravel.	NV	NP	16.7	SM	A-2-4(0)	89.5	25.9	9	8	8	8
	9	53	Saturated medium dense yellow coarse to fine sand w/some silt, trace of fine gravel.	NV	NP	18.2	SM	A-1-b	92.9	14.8	9	8	9	15
	10	58	Saturated medium dense yellows coarse to fine sand and fine gravel w/some silt.	NV	NP	14.7	SM	A-1-b	70	17.3	12	11	8	11
	11	63	Saturated stiff yellow coarse sandy clay w/some fine sand and fine gravel, trace of silt.	42.6	13.6	22.8	SM	A-7-6(2)	81.4	39.3	13	6	9	14
	12	68	Saturated very stiff grayish tan fine sandy clay w/some silt, trace of coarse sand.	58.3	18.9	32.9	MH	A-7-5(16)	100	71.7	6	9	13	17
	13	73	Saturated very stiff grayish brown fine sandy clay w/some coarse sand and silt.	56.9	20.3	30.2	MH	A-7-5(10)	100	57.1	5	12	11	15
	14	78	Saturated hard reddish brown fine sandy clay w/some coarse sand and silt.	70.5	29.9	25.9	MH	A-7-5(14)	100	52.8	9	19	26	37
	15	83	Saturated hard grayish fine sandy clay w/some coarse sand and silt.	50.2	16.6	26	MH	A-7-5(7)	100	54	21	32	50	
	16	88	Saturated hard grayish brown fine sandy clay w/some coarse sand and silt.	47.4	13.5	20.6	ML	A-7-5(6)	100	53.7	15	34	50	
	17	93	Saturated hard reddish brown fine sandy clay w/some silt, trace of coarse sand.	43.2	13.8	88.9	ML	A-7-6(6)	100	55.3	16	19	22	30
	18	98	Saturated very dense grayish brown clayey fine to coarse sand w/trace of silt and fine gravel. (Weathered Rock)	54	14.2	71.1	SM	A-2-7(1)	97.4	32	18	28	52	
	19	103	Saturated very dense grayish brown silty fine sand w/some coarse sand, trace of fine gravel. (Weathered Rock)	NV	NP	73.6	SM	A-2-4(0)	99.1	27.6	26	28	50	
	20	108	Saturated hard green fine to coarse sandy clay w/some silt, trace of fine gravel. (Highly Weathered Rock)	37.5	11.4	287	SM	A-6(2)	97.9	43.3	50			
	21	113	Saturated hard green clayey fine sandy silt w/trace of coarse sand. (Highly Weathered Rock)	33.5	5.9	178.7	SM	A-4(0)	93.7	39.1	50			
	22	118	Saturated dense green silty coarse to fine sand w/some fine gravel. (Highly Weathered Rock)	NV	NP	120.9	SM	A-1-b	80.4	21.3	50			
			End Boring											

Boring/Trench/Test Pit number	SAMP_NUM	Depth (ft. or m.)	Material description	Liquid limit	Plasticity index	Natural moisture %	USCS	AASHTO classification	Percent < than the #10 sieve	Percent < than the #200 sieve	Blow count #1	Blow count #2	Blow count #3	Blow count #4
JS-6														
	1	23	River Mud.	NV	NP	150.4	ML	A-4(0)	100	87.1	WH			
	2	25	Saturated medium dense gray coarse sandy fine gravel w/some silt, trace of fine sand.	NV	NP	31	SP-SM	A-1-a	48.6	10.6	17	13	6	WH
	3	27	Saturated soft dark gray organic fine sandy silt w/some coarse sand.	40.9	NP	74.8	ML	A-5(0)	100	76.4	WH			
	4	29	Saturated soft dark gray clayey fine sandy silt w/trace of coarse sand.	32.3	7.9	55	ML	A-4(3)	100	61.6	WH			
	5	31	Saturated medium dense orange fine to coarse sand w/some silt, trace of fine gravel.	NV	NP	19.3	SM	A-2-4(0)	99.1	19.2	7	5	7	6
	6	33	Saturated loose orange clayey coarse to fine sand w/some silt, trace of fine gravel.	30.2	17.9	16.8	SC	A-2-6(1)	97.7	31.9	3	3	6	7
	7	38	Saturated soft pinkish white clay w/some silt and fine sand, trace of coarse sand.	46.9	24.5	29.2	CL	A-7-6(21)	100	83	WH	1	3	8
	8	43	Saturated medium dense orangish tan coarse to fine sand w/some silt, trace of fine gravel.	NV	NP	19.5	SM	A-2-4(0)	92.8	13.6	12	11	8	7
	9	48	Saturated medium dense orange organic silty fine sand w/some coarse sand, fine gravel and clay.	19.6	4.9	13.8	SC-SM	A-2-4(0)	82.6	30.9	7	8	7	7
	10	53	Saturated medium dense tannish orange silty coarse to fine sand w/some fine gravel.	NV	NP	14.9	SM	A-2-4(0)	85.5	20.9	6	6	7	10
	11	58	Saturated stiff gray silty fine sandy clay w/trace of coarse sand and fine gravel.	40.4	13.3	31.2	ML	A-6(7)	94.3	64.2	4	4	5	7
	12	63	Saturated very stiff green fine sandy clay w/some silt, trace of coarse sand.	54	18.5	37.5	MH	A-7-5(14)	100	69.3	7	10	13	13
	13	68	Saturated hard green fine sandy clay w/some silt, trace of coarse sand.	50.6	15.7	31.7	MH	A-7-5(13)	100	71.5	10	13	18	19
	14	73	Saturated hard green fine sandy clay w/some silt, trace of coarse sand.	41.9	13.8	28.1	ML	A-7-6(6)	100	55.7	11	22	24	28
	15	78	Saturated hard grayish brown fine sandy clay w/some silt, trace of coarse sand.	43.4	16.2	27.7	ML	A-7-6(7)	100	57.3	11	17	16	19
	16	83	Saturated very stiff green clay w/some fine sand and silt, trace of coarse sand.	62.1	26	36.1	MH	A-7-5(22)	99.6	75.3	8	9	15	15
	17	88	Saturated hard green fine sandy clay w/some silt, trace of coarse sand.	55.7	24.6	32	MH	A-7-5(14)	100	59.8	13	22	32	40
	18	93	Saturated hard reddish brown clay w/some coarse to fine sand and silt.	64.3	21.2	35.5	MH	A-7-5(17)	100	70.1	22	26	24	32
	19	98	Saturated hard bluish gray fine sandy clay w/trace of coarse sand and silt.	42.2	13.6	28.2	SM	A-7-6(3)	100	45.3	22	28	28	22
	20	103	Saturated dense bluish gray silty fine to coarse sand.	NV	NP	29.6	SM	A-2-4(0)	100	23.5	50			
	21	108	No Sample											
	22	113	No Sample											
	23	118	End Boring.											
JS-7														
	1	2.5	Wet firm brown clayey silt w/some coarse to fine sand, trace of fine gravel.	27.2	6.5	15.4	CL-ML	A-4(2)	91.3	64.1	2	4	3	
	2	4	Wet very dense brown fine gravel w/some fine to coarse sand and silt.	31.3	NP	13.1	SM	A-1-b	54.1	19.2	2	5	50	
	3	6	Wet soft brown clayey coarse sandy fine gravelly silt w/some fine sand.	27.8	6.3	15.3	SC-SM	A-4(0)	78.5	40.6	3	2	2	3
	4	8	Wet firm brown clayey silt w/some fine to coarse sand, trace of fine gravel.	26.9	5.7	24.2	CL-ML	A-4(2)	92.9	64.8	2	2	3	4
	5	10	Saturated soft gray clayey silt w/some coarse to fine sand and fine gravel.	34.1	6.2	35.9	ML	A-4(1)	82.7	50.3	3	2	1	1
	6	12	Saturated very stiff gray clayey fine gravelly silt w/some fine to coarse sand.	37.4	8.3	63.2	SM	A-4(0)	65.4	36.1	17	9	7	6
	7	14	Saturated loose gray clayey fine gravel w/some fine to coarse sand and silt.	32.6	7.6	36.3	SM	A-2-4(0)	67	31.6	3	2	2	1
	8	16	Saturated firm gray clayey fine gravelly silt w/some fine sand, trace of coarse sand.	37.3	8.6	42	ML	A-4(3)	76.7	54.9	3	5	3	2
	9	18	Saturated firm gray clayey silt w/trace of fine to coarse sand and fine gravel.	50.6	9.7	57.9	MH	A-5(9)	89.7	70.2	3	2	3	2
	U-1	20												
	11	22	Saturated firm brown clayey fine sandy silt w/some coarse sand, trace of fine gravel.	27.8	8	22.1	SC	A-4(1)	94	42.7	2	3	6	10
	12	24	Saturated loose tan clayey fine sand w/some coarse sand, fine gravel and silt.	33.3	14.5	19.3	SC	A-2-6(1)	86.4	33.6	2	3	6	10
	13	26	Saturated stiff reddish brown clayey fine sandy silt w/trace of coarse sand and fine gravel.	25.7	9.3	17.1	SC	A-4(1)	93.3	46.2	6	7	6	7
	14	28	Saturated medium dense reddish brown silty fine sand w/some coarse sand and fine gravel.	20.3	NP	16.1	SM	A-2-4(0)	80	24.4	5	10	14	13
	15	30	Saturated dense brown clayey fine sand w/some coarse sand and silt, trace of fine gravel.	22.7	9.4	16.8	SC	A-2-4(0)	98	34.1	9	14	20	22
	16	32	Saturated very stiff brown fine sand clay w/some coarse sand and silt, trace of fine gravel.	26.9	11.8	15.1	SC	A-6(1)	92.8	36.3	3	8	12	17
	17	34	Saturated medium dense brown clayey coarse to fine sand w/some silt, trace of fine gravel.	24.9	9.7	17.1	SC	A-2-4(0)	95.9	26.7	8	10	13	15
	18	36	Saturated very stiff brown silty clay w/some fine sand, trace of coarse sand and fine gravel.	37.3	15.6	23.7	CL	A-6(10)	94.1	71.9	11	13	9	8
	19	38	Saturated very stiff reddish brown clayey fine sandy silt w/trace of coarse sand and fine gravel.	25	8	19.7	SC	A-4(1)	90.7	44.8	8	10	10	13
	20	40	No sieve analysis - Indication of saturated dense brown sand.								8	15	25	20
	21	43	Saturated dense brown silty fine to coarse sand w/some fine gravel.	NV	NP	15.1	SM	A-2-4(0)	82.2	20.8	15	20	22	16
	22	48	Saturated medium dense gray coarse to fine sand w/some fine gravel and silt.	NV	NP	15.2	SM	A-1-b	84.8	12.9	7	8	13	20
	23	53	Saturated medium dense tan fine gravel and coarse to fine sand w/some silt.	NV	NP	13.8	SM	A-1-b	74.8	18.5	10	6	5	11
	24	58	Saturated stiff tan fine sandy clay w/some coarse sand, trace of silt and fine gravel.	50.1	12.3	42	SM	A-7-5(4)	90.2	48.9	5	7	7	13
	25	63	Saturated hard grayish brown fine sandy clay w/some silt, trace of coarse sand. (Weathered Rock)	44.2	11.3	41.3	ML	A-7-5(5)	100	56.3	15	24	24	28
	26	68	Saturated hard grayish brown fine sandy clay w/some coarse sand, trace of silt. (Weathered Rock)	41.1	11.5	34.8	SM	A-7-5(3)	100	47.2	14	23	39	37
	27	73	Saturated hard bluish gray clayey fine to coarse sandy silt. (Weathered Rock)	45.5	8.8	34	SM	A-5(2)	100	46.9	27	45	50	
	28	78	Saturated hard bluish gray clayey fine sandy silt w/trace of coarse sand. (Wea t hered Rock)	41	8.9	29.8	ML	A-5(4)	100	59.3	24	25	50	
	29	83	Saturated hard bluish gray clay w/some fine to coarse sand and silt. (Weathered Rock)	43.4	11.8	25.8	ML	A-7-5(8)	100	69.1	19	25	24	50
	30	88	Saturated hard bluish gray fine sandy clay w/some silt, trace of coarse sand. (Weathered Rock)	45.7	14.7	30	ML	A-7-5(8)	100	60.9	21	27	28	41
	31	93	Saturated hard bluish gray fine sandy clay w/some silt, trace of coarse sand and fine gravel. (Weathered Rock)	42.7	11	28.4	ML	A-7-5(8)	99.2	70.1	15	20	20	25
	32	98	Saturated very dense bluish gray silty fine sand w/some coarse sand.(Weathered Rock)	NV	NP	22.7	SM	A-2-4(0)	100	29	23	44	50	
	33	103	End Boring.											

Boring/Trench/Test Pit number	SAMP_NUM	Depth (ft. or m.)	Material description	Liquid limit	Plasticity index	Natural moisture %	USCS	AASHTO classification	Percent < than the #10 sieve	Percent < than the #200 sieve	Blow count #1	Blow count #2	Blow count #3	Blow count #4
JS-8														
	1	0	Moist medium dense brown silty coarse sandy fine gravel w/some fine sand.	23.6	NP	13.1	SM	A-2-4(0)	66.4	32.9	10	10	12	12
	2	2	Saturated firm black coarse sandy fine gravelly silt w/some fine sand.	37.7	NP	37.5	SM	A-4(0)	75.9	37.4	5	4	4	3
	3	4	Saturated soft gray silty clay w/some fine gravel, trace of fine to coarse sand.	40.1	11.7	53.7	ML	A-6(9)	87.6	73	2	1	1	3
	4	6	Saturated soft gray clay w/some coarse to fine sand and silt, trace of fine gravel.	40.9	14.2	59.2	ML	A-7-6(9)	96.9	68.4	2	2	1	2
	5	8	Saturated medium dense brown fine gravelly coarse sand w/some fine sand and silt.	NV	NP	15.5	SM	A-1-b	75.5	12.5	5	10	11	12
	6	10	Saturated stiff brownish red fine to coarse sandy clay w/some silt, trace of fine gravel.	26.6	10.1	14.4	SC	A-6(2)	97.8	44.1	7	8	7	10
	7	12	Saturated medium dense orange silty fine sand w/some coarse sand.	NV	NP	15.4	SM	A-2-4(0)	99.8	28.2	5	8	9	9
	8	14	Saturated medium dense orangish brown silty fine to coarse sand w/trace of fine gravel.	NV	NP	14.8	SM	A-2-4(0)	94.1	28.9	5	8	8	8
	9	16	Saturated stiff reddish orange clayey fine sandy silt w/trace of coarse sand and fine gravel.	26.2	10.5	17.2	CL	A-4(4)	96.2	68.6	5	7	8	9
	10	18	Saturated stiff red silty fine sandy clay w/trace of coarse sand.	33.7	15	22.1	CL	A-6(6)	100	60.1	3	4	7	8
	11	23	Saturated medium dense brownish orange silty fine to coarse sand w/trace of fine gravel.	17.5	NP	15.9	SM	A-2-4(0)	94.1	27.3	7	6	10	8
	12	28	Saturated firm red silty clay w/some fine sand, trace of coarse sand.	36.3	16.6	24.8	CL	A-6(13)	100	85.4	3	4	6	6
	13	33	Saturated medium dense orange silty fine to coarse sand w/some fine gravel.	NV	NP	16.3	SM	A-2-4(0)	87.3	22.8	6	10	12	16
	14	38	Saturated medium dense brown silty fine sand w/some coarse sand and fine gravel.	NV	NP	16.7	SM	A-2-4(0)	88	23.5	14	15	13	16
	15	43	Saturated medium dense gray clayey fine to coarse sand w/some silt and fine gravel.	19.7	6.3	15.4	SC-SM	A-2-4(0)	87.2	28.2	7	14	14	15
	16	48	Saturated very stiff brownish tan fine sandy silt w/some clay, trace of coarse sand.	31.3	4.3	26.6	ML	A-4(1)	100	62.6	10	12	15	17
	17	53	Saturated very stiff brownish gray fine sandy clay w/trace of coarse sand, fine gravel and silt.	41.6	12.4	32.6	ML	A-7-6(9)	98.3	67.8	6	8	19	24
	18	58	Saturated very stiff brown fine sandy clay w/some silt, trace of coarse sand.	44.3	16.6	34.8	ML	A-7-6(9)	100	64.5	8	10	18	19
	19	63	Saturated hard brownish gray clayey fine sandy silt w/some coarse sand.	37.5	7.9	25.1	SM	A-4(1)	100	46	12	19	28	27
	20	68	Saturated hard grayish green fine sandy clay w/some silt, trace of coarse sand.	35.5	10.4	24.8	SM	A-6(3)	100	49.7	12	18	24	18
	21	73	No Sample								50			
	22	78	Saturated very dense greenish gray silty fine to coarse sand.	NV	NP	40.7	SM	A-2-4(0)	100	22.4	17	36	43	50
	23	83	Saturated very dense greenish gray silty fine to coarse sand w/trace of fine gravel.	NV	NP	31.3	SM	A-2-4(0)	96.2	25.2	23	35	50	
	24	88	No sieve analysis - Indication of saturated dense greenish gray highly weathered rock.	30.5	NP	13.1					50			
	25	93	No sieve analysis - Indication of saturated dense greenish gray highly weathered rock.	41.9	7	32.2					50			
	26	98	Saturated very dense greenish gray clayey fine to coarse sand w/some silt, trace of fine gravel.	42.2	6.6	32.5	SM	A-2-5(0)	95.7	27.3	25	50		
	CR-1	101.5	Schist, gray fine grained, thin bedded, slightly weathered, hard.											
	CR-2	106.5	Schist, gray fine grained, thin bedded, slightly weathered, hard.											
		111.5	End Boring.											
JS-9														
	1	0	Moist medium dense brown coarse to fine sand and fine gravel w/some silt.	NV	NP	5.5	SP-SM	A-1-b	65	11.9	15	8	8	12
	2	2	Wet firm brownish gray silt w/some fine to coarse sand, trace of fine gravel and clay.	27.3	2.8	21.7	ML	A-4(1)	97.5	75.3	3	3	3	2
	3	4	Wet stiff tan clayey silt w/trace of fine to coarse sand and fine gravel.	28.4	6.3	23.2	CL-ML	A-4(5)	99.2	94.2	6	6	6	5
	4	6	Wet very stiff tan silt w/some fine sand and clay, trace of coarse sand and fine gravel.	23.3	4.2	20.2	CL-ML	A-4(1)	96.5	69.6	6	7	11	9
	5	8	Wet medium dense brown coarse to fine sand w/some fine gravel and silt.	NV	NP	16.2	SM	A-1-b	80.3	14.8	6	8	12	12
	6	10	Wet medium dense brown fine gravelly coarse to fine sand w/some silt.	NV	NP	17.8	SP-SM	A-1-b	79	11.1	8	11	9	6
	7	12	Wet dense brown coarse sandy fine gravel w/some fine sand, trace of silt.	NV	NP	13.1	SW-SM	A-1-b	50.8	6.1	9	19	20	20
	8	14	Wet dense orange coarse sandy fine gravel w/some fine sand and silt.	NV	NP	12.9	SP-SM	A-1-a	49.1	10.9	25	29	19	27
	9	16	Wet medium dense orange silty fine sand and fine gravel w/some coarse sand.	NV	NP	14	SM	A-1-b	66.9	22.3	25	8	11	10
	10	18	Wet medium dense orange silty fine sand w/some coarse sand, trace of fine gravel.	NV	NP	17.1	SM	A-2-4(0)	97.1	33.9	12	3	8	9
	11	23	Wet stiff brown clayey fine sandy silt w/some coarse sand, trace of fine gravel.	23.7	8.7	19.6	SC	A-4(0)	98.8	35.8	5	5	7	12
	12	28	Wet medium dense brownish orange silty coarse to fine sand w/trace of fine gravel.	28.5	11	17.8	SC	A-2-4(0)	95.3	24.8	10	11	8	10
	13	33	Wet very stiff reddish brown fine sandy clay w/some coarse sand and silt, trace of fine gravel.	27.7	12.5	16	SC	A-6(1)	98.4	40.1	2	6	13	12
	14	37	Wet medium dense brownish gray clayey fine to coarse sand w/some fine gravel, trace of silt	27.1	10.7	14.3	SC	A-2-6(0)	80.2	21.6	6	16	14	16
	15	42	Wet medium dense reddish brown silty fine sand w/some fine gravel and clay, trace of coarse sand.	20.1	5.4	16.7	SC-SM	A-2-4(0)	85.5	31.2	4	7	12	19
	16	47	Wet medium dense gray silty fine sand w/some coarse sand and fine gravel.	16.3	NP	15.9	SM	A-2-4(0)	88.8	22.5	8	11	10	14
	17	52	Saturated firm grayish brown fine sandy clay w/some silt, trace of coarse sand and fine gravel.	46.6	17.1	41.1	ML	A-7-5(13)	98.8	72.6	2	3	6	5
	18	57	Saturated very stiff grayish brown fine sandy clay w/some silt, trace of coarse sand and fine gravel.	43.8	17.6	34.9	CL	A-7-6(12)	99	67.6	7	7	9	13
	19	62	Saturated very stiff grayish brown clayey fine sandy silt w/trace of coarse sand and fine gravel.	30.7	10	24.7	SC	A-4(2)	99.4	45.2	9	10	11	23
	20	67	Saturated hard bluish gray fine sandy clay w/some coarse sand, trace of silt and fine gravel.	58	23.3	38.2	SM	A-7-5(6)	99.3	44.2	10	17	20	22
	21	72	Saturated medium dense bluish gray silty fine to coarse sand w/trace of fine gravel.	37.9	NP	31.6	SM	A-2-4(0)	93.9	25.5	18	16	18	50
	22	77	Saturated very dense bluish gray silty fine sand w/some coarse sand, trace of fine gravel.	27.3	NP	21.8	SM	A-2-4(0)	95.3	22.3	50			
	23	82	Saturated very dense bluish gray coarse to fine sand and fine gravel w/some silt.	39.2	NP	29.9	SM	A-1-b	72.4	13.2	28	38	44	50
	24	87	Saturated dense gray silty fine sand w/some coarse sand, trace of fine gravel. (Weathered Rock)	33.9	NP	24.3	SM	A-2-4(0)	99.3	30.1	50			
	25	92	Saturated dense gray silty fine sand w/some coarse sand, trace of fine gravel. (Weathered Rock)	39.7	NP	30.7	SM	A-2-4(0)	98.7	31.6	50			
	26	97	Schist, wet, very dense weathered rock.								50			
	CR-1	98	Schist gray fine grained thin bedded, mod-slightly weathered rock.											
	CR-2	104.9	Schist gray fine grained thin bedded, slightly weathered rock.											
		108.7	End Boring.											
JS-10														
	1	0	Moist very stiff red coarse sandy silt w/some fine sand and fine gravel, trace of clay.	27.6	2.6	11.3	SM	A-4(0)	80.6	35.6	9	12	14	10
	2	2	Indication of - moist loose red brick rubble.	32.9	NP	16.9					4	4	3	2
	3	4	Wet very stiff brown silt w/trace of fine to coarse sand and clay.	24.4	2.2	19.7	ML	A-4(1)	99.5	88.3	12	8	9	10
	4	6	Wet medium dense brown silty fine to coarse sand and fine gravel.	16.6	NP	13	SM	A-2-4(0)	79.4	29	11	6	6	9
	5	8	Wet medium dense brown coarse sand and fine gravel w/trace of fine sand and silt.	NV	NP	11.3	SW-SM	A-1-b	54.1	5.2	10	12	14	14
		10	End Boring.											

CONSOLIDATION TEST REPORT



Natural Sat.	Natural Moist.	Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (tsf)	P_c (tsf)	C_c	C_r	Swell Press. (tsf)	Swell %	e_o
102.8 %	70.5 %	56.8	48.1	13.1	2.420	1.02	1.15	0.65	0.08			1.659

MATERIAL DESCRIPTION (1.15 tsf = 2300 psf)	USCS	AASHTO
Saturated dark gray organic clay w/some fine gravel, trace of fine to coarse sand and silt.	ML	A-7-5(12)

Project No. T201207101 **Client:**

Project: James Street Bridge

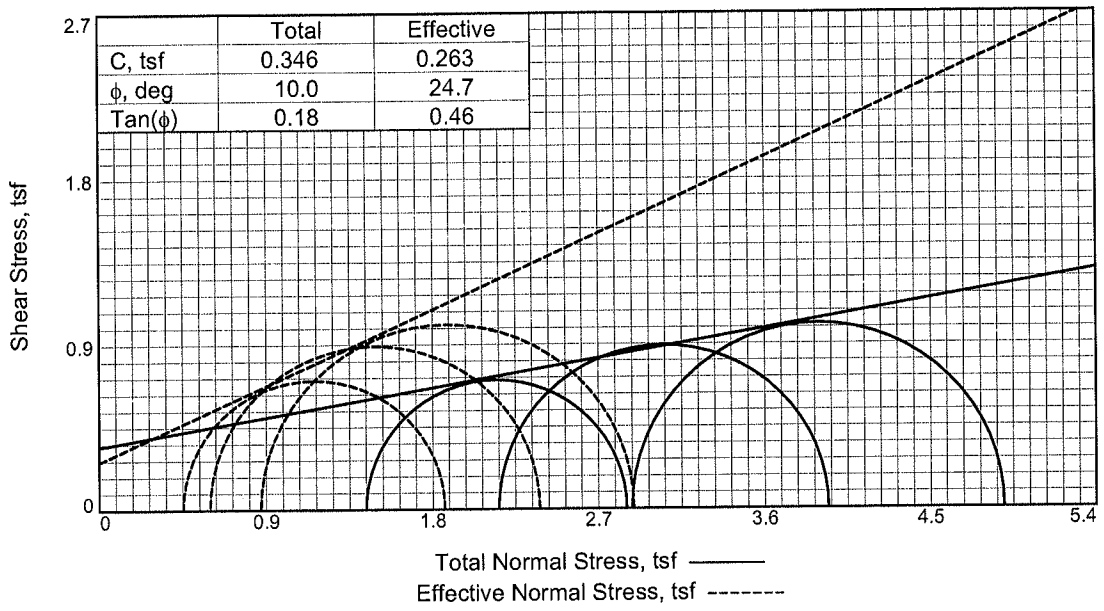
Source: JS-2 **Sample No.:** U-1 **Elev./Depth:** 16.0

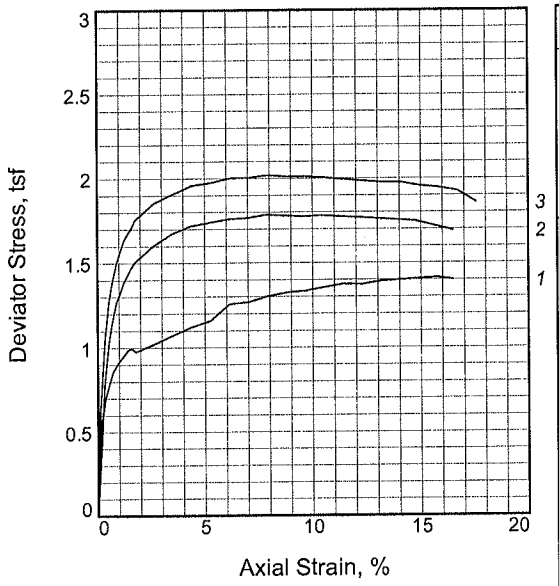
Remarks:

CONSOLIDATION TEST REPORT

Delaware Department of Transportation
Materials and Research Laboratory

Figure





Sample No.		1	2	3
Initial	Water Content, %	80.1	71.0	73.1
	Dry Density, pcf	54.4	57.7	56.7
	Saturation, %	103.9	100.6	100.9
	Void Ratio	2.0433	1.8692	1.9184
	Diameter, in.	2.85	2.85	2.85
	Height, in.	6.09	5.98	6.07
At Test	Water Content, %	59.8	55.0	60.1
	Dry Density, pcf	64.0	67.3	63.8
	Saturation, %	100.0	100.0	100.0
	Void Ratio	1.5848	1.4568	1.5930
	Diameter, in.	2.71	2.69	2.77
	Height, in.	5.71	5.76	5.69
Strain rate, in./min.		0.00	0.00	0.00
Back Pressure, psi		90.00	90.00	90.00
Cell Pressure, psi		110.00	120.00	130.00
Fail. Stress, tsf		1.41	1.78	2.02
Total Pore Pr., tsf		7.47	8.04	8.49
Ult. Stress, tsf				
Total Pore Pr., tsf				
$\bar{\sigma}_1$ Failure, tsf		1.86	2.38	2.89
$\bar{\sigma}_3$ Failure, tsf		0.45	0.60	0.87

Type of Test:
CU with Pore Pressures
Sample Type: Undisturbed
Description: Elastic SILT

LL= 66 **PL=** 36 **PI=** 30
Assumed Specific Gravity= 2.65
Remarks:

Client: Delaware Department of Transportation

Project: Replacement of BR1-159 James Street Bridge

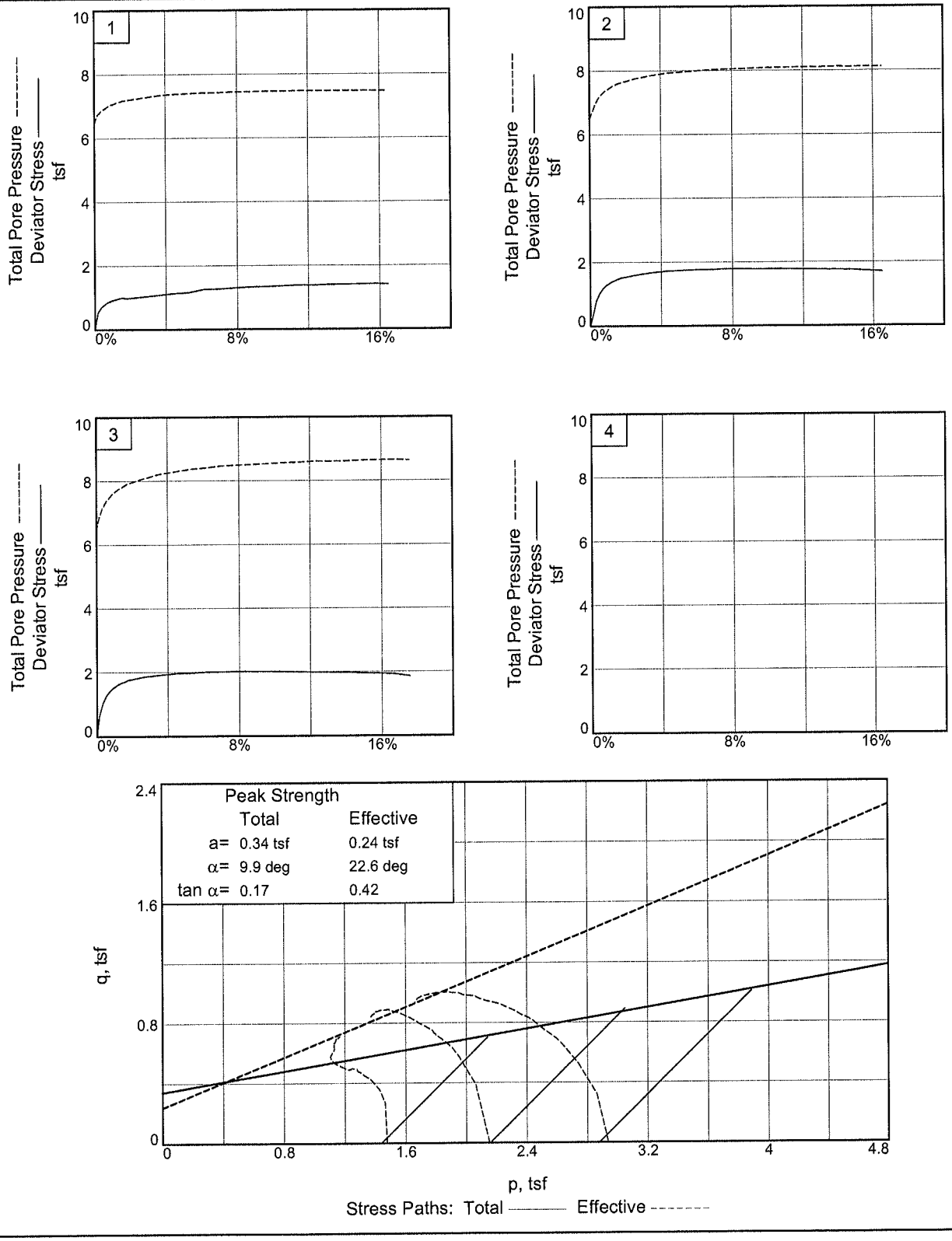
Source of Sample: JS-2 **Depth:** 26.0
Sample Number: U-2

Proj. No.: AGR 1550, Task 15 **Date Sampled:**

GEO-TECHNOLOGY ASSOCIATES, INC.
18 Boulden Circle, Suite 36
New Castle, DE 19720

Figure 1

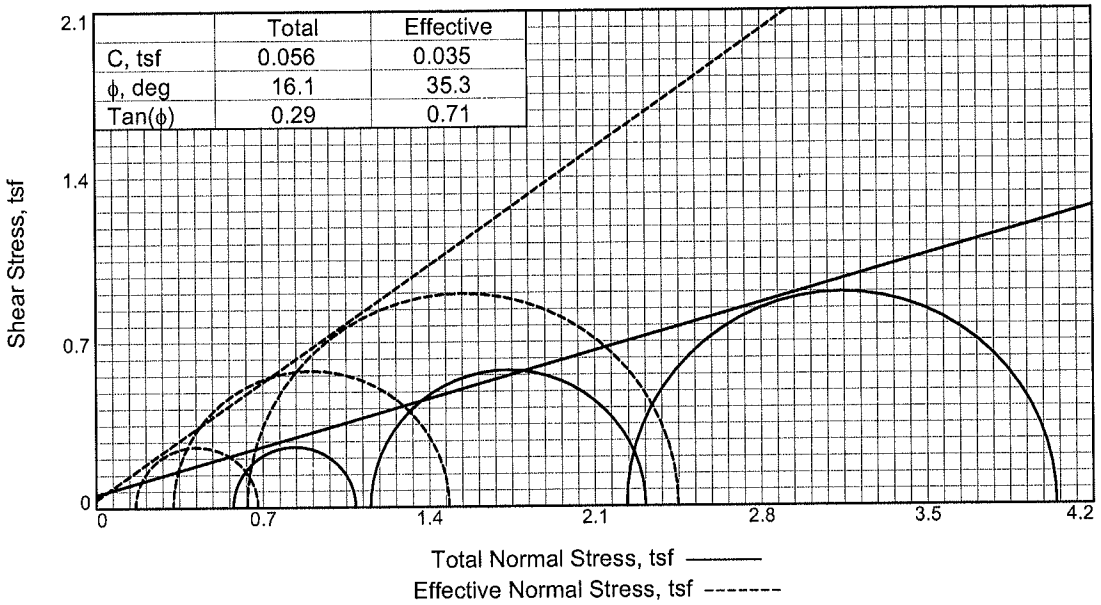
Tested By: K. Kershaw **Checked By:** M. Lester

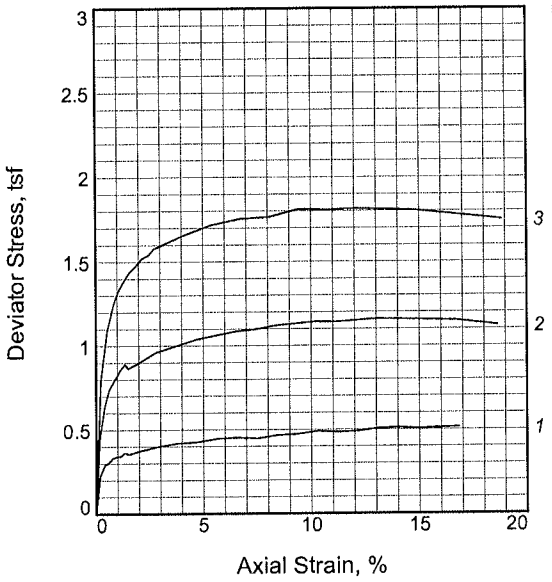


Client: Delaware Department of Transportation
Project: Replacement of BR1-159 James Street Bridge
Source of Sample: JS-2 **Depth:** 26.0 **Sample Number:** U-2
Project No.: AGR 1550, Task 15 **Figure** _____

Geo-Technology Associates, Inc.

Tested By: K. Kershaw **Checked By:** M. Lester





Sample No.		1	2	3
Initial	Water Content, %	74.4	74.4	74.4
	Dry Density, pcf	49.3	55.5	53.4
	Saturation, %	83.7	99.6	94.0
	Void Ratio	2.3570	1.9808	2.0984
	Diameter, in.	2.88	2.88	2.88
	Height, in.	5.63	5.63	4.05
At Test	Water Content, %	66.1	57.2	53.4
	Dry Density, pcf	60.1	65.7	68.5
	Saturation, %	100.0	100.0	100.0
	Void Ratio	1.7523	1.5162	1.4139
	Diameter, in.	2.67	2.70	2.65
	Height, in.	5.34	5.37	3.71
Strain rate, in./min.		0.00	0.00	0.00
Back Pressure, psi		90.00	90.00	91.00
Cell Pressure, psi		98.00	106.00	122.00
Fail. Stress, tsf		0.51	1.16	1.81
Total Pore Pr., tsf		6.89	7.31	8.15
Ult. Stress, tsf				
Total Pore Pr., tsf				
$\bar{\sigma}_1$ Failure, tsf		0.68	1.48	2.45
$\bar{\sigma}_3$ Failure, tsf		0.17	0.32	0.63

Type of Test:
CU with Pore Pressures
Sample Type: Undisturbed
Description: Elastic SILT

LL= 55 **PL=** 35 **PI=** 20
Assumed Specific Gravity= 2.65
Remarks:

Client: Delaware Department of Transportation

Project: Replacement of BR1-159 James Street Bridge

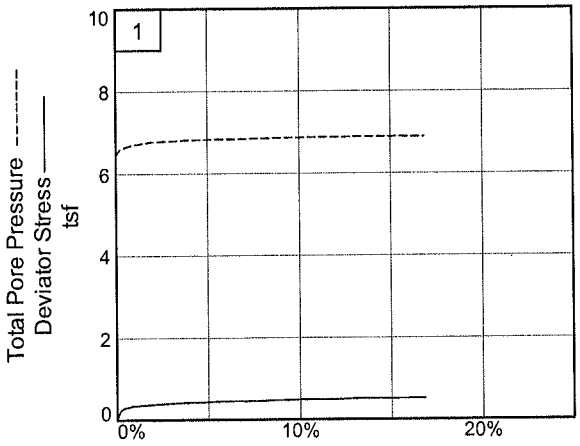
Source of Sample: JS-3 **Depth:** 22.0
Sample Number: U-1

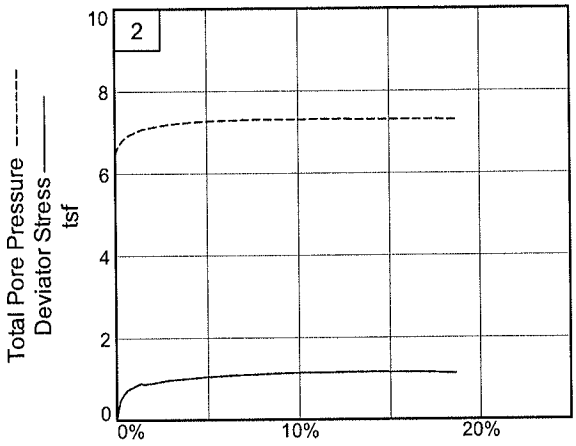
Proj. No.: AGR 1550, Task 15 **Date Sampled:**

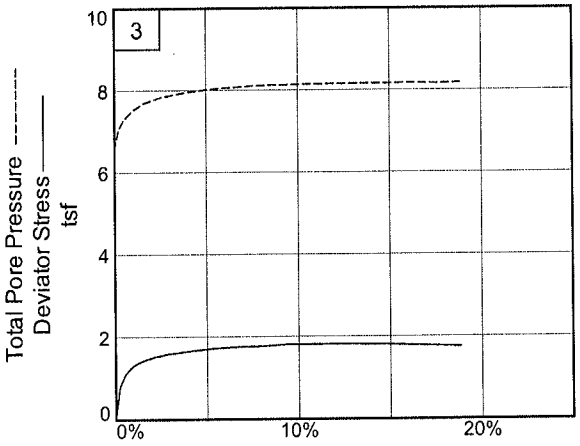
GEO-TECHNOLOGY ASSOCIATES, INC.
18 Boulden Circle, Suite 36
New Castle, DE 19720

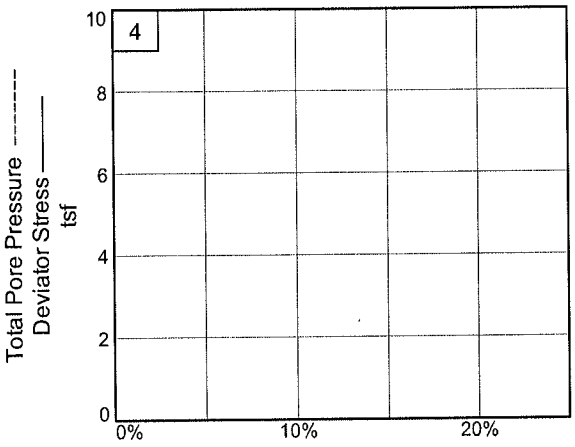
Figure 2

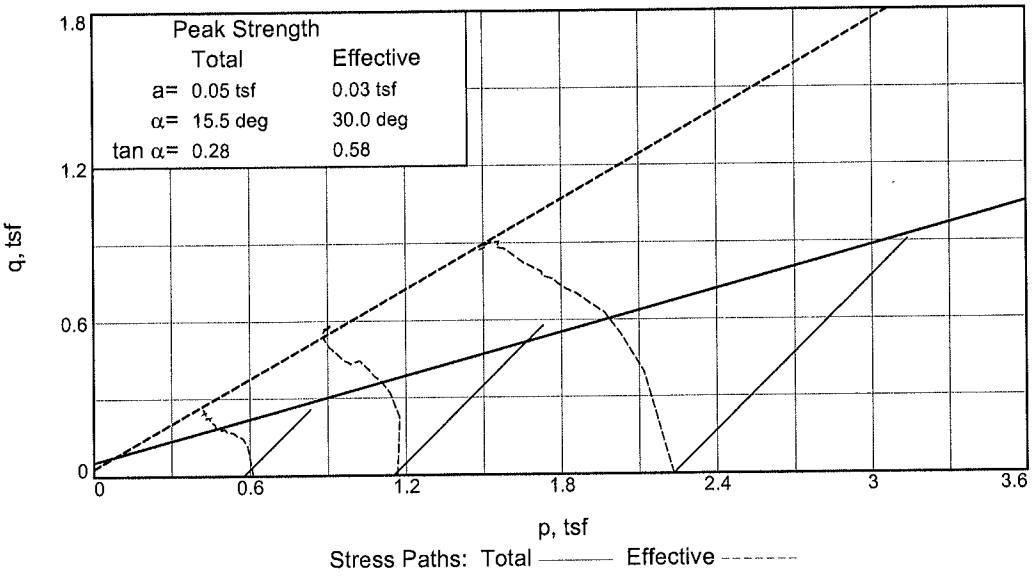
Tested By: C. Reith **Checked By:** M. Lester











Client: Delaware Department of Transportation
Project: Replacement of BR1-159 James Street Bridge
Source of Sample: JS-3 **Depth:** 22.0 **Sample Number:** U-1
Project No.: AGR 1550, Task 15 **Figure** _____

Geo-Technology Associates, Inc.

Tested By: C. Reith **Checked By:** M. Lester

Preliminary Subsurface Exploration
AGR 1550, Task 15, Replacement of BR1-159 James Street Bridge

TABLE
SUMMARY OF CORROSION POTENTIAL TESTING

Corrosion Potential Test	Sample ID		
	JS-7 38-42 feet	JS-3 32-38 feet	JS-3 38-55 feet
Resistivity -ohm-cm (ASTM G-57)			
< 1,500			
≥ 1,500-1,800			
> 1,800-2,100			
> 2,100-2,500			
> 2,500-3,000			
> 3,000	18,000	21,000	27,000
pH (ASTM G-51)			
0-2			
2-4			
4-6.5	6.00		6.46
6.5-7.5		6.89	
7.5-8.5			
> 8.5			
pH (Retested six weeks from original test date)	---	---	---
Redox potential (ASTM D1498)			
> 100 mV	380.8	396.1	400.0
50 to 100 mV			
0 to 50 mV			
Negative			
Sulfides			
Positive			
Trace			
Negative	Negative	Negative	Negative
Moisture (ASTM D-2216)			
Poor drainage, continuously wet	Wet	Wet	Wet
Fair Drainage, generally moist			
Good drainage, generally dry			

APPENDIX C

Design Calculations

C-1 – Abutment Design Calculations
C-2 – Piers Design Calculations
C-3 – Scour Analysis Summary

APPENDIX C-1

Abutment Design Calculations

ABUTMENT A

Boring No. JS-2 By: SJM Chk: AT

OG Elev. = ~~5706~~ 8.5

Sample No.	Depth of SS run (ft)	N-Values Field	q'_v (ksf)	C_N	N_{CORR}	Layer
1	2	20	0.095	2.020	40	1
2	4	50	0.190	1.788	89	
3	6	12	0.286	1.653	20	
4	8	20	0.381	1.556	31	
5	10	8	0.476	1.482	12	
6	12	4	0.571	1.421	6	2
7	14	4	0.666	1.369	5	
9	18	5	0.857	1.285	6	
10	20	7	0.952	1.250	9	
11	22	2	1.047	1.218	2	
12	26	2	1.238	1.162	2	
13	28	5	1.333	1.138	6	3
14	30	15	1.428	1.114	17	
15	32	20	1.523	1.093	22	
16	34	45	1.618	1.073	48	
17	36	18	1.714	1.053	19	
18	38	29	1.809	1.035	30	
19	40	12	1.904	1.018	12	4
20	42	28	1.999	1.002	28	
21	48	46	2.285	0.957	44	
22	53	12	2.523	0.924	11	
23	58	14	2.761	0.894	13	
24	63	17	2.999	0.866	15	5
25	68	13	3.237	0.841	11	
26	73	18	3.475	0.817	15	6
27	78	31	3.713	0.795	25	
28	83	38	3.951	0.774	29	
29	88	61	4.189	0.755	46	
30	93	44	4.427	0.736	32	
31	98	44	4.665	0.719	32	7
32	103	83	4.903	0.702	58	
33	108	50	5.141	0.686	34	
34	113	79	5.379	0.671	53	
35	118	50	5.617	0.656	33	
				$N_{Avg\ (Below\ BPCE)}$	**25**	

GWT= -23.0

γ = 110 lb/ft3

γ' = 47.6 lb/ft3

C_N= 0.77xlog (40/q'_v)

N_{CORR} = N_{Field} x C_N

(Ref. AASHTO Eqn 10.4.6.2.4-1)

McCORMICK TAYLOR

PROJECT BR 1-159 JOB NO. _____ SHEET NO. 1 OF 1

LOCATION ABUTMENT A

SUBJECT SOIL PROFILE (JS-2)

DESIGNED BY SJM DATE 7/24/14 CHECKED BY AT DATE 8/14

REVISED BY _____ DATE _____ BACK CHECKED BY _____ DATE _____

REF./REM.

BORING JS-2

DEPTH BELOW OG.	LAYER THICKNESS (FT)	x_1 DEPTH BELOW BDSCE	ELEVATION	SOIL TYPE
$x=0$			8.5	
	(10)	$x_1=0$		N_{CORR} = 20-89 MED SAND WITH SILT + GRAVEL (FILL) DENSE γ_s = 135 pcf ϕ = 34° ▽ MHWE 4.64
LAYER 1 $x=10$		$x_1=3.0-1.5$		
	(16)			N_{CORR} 2-12 SOFT CLAY WITH SAND γ_s = 100 pcf C = 400 psf ϕ = 0°
$x=26$		$x_1=19-17.5$		
	(12)			N_{CORR} 6-48 MED SAND WITH SOME GRAVEL γ_s = 130 pcf ϕ = 32° C = 0 psf
$x=38$		$x_1=31-29.5$		
	(20)			N_{CORR} 11-44 CLAY + F SAND ϕ = 0° γ_s = 125 pcf C = 1000 psf
$x=58$		$x_1=51-49.5$		
	(10)			N_{CORR} 14-15 MED SAND WITH GRAVEL γ = 130 pcf ϕ = 32° C = 0 psf
$x=68$		$x_1=61-59.5$		
	(25)			N_{CORR} = 15-46 SILT / CLAY + F SAND γ = 125 pcf C = 1000 psf ϕ = 0°
$x=93$		$x_1=86-84.5$		
	(25)			N_{CORR} = 32-58 VERY DENSE SAND + GRAVEL γ_s = 135 pcf ϕ = 34°
$x=118$		$x_1=111-109.5$		

SCOUR: NONE

TOP OF DS +2.5 BDSCE +4.5 $x_1=0$

TIP @ x_1 = 95' EL -93.5 SAY -94.0

Ref: FHWA HI-88-009, July 1993

a. Granular Soil (Sand)

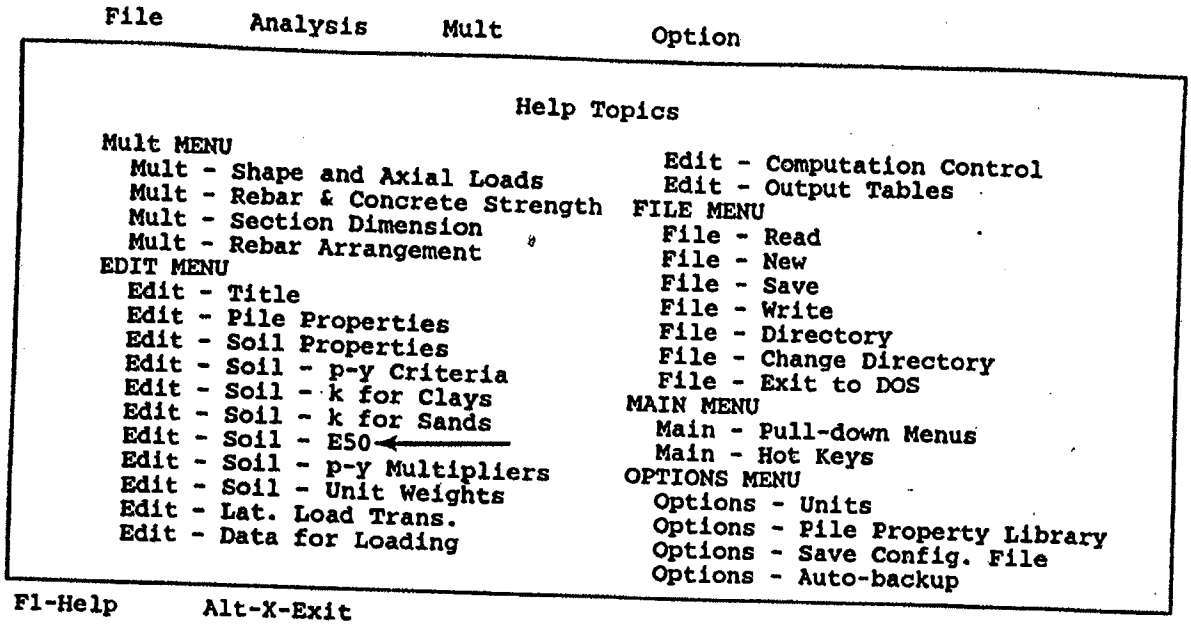
Description	Very Loose	Loose	Medium	Dense	Very Dense
Standard Penetration no. N'*	0	4	10	30	50
Approx. angle of internal friction, (ϕ)degrees**	25-30	27-32	30-35	35-40	38-43
Approx. range of moist unit weight, (γ)pcf**	70-100	90-115	110-130	120-140	130-150

* N' is SPT value corrected for overburden pressure.
** Use larger values for granular material with 5% or less fine sand and silt.

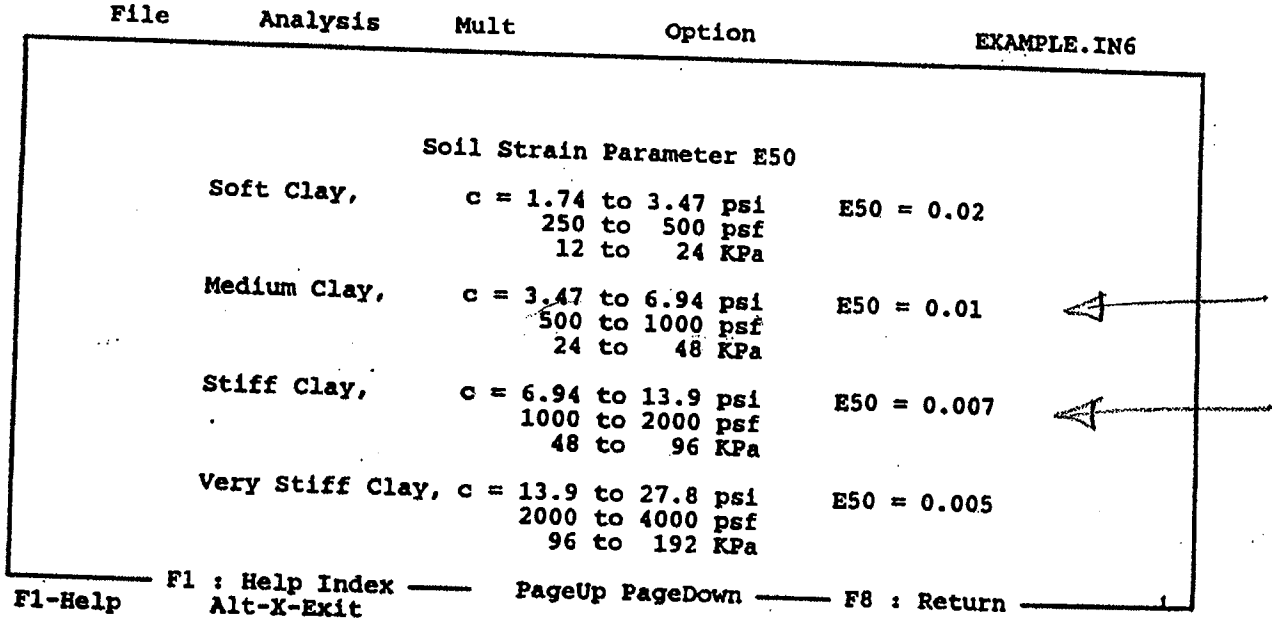
b. Cohesive soils (Clay) - (Rather unreliable, use only for preliminary estimate purposes).

Consistency	Very Soft	Soft	Medium	Stiff	Very Stiff	Hard
qu, ksf	0	0.5	1.0	2.0	4.0	8.0
N, standard penetration resistance	0	2	4	8	16	32
γ(moist) pcf	100-120		110-130		120-140	

4. Use the appropriate equation on figures 14 thru 17 to compute the ultimate bearing capacity. The continuous footing general case may be used when the footing length is 9 or more times the footing width. Also the bearing capacity factor N_γ will usually be determined for a rough base condition since most footings are poured concrete. If soil test data was used, apply a minimum safety factor of 2.5 to find the allowable bearing capacity. A safety factor of 3 should be used for bearing capacity computed using standard penetration values.



Move the cursor to the "E50", then press <Enter>.



Press Command Key [F8] to return.

Recommended k	Relative Density		
	Loose	Medium	Dense
MN/m³	5.4	16.3	34
(lb/in.³)	(20.0)	(60.0)	(125.0)

Table 3.6 Representative Values of k for Submerged Sand

Recommended k	Relative Density		
	Loose	Medium	Dense
MN/m³	6.8	24.4	61.0
(lb/in.³)	(25.0)	(90.0)	(225.0)

Table 3.7 Representative Values of k for Sand Above the Water Table (Static and Cyclic Loading)

9. Establish the parabolic section of the p-y curve,

$$p = \overline{C} y^{1/n} \quad \text{.....(3.53)}$$

Fit the parabola between points k and m as follows:

a. Get the slope of the line between points m and u by,

$$m = \frac{p_u - p_m}{y_u - y_m} \quad \text{.....(3.54)}$$

b. Obtain the power of the parabolic section by,

$$n = \frac{p_m}{m y_m} \quad \text{.....(3.55)}$$

c. Obtain the coefficient $\overline{C}$ as follows:

$$\overline{C} = \frac{p_m}{y_m^{1/n}} \quad \text{.....(3.56)}$$

Table 10.5.5.2.4-1—Resistance Factors for Geotechnical Resistance of Drilled Shafts

Method/Soil/Condition			Resistance Factor
Nominal Axial Compressive Resistance of Single-Drilled Shafts, φ_{stat}	Side resistance in clay	α-method (O'Neill and Reese, 1999)	0.45
	Tip resistance in clay	Total Stress (O'Neill and Reese, 1999)	0.40
	Side resistance in sand	β-method (O'Neill and Reese, 1999)	0.55
	Tip resistance in sand	O'Neill and Reese (1999)	0.50
	Side resistance in IGMs	O'Neill and Reese (1999)	0.60
	Tip resistance in IGMs	O'Neill and Reese (1999)	0.55
	Side resistance in rock	Horvath and Kenney (1979) O'Neill and Reese (1999)	0.55
	Side resistance in rock	Carter and Kulhawy (1988)	0.50
	Tip resistance in rock	Canadian Geotechnical Society (1985) Pressuremeter Method (Canadian Geotechnical Society, 1985) O'Neill and Reese (1999)	0.50
Block Failure, φ_{b1}	Clay		0.55
Uplift Resistance of Single-Drilled Shafts, φ_{up}	Clay	α-method (O'Neill and Reese, 1999)	0.35
	Sand	β-method (O'Neill and Reese, 1999)	0.45
	Rock	Horvath and Kenney (1979) Carter and Kulhawy (1988)	0.40
Group Uplift Resistance, φ_{ug}	Sand and clay		0.45
Horizontal Geotechnical Resistance of Single Shaft or Shaft Group	All materials		1.0
Static Load Test (compression), φ_{load}	All Materials		Values in Table 10.5.5.2.3-2, but no greater than 0.70
Static Load Test (uplift), φ_{upload}	All Materials		0.60

10.5.5.2.5—Micropiles

Resistance factors shall be selected from Table 10.5.5.2.5-1 based on the method used for determining the nominal axial pile resistance. If the resistance factors provided in Table 10.5.5.2.5-1 are to be applied to piles in potentially creeping soils, highly plastic soils, weak rock, or other marginal ground type, the resistance factor values in the Table should be reduced by 20 percent to reflect greater design uncertainty.

C10.5.5.2.5

The resistance factors in Table 10.5.5.2.5-1 were calibrated by fitting to ASD procedures tempered with engineering judgment. The resistance factors in Table 10.5.5.2.5.-2 for structural resistance were calibrated by fitting to ASD procedures and are equal to or slightly more conservative than corresponding resistance factors from Section 5 of the AASHTO LRFD Specifications for reinforced concrete column design.

where:

E_m = Elastic modulus of the rock mass (ksi)

E_m/E_i = Reduction factor determined from Table 10.4.6.5-1 (dim)

E_i = Elastic modulus of intact rock from tests (ksi)

For critical or large structures, determination of rock mass modulus (E_m) using in-situ tests may be warranted. Refer to Sabatini et al. (2002) for descriptions of suitable in-situ tests.

Table 10.4.6.5-1—Estimation of E_m Based on *RQD* (after O'Neill and Reese, 1999)

RQD (percent)	E_m/E_i	
	Closed Joints	Open Joints
100	1.00	0.60
70	0.70	0.10
50	0.15	0.10
20	0.05	0.05

Table C10.4.6.5-1—Summary of Elastic Moduli for Intact Rock (modified after Kulhawy, 1978)

Rock Type	No. of Values	No. of Rock Types	Elastic Modulus, E_i (ksi $\times 10^3$)			Standard Deviation (ksi $\times 10^3$)
			Maximum	Minimum	Mean	
Granite	26	26	14.5	0.93	7.64	3.55
Diorite	3	3	16.2	2.48	7.45	6.19
Gabbro	3	3	12.2	9.8	11.0	0.97
Diabase	7	7	15.1	10.0	12.8	1.78
Basalt	12	12	12.2	4.20	8.14	2.60
Quartzite	7	7	12.8	5.29	9.59	2.32
Marble	14	13	10.7	0.58	6.18	2.49
Gneiss	13	13	11.9	4.13	8.86	2.31
Slate	11	2	3.79	0.35	1.39	0.96
Schist	13	12	10.0	0.86	4.97	3.18
Phyllite	3	3	2.51	1.25	1.71	0.57
Sandstone	27	19	5.68	0.09	2.13	1.19
Siltstone	5	5	4.76	0.38	2.39	1.65
Shale	30	14	5.60	0.001	1.42	1.45
Limestone	30	30	13.0	0.65	5.7	3.73
Dolostone	17	16	11.4	0.83	4.22	3.44

Poisson's ratio for rock should be determined from tests on intact rock core.

Where tests on rock core are not practical, Poisson's ratio may be estimated from Table C10.4.6.5-2.

SPECIFICATIONS COMMENTARY

Table 10.6.3.2.2-2 - Typical Range of Uniaxial Compressive Strength (Co) as a Function of Rock Category and Rock Type

ROCK CATEGORY	GENERAL DESCRIPTION	ROCK TYPE	$Co^{(1)}$	
			MPa	ksf
A	Carbonate rocks with well-developed crystal cleavage	Dolostone	30-310	600-6,400
		Limestone	20-290	600-6,000
		Carbonatite	40-70	800-1,400
		Marble	40-240	800-5,000
		Tactite-Skarn	130-330	2,800-6,800
B	Lithifield argillaceous rock	Argillite	30-150	600-3,000
		Claystone	1-8	30-170
		Marlstone	50-190	1,000-4,000
		Phyllite	20-240	600-5,000
		Siltstone	10-120	200-2,400
		Shale[2]	10-35	150-740
		Slate	140-210	3,000-4,400
C	Arenaceous rocks with strong crystals and poor cleavage	Conglomerate	30-220	600-4,600
		Sandstone	70-170	1,400-3,600
		Quartzite	60-380	1,200-8,000
D	Fine-grained igneous crystalline rock	Andesite	100-180	2,000-3,800
		Diabase	20-575	450-12,000
E	Coarse-grained igneous and metamorphic crystalline rock	Amphibolite	120-280	2,400-5,800
		Gabbro	125-310	2,600-6,400
		Gneiss	20-310	500-6,400
		Granite	10-330	300-6,800
		Quartzdiorite	10-100	200-2,000
		Quartzmonzonite	130-160	2,800-3,400
		Schist	10-140	200-3,000
		Syenite	180-430	3,800-9,000

[1]Range of Uniaxial Compressive Strength values reported by various investigations
[2]Not including oil shale

10.6.3.2.3 Analytic Method

The nominal bearing resistance of foundations on rock shall be determined using established rock mechanics principles based on the rock mass strength parameters determined in accordance with D10.4.6.4. The influence of discontinuities on the failure mode shall also be considered.

C10.6.3.2.3

Depending upon the relative spacing of joints and rock layering, bearing capacity failures for foundations on rock may take several forms. Except for the case of a rock mass with closed joints, the failure modes are different from those in soil. Procedures for estimating bearing resistance for each of the failure modes can be found in Kulhawy and Goodman (*1980*), Kulhawy and Goodman (*1987*), Goodman (*1989*),

AXIAL CAPACITY

SHAFT for Windows, Version 2012.7.11

Serial Number : 228741384

VERTICALLY LOADED DRILLED SHAFT ANALYSIS

Path to file locations : Y:\Bridges\DELDOT\BR1-159_JAMES ST BRIDGE\FOUNDATION REPORT\SHAFT Output\
Name of input data file : Abut A.sfd
Name of output file : Abut A.sfo
Name of plot output file : Abut A.sfp
Name of runtime file : Abut A.sfr

Time and Date of Analysis

Date: July 30, 2014 Time: 11:42:25

BR1-159 Amutment A

PROPOSED DEPTH = 103.0 FT

NUMBER OF LAYERS = 7

WATER TABLE DEPTH = 0.0 FT.

SOIL INFORMATION

LAYER NO 1----SAND

AT THE TOP

SKIN FRICTION COEFFICIENT- BETA	= 0.120E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.340E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.135E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.000E+00

AT THE BOTTOM

SKIN FRICTION COEFFICIENT- BETA	= 0.120E+01

UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.340E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.135E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.300E+01

LRFD RESISTANCE FACTOR (SIDE FRICTION)	= 0.550E+00
LRFD RESISTANCE FACTOR (TIP RESISTANCE)	= 0.500E+00

LAYER NO 2----CLAY

AT THE TOP

STRENGTH REDUCTION FACTOR-ALPHA	= 0.550E+00
END BEARING COEFFICIENT-Nc	= 0.800E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.400E+03
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.100E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.300E+01

AT THE BOTTOM

STRENGTH REDUCTION FACTOR-ALPHA	= 0.550E+00
END BEARING COEFFICIENT-Nc	= 0.800E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.400E+03
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.100E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.190E+02

LRFD RESISTANCE FACTOR (SIDE FRICTION)	= 0.450E+00
LRFD RESISTANCE FACTOR (TIP RESISTANCE)	= 0.400E+00

LAYER NO 3----SAND

AT THE TOP

SKIN FRICTION COEFFICIENT- BETA	= 0.912E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.320E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.130E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.190E+02

AT THE BOTTOM

SKIN FRICTION COEFFICIENT- BETA	= 0.748E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.320E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.130E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11

DEPTH, FT	= 0.310E+02
LRFD RESISTANCE FACTOR (SIDE FRICTION)	= 0.550E+00
LRFD RESISTANCE FACTOR (TIP RESISTANCE)	= 0.500E+00

LAYER NO 4----CLAY

AT THE TOP

STRENGTH REDUCTION FACTOR-ALPHA	= 0.550E+00
END BEARING COEFFICIENT-Nc	= 0.800E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.100E+04
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.125E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.310E+02

AT THE BOTTOM

STRENGTH REDUCTION FACTOR-ALPHA	= 0.550E+00
END BEARING COEFFICIENT-Nc	= 0.800E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.100E+04
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.125E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.510E+02
LRFD RESISTANCE FACTOR (SIDE FRICTION)	= 0.450E+00
LRFD RESISTANCE FACTOR (TIP RESISTANCE)	= 0.400E+00

LAYER NO 5----SAND

AT THE TOP

SKIN FRICTION COEFFICIENT- BETA	= 0.536E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.320E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.130E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.510E+02

AT THE BOTTOM

SKIN FRICTION COEFFICIENT- BETA	= 0.446E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.320E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.130E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.610E+02
LRFD RESISTANCE FACTOR (SIDE FRICTION)	= 0.550E+00
LRFD RESISTANCE FACTOR (TIP RESISTANCE)	= 0.500E+00

LAYER NO 6----CLAY

AT THE TOP

STRENGTH REDUCTION FACTOR-ALPHA	= 0.550E+00
END BEARING COEFFICIENT-Nc	= 0.900E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.100E+04
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.125E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.610E+02

AT THE BOTTOM

STRENGTH REDUCTION FACTOR-ALPHA	= 0.550E+00
END BEARING COEFFICIENT-Nc	= 0.900E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.100E+04
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.125E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.860E+02
LRFD RESISTANCE FACTOR (SIDE FRICTION)	= 0.450E+00
LRFD RESISTANCE FACTOR (TIP RESISTANCE)	= 0.400E+00

LAYER NO 7----SAND

AT THE TOP

SKIN FRICTION COEFFICIENT- BETA	= 0.250E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.340E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.135E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.860E+02

AT THE BOTTOM

SKIN FRICTION COEFFICIENT- BETA	= 0.250E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.340E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.135E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.111E+03
LRFD RESISTANCE FACTOR (SIDE FRICTION)	= 0.550E+00
LRFD RESISTANCE FACTOR (TIP RESISTANCE)	= 0.500E+00

DRILLED SHAFT INFORMATION

DIAMETER OF STEM	=	4.000	FT.
DIAMETER OF BASE	=	4.000	FT.
END OF STEM TO BASE	=	0.000	FT.
ANGLE OF BELL	=	0.000	DEG.
IGNORED TOP PORTION	=	5.000	FT.
IGNORED BOTTOM PORTION	=	4.000	FT.
AREA OF ONE PERCENT STEEL	=	18.098	SQ.IN.
ELASTIC MODULUS, Ec	=	0.312E+07	LB/SQ IN
VOLUME OF UNDERREAM	=	0.000	CU.YDS.

PREDICTED RESULTS

QS = ULTIMATE SIDE RESISTANCE;
QB = ULTIMATE BASE RESISTANCE;
WT = WEIGHT OF DRILLED SHAFT (UPLIFT CAPACITY ONLY);
QU = TOTAL ULTIMATE RESISTANCE;
LRFD QS = TOTAL SIDE FRICTION USING LRFD RESISTANCE FACTOR TO THE ULTIMATE SIDE RESISTANCE;
LRFD QB = TOTAL BASE BEARING USING LRFD RESISTANCE FACTOR TO THE ULTIMATE BASE RESISTANCE
LRFD QU = TOTAL CAPACITY WITH LRFD RESISTANCE FACTOR.

LENGTH (FEET)	VOLUME (CU.YDS)	QS (TONS)	QB (TONS)	QU (TONS)	LRFD QS (TONS)	LRFD QB (TONS)	LRFD QU (TONS)
10.0	4.65	1.38	20.11	21.49	0.62	8.04	8.67
11.0	5.12	2.76	20.11	22.87	1.24	8.04	9.29
12.0	5.59	4.15	27.15	31.30	1.87	10.86	12.73
13.0	6.05	5.53	34.97	40.50	2.49	13.99	16.48
14.0	6.52	6.91	43.57	50.49	3.11	17.43	20.54
15.0	6.98	8.29	52.96	61.25	3.73	21.18	24.92
16.0	7.45	9.68	60.00	69.68	4.35	24.00	28.35
17.0	7.91	11.06	64.69	75.75	4.98	25.88	30.85
18.0	8.38	12.44	67.04	79.48	5.60	26.82	32.41
19.0	8.84	13.82	67.04	80.86	6.22	33.52	39.74
20.0	9.31	15.21	67.04	82.24	6.84	33.52	40.36
21.0	9.78	16.59	67.04	83.63	7.47	33.52	40.98
22.0	10.24	17.97	67.04	85.01	8.09	33.52	41.61
23.0	10.71	19.35	67.04	86.39	8.71	33.52	42.23
24.0	11.17	23.57	64.52	88.09	11.03	32.26	43.29
25.0	11.64	28.09	61.73	89.82	13.51	30.86	44.38
26.0	12.10	32.90	58.65	91.55	16.16	29.33	45.49
27.0	12.57	37.99	55.30	93.30	18.96	27.65	46.61
28.0	13.03	43.36	52.79	96.15	21.91	26.39	48.31
29.0	13.50	48.99	51.11	100.10	25.01	25.56	50.57
30.0	13.96	54.88	50.27	105.15	28.25	25.14	53.38
31.0	14.43	61.01	50.27	111.28	31.62	20.11	51.73
32.0	14.90	67.37	50.27	117.64	35.12	20.11	55.23
33.0	15.36	73.96	50.27	124.23	38.74	20.11	58.85
34.0	15.83	80.77	50.27	131.04	42.49	20.11	62.60
35.0	16.29	87.78	50.27	138.05	46.34	20.11	66.45
36.0	16.76	91.24	50.27	141.51	47.90	20.11	68.01
37.0	17.22	94.69	50.27	144.97	49.46	20.11	69.56
38.0	17.69	98.15	50.27	148.42	51.01	20.11	71.12
39.0	18.15	101.61	50.27	151.88	52.57	20.11	72.67
40.0	18.62	105.06	50.27	155.34	54.12	20.11	74.23
41.0	19.08	108.52	50.27	158.79	55.68	20.11	75.79
42.0	19.55	111.98	50.27	162.25	57.23	20.11	77.34

43.0	20.02	115.43	50.27	165.70	58.79	20.11	78.90
44.0	20.48	118.89	52.79	171.67	60.34	21.11	81.46
45.0	20.95	122.34	55.58	177.93	61.90	22.23	84.13
46.0	21.41	125.80	58.65	184.46	63.45	23.46	86.91
47.0	21.88	129.26	62.01	191.26	65.01	24.80	89.81
48.0	22.34	132.71	64.52	197.24	66.56	25.81	92.37
49.0	22.81	136.17	66.20	202.37	68.12	26.48	94.60
50.0	23.27	139.63	67.04	206.66	69.67	26.82	96.49
51.0	23.74	143.08	67.04	210.12	71.23	33.52	104.75
52.0	24.21	146.54	67.04	213.58	72.78	33.52	106.30
53.0	24.67	149.99	67.04	217.03	74.34	33.52	107.86
54.0	25.14	153.45	65.47	218.92	75.90	32.73	108.63
55.0	25.60	156.91	63.72	220.62	77.45	31.86	109.31
56.0	26.07	166.21	61.80	228.00	82.57	30.90	113.46
57.0	26.53	175.56	59.70	235.27	87.71	29.85	117.56
58.0	27.00	184.97	58.13	243.10	92.89	29.06	121.95
59.0	27.46	194.42	57.08	251.50	98.08	28.54	126.62
60.0	27.93	203.90	56.56	260.46	103.30	28.28	131.58
61.0	28.39	213.42	56.56	269.97	108.53	22.62	131.15
62.0	28.86	222.96	56.56	279.51	113.78	22.62	136.40
63.0	29.33	232.51	56.56	289.07	119.04	22.62	141.66
64.0	29.79	242.08	56.56	298.64	124.30	22.62	146.92
65.0	30.26	251.66	56.56	308.22	129.57	22.62	152.19
66.0	30.72	255.12	56.56	311.67	131.12	22.62	153.74
67.0	31.19	258.57	56.56	315.13	132.68	22.62	155.30
68.0	31.65	262.03	56.56	318.59	134.23	22.62	156.85
69.0	32.12	265.49	56.56	322.04	135.79	22.62	158.41
70.0	32.58	268.94	56.56	325.50	137.34	22.62	159.96
71.0	33.05	272.40	56.56	328.95	138.90	22.62	161.52
72.0	33.51	275.85	56.56	332.41	140.45	22.62	163.07
73.0	33.98	279.31	56.56	335.87	142.01	22.62	164.63
74.0	34.45	282.77	56.56	339.32	143.56	22.62	166.19
75.0	34.91	286.22	56.56	342.78	145.12	22.62	167.74
76.0	35.38	289.68	56.56	346.23	146.67	22.62	169.30
77.0	35.84	293.14	56.56	349.69	148.23	22.62	170.85
78.0	36.31	296.59	56.56	353.15	149.78	22.62	172.41
79.0	36.77	300.05	68.18	368.23	151.34	27.27	178.61
80.0	37.24	303.50	81.10	384.61	152.89	32.44	185.34
81.0	37.70	306.96	95.32	402.28	154.45	38.13	192.58
82.0	38.17	310.42	110.82	421.24	156.01	44.33	200.33
83.0	38.63	313.87	122.45	436.32	157.56	48.98	206.54
84.0	39.10	317.33	130.20	447.53	159.12	52.08	211.20
85.0	39.57	320.78	134.08	454.86	160.67	53.63	214.30
86.0	40.03	324.24	134.08	458.32	162.23	67.04	229.26
87.0	40.50	327.70	134.08	461.77	163.78	67.04	230.82
88.0	40.96	331.15	134.08	465.23	165.34	67.04	232.37
89.0	41.43	334.61	134.08	468.68	166.89	67.04	233.93
90.0	41.89	338.07	134.08	472.14	168.45	67.04	235.49
91.0	42.36	346.01	134.08	480.08	172.82	67.04	239.85
92.0	42.82	354.06	134.08	488.14	177.25	67.04	244.28
93.0	43.29	362.23	134.08	496.31	181.74	67.04	248.78
94.0	43.76	370.52	134.08	504.59	186.29	67.04	253.33
95.0	44.22	378.91	134.08	512.99	190.91	67.04	257.95
96.0	44.69	387.42	134.08	521.50	195.59	67.04	262.63
97.0	45.15	396.05	134.08	530.13	200.34	67.04	267.38
98.0	45.62	404.79	134.08	538.86	205.15	67.04	272.18
99.0	46.08	413.64	134.08	547.72	210.01	67.04	277.05
100.0	46.55	422.61	134.08	556.69	214.95	67.04	281.98
101.0	47.01	431.69	134.08	565.77	219.94	67.04	286.98
102.0	47.48	440.89	134.08	574.96	225.00	67.04	292.04

516 k

RESULT FROM TREND (AVERAGED) LINE

TOP LOAD ton	TOP MOVEMENT IN.	TIP LOAD ton	TIP MOVEMENT IN.
0.4451E-01	0.2041E-04	0.9776E-03	0.1000E-04
0.2226E+00	0.1020E-03	0.4888E-02	0.5000E-04
0.4451E+00	0.2041E-03	0.9776E-02	0.1000E-03
0.2226E+02	0.1020E-01	0.4888E+00	0.5000E-02
0.3339E+02	0.1530E-01	0.7332E+00	0.7500E-02
0.4452E+02	0.2041E-01	0.9776E+00	0.1000E-01
0.1116E+03	0.5107E-01	0.2444E+01	0.2500E-01
0.1990E+03	0.9816E-01	0.4888E+01	0.5000E-01
0.2535E+03	0.1370E+00	0.7332E+01	0.7500E-01
0.2986E+03	0.1741E+00	0.9776E+01	0.1000E+00
0.3912E+03	0.3519E+00	0.2441E+02	0.2500E+00
0.4271E+03	0.6160E+00	0.4782E+02	0.5000E+00
0.4336E+03	0.7445E+00	0.5760E+02	0.6250E+00
0.4451E+03	0.1328E+01	0.8581E+02	0.1200E+01
0.4948E+03	0.2549E+01	0.1361E+03	0.2400E+01

RESULT FROM UPPER-BOUND LINE

TOP LOAD ton	TOP MOVEMENT IN.	TIP LOAD ton	TIP MOVEMENT IN.
0.6785E-01	0.2540E-04	0.1397E-02	0.1000E-04
0.3393E+00	0.1270E-03	0.6983E-02	0.5000E-04
0.6785E+00	0.2540E-03	0.1397E-01	0.1000E-03
0.3393E+02	0.1270E-01	0.6983E+00	0.5000E-02
0.5095E+02	0.1905E-01	0.1047E+01	0.7500E-02
0.6803E+02	0.2542E-01	0.1397E+01	0.1000E-01
0.1689E+03	0.6357E-01	0.3492E+01	0.2500E-01
0.2801E+03	0.1176E+00	0.6983E+01	0.5000E-01
0.3342E+03	0.1576E+00	0.1047E+02	0.7500E-01
0.3696E+03	0.1933E+00	0.1397E+02	0.1000E+00
0.4375E+03	0.3658E+00	0.3480E+02	0.2500E+00
0.4679E+03	0.6295E+00	0.6648E+02	0.5000E+00
0.4767E+03	0.7593E+00	0.7975E+02	0.6250E+00
0.4865E+03	0.1341E+01	0.1019E+03	0.1200E+01
0.5294E+03	0.2560E+01	0.1448E+03	0.2400E+01

RESULT FROM LOWER-BOUND LINE

TOP LOAD ton	TOP MOVEMENT IN.	TIP LOAD ton	TIP MOVEMENT IN.
0.2479E-01	0.1598E-04	0.5586E-03	0.1000E-04
0.1239E+00	0.7992E-04	0.2793E-02	0.5000E-04
0.2479E+00	0.1598E-03	0.5586E-02	0.1000E-03
0.1239E+02	0.7992E-02	0.2793E+00	0.5000E-02
0.1859E+02	0.1199E-01	0.4190E+00	0.7500E-02
0.2479E+02	0.1598E-01	0.5586E+00	0.1000E-01
0.6204E+02	0.3997E-01	0.1397E+01	0.2500E-01
0.1202E+03	0.7927E-01	0.2793E+01	0.5000E-01
0.1690E+03	0.1163E+00	0.4190E+01	0.7500E-01
0.2120E+03	0.1521E+00	0.5586E+01	0.1000E+00
0.3439E+03	0.3377E+00	0.1402E+02	0.2500E+00
0.3861E+03	0.6024E+00	0.2916E+02	0.5000E+00
0.3871E+03	0.7290E+00	0.3545E+02	0.6250E+00
0.4037E+03	0.1315E+01	0.6972E+02	0.1200E+01
0.4602E+03	0.2539E+01	0.1274E+03	0.2400E+01

LATERAL CAPACITY
ABUTMENT A.

LPile Plus for Windows, Version 2013-07.007

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

This copy of LPile is used by:

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Files Used for Analysis

Path to file locations: Y:\Bridges\DELDOT\BR1-159_JAMES ST BRIDGE\FOUNDATION REPORT\LPILE Output\
Name of input data file: Abut A.lp7d
Name of output report file: Abut A.lp7o
Name of plot output file: Abut A.lp7p
Name of runtime messeage file: Abut A.lp7r

Date and Time of Analysis

Date: October 15, 2014 Time: 16:10:38

Problem Title

Project Name: BR1-159 Abutment A

Job Number:

Client: DelDOT

Engineer: SJM

Description: Abutment A Lateral Pile Capacity

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	=	1
Total length of pile	=	95.00 ft
Depth of ground surface below top of pile	=	1.00 ft

Pile diameter values used for p-y curve computations are defined using 2 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	49.0000000
2	95.000000	49.0000000

Input Structural Properties:

Pile Section No. 1:

Section Type	=	Drilled Shaft with Permanent Casing
Section Length	=	95.00000 ft
Section Diameter	=	49.00000 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 7 layers

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

Distance from top of pile to top of layer	=	1.00000 ft
Distance from top of pile to bottom of layer	=	4.00000 ft
Effective unit weight at top of layer	=	72.60000 pcf
Effective unit weight at bottom of layer	=	72.60000 pcf
Friction angle at top of layer	=	34.00000 deg.
Friction angle at bottom of layer	=	34.00000 deg.
Subgrade k at top of layer	=	60.00000 pci
Subgrade k at bottom of layer	=	60.00000 pci

Layer 2 is soft clay, p-y criteria by Matlock, 1970

Distance from top of pile to top of layer	=	4.00000 ft
Distance from top of pile to bottom of layer	=	20.00000 ft
Effective unit weight at top of layer	=	37.60000 pcf
Effective unit weight at bottom of layer	=	37.60000 pcf
Undrained cohesion at top of layer	=	400.00000 psf
Undrained cohesion at bottom of layer	=	400.00000 psf
Epsilon-50 at top of layer	=	0.02000
Epsilon-50 at bottom of layer	=	0.02000

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

Distance from top of pile to top of layer	=	20.00000 ft
Distance from top of pile to bottom of layer	=	32.00000 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	=	32.00000 deg.
Friction angle at bottom of layer	=	32.00000 deg.
Subgrade k at top of layer	=	60.00000 pci
Subgrade k at bottom of layer	=	60.00000 pci

Layer 4 is stiff clay with water-induced erosion

Distance from top of pile to top of layer	=	32.00000 ft
Distance from top of pile to bottom of layer	=	52.00000 ft
Effective unit weight at top of layer	=	62.60000 pcf
Effective unit weight at bottom of layer	=	62.60000 pcf
Undrained cohesion at top of layer	=	1000.00000 psf
Undrained cohesion at bottom of layer	=	1000.00000 psf
Epsilon-50 at top of layer	=	0.00700
Epsilon-50 at bottom of layer	=	0.00700
Subgrade k at top of layer	=	200.00000 pci
Subgrade k at bottom of layer	=	200.00000 pci

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

Distance from top of pile to top of layer	=	52.00000 ft
Distance from top of pile to bottom of layer	=	62.00000 ft
Effective unit weight at top of layer	=	67.20000 pcf
Effective unit weight at bottom of layer	=	67.20000 pcf
Friction angle at top of layer	=	32.00000 deg.
Friction angle at bottom of layer	=	32.00000 deg.
Subgrade k at top of layer	=	60.00000 pci
Subgrade k at bottom of layer	=	60.00000 pci

Layer 6 is stiff clay with water-induced erosion

Distance from top of pile to top of layer	=	62.00000 ft
Distance from top of pile to bottom of layer	=	87.00000 ft
Effective unit weight at top of layer	=	62.60000 pcf
Effective unit weight at bottom of layer	=	62.60000 pcf
Undrained cohesion at top of layer	=	1000.00000 psf
Undrained cohesion at bottom of layer	=	1000.00000 psf
Epsilon-50 at top of layer	=	0.00700
Epsilon-50 at bottom of layer	=	0.00700
Subgrade k at top of layer	=	200.00000 pci
Subgrade k at bottom of layer	=	200.00000 pci

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

Distance from top of pile to top of layer	=	87.00000 ft
Distance from top of pile to bottom of layer	=	112.00000 ft
Effective unit weight at top of layer	=	72.60000 pcf
Effective unit weight at bottom of layer	=	72.30000 pcf
Friction angle at top of layer	=	34.00000 deg.
Friction angle at bottom of layer	=	34.00000 deg.
Subgrade k at top of layer	=	125.00000 pci
Subgrade k at bottom of layer	=	125.00000 pci

(Depth of lowest soil layer extends 17.00 ft below pile tip)

Summary of Soil Properties

Layer	Layer	Effective	Undrained

Layer Num.	Soil Type (p-y Curve Criteria)	Strain Factor Epsilon 50	kpy pci	Depth ft	Unit Wt. pcf	Cohesion psf	Angle of Friction deg.
1	Sand (Reese, et al.)	--	60.000	1.000	72.600	--	34.000
		--	60.000	4.000	72.600	--	34.000
2	Soft Clay	0.02000	--	4.000	37.600	400.000	--
		0.02000	--	20.000	37.600	400.000	--
3	Sand (Reese, et al.)	--	60.000	20.000	67.600	--	32.000
		--	60.000	32.000	67.600	--	32.000
4	Stiff Clay with Free Water	0.00700	200.000	32.000	62.600	1000.000	--
		0.00700	200.000	52.000	62.600	1000.000	--
5	Sand (Reese, et al.)	--	60.000	52.000	67.200	--	32.000
		--	60.000	62.000	67.200	--	32.000
6	Stiff Clay with Free Water	0.00700	200.000	62.000	62.600	1000.000	--
		0.00700	200.000	87.000	62.600	1000.000	--
7	Sand (Reese, et al.)	--	125.000	87.000	72.600	--	34.000
		--	125.000	112.000	72.300	--	34.000

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 = 8

Load No.	Load Compute Type	Condition 1		Condition 2		Axial Thrust Force, lbs	Top y vs. Pile Length
1	1	V =	68000. lbs	M =	5342000. in-lbs	504400.	Yes
2	1	V =	53000. lbs	M =	4038000. in-lbs	410100.	Yes
3	4	y =	1.00000 in	M =	5342000. in-lbs	504400.	Yes

4	4	y =	1.50000 in	M =	5342000. in-lbs	504400.	Yes
5	4	y =	2.00000 in	M =	5342000. in-lbs	504400.	Yes
6	4	y =	0.50000 in	M =	4038000. in-lbs	410100.	No
7	4	y =	1.00000 in	M =	4038000. in-lbs	410100.	Yes
8	4	y =	1.50000 in	M =	4038000. in-lbs	410100.	Yes

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 = 1

Pile Section No. 1:

Dimensions and Properties of Drilled Shaft (Bored Pile) with Permanent Casing:

Length of Section	=	95.00000 ft
Outer Diameter of Casing	=	49.00000 in
Concrete Cover Thickness Inside Casing	=	4.00000 in
Casing Wall Thickness	=	0.50000 in
Moment of Inertia of Steel Casing	=	22403. in^4
Yield Stress of Casing	=	36000. psi
Elastic Modulus of Casing	=	29000000. psi
Number of Reinforcing Bars	=	12 bars
Area of Single Reinforcing Bar	=	0.79000 sq. in.
Edge-to-Edge Bar Spacing	=	9.09394 in
Maximum Concrete Aggregate Size	=	0.50000 in
Ratio of Bar Spacing to Aggregate Size	=	18.19
Offset of Center of Rebar Cage from Center of Pile	=	0.0000 in
Yield Stress of Reinforcing Bars	=	60000. psi
Modulus of Elasticity of Reinforcing Bars	=	29000000. psi
Gross Area of Pile	=	1885.74099 sq. in.
Area of Concrete	=	1800.07737 sq. in.
Cross-sectional Area of Steel Casing	=	76.18362 sq. in.
Area of All Steel (Casing and Bars)	=	85.66362 sq. in.
Area Ratio of All Steel to Gross Area of Pile	=	4.54 percent

Axial Structural Capacities:

Nom. Axial Structural Capacity = 0.85 Fc Ac + Fy As	=	7901.608 kips
Tensile Load for Cracking of Concrete	=	-939.735 kips
Nominal Axial Tensile Capacity	=	-3311.410 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.00000	0.79000	19.50000	0.00000
2	1.00000	0.79000	16.88750	9.75000
3	1.00000	0.79000	9.75000	16.88750
4	1.00000	0.79000	0.00000	19.50000
5	1.00000	0.79000	-9.75000	16.88750
6	1.00000	0.79000	-16.88750	9.75000
7	1.00000	0.79000	-19.50000	0.00000
8	1.00000	0.79000	-16.88750	-9.75000
9	1.00000	0.79000	-9.75000	-16.88750
10	1.00000	0.79000	0.00000	-19.50000
11	1.00000	0.79000	9.75000	-16.88750
12	1.00000	0.79000	16.88750	-9.75000

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

Minimum spacing between any two bars not equal to zero = 9.09394 inches between Bars 7 and 8

Concrete Properties:

Compressive Strength of Concrete	=	3000.00000 psi
Modulus of Elasticity of Concrete	=	3122019. psi
Modulus of Rupture of Concrete	=	-410.79191 psi
Compression Strain at Peak Stress	=	0.00163
Tensile Strain at Fracture of Concrete	=	-0.0001160
Maximum Coarse Aggregate Size	=	0.0000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 2

Number	Axial Thrust Force kips
1	410.100
2	504.400

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 = 410.100 kips

Bending Max Concrete Curvature rad/in.	Bending Max Steel Stress ksi	Bending Max Casing Stress ksi	Depth to N Axis in	Run Msg	Max Comp Strain in/in	Max Tens Strain in/in
0.000000625	1016.2832887	1626053262.	97.3972510		0.0000609	0.0000302
0.2188780	1.7608846	1.7608846				
0.000001250	2032.5544486	1626043559.	60.9792541		0.0000762	0.0000150
0.2723639	2.2016167	2.2016167				
0.000001875	3048.7699113	1626010619.	48.8535267		0.0000916	-0.000000275
0.3254189	2.6430886	2.6430886				
0.000002500	4064.6193221	1625847729.	42.8002900		0.0001070	-0.0000155
0.3780356	3.0852585	3.0852585				
0.000003125	5078.6289032	1625161249.	39.1734655		0.0001224	-0.0000307
0.4301838	3.5278922	3.5278922				
0.000003750	6089.7797533	1623941268.	36.7580676		0.0001378	-0.0000459
0.4818397	3.9707961	3.9707961				
0.000004375	7097.6455489	1622318983.	35.0341260		0.0001533	-0.0000611
0.5329906	4.4138704	4.4138704				
0.000005000	8102.0348707	1620406974.	33.7419764		0.0001687	-0.0000763
0.5836300	4.8570616	4.8570616				
0.000005625	9102.8544076	1618285228.	32.7375035		0.0001841	-0.0000915
0.6337540	5.3003396	5.3003396				
0.000006250	10100.	1616008555.	31.9343018		0.0001996	-0.0001067
0.6833603	5.7436860	5.7436860				
0.000006875	10100.	1469098686.	28.9963893		0.0001994	-0.0001375
0.6820938	5.7323083	5.7323083		C		
0.000007500	10100.	1346673796.	28.2317503		0.0002117	-0.0001558
0.7214260	6.0871182	6.0871182		C		
0.000008125	10176.	1252491570.	27.5723971		0.0002240	-0.0001741
0.7601030	6.4390179	6.4390179		C		
0.000008750	10791.	1233214725.	26.9982941		0.0002362	-0.0001925
0.7982028	6.7886484	6.7886484		C		
0.000009375	11401.	1216093721.	26.4940382		0.0002484	-0.0002110
0.8357798	7.1364573	7.1364573		C		
0.0000100	12008.	1200791132.	26.0475634		0.0002605	-0.0002295
0.8728710	7.4827434	7.4827434		C		
0.0000106	12612.	1187043062.	25.6497162		0.0002725	-0.0002481
0.9095146	7.8278282	7.8278282		C		
0.0000113	13214.	1174607991.	25.2925644		0.0002845	-0.0002667
0.9457199	8.1717679	8.1717679		C		
0.0000119	13814.	1163293846.	24.9697585		0.0002965	-0.0002854
0.9814926	8.5145887	8.5145887		C		
0.0000125	14413.	1153005151.	24.6781673		0.0003085	-0.0003040
1.0169113	8.8570232	8.8570232		C		
0.0000131	15009.	1143555248.	24.4119664		0.0003204	-0.0003227
1.0519240	-9.2655671	-9.2655671		C		
0.0000138	15605.	1134884723.	24.1693238		0.0003323	-0.0003414
1.0865990	-9.8035383	-9.8035383		C		
0.0000144	16199.	1126864957.	23.9462060		0.0003442	-0.0003601
1.1208969	-10.3421660	-10.3421660		C		
0.0000150	16792.	1119465130.	23.7419139		0.0003561	-0.0003789
1.1548946	-10.8806924	-10.8806924		C		
0.0000156	17384.	1112551307.	23.5518472		0.0003680	-0.0003976
1.1884874	-11.4201786	-11.4201786		C		
0.0000163	17975.	1106133610.	23.3769558		0.0003799	-0.0004164
1.2217972	-11.9594033	-11.9594033		C		
0.0000169	18565.	1100134633.	23.2145744		0.0003917	-0.0004351
1.2547768	-12.4988457	-12.4988457		C		

0.0000175	19154.	1094495865.	23.0627496	0.0004036	-0.0004539
1.2873972	-13.0388170	-13.0388170	C		
0.0000181	19742.	1089214086.	22.9218967	0.0004155	-0.0004727
1.3197347	-13.5785249	-13.5785249	C		
0.0000188	20330.	1084253485.	22.7909203	0.0004273	-0.0004914
1.3517889	-14.1179683	-14.1179683	C		
0.0000194	20916.	1079544481.	22.6669095	0.0004392	-0.0005102
1.3834568	-14.6582458	-14.6582458	C		
0.0000200	21502.	1075099130.	22.5510151	0.0004510	-0.0005290
1.4148371	-15.1983112	-15.1983112	C		
0.0000206	22087.	1070895146.	22.4425916	0.0004629	-0.0005477
1.4459341	-15.7381092	-15.7381092	C		
0.0000213	22672.	1066911135.	22.3409813	0.0004747	-0.0005665
1.4767473	-16.2776390	-16.2776390	C		
0.0000219	23256.	1063113942.	22.2447526	0.0004866	-0.0005853
1.5072280	-16.8174381	-16.8174381	C		
0.0000225	23839.	1059489501.	22.1535402	0.0004985	-0.0006040
1.5373815	-17.3574525	-17.3574525	C		
0.0000231	24421.	1056035911.	22.0676639	0.0005103	-0.0006228
1.5672512	-17.8971947	-17.8971947	C		
0.0000238	25003.	1052739593.	21.9867041	0.0005222	-0.0006416
1.5968364	-18.4366637	-18.4366637	C		
0.0000244	25584.	1049588362.	21.9102841	0.0005341	-0.0006603
1.6261364	-18.9758585	-18.9758585	C		
0.0000256	26744.	1043669856.	21.7691203	0.0005578	-0.0006978
1.6838398	-20.0538818	-20.0538818	C		
0.0000269	27901.	1038191736.	21.6408465	0.0005816	-0.0007353
1.7402898	-21.1320933	-21.1320933	C		
0.0000281	29056.	1033116889.	21.5253551	0.0006054	-0.0007727
1.7955929	-22.2091790	-22.2091790	C		
0.0000294	30209.	1028393230.	21.4210253	0.0006292	-0.0008101
1.8497437	-23.2851296	-23.2851296	C		
0.0000306	31359.	1023977170.	21.3265012	0.0006531	-0.0008475
1.9027367	-24.3599354	-24.3599354	C		
0.0000319	32507.	1019817923.	21.2392914	0.0006770	-0.0008849
1.9544732	-25.4348330	-25.4348330	C		
0.0000331	33652.	1015897981.	21.1596944	0.0007009	-0.0009222
2.0050325	-26.5087403	-26.5087403	C		
0.0000344	34794.	1012192652.	21.0870752	0.0007249	-0.0009595
2.0544232	-27.5814624	-27.5814624	C		
0.0000356	35934.	1008678809.	21.0207094	0.0007489	-0.0009968
2.1026394	-28.6529889	-28.6529889	C		
0.0000369	37072.	1005336457.	20.9599711	0.0007729	-0.0010340
2.1496753	-29.7233089	-29.7233089	C		
0.0000381	38207.	1002148213.	20.9043167	0.0007970	-0.0010711
2.1955249	-30.7924116	-30.7924116	C		
0.0000394	39340.	999098895.	20.8532717	0.0008211	-0.0011083
2.2401823	-31.8602859	-31.8602859	C		
0.0000406	40470.	996172794.	20.8060710	0.0008452	-0.0011454
2.2836157	-32.9273318	-32.9273318	C		
0.0000419	41597.	993357599.	20.7622339	0.0008694	-0.0011825
2.3258107	-33.9937152	-33.9937152	C		
0.0000431	42722.	990646571.	20.7219611	0.0008936	-0.0012195
2.3667996	-35.0588192	-35.0588192	C		
0.0000444	43832.	987766303.	20.6829592	0.0009178	-0.0012566
2.4064307	-36.1252074	-36.0000000	CY		
0.0000456	44804.	982008005.	20.6242634	0.0009410	-0.0012946
2.4432062	-37.2204807	-36.0000000	CY		
0.0000469	45666.	974199994.	20.5513674	0.0009633	-0.0013335
2.4775613	-38.3393130	-36.0000000	CY		
0.0000481	46462.	965443025.	20.4723226	0.0009852	-0.0013729
2.5101131	-39.4720115	-36.0000000	CY		
0.0000494	47200.	955957144.	20.3884472	0.0010067	-0.0014127

2.5409915	-40.6173577	-36.0000000	CY		
0.0000506	47898.	946130679.	20.3020333	0.0010278	-0.0014528
2.5703949	-41.7725116	-36.0000000	CY		
0.0000519	48553.	935954589.	20.2122509	0.0010485	-0.0014934
2.5983001	-42.9389981	-36.0000000	CY		
0.0000531	49177.	925683891.	20.1221584	0.0010690	-0.0015341
2.6249554	-44.1124714	-36.0000000	CY		
0.0000544	49773.	915370755.	20.0320593	0.0010892	-0.0015751
2.6504130	-45.2924869	-36.0000000	CY		
0.0000556	50341.	905015200.	19.9417761	0.0011093	-0.0016164
2.6746911	-46.4793317	-36.0000000	CY		
0.0000569	50888.	894727876.	19.8522527	0.0011291	-0.0016578
2.6978830	-47.6714687	-36.0000000	CY		
0.0000581	51412.	884506822.	19.7617736	0.0011487	-0.0016995
2.7199038	-48.8717071	-36.0000000	CY		
0.0000594	51917.	874399638.	19.6721919	0.0011680	-0.0017413
2.7409049	-50.0769601	-36.0000000	CY		
0.0000606	52406.	864426816.	19.5837950	0.0011873	-0.0017834
2.7609300	-51.2866245	-36.0000000	CY		
0.0000619	52879.	854602744.	19.4966833	0.0012064	-0.0018255
2.7800091	-52.5003918	-36.0000000	CY		
0.0000631	53337.	844938885.	19.4109402	0.0012253	-0.0018678
2.7981697	-53.7179694	-36.0000000	CY		
0.0000644	53781.	835433707.	19.3259401	0.0012441	-0.0019103
2.8153964	-54.9403760	-36.0000000	CY		
0.0000656	54204.	825972645.	19.2433003	0.0012628	-0.0019528
2.8318047	-56.1644533	36.0000000	CY		
0.0000669	54599.	816430955.	19.1675809	0.0012818	-0.0019950
2.8476616	-57.3811007	36.0000000	CY		
0.0000681	54972.	806935082.	19.0966334	0.0013010	-0.0020372
2.8628402	-58.5938104	36.0000000	CY		
0.0000694	55327.	797508879.	19.0301621	0.0013202	-0.0020792
2.8773214	-59.8026580	36.0000000	CY		
0.0000706	55665.	788171441.	18.9675095	0.0013396	-0.0021210
2.8910674	-60.0000000	36.0000000	CY		
0.0000719	55989.	778971034.	18.9071527	0.0013590	-0.0021629
2.9040023	-60.0000000	36.0000000	CY		
0.0000731	56299.	769901107.	18.8498196	0.0013784	-0.0022047
2.9161631	-60.0000000	36.0000000	CY		
0.0000744	56600.	761002751.	18.7936793	0.0013978	-0.0022466
2.9274694	-60.0000000	36.0000000	CY		
0.0000794	57700.	726933078.	18.5908938	0.0014757	-0.0024137
2.9646386	-60.0000000	36.0000000	CY		
0.0000844	58624.	694804959.	18.4080483	0.0015532	-0.0025812
2.9885202	-60.0000000	36.0000000	CY		
0.0000894	59404.	664659144.	18.2393543	0.0016301	-0.0027492
2.9992796	-60.0000000	36.0000000	CY		
0.0000944	59974.	635490182.	18.0674508	0.0017051	-0.0029193
2.9995448	-60.0000000	36.0000000	CY		
0.0000994	60473.	608533073.	17.9135706	0.0017802	-0.0030892
2.9993618	-60.0000000	36.0000000	CY		
0.0001044	60919.	583658354.	17.7734920	0.0018551	-0.0032593
2.9999169	-60.0000000	36.0000000	CY		
0.0001094	61320.	560644326.	17.6472597	0.0019302	-0.0034292
2.9996168	-60.0000000	36.0000000	CY		
0.0001144	61687.	539338623.	17.5348037	0.0020055	-0.0035988
2.9984005	-60.0000000	36.0000000	CY		
0.0001194	62023.	519561428.	17.4347896	0.0020813	-0.0037681
2.9981272	-60.0000000	36.0000000	CY		
0.0001244	62298.	500889312.	17.3357735	0.0021561	-0.0039382
2.9990536	60.0000000	36.0000000	CY		
0.0001294	62500.	483091645.	17.2316860	0.0022293	-0.0041100
2.9999532	60.0000000	36.0000000	CY		

0.0001344	62681.	466460224.	17.1372542	0.0023028	-0.0042816
2.9994509	60.0000000	36.0000000 CY			
0.0001394	62847.	450917991.	17.0499805	0.0023763	-0.0044530
2.9979602	60.0000000	36.0000000 CY			
0.0001444	62998.	436351819.	16.9707310	0.0024501	-0.0046242
2.9993690	60.0000000	36.0000000 CY			
0.0001494	63139.	422691045.	16.8969414	0.0025240	-0.0047954
2.9993252	60.0000000	36.0000000 CY			
0.0001544	63265.	409813844.	16.8261188	0.0025975	-0.0049668
2.9963195	60.0000000	36.0000000 CY			
0.0001594	63383.	397697401.	16.7598724	0.0026711	-0.0051383
2.9996857	60.0000000	36.0000000 CY			
0.0001644	63494.	386275042.	16.6995376	0.0027450	-0.0053094
2.9964167	60.0000000	36.0000000 CY			
0.0001694	63595.	375466307.	16.6427963	0.0028189	-0.0054805
2.9996319	60.0000000	36.0000000 CY			
0.0001744	63691.	365250462.	16.5908913	0.0028930	-0.0056513
2.9957328	60.0000000	36.0000000 CY			
0.0001794	63775.	355542555.	16.5436355	0.0029675	-0.0058219
2.9990934	60.0000000	36.0000000 CY			
0.0001844	63853.	346321345.	16.5024143	0.0030426	-0.0059917
2.9981833	60.0000000	36.0000000 CY			
0.0001894	63921.	337538060.	16.4642481	0.0031179	-0.0061615
2.9975442	60.0000000	36.0000000 CY			
0.0001944	63988.	329197349.	16.4293559	0.0031935	-0.0063309
2.9998481	60.0000000	36.0000000 CY			
0.0001994	64046.	321233071.	16.3964161	0.0032690	-0.0065003
2.9951125	60.0000000	36.0000000 CY			
0.0002044	64102.	313646693.	16.3649161	0.0033446	-0.0066698
2.9980643	60.0000000	36.0000000 CY			
0.0002094	64155.	306414158.	16.3355157	0.0034202	-0.0068391
2.9999149	60.0000000	36.0000000 CY			
0.0002144	64205.	299497358.	16.3069573	0.0034958	-0.0070086
2.9950191	60.0000000	36.0000000 CY			
0.0002194	64251.	292883848.	16.2821537	0.0035719	-0.0071775
2.9971561	60.0000000	36.0000000 CY			
0.0002244	64297.	286558333.	16.2594319	0.0036482	-0.0073462
2.9995809	60.0000000	36.0000000 CY			
0.0002294	64336.	280483661.	16.2378083	0.0037245	-0.0075148
2.9975688	60.0000000	36.0000000 CY			
0.0002344	64373.	274658466.	16.2186902	0.0038013	-0.0076831
2.9942114	60.0000000	36.0000000 CY			

Axial Thrust Force = 504.400 kips

Bending Max Concrete Curvature rad/in.	Bending Max Steel Stress ksi	Bending Max Casing Stress ksi	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Run Msg
0.000000625	1012.4217610	1619874818.	114.3691391	0.0000715	0.0000409	
0.2562640	2.0685000	2.0685000				
0.000001250	2024.8349320	1619867946.	69.4653464	0.0000868	0.0000256	
0.3093881	2.5092376	2.5092376				
0.000001875	3037.1921363	1619835806.	54.5110863	0.0001022	0.0000103	
0.3620811	2.9507184	2.9507184				
0.000002500	4049.4627634	1619785105.	47.0442051	0.0001176	-0.000004889	
0.4143404	3.3929424	3.3929424				
0.000003125	5061.1234108	1619559491.	42.5714571	0.0001330	-0.0000201	

0.4661548	3.8358352	3.8358352				
0.000003750	6070.8191835	1618885116.	39.5937620	0.0001485	-0.0000353	
0.5174965	4.2791779	4.2791779				
0.000004375	7077.7225541	1617765155.	37.4691318	0.0001639	-0.0000504	
0.5683460	4.7228117	4.7228117				
0.000005000	8081.4293480	1616285870.	35.8770319	0.0001794	-0.0000656	
0.6186917	5.1666446	5.1666446				
0.000005625	9081.7326309	1614530245.	34.6396176	0.0001948	-0.0000808	
0.6685269	5.6106220	5.6106220				
0.000006250	10079.	1612563218.	33.6502979	0.0002103	-0.0000959	
0.7178474	6.0547103	6.0547103				
0.000006875	11072.	1610433110.	32.8413032	0.0002258	-0.0001111	
0.7666504	6.4988880	6.4988880				
0.000007500	11072.	1476230351.	30.2030190	0.0002265	-0.0001410	
0.7685057	6.5158692	6.5158692	C			
0.000008125	11072.	1362674170.	29.4294851	0.0002391	-0.0001590	
0.8077350	6.8765943	6.8765943	C			
0.000008750	11244.	1284998182.	28.7552841	0.0002516	-0.0001771	
0.8463122	7.2344846	7.2344846	C			
0.000009375	11865.	1265556532.	28.1618984	0.0002640	-0.0001954	
0.8842845	7.5899068	7.5899068	C			
0.0000100	12480.	1248019992.	27.6348198	0.0002763	-0.0002137	
0.9216786	7.9430478	7.9430478	C			
0.0000106	13092.	1232176170.	27.1642736	0.0002886	-0.0002320	
0.9585630	8.2945012	8.2945012	C			
0.0000113	13700.	1217779457.	26.7412295	0.0003008	-0.0002504	
0.9949556	8.6443949	8.6443949	C			
0.0000119	14305.	1204631760.	26.3584957	0.0003130	-0.0002689	
1.0308718	8.9928351	8.9928351	C			
0.0000125	14908.	1192609959.	26.0113083	0.0003251	-0.0002874	
1.0663628	9.3402868	9.3402868	C			
0.0000131	15508.	1181593118.	25.6955179	0.0003373	-0.0003059	
1.1014672	9.6871034	9.6871034	C			
0.0000138	16107.	1171388763.	25.4051519	0.0003493	-0.0003244	
1.1361192	10.0326106	10.0326106	C			
0.0000144	16703.	1161980077.	25.1392197	0.0003614	-0.0003430	
1.1704184	10.3777779	10.3777779	C			
0.0000150	17299.	1153234033.	24.8936480	0.0003734	-0.0003616	
1.2043224	10.7221619	10.7221619	C			
0.0000156	17892.	1145113011.	24.6671445	0.0003854	-0.0003802	
1.2378839	11.0662843	11.0662843	C			
0.0000163	18485.	1137515750.	24.4565397	0.0003974	-0.0003988	
1.2710597	-11.4506494	-11.4506494	C			
0.0000169	19076.	1130445386.	24.2620846	0.0004094	-0.0004175	
1.3039459	-11.9862204	-11.9862204	C			
0.0000175	19666.	1123771545.	24.0793541	0.0004214	-0.0004361	
1.3364126	-12.5228902	-12.5228902	C			
0.0000181	20255.	1117522020.	23.9096345	0.0004334	-0.0004548	
1.3685857	-13.0593452	-13.0593452	C			
0.0000188	20843.	1111651644.	23.7515078	0.0004453	-0.0004734	
1.4004585	-13.5956488	-13.5956488	C			
0.0000194	21430.	1106074679.	23.6018467	0.0004573	-0.0004921	
1.4319277	-14.1329279	-14.1329279	C			
0.0000200	22016.	1100816373.	23.4620056	0.0004692	-0.0005108	
1.4631087	-14.6699367	-14.6699367	C			
0.0000206	22602.	1095847653.	23.3310934	0.0004812	-0.0005294	
1.4940009	-15.2066741	-15.2066741	C			
0.0000213	23186.	1091118808.	23.2072065	0.0004932	-0.0005481	
1.5245425	-15.7438277	-15.7438277	C			
0.0000219	23770.	1086613805.	23.0899443	0.0005051	-0.0005668	
1.5547459	-16.2812697	-16.2812697	C			
0.0000225	24352.	1082332494.	22.9796163	0.0005170	-0.0005855	
1.5846608	-16.8184378	-16.8184378	C			

0.0000231	24935.	1078256643.	22.8756620	0.0005290	-0.0006041
1.6142865	-17.3553310	-17.3553310 C			
0.0000238	25516.	1074367576.	22.7774526	0.0005410	-0.0006228
1.6436149	-17.8920357	-17.8920357 C			
0.0000244	26097.	1070626013.	22.6832035	0.0005529	-0.0006415
1.6725655	-18.4295011	-18.4295011 C			
0.0000256	27255.	1063620213.	22.5096229	0.0005768	-0.0006788
1.7295987	-19.5035958	-19.5035958 C			
0.0000269	28412.	1057176290.	22.3536291	0.0006008	-0.0007161
1.7854701	-20.5765684	-20.5765684 C			
0.0000281	29565.	1051196437.	22.2114472	0.0006247	-0.0007534
1.8400817	-21.6495852	-21.6495852 C			
0.0000294	30715.	1045628423.	22.0817719	0.0006487	-0.0007907
1.8934636	-22.7222561	-22.7222561 C			
0.0000306	31863.	1040435274.	21.9639820	0.0006726	-0.0008280
1.9456747	-23.7937727	-23.7937727 C			
0.0000319	33009.	1035572300.	21.8566898	0.0006967	-0.0008652
1.9967094	-24.8641254	-24.8641254 C			
0.0000331	34152.	1030991320.	21.7578828	0.0007207	-0.0009024
2.0465047	-25.9341056	-25.9341056 C			
0.0000344	35291.	1026660894.	21.6665972	0.0007448	-0.0009396
2.0950558	-27.0037514	-27.0037514 C			
0.0000356	36429.	1022564444.	21.5828820	0.0007689	-0.0009767
2.1424198	-28.0721943	-28.0721943 C			
0.0000369	37564.	1018677641.	21.5059773	0.0007930	-0.0010138
2.1885907	-29.1394236	-29.1394236 C			
0.0000381	38696.	1014979339.	21.4352230	0.0008172	-0.0010509
2.2335625	-30.2054283	-30.2054283 C			
0.0000394	39826.	1011451066.	21.3700431	0.0008414	-0.0010879
2.2773291	-31.2701975	-31.2701975 C			
0.0000406	40953.	1008075788.	21.3098382	0.0008657	-0.0011249
2.3198775	-32.3338311	-32.3338311 C			
0.0000419	42077.	1004831963.	21.2533140	0.0008900	-0.0011619
2.3611412	-33.3973598	-33.3973598 C			
0.0000431	43199.	1001716056.	21.2010933	0.0009143	-0.0011988
2.4011863	-34.4596045	-34.4596045 C			
0.0000444	44318.	998716767.	21.1528219	0.0009387	-0.0012357
2.4400064	-35.5205528	-35.5205528 C			
0.0000456	45379.	994613612.	21.0990508	0.0009626	-0.0012730
2.4769558	-36.5922776	-36.0000000 CY			
0.0000469	46291.	987542440.	21.0250013	0.0009855	-0.0013113
2.5110368	-37.6954669	-36.0000000 CY			
0.0000481	47124.	979203968.	20.9429816	0.0010079	-0.0013502
2.5431550	-38.8151480	-36.0000000 CY			
0.0000494	47893.	969986373.	20.8555197	0.0010297	-0.0013896
2.5735264	-39.9485682	-36.0000000 CY			
0.0000506	48616.	960308221.	20.7645255	0.0010512	-0.0014294
2.6023218	-41.0935152	-36.0000000 CY			
0.0000519	49293.	950234842.	20.6706832	0.0010723	-0.0014696
2.6296267	-42.2493440	-36.0000000 CY			
0.0000531	49939.	940022226.	20.5765295	0.0010931	-0.0015100
2.6556482	-43.4124559	-36.0000000 CY			
0.0000544	50553.	929707763.	20.4821794	0.0011137	-0.0015507
2.6804270	-44.5827039	-36.0000000 CY			
0.0000556	51139.	919344223.	20.3879211	0.0011341	-0.0015915
2.7040145	-45.7596440	-36.0000000 CY			
0.0000569	51700.	909013089.	20.2935967	0.0011542	-0.0016327
2.7264324	-46.9435270	-36.0000000 CY			
0.0000581	52239.	898740107.	20.1991016	0.0011741	-0.0016741
2.7477060	-48.1345360	-36.0000000 CY			
0.0000594	52759.	888569785.	20.1057785	0.0011938	-0.0017156
2.7679483	-49.3303781	-36.0000000 CY			
0.0000606	53260.	878522619.	20.0137502	0.0012133	-0.0017573

2.7871928	-50.5307097	-36.0000000 CY			
0.0000619	53746.	868615076.	19.9231170	0.0012327	-0.0017991
2.8054701	-51.7352099	-36.0000000 CY			
0.0000631	54215.	858856089.	19.8336962	0.0012520	-0.0018411
2.8227929	-52.9440618	-36.0000000 CY			
0.0000644	54649.	848923571.	19.7498045	0.0012714	-0.0018830
2.8394205	-54.1490742	36.0000000 CY			
0.0000656	55063.	839053569.	19.6697798	0.0012908	-0.0019248
2.8552647	-55.3528096	36.0000000 CY			
0.0000669	55444.	829075496.	19.5974132	0.0013106	-0.0019663
2.8705243	-56.5474947	36.0000000 CY			
0.0000681	55812.	819257177.	19.5276239	0.0013303	-0.0020078
2.8849302	-57.7423348	36.0000000 CY			
0.0000694	56161.	809525125.	19.4621219	0.0013502	-0.0020492
2.8985699	-58.9336090	36.0000000 CY			
0.0000706	56497.	799960215.	19.3993578	0.0013701	-0.0020905
2.9113680	-60.0000000	36.0000000 CY			
0.0000719	56817.	790503146.	19.3388436	0.0013900	-0.0021319
2.9233062	-60.0000000	36.0000000 CY			
0.0000731	57126.	781209834.	19.2794924	0.0014098	-0.0021733
2.9343453	-60.0000000	36.0000000 CY			
0.0000744	57424.	772081820.	19.2231117	0.0014297	-0.0022147
2.9445632	-60.0000000	36.0000000 CY			
0.0000794	58521.	737272743.	19.0176659	0.0015095	-0.0023798
2.9768568	-60.0000000	36.0000000 CY			
0.0000844	59463.	704751193.	18.8347039	0.0015892	-0.0025452
2.9952425	-60.0000000	36.0000000 CY			
0.0000894	60250.	674120297.	18.6633621	0.0016680	-0.0027113
2.9989049	-60.0000000	36.0000000 CY			
0.0000944	60856.	644830866.	18.4959564	0.0017456	-0.0028788
2.9999853	-60.0000000	36.0000000 CY			
0.0000994	61352.	617376397.	18.3390719	0.0018224	-0.0030469
2.9989723	-60.0000000	36.0000000 CY			
0.0001044	61795.	592047578.	18.1962968	0.0018992	-0.0032151
2.9997260	-60.0000000	36.0000000 CY			
0.0001094	62194.	568626728.	18.0686367	0.0019763	-0.0033831
2.9999640	-60.0000000	36.0000000 CY			
0.0001144	62557.	546950567.	17.9549326	0.0020536	-0.0035508
2.9999999	-60.0000000	36.0000000 CY			
0.0001194	62888.	526814161.	17.8529864	0.0021312	-0.0037182
2.9999076	60.0000000	36.0000000 CY			
0.0001244	63185.	508021229.	17.7567006	0.0022085	-0.0038859
2.9999817	60.0000000	36.0000000 CY			
0.0001294	63407.	490101011.	17.6568890	0.0022844	-0.0040550
2.9997527	60.0000000	36.0000000 CY			
0.0001344	63587.	473203969.	17.5619755	0.0023599	-0.0042245
2.9989286	60.0000000	36.0000000 CY			
0.0001394	63752.	457416230.	17.4737856	0.0024354	-0.0043940
2.9969809	60.0000000	36.0000000 CY			
0.0001444	63902.	442613788.	17.3941822	0.0025113	-0.0045631
2.9999515	60.0000000	36.0000000 CY			
0.0001494	64040.	428719252.	17.3163282	0.0025866	-0.0047327
2.9986191	60.0000000	36.0000000 CY			
0.0001544	64166.	415651118.	17.2449833	0.0026622	-0.0049022
2.9984535	60.0000000	36.0000000 CY			
0.0001594	64282.	403336718.	17.1784518	0.0027378	-0.0050716
2.9991122	60.0000000	36.0000000 CY			
0.0001644	64392.	391737392.	17.1166657	0.0028136	-0.0052408
2.9974848	60.0000000	36.0000000 CY			
0.0001694	64489.	380745190.	17.0615228	0.0028898	-0.0054096
2.9989770	60.0000000	36.0000000 CY			
0.0001744	64579.	370344143.	17.0105524	0.0029662	-0.0055782
2.9982805	60.0000000	36.0000000 CY			

0.0001794	64657.	360455202.	16.9656192	0.0030432	-0.0057462
2.9981471	60.0000000	36.0000000 CY			
0.0001844	64728.	351065659.	16.9253602	0.0031206	-0.0059138
2.9999853	60.0000000	36.0000000 CY			
0.0001894	64793.	342140569.	16.8866732	0.0031979	-0.0060815
2.9960152	60.0000000	36.0000000 CY			
0.0001944	64855.	333660501.	16.8493359	0.0032751	-0.0062493
2.9992841	60.0000000	36.0000000 CY			
0.0001994	64912.	325575761.	16.8139742	0.0033523	-0.0064171
2.9981125	60.0000000	36.0000000 CY			
0.0002044	64965.	317871845.	16.7828785	0.0034300	-0.0065844
2.9964471	60.0000000	36.0000000 CY			
0.0002094	65015.	310520014.	16.7528869	0.0035076	-0.0067517
2.9993574	60.0000000	36.0000000 CY			
0.0002144	65062.	303498046.	16.7244782	0.0035853	-0.0069191
2.9982465	60.0000000	36.0000000 CY			
0.0002194	65105.	296776505.	16.7001800	0.0036636	-0.0070858
2.9950903	60.0000000	36.0000000 CY			
0.0002244	65144.	290333379.	16.6783482	0.0037422	-0.0072522
2.9986025	60.0000000	36.0000000 CY			
0.0002294	65177.	284151688.	16.6586643	0.0038211	-0.0074183
2.9999806	60.0000000	36.0000000 CY			

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	410.100	63808.984	0.00300000
2	504.400	64612.939	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 Bending Stiffness Moment Capacity at Ult. Mom. Cap. in-kip	Ultimate (Factored) Axial Thrust kips	Ultimate (Factored) Moment Capacity in-kip
		kip-in^2		
1	0.65	63808.984	266.565	41475.838
		993659791.936		
2	0.65	64612.939	327.860	41998.409
		1005059698.456		

1	0.70	63808.984		287.070
44666.288		982824530.145		
2	0.70	64612.939		353.080
45229.057		995194328.254		
1	0.75	63808.984		307.575
47856.738		946710106.993		
2	0.75	64612.939		378.300
48459.705		962396471.328		

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 = 68000.0 lbs
Applied moment at pile head = 5342000.0 in-lbs
Axial thrust load on pile head = 504400.0 lbs

Depth X	Deflect. y	Bending Moment	Shear Force	Slope S	Total Stress	Bending Stiffness	Soil Res. Es*h	Soil Spr. Distrib. Lat. Load p
feet	inches	in-lbs	lbs	radians	psi*	lb-in^2	lb/inch	lb/in
0.00	1.0886	5342000.	68000.	-0.004463	0.000	1.619E+12	0.000	0.000
0.950	1.0379	6142754.	68000.	-0.004422	0.000	1.619E+12	0.000	0.000
1.900	0.9877	6943260.	66966.	-0.004376	0.000	1.618E+12	-181.3208	2092.7129
2.850	0.9381	7719920.	63669.	-0.004325	0.000	1.617E+12	-397.1875	4826.5641
3.800	0.8891	8444648.	57839.	-0.004268	0.000	1.616E+12	-625.5380	8020.2850
4.750	0.8408	9087739.	53204.	-0.004206	0.000	1.615E+12	-187.7271	2545.2254
5.700	0.7932	9706064.	51028.	-0.004139	0.000	1.613E+12	-194.0364	2788.5675
6.650	0.7464	10298777.	48783.	-0.004069	0.000	1.612E+12	-199.7611	3050.8277
7.600	0.7005	10865111.	46476.	-0.003994	0.000	1.611E+12	-204.9330	3335.2066
8.550	0.6554	11404369.	44114.	-0.003905	0.000	1.280E+12	-209.5575	3645.1157
9.500	0.6115	11915809.	41701.	-0.003800	0.000	1.264E+12	-213.6550	3983.4173
10.450	0.5687	12398865.	39245.	-0.003690	0.000	1.250E+12	-217.2215	4354.0315
11.400	0.5273	12853040.	36752.	-0.003574	0.000	1.238E+12	-220.2499	4761.4984
12.350	0.4873	13277912.	34227.	-0.003453	0.000	1.228E+12	-222.7314	5211.1300
13.300	0.4486	13673128.	31677.	-0.003328	0.000	1.218E+12	-224.6556	5709.1921

14.250	0.4114	14038412.	29108.	-0.003198	0.000	1.210E+12
-226.0118	6263.1282	0.000				
15.200	0.3757	14373563.	26527.	-0.003063	0.000	1.203E+12
-226.7883	6881.8404	0.000				
16.150	0.3415	14678458.	23941.	-0.002925	0.000	1.197E+12
-226.9731	7576.0509	0.000				
17.100	0.3090	14953051.	21355.	-0.002784	0.000	1.192E+12
-226.5541	8358.7637	0.000				
18.050	0.2781	15197379.	18779.	-0.002640	0.000	1.187E+12
-225.5188	9245.8685	0.000				
19.000	0.2488	15411560.	16217.	-0.002492	0.000	1.183E+12
-223.8550	10257.	0.000				
19.950	0.2212	15595795.	13678.	-0.002343	0.000	1.180E+12
-221.5508	11416.	0.000				
20.900	0.1954	15750370.	8148.6510	-0.002191	0.000	1.177E+12
-748.5834	43676.	0.000				
21.850	0.1713	15806783.	-234.4039	-0.002038	0.000	1.176E+12
-722.1280	48064.	0.000				
22.800	0.1489	15768467.	-8180.3720	-0.001885	0.000	1.177E+12
-671.9015	51437.	0.000				
23.750	0.1283	15641952.	-15428.	-0.001733	0.000	1.179E+12
-599.6978	53289.	0.000				
24.700	0.1094	15436632.	-22206.	-0.001583	0.000	1.183E+12
-589.2725	61409.	0.000				
25.650	0.0922	15153874.	-28842.	-0.001436	0.000	1.188E+12
-574.9568	71097.	0.000				
26.600	0.0766	14795558.	-35258.	-0.001293	0.000	1.195E+12
-550.6729	81904.	0.000				
27.550	0.0627	14364865.	-41343.	-0.001154	0.000	1.203E+12
-516.8975	93965.	0.000				
28.500	0.0503	13866214.	-47076.	-0.001021	0.000	1.214E+12
-488.9836	110764.	0.000				
29.450	0.0394	13303266.	-52495.	-0.000894	0.000	1.227E+12
-461.6119	133471.	0.000				
30.400	0.0299	12679615.	-57554.	-0.000774	0.000	1.243E+12
-425.8890	162181.	0.000				
31.350	0.0218	11999948.	-62113.	-0.000662	0.000	1.262E+12
-374.0546	195859.	0.000				
32.300	0.0148	11271045.	-66465.	-0.000558	0.000	1.284E+12
-389.3336	299011.	0.000				
33.250	0.009056	10490968.	-70417.	-0.000471	0.000	1.612E+12
-304.1029	382816.	0.000				
34.200	0.004114	9670944.	-73319.	-0.000399	0.000	1.613E+12
-204.9768	567952.	0.000				
35.150	-4.829E-05	8823888.	-74367.	-0.000334	0.000	1.615E+12
21.0409	4967632.	0.000				
36.100	-0.003501	7979208.	-73170.	-0.000275	0.000	1.616E+12
189.0734	615697.	0.000				
37.050	-0.006312	7158777.	-70645.	-0.000221	0.000	1.618E+12
253.8781	458540.	0.000				
38.000	-0.008548	6371049.	-67514.	-0.000174	0.000	1.619E+12
295.4425	394032.	0.000				
38.950	-0.0103	5621460.	-63984.	-0.000131	0.000	1.619E+12
323.8741	359442.	0.000				
39.900	-0.0115	4913733.	-60180.	-9.438E-05	0.000	1.620E+12
343.3585	339045.	0.000				
40.850	-0.0124	4250430.	-56193.	-6.213E-05	0.000	1.620E+12
356.1870	326834.	0.000				
41.800	-0.0130	3633246.	-52089.	-3.439E-05	0.000	1.620E+12
363.8142	319983.	0.000				
42.750	-0.0132	3063195.	-47922.	-1.082E-05	0.000	1.620E+12
367.2541	316986.	0.000				
43.700	-0.0132	2540749.	-43735.	8.897E-06	0.000	1.620E+12

367.2611	316980.	0.000				
44.650	-0.0130	2065930.	-39565.	2.511E-05	0.000	1.620E+12
364.4232	319448.	0.000				
45.600	-0.0126	1638387.	-35440.	3.814E-05	0.000	1.620E+12
359.2147	324081.	0.000				
46.550	-0.0121	1257461.	-31386.	4.833E-05	0.000	1.620E+12
352.0282	330697.	0.000				
47.500	-0.0115	922235.	-27423.	5.600E-05	0.000	1.620E+12
343.1942	339209.	0.000				
48.450	-0.0109	631572.	-23569.	6.147E-05	0.000	1.620E+12
332.9942	349600.	0.000				
49.400	-0.0101	384160.	-19837.	6.504E-05	0.000	1.620E+12
321.6684	361909.	0.000				
50.350	-0.009376	178536.	-16240.	6.702E-05	0.000	1.620E+12
309.4208	376234.	0.000				
51.300	-0.008604	13118.	-12787.	6.770E-05	0.000	1.620E+12
296.4213	392734.	0.000				
52.250	-0.007832	-113779.	-10328.	6.734E-05	0.000	1.620E+12
134.8419	196271.	0.000				
53.200	-0.007069	-223146.	-8838.6159	6.616E-05	0.000	1.620E+12
126.5380	204068.	0.000				
54.150	-0.006324	-316060.	-7447.4694	6.426E-05	0.000	1.620E+12
117.5228	211866.	0.000				
55.100	-0.005604	-393688.	-6162.1220	6.176E-05	0.000	1.620E+12
107.9767	219664.	0.000				
56.050	-0.004915	-457267.	-4987.6211	5.877E-05	0.000	1.620E+12
98.0761	227461.	0.000				
57.000	-0.004264	-508081.	-3927.0396	5.537E-05	0.000	1.620E+12
87.9909	235259.	0.000				
57.950	-0.003653	-547440.	-2981.5569	5.166E-05	0.000	1.620E+12
77.8833	243056.	0.000				
58.900	-0.003086	-576655.	-2150.5544	4.770E-05	0.000	1.620E+12
67.9066	250854.	0.000				
59.850	-0.002565	-597021.	-1431.7245	4.357E-05	0.000	1.620E+12
58.2039	258652.	0.000				
60.800	-0.002093	-609799.	-821.1834	3.933E-05	0.000	1.620E+12
48.9085	266449.	0.000				
61.750	-0.001669	-616196.	-313.5880	3.501E-05	0.000	1.620E+12
40.1433	274247.	0.000				
62.700	-0.001294	-617352.	570.5294	3.067E-05	0.000	1.620E+12
114.9650	1012614.	0.000				
63.650	-0.000969	-603541.	1792.9513	2.638E-05	0.000	1.620E+12
99.4950	1170062.	0.000				
64.600	-0.000693	-576776.	2839.5507	2.222E-05	0.000	1.620E+12
84.1190	1383936.	0.000				
65.550	-0.000463	-539055.	3710.8517	1.830E-05	0.000	1.620E+12
68.7408	1693538.	0.000				
66.500	-0.000276	-492379.	4405.1632	1.467E-05	0.000	1.620E+12
53.0682	2193687.	0.000				
67.450	-0.000128	-438786.	4914.0019	1.139E-05	0.000	1.620E+12
36.2017	3215717.	0.000				
68.400	-1.610E-05	-380470.	5193.4332	8.507E-06	0.000	1.620E+12
12.8213	9079193.	0.000				
69.350	6.562E-05	-320473.	5118.9646	6.040E-06	0.000	1.620E+12
-25.8859	4497339.	0.000				
70.300	0.000122	-263828.	4770.5359	3.984E-06	0.000	1.620E+12
-35.2419	3303367.	0.000				
71.250	0.000156	-211751.	4341.8175	2.311E-06	0.000	1.620E+12
-39.9719	2912466.	0.000				
72.200	0.000174	-164861.	3873.4930	9.856E-07	0.000	1.620E+12
-42.1903	2759319.	0.000				
73.150	0.000179	-123447.	3389.3552	-2.889E-08	0.000	1.620E+12
-42.7461	2723442.	0.000				

MOMENT FIXITY →

ELEVATION = 1.5 − 69.35 = − 67.85

AND ELEVATION = 4.5 − 69.35 = − 64.85

74.100	0.000174	-87583.	2905.6722	-7.715E-07	0.000	1.620E+12
-42.1105	2764547.	0.000				
75.050	0.000161	-57189.	2434.2747	-1.281E-06	0.000	1.620E+12
-40.5908	2868056.	0.000				
76.000	0.000144	-32067.	1983.9896	-1.595E-06	0.000	1.620E+12
-38.4066	3031161.	0.000				
76.950	0.000125	-11935.	1561.4411	-1.750E-06	0.000	1.620E+12
-35.7247	3258716.	0.000				
77.900	0.000105	3554.1212	1171.5624	-1.779E-06	0.000	1.620E+12
-32.6751	3562857.	0.000				
78.850	8.441E-05	14797.	817.9654	-1.715E-06	0.000	1.620E+12
-29.3595	3965213.	0.000				
79.800	6.545E-05	22223.	503.2494	-1.584E-06	0.000	1.620E+12
-25.8538	4502873.	0.000				
80.750	4.828E-05	26289.	229.3130	-1.414E-06	0.000	1.620E+12
-22.2052	5242761.	0.000				
81.700	3.322E-05	27468.	-2.2445	-1.225E-06	0.000	1.620E+12
-18.4189	6320463.	0.000				
82.650	2.036E-05	26252.	-189.4291	-1.036E-06	0.000	1.620E+12
-14.4204	8072968.	0.000				
83.600	9.611E-06	23161.	-328.0957	-8.617E-07	0.000	1.620E+12
-9.9070	11750698.	0.000				
84.550	7.175E-07	18781.	-389.5066	-7.141E-07	0.000	1.620E+12
-0.8668	13772567.	0.000				
85.500	-6.670E-06	14288.	-348.4321	-5.977E-07	0.000	1.620E+12
8.0729	13798559.	0.000				
86.450	-1.291E-05	10844.	-236.9678	-5.093E-07	0.000	1.620E+12
11.4823	10139000.	0.000				
87.400	-1.828E-05	8891.4239	-166.5070	-4.398E-07	0.000	1.620E+12
0.8793	548318.	0.000				
88.350	-2.294E-05	7052.7295	-155.0199	-3.837E-07	0.000	1.620E+12
1.1360	564563.	0.000				
89.300	-2.703E-05	5361.3821	-140.6952	-3.400E-07	0.000	1.620E+12
1.3771	580808.	0.000				
90.250	-3.069E-05	3848.7893	-123.6834	-3.076E-07	0.000	1.620E+12
1.6074	597053.	0.000				
91.200	-3.404E-05	2544.9393	-104.0816	-2.851E-07	0.000	1.620E+12
1.8315	613298.	0.000				
92.150	-3.719E-05	1479.0090	-81.9348	-2.710E-07	0.000	1.620E+12
2.0539	629543.	0.000				
93.100	-4.022E-05	679.9423	-57.2401	-2.634E-07	0.000	1.620E+12
2.2785	645788.	0.000				
94.050	-4.320E-05	176.9646	-29.9534	-2.604E-07	0.000	1.620E+12
2.5086	662033.	0.000				
95.000	-4.616E-05	0.000	0.000	-2.597E-07	0.000	1.620E+12
2.7464	339139.	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 = 1.0885729 inches
Computed slope at pile head = -0.0044629 radians
Maximum bending moment = 15806783. inch-lbs

Maximum shear force = -74367. lbs
Depth of maximum bending moment = 21.8500000 feet below pile head
Depth of maximum shear force = 35.1500000 feet below pile head
Number of iterations = 29
Number of zero deflection points = 3

Pile-head Deflection vs. Pile Length for Load Case 1

Boundary Condition Type 1, Shear and Moment

Shear = 68000. lb
Moment = 5342000. in- lb
Axial Load = 504400. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment in-lbs	Maximum Shear lbs
95.0000	1.0885729	15806783.	-74367.
90.2500	1.1086304	16023866.	-75203.
85.5000	1.1224715	16229772.	-76044.
80.7500	1.1320398	16426399.	-76699.
76.0000	1.0818864	15842723.	-74224.
71.2500	1.1183698	16127474.	-76003.
66.5000	1.0690122	15670626.	-73514.
61.7500	1.0978590	16008341.	-74765.
57.0000	1.0731863	15724912.	-73563.
52.2500	1.1182351	16094306.	-77921.
47.5000	1.1651440	15823152.	-87647.
42.7500	1.3646039	15326522.	-101070.
38.0000	2.1416537	14348897.	-116689.
33.2500	6.0584728	13839465.	-151447.

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 2

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

Shear force at pile head = 53000.0 lbs
Applied moment at pile head = 4038000.0 in-lbs
Axial thrust load on pile head = 410100.0 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. Spr. Distrib. p lb/in
	Es*h Lat. Load lb/inch						
0.00	0.6893	4038000.	53000.	-0.002922	0.000	1.626E+12	
0.000	0.000	0.000					
0.950	0.6562	4655793.	53000.	-0.002891	0.000	1.626E+12	
0.000	0.000	0.000					
1.900	0.6234	5273433.	52090.	-0.002856	0.000	1.625E+12	

-159.6605	2919.6586	0.000				
2.850	0.5911	5870151.	49196.	-0.002817	0.000	1.624E+12
-348.0918	6713.8538	0.000				
3.800	0.5592	6421438.	44094.	-0.002774	0.000	1.623E+12
-546.8839	11149.	0.000				
4.750	0.5278	6901442.	40061.	-0.002727	0.000	1.623E+12
-160.7376	3471.7602	0.000				
5.700	0.4970	7360329.	38198.	-0.002677	0.000	1.622E+12
-166.0344	3808.5176	0.000				
6.650	0.4668	7797396.	36278.	-0.002624	0.000	1.621E+12
-170.8226	4172.0816	0.000				
7.600	0.4372	8212007.	34306.	-0.002568	0.000	1.620E+12
-175.1310	4566.9207	0.000				
8.550	0.4082	8603588.	32288.	-0.002508	0.000	1.619E+12
-178.9662	4997.7946	0.000				
9.500	0.3800	8971627.	30229.	-0.002447	0.000	1.619E+12
-182.3239	5470.1167	0.000				
10.450	0.3524	9315676.	28134.	-0.002382	0.000	1.618E+12
-185.1940	5990.2410	0.000				
11.400	0.3257	9635351.	26009.	-0.002315	0.000	1.617E+12
-187.5620	6565.7665	0.000				
12.350	0.2997	9930332.	23860.	-0.002246	0.000	1.616E+12
-189.4097	7205.9171	0.000				
13.300	0.2744	10200370.	21694.	-0.002165	0.000	1.252E+12
-190.7150	7922.0421	0.000				
14.250	0.2503	10445188.	19515.	-0.002071	0.000	1.244E+12
-191.5130	8722.7675	0.000				
15.200	0.2272	10664670.	17330.	-0.001974	0.000	1.237E+12
-191.7950	9622.0636	0.000				
16.150	0.2053	10858767.	15145.	-0.001874	0.000	1.231E+12
-191.5527	10637.	0.000				
17.100	0.1845	11027499.	12966.	-0.001773	0.000	1.226E+12
-190.7779	11788.	0.000				
18.050	0.1649	11170959.	10798.	-0.001669	0.000	1.222E+12
-189.4633	13100.	0.000				
19.000	0.1464	11289308.	8649.0317	-0.001564	0.000	1.219E+12
-187.6028	14604.	0.000				
19.950	0.1292	11382784.	6524.1012	-0.001458	0.000	1.217E+12
-185.1921	16339.	0.000				
20.900	0.1132	11451693.	2097.8267	-0.001351	0.000	1.215E+12
-591.3473	59554.	0.000				
21.850	0.0984	11443248.	-4449.8712	-0.001244	0.000	1.215E+12
-557.3716	64569.	0.000				
22.800	0.0848	11361865.	-10505.	-0.001137	0.000	1.217E+12
-504.9271	67848.	0.000				
23.750	0.0725	11214365.	-15874.	-0.001031	0.000	1.221E+12
-436.9207	68715.	0.000				
24.700	0.0613	11009592.	-20781.	-0.000928	0.000	1.227E+12
-424.0152	78821.	0.000				
25.650	0.0513	10749237.	-25531.	-0.000827	0.000	1.234E+12
-409.4034	90922.	0.000				
26.600	0.0425	10435211.	-30078.	-0.000730	0.000	1.244E+12
-388.3408	104241.	0.000				
27.550	0.0347	10070269.	-34353.	-0.000646	0.000	1.616E+12
-361.6492	118820.	0.000				
28.500	0.0277	9657996.	-38355.	-0.000577	0.000	1.617E+12
-340.3809	139905.	0.000				
29.450	0.0215	9201168.	-42118.	-0.000510	0.000	1.618E+12
-319.7152	169133.	0.000				
30.400	0.0161	8702487.	-45454.	-0.000447	0.000	1.619E+12
-265.6400	188061.	0.000				
31.350	0.0114	8168996.	-48080.	-0.000388	0.000	1.620E+12
-195.0744	195859.	0.000				

32.300	0.007261	7609886.	-50744.	-0.000332	0.000	1.621E+12
-272.3043	427514.	0.000				
33.250	0.003778	7015136.	-53416.	-0.000281	0.000	1.622E+12
-196.4196	592678.	0.000				
34.200	0.000857	6394629.	-55069.	-0.000234	0.000	1.623E+12
-93.5413	1244505.	0.000				
35.150	-0.001552	5761756.	-54884.	-0.000191	0.000	1.624E+12
125.9093	924592.	0.000				
36.100	-0.003501	5145057.	-53089.	-0.000153	0.000	1.625E+12
189.0731	615710.	0.000				
37.050	-0.005038	4552761.	-50718.	-0.000119	0.000	1.625E+12
226.8091	513269.	0.000				
38.000	-0.006210	3989791.	-47990.	-8.889E-05	0.000	1.626E+12
251.8314	462270.	0.000				
38.950	-0.007064	3459419.	-45024.	-6.278E-05	0.000	1.626E+12
268.5870	433432.	0.000				
39.900	-0.007642	2963840.	-41900.	-4.026E-05	0.000	1.626E+12
279.3480	416735.	0.000				
40.850	-0.007982	2504467.	-38681.	-2.109E-05	0.000	1.626E+12
285.5041	407749.	0.000				
41.800	-0.008123	2082116.	-35412.	-5.013E-06	0.000	1.626E+12
288.0031	404211.	0.000				
42.750	-0.008097	1697126.	-32131.	8.235E-06	0.000	1.626E+12
287.5406	404861.	0.000				
43.700	-0.007935	1349449.	-28870.	1.891E-05	0.000	1.626E+12
284.6547	408966.	0.000				
44.650	-0.007665	1038721.	-25652.	2.729E-05	0.000	1.626E+12
279.7779	416094.	0.000				
45.600	-0.007313	764319.	-22500.	3.361E-05	0.000	1.626E+12
273.2677	426007.	0.000				
46.550	-0.006899	525406.	-19429.	3.813E-05	0.000	1.626E+12
265.4261	438593.	0.000				
47.500	-0.006443	320971.	-16454.	4.109E-05	0.000	1.626E+12
256.5112	453836.	0.000				
48.450	-0.005962	149861.	-13586.	4.275E-05	0.000	1.626E+12
246.7448	471799.	0.000				
49.400	-0.005469	10814.	-10832.	4.331E-05	0.000	1.626E+12
236.3169	492618.	0.000				
50.350	-0.004975	-97522.	-8200.6906	4.300E-05	0.000	1.626E+12
225.3875	516505.	0.000				
51.300	-0.004488	-176564.	-5695.6889	4.204E-05	0.000	1.626E+12
214.0864	543770.	0.000				
52.250	-0.004016	-227777.	-4081.2823	4.063E-05	0.000	1.626E+12
69.1428	196271.	0.000				
53.200	-0.003562	-269997.	-3323.7243	3.888E-05	0.000	1.626E+12
63.7621	204068.	0.000				
54.150	-0.003130	-303922.	-2628.7603	3.687E-05	0.000	1.626E+12
58.1614	211866.	0.000				
55.100	-0.002721	-330278.	-1998.3492	3.465E-05	0.000	1.626E+12
52.4371	219664.	0.000				
56.050	-0.002340	-349808.	-1433.3758	3.226E-05	0.000	1.626E+12
46.6811	227461.	0.000				
57.000	-0.001986	-363260.	-933.7090	2.976E-05	0.000	1.626E+12
40.9798	235259.	0.000				
57.950	-0.001661	-371375.	-498.2675	2.719E-05	0.000	1.626E+12
35.4135	243056.	0.000				
58.900	-0.001366	-374875.	-125.0916	2.457E-05	0.000	1.626E+12
30.0560	250854.	0.000				
59.850	-0.001101	-374457.	188.5828	2.195E-05	0.000	1.626E+12
24.9746	258652.	0.000				
60.800	-0.000866	-370780.	446.2492	1.933E-05	0.000	1.626E+12
20.2300	266449.	0.000				
61.750	-0.000660	-364463.	652.0566	1.676E-05	0.000	1.626E+12

15.8766	274247.	0.000				
62.700	-0.000484	-356070.	1143.0775	1.423E-05	0.000	1.626E+12
70.2675	1656718.	0.000				
63.650	-0.000336	-338534.	1877.2492	1.179E-05	0.000	1.626E+12
58.5346	1988794.	0.000				
64.600	-0.000215	-313379.	2477.7255	9.510E-06	0.000	1.626E+12
46.8121	2486811.	0.000				
65.550	-0.000119	-282131.	2943.0114	7.422E-06	0.000	1.626E+12
34.8170	3343554.	0.000				
66.500	-4.537E-05	-246348.	3264.1615	5.569E-06	0.000	1.626E+12
21.5251	5408132.	0.000				
67.450	8.274E-06	-207760.	3334.4581	3.978E-06	0.000	1.626E+12
-9.1924	12665638.	0.000				
68.400	4.532E-05	-170359.	3159.4429	2.652E-06	0.000	1.626E+12
-21.5120	5411663.	0.000				
69.350	6.874E-05	-135749.	2885.8020	1.579E-06	0.000	1.626E+12
-26.4952	4393814.	0.000				
70.300	8.132E-05	-104578.	2570.5220	7.367E-07	0.000	1.626E+12
-28.8171	4039763.	0.000				
71.250	8.554E-05	-77148.	2237.7999	9.965E-08	0.000	1.626E+12
-29.5552	3938874.	0.000				
72.200	8.359E-05	-53557.	1902.7993	-3.585E-07	0.000	1.626E+12
-29.2169	3984477.	0.000				
73.150	7.737E-05	-33761.	1576.0505	-6.646E-07	0.000	1.626E+12
-28.1075	4141735.	0.000				
74.100	6.844E-05	-17617.	1265.1503	-8.447E-07	0.000	1.626E+12
-26.4364	4403536.	0.000				
75.050	5.811E-05	-4907.7425	975.6171	-9.237E-07	0.000	1.626E+12
-24.3589	4779090.	0.000				
76.000	4.738E-05	4635.8484	711.3939	-9.246E-07	0.000	1.626E+12
-21.9960	5292467.	0.000				
76.950	3.702E-05	11321.	475.1844	-8.687E-07	0.000	1.626E+12
-19.4442	5987026.	0.000				
77.900	2.757E-05	15478.	268.7061	-7.747E-07	0.000	1.626E+12
-16.7800	6937574.	0.000				
78.850	1.936E-05	17454.	92.9155	-6.593E-07	0.000	1.626E+12
-14.0604	8279457.	0.000				
79.800	1.254E-05	17603.	-51.7334	-5.364E-07	0.000	1.626E+12
-11.3166	10286835.	0.000				
80.750	7.129E-06	16280.	-164.8730	-4.176E-07	0.000	1.626E+12
-8.5325	13643335.	0.000				
81.700	3.019E-06	13848.	-234.1795	-3.120E-07	0.000	1.626E+12
-3.6266	13694591.	0.000				
82.650	1.512E-08	10944.	-254.9547	-2.251E-07	0.000	1.626E+12
-0.0182	13720583.	0.000				
83.600	-2.114E-06	8036.7509	-240.5279	-1.586E-07	0.000	1.626E+12
2.5492	13746575.	0.000				
84.550	-3.601E-06	5460.9895	-201.2007	-1.113E-07	0.000	1.626E+12
4.3503	13772567.	0.000				
85.500	-4.651E-06	3450.4147	-144.3136	-8.004E-08	0.000	1.626E+12
5.6299	13798559.	0.000				
86.450	-5.426E-06	2171.3871	-74.7182	-6.034E-08	0.000	1.626E+12
6.5798	13824551.	0.000				
87.400	-6.027E-06	1747.4050	-35.5607	-4.660E-08	0.000	1.626E+12
0.2899	548318.	0.000				
88.350	-6.488E-06	1361.0389	-32.0768	-3.570E-08	0.000	1.626E+12
0.3213	564563.	0.000				
89.300	-6.841E-06	1016.3872	-28.2586	-2.737E-08	0.000	1.626E+12
0.3485	580808.	0.000				
90.250	-7.112E-06	716.9977	-24.1488	-2.129E-08	0.000	1.626E+12
0.3725	597053.	0.000				
91.200	-7.326E-06	465.9943	-19.7789	-1.715E-08	0.000	1.626E+12
0.3941	613298.	0.000				

92.150	-7.503E-06	266.1992	-15.1704	-1.458E-08	0.000	1.626E+12
0.4144	629543.	0.000				
93.100	-7.659E-06	120.2448	-10.3356	-1.322E-08	0.000	1.626E+12
0.4339	645788.	0.000				
94.050	-7.805E-06	30.6708	-5.2791	-1.270E-08	0.000	1.626E+12
0.4532	662033.	0.000				
95.000	-7.948E-06	0.000	0.000	-1.259E-08	0.000	1.626E+12
0.4729	339139.	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. 2:

Pile-head deflection	=	0.6893235 inches
Computed slope at pile head	=	-0.0029216 radians
Maximum bending moment	=	11451693. inch-lbs
Maximum shear force	=	-55069. lbs
Depth of maximum bending moment	=	20.9000000 feet below pile head
Depth of maximum shear force	=	34.2000000 feet below pile head
Number of iterations	=	42
Number of zero deflection points	=	3

Pile-head Deflection vs. Pile Length for Load Case 2

Boundary Condition Type 1, Shear and Moment

Shear	=	53000.	lb
Moment	=	4038000.	in- lb
Axial Load	=	410100.	lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment ln-lbs	Maximum Shear lbs
95.0000	0.6893235	11451693.	-55069.

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 3

Pile-head conditions are Displacement and Moment (Loading Type 4)

Displacement of pile head	=	1.000000 inches
Moment at pile head	=	5342000.0 in-lbs
Axial load at pile head	=	504400.0 lbs

Depth	Deflect.	Bending	Shear	Slope	Total	Bending	Soil Res.	Soil Spr.	Distrib.

X	y	Moment	Force	S	Stress	Stiffness	p
Es*h	Lat. Load						
feet	inches	in-lbs	lbs	radians	psi*	lb-in^2	lb/in
lb/inch	lb/inch						
0.00	1.0000	5342000.	64030.	-0.004142	0.000	1.619E+12	
0.000	0.000	0.000					
0.950	0.9530	6095647.	64030.	-0.004102	0.000	1.619E+12	
0.000	0.000	0.000					
1.900	0.9065	6849048.	63022.	-0.004056	0.000	1.618E+12	
-176.7338	2222.6305	0.000					
2.850	0.8605	7579203.	59809.	-0.004005	0.000	1.617E+12	
-386.9931	5126.8573	0.000					
3.800	0.8152	8258757.	54128.	-0.003950	0.000	1.616E+12	
-609.6154	8525.5191	0.000					
4.750	0.7705	8858750.	49614.	-0.003889	0.000	1.615E+12	
-182.3367	2697.9128	0.000					
5.700	0.7265	9434688.	47501.	-0.003825	0.000	1.614E+12	
-188.4319	2956.8868	0.000					
6.650	0.6833	9985753.	45321.	-0.003756	0.000	1.613E+12	
-193.9572	3236.1145	0.000					
7.600	0.6408	10511206.	43082.	-0.003683	0.000	1.612E+12	
-198.9438	3539.0094	0.000					
8.550	0.5993	11010377.	40788.	-0.003607	0.000	1.611E+12	
-203.3976	3869.2102	0.000					
9.500	0.5586	11482665.	38447.	-0.003517	0.000	1.277E+12	
-207.3120	4230.8676	0.000					
10.450	0.5191	11927423.	36065.	-0.003412	0.000	1.264E+12	
-210.7058	4627.4391	0.000					
11.400	0.4808	12344178.	33646.	-0.003302	0.000	1.252E+12	
-213.5722	5063.8666	0.000					
12.350	0.4438	12732531.	31198.	-0.003187	0.000	1.241E+12	
-215.9027	5545.9395	0.000					
13.300	0.4081	13092153.	28727.	-0.003068	0.000	1.232E+12	
-217.6876	6080.4945	0.000					
14.250	0.3738	13422787.	26238.	-0.002945	0.000	1.224E+12	
-218.9163	6675.6638	0.000					
15.200	0.3410	13724253.	23739.	-0.002819	0.000	1.217E+12	
-219.5778	7341.1848	0.000					
16.150	0.3096	13996443.	21235.	-0.002688	0.000	1.211E+12	
-219.6607	8088.8010	0.000					
17.100	0.2797	14239328.	18734.	-0.002555	0.000	1.206E+12	
-219.1535	8932.7729	0.000					
18.050	0.2513	14452958.	16242.	-0.002419	0.000	1.202E+12	
-218.0445	9890.5477	0.000					
19.000	0.2245	14637463.	13766.	-0.002281	0.000	1.198E+12	
-216.3223	10984.	0.000					
19.950	0.1993	14793053.	11313.	-0.002141	0.000	1.195E+12	
-213.9760	12239.	0.000					
20.900	0.1757	14920024.	6017.7882	-0.001999	0.000	1.192E+12	
-715.0344	46391.	0.000					
21.850	0.1537	14953248.	-1971.3441	-0.001856	0.000	1.192E+12	
-686.5678	50912.	0.000					
22.800	0.1334	14896423.	-9506.3736	-0.001713	0.000	1.193E+12	
-635.3672	54301.	0.000					
23.750	0.1147	14756208.	-16340.	-0.001572	0.000	1.196E+12	
-563.4915	56021.	0.000					
24.700	0.0976	14541952.	-22699.	-0.001432	0.000	1.200E+12	
-552.0988	64520.	0.000					
25.650	0.0820	14255151.	-28908.	-0.001296	0.000	1.206E+12	
-537.2214	74680.	0.000					
26.600	0.0680	13897757.	-34894.	-0.001163	0.000	1.213E+12	

-513.0382	86007.	0.000					
27.550	0.0555	13472938.	-40555.	-0.001035	0.000	1.223E+12	
-480.0827	98640.	0.000					
28.500	0.0444	12985005.	-45874.	-0.000912	0.000	1.235E+12	
-453.1065	116342.	0.000					
29.450	0.0347	12437498.	-50891.	-0.000796	0.000	1.249E+12	
-426.9705	140355.	0.000					
30.400	0.0263	11833848.	-55566.	-0.000686	0.000	1.266E+12	
-393.2254	170743.	0.000					
31.350	0.0190	11178483.	-59672.	-0.000584	0.000	1.314E+12	
-327.1841	195859.	0.000					
32.300	0.0129	10480039.	-63609.	-0.000498	0.000	1.612E+12	
-363.4962	320263.	0.000					
33.250	0.007679	9733928.	-67277.	-0.000427	0.000	1.613E+12	
-280.0316	415722.	0.000					
34.200	0.003203	8951030.	-69904.	-0.000361	0.000	1.615E+12	
-180.8689	643662.	0.000					
35.150	-0.000552	8144262.	-70507.	-0.000301	0.000	1.616E+12	
75.0599	1550559.	0.000					
36.100	-0.003652	7346918.	-68979.	-0.000246	0.000	1.617E+12	
193.1163	602793.	0.000					
37.050	-0.006162	6574374.	-66448.	-0.000197	0.000	1.618E+12	
250.8491	464068.	0.000					
38.000	-0.008144	5834165.	-63375.	-0.000153	0.000	1.619E+12	
288.3838	403670.	0.000					
38.950	-0.009658	5131197.	-59941.	-0.000115	0.000	1.620E+12	
314.0428	370689.	0.000					
39.900	-0.0108	4468835.	-56261.	-8.094E-05	0.000	1.620E+12	
331.4752	351195.	0.000					
40.850	-0.0115	3849370.	-52418.	-5.166E-05	0.000	1.620E+12	
342.7347	339658.	0.000					
41.800	-0.0119	3274291.	-48475.	-2.659E-05	0.000	1.620E+12	
349.1483	333420.	0.000					
42.750	-0.0121	2744455.	-44480.	-5.416E-06	0.000	1.620E+12	
351.6524	331046.	0.000					
43.700	-0.0121	2260209.	-40475.	1.220E-05	0.000	1.620E+12	
350.9498	331709.	0.000					
44.650	-0.0118	1821481.	-36493.	2.656E-05	0.000	1.620E+12	
347.5922	334914.	0.000					
45.600	-0.0115	1427852.	-32563.	3.799E-05	0.000	1.620E+12	
342.0273	340363.	0.000					
46.550	-0.0110	1078615.	-28706.	4.681E-05	0.000	1.620E+12	
334.6269	347891.	0.000					
47.500	-0.0104	772823.	-24942.	5.333E-05	0.000	1.620E+12	
325.7053	357420.	0.000					
48.450	-0.009750	509328.	-21287.	5.784E-05	0.000	1.620E+12	
315.5307	368946.	0.000					
49.400	-0.009070	286819.	-17754.	6.064E-05	0.000	1.620E+12	
304.3320	382523.	0.000					
50.350	-0.008367	103849.	-14353.	6.201E-05	0.000	1.620E+12	
292.3034	398265.	0.000					
51.300	-0.007656	-41137.	-11093.	6.223E-05	0.000	1.620E+12	
279.6061	416351.	0.000					
52.250	-0.006948	-149784.	-8817.2696	6.156E-05	0.000	1.620E+12	
119.6219	196271.	0.000					
53.200	-0.006252	-242879.	-7497.4868	6.018E-05	0.000	1.620E+12	
111.9189	204068.	0.000					
54.150	-0.005576	-321419.	-6268.8800	5.820E-05	0.000	1.620E+12	
103.6262	211866.	0.000					
55.100	-0.004925	-386478.	-5137.2520	5.570E-05	0.000	1.620E+12	
94.9051	219664.	0.000					
56.050	-0.004306	-439189.	-4106.5905	5.280E-05	0.000	1.620E+12	
85.9127	227461.	0.000					

57.000	-0.003722	-480716.	-3179.1278	4.956E-05	0.000	1.620E+12
76.8000	235259.	0.000				
57.950	-0.003176	-512243.	-2355.4192	4.607E-05	0.000	1.620E+12
67.7103	243056.	0.000				
58.900	-0.002671	-534949.	-1634.4344	4.238E-05	0.000	1.620E+12
58.7783	250854.	0.000				
59.850	-0.002209	-549995.	-1013.6588	3.857E-05	0.000	1.620E+12
50.1297	258652.	0.000				
60.800	-0.001792	-558504.	-489.1984	3.467E-05	0.000	1.620E+12
41.8809	266449.	0.000				
61.750	-0.001419	-561548.	-55.8868	3.072E-05	0.000	1.620E+12
34.1387	274247.	0.000				
62.700	-0.001091	-560132.	740.4522	2.678E-05	0.000	1.620E+12
105.5699	1102744.	0.000				
63.650	-0.000809	-544973.	1860.1554	2.289E-05	0.000	1.620E+12
90.8693	1281149.	0.000				
64.600	-0.000570	-517983.	2812.8048	1.915E-05	0.000	1.620E+12
76.2622	1526547.	0.000				
65.550	-0.000372	-481061.	3598.8242	1.563E-05	0.000	1.620E+12
61.6360	1888814.	0.000				
66.500	-0.000213	-436110.	4216.0516	1.241E-05	0.000	1.620E+12
46.6495	2495646.	0.000				
67.450	-8.917E-05	-385078.	4653.9639	9.516E-06	0.000	1.620E+12
30.1772	3858087.	0.000				
68.400	3.862E-06	-330109.	4800.2338	6.999E-06	0.000	1.620E+12
-4.5158	13330703.	0.000				
69.350	7.041E-05	-275713.	4621.6585	4.867E-06	0.000	1.620E+12
-26.8132	4341420.	0.000				
70.300	0.000115	-224791.	4273.6337	3.106E-06	0.000	1.620E+12
-34.2438	3399509.	0.000				
71.250	0.000141	-178310.	3861.9820	1.688E-06	0.000	1.620E+12
-37.9758	3065479.	0.000				
72.200	0.000153	-136757.	3419.9847	5.790E-07	0.000	1.620E+12
-39.5676	2942184.	0.000				
73.150	0.000154	-100341.	2968.0953	-2.553E-07	0.000	1.620E+12
-39.7113	2931562.	0.000				
74.100	0.000147	-69082.	2520.5281	-8.515E-07	0.000	1.620E+12
-38.8093	2999713.	0.000				
75.050	0.000135	-42863.	2087.6660	-1.245E-06	0.000	1.620E+12
-37.1314	3135284.	0.000				
76.000	0.000119	-21469.	1677.2347	-1.472E-06	0.000	1.620E+12
-34.8741	3338247.	0.000				
76.950	0.000101	-4605.4517	1294.9806	-1.564E-06	0.000	1.620E+12
-32.1880	3616843.	0.000				
77.900	8.344E-05	8074.8320	945.1153	-1.551E-06	0.000	1.620E+12
-29.1918	3988101.	0.000				
78.850	6.608E-05	16961.	630.6456	-1.463E-06	0.000	1.620E+12
-25.9783	4481478.	0.000				
79.800	5.008E-05	22470.	353.6597	-1.324E-06	0.000	1.620E+12
-22.6158	5147841.	0.000				
80.750	3.589E-05	25040.	115.6306	-1.157E-06	0.000	1.620E+12
-19.1437	6081570.	0.000				
81.700	2.370E-05	25120.	-82.1611	-9.808E-07	0.000	1.620E+12
-15.5566	7484065.	0.000				
82.650	1.352E-05	23178.	-237.8201	-8.109E-07	0.000	1.620E+12
-11.7520	9907261.	0.000				
83.600	5.209E-06	19707.	-340.6074	-6.600E-07	0.000	1.620E+12
-6.2808	13746575.	0.000				
84.550	-1.524E-06	15419.	-365.9111	-5.364E-07	0.000	1.620E+12
1.8416	13772567.	0.000				
85.500	-7.020E-06	11370.	-307.1538	-4.421E-07	0.000	1.620E+12
8.4667	13748892.	0.000				
86.450	-1.160E-05	8421.4167	-196.8453	-3.724E-07	0.000	1.620E+12

10.8856	10694332.	0.000				
87.400	-1.551E-05	6886.7007	-130.5444	-3.186E-07	0.000	1.620E+12
0.7461	548318.	0.000				
88.350	-1.887E-05	5448.6688	-120.9657	-2.752E-07	0.000	1.620E+12
0.9344	564563.	0.000				
89.300	-2.179E-05	4131.8482	-109.3130	-2.415E-07	0.000	1.620E+12
1.1100	580808.	0.000				
90.250	-2.437E-05	2959.1097	-95.7103	-2.165E-07	0.000	1.620E+12
1.2765	597053.	0.000				
91.200	-2.672E-05	1952.1429	-80.2400	-1.992E-07	0.000	1.620E+12
1.4376	613298.	0.000				
92.150	-2.892E-05	1131.9291	-62.9439	-1.884E-07	0.000	1.620E+12
1.5968	629543.	0.000				
93.100	-3.102E-05	519.1880	-43.8269	-1.826E-07	0.000	1.620E+12
1.7571	645788.	0.000				
94.050	-3.308E-05	134.7750	-22.8623	-1.803E-07	0.000	1.620E+12
1.9209	662033.	0.000				
95.000	-3.513E-05	0.000	0.000	-1.798E-07	0.000	1.620E+12
2.0900	339139.	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. 3:

Pile-head deflection	=	1.0000000 inches
Computed slope at pile head	=	-0.0041421 radians
Maximum bending moment	=	14953248. inch-lbs
Maximum shear force	=	-70507. lbs
Depth of maximum bending moment	=	21.8500000 feet below pile head
Depth of maximum shear force	=	35.1500000 feet below pile head
Number of iterations	=	42
Number of zero deflection points	=	3

Pile-head Deflection vs. Pile Length for Load Case 3

Boundary Condition Type 4, Deflection and Moment

Deflection	=	1.00000 in
Moment	=	5342000. in- lb
Axial Load	=	504400. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment ln-lbs	Maximum Shear lbs
95.0000	1.0000000	14953248.	-70507.
90.2500	1.0000000	15006913.	-70577.
85.5000	1.0000000	15060170.	-70767.
80.7500	1.0000000	15140081.	-71104.

76.0000	1.0000000	15034710.	-70581.
71.2500	1.0000000	14976702.	-70911.
66.5000	1.0000000	14984909.	-70395.
61.7500	1.0000000	15063200.	-70598.
57.0000	1.0000000	14999825.	-70295.
52.2500	1.0000000	14983188.	-72217.
47.5000	1.0000000	14436485.	-78794.
42.7500	1.0000000	13023097.	-83139.
38.0000	1.0000000	10521778.	-78816.
33.2500	1.0000000	7814953.	-63547.
28.5000	1.0000000	6109165.	-46782.
23.7500	1.0000000	5448267.	-38521.
19.0000	1.0000000	5342000.	-44514.

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 4

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head = 1.500000 inches
Moment at pile head = 5342000.0 in-lbs
Axial load at pile head = 504400.0 lbs

Depth X	Deflect. y	Bending Moment	Shear Force	Slope S	Total Stress	Bending Stiffness	Soil Res. Spr. Distrib. p
Es*h	Lat. Load						
feet	inches	in-lbs	lbs	radians	psi*	lb-in^2	lb/in
lb/inch	lb/inch						
0.00	1.5000	5342000.	85768.	-0.005908	0.000	1.619E+12	
0.000	0.000	0.000					
0.950	1.4329	6353616.	85768.	-0.005867	0.000	1.619E+12	
0.000	0.000	0.000					
1.900	1.3662	7364974.	84612.	-0.005819	0.000	1.617E+12	
-202.6818	1691.1991	0.000					
2.850	1.3002	8349693.	80922.	-0.005763	0.000	1.616E+12	
-444.7350	3899.3930	0.000					
3.800	1.2348	9276276.	74398.	-0.005701	0.000	1.614E+12	
-699.9254	6461.7290	0.000					
4.750	1.1702	10111520.	69213.	-0.005633	0.000	1.612E+12	
-209.5940	2041.8243	0.000					
5.700	1.1064	10919114.	66783.	-0.005558	0.000	1.611E+12	
-216.7962	2233.7786	0.000					
6.650	1.0435	11698089.	64274.	-0.005467	0.000	1.271E+12	
-223.3604	2440.1876	0.000					
7.600	0.9818	12447432.	61694.	-0.005358	0.000	1.249E+12	
-229.3408	2663.0511	0.000					
8.550	0.9213	13166317.	59048.	-0.005240	0.000	1.230E+12	
-234.7515	2904.6691	0.000					
9.500	0.8623	13853992.	56344.	-0.005114	0.000	1.214E+12	
-239.5940	3167.5665	0.000					
10.450	0.8047	14509781.	53589.	-0.004980	0.000	1.200E+12	
-243.8638	3454.6048	0.000					
11.400	0.7488	15133086.	50788.	-0.004838	0.000	1.188E+12	
-247.5528	3769.0803	0.000					
12.350	0.6944	15723384.	47948.	-0.004690	0.000	1.178E+12	
-250.6509	4114.8305	0.000					
13.300	0.6418	16280232.	45076.	-0.004534	0.000	1.169E+12	
-253.1465	4496.3593	0.000					

14.250	0.5910	16803268.	42180.	-0.004372	0.000	1.160E+12
-255.0273	4918.9887	0.000				
15.200	0.5421	17292211.	39265.	-0.004204	0.000	1.153E+12
-256.2800	5389.0500	0.000				
16.150	0.4952	17746866.	36340.	-0.004031	0.000	1.147E+12
-256.8908	5914.1248	0.000				
17.100	0.4502	18167120.	33412.	-0.003852	0.000	1.142E+12
-256.8456	6503.3532	0.000				
18.050	0.4074	18552952.	30488.	-0.003668	0.000	1.137E+12
-256.1301	7167.8308	0.000				
19.000	0.3666	18904427.	27576.	-0.003480	0.000	1.132E+12
-254.7299	7921.1248	0.000				
19.950	0.3280	19221703.	24684.	-0.003288	0.000	1.129E+12
-252.6309	8779.9463	0.000				
20.900	0.2916	19505031.	18171.	-0.003092	0.000	1.126E+12
-889.9777	34788.	0.000				
21.850	0.2575	19671562.	8117.9746	-0.002893	0.000	1.124E+12
-873.7369	38678.	0.000				
22.800	0.2257	19723394.	-1592.3965	-0.002693	0.000	1.123E+12
-829.8369	41918.	0.000				
23.750	0.1961	19666229.	-10648.	-0.002493	0.000	1.124E+12
-758.8711	44112.	0.000				
24.700	0.1688	19509295.	-19273.	-0.002295	0.000	1.125E+12
-754.1985	50926.	0.000				
25.650	0.1438	19253208.	-27812.	-0.002099	0.000	1.128E+12
-744.0413	58987.	0.000				
26.600	0.1210	18899307.	-36165.	-0.001906	0.000	1.133E+12
-721.3467	67975.	0.000				
27.550	0.1003	18450566.	-44189.	-0.001719	0.000	1.138E+12
-686.3673	77991.	0.000				
28.500	0.0818	17911562.	-51846.	-0.001537	0.000	1.145E+12
-656.9089	91567.	0.000				
29.450	0.0653	17286161.	-59165.	-0.001363	0.000	1.153E+12
-627.1955	109536.	0.000				
30.400	0.0507	16578267.	-66085.	-0.001196	0.000	1.164E+12
-586.7954	131905.	0.000				
31.350	0.0380	15793179.	-72480.	-0.001038	0.000	1.177E+12
-535.1518	160528.	0.000				
32.300	0.0270	14937663.	-78526.	-0.000890	0.000	1.192E+12
-525.4661	221548.	0.000				
33.250	0.0177	14013036.	-83944.	-0.000753	0.000	1.211E+12
-425.1640	273817.	0.000				
34.200	0.009868	13032396.	-88177.	-0.000627	0.000	1.234E+12
-317.4484	366735.	0.000				
35.150	0.003408	12009808.	-91050.	-0.000512	0.000	1.261E+12
-186.5543	624102.	0.000				
36.100	-0.001815	10962351.	-91337.	-0.000419	0.000	1.611E+12
136.1289	854980.	0.000				
37.050	-0.006153	9932139.	-89133.	-0.000345	0.000	1.613E+12
250.6633	464394.	0.000				
38.000	-0.009691	8934100.	-85911.	-0.000279	0.000	1.615E+12
314.5798	370048.	0.000				
38.950	-0.0125	7976580.	-82080.	-0.000219	0.000	1.616E+12
357.4161	325701.	0.000				
39.900	-0.0147	7065188.	-77836.	-0.000166	0.000	1.618E+12
387.2765	300591.	0.000				
40.850	-0.0163	6203839.	-73303.	-0.000119	0.000	1.619E+12
407.9510	285358.	0.000				
41.800	-0.0174	5395256.	-68574.	-7.854E-05	0.000	1.619E+12
421.6382	276096.	0.000				
42.750	-0.0181	4641251.	-63721.	-4.322E-05	0.000	1.620E+12
429.7811	270865.	0.000				
43.700	-0.0184	3942913.	-58801.	-1.301E-05	0.000	1.620E+12

433.4072	268599.	0.000				
44.650	-0.0184	3300741.	-53861.	1.248E-05	0.000	1.620E+12
433.2912	268672.	0.000				
45.600	-0.0181	2714745.	-48940.	3.365E-05	0.000	1.620E+12
430.0423	270702.	0.000				
46.550	-0.0176	2184528.	-44071.	5.089E-05	0.000	1.620E+12
424.1549	274460.	0.000				
47.500	-0.0169	1709346.	-39282.	6.459E-05	0.000	1.620E+12
416.0392	279814.	0.000				
48.450	-0.0161	1288163.	-34596.	7.514E-05	0.000	1.620E+12
406.0411	286704.	0.000				
49.400	-0.0152	919697.	-30033.	8.291E-05	0.000	1.620E+12
394.4550	295126.	0.000				
50.350	-0.0143	602457.	-25610.	8.826E-05	0.000	1.620E+12
381.5319	305122.	0.000				
51.300	-0.0132	334777.	-21340.	9.156E-05	0.000	1.620E+12
367.4845	316786.	0.000				
52.250	-0.0122	114842.	-18052.	9.314E-05	0.000	1.620E+12
209.4798	196271.	0.000				
53.200	-0.0111	-77875.	-15725.	9.327E-05	0.000	1.620E+12
198.7121	204068.	0.000				
54.150	-0.0100	-244763.	-13529.	9.214E-05	0.000	1.620E+12
186.6016	211866.	0.000				
55.100	-0.009000	-387391.	-11477.	8.991E-05	0.000	1.620E+12
173.4192	219664.	0.000				
56.050	-0.007991	-507465.	-9579.4189	8.676E-05	0.000	1.620E+12
159.4334	227461.	0.000				
57.000	-0.007022	-606799.	-7844.6800	8.284E-05	0.000	1.620E+12
144.9068	235259.	0.000				
57.950	-0.006102	-687277.	-6277.1819	7.829E-05	0.000	1.620E+12
130.0929	243056.	0.000				
58.900	-0.005237	-750820.	-4878.8208	7.323E-05	0.000	1.620E+12
115.2336	250854.	0.000				
59.850	-0.004432	-799356.	-3648.8095	6.778E-05	0.000	1.620E+12
100.5578	258652.	0.000				
60.800	-0.003691	-834792.	-2583.8331	6.203E-05	0.000	1.620E+12
86.2801	266449.	0.000				
61.750	-0.003018	-858981.	-1678.2135	5.607E-05	0.000	1.620E+12
72.6005	274247.	0.000				
62.700	-0.002413	-873700.	-369.5902	4.997E-05	0.000	1.620E+12
156.9826	741588.	0.000				
63.650	-0.001879	-867982.	1314.7045	4.384E-05	0.000	1.620E+12
138.5077	840508.	0.000				
64.600	-0.001414	-844229.	2789.0620	3.781E-05	0.000	1.620E+12
120.1515	968923.	0.000				
65.550	-0.001016	-804826.	4054.6545	3.201E-05	0.000	1.620E+12
101.8823	1142676.	0.000				
66.500	-0.000684	-752151.	5111.7006	2.653E-05	0.000	1.620E+12
83.5644	1393175.	0.000				
67.450	-0.000411	-688585.	5957.5173	2.146E-05	0.000	1.620E+12
64.8245	1795962.	0.000				
68.400	-0.000194	-616566.	6581.0079	1.687E-05	0.000	1.620E+12
44.5598	2612873.	0.000				
69.350	-2.682E-05	-538732.	6929.3614	1.281E-05	0.000	1.620E+12
16.5549	7037397.	0.000				
70.300	9.756E-05	-458724.	6843.8284	9.296E-06	0.000	1.620E+12
-31.5607	3687966.	0.000				
71.250	0.000185	-382799.	6416.1045	6.335E-06	0.000	1.620E+12
-43.4786	2677323.	0.000				
72.200	0.000242	-312510.	5884.9293	3.888E-06	0.000	1.620E+12
-49.7100	2341779.	0.000				
73.150	0.000274	-248668.	5300.1959	1.914E-06	0.000	1.620E+12
-52.8748	2201648.	0.000				

74.100	0.000286	-191687.	4690.9739	3.640E-07	0.000	1.620E+12
-54.0062	2155546.	0.000				
75.050	0.000282	-141718.	4077.2149	-8.092E-07	0.000	1.620E+12
-53.6708	2169036.	0.000				
76.000	0.000267	-98717.	3473.5613	-1.655E-06	0.000	1.620E+12
-52.2334	2228743.	0.000				
76.950	0.000244	-62501.	2891.1043	-2.222E-06	0.000	1.620E+12
-49.9521	2330542.	0.000				
77.900	0.000217	-32775.	2338.3627	-2.558E-06	0.000	1.620E+12
-47.0201	2475882.	0.000				
78.850	0.000186	-9157.3773	1821.9095	-2.705E-06	0.000	1.620E+12
-43.5857	2670990.	0.000				
79.800	0.000155	8795.9323	1346.8264	-2.707E-06	0.000	1.620E+12
-39.7622	2927854.	0.000				
80.750	0.000124	21581.	917.0864	-2.600E-06	0.000	1.620E+12
-35.6308	3267368.	0.000				
81.700	9.555E-05	29735.	535.9397	-2.419E-06	0.000	1.620E+12
-31.2370	3726989.	0.000				
82.650	6.916E-05	33829.	206.4023	-2.195E-06	0.000	1.620E+12
-26.5765	4380625.	0.000				
83.600	4.549E-05	34467.	-67.9431	-1.955E-06	0.000	1.620E+12
-21.5542	5401473.	0.000				
84.550	2.459E-05	32302.	-281.1241	-1.720E-06	0.000	1.620E+12
-15.8460	7347667.	0.000				
85.500	6.271E-06	28077.	-414.7112	-1.508E-06	0.000	1.620E+12
-7.5904	13798559.	0.000				
86.450	-9.791E-06	22864.	-400.9888	-1.328E-06	0.000	1.620E+12
9.9978	11641189.	0.000				
87.400	-2.402E-05	18950.	-337.4163	-1.181E-06	0.000	1.620E+12
1.1552	548318.	0.000				
88.350	-3.673E-05	15184.	-320.4648	-1.061E-06	0.000	1.620E+12
1.8187	564563.	0.000				
89.300	-4.821E-05	11655.	-296.0964	-9.668E-07	0.000	1.620E+12
2.4564	580808.	0.000				
90.250	-5.877E-05	8444.5547	-264.5512	-8.961E-07	0.000	1.620E+12
3.0778	597053.	0.000				
91.200	-6.864E-05	5633.6509	-225.9579	-8.465E-07	0.000	1.620E+12
3.6929	613298.	0.000				
92.150	-7.807E-05	3302.4498	-180.3347	-8.151E-07	0.000	1.620E+12
4.3112	629543.	0.000				
93.100	-8.723E-05	1531.3943	-127.5958	-7.981E-07	0.000	1.620E+12
4.9413	645788.	0.000				
94.050	-9.626E-05	402.4446	-67.5655	-7.913E-07	0.000	1.620E+12
5.5903	662033.	0.000				
95.000	-0.000105	0.000	0.000	-7.898E-07	0.000	1.620E+12
6.2633	339139.	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. 4:

Pile-head deflection	=	1.5000000 inches
Computed slope at pile head	=	-0.0059081 radians
Maximum bending moment	=	19723394. inch-lbs

Maximum shear force = -91337. lbs
Depth of maximum bending moment = 22.8000000 feet below pile head
Depth of maximum shear force = 36.1000000 feet below pile head
Number of iterations = 22
Number of zero deflection points = 3

Pile-head Deflection vs. Pile Length for Load Case 4

Boundary Condition Type 4, Deflection and Moment

Deflection = 1.50000 in
Moment = 5342000. in- lb
Axial Load = 504400. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment in-lbs	Maximum Shear lbs
95.0000	1.5000000	19723394.	-91337.
90.2500	1.5000000	19751686.	-91392.
85.5000	1.5000000	19799225.	-91670.
80.7500	1.5000000	19899304.	-92161.
76.0000	1.5000000	19787069.	-91782.
71.2500	1.5000000	19728756.	-91827.
66.5000	1.5000000	19751695.	-91356.
61.7500	1.5000000	19797015.	-91331.
57.0000	1.5000000	19751855.	-91749.
52.2500	1.5000000	19584436.	-96028.
47.5000	1.5000000	18494566.	-104716.
42.7500	1.5000000	16120998.	-107207.
38.0000	1.5000000	12348109.	-96737.
33.2500	1.5000000	8816748.	-77409.
28.5000	1.5000000	6516878.	-54913.
23.7500	1.5000000	5595769.	-42906.
19.0000	1.5000000	5342000.	-48904.

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 5

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head = 2.000000 inches
Moment at pile head = 5342000.0 in-lbs
Axial load at pile head = 504400.0 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. Spr. Distrib. p lb/in
	Es*h lb/inch	Lat. Load lb/inch					
0.00	2.0000	5342000.	105636.	-0.007631	0.000	1.619E+12	
0.000	0.000	0.000					
0.950	1.9132	6590023.	105636.	-0.007589	0.000	1.619E+12	

STR 1 CAPACITY @ 2" DEFLECTION.

0.000	0.000	0.000				
1.900	1.8270	7837778.	104333.	-0.007538	0.000	1.617E+12
-228.6856	1426.9558	0.000				
2.850	1.7414	9055496.	100164.	-0.007478	0.000	1.615E+12
-502.6712	3290.7891	0.000				
3.800	1.6565	10207520.	92792.	-0.007410	0.000	1.612E+12
-790.6579	5441.3800	0.000				
4.750	1.5724	11256374.	86967.	-0.007324	0.000	1.285E+12
-231.2840	1676.8148	0.000				
5.700	1.4895	12274596.	84284.	-0.007218	0.000	1.254E+12
-239.3819	1832.1498	0.000				
6.650	1.4078	13261066.	81513.	-0.007101	0.000	1.228E+12
-246.8086	1998.5518	0.000				
7.600	1.3276	14214753.	78660.	-0.006972	0.000	1.207E+12
-253.6098	2177.7640	0.000				
8.550	1.2489	15134709.	75734.	-0.006833	0.000	1.188E+12
-259.8010	2371.5504	0.000				
9.500	1.1718	16020066.	72740.	-0.006682	0.000	1.173E+12
-265.3842	2581.8341	0.000				
10.450	1.0965	16870039.	69687.	-0.006521	0.000	1.159E+12
-270.3544	2810.7821	0.000				
11.400	1.0231	17683922.	66580.	-0.006351	0.000	1.148E+12
-274.7027	3060.8794	0.000				
12.350	0.9517	18461095.	63427.	-0.006170	0.000	1.138E+12
-278.4182	3335.0060	0.000				
13.300	0.8824	19201021.	60236.	-0.005981	0.000	1.129E+12
-281.4881	3636.5264	0.000				
14.250	0.8153	19903250.	57013.	-0.005783	0.000	1.121E+12
-283.8986	3969.3984	0.000				
15.200	0.7506	20567420.	53767.	-0.005576	0.000	1.114E+12
-285.6353	4338.3069	0.000				
16.150	0.6882	21193259.	50504.	-0.005362	0.000	1.108E+12
-286.6828	4748.8332	0.000				
17.100	0.6283	21780588.	47234.	-0.005141	0.000	1.103E+12
-287.0257	5207.6693	0.000				
18.050	0.5710	22329320.	43964.	-0.004912	0.000	1.098E+12
-286.6478	5722.8914	0.000				
19.000	0.5163	22839466.	40703.	-0.004677	0.000	1.094E+12
-285.5332	6304.3132	0.000				
19.950	0.4644	23311135.	37458.	-0.004436	0.000	1.090E+12
-283.6660	6963.9424	0.000				
20.900	0.4152	23744538.	29933.	-0.004190	0.000	1.087E+12
-1036.6451	28464.	0.000				
21.850	0.3688	24041786.	18133.	-0.003939	0.000	1.085E+12
-1033.4363	31942.	0.000				
22.800	0.3254	24203275.	6546.9353	-0.003685	0.000	1.083E+12
-999.2484	35011.	0.000				
23.750	0.2848	24233438.	-4468.8713	-0.003430	0.000	1.083E+12
-933.3492	37359.	0.000				
24.700	0.2472	24140836.	-15128.	-0.003176	0.000	1.084E+12
-936.7242	43206.	0.000				
25.650	0.2124	23925038.	-25785.	-0.002923	0.000	1.085E+12
-932.9209	50073.	0.000				
26.600	0.1805	23586552.	-36313.	-0.002674	0.000	1.088E+12
-913.9996	57726.	0.000				
27.550	0.1514	23127862.	-46538.	-0.002430	0.000	1.092E+12
-879.9276	66245.	0.000				
28.500	0.1251	22553427.	-56402.	-0.002192	0.000	1.096E+12
-850.6295	77514.	0.000				
29.450	0.1015	21867096.	-65925.	-0.001961	0.000	1.102E+12
-820.0606	92149.	0.000				
30.400	0.0804	21072889.	-75025.	-0.001740	0.000	1.109E+12
-776.4390	110118.	0.000				

31.350	0.0618	20176532.	-83550.	-0.001529	0.000	1.118E+12
-719.0811	132692.	0.000				
32.300	0.0455	19185539.	-91535.	-0.001329	0.000	1.129E+12
-681.8282	170754.	0.000				
33.250	0.0315	18104823.	-98653.	-0.001142	0.000	1.142E+12
-566.9365	205366.	0.000				
34.200	0.0195	16949388.	-104427.	-0.000968	0.000	1.158E+12
-446.0694	261033.	0.000				
35.150	0.009393	15735024.	-108735.	-0.000809	0.000	1.178E+12
-309.7719	375966.	0.000				
36.100	0.001041	14479525.	-111090.	-0.000664	0.000	1.201E+12
-103.3054	1131122.	0.000				
37.050	-0.005744	13209810.	-110299.	-0.000534	0.000	1.229E+12
242.1061	480525.	0.000				
38.000	-0.0111	11970855.	-106997.	-0.000419	0.000	1.262E+12
337.1071	345221.	0.000				
38.950	-0.0153	10775089.	-102824.	-0.000326	0.000	1.611E+12
395.0722	294599.	0.000				
39.900	-0.0186	9630228.	-98090.	-0.000254	0.000	1.613E+12
435.4844	267274.	0.000				
40.850	-0.0211	8541572.	-92963.	-0.000190	0.000	1.615E+12
463.9935	250859.	0.000				
41.800	-0.0229	7512869.	-87561.	-0.000134	0.000	1.617E+12
483.6488	240669.	0.000				
42.750	-0.0241	6546717.	-81975.	-8.396E-05	0.000	1.618E+12
496.3634	234507.	0.000				
43.700	-0.0248	5644807.	-76276.	-4.103E-05	0.000	1.619E+12
503.4565	231205.	0.000				
44.650	-0.0251	4808098.	-70523.	-4.238E-06	0.000	1.620E+12
505.8987	230091.	0.000				
45.600	-0.0249	4036940.	-64764.	2.689E-05	0.000	1.620E+12
504.4391	230758.	0.000				
46.550	-0.0245	3331176.	-59040.	5.282E-05	0.000	1.620E+12
499.6764	232959.	0.000				
47.500	-0.0237	2690216.	-53387.	7.401E-05	0.000	1.620E+12
492.1027	236546.	0.000				
48.450	-0.0228	2113100.	-47834.	9.091E-05	0.000	1.620E+12
482.1301	241440.	0.000				
49.400	-0.0216	1598556.	-42406.	0.000104	0.000	1.620E+12
470.1091	247614.	0.000				
50.350	-0.0204	1145043.	-37125.	0.000114	0.000	1.620E+12
456.3397	255087.	0.000				
51.300	-0.0191	750790.	-32010.	0.000120	0.000	1.620E+12
441.0796	263913.	0.000				
52.250	-0.0177	413828.	-27764.	0.000124	0.000	1.620E+12
303.9001	196271.	0.000				
53.200	-0.0162	116345.	-24377.	0.000126	0.000	1.620E+12
290.2920	204068.	0.000				
54.150	-0.0148	-143416.	-21157.	0.000126	0.000	1.620E+12
274.5479	211866.	0.000				
55.100	-0.0133	-367491.	-18127.	0.000124	0.000	1.620E+12
257.0500	219664.	0.000				
56.050	-0.0119	-558146.	-15304.	0.000121	0.000	1.620E+12
238.1807	227461.	0.000				
57.000	-0.0106	-717823.	-12702.	0.000117	0.000	1.620E+12
218.3162	235259.	0.000				
57.950	-0.009278	-849100.	-10330.	0.000111	0.000	1.620E+12
197.8215	243056.	0.000				
58.900	-0.008046	-954633.	-8193.5870	0.000105	0.000	1.620E+12
177.0465	250854.	0.000				
59.850	-0.006890	-1037118.	-6293.3800	9.775E-05	0.000	1.620E+12
156.3231	258652.	0.000				
60.800	-0.005817	-1099246.	-4627.3480	9.023E-05	0.000	1.620E+12

135.9632	266449.	0.000				
61.750	-0.004833	-1143659.	-3189.6909	8.234E-05	0.000	1.620E+12
116.2573	274247.	0.000				
62.700	-0.003940	-1172918.	-1383.7127	7.419E-05	0.000	1.620E+12
200.5809	580384.	0.000				
63.650	-0.003141	-1176061.	780.4739	6.592E-05	0.000	1.620E+12
179.1009	649998.	0.000				
64.600	-0.002437	-1155881.	2700.5232	5.772E-05	0.000	1.620E+12
157.7498	737986.	0.000				
65.550	-0.001825	-1115153.	4377.9038	4.972E-05	0.000	1.620E+12
136.5275	852718.	0.000				
66.500	-0.001303	-1056637.	5813.6654	4.208E-05	0.000	1.620E+12
115.3605	1009208.	0.000				
67.450	-0.000866	-983085.	7007.1998	3.491E-05	0.000	1.620E+12
94.0315	1238179.	0.000				
68.400	-0.000507	-897274.	7953.4668	2.829E-05	0.000	1.620E+12
71.9802	1617627.	0.000				
69.350	-0.000221	-802072.	8634.4552	2.231E-05	0.000	1.620E+12
47.4914	2452298.	0.000				
70.300	1.375E-06	-700665.	8895.9551	1.702E-05	0.000	1.620E+12
-1.6142	13382687.	0.000				
71.250	0.000167	-599440.	8651.1928	1.245E-05	0.000	1.620E+12
-41.3265	2815862.	0.000				
72.200	0.000285	-503561.	8108.0705	8.565E-06	0.000	1.620E+12
-53.9581	2157163.	0.000				
73.150	0.000363	-414674.	7453.6730	5.334E-06	0.000	1.620E+12
-60.8485	1913072.	0.000				
74.100	0.000407	-333679.	6739.4669	2.701E-06	0.000	1.620E+12
-64.4508	1806273.	0.000				
75.050	0.000424	-261045.	5996.9387	6.081E-07	0.000	1.620E+12
-65.8173	1768887.	0.000				
76.000	0.000421	-196955.	5248.1768	-1.004E-06	0.000	1.620E+12
-65.5444	1776375.	0.000				
76.950	0.000401	-141375.	4509.6456	-2.194E-06	0.000	1.620E+12
-64.0224	1818752.	0.000				
77.900	0.000371	-94110.	3794.0009	-3.023E-06	0.000	1.620E+12
-61.5292	1892637.	0.000				
78.850	0.000332	-54837.	3111.1297	-3.547E-06	0.000	1.620E+12
-58.2727	1998653.	0.000				
79.800	0.000290	-23136.	2468.8286	-3.821E-06	0.000	1.620E+12
-54.4117	2140819.	0.000				
80.750	0.000245	1495.7949	1873.3079	-3.897E-06	0.000	1.620E+12
-50.0656	2327147.	0.000				
81.700	0.000201	19621.	1329.6225	-3.823E-06	0.000	1.620E+12
-45.3178	2571700.	0.000				
82.650	0.000158	31855.	842.1123	-3.642E-06	0.000	1.620E+12
-40.2103	2899548.	0.000				
83.600	0.000118	38863.	414.9589	-3.393E-06	0.000	1.620E+12
-34.7289	3359329.	0.000				
84.550	8.073E-05	41355.	53.0749	-3.111E-06	0.000	1.620E+12
-28.7595	4061060.	0.000				
85.500	4.693E-05	40109.	-235.9905	-2.824E-06	0.000	1.620E+12
-21.9537	5333001.	0.000				
86.450	1.634E-05	36007.	-435.3688	-2.556E-06	0.000	1.620E+12
-13.0250	9085320.	0.000				
87.400	-1.135E-05	30212.	-506.4985	-2.323E-06	0.000	1.620E+12
0.5461	548318.	0.000				
88.350	-3.663E-05	24486.	-493.0469	-2.131E-06	0.000	1.620E+12
1.8139	564563.	0.000				
89.300	-5.993E-05	18995.	-465.3026	-1.978E-06	0.000	1.620E+12
3.0536	580808.	0.000				
90.250	-8.172E-05	13900.	-423.5018	-1.862E-06	0.000	1.620E+12
4.2799	597053.	0.000				

91.200	-0.000102	9360.1433	-367.7089	-1.780E-06	0.000	1.620E+12
5.5083	613298.	0.000				
92.150	-0.000122	5536.2403	-297.8125	-1.728E-06	0.000	1.620E+12
6.7542	629543.	0.000				
93.100	-0.000142	2589.8885	-213.5330	-1.699E-06	0.000	1.620E+12
8.0317	645788.	0.000				
94.050	-0.000161	687.2277	-114.4428	-1.688E-06	0.000	1.620E+12
9.3526	662033.	0.000				
95.000	-0.000180	0.000	0.000	-1.685E-06	0.000	1.620E+12
10.7251	339139.	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. 5:

Pile-head deflection	=	2.0000000	inches
Computed slope at pile head	=	-0.0076307	radians
Maximum bending moment	=	24233438.	inch-lbs
Maximum shear force	=	-111090.	lbs
Depth of maximum bending moment	=	23.7500000	feet below pile head
Depth of maximum shear force	=	36.1000000	feet below pile head
Number of iterations	=	12	
Number of zero deflection points	=	3	

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 6

Pile-head conditions are Displacement and Moment (Loading Type 4)

Displacement of pile head	=	0.500000	inches
Moment at pile head	=	4038000.0	in-lbs
Axial load at pile head	=	410100.0	lbs

Depth X	Deflect. y	Bending Moment	Shear Force	Slope S	Total Stress	Bending Stiffness	Soil Res. Spr. Distrib. p
feet	inches	in-lbs	lbs	radians	psi*	lb-in^2	lb/in
Es*h	Lat. Load						
lb/inch	lb/inch						
0.00	0.5000	4038000.	44561.	-0.002194	0.000	1.626E+12	
0.000	0.000	0.000					
0.950	0.4751	4556190.	44561.	-0.002164	0.000	1.626E+12	
0.000	0.000	0.000					
1.900	0.4507	5074231.	43727.	-0.002130	0.000	1.625E+12	
-146.3379	3701.8125	0.000					
2.850	0.4266	5573088.	41083.	-0.002093	0.000	1.625E+12	
-317.5756	8487.0474	0.000					
3.800	0.4029	6030490.	36436.	-0.002052	0.000	1.624E+12	
-497.6121	14079.	0.000					

4.750	0.3798	6423024.	32779.	-0.002009	0.000	1.623E+12
-144.0357	4323.5389	0.000				
5.700	0.3571	6796628.	31110.	-0.001962	0.000	1.623E+12
-148.7174	4747.0612	0.000				
6.650	0.3350	7150682.	29391.	-0.001913	0.000	1.622E+12
-152.9492	5204.1159	0.000				
7.600	0.3135	7484623.	27625.	-0.001862	0.000	1.622E+12
-156.7610	5699.9787	0.000				
8.550	0.2926	7797946.	25819.	-0.001808	0.000	1.621E+12
-160.1635	6240.1428	0.000				
9.500	0.2723	8090198.	23976.	-0.001752	0.000	1.620E+12
-163.1590	6830.7074	0.000				
10.450	0.2527	8360979.	22101.	-0.001694	0.000	1.620E+12
-165.7452	7478.6416	0.000				
11.400	0.2337	8609945.	20199.	-0.001634	0.000	1.619E+12
-167.9177	8192.0309	0.000				
12.350	0.2154	8836805.	18275.	-0.001573	0.000	1.619E+12
-169.6705	8980.3535	0.000				
13.300	0.1978	9041324.	16333.	-0.001510	0.000	1.618E+12
-170.9966	9854.8108	0.000				
14.250	0.1810	9223322.	14379.	-0.001446	0.000	1.618E+12
-171.8882	10829.	0.000				
15.200	0.1648	9382678.	12417.	-0.001380	0.000	1.618E+12
-172.3370	11918.	0.000				
16.150	0.1495	9519328.	10452.	-0.001314	0.000	1.617E+12
-172.3342	13142.	0.000				
17.100	0.1349	9633268.	8490.0923	-0.001246	0.000	1.617E+12
-171.8704	14525.	0.000				
18.050	0.1211	9724553.	6536.0958	-0.001178	0.000	1.617E+12
-170.9360	16095.	0.000				
19.000	0.1080	9793304.	4595.4934	-0.001109	0.000	1.617E+12
-169.5206	17887.	0.000				
19.950	0.0958	9839700.	2673.8267	-0.001040	0.000	1.617E+12
-167.6139	19948.	0.000				
20.900	0.0843	9863989.	-1249.9108	-0.000970	0.000	1.617E+12
-520.7611	70396.	0.000				
21.850	0.0737	9820275.	-6993.3241	-0.000901	0.000	1.617E+12
-486.8553	75341.	0.000				
22.800	0.0638	9712966.	-12259.	-0.000832	0.000	1.617E+12
-436.8809	78074.	0.000				
23.750	0.0547	9548559.	-16879.	-0.000764	0.000	1.617E+12
-373.7565	77899.	0.000				
24.700	0.0464	9335264.	-21071.	-0.000698	0.000	1.618E+12
-361.7071	88927.	0.000				
25.650	0.0388	9074654.	-25117.	-0.000633	0.000	1.618E+12
-348.0336	102281.	0.000				
26.600	0.0319	8768514.	-28971.	-0.000570	0.000	1.619E+12
-328.1378	117111.	0.000				
27.550	0.0258	8419442.	-32565.	-0.000509	0.000	1.620E+12
-302.4361	133650.	0.000				
28.500	0.0203	8030787.	-35896.	-0.000452	0.000	1.621E+12
-281.8062	158042.	0.000				
29.450	0.0155	7605245.	-38899.	-0.000397	0.000	1.621E+12
-245.1250	180264.	0.000				
30.400	0.0113	7147597.	-41357.	-0.000345	0.000	1.622E+12
-186.1802	188061.	0.000				
31.350	0.007643	6665517.	-43167.	-0.000296	0.000	1.623E+12
-131.3059	195859.	0.000				
32.300	0.004533	6166155.	-45142.	-0.000251	0.000	1.624E+12
-215.2399	541288.	0.000				
33.250	0.001917	5638617.	-47168.	-0.000210	0.000	1.624E+12
-140.0396	832739.	0.000				
34.200	-0.000248	5092695.	-47681.	-0.000172	0.000	1.625E+12

50.0009	2300097.	0.000				
35.150	-0.002005	4553104.	-46581.	-0.000138	0.000	1.625E+12
143.0101	812924.	0.000				
36.100	-0.003399	4031949.	-44704.	-0.000108	0.000	1.626E+12
186.2438	624623.	0.000				
37.050	-0.004470	3534866.	-42425.	-8.159E-05	0.000	1.626E+12
213.6132	544725.	0.000				
38.000	-0.005259	3065428.	-39886.	-5.845E-05	0.000	1.626E+12
231.7094	502250.	0.000				
38.950	-0.005803	2626004.	-37178.	-3.850E-05	0.000	1.626E+12
243.4048	478159.	0.000				
39.900	-0.006137	2218125.	-34364.	-2.152E-05	0.000	1.626E+12
250.3183	464984.	0.000				
40.850	-0.006294	1842706.	-31492.	-7.281E-06	0.000	1.626E+12
253.4998	459174.	0.000				
41.800	-0.006303	1500171.	-28601.	4.437E-06	0.000	1.626E+12
253.6946	458844.	0.000				
42.750	-0.006193	1190557.	-25722.	1.387E-05	0.000	1.626E+12
251.4661	462932.	0.000				
43.700	-0.005987	913584.	-22879.	2.125E-05	0.000	1.626E+12
247.2601	470828.	0.000				
44.650	-0.005708	668716.	-20093.	2.679E-05	0.000	1.626E+12
241.4416	482196.	0.000				
45.600	-0.005376	455203.	-17382.	3.073E-05	0.000	1.626E+12
234.3170	496880.	0.000				
46.550	-0.005007	272127.	-14757.	3.328E-05	0.000	1.626E+12
226.1484	514852.	0.000				
47.500	-0.004617	118433.	-12230.	3.465E-05	0.000	1.626E+12
217.1620	536184.	0.000				
48.450	-0.004217	-7043.4789	-9809.2311	3.504E-05	0.000	1.626E+12
207.5538	561034.	0.000				
49.400	-0.003818	-105546.	-7500.4666	3.465E-05	0.000	1.626E+12
197.4926	589649.	0.000				
50.350	-0.003427	-178378.	-5308.1751	3.365E-05	0.000	1.626E+12
187.1200	622372.	0.000				
51.300	-0.003051	-226887.	-3235.2585	3.223E-05	0.000	1.626E+12
176.5496	659677.	0.000				
52.250	-0.002693	-252443.	-1964.6834	3.055E-05	0.000	1.626E+12
46.3583	196271.	0.000				
53.200	-0.002354	-271967.	-1460.2070	2.871E-05	0.000	1.626E+12
42.1463	204068.	0.000				
54.150	-0.002038	-286005.	-1004.0813	2.676E-05	0.000	1.626E+12
37.8757	211866.	0.000				
55.100	-0.001744	-295110.	-596.5975	2.472E-05	0.000	1.626E+12
33.6127	219664.	0.000				
56.050	-0.001474	-299838.	-237.3195	2.263E-05	0.000	1.626E+12
29.4186	227461.	0.000				
57.000	-0.001228	-300733.	74.8595	2.053E-05	0.000	1.626E+12
25.3497	235259.	0.000				
57.950	-0.001006	-298323.	341.6556	1.843E-05	0.000	1.626E+12
21.4567	243056.	0.000				
58.900	-0.000808	-293115.	565.3308	1.635E-05	0.000	1.626E+12
17.7846	250854.	0.000				
59.850	-0.000633	-285587.	748.6290	1.433E-05	0.000	1.626E+12
14.3730	258652.	0.000				
60.800	-0.000482	-276181.	894.7132	1.236E-05	0.000	1.626E+12
11.2558	266449.	0.000				
61.750	-0.000352	-265303.	1007.1040	1.046E-05	0.000	1.626E+12
8.4619	274247.	0.000				
62.700	-0.000243	-253316.	1339.8071	8.641E-06	0.000	1.626E+12
49.9071	2340191.	0.000				
63.650	-0.000155	-234836.	1851.3668	6.930E-06	0.000	1.626E+12
39.8402	2935215.	0.000				

64.600	-8.512E-05	-211170.	2247.1046	5.366E-06	0.000	1.626E+12
29.5875	3962594.	0.000				
65.550	-3.238E-05	-183652.	2520.2317	3.982E-06	0.000	1.626E+12
18.3296	6452539.	0.000				
66.500	5.675E-06	-153746.	2587.0336	2.800E-06	0.000	1.626E+12
-6.6100	13278719.	0.000				
67.450	3.145E-05	-124694.	2447.7585	1.823E-06	0.000	1.626E+12
-17.8243	6461911.	0.000				
68.400	4.725E-05	-97954.	2221.3007	1.043E-06	0.000	1.626E+12
-21.9052	5285075.	0.000				
69.350	5.523E-05	-74058.	1961.3186	4.400E-07	0.000	1.626E+12
-23.7057	4893486.	0.000				
70.300	5.728E-05	-53240.	1688.4996	-6.214E-09	0.000	1.626E+12
-24.1572	4807640.	0.000				
71.250	5.508E-05	-35560.	1415.7180	-3.175E-07	0.000	1.626E+12
-23.6992	4904719.	0.000				
72.200	5.004E-05	-20959.	1151.8295	-5.156E-07	0.000	1.626E+12
-22.5970	5147662.	0.000				
73.150	4.333E-05	-9293.5733	903.1353	-6.217E-07	0.000	1.626E+12
-21.0335	5534151.	0.000				
74.100	3.587E-05	-361.5307	674.1191	-6.555E-07	0.000	1.626E+12
-19.1447	6084587.	0.000				
75.050	2.838E-05	6082.4725	467.8840	-6.355E-07	0.000	1.626E+12
-17.0369	6843060.	0.000				
76.000	2.138E-05	10312.	286.4462	-5.780E-07	0.000	1.626E+12
-14.7943	7888134.	0.000				
76.950	1.520E-05	12619.	130.9628	-4.976E-07	0.000	1.626E+12
-12.4834	9360155.	0.000				
77.900	1.004E-05	13303.	1.9470	-4.067E-07	0.000	1.626E+12
-10.1509	11531078.	0.000				
78.850	5.930E-06	12667.	-96.2886	-3.157E-07	0.000	1.626E+12
-7.0834	13616615.	0.000				
79.800	2.837E-06	11110.	-156.0193	-2.324E-07	0.000	1.626E+12
-3.3957	13642607.	0.000				
80.750	6.326E-07	9111.9773	-179.6984	-1.615E-07	0.000	1.626E+12
-0.7585	13668599.	0.000				
81.700	-8.439E-07	7014.7312	-178.2434	-1.049E-07	0.000	1.626E+12
1.0138	13694591.	0.000				
82.650	-1.760E-06	5049.0085	-160.3915	-6.265E-08	0.000	1.626E+12
2.1181	13720583.	0.000				
83.600	-2.272E-06	3358.3897	-132.7003	-3.318E-08	0.000	1.626E+12
2.7400	13746575.	0.000				
84.550	-2.516E-06	2023.7508	-99.7547	-1.431E-08	0.000	1.626E+12
3.0399	13772567.	0.000				
85.500	-2.599E-06	1084.1167	-64.4992	-3.414E-09	0.000	1.626E+12
3.1452	13798559.	0.000				
86.450	-2.594E-06	553.2008	-28.6403	2.326E-09	0.000	1.626E+12
3.1458	13824551.	0.000				
87.400	-2.545E-06	431.0963	-10.0113	5.776E-09	0.000	1.626E+12
0.1224	548318.	0.000				
88.350	-2.462E-06	324.8891	-8.6183	8.426E-09	0.000	1.626E+12
0.1219	564563.	0.000				
89.300	-2.353E-06	234.5193	-7.2398	1.039E-08	0.000	1.626E+12
0.1199	580808.	0.000				
90.250	-2.226E-06	159.7240	-5.8920	1.177E-08	0.000	1.626E+12
0.1166	597053.	0.000				
91.200	-2.085E-06	100.0718	-4.5882	1.268E-08	0.000	1.626E+12
0.1122	613298.	0.000				
92.150	-1.936E-06	54.9940	-3.3393	1.322E-08	0.000	1.626E+12
0.1069	629543.	0.000				
93.100	-1.784E-06	23.8122	-2.1538	1.350E-08	0.000	1.626E+12
0.1010	645788.	0.000				
94.050	-1.629E-06	5.7601	-1.0388	1.360E-08	0.000	1.626E+12

```
0.0946    662033.      0.000
    95.000 -1.473E-06      0.000      0.000  1.362E-08      0.000  1.626E+12
0.0877    339139.      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. 6:

Pile-head deflection              =      0.5000000 inches
Computed slope at pile head       =     -0.0021942 radians
Maximum bending moment            =      9863989. inch-lbs
Maximum shear force               =       -47681. lbs
Depth of maximum bending moment   =     20.9000000 feet below pile head
Depth of maximum shear force      =     34.2000000 feet below pile head
Number of iterations              =             12
Number of zero deflection points  =              3


----------------------------------------------------------------------------
           Pile-head Deflection vs. Pile Length for Load Case 6
----------------------------------------------------------------------------

Boundary Condition Type 4, Deflection and Moment

Deflection =         0.50000 in
Moment     =        4038000. in- lb
Axial Load =         410100.  lb

    Pile          Pile Head        Maximum        Maximum
   Length       Deflection         Moment          Shear
    feet          inches          in-lbs          lbs
-----------   ------------   ------------   ------------
    95.0000      0.5000000      9863989.       -47681.
    90.2500      0.5000000      9887865.       -47604.
    85.5000      0.5000000      9932187.       -47748.
    80.7500      0.5000000     10005723.       -48120.
    76.0000      0.5000000      9937141.       -47608.
    71.2500      0.5000000      9887895.       -48000.
    66.5000      0.5000000      9904124.       -47633.
    61.7500      0.5000000      9948097.       -47859.
    57.0000      0.5000000      9913982.       -47188.
    52.2500      0.5000000      9923089.       -47515.
    47.5000      0.5000000      9680496.       -50415.
    42.7500      0.5000000      8899378.       -53478.
    38.0000      0.5000000      7372369.       -50875.
    33.2500      0.5000000      5772002.       -43372.
    28.5000      0.5000000      4624257.       -32728.
    23.7500      0.5000000      4147399.       -28581.
    19.0000      0.5000000      4038000.       -29785.


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SERV II → CAPACITY (@ 1" DEFLECTION)


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Computed Values of Pile Loading and Deflection
  for Lateral Loading for Load Case Number 7
----------------------------------------------------------------------------

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head                              =     1.000000 inches
Moment at pile head                                    =    4038000.0 in-lbs
Axial load at pile head                                =     410100.0 lbs

   Depth    Deflect.    Bending    Shear       Slope      Total     Bending    Soil
Res.  Soil Spr.   Distrib.
     X         y        Moment     Force         S        Stress    Stiffness      p
     Es*h     Lat. Load
   feet      inches     in-lbs      lbs       radians      psi*      lb-in^2      lb/in
    lb/inch    lb/inch
---------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
---------- ----------
      0.00     1.0000    4038000.    67395. -0.004050      0.000  1.626E+12
0.000      0.000      0.000
     0.950     0.9540    4825167.    67395. -0.004019      0.000  1.626E+12
0.000      0.000      0.000
     1.900     0.9084    5612175.    66387. -0.003982      0.000  1.624E+12
-176.8405  2219.3456     0.000
     2.850     0.8632    6376018.    63171. -0.003940      0.000  1.623E+12
-387.3453  5115.5826     0.000
     3.800     0.8185    7089311.    57484. -0.003893      0.000  1.622E+12
-610.3420  8500.4891     0.000
     4.750     0.7744    7723052.    52964. -0.003841      0.000  1.621E+12
-182.6495  2688.6820     0.000
     5.700     0.7310    8332802.    50847. -0.003784      0.000  1.620E+12
-188.8181  2944.8084     0.000
     6.650     0.6881    8917739.    48662. -0.003724      0.000  1.619E+12
-194.4186  3220.7785     0.000
     7.600     0.6461    9477115.    46417. -0.003659      0.000  1.617E+12
-199.4816  3519.9609     0.000
     8.550     0.6047   10010254.    44117. -0.003590      0.000  1.616E+12
-204.0121  3845.9452     0.000
     9.500     0.5642   10516550.    41768. -0.003507      0.000  1.241E+12
-208.0026  4202.8280     0.000
    10.450     0.5248   10995363.    39377. -0.003407      0.000  1.227E+12
-211.4725  4593.9558     0.000
    11.400     0.4865   11446215.    36950. -0.003302      0.000  1.215E+12
-214.4145  5024.1730     0.000
    12.350     0.4495   11868699.    34492. -0.003193      0.000  1.204E+12
-216.8195  5499.1542     0.000
    13.300     0.4137   12262481.    32010. -0.003078      0.000  1.195E+12
-218.6772  6025.5993     0.000
    14.250     0.3793   12627296.    29509. -0.002959      0.000  1.187E+12
-219.9767  6611.4768     0.000
    15.200     0.3463   12962956.    26997. -0.002835      0.000  1.180E+12
-220.7062  7266.3303     0.000
    16.150     0.3147   13269347.    24480. -0.002708      0.000  1.174E+12
-220.8538  8001.6681     0.000
    17.100     0.2845   13546433.    21965. -0.002578      0.000  1.168E+12
-220.4073  8831.4691     0.000
    18.050     0.2559   13794257.    19459. -0.002444      0.000  1.164E+12
-219.3542  9772.8378     0.000
    19.000     0.2288   14012943.    16967. -0.002308      0.000  1.160E+12
-217.6823    10847.      0.000
    19.950     0.2033   14202694.    14499. -0.002169      0.000  1.156E+12
-215.3799    12080.      0.000
    20.900     0.1793   14363800.  9159.5624 -0.002028     0.000  1.154E+12
-721.3663    45856.      0.000
```

21.850	0.1570	14430493.	1095.4277	-0.001886	0.000	1.153E+12
-693.3942	50341.	0.000				
22.800	0.1363	14406406.	-6518.9948	-0.001743	0.000	1.153E+12
-642.4694	53719.	0.000				
23.750	0.1173	14298158.	-13433.	-0.001601	0.000	1.155E+12
-570.5846	55461.	0.000				
24.700	0.0998	14115096.	-19874.	-0.001461	0.000	1.158E+12
-559.4119	63879.	0.000				
25.650	0.0840	13858684.	-26167.	-0.001324	0.000	1.162E+12
-544.6337	73943.	0.000				
26.600	0.0697	13530856.	-32238.	-0.001190	0.000	1.168E+12
-520.3686	85169.	0.000				
27.550	0.0568	13134784.	-37981.	-0.001060	0.000	1.176E+12
-487.1332	97700.	0.000				
28.500	0.0455	12674809.	-43378.	-0.000936	0.000	1.186E+12
-459.7919	115249.	0.000				
29.450	0.0355	12154509.	-48468.	-0.000817	0.000	1.197E+12
-433.1620	139060.	0.000				
30.400	0.0269	11577374.	-53210.	-0.000704	0.000	1.211E+12
-398.7075	169227.	0.000				
31.350	0.0194	10947915.	-57387.	-0.000599	0.000	1.229E+12
-334.1551	195859.	0.000				
32.300	0.0132	10274553.	-61384.	-0.000501	0.000	1.249E+12
-367.1285	317106.	0.000				
33.250	0.008016	9553041.	-65108.	-0.000421	0.000	1.617E+12
-286.1152	406903.	0.000				
34.200	0.003601	8794031.	-67832.	-0.000356	0.000	1.619E+12
-191.7808	607089.	0.000				
35.150	-0.000107	8009807.	-68737.	-0.000297	0.000	1.621E+12
33.0618	3508624.	0.000				
36.100	-0.003174	7229617.	-67522.	-0.000244	0.000	1.622E+12
180.0183	646612.	0.000				
37.050	-0.005661	6472584.	-65125.	-0.000195	0.000	1.623E+12
240.4267	484174.	0.000				
38.000	-0.007630	5746585.	-62164.	-0.000153	0.000	1.624E+12
279.1266	417053.	0.000				
38.950	-0.009139	5056672.	-58832.	-0.000115	0.000	1.625E+12
305.4884	381068.	0.000				
39.900	-0.0102	4406295.	-55247.	-8.146E-05	0.000	1.626E+12
323.4275	359935.	0.000				
40.850	-0.0110	3797806.	-51493.	-5.269E-05	0.000	1.626E+12
335.0973	347402.	0.000				
41.800	-0.0114	3232742.	-47635.	-2.805E-05	0.000	1.626E+12
341.8700	340521.	0.000				
42.750	-0.0116	2712001.	-43721.	-7.208E-06	0.000	1.626E+12
344.7048	337722.	0.000				
43.700	-0.0116	2235969.	-39794.	1.014E-05	0.000	1.626E+12
344.3169	338103.	0.000				
44.650	-0.0114	1804611.	-35886.	2.430E-05	0.000	1.626E+12
341.2652	341128.	0.000				
45.600	-0.0111	1417545.	-32025.	3.560E-05	0.000	1.626E+12
336.0012	346473.	0.000				
46.550	-0.0106	1074099.	-28235.	4.433E-05	0.000	1.626E+12
328.8992	353955.	0.000				
47.500	-0.0100	773362.	-24535.	5.081E-05	0.000	1.626E+12
320.2747	363488.	0.000				
48.450	-0.009435	514222.	-20940.	5.532E-05	0.000	1.626E+12
310.3963	375057.	0.000				
49.400	-0.008783	295405.	-17464.	5.816E-05	0.000	1.626E+12
299.4931	388712.	0.000				
50.350	-0.008109	115500.	-14117.	5.960E-05	0.000	1.626E+12
287.7589	404564.	0.000				
51.300	-0.007425	-27012.	-10907.	5.991E-05	0.000	1.626E+12

275.3543	422790.	0.000				
52.250	-0.006743	-133738.	-8675.6816	5.935E-05	0.000	1.626E+12
116.0872	196271.	0.000				
53.200	-0.006072	-225372.	-7394.4832	5.809E-05	0.000	1.626E+12
108.6844	204068.	0.000				
54.150	-0.005418	-302875.	-6201.0023	5.623E-05	0.000	1.626E+12
100.6982	211866.	0.000				
55.100	-0.004789	-367281.	-5100.9991	5.389E-05	0.000	1.626E+12
92.2848	219664.	0.000				
56.050	-0.004190	-419682.	-4098.4741	5.113E-05	0.000	1.626E+12
83.5967	227461.	0.000				
57.000	-0.003624	-461204.	-3195.7233	4.804E-05	0.000	1.626E+12
74.7806	235259.	0.000				
57.950	-0.003094	-492993.	-2393.4109	4.469E-05	0.000	1.626E+12
65.9760	243056.	0.000				
58.900	-0.002605	-516192.	-1690.6559	4.116E-05	0.000	1.626E+12
57.3144	250854.	0.000				
59.850	-0.002156	-531925.	-1085.1267	3.748E-05	0.000	1.626E+12
48.9188	258652.	0.000				
60.800	-0.001750	-541283.	-573.1411	3.372E-05	0.000	1.626E+12
40.9032	266449.	0.000				
61.750	-0.001387	-545308.	-149.7669	2.991E-05	0.000	1.626E+12
33.3729	274247.	0.000				
62.700	-0.001068	-544978.	635.7628	2.609E-05	0.000	1.626E+12
104.4393	1114738.	0.000				
63.650	-0.000792	-531057.	1743.8343	2.232E-05	0.000	1.626E+12
89.9592	1294181.	0.000				
64.600	-0.000559	-505427.	2687.3640	1.868E-05	0.000	1.626E+12
75.5723	1540577.	0.000				
65.550	-0.000366	-469959.	3466.8162	1.527E-05	0.000	1.626E+12
61.1737	1903224.	0.000				
66.500	-0.000211	-426526.	4080.2234	1.212E-05	0.000	1.626E+12
46.4416	2507042.	0.000				
67.450	-9.003E-05	-377044.	4517.7890	9.306E-06	0.000	1.626E+12
30.3243	3839902.	0.000				
68.400	9.895E-07	-323608.	4684.0417	6.850E-06	0.000	1.626E+12
-1.1571	13330703.	0.000				
69.350	6.614E-05	-270312.	4529.3161	4.768E-06	0.000	1.626E+12
-25.9877	4479112.	0.000				
70.300	0.000110	-220384.	4190.4166	3.048E-06	0.000	1.626E+12
-33.4683	3478293.	0.000				
71.250	0.000136	-174799.	3787.5171	1.662E-06	0.000	1.626E+12
-37.2158	3128153.	0.000				
72.200	0.000148	-134044.	3354.0958	5.796E-07	0.000	1.626E+12
-38.8230	2998714.	0.000				
73.150	0.000149	-98331.	2910.5756	-2.349E-07	0.000	1.626E+12
-38.9875	2986107.	0.000				
74.100	0.000142	-67681.	2471.1050	-8.169E-07	0.000	1.626E+12
-38.1126	3054703.	0.000				
75.050	0.000130	-41982.	2046.0001	-1.201E-06	0.000	1.626E+12
-36.4672	3192566.	0.000				
76.000	0.000115	-21021.	1642.9268	-1.422E-06	0.000	1.626E+12
-34.2474	3399548.	0.000				
76.950	9.779E-05	-4509.6972	1267.5801	-1.512E-06	0.000	1.626E+12
-31.6029	3684067.	0.000				
77.900	8.038E-05	7894.2999	924.1288	-1.500E-06	0.000	1.626E+12
-28.6517	4063599.	0.000				
78.850	6.360E-05	16574.	615.5437	-1.414E-06	0.000	1.626E+12
-25.4860	4568432.	0.000				
79.800	4.814E-05	21942.	343.8826	-1.279E-06	0.000	1.626E+12
-22.1738	5250948.	0.000				
80.750	3.444E-05	24427.	110.5917	-1.116E-06	0.000	1.626E+12
-18.7544	6208509.	0.000				

```
    81.700  2.269E-05     24474.   -83.0743 -9.450E-07      0.000  1.626E+12
-15.2221   7649508.      0.000
    82.650  1.289E-05     22542.   -235.2466 -7.802E-07      0.000  1.626E+12
-11.4748  10148307.      0.000
    83.600  4.896E-06     19118.   -334.3080 -6.342E-07      0.000  1.626E+12
-5.9044  13746575.      0.000
    84.550 -1.569E-06     14925.   -357.1570 -5.148E-07      0.000  1.626E+12
1.8958  13772567.      0.000
    85.500 -6.842E-06     10979.   -299.1461 -4.240E-07      0.000  1.626E+12
8.2816  13798559.      0.000
    86.450 -1.124E-05  8108.8269   -190.8801 -3.571E-07      0.000  1.626E+12
10.7125  10867590.      0.000
    87.400 -1.498E-05  6630.4285   -125.7107 -3.055E-07      0.000  1.626E+12
0.7207    548318.      0.000
    88.350 -1.820E-05  5245.4784   -116.4645 -2.638E-07      0.000  1.626E+12
0.9014    564563.      0.000
    89.300 -2.100E-05  3977.5037   -105.2281 -2.315E-07      0.000  1.626E+12
1.0699    580808.      0.000
    90.250 -2.348E-05  2848.4432    -92.1202 -2.076E-07      0.000  1.626E+12
1.2297    597053.      0.000
    91.200 -2.573E-05  1879.1039    -77.2199 -1.910E-07      0.000  1.626E+12
1.3844    613298.      0.000
    92.150 -2.783E-05  1089.6146    -60.5675 -1.806E-07      0.000  1.626E+12
1.5371    629543.      0.000
    93.100 -2.985E-05   499.8544    -42.1674 -1.750E-07      0.000  1.626E+12
1.6909    645788.      0.000
    94.050 -3.183E-05   129.8336    -21.9943 -1.728E-07      0.000  1.626E+12
1.8482    662033.      0.000
    95.000 -3.379E-05      0.000       0.000 -1.724E-07      0.000  1.626E+12
2.0105    339139.      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. 7:

Pile-head deflection              =      1.0000000 inches
Computed slope at pile head       =     -0.0040500 radians
Maximum bending moment            =      14430493. inch-lbs
Maximum shear force               =        -68737. lbs
Depth of maximum bending moment   =     21.8500000 feet below pile head
Depth of maximum shear force      =     35.1500000 feet below pile head
Number of iterations              =             33
Number of zero deflection points  =              3


---------------------------------------------------------------------------
           Pile-head Deflection vs. Pile Length for Load Case 7
---------------------------------------------------------------------------

Boundary Condition Type 4, Deflection and Moment

Deflection =         1.00000 in
Moment     =       4038000. in- lb
```



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Axial Load =         410100.  lb


    Pile       Pile Head       Maximum       Maximum
   Length     Deflection        Moment         Shear
    feet        inches         lb-lbs          lbs
------------  ------------  ------------  ------------
    95.0000     1.0000000     14430493.       -68737.
    90.2500     1.0000000     14462384.       -68734.
    85.5000     1.0000000     14524307.       -68941.
    80.7500     1.0000000     14586113.       -69146.
    76.0000     1.0000000     14531729.       -68845.
    71.2500     1.0000000     14475480.       -69136.
    66.5000     1.0000000     14482518.       -68719.
    61.7500     1.0000000     14524944.       -68726.
    57.0000     1.0000000     14492529.       -68557.
    52.2500     1.0000000     14461785.       -70440.
    47.5000     1.0000000     13929766.       -77043.
    42.7500     1.0000000     12541086.       -81431.
    38.0000     1.0000000     10070679.       -77345.
    33.2500     1.0000000      7151693.       -61363.
    28.5000     1.0000000      5213879.       -43799.
    23.7500     1.0000000      4369698.       -34131.
    19.0000     1.0000000      4038000.       -33100.


---------------------------------------------------------------------------
                Computed Values of Pile Loading and Deflection
                  for Lateral Loading for Load Case Number 8
---------------------------------------------------------------------------

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head                              =     1.500000 inches
Moment at pile head                                    =    4038000.0 in-lbs
Axial load at pile head                                =     410100.0 lbs

   Depth     Deflect.     Bending     Shear       Slope       Total     Bending    Soil
Res.  Soil Spr.    Distrib.
     X          y         Moment      Force         S        Stress    Stiffness       p
      Es*h     Lat. Load
   feet       inches      in-lbs       lbs        radians      psi*      lb-in^2      lb/in
     lb/inch    lb/inch
---------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
---------- ---------- ----------
      0.00     1.5000   4038000.     89002.  -0.005812      0.000  1.626E+12
0.000      0.000      0.000
     0.950     1.4339   5079726.     89002.  -0.005780      0.000  1.626E+12
0.000      0.000      0.000
     1.900     1.3682   6121286.     87846.  -0.005740      0.000  1.624E+12
-202.7941  1689.6765      0.000
     2.850     1.3030   7136290.     84153.  -0.005694      0.000  1.622E+12
-445.1066  3894.1784      0.000
     3.800     1.2384   8093213.     77622.  -0.005640      0.000  1.620E+12
-700.6936  6450.1770      0.000
     4.750     1.1744   8958808.     72432.  -0.005580      0.000  1.619E+12
-209.8452  2036.9402      0.000
     5.700     1.1112   9796837.     69998.  -0.005514      0.000  1.617E+12
-217.1067  2227.3969      0.000
     6.650     1.0487  10606327.     67485.  -0.005431      0.000  1.239E+12
-223.7318  2432.0959      0.000
     7.600     0.9873  11386285.     64900.  -0.005329      0.000  1.216E+12
-229.7749  2653.0051      0.000
     8.550     0.9272  12135882.     62250.  -0.005218      0.000  1.198E+12
```

-235.2495	2892.3912	0.000				
9.500	0.8684	12854367.	59540.	-0.005098	0.000	1.182E+12
-240.1570	3152.7407	0.000				
10.450	0.8110	13541061.	56777.	-0.004970	0.000	1.168E+12
-244.4925	3436.8689	0.000				
11.400	0.7551	14195363.	53969.	-0.004834	0.000	1.157E+12
-248.2478	3748.0177	0.000				
12.350	0.7008	14816748.	51121.	-0.004690	0.000	1.147E+12
-251.4123	4089.9600	0.000				
13.300	0.6481	15404771.	48240.	-0.004539	0.000	1.138E+12
-253.9741	4467.1218	0.000				
14.250	0.5973	15959066.	45334.	-0.004382	0.000	1.130E+12
-255.9206	4884.7318	0.000				
15.200	0.5482	16479349.	42409.	-0.004218	0.000	1.123E+12
-257.2381	5349.0080	0.000				
16.150	0.5011	16965420.	39472.	-0.004047	0.000	1.117E+12
-257.9125	5867.3942	0.000				
17.100	0.4560	17417163.	36532.	-0.003872	0.000	1.112E+12
-257.9293	6448.8616	0.000				
18.050	0.4128	17834550.	33595.	-0.003690	0.000	1.108E+12
-257.2738	7104.2975	0.000				
19.000	0.3718	18217644.	30670.	-0.003505	0.000	1.104E+12
-255.9311	7847.0098	0.000				
19.950	0.3329	18566598.	27764.	-0.003314	0.000	1.100E+12
-253.8866	8693.3853	0.000				
20.900	0.2962	18881657.	21210.	-0.003120	0.000	1.097E+12
-896.0142	34480.	0.000				
21.850	0.2618	19079353.	11084.	-0.002923	0.000	1.095E+12
-880.4771	38341.	0.000				
22.800	0.2296	19161693.	1293.2947	-0.002724	0.000	1.094E+12
-837.1416	41564.	0.000				
23.750	0.1997	19134306.	-7847.6078	-0.002524	0.000	1.095E+12
-766.5255	43758.	0.000				
24.700	0.1721	19006369.	-16562.	-0.002326	0.000	1.096E+12
-762.3710	50512.	0.000				
25.650	0.1467	18778430.	-25198.	-0.002129	0.000	1.098E+12
-752.6510	58498.	0.000				
26.600	0.1235	18451765.	-33651.	-0.001936	0.000	1.101E+12
-730.2572	67401.	0.000				
27.550	0.1025	18029303.	-41777.	-0.001748	0.000	1.106E+12
-695.4174	77323.	0.000				
28.500	0.0837	17515595.	-49537.	-0.001565	0.000	1.111E+12
-666.0414	90756.	0.000				
29.450	0.0668	16914488.	-56961.	-0.001389	0.000	1.118E+12
-636.3290	108520.	0.000				
30.400	0.0520	16229878.	-63984.	-0.001221	0.000	1.126E+12
-595.7674	130622.	0.000				
31.350	0.0390	15467074.	-70479.	-0.001061	0.000	1.137E+12
-543.7866	158882.	0.000				
32.300	0.0278	14632874.	-76616.	-0.000911	0.000	1.149E+12
-532.8960	218465.	0.000				
33.250	0.0183	13728740.	-82115.	-0.000771	0.000	1.165E+12
-431.7411	269656.	0.000				
34.200	0.0102	12767870.	-86418.	-0.000642	0.000	1.184E+12
-323.2091	360221.	0.000				
35.150	0.003607	11764420.	-89354.	-0.000525	0.000	1.207E+12
-191.9448	606668.	0.000				
36.100	-0.001748	10735505.	-89687.	-0.000420	0.000	1.235E+12
133.5665	871116.	0.000				
37.050	-0.005973	9723486.	-87518.	-0.000336	0.000	1.617E+12
246.9512	471337.	0.000				
38.000	-0.009416	8743239.	-84343.	-0.000271	0.000	1.619E+12
310.0783	375403.	0.000				

38.950	-0.0122	7803003.	-80567.	-0.000213	0.000	1.621E+12
352.3424	330381.	0.000				
39.900	-0.0143	6908300.	-76383.	-0.000161	0.000	1.623E+12
381.7764	304914.	0.000				
40.850	-0.0158	6062986.	-71914.	-0.000116	0.000	1.624E+12
402.1329	289481.	0.000				
41.800	-0.0169	5269735.	-67253.	-7.602E-05	0.000	1.625E+12
415.5885	280110.	0.000				
42.750	-0.0176	4530320.	-62470.	-4.165E-05	0.000	1.625E+12
423.5713	274833.	0.000				
43.700	-0.0179	3845804.	-57621.	-1.228E-05	0.000	1.626E+12
427.0981	272564.	0.000				
44.650	-0.0178	3216668.	-52753.	1.248E-05	0.000	1.626E+12
426.9353	272669.	0.000				
45.600	-0.0176	2642911.	-47905.	3.302E-05	0.000	1.626E+12
423.6852	274762.	0.000				
46.550	-0.0171	2124129.	-43108.	4.973E-05	0.000	1.626E+12
417.8367	278609.	0.000				
47.500	-0.0164	1659580.	-38391.	6.299E-05	0.000	1.626E+12
409.7952	284076.	0.000				
48.450	-0.0157	1248233.	-33775.	7.318E-05	0.000	1.626E+12
399.9027	291104.	0.000				
49.400	-0.0148	888817.	-29282.	8.068E-05	0.000	1.626E+12
388.4501	299688.	0.000				
50.350	-0.0138	579855.	-24926.	8.582E-05	0.000	1.626E+12
375.6851	309871.	0.000				
51.300	-0.0128	319697.	-20722.	8.898E-05	0.000	1.626E+12
361.8173	321749.	0.000				
52.250	-0.0118	106551.	-17503.	9.047E-05	0.000	1.626E+12
203.0295	196271.	0.000				
53.200	-0.0108	-80213.	-15248.	9.056E-05	0.000	1.626E+12
192.5569	204068.	0.000				
54.150	-0.009728	-241949.	-13120.	8.943E-05	0.000	1.626E+12
180.7867	211866.	0.000				
55.100	-0.008718	-380183.	-11132.	8.725E-05	0.000	1.626E+12
167.9812	219664.	0.000				
56.050	-0.007738	-496573.	-9294.3485	8.418E-05	0.000	1.626E+12
154.4004	227461.	0.000				
57.000	-0.006798	-592881.	-7614.5644	8.036E-05	0.000	1.626E+12
140.2986	235259.	0.000				
57.950	-0.005906	-670936.	-6097.1099	7.593E-05	0.000	1.626E+12
125.9215	243056.	0.000				
58.900	-0.005067	-732605.	-4743.7877	7.101E-05	0.000	1.626E+12
111.5035	250854.	0.000				
59.850	-0.004287	-779759.	-3553.7991	6.571E-05	0.000	1.626E+12
97.2665	258652.	0.000				
60.800	-0.003569	-814246.	-2523.8938	6.012E-05	0.000	1.626E+12
83.4187	266449.	0.000				
61.750	-0.002916	-837866.	-1648.5278	5.433E-05	0.000	1.626E+12
70.1543	274247.	0.000				
62.700	-0.002330	-852340.	-369.3363	4.841E-05	0.000	1.626E+12
154.2653	754674.	0.000				
63.650	-0.001813	-846739.	1285.4769	4.245E-05	0.000	1.626E+12
136.0529	855706.	0.000				
64.600	-0.001362	-823428.	2733.3378	3.660E-05	0.000	1.626E+12
117.9578	986989.	0.000				
65.550	-0.000978	-784761.	3975.4056	3.096E-05	0.000	1.626E+12
99.9488	1164854.	0.000				
66.500	-0.000657	-733079.	5011.8862	2.564E-05	0.000	1.626E+12
81.8899	1421788.	0.000				
67.450	-0.000394	-670730.	5840.0790	2.072E-05	0.000	1.626E+12
63.4071	1836361.	0.000				
68.400	-0.000184	-600119.	6448.8016	1.626E-05	0.000	1.626E+12

43.3864	2684256.	0.000				
69.350	-2.286E-05	-523849.	6783.3142	1.232E-05	0.000	1.626E+12
15.3000	7630061.	0.000				
70.300	9.667E-05	-445574.	6691.4817	8.923E-06	0.000	1.626E+12
-31.4110	3704045.	0.000				
71.250	0.000181	-371367.	6267.6886	6.060E-06	0.000	1.626E+12
-42.9387	2710472.	0.000				
72.200	0.000235	-302728.	5743.8299	3.697E-06	0.000	1.626E+12
-48.9664	2377038.	0.000				
73.150	0.000265	-240442.	5168.2886	1.793E-06	0.000	1.626E+12
-52.0058	2238218.	0.000				
74.100	0.000276	-184907.	4569.4195	3.017E-07	0.000	1.626E+12
-53.0590	2193856.	0.000				
75.050	0.000272	-136262.	3966.7181	-8.241E-07	0.000	1.626E+12
-52.6781	2209763.	0.000				
76.000	0.000257	-94458.	3374.4985	-1.633E-06	0.000	1.626E+12
-51.2201	2272705.	0.000				
76.950	0.000235	-59308.	2803.5989	-2.172E-06	0.000	1.626E+12
-48.9378	2378732.	0.000				
77.900	0.000207	-30516.	2262.3358	-2.487E-06	0.000	1.626E+12
-46.0207	2529546.	0.000				
78.850	0.000178	-7703.7601	1757.1160	-2.621E-06	0.000	1.626E+12
-42.6144	2731777.	0.000				
79.800	0.000148	9570.6573	1292.8824	-2.614E-06	0.000	1.626E+12
-38.8301	2998055.	0.000				
80.750	0.000118	21798.	873.4915	-2.504E-06	0.000	1.626E+12
-34.7473	3350388.	0.000				
81.700	9.055E-05	29510.	502.0966	-2.324E-06	0.000	1.626E+12
-30.4097	3828358.	0.000				
82.650	6.523E-05	33268.	181.6378	-2.104E-06	0.000	1.626E+12
-25.8111	4510578.	0.000				
83.600	4.257E-05	33671.	-84.3439	-1.870E-06	0.000	1.626E+12
-20.8524	5583494.	0.000				
84.550	2.261E-05	31362.	-289.8176	-1.642E-06	0.000	1.626E+12
-15.1956	7662944.	0.000				
85.500	5.144E-06	27078.	-411.9233	-1.437E-06	0.000	1.626E+12
-6.2264	13798559.	0.000				
86.450	-1.015E-05	21984.	-389.3880	-1.265E-06	0.000	1.626E+12
10.1800	11429338.	0.000				
87.400	-2.369E-05	18212.	-324.8660	-1.124E-06	0.000	1.626E+12
1.1397	548318.	0.000				
88.350	-3.578E-05	14588.	-308.2698	-1.009E-06	0.000	1.626E+12
1.7719	564563.	0.000				
89.300	-4.670E-05	11193.	-284.6080	-9.186E-07	0.000	1.626E+12
2.3793	580808.	0.000				
90.250	-5.672E-05	8107.0550	-254.1125	-8.510E-07	0.000	1.626E+12
2.9708	597053.	0.000				
91.200	-6.610E-05	5407.0631	-216.9088	-8.036E-07	0.000	1.626E+12
3.5561	613298.	0.000				
92.150	-7.505E-05	3169.0485	-173.0165	-7.735E-07	0.000	1.626E+12
4.1443	629543.	0.000				
93.100	-8.374E-05	1469.5207	-122.3557	-7.573E-07	0.000	1.626E+12
4.7436	645788.	0.000				
94.050	-9.231E-05	386.4202	-64.7605	-7.508E-07	0.000	1.626E+12
5.3608	662033.	0.000				
95.000	-0.000101	0.000	0.000	-7.494E-07	0.000	1.626E+12
6.0007	339139.	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. 8:

Pile-head deflection	=	1.5000000 inches
Computed slope at pile head	=	-0.0058117 radians
Maximum bending moment	=	19161693. inch-lbs
Maximum shear force	=	-89687. lbs
Depth of maximum bending moment	=	22.8000000 feet below pile head
Depth of maximum shear force	=	36.1000000 feet below pile head
Number of iterations	=	15
Number of zero deflection points	=	3

Pile-head Deflection vs. Pile Length for Load Case 8

Boundary Condition Type 4, Deflection and Moment

Deflection = 1.50000 in
Moment = 4038000. in- lb
Axial Load = 410100. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment ln-lbs	Maximum Shear lbs
95.0000	1.5000000	19161693.	-89687.
90.2500	1.5000000	19185074.	-89742.
85.5000	1.5000000	19269618.	-90020.
80.7500	1.5000000	19342018.	-90517.
76.0000	1.5000000	19236419.	-90147.
71.2500	1.5000000	19180163.	-90165.
66.5000	1.5000000	19182827.	89909.
61.7500	1.5000000	19248721.	-89675.
57.0000	1.5000000	19189062.	-90090.
52.2500	1.5000000	19037157.	-94171.
47.5000	1.5000000	17980152.	-102750.
42.7500	1.5000000	15643990.	-105179.
38.0000	1.5000000	11884546.	-94537.
33.2500	1.5000000	8206462.	-75042.
28.5000	1.5000000	5681649.	-51829.
23.7500	1.5000000	4547475.	-38334.
19.0000	1.5000000	4038000.	-36275.

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

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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.	Maximum Load Type in Pile No.	Pile-head Condition 1 Maximum Shear V(lbs) or y(inches) lbs	Pile-head Condition 2 Pile-head in-lb, rad., Rotation or in-lb/rad. radians	Axial Loading lbs	Pile-head Deflection inches	Maximum Moment in Pile in-lbs
1	1	V = 68000.	M = 5342000.	504400.	1.08857285	
		-74367.	-0.00446290			15806783.
2	1	V = 53000.	M = 4038000.	410100.	0.68932349	
		-55069.	-0.00292165			11451693.
3	4	y = 1.0000	M = 5342000.	504400.	1.00000000	
		-70507.	-0.00414210			14953248.
4	4	y = 1.5000	M = 5342000.	504400.	1.50000000	
		-91337.	-0.00590812			19723394.
5	4	y = 2.0000	M = 5342000.	504400.	2.00000000	
		-111090.	-0.00763070			24233438.
6	4	y = 0.5000	M = 4038000.	410100.	0.50000000	
		-47681.	-0.00219425			9863989.
7	4	y = 1.0000	M = 4038000.	410100.	1.00000000	
		-68737.	-0.00405004			14430493.
8	4	y = 1.5000	M = 4038000.	410100.	1.50000000	
		-89687.	-0.00581171			19161693.

SER 1 $\Delta = 0.69'' < 1''$ OK

The analysis ended normally.

LATERAL CAPACITY @ 2.0" DEFLECTION (STR 1) = 105.64 K

LATERAL CAPACITY @ 1.0" DEFLECTION (SERV II) = 67.40 K

McCORMICK TAYLOR

PROJECT BR-159 JOB NO. _____ SHEET NO. 1 OF 1

LOCATION JAMES ST OVER CHRISTINA RIVER

SUBJECT ABUT A

DESIGNED BY ZME DATE 10/14/14 CHECKED BY _____ DATE _____

REVISED BY _____ DATE _____ BACK CHECKED BY _____ DATE _____

REF./REM.

ABUTMENT A

STRENGTH I

AXIAL = 504.4 K
LATERAL = 67.9 K
MOMENT = 5342 K-IN

Actual Deflection = 1.08"

@ 1" Deflection, Lateral = 64.03 K
1.5" Deflection, Lateral = 85.77 K
→ 2.0" Deflection Lateral = 105.64 K

[105.64 K > 67.9 K ok]

SERVICE II

AXIAL = 410.1 K
LATERAL = 52.6 K
MOMENT = 4038 K-IN

Actual Deflection = 0.69"

@ 0.5" Deflection Lateral = 44.56 K
→ 1.0" Deflection, Lateral = 67.40 K
1.5" Deflection, Lateral = 89.0 K

[67.40 K > 52.6 K ok]

[4-PILES @ 14'-3" SPACING]

GEOTECHNICAL STRENGTH AXIAL CAPACITY

516 K COMPRESSION > 504.4 K ok.

ABUTMENT B

LAYER

Boring No. JS-9 By: SJM Chk: AT

OG Elev. = 4.50 ✓

Sample No.	Depth of SS run (ft)	N-Values Field	q'_v (ksf)	C_N	N_{CORR}	
2	2	6	0.095	2.020	12	GWT= 4.6
3	4	12	0.190	1.788	21	γ = 110 lb/ft3
4	6	18	0.286	1.653	30	γ' = 48 lb/ft3
5	8	20	0.381	1.556	31	
6	10	20	0.476	1.482	30	
7	12	39	0.571	1.421	55	
8	14	48	0.666	1.369	66	
9	16	19	0.762	1.325	25	
10	18	11	0.857	1.285	14	
11	23	12	1.095	1.203	14	
12	28	19	1.333	1.138	22	
13	33	19	1.571	1.083	21	
14	37	30	1.761	1.044	31	
15	42	19	1.999	1.002	19	
16	47	21	2.237	0.964	20	
17	52	9	2.475	0.931	8	
18	57	16	2.713	0.900	14	
19	62	21	2.951	0.872	18	
20	67	37	3.189	0.846	31	
21	72	34	3.427	0.822	28	
22	77	0	3.665	0.799	0	IGNOR THIS VALUE.
23	82	82	3.903	0.778	64	
24	87	50	4.141	0.758	38	
25	92	50	4.379	0.740	37	
26	97	50	4.617	0.722	36	
				$N_{avg\ (Below\ BFE)}$	**27**	

(1) (2) (3) (4) (5) (6)

C_N= **0.77xlog (40/q'_v)** (Ref. AASHTO Eqn 10.4.6.2.4-1)

N_{CORR} = **N_{Field} x C_N**

McCORMICK TAYLOR

PROJECT BRI-159 JOB NO. _____ SHEET NO. 1 OF 1

LOCATION ABUTMENT B

SUBJECT SOIL PROFILE (BORING J5-9)

DESIGNED BY SJM DATE 7/29/14 CHECKED BY AT DATE 8/14

REVISED BY _____ DATE _____ BACK CHECKED BY _____ DATE _____

NO SCOUR

DEPTH BELOW OG	DEPTH BELOW BDSE (x1)	LAYER THICKNESS (H')	ELEVATIONS	SOIL TYPE	REF./REM.
			+4.5	OG EL	MHWF = +4.64
x = 0					+4.5 OG, BDSE +4.0, y=0, y=1.5
Layer (1)	$x_1 = 0$	(6)		SILT WITH SAND + GRAVEL $\gamma_s = 120$ pcf $c = 750$ psf $\phi = 0$ $N_{CORR} = 12-30$ $\gamma' = 57.6$ pcf $E_{50} = 0.02$ $\phi = 0°$	
x = 6	$x_1 = 5.5$	−1.5			y = 7.0
(2)		(10')		MED DENSE SAND WITH GRAVEL $\gamma_s = 135$ pcf $\phi = 34°$ $c = 0$ psf $\gamma' = 72.6$ pcf $K = 60$ pci $N_{CORR} = 25-66$	
x = 16	$x_1 = 15.5$	−11.5			y = 17
(3)		31'		MED FINE SAND WITH SILT + GRAVEL $\gamma_s = 135$ pcf $\phi = 32°$ $N_{CORR} = 14-31$ $\gamma' = 72.6$ pcf $K = 60$ pci	
x = 47	$x_1 = 46.5$	−42.5			y = 48
(4)		15'		V STIFF SILT/CLAY $\gamma_s = 125$ pcf $c = 1000$ psf $\phi = 0°$ $N_{CORR} = 8-18$ $\gamma' = 62.6$ pcf $E_{50} = 0.007$ $x_1 = 50$ $K = 200$ pci	TIP EL −46
x = 62	$x_1 = 61.5$	−57.5	TIP $x_1 = 50$ EL. −46		y = 63
(5)		30'		VERY DENSE SAND $\gamma = 135$ pcf $c = 0$ $\phi = 34°$ $N_{CORR} = 28-64$ $\gamma' = 72.6$ pcf $K = 125$ pci	
x = 92	$x_1 = 91.5'$	−87.5			y = 93
(6)		(16.7')		WEATHERED ROCK $\gamma_s = 150$ pcf $C_o = 200$ ksf $= 1398$ ksi $N_{CORR} 7-36$ $\gamma' = 87.6$ pcf $\phi = 46°$ $K = 580$ pci	
	$x_1 = 108.2$	−104.2			y = 109.7
158.7	END BORING				

AXIAL CAPACITY

SHAFT for Windows, Version 2012.7.11

Serial Number : 228741384

VERTICALLY LOADED DRILLED SHAFT ANALYSIS

Path to file locations : Y:\Bridges\DELDOT\BR1-159_JAMES ST BRIDGE\FOUNDATION REPORT\SHAFT Output\
Name of input data file : Abut B.sfd
Name of output file : Abut B.sfo
Name of plot output file : Abut B.sfp
Name of runtime file : Abut B.sfr

Time and Date of Analysis

Date: July 29, 2014 Time: 11:47:32

BR1-159 Abutment B

PROPOSED DEPTH = 100.2 FT

NUMBER OF LAYERS = 6

WATER TABLE DEPTH = 0.0 FT.

SOIL INFORMATION

LAYER NO 1----CLAY

AT THE TOP

STRENGTH REDUCTION FACTOR-ALPHA	= 0.550E+00
END BEARING COEFFICIENT-Nc	= 0.800E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.750E+03
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.000E+00

AT THE BOTTOM

STRENGTH REDUCTION FACTOR-ALPHA	= 0.550E+00
END BEARING COEFFICIENT-Nc	= 0.800E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.750E+03
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.550E+01

LRFD RESISTANCE FACTOR (SIDE FRICTION)	= 0.450E+00
LRFD RESISTANCE FACTOR (TIP RESISTANCE)	= 0.400E+00

LAYER NO 2----SAND

AT THE TOP

SKIN FRICTION COEFFICIENT- BETA	= 0.118E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.340E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.135E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.550E+01

AT THE BOTTOM

SKIN FRICTION COEFFICIENT- BETA	= 0.969E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.340E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.135E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.155E+02

LRFD RESISTANCE FACTOR (SIDE FRICTION)	= 0.550E+00
LRFD RESISTANCE FACTOR (TIP RESISTANCE)	= 0.500E+00

LAYER NO 3----SAND

AT THE TOP

SKIN FRICTION COEFFICIENT- BETA	= 0.969E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.320E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.135E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.155E+02

AT THE BOTTOM

SKIN FRICTION COEFFICIENT- BETA	= 0.579E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.320E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.135E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11

DEPTH, FT	= 0.465E+02
LRFD RESISTANCE FACTOR (SIDE FRICTION)	= 0.550E+00
LRFD RESISTANCE FACTOR (TIP RESISTANCE)	= 0.500E+00

LAYER NO 4----CLAY

AT THE TOP

STRENGTH REDUCTION FACTOR-ALPHA	= 0.550E+00
END BEARING COEFFICIENT-Nc	= 0.800E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.100E+04
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.125E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.465E+02

AT THE BOTTOM

STRENGTH REDUCTION FACTOR-ALPHA	= 0.550E+00
END BEARING COEFFICIENT-Nc	= 0.800E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.100E+04
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.125E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.615E+02
LRFD RESISTANCE FACTOR (SIDE FRICTION)	= 0.450E+00
LRFD RESISTANCE FACTOR (TIP RESISTANCE)	= 0.400E+00

LAYER NO 5----SAND

AT THE TOP

SKIN FRICTION COEFFICIENT- BETA	= 0.441E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.340E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.135E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.615E+02

AT THE BOTTOM

SKIN FRICTION COEFFICIENT- BETA	= 0.250E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.340E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.135E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.915E+02
LRFD RESISTANCE FACTOR (SIDE FRICTION)	= 0.100E+01
LRFD RESISTANCE FACTOR (TIP RESISTANCE)	= 0.100E+01

LAYER NO 6----WEAK ROCK

AT THE TOP

DIAMETER OF SOCKET, FT	= 0.350E+01
SLUMP OF CONCRETE, IN	= 0.000E+00
ANGLE OF INTERFACE FRICTION, DEG.	= 0.000E+00
UNIAXIAL COMPRESSION STRENGTH OF ROCK,LB/SQ FT	= 0.200E+06
ELASTIC MODULUS FOR THE INTACT ROCK, LB/SQ IN.	= 0.497E+07
ROCK QUALITY DESIGNATION (RQD) %	= 0.000E+00
DEPTH, FT	= 0.915E+02

AT THE BOTTOM

DIAMETER OF SOCKET, FT	= 0.350E+01
SLUMP OF CONCRETE, IN	= 0.000E+00
ANGLE OF INTERFACE FRICTION, DEG.	= 0.000E+00
UNIAXIAL COMPRESSION STRENGTH OF ROCK,LB/SQ FT	= 0.200E+06
ELASTIC MODULUS FOR THE INTACT ROCK, LB/SQ IN.	= 0.497E+07
ROCK QUALITY DESIGNATION (RQD) %	= 0.000E+00
DEPTH, FT	= 0.108E+03
LRFD RESISTANCE FACTOR (SIDE FRICTION)	= 0.550E+00
LRFD RESISTANCE FACTOR (TIP RESISTANCE)	= 0.500E+00

DRILLED SHAFT INFORMATION

DIAMETER OF STEM	= 4.000	FT.
DIAMETER OF BASE	= 4.000	FT.
END OF STEM TO BASE	= 0.000	FT.
ANGLE OF BELL	= 0.000	DEG.
IGNORED TOP PORTION	= 5.000	FT.
IGNORED BOTTOM PORTION	= 4.000	FT.
AREA OF ONE PERCENT STEEL	= 18.098	SQ.IN.
ELASTIC MODULUS, Ec	= 0.312E+07	LB/SQ IN
VOLUME OF UNDERREAM	= 0.000	CU.YDS.

PREDICTED RESULTS

QS = ULTIMATE SIDE RESISTANCE;
QB = ULTIMATE BASE RESISTANCE;
WT = WEIGHT OF DRILLED SHAFT (UPLIFT CAPACITY ONLY);
QU = TOTAL ULTIMATE RESISTANCE;
LRFD QS = TOTAL SIDE FRICTION USING LRFD RESISTANCE FACTOR TO THE ULTIMATE SIDE RESISTANCE;
LRFD QB = TOTAL BASE BEARING USING LRFD RESISTANCE FACTOR TO THE ULTIMATE BASE RESISTANCE
LRFD QU = TOTAL CAPACITY WITH LRFD RESISTANCE FACTOR.

LENGTH (FEET)	VOLUME (CU.YDS)	QS (TONS)	QB (TONS)	QU (TONS)	LRFD QS (TONS)	LRFD QB (TONS)	LRFD QU (TONS)

10.0	4.65	2.59	112.85	115.44	1.17	56.42	57.59
11.0	5.12	5.33	100.56	105.89	2.67	50.28	52.95
12.0	5.59	8.53	87.15	95.68	4.43	43.57	48.01
13.0	6.05	12.16	77.09	89.25	6.43	38.55	44.97
14.0	6.52	16.20	70.39	86.59	8.65	35.19	43.85
15.0	6.98	20.64	67.04	87.68	11.10	33.52	44.61
16.0	7.45	25.48	67.04	92.51	13.75	33.52	47.27
17.0	7.91	30.68	67.04	97.72	16.62	33.52	50.13
18.0	8.38	36.25	67.04	103.28	19.68	33.52	53.20
19.0	8.84	42.16	67.04	109.20	22.93	33.52	56.45
20.0	9.31	48.40	67.04	115.44	26.36	33.52	59.88
21.0	9.78	54.97	67.04	122.01	29.98	33.52	63.49
22.0	10.24	61.85	67.04	128.89	33.76	33.52	67.28
23.0	10.71	69.03	67.04	136.07	37.71	33.52	71.23
24.0	11.17	76.49	67.04	143.53	41.81	33.52	75.33
25.0	11.64	84.24	67.04	151.28	46.07	33.52	79.59
26.0	12.10	92.25	67.04	159.29	50.48	33.52	84.00
27.0	12.57	100.52	67.04	167.56	55.03	33.52	88.55
28.0	13.03	109.04	67.04	176.07	59.71	33.52	93.23
29.0	13.50	117.79	67.04	184.83	64.53	33.52	98.05
30.0	13.96	126.78	67.04	193.81	69.47	33.52	102.99
31.0	14.43	135.98	67.04	203.02	74.53	33.52	108.05
32.0	14.90	145.39	67.04	212.43	79.71	33.52	113.22
33.0	15.36	155.00	67.04	222.04	84.99	33.52	118.51
34.0	15.83	164.81	67.04	231.85	90.39	33.52	123.90
35.0	16.29	174.80	67.04	241.84	95.88	33.52	129.40
36.0	16.76	184.96	67.04	252.00	101.47	33.52	134.99
37.0	17.22	195.30	67.04	262.33	107.15	33.52	140.67
38.0	17.69	205.79	67.04	272.83	112.92	33.52	146.44
39.0	18.15	216.43	67.04	283.47	118.78	33.52	152.30
40.0	18.62	227.21	64.52	291.74	124.71	32.26	156.97
41.0	19.08	238.13	61.73	299.86	130.71	30.86	161.58
42.0	19.55	249.18	58.65	307.84	136.79	29.33	166.12
43.0	20.02	260.35	55.30	315.65	142.93	27.65	170.58
44.0	20.48	271.63	52.79	324.41	149.14	26.39	175.53
45.0	20.95	283.01	51.11	334.12	155.40	25.56	180.95
46.0	21.41	294.49	50.27	344.77	161.71	25.14	186.85
47.0	21.88	306.07	50.27	356.34	168.08	20.11	188.19
48.0	22.34	317.72	50.27	367.99	174.49	20.11	194.60
49.0	22.81	329.45	50.27	379.72	180.94	20.11	201.05
50.0	23.27	341.25	50.27	391.52	187.43	20.11	207.54
51.0	23.74	353.11	50.27	403.39	193.95	20.11	214.06
52.0	24.21	356.57	50.27	406.84	195.51	20.11	215.62
53.0	24.67	360.03	50.27	410.30	197.06	20.11	217.17
54.0	25.14	363.48	50.27	413.75	198.62	20.11	218.73
55.0	25.60	366.94	62.84	429.78	200.17	25.14	225.31
56.0	26.07	370.39	76.81	447.20	201.73	30.72	232.45
57.0	26.53	373.85	92.17	466.02	203.29	36.87	240.15
58.0	27.00	377.31	108.93	486.24	204.84	43.57	248.41
59.0	27.46	380.76	121.50	502.27	206.40	48.60	255.00
60.0	27.93	384.22	129.89	514.10	207.95	51.95	259.90
61.0	28.39	387.68	134.08	521.75	209.51	53.63	263.14
62.0	28.86	391.13	134.08	525.21	211.06	134.08	345.14
63.0	29.33	394.59	134.08	528.66	212.62	134.08	346.69
64.0	29.79	398.04	134.08	532.12	214.17	134.08	348.25
65.0	30.26	401.50	134.08	535.58	215.73	134.08	349.80
66.0	30.72	404.96	134.08	539.03	217.28	134.08	351.36
67.0	31.19	416.53	134.08	550.60	228.85	134.08	362.93
68.0	31.65	428.06	134.08	562.14	240.39	134.08	374.46
69.0	32.12	439.55	134.08	573.63	251.88	134.08	385.95
70.0	32.58	450.99	134.08	585.07	263.32	134.08	397.40
71.0	33.05	462.38	134.08	596.46	274.71	134.08	408.78
72.0	33.51	473.71	134.08	607.78	286.03	134.08	420.11

415 K

73.0	33.98	484.97	134.08	619.05	297.30	134.08	431.37
74.0	34.45	496.16	134.08	630.23	308.48	134.08	442.56
75.0	34.91	507.27	134.08	641.35	319.60	134.08	453.67
76.0	35.38	518.30	134.08	652.37	330.62	134.08	464.70
77.0	35.84	529.24	134.08	663.31	341.56	134.08	475.64
78.0	36.31	540.09	134.08	674.16	352.41	134.08	486.49
79.0	36.77	550.83	134.08	684.91	363.16	134.08	497.23
80.0	37.24	561.47	134.08	695.55	373.80	134.08	507.87
81.0	37.70	572.00	134.08	706.08	384.33	134.08	518.41
82.0	38.17	582.42	134.08	716.50	394.75	134.08	528.82
83.0	38.63	592.72	134.08	726.79	405.04	134.08	539.12
84.0	39.10	602.88	134.08	736.96	415.21	134.08	549.28
85.0	39.57	612.92	474.76	1087.68	425.25	474.76	900.00
86.0	40.03	622.82	853.29	1476.11	435.15	853.29	1288.44
87.0	40.50	632.58	1269.68	1902.26	444.90	1269.68	1714.59
88.0	40.96	642.19	1723.92	2366.11	454.52	1723.92	2178.44
89.0	41.43	651.65	2064.61	2716.26	463.98	2064.61	2528.58
90.0	41.89	661.02	2291.73	2952.75	473.35	2291.73	2765.08
91.0	42.36	670.51	2405.29	3075.80	482.84	2405.29	2888.13
92.0	42.82	680.12	2405.29	3085.40	492.44	1202.64	1695.09
93.0	43.29	689.83	2405.29	3095.12	502.16	1202.64	1704.80
94.0	43.76	699.66	2397.92	3097.59	511.99	1198.96	1710.95
95.0	44.22	709.61	2379.52	3089.13	521.93	1189.76	1711.69
96.0	44.69	719.67	2349.35	3069.02	531.99	1174.67	1706.67
97.0	45.15	954.14	2306.72	3260.86	660.95	1153.36	1814.32
98.0	45.62	1188.62	2254.24	3442.85	789.92	1127.12	1917.03
99.0	46.08	1423.09	2195.78	3618.87	918.88	1097.89	2016.77

LOAD SETTLEMENT RELATIONSHIP

TOP LOAD TONS	TOP MOVEMENT IN.
0.1031E+04	0.5302E+00
0.1063E+04	0.5481E+00
0.1107E+04	0.5734E+00
0.1168E+04	0.6092E+00
0.1254E+04	0.6593E+00
0.1371E+04	0.7285E+00
0.1527E+04	0.8223E+00
0.1664E+04	0.9142E+00
0.1740E+04	0.9849E+00
0.1838E+04	0.1084E+01
0.1968E+04	0.1223E+01
0.2138E+04	0.1418E+01
0.2405E+04	0.1753E+01
0.2985E+04	0.2574E+01
0.3828E+04	0.4054E+01

LATERAL CAPACITY
ABUTMENT B

LPile Plus for Windows, Version 2013-07.007

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

This copy of LPile is used by:

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Files Used for Analysis

Path to file locations: Y:\Bridges\DELDOT\BR1-159_JAMES ST BRIDGE\FOUNDATION REPORT\LPILE Output\
Name of input data file: Abut B.lp7d
Name of output report file: Abut B.lp7o
Name of plot output file: Abut B.lp7p
Name of runtime messeage file: Abut B.lp7r

Date and Time of Analysis

Date: October 16, 2014 Time: 9:50:14

Problem Title

Project Name: BR1-159 Abutment B

Job Number:

Client: DelDOT

Engineer: SJM

Description: Abutment B Lateral Capacity

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	=	1
Total length of pile	=	50.00 ft
Depth of ground surface below top of pile	=	1.50 ft

Pile diameter values used for p-y curve computations are defined using 2 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	49.0000000
2	50.000000	49.0000000

Input Structural Properties:

Pile Section No. 1:

Section Type	=	Drilled Shaft with Permanent Casing
Section Length	=	50.00000 ft
Section Diameter	=	49.00000 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 soft clay, p-y criteria by Matlock, 1970

Distance from top of pile to top of layer	=	1.50000 ft
Distance from top of pile to bottom of layer	=	7.00000 ft
Effective unit weight at top of layer	=	57.60000 pcf
Effective unit weight at bottom of layer	=	42.60000 pcf
Undrained cohesion at top of layer	=	750.00000 psf
Undrained cohesion at bottom of layer	=	750.00000 psf
Epsilon-50 at top of layer	=	0.02000
Epsilon-50 at bottom of layer	=	0.02000

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

Distance from top of pile to top of layer	=	7.00000 ft
Distance from top of pile to bottom of layer	=	17.00000 ft
Effective unit weight at top of layer	=	72.60000 pcf
Effective unit weight at bottom of layer	=	72.60000 pcf
Friction angle at top of layer	=	34.00000 deg.
Friction angle at bottom of layer	=	34.00000 deg.
Subgrade k at top of layer	=	60.00000 pci
Subgrade k at bottom of layer	=	60.00000 pci

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

Distance from top of pile to top of layer	=	17.00000 ft
Distance from top of pile to bottom of layer	=	48.00000 ft
Effective unit weight at top of layer	=	57.60000 pcf
Effective unit weight at bottom of layer	=	57.60000 pcf
Friction angle at top of layer	=	32.00000 deg.
Friction angle at bottom of layer	=	32.00000 deg.
Subgrade k at top of layer	=	60.00000 pci
Subgrade k at bottom of layer	=	60.00000 pci

Layer 4 is stiff clay with water-induced erosion

Distance from top of pile to top of layer	=	48.00000 ft
Distance from top of pile to bottom of layer	=	63.00000 ft
Effective unit weight at top of layer	=	62.60000 pcf
Effective unit weight at bottom of layer	=	62.60000 pcf
Undrained cohesion at top of layer	=	1000.00000 psf
Undrained cohesion at bottom of layer	=	1000.00000 psf
Epsilon-50 at top of layer	=	0.00700
Epsilon-50 at bottom of layer	=	0.00700
Subgrade k at top of layer	=	200.00000 pci
Subgrade k at bottom of layer	=	200.00000 pci

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

Distance from top of pile to top of layer	=	63.00000 ft
Distance from top of pile to bottom of layer	=	93.00000 ft
Effective unit weight at top of layer	=	72.60000 pcf
Effective unit weight at bottom of layer	=	72.60000 pcf
Friction angle at top of layer	=	34.00000 deg.
Friction angle at bottom of layer	=	34.00000 deg.
Subgrade k at top of layer	=	125.00000 pci
Subgrade k at bottom of layer	=	125.00000 pci

Layer 6 is weak rock, p-y criteria by Reese, 1997

Distance from top of pile to top of layer	=	93.00000 ft
Distance from top of pile to bottom of layer	=	109.70000 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	=	1389000. psi
Uniaxial compressive strength at bottom of layer	=	1389000. psi
Initial modulus of rock at top of layer	=	4970000. psi
Initial modulus of rock at bottom of layer	=	4970000. psi
RQD of rock at top of layer	=	0.0000 %
RQD of rock at bottom of layer	=	0.0000 %
k rm of rock at top of layer	=	0.0000
k rm of rock at bottom of layer	=	0.0000

(Depth of lowest soil layer extends 59.70 ft below pile tip)

Summary of Soil Properties

Layer Num.	Soil Type (p-y Curve Criteria)	Uniaxial qu psi	RQD % or GSI	Strain Factor Epsilon 50	Layer Depth ft	Effective Unit Wt. kpy pci	Undrained Cohesion Rock Mass krm psf	Angle of Friction deg.

1	Soft Clay				1.500	57.600	750.000	
--	--	--	0.02000		--	--	--	
					7.000	42.600	750.000	
--	--	--	0.02000		--	--	--	
2	Sand (Reese, et al.)				7.000	72.600	--	
34.000	--	--	--		60.000	--	--	
					17.000	72.600	--	
34.000	--	--	--		60.000	--	--	
3	Sand (Reese, et al.)				17.000	57.600	--	
32.000	--	--	--		60.000	--	--	
					48.000	57.600	--	
32.000	--	--	--		60.000	--	--	
4	Stiff Clay with Free Water				48.000	62.600	1000.000	
--	--	--	0.00700		200.000	--	--	
					63.000	62.600	1000.000	
--	--	--	0.00700		200.000	--	--	
5	Sand (Reese, et al.)				63.000	72.600	--	
34.000	--	--	--		125.000	--	--	
					93.000	72.600	--	
34.000	--	--	--		125.000	--	--	
6	Weak Rock				93.000	87.600	--	
--	1389000.	0.00	--		--	4970000.		
0.00								
					109.700	87.600	--	
--	1389000.	0.00	--		--	4970000.		
0.00								

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 = 8

Load No.	Load Compute Type	Condition 1		Condition 2		Axial Thrust Force, lbs	Top y vs. Pile Length
1	1	V = 55300. lbs	M = 3729000. in-lbs			402100.	Yes
2	1	V = 42300. lbs	M = 2808000. in-lbs			311000.	Yes

3	4	y = 1.00000 in	M = 3729000. in-lbs			402100.	Yes
4	4	y = 1.50000 in	M = 3729000. in-lbs			402100.	Yes
5	4	y = 2.00000 in	M = 3729000. in-lbs			402100.	Yes
6	4	y = 0.50000 in	M = 2808000. in-lbs			311000.	Yes
7	4	y = 1.00000 in	M = 2808000. in-lbs			311000.	Yes
8	4	y = 1.50000 in	M = 2808000. in-lbs			311000.	Yes

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 = 1

Pile Section No. 1:

Dimensions and Properties of Drilled Shaft (Bored Pile) with Permanent Casing:

Length of Section	=	50.00000 ft
Outer Diameter of Casing	=	49.00000 in
Concrete Cover Thickness Inside Casing	=	4.00000 in
Casing Wall Thickness	=	0.50000 in
Moment of Inertia of Steel Casing	=	22403. in^4
Yield Stress of Casing	=	36000. psi
Elastic Modulus of Casing	=	29000000. psi
Number of Reinforcing Bars	=	12 bars
Area of Single Reinforcing Bar	=	0.79000 sq. in.
Edge-to-Edge Bar Spacing	=	9.09394 in
Maximum Concrete Aggregate Size	=	0.50000 in
Ratio of Bar Spacing to Aggregate Size	=	18.19
Offset of Center of Rebar Cage from Center of Pile	=	0.0000 in
Yield Stress of Reinforcing Bars	=	60000. psi
Modulus of Elasticity of Reinforcing Bars	=	29000000. psi
Gross Area of Pile	=	1885.74099 sq. in.
Area of Concrete	=	1800.07737 sq. in.
Cross-sectional Area of Steel Casing	=	76.18362 sq. in.
Area of All Steel (Casing and Bars)	=	85.66362 sq. in.
Area Ratio of All Steel to Gross Area of Pile	=	4.54 percent

Axial Structural Capacities:

Nom. Axial Structural Capacity = 0.85 Fc Ac + Fy As	=	7901.608 kips
Tensile Load for Cracking of Concrete	=	-939.735 kips
Nominal Axial Tensile Capacity	=	-3311.410 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.00000	0.79000	19.50000	0.00000
2	1.00000	0.79000	16.88750	9.75000
3	1.00000	0.79000	9.75000	16.88750
4	1.00000	0.79000	0.00000	19.50000
5	1.00000	0.79000	-9.75000	16.88750
6	1.00000	0.79000	-16.88750	9.75000
7	1.00000	0.79000	-19.50000	0.00000
8	1.00000	0.79000	-16.88750	-9.75000
9	1.00000	0.79000	-9.75000	-16.88750
10	1.00000	0.79000	0.00000	-19.50000
11	1.00000	0.79000	9.75000	-16.88750
12	1.00000	0.79000	16.88750	-9.75000

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

Minimum spacing between any two bars not equal to zero = 9.09394 inches between Bars 7 and 8

Concrete Properties:

Compressive Strength of Concrete	=	3000.00000 psi
Modulus of Elasticity of Concrete	=	3122019. psi
Modulus of Rupture of Concrete	=	-410.79191 psi
Compression Strain at Peak Stress	=	0.00163
Tensile Strain at Fracture of Concrete	=	-0.0001160
Maximum Coarse Aggregate Size	=	0.0000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 2

Number	Axial Thrust Force kips
1	311.000
2	402.100

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 = 311.000 kips

Bending Max Concrete Curvature Stress rad/in. ksi	Bending Max Steel Moment Stress in-kip ksi	Bending Max Casing Stiffness Stress kip-in2 ksi	Run Msg	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in
0.000000625	1020.3214226	1632514276.		79.6491408	0.0000498	0.0000192
0.1795114	1.4392001	1.4392001				
0.000001250	2040.6270179	1632501614.		52.1050455	0.0000651	0.000003881
0.2333757	1.8799267	1.8799267				
0.000001875	3060.7305083	1632389604.		42.9368208	0.0000805	-0.0000114
0.2868068	2.3213677	2.3213677				
0.000002500	4079.1054018	1631642161.		38.3592360	0.0000959	-0.0000266
0.3397732	2.7632821	2.7632821				
0.000003125	5094.4916454	1630237327.		35.6152703	0.0001113	-0.0000418
0.3922453	3.2054308	3.2054308				
0.000003750	6106.4706701	1628392179.		33.7871625	0.0001267	-0.0000570
0.4442100	3.6477102	3.6477102				
0.000004375	7114.8891887	1626260386.		32.4820312	0.0001421	-0.0000723
0.4956613	4.0900733	4.0900733				
0.000005000	8119.6807854	1623936157.		31.5035924	0.0001575	-0.0000875
0.5465964	4.5324959	4.5324959				
0.000005625	9120.8127913	1621477830.		30.7428636	0.0001729	-0.0001027
0.5970132	4.9749640	4.9749640				
0.000006250	9120.8127913	1459330047.		27.3891606	0.0001712	-0.0001351
0.5907651	4.9198791	4.9198791	C			
0.000006875	9120.8127913	1326663679.		26.6644349	0.0001833	-0.0001536
0.6300446	5.2673748	5.2673748	C			
0.000007500	9120.8127913	1216108372.		26.0487700	0.0001954	-0.0001721
0.6687165	5.6123200	5.6123200	C			
0.000008125	9667.3567964	1189828529.		25.5203447	0.0002074	-0.0001908
0.7068752	5.9555031	5.9555031	C			
0.000008750	10272.	1173985424.		25.0616937	0.0002193	-0.0002095
0.7445597	6.2972361	6.2972361	C			
0.000009375	10875.	1160020442.		24.6601383	0.0002312	-0.0002282
0.7818119	6.6378657	6.6378657	C			
0.0000100	11476.	1147610245.		24.3055242	0.0002431	-0.0002469
0.8186520	-7.0903480	-7.0903480	C			
0.0000106	12075.	1136489552.		23.9894799	0.0002549	-0.0002657
0.8550796	-7.6308758	-7.6308758	C			
0.0000113	12673.	1126510140.		23.7077461	0.0002667	-0.0002845
0.8911727	-8.1716666	-8.1716666	C			
0.0000119	13270.	1117448766.		23.4531991	0.0002785	-0.0003034
0.9268699	-8.7133077	-8.7133077	C			
0.0000125	13865.	1109229179.		23.2239888	0.0002903	-0.0003222
0.9622580	-9.2549915	-9.2549915	C			
0.0000131	14460.	1101687864.		23.0146565	0.0003021	-0.0003411
0.9972645	-9.7974182	-9.7974182	C			
0.0000138	15053.	1094791472.		22.8249906	0.0003138	-0.0003599
1.0319938	-10.3395912	-10.3395912	C			
0.0000144	15646.	1088410177.		22.6502315	0.0003256	-0.0003788
1.0663521	-10.8824254	-10.8824254	C			
0.0000150	16238.	1082511014.		22.4900158	0.0003374	-0.0003976
1.1004069	-11.4252681	-11.4252681	C			
0.0000156	16829.	1077048131.		22.3431824	0.0003491	-0.0004165
1.1341848	-11.9678548	-11.9678548	C			
0.0000163	17419.	1071944825.		22.2067237	0.0003609	-0.0004354
1.1676167	-12.5108751	-12.5108751	C			

0.0000169	18009.	1067173190.	22.0801491	0.0003726	-0.0004543
1.2007357	-13.0540051	-13.0540051	C		
0.0000175	18597.	1062710628.	21.9631263	0.0003844	-0.0004731
1.2335778	-13.5968759	-13.5968759	C		
0.0000181	19186.	1058525057.	21.8546689	0.0003961	-0.0004920
1.2661424	-14.1394865	-14.1394865	C		
0.0000188	19773.	1054575443.	21.7530428	0.0004079	-0.0005109
1.2983834	-14.6823142	-14.6823142	C		
0.0000194	20360.	1050839898.	21.6576430	0.0004196	-0.0005298
1.3303043	-15.2253274	-15.2253274	C		
0.0000200	20946.	1047309964.	21.5686613	0.0004314	-0.0005486
1.3619476	-15.7680764	-15.7680764	C		
0.0000206	21532.	1043966851.	21.4855159	0.0004431	-0.0005675
1.3933128	-16.3105601	-16.3105601	C		
0.0000213	22117.	1040793982.	21.4076936	0.0004549	-0.0005863
1.4243993	-16.8527775	-16.8527775	C		
0.0000219	22701.	1037776671.	21.3347397	0.0004667	-0.0006052
1.4552064	-17.3947276	-17.3947276	C		
0.0000225	23285.	1034891504.	21.2653913	0.0004785	-0.0006240
1.4856830	-17.9369696	-17.9369696	C		
0.0000231	23868.	1032134012.	21.1998678	0.0004902	-0.0006429
1.5158606	-18.4791605	-18.4791605	C		
0.0000238	24451.	1029497912.	21.1381885	0.0005020	-0.0006617
1.5457585	-19.0210788	-19.0210788	C		
0.0000244	25032.	1026973784.	21.0800594	0.0005138	-0.0006805
1.5753760	-19.5627236	-19.5627236	C		
0.0000256	26195.	1022228344.	20.9734185	0.0005374	-0.0007182
1.6337675	-20.6451877	-20.6451877	C		
0.0000269	27354.	1017839188.	20.8781196	0.0005611	-0.0007558
1.6910299	-21.7265436	-21.7265436	C		
0.0000281	28512.	1013752992.	20.7920762	0.0005848	-0.0007933
1.7471188	-22.8072597	-22.8072597	C		
0.0000294	29667.	1009928147.	20.7138153	0.0006085	-0.0008309
1.8020110	-23.8875842	-23.8875842	C		
0.0000306	30819.	1006339708.	20.6432361	0.0006322	-0.0008684
1.8557633	-24.9667602	-24.9667602	C		
0.0000319	31969.	1002959305.	20.5794458	0.0006560	-0.0009059
1.9083705	-26.0447778	-26.0447778	C		
0.0000331	33117.	999762841.	20.5216865	0.0006798	-0.0009433
1.9598268	-27.1216267	-27.1216267	C		
0.0000344	34263.	996729714.	20.4693106	0.0007036	-0.0009807
2.0101267	-28.1972965	-28.1972965	C		
0.0000356	35406.	993842209.	20.4217617	0.0007275	-0.0010181
2.0592645	-29.2717767	-29.2717767	C		
0.0000369	36546.	991085003.	20.3785591	0.0007515	-0.0010554
2.1072344	-30.3450564	-30.3450564	C		
0.0000381	37684.	988444778.	20.3392850	0.0007754	-0.0010927
2.1540305	-31.4171248	-31.4171248	C		
0.0000394	38820.	985906889.	20.3029816	0.0007994	-0.0011299
2.1996026	-32.4886484	-32.4886484	C		
0.0000406	39953.	983464219.	20.2698990	0.0008235	-0.0011672
2.2439868	-33.5590095	-33.5590095	C		
0.0000419	41084.	981108141.	20.2398320	0.0008475	-0.0012043
2.2871832	-34.6281070	-34.6281070	C		
0.0000431	42212.	978830647.	20.2125281	0.0008717	-0.0012415
2.3291852	-35.6959288	-35.6959288	C		
0.0000444	43252.	974702081.	20.1730347	0.0008952	-0.0012792
2.3688862	-36.7814165	-36.0000000	CY		
0.0000456	44154.	967754415.	20.1132375	0.0009177	-0.0013180
2.4057016	-37.8966319	-36.0000000	CY		
0.0000469	44971.	959380000.	20.0432232	0.0009395	-0.0013573
2.4404143	-39.0300715	-36.0000000	CY		
0.0000481	45732.	950276230.	19.9681413	0.0009610	-0.0013972

2.4734381	-40.1756596	-36.0000000	CY		
0.0000494	46442.	940589716.	19.8888287	0.0009820	-0.0014374
2.5048659	-41.3327489	-36.0000000	CY		
0.0000506	47113.	930631709.	19.8069446	0.0010027	-0.0014779
2.5348518	-42.4993637	-36.0000000	CY		
0.0000519	47746.	920395334.	19.7219966	0.0010231	-0.0015188
2.5633918	-43.6765243	-36.0000000	CY		
0.0000531	48349.	910102985.	19.6366783	0.0010432	-0.0015599
2.5907135	-44.8604143	-36.0000000	CY		
0.0000544	48927.	899804124.	19.5513152	0.0010631	-0.0016013
2.6168695	-46.0505603	-36.0000000	CY		
0.0000556	49478.	889486257.	19.4656376	0.0010828	-0.0016428
2.6418688	-47.2474026	-36.0000000	CY		
0.0000569	50008.	879254924.	19.3805918	0.0011023	-0.0016846
2.6658063	-48.4494143	-36.0000000	CY		
0.0000581	50517.	869114099.	19.2949678	0.0011215	-0.0017266
2.6886247	-49.6585667	-36.0000000	CY		
0.0000594	51009.	859093311.	19.2096767	0.0011406	-0.0017688
2.7104145	-50.8733534	-36.0000000	CY		
0.0000606	51484.	849216695.	19.1254364	0.0011595	-0.0018111
2.7312497	-52.0924763	-36.0000000	CY		
0.0000619	51944.	839496766.	19.0423492	0.0011782	-0.0018536
2.7511599	-53.3156376	-36.0000000	CY		
0.0000631	52390.	829943434.	18.9605015	0.0011969	-0.0018962
2.7701722	-54.5425537	-36.0000000	CY		
0.0000644	52824.	820564444.	18.8799671	0.0012154	-0.0019390
2.7883120	-55.7729518	-36.0000000	CY		
0.0000656	53244.	811342601.	18.7992031	0.0012337	-0.0019819
2.8055038	-57.0096259	-36.0000000	CY		
0.0000669	53654.	802299325.	18.7195015	0.0012519	-0.0020250
2.8218506	-58.2500948	-36.0000000	CY		
0.0000681	54037.	793208483.	18.6462883	0.0012703	-0.0020678
2.8376874	-59.4835233	36.0000000	CY		
0.0000694	54404.	784206139.	18.5769131	0.0012888	-0.0021106
2.8528549	-60.0000000	36.0000000	CY		
0.0000706	54746.	775162773.	18.5135808	0.0013075	-0.0021531
2.8674741	-60.0000000	36.0000000	CY		
0.0000719	55075.	766267384.	18.4525956	0.0013263	-0.0021956
2.8813362	-60.0000000	36.0000000	CY		
0.0000731	55389.	757452111.	18.3961513	0.0013452	-0.0022379
2.8945565	-60.0000000	36.0000000	CY		
0.0000744	55693.	748818963.	18.3407229	0.0013641	-0.0022803
2.9069538	-60.0000000	36.0000000	CY		
0.0000794	56798.	715565088.	18.1401814	0.0014399	-0.0024495
2.9489336	-60.0000000	36.0000000	CY		
0.0000844	57704.	683899125.	17.9573250	0.0015151	-0.0026192
2.9782536	-60.0000000	36.0000000	CY		
0.0000894	58450.	653986584.	17.7865909	0.0015897	-0.0027897
2.9951357	-60.0000000	36.0000000	CY		
0.0000944	59010.	625272856.	17.6154998	0.0016625	-0.0029619
2.9987989	-60.0000000	36.0000000	CY		
0.0000994	59511.	598848714.	17.4638968	0.0017355	-0.0031339
2.9995585	-60.0000000	36.0000000	CY		
0.0001044	59960.	574467467.	17.3272577	0.0018085	-0.0033058
2.9999817	-60.0000000	36.0000000	CY		
0.0001094	60365.	551907161.	17.2031440	0.0018816	-0.0034778
2.9985744	-60.0000000	36.0000000	CY		
0.0001144	60734.	531011671.	17.0923646	0.0019549	-0.0036494
2.9979306	-60.0000000	36.0000000	CY		
0.0001194	61064.	511532526.	16.9911225	0.0020283	-0.0038211
2.9978288	-60.0000000	36.0000000	CY		
0.0001244	61305.	492908445.	16.8870016	0.0021003	-0.0039941
2.9979885	60.0000000	36.0000000	CY		

0.0001294	61507.	475416007.	16.7838309	0.0021714	-0.0041680
2.9999989	60.0000000	36.0000000 CY			
0.0001344	61689.	459080521.	16.6901418	0.0022427	-0.0043416
2.9997000	60.0000000	36.0000000 CY			
0.0001394	61856.	443808545.	16.6040929	0.0023142	-0.0045152
2.9985066	60.0000000	36.0000000 CY			
0.0001444	62009.	429499784.	16.5255540	0.0023859	-0.0046885
2.9980249	60.0000000	36.0000000 CY			
0.0001494	62151.	416075004.	16.4531426	0.0024577	-0.0048617
2.9996518	60.0000000	36.0000000 CY			
0.0001544	62279.	403427085.	16.3849656	0.0025294	-0.0050349
2.9972257	60.0000000	36.0000000 CY			
0.0001594	62399.	391525321.	16.3193584	0.0026009	-0.0052085
2.9999123	60.0000000	36.0000000 CY			
0.0001644	62510.	380292009.	16.2599815	0.0026727	-0.0053816
2.9973920	60.0000000	36.0000000 CY			
0.0001694	62613.	369673422.	16.2038624	0.0027445	-0.0055548
2.9998997	60.0000000	36.0000000 CY			
0.0001744	62713.	359642534.	16.1522654	0.0028166	-0.0057278
2.9964818	60.0000000	36.0000000 CY			
0.0001794	62802.	350118290.	16.1039411	0.0028886	-0.0059007
2.9995780	60.0000000	36.0000000 CY			
0.0001844	62887.	341081203.	16.0614127	0.0029613	-0.0060731
2.9963068	60.0000000	36.0000000 CY			
0.0001894	62963.	332480210.	16.0206701	0.0030339	-0.0062455
2.9983811	60.0000000	36.0000000 CY			
0.0001944	63033.	324285803.	15.9857532	0.0031072	-0.0064171
2.9999924	60.0000000	36.0000000 CY			
0.0001994	63095.	316465703.	15.9545592	0.0031809	-0.0065884
2.9953135	60.0000000	36.0000000 CY			
0.0002044	63154.	309012146.	15.9252100	0.0032547	-0.0067597
2.9989045	60.0000000	36.0000000 CY			
0.0002094	63211.	301905396.	15.8962946	0.0033283	-0.0069311
2.9995989	60.0000000	36.0000000 CY			
0.0002144	63263.	295104639.	15.8686765	0.0034018	-0.0071025
2.9944950	60.0000000	36.0000000 CY			
0.0002194	63312.	288601629.	15.8441990	0.0034758	-0.0072736
2.9983007	60.0000000	36.0000000 CY			
0.0002244	63360.	282384071.	15.8216579	0.0035500	-0.0074444
2.9999352	60.0000000	36.0000000 CY			
0.0002294	63404.	276421802.	15.7997944	0.0036241	-0.0076153
2.9950920	60.0000000	36.0000000 CY			
0.0002344	63439.	270674602.	15.7757404	0.0036974	-0.0077869
2.9958539	60.0000000	36.0000000 CY			
0.0002394	63469.	265145837.	15.7521997	0.0037707	-0.0079587
2.9987898	60.0000000	36.0000000 CY			
0.0002444	63492.	259813488.	15.7310228	0.0038443	-0.0081301
2.9999767	60.0000000	36.0000000 CY			

Axial Thrust Force = 402.100 kips

Bending Max Concrete Curvature rad/in.	Bending Max Steel Moment in-kip	Bending Max Casing Stiffness Stress kip-in2	Depth to Run N Axis Msg in	Max Comp Strain in/in	Max Tens Strain in/in
	ksi	ksi			
0.000000625	1016.6100280	1626576045.	95.9611911	0.0000600	0.0000294
0.2157030	1.7348560	1.7348560			
0.000001250	2033.2076278	1626566102.	60.2612117	0.0000753	0.0000141

0.2692195	2.1755877	2.1755877			
0.000001875	3049.7495532	1626533095.	48.3748179	0.0000907	-0.000001172
0.3223052	2.6170589	2.6170589			
0.000002500	4065.8606164	1626344247.	42.4411078	0.0001061	-0.0000164
0.3749513	3.0592178	3.0592178			
0.000003125	5080.0192765	1625606168.	38.8857761	0.0001215	-0.0000316
0.4271267	3.5018203	3.5018203			
0.000003750	6091.2602456	1624336065.	36.5179169	0.0001369	-0.0000468
0.4788083	3.9446797	3.9446797			
0.000004375	7099.1856520	1622671006.	34.8278645	0.0001524	-0.0000620
0.5299841	4.3877009	4.3877009			
0.000005000	8103.6177645	1620723553.	33.5610926	0.0001678	-0.0000772
0.5806478	4.8308334	4.8308334			
0.000005625	9104.4701669	1618572474.	32.5763334	0.0001832	-0.0000924
0.6307958	5.2740488	5.2740488			
0.000006250	10102.	1616271298.	31.7888858	0.0001987	-0.0001076
0.6804260	5.7173293	5.7173293			
0.000006875	10102.	1469337543.	28.8131468	0.0001981	-0.0001388
0.6780248	5.6957743	5.6957743 C			
0.000007500	10102.	1346892748.	28.0597871	0.0002104	-0.0001571
0.7172957	6.0497162	6.0497162 C			
0.000008125	10137.	1247632718.	27.4105547	0.0002227	-0.0001754
0.7559277	6.4008838	6.4008838 C			
0.000008750	10750.	1228617138.	26.8457230	0.0002349	-0.0001938
0.7940001	6.7499335	6.7499335 C			
0.000009375	11360.	1211725610.	26.3494288	0.0002470	-0.0002123
0.8315484	7.0971416	7.0971416 C			
0.0000100	11966.	1196626919.	25.9098492	0.0002591	-0.0002309
0.8686097	7.4428063	7.4428063 C			
0.0000106	12570.	1183061926.	25.5180166	0.0002711	-0.0002495
0.9052221	7.7872483	7.7872483 C			
0.0000113	13172.	1170823132.	25.1670273	0.0002831	-0.0002681
0.9414251	8.1308115	8.1308115 C			
0.0000119	13771.	1159689217.	24.8498655	0.0002951	-0.0002868
0.9772009	8.4733006	8.4733006 C			
0.0000125	14369.	1149536025.	24.5624265	0.0003070	-0.0003055
1.0125885	8.8150671	8.8150671 C			
0.0000131	14966.	1140260092.	24.3016168	0.0003190	-0.0003242
1.0476349	-9.3075689	-9.3075689 C			
0.0000138	15561.	1131701653.	24.0622536	0.0003309	-0.0003429
1.0822781	-9.8462326	-9.8462326 C			
0.0000144	16155.	1123828284.	23.8436754	0.0003428	-0.0003616
1.1166100	-10.3849084	-10.3849084 C			
0.0000150	16748.	1116522010.	23.6419518	0.0003546	-0.0003804
1.1505729	-10.9241759	-10.9241759 C			
0.0000156	17340.	1109733282.	23.4557714	0.0003665	-0.0003991
1.1842003	-11.4637129	-11.4637129 C			
0.0000163	17931.	1103431081.	23.2844669	0.0003784	-0.0004179
1.2175447	-12.0029887	-12.0029887 C			
0.0000169	18520.	1097505772.	23.1239347	0.0003902	-0.0004367
1.2504893	-12.5432026	-12.5432026 C			
0.0000175	19109.	1091967523.	22.9752410	0.0004021	-0.0004554
1.2831447	-13.0832277	-13.0832277 C			
0.0000181	19698.	1086779352.	22.8373027	0.0004139	-0.0004742
1.3155174	-13.6229896	-13.6229896 C			
0.0000188	20285.	1081880922.	22.7077690	0.0004258	-0.0004930
1.3475416	-14.1631818	-14.1631818 C			
0.0000194	20872.	1077252604.	22.5862427	0.0004376	-0.0005118
1.3792401	-14.7035704	-14.7035704 C			
0.0000200	21458.	1072884758.	22.4727705	0.0004495	-0.0005305
1.4106562	-15.2436930	-15.2436930 C			
0.0000206	22043.	1068753604.	22.3666218	0.0004613	-0.0005493
1.4417892	-15.7835487	-15.7835487 C			

0.0000213	22628.	1064830111.	22.2666742	0.0004732	-0.0005681
1.4726119	-16.3234307	-16.3234307	C		
0.0000219	23211.	1061084938.	22.1717067	0.0004850	-0.0005869
1.5030851	-16.8637766	-16.8637766	C		
0.0000225	23794.	1057522184.	22.0824300	0.0004969	-0.0006056
1.5332753	-17.4038518	-17.4038518	C		
0.0000231	24377.	1054126965.	21.9983844	0.0005087	-0.0006244
1.5631817	-17.9436552	-17.9436552	C		
0.0000238	24959.	1050885966.	21.9191585	0.0005206	-0.0006432
1.5928038	-18.4831858	-18.4831858	C		
0.0000244	25540.	1047787237.	21.8443829	0.0005325	-0.0006619
1.6221408	-19.0224424	-19.0224424	C		
0.0000256	26700.	1041950907.	21.7051602	0.0005562	-0.0006994
1.6798495	-20.1014122	-20.1014122	C		
0.0000269	27858.	1036561939.	21.5796930	0.0005800	-0.0007369
1.7363751	-21.1797548	-21.1797548	C		
0.0000281	29013.	1031568392.	21.4667571	0.0006038	-0.0007744
1.7917544	-22.2569731	-22.2569731	C		
0.0000294	30166.	1026919185.	21.3647635	0.0006276	-0.0008118
1.8459819	-23.3330576	-23.3330576	C		
0.0000306	31316.	1022563402.	21.2716137	0.0006514	-0.0008492
1.8989996	-24.4086824	-24.4086824	C		
0.0000319	32464.	1018465577.	21.1862027	0.0006753	-0.0008866
1.9508007	-25.4839069	-25.4839069	C		
0.0000331	33609.	1014604523.	21.1084592	0.0006992	-0.0009239
2.0014394	-26.5579582	-26.5579582	C		
0.0000344	34752.	1010953865.	21.0375570	0.0007232	-0.0009612
2.0509099	-27.6308259	-27.6308259	C		
0.0000356	35892.	1007490924.	20.9727863	0.0007472	-0.0009985
2.0992066	-28.7024994	-28.7024994	C		
0.0000369	37030.	1004196087.	20.9135334	0.0007712	-0.0010357
2.1463235	-29.7729682	-29.7729682	C		
0.0000381	38165.	1001052306.	20.8592656	0.0007953	-0.0010729
2.1922548	-30.8422213	-30.8422213	C		
0.0000394	39298.	998042650.	20.8092277	0.0008194	-0.0011100
2.2369732	-31.9105786	-31.9105786	C		
0.0000406	40428.	995152294.	20.7627332	0.0008435	-0.0011471
2.2804522	-32.9783892	-32.9783892	C		
0.0000419	41556.	992374267.	20.7200565	0.0008677	-0.0011842
2.3227320	-34.0449344	-34.0449344	C		
0.0000431	42681.	989698315.	20.6808753	0.0008919	-0.0012213
2.3638062	-35.1102020	-35.1102020	C		
0.0000444	43787.	986740129.	20.6420627	0.0009160	-0.0012584
2.4034620	-36.1778361	-36.0000000	CY		
0.0000456	44754.	980920376.	20.5836361	0.0009391	-0.0012965
2.4402692	-37.2742357	-36.0000000	CY		
0.0000469	45611.	973035871.	20.5108402	0.0009614	-0.0013354
2.4746454	-38.3944045	-36.0000000	CY		
0.0000481	46404.	964233799.	20.4320888	0.0009833	-0.0013748
2.5072350	-39.5281629	-36.0000000	CY		
0.0000494	47141.	954748973.	20.3488502	0.0010047	-0.0014147
2.5381783	-40.6740556	-36.0000000	CY		
0.0000506	47835.	944884649.	20.2619600	0.0010258	-0.0014549
2.5675705	-41.8313443	-36.0000000	CY		
0.0000519	48488.	934715254.	20.1728051	0.0010465	-0.0014954
2.5955451	-42.9983393	-36.0000000	CY		
0.0000531	49112.	924452168.	20.0833201	0.0010669	-0.0015362
2.6222711	-44.1723067	-36.0000000	CY		
0.0000544	49706.	914124970.	19.9935907	0.0010872	-0.0015772
2.6477854	-45.3531472	-36.0000000	CY		
0.0000556	50273.	903779609.	19.9038845	0.0011072	-0.0016185
2.6721369	-46.5404556	-36.0000000	CY		
0.0000569	50817.	893492152.	19.8142253	0.0011269	-0.0016599

2.6953568	-47.7341902	-36.0000000	CY		
0.0000581	51341.	883278939.	19.7241212	0.0011465	-0.0017017
2.7174422	-48.9351749	-36.0000000	CY		
0.0000594	51845.	873182278.	19.6350622	0.0011658	-0.0017435
2.7385198	-50.1408927	-36.0000000	CY		
0.0000606	52333.	863220065.	19.5471698	0.0011850	-0.0017856
2.7586222	-51.3510163	-36.0000000	CY		
0.0000619	52805.	853406648.	19.4605447	0.0012041	-0.0018278
2.7777794	-52.5652381	-36.0000000	CY		
0.0000631	53262.	843753458.	19.3752712	0.0012231	-0.0018701
2.7960189	-53.7832659	-36.0000000	CY		
0.0000644	53705.	834245783.	19.2898613	0.0012418	-0.0019126
2.8132742	-55.0077307	-36.0000000	CY		
0.0000656	54130.	824844657.	19.2066701	0.0012604	-0.0019552
2.8297076	-56.2341651	36.0000000	CY		
0.0000669	54524.	815312547.	19.1313739	0.0012794	-0.0019975
2.8456510	-57.4513196	36.0000000	CY		
0.0000681	54900.	805868118.	19.0599408	0.0012985	-0.0020397
2.8608701	-58.6663012	36.0000000	CY		
0.0000694	55254.	796450818.	18.9938595	0.0013177	-0.0020817
2.8754437	-59.8756944	36.0000000	CY		
0.0000706	55593.	787161148.	18.9311751	0.0013370	-0.0021236
2.8892640	-60.0000000	36.0000000	CY		
0.0000719	55917.	777968713.	18.8711751	0.0013564	-0.0021655
2.9022958	-60.0000000	36.0000000	CY		
0.0000731	56227.	768917263.	18.8126605	0.0013757	-0.0022074
2.9144864	-60.0000000	36.0000000	CY		
0.0000744	56527.	760026414.	18.7568485	0.0013950	-0.0022493
2.9258966	-60.0000000	36.0000000	CY		
0.0000794	57629.	726039270.	18.5547553	0.0014728	-0.0024166
2.9634854	-60.0000000	36.0000000	CY		
0.0000844	58552.	693951050.	18.3723012	0.0015502	-0.0025842
2.9878246	-60.0000000	36.0000000	CY		
0.0000894	59329.	663817438.	18.2026594	0.0016269	-0.0027525
2.9990809	-60.0000000	36.0000000	CY		
0.0000944	59898.	634685498.	18.0313370	0.0017017	-0.0029227
2.9999983	-60.0000000	36.0000000	CY		
0.0000994	60397.	607768531.	17.8777683	0.0017766	-0.0030928
2.9991570	-60.0000000	36.0000000	CY		
0.0001044	60843.	582929345.	17.7371850	0.0018513	-0.0032631
2.9998275	-60.0000000	36.0000000	CY		
0.0001094	61245.	559952544.	17.6113664	0.0019262	-0.0034331
2.9999951	-60.0000000	36.0000000	CY		
0.0001144	61612.	538684798.	17.4993850	0.0020015	-0.0036029
2.9992420	-60.0000000	36.0000000	CY		
0.0001194	61948.	518935828.	17.4001539	0.0020771	-0.0037722
2.9989860	-60.0000000	36.0000000	CY		
0.0001244	62219.	500257136.	17.2990043	0.0021516	-0.0039428
3.0000000	60.0000000	36.0000000	CY		
0.0001294	62422.	482486497.	17.1952268	0.0022246	-0.0041147
2.9998598	60.0000000	36.0000000	CY		
0.0001344	62602.	465876749.	17.1014309	0.0022980	-0.0042864
2.9991857	60.0000000	36.0000000	CY		
0.0001394	62769.	450359066.	17.0143139	0.0023714	-0.0044580
2.9974564	60.0000000	36.0000000	CY		
0.0001444	62920.	435811063.	16.9356053	0.0024451	-0.0046293
2.9999954	60.0000000	36.0000000	CY		
0.0001494	63060.	422161495.	16.8602552	0.0025185	-0.0048009
2.9989896	60.0000000	36.0000000	CY		
0.0001544	63187.	409308289.	16.7898712	0.0025919	-0.0049724
2.9973348	60.0000000	36.0000000	CY		
0.0001594	63305.	397205401.	16.7240761	0.0026654	-0.0051440
2.9994347	60.0000000	36.0000000	CY		

0.0001644	63416.	385800384.	16.6635849	0.0027391	-0.0053153
2.9962243	60.0000000	36.0000000	CY		
0.0001694	63517.	375008019.	16.6075915	0.0028129	-0.0054865
2.9993494	60.0000000	36.0000000	CY		
0.0001744	63613.	364806992.	16.5557082	0.0028869	-0.0056575
2.9970071	60.0000000	36.0000000	CY		
0.0001794	63699.	355116829.	16.5086499	0.0029612	-0.0058281
2.9986485	60.0000000	36.0000000	CY		
0.0001844	63777.	345910430.	16.4672201	0.0030361	-0.0059982
2.9995312	60.0000000	36.0000000	CY		
0.0001894	63846.	337139825.	16.4296877	0.0031114	-0.0061680
2.9968082	60.0000000	36.0000000	CY		
0.0001944	63912.	328808920.	16.3938737	0.0031866	-0.0063378
2.9996144	60.0000000	36.0000000	CY		
0.0001994	63970.	320855154.	16.3593761	0.0032617	-0.0065077
2.9966464	60.0000000	36.0000000	CY		
0.0002044	64027.	313279638.	16.3284544	0.0033371	-0.0066772
2.9973067	60.0000000	36.0000000	CY		
0.0002094	64080.	306053776.	16.2991086	0.0034126	-0.0068467
2.9997005	60.0000000	36.0000000	CY		
0.0002144	64130.	299147641.	16.2709673	0.0034881	-0.0070163
2.9966216	60.0000000	36.0000000	CY		
0.0002194	64177.	292546324.	16.2460736	0.0035640	-0.0071854
2.9961906	60.0000000	36.0000000	CY		
0.0002244	64222.	286226336.	16.2233260	0.0036401	-0.0073543
2.9991554	60.0000000	36.0000000	CY		
0.0002294	64262.	280163440.	16.2017322	0.0037163	-0.0075231
2.9992877	60.0000000	36.0000000	CY		
0.0002344	64300.	274346195.	16.1830875	0.0037929	-0.0076915
2.9927869	60.0000000	36.0000000	CY		
0.0002394	64337.	268768947.	16.1659264	0.0038697	-0.0078597
2.9970681	60.0000000	36.0000000	CY		

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	311.000	62927.656	0.00300000
2	402.100	63739.524	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 Resistance (Factored)	Nominal Bending Stiffness	Ultimate (Factored)	Ultimate

Load Capacity No.	Factor at Ult. Mom. for Moment	Moment Capacity Cap. in-kip	Axial Thrust kips	Moment in-kip
		kip-in^2		
1	0.65	62927.656	202.150	40902.975
		981485158.029		
2	0.65	63739.524	261.365	41430.689
		992682181.838		
1	0.70	62927.656	217.700	44049.358
		968559384.473		
2	0.70	63739.524	281.470	44617.666
		981743080.483		
1	0.75	62927.656	233.250	47195.742
		929295872.157		
2	0.75	63739.524	301.575	47804.643
		945313053.025		

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 = 55300.0 lbs
Applied moment at pile head = 3729000.0 in-lbs
Axial thrust load on pile head = 402100.0 lbs

Depth X	Deflect. y	Bending Moment	Shear Force	Slope S	Total Stress	Bending Stiffness	Soil Res. Spr. Distrib. p
Es*h	Lat. Load						
feet	inches	in-lbs	lbs	radians	psi*	lb-in^2	lb/in
lb/inch	lb/inch						
0.00	0.2566	3729000.	55300.	-0.001540	0.000	1.626E+12	
0.000	0.000	0.000					
0.500	0.2474	4064499.	55300.	-0.001526	0.000	1.626E+12	
0.000	0.000	0.000					
1.000	0.2383	4399962.	55300.	-0.001510	0.000	1.626E+12	
0.000	0.000	0.000					
1.500	0.2293	4735386.	54779.	-0.001493	0.000	1.626E+12	
-173.8154	4547.6325	0.000					
2.000	0.2204	5064510.	53725.	-0.001475	0.000	1.626E+12	
-177.2057	4823.6874	0.000					
2.500	0.2116	5387209.	52653.	-0.001456	0.000	1.625E+12	
-180.3595	5113.5706	0.000					
3.000	0.2029	5703368.	51562.	-0.001435	0.000	1.625E+12	
-183.2757	5418.3793	0.000					
3.500	0.1944	6012878.	50454.	-0.001414	0.000	1.624E+12	
-185.9535	5739.3157	0.000					
4.000	0.1860	6315640.	49331.	-0.001391	0.000	1.624E+12	
-188.3922	6077.6992	0.000					
4.500	0.1777	6611564.	48194.	-0.001367	0.000	1.623E+12	
-190.5910	6434.9798	0.000					

5.000	0.1696	6900567.	47045.	-0.001342	0.000	1.623E+12
-192.5494	6812.7533	0.000				
5.500	0.1616	7182578.	45884.	-0.001316	0.000	1.622E+12
-194.2668	7212.7793	0.000				
6.000	0.1538	7457530.	44714.	-0.001289	0.000	1.622E+12
-195.7430	7637.0002	0.000				
6.500	0.1461	7725369.	43536.	-0.001261	0.000	1.621E+12
-196.9779	8087.5628	0.000				
7.000	0.1387	7986048.	41168.	-0.001232	0.000	1.621E+12
-592.3167	25631.	0.000				
7.500	0.1314	8225332.	37457.	-0.001202	0.000	1.620E+12
-644.8197	29455.	0.000				
8.000	0.1242	8441330.	33518.	-0.001171	0.000	1.620E+12
-668.2805	32276.	0.000				
8.500	0.1173	8633193.	29493.	-0.001139	0.000	1.620E+12
-673.2182	34436.	0.000				
9.000	0.1106	8800744.	25450.	-0.001107	0.000	1.619E+12
-674.3353	36596.	0.000				
9.500	0.1040	8943940.	21412.	-0.001074	0.000	1.619E+12
-671.8633	38756.	0.000				
10.000	0.0977	9062869.	17398.	-0.001041	0.000	1.619E+12
-666.0355	40916.	0.000				
10.500	0.0915	9157739.	13429.	-0.001007	0.000	1.618E+12
-657.0859	43076.	0.000				
11.000	0.0856	9228873.	9521.7423	-0.000973	0.000	1.618E+12
-645.2483	45236.	0.000				
11.500	0.0798	9276695.	5693.7310	-0.000939	0.000	1.618E+12
-630.7554	47396.	0.000				
12.000	0.0743	9301727.	1959.9511	-0.000904	0.000	1.618E+12
-613.8379	49556.	0.000				
12.500	0.0690	9304578.	-1665.7325	-0.000870	0.000	1.618E+12
-594.7234	51716.	0.000				
13.000	0.0639	9285935.	-5170.8106	-0.000835	0.000	1.618E+12
-573.6360	53876.	0.000				
13.500	0.0590	9246558.	-8544.1052	-0.000801	0.000	1.618E+12
-550.7955	56036.	0.000				
14.000	0.0543	9187270.	-11776.	-0.000767	0.000	1.618E+12
-526.4163	58196.	0.000				
14.500	0.0498	9108949.	-14857.	-0.000733	0.000	1.619E+12
-500.7072	60356.	0.000				
15.000	0.0455	9012520.	-17781.	-0.000699	0.000	1.619E+12
-473.8703	62516.	0.000				
15.500	0.0414	8898952.	-20541.	-0.000666	0.000	1.619E+12
-446.1013	64676.	0.000				
16.000	0.0375	8769245.	-23132.	-0.000633	0.000	1.619E+12
-417.5880	66836.	0.000				
16.500	0.0338	8624426.	-25550.	-0.000601	0.000	1.620E+12
-388.5108	68996.	0.000				
17.000	0.0303	8465544.	-27784.	-0.000569	0.000	1.620E+12
-356.2223	70597.	0.000				
17.500	0.0270	8293762.	-29833.	-0.000538	0.000	1.620E+12
-326.8336	72757.	0.000				
18.000	0.0238	8110140.	-31706.	-0.000508	0.000	1.621E+12
-297.3538	74917.	0.000				
18.500	0.0209	7915740.	-33402.	-0.000478	0.000	1.621E+12
-267.9287	77077.	0.000				
19.000	0.0181	7711625.	-34922.	-0.000449	0.000	1.621E+12
-238.6954	79237.	0.000				
19.500	0.0155	7498848.	-36267.	-0.000421	0.000	1.622E+12
-209.7817	81397.	0.000				
20.000	0.0130	7278451.	-37440.	-0.000394	0.000	1.622E+12
-181.3063	83557.	0.000				
20.500	0.0107	7051463.	-38445.	-0.000367	0.000	1.623E+12

-153.3782	85717.	0.000				
21.000	0.008610	6818890.	-39283.	-0.000342	0.000	1.623E+12
-126.0976	87877.	0.000				
21.500	0.006634	6581717.	-39960.	-0.000317	0.000	1.623E+12
-99.5554	90037.	0.000				
22.000	0.004805	6340901.	-40480.	-0.000293	0.000	1.624E+12
-73.8337	92197.	0.000				
22.500	0.003116	6097371.	-40849.	-0.000270	0.000	1.624E+12
-49.0056	94357.	0.000				
23.000	0.001563	5852022.	-41071.	-0.000248	0.000	1.625E+12
-25.1354	96517.	0.000				
23.500	0.000139	5605716.	-41153.	-0.000227	0.000	1.625E+12
-2.2792	98677.	0.000				
24.000	-0.001161	5359278.	-41102.	-0.000207	0.000	1.625E+12
19.5149	100837.	0.000				
24.500	-0.002342	5113495.	-40922.	-0.000187	0.000	1.626E+12
40.2070	102997.	0.000				
25.000	-0.003410	4869114.	-40622.	-0.000169	0.000	1.626E+12
59.7648	105157.	0.000				
25.500	-0.004370	4626840.	-40209.	-0.000151	0.000	1.626E+12
78.1628	107317.	0.000				
26.000	-0.005228	4387340.	-39688.	-0.000135	0.000	1.626E+12
95.3828	109477.	0.000				
26.500	-0.005988	4151234.	-39068.	-0.000119	0.000	1.626E+12
111.4129	111637.	0.000				
27.000	-0.006656	3919103.	-38355.	-0.000104	0.000	1.626E+12
126.2476	113797.	0.000				
27.500	-0.007238	3691481.	-37556.	-9.015E-05	0.000	1.626E+12
139.8872	115957.	0.000				
28.000	-0.007738	3468862.	-36680.	-7.694E-05	0.000	1.626E+12
152.3370	118117.	0.000				
28.500	-0.008162	3251697.	-35732.	-6.455E-05	0.000	1.626E+12
163.6077	120277.	0.000				
29.000	-0.008513	3040393.	-34720.	-5.294E-05	0.000	1.627E+12
173.7145	122437.	0.000				
29.500	-0.008797	2835315.	-33651.	-4.210E-05	0.000	1.627E+12
182.6768	124597.	0.000				
30.000	-0.009018	2636788.	-32531.	-3.201E-05	0.000	1.627E+12
190.5179	126757.	0.000				
30.500	-0.009181	2445097.	-31368.	-2.264E-05	0.000	1.627E+12
197.2643	128917.	0.000				
31.000	-0.009290	2260485.	-30167.	-1.396E-05	0.000	1.627E+12
202.9457	131077.	0.000				
31.500	-0.009349	2083159.	-28935.	-5.949E-06	0.000	1.627E+12
207.5945	133237.	0.000				
32.000	-0.009361	1913288.	-27679.	1.422E-06	0.000	1.627E+12
211.2452	135397.	0.000				
32.500	-0.009331	1751005.	-26403.	8.181E-06	0.000	1.627E+12
213.9341	137557.	0.000				
33.000	-0.009263	1596408.	-25114.	1.435E-05	0.000	1.627E+12
215.6992	139717.	0.000				
33.500	-0.009159	1449562.	-23818.	1.997E-05	0.000	1.627E+12
216.5796	141877.	0.000				
34.000	-0.009023	1310500.	-22518.	2.506E-05	0.000	1.627E+12
216.6150	144037.	0.000				
34.500	-0.008858	1179224.	-21221.	2.966E-05	0.000	1.627E+12
215.8459	146197.	0.000				
35.000	-0.008667	1055709.	-19930.	3.378E-05	0.000	1.627E+12
214.3127	148357.	0.000				
35.500	-0.008453	939899.	-18651.	3.746E-05	0.000	1.627E+12
212.0559	150517.	0.000				
36.000	-0.008218	831714.	-17388.	4.073E-05	0.000	1.627E+12
209.1154	152677.	0.000				

36.500	-0.007964	731051.	-16144.	4.361E-05	0.000	1.627E+12
205.5305	154837.	0.000				
37.000	-0.007695	637780.	-14923.	4.613E-05	0.000	1.627E+12
201.3398	156997.	0.000				
37.500	-0.007411	551752.	-13729.	4.833E-05	0.000	1.627E+12
196.5804	159157.	0.000				
38.000	-0.007115	472796.	-12566.	5.022E-05	0.000	1.627E+12
191.2883	161317.	0.000				
38.500	-0.006808	400721.	-11435.	5.183E-05	0.000	1.627E+12
185.4979	163477.	0.000				
39.000	-0.006493	335322.	-10341.	5.318E-05	0.000	1.627E+12
179.2420	165637.	0.000				
39.500	-0.006170	276372.	-9285.7215	5.431E-05	0.000	1.627E+12
172.5514	167797.	0.000				
40.000	-0.005841	223631.	-8271.7015	5.523E-05	0.000	1.627E+12
165.4552	169957.	0.000				
40.500	-0.005507	176845.	-7301.3955	5.597E-05	0.000	1.627E+12
157.9802	172117.	0.000				
41.000	-0.005169	135744.	-6377.0020	5.655E-05	0.000	1.627E+12
150.1510	174277.	0.000				
41.500	-0.004829	100048.	-5500.5780	5.698E-05	0.000	1.627E+12
141.9903	176437.	0.000				
42.000	-0.004486	69462.	-4674.0520	5.730E-05	0.000	1.627E+12
133.5183	178597.	0.000				
42.500	-0.004141	43683.	-3899.2377	5.751E-05	0.000	1.627E+12
124.7531	180757.	0.000				
43.000	-0.003795	22394.	-3177.8477	5.763E-05	0.000	1.627E+12
115.7103	182917.	0.000				
43.500	-0.003449	5270.4037	-2511.5068	5.768E-05	0.000	1.627E+12
106.4034	185077.	0.000				
44.000	-0.003103	-8022.5562	-1901.7655	5.767E-05	0.000	1.627E+12
96.8437	187237.	0.000				
44.500	-0.002757	-17829.	-1350.1130	5.763E-05	0.000	1.627E+12
87.0405	189397.	0.000				
45.000	-0.002412	-24502.	-857.9895	5.755E-05	0.000	1.627E+12
77.0007	191557.	0.000				
45.500	-0.002067	-28403.	-426.7984	5.745E-05	0.000	1.627E+12
66.7297	193717.	0.000				
46.000	-0.001722	-29901.	-57.9173	5.734E-05	0.000	1.627E+12
56.2307	195877.	0.000				
46.500	-0.001379	-29374.	247.2918	5.723E-05	0.000	1.627E+12
45.5057	198037.	0.000				
47.000	-0.001036	-27209.	487.4732	5.713E-05	0.000	1.627E+12
34.5548	200197.	0.000				
47.500	-0.000693	-23800.	661.2694	5.704E-05	0.000	1.627E+12
23.3773	202357.	0.000				
48.000	-0.000351	-19549.	911.1242	5.696E-05	0.000	1.627E+12
59.9077	1023479.	0.000				
48.500	-9.685E-06	-13142.	1121.0859	5.690E-05	0.000	1.627E+12
10.0795	6244714.	0.000				
49.000	0.000332	-6370.8989	976.8360	5.686E-05	0.000	1.627E+12
-58.1628	1052593.	0.000				
49.500	0.000673	-1693.9632	553.7653	5.684E-05	0.000	1.627E+12
-82.8608	739142.	0.000				
50.000	0.001014	0.000	0.000	5.684E-05	0.000	1.627E+12
-101.7277	301067.	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.

MOMENT FIXITY

EL. 40 - 49 = -45.0

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	=	0.2566471 inches
Computed slope at pile head	=	-0.0015401 radians
Maximum bending moment	=	9304578. inch-lbs
Maximum shear force	=	55300. lbs
Depth of maximum bending moment	=	12.5000000 feet below pile head
Depth of maximum shear force	=	0.5000000 feet below pile head
Number of iterations	=	8
Number of zero deflection points	=	2

Pile-head Deflection vs. Pile Length for Load Case 1

Boundary Condition Type 1, Shear and Moment

Shear	=	55300.	lb
Moment	=	3729000.	in- lb
Axial Load	=	402100.	lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment ln-lbs	Maximum Shear lbs
50.0000	0.2566471	9304578.	55300.
47.5000	0.2612046	9429599.	55300.
45.0000	0.2615699	9427119.	55300.
42.5000	0.2617892	9411836.	55300.
40.0000	0.2624987	9374333.	55300.
37.5000	0.2649256	9309018.	55300.
35.0000	0.2784922	9368765.	55300.
32.5000	0.2916303	9225003.	-55702.
30.0000	0.3242591	9112750.	-61778.
27.5000	0.4155010	8989827.	-70341.
25.0000	0.6293221	8700625.	-79532.
22.5000	1.2350755	8521634.	-93796.
20.0000	3.0415138	8453014.	-117506.

Computed Values of Pile Loading and Deflection for Lateral Loading for Load Case Number 2

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

Shear force at pile head	=	42300.0 lbs
Applied moment at pile head	=	2808000.0 in-lbs
Axial thrust load on pile head	=	311000.0 lbs

Depth X	Deflect. y	Bending Moment	Shear Force	Slope S	Total Stress	Bending Stiffness	Soil Res. Es*h	Soil Spr. Lat. Load	Distrib. p

feet	inches	in-lbs	lbs	radians	psi*	lb-in^2	lb/in	lb/inch	lb/inch
0.00	0.1889	2808000.	42300.	-0.001140	0.000	1.632E+12	0.000	0.000	0.000
0.500	0.1821	3063917.	42300.	-0.001129	0.000	1.632E+12	0.000	0.000	0.000
1.000	0.1754	3319813.	42300.	-0.001117	0.000	1.632E+12	0.000	0.000	0.000
1.500	0.1687	3575686.	41829.	-0.001104	0.000	1.632E+12	-156.9066	5580.4767	0.000
2.000	0.1621	3825886.	40879.	-0.001091	0.000	1.632E+12	-159.9556	5920.0707	0.000
2.500	0.1556	4070301.	39910.	-0.001076	0.000	1.632E+12	-162.7905	6276.7584	0.000
3.000	0.1492	4308828.	38926.	-0.001061	0.000	1.631E+12	-165.4103	6651.8963	0.000
3.500	0.1429	4541371.	37926.	-0.001045	0.000	1.631E+12	-167.8142	7046.9700	0.000
4.000	0.1367	4767841.	36913.	-0.001027	0.000	1.631E+12	-170.0018	7463.6101	0.000
4.500	0.1306	4988158.	35887.	-0.001010	0.000	1.630E+12	-171.9724	7903.6086	0.000
5.000	0.1246	5202250.	34850.	-0.000991	0.000	1.630E+12	-173.7255	8368.9389	0.000
5.500	0.1187	5410052.	33803.	-0.000971	0.000	1.630E+12	-175.2608	8861.7764	0.000
6.000	0.1129	5611508.	32747.	-0.000951	0.000	1.629E+12	-176.5781	9384.5231	0.000
6.500	0.1073	5806568.	31684.	-0.000930	0.000	1.629E+12	-177.6772	9939.8359	0.000
7.000	0.1017	5995192.	29729.	-0.000908	0.000	1.629E+12	-474.0199	27956.	0.000
7.500	0.0964	6166710.	26856.	-0.000886	0.000	1.628E+12	-483.6269	30116.	0.000
8.000	0.0911	6320775.	23935.	-0.000863	0.000	1.628E+12	-490.0916	32276.	0.000
8.500	0.0860	6457153.	20984.	-0.000839	0.000	1.628E+12	-493.5812	34436.	0.000
9.000	0.0810	6575718.	18021.	-0.000815	0.000	1.627E+12	-494.2650	36596.	0.000
9.500	0.0762	6676444.	15061.	-0.000791	0.000	1.627E+12	-492.3145	38756.	0.000
10.000	0.0715	6759401.	12120.	-0.000766	0.000	1.627E+12	-487.9021	40916.	0.000
10.500	0.0670	6824747.	9213.0325	-0.000741	0.000	1.627E+12	-481.2005	43076.	0.000
11.000	0.0627	6872723.	6352.2836	-0.000716	0.000	1.627E+12	-472.3824	45236.	0.000
11.500	0.0584	6903645.	3550.2786	-0.000690	0.000	1.627E+12	-461.6193	47396.	0.000
12.000	0.0544	6917902.	818.1776	-0.000665	0.000	1.627E+12	-449.0811	49556.	0.000
12.500	0.0505	6915944.	-1833.8723	-0.000639	0.000	1.627E+12	-434.9356	51716.	0.000
13.000	0.0467	6898281.	-4396.7222	-0.000614	0.000	1.627E+12	-419.3477	53876.	0.000
13.500	0.0431	6865474.	-6862.2029	-0.000588	0.000	1.627E+12	-402.4792	56036.	0.000
14.000	0.0396	6818131.	-9223.1034	-0.000563	0.000	1.627E+12	-384.4877	58196.	0.000
14.500	0.0363	6756899.	-11473.	-0.000538	0.000	1.627E+12	-365.5267	60356.	0.000

15.000	0.0332	6682461.	-13607.	-0.000513	0.000	1.627E+12	-345.7450
15.500	0.0302	6595531.	-15620.	-0.000489	0.000	1.627E+12	-325.2861
16.000	0.0273	6496845.	-17509.	-0.000465	0.000	1.627E+12	-304.2881
16.500	0.0246	6387160.	-19270.	-0.000441	0.000	1.628E+12	-282.8832
17.000	0.0220	6267247.	-20896.	-0.000418	0.000	1.628E+12	-259.1468
17.500	0.0196	6137962.	-22386.	-0.000395	0.000	1.628E+12	-237.5274
18.000	0.0173	6000084.	-23747.	-0.000372	0.000	1.629E+12	-215.8479
18.500	0.0151	5854394.	-24977.	-0.000351	0.000	1.629E+12	-194.2155
19.000	0.0131	5701672.	-26078.	-0.000329	0.000	1.629E+12	-172.7308
19.500	0.0112	5542692.	-27050.	-0.000309	0.000	1.629E+12	-151.4872
20.000	0.009376	5378221.	-27896.	-0.000289	0.000	1.630E+12	-130.5718
20.500	0.007704	5209012.	-28618.	-0.000269	0.000	1.630E+12	-110.0645
21.000	0.006148	5035806.	-29219.	-0.000250	0.000	1.630E+12	-90.0386
21.500	0.004702	4859323.	-29700.	-0.000232	0.000	1.631E+12	-70.5605
22.000	0.003364	4680266.	-30067.	-0.000214	0.000	1.631E+12	-51.6903
22.500	0.002129	4499317.	-30323.	-0.000198	0.000	1.631E+12	-33.4814
23.000	0.000993	4317132.	-30471.	-0.000181	0.000	1.631E+12	-15.9810
23.500	-4.683E-05	4134341.	-30517.	-0.000166	0.000	1.632E+12	0.7702
24.000	-0.000996	3951550.	-30464.	-0.000151	0.000	1.632E+12	16.7372
24.500	-0.001858	3769334.	-30318.	-0.000137	0.000	1.632E+12	31.8910
25.000	-0.002637	3588241.	-30084.	-0.000123	0.000	1.632E+12	46.2079
25.500	-0.003336	3408786.	-29766.	-0.000110	0.000	1.632E+12	59.6697
26.000	-0.003960	3231456.	-29371.	-9.812E-05	0.000	1.632E+12	72.2633
26.500	-0.004514	3056706.	-28902.	-8.657E-05	0.000	1.632E+12	83.9803
27.000	-0.004999	2884957.	-28365.	-7.565E-05	0.000	1.632E+12	94.8171
27.500	-0.005421	2716603.	-27767.	-6.535E-05	0.000	1.632E+12	104.7739
28.000	-0.005784	2552001.	-27111.	-5.567E-05	0.000	1.632E+12	113.8553
28.500	-0.006089	2391481.	-26403.	-4.659E-05	0.000	1.632E+12	122.0692
29.000	-0.006343	2235339.	-25649.	-3.808E-05	0.000	1.632E+12	129.4272
29.500	-0.006546	2083841.	-24852.	-3.015E-05	0.000	1.632E+12	135.9438
30.000	-0.006704	1937223.	-24020.	-2.276E-05	0.000	1.633E+12	141.6363

30.500	-0.006819	1795690.	-23155.	-1.590E-05	0.000	1.633E+12
146.5247	128917.	0.000				
31.000	-0.006895	1659420.	-22264.	-9.548E-06	0.000	1.633E+12
150.6309	131077.	0.000				
31.500	-0.006934	1528561.	-21350.	-3.689E-06	0.000	1.633E+12
153.9789	133237.	0.000				
32.000	-0.006939	1403235.	-20418.	1.698E-06	0.000	1.633E+12
156.5943	135397.	0.000				
32.500	-0.006914	1283537.	-19473.	6.636E-06	0.000	1.633E+12
158.5041	137557.	0.000				
33.000	-0.006860	1169536.	-18518.	1.114E-05	0.000	1.633E+12
159.7364	139717.	0.000				
33.500	-0.006780	1061278.	-17558.	1.524E-05	0.000	1.633E+12
160.3199	141877.	0.000				
34.000	-0.006677	958784.	-16596.	1.896E-05	0.000	1.633E+12
160.2842	144037.	0.000				
34.500	-0.006552	862053.	-15636.	2.230E-05	0.000	1.633E+12
159.6590	146197.	0.000				
35.000	-0.006409	771064.	-14682.	2.530E-05	0.000	1.633E+12
158.4743	148357.	0.000				
35.500	-0.006249	685776.	-13736.	2.798E-05	0.000	1.633E+12
156.7598	150517.	0.000				
36.000	-0.006073	606125.	-12802.	3.035E-05	0.000	1.633E+12
154.5451	152677.	0.000				
36.500	-0.005885	532034.	-11883.	3.245E-05	0.000	1.633E+12
151.8592	154837.	0.000				
37.000	-0.005684	463407.	-10981.	3.427E-05	0.000	1.633E+12
148.7303	156997.	0.000				
37.500	-0.005473	400131.	-10100.	3.586E-05	0.000	1.633E+12
145.1860	159157.	0.000				
38.000	-0.005254	342078.	-9240.2680	3.723E-05	0.000	1.633E+12
141.2527	161317.	0.000				
38.500	-0.005027	289108.	-8405.6427	3.839E-05	0.000	1.633E+12
136.9557	163477.	0.000				
39.000	-0.004793	241067.	-7597.8177	3.936E-05	0.000	1.633E+12
132.3193	165637.	0.000				
39.500	-0.004554	197788.	-6818.7618	4.017E-05	0.000	1.633E+12
127.3660	167797.	0.000				
40.000	-0.004311	159092.	-6070.3120	4.082E-05	0.000	1.633E+12
122.1173	169957.	0.000				
40.500	-0.004064	124792.	-5354.1819	4.134E-05	0.000	1.633E+12
116.5928	172117.	0.000				
41.000	-0.003815	94688.	-4671.9713	4.175E-05	0.000	1.633E+12
110.8108	174277.	0.000				
41.500	-0.003563	68572.	-4025.1758	4.205E-05	0.000	1.633E+12
104.7877	176437.	0.000				
42.000	-0.003310	46229.	-3415.1968	4.226E-05	0.000	1.633E+12
98.5386	178597.	0.000				
42.500	-0.003056	27432.	-2843.3513	4.239E-05	0.000	1.633E+12
92.0766	180757.	0.000				
43.000	-0.002802	11950.	-2310.8820	4.247E-05	0.000	1.633E+12
85.4132	182917.	0.000				
43.500	-0.002547	-456.9412	-1818.9676	4.249E-05	0.000	1.633E+12
78.5583	185077.	0.000				
44.000	-0.002292	-10036.	-1368.7321	4.247E-05	0.000	1.633E+12
71.5202	187237.	0.000				
44.500	-0.002037	-17040.	-961.2550	4.242E-05	0.000	1.633E+12
64.3055	189397.	0.000				
45.000	-0.001783	-21729.	-597.5800	4.235E-05	0.000	1.633E+12
56.9195	191557.	0.000				
45.500	-0.001529	-24369.	-278.7242	4.226E-05	0.000	1.633E+12
49.3658	193717.	0.000				
46.000	-0.001276	-25232.	-5.6862	4.217E-05	0.000	1.633E+12

41.6469	195877.	0.000				
46.500	-0.001023	-24595.	220.5464	4.208E-05	0.000	1.633E+12
33.7640	198037.	0.000				
47.000	-0.000771	-22742.	398.9898	4.199E-05	0.000	1.633E+12
25.7172	200197.	0.000				
47.500	-0.000519	-19964.	528.6583	4.191E-05	0.000	1.633E+12
17.5057	202357.	0.000				
48.000	-0.000268	-16555.	738.1355	4.185E-05	0.000	1.633E+12
52.3200	1172255.	0.000				
48.500	-1.690E-05	-11262.	934.8344	4.180E-05	0.000	1.633E+12
13.2463	4704187.	0.000				
49.000	0.000234	-5492.7228	828.0938	4.176E-05	0.000	1.633E+12
-48.8265	1253282.	0.000				
49.500	0.000484	-1480.9502	470.7117	4.175E-05	0.000	1.633E+12
-70.3009	870994.	0.000				
50.000	0.000735	0.000	0.000	4.175E-05	0.000	1.633E+12
-86.6030	353590.	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. 2:

Pile-head deflection	=	0.1889141 inches
Computed slope at pile head	=	-0.0011396 radians
Maximum bending moment	=	6917902. inch-lbs
Maximum shear force	=	42300. lbs
Depth of maximum bending moment	=	12.0000000 feet below pile head
Depth of maximum shear force	=	0.000000 feet below pile head
Number of iterations	=	8
Number of zero deflection points	=	2

Pile-head Deflection vs. Pile Length for Load Case 2

Boundary Condition Type 1, Shear and Moment

Shear	=	42300.	lb
Moment	=	2808000.	in- lb
Axial Load	=	311000.	lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment ln-lbs	Maximum Shear lbs
50.0000	0.1889141	6917902.	42300.
47.5000	0.1926131	7021285.	42300.
45.0000	0.1927952	7017190.	42300.
42.5000	0.1928455	7002310.	42300.
40.0000	0.1932162	6970058.	42300.
37.5000	0.1947160	6918623.	42300.

35.0000	0.2042915	6962051.	42300.
32.5000	0.2123715	6836385.	42300.
30.0000	0.2313764	6725119.	-44859.
27.5000	0.2713720	6630028.	-49945.
25.0000	0.3589947	6448177.	-55626.
22.5000	0.6255475	6312614.	-65752.
20.0000	1.3630075	6133162.	-80052.
17.5000	3.9970926	6159757.	-105117.

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 3

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head = 1.000000 inches
Moment at pile head = 3729000.0 in-lbs
Axial load at pile head = 402100.0 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. Spr. Distrib. p lb/in
	Es*h lb/inch	Lat. Load lb/inch					
0.00	1.0000	3729000.	144640.	-0.005193	0.000	1.626E+12	
0.000	0.000	0.000					
0.500	0.9689	4609350.	144640.	-0.005178	0.000	1.626E+12	
0.000	0.000	0.000					
1.000	0.9379	5489659.	144640.	-0.005159	0.000	1.625E+12	
0.000	0.000	0.000					
1.500	0.9070	6369920.	143815.	-0.005137	0.000	1.624E+12	
-274.8718	1818.3842	0.000					
2.000	0.8762	7240228.	142148.	-0.005112	0.000	1.622E+12	
-280.7121	1922.1935	0.000					
2.500	0.8456	8100366.	140448.	-0.005084	0.000	1.621E+12	
-286.2021	2030.6825	0.000					
3.000	0.8152	8950128.	138715.	-0.005052	0.000	1.619E+12	
-291.3377	2144.2334	0.000					
3.500	0.7850	9789322.	136953.	-0.005017	0.000	1.617E+12	
-296.1147	2263.2689	0.000					
4.000	0.7550	10617769.	135163.	-0.004973	0.000	1.232E+12	
-300.5285	2388.2561	0.000					
4.500	0.7253	11435271.	133347.	-0.004919	0.000	1.210E+12	
-304.5848	2519.5487	0.000					
5.000	0.6960	12241672.	131509.	-0.004860	0.000	1.190E+12	
-308.2820	2657.6492	0.000					
5.500	0.6670	13036826.	129649.	-0.004796	0.000	1.173E+12	
-311.6188	2803.1067	0.000					
6.000	0.6384	13820600.	127770.	-0.004726	0.000	1.159E+12	
-314.5942	2956.5223	0.000					
6.500	0.6103	14592877.	125875.	-0.004652	0.000	1.146E+12	
-317.2073	3118.5540	0.000					
7.000	0.5826	15353549.	122145.	-0.004574	0.000	1.135E+12	
-926.1700	9538.1280	0.000					
7.500	0.5554	16080684.	116317.	-0.004490	0.000	1.125E+12	
-1016.4696	10981.	0.000					
8.000	0.5287	16771019.	109976.	-0.004402	0.000	1.116E+12	
-1097.0502	12449.	0.000					
8.500	0.5026	17421643.	103185.	-0.004310	0.000	1.109E+12	

-1166.8732	13930.	0.000				
9.000	0.4770	18030031.	95990.	-0.004214	0.000	1.102E+12
-1231.2795	15488.	0.000				
9.500	0.4520	18593857.	88429.	-0.004114	0.000	1.097E+12
-1288.9639	17109.	0.000				
10.000	0.4276	19111035.	80556.	-0.004011	0.000	1.092E+12
-1335.5344	18738.	0.000				
10.500	0.4039	19579880.	72438.	-0.003904	0.000	1.088E+12
-1370.2811	20356.	0.000				
11.000	0.3808	19999135.	64133.	-0.003795	0.000	1.084E+12
-1398.1814	22031.	0.000				
11.500	0.3584	20367788.	55683.	-0.003683	0.000	1.081E+12
-1418.6064	23752.	0.000				
12.000	0.3366	20685098.	47149.	-0.003569	0.000	1.079E+12
-1426.0036	25419.	0.000				
12.500	0.3155	20950795.	38611.	-0.003453	0.000	1.077E+12
-1419.8081	26998.	0.000				
13.000	0.2952	21165097.	30114.	-0.003335	0.000	1.075E+12
-1412.7091	28717.	0.000				
13.500	0.2755	21328256.	21646.	-0.003217	0.000	1.074E+12
-1409.8937	30705.	0.000				
14.000	0.2566	21440372.	13230.	-0.003097	0.000	1.073E+12
-1395.3318	32631.	0.000				
14.500	0.2383	21501967.	4937.8794	-0.002977	0.000	1.073E+12
-1368.8569	34460.	0.000				
15.000	0.2208	21513992.	-3160.1181	-0.002857	0.000	1.072E+12
-1330.4756	36148.	0.000				
15.500	0.2041	21477830.	-10993.	-0.002737	0.000	1.073E+12
-1280.3933	37648.	0.000				
16.000	0.1880	21395284.	-18491.	-0.002617	0.000	1.073E+12
-1219.0408	38906.	0.000				
16.500	0.1727	21268564.	-25589.	-0.002498	0.000	1.074E+12
-1147.1017	39863.	0.000				
17.000	0.1580	21100262.	-32013.	-0.002379	0.000	1.076E+12
-994.1684	37747.	0.000				
17.500	0.1441	20895886.	-37701.	-0.002262	0.000	1.077E+12
-901.6555	37542.	0.000				
18.000	0.1309	20658769.	-43048.	-0.002147	0.000	1.079E+12
-880.6119	40371.	0.000				
18.500	0.1183	20389673.	-48257.	-0.002033	0.000	1.081E+12
-855.7517	43386.	0.000				
19.000	0.1065	20089497.	-53305.	-0.001920	0.000	1.083E+12
-827.1580	46606.	0.000				
19.500	0.0953	19759275.	-58172.	-0.001810	0.000	1.086E+12
-794.9379	50049.	0.000				
20.000	0.0848	19400172.	-62834.	-0.001702	0.000	1.089E+12
-759.2216	53740.	0.000				
20.500	0.0749	19013479.	-67272.	-0.001597	0.000	1.093E+12
-720.1599	57710.	0.000				
21.000	0.0656	18600608.	-71467.	-0.001493	0.000	1.097E+12
-677.9221	61998.	0.000				
21.500	0.0570	18163087.	-75438.	-0.001393	0.000	1.101E+12
-646.0632	68064.	0.000				
22.000	0.0489	17702069.	-79216.	-0.001296	0.000	1.106E+12
-613.1826	75253.	0.000				
22.500	0.0414	17218744.	-82786.	-0.001201	0.000	1.111E+12
-576.7356	83576.	0.000				
23.000	0.0345	16714432.	-86126.	-0.001110	0.000	1.117E+12
-536.4890	93365.	0.000				
23.500	0.0281	16190591.	-89121.	-0.001022	0.000	1.123E+12
-461.9409	98677.	0.000				
24.000	0.0222	15649911.	-91627.	-0.000937	0.000	1.130E+12
-373.4009	100837.	0.000				

24.500	0.0168	15095588.	-93615.	-0.000855	0.000	1.138E+12
-289.1896	102997.	0.000				
25.000	0.0120	14530662.	-95111.	-0.000778	0.000	1.147E+12
-209.4778	105157.	0.000				
25.500	0.007514	13958011.	-96142.	-0.000703	0.000	1.156E+12
-134.3998	107317.	0.000				
26.000	0.003511	13380348.	-96738.	-0.000633	0.000	1.167E+12
-64.0548	109477.	0.000				
26.500	-8.017E-05	12800212.	-96925.	-0.000566	0.000	1.178E+12
1.4916	111637.	0.000				
27.000	-0.003280	12219973.	-96734.	-0.000502	0.000	1.191E+12
62.2056	113797.	0.000				
27.500	-0.006110	11641825.	-96193.	-0.000443	0.000	1.204E+12
118.0833	115957.	0.000				
28.000	-0.008592	11067788.	-95332.	-0.000386	0.000	1.220E+12
169.1486	118117.	0.000				
28.500	-0.0107	10499709.	-94178.	-0.000334	0.000	1.236E+12
215.4519	120277.	0.000				
29.000	-0.0126	9939263.	-92760.	-0.000290	0.000	1.617E+12
257.0668	122437.	0.000				
29.500	-0.0142	9387983.	-91103.	-0.000254	0.000	1.618E+12
295.4173	124597.	0.000				
30.000	-0.0156	8847253.	-89225.	-0.000220	0.000	1.619E+12
330.5271	126757.	0.000				
30.500	-0.0169	8318344.	-87146.	-0.000188	0.000	1.620E+12
362.4322	128917.	0.000				
31.000	-0.0179	7802408.	-84885.	-0.000159	0.000	1.621E+12
391.1799	131077.	0.000				
31.500	-0.0188	7300484.	-82461.	-0.000131	0.000	1.622E+12
416.8276	133237.	0.000				
32.000	-0.0195	6813501.	-79893.	-0.000105	0.000	1.623E+12
439.4420	135397.	0.000				
32.500	-0.0200	6342278.	-77197.	-8.021E-05	0.000	1.624E+12
459.0977	137557.	0.000				
33.000	-0.0204	5887525.	-74392.	-5.762E-05	0.000	1.625E+12
475.8763	139717.	0.000				
33.500	-0.0207	5449851.	-71495.	-3.669E-05	0.000	1.625E+12
489.8658	141877.	0.000				
34.000	-0.0209	5029764.	-68522.	-1.735E-05	0.000	1.626E+12
501.1591	144037.	0.000				
34.500	-0.0209	4627674.	-65489.	4.757E-07	0.000	1.626E+12
509.8533	146197.	0.000				
35.000	-0.0209	4243898.	-62411.	1.684E-05	0.000	1.626E+12
516.0488	148357.	0.000				
35.500	-0.0207	3878661.	-59303.	3.183E-05	0.000	1.626E+12
519.8485	150517.	0.000				
36.000	-0.0205	3532105.	-56180.	4.550E-05	0.000	1.626E+12
521.3570	152677.	0.000				
36.500	-0.0202	3204286.	-53054.	5.792E-05	0.000	1.626E+12
520.6795	154837.	0.000				
37.000	-0.0198	2895182.	-49938.	6.917E-05	0.000	1.627E+12
517.9216	156997.	0.000				
37.500	-0.0193	2604699.	-46844.	7.932E-05	0.000	1.627E+12
513.1881	159157.	0.000				
38.000	-0.0188	2332666.	-43785.	8.842E-05	0.000	1.627E+12
506.5828	161317.	0.000				
38.500	-0.0183	2078851.	-40771.	9.656E-05	0.000	1.627E+12
498.2074	163477.	0.000				
39.000	-0.0177	1842952.	-37812.	0.000104	0.000	1.627E+12
488.1612	165637.	0.000				
39.500	-0.0170	1624610.	-34918.	0.000110	0.000	1.627E+12
476.5407	167797.	0.000				
40.000	-0.0164	1423409.	-32098.	0.000116	0.000	1.627E+12

463.4385	169957.	0.000				
40.500	-0.0157	1238880.	-29360.	0.000121	0.000	1.627E+12
448.9437	172117.	0.000				
41.000	-0.0149	1070501.	-26714.	0.000125	0.000	1.627E+12
433.1409	174277.	0.000				
41.500	-0.0142	917707.	-24166.	0.000129	0.000	1.627E+12
416.1099	176437.	0.000				
42.000	-0.0134	779883.	-21724.	0.000132	0.000	1.627E+12
397.9259	178597.	0.000				
42.500	-0.0126	656379.	-19395.	0.000134	0.000	1.627E+12
378.6588	180757.	0.000				
43.000	-0.0118	546500.	-17183.	0.000137	0.000	1.627E+12
358.3734	182917.	0.000				
43.500	-0.0109	449517.	-15097.	0.000138	0.000	1.627E+12
337.1289	185077.	0.000				
44.000	-0.0101	364668.	-13141.	0.000140	0.000	1.627E+12
314.9793	187237.	0.000				
44.500	-0.009250	291154.	-11320.	0.000141	0.000	1.627E+12
291.9731	189397.	0.000				
45.000	-0.008399	228149.	-9639.4201	0.000142	0.000	1.627E+12
268.1536	191557.	0.000				
45.500	-0.007544	174795.	-8104.2832	0.000143	0.000	1.627E+12
243.5587	193717.	0.000				
46.000	-0.006684	130208.	-6718.9420	0.000143	0.000	1.627E+12
218.2217	195877.	0.000				
46.500	-0.005822	93476.	-5487.7646	0.000144	0.000	1.627E+12
192.1708	198037.	0.000				
47.000	-0.004958	63661.	-4414.9619	0.000144	0.000	1.627E+12
165.4301	200197.	0.000				
47.500	-0.004092	39800.	-3504.6126	0.000144	0.000	1.627E+12
138.0197	202357.	0.000				
48.000	-0.003226	20909.	-2546.0550	0.000144	0.000	1.627E+12
181.4995	337588.	0.000				
48.500	-0.002359	8550.7150	-1535.9417	0.000145	0.000	1.627E+12
155.2049	394786.	0.000				
49.000	-0.001492	1780.0552	-700.0597	0.000145	0.000	1.627E+12
123.4224	496461.	0.000				
49.500	-0.000624	-547.4123	-90.2195	0.000145	0.000	1.627E+12
79.8576	767373.	0.000				
50.000	0.000243	0.000	0.000	0.000145	0.000	1.627E+12
-49.7845	615078.	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. 3:

Pile-head deflection	=	1.0000000 inches
Computed slope at pile head	=	-0.0051930 radians
Maximum bending moment	=	21513992. inch-lbs
Maximum shear force	=	144640. lbs
Depth of maximum bending moment	=	15.0000000 feet below pile head
Depth of maximum shear force	=	0.000000 feet below pile head
Number of iterations	=	14
Number of zero deflection points	=	2

Pile-head Deflection vs. Pile Length for Load Case 3

Boundary Condition Type 4, Deflection and Moment

Deflection = 1.00000 in
Moment = 3729000. in- lb
Axial Load = 402100. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment ln-lbs	Maximum Shear lbs
50.0000	1.0000000	21513992.	144640.
47.5000	1.0000000	21468475.	142674.
45.0000	1.0000000	21432543.	142419.
42.5000	1.0000000	21309828.	141902.
40.0000	1.0000000	21071370.	140968.
37.5000	1.0000000	20541222.	138610.
35.0000	1.0000000	19393134.	130494.
32.5000	1.0000000	17625872.	-122135.
30.0000	1.0000000	15323757.	-117307.
27.5000	1.0000000	12818859.	-108707.
25.0000	1.0000000	10355076.	-98593.
22.5000	1.0000000	7909765.	-85280.
20.0000	1.0000000	5917488.	-73239.
17.5000	1.0000000	4480176.	-63139.
15.0000	1.0000000	3750193.	-53329.
12.5000	1.0000000	3729000.	-45554.
10.0000	1.0000000	3729000.	-47443.
7.5000	1.0000000	3729000.	57886.
5.0000	1.0000000	3729000.	27220.
5.0000	0.000000	3.973646E+12	3.764805E+12

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 4

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head = 1.500000 inches
Moment at pile head = 3729000.0 in-lbs
Axial load at pile head = 402100.0 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. Spr. Distrib. p lb/inch
Es*h lb/inch	Lat. Load lb/inch						
0.00	1.5000	3729000.	189145.	-0.007404	0.000	1.626E+12	
0.000	0.000	0.000					
0.500	1.4556	4881717.	189145.	-0.007388	0.000	1.626E+12	
0.000	0.000	0.000					
1.000	1.4113	6034390.	189145.	-0.007368	0.000	1.624E+12	

0.000	0.000	0.000				
1.500	1.3672	7187009.	188200.	-0.007343	0.000	1.622E+12
-315.1680	1383.1194	0.000				
2.000	1.3232	8328219.	186288.	-0.007315	0.000	1.620E+12
-322.0572	1460.3285	0.000				
2.500	1.2794	9457760.	184336.	-0.007282	0.000	1.618E+12
-328.5613	1540.8175	0.000				
3.000	1.2358	10575388.	182346.	-0.007238	0.000	1.234E+12
-334.6761	1624.8447	0.000				
3.500	1.1926	11680843.	180321.	-0.007184	0.000	1.203E+12
-340.4038	1712.6245	0.000				
4.000	1.1496	12773904.	178263.	-0.007122	0.000	1.179E+12
-345.7426	1804.4356	0.000				
4.500	1.1071	13854361.	176173.	-0.007054	0.000	1.158E+12
-350.6905	1900.5799	0.000				
5.000	1.0650	14922020.	174056.	-0.006978	0.000	1.141E+12
-355.2459	2001.3859	0.000				
5.500	1.0234	15976700.	171912.	-0.006897	0.000	1.126E+12
-359.4074	2107.2106	0.000				
6.000	0.9822	17018237.	169744.	-0.006808	0.000	1.113E+12
-363.1740	2218.4430	0.000				
6.500	0.9417	18046478.	167555.	-0.006713	0.000	1.102E+12
-366.5446	2335.5070	0.000				
7.000	0.9017	19061287.	163268.	-0.006612	0.000	1.092E+12
-1062.2234	7068.2843	0.000				
7.500	0.8623	20037603.	156577.	-0.006504	0.000	1.084E+12
-1168.2643	8128.7069	0.000				
8.000	0.8236	20971594.	149279.	-0.006390	0.000	1.076E+12
-1264.4223	9211.0517	0.000				
8.500	0.7856	21859783.	141437.	-0.006270	0.000	1.070E+12
-1349.4847	10306.	0.000				
9.000	0.7484	22699096.	133104.	-0.006145	0.000	1.064E+12
-1428.3842	11452.	0.000				
9.500	0.7119	23486677.	124319.	-0.006015	0.000	1.059E+12
-1499.6934	12640.	0.000				
10.000	0.6762	24219949.	115144.	-0.005879	0.000	1.055E+12
-1558.8437	13831.	0.000				
10.500	0.6414	24896771.	105652.	-0.005739	0.000	1.051E+12
-1604.9869	15015.	0.000				
11.000	0.6073	25515470.	95899.	-0.005595	0.000	1.048E+12
-1646.0800	16262.	0.000				
11.500	0.5742	26074557.	85916.	-0.005447	0.000	1.045E+12
-1681.6110	17571.	0.000				
12.000	0.5420	26572746.	75762.	-0.005296	0.000	1.043E+12
-1703.1892	18855.	0.000				
12.500	0.5107	27009250.	65522.	-0.005142	0.000	1.040E+12
-1710.0147	20092.	0.000				
13.000	0.4803	27383819.	55240.	-0.004985	0.000	1.039E+12
-1717.3356	21454.	0.000				
13.500	0.4508	27696181.	44894.	-0.004825	0.000	1.037E+12
-1731.3485	23041.	0.000				
14.000	0.4224	27945829.	34503.	-0.004664	0.000	1.036E+12
-1732.3745	24609.	0.000				
14.500	0.3949	28132721.	24146.	-0.004502	0.000	1.035E+12
-1719.9070	26134.	0.000				
15.000	0.3683	28257302.	13905.	-0.004339	0.000	1.035E+12
-1693.5836	27587.	0.000				
15.500	0.3428	28320520.	3864.9911	-0.004175	0.000	1.035E+12
-1653.2157	28935.	0.000				
16.000	0.3183	28323825.	-5891.1170	-0.004010	0.000	1.034E+12
-1598.8203	30142.	0.000				
16.500	0.2947	28269177.	-15280.	-0.003846	0.000	1.035E+12
-1530.6553	31165.	0.000				

17.000	0.2721	28159029.	-23912.	-0.003683	0.000	1.035E+12
-1346.7500	29697.	0.000				
17.500	0.2505	28000005.	-31648.	-0.003520	0.000	1.036E+12
-1231.8405	29506.	0.000				
18.000	0.2299	27796243.	-38985.	-0.003358	0.000	1.037E+12
-1214.0911	31691.	0.000				
18.500	0.2102	27548386.	-46202.	-0.003198	0.000	1.038E+12
-1191.4438	34010.	0.000				
19.000	0.1915	27257252.	-53268.	-0.003040	0.000	1.039E+12
-1163.9363	36472.	0.000				
19.500	0.1737	26923838.	-60155.	-0.002884	0.000	1.041E+12
-1131.6379	39086.	0.000				
20.000	0.1569	26549309.	-66834.	-0.002730	0.000	1.043E+12
-1094.6487	41867.	0.000				
20.500	0.1410	26135005.	-73277.	-0.002578	0.000	1.045E+12
-1053.0999	44827.	0.000				
21.000	0.1259	25682428.	-79458.	-0.002430	0.000	1.047E+12
-1007.1521	47984.	0.000				
21.500	0.1118	25193237.	-85400.	-0.002284	0.000	1.050E+12
-973.6019	52250.	0.000				
22.000	0.0985	24668650.	-91137.	-0.002142	0.000	1.052E+12
-938.9216	57177.	0.000				
22.500	0.0861	24109922.	-96655.	-0.002003	0.000	1.056E+12
-900.1033	62726.	0.000				
23.000	0.0745	23518460.	-101926.	-0.001868	0.000	1.059E+12
-857.0168	69028.	0.000				
23.500	0.0637	22895823.	-106925.	-0.001737	0.000	1.063E+12
-809.4853	76264.	0.000				
24.000	0.0537	22243734.	-111626.	-0.001609	0.000	1.067E+12
-757.2609	84683.	0.000				
24.500	0.0444	21564081.	-115997.	-0.001487	0.000	1.072E+12
-699.9851	94652.	0.000				
25.000	0.0358	20858938.	-119980.	-0.001368	0.000	1.077E+12
-627.6918	105157.	0.000				
25.500	0.0280	20130918.	-123363.	-0.001254	0.000	1.083E+12
-499.9913	107317.	0.000				
26.000	0.0208	19384629.	-126000.	-0.001145	0.000	1.089E+12
-378.8395	109477.	0.000				
26.500	0.0142	18624444.	-127930.	-0.001041	0.000	1.096E+12
-264.4278	111637.	0.000				
27.000	0.008272	17854493.	-129194.	-0.000941	0.000	1.104E+12
-156.8968	113797.	0.000				
27.500	0.002915	17078661.	-129833.	-0.000847	0.000	1.113E+12
-56.3394	115957.	0.000				
28.000	-0.001890	16300578.	-129891.	-0.000757	0.000	1.122E+12
37.1971	118117.	0.000				
28.500	-0.006171	15523624.	-129408.	-0.000672	0.000	1.132E+12
123.7082	120277.	0.000				
29.000	-0.009959	14750925.	-128427.	-0.000593	0.000	1.143E+12
203.2296	122437.	0.000				
29.500	-0.0133	13985355.	-126990.	-0.000518	0.000	1.156E+12
275.8347	124597.	0.000				
30.000	-0.0162	13229541.	-125138.	-0.000447	0.000	1.170E+12
341.6310	126757.	0.000				
30.500	-0.0187	12485861.	-122911.	-0.000382	0.000	1.185E+12
400.7581	128917.	0.000				
31.000	-0.0208	11756456.	-120348.	-0.000321	0.000	1.202E+12
453.3836	131077.	0.000				
31.500	-0.0225	11043231.	-117489.	-0.000264	0.000	1.220E+12
499.7007	133237.	0.000				
32.000	-0.0239	10347865.	-114370.	-0.000212	0.000	1.242E+12
539.9249	135397.	0.000				
32.500	-0.0250	9671815.	-111027.	-0.000169	0.000	1.617E+12

574.2973	137557.	0.000				
33.000	-0.0260	9016353.	-107491.	-0.000135	0.000	1.619E+12
604.4652	139717.	0.000				
33.500	-0.0267	8382572.	-103786.	-0.000102	0.000	1.620E+12
630.5455	141877.	0.000				
34.000	-0.0272	7771415.	-99936.	-7.253E-05	0.000	1.621E+12
652.6637	144037.	0.000				
34.500	-0.0275	7183684.	-95966.	-4.487E-05	0.000	1.622E+12
670.9527	146197.	0.000				
35.000	-0.0277	6620044.	-91896.	-1.935E-05	0.000	1.623E+12
685.5519	148357.	0.000				
35.500	-0.0278	6081025.	-87750.	4.112E-06	0.000	1.624E+12
696.6047	150517.	0.000				
36.000	-0.0277	5567029.	-83547.	2.562E-05	0.000	1.625E+12
704.2588	152677.	0.000				
36.500	-0.0275	5078337.	-79308.	4.527E-05	0.000	1.626E+12
708.6638	154837.	0.000				
37.000	-0.0271	4615112.	-75052.	6.316E-05	0.000	1.626E+12
709.9710	156997.	0.000				
37.500	-0.0267	4177404.	-70797.	7.938E-05	0.000	1.626E+12
708.3316	159157.	0.000				
38.000	-0.0262	3765160.	-66561.	9.403E-05	0.000	1.626E+12
703.8962	161317.	0.000				
38.500	-0.0256	3378222.	-62359.	0.000107	0.000	1.626E+12
696.8139	163477.	0.000				
39.000	-0.0249	3016339.	-58206.	0.000119	0.000	1.627E+12
687.2312	165637.	0.000				
39.500	-0.0241	2679170.	-54119.	0.000130	0.000	1.627E+12
675.2913	167797.	0.000				
40.000	-0.0233	2366287.	-50110.	0.000139	0.000	1.627E+12
661.1337	169957.	0.000				
40.500	-0.0225	2077184.	-46192.	0.000147	0.000	1.627E+12
644.8929	172117.	0.000				
41.000	-0.0216	1811279.	-42377.	0.000154	0.000	1.627E+12
626.6982	174277.	0.000				
41.500	-0.0206	1567919.	-38677.	0.000160	0.000	1.627E+12
606.6731	176437.	0.000				
42.000	-0.0197	1346385.	-35102.	0.000166	0.000	1.627E+12
584.9345	178597.	0.000				
42.500	-0.0186	1145897.	-31662.	0.000170	0.000	1.627E+12
561.5927	180757.	0.000				
43.000	-0.0176	965616.	-28367.	0.000174	0.000	1.627E+12
536.7508	182917.	0.000				
43.500	-0.0166	804649.	-25225.	0.000178	0.000	1.627E+12
510.5045	185077.	0.000				
44.000	-0.0155	662053.	-22245.	0.000180	0.000	1.627E+12
482.9419	187237.	0.000				
44.500	-0.0144	536838.	-19434.	0.000182	0.000	1.627E+12
454.1433	189397.	0.000				
45.000	-0.0133	427966.	-16799.	0.000184	0.000	1.627E+12
424.1815	191557.	0.000				
45.500	-0.0122	334362.	-14347.	0.000186	0.000	1.627E+12
393.1213	193717.	0.000				
46.000	-0.0111	254907.	-12085.	0.000187	0.000	1.627E+12
361.0203	195877.	0.000				
46.500	-0.009935	188446.	-10018.	0.000188	0.000	1.627E+12
327.9283	198037.	0.000				
47.000	-0.008808	133789.	-8152.2716	0.000188	0.000	1.627E+12
293.8885	200197.	0.000				
47.500	-0.007678	89711.	-6493.7946	0.000189	0.000	1.627E+12
258.9372	202357.	0.000				
48.000	-0.006545	54954.	-4941.6447	0.000189	0.000	1.627E+12
258.4461	236915.	0.000				

48.500	-0.005412	29500.	-3461.3615	0.000189	0.000	1.627E+12
234.9816	260524.	0.000				
49.000	-0.004278	12506.	-2129.7710	0.000189	0.000	1.627E+12
208.8819	292993.	0.000				
49.500	-0.003143	3030.6376	-966.0991	0.000189	0.000	1.627E+12
179.0087	341721.	0.000				
50.000	-0.002009	0.000	0.000	0.000189	0.000	1.627E+12
143.0243	213626.	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. 4:

Pile-head deflection	=	1.5000000 inches
Computed slope at pile head	=	-0.0074038 radians
Maximum bending moment	=	28323825. inch-lbs
Maximum shear force	=	189145. lbs
Depth of maximum bending moment	=	16.0000000 feet below pile head
Depth of maximum shear force	=	1.0000000 feet below pile head
Number of iterations	=	15
Number of zero deflection points	=	1

STR 1 @ 2" DEFLECTION

Pile-head Deflection vs. Pile Length for Load Case 4

Boundary Condition Type 4, Deflection and Moment

Deflection = 1.50000 in
Moment = 3729000. in- lb
Axial Load = 402100. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment in-lbs	Maximum Shear lbs
50.0000	1.5000000	28323825.	189145.
47.5000	1.5000000	28272767.	186859.
45.0000	1.5000000	28202452.	186431.
42.5000	1.5000000	27982241.	185490.
40.0000	1.5000000	27546914.	183691.
37.5000	1.5000000	26537081.	179083.
35.0000	1.5000000	24466689.	165911.
32.5000	1.5000000	21778875.	-157647.
30.0000	1.5000000	18557954.	-147494.
27.5000	1.5000000	15240670.	-133683.
25.0000	1.5000000	12084110.	-118685.
22.5000	1.5000000	9131039.	-102317.
20.0000	1.5000000	6705291.	-87017.
17.5000	1.5000000	4943996.	-74260.
15.0000	1.5000000	3873877.	-61706.

12.5000	1.5000000	3729000.	-51369.
10.0000	1.5000000	3729000.	-51363.
7.5000	1.5000000	3729000.	58725.
5.0000	1.5000000	3729000.	27774.
5.0000	0.000000	6.230176E+12	5.647209E+12

Computed Values of Pile Loading and Deflection for Lateral Loading for Load Case Number 5

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head = 2.000000 inches
Moment at pile head = 3729000.0 in-lbs
Axial load at pile head = 402100.0 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. Es*h lb/inch	Spr. Distrib. Lat. Load lb/inch	p lb/in
0.00	2.0000	3729000.	229310.	-0.009545	0.000	1.626E+12	0.000	0.000	0.000
0.500	1.9428	5127872.	229310.	-0.009528	0.000	1.626E+12	0.000	0.000	0.000
1.000	1.8857	6526698.	229310.	-0.009507	0.000	1.624E+12	0.000	0.000	0.000
1.500	1.8287	7925466.	228268.	-0.009480	0.000	1.621E+12	-347.2516	1139.3448	0.000
2.000	1.7719	9311663.	226162.	-0.009448	0.000	1.618E+12	-354.9779	1202.0255	0.000
2.500	1.7153	10684996.	224010.	-0.009405	0.000	1.231E+12	-362.2919	1267.2621	0.000
3.000	1.6590	12045162.	221815.	-0.009349	0.000	1.195E+12	-369.1946	1335.2104	0.000
3.500	1.6031	13391890.	219581.	-0.009284	0.000	1.167E+12	-375.6839	1406.0638	0.000
4.000	1.5476	14724928.	217308.	-0.009211	0.000	1.144E+12	-381.7576	1480.0308	0.000
4.500	1.4926	16044036.	215001.	-0.009129	0.000	1.125E+12	-387.4138	1557.3376	0.000
5.000	1.4381	17348991.	212661.	-0.009040	0.000	1.110E+12	-392.6508	1638.2289	0.000
5.500	1.3841	18639584.	210290.	-0.008942	0.000	1.096E+12	-397.4673	1722.9704	0.000
6.000	1.3308	19915623.	207892.	-0.008836	0.000	1.085E+12	-401.8619	1811.8505	0.000
6.500	1.2781	21176928.	205469.	-0.008722	0.000	1.075E+12	-405.8338	1905.1825	0.000
7.000	1.2261	22423338.	200683.	-0.008599	0.000	1.066E+12	-1189.5030	5820.8193	0.000
7.500	1.1749	23626622.	193194.	-0.008469	0.000	1.059E+12	-1306.9614	6674.4059	0.000
8.000	1.1245	24782532.	185033.	-0.008332	0.000	1.052E+12	-1413.2228	7540.6263	0.000
8.500	1.0749	25887225.	176272.	-0.008187	0.000	1.046E+12	-1507.2524	8413.1902	0.000
9.000	1.0262	26937299.	166967.	-0.008035	0.000	1.041E+12	-1594.4786	9322.2030	0.000

9.500	0.9785	27929596.	157162.	-0.007876	0.000	1.036E+12
-1673.6390	10262.	0.000				
10.000	0.9317	28861253.	146921.	-0.007712	0.000	1.032E+12
-1740.3128	11207.	0.000				
10.500	0.8860	29729853.	136318.	-0.007541	0.000	1.029E+12
-1793.7882	12148.	0.000				
11.000	0.8412	30533459.	125402.	-0.007365	0.000	1.025E+12
-1844.8531	13158.	0.000				
11.500	0.7976	31270219.	114188.	-0.007184	0.000	1.023E+12
-1893.2320	14242.	0.000				
12.000	0.7550	31938380.	102726.	-0.006998	0.000	1.020E+12
-1927.3214	15316.	0.000				
12.500	0.7136	32536705.	91107.	-0.006809	0.000	1.018E+12
-1945.9743	16362.	0.000				
13.000	0.6733	33064511.	79369.	-0.006615	0.000	1.016E+12
-1966.5622	17524.	0.000				
13.500	0.6342	33521051.	67481.	-0.006418	0.000	1.015E+12
-1996.1404	18884.	0.000				
14.000	0.5963	33905252.	55456.	-0.006219	0.000	1.014E+12
-2012.0727	20245.	0.000				
14.500	0.5596	34216533.	43379.	-0.006017	0.000	1.013E+12
-2013.5957	21590.	0.000				
15.000	0.5241	34454836.	31338.	-0.005814	0.000	1.012E+12
-2000.0612	22897.	0.000				
15.500	0.4898	34620644.	19425.	-0.005609	0.000	1.011E+12
-1970.9647	24143.	0.000				
16.000	0.4568	34715002.	7734.3034	-0.005403	0.000	1.011E+12
-1925.9789	25298.	0.000				
16.500	0.4250	34739527.	-3638.6083	-0.005197	0.000	1.011E+12
-1864.9916	26330.	0.000				
17.000	0.3944	34696416.	-14205.	-0.004991	0.000	1.011E+12
-1657.1037	25208.	0.000				
17.500	0.3651	34593151.	-23747.	-0.004786	0.000	1.011E+12
-1523.6513	25040.	0.000				
18.000	0.3370	34434541.	-32848.	-0.004581	0.000	1.012E+12
-1510.0575	26885.	0.000				
18.500	0.3101	34221076.	-41851.	-0.004377	0.000	1.013E+12
-1490.6927	28840.	0.000				
19.000	0.2845	33953456.	-50719.	-0.004175	0.000	1.013E+12
-1465.5480	30911.	0.000				
19.500	0.2600	33632592.	-59420.	-0.003976	0.000	1.015E+12
-1434.6500	33105.	0.000				
20.000	0.2368	33259600.	-67918.	-0.003778	0.000	1.016E+12
-1398.0619	35429.	0.000				
20.500	0.2147	32835805.	-76180.	-0.003583	0.000	1.017E+12
-1355.8839	37894.	0.000				
21.000	0.1938	32362730.	-84172.	-0.003391	0.000	1.019E+12
-1308.2534	40509.	0.000				
21.500	0.1740	31842098.	-91919.	-0.003202	0.000	1.021E+12
-1274.0259	43932.	0.000				
22.000	0.1554	31275150.	-99456.	-0.003016	0.000	1.023E+12
-1238.3996	47830.	0.000				
22.500	0.1378	30663177.	-106766.	-0.002835	0.000	1.025E+12
-1198.0602	52164.	0.000				
23.000	0.1213	30007640.	-113819.	-0.002658	0.000	1.028E+12
-1152.9159	57013.	0.000				
23.500	0.1059	29310176.	-120586.	-0.002485	0.000	1.030E+12
-1102.8486	62476.	0.000				
24.000	0.0915	28572598.	-127038.	-0.002316	0.000	1.033E+12
-1047.7011	68688.	0.000				
24.500	0.0781	27796902.	-133142.	-0.002153	0.000	1.037E+12
-987.2557	75828.	0.000				
25.000	0.0657	26985276.	-138868.	-0.001995	0.000	1.041E+12

-921.2028	84150.	0.000				
25.500	0.0542	26140112.	-144179.	-0.001842	0.000	1.045E+12
-849.0900	94028.	0.000				
26.000	0.0436	25264019.	-149037.	-0.001695	0.000	1.049E+12
-770.2352	106043.	0.000				
26.500	0.0338	24359848.	-153237.	-0.001553	0.000	1.054E+12
-629.7607	111637.	0.000				
27.000	0.0249	23432672.	-156545.	-0.001417	0.000	1.060E+12
-473.1095	113797.	0.000				
27.500	0.0168	22488144.	-158941.	-0.001288	0.000	1.066E+12
-325.4335	115957.	0.000				
28.000	0.009493	21531594.	-160478.	-0.001164	0.000	1.072E+12
-186.8754	118117.	0.000				
28.500	0.002869	20568026.	-161211.	-0.001047	0.000	1.080E+12
-57.5183	120277.	0.000				
29.000	-0.003068	19602112.	-161196.	-0.000936	0.000	1.088E+12
62.6122	122437.	0.000				
29.500	-0.008357	18638191.	-160487.	-0.000830	0.000	1.096E+12
173.5438	124597.	0.000				
30.000	-0.0130	17680272.	-159141.	-0.000732	0.000	1.106E+12
275.3541	126757.	0.000				
30.500	-0.0171	16732034.	-157210.	-0.000639	0.000	1.117E+12
368.1671	128917.	0.000				
31.000	-0.0207	15796833.	-154749.	-0.000552	0.000	1.128E+12
452.1491	131077.	0.000				
31.500	-0.0238	14877707.	-151810.	-0.000471	0.000	1.142E+12
527.5051	133237.	0.000				
32.000	-0.0263	13977382.	-148444.	-0.000395	0.000	1.156E+12
594.4754	135397.	0.000				
32.500	-0.0285	13098284.	-144701.	-0.000325	0.000	1.172E+12
653.3308	137557.	0.000				
33.000	-0.0302	12242543.	-140628.	-0.000261	0.000	1.190E+12
704.3697	139717.	0.000				
33.500	-0.0316	11412011.	-136271.	-0.000202	0.000	1.210E+12
747.9134	141877.	0.000				
34.000	-0.0327	10608268.	-131674.	-0.000148	0.000	1.233E+12
784.3029	144037.	0.000				
34.500	-0.0334	9832634.	-126880.	-0.000104	0.000	1.617E+12
813.8960	146197.	0.000				
35.000	-0.0339	9086213.	-121922.	-6.864E-05	0.000	1.619E+12
838.6027	148357.	0.000				
35.500	-0.0342	8369901.	-116830.	-3.630E-05	0.000	1.620E+12
858.6091	150517.	0.000				
36.000	-0.0344	7684423.	-111632.	-6.584E-06	0.000	1.621E+12
874.1065	152677.	0.000				
36.500	-0.0343	7030345.	-106354.	2.063E-05	0.000	1.623E+12
885.2911	154837.	0.000				
37.000	-0.0341	6408075.	-101021.	4.547E-05	0.000	1.624E+12
892.3617	156997.	0.000				
37.500	-0.0338	5817872.	-95657.	6.805E-05	0.000	1.625E+12
895.5184	159157.	0.000				
38.000	-0.0333	5259856.	-90286.	8.850E-05	0.000	1.625E+12
894.9615	161317.	0.000				
38.500	-0.0327	4734012.	-84928.	0.000107	0.000	1.626E+12
890.8899	163477.	0.000				
39.000	-0.0320	4240198.	-79605.	0.000124	0.000	1.626E+12
883.5004	165637.	0.000				
39.500	-0.0312	3778153.	-74336.	0.000138	0.000	1.626E+12
872.9859	167797.	0.000				
40.000	-0.0303	3347501.	-69138.	0.000151	0.000	1.626E+12
859.5353	169957.	0.000				
40.500	-0.0294	2947762.	-64030.	0.000163	0.000	1.627E+12
843.3316	172117.	0.000				

41.000	-0.0284	2578358.	-59026.	0.000173	0.000	1.627E+12	
824.5521	174277.	0.000					
41.500	-0.0273	2238614.	-54142.	0.000182	0.000	1.627E+12	
803.3666	176437.	0.000					
42.000	-0.0262	1927771.	-49392.	0.000190	0.000	1.627E+12	
779.9373	178597.	0.000					
42.500	-0.0250	1644989.	-44789.	0.000196	0.000	1.627E+12	
754.4180	180757.	0.000					
43.000	-0.0238	1389352.	-40345.	0.000202	0.000	1.627E+12	
726.9535	182917.	0.000					
43.500	-0.0226	1159872.	-36071.	0.000207	0.000	1.627E+12	
697.6789	185077.	0.000					
44.000	-0.0214	955499.	-31978.	0.000211	0.000	1.627E+12	
666.7196	187237.	0.000					
44.500	-0.0201	775119.	-28075.	0.000214	0.000	1.627E+12	
634.1905	189397.	0.000					
45.000	-0.0188	617562.	-24372.	0.000216	0.000	1.627E+12	
600.1963	191557.	0.000					
45.500	-0.0175	481608.	-20877.	0.000218	0.000	1.627E+12	
564.8311	193717.	0.000					
46.000	-0.0162	365983.	-17598.	0.000220	0.000	1.627E+12	
528.1783	195877.	0.000					
46.500	-0.0149	269369.	-14543.	0.000221	0.000	1.627E+12	
490.3109	198037.	0.000					
47.000	-0.0135	190404.	-11718.	0.000222	0.000	1.627E+12	
451.2915	200197.	0.000					
47.500	-0.0122	127684.	-9130.4442	0.000223	0.000	1.627E+12	
411.1725	202357.	0.000					
48.000	-0.0109	79765.	-6898.2062	0.000223	0.000	1.627E+12	
332.9068	184015.	0.000					
48.500	-0.009516	43830.	-4964.3839	0.000223	0.000	1.627E+12	
311.7006	196528.	0.000					
49.000	-0.008177	19116.	-3162.5066	0.000223	0.000	1.627E+12	
288.9251	212010.	0.000					
49.500	-0.006837	4802.5361	-1503.1753	0.000223	0.000	1.627E+12	
264.1853	231848.	0.000					
50.000	-0.005497	0.000	0.000	0.000223	0.000	1.627E+12	
236.8732	129278.	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. 5:

Pile-head deflection	=	2.0000000 inches
Computed slope at pile head	=	-0.0095447 radians
Maximum bending moment	=	34739527. inch-lbs
Maximum shear force	=	229310. lbs
Depth of maximum bending moment	=	16.5000000 feet below pile head
Depth of maximum shear force	=	0.000000 feet below pile head
Number of iterations	=	12
Number of zero deflection points	=	1

Pile-head Deflection vs. Pile Length for Load Case 5

Boundary Condition Type 4, Deflection and Moment

Deflection = 2.00000 in
Moment = 3729000. in- lb
Axial Load = 402100. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment ln-lbs	Maximum Shear lbs
50.0000	2.0000000	34739527.	229310.
47.5000	2.0000000	34664979.	226721.
45.0000	2.0000000	34543591.	226058.
42.5000	2.0000000	34209080.	224624.
40.0000	2.0000000	33534538.	221792.
37.5000	2.0000000	31805828.	213802.
35.0000	2.0000000	28913694.	-196846.
32.5000	2.0000000	25375345.	-188850.
30.0000	2.0000000	21331603.	-173735.
27.5000	2.0000000	17293771.	-155285.
25.0000	2.0000000	13549660.	-136109.
22.5000	2.0000000	10129474.	-116379.
20.0000	2.0000000	7341856.	-98146.
17.5000	2.0000000	5323151.	-83193.
15.0000	2.0000000	3998224.	-68385.
12.5000	2.0000000	3729000.	-56138.
10.0000	2.0000000	3729000.	-55060.
7.5000	2.0000000	3729000.	59531.
5.0000	2.0000000	3729000.	28304.
5.0000	0.000000	8.486800E+12	7.529613E+12

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 6

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head = 0.500000 inches
Moment at pile head = 2808000.0 in-lbs
Axial load at pile head = 311000.0 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. Es*h lb/inch	Soil Spr. Distrib. Lat. Load lb/inch	p lb/in
0.00	0.5000	2808000.	94031.	-0.002820	0.000	1.632E+12	0.000	0.000	0.000
0.500	0.4831	3377437.	94031.	-0.002808	0.000	1.632E+12	0.000	0.000	0.000
1.000	0.4663	3946850.	94031.	-0.002795	0.000	1.632E+12	0.000	0.000	0.000
1.500	0.4496	4516236.	93378.	-0.002779	0.000	1.631E+12	-217.5368	2903.2200	0.000

2.000	0.4330	5077760.	92060.	-0.002762	0.000	1.630E+12
-221.9230	3075.4875	0.000				
2.500	0.4164	5631260.	90716.	-0.002742	0.000	1.629E+12
-226.0107	3256.3336	0.000				
3.000	0.4001	6176585.	89349.	-0.002720	0.000	1.628E+12
-229.7961	3446.5073	0.000				
3.500	0.3838	6713595.	87959.	-0.002696	0.000	1.627E+12
-233.2755	3646.8431	0.000				
4.000	0.3677	7242160.	86550.	-0.002671	0.000	1.626E+12
-236.4447	3858.2734	0.000				
4.500	0.3518	7762164.	85123.	-0.002643	0.000	1.625E+12
-239.2995	4081.8441	0.000				
5.000	0.3360	8273500.	83680.	-0.002613	0.000	1.624E+12
-241.8353	4318.7326	0.000				
5.500	0.3204	8776072.	82222.	-0.002582	0.000	1.622E+12
-244.0473	4570.2694	0.000				
6.000	0.3050	9269798.	80752.	-0.002542	0.000	1.208E+12
-245.9302	4837.9636	0.000				
6.500	0.2899	9754585.	79272.	-0.002495	0.000	1.187E+12
-247.4983	5122.7090	0.000				
7.000	0.2751	10230369.	76330.	-0.002444	0.000	1.175E+12
-733.1497	15992.	0.000				
7.500	0.2606	10679663.	71729.	-0.002390	0.000	1.164E+12
-800.4495	18433.	0.000				
8.000	0.2464	11100038.	66751.	-0.002334	0.000	1.155E+12
-859.0094	20919.	0.000				
8.500	0.2325	11489382.	61450.	-0.002275	0.000	1.147E+12
-908.0139	23428.	0.000				
9.000	0.2191	11845924.	55867.	-0.002214	0.000	1.141E+12
-952.6731	26092.	0.000				
9.500	0.2060	12168054.	50034.	-0.002151	0.000	1.135E+12
-991.8615	28892.	0.000				
10.000	0.1933	12454357.	43994.	-0.002085	0.000	1.130E+12
-1021.5859	31715.	0.000				
10.500	0.1810	12703759.	37805.	-0.002019	0.000	1.126E+12
-1041.3459	34529.	0.000				
11.000	0.1690	12915547.	31523.	-0.001950	0.000	1.123E+12
-1052.5773	37360.	0.000				
11.500	0.1576	13089313.	25201.	-0.001881	0.000	1.120E+12
-1054.6764	40165.	0.000				
12.000	0.1465	13224980.	18900.	-0.001810	0.000	1.118E+12
-1045.6310	42831.	0.000				
12.500	0.1358	13322872.	12688.	-0.001739	0.000	1.117E+12
-1025.2564	45288.	0.000				
13.000	0.1256	13383721.	6603.2820	-0.001667	0.000	1.116E+12
-1002.8595	47902.	0.000				
13.500	0.1158	13408332.	647.7047	-0.001595	0.000	1.115E+12
-982.3330	50886.	0.000				
14.000	0.1065	13397445.	-5157.0995	-0.001523	0.000	1.116E+12
-952.6018	53681.	0.000				
14.500	0.0976	13352130.	-10757.	-0.001451	0.000	1.116E+12
-913.9766	56215.	0.000				
15.000	0.0891	13273778.	-16100.	-0.001379	0.000	1.117E+12
-866.9543	58406.	0.000				
15.500	0.0810	13164083.	-21137.	-0.001309	0.000	1.119E+12
-812.2320	60166.	0.000				
16.000	0.0734	13025016.	-25826.	-0.001238	0.000	1.121E+12
-750.7175	61400.	0.000				
16.500	0.0661	12858792.	-30129.	-0.001169	0.000	1.124E+12
-683.5348	62009.	0.000				
17.000	0.0593	12667833.	-33905.	-0.001101	0.000	1.127E+12
-575.1920	58169.	0.000				
17.500	0.0529	12456042.	-37168.	-0.001034	0.000	1.130E+12

-512.3328	58081.	0.000				
18.000	0.0469	12225683.	-40176.	-0.000969	0.000	1.134E+12
-490.6330	62743.	0.000				
18.500	0.0413	11977540.	-43048.	-0.000905	0.000	1.138E+12
-466.6088	67790.	0.000				
19.000	0.0361	11712482.	-45769.	-0.000843	0.000	1.143E+12
-440.3820	73277.	0.000				
19.500	0.0312	11431455.	-48327.	-0.000782	0.000	1.148E+12
-412.0866	79280.	0.000				
20.000	0.0267	11135482.	-50677.	-0.000723	0.000	1.154E+12
-371.4693	83557.	0.000				
20.500	0.0225	10826028.	-52756.	-0.000666	0.000	1.161E+12
-321.5576	85717.	0.000				
21.000	0.0187	10504893.	-54542.	-0.000611	0.000	1.168E+12
-273.5626	87877.	0.000				
21.500	0.0152	10173810.	-56045.	-0.000558	0.000	1.176E+12
-227.6672	90037.	0.000				
22.000	0.0120	9834433.	-57280.	-0.000508	0.000	1.185E+12
-184.0312	92197.	0.000				
22.500	0.009080	9488339.	-58261.	-0.000459	0.000	1.198E+12
-142.7922	94357.	0.000				
23.000	0.006469	9137015.	-59001.	-0.000418	0.000	1.556E+12
-104.0535	96517.	0.000				
23.500	0.004068	8781880.	-59514.	-0.000384	0.000	1.622E+12
-66.9112	98677.	0.000				
24.000	0.001863	8424275.	-59809.	-0.000352	0.000	1.623E+12
-31.3162	100837.	0.000				
24.500	-0.000155	8065485.	-59895.	-0.000321	0.000	1.624E+12
2.6592	102997.	0.000				
25.000	-0.001994	7706735.	-59782.	-0.000292	0.000	1.625E+12
34.9542	105157.	0.000				
25.500	-0.003663	7349191.	-59481.	-0.000265	0.000	1.626E+12
65.5196	107317.	0.000				
26.000	-0.005169	6993954.	-59001.	-0.000238	0.000	1.626E+12
94.3169	109477.	0.000				
26.500	-0.006520	6642064.	-58354.	-0.000213	0.000	1.627E+12
121.3183	111637.	0.000				
27.000	-0.007725	6294497.	-57551.	-0.000189	0.000	1.628E+12
146.5054	113797.	0.000				
27.500	-0.008790	5952160.	-56602.	-0.000167	0.000	1.629E+12
169.8695	115957.	0.000				
28.000	-0.009723	5615898.	-55518.	-0.000145	0.000	1.629E+12
191.4104	118117.	0.000				
28.500	-0.0105	5286487.	-54310.	-0.000125	0.000	1.630E+12
211.1357	120277.	0.000				
29.000	-0.0112	4964642.	-52990.	-0.000106	0.000	1.630E+12
229.0610	122437.	0.000				
29.500	-0.0118	4651008.	-51567.	-8.861E-05	0.000	1.631E+12
245.2086	124597.	0.000				
30.000	-0.0123	4346170.	-50052.	-7.206E-05	0.000	1.631E+12
259.6068	126757.	0.000				
30.500	-0.0127	4050648.	-48457.	-5.662E-05	0.000	1.632E+12
272.2899	128917.	0.000				
31.000	-0.0130	3764901.	-46790.	-4.225E-05	0.000	1.632E+12
283.2974	131077.	0.000				
31.500	-0.0132	3489327.	-45062.	-2.891E-05	0.000	1.632E+12
292.6728	133237.	0.000				
32.000	-0.0133	3224265.	-43283.	-1.657E-05	0.000	1.632E+12
300.4640	135397.	0.000				
32.500	-0.0134	2969997.	-41461.	-5.190E-06	0.000	1.632E+12
306.7221	137557.	0.000				
33.000	-0.0134	2726751.	-39606.	5.279E-06	0.000	1.632E+12
311.5009	139717.	0.000				

33.500	-0.0133	2494700.	-37727.	1.488E-05	0.000	1.632E+12
314.8567	141877.	0.000				
34.000	-0.0132	2273968.	-35832.	2.364E-05	0.000	1.632E+12
316.8473	144037.	0.000				
34.500	-0.0130	2064626.	-33929.	3.161E-05	0.000	1.632E+12
317.5319	146197.	0.000				
35.000	-0.0128	1866701.	-32026.	3.884E-05	0.000	1.633E+12
316.9706	148357.	0.000				
35.500	-0.0126	1680174.	-30129.	4.535E-05	0.000	1.633E+12
315.2237	150517.	0.000				
36.000	-0.0123	1504984.	-28246.	5.121E-05	0.000	1.633E+12
312.3514	152677.	0.000				
36.500	-0.0120	1341028.	-26384.	5.644E-05	0.000	1.633E+12
308.4133	154837.	0.000				
37.000	-0.0116	1188165.	-24548.	6.109E-05	0.000	1.633E+12
303.4683	156997.	0.000				
37.500	-0.0112	1046220.	-22745.	6.519E-05	0.000	1.633E+12
297.5739	159157.	0.000				
38.000	-0.0108	914980.	-20980.	6.880E-05	0.000	1.633E+12
290.7858	161317.	0.000				
38.500	-0.0104	794202.	-19258.	7.194E-05	0.000	1.633E+12
283.1580	163477.	0.000				
39.000	-0.009952	683612.	-17585.	7.465E-05	0.000	1.633E+12
274.7423	165637.	0.000				
39.500	-0.009497	582908.	-15964.	7.698E-05	0.000	1.633E+12
265.5879	167797.	0.000				
40.000	-0.009028	491761.	-14400.	7.895E-05	0.000	1.633E+12
255.7415	169957.	0.000				
40.500	-0.008549	409818.	-12897.	8.061E-05	0.000	1.633E+12
245.2469	172117.	0.000				
41.000	-0.008061	336701.	-11458.	8.198E-05	0.000	1.633E+12
234.1447	174277.	0.000				
41.500	-0.007566	272011.	-10089.	8.310E-05	0.000	1.633E+12
222.4728	176437.	0.000				
42.000	-0.007064	215327.	-8790.3983	8.400E-05	0.000	1.633E+12
210.2654	178597.	0.000				
42.500	-0.006558	166212.	-7566.9405	8.470E-05	0.000	1.633E+12
197.5538	180757.	0.000				
43.000	-0.006048	124208.	-6421.1811	8.523E-05	0.000	1.633E+12
184.3660	182917.	0.000				
43.500	-0.005535	88840.	-5355.9042	8.562E-05	0.000	1.633E+12
170.7264	185077.	0.000				
44.000	-0.005020	59618.	-4373.7557	8.590E-05	0.000	1.633E+12
156.6565	187237.	0.000				
44.500	-0.004504	36034.	-3477.2630	8.607E-05	0.000	1.633E+12
142.1744	189397.	0.000				
45.000	-0.003987	17569.	-2668.8531	8.617E-05	0.000	1.633E+12
127.2955	191557.	0.000				
45.500	-0.003470	3686.5737	-1950.8706	8.621E-05	0.000	1.633E+12
112.0320	193717.	0.000				
46.000	-0.002953	-6162.9539	-1325.5945	8.620E-05	0.000	1.633E+12
96.3934	195877.	0.000				
46.500	-0.002436	-12542.	-795.2540	8.617E-05	0.000	1.633E+12
80.3868	198037.	0.000				
47.000	-0.001919	-16028.	-362.0422	8.612E-05	0.000	1.633E+12
64.0171	200197.	0.000				
47.500	-0.001402	-17208.	-28.1293	8.606E-05	0.000	1.633E+12
47.2872	202357.	0.000				
48.000	-0.000886	-16686.	399.0325	8.599E-05	0.000	1.633E+12
95.1001	644063.	0.000				
48.500	-0.000370	-12741.	868.7080	8.594E-05	0.000	1.633E+12
61.4584	996205.	0.000				
49.000	0.000145	-6582.5403	937.4024	8.591E-05	0.000	1.633E+12

-38.5603	1591779.	0.000				
49.500	0.000661	-1812.4875	575.2567	8.589E-05	0.000	1.633E+12
-82.1549	746065.	0.000				
50.000	0.001176	0.000	0.000	8.589E-05	0.000	1.633E+12
-109.5973	279579.	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. 6:

Pile-head deflection	=	0.5000000 inches
Computed slope at pile head	=	-0.0028196 radians
Maximum bending moment	=	13408332. inch-lbs
Maximum shear force	=	94031. lbs
Depth of maximum bending moment	=	13.5000000 feet below pile head
Depth of maximum shear force	=	0.000000 feet below pile head
Number of iterations	=	13
Number of zero deflection points	=	2

Pile-head Deflection vs. Pile Length for Load Case 6

Boundary Condition Type 4, Deflection and Moment

Deflection	=	0.50000 in
Moment	=	2808000. in- lb
Axial Load	=	311000. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment in-lbs	Maximum Shear lbs
50.0000	0.5000000	13408332.	94031.
47.5000	0.5000000	13372658.	92503.
45.0000	0.5000000	13363894.	92419.
42.5000	0.5000000	13319300.	92251.
40.0000	0.5000000	13225399.	91959.
37.5000	0.5000000	13027375.	91191.
35.0000	0.5000000	12579276.	87249.
32.5000	0.5000000	11917890.	83891.
30.0000	0.5000000	10728329.	-77319.
27.5000	0.5000000	9276777.	-75068.
25.0000	0.5000000	7559065.	-68370.
22.5000	0.5000000	5776542.	-58447.
20.0000	0.5000000	4344165.	-49849.
17.5000	0.5000000	3326378.	-42955.
15.0000	0.5000000	2824942.	-36515.
12.5000	0.5000000	2808000.	-31384.
10.0000	0.5000000	2808000.	-33318.

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 7

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head = 1.000000 inches
Moment at pile head = 2808000.0 in-lbs
Axial load at pile head = 311000.0 lbs

SERV H @ 1" Deflection

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. Spr. Distrib. Es*h Lat. Load lb/inch lb/inch	p lb/in
0.00	1.0000	2808000.	146979	-0.005151	0.000	1.632E+12		
0.000	0.000	0.000						
0.500	0.9691	3699477.	146979.	-0.005139	0.000	1.632E+12		
0.000	0.000	0.000						
1.000	0.9383	4590929.	146979.	-0.005123	0.000	1.631E+12		
0.000	0.000	0.000						
1.500	0.9076	5482350.	146155.	-0.005105	0.000	1.629E+12		
-274.9395	1817.4894	0.000						
2.000	0.8771	6363835.	144487.	-0.005083	0.000	1.628E+12		
-280.8033	1920.9475	0.000						
2.500	0.8466	7235167.	142786.	-0.005058	0.000	1.626E+12		
-286.3168	2029.0582	0.000						
3.000	0.8164	8096142.	141053.	-0.005030	0.000	1.624E+12		
-291.4760	2142.2038	0.000						
3.500	0.7863	8946569.	139289.	-0.004998	0.000	1.622E+12		
-296.2763	2260.8073	0.000						
4.000	0.7564	9786267.	137498.	-0.004957	0.000	1.187E+12		
-300.7127	2385.3358	0.000						
4.500	0.7268	10615047.	135682.	-0.004905	0.000	1.166E+12		
-304.7918	2516.1311	0.000						
5.000	0.6975	11432753.	133842.	-0.004848	0.000	1.148E+12		
-308.5120	2653.6926	0.000						
5.500	0.6686	12239242.	131981.	-0.004785	0.000	1.134E+12		
-311.8717	2798.5659	0.000						
6.000	0.6401	13034381.	130101.	-0.004718	0.000	1.121E+12		
-314.8700	2951.3480	0.000						
6.500	0.6120	13818056.	128203.	-0.004646	0.000	1.110E+12		
-317.5059	3112.6928	0.000						
7.000	0.5844	14590160.	124470.	-0.004569	0.000	1.100E+12		
-927.0402	9518.3457	0.000						
7.500	0.5572	15328743.	118636.	-0.004487	0.000	1.092E+12		
-1017.4993	10957.	0.000						
8.000	0.5305	16030539.	112289.	-0.004400	0.000	1.085E+12		
-1098.2450	12421.	0.000						
8.500	0.5044	16692632.	105489.	-0.004310	0.000	1.078E+12		
-1168.2366	13897.	0.000						
9.000	0.4788	17312496.	98286.	-0.004215	0.000	1.073E+12		
-1232.8135	15448.	0.000						
9.500	0.4538	17887797.	90716.	-0.004116	0.000	1.068E+12		
-1290.6684	17064.	0.000						
10.000	0.4294	18416447.	82832.	-0.004014	0.000	1.064E+12		
-1337.4060	18687.	0.000						
10.500	0.4056	18896757.	74702.	-0.003909	0.000	1.061E+12		
-1372.3135	20298.	0.000						

11.000	0.3825	19327463.	66384.	-0.003800	0.000	1.058E+12
-1400.3919	21966.	0.000				
11.500	0.3600	19707551.	57920.	-0.003689	0.000	1.055E+12
-1421.0133	23681.	0.000				
12.000	0.3382	20036274.	49371.	-0.003576	0.000	1.053E+12
-1428.5999	25341.	0.000				
12.500	0.3171	20313354.	40818.	-0.003461	0.000	1.051E+12
-1422.5825	26915.	0.000				
13.000	0.2967	20539004.	32303.	-0.003345	0.000	1.050E+12
-1415.6733	28627.	0.000				
13.500	0.2770	20713471.	23817.	-0.003227	0.000	1.049E+12
-1413.0684	30608.	0.000				
14.000	0.2580	20836847.	15381.	-0.003108	0.000	1.048E+12
-1398.7008	32529.	0.000				
14.500	0.2397	20909646.	7068.1608	-0.002988	0.000	1.048E+12
-1372.3979	34352.	0.000				
15.000	0.2221	20932816.	-1051.5128	-0.002868	0.000	1.047E+12
-1334.1600	36036.	0.000				
15.500	0.2053	20907733.	-8906.5501	-0.002748	0.000	1.048E+12
-1284.1858	37534.	0.000				
16.000	0.1892	20836195.	-16428.	-0.002629	0.000	1.048E+12
-1222.8997	38790.	0.000				
16.500	0.1737	20720410.	-23549.	-0.002510	0.000	1.049E+12
-1150.9787	39749.	0.000				
17.000	0.1590	20562969.	-29995.	-0.002392	0.000	1.050E+12
-997.7053	37641.	0.000				
17.500	0.1450	20369391.	-35703.	-0.002275	0.000	1.051E+12
-904.9407	37437.	0.000				
18.000	0.1317	20143018.	-41070.	-0.002159	0.000	1.052E+12
-883.8870	40258.	0.000				
18.500	0.1191	19884611.	-46299.	-0.002045	0.000	1.054E+12
-858.9879	43266.	0.000				
19.000	0.1072	19595069.	-51366.	-0.001933	0.000	1.056E+12
-830.3244	46478.	0.000				
19.500	0.0959	19275427.	-56251.	-0.001823	0.000	1.058E+12
-798.0016	49914.	0.000				
20.000	0.0853	18926854.	-60932.	-0.001715	0.000	1.060E+12
-762.1476	53599.	0.000				
20.500	0.0754	18550643.	-65387.	-0.001609	0.000	1.063E+12
-722.9117	57564.	0.000				
21.000	0.0660	18148212.	-69597.	-0.001505	0.000	1.066E+12
-680.4615	61848.	0.000				
21.500	0.0573	17721094.	-73584.	-0.001404	0.000	1.069E+12
-648.3783	67907.	0.000				
22.000	0.0492	17270449.	-77375.	-0.001306	0.000	1.073E+12
-615.2348	75090.	0.000				
22.500	0.0416	16797475.	-80956.	-0.001211	0.000	1.077E+12
-578.4770	83413.	0.000				
23.000	0.0346	16303502.	-84305.	-0.001119	0.000	1.082E+12
-537.8656	93210.	0.000				
23.500	0.0282	15789996.	-87309.	-0.001031	0.000	1.087E+12
-463.4151	98677.	0.000				
24.000	0.0223	15259645.	-89821.	-0.000945	0.000	1.093E+12
-374.0281	100837.	0.000				
24.500	0.0168	14715673.	-91810.	-0.000863	0.000	1.099E+12
-289.0087	102997.	0.000				
25.000	0.0119	14161146.	-93303.	-0.000784	0.000	1.105E+12
-208.5385	105157.	0.000				
25.500	0.007423	13598969.	-94327.	-0.000709	0.000	1.113E+12
-132.7625	107317.	0.000				
26.000	0.003387	13031875.	-94910.	-0.000638	0.000	1.121E+12
-61.7909	109477.	0.000				
26.500	-0.000231	12462427.	-95083.	-0.000570	0.000	1.130E+12

4.2996	111637.	0.000				
27.000	-0.003452	11893009.	-94873.	-0.000505	0.000	1.140E+12
65.4638	113797.	0.000				
27.500	-0.006296	11325832.	-94312.	-0.000445	0.000	1.151E+12
121.6868	115957.	0.000				
28.000	-0.008787	10762925.	-93428.	-0.000387	0.000	1.162E+12
172.9819	118117.	0.000				
28.500	-0.0109	10206142.	-92251.	-0.000333	0.000	1.176E+12
219.3885	120277.	0.000				
29.000	-0.0128	9657160.	-90810.	-0.000283	0.000	1.190E+12
260.9707	122437.	0.000				
29.500	-0.0143	9117482.	-89133.	-0.000242	0.000	1.621E+12
297.8157	124597.	0.000				
30.000	-0.0157	8588462.	-87245.	-0.000209	0.000	1.623E+12
331.5021	126757.	0.000				
30.500	-0.0169	8071317.	-85165.	-0.000178	0.000	1.624E+12
362.0667	128917.	0.000				
31.000	-0.0178	7567151.	-82910.	-0.000149	0.000	1.625E+12
389.5575	131077.	0.000				
31.500	-0.0186	7076957.	-80499.	-0.000122	0.000	1.626E+12
414.0321	133237.	0.000				
32.000	-0.0193	6601619.	-77950.	-9.723E-05	0.000	1.627E+12
435.5571	135397.	0.000				
32.500	-0.0198	6141916.	-75281.	-7.375E-05	0.000	1.628E+12
454.2063	137557.	0.000				
33.000	-0.0202	5698522.	-72508.	-5.194E-05	0.000	1.629E+12
470.0609	139717.	0.000				
33.500	-0.0204	5272011.	-69648.	-3.174E-05	0.000	1.630E+12
483.2075	141877.	0.000				
34.000	-0.0206	4862859.	-66718.	-1.309E-05	0.000	1.631E+12
493.7377	144037.	0.000				
34.500	-0.0206	4471449.	-63731.	4.086E-06	0.000	1.631E+12
501.7469	146197.	0.000				
35.000	-0.0205	4098071.	-60704.	1.985E-05	0.000	1.632E+12
507.3336	148357.	0.000				
35.500	-0.0204	3742928.	-57650.	3.426E-05	0.000	1.632E+12
510.5989	150517.	0.000				
36.000	-0.0201	3406142.	-54583.	4.740E-05	0.000	1.632E+12
511.6448	152677.	0.000				
36.500	-0.0198	3087751.	-51517.	5.934E-05	0.000	1.632E+12
510.5740	154837.	0.000				
37.000	-0.0194	2787720.	-48463.	7.014E-05	0.000	1.632E+12
507.4896	156997.	0.000				
37.500	-0.0189	2505939.	-45433.	7.987E-05	0.000	1.632E+12
502.4936	159157.	0.000				
38.000	-0.0184	2242231.	-42438.	8.859E-05	0.000	1.632E+12
495.6866	161317.	0.000				
38.500	-0.0179	1996352.	-39489.	9.638E-05	0.000	1.633E+12
487.1674	163477.	0.000				
39.000	-0.0173	1767998.	-36597.	0.000103	0.000	1.633E+12
477.0324	165637.	0.000				
39.500	-0.0166	1556804.	-33770.	0.000109	0.000	1.633E+12
465.3749	167797.	0.000				
40.000	-0.0160	1362354.	-31017.	0.000115	0.000	1.633E+12
452.2846	169957.	0.000				
40.500	-0.0153	1184176.	-28346.	0.000119	0.000	1.633E+12
437.8475	172117.	0.000				
41.000	-0.0145	1021753.	-25766.	0.000124	0.000	1.633E+12
422.1453	174277.	0.000				
41.500	-0.0138	874520.	-23284.	0.000127	0.000	1.633E+12
405.2551	176437.	0.000				
42.000	-0.0130	741870.	-20907.	0.000130	0.000	1.633E+12
387.2491	178597.	0.000				

42.500	-0.0122	623156.	-18640.	0.000132	0.000	1.633E+12
368.1948	180757.	0.000				
43.000	-0.0114	517692.	-16491.	0.000135	0.000	1.633E+12
348.1543	182917.	0.000				
43.500	-0.0106	424759.	-14465.	0.000136	0.000	1.633E+12
327.1844	185077.	0.000				
44.000	-0.009784	343602.	-12568.	0.000138	0.000	1.633E+12
305.3367	187237.	0.000				
44.500	-0.008954	273434.	-10804.	0.000139	0.000	1.633E+12
282.6577	189397.	0.000				
45.000	-0.008118	213440.	-9178.0941	0.000140	0.000	1.633E+12
259.1885	191557.	0.000				
45.500	-0.007278	162775.	-7695.6321	0.000140	0.000	1.633E+12
234.9654	193717.	0.000				
46.000	-0.006433	120568.	-6360.6763	0.000141	0.000	1.633E+12
210.0198	195877.	0.000				
46.500	-0.005586	85921.	-5177.4815	0.000141	0.000	1.633E+12
184.3785	198037.	0.000				
47.000	-0.004737	57911.	-4150.1540	0.000142	0.000	1.633E+12
158.0640	200197.	0.000				
47.500	-0.003887	35591.	-3282.6759	0.000142	0.000	1.633E+12
131.0953	202357.	0.000				
48.000	-0.003036	17990.	-2361.1376	0.000142	0.000	1.633E+12
176.0841	347985.	0.000				
48.500	-0.002185	6727.6893	-1384.7736	0.000142	0.000	1.633E+12
149.3706	410232.	0.000				
49.000	-0.001333	842.8912	-586.5990	0.000142	0.000	1.633E+12
116.6876	525170.	0.000				
49.500	-0.000482	-841.1581	-26.1026	0.000142	0.000	1.633E+12
70.1445	873914.	0.000				
50.000	0.000370	0.000	0.000	0.000142	0.000	1.633E+12
-61.4436	498265.	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. 7:

Pile-head deflection	=	1.0000000	inches
Computed slope at pile head	=	-0.0051506	radians
Maximum bending moment	=	20932816.	inch-lbs
Maximum shear force	=	146979.	lbs
Depth of maximum bending moment	=	15.0000000	feet below pile head
Depth of maximum shear force	=	1.0000000	feet below pile head
Number of iterations	=	21	
Number of zero deflection points	=	2	

Pile-head Deflection vs. Pile Length for Load Case 7

Boundary Condition Type 4, Deflection and Moment

Deflection = 1.00000 in
Moment = 2808000. in- lb
Axial Load = 311000. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment In-lbs	Maximum Shear lbs
50.0000	1.0000000	20932816.	146979.
47.5000	1.0000000	20885663.	145016.
45.0000	1.0000000	20838516.	144705.
42.5000	1.0000000	20736165.	144291.
40.0000	1.0000000	20504282.	143398.
37.5000	1.0000000	19984476.	141108.
35.0000	1.0000000	18886765.	133342.
32.5000	1.0000000	17155181.	124168.
30.0000	1.0000000	14875623.	-114679.
27.5000	1.0000000	12396281.	-106070.
25.0000	1.0000000	9940976.	-95605.
22.5000	1.0000000	7531431.	-82441.
20.0000	1.0000000	5528861.	-69852.
17.5000	1.0000000	4054792.	-59270.
15.0000	1.0000000	3063264.	-48715.
12.5000	1.0000000	2808000.	-39478.
10.0000	1.0000000	2808000.	-37038.

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 8

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head = 1.500000 inches
Moment at pile head = 2808000.0 in-lbs
Axial load at pile head = 311000.0 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. Spr. Distrib. p lb/in
	Es*h lb/inch	Lat. Load lb/inch					
0.00	1.5000	2808000.	191481.	-0.007359	0.000	1.632E+12	
0.000	0.000	0.000					
0.500	1.4559	3970606.	191481.	-0.007347	0.000	1.632E+12	
0.000	0.000	0.000					
1.000	1.4118	5133186.	191481.	-0.007330	0.000	1.630E+12	
0.000	0.000	0.000					
1.500	1.3679	6295730.	190535.	-0.007309	0.000	1.628E+12	
-315.2227	1382.6395	0.000					
2.000	1.3241	7446882.	188623.	-0.007284	0.000	1.625E+12	
-322.1309	1459.6604	0.000					
2.500	1.2805	8586387.	186671.	-0.007254	0.000	1.623E+12	
-328.6542	1539.9470	0.000					
3.000	1.2371	9714001.	184680.	-0.007214	0.000	1.189E+12	
-334.7881	1623.7573	0.000					
3.500	1.1940	10829471.	182654.	-0.007161	0.000	1.161E+12	
-340.5354	1711.3010	0.000					
4.000	1.1512	11932577.	180595.	-0.007102	0.000	1.139E+12	

-345.8941	1802.8548	0.000					
4.500	1.1087	13023114.	178505.	-0.007035	0.000	1.121E+12	
-350.8622	1898.7190	0.000					
5.000	1.0667	14100890.	176386.	-0.006962	0.000	1.106E+12	
-355.4382	1999.2200	0.000					
5.500	1.0252	15165727.	174241.	-0.006882	0.000	1.094E+12	
-359.6206	2104.7126	0.000					
6.000	0.9841	16217463.	172072.	-0.006796	0.000	1.083E+12	
-363.4081	2215.5835	0.000					
6.500	0.9436	17255948.	169881.	-0.006703	0.000	1.073E+12	
-366.8000	2332.2539	0.000					
7.000	0.9037	18281048.	165591.	-0.006603	0.000	1.065E+12	
-1063.0189	7057.6998	0.000					
7.500	0.8644	19267688.	158895.	-0.006497	0.000	1.058E+12	
-1169.1853	8115.5737	0.000					
8.000	0.8257	20212033.	151591.	-0.006385	0.000	1.052E+12	
-1265.4676	9195.0624	0.000					
8.500	0.7878	21110606.	143742.	-0.006266	0.000	1.046E+12	
-1350.6811	10287.	0.000					
9.000	0.7506	21960329.	135401.	-0.006143	0.000	1.042E+12	
-1429.7428	11430.	0.000					
9.500	0.7141	22758344.	126608.	-0.006014	0.000	1.037E+12	
-1501.2170	12614.	0.000					
10.000	0.6784	23502071.	117423.	-0.005880	0.000	1.034E+12	
-1560.5327	13802.	0.000					
10.500	0.6435	24189363.	107921.	-0.005741	0.000	1.031E+12	
-1606.8395	14982.	0.000					
11.000	0.6095	24818547.	98156.	-0.005598	0.000	1.028E+12	
-1648.1189	16224.	0.000					
11.500	0.5763	25388128.	88160.	-0.005451	0.000	1.025E+12	
-1683.8617	17530.	0.000					
12.000	0.5441	25896813.	77992.	-0.005301	0.000	1.023E+12	
-1705.6530	18809.	0.000					
12.500	0.5127	26343811.	67737.	-0.005148	0.000	1.022E+12	
-1712.6896	20042.	0.000					
13.000	0.4823	26728864.	57438.	-0.004992	0.000	1.020E+12	
-1720.2428	21400.	0.000					
13.500	0.4528	27051694.	47073.	-0.004834	0.000	1.019E+12	
-1734.5200	22983.	0.000					
14.000	0.4243	27311785.	36662.	-0.004674	0.000	1.018E+12	
-1735.8072	24546.	0.000					
14.500	0.3967	27509086.	26284.	-0.004512	0.000	1.017E+12	
-1723.5924	26066.	0.000					
15.000	0.3702	27644035.	16021.	-0.004349	0.000	1.017E+12	
-1697.5075	27515.	0.000					
15.500	0.3446	27717569.	5956.3995	-0.004186	0.000	1.017E+12	
-1657.3571	28861.	0.000					
16.000	0.3199	27731133.	-3825.1244	-0.004022	0.000	1.016E+12	
-1603.1509	30066.	0.000					
16.500	0.2963	27686679.	-13240.	-0.003859	0.000	1.017E+12	
-1535.1387	31087.	0.000					
17.000	0.2736	27586654.	-21898.	-0.003696	0.000	1.017E+12	
-1350.9609	29624.	0.000					
17.500	0.2519	27437691.	-29659.	-0.003533	0.000	1.018E+12	
-1235.8470	29432.	0.000					
18.000	0.2312	27243936.	-37021.	-0.003372	0.000	1.018E+12	
-1218.1928	31611.	0.000					
18.500	0.2115	27006026.	-44262.	-0.003212	0.000	1.019E+12	
-1195.6182	33922.	0.000					
19.000	0.1927	26724777.	-51354.	-0.003054	0.000	1.020E+12	
-1168.1583	36377.	0.000					
19.500	0.1748	26401182.	-58266.	-0.002898	0.000	1.021E+12	
-1135.8797	38984.	0.000					

20.000	0.1579	26036405.	-64970.	-0.002744	0.000	1.023E+12
-1098.8797	41756.	0.000				
20.500	0.1419	25631784.	-71438.	-0.002593	0.000	1.024E+12
-1057.2866	44708.	0.000				
21.000	0.1268	25188820.	-77644.	-0.002444	0.000	1.026E+12
-1011.2587	47857.	0.000				
21.500	0.1126	24709176.	-83611.	-0.002298	0.000	1.028E+12
-977.6225	52112.	0.000				
22.000	0.0992	24194068.	-89372.	-0.002156	0.000	1.031E+12
-942.8253	57024.	0.000				
22.500	0.0867	23644756.	-94912.	-0.002017	0.000	1.033E+12
-903.8499	62558.	0.000				
23.000	0.0750	23062650.	-100205.	-0.001881	0.000	1.036E+12
-860.5620	68845.	0.000				
23.500	0.0641	22449313.	-105225.	-0.001750	0.000	1.039E+12
-812.7797	76064.	0.000				
24.000	0.0540	21806475.	-109944.	-0.001622	0.000	1.042E+12
-760.2489	84468.	0.000				
24.500	0.0446	21136034.	-114333.	-0.001499	0.000	1.046E+12
-702.6031	94424.	0.000				
25.000	0.0360	20440072.	-118335.	-0.001380	0.000	1.050E+12
-631.2210	105157.	0.000				
25.500	0.0281	19721169.	-121735.	-0.001265	0.000	1.055E+12
-502.3657	107317.	0.000				
26.000	0.0208	18983972.	-124383.	-0.001156	0.000	1.060E+12
-380.0812	109477.	0.000				
26.500	0.0142	18232891.	-126317.	-0.001051	0.000	1.065E+12
-264.5694	111637.	0.000				
27.000	0.008224	17472094.	-127578.	-0.000950	0.000	1.071E+12
-155.9820	113797.	0.000				
27.500	0.002816	16705499.	-128209.	-0.000855	0.000	1.078E+12
-54.4231	115957.	0.000				
28.000	-0.002034	15936771.	-128253.	-0.000764	0.000	1.085E+12
40.0487	118117.	0.000				
28.500	-0.006356	15169321.	-127750.	-0.000679	0.000	1.093E+12
127.4170	120277.	0.000				
29.000	-0.0102	14406302.	-126745.	-0.000598	0.000	1.102E+12
207.7061	122437.	0.000				
29.500	-0.0135	13650614.	-125279.	-0.000522	0.000	1.112E+12
280.9772	124597.	0.000				
30.000	-0.0164	12904904.	-123394.	-0.000451	0.000	1.123E+12
347.3261	126757.	0.000				
30.500	-0.0189	12171570.	-121131.	-0.000384	0.000	1.135E+12
406.8805	128917.	0.000				
31.000	-0.0210	11452763.	-118531.	-0.000322	0.000	1.148E+12
459.7967	131077.	0.000				
31.500	-0.0228	10750396.	-115633.	-0.000264	0.000	1.163E+12
506.2573	133237.	0.000				
32.000	-0.0242	10066152.	-112475.	-0.000211	0.000	1.179E+12
546.4675	135397.	0.000				
32.500	-0.0253	9401485.	-109093.	-0.000162	0.000	1.204E+12
580.6526	137557.	0.000				
33.000	-0.0262	8757634.	-105524.	-0.000122	0.000	1.622E+12
609.0905	139717.	0.000				
33.500	-0.0268	8135649.	-101796.	-9.086E-05	0.000	1.624E+12
633.5304	141877.	0.000				
34.000	-0.0272	7536416.	-97934.	-6.192E-05	0.000	1.625E+12
654.0980	144037.	0.000				
34.500	-0.0275	6960678.	-93958.	-3.517E-05	0.000	1.627E+12
670.9255	146197.	0.000				
35.000	-0.0277	6409046.	-89893.	-1.052E-05	0.000	1.628E+12
684.1512	148357.	0.000				
35.500	-0.0277	5881999.	-85759.	1.213E-05	0.000	1.629E+12

693.9172	150517.	0.000				
36.000	-0.0275	5379893.	-81576.	3.287E-05	0.000	1.630E+12
700.3695	152677.	0.000				
36.500	-0.0273	4902963.	-77364.	5.179E-05	0.000	1.630E+12
703.6556	154837.	0.000				
37.000	-0.0269	4451331.	-73141.	6.900E-05	0.000	1.631E+12
703.9243	156997.	0.000				
37.500	-0.0264	4025009.	-68926.	8.459E-05	0.000	1.632E+12
701.3242	159157.	0.000				
38.000	-0.0259	3623908.	-64734.	9.865E-05	0.000	1.632E+12
696.0030	161317.	0.000				
38.500	-0.0253	3247838.	-60581.	0.000111	0.000	1.632E+12
688.1062	163477.	0.000				
39.000	-0.0246	2896518.	-56484.	0.000123	0.000	1.632E+12
677.7770	165637.	0.000				
39.500	-0.0238	2569577.	-52455.	0.000133	0.000	1.632E+12
665.1548	167797.	0.000				
40.000	-0.0230	2266565.	-48508.	0.000142	0.000	1.632E+12
650.3749	169957.	0.000				
40.500	-0.0221	1986950.	-44656.	0.000149	0.000	1.633E+12
633.5679	172117.	0.000				
41.000	-0.0212	1730131.	-40911.	0.000156	0.000	1.633E+12
614.8589	174277.	0.000				
41.500	-0.0202	1495434.	-37283.	0.000162	0.000	1.633E+12
594.3671	176437.	0.000				
42.000	-0.0192	1282124.	-33784.	0.000167	0.000	1.633E+12
572.2054	178597.	0.000				
42.500	-0.0182	1089405.	-30422.	0.000172	0.000	1.633E+12
548.4798	180757.	0.000				
43.000	-0.0172	916424.	-27206.	0.000175	0.000	1.633E+12
523.2895	182917.	0.000				
43.500	-0.0161	762275.	-24146.	0.000178	0.000	1.633E+12
496.7260	185077.	0.000				
44.000	-0.0150	626003.	-21250.	0.000181	0.000	1.633E+12
468.8738	187237.	0.000				
44.500	-0.0139	506606.	-18523.	0.000183	0.000	1.633E+12
439.8094	189397.	0.000				
45.000	-0.0128	403038.	-15975.	0.000185	0.000	1.633E+12
409.6020	191557.	0.000				
45.500	-0.0117	314214.	-13611.	0.000186	0.000	1.633E+12
378.3133	193717.	0.000				
46.000	-0.0106	239007.	-11439.	0.000187	0.000	1.633E+12
345.9976	195877.	0.000				
46.500	-0.009474	176253.	-9462.4599	0.000188	0.000	1.633E+12
312.7023	198037.	0.000				
47.000	-0.008346	124756.	-7688.9500	0.000188	0.000	1.633E+12
278.4677	200197.	0.000				
47.500	-0.007215	83283.	-6123.5630	0.000189	0.000	1.633E+12
243.3280	202357.	0.000				
48.000	-0.006082	50570.	-4646.2011	0.000189	0.000	1.633E+12
249.1260	245768.	0.000				
48.500	-0.004948	26824.	-3224.7798	0.000189	0.000	1.633E+12
224.6811	272449.	0.000				
49.000	-0.003813	11167.	-1959.0936	0.000189	0.000	1.633E+12
197.2142	310289.	0.000				
49.500	-0.002679	2609.1619	-871.7443	0.000189	0.000	1.633E+12
165.2356	370109.	0.000				
50.000	-0.001544	0.000	0.000	0.000189	0.000	1.633E+12
125.3459	243570.	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. 8:

Pile-head deflection	=	1.5000000	inches
Computed slope at pile head	=	-0.0073591	radians
Maximum bending moment	=	27731133.	inch-lbs
Maximum shear force	=	191481.	lbs
Depth of maximum bending moment	=	16.0000000	feet below pile head
Depth of maximum shear force	=	0.5000000	feet below pile head
Number of iterations	=	14	
Number of zero deflection points	=	1	

Pile-head Deflection vs. Pile Length for Load Case 8

Boundary Condition Type 4, Deflection and Moment

Deflection = 1.50000 in
Moment = 2808000. in- lb
Axial Load = 311000. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment In-lbs	Maximum Shear lbs
50.0000	1.5000000	27731133.	191481.
47.5000	1.5000000	27675434.	189202.
45.0000	1.5000000	27612376.	188801.
42.5000	1.5000000	27402575.	187911.
40.0000	1.5000000	26979813.	186180.
37.5000	1.5000000	26002014.	181764.
35.0000	1.5000000	23971019.	168900.
32.5000	1.5000000	21318151.	-155018.
30.0000	1.5000000	18123005.	-144757.
27.5000	1.5000000	14828393.	-130939.
25.0000	1.5000000	11692252.	-115731.
22.5000	1.5000000	8765229.	-99294.
20.0000	1.5000000	6333756.	-83394.
17.5000	1.5000000	4552671.	-70190.
15.0000	1.5000000	3271292.	-56859.
12.5000	1.5000000	2808000.	-45096.
10.0000	1.5000000	2808000.	-40252.
7.5000	1.5000000	2808000.	60714.
5.0000	1.5000000	2808000.	28175.
5.0000	0.000000	6.224330E+12	5.668093E+12

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 Rotation 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 = 55300.	M = 3729000.	402100.	0.25664708	9304578.	55300.	-0.00154010
2	1	V = 42300.	M = 2808000.	311000.	0.18891412	6917902.	42300.	-0.00113961
3	4	y = 1.0000	M = 3729000.	402100.	1.00000000	21513992.	144640.	-0.00519298
4	4	y = 1.5000	M = 3729000.	402100.	1.50000000	28323825.	189145.	-0.00740380
5	4	y = 2.0000	M = 3729000.	402100.	2.00000000	34739527.	229310.	-0.00954469
6	4	y = 0.5000	M = 2808000.	311000.	0.50000000	13408332.	94031.	-0.00281955
7	4	y = 1.0000	M = 2808000.	311000.	1.00000000	20932816.	146979.	-0.00515063
8	4	y = 1.5000	M = 2808000.	311000.	1.50000000	27731133.	191481.	-0.00735912

The analysis ended normally.

SER 1
$\Delta = 0.19 < 1.0$ OK

LATERAL CAPACITY @ 2" Deflection (SER 1) = 229.3 k
LATERAL CAPACITY @ 1" Deflection (SER II) = 146.98 k

McCORMICK TAYLOR

PROJECT BR I-159 JOB NO. _____ SHEET NO. 1 OF 1

LOCATION JAMES ST OVER CHAISTNA RIVER

SUBJECT ABUT B

DESIGNED BY ZMR DATE 10/14/14 CHECKED BY _____ DATE _____

REVISED BY _____ DATE _____ BACK CHECKED BY _____ DATE _____

REF./REM.

ABUTMENT B

STRENGTH I

AXIAL = 402.1 K

LATERAL = 55.3 K

MOMENT = 3729 K-IN

@ 1" Deflection, Lateral = 144.84 k

@ 1.5" " " = 189.15 k

@ 2.0" " " = 229.3 k

229.3 > 55.3 ok

Actual Deflection = 0.26"

SERVICE II

AXIAL = 311 K

LATERAL = 42.3 K

MOMENT = 2808 K-IN

@ 0.5" Deflection, Lateral = 94.03 k

@ 1.0" " " = 146.98 k

@ 1.5" " " 191.48 k

Actual Deflection = 0.19

[4-#14SSNS @ 13½"]

146.98 k > 42.3 k

GEOTECHNICAL STRENGTH AXIAL CAPACITY

415 k COMPRESSION > 402.1 k ok.

APPENDIX C-2

Piers Design Calculations

PIER 1

LAYER

Boring No. JS-3 By: SJM Chk: AT

OG Elev. = 11.00

Sample No.	Depth of SS run (ft)	N-Values Field	q'_v (ksf)	C_N	N_{CORR}
2	2	18	0.220	1.740	31
3	4	6	0.440	1.608	9
4	6	7	0.266	1.653	12
5	6	50	0.381	1.556	78
6	10	4	0.476	1.482	6
7	12	2	0.671	1.421	3
8	14	44	0.666	1.369	60
9	16	18	0.762	1.325	24
10	18	3	0.857	1.285	4
11	20	4	0.952	1.250	5
13	24	5	1.142	1.189	6
14	26	13	1.236	1.162	15
15	28	49	1.333	1.138	56
16	30	8	1.428	1.114	9
17	32	30	1.523	1.093	33
18	34	33	1.618	1.073	35
19	36	72	1.714	1.053	76
20	38	32	1.809	1.035	33
21	40	30	1.904	1.018	31
22	43	14	2.047	0.994	14
23	46	11	2.285	0.957	11
24	53	25	2.523	0.924	23
25	58	29	2.761	0.894	26
26	63	23	2.999	0.866	20
27	68	10	3.237	0.841	8
28	73	16	3.475	0.817	13
29	78	18	3.713	0.795	14
30	83	37	3.951	0.774	29
31	88	61	4.189	0.755	46
32	93	57	4.427	0.736	42
33	98	46	4.665	0.719	32
34	103	64	4.903	0.702	45
35	108	50	5.141	0.686	34
36	113	50	5.379	0.671	34
37	118	50	5.617	0.656	33
				$N_{Avg\ (Below\ BFE)}$	27

GWTE = 5.0
γ = 110 lb/ft3
γ' = 47.6 lb/ft3

① 3-60
② 8-76
③ 13-46
④ 32-45

C_N= $0.77 x log (40/q'_v)$
N_{CORR} = $N_{Field} \times C_N$
(Ref. AASHTO Eqn 10.4.6.2.4-1)

Boring No. JS-4 By: SJM Chk: AT

OG Elev. = 4.0

Sample No.	Depth of SS run (ft)	N-Values Field	q'_v (ksf)	C_N	N_{CORR}
2A	2	4	0.220	1.740	7
2B	3	3	0.330	1.604	5
3	4	4	0.190	1.768	7
4	6	3	0.266	1.653	5
U-1	8	0	0.381	1.556	0
5	10	2	0.476	1.482	3
6	12	2	0.671	1.421	3
7	14	2	0.666	1.369	3
8	16	4	0.762	1.325	5
9	18	2	0.857	1.285	3
10	23	8	1.095	1.203	10
11	28	36	1.333	1.138	41
12	33	19	1.571	1.083	21
13	38	18	1.809	1.035	19
14	43	32	2.047	0.994	32
15	48	40	2.285	0.957	38
16	53	34	2.523	0.924	31
17	58	22	2.761	0.894	20
18	63	16	2.999	0.866	14
19	68	14	3.237	0.841	12
20	73	25	3.475	0.817	20
21	78	40	3.713	0.795	32
22	83	40	3.951	0.774	31
23	88	46	4.189	0.755	35
24	93	45	4.427	0.736	33
25	98	38	4.665	0.719	27
26	104.7	66	4.984	0.696	61
27	108	50	5.141	0.686	34
28	113.2	50	5.398	0.670	34
29	118	50	5.617	0.656	33
				$N_{Avg\ (Below\ BFE)}$	21

5.0 assume
γ = 110 lb/ft3
γ' = 47.6 lb/ft3

① 0-10
② 12-41
③ 20-35
④ 27-61

C_N= $0.77 x log (40/q'_v)$
N_{CORR} = $N_{Field} \times C_N$
(Ref. AASHTO Eqn 10.4.6.2.4-1)

McCORMICK TAYLOR

PROJECT BR 1-159 JOB NO. _____ SHEET NO. 1 OF 1

LOCATION PIER 1

SUBJECT AXIAL & LATERAL CAPACITIES (4-CSL/INDIVIDUAL DRILLED SHAFTS)

DESIGNED BY SJM DATE 7/14 CHECKED BY AT DATE 8/14

REVISED BY _____ DATE _____ BACK CHECKED BY _____ DATE _____

USE BORING J54.

$x = 0$ x - DEPTH BELOW CAP FOR LATERAL CAPACITY

$x = 2.65'$

$x = 3.25'$

P_u, V_u, M_u

EL +7.25 TOP OF COLUMN

LAYER THICKNESS

▽ MHW ≡ EL. +4.6

NO SCOUR

OG EL +4.0 @ J5-4

LAYER (1)
Soft Organic Clay w. Silt
$\gamma_s = 100$ pcf $\gamma' = 37.6$ pcf
$c = 300$ psf $\ell_{50} = 0.02$
$\phi = 0°$

23'

1/2" CASING @ EL 0.0

$x = 26.25'$

EL +19.0

LAYER (2)
MED DENSE SAND w. Gravel + Silt
$\gamma_s = 130$ pcf $\gamma' = 67.6$ pcf
$\phi = 32°$ $k = 60$ pci
$c = 0$ psf

45'

48" ϕ CASED DRILLED SHAFT

$x = 71.25'$

EL −64.0

LAYER (3)
Stiff to hard Clay
$\gamma_s = 125$ pcf $\gamma' = 62.6$ pcf
$c = 1000$ pcf $\ell_{50} = 0.007$
$k = 200$ pci

25'

$x = 96.25'$

EL −89.0

LAYER (4)
WEATHERED Rock
$\gamma_s = 135$ pcf $\gamma' = 72.6$ pcf
$\phi = 35°$ $k = 125$ pci
$c = 0$ psf

25'

$x = 121.25'$

EL −114.0

END SHAFT @ MIN $x = 111.25'$

REF./REM.

$P_u = 777.5^k$
STR-1 ^{k}
RR = 778 ✓

y FOR AXIAL RESISTANCE SHAFT PROGRAM

$y = 0$

$y = 23'$

$y = 68'$

$y = 93'$

MINIM BOTTOM OF SHAFT
$y = 108'$
AXIAL CAPACITY
$= 778^k$ (389.28 T)
EL −104.0

$y = 118$

AXIAL CAPACITY

SHAFT for Windows, Version 2012.7.11

Serial Number : 228741384

VERTICALLY LOADED DRILLED SHAFT ANALYSIS

Path to file locations : Y:\Bridges\DELDOT\BR1-159_JAMES ST BRIDGE\FOUNDATION REPORT\SHAFT Output\
Name of input data file : Pier 11.sffd.sfd
Name of output file : Pier 11.sffd.sfo
Name of plot output file : Pier 11.sffd.sfp
Name of runtime file : Pier 11.sffd.sfr

Time and Date of Analysis

Date: October 27, 2014 Time: 15:11:36

BR1-159 Pier 1

PROPOSED DEPTH = 110.0 FT

NUMBER OF LAYERS = 4

WATER TABLE DEPTH = 0.0 FT.

SOIL INFORMATION

LAYER NO 1----CLAY

AT THE TOP

STRENGTH REDUCTION FACTOR-ALPHA	= 0.550E+00
END BEARING COEFFICIENT-Nc	= 0.800E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.300E+03
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.100E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.000E+00

AT THE BOTTOM

STRENGTH REDUCTION FACTOR-ALPHA	= 0.550E+00
END BEARING COEFFICIENT-Nc	= 0.800E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.300E+03
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.100E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.230E+02

LRFD RESISTANCE FACTOR (SIDE FRICTION)	= 0.450E+00
LRFD RESISTANCE FACTOR (TIP RESISTANCE)	= 0.400E+00

LAYER NO 2----SAND

AT THE TOP

SKIN FRICTION COEFFICIENT- BETA	= 0.853E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.320E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.130E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.230E+02

AT THE BOTTOM

SKIN FRICTION COEFFICIENT- BETA	= 0.387E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.320E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.130E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.680E+02

LRFD RESISTANCE FACTOR (SIDE FRICTION)	= 0.550E+00
LRFD RESISTANCE FACTOR (TIP RESISTANCE)	= 0.500E+00

LAYER NO 3----CLAY

AT THE TOP

STRENGTH REDUCTION FACTOR-ALPHA	= 0.550E+00
END BEARING COEFFICIENT-Nc	= 0.800E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.100E+04
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.125E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.680E+02

AT THE BOTTOM

STRENGTH REDUCTION FACTOR-ALPHA	= 0.550E+00
END BEARING COEFFICIENT-Nc	= 0.800E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.100E+04
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00

SOIL UNIT WEIGHT, LB/CU FT	= 0.125E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.930E+02
LRFD RESISTANCE FACTOR (SIDE FRICTION)	= 0.450E+00
LRFD RESISTANCE FACTOR (TIP RESISTANCE)	= 0.400E+00

LAYER NO 4----SAND

AT THE TOP

SKIN FRICTION COEFFICIENT- BETA	= 0.250E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.350E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.135E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.930E+02

AT THE BOTTOM

SKIN FRICTION COEFFICIENT- BETA	= 0.250E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.350E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.135E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.118E+03
LRFD RESISTANCE FACTOR (SIDE FRICTION)	= 0.550E+00
LRFD RESISTANCE FACTOR (TIP RESISTANCE)	= 0.500E+00

DRILLED SHAFT INFORMATION

DIAMETER OF STEM	= 4.000	FT.
DIAMETER OF BASE	= 4.000	FT.
END OF STEM TO BASE	= 0.000	FT.
ANGLE OF BELL	= 0.000	DEG.
IGNORED TOP PORTION	= 5.000	FT.
IGNORED BOTTOM PORTION	= 4.000	FT.
AREA OF ONE PERCENT STEEL	= 18.098	SQ.IN.
ELASTIC MODULUS, Ec	= 0.312E+07	LB/SQ IN
VOLUME OF UNDERREAM	= 0.000	CU.YDS.

PREDICTED RESULTS

QS = ULTIMATE SIDE RESISTANCE;
QB = ULTIMATE BASE RESISTANCE;
WT = WEIGHT OF DRILLED SHAFT (UPLIFT CAPACITY ONLY);
QU = TOTAL ULTIMATE RESISTANCE;
LRFD QS = TOTAL SIDE FRICTION USING LRFD RESISTANCE FACTOR

TO THE ULTIMATE SIDE RESISTANCE;
LRFD QB = TOTAL BASE BEARING USING LRFD RESISTANCE FACTOR
TO THE ULTIMATE BASE RESISTANCE
LRFD QU = TOTAL CAPACITY WITH LRFD RESISTANCE FACTOR.

LENGTH (FEET)	VOLUME (CU.YDS)	QS (TONS)	QB (TONS)	QU (TONS)	LRFD QS (TONS)	LRFD QB (TONS)	LRFD QU (TONS)
10.0	4.65	1.04	15.08	16.12	0.47	6.03	6.50
11.0	5.12	2.07	15.08	17.16	0.93	6.03	6.97
12.0	5.59	3.11	15.08	18.19	1.40	6.03	7.43
13.0	6.05	4.15	15.08	19.23	1.87	6.03	7.90
14.0	6.52	5.18	15.08	20.27	2.33	6.03	8.37
15.0	6.98	6.22	15.08	21.30	2.80	6.03	8.83
16.0	7.45	7.26	22.88	30.13	3.27	9.15	12.42
17.0	7.91	8.29	31.53	39.83	3.73	12.61	16.35
18.0	8.38	9.33	41.06	50.39	4.20	16.42	20.62
19.0	8.84	10.37	51.45	61.82	4.67	20.58	25.25
20.0	9.31	11.41	59.24	70.65	5.13	23.70	28.83
21.0	9.78	12.44	64.44	76.88	5.60	25.78	31.38
22.0	10.24	13.48	67.04	80.52	6.07	26.82	32.88
23.0	10.71	14.52	67.04	81.55	6.53	33.52	40.05
24.0	11.17	15.55	67.04	82.59	7.00	33.52	40.52
25.0	11.64	16.59	67.04	83.63	7.47	33.52	40.98
26.0	12.10	17.63	67.04	84.66	7.93	33.52	41.45
27.0	12.57	18.66	67.04	85.70	8.40	33.52	41.92
28.0	13.03	23.40	67.04	90.44	11.00	33.52	44.52
29.0	13.50	28.41	67.04	95.45	13.76	33.52	47.28
30.0	13.96	33.68	67.04	100.72	16.66	33.52	50.18
31.0	14.43	39.21	67.04	106.25	19.70	33.52	53.22
32.0	14.90	44.98	67.04	112.02	22.87	33.52	56.39
33.0	15.36	50.99	67.04	118.02	26.18	33.52	59.69
34.0	15.83	57.22	67.04	124.26	29.60	33.52	63.12
35.0	16.29	63.67	67.04	130.71	33.15	33.52	66.67
36.0	16.76	70.33	67.04	137.37	36.82	33.52	70.33
37.0	17.22	77.19	67.04	144.23	40.59	33.52	74.11
38.0	17.69	84.24	67.04	151.28	44.47	33.52	77.99
39.0	18.15	91.48	67.04	158.52	48.45	33.52	81.97
40.0	18.62	98.90	67.04	165.93	52.53	33.52	86.05
41.0	19.08	106.48	67.04	173.52	56.70	33.52	90.22
42.0	19.55	114.22	67.04	181.26	60.95	33.52	94.47
43.0	20.02	122.12	67.04	189.15	65.30	33.52	98.82
44.0	20.48	130.16	67.04	197.19	69.72	33.52	103.24
45.0	20.95	138.34	67.04	205.37	74.22	33.52	107.74
46.0	21.41	146.64	67.04	213.68	78.79	33.52	112.31
47.0	21.88	155.08	67.04	222.12	83.43	33.52	116.95
48.0	22.34	163.63	67.04	230.66	88.13	33.52	121.65
49.0	22.81	172.29	67.04	239.32	92.89	33.52	126.41
50.0	23.27	181.05	67.04	248.09	97.71	33.52	131.23
51.0	23.74	189.90	67.04	256.94	102.58	33.52	136.10
52.0	24.21	198.85	67.04	265.89	107.50	33.52	141.02
53.0	24.67	207.88	67.04	274.92	112.47	33.52	145.99
54.0	25.14	216.98	67.04	284.02	117.47	33.52	150.99
55.0	25.60	226.15	67.04	293.19	122.52	33.52	156.04
56.0	26.07	235.39	67.04	302.43	127.60	33.52	161.12
57.0	26.53	244.68	67.04	311.72	132.71	33.52	166.23
58.0	27.00	254.02	67.04	321.06	137.85	33.52	171.37
59.0	27.46	263.41	67.04	330.45	143.01	33.52	176.53
60.0	27.93	272.83	67.04	339.87	148.19	33.52	181.71
61.0	28.39	282.29	64.52	346.81	153.39	32.26	185.65
62.0	28.86	291.77	61.73	353.49	158.61	30.86	189.47
63.0	29.33	301.27	58.65	359.92	163.83	29.33	193.16
64.0	29.79	310.78	55.30	366.08	169.06	27.65	196.71
65.0	30.26	320.30	52.79	373.09	174.30	26.39	200.69

66.0	30.72	329.82	51.11	380.93	179.54	25.56	205.09
67.0	31.19	339.34	50.27	389.61	184.77	25.14	209.91
68.0	31.65	348.85	50.27	399.12	190.00	20.11	210.11
69.0	32.12	358.34	50.27	408.61	195.22	20.11	215.33
70.0	32.58	367.81	50.27	418.08	200.43	20.11	220.54
71.0	33.05	377.26	50.27	427.53	205.62	20.11	225.73
72.0	33.51	386.67	50.27	436.94	210.80	20.11	230.91
73.0	33.98	390.13	50.27	440.40	212.36	20.11	232.47
74.0	34.45	393.58	50.27	443.85	213.91	20.11	234.02
75.0	34.91	397.04	50.27	447.31	215.47	20.11	235.58
76.0	35.38	400.49	50.27	450.77	217.02	20.11	237.13
77.0	35.84	403.95	50.27	454.22	218.58	20.11	238.69
78.0	36.31	407.41	50.27	457.68	220.13	20.11	240.24
79.0	36.77	410.86	50.27	461.14	221.69	20.11	241.80
80.0	37.24	414.32	50.27	464.59	223.24	20.11	243.35
81.0	37.70	417.78	50.27	468.05	224.80	20.11	244.91
82.0	38.17	421.23	50.27	471.50	226.35	20.11	246.46
83.0	38.63	424.69	50.27	474.96	227.91	20.11	248.02
84.0	39.10	428.14	50.27	478.42	229.47	20.11	249.57
85.0	39.57	431.60	50.27	481.87	231.02	20.11	251.13
86.0	40.03	435.06	67.87	502.93	232.58	27.15	259.72
87.0	40.50	438.51	87.42	525.94	234.13	34.97	269.10
88.0	40.96	441.97	108.93	550.90	235.69	43.57	279.26
89.0	41.43	445.43	132.40	577.82	237.24	52.96	290.20
90.0	41.89	448.88	150.00	598.88	238.80	60.00	298.80
91.0	42.36	452.34	161.73	614.07	240.35	64.69	305.04
92.0	42.82	455.79	167.59	623.39	241.91	67.04	308.95
93.0	43.29	459.25	167.59	626.84	243.46	83.80	327.26
94.0	43.76	462.71	167.59	630.30	245.02	83.80	328.82
95.0	44.22	466.16	167.59	633.76	246.57	83.80	330.37
96.0	44.69	469.62	167.59	637.21	248.13	83.80	331.93
97.0	45.15	473.07	167.59	640.67	249.68	83.80	333.48
98.0	45.62	481.73	167.59	649.32	254.44	83.80	338.24
99.0	46.08	490.50	167.59	658.09	259.27	83.80	343.06
100.0	46.55	499.38	167.59	666.97	264.15	83.80	347.95
101.0	47.01	508.37	167.59	675.97	269.10	83.80	352.89
102.0	47.48	517.48	167.59	685.08	274.11	83.80	357.90
103.0	47.94	526.71	167.59	694.30	279.18	83.80	362.98
104.0	48.41	536.04	167.59	703.64	284.32	83.80	368.11
105.0	48.88	545.49	167.59	713.09	289.51	83.80	373.31
106.0	49.34	555.06	167.59	722.65	294.78	83.80	378.57
107.0	49.81	564.74	167.59	732.33	300.10	83.80	383.90
108.0	50.27	574.53	167.59	742.13	305.49	83.80	389.28
109.0	50.74	584.44	167.59	752.04	310.94	83.80	394.73

y = 108'

R_R = 778 k

RESULT FROM TREND (AVERAGED) LINE

TOP LOAD ton	TOP MOVEMENT IN.	TIP LOAD ton	TIP MOVEMENT IN.
0.5497E-01	0.2385E-04	0.1222E-02	0.1000E-04
0.2748E+00	0.1193E-03	0.6110E-02	0.5000E-04
0.5497E+00	0.2385E-03	0.1222E-01	0.1000E-03
0.2748E+02	0.1193E-01	0.6110E+00	0.5000E-02
0.4123E+02	0.1789E-01	0.9165E+00	0.7500E-02
0.5504E+02	0.2386E-01	0.1222E+01	0.1000E-01
0.1375E+03	0.5971E-01	0.3055E+01	0.2500E-01
0.2500E+03	0.1148E+00	0.6110E+01	0.5000E-01
0.3262E+03	0.1601E+00	0.9165E+01	0.7500E-01
0.3814E+03	0.2011E+00	0.1222E+02	0.1000E+00
0.5184E+03	0.3921E+00	0.3052E+02	0.2500E+00
0.5719E+03	0.6626E+00	0.5978E+02	0.5000E+00

0.5820E+03	0.7927E+00	0.7200E+02	0.6250E+00
0.6059E+03	0.1381E+01	0.1073E+03	0.1200E+01
0.6675E+03	0.2609E+01	0.1701E+03	0.2400E+01

RESULT FROM UPPER-BOUND LINE

TOP LOAD ton	TOP MOVEMENT IN.	TIP LOAD ton	TIP MOVEMENT IN.
0.8271E-01	0.3033E-04	0.1746E-02	0.1000E-04
0.4135E+00	0.1517E-03	0.8729E-02	0.5000E-04
0.8271E+00	0.3033E-03	0.1746E-01	0.1000E-03
0.4135E+02	0.1517E-01	0.8729E+00	0.5000E-02
0.6218E+02	0.2277E-01	0.1309E+01	0.7500E-02
0.8303E+02	0.3038E-01	0.1746E+01	0.1000E-01
0.2042E+03	0.7584E-01	0.4364E+01	0.2500E-01
0.3532E+03	0.1413E+00	0.8729E+01	0.5000E-01
0.4355E+03	0.1894E+00	0.1309E+02	0.7500E-01
0.4861E+03	0.2298E+00	0.1746E+02	0.1000E+00
0.5800E+03	0.4114E+00	0.4350E+02	0.2500E+00
0.6196E+03	0.6800E+00	0.8310E+02	0.5000E+00
0.6335E+03	0.8120E+00	0.9968E+02	0.6250E+00
0.6536E+03	0.1397E+01	0.1274E+03	0.1200E+01
0.7072E+03	0.2622E+01	0.1810E+03	0.2400E+01

RESULT FROM LOWER-BOUND LINE

TOP LOAD ton	TOP MOVEMENT IN.	TIP LOAD ton	TIP MOVEMENT IN.
0.3156E-01	0.1814E-04	0.6983E-03	0.1000E-04
0.1578E+00	0.9069E-04	0.3492E-02	0.5000E-04
0.3156E+00	0.1814E-03	0.6983E-02	0.1000E-03
0.1578E+02	0.9069E-02	0.3492E+00	0.5000E-02
0.2367E+02	0.1360E-01	0.5237E+00	0.7500E-02
0.3156E+02	0.1814E-01	0.6983E+00	0.1000E-01
0.7905E+02	0.4537E-01	0.1746E+01	0.2500E-01
0.1526E+03	0.8969E-01	0.3492E+01	0.5000E-01
0.2147E+03	0.1310E+00	0.5237E+01	0.7500E-01
0.2681E+03	0.1705E+00	0.6983E+01	0.1000E+00
0.4541E+03	0.3722E+00	0.1753E+02	0.2500E+00
0.5237E+03	0.6451E+00	0.3645E+02	0.5000E+00
0.5286E+03	0.7730E+00	0.4431E+02	0.6250E+00
0.5583E+03	0.1364E+01	0.8715E+02	0.1200E+01
0.6279E+03	0.2597E+01	0.1592E+03	0.2400E+01

PIER 1
LATERAL CAPACITY

LPile Plus for Windows, Version 2013-07.007

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

This copy of LPile is used by:

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Files Used for Analysis

Path to file locations: Y:\Bridges\DELDOT\BR1-159_JAMES ST BRIDGE\FOUNDATION REPORT\LPILE Output\
Name of input data file: Pier 11aff.lp7d
Name of output report file: Pier 11aff.lp7o
Name of plot output file: Pier 11aff.lp7p
Name of runtime messeage file: Pier 11aff.lp7r

Date and Time of Analysis

Date: October 27, 2014 Time: 15:28:45

Problem Title

Project Name: BR1-159 Pier 1

Job Number:

Client: DelDOT

Engineer: SJM

Description: Pier 1 Lateral Capacity

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 = 500
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 300.0000 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 = 111.25 ft

Depth of ground surface below top of pile = 3.25 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	48.0000000
2	7.250000	48.0000000
3	7.250000	49.0000000

4	111.250000	49.0000000

Input Structural Properties:

Pile Section No. 1:

Section Type	=	Drilled Shaft (Bored Pile)
Section Length	=	7.25000 ft
Section Diameter	=	48.00000 in

Pile Section No. 2:

Section Type	=	Drilled Shaft with Permanent Casing
Section Length	=	104.00000 ft
Section Diameter	=	49.00000 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 soft clay, p-y criteria by Matlock, 1970

Distance from top of pile to top of layer	=	3.25000 ft
Distance from top of pile to bottom of layer	=	26.25000 ft
Effective unit weight at top of layer	=	37.60000 pcf
Effective unit weight at bottom of layer	=	37.60000 pcf
Undrained cohesion at top of layer	=	300.00000 psf
Undrained cohesion at bottom of layer	=	300.00000 psf
Epsilon-50 at top of layer	=	0.02000
Epsilon-50 at bottom of layer	=	0.02000

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

Distance from top of pile to top of layer	=	26.25000 ft
Distance from top of pile to bottom of layer	=	71.25000 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	=	32.00000 deg.
Friction angle at bottom of layer	=	32.00000 deg.
Subgrade k at top of layer	=	60.00000 pci
Subgrade k at bottom of layer	=	60.00000 pci

Layer 3 is stiff clay with water-induced erosion

Distance from top of pile to top of layer	=	71.25000 ft
Distance from top of pile to bottom of layer	=	96.25000 ft
Effective unit weight at top of layer	=	62.60000 pcf
Effective unit weight at bottom of layer	=	62.60000 pcf
Undrained cohesion at top of layer	=	1000.00000 psf
Undrained cohesion at bottom of layer	=	1000.00000 psf
Epsilon-50 at top of layer	=	0.00700
Epsilon-50 at bottom of layer	=	0.00700
Subgrade k at top of layer	=	200.00000 pci
Subgrade k at bottom of layer	=	200.00000 pci

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

Distance from top of pile to top of layer	=	96.25000 ft
Distance from top of pile to bottom of layer	=	121.25000 ft
Effective unit weight at top of layer	=	72.60000 pcf
Effective unit weight at bottom of layer	=	72.60000 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	=	125.00000 pci
Subgrade k at bottom of layer	=	125.00000 pci

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

Summary of Soil Properties

Layer Num.	Soil Type (p-y Curve Criteria)	Strain Factor Epsilon 50	kpy pci	Layer Depth ft	Effective Unit Wt. pcf	Undrained Cohesion psf	Angle of Friction deg.
1	Soft Clay	0.02000	--	3.250	37.600	300.000	--
		0.02000	--	26.250	37.600	300.000	--
2	Sand (Reese, et al.)		60.000	26.250	67.600	--	32.000
			60.000	71.250	67.600	--	32.000
3	Stiff Clay with Free Water	0.00700	200.000	71.250	62.600	1000.000	--
		0.00700	200.000	96.250	62.600	1000.000	--
4	Sand (Reese, et al.)		125.000	96.250	72.600	--	35.000
			125.000	121.250	72.600	--	35.000

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 = 10

Load No.	Load Compute Type Top y vs. Pile	Condition 1		Condition 2		Axial Thrust Force, lbs
1	4 No	y =	0.50000 in	M =	5499600. in-lbs	0.0000000
2	4 No	y =	1.00000 in	M =	5499600. in-lbs	0.0000000
3	4 No	y =	1.50000 in	M =	5499600. in-lbs	0.0000000
4	4 Yes	y =	2.00000 in	M =	5499600. in-lbs	0.0000000
5	4 No	y =	0.50000 in	M =	783600. in-lbs	0.0000000
6	4 Yes	y =	1.00000 in	M =	783600. in-lbs	0.0000000
7	4 No	y =	1.50000 in	M =	783600. in-lbs	0.0000000
8	4 No	y =	2.00000 in	M =	783600. in-lbs	0.0000000
9	1 Yes	V =	13600. lbs	M =	5499600. in-lbs	0.0000000
10	1 Yes	V =	9900.00000 lbs	M =	783600. in-lbs	0.0000000

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

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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	=	7.25000 ft
Shaft Diameter	=	48.00000 in
Concrete Cover Thickness	=	4.00000 in
Number of Reinforcing Bars	=	50 bars

Yield Stress of Reinforcing Bars	=	60000. psi
Modulus of Elasticity of Reinforcing Bars	=	29000000. psi
Gross Area of Shaft	=	1809.55737 sq. in.
Total Area of Reinforcing Steel	=	39.50000 sq. in.
Area Ratio of Steel Reinforcement	=	2.18 percent
Edge-to-Edge Bar Spacing	=	2.89438 in
Maximum Concrete Aggregate Size	=	0.37500 in
Ratio of Bar Spacing to Aggregate Size	=	7.72
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	=	9140.470 kips
Tensile Load for Cracking of Concrete	=	-911.303 kips
Nominal Axial Tensile Capacity	=	-2370.000 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.00000	0.79000	19.49359	-0.49995
2	1.00000	0.79000	19.49359	0.49995
3	1.00000	0.79000	19.00549	4.36362
4	1.00000	0.79000	18.75683	5.33210
5	1.00000	0.79000	17.32321	8.95300
6	1.00000	0.79000	16.84151	9.82921
7	1.00000	0.79000	14.55245	12.97984
8	1.00000	0.79000	13.86798	13.70873
9	1.00000	0.79000	10.86731	16.19110
10	1.00000	0.79000	10.02307	16.72687
11	1.00000	0.79000	6.49933	18.38501
12	1.00000	0.79000	5.54837	18.69400
13	1.00000	0.79000	1.72297	19.42373
14	1.00000	0.79000	0.72505	19.48652
15	1.00000	0.79000	-3.16164	19.24199
16	1.00000	0.79000	-4.14382	19.05462
17	1.00000	0.79000	-7.84760	17.85119
18	1.00000	0.79000	-8.75233	17.42546
19	1.00000	0.79000	-12.04047	15.33875
20	1.00000	0.79000	-12.81090	14.70139
21	1.00000	0.79000	-15.47679	11.86251
22	1.00000	0.79000	-16.06451	11.05358
23	1.00000	0.79000	-17.94064	7.64091
24	1.00000	0.79000	-18.30872	6.71123
25	1.00000	0.79000	-19.27722	2.93920
26	1.00000	0.79000	-19.40254	1.94719
27	1.00000	0.79000	-19.40254	-1.94719
28	1.00000	0.79000	-19.27722	-2.93920
29	1.00000	0.79000	-18.30872	-6.71123
30	1.00000	0.79000	-17.94064	-7.64091
31	1.00000	0.79000	-16.06451	-11.05358
32	1.00000	0.79000	-15.47679	-11.86251
33	1.00000	0.79000	-12.81090	-14.70139
34	1.00000	0.79000	-12.04047	-15.33875
35	1.00000	0.79000	-8.75233	-17.42546
36	1.00000	0.79000	-7.84760	-17.85119
37	1.00000	0.79000	-4.14382	-19.05462
38	1.00000	0.79000	-3.16164	-19.24199
39	1.00000	0.79000	0.72505	-19.48652
40	1.00000	0.79000	1.72297	-19.42373

41	1.00000	0.79000	5.54837	-18.69400
42	1.00000	0.79000	6.49933	-18.38501
43	1.00000	0.79000	10.02307	-16.72687
44	1.00000	0.79000	10.86731	-16.19110
45	1.00000	0.79000	13.86798	-13.70873
46	1.00000	0.79000	14.55245	-12.97984
47	1.00000	0.79000	16.84151	-9.82921
48	1.00000	0.79000	17.32321	-8.95300
49	1.00000	0.79000	18.75683	-5.33210
50	1.00000	0.79000	19.00549	-4.36362

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

Minimum spacing between any two bars not equal to zero = -0.0001096 inches between Bars 1 and 2

Spacing to aggregate size ratio = -0.0002922

Concrete Properties:

Compressive Strength of Concrete	=	4500.00000 psi
Modulus of Elasticity of Concrete	=	3823676. psi
Modulus of Rupture of Concrete	=	-503.11528 psi
Compression Strain at Peak Stress	=	0.00200
Tensile Strain at Fracture of Concrete	=	-0.0001152
Maximum Coarse Aggregate Size	=	0.37500 in

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

Number	Axial Thrust Force kips
1	0.000

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 = 0.000 kips

Bending Max Concrete Stress rad/in.	Bending Max Steel Stress ksi	Bending Moment in-kip	Run Msg	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in
0.000000625	845.9514339	1353522294.		24.0001518	0.0000150	-0.0000150	
0.0665544	0.4306528						
0.000001250	1688.2814444	1350625155.		24.0001524	0.0000300	-0.0000300	
0.1326129	0.8613055						
0.000001875	2526.9900314	1347728017.		24.0001529	0.0000450	-0.0000450	
0.1981756	1.2919583						
0.000002500	3362.0771951	1344830878.		24.0001534	0.0000600	-0.0000600	
0.2632425	1.7226111						
0.000003125	4193.5429353	1341933739.		24.0001540	0.0000750	-0.0000750	
0.3278135	2.1532639						
0.000003750	5021.3872521	1339036601.		24.0001545	0.0000900	-0.0000900	
0.3918887	2.5839168						
0.000004375	5845.6101456	1336139462.		24.0001551	0.0001050	-0.0001050	
0.4554681	3.0145696						
0.000005000	5845.6101456	1169122029.		14.1767436	0.0000709	-0.0001691	
0.3080092	-4.8695722		C				
0.000005625	5845.6101456	1039219581.		14.1814610	0.0000798	-0.0001902	
0.3458573	-5.4774992		C				
0.000006250	5845.6101456	935297623.		14.1861892	0.0000887	-0.0002113	
0.3835595	-6.0852532		C				
0.000006875	5845.6101456	850270567.		14.1909283	0.0000976	-0.0002324	
0.4211155	-6.6928337		C				
0.000007500	5845.6101456	779414686.		14.1956783	0.0001065	-0.0002535	
0.4585249	-7.3002399		C				
0.000008125	5845.6101456	719459710.		14.2004394	0.0001154	-0.0002746	
0.4957876	-7.9074715		C				
0.000008750	5845.6101456	668069731.		14.2052115	0.0001243	-0.0002957	
0.5329033	-8.5145276		C				
0.000009375	5845.6101456	623531749.		14.2099947	0.0001332	-0.0003168	
0.5698716	-9.1214077		C				
0.0000100	5845.6101456	584561015.		14.2147891	0.0001421	-0.0003379	
0.6066924	-9.7281112		C				
0.0000106	5845.6101456	550175073.		14.2195946	0.0001511	-0.0003589	
0.6433653	-10.3346374		C				
0.0000113	5845.6101456	519609791.		14.2244115	0.0001600	-0.0003800	
0.6798902	-10.9409857		C				
0.0000119	5845.6101456	492261907.		14.2292396	0.0001690	-0.0004010	
0.7162666	-11.5471556		C				
0.0000125	5845.6101456	467648812.		14.2340792	0.0001779	-0.0004221	
0.7524943	-12.1531463		C				
0.0000131	5845.6101456	445379821.		14.2389301	0.0001869	-0.0004431	
0.7885732	-12.7589572		C				
0.0000138	5845.6101456	425135283.		14.2437926	0.0001959	-0.0004641	
0.8245028	-13.3645877		C				
0.0000144	6023.7945632	419046578.		14.2486666	0.0002048	-0.0004852	
0.8602829	-13.9700371		C				
0.0000150	6283.5150883	418901006.		14.2535522	0.0002138	-0.0005062	
0.8959132	-14.5753048		C				
0.0000156	6543.0489845	418755135.		14.2584494	0.0002228	-0.0005272	
0.9313934	-15.1803901		C				
0.0000163	6802.3956702	418608964.		14.2633583	0.0002318	-0.0005482	
0.9667234	-15.7852924		C				
0.0000169	7061.5545606	418462492.		14.2682790	0.0002408	-0.0005692	
1.0019026	-16.3900109		C				
0.0000175	7320.5250670	418315718.		14.2732116	0.0002498	-0.0005902	
1.0369310	-16.9945451		C				
0.0000181	7579.3065976	418168640.		14.2781560	0.0002588	-0.0006112	
1.0718081	-17.5988942		C				
0.0000188	7837.8985565	418021256.		14.2831123	0.0002678	-0.0006322	
1.1065338	-18.2030577		C				

0.0000194	8096.3003444	417873566.	14.2880807	0.0002768	-0.0006532
1.1411076	-18.8070346 C				
0.0000200	8354.5113583	417725568.	14.2930611	0.0002859	-0.0006741
1.1755294	-19.4108245 C				
0.0000206	8612.5309914	417577260.	14.2980536	0.0002949	-0.0006951
1.2097988	-20.0144267 C				
0.0000213	8870.3586334	417428642.	14.3030584	0.0003039	-0.0007161
1.2439155	-20.6178403 C				
0.0000219	9127.9936698	417279711.	14.3080753	0.0003130	-0.0007370
1.2778793	-21.2210647 C				
0.0000225	9385.4354826	417130466.	14.3131046	0.0003220	-0.0007580
1.3116898	-21.8240993 C				
0.0000231	9642.6834500	416980906.	14.3181462	0.0003311	-0.0007789
1.3453467	-22.4269432 C				
0.0000238	9899.7369459	416831029.	14.3232002	0.0003402	-0.0007998
1.3788497	-23.0295958 C				
0.0000244	10157.	416680834.	14.3282668	0.0003493	-0.0008207
1.4121986	-23.6320564 C				
0.0000256	10670.	416379475.	14.3384375	0.0003674	-0.0008626
1.4784325	-24.8363989 C				
0.0000269	11182.	416076834.	14.3486590	0.0003856	-0.0009044
1.5440460	-26.0399641 C				
0.0000281	11694.	415772890.	14.3589318	0.0004038	-0.0009462
1.6090366	-27.2427466 C				
0.0000294	12204.	415467630.	14.3692563	0.0004221	-0.0009879
1.6734018	-28.4447402 C				
0.0000306	12714.	415161043.	14.3796331	0.0004404	-0.0010296
1.7371390	-29.6459388 C				
0.0000319	13223.	414853116.	14.3900627	0.0004587	-0.0010713
1.8002456	-30.8463362 C				
0.0000331	13732.	414543834.	14.4005458	0.0004770	-0.0011130
1.8627191	-32.0459262 C				
0.0000344	14239.	414233186.	14.4110828	0.0004954	-0.0011546
1.9245567	-33.2447024 C				
0.0000356	14746.	413921159.	14.4216743	0.0005138	-0.0011962
1.9857559	-34.4426584 C				
0.0000369	15252.	413607737.	14.4323209	0.0005322	-0.0012378
2.0463138	-35.6397875 C				
0.0000381	15757.	413292908.	14.4430232	0.0005506	-0.0012794
2.1062279	-36.8360832 C				
0.0000394	16261.	412976658.	14.4537818	0.0005691	-0.0013209
2.1654952	-38.0315387 C				
0.0000406	16764.	412658972.	14.4645973	0.0005876	-0.0013624
2.2241131	-39.2261471 C				
0.0000419	17267.	412339835.	14.4754703	0.0006062	-0.0014038
2.2820786	-40.4199016 C				
0.0000431	17768.	412019235.	14.4864015	0.0006247	-0.0014453
2.3393890	-41.6127951 C				
0.0000444	18269.	411697154.	14.4973914	0.0006433	-0.0014867
2.3960413	-42.8048205 C				
0.0000456	18769.	411373579.	14.5084408	0.0006619	-0.0015281
2.4520326	-43.9959704 C				
0.0000469	19268.	411048519.	14.5195502	0.0006806	-0.0015694
2.5073600	-45.1862362 C				
0.0000481	19766.	410721909.	14.5307205	0.0006993	-0.0016107
2.5620203	-46.3756131 C				
0.0000494	20263.	410393756.	14.5419521	0.0007180	-0.0016520
2.6160105	-47.5640922 C				
0.0000506	20759.	410064046.	14.5532459	0.0007368	-0.0016932
2.6693276	-48.7516657 C				
0.0000519	21255.	409732761.	14.5646025	0.0007555	-0.0017345
2.7219685	-49.9383259 C				
0.0000531	21749.	409399885.	14.5760227	0.0007744	-0.0017756

2.7739299	-51.1240649 C				
0.0000544	22243.	409065400.	14.5875072	0.0007932	-0.0018168
2.8252088	-52.3088745 C				
0.0000556	22736.	408729291.	14.5990567	0.0008121	-0.0018579
2.8758017	-53.4927466 C				
0.0000569	23227.	408391538.	14.6106719	0.0008310	-0.0018990
2.9257055	-54.6756728 C				
0.0000581	23718.	408052124.	14.6223538	0.0008499	-0.0019401
2.9749169	-55.8576448 C				
0.0000594	24208.	407711031.	14.6341029	0.0008689	-0.0019811
3.0234323	-57.0386538 C				
0.0000606	24697.	407368552.	14.6457265	0.0008879	-0.0020221
3.0712187	-58.2190319 C				
0.0000619	25185.	407024713.	14.6572221	0.0009069	-0.0020631
3.1182718	-59.3987969 C				
0.0000631	25672.	406679201.	14.6687831	0.0009260	-0.0021040
3.1646176	-60.0000000 CY				
0.0000644	26158.	406331998.	14.6804101	0.0009451	-0.0021449
3.2102527	-60.0000000 CY				
0.0000656	26643.	405983085.	14.6921039	0.0009642	-0.0021858
3.2551736	-60.0000000 CY				
0.0000669	27127.	405632443.	14.7038654	0.0009833	-0.0022267
3.2993766	-60.0000000 CY				
0.0000681	27610.	405280053.	14.7156953	0.0010025	-0.0022675
3.3428584	-60.0000000 CY				
0.0000694	28092.	404925896.	14.7275946	0.0010217	-0.0023083
3.3856151	-60.0000000 CY				
0.0000706	28573.	404569952.	14.7395639	0.0010410	-0.0023490
3.4276432	-60.0000000 CY				
0.0000719	29044.	404091673.	14.7500835	0.0010602	-0.0023898
3.4687035	-60.0000000 CY				
0.0000731	29475.	403072266.	14.7537205	0.0010789	-0.0024311
3.5079550	-60.0000000 CY				
0.0000744	29858.	401455043.	14.7495436	0.0010970	-0.0024730
3.5452601	-60.0000000 CY				
0.0000794	31135.	392246336.	14.6948027	0.0011664	-0.0026436
3.6813494	-60.0000000 CY				
0.0000844	32160.	381149774.	14.6090319	0.0012326	-0.0028174
3.8013803	-60.0000000 CY				
0.0000894	33012.	369362560.	14.5055975	0.0012964	-0.0029936
3.9079319	-60.0000000 CY				
0.0000944	33740.	357505362.	14.3951856	0.0013585	-0.0031715
4.0031450	-60.0000000 CY				
0.0000994	34377.	345931693.	14.2834974	0.0014194	-0.0033506
4.0883438	-60.0000000 CY				
0.0001044	34935.	334703122.	14.1715893	0.0014792	-0.0035308
4.1641357	-60.0000000 CY				
0.0001094	35431.	323940666.	14.0579740	0.0015376	-0.0037124
4.2307884	-60.0000000 CY				
0.0001144	35871.	313627073.	13.9461294	0.0015951	-0.0038949
4.2891684	-60.0000000 CY				
0.0001194	36273.	303860741.	13.8392296	0.0016521	-0.0040779
4.3399744	-60.0000000 CY				
0.0001244	36632.	294530941.	13.7351344	0.0017083	-0.0042617
4.3832660	-60.0000000 CY				
0.0001294	36961.	285688006.	13.6338565	0.0017639	-0.0044461
4.4193369	-60.0000000 CY				
0.0001344	37263.	277303670.	13.5348499	0.0018187	-0.0046313
4.4484203	-60.0000000 CY				
0.0001394	37535.	269310170.	13.4391679	0.0018731	-0.0048169
4.4708379	-60.0000000 CY				
0.0001444	37783.	261702218.	13.3473027	0.0019270	-0.0050030
4.4868079	-60.0000000 CY				

0.0001494	38022.	254539263.	13.2620016	0.0019810	-0.0051890	
4.4965333	-60.0000000	CY				
0.0001544	38238.	247698346.	13.1787297	0.0020345	-0.0053755	
4.4999879	-60.0000000	CY				
0.0001594	38435.	241162765.	13.0959086	0.0020872	-0.0055628	
4.4991008	-60.0000000	CY				
0.0001644	38615.	234919408.	13.0163967	0.0021396	-0.0057504	
4.4961694	60.0000000	CY				
0.0001694	38781.	228965876.	12.9406891	0.0021918	-0.0059382	
4.4998350	60.0000000	CY				
0.0001744	38944.	223333425.	12.8709600	0.0022444	-0.0061256	
4.4972710	60.0000000	CY				
0.0001794	39093.	217937643.	12.8035616	0.0022966	-0.0063134	
4.4999672	60.0000000	CY				
0.0001844	39230.	212773812.	12.7393054	0.0023488	-0.0065012	
4.4971745	60.0000000	CY				
0.0001894	39357.	207826445.	12.6749886	0.0024003	-0.0066897	
4.4999003	60.0000000	CY				
0.0001944	39475.	203085332.	12.6125107	0.0024516	-0.0068784	
4.4956386	60.0000000	CY				
0.0001994	39581.	198527530.	12.5515567	0.0025025	-0.0070675	
4.4993210	60.0000000	CY				
0.0002044	39686.	194183848.	12.4946057	0.0025536	-0.0072564	
4.4949946	60.0000000	CY				
0.0002094	39789.	190038278.	12.4414757	0.0026049	-0.0074451	
4.4972998	60.0000000	CY				
0.0002144	39883.	186045078.	12.3892958	0.0026560	-0.0076340	
4.4997925	60.0000000	CY				
0.0002194	39974.	182216468.	12.3398762	0.0027071	-0.0078229	
4.4921838	60.0000000	CY				
0.0002244	40057.	178526610.	12.2917083	0.0027580	-0.0080120	
4.4971340	60.0000000	CY				
0.0002294	40137.	174983396.	12.2454771	0.0028088	-0.0082012	
4.4996503	60.0000000	CY				
0.0002344	40210.	171561779.	12.1978486	0.0028589	-0.0083911	
4.4945873	60.0000000	CY				
0.0002394	40279.	168266185.	12.1516759	0.0029088	-0.0085812	
4.4947195	60.0000000	CY				
0.0002444	40343.	165084525.	12.1063441	0.0029585	-0.0087715	
4.4982677	60.0000000	CY				
0.0002494	40406.	162028002.	12.0632455	0.0030083	-0.0089617	
4.4998905	60.0000000	CYT				
0.0002544	40468.	159086090.	12.0224625	0.0030582	-0.0091518	
4.4926204	60.0000000	CYT				
0.0002594	40529.	156254980.	11.9837750	0.0031083	-0.0093417	
4.4936508	60.0000000	CYT				
0.0002644	40585.	153511868.	11.9459332	0.0031582	-0.0095318	
4.4974059	60.0000000	CYT				
0.0002694	40638.	150860647.	11.9101831	0.0032083	-0.0097217	
4.4995166	60.0000000	CYT				
0.0002744	40690.	148301338.	11.8759269	0.0032585	-0.0099115	
4.4975184	60.0000000	CYT				
0.0003044	40923.	134448054.	11.6976495	0.0035605	-0.0110495	
4.4903477	60.0000000	CYT				
0.0003344	40940.	122436952.	11.6093256	0.0038819	-0.0121681	
4.4867102	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	0.000	40395.232	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 at Ult. Mom. Cap. in-kip	Ultimate (Factored) Axial Thrust kips	Ultimate (Factored) Moment Capacity in-kip	Bending Stiffness kip-in^2
1	0.65	40395.232	0.000	26256.900	406260579.288
1	0.70	40395.232	0.000	28276.662	404789053.314
1	0.75	40395.232	0.000	30296.424	398293409.577

Pile Section No. 2:

Dimensions and Properties of Drilled Shaft (Bored Pile) with Permanent Casing:

Length of Section	=	104.00000	ft
Outer Diameter of Casing	=	49.00000	in
Concrete Cover Thickness Inside Casing	=	4.50000	in
Casing Wall Thickness	=	0.50000	in
Moment of Inertia of Steel Casing	=	22403.	in^4
Yield Stress of Casing	=	36000.	psi
Elastic Modulus of Casing	=	29000000.	psi
Number of Reinforcing Bars	=	50	bars
Area of Single Reinforcing Bar	=	0.79000	sq. in.
Edge-to-Edge Bar Spacing	=	2.76901	in
Maximum Concrete Aggregate Size	=	0.37500	in
Ratio of Bar Spacing to Aggregate Size	=	7.38	
Offset of Center of Rebar Cage from Center of Pile	=	0.0000	in
Yield Stress of Reinforcing Bars	=	60000.	psi
Modulus of Elasticity of Reinforcing Bars	=	29000000.	psi
Gross Area of Pile	=	1885.74099	sq. in.
Area of Concrete	=	1770.05737	sq. in.
Cross-sectional Area of Steel Casing	=	76.18362	sq. in.

Area of All Steel (Casing and Bars) = 115.68362 sq. in.
Area Ratio of All Steel to Gross Area of Pile = 6.13 percent

Axial Structural Capacities:

Nom. Axial Structural Capacity = 0.85 Fc Ac + Fy As = 11883.080 kips
Tensile Load for Cracking of Concrete = -1165.721 kips
Nominal Axial Tensile Capacity = -5112.610 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.00000	0.79000	18.99342	-0.49994
2	1.00000	0.79000	18.99342	0.49994
3	1.00000	0.79000	18.52104	4.23924
4	1.00000	0.79000	18.27238	5.20771
5	1.00000	0.79000	16.88491	8.71205
6	1.00000	0.79000	16.40321	9.58825
7	1.00000	0.79000	14.18784	12.63745
8	1.00000	0.79000	13.50337	13.36633
9	1.00000	0.79000	10.59930	15.76879
10	1.00000	0.79000	9.75507	16.30456
11	1.00000	0.79000	6.34476	17.90933
12	1.00000	0.79000	5.39382	18.21831
13	1.00000	0.79000	1.69156	18.92455
14	1.00000	0.79000	0.69365	18.98733
15	1.00000	0.79000	-3.06793	18.75068
16	1.00000	0.79000	-4.05010	18.56332
17	1.00000	0.79000	-7.63464	17.39863
18	1.00000	0.79000	-8.53937	16.97290
19	1.00000	0.79000	-11.72165	14.95336
20	1.00000	0.79000	-12.49207	14.31601
21	1.00000	0.79000	-15.07214	11.56851
22	1.00000	0.79000	-15.65986	10.75959
23	1.00000	0.79000	-17.47560	7.45678
24	1.00000	0.79000	-17.84368	6.52711
25	1.00000	0.79000	-18.78099	2.87651
26	1.00000	0.79000	-18.90631	1.88451
27	1.00000	0.79000	-18.90631	-1.88451
28	1.00000	0.79000	-18.78099	-2.87651
29	1.00000	0.79000	-17.84368	-6.52711
30	1.00000	0.79000	-17.47560	-7.45678
31	1.00000	0.79000	-15.65986	-10.75959
32	1.00000	0.79000	-15.07214	-11.56851
33	1.00000	0.79000	-12.49207	-14.31601
34	1.00000	0.79000	-11.72165	-14.95336
35	1.00000	0.79000	-8.53937	-16.97290
36	1.00000	0.79000	-7.63464	-17.39863
37	1.00000	0.79000	-4.05010	-18.56332
38	1.00000	0.79000	-3.06793	-18.75068
39	1.00000	0.79000	0.69365	-18.98733
40	1.00000	0.79000	1.69156	-18.92455
41	1.00000	0.79000	5.39382	-18.21831
42	1.00000	0.79000	6.34476	-17.90933
43	1.00000	0.79000	9.75507	-16.30456
44	1.00000	0.79000	10.59930	-15.76879
45	1.00000	0.79000	13.50337	-13.36633
46	1.00000	0.79000	14.18784	-12.63745
47	1.00000	0.79000	16.40321	-9.58825

48	1.00000	0.79000	16.88491	-8.71205
49	1.00000	0.79000	18.27238	-5.20771
50	1.00000	0.79000	18.52104	-4.23924

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

Minimum spacing between any two bars not equal to zero = -0.0001154 inches between Bars 1 and 2

Spacing to aggregate size ratio = -0.0003078

Concrete Properties:

Compressive Strength of Concrete = 4500.00000 psi
Modulus of Elasticity of Concrete = 3823676. psi
Modulus of Rupture of Concrete = -503.11528 psi
Compression Strain at Peak Stress = 0.00200
Tensile Strain at Fracture of Concrete = -0.0001152
Maximum Coarse Aggregate Size = 0.37500 in

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

Number	Axial Thrust Force kips
1	0.000

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 = 0.000 kips

Bending Max Concrete Stress rad/in. ksi	Bending Max Steel Stress in-kip ksi	Bending Max Casing Stiffness kip-in2 ksi	Run Msg	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in
0.000000625	1246.1877906	1993900465.		24.5001275	0.0000153	-0.0000153
0.0679356	0.4396242	0.4396242				
0.000001250	2488.7459054	1990996724.		24.5001279	0.0000306	-0.0000306
0.1353544	0.8792484	0.8792484				

0.000001875	3727.6743445	1988092984.	24.5001283	0.0000459	-0.0000459
0.2022566	1.3188726	1.3188726			
0.000002500	4962.9731077	1985189243.	24.5001286	0.0000613	-0.0000612
0.2686421	1.7584968	1.7584968			
0.000003125	6194.6421952	1982285502.	24.5001290	0.0000766	-0.0000766
0.3345108	2.1981210	2.1981210			
0.000003750	7422.6816068	1979381762.	24.5001294	0.0000919	-0.0000919
0.3998628	2.6377453	2.6377453			
0.000004375	8647.0913427	1976478021.	24.5001298	0.0001072	-0.0001072
0.4646981	3.0773696	3.0773696			
0.000005000	8647.0913427	1729418269.	18.5144499	0.0000926	-0.0001524
0.4015395	-4.3848797	-4.3848797 C			
0.000005625	8647.0913427	1537260683.	18.5199878	0.0001042	-0.0001715
0.4505457	-4.9320864	-4.9320864 C			
0.000006250	8647.0913427	1383534615.	18.5255374	0.0001158	-0.0001905
0.4992868	-5.4790901	-5.4790901 C			
0.000006875	8647.0913427	1257758741.	18.5310987	0.0001274	-0.0002095
0.5477623	-6.0258903	-6.0258903 C			
0.000007500	8894.9772711	1185996969.	18.5366719	0.0001390	-0.0002285
0.5959719	-6.5724864	-6.5724864 C			
0.000008125	9632.8701085	1185584013.	18.5422569	0.0001507	-0.0002475
0.6439151	-7.1188776	-7.1188776 C			
0.000008750	10370.	1185170297.	18.5478538	0.0001623	-0.0002665
0.6915914	-7.6650633	-7.6650633 C			
0.000009375	11107.	1184755819.	18.5534628	0.0001739	-0.0002854
0.7390003	-8.2110429	-8.2110429 C			
0.0000100	11843.	1184340574.	18.5590837	0.0001856	-0.0003044
0.7861415	-8.7568157	-8.7568157 C			
0.0000106	12579.	1183924560.	18.5647167	0.0001973	-0.0003234
0.8330144	-9.3023810	-9.3023810 C			
0.0000113	13314.	1183507775.	18.5703619	0.0002089	-0.0003423
0.8796186	-9.8477382	-9.8477382 C			
0.0000119	14049.	1183090214.	18.5760192	0.0002206	-0.0003613
0.9259536	-10.3928865	-10.3928865 C			
0.0000125	14783.	1182671874.	18.5816888	0.0002323	-0.0003802
0.9720190	-10.9378253	-10.9378253 C			
0.0000131	15517.	1182252753.	18.5873707	0.0002440	-0.0003992
1.0178143	-11.4825539	-11.4825539 C			
0.0000138	16250.	1181832847.	18.5930649	0.0002557	-0.0004181
1.0633390	-12.0270716	-12.0270716 C			
0.0000144	16983.	1181412154.	18.5987715	0.0002674	-0.0004370
1.1085926	-12.5713777	-12.5713777 C			
0.0000150	17715.	1180990669.	18.6044906	0.0002791	-0.0004559
1.1535747	-13.1154716	-13.1154716 C			
0.0000156	18446.	1180568390.	18.6102222	0.0002908	-0.0004748
1.1982848	-13.6593524	-13.6593524 C			
0.0000163	19177.	1180145312.	18.6159664	0.0003025	-0.0004937
1.2427224	-14.2030196	-14.2030196 C			
0.0000169	19908.	1179721434.	18.6217231	0.0003142	-0.0005126
1.2868870	-14.7464723	-14.7464723 C			
0.0000175	20638.	1179296752.	18.6274926	0.0003260	-0.0005315
1.3307782	-15.2897100	-15.2897100 C			
0.0000181	21367.	1178871262.	18.6332748	0.0003377	-0.0005504
1.3743954	-15.8327318	-15.8327318 C			
0.0000188	22096.	1178444960.	18.6390698	0.0003495	-0.0005693
1.4177383	-16.3755370	-16.3755370 C			
0.0000194	22824.	1178017845.	18.6448776	0.0003612	-0.0005881
1.4608062	-16.9181250	-16.9181250 C			
0.0000200	23552.	1177589911.	18.6506984	0.0003730	-0.0006070
1.5035986	-17.4604949	-17.4604949 C			
0.0000206	24279.	1177161157.	18.6565321	0.0003848	-0.0006258
1.5461152	-18.0026461	-18.0026461 C			
0.0000213	25006.	1176731577.	18.6623788	0.0003966	-0.0006447

1.5883554	-18.5445778	-18.5445778 C			
0.0000219	25732.	1176301169.	18.6682387	0.0004084	-0.0006635
1.6303186	-19.0862892	-19.0862892 C			
0.0000225	26457.	1175869930.	18.6741116	0.0004202	-0.0006823
1.6720045	-19.6277796	-19.6277796 C			
0.0000231	27182.	1175437855.	18.6799978	0.0004320	-0.0007012
1.7134124	-20.1690483	-20.1690483 C			
0.0000238	27906.	1175004942.	18.6858973	0.0004438	-0.0007200
1.7545419	-20.7100945	-20.7100945 C			
0.0000244	28630.	1174571186.	18.6918101	0.0004556	-0.0007388
1.7953924	-21.2509174	-21.2509174 C			
0.0000256	30076.	1173701123.	18.7036758	0.0004793	-0.0007763
1.8762546	-22.3318905	-22.3318905 C			
0.0000269	31520.	1172827657.	18.7155957	0.0005030	-0.0008139
1.9559948	-23.4119610	-23.4119610 C			
0.0000281	32961.	1171950748.	18.7275700	0.0005267	-0.0008514
2.0346089	-24.4911229	-24.4911229 C			
0.0000294	34400.	1171070367.	18.7395995	0.0005505	-0.0008889
2.1120926	-25.5693697	-25.5693697 C			
0.0000306	35837.	1170186484.	18.7516845	0.0005743	-0.0009264
2.1884416	-26.6466950	-26.6466950 C			
0.0000319	37271.	1169299068.	18.7638256	0.0005981	-0.0009638
2.2636516	-27.7230922	-27.7230922 C			
0.0000331	38704.	1168408088.	18.7760234	0.0006220	-0.0010012
2.3377183	-28.7985549	-28.7985549 C			
0.0000344	40133.	1167513512.	18.7882783	0.0006458	-0.0010385
2.4106371	-29.8730762	-29.8730762 C			
0.0000356	41561.	1166615309.	18.8005910	0.0006698	-0.0010759
2.4824038	-30.9466494	-30.9466494 C			
0.0000369	42986.	1165713445.	18.8129619	0.0006937	-0.0011131
2.5530137	-32.0192676	-32.0192676 C			
0.0000381	44408.	1164807888.	18.8253917	0.0007177	-0.0011504
2.6224624	-33.0909239	-33.0909239 C			
0.0000394	45829.	1163898606.	18.8378808	0.0007417	-0.0011876
2.6907451	-34.1616112	-34.1616112 C			
0.0000406	47246.	1162985563.	18.8504300	0.0007658	-0.0012248
2.7578573	-35.2313223	-35.2313223 C			
0.0000419	48633.	1161383574.	18.8589255	0.0007897	-0.0012622
2.8233213	-36.3050459	-36.0000000 CY			
0.0000431	49871.	1156423145.	18.8470541	0.0008128	-0.0013003
2.8852227	-37.4036257	-36.0000000 CY			
0.0000444	51010.	1149514080.	18.8228946	0.0008353	-0.0013391
2.9444397	-38.5188780	-36.0000000 CY			
0.0000456	52078.	1141425698.	18.7908550	0.0008573	-0.0013783
3.0014606	-39.6463092	-36.0000000 CY			
0.0000469	53097.	1132740521.	18.7544646	0.0008791	-0.0014178
3.0566932	-40.7819777	-36.0000000 CY			
0.0000481	54073.	1123594301.	18.7144572	0.0009006	-0.0014575
3.1102262	-41.9253324	-36.0000000 CY			
0.0000494	55015.	1114223210.	18.6723249	0.0009219	-0.0014974
3.1622450	-43.0746302	-36.0000000 CY			
0.0000506	55923.	1104657286.	18.6281712	0.0009431	-0.0015376
3.2127721	-44.2299504	-36.0000000 CY			
0.0000519	56806.	1095064859.	18.5831473	0.0009640	-0.0015779
3.2619595	-45.3897808	-36.0000000 CY			
0.0000531	57667.	1085491449.	18.5375498	0.0009848	-0.0016183
3.3098579	-46.5537591	-36.0000000 CY			
0.0000544	58504.	1075932199.	18.4912920	0.0010055	-0.0016589
3.3564715	-47.7220844	-36.0000000 CY			
0.0000556	59322.	1066467855.	18.4449815	0.0010260	-0.0016996
3.4018904	-48.8938485	-36.0000000 CY			
0.0000569	60124.	1057124396.	18.3988175	0.0010464	-0.0017404
3.4461551	-50.0687283	-36.0000000 CY			

0.0000581	60910.	1047913654.	18.3524698	0.0010667	-0.0017814
3.4892404	-51.2472648	-36.0000000	CY		
0.0000594	61682.	1038848112.	18.3060172	0.0010869	-0.0018225
3.5311716	-52.4293420	-36.0000000	CY		
0.0000606	62440.	1029943371.	18.2600628	0.0011070	-0.0018636
3.5720391	-53.6139113	-36.0000000	CY		
0.0000619	63187.	1021207548.	18.2146955	0.0011270	-0.0019048
3.6118689	-54.8007587	-36.0000000	CY		
0.0000631	63923.	1012646783.	18.1699929	0.0011470	-0.0019461
3.6506854	-55.9896785	-36.0000000	CY		
0.0000644	64650.	1004265562.	18.1260229	0.0011669	-0.0019875
3.6885113	-57.1804715	-36.0000000	CY		
0.0000656	65367.	996065543.	18.0828308	0.0011867	-0.0020289
3.7253656	-58.3729718	-36.0000000	CY		
0.0000669	66074.	988019719.	18.0401664	0.0012064	-0.0020704
3.7612310	-59.5675802	-36.0000000	CY		
0.0000681	66773.	980156974.	17.9983515	0.0012261	-0.0021120
3.7961596	-60.0000000	-36.0000000	CY		
0.0000694	67466.	972477926.	17.9574311	0.0012458	-0.0021536
3.8301685	-60.0000000	-36.0000000	CY		
0.0000706	68142.	964843635.	17.9194255	0.0012656	-0.0021951
3.8635106	-60.0000000	36.0000000	CY		
0.0000719	68792.	957107775.	17.8855537	0.0012855	-0.0022364
3.8963346	-60.0000000	36.0000000	CY		
0.0000731	69423.	949380920.	17.8542977	0.0013056	-0.0022775
3.9284606	-60.0000000	36.0000000	CY		
0.0000744	70040.	941712434.	17.8260522	0.0013258	-0.0023186
3.9599353	-60.0000000	36.0000000	CY		
0.0000794	72378.	911849904.	17.7321611	0.0014075	-0.0024819
4.0780360	-60.0000000	36.0000000	CY		
0.0000844	74294.	880518603.	17.6293607	0.0014875	-0.0026469
4.1795572	-60.0000000	36.0000000	CY		
0.0000894	75780.	847889856.	17.5073060	0.0015647	-0.0028147
4.2643087	-60.0000000	36.0000000	CY		
0.0000944	77018.	816087263.	17.3824668	0.0016405	-0.0029839
4.3347927	-60.0000000	36.0000000	CY		
0.0000994	78074.	785647632.	17.2557305	0.0017148	-0.0031546
4.3917872	-60.0000000	36.0000000	CY		
0.0001044	78992.	756814015.	17.1323516	0.0017882	-0.0033262
4.4362794	-60.0000000	36.0000000	CY		
0.0001094	79801.	729607533.	17.0132920	0.0018608	-0.0034985
4.4687739	-60.0000000	36.0000000	CY		
0.0001144	80517.	703973935.	16.8993985	0.0019329	-0.0036715
4.4896725	-60.0000000	36.0000000	CY		
0.0001194	81155.	679836432.	16.7874938	0.0020040	-0.0038454
4.4992440	-60.0000000	36.0000000	CY		
0.0001244	81729.	657114104.	16.6801722	0.0020746	-0.0040198
4.4996552	-60.0000000	36.0000000	CY		
0.0001294	82242.	635688352.	16.5782931	0.0021448	-0.0041946
4.4997682	60.0000000	36.0000000	CY		
0.0001344	82714.	615544993.	16.4830044	0.0022149	-0.0043695
4.4997034	60.0000000	36.0000000	CY		
0.0001394	83139.	596511259.	16.3914553	0.0022846	-0.0045448
4.4993815	60.0000000	36.0000000	CY		
0.0001444	83520.	578491131.	16.3016668	0.0023536	-0.0047208
4.4985243	60.0000000	36.0000000	CY		
0.0001494	83870.	561472182.	16.2171924	0.0024224	-0.0048969
4.4967207	60.0000000	36.0000000	CY		
0.0001544	84197.	545405022.	16.1373405	0.0024912	-0.0050732
4.4999984	60.0000000	36.0000000	CY		
0.0001594	84492.	530143855.	16.0618326	0.0025599	-0.0052495
4.4992081	60.0000000	36.0000000	CY		
0.0001644	84764.	515674732.	15.9893153	0.0026282	-0.0054261

4.4963383	60.0000000	36.0000000	CY		
0.0001694	85016.	501939766.	15.9198154	0.0026964	-0.0056030
4.4998938	60.0000000	36.0000000	CY		
0.0001744	85250.	488887679.	15.8522568	0.0027642	-0.0057801
4.4973913	60.0000000	36.0000000	CY		
0.0001794	85470.	476485302.	15.7875418	0.0028319	-0.0059575
4.4999838	60.0000000	36.0000000	CY		
0.0001844	85672.	464662001.	15.7250435	0.0028993	-0.0061351
4.4971898	60.0000000	36.0000000	CY		
0.0001894	85863.	453401426.	15.6654328	0.0029666	-0.0063127
4.4999209	60.0000000	36.0000000	CY		
0.0001944	86039.	442646666.	15.6085953	0.0030339	-0.0064905
4.4956681	60.0000000	36.0000000	CYT		
0.0001994	86203.	432367621.	15.5537463	0.0031010	-0.0066683
4.4993979	60.0000000	36.0000000	CYT		
0.0002044	86354.	422528550.	15.5023858	0.0031683	-0.0068461
4.4940147	60.0000000	36.0000000	CYT		
0.0002094	86502.	413145390.	15.4543831	0.0032358	-0.0070236
4.4974792	60.0000000	36.0000000	CYT		
0.0002144	86628.	404097559.	15.4101001	0.0033035	-0.0072008
4.4998831	60.0000000	36.0000000	CYT		
0.0002194	86741.	395401075.	15.3687912	0.0033715	-0.0073778
4.4927456	60.0000000	36.0000000	CYT		
0.0002244	86847.	387060625.	15.3287878	0.0034394	-0.0075550
4.4976689	60.0000000	36.0000000	CYT		
0.0002294	86936.	379011338.	15.2937898	0.0035080	-0.0077314
4.4998877	60.0000000	36.0000000	CYT		
0.0002344	87016.	371267093.	15.2602682	0.0035766	-0.0079077
4.4910346	60.0000000	36.0000000	CYT		
0.0002394	87093.	363833635.	15.2284729	0.0036453	-0.0080841
4.4964573	60.0000000	36.0000000	CYT		
0.0002444	87157.	356654585.	15.2004065	0.0037146	-0.0082598
4.4994370	60.0000000	36.0000000	CYT		
0.0002494	87214.	349732331.	15.1732525	0.0037838	-0.0084355
4.4957504	60.0000000	36.0000000	CYT		
0.0002544	87270.	343075082.	15.1480720	0.0038533	-0.0086111
4.4929161	60.0000000	36.0000000	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	0.000	85950.433	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 (Factored) Load Capacity No. in-kip	Resistance Bending Stiffness Factor at Ult. Mom. for Moment	Nominal Cap. Moment Capacity in-kip kip-in^2	Ultimate (Factored) Axial Thrust kips	Ultimate Moment
1 55867.779	0.65	1105241617.673	85950.433	0.000
1 60165.302	0.70	1056639830.845	85950.433	0.000
1 64462.825	0.75	1006420922.590	85950.433	0.000

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

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head = 0.500000 inches
Moment at pile head = 5499600.0 in-lbs
Axial load at pile head = 0.0 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. Es*h lb/inch	Soil Spr. Distrib. p Lat. Load lb/inch
0.00	0.5000	5499600.	22344.	-0.002739	0.000	1.337E+12	0.000	0.000
1.113	0.4638	5797894.	22344.	-0.002683	0.000	1.337E+12	0.000	0.000
2.225	0.4284	6096188.	22344.	-0.002557	0.000	4.190E+11	0.000	0.000
3.337	0.3955	6394482.	21791.	-0.002358	0.000	4.188E+11	-82.8403	2796.0311
4.450	0.3654	6678012.	20650.	-0.002149	0.000	4.187E+11	-88.1178	3219.2712
5.562	0.3381	6945837.	19440.	-0.001932	0.000	4.185E+11	-93.1145	3676.1968
6.675	0.3138	7197068.	18165.	-0.001707	0.000	4.184E+11	-97.8948	4164.3783
7.788	0.2926	7430851.	16820.	-0.001567	0.000	1.979E+12	-103.6665	4730.1857
8.900	0.2720	7646158.	15407.	-0.001516	0.000	1.979E+12	-107.9391	5297.7933
10.012	0.2521	7842229.	13940.	-0.001464	0.000	1.978E+12	-111.8346	5922.0812
11.125	0.2329	8018368.	12424.	-0.001410	0.000	1.978E+12	-115.3446	6611.0477
12.237	0.2145	8173950.	10863.	-0.001355	0.000	1.977E+12	-118.4604	7374.1527

13.350	0.1967	8308419.	9263.8001	-0.001300	0.000	1.977E+12	-121.1731	8222.6590
14.462	0.1798	8421293.	7630.7868	-0.001243	0.000	1.977E+12	-123.4731	9170.0733
15.575	0.1635	8512161.	5969.8891	-0.001186	0.000	1.977E+12	-125.3505	10233.
16.688	0.1481	8580689.	4286.8211	-0.001128	0.000	1.977E+12	-126.7945	11431.
17.800	0.1334	8626619.	2587.4473	-0.001068	0.000	1.832E+12	-127.7934	12788.
18.912	0.1196	8649774.	877.6590	-0.001002	0.000	1.680E+12	-128.3547	14331.
20.025	0.1067	8650053.	-836.8740	-0.000937	0.000	1.889E+12	-128.5042	16085.
21.137	0.0945	8627429.	-2550.3844	-0.000878	0.000	1.977E+12	-128.2015	18102.
22.250	0.0832	8581958.	-4256.6602	-0.000819	0.000	1.977E+12	-127.4203	20440.
23.362	0.0727	8513777.	-5949.2121	-0.000762	0.000	1.977E+12	-126.1455	23174.
24.475	0.0629	8423114.	-7621.3346	-0.000704	0.000	1.977E+12	-124.3597	26400.
25.588	0.0539	8310287.	-9266.0702	-0.000648	0.000	1.977E+12	-122.0426	30250.
26.700	0.0456	8175709.	-12301.	-0.000592	0.000	1.977E+12	-332.6686	97428.
27.812	0.0380	7981843.	-16451.	-0.000538	0.000	1.978E+12	-289.0102	101415.
28.925	0.0312	7736469.	-19944.	-0.000485	0.000	1.979E+12	-234.2468	100153.
30.037	0.0251	7449346.	-23010.	-0.000434	0.000	1.979E+12	-225.1673	119756.
31.150	0.0196	7122093.	-25912.	-0.000384	0.000	1.980E+12	-209.5741	142395.
32.262	0.0148	6757490.	-28564.	-0.000338	0.000	1.981E+12	-187.7539	168939.
33.375	0.0106	6359425.	-30881.	-0.000293	0.000	1.982E+12	-159.2706	199962.
34.487	0.007002	5932974.	-32681.	-0.000252	0.000	1.983E+12	-110.4836	210655.
35.600	0.003903	5486832.	-33851.	-0.000214	0.000	1.984E+12	-64.7207	221349.
36.712	0.001298	5029156.	-34433.	-0.000178	0.000	1.985E+12	-22.5623	232042.
37.825	-0.000856	4567459.	-34480.	-0.000146	0.000	1.986E+12	15.5599	242735.
38.938	-0.002600	4108535.	-34047.	-0.000117	0.000	1.987E+12	49.3514	253429.
40.050	-0.003975	3658406.	-33193.	-9.075E-05	0.000	1.988E+12	78.6459	264122.
41.163	-0.005023	3222294.	-31977.	-6.765E-05	0.000	1.989E+12	103.3930	274815.
42.275	-0.005781	2804609.	-30462.	-4.743E-05	0.000	1.990E+12	123.6434	285509.
43.387	-0.006289	2408959.	-28705.	-2.995E-05	0.000	1.991E+12	139.5363	296202.
44.500	-0.006581	2038179.	-26764.	-1.504E-05	0.000	1.992E+12	151.2855	306895.
45.613	-0.006691	1694360.	-24692.	-2.531E-06	0.000	1.992E+12	159.1636	317589.
46.725	-0.006649	1378909.	-22538.	7.763E-06	0.000	1.993E+12	163.4901	328282.

47.837	-0.006483	1092595.	-20348.	1.604E-05	0.000	1.994E+12
164.6189	338975.	0.000				
48.950	-0.006220	835619.	-18162.	2.249E-05	0.000	1.994E+12
162.9250	349669.	0.000				
50.062	-0.005883	607681.	-16014.	2.732E-05	0.000	1.994E+12
158.7937	360362.	0.000				
51.175	-0.005491	408043.	-13935.	3.073E-05	0.000	1.994E+12
152.6118	371056.	0.000				
52.287	-0.005062	235604.	-11951.	3.288E-05	0.000	1.994E+12
144.7591	381749.	0.000				
53.400	-0.004613	88965.	-10079.	3.397E-05	0.000	1.994E+12
135.6010	392442.	0.000				
54.512	-0.004155	-33508.	-8336.3689	3.415E-05	0.000	1.994E+12
125.4826	403136.	0.000				
55.625	-0.003701	-133616.	-6732.9872	3.359E-05	0.000	1.994E+12
114.7244	413829.	0.000				
56.738	-0.003258	-213278.	-5275.5530	3.243E-05	0.000	1.994E+12
103.6179	424522.	0.000				
57.850	-0.002835	-274474.	-3966.9739	3.080E-05	0.000	1.994E+12
92.4240	435216.	0.000				
58.962	-0.002436	-319197.	-2806.8912	2.881E-05	0.000	1.994E+12
81.3712	445909.	0.000				
60.075	-0.002066	-349418.	-1792.1149	2.657E-05	0.000	1.994E+12
70.6552	456602.	0.000				
61.188	-0.001727	-367046.	-917.0597	2.417E-05	0.000	1.994E+12
60.4392	467296.	0.000				
62.300	-0.001420	-373903.	-174.1744	2.169E-05	0.000	1.994E+12
50.8545	477989.	0.000				
63.412	-0.001147	-371697.	445.6460	1.920E-05	0.000	1.994E+12
42.0025	488682.	0.000				
64.525	-0.000908	-362004.	952.6694	1.674E-05	0.000	1.994E+12
33.9561	499376.	0.000				
65.638	-0.000700	-346260.	1357.9623	1.437E-05	0.000	1.994E+12
26.7620	510069.	0.000				
66.750	-0.000524	-325747.	1673.0558	1.212E-05	0.000	1.994E+12
20.4431	520762.	0.000				
67.862	-0.000377	-301590.	1909.6428	1.002E-05	0.000	1.994E+12
15.0007	531456.	0.000				
68.975	-0.000257	-274759.	2079.3072	8.091E-06	0.000	1.994E+12
10.4172	542149.	0.000				
70.087	-0.000161	-246072.	2193.2841	6.348E-06	0.000	1.994E+12
6.6580	552842.	0.000				
71.200	-8.703E-05	-216199.	2262.2493	4.800E-06	0.000	1.994E+12
3.6739	563536.	0.000				
72.312	-3.261E-05	-185670.	2408.6071	3.455E-06	0.000	1.994E+12
18.2524	7471301.	0.000				
73.425	5.209E-06	-151889.	2481.7830	2.325E-06	0.000	1.994E+12
-7.2897	18682479.	0.000				
74.537	2.946E-05	-119407.	2317.3598	1.416E-06	0.000	1.994E+12
-17.3430	7860224.	0.000				
75.650	4.303E-05	-90015.	2061.6725	7.154E-07	0.000	1.994E+12
-20.9623	6503603.	0.000				
76.763	4.856E-05	-64360.	1773.1079	1.986E-07	0.000	1.994E+12
-22.2684	6122336.	0.000				
77.875	4.833E-05	-42673.	1476.1678	-1.597E-07	0.000	1.994E+12
-22.2170	6136634.	0.000				
78.987	4.429E-05	-24946.	1185.9018	-3.861E-07	0.000	1.994E+12
-21.2686	6410399.	0.000				
80.100	3.802E-05	-11010.	912.3954	-5.064E-07	0.000	1.994E+12
-19.7062	6918749.	0.000				
81.212	3.077E-05	-585.2394	662.5258	-5.453E-07	0.000	1.994E+12
-17.7275	7691137.	0.000				
82.325	2.347E-05	6679.7625	440.8602	-5.249E-07	0.000	1.994E+12

-15.4808	8807462.	0.000				
83.438	1.676E-05	11186.	250.2014	-4.651E-07	0.000	1.994E+12
-13.0823	10422505.	0.000				
84.550	1.105E-05	13360.	91.9696	-3.829E-07	0.000	1.994E+12
-10.6229	12835934.	0.000				
85.663	6.534E-06	13641.	-33.4687	-2.925E-07	0.000	1.994E+12
-8.1694	16691622.	0.000				
86.775	3.239E-06	12467.	-126.3936	-2.051E-07	0.000	1.994E+12
-5.7519	23708766.	0.000				
87.887	1.058E-06	10267.	-186.7352	-1.290E-07	0.000	1.994E+12
-3.2880	41486227.	0.000				
89.000	-2.050E-07	7480.6948	-201.6967	-6.957E-08	0.000	1.994E+12
1.0466	68139446.	0.000				
90.112	-7.995E-07	4881.3048	-175.6391	-2.819E-08	0.000	1.994E+12
2.8572	47709716.	0.000				
91.225	-9.576E-07	2791.1318	-135.6928	-2.502E-09	0.000	1.994E+12
3.1273	43596065.	0.000				
92.337	-8.663E-07	1258.3072	-94.9636	1.105E-08	0.000	1.994E+12
2.9745	45838752.	0.000				
93.450	-6.625E-07	255.6043	-57.7455	1.612E-08	0.000	1.994E+12
2.6012	52419909.	0.000				
94.562	-4.358E-07	-283.4986	-26.2985	1.603E-08	0.000	1.994E+12
2.1099	64632934.	0.000				
95.675	-2.345E-07	-446.5667	-4.2010	1.359E-08	0.000	1.994E+12
1.2006	68353313.	0.000				
96.788	-7.307E-08	-395.6658	3.8513	1.077E-08	0.000	1.994E+12
0.005775	1054980.	0.000				
97.900	5.297E-08	-343.7357	3.8614	8.291E-09	0.000	1.994E+12
-0.004274	1077257.	0.000				
99.012	1.483E-07	-292.5674	3.7513	6.160E-09	0.000	1.994E+12
-0.0122	1099535.	0.000				
100.125	2.175E-07	-243.5757	3.5478	4.366E-09	0.000	1.994E+12
-0.0183	1121813.	0.000				
101.237	2.648E-07	-197.8406	3.2743	2.888E-09	0.000	1.994E+12
-0.0227	1144091.	0.000				
102.350	2.946E-07	-156.1507	2.9511	1.703E-09	0.000	1.994E+12
-0.0257	1166369.	0.000				
103.462	3.103E-07	-119.0472	2.5949	7.815E-10	0.000	1.994E+12
-0.0276	1188646.	0.000				
104.575	3.154E-07	-86.8679	2.2195	9.216E-11	0.000	1.994E+12
-0.0286	1210924.	0.000				
105.688	3.128E-07	-59.7877	1.8356	-3.988E-10	0.000	1.994E+12
-0.0289	1233202.	0.000				
106.800	3.048E-07	-37.8567	1.4515	-7.257E-10	0.000	1.994E+12
-0.0287	1255480.	0.000				
107.913	2.934E-07	-21.0339	1.0727	-9.228E-10	0.000	1.994E+12
-0.0281	1277758.	0.000				
109.025	2.801E-07	-9.2158	0.7032	-1.024E-09	0.000	1.994E+12
-0.0273	1300036.	0.000				
110.137	2.661E-07	-2.2596	0.3452	-1.063E-09	0.000	1.994E+12
-0.0264	1322313.	0.000				
111.250	2.518E-07	0.000	0.000	-1.070E-09	0.000	1.994E+12
-0.0254	672296.	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	=	0.5000000	inches
Computed slope at pile head	=	-0.0027392	radians
Maximum bending moment	=	8650053.	inch-lbs
Maximum shear force	=	-34480.	lbs
Depth of maximum bending moment	=	20.0250000	feet below pile head
Depth of maximum shear force	=	37.8250000	feet below pile head
Number of iterations	=	43	
Number of zero deflection points	=	4	

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 2

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head = 1.000000 inches
Moment at pile head = 5499600.0 in-lbs
Axial load at pile head = 0.0 lbs

Depth X	Deflect. y	Bending Moment	Shear Force	Slope S	Total Stress	Bending Stiffness	Soil Res. Spr. Distrib. p
feet	inches	in-lbs	lbs	radians	psi*	lb-in^2	lb/in
Es*h lb/inch	Lat. Load lb/inch						
0.00	1.0000	5499600.	36070.	-0.004610	0.000	1.337E+12	
0.000	0.000	0.000					
1.113	0.9388	5981138.	36070.	-0.004553	0.000	1.337E+12	
0.000	0.000	0.000					
2.225	0.8784	6462676.	36070.	-0.004420	0.000	4.188E+11	
0.000	0.000	0.000					
3.337	0.8208	6944214.	35365.	-0.004206	0.000	4.185E+11	
-105.6647	1718.5636	0.000					
4.450	0.7661	7406920.	33907.	-0.003977	0.000	4.183E+11	
-112.7815	1965.2096	0.000					
5.562	0.7146	7849526.	32356.	-0.003734	0.000	4.180E+11	
-119.4935	2232.2630	0.000					
6.675	0.6665	8270835.	30719.	-0.003476	0.000	4.178E+11	
-125.8309	2520.5482	0.000					
7.788	0.6218	8669719.	28989.	-0.003298	0.000	1.250E+12	
-133.2843	2861.5185	0.000					
8.900	0.5784	9044848.	27173.	-0.003200	0.000	1.186E+12	
-138.8043	3203.6485	0.000					
10.012	0.5364	9395239.	25286.	-0.003097	0.000	1.186E+12	
-143.8363	3580.0203	0.000					
11.125	0.4957	9719996.	23336.	-0.002989	0.000	1.186E+12	
-148.3689	3995.5133	0.000					
12.237	0.4566	10018310.	21328.	-0.002878	0.000	1.185E+12	
-152.3902	4455.8957	0.000					
13.350	0.4189	10289464.	19271.	-0.002763	0.000	1.185E+12	
-155.8884	4968.0279	0.000					
14.462	0.3828	10532835.	17170.	-0.002646	0.000	1.185E+12	
-158.8512	5540.1223	0.000					
15.575	0.3482	10747896.	15033.	-0.002526	0.000	1.185E+12	
-161.2661	6182.0782	0.000					

16.688	0.3153	10934216.	12868.	-0.002404	0.000	1.185E+12
-163.1202	6905.9178	0.000				
17.800	0.2841	11091463.	10681.	-0.002280	0.000	1.185E+12
-164.4002	7726.3604	0.000				
18.912	0.2545	11219411.	8482.1245	-0.002154	0.000	1.185E+12
-165.0923	8661.5848	0.000				
20.025	0.2265	11317936.	6277.5408	-0.002027	0.000	1.185E+12
-165.1824	9734.2555	0.000				
21.137	0.2003	11387022.	4075.8732	-0.001899	0.000	1.185E+12
-164.6555	10973.	0.000				
22.250	0.1758	11426762.	1885.4603	-0.001771	0.000	1.185E+12
-163.4963	12414.	0.000				
23.362	0.1530	11437363.	-285.1513	-0.001642	0.000	1.185E+12
-161.6890	14104.	0.000				
24.475	0.1320	11419148.	-2427.2020	-0.001513	0.000	1.185E+12
-159.2175	16105.	0.000				
25.588	0.1126	11372557.	-4531.7183	-0.001385	0.000	1.185E+12
-156.0659	18497.	0.000				
26.700	0.0950	11298151.	-8682.2025	-0.001257	0.000	1.185E+12
-465.7295	65441.	0.000				
27.812	0.0791	11140742.	-14581.	-0.001131	0.000	1.185E+12
-418.0541	70576.	0.000				
28.925	0.0648	10908826.	-19724.	-0.001006	0.000	1.185E+12
-352.2911	72554.	0.000				
30.037	0.0522	10614124.	-24359.	-0.000885	0.000	1.185E+12
-342.2108	87507.	0.000				
31.150	0.0412	10258433.	-28800.	-0.000768	0.000	1.185E+12
-323.1151	104727.	0.000				
32.262	0.0317	9845155.	-32932.	-0.000654	0.000	1.185E+12
-295.8540	124544.	0.000				
33.375	0.0237	9379149.	-36696.	-0.000546	0.000	1.186E+12
-268.0010	150853.	0.000				
34.487	0.0171	8865379.	-40126.	-0.000444	0.000	1.200E+12
-245.9383	191656.	0.000				
35.600	0.0119	8307778.	-43081.	-0.000367	0.000	1.977E+12
-196.6747	221349.	0.000				
36.712	0.007341	7715125.	-45245.	-0.000313	0.000	1.979E+12
-127.6054	232042.	0.000				
37.825	0.003516	7099729.	-46524.	-0.000263	0.000	1.980E+12
-63.9302	242735.	0.000				
38.938	0.000330	6472940.	-46992.	-0.000217	0.000	1.982E+12
-6.2577	253429.	0.000				
40.050	-0.002275	5845035.	-46734.	-0.000175	0.000	1.983E+12
45.0010	264122.	0.000				
41.163	-0.004353	5225151.	-45835.	-0.000138	0.000	1.984E+12
89.6176	274815.	0.000				
42.275	-0.005963	4621239.	-44386.	-0.000105	0.000	1.986E+12
127.5287	285509.	0.000				
43.387	-0.007158	4040055.	-42474.	-7.593E-05	0.000	1.987E+12
158.8162	296202.	0.000				
44.500	-0.007990	3487175.	-40188.	-5.066E-05	0.000	1.988E+12
183.6885	306895.	0.000				
45.613	-0.008510	2967034.	-37611.	-2.900E-05	0.000	1.990E+12
202.4592	317589.	0.000				
46.725	-0.008765	2482974.	-34820.	-1.072E-05	0.000	1.991E+12
215.5273	328282.	0.000				
47.837	-0.008797	2037327.	-31891.	4.435E-06	0.000	1.992E+12
223.3591	338975.	0.000				
48.950	-0.008646	1631487.	-28888.	1.673E-05	0.000	1.993E+12
226.4669	349669.	0.000				
50.062	-0.008350	1266009.	-25872.	2.643E-05	0.000	1.994E+12
225.3948	360362.	0.000				
51.175	-0.007941	940701.	-22894.	3.382E-05	0.000	1.994E+12

220.7025	371056.	0.000				
52.287	-0.007447	654728.	-20000.	3.916E-05	0.000	1.994E+12
212.9500	381749.	0.000				
53.400	-0.006895	406707.	-17225.	4.271E-05	0.000	1.994E+12
202.6865	392442.	0.000				
54.512	-0.006307	194809.	-14601.	4.473E-05	0.000	1.994E+12
190.4408	403136.	0.000				
55.625	-0.005701	16852.	-12151.	4.544E-05	0.000	1.994E+12
176.7126	413829.	0.000				
56.738	-0.005093	-129611.	-9889.8769	4.506E-05	0.000	1.994E+12
161.9661	424522.	0.000				
57.850	-0.004498	-247208.	-7830.0361	4.380E-05	0.000	1.994E+12
146.6243	435216.	0.000				
58.962	-0.003924	-338673.	-5976.4524	4.184E-05	0.000	1.994E+12
131.0661	445909.	0.000				
60.075	-0.003381	-406779.	-4329.7930	3.934E-05	0.000	1.994E+12
115.6244	456602.	0.000				
61.188	-0.002874	-454278.	-2886.5964	3.646E-05	0.000	1.994E+12
100.5848	467296.	0.000				
62.300	-0.002407	-483851.	-1639.8950	3.332E-05	0.000	1.994E+12
86.1869	477989.	0.000				
63.412	-0.001984	-498064.	-579.8264	3.003E-05	0.000	1.994E+12
72.6249	488682.	0.000				
64.525	-0.001605	-499333.	305.7802	2.669E-05	0.000	1.994E+12
60.0503	499376.	0.000				
65.638	-0.001271	-489899.	1030.8492	2.338E-05	0.000	1.994E+12
48.5743	510069.	0.000				
66.750	-0.000981	-471809.	1610.5446	2.016E-05	0.000	1.994E+12
38.2714	520762.	0.000				
67.862	-0.000733	-446898.	2060.7993	1.708E-05	0.000	1.994E+12
29.1825	531456.	0.000				
68.975	-0.000525	-416786.	2397.8918	1.419E-05	0.000	1.994E+12
21.3183	542149.	0.000				
70.087	-0.000354	-382874.	2638.0701	1.152E-05	0.000	1.994E+12
14.6635	552842.	0.000				
71.200	-0.000217	-346349.	2797.2227	9.075E-06	0.000	1.994E+12
9.1796	563536.	0.000				
72.312	-0.000112	-308188.	3083.9261	6.884E-06	0.000	1.994E+12
33.7722	4033127.	0.000				
73.425	-3.366E-05	-264008.	3432.9889	4.968E-06	0.000	1.994E+12
18.5218	7345301.	0.000				
74.537	2.086E-05	-216527.	3459.0842	3.360E-06	0.000	1.994E+12
-14.6124	9349640.	0.000				
75.650	5.604E-05	-171651.	3201.8326	2.060E-06	0.000	1.994E+12
-23.9271	5700172.	0.000				
76.763	7.587E-05	-131039.	2856.3117	1.047E-06	0.000	1.994E+12
-27.8363	4898105.	0.000				
77.875	8.399E-05	-95387.	2475.0235	2.888E-07	0.000	1.994E+12
-29.2855	4655016.	0.000				
78.987	8.358E-05	-64955.	2084.5469	-2.480E-07	0.000	1.994E+12
-29.2129	4666131.	0.000				
80.100	7.737E-05	-39730.	1701.9517	-5.985E-07	0.000	1.994E+12
-28.1048	4849705.	0.000				
81.212	6.760E-05	-19513.	1338.9981	-7.968E-07	0.000	1.994E+12
-26.2703	5187977.	0.000				
82.325	5.609E-05	-3978.6294	1003.9197	-8.754E-07	0.000	1.994E+12
-23.9287	5695195.	0.000				
83.438	4.423E-05	7291.3801	702.3734	-8.643E-07	0.000	1.994E+12
-21.2467	6413520.	0.000				
84.550	3.301E-05	14775.	438.0271	-7.905E-07	0.000	1.994E+12
-18.3557	7422838.	0.000				
85.663	2.312E-05	18987.	212.9744	-6.775E-07	0.000	1.994E+12
-15.3601	8869171.	0.000				

86.775	1.492E-05	20461.	28.0784	-5.454E-07	0.000	1.994E+12
-12.3397	11037701.	0.000				
87.887	8.558E-06	19736.	-116.6502	-4.108E-07	0.000	1.994E+12
-9.3425	14573453.	0.000				
89.000	3.956E-06	17347.	-221.3913	-2.867E-07	0.000	1.994E+12
-6.3491	21427161.	0.000				
90.112	9.038E-07	13825.	-283.9853	-1.823E-07	0.000	1.994E+12
-3.0283	44731796.	0.000				
91.225	-9.124E-07	9764.1903	-283.7840	-1.034E-07	0.000	1.994E+12
3.0585	44750487.	0.000				
92.337	-1.856E-06	6248.2182	-234.2961	-4.975E-08	0.000	1.994E+12
4.3554	31331017.	0.000				
93.450	-2.241E-06	3508.4841	-173.2906	-1.709E-08	0.000	1.994E+12
4.7840	28501659.	0.000				
94.562	-2.312E-06	1621.3581	-108.9283	8.419E-11	0.000	1.994E+12
4.8583	28051779.	0.000				
95.675	-2.239E-06	600.0975	-44.5957	7.521E-09	0.000	1.994E+12
4.7795	28503786.	0.000				
96.788	-2.111E-06	430.6532	-11.5788	1.097E-08	0.000	1.994E+12
0.1668	1054980.	0.000				
97.900	-1.946E-06	290.9444	-9.4171	1.339E-08	0.000	1.994E+12
0.1570	1077257.	0.000				
99.012	-1.754E-06	179.2158	-7.4050	1.496E-08	0.000	1.994E+12
0.1445	1099535.	0.000				
100.125	-1.546E-06	93.2317	-5.5735	1.587E-08	0.000	1.994E+12
0.1299	1121813.	0.000				
101.237	-1.330E-06	30.4026	-3.9455	1.629E-08	0.000	1.994E+12
0.1140	1144091.	0.000				
102.350	-1.111E-06	-12.1120	-2.5366	1.635E-08	0.000	1.994E+12
0.0971	1166369.	0.000				
103.462	-8.935E-07	-37.3233	-1.3574	1.618E-08	0.000	1.994E+12
0.0796	1188646.	0.000				
104.575	-6.792E-07	-48.3556	-0.4152	1.590E-08	0.000	1.994E+12
0.0616	1210924.	0.000				
105.688	-4.691E-07	-48.4088	0.2853	1.557E-08	0.000	1.994E+12
0.0433	1233202.	0.000				
106.800	-2.634E-07	-40.7388	0.7399	1.527E-08	0.000	1.994E+12
0.0248	1255480.	0.000				
107.913	-6.130E-08	-28.6544	0.9444	1.504E-08	0.000	1.994E+12
0.005867	1277758.	0.000				
109.025	1.382E-07	-15.5244	0.8937	1.489E-08	0.000	1.994E+12
-0.0135	1300036.	0.000				
110.137	3.364E-07	-4.7933	0.5814	1.483E-08	0.000	1.994E+12
-0.0333	1322313.	0.000				
111.250	5.341E-07	0.000	0.000	1.481E-08	0.000	1.994E+12
-0.0538	672296.	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. 2:

Pile-head deflection	=	1.0000000 inches
Computed slope at pile head	=	-0.0046099 radians
Maximum bending moment	=	11437363. inch-lbs

Maximum shear force = -46992. lbs
Depth of maximum bending moment = 23.3625000 feet below pile head
Depth of maximum shear force = 38.9375000 feet below pile head
Number of iterations = 18
Number of zero deflection points = 4

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 3

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head = 1.500000 inches
Moment at pile head = 5499600.0 in-lbs
Axial load at pile head = 0.0 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. Es*h lb/inch	Soil Spr. Distrib. p lb/inch
0.00	1.5000	5499600.	52450.	-0.006195	0.000	1.337E+12	0.000	0.000
1.113	1.4177	6199811.	52450.	-0.006137	0.000	1.337E+12	0.000	0.000
2.225	1.3361	6900023.	52450.	-0.005996	0.000	4.186E+11	0.000	0.000
3.337	1.2576	7600234.	51637.	-0.005765	0.000	4.182E+11	-121.8122	1293.1286
4.450	1.1822	8278736.	49954.	-0.005511	0.000	4.178E+11	-130.3267	1471.6828
5.562	1.1104	8934010.	48160.	-0.005236	0.000	4.174E+11	-138.4028	1663.9458
6.675	1.0424	9564618.	46262.	-0.004940	0.000	4.170E+11	-146.0638	1870.5880
7.788	0.9785	10169194.	44252.	-0.004730	0.000	1.185E+12	-155.0287	2115.0590
8.900	0.9161	10746141.	42137.	-0.004612	0.000	1.185E+12	-161.7988	2357.7143
10.012	0.8554	11294251.	39935.	-0.004488	0.000	1.185E+12	-168.0473	2622.7058
11.125	0.7963	11812412.	37654.	-0.004357	0.000	1.184E+12	-173.7612	2913.0092
12.237	0.7390	12299604.	35299.	-0.004221	0.000	1.184E+12	-178.9270	3232.1065
13.350	0.6836	12754907.	32880.	-0.004080	0.000	1.184E+12	-183.5311	3584.0940
14.462	0.6301	13177502.	30403.	-0.003934	0.000	1.184E+12	-187.5595	3973.8190
15.575	0.5786	13566669.	27876.	-0.003783	0.000	1.183E+12	-190.9979	4407.0529
16.688	0.5291	13921795.	25307.	-0.003628	0.000	1.183E+12	-193.8314	4890.7147
17.800	0.4817	14242377.	22705.	-0.003469	0.000	1.183E+12	-196.0446	5433.1581
18.912	0.4365	14528019.	20077.	-0.003307	0.000	1.183E+12	-197.6216	6044.5486
20.025	0.3934	14778440.	17433.	-0.003141	0.000	1.183E+12	-198.5457	6737.3612
21.137	0.3526	14993476.	14781.	-0.002973	0.000	1.183E+12	-198.7994	7527.0449
22.250	0.3140	15173082.	12130.	-0.002803	0.000	1.182E+12	-198.3642	8432.9230
23.362	0.2777	15317335.	9488.9898	-0.002631	0.000	1.182E+12	-197.2209	9479.4259
24.475	0.2438	15426438.	6868.5860	-0.002457	0.000	1.182E+12	-195.3490	10698.
25.588	0.2121	15500726.	4278.1791	-0.002283	0.000	1.182E+12	-192.7270	12129.
26.700	0.1828	15540665.	-1204.2089	-0.002108	0.000	1.182E+12	-628.6046	45900.
27.812	0.1559	15468574.	-9329.9981	-0.001932	0.000	1.182E+12	-588.7421	50426.
28.925	0.1312	15291555.	-16747.	-0.001759	0.000	1.182E+12	-522.4576	53148.
30.037	0.1089	15021422.	-23712.	-0.001588	0.000	1.183E+12	-521.0029	63866.
31.150	0.0888	14658435.	-30572.	-0.001420	0.000	1.183E+12	-506.6019	76126.
32.262	0.0710	14205160.	-37153.	-0.001257	0.000	1.183E+12	-479.3380	90145.
33.375	0.0553	13666456.	-43345.	-0.001100	0.000	1.183E+12	-448.3261	108285.
34.487	0.0416	13047850.	-49154.	-0.000949	0.000	1.184E+12	-421.9728	135364.
35.600	0.0299	12354039.	-54534.	-0.000806	0.000	1.184E+12	-383.9803	171302.
36.712	0.0201	11591795.	-59322.	-0.000671	0.000	1.184E+12	-333.4040	221523.
37.825	0.0120	10770130.	-63005.	-0.000545	0.000	1.185E+12	-218.2705	242735.
38.938	0.005536	9909565.	-65163.	-0.000429	0.000	1.185E+12	-105.1001	253429.
40.050	0.000558	9030268.	-65939.	-0.000322	0.000	1.186E+12	-11.0439	264122.
41.163	-0.003063	8149003.	-65591.	-0.000244	0.000	1.978E+12	63.0511	274815.
42.275	-0.005950	7278976.	-64321.	-0.000192	0.000	1.980E+12	127.2408	285509.
43.387	-0.008181	6431625.	-62260.	-0.000145	0.000	1.982E+12	181.5155	296202.
44.500	-0.009834	5616625.	-59540.	-0.000105	0.000	1.983E+12	226.0675	306895.
45.613	-0.0110	4841914.	-56287.	-6.974E-05	0.000	1.985E+12	261.2618	317589.
46.725	-0.0117	4113767.	-52623.	-3.964E-05	0.000	1.987E+12	287.6076	328282.
47.837	-0.0120	3436878.	-48663.	-1.428E-05	0.000	1.989E+12	305.7277	338975.
48.950	-0.0121	2814476.	-44510.	6.695E-06	0.000	1.990E+12	316.3321	349669.
50.062	-0.0119	2248452.	-40262.	2.367E-05	0.000	1.991E+12	320.1912	360362.
51.175	-0.0114	1739493.	-36001.	3.704E-05	0.000	1.992E+12	318.1119	371056.
52.287	-0.0109	1287229.	-31802.	4.718E-05	0.000	1.994E+12	310.9154	381749.
53.400	-0.0102	890377.	-27728.	5.447E-05	0.000	1.994E+12	299.4195	392442.
54.512	-0.009419	546888.	-23831.	5.928E-05	0.000	1.994E+12	284.4192	403136.

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    55.625  -0.008603    254089.    -20152.  6.196E-05       0.000  1.994E+12
266.6750    413829.      0.000
    56.738  -0.007764   8817.3164    -16724.  6.284E-05       0.000  1.994E+12
246.9018    424522.      0.000
    57.850  -0.006925   -192451.    -13569.  6.222E-05       0.000  1.994E+12
225.7595    435216.      0.000
    58.962  -0.006103   -353483.    -10702.  6.040E-05       0.000  1.994E+12
203.8472    445909.      0.000
    60.075  -0.005312   -478186. -8128.1664  5.761E-05       0.000  1.994E+12
181.6986    456602.      0.000
    61.188  -0.004565   -570505. -5848.7983  5.410E-05       0.000  1.994E+12
159.7797    467296.      0.000
    62.300  -0.003868   -634349. -3857.8560  5.007E-05       0.000  1.994E+12
138.4888    477989.      0.000
    63.412  -0.003228   -673510. -2144.7446  4.569E-05       0.000  1.994E+12
118.1571    488682.      0.000
    64.525  -0.002648   -691613.  -694.8738  4.112E-05       0.000  1.994E+12
99.0520     499376.      0.000
    65.638  -0.002130   -692063.   509.5089  3.649E-05       0.000  1.994E+12
81.3799     510069.      0.000
    66.750  -0.001674   -678009.  1488.5360  3.190E-05       0.000  1.994E+12
65.2909     520762.      0.000
    67.862  -0.001278   -652319.  2264.0007  2.745E-05       0.000  1.994E+12
50.8836     531456.      0.000
    68.975  -0.000941   -617561.  2858.7042  2.320E-05       0.000  1.994E+12
38.2105     542149.      0.000
    70.087  -0.000659   -575992.  3295.8736  1.920E-05       0.000  1.994E+12
27.2830     552842.      0.000
    71.200  -0.000428   -529561.  3598.6511  1.550E-05       0.000  1.994E+12
18.0769     563536.      0.000
    72.312  -0.000245   -479908.  4053.1147  1.212E-05       0.000  1.994E+12
50.0075    2725131.      0.000
    73.425  -0.000105   -421343.  4604.9926  9.103E-06       0.000  1.994E+12
32.6708    4169043.      0.000
    74.537 -1.917E-06   -356955.  4851.9286  6.498E-06       0.000  1.994E+12
4.3233    30101639.      0.000
    75.650  6.888E-05   -291796.  4703.6516  4.326E-06       0.000  1.994E+12
-26.5371    5143531.      0.000
    76.763   0.000114   -231367.  4299.1050  2.575E-06       0.000  1.994E+12
-34.0691    4004096.      0.000
    77.875   0.000138   -177010.  3821.4050  1.208E-06       0.000  1.994E+12
-37.4964    3637351.      0.000
    78.987   0.000146   -129336.  3313.4862  1.820E-07       0.000  1.994E+12
-38.5963    3533260.      0.000
    80.100   0.000142    -88540.  2801.2143 -5.474E-07       0.000  1.994E+12
-38.1485    3574390.      0.000
    81.212   0.000131    -54543.  2302.2149 -1.026E-06       0.000  1.994E+12
-36.6079    3724492.      0.000
    82.325   0.000115    -27071.  1829.0307 -1.300E-06       0.000  1.994E+12
-34.2811    3976928.      0.000
    83.438  9.652E-05  -5708.0327  1390.6515 -1.409E-06       0.000  1.994E+12
-31.3937    4342267.      0.000
    84.550  7.745E-05    10060.    993.3971 -1.395E-06       0.000  1.994E+12
-28.1201    4847166.      0.000
    85.663  5.928E-05    20816.    641.4947 -1.291E-06       0.000  1.994E+12
-24.5993    5540052.      0.000
    86.775  4.297E-05    27188.    337.5108 -1.131E-06       0.000  1.994E+12
-20.9413    6506420.      0.000
    87.887  2.909E-05    29827.     82.7335 -9.398E-07       0.000  1.994E+12
-17.2276    7906602.      0.000
    89.000  1.787E-05    29397.   -122.3817 -7.416E-07       0.000  1.994E+12
-13.5013   10083781.      0.000
    90.112  9.288E-06    26560.   -277.4356 -5.542E-07       0.000  1.994E+12
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-9.7277   13981417.      0.000
    91.225  3.076E-06    21989.  -379.6688 -3.917E-07       0.000  1.994E+12
-5.5881   24249677.      0.000
    92.337 -1.170E-06    16422.  -393.7474 -2.631E-07       0.000  1.994E+12
3.4789    39687963.      0.000
    93.450 -3.949E-06    11476.  -328.0788 -1.697E-07       0.000  1.994E+12
6.3591    21497972.      0.000
    94.562 -5.702E-06  7662.7563  -234.6645 -1.057E-07       0.000  1.994E+12
7.6356    17877589.      0.000
    95.675 -6.770E-06  5210.4018  -128.1790 -6.256E-08       0.000  1.994E+12
8.3173    16401581.      0.000
    96.788 -7.372E-06  4240.3778   -68.7723 -3.092E-08       0.000  1.994E+12
0.5826     1054980.      0.000
    97.900 -7.595E-06  3374.1824   -60.7925 -5.427E-09       0.000  1.994E+12
0.6129     1077257.      0.000
    99.012 -7.517E-06  2617.2188   -52.5688  1.463E-08       0.000  1.994E+12
0.6191     1099535.      0.000
   100.125 -7.205E-06  1970.5960   -44.3950  2.999E-08       0.000  1.994E+12
0.6054     1121813.      0.000
   101.237 -6.716E-06  1431.8726   -36.5118  4.138E-08       0.000  1.994E+12
0.5756     1144091.      0.000
   102.350 -6.100E-06   995.7316   -29.1124  4.951E-08       0.000  1.994E+12
0.5329     1166369.      0.000
   103.462 -5.394E-06   654.5722   -22.3489  5.503E-08       0.000  1.994E+12
0.4803     1188646.      0.000
   104.575 -4.631E-06   399.0149   -16.3392  5.856E-08       0.000  1.994E+12
0.4200     1210924.      0.000
   105.688 -3.831E-06   218.3147   -11.1734  6.062E-08       0.000  1.994E+12
0.3539     1233202.      0.000
   106.800 -3.012E-06   100.6850    -6.9205  6.169E-08       0.000  1.994E+12
0.2832     1255480.      0.000
   107.913 -2.184E-06    33.5365    -3.6347  6.214E-08       0.000  1.994E+12
0.2090     1277758.      0.000
   109.025 -1.353E-06     3.6392    -1.3602  6.227E-08       0.000  1.994E+12
0.1317     1300036.      0.000
   110.137 -5.213E-07    -2.7814    -0.1363  6.227E-08       0.000  1.994E+12
0.0516     1322313.      0.000
   111.250  3.099E-07       0.000       0.000  6.226E-08       0.000  1.994E+12
-0.0312     672296.      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. 3:

```
Pile-head deflection             =      1.5000000 inches
Computed slope at pile head      =     -0.0061954 radians
Maximum bending moment           =      15540665. inch-lbs
Maximum shear force              =        -65939. lbs
Depth of maximum bending moment  =     26.7000000 feet below pile head
Depth of maximum shear force     =     40.0500000 feet below pile head
Number of iterations             =             15
Number of zero deflection points =              4
```

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 4

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head = 2.000000 inches
Moment at pile head = 5499600.0 in-lbs
Axial load at pile head = 0.0 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. Spr. Distrib. Es*h Lat. Load lb/inch lb/inch	p lb/in
0.00	2.0000	5499600.	67787.	-0.007738	0.000	1.337E+12	0.000	0.000
1.113	1.8971	6404562.	67787.	-0.007678	0.000	1.337E+12	0.000	0.000
2.225	1.7950	7309524.	67787.	-0.007529	0.000	4.183E+11	0.000	0.000
3.337	1.6960	8214486.	66889.	-0.007282	0.000	4.178E+11	-134.5835	1059.3483
4.450	1.6006	9095463.	65028.	-0.007005	0.000	4.173E+11	-144.1756	1202.5325
5.562	1.5090	9950743.	63043.	-0.006700	0.000	4.168E+11	-153.3013	1356.2409
6.675	1.4217	10778703.	60938.	-0.006368	0.000	4.163E+11	-161.9801	1521.0358
7.788	1.3390	11577793.	58708.	-0.006130	0.000	1.184E+12	-172.1128	1716.0099
8.900	1.2580	12346210.	56359.	-0.005995	0.000	1.184E+12	-179.8384	1908.4295
10.012	1.1789	13082575.	53910.	-0.005852	0.000	1.184E+12	-187.0127	2117.7242
11.125	1.1018	13785610.	51369.	-0.005700	0.000	1.183E+12	-193.6216	2346.0586
12.237	1.0267	14454137.	48744.	-0.005541	0.000	1.183E+12	-199.6502	2595.9509
13.350	0.9538	15087083.	46043.	-0.005374	0.000	1.182E+12	-205.0839	2870.3452
14.462	0.8832	15683478.	43273.	-0.005200	0.000	1.182E+12	-209.9074	3172.7025
15.575	0.8150	16242462.	40442.	-0.005020	0.000	1.182E+12	-214.1050	3507.1146
16.688	0.7492	16763288.	37560.	-0.004833	0.000	1.182E+12	-217.6607	3878.4492
17.800	0.6859	17245322.	34635.	-0.004641	0.000	1.181E+12	-220.5580	4292.5351
18.912	0.6253	17688048.	31676.	-0.004444	0.000	1.181E+12	-222.7798	4756.4017
20.025	0.5673	18091070.	28692.	-0.004242	0.000	1.181E+12	-224.3080	5278.5903
21.137	0.5120	18454114.	25692.	-0.004035	0.000	1.181E+12	-225.1244	5869.5651
22.250	0.4596	18777037.	22686.	-0.003825	0.000	1.180E+12	-225.2094	6542.2591
23.362	0.4099	19059822.	19684.	-0.003611	0.000	1.180E+12	-224.5430	7312.8086

STR - 1
$\Delta = 2.0''$
LATERAL RESISTANCE = 67.79 K

24.475	0.3632	19302588.	16696.	-0.003394	0.000	1.180E+12
-223.1042	8201.5533	0.000				
25.588	0.3193	19505592.	13732.	-0.003174	0.000	1.180E+12
-220.8713	9234.4139	0.000				
26.700	0.2784	19669233.	7170.1746	-0.002952	0.000	1.180E+12
-762.1729	36547.	0.000				
27.812	0.2405	19697036.	-2808.3444	-0.002730	0.000	1.180E+12
-732.7363	40677.	0.000				
28.925	0.2055	19594250.	-12180.	-0.002507	0.000	1.180E+12
-671.2753	43603.	0.000				
30.037	0.1735	19371827.	-21200.	-0.002287	0.000	1.180E+12
-679.9847	52312.	0.000				
31.150	0.1445	19028216.	-30233.	-0.002070	0.000	1.180E+12
-673.2540	62216.	0.000				
32.262	0.1183	18564615.	-39070.	-0.001857	0.000	1.180E+12
-650.6952	73450.	0.000				
33.375	0.0949	17985046.	-47570.	-0.001651	0.000	1.181E+12
-622.6635	87616.	0.000				
34.487	0.0742	17294505.	-55729.	-0.001451	0.000	1.181E+12
-599.7408	107909.	0.000				
35.600	0.0561	16497076.	-63489.	-0.001260	0.000	1.182E+12
-562.8360	133869.	0.000				
36.712	0.0405	15599337.	-70657.	-0.001079	0.000	1.182E+12
-510.9338	168219.	0.000				
37.825	0.0273	14610538.	-77021.	-0.000908	0.000	1.183E+12
-442.4604	216216.	0.000				
38.938	0.0163	13542883.	-82039.	-0.000750	0.000	1.183E+12
-309.2784	253429.	0.000				
40.050	0.007304	12420107.	-85068.	-0.000603	0.000	1.184E+12
-144.5141	264122.	0.000				
41.163	0.000186	11271576.	-86058.	-0.000470	0.000	1.185E+12
-3.8368	274815.	0.000				
42.275	-0.005236	10122361.	-85336.	-0.000349	0.000	1.185E+12
111.9783	285509.	0.000				
43.387	-0.009136	8993103.	-83236.	-0.000242	0.000	1.186E+12
202.7107	296202.	0.000				
44.500	-0.0117	7899973.	-80089.	-0.000164	0.000	1.978E+12
268.6230	306895.	0.000				
45.613	-0.0135	6854717.	-76149.	-0.000115	0.000	1.981E+12
321.6863	317589.	0.000				
46.725	-0.0147	5866793.	-71582.	-7.166E-05	0.000	1.983E+12
362.5248	328282.	0.000				
47.837	-0.0154	4943479.	-66546.	-3.529E-05	0.000	1.985E+12
391.9295	338975.	0.000				
48.950	-0.0157	4090016.	-61188.	-4.926E-06	0.000	1.987E+12
410.8202	349669.	0.000				
50.062	-0.0156	3309770.	-55640.	1.992E-05	0.000	1.989E+12
420.2078	360362.	0.000				
51.175	-0.0152	2604415.	-50024.	3.976E-05	0.000	1.991E+12
421.1632	371056.	0.000				
52.287	-0.0145	1974120.	-44444.	5.511E-05	0.000	1.992E+12
414.7872	381749.	0.000				
53.400	-0.0137	1417750.	-38991.	6.648E-05	0.000	1.993E+12
402.1814	392442.	0.000				
54.512	-0.0127	933058.	-33740.	7.435E-05	0.000	1.994E+12
384.4273	403136.	0.000				
55.625	-0.0117	516879.	-28754.	7.920E-05	0.000	1.994E+12
362.5646	413829.	0.000				
56.738	-0.0106	165317.	-24081.	8.149E-05	0.000	1.994E+12
337.5760	424522.	0.000				
57.850	-0.009521	-126081.	-19756.	8.162E-05	0.000	1.994E+12
310.3748	435216.	0.000				
58.962	-0.008437	-362163.	-15803.	7.998E-05	0.000	1.994E+12

281.7954	445909.	0.000				
60.075	-0.007385	-548023.	-12236.	7.693E-05	0.000	1.994E+12
252.5868	456602.	0.000				
61.188	-0.006382	-688866.	-9058.8119	7.279E-05	0.000	1.994E+12
223.4081	467296.	0.000				
62.300	-0.005441	-789893.	-6267.0860	6.784E-05	0.000	1.994E+12
194.8280	477989.	0.000				
63.412	-0.004571	-856198.	-3849.7167	6.233E-05	0.000	1.994E+12
167.3247	488682.	0.000				
64.525	-0.003777	-892681.	-1789.7141	5.648E-05	0.000	1.994E+12
141.2899	499376.	0.000				
65.638	-0.003063	-903983.	-65.4171	5.046E-05	0.000	1.994E+12
117.0318	510069.	0.000				
66.750	-0.002430	-894427.	1348.4379	4.444E-05	0.000	1.994E+12
94.7817	520762.	0.000				
67.862	-0.001876	-867980.	2479.7263	3.854E-05	0.000	1.994E+12
74.6997	531456.	0.000				
68.975	-0.001401	-828219.	3358.0341	3.286E-05	0.000	1.994E+12
56.8820	542149.	0.000				
70.087	-0.000999	-778320.	4013.8510	2.749E-05	0.000	1.994E+12
41.3677	552842.	0.000				
71.200	-0.000667	-721049.	4477.8593	2.247E-05	0.000	1.994E+12
28.1466	563536.	0.000				
72.312	-0.000399	-658761.	5091.7669	1.785E-05	0.000	1.994E+12
63.8246	2135081.	0.000				
73.425	-0.000190	-585099.	5811.8749	1.368E-05	0.000	1.994E+12
44.0568	3091532.	0.000				
74.537	-3.372E-05	-503584.	6229.4945	1.004E-05	0.000	1.994E+12
18.5080	7327625.	0.000				
75.650	7.780E-05	-418771.	6164.6849	6.951E-06	0.000	1.994E+12
-28.2173	4842072.	0.000				
76.763	0.000152	-338987.	5713.3138	4.415E-06	0.000	1.994E+12
-39.4039	3463475.	0.000				
77.875	0.000196	-266226.	5151.8036	2.389E-06	0.000	1.994E+12
-44.7175	3050981.	0.000				
78.987	0.000216	-201434.	4539.9723	8.230E-07	0.000	1.994E+12
-46.9426	2905934.	0.000				
80.100	0.000218	-145009.	3911.8644	-3.368E-07	0.000	1.994E+12
-47.1559	2892528.	0.000				
81.212	0.000207	-96987.	3290.3838	-1.147E-06	0.000	1.994E+12
-45.9498	2968257.	0.000				
82.325	0.000187	-57155.	2691.9055	-1.663E-06	0.000	1.994E+12
-43.7099	3120188.	0.000				
83.438	0.000162	-25113.	2128.3813	-1.938E-06	0.000	1.994E+12
-40.7132	3349666.	0.000				
84.550	0.000135	-327.4969	1608.5056	-2.024E-06	0.000	1.994E+12
-37.1708	3668676.	0.000				
85.663	0.000108	17834.	1138.4542	-1.965E-06	0.000	1.994E+12
-33.2489	4101124.	0.000				
86.775	8.280E-05	30069.	722.4127	-1.805E-06	0.000	1.994E+12
-29.0794	4688714.	0.000				
87.887	6.005E-05	37122.	363.0144	-1.580E-06	0.000	1.994E+12
-24.7630	5505260.	0.000				
89.000	4.062E-05	39762.	61.7885	-1.322E-06	0.000	1.994E+12
-20.3645	6692943.	0.000				
90.112	2.474E-05	38772.	-180.2186	-1.059E-06	0.000	1.994E+12
-15.8913	8573623.	0.000				
91.225	1.233E-05	34950.	-361.1502	-8.126E-07	0.000	1.994E+12
-11.2146	12137828.	0.000				
92.337	3.049E-06	29129.	-473.1247	-5.981E-07	0.000	1.994E+12
-5.5606	24349712.	0.000				
93.450	-3.633E-06	22317.	-469.4609	-4.258E-07	0.000	1.994E+12
6.1095	22447345.	0.000				

94.562	-8.321E-06	16595.	-367.0710	-2.956E-07	0.000	1.994E+12
9.2298	14808315.	0.000				
95.675	-1.152E-05	12517.	-232.9843	-1.981E-07	0.000	1.994E+12
10.8581	12577598.	0.000				
96.788	-1.361E-05	10374.	-153.3273	-1.215E-07	0.000	1.994E+12
1.0755	1054980.	0.000				
97.900	-1.477E-05	8422.8150	-138.1935	-5.855E-08	0.000	1.994E+12
1.1917	1077257.	0.000				
99.012	-1.517E-05	6684.1260	-121.8970	-7.972E-09	0.000	1.994E+12
1.2497	1099535.	0.000				
100.125	-1.498E-05	5168.1639	-105.1522	3.171E-08	0.000	1.994E+12
1.2589	1121813.	0.000				
101.237	-1.433E-05	3876.5614	-88.5537	6.198E-08	0.000	1.994E+12
1.2278	1144091.	0.000				
102.350	-1.333E-05	2803.7814	-72.5865	8.435E-08	0.000	1.994E+12
1.1643	1166369.	0.000				
103.462	-1.207E-05	1938.5022	-57.6386	1.002E-07	0.000	1.994E+12
1.0751	1188646.	0.000				
104.575	-1.065E-05	1264.8298	-44.0141	1.109E-07	0.000	1.994E+12
0.9660	1210924.	0.000				
105.688	-9.112E-06	763.3252	-31.9472	1.177E-07	0.000	1.994E+12
0.8418	1233202.	0.000				
106.800	-7.506E-06	411.8404	-21.6163	1.217E-07	0.000	1.994E+12
0.7059	1255480.	0.000				
107.913	-5.864E-06	186.1693	-13.1580	1.237E-07	0.000	1.994E+12
0.5612	1277758.	0.000				
109.025	-4.204E-06	60.5228	-6.6788	1.245E-07	0.000	1.994E+12
0.4094	1300036.	0.000				
110.137	-2.540E-06	7.8456	-2.2668	1.247E-07	0.000	1.994E+12
0.2515	1322313.	0.000				
111.250	-8.741E-07	0.000	0.000	1.248E-07	0.000	1.994E+12
0.0880	672296.	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. 4:

Pile-head deflection	=	2.0000000	inches
Computed slope at pile head	=	-0.0077375	radians
Maximum bending moment	=	19697036.	inch-lbs
Maximum shear force	=	-86058.	lbs
Depth of maximum bending moment	=	27.8125000	feet below pile head
Depth of maximum shear force	=	41.1625000	feet below pile head
Number of iterations	=	17	
Number of zero deflection points	=	4	

Pile-head Deflection vs. Pile Length for Load Case 4

Boundary Condition Type 4, Deflection and Moment

Deflection = 2.00000 in
Moment = 5499600. in- lb
Axial Load = 0. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment ln-lbs	Maximum Shear lbs
111.2500	2.0000000	19697036.	-86058.
105.6875	2.0000000	19852396.	-86562.
100.1250	2.0000000	19544590.	-85185.
94.5625	2.0000000	19771668.	-86245.
89.0000	2.0000000	19606694.	-85794.
83.4375	2.0000000	19681879.	-85972.
77.8750	2.0000000	19682032.	-86145.
72.3125	2.0000000	19548374.	-85340.
66.7500	2.0000000	19650220.	-85215.
61.1875	2.0000000	19753534.	-86408.
55.6250	2.0000000	19304530.	-92511.
50.0625	2.0000000	18056391.	-106916.
44.5000	2.0000000	13862172.	-100440.
38.9375	2.0000000	9309965.	-73191.
33.3750	2.0000000	6676651.	-46727.
27.8125	2.0000000	5527169.	-33074.
22.2500	2.0000000	5499600.	-30204.
16.6875	2.0000000	5499600.	-38714.

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 5

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head = 0.500000 inches
Moment at pile head = 783600.0 in-lbs
Axial load at pile head = 0.0 lbs

Depth Res. X feet	Soil Spr. y inches	Distrib. Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil p lb/in
	Es*h lb/inch	Lat. Load lb/inch					
0.00	0.5000	783600.	39313.	-0.001738	0.000	1.354E+12	
0.000	0.000	0.000					
1.113	0.4769	1308425.	39313.	-0.001728	0.000	1.354E+12	
0.000	0.000	0.000					
2.225	0.4539	1833249.	39313.	-0.001712	0.000	1.350E+12	
0.000	0.000	0.000					
3.337	0.4311	2358074.	38744.	-0.001691	0.000	1.348E+12	
-85.2550	2639.8798	0.000					
4.450	0.4087	2867704.	37564.	-0.001665	0.000	1.346E+12	
-91.4690	2987.6813	0.000					
5.562	0.3867	3361033.	36303.	-0.001635	0.000	1.345E+12	
-97.3711	3361.7807	0.000					
6.675	0.3651	3837007.	34966.	-0.001599	0.000	1.343E+12	
-102.9566	3764.9200	0.000					
7.788	0.3440	4294633.	33549.	-0.001565	0.000	1.987E+12	
-109.4129	4246.3072	0.000					

8.900	0.3233	4732758.	32055.	-0.001535	0.000	1.986E+12
-114.3353	4721.5287	0.000				
10.012	0.3030	5150507.	30498.	-0.001502	0.000	1.985E+12
-118.9030	5238.7740	0.000				
11.125	0.2832	5547064.	28883.	-0.001466	0.000	1.984E+12
-123.1061	5803.5144	0.000				
12.237	0.2639	5921681.	27214.	-0.001427	0.000	1.983E+12
-126.9350	6422.1163	0.000				
13.350	0.2451	6273676.	25496.	-0.001386	0.000	1.982E+12
-130.3797	7102.0264	0.000				
14.462	0.2269	6602434.	23735.	-0.001343	0.000	1.981E+12
-133.4305	7852.0029	0.000				
15.575	0.2092	6907411.	21936.	-0.001297	0.000	1.980E+12
-136.0771	8682.4060	0.000				
16.688	0.1922	7188137.	20105.	-0.001250	0.000	1.980E+12
-138.3093	9605.5687	0.000				
17.800	0.1759	7444212.	18246.	-0.001200	0.000	1.979E+12
-140.1166	10636.	0.000				
18.912	0.1602	7675316.	16367.	-0.001149	0.000	1.979E+12
-141.4879	11792.	0.000				
20.025	0.1452	7881204.	14472.	-0.001097	0.000	1.978E+12
-142.4123	13096.	0.000				
21.137	0.1309	8061710.	12567.	-0.001043	0.000	1.978E+12
-142.8778	14572.	0.000				
22.250	0.1173	8216752.	10660.	-0.000988	0.000	1.977E+12
-142.8724	16256.	0.000				
23.362	0.1045	8346331.	8755.9004	-0.000932	0.000	1.977E+12
-142.3832	18188.	0.000				
24.475	0.0924	8450535.	6861.6691	-0.000875	0.000	1.977E+12
-141.3967	20420.	0.000				
25.588	0.0811	8529538.	4984.0231	-0.000818	0.000	1.977E+12
-139.8986	23019.	0.000				
26.700	0.0706	8583608.	1336.9048	-0.000760	0.000	1.977E+12
-406.4862	76865.	0.000				
27.812	0.0608	8565233.	-3821.0515	-0.000702	0.000	1.977E+12
-366.2413	80370.	0.000				
28.925	0.0518	8481586.	-8341.3553	-0.000645	0.000	1.977E+12
-310.9577	80072.	0.000				
30.037	0.0436	8342519.	-12478.	-0.000588	0.000	1.977E+12
-308.8025	94514.	0.000				
31.150	0.0361	8148417.	-16538.	-0.000532	0.000	1.978E+12
-299.3523	110568.	0.000				
32.262	0.0294	7900963.	-20423.	-0.000478	0.000	1.978E+12
-282.7829	128390.	0.000				
33.375	0.0234	7603111.	-24084.	-0.000426	0.000	1.979E+12
-265.6834	151733.	0.000				
34.487	0.0180	7257908.	-27552.	-0.000376	0.000	1.980E+12
-253.7818	187884.	0.000				
35.600	0.0133	6867476.	-30723.	-0.000328	0.000	1.981E+12
-221.2224	221349.	0.000				
36.712	0.009270	6437616.	-33275.	-0.000283	0.000	1.982E+12
-161.1324	232042.	0.000				
37.825	0.005777	5979040.	-35051.	-0.000242	0.000	1.983E+12
-105.0465	242735.	0.000				
38.938	0.002822	5501741.	-36110.	-0.000203	0.000	1.984E+12
-53.5672	253429.	0.000				
40.050	0.000360	5014896.	-36515.	-0.000168	0.000	1.985E+12
-7.1323	264122.	0.000				
41.163	-0.001651	4526780.	-36336.	-0.000135	0.000	1.986E+12
33.9771	274815.	0.000				
42.275	-0.003255	4044719.	-35645.	-0.000107	0.000	1.987E+12
69.6204	285509.	0.000				
43.387	-0.004497	3575066.	-34514.	-8.104E-05	0.000	1.988E+12

99.7861	296202.	0.000				
44.500	-0.005419	3123197.	-33016.	-5.855E-05	0.000	1.989E+12
124.5750	306895.	0.000				
45.613	-0.006061	2693530.	-31222.	-3.904E-05	0.000	1.990E+12
144.1835	317589.	0.000				
46.725	-0.006461	2289560.	-29199.	-2.233E-05	0.000	1.991E+12
158.8893	328282.	0.000				
47.837	-0.006657	1913908.	-27010.	-8.244E-06	0.000	1.992E+12
169.0335	338975.	0.000				
48.950	-0.006682	1568381.	-24714.	3.423E-06	0.000	1.993E+12
175.0059	349669.	0.000				
50.062	-0.006566	1254045.	-22363.	1.288E-05	0.000	1.994E+12
177.2310	360362.	0.000				
51.175	-0.006338	971294.	-20004.	2.033E-05	0.000	1.994E+12
176.1549	371056.	0.000				
52.287	-0.006023	719939.	-17678.	2.599E-05	0.000	1.994E+12
172.2311	381749.	0.000				
53.400	-0.005644	499279.	-15421.	3.007E-05	0.000	1.994E+12
165.9114	392442.	0.000				
54.512	-0.005220	308188.	-13262.	3.277E-05	0.000	1.994E+12
157.6367	403136.	0.000				
55.625	-0.004769	145192.	-11223.	3.429E-05	0.000	1.994E+12
147.8293	413829.	0.000				
56.738	-0.004305	8541.6578	-9322.2334	3.480E-05	0.000	1.994E+12
136.8863	424522.	0.000				
57.850	-0.003840	-103712.	-7572.9760	3.449E-05	0.000	1.994E+12
125.1747	435216.	0.000				
58.962	-0.003384	-193657.	-5982.9747	3.349E-05	0.000	1.994E+12
113.0277	445909.	0.000				
60.075	-0.002945	-263457.	-4556.0569	3.196E-05	0.000	1.994E+12
100.7427	456602.	0.000				
61.188	-0.002531	-315304.	-3292.3302	3.002E-05	0.000	1.994E+12
88.5796	467296.	0.000				
62.300	-0.002144	-351363.	-2188.6818	2.779E-05	0.000	1.994E+12
76.7610	477989.	0.000				
63.412	-0.001789	-373741.	-1239.2741	2.536E-05	0.000	1.994E+12
65.4724	488682.	0.000				
64.525	-0.001467	-384451.	-436.0264	2.282E-05	0.000	1.994E+12
54.8643	499376.	0.000				
65.638	-0.001179	-385383.	230.9249	2.025E-05	0.000	1.994E+12
45.0535	510069.	0.000				
66.750	-0.000926	-378286.	772.7964	1.769E-05	0.000	1.994E+12
36.1258	520762.	0.000				
67.862	-0.000707	-364750.	1201.7616	1.520E-05	0.000	1.994E+12
28.1387	531456.	0.000				
68.975	-0.000520	-346199.	1530.5922	1.282E-05	0.000	1.994E+12
21.1243	542149.	0.000				
70.087	-0.000364	-323883.	1772.3389	1.058E-05	0.000	1.994E+12
15.0924	552842.	0.000				
71.200	-0.000238	-298877.	1940.0515	8.495E-06	0.000	1.994E+12
10.0331	563536.	0.000				
72.312	-0.000138	-272083.	2257.3542	6.584E-06	0.000	1.994E+12
37.5029	3637880.	0.000				
73.425	-6.189E-05	-238606.	2675.6175	4.874E-06	0.000	1.994E+12
25.1582	5426772.	0.000				
74.537	-7.482E-06	-200644.	2902.1865	3.404E-06	0.000	1.994E+12
8.7847	15674188.	0.000				
75.650	2.899E-05	-161117.	2846.0810	2.193E-06	0.000	1.994E+12
-17.1900	7915690.	0.000				
76.763	5.106E-05	-124654.	2578.9617	1.236E-06	0.000	1.994E+12
-22.8279	5968093.	0.000				
77.875	6.199E-05	-92259.	2258.6521	5.099E-07	0.000	1.994E+12
-25.1586	5417771.	0.000				

78.987	6.468E-05	-64348.	1919.1585	-1.440E-08	0.000	1.994E+12
-25.7019	5305109.	0.000				
80.100	6.161E-05	-41018.	1580.1281	-3.671E-07	0.000	1.994E+12
-25.0892	5436541.	0.000				
81.212	5.487E-05	-22159.	1254.5729	-5.786E-07	0.000	1.994E+12
-23.6831	5761643.	0.000				
82.325	4.616E-05	-7520.4835	951.4622	-6.780E-07	0.000	1.994E+12
-21.7268	6283642.	0.000				
83.438	3.677E-05	3245.4380	676.9495	-6.923E-07	0.000	1.994E+12
-19.3987	7042541.	0.000				
84.550	2.768E-05	10554.	435.0751	-6.461E-07	0.000	1.994E+12
-16.8371	8121799.	0.000				
85.663	1.952E-05	14862.	228.2287	-5.610E-07	0.000	1.994E+12
-14.1511	9677203.	0.000				
86.775	1.270E-05	16648.	57.5065	-4.555E-07	0.000	1.994E+12
-11.4253	12013295.	0.000				
87.887	7.359E-06	16397.	-76.9380	-3.449E-07	0.000	1.994E+12
-8.7162	15811564.	0.000				
89.000	3.488E-06	14594.	-175.3572	-2.412E-07	0.000	1.994E+12
-6.0282	23074663.	0.000				
90.112	9.205E-07	11715.	-236.7184	-1.531E-07	0.000	1.994E+12
-3.1645	45895789.	0.000				
91.225	-5.996E-07	8273.1479	-241.8695	-8.616E-08	0.000	1.994E+12
2.3928	53279129.	0.000				
92.337	-1.380E-06	5257.4135	-201.0759	-4.087E-08	0.000	1.994E+12
3.7186	35971213.	0.000				
93.450	-1.691E-06	2904.4215	-148.6190	-1.354E-08	0.000	1.994E+12
4.1401	32690635.	0.000				
94.562	-1.742E-06	1289.2875	-92.8336	4.956E-10	0.000	1.994E+12
4.2173	32324757.	0.000				
95.675	-1.677E-06	425.7634	-36.9766	6.237E-09	0.000	1.994E+12
4.1508	33034032.	0.000				
96.788	-1.575E-06	302.0123	-8.4388	8.673E-09	0.000	1.994E+12
0.1245	1054980.	0.000				
97.900	-1.446E-06	200.4461	-6.8292	1.036E-08	0.000	1.994E+12
0.1167	1077257.	0.000				
99.012	-1.299E-06	119.6737	-5.3364	1.143E-08	0.000	1.994E+12
0.1070	1099535.	0.000				
100.125	-1.141E-06	57.9646	-3.9825	1.202E-08	0.000	1.994E+12
0.0959	1121813.	0.000				
101.237	-9.777E-07	13.3400	-2.7834	1.226E-08	0.000	1.994E+12
0.0838	1144091.	0.000				
102.350	-8.134E-07	-16.3515	-1.7497	1.225E-08	0.000	1.994E+12
0.0711	1166369.	0.000				
103.462	-6.506E-07	-33.3771	-0.8887	1.208E-08	0.000	1.994E+12
0.0579	1188646.	0.000				
104.575	-4.908E-07	-40.0785	-0.2048	1.184E-08	0.000	1.994E+12
0.0445	1210924.	0.000				
105.688	-3.345E-07	-38.8460	0.2986	1.157E-08	0.000	1.994E+12
0.0309	1233202.	0.000				
106.800	-1.818E-07	-32.1060	0.6190	1.134E-08	0.000	1.994E+12
0.0171	1255480.	0.000				
107.913	-3.185E-08	-22.3197	0.7534	1.115E-08	0.000	1.994E+12
0.003049	1277758.	0.000				
109.025	1.161E-07	-11.9899	0.6983	1.104E-08	0.000	1.994E+12
-0.0113	1300036.	0.000				
110.137	2.629E-07	-3.6745	0.4491	1.099E-08	0.000	1.994E+12
-0.0260	1322313.	0.000				
111.250	4.094E-07	0.000	0.000	1.097E-08	0.000	1.994E+12
-0.0412	672296.	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. 5:

Pile-head deflection	=	0.5000000	inches
Computed slope at pile head	=	-0.0017379	radians
Maximum bending moment	=	8583608.	inch-lbs
Maximum shear force	=	39313.	lbs
Depth of maximum bending moment	=	26.7000000	feet below pile head
Depth of maximum shear force	=	0.000000	feet below pile head
Number of iterations	=	11	
Number of zero deflection points	=	4	

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 6

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head = 1.000000 inches
Moment at pile head = 783600.0 in-lbs
Axial load at pile head = 0.0 lbs

Depth X	Deflect. y	Bending Moment	Shear Force	Slope S	Total Stress	Bending Stiffness	Soil Res. Spr. Distrib. p
feet	inches	in-lbs	lbs	radians	psi*	lb-in^2	lb/in
Es*h lb/inch	Lat. Load lb/inch						
0.00	1.0000	783600.	52667.	-0.003343	0.000	1.354E+12	
0.000	0.000	0.000					
1.113	0.9554	1486709.	52667.	-0.003332	0.000	1.354E+12	
0.000	0.000	0.000					
2.225	0.9110	2189818.	52667.	-0.003314	0.000	1.349E+12	
0.000	0.000	0.000					
3.337	0.8669	2892926.	51949.	-0.003289	0.000	1.346E+12	
-107.6079	1657.0487	0.000					
4.450	0.8232	3576857.	50460.	-0.003257	0.000	1.344E+12	
-115.5156	1873.2702	0.000					
5.562	0.7800	4240200.	48867.	-0.003218	0.000	1.342E+12	
-123.0306	2105.7338	0.000					
6.675	0.7373	4881616.	47177.	-0.003172	0.000	1.339E+12	
-130.1406	2356.3432	0.000					
7.788	0.6953	5499839.	45385.	-0.003129	0.000	1.984E+12	
-138.3392	2656.1802	0.000					
8.900	0.6538	6093406.	43497.	-0.003090	0.000	1.982E+12	
-144.5865	2952.4854	0.000					
10.012	0.6128	6661205.	41528.	-0.003047	0.000	1.981E+12	
-150.3649	3275.8338	0.000					
11.125	0.5724	7202205.	39485.	-0.003001	0.000	1.980E+12	
-155.6524	3630.2663	0.000					
12.237	0.5327	7715464.	37376.	-0.002950	0.000	1.979E+12	

SER-1
A = 1.0"
LATERAL RESISTANCE = 52.67 K

-160.4246	4020.6756	0.000				
13.350	0.4936	8200132.	35206.	-0.002897	0.000	1.977E+12
-164.6541	4453.0521	0.000				
14.462	0.4553	8655455.	32983.	-0.002823	0.000	1.254E+12
-168.3100	4934.8241	0.000				
15.575	0.4183	9080782.	30715.	-0.002726	0.000	1.186E+12
-171.4178	5471.4006	0.000				
16.688	0.3825	9475558.	28410.	-0.002621	0.000	1.186E+12
-173.9707	6071.1737	0.000				
17.800	0.3483	9839328.	26074.	-0.002512	0.000	1.185E+12
-175.9537	6744.8011	0.000				
18.912	0.3155	10171740.	23716.	-0.002400	0.000	1.185E+12
-177.3514	7505.2782	0.000				
20.025	0.2842	10472543.	21343.	-0.002284	0.000	1.185E+12
-178.1480	8368.5829	0.000				
21.137	0.2545	10741597.	18963.	-0.002164	0.000	1.185E+12
-178.3271	9354.5362	0.000				
22.250	0.2264	10978869.	16586.	-0.002042	0.000	1.185E+12
-177.8720	10488.	0.000				
23.362	0.2000	11184439.	14219.	-0.001917	0.000	1.185E+12
-176.7658	11800.	0.000				
24.475	0.1752	11358507.	11871.	-0.001790	0.000	1.185E+12
-174.9914	13332.	0.000				
25.588	0.1522	11501386.	9550.9588	-0.001661	0.000	1.185E+12
-172.5317	15134.	0.000				
26.700	0.1309	11613517.	4799.1485	-0.001531	0.000	1.184E+12
-539.3500	55013.	0.000				
27.812	0.1113	11629524.	-2117.1007	-0.001400	0.000	1.184E+12
-496.7922	59576.	0.000				
28.925	0.0935	11556991.	-8319.0175	-0.001269	0.000	1.184E+12
-432.3339	61721.	0.000				
30.037	0.0774	11407406.	-14067.	-0.001140	0.000	1.185E+12
-428.7294	73910.	0.000				
31.150	0.0631	11181412.	-19696.	-0.001012	0.000	1.185E+12
-414.6409	87749.	0.000				
32.262	0.0504	10881520.	-25070.	-0.000888	0.000	1.185E+12
-390.4963	103418.	0.000				
33.375	0.0394	10512032.	-30112.	-0.000768	0.000	1.185E+12
-364.7650	123685.	0.000				
34.487	0.0299	10077535.	-34851.	-0.000652	0.000	1.185E+12
-345.2269	154065.	0.000				
35.600	0.0220	9581511.	-39280.	-0.000541	0.000	1.186E+12
-318.2354	193347.	0.000				
36.712	0.0155	9028771.	-43199.	-0.000436	0.000	1.186E+12
-268.9264	232042.	0.000				
37.825	0.0103	8428101.	-46247.	-0.000357	0.000	1.977E+12
-187.7857	242735.	0.000				
38.938	0.005943	7793964.	-48254.	-0.000302	0.000	1.978E+12
-112.8277	253429.	0.000				
40.050	0.002261	7139719.	-49306.	-0.000252	0.000	1.980E+12
-44.7368	264122.	0.000				
41.163	-0.000778	6477500.	-49497.	-0.000206	0.000	1.982E+12
16.0235	274815.	0.000				
42.275	-0.003235	5818137.	-48929.	-0.000164	0.000	1.983E+12
69.1936	285509.	0.000				
43.387	-0.005170	5171106.	-47701.	-0.000127	0.000	1.985E+12
114.6980	296202.	0.000				
44.500	-0.006639	4544517.	-45917.	-9.482E-05	0.000	1.986E+12
152.6255	306895.	0.000				
45.613	-0.007701	3945129.	-43675.	-6.629E-05	0.000	1.987E+12
183.2057	317589.	0.000				
46.725	-0.008409	3378392.	-41072.	-4.170E-05	0.000	1.989E+12
206.7876	328282.	0.000				

47.837	-0.008815	2848510.	-38198.	-2.081E-05	0.000	1.990E+12
223.8162	338975.	0.000				
48.950	-0.008965	2358517.	-35136.	-3.348E-06	0.000	1.991E+12
234.8120	349669.	0.000				
50.062	-0.008904	1910372.	-31965.	1.096E-05	0.000	1.992E+12
240.3501	360362.	0.000				
51.175	-0.008672	1505063.	-28751.	2.240E-05	0.000	1.993E+12
241.0397	371056.	0.000				
52.287	-0.008306	1142713.	-25557.	3.127E-05	0.000	1.994E+12
237.5092	381749.	0.000				
53.400	-0.007837	822693.	-22434.	3.785E-05	0.000	1.994E+12
230.3892	392442.	0.000				
54.512	-0.007295	543733.	-19425.	4.242E-05	0.000	1.994E+12
220.2980	403136.	0.000				
55.625	-0.006705	304035.	-16568.	4.526E-05	0.000	1.994E+12
207.8319	413829.	0.000				
56.738	-0.006087	101377.	-13888.	4.662E-05	0.000	1.994E+12
193.5554	424522.	0.000				
57.850	-0.005460	-66784.	-11408.	4.674E-05	0.000	1.994E+12
177.9937	435216.	0.000				
58.962	-0.004839	-203224.	-9141.3044	4.583E-05	0.000	1.994E+12
161.6271	445909.	0.000				
60.075	-0.004236	-310857.	-7095.3226	4.411E-05	0.000	1.994E+12
144.8870	456602.	0.000				
61.188	-0.003661	-392669.	-5272.7741	4.176E-05	0.000	1.994E+12
128.1539	467296.	0.000				
62.300	-0.003121	-451640.	-3671.3726	3.893E-05	0.000	1.994E+12
111.7564	477989.	0.000				
63.412	-0.002622	-490694.	-2284.7874	3.577E-05	0.000	1.994E+12
95.9717	488682.	0.000				
64.525	-0.002166	-512644.	-1103.3180	3.242E-05	0.000	1.994E+12
81.0274	499376.	0.000				
65.638	-0.001756	-520153.	-114.5408	2.896E-05	0.000	1.994E+12
67.1040	510069.	0.000				
66.750	-0.001393	-515702.	696.0817	2.549E-05	0.000	1.994E+12
54.3376	520762.	0.000				
67.862	-0.001076	-501568.	1344.6365	2.208E-05	0.000	1.994E+12
42.8242	531456.	0.000				
68.975	-0.000803	-479801.	1848.2475	1.880E-05	0.000	1.994E+12
32.6232	542149.	0.000				
70.087	-0.000574	-452219.	2224.6171	1.568E-05	0.000	1.994E+12
23.7618	552842.	0.000				
71.200	-0.000385	-420403.	2491.6219	1.276E-05	0.000	1.994E+12
16.2389	563536.	0.000				
72.312	-0.000233	-385693.	2925.7300	1.006E-05	0.000	1.994E+12
48.7960	2793763.	0.000				
73.425	-0.000116	-342286.	3481.2923	7.622E-06	0.000	1.994E+12
34.4343	3958757.	0.000				
74.537	-2.967E-05	-292743.	3827.3018	5.496E-06	0.000	1.994E+12
17.4023	7830897.	0.000				
75.650	3.062E-05	-240097.	3825.4017	3.712E-06	0.000	1.994E+12
-17.6870	7711039.	0.000				
76.763	6.945E-05	-190604.	3529.5640	2.270E-06	0.000	1.994E+12
-26.6333	5119677.	0.000				
77.875	9.124E-05	-145858.	3148.0243	1.144E-06	0.000	1.994E+12
-30.5262	4466558.	0.000				
78.987	9.999E-05	-106552.	2730.9514	2.990E-07	0.000	1.994E+12
-31.9566	4266534.	0.000				
80.100	9.922E-05	-72942.	2305.1562	-3.019E-07	0.000	1.994E+12
-31.8329	4283041.	0.000				
81.212	9.193E-05	-45004.	1888.1433	-6.968E-07	0.000	1.994E+12
-30.6409	4449606.	0.000				
82.325	8.062E-05	-22528.	1492.0868	-9.229E-07	0.000	1.994E+12

-28.6934	4751538.	0.000				
83.438	6.729E-05	-5165.7322	1125.5770	-1.016E-06	0.000	1.994E+12
-26.2144	5200772.	0.000				
84.550	5.350E-05	7524.7200	794.5710	-1.008E-06	0.000	1.994E+12
-23.3745	5832501.	0.000				
85.663	4.039E-05	16049.	502.9917	-9.288E-07	0.000	1.994E+12
-20.3078	6713008.	0.000				
86.775	2.870E-05	20955.	253.1597	-8.049E-07	0.000	1.994E+12
-17.1202	7962443.	0.000				
87.887	1.890E-05	22809.	46.1681	-6.584E-07	0.000	1.994E+12
-13.8898	9813366.	0.000				
89.000	1.113E-05	22187.	-117.6824	-5.077E-07	0.000	1.994E+12
-10.6571	12787785.	0.000				
90.112	5.339E-06	19667.	-238.0866	-3.676E-07	0.000	1.994E+12
-7.3810	18455868.	0.000				
91.225	1.310E-06	15830.	-311.7321	-2.488E-07	0.000	1.994E+12
-3.6521	37211997.	0.000				
92.337	-1.304E-06	11343.	-311.7196	-1.578E-07	0.000	1.994E+12
3.6539	37419172.	0.000				
93.450	-2.904E-06	7507.4606	-250.9620	-9.471E-08	0.000	1.994E+12
5.4483	25050750.	0.000				
94.562	-3.832E-06	4642.6257	-172.8214	-5.404E-08	0.000	1.994E+12
6.2581	21800079.	0.000				
95.675	-4.346E-06	2893.1305	-86.5673	-2.881E-08	0.000	1.994E+12
6.6638	20468659.	0.000				
96.788	-4.602E-06	2331.2784	-39.6590	-1.132E-08	0.000	1.994E+12
0.3636	1054980.	0.000				
97.900	-4.648E-06	1834.2343	-34.7280	2.627E-09	0.000	1.994E+12
0.3751	1077257.	0.000				
99.012	-4.531E-06	1404.0412	-29.7330	1.347E-08	0.000	1.994E+12
0.3732	1099535.	0.000				
100.125	-4.289E-06	1040.3635	-24.8361	2.165E-08	0.000	1.994E+12
0.3604	1121813.	0.000				
101.237	-3.953E-06	740.9166	-20.1690	2.761E-08	0.000	1.994E+12
0.3388	1144091.	0.000				
102.350	-3.552E-06	501.8511	-15.8363	3.177E-08	0.000	1.994E+12
0.3103	1166369.	0.000				
103.462	-3.105E-06	318.0870	-11.9198	3.452E-08	0.000	1.994E+12
0.2765	1188646.	0.000				
104.575	-2.630E-06	183.5932	-8.4821	3.620E-08	0.000	1.994E+12
0.2385	1210924.	0.000				
105.688	-2.138E-06	91.6137	-5.5713	3.712E-08	0.000	1.994E+12
0.1975	1233202.	0.000				
106.800	-1.639E-06	34.8395	-3.2240	3.754E-08	0.000	1.994E+12
0.1541	1255480.	0.000				
107.913	-1.136E-06	5.5322	-1.4695	3.768E-08	0.000	1.994E+12
0.1087	1277758.	0.000				
109.025	-6.327E-07	-4.3972	-0.3325	3.768E-08	0.000	1.994E+12
0.0616	1300036.	0.000				
110.137	-1.299E-07	-3.3449	0.1647	3.766E-08	0.000	1.994E+12
0.0129	1322313.	0.000				
111.250	3.727E-07	0.000	0.000	3.765E-08	0.000	1.994E+12
-0.0375	672296.	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. 6:

Pile-head deflection	=	1.0000000 inches
Computed slope at pile head	=	-0.0033432 radians
Maximum bending moment	=	11629524. inch-lbs
Maximum shear force	=	52667. lbs
Depth of maximum bending moment	=	27.8125000 feet below pile head
Depth of maximum shear force	=	0.000000 feet below pile head
Number of iterations	=	17
Number of zero deflection points	=	4

Pile-head Deflection vs. Pile Length for Load Case 6

Boundary Condition Type 4, Deflection and Moment

Deflection = 1.00000 in
Moment = 783600. in- lb
Axial Load = 0. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment ln-lbs	Maximum Shear lbs
111.2500	1.0000000	11629524.	52667.
105.6875	1.0000000	11686281.	51859.
100.1250	1.0000000	11541827.	51544.
94.5625	1.0000000	11696125.	52316.
89.0000	1.0000000	11622685.	52264.
83.4375	1.0000000	11658676.	52592.
77.8750	1.0000000	11668688.	51995.
72.3125	1.0000000	11603785.	52031.
66.7500	1.0000000	11593421.	52298.
61.1875	1.0000000	11673728.	52197.
55.6250	1.0000000	11468015.	-54030.
50.0625	1.0000000	10926663.	-63572.
44.5000	1.0000000	9023654.	-66867.
38.9375	1.0000000	5538215.	-48031.
33.3750	1.0000000	3246590.	-28544.
27.8125	1.0000000	2039742.	-17677.
22.2500	1.0000000	1145959.	-11387.
16.6875	1.0000000	788251.	-8811.8966282
11.1250	1.0000000	783600.	-8237.6272468
11.1250	0.000000	7.746642E+11	-2.901365E+11

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 7

Pile-head conditions are Displacement and Moment (Loading Type 4)

Displacement of pile head	=	1.500000 inches
Moment at pile head	=	783600.0 in-lbs
Axial load at pile head	=	0.0 lbs

Depth	Deflect.	Bending	Shear	Slope	Total	Bending	Soil

Res. Soil Spr. X Es*h feet lb/inch	Distrib. y Lat. Load inches lb/inch	Moment in-lbs	Force lbs	S radians	Stress psi*	Stiffness lb-in^2	p lb/in
0.00	1.5000	783600.	68040.	-0.004975	0.000	1.354E+12	
0.000	0.000	0.000					
1.113	1.4336	1691929.	68040.	-0.004963	0.000	1.354E+12	
0.000	0.000	0.000					
2.225	1.3675	2600259.	68040.	-0.004942	0.000	1.347E+12	
0.000	0.000	0.000					
3.337	1.3017	3508588.	67217.	-0.004911	0.000	1.344E+12	
-123.2207	1263.7341	0.000					
4.450	1.2364	4394957.	65512.	-0.004872	0.000	1.341E+12	
-132.2863	1428.4031	0.000					
5.562	1.1716	5257749.	63688.	-0.004824	0.000	1.338E+12	
-140.8998	1605.4903	0.000					
6.675	1.1076	6095430.	61753.	-0.004701	0.000	4.190E+11	
-149.0448	1796.5086	0.000					
7.788	1.0461	6906547.	59700.	-0.004580	0.000	1.980E+12	
-158.5187	2022.9509	0.000					
8.900	0.9853	7689413.	57535.	-0.004531	0.000	1.979E+12	
-165.7698	2246.1055	0.000					
10.012	0.9251	8442735.	55277.	-0.004477	0.000	1.977E+12	
-172.4956	2489.1785	0.000					
11.125	0.8658	9165315.	52933.	-0.004396	0.000	1.186E+12	
-178.6704	2755.1250	0.000					
12.237	0.8077	9856051.	50510.	-0.004289	0.000	1.185E+12	
-184.3077	3046.1373	0.000					
13.350	0.7512	10513940.	48016.	-0.004175	0.000	1.185E+12	
-189.3923	3365.6833	0.000					
14.462	0.6963	11138075.	45457.	-0.004053	0.000	1.185E+12	
-193.9086	3717.8442	0.000					
15.575	0.6430	11727650.	42842.	-0.003924	0.000	1.184E+12	
-197.8408	4107.4516	0.000					
16.688	0.5915	12281966.	40179.	-0.003788	0.000	1.184E+12	
-201.1727	4540.2610	0.000					
17.800	0.5419	12800429.	37475.	-0.003647	0.000	1.184E+12	
-203.8876	5023.1750	0.000					
18.912	0.4941	13282554.	34739.	-0.003500	0.000	1.184E+12	
-205.9685	5564.5313	0.000					
20.025	0.4484	13727971.	31980.	-0.003348	0.000	1.183E+12	
-207.3976	6174.4789	0.000					
21.137	0.4048	14136425.	29206.	-0.003190	0.000	1.183E+12	
-208.1567	6865.4739	0.000					
22.250	0.3632	14507781.	26427.	-0.003029	0.000	1.183E+12	
-208.2266	7652.9399	0.000					
23.362	0.3239	14842027.	23651.	-0.002863	0.000	1.183E+12	
-207.5880	8556.1579	0.000					
24.475	0.2868	15139275.	20889.	-0.002694	0.000	1.182E+12	
-206.2206	9599.4775	0.000					
25.588	0.2520	15399770.	18150.	-0.002521	0.000	1.182E+12	
-204.1037	10814.	0.000					
26.700	0.2195	15623889.	12226.	-0.002346	0.000	1.182E+12	
-683.4697	41575.	0.000					
27.812	0.1893	15726199.	3328.6771	-0.002169	0.000	1.182E+12	
-649.4334	45795.	0.000					
28.925	0.1615	15712765.	-4923.0640	-0.001992	0.000	1.182E+12	
-586.7825	48491.	0.000					
30.037	0.1361	15594753.	-12791.	-0.001815	0.000	1.182E+12	
-591.9076	58042.	0.000					

31.150	0.1131	15371250.	-20636.	-0.001640	0.000	1.182E+12
-583.4010	68871.	0.000				
32.262	0.0923	15043772.	-28276.	-0.001468	0.000	1.183E+12
-561.1102	81115.	0.000				
33.375	0.0739	14616291.	-35591.	-0.001301	0.000	1.183E+12
-534.8125	96642.	0.000				
34.487	0.0576	14093495.	-42593.	-0.001139	0.000	1.183E+12
-514.2209	119161.	0.000				
35.600	0.0435	13479053.	-49242.	-0.000984	0.000	1.183E+12
-481.7983	147982.	0.000				
36.712	0.0313	12778743.	-55374.	-0.000835	0.000	1.184E+12
-436.9464	186069.	0.000				
37.825	0.0212	12000560.	-60819.	-0.000696	0.000	1.184E+12
-378.7871	238995.	0.000				
38.938	0.0128	11154869.	-64966.	-0.000565	0.000	1.185E+12
-242.4831	253429.	0.000				
40.050	0.006066	10265962.	-67386.	-0.000445	0.000	1.185E+12
-120.0183	264122.	0.000				
41.163	0.000903	9355664.	-68311.	-0.000334	0.000	1.186E+12
-18.5862	274815.	0.000				
42.275	-0.002854	8442054.	-68028.	-0.000253	0.000	1.977E+12
61.0438	285509.	0.000				
43.387	-0.005850	7539324.	-66754.	-0.000199	0.000	1.979E+12
129.8067	296202.	0.000				
44.500	-0.008168	6659728.	-64634.	-0.000151	0.000	1.981E+12
187.7615	306895.	0.000				
45.613	-0.009886	5813595.	-61811.	-0.000109	0.000	1.983E+12
235.1755	317589.	0.000				
46.725	-0.0111	5009376.	-58422.	-7.271E-05	0.000	1.985E+12
272.4937	328282.	0.000				
47.837	-0.0118	4253722.	-54599.	-4.157E-05	0.000	1.987E+12
300.3073	338975.	0.000				
48.950	-0.0122	3551589.	-50463.	-1.536E-05	0.000	1.988E+12
319.3207	349669.	0.000				
50.062	-0.0122	2906366.	-46126.	6.313E-06	0.000	1.990E+12
330.3246	360362.	0.000				
51.175	-0.0120	2320014.	-41691.	2.384E-05	0.000	1.991E+12
334.1665	371056.	0.000				
52.287	-0.0116	1793218.	-37246.	3.763E-05	0.000	1.992E+12
331.7269	381749.	0.000				
53.400	-0.0110	1325544.	-32870.	4.807E-05	0.000	1.994E+12
323.8951	392442.	0.000				
54.512	-0.0103	915595.	-28628.	5.558E-05	0.000	1.994E+12
311.5516	403136.	0.000				
55.625	-0.009534	561171.	-24576.	6.052E-05	0.000	1.994E+12
295.5482	413829.	0.000				
56.738	-0.008701	259421.	-20756.	6.327E-05	0.000	1.994E+12
276.6956	424522.	0.000				
57.850	-0.007845	6984.2250	-17202.	6.416E-05	0.000	1.994E+12
255.7526	435216.	0.000				
58.962	-0.006988	-199872.	-13937.	6.351E-05	0.000	1.994E+12
233.4171	445909.	0.000				
60.075	-0.006149	-365128.	-10975.	6.162E-05	0.000	1.994E+12
210.3199	456602.	0.000				
61.188	-0.005343	-492900.	-8322.5756	5.875E-05	0.000	1.994E+12
187.0212	467296.	0.000				
62.300	-0.004581	-587340.	-5979.4553	5.513E-05	0.000	1.994E+12
164.0081	477989.	0.000				
63.412	-0.003871	-652551.	-3938.8831	5.098E-05	0.000	1.994E+12
141.6956	488682.	0.000				
64.525	-0.003219	-692509.	-2189.2089	4.648E-05	0.000	1.994E+12
120.4279	499376.	0.000				
65.638	-0.002630	-711003.	-714.6385	4.178E-05	0.000	1.994E+12

100.4815	510069.	0.000				
66.750	-0.002104	-711589.	503.8918	3.702E-05	0.000	1.994E+12
82.0698	520762.	0.000				
67.862	-0.001642	-697549.	1487.9025	3.230E-05	0.000	1.994E+12
65.3475	531456.	0.000				
68.975	-0.001241	-671862.	2260.6273	2.772E-05	0.000	1.994E+12
50.4165	542149.	0.000				
70.087	-0.000901	-637190.	2846.3453	2.333E-05	0.000	1.994E+12
37.3315	552842.	0.000				
71.200	-0.000618	-595865.	3269.7913	1.921E-05	0.000	1.994E+12
26.1061	563536.	0.000				
72.312	-0.000389	-549887.	3864.5944	1.537E-05	0.000	1.994E+12
63.0030	2164006.	0.000				
73.425	-0.000208	-492680.	4592.8307	1.188E-05	0.000	1.994E+12
46.0961	2957847.	0.000				
74.537	-7.147E-05	-427258.	5080.8731	8.801E-06	0.000	1.994E+12
27.0189	5047143.	0.000				
75.650	2.693E-05	-357021.	5150.5693	6.175E-06	0.000	1.994E+12
-16.5775	8218726.	0.000				
76.763	9.341E-05	-289738.	4833.7695	4.010E-06	0.000	1.994E+12
-30.8831	4413775.	0.000				
77.875	0.000134	-227959.	4380.7172	2.277E-06	0.000	1.994E+12
-36.9899	3685347.	0.000				
78.987	0.000154	-172773.	3868.9330	9.353E-07	0.000	1.994E+12
-39.6819	3435438.	0.000				
80.100	0.000159	-124659.	3335.1152	-6.037E-08	0.000	1.994E+12
-40.2908	3383589.	0.000				
81.212	0.000153	-83725.	2802.6806	-7.580E-07	0.000	1.994E+12
-39.4747	3453597.	0.000				
82.325	0.000139	-49827.	2287.9439	-1.205E-06	0.000	1.994E+12
-37.6394	3622045.	0.000				
83.438	0.000120	-22637.	1802.6268	-1.448E-06	0.000	1.994E+12
-35.0673	3887776.	0.000				
84.550	0.000100	-1697.1110	1355.1580	-1.529E-06	0.000	1.994E+12
-31.9692	4264594.	0.000				
85.663	7.959E-05	13545.	951.4617	-1.489E-06	0.000	1.994E+12
-28.5096	4782188.	0.000				
86.775	6.031E-05	23707.	595.5012	-1.365E-06	0.000	1.994E+12
-24.8178	5493690.	0.000				
87.887	4.315E-05	29445.	289.7177	-1.187E-06	0.000	1.994E+12
-20.9925	6494952.	0.000				
89.000	2.862E-05	31442.	35.4681	-9.830E-07	0.000	1.994E+12
-17.0974	7974949.	0.000				
90.112	1.690E-05	30392.	-166.3646	-7.760E-07	0.000	1.994E+12
-13.1398	10377621.	0.000				
91.225	7.902E-06	27000.	-314.0465	-5.838E-07	0.000	1.994E+12
-8.9849	15178862.	0.000				
92.337	1.315E-06	22007.	-398.4986	-4.198E-07	0.000	1.994E+12
-3.6671	37236645.	0.000				
93.450	-3.306E-06	16361.	-384.2022	-2.913E-07	0.000	1.994E+12
5.8089	23458915.	0.000				
94.562	-6.464E-06	11749.	-291.1996	-1.972E-07	0.000	1.994E+12
8.1241	16778887.	0.000				
95.675	-8.572E-06	8585.4984	-174.5214	-1.292E-07	0.000	1.994E+12
9.3558	14571113.	0.000				
96.788	-9.912E-06	7089.3480	-106.8426	-7.668E-08	0.000	1.994E+12
0.7833	1054980.	0.000				
97.900	-1.062E-05	5732.8022	-95.8941	-3.376E-08	0.000	1.994E+12
0.8569	1077257.	0.000				
99.012	-1.081E-05	4528.9747	-84.2294	5.975E-10	0.000	1.994E+12
0.8906	1099535.	0.000				
100.125	-1.060E-05	3483.8775	-72.3370	2.742E-08	0.000	1.994E+12
0.8910	1121813.	0.000				

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   101.237 -1.008E-05  2597.5761   -60.6226  4.778E-08      0.000  1.994E+12
0.8640   1144091.      0.000
   102.350 -9.327E-06  1865.2544   -49.4159  6.272E-08      0.000  1.994E+12
0.8149   1166369.      0.000
   103.462 -8.407E-06  1278.1704   -38.9800  7.324E-08      0.000  1.994E+12
0.7485   1188646.      0.000
   104.575 -7.372E-06   824.4885   -29.5203  8.028E-08      0.000  1.994E+12
0.6687   1210924.      0.000
   105.688 -6.263E-06   489.9781   -21.1951  8.468E-08      0.000  1.994E+12
0.5786   1233202.      0.000
   106.800 -5.111E-06   258.5800   -14.1250  8.719E-08      0.000  1.994E+12
0.4806   1255480.      0.000
   107.913 -3.935E-06   112.8413    -8.4026  8.843E-08      0.000  1.994E+12
0.3766   1277758.      0.000
   109.025 -2.750E-06    34.2295    -4.1013  8.893E-08      0.000  1.994E+12
0.2678   1300036.      0.000
   110.137 -1.561E-06     3.3378    -1.2820  8.905E-08      0.000  1.994E+12
0.1546   1322313.      0.000
   111.250 -3.719E-07      0.000      0.000  8.906E-08      0.000  1.994E+12
0.0375    672296.      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. 7:

Pile-head deflection             =      1.5000000 inches
Computed slope at pile head      =     -0.0049750 radians
Maximum bending moment           =      15726199. inch-lbs
Maximum shear force              =         -68311. lbs
Depth of maximum bending moment  =     27.8125000 feet below pile head
Depth of maximum shear force     =     41.1625000 feet below pile head
Number of iterations             =             26
Number of zero deflection points =              4


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                Computed Values of Pile Loading and Deflection
                  for Lateral Loading for Load Case Number 8
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Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head                              =     2.000000 inches
Moment at pile head                                    =     783600.0 in-lbs
Axial load at pile head                                =          0.0 lbs

   Depth    Deflect.    Bending    Shear       Slope      Total    Bending   Soil
Res.  Soil Spr.   Distrib.
     X         y        Moment     Force         S       Stress   Stiffness      p
      Es*h    Lat. Load
   feet      inches     in-lbs      lbs       radians     psi*      lb-in^2    lb/in
     lb/inch    lb/inch
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      0.00     2.0000    783600.     82566.  -0.006600      0.000  1.354E+12
0.000      0.000      0.000
     1.113     1.9119   1885854.     82566.  -0.006587      0.000  1.354E+12
0.000      0.000      0.000
     2.225     1.8241   2988108.     82566.  -0.006563      0.000  1.346E+12
0.000      0.000      0.000
     3.337     1.7367   4090363.     81660.  -0.006528      0.000  1.342E+12
-135.6508  1042.7453      0.000
     4.450     1.6498   5168441.     79783.  -0.006482      0.000  1.338E+12
-145.6396  1178.4805      0.000
     5.562     1.5636   6220563.     77775.  -0.006357      0.000  4.189E+11
-155.1296  1324.4623      0.000
     6.675     1.4801   7245037.     75644.  -0.006142      0.000  4.184E+11
-164.1688  1480.7506      0.000
     7.788     1.3996   8240253.     73382.  -0.005999      0.000  1.977E+12
-174.6737  1666.0650      0.000
     8.900     1.3199   9204338.     70996.  -0.005919      0.000  1.186E+12
-182.7415  1848.2801      0.000
    10.012     1.2416  10135855.     68506.  -0.005810      0.000  1.185E+12
-190.2704  2045.8358      0.000
    11.125     1.1648  11033460.     65920.  -0.005691      0.000  1.185E+12
-197.2447  2260.6700      0.000
    12.237     1.0896  11895913.     63244.  -0.005562      0.000  1.184E+12
-203.6485  2495.0292      0.000
    13.350     1.0163  12722071.     60486.  -0.005423      0.000  1.184E+12
-209.4655  2751.5305      0.000
    14.462     0.9449  13510897.     57655.  -0.005275      0.000  1.183E+12
-214.6793  3033.2390      0.000
    15.575     0.8754  14261462.     54758.  -0.005118      0.000  1.183E+12
-219.2731  3343.7641      0.000
    16.688     0.8082  14972949.     51805.  -0.004953      0.000  1.183E+12
-223.2296  3687.3814      0.000
    17.800     0.7432  15644650.     48803.  -0.004781      0.000  1.182E+12
-226.5311  4069.1869      0.000
    18.912     0.6806  16275979.     45761.  -0.004600      0.000  1.182E+12
-229.1595  4495.2958      0.000
    20.025     0.6204  16866466.     42689.  -0.004413      0.000  1.181E+12
-231.0961  4973.0980      0.000
    21.137     0.5627  17415767.     39595.  -0.004219      0.000  1.181E+12
-232.3215  5511.5925      0.000
    22.250     0.5077  17923663.     36491.  -0.004020      0.000  1.181E+12
-232.8159  6121.8266      0.000
    23.362     0.4554  18390066.     33384.  -0.003814      0.000  1.181E+12
-232.5588  6817.4808      0.000
    24.475     0.4059  18815021.     30286.  -0.003604      0.000  1.180E+12
-231.5292  7615.6530      0.000
    25.588     0.3592  19198713.     27208.  -0.003389      0.000  1.180E+12
-229.7058  8537.9223      0.000
    26.700     0.3154  19541467.     20288.  -0.003170      0.000  1.180E+12
-806.9832    34160.       0.000
    27.812     0.2745  19740397.  9672.0969  -0.002948      0.000  1.180E+12
-783.3817    38094.       0.000
    28.925     0.2367  19799712.  -405.3678  -0.002724      0.000  1.180E+12
-726.3508    40971.       0.000
    30.037     0.2018  19729574.    -10202.  -0.002500      0.000  1.180E+12
-741.2747    49037.       0.000
    31.150     0.1699  19527324.    -20091.  -0.002278      0.000  1.180E+12
-740.3143    58164.       0.000
    32.262     0.1410  19193134.    -29858.  -0.002059      0.000  1.180E+12
-722.8739    68452.       0.000
    33.375     0.1149  18730112.    -39354.  -0.001845      0.000  1.180E+12
-699.7039    81269.       0.000
    34.487     0.0917  18142386.    -48579.  -0.001636      0.000  1.181E+12
```

-682.2933	99301.	0.000				
35.600	0.0713	17433060.	-57476.	-0.001435	0.000	1.181E+12
-650.7096	121916.	0.000				
36.712	0.0534	16607764.	-65852.	-0.001243	0.000	1.182E+12
-604.1089	150999.	0.000				
37.825	0.0381	15674801.	-73499.	-0.001060	0.000	1.182E+12
-541.3834	189839.	0.000				
38.938	0.0251	14645352.	-80187.	-0.000889	0.000	1.183E+12
-460.6407	245040.	0.000				
40.050	0.0143	13533806.	-85154.	-0.000730	0.000	1.183E+12
-283.4616	264122.	0.000				
41.163	0.005597	12371741.	-87815.	-0.000584	0.000	1.184E+12
-115.2206	274815.	0.000				
42.275	-0.001271	11189142.	-88403.	-0.000451	0.000	1.185E+12
27.1803	285509.	0.000				
43.387	-0.006456	10011386.	-87265.	-0.000332	0.000	1.185E+12
143.2370	296202.	0.000				
44.500	-0.0101	8859158.	-84754.	-0.000226	0.000	1.200E+12
232.9968	306895.	0.000				
45.613	-0.0125	7748456.	-81214.	-0.000151	0.000	1.979E+12
297.3533	317589.	0.000				
46.725	-0.0142	6690749.	-76904.	-0.000102	0.000	1.981E+12
348.3335	328282.	0.000				
47.837	-0.0152	5695122.	-71998.	-6.054E-05	0.000	1.983E+12
386.6985	338975.	0.000				
48.950	-0.0158	4768414.	-66657.	-2.534E-05	0.000	1.986E+12
413.3636	349669.	0.000				
50.062	-0.0159	3915377.	-61032.	3.839E-06	0.000	1.988E+12
429.3600	360362.	0.000				
51.175	-0.0157	3138861.	-55257.	2.752E-05	0.000	1.989E+12
435.7971	371056.	0.000				
52.287	-0.0152	2440014.	-49452.	4.623E-05	0.000	1.991E+12
433.8290	381749.	0.000				
53.400	-0.0144	1818485.	-43722.	6.051E-05	0.000	1.992E+12
424.6265	392442.	0.000				
54.512	-0.0136	1272634.	-38155.	7.086E-05	0.000	1.994E+12
409.3474	403136.	0.000				
55.625	-0.0126	799738.	-32826.	7.780E-05	0.000	1.994E+12
389.1176	413829.	0.000				
56.738	-0.0115	396192.	-27792.	8.180E-05	0.000	1.994E+12
365.0080	424522.	0.000				
57.850	-0.0104	57698.	-23099.	8.332E-05	0.000	1.994E+12
338.0227	435216.	0.000				
58.962	-0.009254	-220552.	-18780.	8.278E-05	0.000	1.994E+12
309.0873	445909.	0.000				
60.075	-0.008158	-443717.	-14854.	8.055E-05	0.000	1.994E+12
279.0401	456602.	0.000				
61.188	-0.007103	-617150.	-11332.	7.700E-05	0.000	1.994E+12
248.6265	467296.	0.000				
62.300	-0.006103	-746272.	-8213.6033	7.244E-05	0.000	1.994E+12
218.4970	477989.	0.000				
63.412	-0.005169	-836453.	-5492.1810	6.714E-05	0.000	1.994E+12
189.2067	488682.	0.000				
64.525	-0.004310	-892913.	-3153.1015	6.135E-05	0.000	1.994E+12
161.2172	499376.	0.000				
65.638	-0.003531	-920641.	-1176.5114	5.528E-05	0.000	1.994E+12
134.9012	510069.	0.000				
66.750	-0.002834	-924326.	461.8547	4.910E-05	0.000	1.994E+12
110.5470	520762.	0.000				
67.862	-0.002220	-908309.	1789.5951	4.297E-05	0.000	1.994E+12
88.3655	531456.	0.000				
68.975	-0.001687	-876544.	2836.6529	3.699E-05	0.000	1.994E+12
68.4971	542149.	0.000				

70.087	-0.001232	-832570.	3634.4256	3.127E-05	0.000	1.994E+12
51.0194	552842.	0.000				
71.200	-0.000852	-779504.	4214.9772	2.587E-05	0.000	1.994E+12
35.9546	563536.	0.000				
72.312	-0.000541	-720031.	4951.0493	2.085E-05	0.000	1.994E+12
74.3183	1833332.	0.000				
73.425	-0.000295	-647311.	5813.2968	1.628E-05	0.000	1.994E+12
54.8573	2482950.	0.000				
74.537	-0.000107	-564816.	6399.4668	1.222E-05	0.000	1.994E+12
32.9584	4128076.	0.000				
75.650	3.129E-05	-476446.	6499.8099	8.733E-06	0.000	1.994E+12
-17.9257	7647408.	0.000				
76.763	0.000127	-391271.	6140.0360	5.828E-06	0.000	1.994E+12
-35.9730	3793818.	0.000				
77.875	0.000187	-312507.	5608.2183	3.472E-06	0.000	1.994E+12
-43.7001	3121376.	0.000				
78.987	0.000219	-241531.	5000.5922	1.617E-06	0.000	1.994E+12
-47.3301	2881385.	0.000				
80.100	0.000230	-178991.	4361.0708	2.095E-07	0.000	1.994E+12
-48.4784	2812805.	0.000				
81.212	0.000225	-125091.	3717.5760	-8.084E-07	0.000	1.994E+12
-47.9253	2845041.	0.000				
82.325	0.000209	-79732.	3089.6553	-1.494E-06	0.000	1.994E+12
-46.1452	2954616.	0.000				
83.438	0.000185	-42597.	2491.5095	-1.904E-06	0.000	1.994E+12
-43.4647	3136669.	0.000				
84.550	0.000158	-13208.	1933.5395	-2.090E-06	0.000	1.994E+12
-40.1264	3397458.	0.000				
85.663	0.000129	9028.7164	1423.2695	-2.104E-06	0.000	1.994E+12
-36.3186	3753469.	0.000				
86.775	0.000101	24793.	965.9719	-1.991E-06	0.000	1.994E+12
-32.1904	4234591.	0.000				
87.887	7.601E-05	34820.	565.1509	-1.792E-06	0.000	1.994E+12
-27.8577	4892864.	0.000				
89.000	5.365E-05	39882.	222.9890	-1.542E-06	0.000	1.994E+12
-23.4025	5823792.	0.000				
90.112	3.485E-05	40774.	-59.1168	-1.272E-06	0.000	1.994E+12
-18.8605	7225257.	0.000				
91.225	1.970E-05	38304.	-279.6421	-1.007E-06	0.000	1.994E+12
-14.1770	9609633.	0.000				
92.337	7.966E-06	33308.	-434.4304	-7.671E-07	0.000	1.994E+12
-9.0123	15104154.	0.000				
93.450	-7.867E-07	26705.	-475.5417	-5.662E-07	0.000	1.994E+12
2.8533	48420300.	0.000				
94.562	-7.152E-06	20611.	-399.4158	-4.078E-07	0.000	1.994E+12
8.5513	15962005.	0.000				
95.675	-1.168E-05	16040.	-269.4285	-2.851E-07	0.000	1.994E+12
10.9224	12489341.	0.000				
96.788	-1.476E-05	13417.	-188.7333	-1.865E-07	0.000	1.994E+12
1.1668	1054980.	0.000				
97.900	-1.665E-05	11001.	-171.9746	-1.048E-07	0.000	1.994E+12
1.3439	1077257.	0.000				
99.012	-1.756E-05	8825.1017	-153.3494	-3.838E-08	0.000	1.994E+12
1.4464	1099535.	0.000				
100.125	-1.768E-05	6906.7762	-133.7784	1.429E-08	0.000	1.994E+12
1.4856	1121813.	0.000				
101.237	-1.718E-05	5253.2177	-114.0345	5.500E-08	0.000	1.994E+12
1.4723	1144091.	0.000				
102.350	-1.621E-05	3862.0562	-94.7530	8.551E-08	0.000	1.994E+12
1.4163	1166369.	0.000				
103.462	-1.490E-05	2723.3130	-76.4457	1.076E-07	0.000	1.994E+12
1.3264	1188646.	0.000				
104.575	-1.334E-05	1820.9553	-59.5161	1.228E-07	0.000	1.994E+12

```
1.2099    1210924.       0.000
   105.688 -1.162E-05  1134.2337   -44.2758  1.327E-07       0.000  1.994E+12
1.0733    1233202.       0.000
   106.800 -9.797E-06   638.7922   -30.9618  1.386E-07       0.000  1.994E+12
0.9213    1255480.       0.000
   107.913 -7.918E-06   307.5528   -19.7533  1.418E-07       0.000  1.994E+12
0.7579    1277758.       0.000
   109.025 -6.012E-06   111.3796   -10.7869  1.432E-07       0.000  1.994E+12
0.5854    1300036.       0.000
   110.137 -4.095E-06    19.5421    -4.1715  1.436E-07       0.000  1.994E+12
0.4056    1322313.       0.000
   111.250 -2.177E-06       0.000       0.000  1.437E-07       0.000  1.994E+12
0.2193     672296.       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. 8:

Pile-head deflection              =      2.0000000 inches
Computed slope at pile head       =     -0.0066004 radians
Maximum bending moment            =      19799712. inch-lbs
Maximum shear force               =        -88403. lbs
Depth of maximum bending moment   =     28.9250000 feet below pile head
Depth of maximum shear force      =     42.2750000 feet below pile head
Number of iterations              =             23
Number of zero deflection points  =              3


------------------------------------------------------------------------------
                Computed Values of Pile Loading and Deflection
                  for Lateral Loading for Load Case Number 9
------------------------------------------------------------------------------

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

Shear force at pile head                              =      13600.0 lbs
Applied moment at pile head                           =    5499600.0 in-lbs
Axial thrust load on pile head                        =          0.0 lbs

   Depth    Deflect.    Bending    Shear       Slope      Total    Bending   Soil
Res.  Soil Spr.   Distrib.
     X         y        Moment     Force         S       Stress   Stiffness      p
      Es*h    Lat. Load
   feet      inches     in-lbs      lbs       radians     psi*      lb-in^2    lb/in
     lb/inch    lb/inch
---------- ---------- ---------- ---------- ---------- ---------- ----------
---------- ---------- ----------
      0.00     0.3540   5499600.     13600.  -0.002118       0.000  1.337E+12
0.000      0.000      0.000
     1.113     0.3261   5681160.     13600.  -0.002062       0.000  1.337E+12
0.000      0.000      0.000
     2.225     0.2989   5862720.     13600.  -0.002001       0.000  1.199E+12
0.000      0.000      0.000
```



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     3.337     0.2726   6044280.      13112.  -0.001872       0.000  4.190E+11
-73.1768  3583.2367       0.000
     4.450     0.2489   6212798.      12106.  -0.001677       0.000  4.189E+11
-77.5334  4158.1655       0.000
     5.562     0.2279   6367498.      11043.  -0.001476       0.000  4.189E+11
-81.6340  4782.8312       0.000
     6.675     0.2095   6507649.     9927.1098  -0.001271       0.000  4.188E+11
-85.5573  5451.8890       0.000
     7.788     0.1939   6632552.     8752.6996  -0.001145       0.000  1.981E+12
-90.3843  6222.4051       0.000
     8.900     0.1789   6741346.     7522.7764  -0.001100       0.000  1.981E+12
-93.8739  7004.0546       0.000
    10.012     0.1645   6833410.     6248.6462  -0.001054       0.000  1.981E+12
-97.0071  7870.5083       0.000
    11.125     0.1508   6908185.     4935.1116  -0.001008       0.000  1.980E+12
-99.7771  8834.4907       0.000
    12.237     0.1376   6965178.     3587.0669  -0.000961       0.000  1.980E+12
-102.1771  9911.1883       0.000
    13.350     0.1251   7003960.     2209.5009  -0.000914       0.000  1.980E+12
-104.1998     11119.       0.000
    14.462     0.1132   7024171.      807.5012  -0.000867       0.000  1.980E+12
-105.8376     12480.       0.000
    15.575     0.1020   7025520.     -613.7407  -0.000820       0.000  1.980E+12
-107.0825     14020.       0.000
    16.688     0.0913   7007785.    -2048.9227  -0.000772       0.000  1.980E+12
-107.9260     15775.       0.000
    17.800     0.0813   6970814.    -3492.6226  -0.000725       0.000  1.980E+12
-108.3586     17784.       0.000
    18.912     0.0720   6914532.    -4939.2862  -0.000678       0.000  1.980E+12
-108.3700     20100.       0.000
    20.025     0.0632   6838935.    -6383.2110  -0.000632       0.000  1.981E+12
-107.9483     22791.       0.000
    21.137     0.0551   6744100.    -7818.5245  -0.000586       0.000  1.981E+12
-107.0799     25943.       0.000
    22.250     0.0476   6630180.    -9239.1550  -0.000541       0.000  1.981E+12
-105.7486     29672.       0.000
    23.362     0.0407   6497414.     -10639.  -0.000497       0.000  1.981E+12
-103.9346     34131.       0.000
    24.475     0.0343   6346125.     -12011.  -0.000454       0.000  1.982E+12
-101.6133     39537.       0.000
    25.588     0.0285   6176725.     -13348.  -0.000411       0.000  1.982E+12
-98.7526     46193.       0.000
    26.700     0.0233   5989726.     -15591.  -0.000371       0.000  1.983E+12
-237.2630     135802.       0.000
    27.812     0.0186   5760441.     -18521.  -0.000331       0.000  1.983E+12
-201.6676     144382.       0.000
    28.925     0.0145   5495214.     -20885.  -0.000293       0.000  1.984E+12
-152.5169     140545.       0.000
    30.037     0.0108   5202806.     -22812.  -0.000257       0.000  1.985E+12
-136.0819     167882.       0.000
    31.150   0.007623   4886144.     -24401.  -0.000223       0.000  1.985E+12
-101.9626     178575.       0.000
    32.262   0.004862   4551311.     -25541.  -0.000191       0.000  1.986E+12
-68.9376     189269.       0.000
    33.375   0.002511   4204191.     -26253.  -0.000162       0.000  1.987E+12
-37.6087     199962.       0.000
    34.487   0.000536   3850369.     -26560.  -0.000135       0.000  1.988E+12
-8.4635     210655.       0.000
    35.600  -0.001093   3495038.     -26496.  -0.000110       0.000  1.988E+12
18.1208     221349.       0.000
    36.712  -0.002409   3142937.     -26095. -8.803E-05       0.000  1.989E+12
41.8704     232042.       0.000
    37.825  -0.003443   2798298.     -25398. -6.810E-05       0.000  1.990E+12
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62.6082	242735.	0.000					
38.938	-0.004227	2464817.	-24444.	-5.045E-05	0.000	1.991E+12	
80.2457	253429.	0.000					
40.050	-0.004790	2145638.	-23276.	-3.499E-05	0.000	1.991E+12	
94.7738	264122.	0.000					
41.163	-0.005161	1843349.	-21934.	-2.163E-05	0.000	1.992E+12	
106.2513	274815.	0.000					
42.275	-0.005368	1559997.	-20459.	-1.022E-05	0.000	1.993E+12	
114.7963	285509.	0.000					
43.387	-0.005434	1297105.	-18887.	-6.546E-07	0.000	1.994E+12	
120.5761	296202.	0.000					
44.500	-0.005385	1055701.	-17256.	7.222E-06	0.000	1.994E+12	
123.7971	306895.	0.000					
45.613	-0.005242	836361.	-15598.	1.356E-05	0.000	1.994E+12	
124.6945	317589.	0.000					
46.725	-0.005023	639245.	-13941.	1.850E-05	0.000	1.994E+12	
123.5235	328282.	0.000					
47.837	-0.004748	464143.	-12312.	2.219E-05	0.000	1.994E+12	
120.5519	338975.	0.000					
48.950	-0.004431	310526.	-10732.	2.478E-05	0.000	1.994E+12	
116.0523	349669.	0.000					
50.062	-0.004086	177592.	-9221.3596	2.642E-05	0.000	1.994E+12	
110.2956	360362.	0.000					
51.175	-0.003725	64316.	-7793.9700	2.723E-05	0.000	1.994E+12	
103.5455	371056.	0.000					
52.287	-0.003359	-30507.	-6461.6481	2.734E-05	0.000	1.994E+12	
96.0533	381749.	0.000					
53.400	-0.002995	-108210.	-5232.7297	2.688E-05	0.000	1.994E+12	
88.0543	392442.	0.000					
54.512	-0.002641	-170221.	-4112.5364	2.594E-05	0.000	1.994E+12	
79.7649	403136.	0.000					
55.625	-0.002303	-218015.	-3103.6438	2.464E-05	0.000	1.994E+12	
71.3801	413829.	0.000					
56.738	-0.001983	-253088.	-2206.1749	2.307E-05	0.000	1.994E+12	
63.0722	424522.	0.000					
57.850	-0.001687	-276920.	-1418.1068	2.129E-05	0.000	1.994E+12	
54.9904	435216.	0.000					
58.962	-0.001415	-290952.	-735.5842	1.939E-05	0.000	1.994E+12	
47.2602	445909.	0.000					
60.075	-0.001169	-296560.	-153.2307	1.743E-05	0.000	1.994E+12	
39.9838	456602.	0.000					
61.188	-0.000950	-295043.	335.5478	1.544E-05	0.000	1.994E+12	
33.2414	467296.	0.000					
62.300	-0.000757	-287601.	738.2724	1.349E-05	0.000	1.994E+12	
27.0919	477989.	0.000					
63.412	-0.000589	-275331.	1063.1176	1.161E-05	0.000	1.994E+12	
21.5741	488682.	0.000					
64.525	-0.000447	-259216.	1318.6567	9.820E-06	0.000	1.994E+12	
16.7089	499376.	0.000					
65.638	-0.000327	-240123.	1513.6289	8.148E-06	0.000	1.994E+12	
12.5004	510069.	0.000					
66.750	-0.000229	-218802.	1656.7282	6.612E-06	0.000	1.994E+12	
8.9377	520762.	0.000					
67.862	-0.000151	-195888.	1756.4136	5.224E-06	0.000	1.994E+12	
5.9965	531456.	0.000					
68.975	-8.965E-05	-171906.	1820.7404	3.993E-06	0.000	1.994E+12	
3.6405	542149.	0.000					
70.087	-4.403E-05	-147274.	1857.2110	2.924E-06	0.000	1.994E+12	
1.8232	552842.	0.000					
71.200	-1.157E-05	-122318.	1872.6419	2.022E-06	0.000	1.994E+12	
0.4885	563536.	0.000					
72.312	9.948E-06	-97275.	1808.6252	1.286E-06	0.000	1.994E+12	
-10.0790	13525740.	0.000					

MOMENT FIXITY @ 72.31

EL 7.25 - 72.31 = -65.06

73.425	2.277E-05	-74028.	1639.5537	7.129E-07	0.000	1.994E+12	
-15.2500	8939410.	0.000					
74.537	2.898E-05	-53499.	1422.9244	2.860E-07	0.000	1.994E+12	
-17.2038	7924201.	0.000					
75.650	3.041E-05	-36036.	1190.4602	-1.372E-08	0.000	1.994E+12	
-17.6223	7736007.	0.000					
76.763	2.862E-05	-21713.	958.7240	-2.071E-07	0.000	1.994E+12	
-17.0947	7974766.	0.000					
77.875	2.488E-05	-10438.	738.2154	-3.147E-07	0.000	1.994E+12	
-15.9403	8552306.	0.000					
78.987	2.022E-05	-2003.1250	535.9097	-3.563E-07	0.000	1.994E+12	
-14.3677	9488410.	0.000					
80.100	1.537E-05	3870.9484	356.3844	-3.501E-07	0.000	1.994E+12	
-12.5275	10882165.	0.000					
81.212	1.087E-05	7512.3393	202.4443	-3.120E-07	0.000	1.994E+12	
-10.5347	12940694.	0.000					
82.325	7.039E-06	9276.2099	75.5337	-2.558E-07	0.000	1.994E+12	
-8.4781	16079783.	0.000					
83.438	4.039E-06	9529.0888	-23.9256	-1.928E-07	0.000	1.994E+12	
-6.4222	21227502.	0.000					
84.550	1.891E-06	8637.3952	-96.1236	-1.320E-07	0.000	1.994E+12	
-4.3940	31025389.	0.000					
85.663	5.146E-07	6962.5876	-140.7550	-7.977E-08	0.000	1.994E+12	
-2.2923	59471039.	0.000					
86.775	-2.392E-07	4879.2379	-147.9145	-4.013E-08	0.000	1.994E+12	
1.2197	68068157.	0.000					
87.887	-5.569E-07	3013.2708	-123.8549	-1.371E-08	0.000	1.994E+12	
2.3847	57166870.	0.000					
89.000	-6.052E-07	1572.3124	-91.3426	1.643E-09	0.000	1.994E+12	
2.4860	54836649.	0.000					
90.112	-5.130E-07	574.4229	-59.4702	8.830E-09	0.000	1.994E+12	
2.2889	59560979.	0.000					
91.225	-3.695E-07	-15.5414	-31.5910	1.070E-08	0.000	1.994E+12	
1.8878	68210735.	0.000					
92.337	-2.273E-07	-269.0571	-11.2332	9.748E-09	0.000	1.994E+12	
1.1621	68246380.	0.000					
93.450	-1.092E-07	-315.4685	0.2519	7.791E-09	0.000	1.994E+12	
0.5586	68282024.	0.000					
94.562	-1.929E-08	-262.3324	4.6392	5.857E-09	0.000	1.994E+12	
0.0987	68317669.	0.000					
95.675	4.717E-08	-191.6009	3.6861	4.337E-09	0.000	1.994E+12	
-0.2415	68353313.	0.000					
96.788	9.651E-08	-163.9144	2.0230	3.147E-09	0.000	1.994E+12	
-0.007627	1054980.	0.000					
97.900	1.312E-07	-137.5871	1.9014	2.138E-09	0.000	1.994E+12	
-0.0106	1077257.	0.000					
99.012	1.536E-07	-113.1466	1.7463	1.298E-09	0.000	1.994E+12	
-0.0126	1099535.	0.000					
100.125	1.659E-07	-90.9605	1.5688	6.150E-10	0.000	1.994E+12	
-0.0139	1121813.	0.000					
101.237	1.700E-07	-71.2584	1.3786	7.193E-11	0.000	1.994E+12	
-0.0146	1144091.	0.000					
102.350	1.678E-07	-54.1529	1.1835	-3.479E-10	0.000	1.994E+12	
-0.0147	1166369.	0.000					
103.462	1.607E-07	-39.6600	0.9901	-6.620E-10	0.000	1.994E+12	
-0.0143	1188646.	0.000					
104.575	1.501E-07	-27.7173	0.8037	-8.875E-10	0.000	1.994E+12	
-0.0136	1210924.	0.000					
105.688	1.370E-07	-18.2013	0.6283	-1.041E-09	0.000	1.994E+12	
-0.0127	1233202.	0.000					
106.800	1.223E-07	-10.9411	0.4671	-1.139E-09	0.000	1.994E+12	
-0.0115	1255480.	0.000					
107.913	1.066E-07	-5.7307	0.3222	-1.195E-09	0.000	1.994E+12	

```
-0.0102   1277758.      0.000
   109.025  9.041E-08    -2.3390      0.1953 -1.222E-09       0.000  1.994E+12
-0.008804   1300036.      0.000
   110.137  7.400E-08    -0.5164      0.0876 -1.231E-09       0.000  1.994E+12
-0.007329   1322313.      0.000
   111.250  5.754E-08     0.000       0.000 -1.233E-09       0.000  1.994E+12
-0.005795    672296.      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. 9:

Pile-head deflection	=	0.3539704 inches
Computed slope at pile head	=	-0.0021179 radians
Maximum bending moment	=	7025520. inch-lbs
Maximum shear force	=	-26560. lbs
Depth of maximum bending moment	=	15.5750000 feet below pile head
Depth of maximum shear force	=	34.4875000 feet below pile head
Number of iterations	=	39
Number of zero deflection points	=	4

Pile-head Deflection vs. Pile Length for Load Case 9

Boundary Condition Type 1, Shear and Moment

Shear	=	13600.	lb
Moment	=	5499600.	in- lb
Axial Load	=	0.	lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment in-lbs	Maximum Shear lbs
111.2500	0.3539704	7025520.	-26560.
105.6875	0.3587023	7134252.	-27299.
100.1250	0.3682543	7106117.	-26907.
94.5625	0.3585636	7087886.	-27006.
89.0000	0.3641047	7063670.	-26773.
83.4375	0.3563132	7041701.	-26650.
77.8750	0.3642149	7109677.	-27110.
72.3125	0.3659302	7078240.	-26806.
66.7500	0.3561247	7050086.	-26595.
61.1875	0.3594534	7093696.	-26826.
55.6250	0.3637319	7054319.	-26825.
50.0625	0.3718272	7066583.	-29616.
44.5000	0.4201769	7028526.	-36135.
38.9375	0.6973490	6864307.	-43585.
33.3750	1.9170195	6624521.	-45991.
27.8125	7.3014206	6431518.	-45864.

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 10

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

Shear force at pile head	=	9900.0 lbs
Applied moment at pile head	=	783600.0 in-lbs
Axial thrust load on pile head	=	0.0 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. Spr. Distrib. p lb/in
	Es*h lb/inch	Lat. Load lb/inch					
0.00	0.0780	783600.	9900.0000	-0.000377	0.000	1.354E+12	0.000
0.000	0.000	0.000					
1.113	0.0730	915765.	9900.0000	-0.000369	0.000	1.354E+12	0.000
0.000	0.000	0.000					
2.225	0.0681	1047930.	9900.0000	-0.000359	0.000	1.352E+12	0.000
0.000	0.000	0.000					
3.337	0.0634	1180095.	9599.6620	-0.000348	0.000	1.352E+12	-44.9945
9479.4161	0.000						
4.450	0.0588	1304241.	8979.3960	-0.000336	0.000	1.351E+12	-47.9293
10883.	0.000						
5.562	0.0544	1419845.	8321.4260	-0.000323	0.000	1.351E+12	-50.6430
12430.	0.000						
6.675	0.0502	1526423.	7628.7001	-0.000308	0.000	1.351E+12	-53.1362
14137.	0.000						
7.788	0.0462	1623531.	6900.0749	-0.000295	0.000	1.993E+12	-56.0212
16201.	0.000						
8.900	0.0423	1710655.	6138.6655	-0.000284	0.000	1.992E+12	-58.0476
18322.	0.000						
10.012	0.0386	1787434.	5351.8782	-0.000272	0.000	1.992E+12	-59.8231
20700.	0.000						
11.125	0.0350	1853550.	4543.1035	-0.000260	0.000	1.992E+12	-61.3416
23380.	0.000						
12.237	0.0316	1908734.	3715.8108	-0.000247	0.000	1.992E+12	-62.5973
26414.	0.000						
13.350	0.0284	1952762.	2873.5493	-0.000235	0.000	1.992E+12	-63.5842
29868.	0.000						
14.462	0.0254	1985458.	2019.9504	-0.000221	0.000	1.992E+12	-64.2958
33825.	0.000						
15.575	0.0225	2006695.	1158.7311	-0.000208	0.000	1.992E+12	-64.7258
38386.	0.000						
16.688	0.0198	2016396.	293.7008	-0.000194	0.000	1.992E+12	-64.8668
43682.	0.000						
17.800	0.0173	2014537.	-571.2297	-0.000181	0.000	1.992E+12	-64.7108
49882.	0.000						
18.912	0.0150	2001144.	-1432.0335	-0.000167	0.000	1.992E+12	-64.2485
57207.	0.000						
20.025	0.0128	1976302.	-2284.5460	-0.000154	0.000	1.992E+12	-63.4687
65955.	0.000						
21.137	0.0109	1940147.	-3124.4332	-0.000141	0.000	1.992E+12	-62.3571
76533.	0.000						
22.250	0.009081	1892879.	-3947.1427	-0.000128	0.000	1.992E+12	-60.8953
89520.	0.000						

23.362	0.007455	1834758.	-4747.8296	-0.000116	0.000	1.992E+12
-59.0578	105764.	0.000				
24.475	0.005992	1766112.	-5521.2382	-0.000104	0.000	1.992E+12
-56.8086	126566.	0.000				
25.588	0.004688	1687341.	-6261.5077	-9.206E-05	0.000	1.992E+12
-54.0932	154053.	0.000				
26.700	0.003534	1598930.	-6862.5476	-8.105E-05	0.000	1.993E+12
-35.9503	135802.	0.000				
27.812	0.002524	1504111.	-7287.3606	-7.066E-05	0.000	1.993E+12
-27.6921	146495.	0.000				
28.925	0.001648	1404357.	-7601.6936	-6.092E-05	0.000	1.993E+12
-19.3989	157189.	0.000				
30.037	0.000897	1301146.	-7806.4853	-5.186E-05	0.000	1.994E+12
-11.2814	167882.	0.000				
31.150	0.000263	1195924.	-7905.2690	-4.350E-05	0.000	1.994E+12
-3.5176	178575.	0.000				
32.262	-0.000264	1090075.	-7903.7408	-3.584E-05	0.000	1.994E+12
3.7466	189269.	0.000				
33.375	-0.000694	984894.	-7809.3394	-2.890E-05	0.000	1.994E+12
10.3960	199962.	0.000				
34.487	-0.001036	881566.	-7630.8450	-2.265E-05	0.000	1.994E+12
16.3448	210655.	0.000				
35.600	-0.001299	781151.	-7378.0001	-1.708E-05	0.000	1.994E+12
21.5346	221349.	0.000				
36.712	-0.001492	684573.	-7061.1599	-1.218E-05	0.000	1.994E+12
25.9321	232042.	0.000				
37.825	-0.001624	592618.	-6690.9744	-7.900E-06	0.000	1.994E+12
29.5264	242735.	0.000				
38.938	-0.001703	505924.	-6278.1056	-4.223E-06	0.000	1.994E+12
32.3266	253429.	0.000				
40.050	-0.001737	424992.	-5832.9820	-1.106E-06	0.000	1.994E+12
34.3586	264122.	0.000				
41.163	-0.001732	350184.	-5365.5896	1.489E-06	0.000	1.994E+12
35.6627	274815.	0.000				
42.275	-0.001697	281731.	-4885.3008	3.604E-06	0.000	1.994E+12
36.2907	285509.	0.000				
43.387	-0.001636	219746.	-4400.7383	5.283E-06	0.000	1.994E+12
36.3030	296202.	0.000				
44.500	-0.001556	164231.	-3919.6746	6.568E-06	0.000	1.994E+12
35.7665	306895.	0.000				
45.613	-0.001461	115091.	-3448.9631	7.503E-06	0.000	1.994E+12
34.7521	317589.	0.000				
46.725	-0.001356	72144.	-2994.4989	8.130E-06	0.000	1.994E+12
33.3325	328282.	0.000				
47.837	-0.001244	35138.	-2561.2056	8.489E-06	0.000	1.994E+12
31.5804	338975.	0.000				
48.950	-0.001129	3759.8898	-2153.0468	8.620E-06	0.000	1.994E+12
29.5670	349669.	0.000				
50.062	-0.001014	-22349.	-1773.0558	8.557E-06	0.000	1.994E+12
27.3605	360362.	0.000				
51.175	-0.000900	-43581.	-1423.3836	8.337E-06	0.000	1.994E+12
25.0249	371056.	0.000				
52.287	-0.000791	-60353.	-1105.3593	7.989E-06	0.000	1.994E+12
22.6192	381749.	0.000				
53.400	-0.000687	-73094.	-819.5612	7.542E-06	0.000	1.994E+12
20.1970	392442.	0.000				
54.512	-0.000590	-82235.	-565.8946	7.022E-06	0.000	1.994E+12
17.8055	403136.	0.000				
55.625	-0.000500	-88203.	-343.6750	6.451E-06	0.000	1.994E+12
15.4858	413829.	0.000				
56.738	-0.000417	-91411.	-151.7129	5.850E-06	0.000	1.994E+12
13.2725	424522.	0.000				
57.850	-0.000343	-92254.	11.6012	5.235E-06	0.000	1.994E+12

11.1940	435216.	0.000				
58.962	-0.000278	-91102.	148.2134	4.621E-06	0.000	1.994E+12
9.2723	445909.	0.000				
60.075	-0.000220	-88297.	260.3266	4.021E-06	0.000	1.994E+12
7.5237	456602.	0.000				
61.188	-0.000170	-84151.	350.3244	3.444E-06	0.000	1.994E+12
5.9591	467296.	0.000				
62.300	-0.000128	-78943.	420.7004	2.898E-06	0.000	1.994E+12
4.5841	477989.	0.000				
63.412	-9.288E-05	-72918.	473.9933	2.389E-06	0.000	1.994E+12
3.3998	488682.	0.000				
64.525	-6.424E-05	-66287.	512.7271	1.923E-06	0.000	1.994E+12
2.4030	499376.	0.000				
65.638	-4.153E-05	-59228.	539.3584	1.503E-06	0.000	1.994E+12
1.5867	510069.	0.000				
66.750	-2.411E-05	-51886.	556.2274	1.131E-06	0.000	1.994E+12
0.9405	520762.	0.000				
67.862	-1.133E-05	-44377.	565.5160	8.088E-07	0.000	1.994E+12
0.4510	531456.	0.000				
68.975	-2.516E-06	-36787.	569.2089	5.370E-07	0.000	1.994E+12
0.1022	542149.	0.000				
70.087	3.009E-06	-29179.	569.0593	3.162E-07	0.000	1.994E+12
-0.1246	552842.	0.000				
71.200	5.926E-06	-21593.	566.5577	1.462E-07	0.000	1.994E+12
-0.2502	563536.	0.000				
72.312	6.913E-06	-14052.	508.8252	2.691E-08	0.000	1.994E+12
-8.3989	16218366.	0.000				
73.425	6.645E-06	-8007.6703	397.7944	-4.694E-08	0.000	1.994E+12
-8.2349	16545035.	0.000				
74.537	5.660E-06	-3430.9403	292.0902	-8.524E-08	0.000	1.994E+12
-7.6009	17927597.	0.000				
75.650	4.369E-06	-208.8608	196.7774	-9.742E-08	0.000	1.994E+12
-6.6782	20406679.	0.000				
76.763	3.059E-06	1823.0150	114.8984	-9.202E-08	0.000	1.994E+12
-5.5883	24388808.	0.000				
77.875	1.912E-06	2858.9270	48.1039	-7.634E-08	0.000	1.994E+12
-4.4184	30850176.	0.000				
78.987	1.021E-06	3107.3891	-2.9375	-5.637E-08	0.000	1.994E+12
-3.2283	42229399.	0.000				
80.100	4.069E-07	2780.4964	-38.0953	-3.666E-08	0.000	1.994E+12
-2.0388	66892170.	0.000				
81.212	4.175E-08	2090.2446	-53.1216	-2.035E-08	0.000	1.994E+12
-0.2123	67889935.	0.000				
82.325	-1.366E-07	1362.1500	-49.9013	-8.796E-09	0.000	1.994E+12
0.6948	67925579.	0.000				
83.438	-1.931E-07	757.8804	-38.7020	-1.699E-09	0.000	1.994E+12
0.9830	67961224.	0.000				
84.550	-1.819E-07	328.8079	-25.9556	1.939E-09	0.000	1.994E+12
0.9265	67996868.	0.000				
85.663	-1.413E-07	64.8647	-14.9636	3.257E-09	0.000	1.994E+12
0.7202	68032513.	0.000				
86.775	-9.495E-08	-70.7207	-6.9248	3.237E-09	0.000	1.994E+12
0.4841	68068157.	0.000				
87.887	-5.489E-08	-120.0269	-1.8243	2.599E-09	0.000	1.994E+12
0.2800	68103802.	0.000				
89.000	-2.556E-08	-119.4296	0.9155	1.797E-09	0.000	1.994E+12
0.1304	68139446.	0.000				
90.112	-6.903E-09	-95.5833	2.0215	1.077E-09	0.000	1.994E+12
0.0353	68175091.	0.000				
91.225	3.209E-09	-65.4545	2.1474	5.383E-10	0.000	1.994E+12
-0.0164	68210735.	0.000				
92.337	7.470E-09	-38.2477	1.7831	1.911E-10	0.000	1.994E+12
-0.0382	68246380.	0.000				

93.450	8.312E-09	-17.8464	1.2444	3.344E-12	0.000	1.994E+12
-0.0425	68282024.	0.000				
94.562	7.559E-09	-5.0221	0.7024	-7.321E-11	0.000	1.994E+12
-0.0387	68317669.	0.000				
95.675	6.357E-09	0.9081	0.2269	-8.699E-11	0.000	1.994E+12
-0.0325	68353313.	0.000				
96.788	5.237E-09	1.0373	0.006913	-8.047E-11	0.000	1.994E+12
-0.000414	1054980.	0.000				
97.900	4.209E-09	1.0927	0.001884	-7.334E-11	0.000	1.994E+12
-0.000340	1077257.	0.000				
99.012	3.278E-09	1.0876	-0.002185	-6.604E-11	0.000	1.994E+12
-0.000270	1099535.	0.000				
100.125	2.445E-09	1.0344	-0.005359	-5.894E-11	0.000	1.994E+12
-0.000205	1121813.	0.000				
101.237	1.705E-09	0.9445	-0.007705	-5.231E-11	0.000	1.994E+12
-0.000146	1144091.	0.000				
102.350	1.048E-09	0.8286	-0.009292	-4.638E-11	0.000	1.994E+12
-9.160E-05	1166369.	0.000				
103.462	4.663E-10	0.6964	-0.0102	-4.127E-11	0.000	1.994E+12
-4.152E-05	1188646.	0.000				
104.575	-5.355E-11	0.5568	-0.0104	-3.708E-11	0.000	1.994E+12
4.857E-06	1210924.	0.000				
105.688	-5.237E-10	0.4181	-0.0101	-3.381E-11	0.000	1.994E+12
4.837E-05	1233202.	0.000				
106.800	-9.564E-10	0.2879	-0.009147	-3.145E-11	0.000	1.994E+12
8.994E-05	1255480.	0.000				
107.913	-1.363E-09	0.1738	-0.007675	-2.990E-11	0.000	1.994E+12
0.000130	1277758.	0.000				
109.025	-1.755E-09	0.0830	-0.005664	-2.904E-11	0.000	1.994E+12
0.000171	1300036.	0.000				
110.137	-2.139E-09	0.0226	-0.003109	-2.869E-11	0.000	1.994E+12
0.000212	1322313.	0.000				
111.250	-2.521E-09	0.000	0.000	-2.862E-11	0.000	1.994E+12
0.000254	672296.	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. 10:

Pile-head deflection	=	0.0779506 inches
Computed slope at pile head	=	-0.0003775 radians
Maximum bending moment	=	2016396. inch-lbs
Maximum shear force	=	9900.0000000 lbs
Depth of maximum bending moment	=	16.6875000 feet below pile head
Depth of maximum shear force	=	2.2250000 feet below pile head
Number of iterations	=	17
Number of zero deflection points	=	5

Pile-head Deflection vs. Pile Length for Load Case 10

Boundary Condition Type 1, Shear and Moment

Shear = 9900. lb
Moment = 783600. in- lb
Axial Load = 0. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment ln-lbs	Maximum Shear lbs
111.2500	0.0779506	2016396.	9900.0000000
105.6875	0.0821817	2082183.	9900.0000000
100.1250	0.0814101	2069212.	9900.0000000
94.5625	0.0803756	2054427.	9900.0000000
89.0000	0.0796179	2040534.	9900.0000000
83.4375	0.0784944	2025865.	9900.0000000
77.8750	0.0814254	2068773.	9900.0000001
72.3125	0.0802745	2050783.	9900.0000004
66.7500	0.0788945	2031984.	9900.0000002
61.1875	0.0806903	2057972.	9900.0000002
55.6250	0.0793749	2036372.	9900.0000005
50.0625	0.0810021	2046311.	9900.0000004
44.5000	0.0865805	2031405.	9900.0000000
38.9375	0.1070935	1966597.	-11626.
33.3750	0.1868040	1828453.	-13331.
27.8125	0.4979177	1668325.	-14024.
22.2500	2.9740213	1470125.	-15407.
16.6875	20.5456467	1341405.	-18651.

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	Pile-head Condition 1 Shear V(lbs) or Maximum in Pile lbs		Pile-head Condition 2 in-lb, rad., or Pile Rotation y(inches) or in-lb/rad.		Axial Loading lbs	Pile-head Deflection inches	Maximum Moment in Pile in-lbs
					radians			
1	4	y =	0.5000	M =	5499600.	0.0000000	0.50000000	8650053.
			-34480.		-0.00273924			
2	4	y =	1.0000	M =	5499600.	0.0000000	1.00000000	11437363.
			-46992.		-0.00460994			
3	4	y =	1.5000	M =	5499600.	0.0000000	1.50000000	15540665.
			-65939.		-0.00619540			
4	4	y =	2.0000	M =	5499600.	0.0000000	2.00000000	

```
19697036.          -86058.     -0.00773751
  5     4    y =      0.5000  M =     783600.       0.0000000      0.50000000
8583608.           39313.     -0.00173790
  6     4    y =      1.0000  M =     783600.       0.0000000      1.00000000
11629524.           52667.     -0.00334316
  7     4    y =      1.5000  M =     783600.       0.0000000      1.50000000
15726199.          -68311.     -0.00497502
  8     4    y =      2.0000  M =     783600.       0.0000000      2.00000000
19799712.          -88403.     -0.00660036
  9     1    V =      13600.  M =    5499600.       0.0000000      0.35397042
7025520.           -26560.     -0.00211790
 10     1    V =   9900.0000  M =     783600.       0.0000000      0.07795055
2016396.         9900.0000     -0.00037748

The analysis ended normally.
```

SER-1, $\Delta = 0.08'' < 1.0''$ OK.

10/28/14

DELDOT BR1-159
VBENT RESULTANT FORCES
DESIGNED BY: SBM 10/16/2014

$R_R = 778^k$

PIER 1

					k-ft	k	k
Worst Case	**Limit State**	**Load Case**	**Column**	**Top/Bot**	**M_u**	**P_u**	**V_u**
Max P_u	STR-I	1/2/3	1	T	540.1	777.5	
	SER-I	1/2/3	1	T	248.8	516.1	
Max V_u	STR-I	26	3	T	458.3		13.6
	SER-I	28	4	T	65.3		9.9

PIER 2

Worst Case	**Limit State**	**Load Case**	**Column**	**Top/Bot**	**M_u**	**P_u**	**V_u**
Max P_u	STR-I	2	4	T	252.0	689.2	
	SER-I	1/3	1	T	132.4	464.8	
Max V_u	STR-V	28	4	T	115.2		8.8
	SER-I	28	4	T	98.6		8.7

PIER 3

Worst Case	**Limit State**	**Load Case**	**Column**	**Top/Bot**	**M_u**	**P_u**	**V_u**
Max P_u	STR-I	4	4	T	141.4	688.3	
	SER-I	4	1	T	218.4	500.6	
Max V_u	STR-III	25	2	T	651.5		21.3
	SER-I	26	3	T	365.0		11.0

PIER 4

Worst Case	**Limit State**	**Load Case**	**Column**	**Top/Bot**	**M_u**	**P_u**	**V_u**
Max P_u	STR-I	1/2/3	1	T	377.0	709.1	
	SER-I	1/2/3	1	T	185.3	475.0	
Max V_u	STR-I	26	4	T	316.1		9.8
	SER-I	26	4	T	270.7		8.4

PIER-1

4'Ø, 1/2" STEEL CASING, TOP ELEV = 0.0

DEFLECTION	STR-1 (lbs)	SER 1 (lbs)
0.5	23,344	39,319
1.0	36,070	52,667 ←
1.5	52,450	68,040
→ 2.0	67,787	82,568

GEOTECHNICAL AXIAL CAPACITY
$= 778^k > 777.5^k$ OK

LATERAL CAPACITY, 2" DEFLECTION (STR-1)
$67.79^k > 13.6^k$ OK.

LATERAL CAPACITY, 1" DEFLECTION (SER-1)
$52.67 > 9.9^k$ OK.

PIER 2 LAYER (BELOW DSCAP)

Boring No. JS-5 (BELOW BRIDGE DECK) By: SJM Chk: AT

OG Elev. = 11.00 RIVER BED @ EL. −9.0

GWT= 5.0
γ = 110 lb/ft3
γ' = 47.6 lb/ft3

Sample No.	Depth of SS run (ft)	N-Values Field	q'_v (ksf)	C_N	N_{CORR}	
1	20	4	0.952	1.250	5	
2	22	0	1.047	1.218	0	
3	24	0	1.142	1.189	0	
4	26	2	1.238	1.162	2	
5	33	10	1.571	1.083	11	(1)
6	38	13	1.809	1.035	13	
7	43	29	2.047	0.994	29	(2)
8	48	16	2.285	0.957	15	
9	53	17	2.523	0.924	16	
10	58	19	2.761	0.894	17	(3)
11	63	15	2.999	0.866	13	
12	68	22	3.237	0.841	18	
13	73	23	3.475	0.817	19	
14	78	45	3.713	0.795	36	(4)
15	83	82	3.951	0.774	63	
16	88	84	4.189	0.755	63	
17	93	41	4.427	0.736	30	
18	98	80	4.665	0.719	57	
19	103	78	4.903	0.702	55	(5)
20	108	50	5.141	0.686	34	
21	113	50	5.379	0.671	34	(6)
22	118	50	5.617	0.656	33	

$N_{avg\ (Below\ BFE)}$ = 26

C_N= $0.77 \times \log (40/q'_v)$

N_{CORR} = $N_{Field} \times C_N$

(Ref. AASHTO Eqn 10.4.6.2.4-1)

Boring No. JS-6 By: SJM Chk:

OG Elev. = 11.00

GWT= 0.0
γ = 110 lb/ft3
γ' = 47.6 lb/ft3

Sample No.	Depth of SS run (ft)	N-Values Field	q'_v (ksf)	C_N	N_{CORR}
1	23	0	1.095	1.203	0
2	25	19	1.190	1.175	22
3	27	0	1.285	1.150	0
4	29	0	1.380	1.126	0
5	31	12	1.476	1.103	13
6	33	9	1.571	1.083	10
7	38	4	1.809	1.035	4
8	43	19	2.047	0.994	19
9	48	15	2.285	0.957	14
10	53	13	2.523	0.924	12
11	58	9	2.761	0.894	8
12	63	23	2.999	0.866	20
13	68	31	3.237	0.841	26
14	73	46	3.475	0.817	38
15	78	33	3.713	0.795	26
16	83	24	3.951	0.774	19
17	88	54	4.189	0.755	41
18	93	50	4.427	0.736	37
19	98	56	4.665	0.719	40
20	103	50	4.903	0.702	35
21	108		5.141	0.686	

$N_{avg\ (Below\ BFE)}$ = 20

C_N= $0.77 \times \log (40/q'_v)$

N_{CORR} = $N_{Field} \times C_N$

(Ref. AASHTO Eqn 10.4.6.2.4-1)

McCORMICK TAYLOR

PROJECT BR1-159 JOB NO. _____ SHEET NO. 1 OF 1

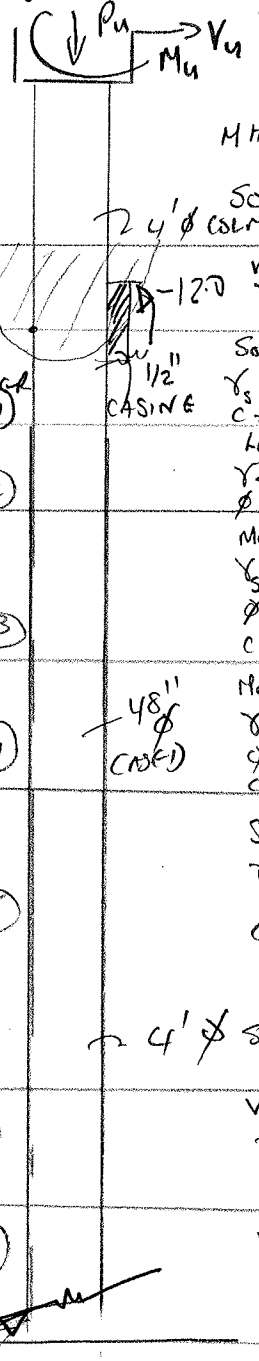
LOCATION RER 2

SUBJECT SOIL PROFILE (AXIAL & LATERAL CAPACITIES)

DESIGNED BY SJM DATE 7/14 CHECKED BY AT DATE 8/14

REVISED BY _____ DATE _____ BACK CHECKED BY _____ DATE _____

SOIL PROFILE BASED ON BORING JS-5



x Depth Below Top of Colm.	y - Depth Below Assumed channel Bottom	Layer Thickness (ft)	Elevation
			+9.22
			+4.64
			-9.0
x = 24.22' y = 0'		(6')	
x = 27.22' (with scour)			-15.0
x = 31.22	y = 7'	(7') Layer (1)	-18.0
x = 36.22'	y = 12'	(5') (2)	-22.0
x = 51.22'	y = 27'	(15') (3)	-27.0
x = 61.22'	y = 37'	(10') (4)	-42.0
		(35') (5)	-52.0
x = 96.22'	y = 72'		-87.0
x = 106.22	y = 82'	(10') (6)	-97.0
x = 116.22	y = 92'	(10') (7)	-107.0

REF./REM.

P_u = 689.2 k

R_R = 703 k

IGNORE THIS LAYER. ASSUME Channel Bottom

100 YR Scour

END @ x = 112.22

y = 88'

R_R = 703 k (351.72 T) AXIAL CAPACITY

EL. = -103.00

AXIAL CAPACITY

SHAFT for Windows, Version 2012.7.11

Serial Number : 228741384

VERTICALLY LOADED DRILLED SHAFT ANALYSIS

Path to file locations : Y:\Bridges\DELDOT\BR1-159_JAMES ST BRIDGE\FOUNDATION REPORT\SHAFT Output\
Name of input data file : Pier 22.sfd
Name of output file : Pier 22.sfo
Name of plot output file : Pier 22.sfp
Name of runtime file : Pier 22.sfr

Time and Date of Analysis

Date: September 10, 2014 Time: 14:03:55

BR1-159 Pier 2

PROPOSED DEPTH = 110.0 FT

NUMBER OF LAYERS = 7

WATER TABLE DEPTH = 0.0 FT.

**********WARNING**********
PLEASE PROVIDE THE SOIL DEPTH THAT IS TWO-DIAMETER DEEPER THAN THE TIP OF DRILLED SHAFTS

SOIL INFORMATION

LAYER NO 1----CLAY

AT THE TOP

STRENGTH REDUCTION FACTOR-ALPHA	= 0.550E+00
END BEARING COEFFICIENT-Nc	= 0.800E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.600E+03
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00

SOIL UNIT WEIGHT, LB/CU FT	= 0.105E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.000E+00

AT THE BOTTOM

STRENGTH REDUCTION FACTOR-ALPHA	= 0.550E+00
END BEARING COEFFICIENT-Nc	= 0.800E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.600E+03
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.105E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.700E+01

LRFD RESISTANCE FACTOR (SIDE FRICTION)	= 0.450E+00
LRFD RESISTANCE FACTOR (TIP RESISTANCE)	= 0.400E+00

LAYER NO 2----SAND

AT THE TOP

SKIN FRICTION COEFFICIENT- BETA	= 0.114E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.300E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.110E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.700E+01

AT THE BOTTOM

SKIN FRICTION COEFFICIENT- BETA	= 0.103E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.300E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.110E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.120E+02

LRFD RESISTANCE FACTOR (SIDE FRICTION)	= 0.550E+00
LRFD RESISTANCE FACTOR (TIP RESISTANCE)	= 0.500E+00

LAYER NO 3----SAND

AT THE TOP

SKIN FRICTION COEFFICIENT- BETA	= 0.103E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.320E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.120E+02

AT THE BOTTOM

SKIN FRICTION COEFFICIENT- BETA	= 0.799E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.320E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.270E+02
LRFD RESISTANCE FACTOR (SIDE FRICTION)	= 0.550E+00
LRFD RESISTANCE FACTOR (TIP RESISTANCE)	= 0.500E+00

LAYER NO 4----SAND

AT THE TOP

SKIN FRICTION COEFFICIENT- BETA	= 0.799E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.320E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.130E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.270E+02

AT THE BOTTOM

SKIN FRICTION COEFFICIENT- BETA	= 0.679E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.320E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.130E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.370E+02
LRFD RESISTANCE FACTOR (SIDE FRICTION)	= 0.550E+00
LRFD RESISTANCE FACTOR (TIP RESISTANCE)	= 0.500E+00

LAYER NO 5----CLAY

AT THE TOP

STRENGTH REDUCTION FACTOR-ALPHA	= 0.550E+00
END BEARING COEFFICIENT-Nc	= 0.800E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.200E+04
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.125E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.370E+02

AT THE BOTTOM

STRENGTH REDUCTION FACTOR-ALPHA	= 0.550E+00
END BEARING COEFFICIENT-Nc	= 0.800E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.200E+04
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00

SOIL UNIT WEIGHT, LB/CU FT	= 0.125E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.720E+02
LRFD RESISTANCE FACTOR (SIDE FRICTION)	= 0.450E+00
LRFD RESISTANCE FACTOR (TIP RESISTANCE)	= 0.400E+00

LAYER NO 6----SAND

AT THE TOP

SKIN FRICTION COEFFICIENT- BETA	= 0.354E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.360E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.135E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.720E+02

AT THE BOTTOM

SKIN FRICTION COEFFICIENT- BETA	= 0.278E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.360E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.135E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.820E+02
LRFD RESISTANCE FACTOR (SIDE FRICTION)	= 0.550E+00
LRFD RESISTANCE FACTOR (TIP RESISTANCE)	= 0.500E+00

LAYER NO 7----DECOMPOSED ROCK

AT THE TOP

ELASTIC MODULUS OF GRAVEL, LB/SQ IN	= 0.000E+00
POISSION RATIO OF GRAVEL	= 0.300E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.340E+02
SOIL UNIT WEIGHT, LB/CU FT	= 0.150E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.820E+02

AT THE BOTTOM

ELASTIC MODULUS OF GRAVEL, LB/SQ IN	= 0.000E+00
POISSION RATIO OF GRAVEL	= 0.300E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.340E+02
SOIL UNIT WEIGHT, LB/CU FT	= 0.150E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.100E+03
LRFD RESISTANCE FACTOR (SIDE FRICTION)	= 0.550E+00
LRFD RESISTANCE FACTOR (TIP RESISTANCE)	= 0.500E+00

DRILLED SHAFT INFORMATION

DIAMETER OF STEM	=	4.000	FT.
DIAMETER OF BASE	=	4.000	FT.
END OF STEM TO BASE	=	0.000	FT.
ANGLE OF BELL	=	0.000	DEG.
IGNORED TOP PORTION	=	5.000	FT.
IGNORED BOTTOM PORTION	=	4.000	FT.
AREA OF ONE PERCENT STEEL	=	18.098	SQ.IN.
ELASTIC MODULUS, Ec	=	0.312E+07	LB/SQ IN
VOLUME OF UNDERREAM	=	0.000	CU.YDS.

PREDICTED RESULTS

QS = ULTIMATE SIDE RESISTANCE;
QB = ULTIMATE BASE RESISTANCE;
WT = WEIGHT OF DRILLED SHAFT (UPLIFT CAPACITY ONLY);
QU = TOTAL ULTIMATE RESISTANCE;
LRFD QS = TOTAL SIDE FRICTION USING LRFD RESISTANCE FACTOR TO THE ULTIMATE SIDE RESISTANCE;
LRFD QB = TOTAL BASE BEARING USING LRFD RESISTANCE FACTOR TO THE ULTIMATE BASE RESISTANCE
LRFD QU = TOTAL CAPACITY WITH LRFD RESISTANCE FACTOR.

LENGTH (FEET)	VOLUME (CU.YDS)	QS (TONS)	QB (TONS)	QU (TONS)	LRFD QS (TONS)	LRFD QB (TONS)	LRFD QU (TONS)
10.0	4.65	2.07	63.69	65.76	0.93	31.84	32.78
11.0	5.12	4.15	67.04	71.19	1.87	33.52	35.39
12.0	5.59	6.41	67.04	73.45	3.11	33.52	36.63
13.0	6.05	8.95	67.04	75.99	4.51	33.52	38.03
14.0	6.52	11.77	67.04	78.80	6.06	33.52	39.58
15.0	6.98	14.84	67.04	81.88	7.75	33.52	41.27
16.0	7.45	18.16	67.04	85.20	9.58	33.52	43.09
17.0	7.91	21.76	67.04	88.80	11.55	33.52	45.07
18.0	8.38	25.65	67.04	92.69	13.69	33.52	47.21
19.0	8.84	29.83	67.04	96.87	15.99	33.52	49.51
20.0	9.31	34.28	67.04	101.32	18.44	33.52	51.96
21.0	9.78	39.00	67.04	106.03	21.03	33.52	54.55
22.0	10.24	43.97	67.04	111.00	23.77	33.52	57.29
23.0	10.71	49.18	67.04	116.22	26.64	33.52	60.15
24.0	11.17	54.64	67.04	121.67	29.64	33.52	63.15
25.0	11.64	60.32	67.04	127.36	32.76	33.52	66.28
26.0	12.10	66.22	67.04	133.26	36.01	33.52	69.52
27.0	12.57	72.33	67.04	139.37	39.37	33.52	72.89
28.0	13.03	78.65	67.04	145.69	42.84	33.52	76.36
29.0	13.50	85.16	67.04	152.20	46.42	33.52	79.94
30.0	13.96	91.86	72.06	163.93	50.11	36.03	86.14
31.0	14.43	98.74	77.65	176.39	53.89	38.82	92.72
32.0	14.90	105.82	83.79	189.61	57.79	41.90	99.68
33.0	15.36	113.12	90.49	203.61	61.80	45.25	107.05
34.0	15.83	120.62	95.52	216.13	65.92	47.76	113.68
35.0	16.29	128.31	98.87	227.18	70.16	49.43	119.59
36.0	16.76	136.20	100.54	236.74	74.50	50.27	124.77
37.0	17.22	144.27	100.54	244.81	78.93	40.22	119.15
38.0	17.69	152.51	100.54	253.05	83.46	40.22	123.68
39.0	18.15	160.91	100.54	261.46	88.09	40.22	128.31

40.0	18.62	169.48	100.54	270.02	92.80	40.22	133.01
41.0	19.08	178.19	100.54	278.73	97.59	40.22	137.81
42.0	19.55	185.10	100.54	285.64	100.70	40.22	140.92
43.0	20.02	192.01	100.54	292.56	103.81	40.22	144.03
44.0	20.48	198.93	100.54	299.47	106.92	40.22	147.14
45.0	20.95	205.84	100.54	306.38	110.03	40.22	150.25
46.0	21.41	212.75	100.54	313.29	113.14	40.22	153.36
47.0	21.88	219.66	100.54	320.21	116.25	40.22	156.47
48.0	22.34	226.57	100.54	327.12	119.36	40.22	159.58
49.0	22.81	233.49	100.54	334.03	122.47	40.22	162.69
50.0	23.27	240.40	100.54	340.94	125.58	40.22	165.80
51.0	23.74	247.31	100.54	347.86	128.69	40.22	168.91
52.0	24.21	254.22	100.54	354.77	131.81	40.22	172.02
53.0	24.67	261.14	100.54	361.68	134.92	40.22	175.13
54.0	25.14	268.05	100.54	368.59	138.03	40.22	178.24
55.0	25.60	274.96	100.54	375.51	141.14	40.22	181.35
56.0	26.07	281.87	100.54	382.42	144.25	40.22	184.47
57.0	26.53	288.79	100.54	389.33	147.36	40.22	187.58
58.0	27.00	295.70	100.54	396.24	150.47	40.22	190.69
59.0	27.46	302.61	100.54	403.16	153.58	40.22	193.80
60.0	27.93	309.52	100.54	410.07	156.69	40.22	196.91
61.0	28.39	316.44	100.54	416.98	159.80	40.22	200.02
62.0	28.86	323.35	100.54	423.89	162.91	40.22	203.13
63.0	29.33	330.26	100.54	430.81	166.02	40.22	206.24
64.0	29.79	337.17	100.54	437.72	169.13	40.22	209.35
65.0	30.26	344.09	115.63	459.72	172.24	46.25	218.49
66.0	30.72	351.00	132.39	483.39	175.35	52.96	228.31
67.0	31.19	357.91	150.83	508.74	178.46	60.33	238.80
68.0	31.65	364.82	170.94	535.77	181.57	68.38	249.95
69.0	32.12	371.74	186.03	557.76	184.68	74.41	259.10
70.0	32.58	378.65	196.08	574.73	187.80	78.43	266.23
71.0	33.05	385.56	201.11	586.67	190.91	80.45	271.35
72.0	33.51	392.47	201.11	593.59	194.02	100.56	294.57
73.0	33.98	399.39	201.11	600.50	197.13	100.56	297.68
74.0	34.45	406.30	201.11	607.41	200.24	100.56	300.79
75.0	34.91	413.21	194.57	607.78	203.35	97.29	300.64
76.0	35.38	420.12	187.39	607.51	206.46	93.70	300.15
77.0	35.84	429.49	179.57	609.06	211.61	89.78	301.40
78.0	36.31	438.81	171.12	609.93	216.74	85.56	302.30
79.0	36.77	448.06	164.95	613.01	221.82	82.48	304.30
80.0	37.24	457.24	161.04	618.28	226.87	80.52	307.39
81.0	37.70	466.34	159.35	625.70	231.88	79.68	311.56
82.0	38.17	475.37	159.87	635.23	236.84	79.93	316.78
83.0	38.63	484.30	160.38	644.68	241.76	80.19	321.95
84.0	39.10	493.15	160.88	654.03	246.62	80.44	327.06
85.0	39.57	501.89	161.38	663.27	251.43	80.69	332.12
86.0	40.03	510.54	161.87	672.41	256.19	80.93	337.12
87.0	40.50	523.34	162.35	685.69	263.23	81.18	344.40
88.0	40.96	536.20	162.83	699.03	270.30	81.42	351.72
89.0	41.43	549.13	163.30	712.43	277.41	81.65	359.06
90.0	41.89	562.13	163.77	725.90	284.56	81.89	366.45
91.0	42.36	575.19	164.23	739.42	291.75	82.12	373.86

y=88'

R_R=703 k

LOAD SETTLEMENT RELATIONSHIP

TOP LOAD TONS	TOP MOVEMENT IN.
0.6034E+02	0.4507E-01
0.1207E+03	0.9014E-01
0.1810E+03	0.1352E+00
0.2414E+03	0.1803E+00

	Pier 22.sfo
0.3017E+03	0.2253E+00
0.3621E+03	0.2704E+00
0.4224E+03	0.3155E+00
0.4827E+03	0.3606E+00
0.5431E+03	0.4056E+00
0.6034E+03	0.4507E+00
0.6378E+03	0.9674E+00
0.6722E+03	0.1484E+01
0.7066E+03	0.2001E+01
0.7410E+03	0.2518E+01
0.7410E+03	0.3021E+01

PIER 2
LATERAL CAPACITY

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: Y:\Bridges\DELDOT\BR1-159_JAMES ST BRIDGE\FOUNDATION REPORT\LPILE Output\
Name of input data file: Pier 22af.lp7d
Name of output report file: Pier 22af.lp7o
Name of plot output file: Pier 22af.lp7p
Name of runtime messeage file: Pier 22af.lp7r

Date and Time of Analysis

Date: October 24, 2014 Time: 14:48:28

Problem Title

Project Name: BR1-159 Pier 2

Job Number:

Client: DelDOT

Engineer: SJM

Description: Pier 2 Lateral Capacity (4' DIA Colm.&Caisson at each Beam)

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	=	600
- 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	=	112.22 ft
Depth of ground surface below top of pile	=	27.22 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	48.0000000
2	21.220000	48.0000000
3	21.220000	49.0000000

4	112.220000	49.0000000

Input Structural Properties:

Pile Section No. 1:

Section Type	=	Drilled Shaft (Bored Pile)
Section Length	=	21.22000 ft
Section Diameter	=	48.00000 in

Pile Section No. 2:

Section Type	=	Drilled Shaft with Permanent Casing
Section Length	=	91.00000 ft
Section Diameter	=	49.00000 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 7 layers

Layer 1 is soft clay, p-y criteria by Matlock, 1970

Distance from top of pile to top of layer	=	27.22000 ft
Distance from top of pile to bottom of layer	=	31.22000 ft
Effective unit weight at top of layer	=	42.60000 pcf
Effective unit weight at bottom of layer	=	42.60000 pcf
Undrained cohesion at top of layer	=	600.00000 psf
Undrained cohesion at bottom of layer	=	600.00000 psf
Epsilon-50 at top of layer	=	0.02000
Epsilon-50 at bottom of layer	=	0.02000

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

Distance from top of pile to top of layer	=	31.22000 ft
Distance from top of pile to bottom of layer	=	36.22000 ft
Effective unit weight at top of layer	=	47.60000 pcf
Effective unit weight at bottom of layer	=	47.60000 pcf
Friction angle at top of layer	=	30.00000 deg.
Friction angle at bottom of layer	=	30.00000 deg.
Subgrade k at top of layer	=	20.00000 pci
Subgrade k at bottom of layer	=	20.00000 pci

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

Distance from top of pile to top of layer	=	36.22000 ft
Distance from top of pile to bottom of layer	=	51.22000 ft
Effective unit weight at top of layer	=	57.60000 pcf
Effective unit weight at bottom of layer	=	57.60000 pcf
Friction angle at top of layer	=	32.00000 deg.
Friction angle at bottom of layer	=	32.00000 deg.
Subgrade k at top of layer	=	60.00000 pci
Subgrade k at bottom of layer	=	60.00000 pci

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

Distance from top of pile to top of layer	=	51.22000 ft
Distance from top of pile to bottom of layer	=	61.22000 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	=	32.00000 deg.
Friction angle at bottom of layer	=	32.00000 deg.
Subgrade k at top of layer	=	60.00000 pci
Subgrade k at bottom of layer	=	60.00000 pci

Layer 5 is stiff clay with water-induced erosion

Distance from top of pile to top of layer	=	61.22000 ft
Distance from top of pile to bottom of layer	=	96.22000 ft
Effective unit weight at top of layer	=	62.60000 pcf
Effective unit weight at bottom of layer	=	62.60000 pcf
Undrained cohesion at top of layer	=	2000.00000 psf
Undrained cohesion at bottom of layer	=	2000.00000 psf
Epsilon-50 at top of layer	=	0.00700
Epsilon-50 at bottom of layer	=	0.00700
Subgrade k at top of layer	=	200.00000 pci
Subgrade k at bottom of layer	=	200.00000 pci

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

Distance from top of pile to top of layer	=	96.22000 ft
Distance from top of pile to bottom of layer	=	106.22000 ft
Effective unit weight at top of layer	=	72.60000 pcf
Effective unit weight at bottom of layer	=	72.60000 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	=	125.00000 pci
Subgrade k at bottom of layer	=	125.00000 pci

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

Distance from top of pile to top of layer	=	106.22000 ft
Distance from top of pile to bottom of layer	=	116.22000 ft
Effective unit weight at top of layer	=	87.60000 pcf
Effective unit weight at bottom of layer	=	87.60000 pcf
Friction angle at top of layer	=	46.00000 deg.
Friction angle at bottom of layer	=	46.00000 deg.
Subgrade k at top of layer	=	500.00000 pci
Subgrade k at bottom of layer	=	500.00000 pci

(Depth of lowest soil layer extends 4.00 ft below pile tip)

Summary of Soil Properties

Layer Num.	Soil Type (p-y Curve Criteria)	Angle of Friction deg.	Strain Factor Epsilon 50	kpy pci	Layer Depth ft	Effective Unit Wt. pcf	Undrained Cohesion psf
1	Soft Clay	--	0.02000	--	27.220	42.600	600.000
		--	0.02000	--	31.220	42.600	600.000
2	Sand (Reese, et al.)	30.000	--	20.000	31.220	47.600	--
		30.000	--	20.000	36.220	47.600	--
3	Sand (Reese, et al.)	32.000	--	60.000	36.220	57.600	--
		32.000	--	60.000	51.220	57.600	--
4	Sand (Reese, et al.)	32.000	--	60.000	51.220	67.600	--
		32.000	--	60.000	61.220	67.600	--
5	Stiff Clay with Free Water	--	0.00700	200.000	61.220	62.600	2000.000
		--	0.00700	200.000	96.220	62.600	2000.000
6	Sand (Reese, et al.)	36.000	--	125.000	96.220	72.600	--
		36.000	--	125.000	106.220	72.600	--
7	Sand (Reese, et al.)	46.000	--	500.000	106.220	87.600	--
		46.000	--	500.000	116.220	87.600	--

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 = 10

Load No.	Load Compute Type	Condition 1	Condition 2	Axial Thrust Force, lbs
	Top y vs. Pile Length			

1	4 No	y =	0.50000 in	M =	1382400. in-lbs	0.0000000
2	4 No	y =	1.00000 in	M =	1382400. in-lbs	0.0000000
3	4 No	y =	1.50000 in	M =	1382400. in-lbs	0.0000000
4	4 Yes	y =	2.00000 in	M =	1382400. in-lbs	0.0000000
5	4 No	y =	0.50000 in	M =	1183200. in-lbs	0.0000000
6	4 Yes	y =	1.00000 in	M =	1183200. in-lbs	0.0000000
7	4 No	y =	1.50000 in	M =	1183200. in-lbs	0.0000000
8	4 No	y =	2.00000 in	M =	1183200. in-lbs	0.0000000
9	1 Yes	V =	8800.00000 lbs	M =	1382400. in-lbs	0.0000000
10	1 Yes	V =	8700.00000 lbs	M =	1183200. in-lbs	0.0000000

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	=	21.22000 ft
Shaft Diameter	=	48.00000 in
Concrete Cover Thickness	=	4.00000 in
Number of Reinforcing Bars	=	50 bars
Yield Stress of Reinforcing Bars	=	60000. psi
Modulus of Elasticity of Reinforcing Bars	=	29000000. psi
Gross Area of Shaft	=	1809.55737 sq. in.
Total Area of Reinforcing Steel	=	39.50000 sq. in.
Area Ratio of Steel Reinforcement	=	2.18 percent
Edge-to-Edge Bar Spacing	=	2.89438 in
Maximum Concrete Aggregate Size	=	0.37500 in
Ratio of Bar Spacing to Aggregate Size	=	7.72
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	=	9140.470 kips
Tensile Load for Cracking of Concrete	=	-911.303 kips

Nominal Axial Tensile Capacity = -2370.000 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.00000	0.79000	19.49359	-0.49995
2	1.00000	0.79000	19.49359	0.49995
3	1.00000	0.79000	19.00549	4.36362
4	1.00000	0.79000	18.75683	5.33210
5	1.00000	0.79000	17.32321	8.95300
6	1.00000	0.79000	16.84151	9.82921
7	1.00000	0.79000	14.55245	12.97984
8	1.00000	0.79000	13.86798	13.70873
9	1.00000	0.79000	10.86731	16.19110
10	1.00000	0.79000	10.02307	16.72687
11	1.00000	0.79000	6.49933	18.38501
12	1.00000	0.79000	5.54837	18.69400
13	1.00000	0.79000	1.72297	19.42373
14	1.00000	0.79000	0.72505	19.48652
15	1.00000	0.79000	-3.16164	19.24199
16	1.00000	0.79000	-4.14382	19.05462
17	1.00000	0.79000	-7.84760	17.85119
18	1.00000	0.79000	-8.75233	17.42546
19	1.00000	0.79000	-12.04047	15.33875
20	1.00000	0.79000	-12.81090	14.70139
21	1.00000	0.79000	-15.47679	11.86251
22	1.00000	0.79000	-16.06451	11.05358
23	1.00000	0.79000	-17.94064	7.64091
24	1.00000	0.79000	-18.30872	6.71123
25	1.00000	0.79000	-19.27722	2.93920
26	1.00000	0.79000	-19.40254	1.94719
27	1.00000	0.79000	-19.40254	-1.94719
28	1.00000	0.79000	-19.27722	-2.93920
29	1.00000	0.79000	-18.30872	-6.71123
30	1.00000	0.79000	-17.94064	-7.64091
31	1.00000	0.79000	-16.06451	-11.05358
32	1.00000	0.79000	-15.47679	-11.86251
33	1.00000	0.79000	-12.81090	-14.70139
34	1.00000	0.79000	-12.04047	-15.33875
35	1.00000	0.79000	-8.75233	-17.42546
36	1.00000	0.79000	-7.84760	-17.85119
37	1.00000	0.79000	-4.14382	-19.05462
38	1.00000	0.79000	-3.16164	-19.24199
39	1.00000	0.79000	0.72505	-19.48652
40	1.00000	0.79000	1.72297	-19.42373
41	1.00000	0.79000	5.54837	-18.69400
42	1.00000	0.79000	6.49933	-18.38501
43	1.00000	0.79000	10.02307	-16.72687
44	1.00000	0.79000	10.86731	-16.19110
45	1.00000	0.79000	13.86798	-13.70873
46	1.00000	0.79000	14.55245	-12.97984
47	1.00000	0.79000	16.84151	-9.82921
48	1.00000	0.79000	17.32321	-8.95300
49	1.00000	0.79000	18.75683	-5.33210
50	1.00000	0.79000	19.00549	-4.36362

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

Minimum spacing between any two bars not equal to zero = -0.0001096 inches between

Bars 1 and 2

Spacing to aggregate size ratio = -0.0002922

Concrete Properties:

Compressive Strength of Concrete	=	4500.00000 psi
Modulus of Elasticity of Concrete	=	3823676. psi
Modulus of Rupture of Concrete	=	-503.11528 psi
Compression Strain at Peak Stress	=	0.00200
Tensile Strain at Fracture of Concrete	=	-0.0001152
Maximum Coarse Aggregate Size	=	0.37500 in

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

Number	Axial Thrust Force kips
1	0.000

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 = 0.000 kips

Bending Max Concrete Curvature Stress rad/in. ksi	Bending Max Steel Moment Stress in-kip ksi	Bending Run Stiffness Msg kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in
0.000000625	845.9514339	1353522294.	24.0001518	0.0000150	-0.0000150
0.0665544	0.4306528				
0.000001250	1688.2814444	1350625155.	24.0001524	0.0000300	-0.0000300
0.1326129	0.8613055				
0.000001875	2526.9900314	1347728017.	24.0001529	0.0000450	-0.0000450
0.1981756	1.2919583				
0.000002500	3362.0771951	1344830878.	24.0001534	0.0000600	-0.0000600
0.2632425	1.7226111				
0.000003125	4193.5429353	1341933739.	24.0001540	0.0000750	-0.0000750
0.3278135	2.1532639				
0.000003750	5021.3872521	1339036601.	24.0001545	0.0000900	-0.0000900
0.3918887	2.5839168				

0.000004375	5845.6101456	1336139462.	24.0001551	0.0001050	-0.0001050
0.4554681	3.0145696				
0.000005000	5845.6101456	1169122029.	14.1767436	0.0000709	-0.0001691
0.3080092	-4.8695722 C				
0.000005625	5845.6101456	1039219581.	14.1814610	0.0000798	-0.0001902
0.3458573	-5.4774992 C				
0.000006250	5845.6101456	935297623.	14.1861892	0.0000887	-0.0002113
0.3835595	-6.0852532 C				
0.000006875	5845.6101456	850270567.	14.1909283	0.0000976	-0.0002324
0.4211155	-6.6928337 C				
0.000007500	5845.6101456	779414686.	14.1956783	0.0001065	-0.0002535
0.4585249	-7.3002399 C				
0.000008125	5845.6101456	719459710.	14.2004394	0.0001154	-0.0002746
0.4957876	-7.9074715 C				
0.000008750	5845.6101456	668069731.	14.2052115	0.0001243	-0.0002957
0.5329033	-8.5145276 C				
0.000009375	5845.6101456	623531749.	14.2099947	0.0001332	-0.0003168
0.5698716	-9.1214077 C				
0.0000100	5845.6101456	584561015.	14.2147891	0.0001421	-0.0003379
0.6066924	-9.7281112 C				
0.0000106	5845.6101456	550175073.	14.2195946	0.0001511	-0.0003589
0.6433653	-10.3346374 C				
0.0000113	5845.6101456	519609791.	14.2244115	0.0001600	-0.0003800
0.6798902	-10.9409857 C				
0.0000119	5845.6101456	492261907.	14.2292396	0.0001690	-0.0004010
0.7162666	-11.5471556 C				
0.0000125	5845.6101456	467648812.	14.2340792	0.0001779	-0.0004221
0.7524943	-12.1531463 C				
0.0000131	5845.6101456	445379821.	14.2389301	0.0001869	-0.0004431
0.7885732	-12.7589572 C				
0.0000138	5845.6101456	425135283.	14.2437926	0.0001959	-0.0004641
0.8245028	-13.3645877 C				
0.0000144	6023.7945632	419046578.	14.2486666	0.0002048	-0.0004852
0.8602829	-13.9700371 C				
0.0000150	6283.5150883	418901006.	14.2535522	0.0002138	-0.0005062
0.8959132	-14.5753048 C				
0.0000156	6543.0489845	418755135.	14.2584494	0.0002228	-0.0005272
0.9313934	-15.1803901 C				
0.0000163	6802.3956702	418608964.	14.2633583	0.0002318	-0.0005482
0.9667234	-15.7852924 C				
0.0000169	7061.5545606	418462492.	14.2682790	0.0002408	-0.0005692
1.0019026	-16.3900109 C				
0.0000175	7320.5250670	418315718.	14.2732116	0.0002498	-0.0005902
1.0369310	-16.9945451 C				
0.0000181	7579.3065976	418168640.	14.2781560	0.0002588	-0.0006112
1.0718081	-17.5988942 C				
0.0000188	7837.8985565	418021256.	14.2831123	0.0002678	-0.0006322
1.1065338	-18.2030577 C				
0.0000194	8096.3003444	417873566.	14.2880807	0.0002768	-0.0006532
1.1411076	-18.8070346 C				
0.0000200	8354.5113583	417725568.	14.2930611	0.0002859	-0.0006741
1.1755294	-19.4108245 C				
0.0000206	8612.5309914	417577260.	14.2980536	0.0002949	-0.0006951
1.2097988	-20.0144267 C				
0.0000213	8870.3586334	417428642.	14.3030584	0.0003039	-0.0007161
1.2439155	-20.6178403 C				
0.0000219	9127.9936698	417279711.	14.3080753	0.0003130	-0.0007370
1.2778793	-21.2210647 C				
0.0000225	9385.4354826	417130466.	14.3131046	0.0003220	-0.0007580
1.3116898	-21.8240993 C				
0.0000231	9642.6834500	416980906.	14.3181462	0.0003311	-0.0007789
1.3453467	-22.4269432 C				
0.0000238	9899.7369459	416831029.	14.3232002	0.0003402	-0.0007998

1.3788497	-23.0295958 C				
0.0000244	10157.	416680834.	14.3282668	0.0003493	-0.0008207
1.4121986	-23.6320564 C				
0.0000256	10670.	416379475.	14.3384375	0.0003674	-0.0008626
1.4784325	-24.8363989 C				
0.0000269	11182.	416076834.	14.3486590	0.0003856	-0.0009044
1.5440460	-26.0399641 C				
0.0000281	11694.	415772890.	14.3589318	0.0004038	-0.0009462
1.6090366	-27.2427466 C				
0.0000294	12204.	415467630.	14.3692563	0.0004221	-0.0009879
1.6734018	-28.4447402 C				
0.0000306	12714.	415161043.	14.3796331	0.0004404	-0.0010296
1.7371390	-29.6459388 C				
0.0000319	13223.	414853116.	14.3900627	0.0004587	-0.0010713
1.8002456	-30.8463362 C				
0.0000331	13732.	414543834.	14.4005458	0.0004770	-0.0011130
1.8627191	-32.0459262 C				
0.0000344	14239.	414233186.	14.4110828	0.0004954	-0.0011546
1.9245567	-33.2447024 C				
0.0000356	14746.	413921159.	14.4216743	0.0005138	-0.0011962
1.9857559	-34.4426584 C				
0.0000369	15252.	413607737.	14.4323209	0.0005322	-0.0012378
2.0463138	-35.6397875 C				
0.0000381	15757.	413292908.	14.4430232	0.0005506	-0.0012794
2.1062279	-36.8360832 C				
0.0000394	16261.	412976658.	14.4537818	0.0005691	-0.0013209
2.1654952	-38.0315387 C				
0.0000406	16764.	412658972.	14.4645973	0.0005876	-0.0013624
2.2241131	-39.2261471 C				
0.0000419	17267.	412339835.	14.4754703	0.0006062	-0.0014038
2.2820786	-40.4199016 C				
0.0000431	17768.	412019235.	14.4864015	0.0006247	-0.0014453
2.3393890	-41.6127951 C				
0.0000444	18269.	411697154.	14.4973914	0.0006433	-0.0014867
2.3960413	-42.8048205 C				
0.0000456	18769.	411373579.	14.5084408	0.0006619	-0.0015281
2.4520326	-43.9959704 C				
0.0000469	19268.	411048519.	14.5195502	0.0006806	-0.0015694
2.5073600	-45.1862362 C				
0.0000481	19766.	410721909.	14.5307205	0.0006993	-0.0016107
2.5620203	-46.3756131 C				
0.0000494	20263.	410393756.	14.5419521	0.0007180	-0.0016520
2.6160105	-47.5640922 C				
0.0000506	20759.	410064046.	14.5532459	0.0007368	-0.0016932
2.6693276	-48.7516657 C				
0.0000519	21255.	409732761.	14.5646025	0.0007555	-0.0017345
2.7219685	-49.9383259 C				
0.0000531	21749.	409399885.	14.5760227	0.0007744	-0.0017756
2.7739299	-51.1240649 C				
0.0000544	22243.	409065400.	14.5875072	0.0007932	-0.0018168
2.8252088	-52.3088745 C				
0.0000556	22736.	408729291.	14.5990567	0.0008121	-0.0018579
2.8758017	-53.4927466 C				
0.0000569	23227.	408391538.	14.6106719	0.0008310	-0.0018990
2.9257055	-54.6756728 C				
0.0000581	23718.	408052124.	14.6223538	0.0008499	-0.0019401
2.9749169	-55.8576448 C				
0.0000594	24208.	407711031.	14.6341029	0.0008689	-0.0019811
3.0234323	-57.0386538 C				
0.0000606	24697.	407368552.	14.6457265	0.0008879	-0.0020221
3.0712187	-58.2190319 C				
0.0000619	25185.	407024713.	14.6572221	0.0009069	-0.0020631
3.1182718	-59.3987969 C				

0.0000631	25672.	406679201.	14.6687831	0.0009260	-0.0021040
3.1646176	-60.0000000 CY				
0.0000644	26158.	406331998.	14.6804101	0.0009451	-0.0021449
3.2102527	-60.0000000 CY				
0.0000656	26643.	405983085.	14.6921039	0.0009642	-0.0021858
3.2551736	-60.0000000 CY				
0.0000669	27127.	405632443.	14.7038654	0.0009833	-0.0022267
3.2993766	-60.0000000 CY				
0.0000681	27610.	405280053.	14.7156953	0.0010025	-0.0022675
3.3428584	-60.0000000 CY				
0.0000694	28092.	404925896.	14.7275946	0.0010217	-0.0023083
3.3856151	-60.0000000 CY				
0.0000706	28573.	404569952.	14.7395639	0.0010410	-0.0023490
3.4276432	-60.0000000 CY				
0.0000719	29044.	404091673.	14.7500835	0.0010602	-0.0023898
3.4687035	-60.0000000 CY				
0.0000731	29475.	403072266.	14.7537205	0.0010789	-0.0024311
3.5079550	-60.0000000 CY				
0.0000744	29858.	401455043.	14.7495436	0.0010970	-0.0024730
3.5452601	-60.0000000 CY				
0.0000794	31135.	392246336.	14.6948027	0.0011664	-0.0026436
3.6813494	-60.0000000 CY				
0.0000844	32160.	381149774.	14.6090319	0.0012326	-0.0028174
3.8013803	-60.0000000 CY				
0.0000894	33012.	369362560.	14.5055975	0.0012964	-0.0029936
3.9079319	-60.0000000 CY				
0.0000944	33740.	357505362.	14.3951856	0.0013585	-0.0031715
4.0031450	-60.0000000 CY				
0.0000994	34377.	345931693.	14.2834974	0.0014194	-0.0033506
4.0883438	-60.0000000 CY				
0.0001044	34935.	334703122.	14.1715893	0.0014792	-0.0035308
4.1641357	-60.0000000 CY				
0.0001094	35431.	323940666.	14.0579740	0.0015376	-0.0037124
4.2307884	-60.0000000 CY				
0.0001144	35871.	313627073.	13.9461294	0.0015951	-0.0038949
4.2891684	-60.0000000 CY				
0.0001194	36273.	303860741.	13.8392296	0.0016521	-0.0040779
4.3399744	-60.0000000 CY				
0.0001244	36632.	294530941.	13.7351344	0.0017083	-0.0042617
4.3832660	-60.0000000 CY				
0.0001294	36961.	285688006.	13.6338565	0.0017639	-0.0044461
4.4193369	-60.0000000 CY				
0.0001344	37263.	277303670.	13.5348499	0.0018187	-0.0046313
4.4484203	-60.0000000 CY				
0.0001394	37535.	269310170.	13.4391679	0.0018731	-0.0048169
4.4708379	-60.0000000 CY				
0.0001444	37783.	261702218.	13.3473027	0.0019270	-0.0050030
4.4868079	-60.0000000 CY				
0.0001494	38022.	254539263.	13.2620016	0.0019810	-0.0051890
4.4965333	-60.0000000 CY				
0.0001544	38238.	247698346.	13.1787297	0.0020345	-0.0053755
4.4999879	-60.0000000 CY				
0.0001594	38435.	241162765.	13.0959086	0.0020872	-0.0055628
4.4991008	-60.0000000 CY				
0.0001644	38615.	234919408.	13.0163967	0.0021396	-0.0057504
4.4961694	60.0000000 CY				
0.0001694	38781.	228965876.	12.9406891	0.0021918	-0.0059382
4.4998350	60.0000000 CY				
0.0001744	38944.	223333425.	12.8709600	0.0022444	-0.0061256
4.4972710	60.0000000 CY				
0.0001794	39093.	217937643.	12.8035616	0.0022966	-0.0063134
4.4999672	60.0000000 CY				
0.0001844	39230.	212773812.	12.7393054	0.0023488	-0.0065012

4.4971745	60.0000000 CY				
0.0001894	39357.	207826445.	12.6749886	0.0024003	-0.0066897
4.4999003	60.0000000 CY				
0.0001944	39475.	203085332.	12.6125107	0.0024516	-0.0068784
4.4956386	60.0000000 CY				
0.0001994	39581.	198527530.	12.5515567	0.0025025	-0.0070675
4.4993210	60.0000000 CY				
0.0002044	39686.	194183848.	12.4946057	0.0025536	-0.0072564
4.4949946	60.0000000 CY				
0.0002094	39789.	190038278.	12.4414757	0.0026049	-0.0074451
4.4972998	60.0000000 CY				
0.0002144	39883.	186045078.	12.3892958	0.0026560	-0.0076340
4.4997925	60.0000000 CY				
0.0002194	39974.	182216468.	12.3398762	0.0027071	-0.0078229
4.4921838	60.0000000 CY				
0.0002244	40057.	178526610.	12.2917083	0.0027580	-0.0080120
4.4971340	60.0000000 CY				
0.0002294	40137.	174983396.	12.2454771	0.0028088	-0.0082012
4.4996503	60.0000000 CY				
0.0002344	40210.	171561779.	12.1978486	0.0028589	-0.0083911
4.4945873	60.0000000 CY				
0.0002394	40279.	168266185.	12.1516759	0.0029088	-0.0085812
4.4947195	60.0000000 CY				
0.0002444	40343.	165084525.	12.1063441	0.0029585	-0.0087715
4.4982677	60.0000000 CY				
0.0002494	40406.	162028002.	12.0632455	0.0030083	-0.0089617
4.4998905	60.0000000 CYT				
0.0002544	40468.	159086090.	12.0224625	0.0030582	-0.0091518
4.4926204	60.0000000 CYT				
0.0002594	40529.	156254980.	11.9837750	0.0031083	-0.0093417
4.4936508	60.0000000 CYT				
0.0002644	40585.	153511868.	11.9459332	0.0031582	-0.0095318
4.4974059	60.0000000 CYT				
0.0002694	40638.	150860647.	11.9101831	0.0032083	-0.0097217
4.4995166	60.0000000 CYT				
0.0002744	40690.	148301338.	11.8759269	0.0032585	-0.0099115
4.4975184	60.0000000 CYT				
0.0003044	40923.	134448054.	11.6976495	0.0035605	-0.0110495
4.4903477	60.0000000 CYT				
0.0003344	40940.	122436952.	11.6093256	0.0038819	-0.0121681
4.4867102	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	0.000	40395.232	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.

Load No.	Axial (Factored) Load for Moment in-kip	Resistance Factor at Ult. Mom. Cap.	Nominal Bending Stiffness Moment Capacity in-kip	Ultimate (Factored) Axial Thrust kips	Ultimate Moment in-kip	Bending Stiffness kip-in^2
1	26256.900	0.65	40395.232	0.000		406260579.288
1	28276.662	0.70	40395.232	0.000		404789053.314
1	30296.424	0.75	40395.232	0.000		398293409.577

Pile Section No. 2:

Dimensions and Properties of Drilled Shaft (Bored Pile) with Permanent Casing:

Length of Section	=	91.00000	ft
Outer Diameter of Casing	=	49.00000	in
Concrete Cover Thickness Inside Casing	=	4.50000	in
Casing Wall Thickness	=	0.50000	in
Moment of Inertia of Steel Casing	=	22403.	in^4
Yield Stress of Casing	=	36000.	psi
Elastic Modulus of Casing	=	29000000.	psi
Number of Reinforcing Bars	=	50	bars
Area of Single Reinforcing Bar	=	0.79000	sq. in.
Edge-to-Edge Bar Spacing	=	2.76901	in
Maximum Concrete Aggregate Size	=	0.37500	in
Ratio of Bar Spacing to Aggregate Size	=	7.38	
Offset of Center of Rebar Cage from Center of Pile	=	0.0000	in
Yield Stress of Reinforcing Bars	=	60000.	psi
Modulus of Elasticity of Reinforcing Bars	=	29000000.	psi
Gross Area of Pile	=	1885.74099	sq. in.
Area of Concrete	=	1770.05737	sq. in.
Cross-sectional Area of Steel Casing	=	76.18362	sq. in.
Area of All Steel (Casing and Bars)	=	115.68362	sq. in.
Area Ratio of All Steel to Gross Area of Pile	=	6.13	percent

Axial Structural Capacities:

Nom. Axial Structural Capacity = 0.85 Fc Ac + Fy As	=	9626.257	kips
Tensile Load for Cracking of Concrete	=	-1029.818	kips
Nominal Axial Tensile Capacity	=	-5112.610	kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches

1	1.00000	0.79000	18.99342	-0.49994
2	1.00000	0.79000	18.99342	0.49994
3	1.00000	0.79000	18.52104	4.23924
4	1.00000	0.79000	18.27238	5.20771
5	1.00000	0.79000	16.88491	8.71205
6	1.00000	0.79000	16.40321	9.58825
7	1.00000	0.79000	14.18784	12.63745
8	1.00000	0.79000	13.50337	13.36633
9	1.00000	0.79000	10.59930	15.76879
10	1.00000	0.79000	9.75507	16.30456
11	1.00000	0.79000	6.34476	17.90933
12	1.00000	0.79000	5.39382	18.21831
13	1.00000	0.79000	1.69156	18.92455
14	1.00000	0.79000	0.69365	18.98733
15	1.00000	0.79000	-3.06793	18.75068
16	1.00000	0.79000	-4.05010	18.56332
17	1.00000	0.79000	-7.63464	17.39863
18	1.00000	0.79000	-8.53937	16.97290
19	1.00000	0.79000	-11.72165	14.95336
20	1.00000	0.79000	-12.49207	14.31601
21	1.00000	0.79000	-15.07214	11.56851
22	1.00000	0.79000	-15.65986	10.75959
23	1.00000	0.79000	-17.47560	7.45678
24	1.00000	0.79000	-17.84368	6.52711
25	1.00000	0.79000	-18.78099	2.87651
26	1.00000	0.79000	-18.90631	1.88451
27	1.00000	0.79000	-18.90631	-1.88451
28	1.00000	0.79000	-18.78099	-2.87651
29	1.00000	0.79000	-17.84368	-6.52711
30	1.00000	0.79000	-17.47560	-7.45678
31	1.00000	0.79000	-15.65986	-10.75959
32	1.00000	0.79000	-15.07214	-11.56851
33	1.00000	0.79000	-12.49207	-14.31601
34	1.00000	0.79000	-11.72165	-14.95336
35	1.00000	0.79000	-8.53937	-16.97290
36	1.00000	0.79000	-7.63464	-17.39863
37	1.00000	0.79000	-4.05010	-18.56332
38	1.00000	0.79000	-3.06793	-18.75068
39	1.00000	0.79000	0.69365	-18.98733
40	1.00000	0.79000	1.69156	-18.92455
41	1.00000	0.79000	5.39382	-18.21831
42	1.00000	0.79000	6.34476	-17.90933
43	1.00000	0.79000	9.75507	-16.30456
44	1.00000	0.79000	10.59930	-15.76879
45	1.00000	0.79000	13.50337	-13.36633
46	1.00000	0.79000	14.18784	-12.63745
47	1.00000	0.79000	16.40321	-9.58825
48	1.00000	0.79000	16.88491	-8.71205
49	1.00000	0.79000	18.27238	-5.20771
50	1.00000	0.79000	18.52104	-4.23924

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

Minimum spacing between any two bars not equal to zero = -0.0001154 inches between Bars 1 and 2

Spacing to aggregate size ratio = -0.0003078

Concrete Properties:

Compressive Strength of Concrete	=	3000.00000 psi
Modulus of Elasticity of Concrete	=	3122019. psi
Modulus of Rupture of Concrete	=	-410.79191 psi
Compression Strain at Peak Stress	=	0.00163
Tensile Strain at Fracture of Concrete	=	-0.0001160
Maximum Coarse Aggregate Size	=	0.37500 in

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

Number	Axial Thrust Force kips
1	0.000

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 = 0.000 kips

Bending Max Concrete Curvature rad/in.	Bending Max Steel Moment in-kip	Bending Max Casing Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Run Msg
	Stress ksi	Stress ksi				
0.000000625	1115.4130428	1784660868.	24.5001514	0.0000153	-0.0000153	
0.0554218	0.4396246	0.4396246				
0.000001250	2227.1964098	1781757128.	24.5001519	0.0000306	-0.0000306	
0.1103269	0.8792492	0.8792492				
0.000001875	3335.3501009	1778853387.	24.5001524	0.0000459	-0.0000459	
0.1647153	1.3188739	1.3188739				
0.000002500	4439.8741163	1775949647.	24.5001529	0.0000613	-0.0000612	
0.2185870	1.7584986	1.7584986				
0.000003125	5540.7684559	1773045906.	24.5001534	0.0000766	-0.0000766	
0.2719419	2.1981232	2.1981232				
0.000003750	6638.0331197	1770142165.	24.5001539	0.0000919	-0.0000919	
0.3247802	2.6377479	2.6377479				
0.000004375	7731.6681077	1767238425.	24.5001544	0.0001072	-0.0001072	
0.3771017	3.0773727	3.0773727				
0.000005000	7731.6681077	1546333622.	19.1836393	0.0000959	-0.0001491	
0.3377239	-4.2878473	-4.2878473	C			
0.000005625	7731.6681077	1374518775.	19.1903888	0.0001079	-0.0001677	
0.3786522	-4.8227272	-4.8227272	C			
0.000006250	7731.6681077	1237066897.	19.1971550	0.0001200	-0.0001863	

0.4192925	-5.3573594	-5.3573594	C			
0.000006875	7866.3604171	1144197879.	19.2039382	0.0001320	-0.0002048	
0.4596443	-5.8917429	-5.8917429	C			
0.000007500	8577.8442105	1143712561.	19.2107382	0.0001441	-0.0002234	
0.4997069	-6.4258769	-6.4258769	C			
0.000008125	9288.7128352	1143226195.	19.2175554	0.0001561	-0.0002420	
0.5394799	-6.9597604	-6.9597604	C			
0.000008750	9998.9642814	1142738775.	19.2243896	0.0001682	-0.0002605	
0.5789627	-7.4933924	-7.4933924	C			
0.000009375	10709.	1142250296.	19.2312411	0.0001803	-0.0002791	
0.6181545	-8.0267719	-8.0267719	C			
0.0000100	11418.	1141760753.	19.2381099	0.0001924	-0.0002976	
0.6570549	-8.5598981	-8.5598981	C			
0.0000106	12126.	1141270142.	19.2449961	0.0002045	-0.0003161	
0.6956633	-9.0927699	-9.0927699	C			
0.0000113	12834.	1140778456.	19.2518997	0.0002166	-0.0003347	
0.7339790	-9.6253864	-9.6253864	C			
0.0000119	13541.	1140285692.	19.2588210	0.0002287	-0.0003532	
0.7720015	-10.1577466	-10.1577466	C			
0.0000125	14247.	1139791843.	19.2657599	0.0002408	-0.0003717	
0.8097301	-10.6898495	-10.6898495	C			
0.0000131	14953.	1139296905.	19.2727165	0.0002530	-0.0003902	
0.8471642	-11.2216941	-11.2216941	C			
0.0000138	15659.	1138800871.	19.2796910	0.0002651	-0.0004087	
0.8843033	-11.7532794	-11.7532794	C			
0.0000144	16363.	1138303738.	19.2866835	0.0002772	-0.0004271	
0.9211466	-12.2846044	-12.2846044	C			
0.0000150	17067.	1137805500.	19.2936940	0.0002894	-0.0004456	
0.9576937	-12.8156681	-12.8156681	C			
0.0000156	17770.	1137306150.	19.3007226	0.0003016	-0.0004641	
0.9939438	-13.3464694	-13.3464694	C			
0.0000163	18473.	1136805685.	19.3077694	0.0003138	-0.0004825	
1.0298963	-13.8770074	-13.8770074	C			
0.0000169	19175.	1136304097.	19.3148346	0.0003259	-0.0005009	
1.0655507	-14.4072809	-14.4072809	C			
0.0000175	19877.	1135801383.	19.3219182	0.0003381	-0.0005194	
1.1009062	-14.9372890	-14.9372890	C			
0.0000181	20577.	1135297536.	19.3290203	0.0003503	-0.0005378	
1.1359622	-15.4670306	-15.4670306	C			
0.0000188	21277.	1134792551.	19.3361410	0.0003626	-0.0005562	
1.1707181	-15.9965046	-15.9965046	C			
0.0000194	21977.	1134286421.	19.3432804	0.0003748	-0.0005746	
1.2051733	-16.5257100	-16.5257100	C			
0.0000200	22676.	1133779143.	19.3504386	0.0003870	-0.0005930	
1.2393270	-17.0546456	-17.0546456	C			
0.0000206	23374.	1133270763.	19.3575767	0.0003993	-0.0006114	
1.2731765	-17.5833338	-17.5833338	C			
0.0000213	24071.	1132761317.	19.3646650	0.0004115	-0.0006298	
1.3067191	-18.1117940	-18.1117940	C			
0.0000219	24768.	1132250725.	19.3717719	0.0004238	-0.0006481	
1.3399580	-18.6399854	-18.6399854	C			
0.0000225	25464.	1131738979.	19.3788974	0.0004360	-0.0006665	
1.3728926	-19.1679070	-19.1679070	C			
0.0000231	26160.	1131226073.	19.3860417	0.0004483	-0.0006848	
1.4055223	-19.6955577	-19.6955577	C			
0.0000238	26854.	1130712000.	19.3932048	0.0004606	-0.0007032	
1.4378463	-20.2229365	-20.2229365	C			
0.0000244	27549.	1130196756.	19.4003869	0.0004729	-0.0007215	
1.4698640	-20.7500422	-20.7500422	C			
0.0000256	28935.	1129162715.	19.4148084	0.0004975	-0.0007581	
1.5329777	-21.8034304	-21.8034304	C			
0.0000269	30318.	1128123929.	19.4293069	0.0005222	-0.0007947	
1.5948582	-22.8557126	-22.8557126	C			

0.0000281	31699.	1127080336.	19.4438834	0.0005469	-0.0008313
1.6554998	-23.9068801	-23.9068801	C		
0.0000294	33077.	1126031888.	19.4585386	0.0005716	-0.0008678
1.7148969	-24.9569237	-24.9569237	C		
0.0000306	34452.	1124978535.	19.4732735	0.0005964	-0.0009043
1.7730441	-26.0058341	-26.0058341	C		
0.0000319	35825.	1123920225.	19.4880889	0.0006212	-0.0009407
1.8299355	-27.0536017	-27.0536017	C		
0.0000331	37195.	1122856933.	19.5029858	0.0006460	-0.0009771
1.8855654	-28.1002161	-28.1002161	C		
0.0000344	38561.	1121788558.	19.5179650	0.0006709	-0.0010134
1.9399280	-29.1456692	-29.1456692	C		
0.0000356	39925.	1120715069.	19.5330275	0.0006959	-0.0010498
1.9930173	-30.1899502	-30.1899502	C		
0.0000369	41287.	1119636414.	19.5481743	0.0007208	-0.0010860
2.0448273	-31.2330491	-31.2330491	C		
0.0000381	42645.	1118552536.	19.5634063	0.0007459	-0.0011223
2.0953520	-32.2749557	-32.2749557	C		
0.0000394	44000.	1117463380.	19.5787245	0.0007709	-0.0011585
2.1445852	-33.3156595	-33.3156595	C		
0.0000406	45352.	1116368890.	19.5941299	0.0007960	-0.0011946
2.1925207	-34.3551500	-34.3551500	C		
0.0000419	46702.	1115269007.	19.6096235	0.0008212	-0.0012307
2.2391521	-35.3934165	-35.3934165	C		
0.0000431	48008.	1113236478.	19.6190333	0.0008461	-0.0012671
2.2839955	-36.4381689	-36.0000000	CY		
0.0000444	49174.	1108155798.	19.6079027	0.0008701	-0.0013043
2.3259319	-37.5086717	-36.0000000	CY		
0.0000456	50257.	1101529209.	19.5858846	0.0008936	-0.0013420
2.3657173	-38.5943857	-36.0000000	CY		
0.0000469	51275.	1093867640.	19.5561412	0.0009167	-0.0013802
2.4036096	-39.6921985	-36.0000000	CY		
0.0000481	52251.	1085727946.	19.5224541	0.0009395	-0.0014186
2.4399157	-40.7976717	-36.0000000	CY		
0.0000494	53183.	1077128271.	19.4847669	0.0009621	-0.0014573
2.4746489	-41.9113149	-36.0000000	CY		
0.0000506	54085.	1068348919.	19.4450906	0.0009844	-0.0014962
2.5079804	-43.0306106	-36.0000000	CY		
0.0000519	54959.	1059445952.	19.4037758	0.0010066	-0.0015353
2.5399548	-44.1552478	-36.0000000	CY		
0.0000531	55805.	1050450744.	19.3609874	0.0010286	-0.0015746
2.5706027	-45.2851505	-36.0000000	CY		
0.0000544	56630.	1041467525.	19.3169022	0.0010504	-0.0016140
2.5999562	-46.4202004	-36.0000000	CY		
0.0000556	57435.	1032534230.	19.2723281	0.0010720	-0.0016536
2.6280930	-47.5592349	-36.0000000	CY		
0.0000569	58222.	1023678778.	19.2275898	0.0010936	-0.0016933
2.6550534	-48.7017720	-36.0000000	CY		
0.0000581	58992.	1014922893.	19.1828708	0.0011150	-0.0017331
2.6808669	-49.8475202	-36.0000000	CY		
0.0000594	59748.	1006284034.	19.1383276	0.0011363	-0.0017730
2.7055600	-50.9962076	-36.0000000	CY		
0.0000606	60490.	997776162.	19.0940953	0.0011576	-0.0018130
2.7291569	-52.1475779	-36.0000000	CY		
0.0000619	61220.	989410360.	19.0502909	0.0011787	-0.0018531
2.7516794	-53.3013873	-36.0000000	CY		
0.0000631	61938.	981195320.	19.0070162	0.0011998	-0.0018933
2.7731476	-54.4574027	-36.0000000	CY		
0.0000644	62646.	973137740.	18.9643608	0.0012208	-0.0019335
2.7935795	-55.6153994	-36.0000000	CY		
0.0000656	63344.	965242645.	18.9224037	0.0012418	-0.0019738
2.8129916	-56.7751596	-36.0000000	CY		
0.0000669	64026.	957399461.	18.8828534	0.0012628	-0.0020141

2.8314941	-57.9332941	36.0000000	CY		
0.0000681	64674.	949346976.	18.8486036	0.0012841	-0.0020541
2.8492490	-59.0838241	36.0000000	CY		
0.0000694	65297.	941222413.	18.8182436	0.0013055	-0.0020939
2.8661587	-60.0000000	36.0000000	CY		
0.0000706	65904.	933159727.	18.7906547	0.0013271	-0.0021335
2.8821500	-60.0000000	36.0000000	CY		
0.0000719	66489.	925070481.	18.7672152	0.0013489	-0.0021730
2.8972802	-60.0000000	36.0000000	CY		
0.0000731	67063.	917103947.	18.7445517	0.0013707	-0.0022124
2.9113700	-60.0000000	36.0000000	CY		
0.0000744	67622.	909205182.	18.7249127	0.0013927	-0.0022517
2.9245191	-60.0000000	36.0000000	CY		
0.0000794	69755.	878805525.	18.6608272	0.0014812	-0.0024082
2.9668175	-60.0000000	36.0000000	CY		
0.0000844	71700.	849773747.	18.6107997	0.0015703	-0.0025641
2.9920780	-60.0000000	36.0000000	CY		
0.0000894	73199.	819004904.	18.5316756	0.0016563	-0.0027231
2.9998311	-60.0000000	36.0000000	CY		
0.0000944	74410.	788452944.	18.4419665	0.0017405	-0.0028839
2.9999148	-60.0000000	36.0000000	CY		
0.0000994	75424.	758980362.	18.3478736	0.0018233	-0.0030461
2.9990309	-60.0000000	36.0000000	CY		
0.0001044	76295.	730971406.	18.2534341	0.0019052	-0.0032092
2.9998954	-60.0000000	36.0000000	CY		
0.0001094	77051.	704469752.	18.1608710	0.0019863	-0.0033730
2.9990804	-60.0000000	36.0000000	CY		
0.0001144	77715.	679474860.	18.0711279	0.0020669	-0.0035375
2.9979169	-60.0000000	36.0000000	CY		
0.0001194	78306.	655970325.	17.9848775	0.0021469	-0.0037024
2.9979880	60.0000000	36.0000000	CY		
0.0001244	78831.	633817619.	17.9021814	0.0022266	-0.0038678
2.9975288	60.0000000	36.0000000	CY		
0.0001294	79308.	613007643.	17.8209154	0.0023056	-0.0040338
2.9986731	60.0000000	36.0000000	CY		
0.0001344	79738.	593400518.	17.7417126	0.0023840	-0.0042003
2.9999492	60.0000000	36.0000000	CY		
0.0001394	80126.	574897416.	17.6653320	0.0024621	-0.0043673
2.9992903	60.0000000	36.0000000	CY		
0.0001444	80491.	557512788.	17.5929514	0.0025400	-0.0045344
2.9973428	60.0000000	36.0000000	CY		
0.0001494	80823.	541071958.	17.5227136	0.0026175	-0.0047019
2.9999800	60.0000000	36.0000000	CY		
0.0001544	81127.	525522201.	17.4546211	0.0026946	-0.0048698
2.9985563	60.0000000	36.0000000	CY		
0.0001594	81413.	510823892.	17.3887355	0.0027713	-0.0050380
2.9988759	60.0000000	36.0000000	CY		
0.0001644	81678.	496898782.	17.3238682	0.0028476	-0.0052068
2.9986715	60.0000000	36.0000000	CY		
0.0001694	81928.	483709458.	17.2607593	0.0029235	-0.0053758
2.9992565	60.0000000	36.0000000	CY		
0.0001744	82157.	471150387.	17.2013139	0.0029995	-0.0055449
2.9978333	60.0000000	36.0000000	CY		
0.0001794	82368.	459193052.	17.1447881	0.0030753	-0.0057140
2.9999196	60.0000000	36.0000000	CYT		
0.0001844	82542.	447685580.	17.0962917	0.0031521	-0.0058822
2.9956162	60.0000000	36.0000000	CYT		
0.0001894	82707.	436737882.	17.0501319	0.0032289	-0.0060505
2.9990817	60.0000000	36.0000000	CYT		
0.0001944	82848.	426225329.	17.0137717	0.0033071	-0.0062173
2.9986026	60.0000000	36.0000000	CYT		
0.0001994	82977.	416187164.	16.9784072	0.0033851	-0.0063843
2.9964967	60.0000000	36.0000000	CYT		

0.0002044	83089.	406551226.	16.9472040	0.0034636	-0.0065508
2.9994241	60.0000000	36.0000000	CYT		
0.0002094	83194.	397343421.	16.9173183	0.0035421	-0.0067173
2.9978147	60.0000000	36.0000000	CYT		
0.0002144	83283.	388494293.	16.8898205	0.0036208	-0.0068836
2.9957953	60.0000000	36.0000000	CYT		
0.0002194	83365.	380010941.	16.8638741	0.0036995	-0.0070499
2.9989764	60.0000000	36.0000000	CYT		
0.0002244	83440.	371877259.	16.8385877	0.0037782	-0.0072162
2.9998553	60.0000000	36.0000000	CYT		
0.0002294	83504.	364049610.	16.8163596	0.0038573	-0.0073821
2.9933499	60.0000000	36.0000000	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	0.000	82158.297	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 Bending Stiffness Moment Capacity at Ult. Mom. Cap. kip-in^2	Ultimate (Factored) Axial Thrust kips	Ultimate (Factored) Moment in-kip
1	0.65	82158.297	0.000	53402.891
		1074989949.193		
1	0.70	82158.297	0.000	57510.807
		1031678065.076		
1	0.75	82158.297	0.000	61618.723
		984846872.122		

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

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head = 0.500000 inches
Moment at pile head = 1382400.0 in-lbs
Axial load at pile head = 0.0 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. Spr. Distrib. Es*h Lat. Load p lb/in lb/inch lb/inch
0.00	0.5000	1382400.	10435.	-0.001486	0.000	1.351E+12	0.000 0.000 0.000
1.122	0.4801	1522928.	10435.	-0.001472	0.000	1.351E+12	0.000 0.000 0.000
2.244	0.4604	1663456.	10435.	-0.001456	0.000	1.351E+12	0.000 0.000 0.000
3.367	0.4409	1803984.	10435.	-0.001439	0.000	1.350E+12	0.000 0.000 0.000
4.489	0.4216	1944511.	10435.	-0.001420	0.000	1.349E+12	0.000 0.000 0.000
5.611	0.4026	2085039.	10435.	-0.001400	0.000	1.349E+12	0.000 0.000 0.000
6.733	0.3839	2225567.	10435.	-0.001378	0.000	1.349E+12	0.000 0.000 0.000
7.855	0.3655	2366095.	10435.	-0.001355	0.000	1.348E+12	0.000 0.000 0.000
8.978	0.3474	2506623.	10435.	-0.001331	0.000	1.348E+12	0.000 0.000 0.000
10.100	0.3297	2647151.	10435.	-0.001305	0.000	1.347E+12	0.000 0.000 0.000
11.222	0.3123	2787678.	10435.	-0.001278	0.000	1.347E+12	0.000 0.000 0.000
12.344	0.2952	2928206.	10435.	-0.001249	0.000	1.346E+12	0.000 0.000 0.000
13.466	0.2786	3068734.	10435.	-0.001219	0.000	1.346E+12	0.000 0.000 0.000
14.589	0.2624	3209262.	10435.	-0.001188	0.000	1.345E+12	0.000 0.000 0.000
15.711	0.2466	3349790.	10435.	-0.001155	0.000	1.345E+12	0.000 0.000 0.000
16.833	0.2313	3490318.	10435.	-0.001121	0.000	1.344E+12	0.000 0.000 0.000
17.955	0.2164	3630846.	10435.	-0.001085	0.000	1.344E+12	0.000 0.000 0.000
19.077	0.2021	3771373.	10435.	-0.001048	0.000	1.343E+12	0.000 0.000 0.000
20.200	0.1882	3911901.	10435.	-0.001010	0.000	1.343E+12	0.000 0.000 0.000
21.322	0.1749	4052429.	10435.	-0.000975	0.000	1.777E+12	0.000 0.000 0.000
22.444	0.1619	4192957.	10435.	-0.000943	0.000	1.776E+12	0.000 0.000 0.000
23.566	0.1495	4333485.	10435.	-0.000911	0.000	1.776E+12	0.000 0.000 0.000
24.688	0.1374	4474013.	10435.	-0.000878	0.000	1.776E+12	0.000 0.000 0.000
25.811	0.1258	4614540.	10435.	-0.000843	0.000	1.775E+12	0.000 0.000 0.000

26.933	0.1147	4755068.	10435.	-0.000808	0.000	1.775E+12
0.000	0.000	0.000				
28.055	0.1041	4895596.	9677.2442	-0.000771	0.000	1.775E+12
-112.6060	14572.	0.000				
29.177	0.0939	5015704.	8135.9902	-0.000733	0.000	1.774E+12
-116.2977	16674.	0.000				
30.299	0.0843	5114721.	6549.0507	-0.000695	0.000	1.774E+12
-119.3911	19071.	0.000				
31.422	0.0752	5192088.	5141.1707	-0.000656	0.000	1.774E+12
-89.7042	16062.	0.000				
32.544	0.0666	5253187.	3881.1377	-0.000616	0.000	1.774E+12
-97.4332	19689.	0.000				
33.666	0.0586	5296618.	2541.8349	-0.000576	0.000	1.774E+12
-101.4771	23316.	0.000				
34.788	0.0511	5321646.	1169.9042	-0.000536	0.000	1.774E+12
-102.2790	26943.	0.000				
35.910	0.0442	5328127.	-193.9802	-0.000495	0.000	1.774E+12
-100.2821	30570.	0.000				
37.033	0.0378	5316422.	-2624.6988	-0.000455	0.000	1.774E+12
-260.7228	92943.	0.000				
38.155	0.0319	5257436.	-6037.1969	-0.000415	0.000	1.774E+12
-246.0938	103823.	0.000				
39.277	0.0266	5153823.	-9219.8026	-0.000375	0.000	1.774E+12
-226.5797	114704.	0.000				
40.399	0.0218	5009121.	-12115.	-0.000337	0.000	1.774E+12
-203.3840	125585.	0.000				
41.521	0.0175	4827537.	-14680.	-0.000300	0.000	1.775E+12
-177.6328	136465.	0.000				
42.644	0.0137	4613739.	-16889.	-0.000264	0.000	1.775E+12
-150.3626	147346.	0.000				
43.766	0.0104	4372675.	-18726.	-0.000230	0.000	1.776E+12
-122.5103	158227.	0.000				
44.888	0.007558	4109394.	-20190.	-0.000197	0.000	1.777E+12
-94.9069	169107.	0.000				
46.010	0.005108	3828902.	-21289.	-0.000167	0.000	1.777E+12
-68.2735	179988.	0.000				
47.132	0.003049	3536030.	-22039.	-0.000140	0.000	1.778E+12
-43.2189	190869.	0.000				
48.255	0.001351	3235320.	-22467.	-0.000114	0.000	1.779E+12
-20.2399	201749.	0.000				
49.377	-1.750E-05	2930939.	-22601.	-9.053E-05	0.000	1.780E+12
0.2763	212630.	0.000				
50.499	-0.001087	2626609.	-22478.	-6.951E-05	0.000	1.780E+12
18.0468	223510.	0.000				
51.621	-0.001890	2325551.	-22142.	-5.079E-05	0.000	1.781E+12
31.8665	227100.	0.000				
52.743	-0.002455	2030272.	-21635.	-3.433E-05	0.000	1.782E+12
43.3876	237980.	0.000				
53.866	-0.002814	1742861.	-20993.	-2.007E-05	0.000	1.783E+12
52.0046	248861.	0.000				
54.988	-0.002996	1464881.	-20253.	-7.957E-06	0.000	1.783E+12
57.7817	259741.	0.000				
56.110	-0.003028	1197379.	-19455.	2.093E-06	0.000	1.784E+12
60.8588	270622.	0.000				
57.232	-0.002939	940914.	-18631.	1.016E-05	0.000	1.785E+12
61.4446	281503.	0.000				
58.354	-0.002755	695591.	-17815.	1.634E-05	0.000	1.785E+12
59.8108	292383.	0.000				
59.477	-0.002499	461115.	-17033.	2.070E-05	0.000	1.785E+12
56.2868	303264.	0.000				
60.599	-0.002197	236845.	-16309.	2.333E-05	0.000	1.785E+12
51.2572	314145.	0.000				
61.721	-0.001871	21871.	-14100.	2.431E-05	0.000	1.785E+12

276.7818	1992118.	0.000				
62.843	-0.001543	-142910.	-10544.	2.385E-05	0.000	1.785E+12
251.3764	2194519.	0.000				
63.965	-0.001229	-262106.	-7340.3207	2.232E-05	0.000	1.785E+12
224.4137	2459741.	0.000				
65.088	-0.000941	-340605.	-4506.1458	2.005E-05	0.000	1.785E+12
196.5117	2811339.	0.000				
66.210	-0.000689	-383469.	-2050.6510	1.732E-05	0.000	1.785E+12
168.1729	3288816.	0.000				
67.332	-0.000475	-395835.	22.7898	1.438E-05	0.000	1.785E+12
139.7699	3963592.	0.000				
68.454	-0.000301	-382855.	1714.5529	1.144E-05	0.000	1.785E+12
111.4870	4981792.	0.000				
69.576	-0.000167	-349657.	3024.9464	8.676E-06	0.000	1.785E+12
83.1297	6713083.	0.000				
70.699	-6.768E-05	-301385.	3835.8753	6.220E-06	0.000	1.785E+12
37.3076	7422970.	0.000				
71.821	7.697E-07	-246347.	4084.2046	4.154E-06	0.000	1.785E+12
-0.4263	7459238.	0.000				
72.943	4.419E-05	-191386.	3915.7236	2.502E-06	0.000	1.785E+12
-24.5961	7495507.	0.000				
74.065	6.816E-05	-140885.	3493.4245	1.249E-06	0.000	1.785E+12
-38.1229	7531776.	0.000				
75.187	7.782E-05	-97298.	2942.2698	3.500E-07	0.000	1.785E+12
-43.7334	7568045.	0.000				
76.310	7.759E-05	-61642.	2352.8015	-2.496E-07	0.000	1.785E+12
-43.8131	7604313.	0.000				
77.432	7.109E-05	-33930.	1786.1973	-6.102E-07	0.000	1.785E+12
-40.3377	7640582.	0.000				
78.554	6.115E-05	-13534.	1279.8635	-7.893E-07	0.000	1.785E+12
-34.8619	7676851.	0.000				
79.676	4.984E-05	539.8201	852.9339	-8.383E-07	0.000	1.785E+12
-28.5448	7713120.	0.000				
80.798	3.857E-05	9437.5600	511.2710	-8.007E-07	0.000	1.785E+12
-22.1983	7749389.	0.000				
81.921	2.827E-05	14310.	251.7477	-7.111E-07	0.000	1.785E+12
-16.3455	7785657.	0.000				
83.043	1.942E-05	16218.	65.7265	-5.959E-07	0.000	1.785E+12
-11.2819	7821926.	0.000				
84.165	1.222E-05	16080.	-58.2598	-4.741E-07	0.000	1.785E+12
-7.1323	7858195.	0.000				
85.287	6.655E-06	14649.	-132.5534	-3.581E-07	0.000	1.785E+12
-3.9017	7894464.	0.000				
86.409	2.577E-06	12510.	-169.0431	-2.557E-07	0.000	1.785E+12
-1.5177	7930733.	0.000				
87.532	-2.302E-07	10096.	-178.3454	-1.704E-07	0.000	1.785E+12
0.1362	7967001.	0.000				
88.654	-2.012E-06	7706.6037	-169.3792	-1.032E-07	0.000	1.785E+12
1.1955	8003270.	0.000				
89.776	-3.010E-06	5534.0712	-149.2312	-5.325E-08	0.000	1.785E+12
1.7969	8039539.	0.000				
90.898	-3.446E-06	3687.3888	-123.2191	-1.846E-08	0.000	1.785E+12
2.0664	8075808.	0.000				
92.020	-3.507E-06	2215.4361	-95.0811	3.810E-09	0.000	1.785E+12
2.1126	8112076.	0.000				
93.143	-3.343E-06	1126.5874	-67.2363	1.642E-08	0.000	1.785E+12
2.0229	8148345.	0.000				
94.265	-3.065E-06	404.5752	-41.0738	2.220E-08	0.000	1.785E+12
1.8627	8184614.	0.000				
95.387	-2.745E-06	20.3551	-17.2472	2.380E-08	0.000	1.785E+12
1.6760	8220883.	0.000				
96.509	-2.424E-06	-59.9409	-5.2290	2.365E-08	0.000	1.785E+12
0.1090	605356.	0.000				

97.631	-2.108E-06	-120.4779	-3.8333	2.297E-08	0.000	1.785E+12
0.0983	628024.	0.000				
98.754	-1.805E-06	-163.1837	-2.5840	2.190E-08	0.000	1.785E+12
0.0872	650692.	0.000				
99.876	-1.519E-06	-190.0714	-1.4854	2.057E-08	0.000	1.785E+12
0.0759	673360.	0.000				
100.998	-1.251E-06	-203.1886	-0.5386	1.908E-08	0.000	1.785E+12
0.0647	696028.	0.000				
102.120	-1.005E-06	-204.5772	0.2579	1.754E-08	0.000	1.785E+12
0.0536	718696.	0.000				
103.242	-7.788E-07	-196.2421	0.9077	1.603E-08	0.000	1.785E+12
0.0429	741364.	0.000				
104.365	-5.729E-07	-180.1316	1.4152	1.461E-08	0.000	1.785E+12
0.0325	764032.	0.000				
105.487	-3.853E-07	-158.1263	1.7856	1.334E-08	0.000	1.785E+12
0.0225	786700.	0.000				
106.609	-2.138E-07	-132.0390	2.1892	1.224E-08	0.000	1.785E+12
0.0374	2357637.	0.000				
107.731	-5.565E-08	-99.1647	2.5093	1.137E-08	0.000	1.785E+12
0.0101	2448309.	0.000				
108.853	9.240E-08	-64.4555	2.4602	1.075E-08	0.000	1.785E+12
-0.0174	2538981.	0.000				
109.976	2.339E-07	-32.9055	2.0353	1.038E-08	0.000	1.785E+12
-0.0457	2629653.	0.000				
111.098	3.720E-07	-9.6381	1.2218	1.022E-08	0.000	1.785E+12
-0.0752	2720325.	0.000				
112.220	5.092E-07	0.000	0.000	1.019E-08	0.000	1.785E+12
-0.1063	1405499.	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	=	0.5000000	inches
Computed slope at pile head	=	-0.0014862	radians
Maximum bending moment	=	5328127.	inch-lbs
Maximum shear force	=	-22601.	lbs
Depth of maximum bending moment	=	35.9104000	feet below pile head
Depth of maximum shear force	=	49.3768000	feet below pile head
Number of iterations	=	7	
Number of zero deflection points	=	4	

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 2

Pile-head conditions are Displacement and Moment (Loading Type 4)

Displacement of pile head	=	1.000000	inches
Moment at pile head	=	1382400.0	in-lbs
Axial load at pile head	=	0.0	lbs

Depth	Deflect.	Bending	Shear	Slope	Total	Bending	Soil
Res.	Soil Spr.	Distrib.					
X	y	Moment	Force	S	Stress	Stiffness	p
Es*h	Lat. Load						
feet	inches	in-lbs	lbs	radians	psi*	lb-in^2	lb/in
lb/inch	lb/inch						
0.00	1.0000	1382400.	18562.	-0.002813	0.000	1.351E+12	
0.000	0.000	0.000					
1.122	0.9622	1632362.	18562.	-0.002798	0.000	1.351E+12	
0.000	0.000	0.000					
2.244	0.9246	1882323.	18562.	-0.002781	0.000	1.350E+12	
0.000	0.000	0.000					
3.367	0.8873	2132285.	18562.	-0.002761	0.000	1.349E+12	
0.000	0.000	0.000					
4.489	0.8503	2382246.	18562.	-0.002738	0.000	1.348E+12	
0.000	0.000	0.000					
5.611	0.8136	2632208.	18562.	-0.002713	0.000	1.347E+12	
0.000	0.000	0.000					
6.733	0.7772	2882169.	18562.	-0.002685	0.000	1.346E+12	
0.000	0.000	0.000					
7.855	0.7412	3132131.	18562.	-0.002655	0.000	1.345E+12	
0.000	0.000	0.000					
8.978	0.7057	3382092.	18562.	-0.002623	0.000	1.345E+12	
0.000	0.000	0.000					
10.100	0.6706	3632054.	18562.	-0.002588	0.000	1.344E+12	
0.000	0.000	0.000					
11.222	0.6360	3882016.	18562.	-0.002550	0.000	1.343E+12	
0.000	0.000	0.000					
12.344	0.6019	4131977.	18562.	-0.002510	0.000	1.342E+12	
0.000	0.000	0.000					
13.466	0.5684	4381939.	18562.	-0.002467	0.000	1.341E+12	
0.000	0.000	0.000					
14.589	0.5355	4631900.	18562.	-0.002422	0.000	1.340E+12	
0.000	0.000	0.000					
15.711	0.5032	4881862.	18562.	-0.002374	0.000	1.339E+12	
0.000	0.000	0.000					
16.833	0.4715	5131823.	18562.	-0.002324	0.000	1.339E+12	
0.000	0.000	0.000					
17.955	0.4406	5381785.	18562.	-0.002271	0.000	1.338E+12	
0.000	0.000	0.000					
19.077	0.4104	5631746.	18562.	-0.002215	0.000	1.337E+12	
0.000	0.000	0.000					
20.200	0.3809	5881708.	18562.	-0.002094	0.000	4.240E+11	
0.000	0.000	0.000					
21.322	0.3540	6131670.	18562.	-0.001977	0.000	1.771E+12	
0.000	0.000	0.000					
22.444	0.3277	6381631.	18562.	-0.001929	0.000	1.771E+12	
0.000	0.000	0.000					
23.566	0.3020	6631593.	18562.	-0.001880	0.000	1.770E+12	
0.000	0.000	0.000					
24.688	0.2771	6881554.	18562.	-0.001828	0.000	1.769E+12	
0.000	0.000	0.000					
25.811	0.2528	7131516.	18562.	-0.001775	0.000	1.769E+12	
0.000	0.000	0.000					
26.933	0.2293	7381477.	18562.	-0.001720	0.000	1.768E+12	
0.000	0.000	0.000					
28.055	0.2065	7631439.	17609.	-0.001663	0.000	1.767E+12	
-141.4992	9228.2702	0.000					
29.177	0.1845	7855740.	15676.	-0.001587	0.000	1.148E+12	
-145.6431	10631.	0.000					
30.299	0.1637	8053630.	13692.	-0.001494	0.000	1.144E+12	

-148.9554	12251.	0.000				
31.422	0.1443	8224508.	11531.	-0.001398	0.000	1.144E+12
-172.0553	16062.	0.000				
32.544	0.1261	8364185.	9131.1009	-0.001301	0.000	1.144E+12
-184.3309	19689.	0.000				
33.666	0.1092	8470434.	6616.6362	-0.001201	0.000	1.144E+12
-189.1118	23316.	0.000				
34.788	0.0937	8542390.	4080.8112	-0.001101	0.000	1.144E+12
-187.5033	26943.	0.000				
35.910	0.0796	8580342.	1602.1874	-0.001000	0.000	1.144E+12
-180.6164	30570.	0.000				
37.033	0.0668	8585541.	-2716.9367	-0.000899	0.000	1.144E+12
-460.8503	92943.	0.000				
38.155	0.0553	8507167.	-8692.7977	-0.000799	0.000	1.144E+12
-426.6713	103823.	0.000				
39.277	0.0453	8351420.	-14161.	-0.000700	0.000	1.144E+12
-385.5094	114704.	0.000				
40.399	0.0365	8125762.	-19049.	-0.000603	0.000	1.144E+12
-340.4027	125585.	0.000				
41.521	0.0290	7838374.	-23322.	-0.000509	0.000	1.162E+12
-294.1961	136465.	0.000				
42.644	0.0228	7497636.	-26981.	-0.000435	0.000	1.768E+12
-249.2977	147346.	0.000				
43.766	0.0173	7111689.	-30029.	-0.000380	0.000	1.769E+12
-203.3409	158227.	0.000				
44.888	0.0126	6688868.	-32460.	-0.000327	0.000	1.770E+12
-157.6880	169107.	0.000				
46.010	0.008493	6237451.	-34286.	-0.000278	0.000	1.771E+12
-113.5205	179988.	0.000				
47.132	0.005068	5765447.	-35534.	-0.000232	0.000	1.772E+12
-71.8386	190869.	0.000				
48.255	0.002233	5280416.	-36243.	-0.000190	0.000	1.774E+12
-33.4598	201749.	0.000				
49.377	-6.179E-05	4789317.	-36462.	-0.000152	0.000	1.775E+12
0.9756	212630.	0.000				
50.499	-0.001868	4298395.	-36247.	-0.000118	0.000	1.776E+12
30.9981	223510.	0.000				
51.621	-0.003235	3813095.	-35671.	-8.707E-05	0.000	1.777E+12
54.5490	227100.	0.000				
52.743	-0.004213	3337686.	-34802.	-5.999E-05	0.000	1.779E+12
74.4450	237980.	0.000				
53.866	-0.004850	2875778.	-33697.	-3.647E-05	0.000	1.780E+12
89.6332	248861.	0.000				
54.988	-0.005195	2430124.	-32419.	-1.641E-05	0.000	1.781E+12
100.2002	259741.	0.000				
56.110	-0.005292	2002641.	-31028.	3.458E-07	0.000	1.782E+12
106.3517	270622.	0.000				
57.232	-0.005186	1594444.	-29582.	1.393E-05	0.000	1.783E+12
108.4003	281503.	0.000				
58.354	-0.004917	1205905.	-28134.	2.451E-05	0.000	1.784E+12
106.7557	292383.	0.000				
59.477	-0.004526	836726.	-26729.	3.221E-05	0.000	1.785E+12
101.9166	303264.	0.000				
60.599	-0.004049	486028.	-25406.	3.720E-05	0.000	1.785E+12
94.4617	314145.	0.000				
61.721	-0.003524	152460.	-22216.	3.961E-05	0.000	1.785E+12
379.3670	1449862.	0.000				
62.843	-0.002982	-112311.	-17312.	3.976E-05	0.000	1.785E+12
349.0183	1575923.	0.000				
63.965	-0.002453	-313791.	-12831.	3.816E-05	0.000	1.785E+12
316.5035	1737805.	0.000				
65.088	-0.001955	-457874.	-8796.9699	3.525E-05	0.000	1.785E+12
282.5557	1946574.	0.000				

66.210	-0.001503	-550718.	-5226.0247	3.144E-05	0.000	1.785E+12
247.7932	2219626.	0.000				
67.332	-0.001108	-598626.	-2125.2767	2.710E-05	0.000	1.785E+12
212.7230	2585517.	0.000				
68.454	-0.000773	-607958.	503.6727	2.255E-05	0.000	1.785E+12
177.7227	3094633.	0.000				
69.576	-0.000501	-585060.	2663.0219	1.805E-05	0.000	1.785E+12
142.9790	3846494.	0.000				
70.699	-0.000287	-536235.	4354.9356	1.382E-05	0.000	1.785E+12
108.3002	5077879.	0.000				
71.821	-0.000128	-467770.	5562.8157	1.003E-05	0.000	1.785E+12
71.0915	7459238.	0.000				
72.943	-1.701E-05	-386413.	6105.2352	6.810E-06	0.000	1.785E+12
9.4675	7495507.	0.000				
74.065	5.506E-05	-303339.	5961.6291	4.207E-06	0.000	1.785E+12
-30.7956	7531776.	0.000				
75.187	9.631E-05	-225849.	5389.8458	2.211E-06	0.000	1.785E+12
-54.1244	7568045.	0.000				
76.310	0.000115	-158175.	4589.6666	7.620E-07	0.000	1.785E+12
-64.7164	7604313.	0.000				
77.432	0.000117	-102237.	3707.5900	-2.205E-07	0.000	1.785E+12
-66.2877	7640582.	0.000				
78.554	0.000109	-58319.	2844.1491	-8.262E-07	0.000	1.785E+12
-61.9487	7676851.	0.000				
79.676	9.458E-05	-25636.	2062.2888	-1.143E-06	0.000	1.785E+12
-54.1715	7713120.	0.000				
80.798	7.788E-05	-2776.0811	1395.7633	-1.250E-06	0.000	1.785E+12
-44.8194	7749389.	0.000				
81.921	6.091E-05	11956.	856.8805	-1.216E-06	0.000	1.785E+12
-35.2143	7785657.	0.000				
83.043	4.515E-05	20302.	443.2082	-1.094E-06	0.000	1.785E+12
-26.2234	7821926.	0.000				
84.165	3.145E-05	23893.	143.0771	-9.271E-07	0.000	1.785E+12
-18.3514	7858195.	0.000				
85.287	2.018E-05	24156.	-60.1331	-7.458E-07	0.000	1.785E+12
-11.8289	7894464.	0.000				
86.409	1.136E-05	22273.	-184.8330	-5.706E-07	0.000	1.785E+12
-6.6912	7930733.	0.000				
87.532	4.809E-06	19178.	-249.0426	-4.143E-07	0.000	1.785E+12
-2.8450	7967001.	0.000				
88.654	2.047E-07	15566.	-269.0180	-2.832E-07	0.000	1.785E+12
-0.1217	8003270.	0.000				
89.776	-2.818E-06	11932.	-258.5106	-1.794E-07	0.000	1.785E+12
1.6822	8039539.	0.000				
90.898	-4.628E-06	8603.4188	-228.4975	-1.020E-07	0.000	1.785E+12
2.7753	8075808.	0.000				
92.020	-5.564E-06	5778.0202	-187.2449	-4.769E-08	0.000	1.785E+12
3.3515	8112076.	0.000				
93.143	-5.912E-06	3560.3895	-140.5912	-1.246E-08	0.000	1.785E+12
3.5774	8148345.	0.000				
94.265	-5.899E-06	1991.5050	-92.3624	8.486E-09	0.000	1.785E+12
3.5854	8184614.	0.000				
95.387	-5.684E-06	1072.8117	-44.8585	2.005E-08	0.000	1.785E+12
3.4698	8220883.	0.000				
96.509	-5.359E-06	783.3389	-19.8738	2.705E-08	0.000	1.785E+12
0.2409	605356.	0.000				
97.631	-4.955E-06	537.5546	-16.6957	3.203E-08	0.000	1.785E+12
0.2311	628024.	0.000				
98.754	-4.497E-06	333.6775	-13.6768	3.532E-08	0.000	1.785E+12
0.2173	650692.	0.000				
99.876	-4.004E-06	169.2011	-10.8658	3.722E-08	0.000	1.785E+12
0.2002	673360.	0.000				
100.998	-3.494E-06	41.0312	-8.3017	3.801E-08	0.000	1.785E+12

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0.1806    696028.      0.000
   102.120 -2.980E-06   -54.3881    -6.0148  3.796E-08      0.000  1.785E+12
0.1591    718696.      0.000
   103.242 -2.472E-06  -120.9643    -4.0276  3.730E-08      0.000  1.785E+12
0.1361    741364.      0.000
   104.365 -1.976E-06  -162.8636    -2.3567  3.623E-08      0.000  1.785E+12
0.1121    764032.      0.000
   105.487 -1.496E-06  -184.4361    -1.0135  3.492E-08      0.000  1.785E+12
0.0874    786700.      0.000
   106.609 -1.035E-06  -190.1593     0.7953  3.350E-08      0.000  1.785E+12
0.1812   2357637.      0.000
   107.731 -5.937E-07  -163.0159     2.7424  3.217E-08      0.000  1.785E+12
0.1079   2448309.      0.000
   108.853 -1.687E-07  -116.2987     3.6834  3.112E-08      0.000  1.785E+12
0.0318   2538981.      0.000
   109.976  2.444E-07   -63.8123     3.5762  3.044E-08      0.000  1.785E+12
-0.0477   2629653.      0.000
   111.098  6.511E-07   -19.9810     2.3693  3.012E-08      0.000  1.785E+12
-0.1315   2720325.      0.000
   112.220  1.056E-06     0.000      0.000  3.005E-08      0.000  1.785E+12
-0.2204   1405499.      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. 2:

Pile-head deflection             =      1.0000000 inches
Computed slope at pile head      =     -0.0028132 radians
Maximum bending moment           =      8585541. inch-lbs
Maximum shear force              =       -36462. lbs
Depth of maximum bending moment  =     37.0326000 feet below pile head
Depth of maximum shear force     =     49.3768000 feet below pile head
Number of iterations             =             38
Number of zero deflection points =              4


---------------------------------------------------------------------------
                Computed Values of Pile Loading and Deflection
                  for Lateral Loading for Load Case Number 3
---------------------------------------------------------------------------

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head                          =     1.500000 inches
Moment at pile head                                =    1382400.0 in-lbs
Axial load at pile head                            =          0.0 lbs

   Depth    Deflect.    Bending    Shear       Slope      Total    Bending   Soil
Res.  Soil Spr.   Distrib.
     X         y        Moment     Force         S       Stress   Stiffness      p
      Es*h    Lat. Load
   feet      inches     in-lbs      lbs       radians     psi*      lb-in^2    lb/in
     lb/inch    lb/inch
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      0.00     1.5000   1382400.     24084.  -0.004389      0.000  1.351E+12
0.000      0.000      0.000
     1.122     1.4410   1706731.     24084.  -0.004374      0.000  1.351E+12
0.000      0.000      0.000
     2.244     1.3822   2031061.     24084.  -0.004355      0.000  1.349E+12
0.000      0.000      0.000
     3.367     1.3237   2355392.     24084.  -0.004334      0.000  1.348E+12
0.000      0.000      0.000
     4.489     1.2655   2679723.     24084.  -0.004308      0.000  1.347E+12
0.000      0.000      0.000
     5.611     1.2076   3004053.     24084.  -0.004280      0.000  1.346E+12
0.000      0.000      0.000
     6.733     1.1502   3328384.     24084.  -0.004248      0.000  1.345E+12
0.000      0.000      0.000
     7.855     1.0932   3652715.     24084.  -0.004213      0.000  1.344E+12
0.000      0.000      0.000
     8.978     1.0367   3977045.     24084.  -0.004175      0.000  1.343E+12
0.000      0.000      0.000
    10.100     0.9808   4301376.     24084.  -0.004134      0.000  1.341E+12
0.000      0.000      0.000
    11.222     0.9254   4625707.     24084.  -0.004089      0.000  1.340E+12
0.000      0.000      0.000
    12.344     0.8707   4950037.     24084.  -0.004041      0.000  1.339E+12
0.000      0.000      0.000
    13.466     0.8166   5274368.     24084.  -0.003989      0.000  1.338E+12
0.000      0.000      0.000
    14.589     0.7632   5598698.     24084.  -0.003934      0.000  1.337E+12
0.000      0.000      0.000
    15.711     0.7106   5923029.     24084.  -0.003812      0.000  4.224E+11
0.000      0.000      0.000
    16.833     0.6606   6247360.     24084.  -0.003617      0.000  4.189E+11
0.000      0.000      0.000
    17.955     0.6132   6571690.     24084.  -0.003411      0.000  4.187E+11
0.000      0.000      0.000
    19.077     0.5687   6896021.     24084.  -0.003194      0.000  4.186E+11
0.000      0.000      0.000
    20.200     0.5272   7220352.     24084.  -0.002967      0.000  4.184E+11
0.000      0.000      0.000
    21.322     0.4888   7544682.     24084.  -0.002822      0.000  1.768E+12
0.000      0.000      0.000
    22.444     0.4512   7869013.     24084.  -0.002747      0.000  1.144E+12
0.000      0.000      0.000
    23.566     0.4148   8193344.     24084.  -0.002653      0.000  1.144E+12
0.000      0.000      0.000
    24.688     0.3797   8517674.     24084.  -0.002554      0.000  1.144E+12
0.000      0.000      0.000
    25.811     0.3460   8842005.     24084.  -0.002452      0.000  1.144E+12
0.000      0.000      0.000
    26.933     0.3137   9166336.     24084.  -0.002346      0.000  1.143E+12
0.000      0.000      0.000
    28.055     0.2828   9490666.     23026.  -0.002236      0.000  1.143E+12
-157.1465  7482.7273     0.000
    29.177     0.2535   9786499.     20878.  -0.002123      0.000  1.143E+12
-161.9123  8602.7422     0.000
    30.299     0.2256  10052971.     18672.  -0.002006      0.000  1.143E+12
-165.7687  9893.0287     0.000
    31.422     0.1994  10289381.     15954.  -0.001886      0.000  1.143E+12
-237.8750    16062.      0.000
    32.544     0.1749  10482654.     12631.  -0.001763      0.000  1.142E+12
-255.6524    19689.      0.000
    33.666     0.1519  10629566.  9138.2042  -0.001639      0.000  1.142E+12
-263.0716    23316.      0.000
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34.788	0.1307	10728771.	5605.9954	-0.001513	0.000	1.142E+12
-261.5242	26943.	0.000				
35.910	0.1112	10780551.	2145.5770	-0.001386	0.000	1.142E+12
-252.4095	30570.	0.000				
37.033	0.0934	10786558.	-3281.7306	-0.001259	0.000	1.142E+12
-553.6423	79843.	0.000				
38.155	0.0773	10692165.	-10724.	-0.001132	0.000	1.142E+12
-551.7336	96143.	0.000				
39.277	0.0629	10497718.	-17929.	-0.001008	0.000	1.142E+12
-518.3206	111008.	0.000				
40.399	0.0501	10209277.	-24568.	-0.000886	0.000	1.143E+12
-467.6126	125585.	0.000				
41.521	0.0390	9836038.	-30379.	-0.000767	0.000	1.143E+12
-395.4890	136465.	0.000				
42.644	0.0295	9391079.	-35213.	-0.000654	0.000	1.143E+12
-322.4814	147346.	0.000				
43.766	0.0214	8887640.	-38985.	-0.000547	0.000	1.143E+12
-237.6596	149496.	0.000				
44.888	0.0148	8341103.	-41833.	-0.000445	0.000	1.144E+12
-185.2634	169107.	0.000				
46.010	0.009420	7760969.	-43928.	-0.000353	0.000	1.227E+12
-125.9083	179988.	0.000				
47.132	0.005235	7158003.	-45275.	-0.000284	0.000	1.769E+12
-74.1947	190869.	0.000				
48.255	0.001783	6541582.	-45955.	-0.000231	0.000	1.770E+12
-26.7128	201749.	0.000				
49.377	-0.000999	5920317.	-46028.	-0.000184	0.000	1.772E+12
15.7665	212630.	0.000				
50.499	-0.003174	5301911.	-45567.	-0.000141	0.000	1.774E+12
52.6842	223510.	0.000				
51.621	-0.004808	4693059.	-44667.	-0.000104	0.000	1.775E+12
81.0786	227100.	0.000				
52.743	-0.005962	4098910.	-43411.	-7.017E-05	0.000	1.777E+12
105.3591	237980.	0.000				
53.866	-0.006698	3523867.	-41869.	-4.129E-05	0.000	1.778E+12
123.7730	248861.	0.000				
54.988	-0.007074	2971270.	-40117.	-1.671E-05	0.000	1.780E+12
136.4445	259741.	0.000				
56.110	-0.007148	2443416.	-38231.	3.772E-06	0.000	1.781E+12
143.6394	270622.	0.000				
57.232	-0.006972	1941610.	-36282.	2.034E-05	0.000	1.782E+12
145.7524	281503.	0.000				
58.354	-0.006600	1466235.	-34336.	3.322E-05	0.000	1.783E+12
143.2928	292383.	0.000				
59.477	-0.006078	1016846.	-32450.	4.259E-05	0.000	1.785E+12
136.8729	303264.	0.000				
60.599	-0.005453	592278.	-30672.	4.866E-05	0.000	1.785E+12
127.1994	314145.	0.000				
61.721	-0.004767	190777.	-26844.	5.161E-05	0.000	1.785E+12
441.2675	1246473.	0.000				
62.843	-0.004063	-130703.	-21130.	5.184E-05	0.000	1.785E+12
407.3434	1350256.	0.000				
63.965	-0.003371	-378314.	-15889.	4.992E-05	0.000	1.785E+12
371.0575	1482268.	0.000				
65.088	-0.002718	-558636.	-11147.	4.639E-05	0.000	1.785E+12
333.1811	1650737.	0.000				
66.210	-0.002122	-678537.	-6921.6828	4.172E-05	0.000	1.785E+12
294.3720	1868318.	0.000				
67.332	-0.001594	-745056.	-3221.4407	3.635E-05	0.000	1.785E+12
255.1798	2155199.	0.000				
68.454	-0.001143	-765300.	-48.6537	3.065E-05	0.000	1.785E+12
216.0355	2545607.	0.000				
69.576	-0.000769	-746367.	2599.1295	2.495E-05	0.000	1.785E+12

177.2074	3103203.	0.000				
70.699	-0.000471	-695298.	4726.0475	1.951E-05	0.000	1.785E+12
138.6777	3965031.	0.000				
71.821	-0.000244	-619081.	6331.3042	1.455E-05	0.000	1.785E+12
99.7315	5512413.	0.000				
72.943	-7.919E-05	-524778.	7299.5967	1.023E-05	0.000	1.785E+12
44.0772	7495507.	0.000				
74.065	3.193E-05	-422482.	7476.1165	6.658E-06	0.000	1.785E+12
-17.8609	7531776.	0.000				
75.187	0.000100	-323425.	6976.9689	3.844E-06	0.000	1.785E+12
-56.2714	7568045.	0.000				
76.310	0.000135	-234573.	6097.1905	1.739E-06	0.000	1.785E+12
-74.3913	7395548.	0.000				
77.432	0.000147	-159211.	5074.6169	2.529E-07	0.000	1.785E+12
-77.4790	7100041.	0.000				
78.554	0.000142	-97899.	4039.6515	-7.172E-07	0.000	1.785E+12
-76.2318	7215728.	0.000				
79.676	0.000128	-50412.	3040.2063	-1.277E-06	0.000	1.785E+12
-72.2036	7617910.	0.000				
80.798	0.000108	-16018.	2136.0333	-1.527E-06	0.000	1.785E+12
-62.0821	7749389.	0.000				
81.921	8.650E-05	7117.4789	1381.2890	-1.561E-06	0.000	1.785E+12
-50.0108	7785657.	0.000				
83.043	6.584E-05	21184.	787.0492	-1.454E-06	0.000	1.785E+12
-38.2444	7821926.	0.000				
84.165	4.734E-05	28315.	343.5526	-1.267E-06	0.000	1.785E+12
-27.6228	7858195.	0.000				
85.287	3.171E-05	30437.	32.4053	-1.046E-06	0.000	1.785E+12
-18.5882	7894464.	0.000				
86.409	1.917E-05	29188.	-168.7754	-8.208E-07	0.000	1.785E+12
-11.2908	7930733.	0.000				
87.532	9.602E-06	25891.	-283.0464	-6.130E-07	0.000	1.785E+12
-5.6805	7967001.	0.000				
88.654	2.662E-06	21564.	-331.9479	-4.339E-07	0.000	1.785E+12
-1.5822	8003270.	0.000				
89.776	-2.086E-06	16951.	-334.2173	-2.886E-07	0.000	1.785E+12
1.2452	8039539.	0.000				
90.898	-5.111E-06	12563.	-305.1937	-1.773E-07	0.000	1.785E+12
3.0653	8075808.	0.000				
92.020	-6.860E-06	8731.1226	-256.7279	-9.694E-08	0.000	1.785E+12
4.1327	8112076.	0.000				
93.143	-7.722E-06	5648.6428	-197.4392	-4.269E-08	0.000	1.785E+12
4.6727	8148345.	0.000				
94.265	-8.010E-06	3413.5312	-133.1963	-8.502E-09	0.000	1.785E+12
4.8685	8184614.	0.000				
95.387	-7.951E-06	2061.2931	-67.7321	1.215E-08	0.000	1.785E+12
4.8541	8220883.	0.000				
96.509	-7.683E-06	1589.3162	-32.7230	2.593E-08	0.000	1.785E+12
0.3454	605356.	0.000				
97.631	-7.253E-06	1179.9707	-28.1200	3.637E-08	0.000	1.785E+12
0.3383	628024.	0.000				
98.754	-6.703E-06	831.9662	-23.6615	4.397E-08	0.000	1.785E+12
0.3239	650692.	0.000				
99.876	-6.069E-06	542.6992	-19.4373	4.915E-08	0.000	1.785E+12
0.3035	673360.	0.000				
100.998	-5.380E-06	308.4642	-15.5219	5.236E-08	0.000	1.785E+12
0.2780	696028.	0.000				
102.120	-4.659E-06	124.6513	-11.9756	5.400E-08	0.000	1.785E+12
0.2486	718696.	0.000				
103.242	-3.925E-06	-14.0736	-8.8465	5.441E-08	0.000	1.785E+12
0.2161	741364.	0.000				
104.365	-3.193E-06	-113.6109	-6.1717	5.393E-08	0.000	1.785E+12
0.1812	764032.	0.000				

```
   105.487 -2.473E-06  -180.2945    -3.9792  5.282E-08      0.000  1.785E+12
0.1445    786700.       0.000
   106.609 -1.770E-06  -220.7826    -0.9195  5.131E-08      0.000  1.785E+12
0.3100   2357637.       0.000
   107.731 -1.091E-06  -205.0597     2.5028  4.970E-08      0.000  1.785E+12
0.1983   2448309.       0.000
   108.853 -4.318E-07  -153.3754     4.3862  4.835E-08      0.000  1.785E+12
0.0814   2538981.       0.000
   109.976  2.115E-07   -86.9266     4.6563  4.744E-08      0.000  1.785E+12
-0.0413   2629653.      0.000
   111.098  8.460E-07   -27.9675     3.2275  4.701E-08      0.000  1.785E+12
-0.1709   2720325.      0.000
   112.220  1.478E-06     0.000      0.000  4.691E-08      0.000  1.785E+12
-0.3084   1405499.      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. 3:

Pile-head deflection              =      1.5000000 inches
Computed slope at pile head       =     -0.0043895 radians
Maximum bending moment            =      10786558. inch-lbs
Maximum shear force               =        -46028. lbs
Depth of maximum bending moment   =     37.0326000 feet below pile head
Depth of maximum shear force      =     49.3768000 feet below pile head
Number of iterations              =             52
Number of zero deflection points  =              4


---------------------------------------------------------------------------
                Computed Values of Pile Loading and Deflection
                  for Lateral Loading for Load Case Number 4
---------------------------------------------------------------------------

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head                          =     2.000000 inches
Moment at pile head                                =    1382400.0 in-lbs
Axial load at pile head                            =          0.0 lbs

   Depth    Deflect.    Bending    Shear       Slope       Total     Bending   Soil
Res.  Soil Spr.   Distrib.
     X         y         Moment     Force         S        Stress   Stiffness     p
      Es*h    Lat. Load
   feet      inches      in-lbs      lbs        radians      psi*      lb-in^2    lb/in
     lb/inch    lb/inch
---------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
---------- ---------- ----------
      0.00     2.0000   1382400.    30725.  -0.005966       0.000  1.351E+12
0.000     0.000     0.000
    1.122     1.9198   1796158.    30725.  -0.005950       0.000  1.351E+12
0.000     0.000     0.000
    2.244     1.8397   2209916.    30725.  -0.005930       0.000  1.349E+12
0.000     0.000     0.000
```


STR-V
Δ = 2.0 "
LATERAL RESISTANCE = 30.73 K


```
      3.367     1.7600   2623674.    30725.  -0.005906       0.000  1.347E+12
0.000     0.000     0.000
      4.489     1.6807   3037431.    30725.  -0.005878       0.000  1.346E+12
0.000     0.000     0.000
      5.611     1.6017   3451189.    30725.  -0.005845       0.000  1.344E+12
0.000     0.000     0.000
      6.733     1.5233   3864947.    30725.  -0.005809       0.000  1.343E+12
0.000     0.000     0.000
      7.855     1.4453   4278705.    30725.  -0.005768       0.000  1.342E+12
0.000     0.000     0.000
      8.978     1.3679   4692463.    30725.  -0.005723       0.000  1.340E+12
0.000     0.000     0.000
     10.100     1.2912   5106221.    30725.  -0.005673       0.000  1.339E+12
0.000     0.000     0.000
     11.222     1.2151   5519979.    30725.  -0.005620       0.000  1.337E+12
0.000     0.000     0.000
     12.344     1.1398   5933736.    30725.  -0.005497       0.000  4.221E+11
0.000     0.000     0.000
     13.466     1.0671   6347494.    30725.  -0.005301       0.000  4.189E+11
0.000     0.000     0.000
     14.589     0.9970   6761252.    30725.  -0.005090       0.000  4.186E+11
0.000     0.000     0.000
     15.711     0.9300   7175010.    30725.  -0.004866       0.000  4.184E+11
0.000     0.000     0.000
     16.833     0.8660   7588768.    30725.  -0.004628       0.000  4.182E+11
0.000     0.000     0.000
     17.955     0.8053   8002526.    30725.  -0.004377       0.000  4.179E+11
0.000     0.000     0.000
     19.077     0.7481   8416284.    30725.  -0.004112       0.000  4.177E+11
0.000     0.000     0.000
     20.200     0.6946   8830042.    30725.  -0.003834       0.000  4.175E+11
0.000     0.000     0.000
     21.322     0.6448   9243799.    30725.  -0.003637       0.000  1.143E+12
0.000     0.000     0.000
     22.444     0.5966   9657557.    30725.  -0.003526       0.000  1.143E+12
0.000     0.000     0.000
     23.566     0.5499  10071315.    30725.  -0.003410       0.000  1.143E+12
0.000     0.000     0.000
     24.688     0.5048  10485073.    30725.  -0.003289       0.000  1.142E+12
0.000     0.000     0.000
     25.811     0.4613  10898831.    30725.  -0.003163       0.000  1.142E+12
0.000     0.000     0.000
     26.933     0.4196  11312589.    30725.  -0.003032       0.000  1.142E+12
0.000     0.000     0.000
     28.055     0.3797  11726347.    29558.  -0.002896       0.000  1.142E+12
-173.3524  6148.8121       0.000
     29.177     0.3416  12108668.    27187.  -0.002755       0.000  1.141E+12
-178.8454  7050.5374       0.000
     30.299     0.3055  12458557.    24748.  -0.002610       0.000  1.141E+12
-183.3727  8084.3434       0.000
     31.422     0.2713  12775192.    21334.  -0.002461       0.000  1.141E+12
-323.5832    16062.        0.000
     32.544     0.2392  13033148.    16801.  -0.002309       0.000  1.141E+12
-349.6729    19689.        0.000
     33.666     0.2091  13227692.    12009.  -0.002154       0.000  1.140E+12
-362.0434    23316.        0.000
     34.788     0.1811  13356582.  7130.9168  -0.001997       0.000  1.140E+12
-362.4311    26943.        0.000
     35.910     0.1553  13419748.  2316.5872  -0.001839       0.000  1.140E+12
-352.5825    30570.        0.000
     37.033     0.1316  13418975. -4244.3384  -0.001680       0.000  1.140E+12
-621.8317    63621.        0.000
     38.155     0.1101  13305436.   -12643.  -0.001523       0.000  1.140E+12
```

-625.4685	76530.	0.000				
39.277	0.0906	13078472.	-20867.	-0.001367	0.000	1.141E+12
-596.0446	88582.	0.000				
40.399	0.0732	12743420.	-28584.	-0.001214	0.000	1.141E+12
-549.9821	101117.	0.000				
41.521	0.0579	12308631.	-35563.	-0.001067	0.000	1.141E+12
-486.5526	113157.	0.000				
42.644	0.0445	11785609.	-41541.	-0.000924	0.000	1.141E+12
-401.2683	121383.	0.000				
43.766	0.0330	11189820.	-46280.	-0.000789	0.000	1.142E+12
-302.5732	123458.	0.000				
44.888	0.0233	10539160.	-50098.	-0.000661	0.000	1.142E+12
-264.4354	153048.	0.000				
46.010	0.0152	9840547.	-53246.	-0.000541	0.000	1.143E+12
-203.2086	179988.	0.000				
47.132	0.008702	9105084.	-55445.	-0.000429	0.000	1.143E+12
-123.3365	190869.	0.000				
48.255	0.003644	8347254.	-56643.	-0.000326	0.000	1.144E+12
-54.5931	201749.	0.000				
49.377	-9.046E-05	7579523.	-57001.	-0.000248	0.000	1.768E+12
1.4284	212630.	0.000				
50.499	-0.003047	6812052.	-56651.	-0.000194	0.000	1.770E+12
50.5780	223510.	0.000				
51.621	-0.005306	6053753.	-55708.	-0.000145	0.000	1.772E+12
89.4824	227100.	0.000				
52.743	-0.006945	5311681.	-54279.	-0.000102	0.000	1.774E+12
122.7357	237980.	0.000				
53.866	-0.008041	4591867.	-52452.	-6.397E-05	0.000	1.775E+12
148.6008	248861.	0.000				
54.988	-0.008668	3899000.	-50326.	-3.178E-05	0.000	1.777E+12
167.1907	259741.	0.000				
56.110	-0.008897	3236452.	-47996.	-4.763E-06	0.000	1.779E+12
178.7984	270622.	0.000				
57.232	-0.008796	2606328.	-45554.	1.734E-05	0.000	1.780E+12
183.8799	281503.	0.000				
58.354	-0.008430	2009550.	-43084.	3.479E-05	0.000	1.782E+12
183.0349	292383.	0.000				
59.477	-0.007859	1445964.	-40660.	4.784E-05	0.000	1.783E+12
176.9929	303264.	0.000				
60.599	-0.007142	914475.	-38346.	5.675E-05	0.000	1.785E+12
166.5984	314145.	0.000				
61.721	-0.006331	413197.	-33800.	6.176E-05	0.000	1.785E+12
508.5265	1081692.	0.000				
62.843	-0.005478	4137.1767	-27191.	6.334E-05	0.000	1.785E+12
473.0441	1162840.	0.000				
63.965	-0.004625	-319139.	-21079.	6.215E-05	0.000	1.785E+12
434.6546	1265559.	0.000				
65.088	-0.003804	-563593.	-15499.	5.882E-05	0.000	1.785E+12
394.2115	1395414.	0.000				
66.210	-0.003041	-736559.	-10471.	5.391E-05	0.000	1.785E+12
352.4479	1560789.	0.000				
67.332	-0.002352	-845611.	-6010.8468	4.794E-05	0.000	1.785E+12
309.9889	1774603.	0.000				
68.454	-0.001750	-898448.	-2123.5062	4.136E-05	0.000	1.785E+12
267.3503	2057677.	0.000				
69.576	-0.001238	-902802.	1191.0330	3.457E-05	0.000	1.785E+12
224.9178	2445955.	0.000				
70.699	-0.000819	-866370.	3936.8475	2.789E-05	0.000	1.785E+12
182.8845	3008267.	0.000				
71.821	-0.000487	-796772.	6118.1115	2.162E-05	0.000	1.785E+12
141.0720	3900216.	0.000				
72.943	-0.000236	-701592.	7729.8490	1.596E-05	0.000	1.785E+12
98.2997	5598330.	0.000				

74.065	-5.711E-05	-588586.	8606.8035	1.110E-05	0.000	1.785E+12
31.9436	7531776.	0.000				
75.187	6.242E-05	-469787.	8585.6924	7.104E-06	0.000	1.785E+12
-35.0790	7568045.	0.000				
76.310	0.000134	-357349.	7851.0400	3.983E-06	0.000	1.785E+12
-74.0300	7427780.	0.000				
77.432	0.000170	-258336.	6792.0441	1.660E-06	0.000	1.785E+12
-83.2498	6606234.	0.000				
78.554	0.000179	-174420.	5655.8972	2.770E-08	0.000	1.785E+12
-85.4883	6433760.	0.000				
79.676	0.000170	-106007.	4518.4830	-1.030E-06	0.000	1.785E+12
-83.4380	6592193.	0.000				
80.798	0.000151	-52725.	3427.5561	-1.629E-06	0.000	1.785E+12
-78.5841	6999657.	0.000				
81.921	0.000127	-13693.	2414.2953	-1.880E-06	0.000	1.785E+12
-71.9032	7650292.	0.000				
83.043	0.000101	12299.	1536.8773	-1.885E-06	0.000	1.785E+12
-58.4090	7821926.	0.000				
84.165	7.580E-05	27699.	845.7775	-1.734E-06	0.000	1.785E+12
-44.2316	7858195.	0.000				
85.287	5.385E-05	35078.	335.3836	-1.497E-06	0.000	1.785E+12
-31.5709	7894464.	0.000				
86.409	3.547E-05	36732.	-17.8544	-1.226E-06	0.000	1.785E+12
-20.8912	7930733.	0.000				
87.532	2.083E-05	34597.	-241.4761	-9.572E-07	0.000	1.785E+12
-12.3206	7967001.	0.000				
88.654	9.693E-06	30228.	-363.2195	-7.126E-07	0.000	1.785E+12
-5.7604	8003270.	0.000				
89.776	1.632E-06	24815.	-408.5644	-5.050E-07	0.000	1.785E+12
-0.9741	8039539.	0.000				
90.898	-3.908E-06	19225.	-399.3432	-3.388E-07	0.000	1.785E+12
2.3436	8075808.	0.000				
92.020	-7.494E-06	14059.	-353.1674	-2.133E-07	0.000	1.785E+12
4.5143	8112076.	0.000				
93.143	-9.651E-06	9712.7306	-283.4497	-1.236E-07	0.000	1.785E+12
5.8400	8148345.	0.000				
94.265	-1.082E-05	6425.2052	-199.8411	-6.268E-08	0.000	1.785E+12
6.5774	8184614.	0.000				
95.387	-1.134E-05	4330.4507	-108.9432	-2.210E-08	0.000	1.785E+12
6.9226	8220883.	0.000				
96.509	-1.142E-05	3491.0594	-58.8765	7.407E-09	0.000	1.785E+12
0.5132	605356.	0.000				
97.631	-1.114E-05	2744.7414	-51.9226	3.093E-08	0.000	1.785E+12
0.5195	628024.	0.000				
98.754	-1.058E-05	2092.6381	-44.9810	4.918E-08	0.000	1.785E+12
0.5114	650692.	0.000				
99.876	-9.815E-06	1533.2782	-38.2328	6.286E-08	0.000	1.785E+12
0.4908	673360.	0.000				
100.998	-8.891E-06	1062.9226	-31.8339	7.266E-08	0.000	1.785E+12
0.4595	696028.	0.000				
102.120	-7.859E-06	675.9026	-25.9157	7.922E-08	0.000	1.785E+12
0.4194	718696.	0.000				
103.242	-6.757E-06	364.9400	-20.5869	8.315E-08	0.000	1.785E+12
0.3720	741364.	0.000				
104.365	-5.619E-06	121.4402	-15.9354	8.498E-08	0.000	1.785E+12
0.3188	764032.	0.000				
105.487	-4.469E-06	-64.2447	-12.0310	8.520E-08	0.000	1.785E+12
0.2611	786700.	0.000				
106.609	-3.325E-06	-202.5886	-6.3541	8.419E-08	0.000	1.785E+12
0.5821	2357637.	0.000				
107.731	-2.201E-06	-235.3793	0.2596	8.254E-08	0.000	1.785E+12
0.4002	2448309.	0.000				
108.853	-1.102E-06	-195.5973	4.3527	8.091E-08	0.000	1.785E+12

```
0.2077    2538981.       0.000
   109.976 -2.199E-08  -118.1490     5.7801  7.973E-08       0.000  1.785E+12
0.004295    2629653.       0.000
   111.098  1.046E-06   -39.9217     4.3868  7.913E-08       0.000  1.785E+12
-0.2112    2720325.       0.000
   112.220  2.109E-06     0.000      0.000   7.898E-08       0.000  1.785E+12
-0.4403    1405499.       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. 4:

Pile-head deflection	=	2.0000000 inches
Computed slope at pile head	=	-0.0059659 radians
Maximum bending moment	=	13419748. inch-lbs
Maximum shear force	=	-57001. lbs
Depth of maximum bending moment	=	35.9104000 feet below pile head
Depth of maximum shear force	=	49.3768000 feet below pile head
Number of iterations	=	23
Number of zero deflection points	=	4

Pile-head Deflection vs. Pile Length for Load Case 4

Boundary Condition Type 4, Deflection and Moment

Deflection	=	2.00000 in
Moment	=	1382400. in- lb
Axial Load	=	0. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment in-lbs	Maximum Shear lbs
112.2200	2.0000000	13419748.	-57001.
106.6090	2.0000000	13548619.	-57509.
100.9980	2.0000000	13268499.	-56473.
95.3870	2.0000000	13332504.	-56662.
89.7760	2.0000000	13373895.	-56833.
84.1650	2.0000000	13219580.	-56444.
78.5540	2.0000000	13211153.	-56379.
72.9430	2.0000000	13289805.	-56102.
67.3320	2.0000000	13387068.	-55943.
61.7210	2.0000000	13028685.	-64436.
56.1100	2.0000000	11581018.	-73071.
50.4990	2.0000000	8366688.	-67318.
44.8880	2.0000000	4035156.	-42803.
39.2770	2.0000000	1522459.	-19126.
33.6660	2.0000000	1382400.	-7056.0637015
33.6660	0.000000	1.674739E+11	-20727376688.


```
   33.6660      0.000000  1.674739E+11 -20727376688.
   33.6660      0.000000  1.674739E+11 -20727376688.
   33.6660      0.000000  1.674739E+11 -20727376688.
   33.6660      0.000000  1.674739E+11 -20727376688.
```

Computed Values of Pile Loading and Deflection for Lateral Loading for Load Case Number 5

Pile-head conditions are Displacement and Moment (Loading Type 4)

Displacement of pile head	=	0.500000 inches
Moment at pile head	=	1183200.0 in-lbs
Axial load at pile head	=	0.0 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. Es*h lb/inch	Soil Spr. Lat. Load lb/inch	Distrib. p lb/in
0.00	0.5000	1183200.	10961.	-0.001465	0.000	1.352E+12	0.000	0.000	0.000
1.122	0.4804	1330808.	10961.	-0.001452	0.000	1.352E+12	0.000	0.000	0.000
2.244	0.4609	1478415.	10961.	-0.001438	0.000	1.351E+12	0.000	0.000	0.000
3.367	0.4416	1626023.	10961.	-0.001423	0.000	1.351E+12	0.000	0.000	0.000
4.489	0.4226	1773631.	10961.	-0.001406	0.000	1.350E+12	0.000	0.000	0.000
5.611	0.4038	1921238.	10961.	-0.001387	0.000	1.350E+12	0.000	0.000	0.000
6.733	0.3852	2068846.	10961.	-0.001368	0.000	1.349E+12	0.000	0.000	0.000
7.855	0.3669	2216454.	10961.	-0.001346	0.000	1.349E+12	0.000	0.000	0.000
8.978	0.3489	2364061.	10961.	-0.001323	0.000	1.348E+12	0.000	0.000	0.000
10.100	0.3313	2511669.	10961.	-0.001299	0.000	1.348E+12	0.000	0.000	0.000
11.222	0.3140	2659277.	10961.	-0.001273	0.000	1.347E+12	0.000	0.000	0.000
12.344	0.2970	2806884.	10961.	-0.001246	0.000	1.347E+12	0.000	0.000	0.000
13.466	0.2804	2954492.	10961.	-0.001217	0.000	1.346E+12	0.000	0.000	0.000
14.589	0.2642	3102100.	10961.	-0.001187	0.000	1.346E+12	0.000	0.000	0.000
15.711	0.2484	3249708.	10961.	-0.001155	0.000	1.345E+12	0.000	0.000	0.000
16.833	0.2331	3397315.	10961.	-0.001122	0.000	1.345E+12	0.000	0.000	0.000
17.955	0.2182	3544923.	10961.	-0.001087	0.000	1.344E+12	0.000	0.000	0.000
19.077	0.2038	3692531.	10961.	-0.001051	0.000	1.344E+12	0.000	0.000	0.000
20.200	0.1899	3840138.	10961.	-0.001013	0.000	1.343E+12	0.000	0.000	0.000
21.322	0.1766	3987746.	10961.	-0.000978	0.000	1.777E+12			

0.000	0.000	0.000					
22.444	0.1636	4135354.	10961.	-0.000948	0.000	1.777E+12	
0.000	0.000	0.000					
23.566	0.1510	4282961.	10961.	-0.000916	0.000	1.776E+12	
0.000	0.000	0.000					
24.688	0.1389	4430569.	10961.	-0.000883	0.000	1.776E+12	
0.000	0.000	0.000					
25.811	0.1273	4578177.	10961.	-0.000849	0.000	1.776E+12	
0.000	0.000	0.000					
26.933	0.1161	4725784.	10961.	-0.000813	0.000	1.775E+12	
0.000	0.000	0.000					
28.055	0.1054	4873392.	10200.	-0.000777	0.000	1.775E+12	
-113.0751	14452.	0.000					
29.177	0.0952	5000494.	8652.0170	-0.000739	0.000	1.774E+12	
-116.8022	16530.	0.000					
30.299	0.0855	5106415.	7058.0489	-0.000701	0.000	1.774E+12	
-119.9305	18900.	0.000					
31.422	0.0763	5190587.	5637.9671	-0.000662	0.000	1.774E+12	
-90.9769	16062.	0.000					
32.544	0.0676	5258261.	4359.6554	-0.000622	0.000	1.774E+12	
-98.8751	19689.	0.000					
33.666	0.0595	5308005.	3000.0829	-0.000582	0.000	1.774E+12	
-103.0456	23316.	0.000					
34.788	0.0519	5339062.	1606.4544	-0.000542	0.000	1.773E+12	
-103.9330	26943.	0.000					
35.910	0.0449	5351271.	219.9793	-0.000501	0.000	1.773E+12	
-101.9832	30570.	0.000					
37.033	0.0385	5344987.	-2253.5313	-0.000461	0.000	1.773E+12	
-265.3771	92943.	0.000					
38.155	0.0325	5290577.	-5728.6343	-0.000420	0.000	1.774E+12	
-250.7375	103823.	0.000					
39.277	0.0271	5190698.	-8973.1136	-0.000380	0.000	1.774E+12	
-231.1254	114704.	0.000					
40.399	0.0223	5048906.	-11928.	-0.000341	0.000	1.774E+12	
-207.7562	125585.	0.000					
41.521	0.0179	4869439.	-14551.	-0.000304	0.000	1.775E+12	
-181.7682	136465.	0.000					
42.644	0.0141	4657009.	-16813.	-0.000268	0.000	1.775E+12	
-154.2102	147346.	0.000					
43.766	0.0107	4416614.	-18700.	-0.000233	0.000	1.776E+12	
-126.0313	158227.	0.000					
44.888	0.007810	4153364.	-20209.	-0.000201	0.000	1.777E+12	
-98.0739	169107.	0.000					
46.010	0.005317	3872328.	-21348.	-0.000170	0.000	1.777E+12	
-71.0702	179988.	0.000					
47.132	0.003220	3578405.	-22134.	-0.000142	0.000	1.778E+12	
-45.6390	190869.	0.000					
48.255	0.001488	3276205.	-22591.	-0.000116	0.000	1.779E+12	
-22.2862	201749.	0.000					
49.377	8.912E-05	2969964.	-22751.	-9.261E-05	0.000	1.780E+12	
-1.4072	212630.	0.000					
50.499	-0.001007	2663468.	-22648.	-7.130E-05	0.000	1.780E+12	
16.7084	223510.	0.000					
51.621	-0.001831	2360001.	-22327.	-5.231E-05	0.000	1.781E+12	
30.8810	227100.	0.000					
52.743	-0.002415	2062135.	-21832.	-3.559E-05	0.000	1.782E+12	
42.6852	237980.	0.000					
53.866	-0.002790	1772009.	-21197.	-2.111E-05	0.000	1.783E+12	
51.5553	248861.	0.000					
54.988	-0.002984	1491233.	-20463.	-8.783E-06	0.000	1.783E+12	
57.5533	259741.	0.000					
56.110	-0.003026	1220893.	-19666.	1.455E-06	0.000	1.784E+12	
60.8173	270622.	0.000					

57.232	-0.002945	961583.	-18842.	9.691E-06	0.000	1.785E+12
61.5558	281503.	0.000				
58.354	-0.002765	713435.	-18023.	1.601E-05	0.000	1.785E+12
60.0409	292383.	0.000				
59.477	-0.002513	476175.	-17238.	2.050E-05	0.000	1.785E+12
56.6036	303264.	0.000				
60.599	-0.002213	249180.	-16509.	2.324E-05	0.000	1.785E+12
51.6307	314145.	0.000				
61.721	-0.001888	31548.	-14289.	2.429E-05	0.000	1.785E+12
278.0183	1983324.	0.000				
62.843	-0.001559	-135667.	-10716.	2.390E-05	0.000	1.785E+12
252.7131	2182988.	0.000				
63.965	-0.001244	-257055.	-7493.6179	2.242E-05	0.000	1.785E+12
225.8161	2444552.	0.000				
65.088	-0.000955	-337491.	-4640.3044	2.018E-05	0.000	1.785E+12
197.9517	2790985.	0.000				
66.210	-0.000701	-382031.	-2165.3153	1.746E-05	0.000	1.785E+12
169.6282	3260694.	0.000				
67.332	-0.000485	-395809.	-72.2728	1.453E-05	0.000	1.785E+12
141.2258	3922777.	0.000				
68.454	-0.000309	-383977.	1639.0881	1.159E-05	0.000	1.785E+12
112.9417	4917454.	0.000				
69.576	-0.000173	-351664.	2969.2488	8.810E-06	0.000	1.785E+12
84.6108	6594310.	0.000				
70.699	-7.202E-05	-304007.	3806.2347	6.336E-06	0.000	1.785E+12
39.6965	7422970.	0.000				
71.821	-2.136E-06	-249152.	4081.4851	4.249E-06	0.000	1.785E+12
1.1831	7459238.	0.000				
72.943	4.243E-05	-194081.	3930.4471	2.577E-06	0.000	1.785E+12
-23.6150	7495507.	0.000				
74.065	6.727E-05	-143294.	3518.1190	1.304E-06	0.000	1.785E+12
-37.6231	7531776.	0.000				
75.187	7.755E-05	-99329.	2971.3482	3.887E-07	0.000	1.785E+12
-43.5821	7568045.	0.000				
76.310	7.774E-05	-63267.	2382.3329	-2.247E-07	0.000	1.785E+12
-43.8971	7604313.	0.000				
77.432	7.150E-05	-35166.	1813.6285	-5.961E-07	0.000	1.785E+12
-40.5656	7640582.	0.000				
78.554	6.168E-05	-14421.	1303.7296	-7.832E-07	0.000	1.785E+12
-35.1634	7676851.	0.000				
79.676	5.040E-05	-52.6276	872.5857	-8.378E-07	0.000	1.785E+12
-28.8691	7713120.	0.000				
80.798	3.912E-05	9080.3413	526.6335	-8.037E-07	0.000	1.785E+12
-22.5109	7749389.	0.000				
81.921	2.876E-05	14131.	263.1203	-7.162E-07	0.000	1.785E+12
-16.6254	7785657.	0.000				
83.043	1.983E-05	16167.	73.6238	-6.019E-07	0.000	1.785E+12
-11.5182	7821926.	0.000				
84.165	1.255E-05	16114.	-53.2270	-4.801E-07	0.000	1.785E+12
-7.3214	7858195.	0.000				
85.287	6.901E-06	14733.	-129.7617	-3.637E-07	0.000	1.785E+12
-4.0453	7894464.	0.000				
86.409	2.752E-06	12619.	-167.9110	-2.605E-07	0.000	1.785E+12
-1.6205	7930733.	0.000				
87.532	-1.150E-07	10211.	-178.3643	-1.743E-07	0.000	1.785E+12
0.0680	7967001.	0.000				
88.654	-1.944E-06	7815.2867	-170.1268	-1.063E-07	0.000	1.785E+12
1.1554	8003270.	0.000				
89.776	-2.979E-06	5629.0528	-150.3724	-5.562E-08	0.000	1.785E+12
1.7785	8039539.	0.000				
90.898	-3.442E-06	3765.3366	-124.4992	-2.017E-08	0.000	1.785E+12
2.0641	8075808.	0.000				
92.020	-3.522E-06	2275.9407	-96.3143	2.620E-09	0.000	1.785E+12

2.1218	8112076.	0.000				
93.143	-3.371E-06	1171.3240	-68.2919	1.563E-08	0.000	1.785E+12
2.0400	8148345.	0.000				
94.265	-3.101E-06	436.6473	-41.8641	2.169E-08	0.000	1.785E+12
1.8850	8184614.	0.000				
95.387	-2.787E-06	43.8060	-17.7155	2.351E-08	0.000	1.785E+12
1.7015	8220883.	0.000				
96.509	-2.468E-06	-40.4803	-5.5119	2.352E-08	0.000	1.785E+12
0.1110	605356.	0.000				
97.631	-2.154E-06	-104.6441	-4.0884	2.297E-08	0.000	1.785E+12
0.1004	628024.	0.000				
98.754	-1.850E-06	-150.5930	-2.8103	2.201E-08	0.000	1.785E+12
0.0894	650692.	0.000				
99.876	-1.561E-06	-180.3334	-1.6829	2.076E-08	0.000	1.785E+12
0.0781	673360.	0.000				
100.998	-1.291E-06	-195.9185	-0.7082	1.934E-08	0.000	1.785E+12
0.0667	696028.	0.000				
102.120	-1.040E-06	-199.4060	0.1148	1.785E-08	0.000	1.785E+12
0.0555	718696.	0.000				
103.242	-8.100E-07	-192.8262	0.7889	1.637E-08	0.000	1.785E+12
0.0446	741364.	0.000				
104.365	-5.994E-07	-178.1597	1.3181	1.497E-08	0.000	1.785E+12
0.0340	764032.	0.000				
105.487	-4.069E-07	-157.3264	1.7071	1.370E-08	0.000	1.785E+12
0.0238	786700.	0.000				
106.609	-2.303E-07	-132.1828	2.1387	1.261E-08	0.000	1.785E+12
0.0403	2357637.	0.000				
107.731	-6.724E-08	-99.7262	2.4925	1.174E-08	0.000	1.785E+12
0.0122	2448309.	0.000				
108.853	8.572E-08	-65.0526	2.4660	1.111E-08	0.000	1.785E+12
-0.0162	2538981.	0.000				
109.976	2.321E-07	-33.3100	2.0520	1.074E-08	0.000	1.785E+12
-0.0453	2629653.	0.000				
111.098	3.750E-07	-9.7856	1.2368	1.058E-08	0.000	1.785E+12
-0.0758	2720325.	0.000				
112.220	5.170E-07	0.000	0.000	1.054E-08	0.000	1.785E+12
-0.1079	1405499.	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. 5:

Pile-head deflection	=	0.5000000 inches
Computed slope at pile head	=	-0.0014648 radians
Maximum bending moment	=	5351271. inch-lbs
Maximum shear force	=	-22751. lbs
Depth of maximum bending moment	=	35.9104000 feet below pile head
Depth of maximum shear force	=	49.3768000 feet below pile head
Number of iterations	=	7
Number of zero deflection points	=	4

SER-1
Δ = 1.0"
LATERAL
RESISTANCE
= 19.25 K

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 6

Pile-head conditions are Displacement and Moment (Loading Type 4)

Displacement of pile head	=	1.000000 inches
Moment at pile head	=	1183200.0 in-lbs
Axial load at pile head	=	0.0 lbs

Depth X	Deflect. y	Bending Moment	Shear Force	Slope S	Total Stress	Bending Stiffness	Soil Res. Spr. Es*h	Distrib. Lat. Load p
feet	inches	in-lbs	lbs	radians	psi*	lb-in^2	lb/inch	lb/in
0.00	1.0000	1183200.	19250.	-0.002778	0.000	1.352E+12	0.000	0.000
1.122	0.9627	1442433.	19250.	-0.002765	0.000	1.352E+12	0.000	0.000
2.244	0.9255	1701666.	19250.	-0.002749	0.000	1.351E+12	0.000	0.000
3.367	0.8886	1960899.	19250.	-0.002731	0.000	1.349E+12	0.000	0.000
4.489	0.8520	2220132.	19250.	-0.002710	0.000	1.349E+12	0.000	0.000
5.611	0.8156	2479364.	19250.	-0.002687	0.000	1.348E+12	0.000	0.000
6.733	0.7796	2738597.	19250.	-0.002661	0.000	1.347E+12	0.000	0.000
7.855	0.7440	2997830.	19250.	-0.002632	0.000	1.346E+12	0.000	0.000
8.978	0.7087	3257063.	19250.	-0.002601	0.000	1.345E+12	0.000	0.000
10.100	0.6739	3516296.	19250.	-0.002567	0.000	1.344E+12	0.000	0.000
11.222	0.6396	3775529.	19250.	-0.002530	0.000	1.343E+12	0.000	0.000
12.344	0.6058	4034762.	19250.	-0.002491	0.000	1.342E+12	0.000	0.000
13.466	0.5725	4293995.	19250.	-0.002449	0.000	1.342E+12	0.000	0.000
14.589	0.5398	4553227.	19250.	-0.002405	0.000	1.341E+12	0.000	0.000
15.711	0.5077	4812460.	19250.	-0.002358	0.000	1.340E+12	0.000	0.000
16.833	0.4763	5071693.	19250.	-0.002308	0.000	1.339E+12	0.000	0.000
17.955	0.4455	5330926.	19250.	-0.002256	0.000	1.338E+12	0.000	0.000
19.077	0.4155	5590159.	19250.	-0.002201	0.000	1.337E+12	0.000	0.000
20.200	0.3863	5849392.	19250.	-0.002097	0.000	5.209E+11	0.000	0.000
21.322	0.3590	6108625.	19250.	-0.001998	0.000	1.771E+12	0.000	0.000
22.444	0.3324	6367858.	19250.	-0.001951	0.000	1.771E+12	0.000	0.000
23.566	0.3065	6627090.	19250.	-0.001901	0.000	1.770E+12	0.000	0.000
24.688	0.2812	6886323.	19250.	-0.001850	0.000	1.769E+12	0.000	0.000

25.811	0.2567	7145556.	19250.	-0.001797	0.000	1.769E+12
0.000	0.000	0.000				
26.933	0.2328	7404789.	19250.	-0.001741	0.000	1.768E+12
0.000	0.000	0.000				
28.055	0.2098	7664022.	18293.	-0.001684	0.000	1.767E+12
-142.2466	9131.3560	0.000				
29.177	0.1875	7897459.	16349.	-0.001608	0.000	1.144E+12
-146.4292	10517.	0.000				
30.299	0.1665	8104343.	14354.	-0.001514	0.000	1.144E+12
-149.7787	12117.	0.000				
31.422	0.1467	8284064.	12168.	-0.001418	0.000	1.144E+12
-174.9995	16062.	0.000				
32.544	0.1283	8432051.	9726.4181	-0.001319	0.000	1.144E+12
-187.5650	19689.	0.000				
33.666	0.1112	8546024.	7167.2548	-0.001219	0.000	1.144E+12
-192.5163	23316.	0.000				
34.788	0.0954	8625085.	4585.1652	-0.001118	0.000	1.144E+12
-190.9699	26943.	0.000				
35.910	0.0811	8669515.	2060.0856	-0.001016	0.000	1.144E+12
-184.0493	30570.	0.000				
37.033	0.0681	8680569.	-2342.8449	-0.000914	0.000	1.144E+12
-469.8642	92943.	0.000				
38.155	0.0565	8606416.	-8437.2765	-0.000812	0.000	1.144E+12
-435.2673	103823.	0.000				
39.277	0.0462	8453330.	-14018.	-0.000712	0.000	1.144E+12
-393.5134	114704.	0.000				
40.399	0.0373	8228882.	-19008.	-0.000614	0.000	1.144E+12
-347.6829	125585.	0.000				
41.521	0.0297	7941384.	-23374.	-0.000519	0.000	1.144E+12
-300.6621	136465.	0.000				
42.644	0.0233	7599363.	-27116.	-0.000443	0.000	1.768E+12
-255.1119	147346.	0.000				
43.766	0.0177	7211079.	-30237.	-0.000386	0.000	1.769E+12
-208.4550	158227.	0.000				
44.888	0.0129	6784993.	-32732.	-0.000333	0.000	1.770E+12
-162.0758	169107.	0.000				
46.010	0.008767	6329516.	-34612.	-0.000283	0.000	1.771E+12
-117.1766	179988.	0.000				
47.132	0.005276	5852789.	-35905.	-0.000237	0.000	1.772E+12
-74.7751	190869.	0.000				
48.255	0.002383	5362502.	-36649.	-0.000194	0.000	1.773E+12
-35.7046	201749.	0.000				
49.377	3.916E-05	4865741.	-36893.	-0.000156	0.000	1.775E+12
-0.6184	212630.	0.000				
50.499	-0.001808	4368867.	-36695.	-0.000121	0.000	1.776E+12
30.0034	223510.	0.000				
51.621	-0.003208	3877434.	-36129.	-8.933E-05	0.000	1.777E+12
54.1082	227100.	0.000				
52.743	-0.004214	3395814.	-35263.	-6.179E-05	0.000	1.779E+12
74.4635	237980.	0.000				
53.866	-0.004873	2927697.	-34156.	-3.785E-05	0.000	1.780E+12
90.0448	248861.	0.000				
54.988	-0.005233	2475909.	-32870.	-1.742E-05	0.000	1.781E+12
100.9367	259741.	0.000				
56.110	-0.005342	2042425.	-31467.	-3.375E-07	0.000	1.782E+12
107.3447	270622.	0.000				
57.232	-0.005242	1628408.	-30007.	1.353E-05	0.000	1.783E+12
109.5832	281503.	0.000				
58.354	-0.004977	1234262.	-28541.	2.434E-05	0.000	1.784E+12
108.0649	292383.	0.000				
59.477	-0.004587	859714.	-27118.	3.224E-05	0.000	1.785E+12
103.2930	303264.	0.000				
60.599	-0.004109	503897.	-25777.	3.738E-05	0.000	1.785E+12

95.8522	314145.	0.000				
61.721	-0.003580	165463.	-22557.	3.991E-05	0.000	1.785E+12
382.3884	1438437.	0.000				
62.843	-0.003034	-103628.	-17612.	4.014E-05	0.000	1.785E+12
352.0306	1562480.	0.000				
63.965	-0.002499	-308880.	-13091.	3.859E-05	0.000	1.785E+12
319.4687	1721733.	0.000				
65.088	-0.001995	-456198.	-9017.7639	3.570E-05	0.000	1.785E+12
285.4419	1926972.	0.000				
66.210	-0.001537	-551754.	-5408.6624	3.190E-05	0.000	1.785E+12
250.5739	2195109.	0.000				
67.332	-0.001136	-601869.	-2271.3167	2.754E-05	0.000	1.785E+12
215.3777	2553816.	0.000				
68.454	-0.000795	-612927.	392.4460	2.296E-05	0.000	1.785E+12
180.2384	3051695.	0.000				
69.576	-0.000517	-591299.	2584.7329	1.842E-05	0.000	1.785E+12
145.3552	3784032.	0.000				
70.699	-0.000299	-543313.	4307.8921	1.414E-05	0.000	1.785E+12
110.5646	4974665.	0.000				
71.821	-0.000137	-475276.	5555.1278	1.029E-05	0.000	1.785E+12
74.6721	7365610.	0.000				
72.943	-2.204E-05	-393697.	6140.5066	7.016E-06	0.000	1.785E+12
12.2671	7495507.	0.000				
74.065	5.244E-05	-309895.	6025.6242	4.361E-06	0.000	1.785E+12
-29.3292	7531776.	0.000				
75.187	9.543E-05	-231410.	5467.0445	2.319E-06	0.000	1.785E+12
-53.6299	7568045.	0.000				
76.310	0.000115	-162652.	4669.0676	8.325E-07	0.000	1.785E+12
-64.8839	7604313.	0.000				
77.432	0.000118	-105659.	3781.9725	-1.798E-07	0.000	1.785E+12
-66.8655	7640582.	0.000				
78.554	0.000110	-60793.	2909.2962	-8.078E-07	0.000	1.785E+12
-62.7425	7676851.	0.000				
79.676	9.609E-05	-27304.	2116.2479	-1.140E-06	0.000	1.785E+12
-55.0393	7713120.	0.000				
80.798	7.935E-05	-3796.1655	1438.1899	-1.257E-06	0.000	1.785E+12
-45.6644	7749389.	0.000				
81.921	6.223E-05	11431.	888.4875	-1.229E-06	0.000	1.785E+12
-35.9762	7785657.	0.000				
83.043	4.626E-05	20133.	465.3282	-1.110E-06	0.000	1.785E+12
-26.8705	7821926.	0.000				
84.165	3.234E-05	23963.	157.3313	-9.432E-07	0.000	1.785E+12
-18.8725	7858195.	0.000				
85.287	2.086E-05	24371.	-52.0686	-7.609E-07	0.000	1.785E+12
-12.2271	7894464.	0.000				
86.409	1.185E-05	22561.	-181.3812	-5.838E-07	0.000	1.785E+12
-6.9782	7930733.	0.000				
87.532	5.133E-06	19486.	-248.8151	-4.252E-07	0.000	1.785E+12
-3.0370	7967001.	0.000				
88.654	3.977E-07	15860.	-270.8552	-2.918E-07	0.000	1.785E+12
-0.2364	8003270.	0.000				
89.776	-2.726E-06	12191.	-261.4872	-1.860E-07	0.000	1.785E+12
1.6277	8039539.	0.000				
90.898	-4.612E-06	8816.9664	-231.9059	-1.067E-07	0.000	1.785E+12
2.7657	8075808.	0.000				
92.020	-5.601E-06	5944.7980	-190.5653	-5.105E-08	0.000	1.785E+12
3.3741	8112076.	0.000				
93.143	-5.987E-06	3684.5084	-143.4562	-1.472E-08	0.000	1.785E+12
3.6224	8148345.	0.000				
94.265	-5.998E-06	2081.1211	-94.5218	7.035E-09	0.000	1.785E+12
3.6452	8184614.	0.000				
95.387	-5.797E-06	1138.7719	-46.1491	1.918E-08	0.000	1.785E+12
3.5390	8220883.	0.000				

96.509	-5.481E-06	838.1964	-20.6614	2.664E-08	0.000	1.785E+12
0.2464	605356.	0.000				
97.631	-5.080E-06	582.3013	-17.4074	3.200E-08	0.000	1.785E+12
0.2369	628024.	0.000				
98.754	-4.619E-06	369.3652	-14.3096	3.559E-08	0.000	1.785E+12
0.2232	650692.	0.000				
99.876	-4.121E-06	196.9034	-11.4194	3.773E-08	0.000	1.785E+12
0.2061	673360.	0.000				
100.998	-3.603E-06	61.8095	-8.7781	3.870E-08	0.000	1.785E+12
0.1862	696028.	0.000				
102.120	-3.079E-06	-39.5142	-6.4179	3.879E-08	0.000	1.785E+12
0.1643	718696.	0.000				
103.242	-2.558E-06	-111.0428	-4.3633	3.822E-08	0.000	1.785E+12
0.1408	741364.	0.000				
104.365	-2.049E-06	-157.0313	-2.6322	3.721E-08	0.000	1.785E+12
0.1163	764032.	0.000				
105.487	-1.556E-06	-181.9363	-1.2373	3.593E-08	0.000	1.785E+12
0.0909	786700.	0.000				
106.609	-1.081E-06	-190.3561	0.6496	3.453E-08	0.000	1.785E+12
0.1893	2357637.	0.000				
107.731	-6.262E-07	-164.4400	2.6911	3.319E-08	0.000	1.785E+12
0.1139	2448309.	0.000				
108.853	-1.877E-07	-117.8777	3.6959	3.212E-08	0.000	1.785E+12
0.0354	2538981.	0.000				
109.976	2.389E-07	-64.8990	3.6200	3.143E-08	0.000	1.785E+12
-0.0467	2629653.	0.000				
111.098	6.589E-07	-20.3808	2.4097	3.111E-08	0.000	1.785E+12
-0.1331	2720325.	0.000				
112.220	1.077E-06	0.000	0.000	3.103E-08	0.000	1.785E+12
-0.2248	1405499.	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. 6:

Pile-head deflection	=	1.0000000 inches
Computed slope at pile head	=	-0.0027782 radians
Maximum bending moment	=	8680569. inch-lbs
Maximum shear force	=	-36893. lbs
Depth of maximum bending moment	=	37.0326000 feet below pile head
Depth of maximum shear force	=	49.3768000 feet below pile head
Number of iterations	=	81
Number of zero deflection points	=	4

Pile-head Deflection vs. Pile Length for Load Case 6

Boundary Condition Type 4, Deflection and Moment

Deflection	=	1.00000 in
Moment	=	1183200. in- lb

Axial Load = 0. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment in-lbs	Maximum Shear lbs
112.2200	1.0000000	8680569.	-36893.
106.6090	1.0000000	8699609.	-36696.
100.9980	1.0000000	8560408.	-36121.
95.3870	1.0000000	8690727.	-36612.
89.7760	1.0000000	8670054.	-36761.
84.1650	1.0000000	8617068.	-36723.
78.5540	1.0000000	8537347.	-36367.
72.9430	1.0000000	8595186.	-36183.
67.3320	1.0000000	8649093.	-35743.
61.7210	1.0000000	8560604.	-41994.
56.1100	1.0000000	8025547.	-50707.
50.4990	1.0000000	5484685.	-44323.
44.8880	1.0000000	2599184.	-26356.
39.2770	1.0000000	1183200.	-12435.
33.6660	1.0000000	1183200.	-5203.6576945
33.6660	0.000000	83807202875.	-10372383555.
33.6660	0.000000	83807202875.	-10372383555.
33.6660	0.000000	83807202875.	-10372383555.
33.6660	0.000000	83807202875.	-10372383555.
33.6660	0.000000	83807202875.	-10372383555.

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 7

Pile-head conditions are Displacement and Moment (Loading Type 4)

Displacement of pile head	=	1.500000 inches
Moment at pile head	=	1183200.0 in-lbs
Axial load at pile head	=	0.0 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. Spr. Distrib. p lb/in
	Es*h Lat. Load lb/inch	lb/inch					
0.00	1.5000	1183200.	24710.	-0.004346	0.000	1.352E+12	0.000
0.000	0.000	0.000					
1.122	1.4416	1515950.	24710.	-0.004332	0.000	1.352E+12	0.000
0.000	0.000	0.000					
2.244	1.3833	1848700.	24710.	-0.004316	0.000	1.350E+12	0.000
0.000	0.000	0.000					
3.367	1.3253	2181450.	24710.	-0.004296	0.000	1.349E+12	0.000
0.000	0.000	0.000					
4.489	1.2676	2514200.	24710.	-0.004272	0.000	1.348E+12	0.000
0.000	0.000	0.000					
5.611	1.2103	2846950.	24710.	-0.004245	0.000	1.346E+12	0.000
0.000	0.000	0.000					
6.733	1.1533	3179700.	24710.	-0.004215	0.000	1.345E+12	0.000
0.000	0.000	0.000					
7.855	1.0967	3512450.	24710.	-0.004182	0.000	1.344E+12	0.000
0.000	0.000	0.000					

8.978	1.0407	3845200.	24710.	-0.004145	0.000	1.343E+12
0.000	0.000	0.000				
10.100	0.9851	4177950.	24710.	-0.004105	0.000	1.342E+12
0.000	0.000	0.000				
11.222	0.9301	4510700.	24710.	-0.004061	0.000	1.341E+12
0.000	0.000	0.000				
12.344	0.8757	4843450.	24710.	-0.004014	0.000	1.340E+12
0.000	0.000	0.000				
13.466	0.8220	5176200.	24710.	-0.003964	0.000	1.338E+12
0.000	0.000	0.000				
14.589	0.7690	5508950.	24710.	-0.003910	0.000	1.337E+12
0.000	0.000	0.000				
15.711	0.7167	5841700.	24710.	-0.003805	0.000	5.073E+11
0.000	0.000	0.000				
16.833	0.6665	6174450.	24710.	-0.003628	0.000	4.190E+11
0.000	0.000	0.000				
17.955	0.6190	6507200.	24710.	-0.003424	0.000	4.188E+11
0.000	0.000	0.000				
19.077	0.5743	6839950.	24710.	-0.003209	0.000	4.186E+11
0.000	0.000	0.000				
20.200	0.5326	7172700.	24710.	-0.002984	0.000	4.184E+11
0.000	0.000	0.000				
21.322	0.4939	7505450.	24710.	-0.002840	0.000	1.768E+12
0.000	0.000	0.000				
22.444	0.4561	7838200.	24710.	-0.002766	0.000	1.162E+12
0.000	0.000	0.000				
23.566	0.4194	8170950.	24710.	-0.002672	0.000	1.144E+12
0.000	0.000	0.000				
24.688	0.3841	8503700.	24710.	-0.002574	0.000	1.144E+12
0.000	0.000	0.000				
25.811	0.3501	8836450.	24710.	-0.002472	0.000	1.144E+12
0.000	0.000	0.000				
26.933	0.3175	9169200.	24710.	-0.002366	0.000	1.143E+12
0.000	0.000	0.000				
28.055	0.2864	9501950.	23647.	-0.002256	0.000	1.143E+12
-157.8048	7420.1772	0.000				
29.177	0.2568	9806083.	21490.	-0.002142	0.000	1.143E+12
-162.6123	8528.5154	0.000				
30.299	0.2287	10080727.	19274.	-0.002025	0.000	1.143E+12
-166.5091	9804.8294	0.000				
31.422	0.2022	10325176.	16528.	-0.001905	0.000	1.143E+12
-241.1988	16062.	0.000				
32.544	0.1774	10525885.	13158.	-0.001782	0.000	1.142E+12
-259.3549	19689.	0.000				
33.666	0.1542	10679562.	9613.8967	-0.001657	0.000	1.142E+12
-267.0278	23316.	0.000				
34.788	0.1328	10784814.	6027.4950	-0.001530	0.000	1.142E+12
-265.6167	26943.	0.000				
35.910	0.1130	10841899.	2511.7793	-0.001403	0.000	1.142E+12
-256.5297	30570.	0.000				
37.033	0.0950	10852463.	-2964.6119	-0.001275	0.000	1.142E+12
-556.8119	78952.	0.000				
38.155	0.0787	10762054.	-10452.	-0.001148	0.000	1.142E+12
-555.2091	95046.	0.000				
39.277	0.0641	10570960.	-17705.	-0.001022	0.000	1.142E+12
-522.0272	109734.	0.000				
40.399	0.0511	10285200.	-24409.	-0.000899	0.000	1.143E+12
-473.5625	124701.	0.000				
41.521	0.0398	9913562.	-30316.	-0.000780	0.000	1.143E+12
-403.8272	136465.	0.000				
42.644	0.0301	9468693.	-35255.	-0.000666	0.000	1.143E+12
-329.7033	147346.	0.000				
43.766	0.0219	8964033.	-39097.	-0.000557	0.000	1.143E+12

-240.8109	147956.	0.000				
44.888	0.0151	8415705.	-41997.	-0.000455	0.000	1.144E+12
-189.9278	169107.	0.000				
46.010	0.009665	7832934.	-44146.	-0.000360	0.000	1.166E+12
-129.1844	179988.	0.000				
47.132	0.005425	7226736.	-45533.	-0.000287	0.000	1.768E+12
-76.8867	190869.	0.000				
48.255	0.001925	6606595.	-46245.	-0.000235	0.000	1.770E+12
-28.8381	201749.	0.000				
49.377	-0.000898	5981225.	-46344.	-0.000187	0.000	1.772E+12
14.1795	212630.	0.000				
50.499	-0.003109	5358426.	-45901.	-0.000144	0.000	1.773E+12
51.5978	223510.	0.000				
51.621	-0.004772	4744984.	-45012.	-0.000105	0.000	1.775E+12
80.4680	227100.	0.000				
52.743	-0.005950	4146134.	-43762.	-7.176E-05	0.000	1.777E+12
105.1415	237980.	0.000				
53.866	-0.006704	3566351.	-42220.	-4.255E-05	0.000	1.778E+12
123.8975	248861.	0.000				
54.988	-0.007095	3009037.	-40464.	-1.766E-05	0.000	1.779E+12
136.8577	259741.	0.000				
56.110	-0.007180	2476540.	-38571.	3.093E-06	0.000	1.781E+12
144.2875	270622.	0.000				
57.232	-0.007012	1970209.	-36613.	1.990E-05	0.000	1.782E+12
146.5822	281503.	0.000				
58.354	-0.006644	1490460.	-34654.	3.297E-05	0.000	1.783E+12
144.2528	292383.	0.000				
59.477	-0.006124	1036870.	-32754.	4.251E-05	0.000	1.785E+12
137.9150	303264.	0.000				
60.599	-0.005499	608291.	-30962.	4.872E-05	0.000	1.785E+12
128.2794	314145.	0.000				
61.721	-0.004812	202974.	-27113.	5.178E-05	0.000	1.785E+12
443.3469	1240716.	0.000				
62.843	-0.004104	-121945.	-21371.	5.209E-05	0.000	1.785E+12
409.4546	1343416.	0.000				
63.965	-0.003409	-372611.	-16102.	5.022E-05	0.000	1.785E+12
373.1700	1474042.	0.000				
65.088	-0.002752	-555606.	-11332.	4.672E-05	0.000	1.785E+12
335.2687	1640680.	0.000				
66.210	-0.002151	-677801.	-7078.2987	4.206E-05	0.000	1.785E+12
296.4127	1855755.	0.000				
67.332	-0.001619	-746244.	-3351.0111	3.669E-05	0.000	1.785E+12
257.1558	2139053.	0.000				
68.454	-0.001163	-768053.	-152.1379	3.098E-05	0.000	1.785E+12
217.9337	2524028.	0.000				
69.576	-0.000785	-750342.	2520.6465	2.525E-05	0.000	1.785E+12
179.0223	3072646.	0.000				
70.699	-0.000483	-700165.	4671.5020	1.978E-05	0.000	1.785E+12
140.4180	3917404.	0.000				
71.821	-0.000252	-624525.	6300.0295	1.478E-05	0.000	1.785E+12
101.4473	5422303.	0.000				
72.943	-8.465E-05	-530488.	7300.3570	1.042E-05	0.000	1.785E+12
47.1191	7495507.	0.000				
74.065	2.873E-05	-427906.	7509.4098	6.806E-06	0.000	1.785E+12
-16.0711	7531776.	0.000				
75.187	9.864E-05	-328239.	7027.9377	3.953E-06	0.000	1.785E+12
-55.4361	7568045.	0.000				
76.310	0.000135	-238624.	6154.3135	1.814E-06	0.000	1.785E+12
-74.3126	7402013.	0.000				
77.432	0.000148	-162486.	5131.3102	3.009E-07	0.000	1.785E+12
-77.6216	7086504.	0.000				
78.554	0.000143	-100423.	4093.5269	-6.910E-07	0.000	1.785E+12
-76.5077	7189696.	0.000				

```
   79.676   0.000129    -52236.  3089.8255 -1.267E-06      0.000  1.785E+12
-72.5598   7580896.      0.000
   80.798   0.000109    -17206.  2178.2386 -1.529E-06      0.000  1.785E+12
-62.8271   7749389.      0.000
   81.921  8.771E-05  6430.5559  1413.7592 -1.570E-06      0.000  1.785E+12
-50.7117   7785657.      0.000
   83.043  6.690E-05     20871.   810.6525 -1.467E-06      0.000  1.785E+12
-38.8603   7821926.      0.000
   84.165  4.821E-05     28264.   359.5636 -1.281E-06      0.000  1.785E+12
-28.1344   7858195.      0.000
   85.287  3.240E-05     30555.    42.2565 -1.059E-06      0.000  1.785E+12
-18.9914   7894464.      0.000
   86.409  1.968E-05     29402.  -163.6650 -8.331E-07      0.000  1.785E+12
-11.5916   7930733.      0.000
   87.532  9.957E-06     26147.  -281.3787 -6.235E-07      0.000  1.785E+12
-5.8909   7967001.      0.000
   88.654  2.889E-06     21823.  -332.6035 -4.426E-07      0.000  1.785E+12
-1.7169   8003270.      0.000
   89.776 -1.962E-06     17189.  -336.2760 -2.954E-07      0.000  1.785E+12
1.1714   8039539.      0.000
   90.898 -5.067E-06     12767.  -307.9305 -1.824E-07      0.000  1.785E+12
3.0384   8075808.      0.000
   92.020 -6.874E-06  8895.3938  -259.5927 -1.006E-07      0.000  1.785E+12
4.1406   8112076.      0.000
   93.143 -7.777E-06  5775.0528  -200.0289 -4.528E-08      0.000  1.785E+12
4.7057   8148345.      0.000
   94.265 -8.093E-06  3508.0558  -135.2246 -1.026E-08      0.000  1.785E+12
4.9189   8184614.      0.000
   95.387 -8.053E-06  2133.0744   -69.0024  1.102E-08      0.000  1.785E+12
4.9163   8220883.      0.000
   96.509 -7.796E-06  1649.6269   -33.5405  2.529E-08      0.000  1.785E+12
0.3505    605356.      0.000
   97.631 -7.372E-06  1229.7352   -28.8658  3.616E-08      0.000  1.785E+12
0.3438    628024.      0.000
   98.754 -6.823E-06   872.1899   -24.3312  4.409E-08      0.000  1.785E+12
0.3297    650692.      0.000
   99.876 -6.185E-06   574.4273   -20.0293  4.955E-08      0.000  1.785E+12
0.3092    673360.      0.000
  100.998 -5.488E-06   332.7446   -16.0371  5.297E-08      0.000  1.785E+12
0.2837    696028.      0.000
  102.120 -4.758E-06   142.5027   -12.4174  5.476E-08      0.000  1.785E+12
0.2539    718696.      0.000
  103.242 -4.013E-06    -1.6901    -9.2199  5.529E-08      0.000  1.785E+12
0.2209    741364.      0.000
  104.365 -3.269E-06  -105.8158    -6.4835  5.489E-08      0.000  1.785E+12
0.1855    764032.      0.000
  105.487 -2.535E-06  -176.3094    -4.2376  5.382E-08      0.000  1.785E+12
0.1481    786700.      0.000
  106.609 -1.819E-06  -219.9462    -1.0958  5.233E-08      0.000  1.785E+12
0.3185   2357637.      0.000
  107.731 -1.126E-06  -205.8237     2.4268  5.072E-08      0.000  1.785E+12
0.2047   2448309.      0.000
  108.853 -4.532E-07  -154.5845     4.3803  4.936E-08      0.000  1.785E+12
0.0854   2538981.      0.000
  109.976  2.037E-07   -87.8498     4.6879  4.845E-08      0.000  1.785E+12
-0.0398   2629653.      0.000
  111.098  8.516E-07   -28.3269     3.2618  4.801E-08      0.000  1.785E+12
-0.1720   2720325.      0.000
  112.220  1.497E-06      0.000      0.000  4.790E-08      0.000  1.785E+12
-0.3124   1405499.      0.000

* This analysis computed pile response using nonlinear moment-curvature
relationships.
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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. 7:

Pile-head deflection	=	1.5000000	inches
Computed slope at pile head	=	-0.0043459	radians
Maximum bending moment	=	10852463.	inch-lbs
Maximum shear force	=	-46344.	lbs
Depth of maximum bending moment	=	37.0326000	feet below pile head
Depth of maximum shear force	=	49.3768000	feet below pile head
Number of iterations	=	109	
Number of zero deflection points	=	4	

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 8

Pile-head conditions are Displacement and Moment (Loading Type 4)

Displacement of pile head	=	2.000000	inches
Moment at pile head	=	1183200.0	in-lbs
Axial load at pile head	=	0.0	lbs

Depth X	Deflect. y	Bending Moment	Shear Force	Slope S	Total Stress	Bending Stiffness	Soil Res. Spr. Distrib. p
feet	inches	in-lbs	lbs	radians	psi*	lb-in^2	lb/in
Es*h lb/inch	Lat. Load lb/inch						
0.00	2.0000	1183200.	31438.	-0.005894	0.000	1.352E+12	
0.000	0.000	0.000					
1.122	1.9207	1606553.	31438.	-0.005880	0.000	1.352E+12	
0.000	0.000	0.000					
2.244	1.8416	2029906.	31438.	-0.005862	0.000	1.349E+12	
0.000	0.000	0.000					
3.367	1.7628	2453258.	31438.	-0.005840	0.000	1.348E+12	
0.000	0.000	0.000					
4.489	1.6844	2876611.	31438.	-0.005813	0.000	1.346E+12	
0.000	0.000	0.000					
5.611	1.6063	3299964.	31438.	-0.005782	0.000	1.345E+12	
0.000	0.000	0.000					
6.733	1.5286	3723317.	31438.	-0.005747	0.000	1.343E+12	
0.000	0.000	0.000					
7.855	1.4515	4146670.	31438.	-0.005707	0.000	1.342E+12	
0.000	0.000	0.000					
8.978	1.3749	4570023.	31438.	-0.005664	0.000	1.340E+12	
0.000	0.000	0.000					
10.100	1.2990	4993375.	31438.	-0.005616	0.000	1.339E+12	
0.000	0.000	0.000					
11.222	1.2237	5416728.	31438.	-0.005563	0.000	1.338E+12	
0.000	0.000	0.000					
12.344	1.1491	5840081.	31438.	-0.005477	0.000	6.654E+11	

0.000	0.000	0.000				
13.466	1.0762	6263434.	31438.	-0.005317	0.000	4.189E+11
0.000	0.000	0.000				
14.589	1.0059	6686787.	31438.	-0.005109	0.000	4.187E+11
0.000	0.000	0.000				
15.711	0.9386	7110139.	31438.	-0.004887	0.000	4.184E+11
0.000	0.000	0.000				
16.833	0.8743	7533492.	31438.	-0.004651	0.000	4.182E+11
0.000	0.000	0.000				
17.955	0.8133	7956845.	31438.	-0.004402	0.000	4.180E+11
0.000	0.000	0.000				
19.077	0.7557	8380198.	31438.	-0.004138	0.000	4.177E+11
0.000	0.000	0.000				
20.200	0.7018	8803551.	31438.	-0.003861	0.000	4.175E+11
0.000	0.000	0.000				
21.322	0.6518	9226904.	31438.	-0.003665	0.000	1.143E+12
0.000	0.000	0.000				
22.444	0.6031	9650256.	31438.	-0.003554	0.000	1.143E+12
0.000	0.000	0.000				
23.566	0.5560	10073609.	31438.	-0.003438	0.000	1.143E+12
0.000	0.000	0.000				
24.688	0.5105	10496962.	31438.	-0.003316	0.000	1.142E+12
0.000	0.000	0.000				
25.811	0.4667	10920315.	31438.	-0.003190	0.000	1.142E+12
0.000	0.000	0.000				
26.933	0.4246	11343668.	31438.	-0.003059	0.000	1.142E+12
0.000	0.000	0.000				
28.055	0.3843	11767021.	30266.	-0.002923	0.000	1.142E+12
-174.0611	6098.8331	0.000				
29.177	0.3459	12158808.	27884.	-0.002781	0.000	1.141E+12
-179.5956	6991.7259	0.000				
30.299	0.3094	12518028.	25435.	-0.002636	0.000	1.141E+12
-184.1630	8015.0495	0.000				
31.422	0.2749	12843850.	21987.	-0.002486	0.000	1.141E+12
-327.9112	16062.	0.000				
32.544	0.2425	13110208.	17393.	-0.002333	0.000	1.141E+12
-354.4971	19689.	0.000				
33.666	0.2121	13312280.	12533.	-0.002177	0.000	1.140E+12
-367.2077	23316.	0.000				
34.788	0.1838	13447761.	7584.2495	-0.002019	0.000	1.140E+12
-367.7923	26943.	0.000				
35.910	0.1577	13516545.	2697.2761	-0.001860	0.000	1.140E+12
-358.0102	30570.	0.000				
37.033	0.1337	13520406.	-3922.8342	-0.001700	0.000	1.140E+12
-625.1939	62952.	0.000				
38.155	0.1119	13410892.	-12369.	-0.001541	0.000	1.140E+12
-629.1935	75705.	0.000				
39.277	0.0922	13187278.	-20646.	-0.001384	0.000	1.141E+12
-600.0923	87616.	0.000				
40.399	0.0746	12854840.	-28419.	-0.001230	0.000	1.141E+12
-554.3230	100005.	0.000				
41.521	0.0591	12421879.	-35458.	-0.001081	0.000	1.141E+12
-491.0954	111905.	0.000				
42.644	0.0455	11899862.	-41497.	-0.000938	0.000	1.141E+12
-405.7999	120037.	0.000				
43.766	0.0338	11304254.	-46295.	-0.000801	0.000	1.142E+12
-306.8350	122092.	0.000				
44.888	0.0240	10653005.	-50172.	-0.000671	0.000	1.142E+12
-268.8777	151139.	0.000				
46.010	0.0158	9952995.	-53400.	-0.000550	0.000	1.143E+12
-210.6658	179988.	0.000				
47.132	0.009146	9214783.	-55692.	-0.000437	0.000	1.143E+12
-129.6319	190869.	0.000				

48.255	0.003992	8453063.	-56967.	-0.000333	0.000	1.144E+12
-59.8049	201749.	0.000				
49.377	0.000178	7680498.	-57389.	-0.000254	0.000	1.767E+12
-2.8104	212630.	0.000				
50.499	-0.002848	6907423.	-57089.	-0.000198	0.000	1.769E+12
47.2670	223510.	0.000				
51.621	-0.005166	6142920.	-56185.	-0.000149	0.000	1.771E+12
87.1145	227100.	0.000				
52.743	-0.006855	5394214.	-54782.	-0.000105	0.000	1.773E+12
121.1356	237980.	0.000				
53.866	-0.007992	4667475.	-52972.	-6.675E-05	0.000	1.775E+12
147.6921	248861.	0.000				
54.988	-0.008652	3967520.	-50854.	-3.402E-05	0.000	1.777E+12
166.8901	259741.	0.000				
56.110	-0.008908	3297829.	-48525.	-6.502E-06	0.000	1.779E+12
179.0188	270622.	0.000				
57.232	-0.008828	2660602.	-46077.	1.604E-05	0.000	1.780E+12
184.5331	281503.	0.000				
58.354	-0.008476	2056839.	-43596.	3.388E-05	0.000	1.782E+12
184.0331	292383.	0.000				
59.477	-0.007915	1486449.	-41156.	4.726E-05	0.000	1.783E+12
178.2513	303264.	0.000				
60.599	-0.007203	948384.	-38825.	5.645E-05	0.000	1.785E+12
168.0368	314145.	0.000				
61.721	-0.006395	440792.	-34252.	6.169E-05	0.000	1.785E+12
511.0882	1076263.	0.000				
62.843	-0.005542	25882.	-27607.	6.345E-05	0.000	1.785E+12
475.7748	1156147.	0.000				
63.965	-0.004686	-302749.	-21458.	6.241E-05	0.000	1.785E+12
437.4982	1257299.	0.000				
65.088	-0.003861	-552042.	-15838.	5.918E-05	0.000	1.785E+12
397.1199	1385140.	0.000				
66.210	-0.003092	-729320.	-10772.	5.435E-05	0.000	1.785E+12
355.3801	1547828.	0.000				
67.332	-0.002397	-842152.	-6271.8856	4.842E-05	0.000	1.785E+12
312.9104	1757909.	0.000				
68.454	-0.001788	-898239.	-2345.4604	4.185E-05	0.000	1.785E+12
270.2336	2035531.	0.000				
69.576	-0.001270	-905322.	1007.5279	3.505E-05	0.000	1.785E+12
227.7448	2415291.	0.000				
70.699	-0.000844	-871104.	3791.0138	2.835E-05	0.000	1.785E+12
185.6524	2962912.	0.000				
71.821	-0.000506	-803219.	6009.3535	2.203E-05	0.000	1.785E+12
143.8106	3824992.	0.000				
72.943	-0.000250	-709255.	7658.6776	1.632E-05	0.000	1.785E+12
101.1434	5438614.	0.000				
74.065	-6.664E-05	-596949.	8590.6604	1.140E-05	0.000	1.785E+12
37.2726	7531776.	0.000				
75.187	5.650E-05	-477885.	8627.8346	7.341E-06	0.000	1.785E+12
-31.7516	7568045.	0.000				
76.310	0.000131	-364578.	7921.3656	4.163E-06	0.000	1.785E+12
-73.1716	7517320.	0.000				
77.432	0.000169	-264540.	6869.8991	1.789E-06	0.000	1.785E+12
-82.9899	6628041.	0.000				
78.554	0.000179	-179552.	5734.9394	1.137E-07	0.000	1.785E+12
-85.5718	6428083.	0.000				
79.676	0.000172	-110082.	4594.9240	-9.790E-07	0.000	1.785E+12
-83.7407	6568665.	0.000				
80.798	0.000153	-55798.	3498.9637	-1.605E-06	0.000	1.785E+12
-79.0289	6960318.	0.000				
81.921	0.000128	-15845.	2479.1182	-1.875E-06	0.000	1.785E+12
-72.4363	7593807.	0.000				
83.043	0.000102	10972.	1590.9151	-1.894E-06	0.000	1.785E+12

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-59.4777   7821926.      0.000
    84.165  7.746E-05     27003.   886.1050 -1.750E-06      0.000  1.785E+12
-45.1992   7858195.      0.000
    85.287  5.526E-05     34837.   363.6487 -1.517E-06      0.000  1.785E+12
-32.3949   7894464.      0.000
    86.409  3.660E-05     36797.     0.3885 -1.247E-06      0.000  1.785E+12
-21.5557   7930733.      0.000
    87.532  2.168E-05     34847.  -231.1252 -9.764E-07      0.000  1.785E+12
-12.8282   7967001.      0.000
    88.654  1.031E-05     30572.  -358.7385 -7.295E-07      0.000  1.785E+12
-6.1247   8003270.      0.000
    89.776  2.034E-06     25186.  -408.1546 -5.192E-07      0.000  1.785E+12
-1.2145   8039539.      0.000
    90.898 -3.678E-06     19579.  -401.4819 -3.503E-07      0.000  1.785E+12
2.2055   8075808.      0.000
    92.020 -7.400E-06     14373.  -356.6165 -2.222E-07      0.000  1.785E+12
4.4578   8112076.      0.000
    93.143 -9.662E-06  9974.4837  -287.2356 -1.303E-07      0.000  1.785E+12
5.8465   8148345.      0.000
    94.265 -1.091E-05  6636.5657  -203.2201 -6.767E-08      0.000  1.785E+12
6.6313   8184614.      0.000
    95.387 -1.148E-05  4501.1980  -111.3621 -2.565E-08      0.000  1.785E+12
7.0112   8220883.      0.000
    96.509 -1.160E-05  3637.2718   -60.6426  5.051E-09      0.000  1.785E+12
0.5215    605356.      0.000
    97.631 -1.135E-05  2867.9220   -53.5674  2.959E-08      0.000  1.785E+12
0.5293    628024.      0.000
    98.754 -1.080E-05  2194.5519   -46.4885  4.869E-08      0.000  1.785E+12
0.5221    650692.      0.000
    99.876 -1.004E-05  1615.8571   -39.5939  6.307E-08      0.000  1.785E+12
0.5019    673360.      0.000
   100.998 -9.106E-06  1128.1786   -33.0455  7.342E-08      0.000  1.785E+12
0.4707    696028.      0.000
   102.120 -8.060E-06   725.8504   -26.9801  8.042E-08      0.000  1.785E+12
0.4302    718696.      0.000
   103.242 -6.940E-06   401.5280   -21.5112  8.467E-08      0.000  1.785E+12
0.3821    741364.      0.000
   104.365 -5.779E-06   146.4923   -16.7308  8.674E-08      0.000  1.785E+12
0.3279    764032.      0.000
   105.487 -4.604E-06   -49.0796   -12.7120  8.711E-08      0.000  1.785E+12
0.2690    786700.      0.000
   106.609 -3.433E-06  -195.8766    -6.8535  8.618E-08      0.000  1.785E+12
0.6011   2357637.      0.000
   107.731 -2.283E-06  -233.6640    -0.0114  8.456E-08      0.000  1.785E+12
0.4150   2448309.      0.000
   108.853 -1.156E-06  -196.1847     4.2507  8.294E-08      0.000  1.785E+12
0.2180   2538981.      0.000
   109.976 -4.910E-08  -119.1798     5.7829  8.175E-08      0.000  1.785E+12
0.009588   2629653.      0.000
   111.098  1.046E-06   -40.4361     4.4251  8.115E-08      0.000  1.785E+12
-0.2112   2720325.      0.000
   112.220  2.136E-06      0.000      0.000  8.099E-08      0.000  1.785E+12
-0.4460   1405499.      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. 8:

Pile-head deflection              =      2.0000000 inches
Computed slope at pile head       =     -0.0058940 radians
Maximum bending moment            =      13520406. inch-lbs
Maximum shear force               =        -57389. lbs
Depth of maximum bending moment   =     37.0326000 feet below pile head
Depth of maximum shear force      =     49.3768000 feet below pile head
Number of iterations              =            197
Number of zero deflection points  =              4


--------------------------------------------------------------------------------
                Computed Values of Pile Loading and Deflection
                  for Lateral Loading for Load Case Number 9
--------------------------------------------------------------------------------

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

Shear force at pile head                              =       8800.0 lbs
Applied moment at pile head                           =    1382400.0 in-lbs
Axial thrust load on pile head                        =          0.0 lbs

   Depth    Deflect.    Bending    Shear       Slope      Total     Bending   Soil
Res.  Soil Spr.   Distrib.
     X          y        Moment     Force         S       Stress   Stiffness      p
     Es*h    Lat. Load
   feet      inches      in-lbs      lbs       radians      psi*      lb-in^2    lb/in
     lb/inch    lb/inch
---------- ---------- ---------- ---------- ---------- ---------- ----------
---------- ---------- ----------
      0.00     0.4387   1382400.  8800.0000  -0.001324      0.000  1.351E+12
0.000      0.000      0.000
     1.122     0.4210   1500904.  8800.0000  -0.001310      0.000  1.351E+12
0.000      0.000      0.000
     2.244     0.4034   1619409.  8800.0000  -0.001294      0.000  1.351E+12
0.000      0.000      0.000
     3.367     0.3861   1737913.  8800.0000  -0.001278      0.000  1.350E+12
0.000      0.000      0.000
     4.489     0.3690   1856417.  8800.0000  -0.001260      0.000  1.350E+12
0.000      0.000      0.000
     5.611     0.3522   1974922.  8800.0000  -0.001241      0.000  1.349E+12
0.000      0.000      0.000
     6.733     0.3356   2093426.  8800.0000  -0.001220      0.000  1.349E+12
0.000      0.000      0.000
     7.855     0.3193   2211930.  8800.0000  -0.001199      0.000  1.349E+12
0.000      0.000      0.000
     8.978     0.3033   2330435.  8800.0000  -0.001176      0.000  1.348E+12
0.000      0.000      0.000
    10.100     0.2876   2448939.  8800.0000  -0.001152      0.000  1.348E+12
0.000      0.000      0.000
    11.222     0.2723   2567443.  8800.0000  -0.001127      0.000  1.348E+12
0.000      0.000      0.000
    12.344     0.2573   2685948.  8800.0000  -0.001101      0.000  1.347E+12
0.000      0.000      0.000
    13.466     0.2426   2804452.  8800.0000  -0.001074      0.000  1.347E+12
0.000      0.000      0.000
    14.589     0.2284   2922956.  8800.0000  -0.001045      0.000  1.346E+12
0.000      0.000      0.000
    15.711     0.2145   3041460.  8800.0000  -0.001015      0.000  1.346E+12
```

0.000	0.000	0.000				
16.833	0.2010	3159965.	8800.0000	-0.000984	0.000	1.345E+12
0.000	0.000	0.000				
17.955	0.1880	3278469.	8800.0000	-0.000952	0.000	1.345E+12
0.000	0.000	0.000				
19.077	0.1754	3396973.	8800.0000	-0.000918	0.000	1.345E+12
0.000	0.000	0.000				
20.200	0.1632	3515478.	8800.0000	-0.000884	0.000	1.344E+12
0.000	0.000	0.000				
21.322	0.1516	3633982.	8800.0000	-0.000852	0.000	1.778E+12
0.000	0.000	0.000				
22.444	0.1403	3752486.	8800.0000	-0.000824	0.000	1.778E+12
0.000	0.000	0.000				
23.566	0.1294	3870991.	8800.0000	-0.000796	0.000	1.777E+12
0.000	0.000	0.000				
24.688	0.1189	3989495.	8800.0000	-0.000766	0.000	1.777E+12
0.000	0.000	0.000				
25.811	0.1088	4107999.	8800.0000	-0.000735	0.000	1.777E+12
0.000	0.000	0.000				
26.933	0.0991	4226504.	8800.0000	-0.000704	0.000	1.776E+12
0.000	0.000	0.000				
28.055	0.0898	4345008.	8078.1293	-0.000671	0.000	1.776E+12
-107.2106	16076.	0.000				
29.177	0.0810	4444070.	6610.9328	-0.000638	0.000	1.776E+12
-110.6941	18405.	0.000				
30.299	0.0726	4523059.	5100.6824	-0.000604	0.000	1.776E+12
-113.6049	21063.	0.000				
31.422	0.0647	4581446.	3815.8905	-0.000569	0.000	1.775E+12
-77.2095	16062.	0.000				
32.544	0.0573	4625832.	2731.9203	-0.000534	0.000	1.775E+12
-83.7793	19689.	0.000				
33.666	0.0503	4655024.	1580.9209	-0.000499	0.000	1.775E+12
-87.1646	23316.	0.000				
34.788	0.0439	4668410.	403.1654	-0.000464	0.000	1.775E+12
-87.7531	26943.	0.000				
35.910	0.0379	4665883.	-766.2925	-0.000428	0.000	1.775E+12
-85.9322	30570.	0.000				
37.033	0.0323	4647772.	-2847.0913	-0.000393	0.000	1.775E+12
-223.1034	92943.	0.000				
38.155	0.0273	4589202.	-5764.9652	-0.000358	0.000	1.775E+12
-210.2528	103823.	0.000				
39.277	0.0227	4492505.	-8481.6738	-0.000323	0.000	1.776E+12
-193.2268	114704.	0.000				
40.399	0.0186	4360767.	-10948.	-0.000290	0.000	1.776E+12
-173.0689	125585.	0.000				
41.521	0.0149	4197644.	-13128.	-0.000257	0.000	1.776E+12
-150.7541	136465.	0.000				
42.644	0.0116	4007183.	-15000.	-0.000226	0.000	1.777E+12
-127.1782	147346.	0.000				
43.766	0.008779	3793659.	-16551.	-0.000197	0.000	1.777E+12
-103.1505	158227.	0.000				
44.888	0.006322	3561429.	-17780.	-0.000169	0.000	1.778E+12
-79.3870	169107.	0.000				
46.010	0.004228	3314803.	-18695.	-0.000143	0.000	1.779E+12
-56.5074	179988.	0.000				
47.132	0.002472	3057929.	-19311.	-0.000119	0.000	1.779E+12
-35.0336	190869.	0.000				
48.255	0.001027	2794703.	-19651.	-9.669E-05	0.000	1.780E+12
-15.3911	201749.	0.000				
49.377	-0.000132	2528685.	-19740.	-7.656E-05	0.000	1.781E+12
2.0899	212630.	0.000				
50.499	-0.001035	2263046.	-19610.	-5.844E-05	0.000	1.782E+12
17.1708	223510.	0.000				

Moment Fixity @ 71.82' El. -62.60

51.621	-0.001706	2000521.	-19301.	-4.233E-05	0.000	1.782E+12
28.7763	227100.	0.000				
52.743	-0.002175	1743215.	-18849.	-2.819E-05	0.000	1.783E+12
38.4300	237980.	0.000				
53.866	-0.002466	1492877.	-18283.	-1.597E-05	0.000	1.783E+12
45.5632	248861.	0.000				
54.988	-0.002605	1250802.	-17638.	-5.608E-06	0.000	1.784E+12
50.2381	259741.	0.000				
56.110	-0.002617	1017838.	-16946.	2.953E-06	0.000	1.785E+12
52.5827	270622.	0.000				
57.232	-0.002525	794409.	-16236.	9.790E-06	0.000	1.785E+12
52.7847	281503.	0.000				
58.354	-0.002353	580552.	-15537.	1.498E-05	0.000	1.785E+12
51.0862	292383.	0.000				
59.477	-0.002122	375959.	-14871.	1.859E-05	0.000	1.785E+12
47.7809	303264.	0.000				
60.599	-0.001852	180031.	-14258.	2.068E-05	0.000	1.785E+12
43.2109	314145.	0.000				
61.721	-0.001565	-8060.3036	-12264.	2.133E-05	0.000	1.785E+12
252.9842	2177373.	0.000				
62.843	-0.001278	-150275.	-9021.1476	2.074E-05	0.000	1.785E+12
228.6513	2409760.	0.000				
63.965	-0.001006	-251025.	-6115.1742	1.922E-05	0.000	1.785E+12
202.9374	2716073.	0.000				
65.088	-0.000760	-314974.	-3560.8544	1.709E-05	0.000	1.785E+12
176.4245	3125711.	0.000				
66.210	-0.000546	-346929.	-1365.8248	1.459E-05	0.000	1.785E+12
149.5764	3689101.	0.000				
67.332	-0.000367	-351759.	467.5686	1.195E-05	0.000	1.785E+12
122.7151	4500702.	0.000				
68.454	-0.000224	-334336.	1939.7972	9.364E-06	0.000	1.785E+12
95.9370	5765340.	0.000				
69.576	-0.000115	-299515.	3010.3882	6.973E-06	0.000	1.785E+12
63.0648	7386701.	0.000				
70.699	-3.629E-05	-253258.	3569.7105	4.887E-06	0.000	1.785E+12
20.0045	7422970.	0.000				
71.821	1.665E-05	-203373.	3642.2911	3.164E-06	0.000	1.785E+12
-9.2250	7459238.	0.000				
72.943	4.893E-05	-155161.	3396.7830	1.812E-06	0.000	1.785E+12
-27.2373	7495507.	0.000				
74.065	6.545E-05	-111888.	2966.9173	8.042E-07	0.000	1.785E+12
-36.6054	7531776.	0.000				
75.187	7.059E-05	-75253.	2453.3196	9.813E-08	0.000	1.785E+12
-39.6730	7568045.	0.000				
76.310	6.809E-05	-45813.	1927.2996	-3.586E-07	0.000	1.785E+12
-38.4503	7604313.	0.000				
77.432	6.093E-05	-23346.	1435.6194	-6.196E-07	0.000	1.785E+12
-34.5729	7640582.	0.000				
78.554	5.140E-05	-7147.8385	1005.5190	-7.346E-07	0.000	1.785E+12
-29.3046	7676851.	0.000				
79.676	4.115E-05	3735.7747	649.5104	-7.475E-07	0.000	1.785E+12
-23.5690	7713120.	0.000				
80.798	3.127E-05	10345.	369.6412	-6.944E-07	0.000	1.785E+12
-17.9966	7749389.	0.000				
81.921	2.245E-05	13691.	161.0785	-6.037E-07	0.000	1.785E+12
-12.9787	7785657.	0.000				
83.043	1.501E-05	14684.	14.9676	-4.966E-07	0.000	1.785E+12
-8.7214	7821926.	0.000				
84.165	9.073E-06	14094.	-79.4052	-3.880E-07	0.000	1.785E+12
-5.2947	7858195.	0.000				
85.287	4.564E-06	12545.	-133.0702	-2.875E-07	0.000	1.785E+12
-2.6755	7894464.	0.000				
86.409	1.329E-06	10510.	-156.3563	-2.005E-07	0.000	1.785E+12

```
-0.7829   7930733.      0.000
    87.532 -8.374E-07  8333.8728  -158.2917 -1.295E-07      0.000  1.785E+12
0.4954   7967001.      0.000
    88.654 -2.157E-06  6247.1731  -146.3236 -7.444E-08      0.000  1.785E+12
1.2821   8003270.      0.000
    89.776 -2.842E-06  4392.9696  -126.2657 -3.430E-08      0.000  1.785E+12
1.6969   8039539.      0.000
    90.898 -3.081E-06  2846.4830  -102.3997 -6.985E-09      0.000  1.785E+12
1.8477   8075808.      0.000
    92.020 -3.030E-06  1635.0579   -77.6677  9.923E-09      0.000  1.785E+12
1.8255   8112076.      0.000
    93.143 -2.814E-06   754.6757   -53.9127  1.894E-08      0.000  1.785E+12
1.7025   8148345.      0.000
    94.265 -2.520E-06   183.0378   -32.1353  2.248E-08      0.000  1.785E+12
1.5318   8184614.      0.000
    95.387 -2.208E-06  -110.8179   -12.7442  2.275E-08      0.000  1.785E+12
1.3481   8220883.      0.000
    96.509 -1.908E-06  -160.1994    -3.0896  2.173E-08      0.000  1.785E+12
0.0858    605356.      0.000
    97.631 -1.623E-06  -194.0301    -2.0025  2.039E-08      0.000  1.785E+12
0.0757    628024.      0.000
    98.754 -1.358E-06  -214.1336    -1.0509  1.885E-08      0.000  1.785E+12
0.0656    650692.      0.000
    99.876 -1.115E-06  -222.3339    -0.2334  1.720E-08      0.000  1.785E+12
0.0558    673360.      0.000
   100.998 -8.951E-07  -220.4196     0.4536  1.553E-08      0.000  1.785E+12
0.0463    696028.      0.000
   102.120 -6.971E-07  -210.1160     1.0156  1.391E-08      0.000  1.785E+12
0.0372    718696.      0.000
   103.242 -5.204E-07  -193.0659     1.4590  1.239E-08      0.000  1.785E+12
0.0287    741364.      0.000
   104.365 -3.634E-07  -170.8199     1.7908  1.102E-08      0.000  1.785E+12
0.0206    764032.      0.000
   105.487 -2.238E-07  -144.8348     2.0176  9.824E-09      0.000  1.785E+12
0.0131    786700.      0.000
   106.609 -9.882E-08  -116.4790     2.2222  8.839E-09      0.000  1.785E+12
0.0173   2357637.      0.000
   107.731  1.428E-08   -84.9857     2.3212  8.079E-09      0.000  1.785E+12
-0.002597   2448309.      0.000
   108.853  1.188E-07   -53.9633     2.1529  7.554E-09      0.000  1.785E+12
-0.0224   2538981.      0.000
   109.976  2.177E-07   -27.0011     1.7159  7.249E-09      0.000  1.785E+12
-0.0425   2629653.      0.000
   111.098  3.140E-07    -7.7495     1.0025  7.118E-09      0.000  1.785E+12
-0.0634   2720325.      0.000
   112.220  4.094E-07     0.000      0.000   7.088E-09      0.000  1.785E+12
-0.0855   1405499.      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. 9:

Pile-head deflection             =      0.4387188 inches
Computed slope at pile head      =     -0.0013244 radians
```



```
Maximum bending moment           =       4668410. inch-lbs
Maximum shear force              =        -19740. lbs
Depth of maximum bending moment  =     34.7882000 feet below pile head
Depth of maximum shear force     =     49.3768000 feet below pile head
Number of iterations             =              8
Number of zero deflection points =              4
```

Pile-head Deflection vs. Pile Length for Load Case 9

Boundary Condition Type 1, Shear and Moment

```
Shear      =           8800.  lb
Moment     =        1382400. in- lb
Axial Load =              0.  lb
```

Pile Length feet	Pile Head Deflection inches	Maximum Moment ln-lbs	Maximum Shear lbs
112.2200	0.4387188	4668410.	-19740.
106.6090	0.4287418	4629756.	-19387.
100.9980	0.4286872	4597442.	-19273.
95.3870	0.4319256	4637781.	-19431.
89.7760	0.4371260	4655294.	-19605.
84.1650	0.4369732	4639748.	-19589.
78.5540	0.4354110	4623470.	-19540.
72.9430	0.4360957	4653207.	-19551.
67.3320	0.4334746	4638945.	-19011.
61.7210	0.4499110	4647651.	-22126.
56.1100	0.4994044	4588656.	-27718.
50.4990	0.7610424	4507667.	-35619.
44.8880	2.3833130	4438163.	-47500.
39.2770	72.4346727	4331232.	-68348.

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 10

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

```
Shear force at pile head                              =       8700.0 lbs
Applied moment at pile head                           =    1183200.0 in-lbs
Axial thrust load on pile head                        =          0.0 lbs
```

Depth X	Deflect. y	Bending Moment	Shear Force	Slope S	Total Stress	Bending Stiffness	Soil Res. Spr. Distrib. p
Es*h	Lat. Load						
feet	inches	in-lbs	lbs	radians	psi*	lb-in^2	lb/in
lb/inch	lb/inch						
0.00	0.4153	1183200.	8700.0000	-0.001241	0.000	1.352E+12	
0.000	0.000	0.000					
1.122	0.3987	1300358.	8700.0000	-0.001229	0.000	1.352E+12	
0.000	0.000	0.000					

2.244	0.3822	1417515.	8700.0000	-0.001215	0.000	1.351E+12
0.000	0.000	0.000				
3.367	0.3660	1534673.	8700.0000	-0.001201	0.000	1.351E+12
0.000	0.000	0.000				
4.489	0.3499	1651831.	8700.0000	-0.001185	0.000	1.351E+12
0.000	0.000	0.000				
5.611	0.3340	1768988.	8700.0000	-0.001168	0.000	1.350E+12
0.000	0.000	0.000				
6.733	0.3184	1886146.	8700.0000	-0.001149	0.000	1.350E+12
0.000	0.000	0.000				
7.855	0.3031	2003304.	8700.0000	-0.001130	0.000	1.349E+12
0.000	0.000	0.000				
8.978	0.2880	2120461.	8700.0000	-0.001109	0.000	1.349E+12
0.000	0.000	0.000				
10.100	0.2732	2237619.	8700.0000	-0.001088	0.000	1.348E+12
0.000	0.000	0.000				
11.222	0.2587	2354777.	8700.0000	-0.001065	0.000	1.348E+12
0.000	0.000	0.000				
12.344	0.2445	2471934.	8700.0000	-0.001041	0.000	1.348E+12
0.000	0.000	0.000				
13.466	0.2307	2589092.	8700.0000	-0.001015	0.000	1.347E+12
0.000	0.000	0.000				
14.589	0.2172	2706250.	8700.0000	-0.000989	0.000	1.347E+12
0.000	0.000	0.000				
15.711	0.2041	2823408.	8700.0000	-0.000961	0.000	1.347E+12
0.000	0.000	0.000				
16.833	0.1913	2940565.	8700.0000	-0.000932	0.000	1.346E+12
0.000	0.000	0.000				
17.955	0.1789	3057723.	8700.0000	-0.000902	0.000	1.346E+12
0.000	0.000	0.000				
19.077	0.1670	3174881.	8700.0000	-0.000871	0.000	1.345E+12
0.000	0.000	0.000				
20.200	0.1555	3292038.	8700.0000	-0.000839	0.000	1.345E+12
0.000	0.000	0.000				
21.322	0.1444	3409196.	8700.0000	-0.000809	0.000	1.779E+12
0.000	0.000	0.000				
22.444	0.1337	3526354.	8700.0000	-0.000783	0.000	1.778E+12
0.000	0.000	0.000				
23.566	0.1233	3643511.	8700.0000	-0.000756	0.000	1.778E+12
0.000	0.000	0.000				
24.688	0.1133	3760669.	8700.0000	-0.000728	0.000	1.778E+12
0.000	0.000	0.000				
25.811	0.1037	3877827.	8700.0000	-0.000699	0.000	1.777E+12
0.000	0.000	0.000				
26.933	0.0945	3994984.	8700.0000	-0.000669	0.000	1.777E+12
0.000	0.000	0.000				
28.055	0.0857	4112142.	7989.3820	-0.000639	0.000	1.777E+12
-105.5394	16589.	0.000				
29.177	0.0773	4210161.	6544.9945	-0.000607	0.000	1.776E+12
-108.9778	18989.	0.000				
30.299	0.0693	4288417.	5058.0938	-0.000575	0.000	1.776E+12
-111.8534	21728.	0.000				
31.422	0.0618	4346389.	3808.6317	-0.000542	0.000	1.776E+12
-73.7140	16062.	0.000				
32.544	0.0547	4390994.	2773.5730	-0.000509	0.000	1.776E+12
-80.0107	19689.	0.000				
33.666	0.0481	4421089.	1674.1632	-0.000476	0.000	1.776E+12
-83.2712	23316.	0.000				
34.788	0.0419	4436084.	548.8075	-0.000442	0.000	1.776E+12
-83.8641	26943.	0.000				
35.910	0.0362	4435870.	-569.0490	-0.000408	0.000	1.776E+12
-82.1575	30570.	0.000				
37.033	0.0309	4420758.	-2559.1136	-0.000375	0.000	1.776E+12

-213.4025	92943.	0.000				
38.155	0.0261	4366946.	-5350.8467	-0.000341	0.000	1.776E+12
-201.2195	103823.	0.000				
39.277	0.0217	4276645.	-7951.6400	-0.000309	0.000	1.776E+12
-185.0446	114704.	0.000				
40.399	0.0178	4152786.	-10314.	-0.000277	0.000	1.777E+12
-165.8720	125585.	0.000				
41.521	0.0143	3998848.	-12405.	-0.000246	0.000	1.777E+12
-144.6313	136465.	0.000				
42.644	0.0112	3818682.	-14202.	-0.000216	0.000	1.777E+12
-122.1772	147346.	0.000				
43.766	0.008450	3616360.	-15693.	-0.000188	0.000	1.778E+12
-99.2818	158227.	0.000				
44.888	0.006102	3396033.	-16877.	-0.000161	0.000	1.779E+12
-76.6286	169107.	0.000				
46.010	0.004101	3161811.	-17762.	-0.000137	0.000	1.779E+12
-54.8096	179988.	0.000				
47.132	0.002422	2917649.	-18362.	-0.000114	0.000	1.780E+12
-34.3242	190869.	0.000				
48.255	0.001040	2667262.	-18698.	-9.252E-05	0.000	1.780E+12
-15.5796	201749.	0.000				
49.377	-7.018E-05	2414050.	-18796.	-7.331E-05	0.000	1.781E+12
1.1081	212630.	0.000				
50.499	-0.000934	2161040.	-18684.	-5.602E-05	0.000	1.782E+12
15.5101	223510.	0.000				
51.621	-0.001579	1910842.	-18400.	-4.063E-05	0.000	1.782E+12
26.6257	227100.	0.000				
52.743	-0.002029	1665472.	-17979.	-2.712E-05	0.000	1.783E+12
35.8527	237980.	0.000				
53.866	-0.002309	1426604.	-17451.	-1.544E-05	0.000	1.783E+12
42.6759	248861.	0.000				
54.988	-0.002445	1195475.	-16846.	-5.547E-06	0.000	1.784E+12
47.1544	259741.	0.000				
56.110	-0.002459	972897.	-16196.	2.635E-06	0.000	1.785E+12
49.4100	270622.	0.000				
57.232	-0.002374	759279.	-15529.	9.170E-06	0.000	1.785E+12
49.6217	281503.	0.000				
58.354	-0.002212	554660.	-14871.	1.413E-05	0.000	1.785E+12
48.0210	292383.	0.000				
59.477	-0.001993	358750.	-14246.	1.757E-05	0.000	1.785E+12
44.8892	303264.	0.000				
60.599	-0.001738	170979.	-13671.	1.957E-05	0.000	1.785E+12
40.5541	314145.	0.000				
61.721	-0.001466	-9436.8953	-11749.	2.018E-05	0.000	1.785E+12
244.9006	2249336.	0.000				
62.843	-0.001195	-145442.	-8610.7429	1.960E-05	0.000	1.785E+12
221.1177	2491994.	0.000				
63.965	-0.000938	-241348.	-5802.2831	1.814E-05	0.000	1.785E+12
195.9886	2812569.	0.000				
65.088	-0.000706	-301714.	-3337.4191	1.609E-05	0.000	1.785E+12
170.0876	3242475.	0.000				
66.210	-0.000505	-331234.	-1223.4808	1.370E-05	0.000	1.785E+12
143.8699	3835947.	0.000				
67.332	-0.000337	-334665.	537.3589	1.119E-05	0.000	1.785E+12
117.6462	4695577.	0.000				
68.454	-0.000204	-316762.	1945.5284	8.731E-06	0.000	1.785E+12
91.4921	6047494.	0.000				
69.576	-0.000102	-282267.	2939.2256	6.471E-06	0.000	1.785E+12
56.0897	7386701.	0.000				
70.699	-2.946E-05	-237600.	3426.2265	4.509E-06	0.000	1.785E+12
16.2387	7422970.	0.000				
71.821	1.919E-05	-189989.	3463.9825	2.896E-06	0.000	1.785E+12
-10.6312	7459238.	0.000				

```
   72.943  4.854E-05   -144305.  3210.4850  1.635E-06      0.000  1.785E+12
-27.0177   7495507.      0.000
   74.065  6.322E-05   -103522.  2790.4765  6.998E-07      0.000  1.785E+12
-35.3611   7531776.      0.000
   75.187  6.739E-05    -69150.  2297.3845  4.837E-08      0.000  1.785E+12
-37.8719   7568045.      0.000
   76.310  6.453E-05    -41647.  1797.0460 -3.696E-07      0.000  1.785E+12
-36.4373   7604313.      0.000
   77.432  5.743E-05    -20751.  1332.2962 -6.051E-07      0.000  1.785E+12
-32.5863   7640582.      0.000
   78.554  4.823E-05 -5764.0545   927.7565 -7.051E-07      0.000  1.785E+12
-27.4951   7676851.      0.000
   79.676  3.844E-05  4236.4547   594.3700 -7.109E-07      0.000  1.785E+12
-22.0188   7713120.      0.000
   80.798  2.909E-05    10244.    333.4163 -6.562E-07      0.000  1.785E+12
-16.7375   7749389.      0.000
   81.921  2.077E-05    13216.    139.8697 -5.677E-07      0.000  1.785E+12
-12.0076   7785657.      0.000
   83.043  1.380E-05    14011.      5.0670 -4.650E-07      0.000  1.785E+12
-8.0130   7821926.      0.000
   84.165  8.246E-06    13353.    -81.2835 -3.617E-07      0.000  1.785E+12
-4.8116   7858195.      0.000
   85.287  4.052E-06    11822.   -129.6769 -2.668E-07      0.000  1.785E+12
-2.3757   7894464.      0.000
   86.409  1.061E-06 9860.1964   -149.8789 -1.850E-07      0.000  1.785E+12
-0.6247   7930733.      0.000
   87.532 -9.292E-07 7785.2264   -150.3836 -1.184E-07      0.000  1.785E+12
0.5497   7967001.      0.000
   88.654 -2.128E-06 5809.9438   -138.1670 -6.710E-08      0.000  1.785E+12
1.2647   8003270.      0.000
   89.776 -2.736E-06 4064.0013   -118.6522 -2.985E-08      0.000  1.785E+12
1.6336   8039539.      0.000
   90.898 -2.932E-06 2614.3081    -95.8142 -4.652E-09      0.000  1.785E+12
1.7582   8075808.      0.000
   92.020 -2.862E-06 1483.4579    -72.3687  1.081E-08      0.000  1.785E+12
1.7238   8112076.      0.000
   93.143 -2.641E-06  665.2161    -50.0029  1.891E-08      0.000  1.785E+12
1.5979   8148345.      0.000
   94.265 -2.352E-06  136.7391    -29.6181  2.194E-08      0.000  1.785E+12
1.4296   8184614.      0.000
   95.387 -2.050E-06 -132.4825    -11.5665  2.196E-08      0.000  1.785E+12
1.2514   8220883.      0.000
   96.509 -1.761E-06 -174.7779     -2.6078  2.080E-08      0.000  1.785E+12
0.0792    605356.      0.000
   97.631 -1.490E-06 -202.7188     -1.6071  1.937E-08      0.000  1.785E+12
0.0695    628024.      0.000
   98.754 -1.239E-06 -218.0611     -0.7362  1.779E-08      0.000  1.785E+12
0.0599    650692.      0.000
   99.876 -1.011E-06 -222.5459    0.007238  1.612E-08      0.000  1.785E+12
0.0505    673360.      0.000
  100.998 -8.049E-07 -217.8662      0.6276  1.446E-08      0.000  1.785E+12
0.0416    696028.      0.000
  102.120 -6.212E-07 -205.6426      1.1309  1.286E-08      0.000  1.785E+12
0.0332    718696.      0.000
  103.242 -4.584E-07 -187.4072      1.5241  1.138E-08      0.000  1.785E+12
0.0252    741364.      0.000
  104.365 -3.147E-07 -164.5954      1.8142  1.005E-08      0.000  1.785E+12
0.0179    764032.      0.000
  105.487 -1.876E-07 -138.5463      2.0082  8.909E-09      0.000  1.785E+12
0.0110    786700.      0.000
  106.609 -7.470E-08 -110.5093      2.1701  7.970E-09      0.000  1.785E+12
0.0131   2357637.      0.000
  107.731  2.701E-08  -80.1007      2.2250  7.250E-09      0.000  1.785E+12
```



```
-0.004910   2448309.      0.000
  108.853  1.206E-07   -50.5825      2.0389  6.757E-09      0.000  1.785E+12
-0.0227   2538981.      0.000
  109.976  2.090E-07   -25.1869      1.6111  6.472E-09      0.000  1.785E+12
-0.0408   2629653.      0.000
  111.098  2.949E-07    -7.1924      0.9352  6.349E-09      0.000  1.785E+12
-0.0596   2720325.      0.000
  112.220  3.800E-07      0.000       0.000  6.322E-09      0.000  1.785E+12
-0.0793   1405499.      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. 10:

```
Pile-head deflection            =      0.4153266 inches
Computed slope at pile head     =     -0.0012412 radians
Maximum bending moment          =      4436084. inch-lbs
Maximum shear force             =       -18796. lbs
Depth of maximum bending moment =     34.7882000 feet below pile head
Depth of maximum shear force    =     49.3768000 feet below pile head
Number of iterations            =              8
Number of zero deflection points =             4
```

Pile-head Deflection vs. Pile Length for Load Case 10

Boundary Condition Type 1, Shear and Moment

```
Shear      =          8700.  lb
Moment     =       1183200. in- lb
Axial Load =            0.  lb
```

Pile Length feet	Pile Head Deflection inches	Maximum Moment in-lbs	Maximum Shear lbs
112.2200	0.4153266	4436084.	-18796.
106.6090	0.4055619	4398124.	-18443.
100.9980	0.4055098	4365566.	-18330.
95.3870	0.4086891	4406716.	-18486.
89.7760	0.4137290	4423492.	-18662.
84.1650	0.4134026	4406795.	-18641.
78.5540	0.4119681	4391373.	-18598.
72.9430	0.4126979	4421404.	-18611.
67.3320	0.4101166	4407047.	-18085.
61.7210	0.4258757	4415141.	-21049.
56.1100	0.4729722	4356017.	-26370.
50.4990	0.7160300	4275003.	-33844.
44.8880	2.1909835	4206973.	-45071.
39.2770	52.6904141	4105439.	-65504.

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 Shear V(lbs) or Pile-head y(inches)	Pile-head Condition 2 in-lb, rad., or Rotation 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	4	y = 0.5000	M = 1382400.	0.0000000	0.50000000	5328127.	-22601.	-0.00148620
2	4	y = 1.0000	M = 1382400.	0.0000000	1.00000000	8585541.	-36462.	-0.00281324
3	4	y = 1.5000	M = 1382400.	0.0000000	1.50000000	10786558.	-46028.	-0.00438948
4	4	y = 2.0000	M = 1382400.	0.0000000	2.00000000	13419748.	-57001.	-0.00596595
5	4	y = 0.5000	M = 1183200.	0.0000000	0.50000000	5351271.	-22751.	-0.00146483
6	4	y = 1.0000	M = 1183200.	0.0000000	1.00000000	8680569.	-36893.	-0.00277823
7	4	y = 1.5000	M = 1183200.	0.0000000	1.50000000	10852463.	-46344.	-0.00434593
8	4	y = 2.0000	M = 1183200.	0.0000000	2.00000000	13520406.	-57389.	-0.00589400
9	1	V = 8800.0000	M = 1382400.	0.0000000	0.43871878	4668410.	-19740.	-0.00132439
10	1	V = 8700.0000	M = 1183200.	0.0000000	0.41532658	4436084.	-18796.	-0.00124125

SER-1 $\Delta = 0.42'' < 1.0$ ok.

The analysis ended normally.

DELDOT BR1-159
VBENT RESULTANT FORCES
DESIGNED BY: SBM 10/16/2014

PIER 1

					k-ft	k	k
Worst Case	**Limit State**	**Load Case**	**Column**	**Top/Bot**	**M_u**	**P_u**	**V_u**
Max P_u	STR-I	1/2/3	1	T	540.1	777.5	
	SER-I	1/2/3	1	T	248.8	516.1	
Max V_u	STR-I	26	3	T	458.3		13.6
	SER-I	28	4	T	65.3		9.9

PIER 2

$P_R = 708^k$ ok

Worst Case	**Limit State**	**Load Case**	**Column**	**Top/Bot**	**M_u**	**P_u**	**V_u**
Max P_u	STR-I	2	4	T	252.0	689.2	
	SER-I	1/3	1	T	132.4	464.8	
Max V_u	STR-V	28	4	T	115.2		8.8
	SER-I	28	4	T	98.6		8.7

PIER 3

Worst Case	**Limit State**	**Load Case**	**Column**	**Top/Bot**	**M_u**	**P_u**	**V_u**
Max P_u	STR-I	4	4	T	141.4	688.3	
	SER-I	4	1	T	218.4	500.6	
Max V_u	STR-III	25	2	T	651.5		21.3
	SER-I	26	3	T	365.0		11.0

PIER 4

Worst Case	**Limit State**	**Load Case**	**Column**	**Top/Bot**	**M_u**	**P_u**	**V_u**
Max P_u	STR-I	1/2/3	1	T	377.0	709.1	
	SER-I	1/2/3	1	T	185.3	475.0	
Max V_u	STR-I	26	4	T	316.1		9.8
	SER-I	26	4	T	270.7		8.4

PIER 2

4' ϕ, 1/2" STEEL CASING @ EL −12.0

DEFLECTION	STR-V (lbs)	SER-1 (lbs)	
0.5	10,435	10,961	ok
1.0	18562	19,250	←
1.5	24,084	24,710	
→ 2.0	30,725	31,438	

ok

GEOTECHNICAL AXIAL CAPACITY
$= 708^k > 689.2^k$ ok

LATERAL CAPACITY, 2" DEFLECTION (STR-V)
$= 30.73^k > 8.8^k$

LATERAL CAPACITY, 1" DEFLECTION (SER-1)
$= 19.25^k > 8.7^k$

Boring No. JS-5 By: SJM Chk:

OG Elev. = 11.00

Sample No.	Depth of SS run (ft)	N-Values Field	q'_v (ksf)	C_N	N_{CORR}
1	20	4	0.952	1.250	5
2	22	0	1.047	1.218	0
3	24	0	1.142	1.186	0
4	26	2	1.238	1.162	2
5	33	10	1.571	1.083	11
6	38	13	1.809	1.035	13
7	43	29	2.047	0.994	29
8	48	16	2.285	0.957	15
9	53	17	2.523	0.924	16
10	58	19	2.761	0.894	17
11	63	15	2.999	0.866	13
12	68	22	3.237	0.841	18
13	73	23	3.475	0.817	19
14	78	45	3.713	0.795	36
15	83	82	3.951	0.774	63
16	88	84	4.189	0.755	63
17	93	41	4.427	0.736	30
18	98	80	4.665	0.719	57
19	103	78	4.903	0.702	55
20	108	50	5.141	0.686	34
21	113	50	5.379	0.671	34
22	118	50	5.617	0.656	33
				$N_{avg\ (Below\ BFE)}$	26

GWT= 5.0
γ = 110 lb/ft3
γ' = 47.6 lb/ft3

C_N= $0.77 x log (40/q'_v)$
N_{CORR} = $N_{Field} x C_N$
(Ref. AASHTO Eqn 10.4.6.2.4-1)

PIER 3

Boring No. JS-6 By: SJM Chk: AT LAYER

OG Elev. = 11.00

Sample No.	Depth of SS run (ft)	N-Values Field	q'_v (ksf)	C_N	N_{CORR}
1	23	0	1.095	1.203	0
2	25	19	1.190	1.175	22
3	27	0	1.285	1.150	0
4	29	0	1.380	1.126	0
5	31	12	1.476	1.103	13
6	33	9	1.571	1.083	10
7	38	4	1.809	1.035	4
8	43	19	2.047	0.994	19
9	48	15	2.285	0.957	14
10	53	13	2.523	0.924	12
11	58	9	2.761	0.894	8
12	63	23	2.999	0.866	20
13	68	31	3.237	0.841	26
14	73	46	3.475	0.817	38
15	78	33	3.713	0.795	26
16	83	24	3.951	0.774	19
17	88	54	4.189	0.755	41
18	93	50	4.427	0.736	37
19	98	56	4.665	0.719	40
20	103	50	4.903	0.702	35
21	108		5.141	0.686	
				$N_{avg\ (Below\ BFE)}$	20

GWT= 0.0
γ = 110 lb/ft3
γ' = 47.6 lb/ft3

(1) (2) (3) (4)

C_N= $0.77 x log (40/q'_v)$
N_{CORR} = $N_{Field} x C_N$
(Ref. AASHTO Eqn 10.4.6.2.4-1)

McCORMICK TAYLOR

PROJECT BR1-159 JOB NO. _____ SHEET NO. 1 OF 1

LOCATION PIER 3 (AXIAL & LATERAL CAPACITIES)

SUBJECT SOIL PROFILE (JS-6)

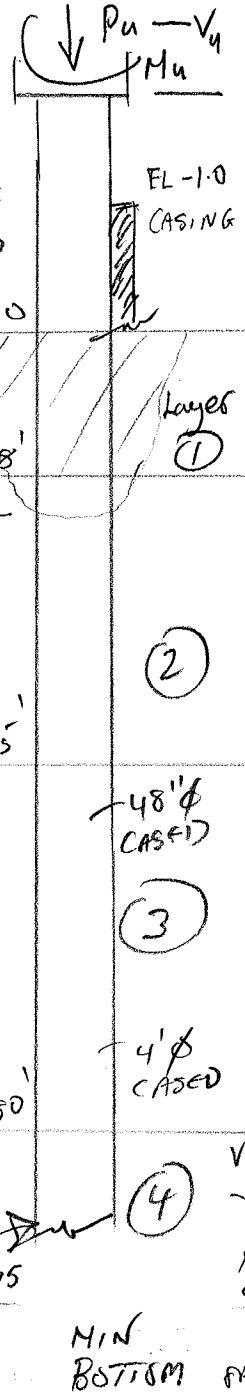
DESIGNED BY SJM DATE 7/14 CHECKED BY AT DATE 8/14

REVISED BY _____ DATE _____ BACK CHECKED BY _____ DATE _____

PROFILE BASED ON BORING JS-6

x - DEPTH BELOW TOP OF CSM

x = 0



	ELEVATION	REF./REM.
TOP OF CSM.	8.83	P_u = 688.3 K
MHWE	4.63	R_R = 695 K
SOIL TYPE		
SOFT SILT N_{corr} = 0-22	-12.0	
Layer ① γ_s = 105 γ' = 42.6 ϕ = 0 E_{50} = 0.02 c = 600 psf	-20.0	
MED Sand γ_s = 120 pcf γ' = 57.6 pcf ϕ = 32° K = 60 pci ② c = 0 psf	-22.0	100 YR SCOUR.
Hard Sandy Clay N_{corr} = 19-41 γ_s = 125 pcf γ' = 62.6 pcf ③ c = 2000 psf E_{50} = 0.007 ϕ = 0° K = 200 pci	-47.0	
	-92.0	
Very Dense Sand γ_s = 135 pcf γ' = 72.6 pcf ϕ = 36° K = 125 pci ④ c = 0 psf	-107.0	
END BORING.		

AXIAL CAPACITY

AXIAL CAPACITY

SHAFT for Windows, Version 2012.7.11

Serial Number : 228741384

VERTICALLY LOADED DRILLED SHAFT ANALYSIS

Path to file locations : Y:\Bridges\DELDOT\BR1-159_JAMES ST BRIDGE\FOUNDATION REPORT\SHAFT Output\
Name of input data file : Pier 32.sfd
Name of output file : Pier 32.sfo
Name of plot output file : Pier 32.sfp
Name of runtime file : Pier 32.sfr

Time and Date of Analysis

Date: October 21, 2014 Time: 14:41:44

BR1-159 Pier 3

PROPOSED DEPTH = 95.0 FT

NUMBER OF LAYERS = 4

WATER TABLE DEPTH = 0.0 FT.

SOIL INFORMATION

LAYER NO 1----CLAY

AT THE TOP

STRENGTH REDUCTION FACTOR-ALPHA	= 0.550E+00
END BEARING COEFFICIENT-Nc	= 0.800E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.600E+03
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.105E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.000E+00

AT THE BOTTOM

STRENGTH REDUCTION FACTOR-ALPHA	= 0.550E+00
END BEARING COEFFICIENT-Nc	= 0.800E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.600E+03
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.105E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.800E+01
LRFD RESISTANCE FACTOR (SIDE FRICTION)	= 0.450E+00
LRFD RESISTANCE FACTOR (TIP RESISTANCE)	= 0.400E+00

LAYER NO 2----SAND

AT THE TOP

SKIN FRICTION COEFFICIENT- BETA	= 0.112E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.320E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.800E+01

AT THE BOTTOM

SKIN FRICTION COEFFICIENT- BETA	= 0.701E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.320E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.350E+02
LRFD RESISTANCE FACTOR (SIDE FRICTION)	= 0.550E+00
LRFD RESISTANCE FACTOR (TIP RESISTANCE)	= 0.500E+00

LAYER NO 3----CLAY

AT THE TOP

STRENGTH REDUCTION FACTOR-ALPHA	= 0.550E+00
END BEARING COEFFICIENT-Nc	= 0.800E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.200E+04
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.125E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.350E+02

AT THE BOTTOM

STRENGTH REDUCTION FACTOR-ALPHA	= 0.550E+00
END BEARING COEFFICIENT-Nc	= 0.800E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.200E+04
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00

SOIL UNIT WEIGHT, LB/CU FT	= 0.125E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.800E+02
LRFD RESISTANCE FACTOR (SIDE FRICTION)	= 0.450E+00
LRFD RESISTANCE FACTOR (TIP RESISTANCE)	= 0.400E+00

LAYER NO 4----SAND

AT THE TOP

SKIN FRICTION COEFFICIENT- BETA	= 0.293E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.360E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.135E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.800E+02

AT THE BOTTOM

SKIN FRICTION COEFFICIENT- BETA	= 0.250E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.360E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.135E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.110E+03
LRFD RESISTANCE FACTOR (SIDE FRICTION)	= 0.550E+00
LRFD RESISTANCE FACTOR (TIP RESISTANCE)	= 0.500E+00

DRILLED SHAFT INFORMATION

DIAMETER OF STEM	= 4.000	FT.
DIAMETER OF BASE	= 4.000	FT.
END OF STEM TO BASE	= 0.000	FT.
ANGLE OF BELL	= 0.000	DEG.
IGNORED TOP PORTION	= 10.000	FT.
IGNORED BOTTOM PORTION	= 4.000	FT.
AREA OF ONE PERCENT STEEL	= 18.098	SQ.IN.
ELASTIC MODULUS, Ec	= 0.312E+07	LB/SQ IN
VOLUME OF UNDERREAM	= 0.000	CU.YDS.

PREDICTED RESULTS

QS = ULTIMATE SIDE RESISTANCE;
QB = ULTIMATE BASE RESISTANCE;
WT = WEIGHT OF DRILLED SHAFT (UPLIFT CAPACITY ONLY);
QU = TOTAL ULTIMATE RESISTANCE;
LRFD QS = TOTAL SIDE FRICTION USING LRFD RESISTANCE FACTOR

TO THE ULTIMATE SIDE RESISTANCE;
LRFD QB = TOTAL BASE BEARING USING LRFD RESISTANCE FACTOR
TO THE ULTIMATE BASE RESISTANCE
LRFD QU = TOTAL CAPACITY WITH LRFD RESISTANCE FACTOR.

LENGTH (FEET)	VOLUME (CU.YDS)	QS (TONS)	QB (TONS)	QU (TONS)	LRFD QS (TONS)	LRFD QB (TONS)	LRFD QU (TONS)
15.0	6.98	4.00	67.04	71.04	2.20	33.52	35.72
16.0	7.45	8.30	67.04	75.33	4.56	33.52	38.08
17.0	7.91	12.88	67.04	79.92	7.08	33.52	40.60
18.0	8.38	17.74	67.04	84.78	9.76	33.52	43.28
19.0	8.84	22.87	67.04	89.91	12.58	33.52	46.10
20.0	9.31	28.26	67.04	95.29	15.54	33.52	49.06
21.0	9.78	33.89	67.04	100.93	18.64	33.52	52.16
22.0	10.24	39.76	67.04	106.80	21.87	33.52	55.39
23.0	10.71	45.87	67.04	112.91	25.23	33.52	58.75
24.0	11.17	52.19	67.04	119.23	28.71	33.52	62.23
25.0	11.64	58.73	67.04	125.77	32.30	33.52	65.82
26.0	12.10	65.48	67.04	132.52	36.01	33.52	69.53
27.0	12.57	72.42	67.04	139.46	39.83	33.52	73.35
28.0	13.03	79.56	72.06	151.62	43.76	36.03	79.79
29.0	13.50	86.87	77.65	164.52	47.78	38.82	86.60
30.0	13.96	94.36	83.79	178.15	51.90	41.90	93.80
31.0	14.43	102.02	90.49	192.51	56.11	45.25	101.36
32.0	14.90	109.84	95.52	205.36	60.41	47.76	108.17
33.0	15.36	117.82	98.87	216.69	64.80	49.43	114.23
34.0	15.83	125.94	100.54	226.48	69.27	50.27	119.54
35.0	16.29	134.20	100.54	234.74	73.81	40.22	114.03
36.0	16.76	142.60	100.54	243.14	78.43	40.22	118.65
37.0	17.22	151.12	100.54	251.66	83.11	40.22	123.33
38.0	17.69	159.76	100.54	260.31	87.87	40.22	128.09
39.0	18.15	168.52	100.54	269.06	92.69	40.22	132.90
40.0	18.62	175.43	100.54	275.98	95.80	40.22	136.01
41.0	19.08	182.34	100.54	282.89	98.91	40.22	139.12
42.0	19.55	189.26	100.54	289.80	102.02	40.22	142.23
43.0	20.02	196.17	100.54	296.71	105.13	40.22	145.35
44.0	20.48	203.08	100.54	303.63	108.24	40.22	148.46
45.0	20.95	209.99	100.54	310.54	111.35	40.22	151.57
46.0	21.41	216.91	100.54	317.45	114.46	40.22	154.68
47.0	21.88	223.82	100.54	324.36	117.57	40.22	157.79
48.0	22.34	230.73	100.54	331.27	120.68	40.22	160.90
49.0	22.81	237.64	100.54	338.19	123.79	40.22	164.01
50.0	23.27	244.56	100.54	345.10	126.90	40.22	167.12
51.0	23.74	251.47	100.54	352.01	130.01	40.22	170.23
52.0	24.21	258.38	100.54	358.92	133.12	40.22	173.34
53.0	24.67	265.29	100.54	365.84	136.23	40.22	176.45
54.0	25.14	272.21	100.54	372.75	139.34	40.22	179.56
55.0	25.60	279.12	100.54	379.66	142.45	40.22	182.67
56.0	26.07	286.03	100.54	386.57	145.57	40.22	185.78
57.0	26.53	292.94	100.54	393.49	148.68	40.22	188.89
58.0	27.00	299.85	100.54	400.40	151.79	40.22	192.00
59.0	27.46	306.77	100.54	407.31	154.90	40.22	195.11
60.0	27.93	313.68	100.54	414.22	158.01	40.22	198.23
61.0	28.39	320.59	100.54	421.14	161.12	40.22	201.34
62.0	28.86	327.50	100.54	428.05	164.23	40.22	204.45
63.0	29.33	334.42	100.54	434.96	167.34	40.22	207.56
64.0	29.79	341.33	100.54	441.87	170.45	40.22	210.67
65.0	30.26	348.24	100.54	448.79	173.56	40.22	213.78
66.0	30.72	355.15	100.54	455.70	176.67	40.22	216.89
67.0	31.19	362.07	100.54	462.61	179.78	40.22	220.00
68.0	31.65	368.98	100.54	469.52	182.89	40.22	223.11
69.0	32.12	375.89	100.54	476.44	186.00	40.22	226.22
70.0	32.58	382.80	100.54	483.35	189.11	40.22	229.33

71.0	33.05	389.72	100.54	490.26	192.22	40.22	232.44
72.0	33.51	396.63	100.54	497.17	195.33	40.22	235.55
73.0	33.98	403.54	115.63	519.17	198.45	46.25	244.70
74.0	34.45	410.45	132.39	542.84	201.56	52.96	254.51
75.0	34.91	417.37	150.83	568.19	204.67	60.33	265.00
76.0	35.38	424.28	170.94	595.22	207.78	68.38	276.15
77.0	35.84	431.19	186.03	617.22	210.89	74.41	285.30
78.0	36.31	438.10	196.08	634.19	214.00	78.43	292.43
79.0	36.77	445.02	201.11	646.13	217.11	80.45	297.55
80.0	37.24	451.93	201.11	653.04	220.22	100.56	320.78
81.0	37.70	458.84	201.11	659.95	223.33	100.56	323.89
82.0	38.17	465.75	201.11	666.87	226.44	100.56	327.00
83.0	38.63	472.67	201.11	673.78	229.55	100.56	330.11
84.0	39.10	479.58	201.11	680.69	232.66	100.56	333.22
85.0	39.57	488.30	201.11	689.41	237.46	100.56	338.01
86.0	40.03	496.92	201.11	698.03	242.20	100.56	342.75
87.0	40.50	505.43	201.11	706.54	246.88	100.56	347.44
88.0	40.96	513.83	201.11	714.94	251.50	100.56	352.05
89.0	41.43	522.11	201.11	723.22	256.05	100.56	356.61
90.0	41.89	530.33	201.11	731.44	260.57	100.56	361.13
91.0	42.36	538.66	201.11	739.77	265.16	100.56	365.71
92.0	42.82	547.11	201.11	748.22	269.80	100.56	370.36
93.0	43.29	555.67	201.11	756.78	274.51	100.56	375.07
94.0	43.76	564.35	201.11	765.46	279.28	100.56	379.84
95.0	44.22	573.14	201.11	774.25	284.12	100.56	384.68

$y = 87'$ $R_R = 695^k$

RESULT FROM TREND (AVERAGED) LINE

TOP LOAD ton	TOP MOVEMENT IN.	TIP LOAD ton	TIP MOVEMENT IN.
0.6960E-01	0.2450E-04	0.1466E-02	0.1000E-04
0.3480E+00	0.1225E-03	0.7332E-02	0.5000E-04
0.6960E+00	0.2450E-03	0.1466E-01	0.1000E-03
0.3480E+02	0.1225E-01	0.7332E+00	0.5000E-02
0.5230E+02	0.1838E-01	0.1100E+01	0.7500E-02
0.6984E+02	0.2452E-01	0.1466E+01	0.1000E-01
0.1743E+03	0.6137E-01	0.3666E+01	0.2500E-01
0.3048E+03	0.1156E+00	0.7332E+01	0.5000E-01
0.3787E+03	0.1576E+00	0.1100E+02	0.7500E-01
0.4403E+03	0.1977E+00	0.1466E+02	0.1000E+00
0.5608E+03	0.3800E+00	0.3662E+02	0.2500E+00
0.6067E+03	0.6472E+00	0.7173E+02	0.5000E+00
0.6155E+03	0.7768E+00	0.8639E+02	0.6250E+00
0.6310E+03	0.1362E+01	0.1287E+03	0.1200E+01
0.7057E+03	0.2593E+01	0.2041E+03	0.2400E+01

RESULT FROM UPPER-BOUND LINE

TOP LOAD ton	TOP MOVEMENT IN.	TIP LOAD ton	TIP MOVEMENT IN.
0.1092E+00	0.3206E-04	0.2095E-02	0.1000E-04
0.5460E+00	0.1603E-03	0.1047E-01	0.5000E-04
0.1092E+01	0.3206E-03	0.2095E-01	0.1000E-03
0.5475E+02	0.1604E-01	0.1047E+01	0.5000E-02
0.8234E+02	0.2409E-01	0.1571E+01	0.7500E-02
0.1099E+03	0.3215E-01	0.2095E+01	0.1000E-01
0.2695E+03	0.8022E-01	0.5237E+01	0.2500E-01
0.4321E+03	0.1429E+00	0.1047E+02	0.5000E-01
0.4983E+03	0.1845E+00	0.1571E+02	0.7500E-01

0.5388E+03	0.2210E+00	0.2095E+02	0.1000E+00
0.6231E+03	0.3972E+00	0.5221E+02	0.2500E+00
0.6673E+03	0.6659E+00	0.9972E+02	0.5000E+00
0.6797E+03	0.7972E+00	0.1196E+03	0.6250E+00
0.6929E+03	0.1381E+01	0.1528E+03	0.1200E+01
0.7572E+03	0.2607E+01	0.2172E+03	0.2400E+01

RESULT FROM LOWER-BOUND LINE

TOP LOAD ton	TOP MOVEMENT IN.	TIP LOAD ton	TIP MOVEMENT IN.
0.3742E-01	0.1803E-04	0.8380E-03	0.1000E-04
0.1871E+00	0.9013E-04	0.4190E-02	0.5000E-04
0.3742E+00	0.1803E-03	0.8380E-02	0.1000E-03
0.1871E+02	0.9013E-02	0.4190E+00	0.5000E-02
0.2807E+02	0.1352E-01	0.6285E+00	0.7500E-02
0.3742E+02	0.1803E-01	0.8380E+00	0.1000E-01
0.9383E+02	0.4510E-01	0.2095E+01	0.2500E-01
0.1804E+03	0.8910E-01	0.4190E+01	0.5000E-01
0.2524E+03	0.1300E+00	0.6285E+01	0.7500E-01
0.3146E+03	0.1692E+00	0.8380E+01	0.1000E+00
0.4965E+03	0.3625E+00	0.2103E+02	0.2500E+00
0.5462E+03	0.6284E+00	0.4374E+02	0.5000E+00
0.5456E+03	0.7551E+00	0.5317E+02	0.6250E+00
0.5691E+03	0.1344E+01	0.1046E+03	0.1200E+01
0.6541E+03	0.2579E+01	0.1911E+03	0.2400E+01

PIER 3
LATERAL CAPACITY

LPile Plus for Windows, Version 2013-07.007

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

This copy of LPile is used by:

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Serial Number of Security Device: 161634504
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Use of this program by any entity other than Mc Cormick Taylor, Inc., Philade is forbidden by the software license agreement.

Files Used for Analysis

Path to file locations: Y:\Bridges\DELDOT\BR1-159_JAMES ST BRIDGE\FOUNDATION REPORT\LPILE Output\
Name of input data file: Pier 32aff.lp7d
Name of output report file: Pier 32aff.lp7o
Name of plot output file: Pier 32aff.lp7p
Name of runtime messeage file: Pier 32aff.lp7r

Date and Time of Analysis

Date: October 24, 2014 Time: 15:04:42

Problem Title

Project Name: BR1-159 Pier 3

Job Number:

Client: DelDOT

Engineer: SJM

Description: Pier 3 Lateral Capacity

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	=	600
- 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
- Compute buckling analysis of pile for specified loading

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	=	107.83 ft
Depth of ground surface below top of pile	=	30.83 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	48.0000000
2	9.830000	48.0000000
3	9.830000	49.5000000

4 107.830000 49.5000000

Input Structural Properties:

Pile Section No. 1:

Section Type	=	Drilled Shaft (Bored Pile)
Section Length	=	9.83000 ft
Section Diameter	=	48.00000 in

Pile Section No. 2:

Section Type	=	Drilled Shaft with Permanent Casing
Section Length	=	98.00000 ft
Section Diameter	=	49.50000 in

Control Data for Pile Buckling Analysis

Pile-head fixity condition for pile buckling analysis	=	shear and moment
Number of axial loads for buckling analysis	=	50
Pile-head shear force for buckling analysis	=	14000. lbs
Pile-head moment for buckling analysis	=	9502800. in-lb
Maximum compression load for buckling analysis	=	698600. 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 3 layers

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

Distance from top of pile to top of layer	=	30.83000 ft
Distance from top of pile to bottom of layer	=	55.83000 ft
Effective unit weight at top of layer	=	57.60000 pcf
Effective unit weight at bottom of layer	=	57.60000 pcf
Friction angle at top of layer	=	32.00000 deg.
Friction angle at bottom of layer	=	32.00000 deg.
Subgrade k at top of layer	=	60.00000 pci
Subgrade k at bottom of layer	=	60.00000 pci

Layer 2 is stiff clay with water-induced erosion

Distance from top of pile to top of layer	=	55.83000 ft

Distance from top of pile to bottom of layer	=	100.83000 ft
Effective unit weight at top of layer	=	62.60000 pcf
Effective unit weight at bottom of layer	=	62.60000 pcf
Undrained cohesion at top of layer	=	2000.00000 psf
Undrained cohesion at bottom of layer	=	2000.00000 psf
Epsilon-50 at top of layer	=	0.00700
Epsilon-50 at bottom of layer	=	0.00700
Subgrade k at top of layer	=	200.00000 pci
Subgrade k at bottom of layer	=	200.00000 pci

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

Distance from top of pile to top of layer	=	100.83000 ft
Distance from top of pile to bottom of layer	=	115.83000 ft
Effective unit weight at top of layer	=	72.60000 pcf
Effective unit weight at bottom of layer	=	72.60000 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	=	125.00000 pci
Subgrade k at bottom of layer	=	125.00000 pci

(Depth of lowest soil layer extends 8.00 ft below pile tip)

Summary of Soil Properties

Layer Num.	Soil Type (p-y Curve Criteria)	Strain Factor Epsilon 50	kpy pci	Angle of Friction deg.	Layer Depth ft	Effective Unit Wt. pcf	Undrained Cohesion psf
1	Sand (Reese, et al.)	--	60.000	32.000	30.830	57.600	--
					55.830	57.600	--
2	Stiff Clay with Free Water	0.00700	200.000	--	55.830	62.600	2000.000
					100.830	62.600	2000.000
3	Sand (Reese, et al.)	--	125.000	36.000	100.830	72.600	--
					115.830	72.600	--

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 = 10

Load No.	Load Compute Type	Condition 1		Condition 2		Axial Thrust Force, lbs	Top y vs. Pile Length
1	4	y = 0.50000 in	M = 7818000. in-lbs			0.0000000	No
2	4	y = 1.00000 in	M = 7818000. in-lbs			0.0000000	No
3	4	y = 1.50000 in	M = 7818000. in-lbs			0.0000000	No
4	4	y = 2.00000 in	M = 7818000. in-lbs			0.0000000	Yes
5	4	y = 0.50000 in	M = 4380000. in-lbs			0.0000000	No
6	4	y = 1.00000 in	M = 4380000. in-lbs			0.0000000	Yes
7	4	y = 1.50000 in	M = 4380000. in-lbs			0.0000000	No
8	4	y = 2.00000 in	M = 4380000. in-lbs			0.0000000	No
9	1	V = 21300. lbs	M = 7818000. in-lbs			0.0000000	Yes
10	1	V = 11000. lbs	M = 4380000. in-lbs			0.0000000	Yes

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	=	9.83000 ft
Shaft Diameter	=	48.00000 in
Concrete Cover Thickness	=	4.00000 in
Number of Reinforcing Bars	=	50 bars
Yield Stress of Reinforcing Bars	=	60000. psi
Modulus of Elasticity of Reinforcing Bars	=	29000000. psi
Gross Area of Shaft	=	1809.55737 sq. in.
Total Area of Reinforcing Steel	=	39.50000 sq. in.
Area Ratio of Steel Reinforcement	=	2.18 percent

Edge-to-Edge Bar Spacing	=	2.89438 in
Maximum Concrete Aggregate Size	=	0.50000 in
Ratio of Bar Spacing to Aggregate Size	=	5.79
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	=	9140.470 kips
Tensile Load for Cracking of Concrete	=	-911.303 kips
Nominal Axial Tensile Capacity	=	-2370.000 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.00000	0.79000	19.49359	-0.49995
2	1.00000	0.79000	19.49359	0.49995
3	1.00000	0.79000	19.00549	4.36362
4	1.00000	0.79000	18.75683	5.33210
5	1.00000	0.79000	17.32321	8.95300
6	1.00000	0.79000	16.84151	9.82921
7	1.00000	0.79000	14.55245	12.97984
8	1.00000	0.79000	13.86798	13.70873
9	1.00000	0.79000	10.86731	16.19110
10	1.00000	0.79000	10.02307	16.72687
11	1.00000	0.79000	6.49933	18.38501
12	1.00000	0.79000	5.54837	18.69400
13	1.00000	0.79000	1.72297	19.42373
14	1.00000	0.79000	0.72505	19.48652
15	1.00000	0.79000	-3.16164	19.24199
16	1.00000	0.79000	-4.14382	19.05462
17	1.00000	0.79000	-7.84760	17.85119
18	1.00000	0.79000	-8.75233	17.42546
19	1.00000	0.79000	-12.04047	15.33875
20	1.00000	0.79000	-12.81090	14.70139
21	1.00000	0.79000	-15.47679	11.86251
22	1.00000	0.79000	-16.06451	11.05358
23	1.00000	0.79000	-17.94064	7.64091
24	1.00000	0.79000	-18.30872	6.71123
25	1.00000	0.79000	-19.27722	2.93920
26	1.00000	0.79000	-19.40254	1.94719
27	1.00000	0.79000	-19.40254	-1.94719
28	1.00000	0.79000	-19.27722	-2.93920
29	1.00000	0.79000	-18.30872	-6.71123
30	1.00000	0.79000	-17.94064	-7.64091
31	1.00000	0.79000	-16.06451	-11.05358
32	1.00000	0.79000	-15.47679	-11.86251
33	1.00000	0.79000	-12.81090	-14.70139
34	1.00000	0.79000	-12.04047	-15.33875
35	1.00000	0.79000	-8.75233	-17.42546
36	1.00000	0.79000	-7.84760	-17.85119
37	1.00000	0.79000	-4.14382	-19.05462
38	1.00000	0.79000	-3.16164	-19.24199
39	1.00000	0.79000	0.72505	-19.48652
40	1.00000	0.79000	1.72297	-19.42373
41	1.00000	0.79000	5.54837	-18.69400
42	1.00000	0.79000	6.49933	-18.38501
43	1.00000	0.79000	10.02307	-16.72687
44	1.00000	0.79000	10.86731	-16.19110
45	1.00000	0.79000	13.86798	-13.70873

46	1.00000	0.79000	14.55245	-12.97984
47	1.00000	0.79000	16.84151	-9.82921
48	1.00000	0.79000	17.32321	-8.95300
49	1.00000	0.79000	18.75683	-5.33210
50	1.00000	0.79000	19.00549	-4.36362

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

Minimum spacing between any two bars not equal to zero = -0.0001096 inches between Bars 1 and 2

Spacing to aggregate size ratio = -0.0002191

Concrete Properties:

Compressive Strength of Concrete	=	4500.00000 psi
Modulus of Elasticity of Concrete	=	3823676. psi
Modulus of Rupture of Concrete	=	-503.11528 psi
Compression Strain at Peak Stress	=	0.00200
Tensile Strain at Fracture of Concrete	=	-0.0001152
Maximum Coarse Aggregate Size	=	0.50000 in

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

Number	Axial Thrust Force kips
1	0.000

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 = 0.000 kips

Bending Max Concrete Curvature rad/in.	Bending Max Steel Stress ksi	Bending Moment in-kip	Run Msg	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in
0.000000625	845.9514339	1353522294.		24.0001518	24.0001518	0.0000150	-0.0000150
0.0665544	0.4306528						

0.000001250	1688.2814444	1350625155.	24.0001524	0.0000300	-0.0000300
0.1326129	0.8613055				
0.000001875	2526.9900314	1347728017.	24.0001529	0.0000450	-0.0000450
0.1981756	1.2919583				
0.000002500	3362.0771951	1344830878.	24.0001534	0.0000600	-0.0000600
0.2632425	1.7226111				
0.000003125	4193.5429353	1341933739.	24.0001540	0.0000750	-0.0000750
0.3278135	2.1532639				
0.000003750	5021.3872521	1339036601.	24.0001545	0.0000900	-0.0000900
0.3918887	2.5839168				
0.000004375	5845.6101456	1336139462.	24.0001551	0.0001050	-0.0001050
0.4554681	3.0145696				
0.000005000	5845.6101456	1169122029.	14.1767436	0.0000709	-0.0001691
0.3080092	-4.8695722	C			
0.000005625	5845.6101456	1039219581.	14.1814610	0.0000798	-0.0001902
0.3458573	-5.4774992	C			
0.000006250	5845.6101456	935297623.	14.1861892	0.0000887	-0.0002113
0.3835595	-6.0852532	C			
0.000006875	5845.6101456	850270567.	14.1909283	0.0000976	-0.0002324
0.4211155	-6.6928337	C			
0.000007500	5845.6101456	779414686.	14.1956783	0.0001065	-0.0002535
0.4585249	-7.3002399	C			
0.000008125	5845.6101456	719459710.	14.2004394	0.0001154	-0.0002746
0.4957876	-7.9074715	C			
0.000008750	5845.6101456	668069731.	14.2052115	0.0001243	-0.0002957
0.5329033	-8.5145276	C			
0.000009375	5845.6101456	623531749.	14.2099947	0.0001332	-0.0003168
0.5698716	-9.1214077	C			
0.0000100	5845.6101456	584561015.	14.2147891	0.0001421	-0.0003379
0.6066924	-9.7281112	C			
0.0000106	5845.6101456	550175073.	14.2195946	0.0001511	-0.0003589
0.6433653	-10.3346374	C			
0.0000113	5845.6101456	519609791.	14.2244115	0.0001600	-0.0003800
0.6798902	-10.9409857	C			
0.0000119	5845.6101456	492261907.	14.2292396	0.0001690	-0.0004010
0.7162666	-11.5471556	C			
0.0000125	5845.6101456	467648812.	14.2340792	0.0001779	-0.0004221
0.7524943	-12.1531463	C			
0.0000131	5845.6101456	445379821.	14.2389301	0.0001869	-0.0004431
0.7885732	-12.7589572	C			
0.0000138	5845.6101456	425135283.	14.2437926	0.0001959	-0.0004641
0.8245028	-13.3645877	C			
0.0000144	6023.7945632	419046578.	14.2486666	0.0002048	-0.0004852
0.8602829	-13.9700371	C			
0.0000150	6283.5150883	418901006.	14.2535522	0.0002138	-0.0005062
0.8959132	-14.5753048	C			
0.0000156	6543.0489845	418755135.	14.2584494	0.0002228	-0.0005272
0.9313934	-15.1803901	C			
0.0000163	6802.3956702	418608964.	14.2633583	0.0002318	-0.0005482
0.9667234	-15.7852924	C			
0.0000169	7061.5545606	418462492.	14.2682790	0.0002408	-0.0005692
1.0019026	-16.3900109	C			
0.0000175	7320.5250670	418315718.	14.2732116	0.0002498	-0.0005902
1.0369310	-16.9945451	C			
0.0000181	7579.3065976	418168640.	14.2781560	0.0002588	-0.0006112
1.0718081	-17.5988942	C			
0.0000188	7837.8985565	418021256.	14.2831123	0.0002678	-0.0006322
1.1065338	-18.2030577	C			
0.0000194	8096.3003444	417873566.	14.2880807	0.0002768	-0.0006532
1.1411076	-18.8070346	C			
0.0000200	8354.5113583	417725568.	14.2930611	0.0002859	-0.0006741
1.1755294	-19.4108245	C			
0.0000206	8612.5309914	417577260.	14.2980536	0.0002949	-0.0006951

1.2097988	-20.0144267	C			
0.0000213	8870.3586334	417428642.	14.3030584	0.0003039	-0.0007161
1.2439155	-20.6178403	C			
0.0000219	9127.9936698	417279711.	14.3080753	0.0003130	-0.0007370
1.2778793	-21.2210647	C			
0.0000225	9385.4354826	417130466.	14.3131046	0.0003220	-0.0007580
1.3116898	-21.8240993	C			
0.0000231	9642.6834500	416980906.	14.3181462	0.0003311	-0.0007789
1.3453467	-22.4269432	C			
0.0000238	9899.7369459	416831029.	14.3232002	0.0003402	-0.0007998
1.3788497	-23.0295958	C			
0.0000244	10157.	416680834.	14.3282668	0.0003493	-0.0008207
1.4121986	-23.6320564	C			
0.0000256	10670.	416379475.	14.3384375	0.0003674	-0.0008626
1.4784325	-24.8363989	C			
0.0000269	11182.	416076834.	14.3486590	0.0003856	-0.0009044
1.5440460	-26.0399641	C			
0.0000281	11694.	415772890.	14.3589318	0.0004038	-0.0009462
1.6090366	-27.2427466	C			
0.0000294	12204.	415467630.	14.3692563	0.0004221	-0.0009879
1.6734018	-28.4447402	C			
0.0000306	12714.	415161043.	14.3796331	0.0004404	-0.0010296
1.7371390	-29.6459388	C			
0.0000319	13223.	414853116.	14.3900627	0.0004587	-0.0010713
1.8002456	-30.8463362	C			
0.0000331	13732.	414543834.	14.4005458	0.0004770	-0.0011130
1.8627191	-32.0459262	C			
0.0000344	14239.	414233186.	14.4110828	0.0004954	-0.0011546
1.9245567	-33.2447024	C			
0.0000356	14746.	413921159.	14.4216743	0.0005138	-0.0011962
1.9857559	-34.4426584	C			
0.0000369	15252.	413607737.	14.4323209	0.0005322	-0.0012378
2.0463138	-35.6397875	C			
0.0000381	15757.	413292908.	14.4430232	0.0005506	-0.0012794
2.1062279	-36.8360832	C			
0.0000394	16261.	412976658.	14.4537818	0.0005691	-0.0013209
2.1654952	-38.0315387	C			
0.0000406	16764.	412658972.	14.4645973	0.0005876	-0.0013624
2.2241131	-39.2261471	C			
0.0000419	17267.	412339835.	14.4754703	0.0006062	-0.0014038
2.2820786	-40.4199016	C			
0.0000431	17768.	412019235.	14.4864015	0.0006247	-0.0014453
2.3393890	-41.6127951	C			
0.0000444	18269.	411697154.	14.4973914	0.0006433	-0.0014867
2.3960413	-42.8048205	C			
0.0000456	18769.	411373579.	14.5084408	0.0006619	-0.0015281
2.4520326	-43.9959704	C			
0.0000469	19268.	411048519.	14.5195502	0.0006806	-0.0015694
2.5073600	-45.1862362	C			
0.0000481	19766.	410721909.	14.5307205	0.0006993	-0.0016107
2.5620203	-46.3756131	C			
0.0000494	20263.	410393756.	14.5419521	0.0007180	-0.0016520
2.6160105	-47.5640922	C			
0.0000506	20759.	410064046.	14.5532459	0.0007368	-0.0016932
2.6693276	-48.7516657	C			
0.0000519	21255.	409732761.	14.5646025	0.0007555	-0.0017345
2.7219685	-49.9383259	C			
0.0000531	21749.	409399885.	14.5760227	0.0007744	-0.0017756
2.7739299	-51.1240649	C			
0.0000544	22243.	409065400.	14.5875072	0.0007932	-0.0018168
2.8252088	-52.3088745	C			
0.0000556	22736.	408729291.	14.5990567	0.0008121	-0.0018579
2.8758017	-53.4927466	C			

0.0000569	23227.	408391538.	14.6106719	0.0008310	-0.0018990
2.9257055	-54.6756728	C			
0.0000581	23718.	408052124.	14.6223538	0.0008499	-0.0019401
2.9749169	-55.8576448	C			
0.0000594	24208.	407711031.	14.6341029	0.0008689	-0.0019811
3.0234323	-57.0386538	C			
0.0000606	24697.	407368552.	14.6457265	0.0008879	-0.0020221
3.0712187	-58.2190319	C			
0.0000619	25185.	407024713.	14.6572221	0.0009069	-0.0020631
3.1182718	-59.3987969	C			
0.0000631	25672.	406679201.	14.6687831	0.0009260	-0.0021040
3.1646176	-60.0000000	CY			
0.0000644	26158.	406331998.	14.6804101	0.0009451	-0.0021449
3.2102527	-60.0000000	CY			
0.0000656	26643.	405983085.	14.6921039	0.0009642	-0.0021858
3.2551736	-60.0000000	CY			
0.0000669	27127.	405632443.	14.7038654	0.0009833	-0.0022267
3.2993766	-60.0000000	CY			
0.0000681	27610.	405280053.	14.7156953	0.0010025	-0.0022675
3.3428584	-60.0000000	CY			
0.0000694	28092.	404925896.	14.7275946	0.0010217	-0.0023083
3.3856151	-60.0000000	CY			
0.0000706	28573.	404569952.	14.7395639	0.0010410	-0.0023490
3.4276432	-60.0000000	CY			
0.0000719	29044.	404091673.	14.7500835	0.0010602	-0.0023898
3.4687035	-60.0000000	CY			
0.0000731	29475.	403072266.	14.7537205	0.0010789	-0.0024311
3.5079550	-60.0000000	CY			
0.0000744	29858.	401455043.	14.7495436	0.0010970	-0.0024730
3.5452601	-60.0000000	CY			
0.0000794	31135.	392246336.	14.6948027	0.0011664	-0.0026436
3.6813494	-60.0000000	CY			
0.0000844	32160.	381149774.	14.6090319	0.0012326	-0.0028174
3.8013803	-60.0000000	CY			
0.0000894	33012.	369362560.	14.5055975	0.0012964	-0.0029936
3.9079319	-60.0000000	CY			
0.0000944	33740.	357505362.	14.3951856	0.0013585	-0.0031715
4.0031450	-60.0000000	CY			
0.0000994	34377.	345931693.	14.2834974	0.0014194	-0.0033506
4.0883438	-60.0000000	CY			
0.0001044	34935.	334703122.	14.1715893	0.0014792	-0.0035308
4.1641357	-60.0000000	CY			
0.0001094	35431.	323940666.	14.0579740	0.0015376	-0.0037124
4.2307884	-60.0000000	CY			
0.0001144	35871.	313627073.	13.9461294	0.0015951	-0.0038949
4.2891684	-60.0000000	CY			
0.0001194	36273.	303860741.	13.8392296	0.0016521	-0.0040779
4.3399744	-60.0000000	CY			
0.0001244	36632.	294530941.	13.7351344	0.0017083	-0.0042617
4.3832660	-60.0000000	CY			
0.0001294	36961.	285688006.	13.6338565	0.0017639	-0.0044461
4.4193369	-60.0000000	CY			
0.0001344	37263.	277303670.	13.5348499	0.0018187	-0.0046313
4.4484203	-60.0000000	CY			
0.0001394	37535.	269310170.	13.4391679	0.0018731	-0.0048169
4.4708379	-60.0000000	CY			
0.0001444	37783.	261702218.	13.3473027	0.0019270	-0.0050030
4.4868079	-60.0000000	CY			
0.0001494	38022.	254539263.	13.2620016	0.0019810	-0.0051890
4.4965333	-60.0000000	CY			
0.0001544	38238.	247698346.	13.1787297	0.0020345	-0.0053755
4.4999879	-60.0000000	CY			
0.0001594	38435.	241162765.	13.0959086	0.0020872	-0.0055628

4.4991008	-60.0000000	CY				
0.0001644	38615.		234919408.	13.0163967	0.0021396	-0.0057504
4.4961694	60.0000000	CY				
0.0001694	38781.		228965876.	12.9406891	0.0021918	-0.0059382
4.4998350	60.0000000	CY				
0.0001744	38944.		223333425.	12.8709600	0.0022444	-0.0061256
4.4972710	60.0000000	CY				
0.0001794	39093.		217937643.	12.8035616	0.0022966	-0.0063134
4.4999672	60.0000000	CY				
0.0001844	39230.		212773812.	12.7393054	0.0023488	-0.0065012
4.4971745	60.0000000	CY				
0.0001894	39357.		207826445.	12.6749886	0.0024003	-0.0066897
4.4999003	60.0000000	CY				
0.0001944	39475.		203085332.	12.6125107	0.0024516	-0.0068784
4.4956386	60.0000000	CY				
0.0001994	39581.		198527530.	12.5515567	0.0025025	-0.0070675
4.4993210	60.0000000	CY				
0.0002044	39686.		194183848.	12.4946057	0.0025536	-0.0072564
4.4949946	60.0000000	CY				
0.0002094	39789.		190038278.	12.4414757	0.0026049	-0.0074451
4.4972998	60.0000000	CY				
0.0002144	39883.		186045078.	12.3892958	0.0026560	-0.0076340
4.4997925	60.0000000	CY				
0.0002194	39974.		182216468.	12.3398762	0.0027071	-0.0078229
4.4921838	60.0000000	CY				
0.0002244	40057.		178526610.	12.2917083	0.0027580	-0.0080120
4.4971340	60.0000000	CY				
0.0002294	40137.		174983396.	12.2454771	0.0028088	-0.0082012
4.4996503	60.0000000	CY				
0.0002344	40210.		171561779.	12.1978486	0.0028589	-0.0083911
4.4945873	60.0000000	CY				
0.0002394	40279.		168266185.	12.1516759	0.0029088	-0.0085812
4.4947195	60.0000000	CY				
0.0002444	40343.		165084525.	12.1063441	0.0029585	-0.0087715
4.4982677	60.0000000	CY				
0.0002494	40406.		162028002.	12.0632455	0.0030083	-0.0089617
4.4998905	60.0000000	CYT				
0.0002544	40468.		159086090.	12.0224625	0.0030582	-0.0091518
4.4926204	60.0000000	CYT				
0.0002594	40529.		156254980.	11.9837750	0.0031083	-0.0093417
4.4936508	60.0000000	CYT				
0.0002644	40585.		153511868.	11.9459332	0.0031582	-0.0095318
4.4974059	60.0000000	CYT				
0.0002694	40638.		150860647.	11.9101831	0.0032083	-0.0097217
4.4995166	60.0000000	CYT				
0.0002744	40690.		148301338.	11.8759269	0.0032585	-0.0099115
4.4975184	60.0000000	CYT				
0.0003044	40923.		134448054.	11.6976495	0.0035605	-0.0110495
4.4903477	60.0000000	CYT				
0.0003344	40940.		122436952.	11.6093256	0.0038819	-0.0121681
4.4867102	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	0.000	40395.232	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 Bending Stiffness Moment Capacity at Ult. Mom. Cap. in-kip	Ultimate (Factored) Axial Thrust kips	Ultimate (Factored) Moment in-kip
		kip-in^2		
1	0.65	40395.232	0.000	26256.900
		406260579.288		
1	0.70	40395.232	0.000	28276.662
		404789053.314		
1	0.75	40395.232	0.000	30296.424
		398293409.577		

Pile Section No. 2:

Dimensions and Properties of Drilled Shaft (Bored Pile) with Permanent Casing:

Length of Section	=	98.00000	ft
Outer Diameter of Casing	=	49.50000	in
Concrete Cover Thickness Inside Casing	=	4.50000	in
Casing Wall Thickness	=	0.75000	in
Moment of Inertia of Steel Casing	=	34131.	in^4
Yield Stress of Casing	=	36000.	psi
Elastic Modulus of Casing	=	29000000.	psi
Number of Reinforcing Bars	=	50	bars
Area of Single Reinforcing Bar	=	0.79000	sq. in.
Edge-to-Edge Bar Spacing	=	2.76901	in
Maximum Concrete Aggregate Size	=	0.50000	in
Ratio of Bar Spacing to Aggregate Size	=	5.54	
Offset of Center of Rebar Cage from Center of Pile	=	0.0000	in
Yield Stress of Reinforcing Bars	=	60000.	psi
Modulus of Elasticity of Reinforcing Bars	=	29000000.	psi
Gross Area of Pile	=	1924.42185	sq. in.
Area of Concrete	=	1770.05737	sq. in.
Cross-sectional Area of Steel Casing	=	114.86448	sq. in.
Area of All Steel (Casing and Bars)	=	154.36448	sq. in.
Area Ratio of All Steel to Gross Area of Pile	=	8.02	percent

Axial Structural Capacities:

Nom. Axial Structural Capacity = 0.85 Fc Ac + Fy As = 13275.591 kips
Tensile Load for Cracking of Concrete = -1294.896 kips
Nominal Axial Tensile Capacity = -6505.121 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.00000	0.79000	18.99342	-0.49994
2	1.00000	0.79000	18.99342	0.49994
3	1.00000	0.79000	18.52104	4.23924
4	1.00000	0.79000	18.27238	5.20771
5	1.00000	0.79000	16.88491	8.71205
6	1.00000	0.79000	16.40321	9.58825
7	1.00000	0.79000	14.18784	12.63745
8	1.00000	0.79000	13.50337	13.36633
9	1.00000	0.79000	10.59930	15.76879
10	1.00000	0.79000	9.75507	16.30456
11	1.00000	0.79000	6.34476	17.90933
12	1.00000	0.79000	5.39382	18.21831
13	1.00000	0.79000	1.69156	18.92455
14	1.00000	0.79000	0.69365	18.98733
15	1.00000	0.79000	-3.06793	18.75068
16	1.00000	0.79000	-4.05010	18.56332
17	1.00000	0.79000	-7.63464	17.39863
18	1.00000	0.79000	-8.53937	16.97290
19	1.00000	0.79000	-11.72165	14.95336
20	1.00000	0.79000	-12.49207	14.31601
21	1.00000	0.79000	-15.07214	11.56851
22	1.00000	0.79000	-15.65986	10.75959
23	1.00000	0.79000	-17.47560	7.45678
24	1.00000	0.79000	-17.84368	6.52711
25	1.00000	0.79000	-18.78099	2.87651
26	1.00000	0.79000	-18.90631	1.88451
27	1.00000	0.79000	-18.90631	-1.88451
28	1.00000	0.79000	-18.78099	-2.87651
29	1.00000	0.79000	-17.84368	-6.52711
30	1.00000	0.79000	-17.47560	-7.45678
31	1.00000	0.79000	-15.65986	-10.75959
32	1.00000	0.79000	-15.07214	-11.56851
33	1.00000	0.79000	-12.49207	-14.31601
34	1.00000	0.79000	-11.72165	-14.95336
35	1.00000	0.79000	-8.53937	-16.97290
36	1.00000	0.79000	-7.63464	-17.39863
37	1.00000	0.79000	-4.05010	-18.56332
38	1.00000	0.79000	-3.06793	-18.75068
39	1.00000	0.79000	0.69365	-18.98733
40	1.00000	0.79000	1.69156	-18.92455
41	1.00000	0.79000	5.39382	-18.21831
42	1.00000	0.79000	6.34476	-17.90933
43	1.00000	0.79000	9.75507	-16.30456
44	1.00000	0.79000	10.59930	-15.76879
45	1.00000	0.79000	13.50337	-13.36633
46	1.00000	0.79000	14.18784	-12.63745
47	1.00000	0.79000	16.40321	-9.58825
48	1.00000	0.79000	16.88491	-8.71205
49	1.00000	0.79000	18.27238	-5.20771
50	1.00000	0.79000	18.52104	-4.23924

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

Minimum spacing between any two bars not equal to zero = -0.0001154 inches between Bars 1 and 2

Spacing to aggregate size ratio = -0.0002308

Concrete Properties:

Compressive Strength of Concrete = 4500.00000 psi
Modulus of Elasticity of Concrete = 3823676. psi
Modulus of Rupture of Concrete = -503.11528 psi
Compression Strain at Peak Stress = 0.00200
Tensile Strain at Fracture of Concrete = -0.0001152
Maximum Coarse Aggregate Size = 0.50000 in

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

Number	Axial Thrust Force kips
1	0.000

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 = 0.000 kips

Bending Max Concrete Curvature rad/in.	Bending Max Steel Stress ksi	Bending Max Casing Stress ksi	Depth to N Axis in	Run Msg	Max Comp Strain in/in	Max Tens Strain in/in
0.000000625	1458.6794421	2333887107.	24.7501135		0.0000155	-0.0000155
0.0686261	0.4441099	0.4441099				
0.000001250	2913.7289969	2330983197.	24.7501139		0.0000309	-0.0000309
0.1367249	0.8882197	0.8882197				
0.000001875	4365.1486643	2328079288.	24.7501142		0.0000464	-0.0000464
0.2042964	1.3323296	1.3323296				
0.000002500	5812.9384444	2325175378.	24.7501145		0.0000619	-0.0000619
0.2713405	1.7764395	1.7764395				
0.000003125	7257.0983372	2322271468.	24.7501148		0.0000773	-0.0000773

0.3378574	2.2205494	2.2205494				
0.000003750	8697.6283426	2319367558.		24.7501151	0.0000928	-0.0000928
0.4038469	2.6646594	2.6646594				
0.000004375	10135.	2316463648.		24.7501154	0.0001083	-0.0001083
0.4693092	3.1087693	3.1087693				
0.000005000	10135.	2026905692.		19.6919024	0.0000985	-0.0001490
0.4267214	-4.2862866	-4.2862866	C			
0.000005625	10135.	1801693949.		19.6973086	0.0001108	-0.0001676
0.4786965	-4.8211906	-4.8211906	C			
0.000006250	10135.	1621524554.		19.7027255	0.0001231	-0.0001862
0.5303668	-5.3558966	-5.3558966	C			
0.000006875	10723.	1559731372.		19.7081529	0.0001355	-0.0002048
0.5817317	-5.8904042	-5.8904042	C			
0.000007500	11694.	1559216860.		19.7135911	0.0001479	-0.0002234
0.6327907	-6.4247127	-6.4247127	C			
0.000008125	12664.	1558701472.		19.7190400	0.0001602	-0.0002420
0.6835434	-6.9588215	-6.9588215	C			
0.000008750	13634.	1558185205.		19.7244997	0.0001726	-0.0002605
0.7339893	-7.4927301	-7.4927301	C			
0.000009375	14603.	1557668055.		19.7299702	0.0001850	-0.0002791
0.7841278	-8.0264378	-8.0264378	C			
0.0000100	15572.	1557150019.		19.7354516	0.0001974	-0.0002976
0.8339586	-8.5599440	-8.5599440	C			
0.0000106	16539.	1556631095.		19.7409438	0.0002097	-0.0003162
0.8834811	-9.0932482	-9.0932482	C			
0.0000113	17506.	1556111278.		19.7464471	0.0002221	-0.0003347
0.9326948	-9.6263497	-9.6263497	C			
0.0000119	18473.	1555590565.		19.7519613	0.0002346	-0.0003533
0.9815992	-10.1592480	-10.1592480	C			
0.0000125	19438.	1555068953.		19.7574866	0.0002470	-0.0003718
1.0301939	-10.6919423	-10.6919423	C			
0.0000131	20403.	1554546439.		19.7630229	0.0002594	-0.0003903
1.0784783	-11.2244322	-11.2244322	C			
0.0000138	21368.	1554023019.		19.7685704	0.0002718	-0.0004088
1.1264520	-11.7567169	-11.7567169	C			
0.0000144	22332.	1553498689.		19.7741291	0.0002843	-0.0004273
1.1741144	-12.2887959	-12.2887959	C			
0.0000150	23295.	1552973447.		19.7796990	0.0002967	-0.0004458
1.2214650	-12.8206684	-12.8206684	C			
0.0000156	24257.	1552447288.		19.7852801	0.0003091	-0.0004643
1.2685034	-13.3523340	-13.3523340	C			
0.0000163	25219.	1551920210.		19.7908726	0.0003216	-0.0004828
1.3152290	-13.8837919	-13.8837919	C			
0.0000169	26180.	1551392208.		19.7964765	0.0003341	-0.0005012
1.3616413	-14.4150415	-14.4150415	C			
0.0000175	27140.	1550863280.		19.8020917	0.0003465	-0.0005197
1.4077397	-14.9460822	-14.9460822	C			
0.0000181	28100.	1550333421.		19.8077185	0.0003590	-0.0005382
1.4535239	-15.4769133	-15.4769133	C			
0.0000188	29059.	1549802628.		19.8133567	0.0003715	-0.0005566
1.4989932	-16.0075342	-16.0075342	C			
0.0000194	30017.	1549270898.		19.8190065	0.0003840	-0.0005751
1.5441471	-16.5379442	-16.5379442	C			
0.0000200	30975.	1548738226.		19.8246678	0.0003965	-0.0005935
1.5889852	-17.0681426	-17.0681426	C			
0.0000206	31932.	1548204610.		19.8303409	0.0004090	-0.0006119
1.6335068	-17.5981289	-17.5981289	C			
0.0000213	32888.	1547670045.		19.8360256	0.0004215	-0.0006304
1.6777115	-18.1279023	-18.1279023	C			
0.0000219	33844.	1547134528.		19.8417221	0.0004340	-0.0006488
1.7215987	-18.6574622	-18.6574622	C			
0.0000225	34798.	1546598055.		19.8474303	0.0004466	-0.0006672
1.7651680	-19.1868079	-19.1868079	C			

0.0000231	35753.	1546060622.		19.8531505	0.0004591	-0.0006856
1.8084186	-19.7159388	-19.7159388	C			
0.0000238	36706.	1545522226.		19.8588825	0.0004716	-0.0007040
1.8513502	-20.2448541	-20.2448541	C			
0.0000244	37659.	1544982863.		19.8646264	0.0004842	-0.0007224
1.8939622	-20.7735531	-20.7735531	C			
0.0000256	39562.	1543901212.		19.8761504	0.0005093	-0.0007591
1.9782251	-21.8303000	-21.8303000	C			
0.0000269	41463.	1542815654.		19.8877228	0.0005345	-0.0007958
2.0612030	-22.8861734	-22.8861734	C			
0.0000281	43361.	1541726150.		19.8993440	0.0005597	-0.0008325
2.1428915	-23.9411681	-23.9411681	C			
0.0000294	45256.	1540632669.		19.9110144	0.0005849	-0.0008692
2.2232860	-24.9952783	-24.9952783	C			
0.0000306	47148.	1539535178.		19.9227345	0.0006101	-0.0009058
2.3023821	-26.0484983	-26.0484983	C			
0.0000319	49038.	1538433647.		19.9345047	0.0006354	-0.0009424
2.3801753	-27.1008222	-27.1008222	C			
0.0000331	50924.	1537328041.		19.9463254	0.0006607	-0.0009790
2.4566609	-28.1522443	-28.1522443	C			
0.0000344	52808.	1536218328.		19.9581971	0.0006861	-0.0010155
2.5318344	-29.2027586	-29.2027586	C			
0.0000356	54688.	1535104474.		19.9701203	0.0007114	-0.0010520
2.6056910	-30.2523590	-30.2523590	C			
0.0000369	56566.	1533986444.		19.9820952	0.0007368	-0.0010885
2.6782260	-31.3010396	-31.3010396	C			
0.0000381	58440.	1532864206.		19.9941226	0.0007623	-0.0011249
2.7494346	-32.3487941	-32.3487941	C			
0.0000394	60312.	1531737723.		20.0062027	0.0007877	-0.0011613
2.8193120	-33.3956163	-33.3956163	C			
0.0000406	62181.	1530606961.		20.0183361	0.0008132	-0.0011977
2.8878534	-34.4415000	-34.4415000	C			
0.0000419	64047.	1529471883.		20.0305233	0.0008388	-0.0012340
2.9550538	-35.4864387	-35.4864387	C			
0.0000431	65859.	1527163184.		20.0368732	0.0008641	-0.0012706
3.0202530	-36.5377934	-36.0000000	CY			
0.0000444	67455.	1520101816.		20.0188627	0.0008883	-0.0013082
3.0813576	-37.6200368	-36.0000000	CY			
0.0000456	68921.	1510604330.		19.9878374	0.0009119	-0.0013465
3.1395943	-38.7208065	-36.0000000	CY			
0.0000469	70292.	1499552488.		19.9480539	0.0009351	-0.0013852
3.1954284	-39.8357312	-36.0000000	CY			
0.0000481	71591.	1487610495.		19.9028544	0.0009578	-0.0014244
3.2492388	-40.9610990	-36.0000000	CY			
0.0000494	72828.	1475005519.		19.8533132	0.0009803	-0.0014638
3.3011559	-42.0959605	-36.0000000	CY			
0.0000506	74018.	1462082383.		19.8012801	0.0010024	-0.0015035
3.3514045	-43.2380720	-36.0000000	CY			
0.0000519	75159.	1448840669.		19.7466212	0.0010244	-0.0015435
3.3999851	-44.3879063	-36.0000000	CY			
0.0000531	76261.	1435509633.		19.6906429	0.0010461	-0.0015836
3.4470662	-45.5437360	-36.0000000	CY			
0.0000544	77331.	1422175416.		19.6338275	0.0010676	-0.0016240
3.4927229	-46.7049440	-36.0000000	CY			
0.0000556	78370.	1408891952.		19.5764794	0.0010889	-0.0016645
3.5370105	-47.8711305	-36.0000000	CY			
0.0000569	79380.	1395693736.		19.5182626	0.0011101	-0.0017052
3.5799104	-49.0429077	-36.0000000	CY			
0.0000581	80364.	1382603198.		19.4594465	0.0011311	-0.0017461
3.6214743	-50.2199156	-36.0000000	CY			
0.0000594	81325.	1369675975.		19.4007836	0.0011519	-0.0017871
3.6618098	-51.4009240	-36.0000000	CY			
0.0000606	82265.	1356941755.		19.3424879	0.0011726	-0.0018283

3.7009617	-52.5855399	-36.0000000	CY			
0.0000619	83186.	1344417242.		19.2846911	0.0011932	-0.0018696
3.7389647	-53.7734869	-36.0000000	CY			
0.0000631	84088.	1332094649.		19.2273425	0.0012137	-0.0019110
3.7758322	-54.9648038	-36.0000000	CY			
0.0000644	84975.	1319994588.		19.1706142	0.0012341	-0.0019525
3.8116024	-56.1591203	-36.0000000	CY			
0.0000656	85846.	1308129321.		19.1146254	0.0012544	-0.0019940
3.8463066	-57.3561425	-36.0000000	CY			
0.0000669	86678.	1296125228.		19.0637949	0.0012749	-0.0020354
3.8804556	-58.5472198	36.0000000	CY			
0.0000681	87486.	1284192967.		19.0150674	0.0012954	-0.0020768
3.9137147	-59.7378277	36.0000000	CY			
0.0000694	88246.	1272018558.		18.9733701	0.0013163	-0.0021178
3.9466337	-60.0000000	36.0000000	CY			
0.0000706	88982.	1259928202.		18.9337507	0.0013372	-0.0021587
3.9786667	-60.0000000	36.0000000	CY			
0.0000719	89695.	1247936600.		18.8973536	0.0013582	-0.0021996
4.0099415	-60.0000000	36.0000000	CY			
0.0000731	90390.	1236101322.		18.8637384	0.0013794	-0.0022403
4.0404106	-60.0000000	36.0000000	CY			
0.0000744	91066.	1224418248.		18.8316241	0.0014006	-0.0022810
4.0699403	-60.0000000	36.0000000	CY			
0.0000794	93625.	1179528549.		18.7221742	0.0014861	-0.0024430
4.1791031	-60.0000000	36.0000000	CY			
0.0000844	95908.	1136688520.		18.6254477	0.0015715	-0.0026050
4.2722914	-60.0000000	36.0000000	CY			
0.0000894	97674.	1092853906.		18.5070875	0.0016541	-0.0027700
4.3471390	-60.0000000	36.0000000	CY			
0.0000944	99126.	1050344499.		18.3822675	0.0017348	-0.0029367
4.4059584	-60.0000000	36.0000000	CY			
0.0000994	100362.	1009933605.		18.2590158	0.0018145	-0.0031046
4.4500443	-60.0000000	36.0000000	CY			
0.0001044	101438.	971861656.		18.1395264	0.0018933	-0.0032732
4.4800501	-60.0000000	36.0000000	CY			
0.0001094	102377.	936017699.		18.0225174	0.0019712	-0.0034428
4.4964049	-60.0000000	36.0000000	CY			
0.0001144	103210.	902383143.		17.9097407	0.0020484	-0.0036131
4.4984452	-60.0000000	36.0000000	CY			
0.0001194	103948.	870768603.		17.8013600	0.0021250	-0.0037840
4.4993854	60.0000000	36.0000000	CY			
0.0001244	104617.	841138002.		17.6989220	0.0022013	-0.0039553
4.4997515	60.0000000	36.0000000	CY			
0.0001294	105212.	813235312.		17.6023049	0.0022773	-0.0041268
4.4998493	60.0000000	36.0000000	CY			
0.0001344	105747.	786951689.		17.5080799	0.0023526	-0.0042989
4.4997834	60.0000000	36.0000000	CY			
0.0001394	106236.	762228307.		17.4191877	0.0024278	-0.0044713
4.4994884	60.0000000	36.0000000	CY			
0.0001444	106681.	738913818.		17.3346052	0.0025027	-0.0046439
4.4987003	60.0000000	36.0000000	CY			
0.0001494	107082.	716868514.		17.2542398	0.0025774	-0.0048167
4.4969793	60.0000000	36.0000000	CY			
0.0001544	107452.	696042688.		17.1768527	0.0026517	-0.0049899
4.4994555	60.0000000	36.0000000	CY			
0.0001594	107795.	676362325.		17.1056720	0.0027262	-0.0051628
4.4993558	60.0000000	36.0000000	CY			
0.0001644	108111.	657707616.		17.0355151	0.0028002	-0.0053363
4.4966216	60.0000000	36.0000000	CY			
0.0001694	108401.	640008439.		16.9664016	0.0028737	-0.0055104
4.4999395	60.0000000	36.0000000	CY			
0.0001744	108670.	623197452.		16.9020334	0.0029473	-0.0056843
4.4976180	60.0000000	36.0000000	CY			

0.0001794	108917.	607202050.		16.8391568	0.0030205	-0.0058585
4.4999982	60.0000000	36.0000000	CYT			
0.0001844	109155.	592024698.		16.7809588	0.0030940	-0.0060326
4.4974610	60.0000000	36.0000000	CYT			
0.0001894	109366.	577511185.		16.7256081	0.0031674	-0.0062067
4.4999715	60.0000000	36.0000000	CYT			
0.0001944	109557.	563634818.		16.6770728	0.0032416	-0.0063800
4.4962185	60.0000000	36.0000000	CYT			
0.0001994	109727.	550356844.		16.6308442	0.0033158	-0.0065533
4.4996658	60.0000000	36.0000000	CYT			
0.0002044	109874.	537607365.		16.5900341	0.0033906	-0.0067260
4.4933335	60.0000000	36.0000000	CYT			
0.0002094	110012.	525430028.		16.5496145	0.0034651	-0.0068990
4.4983418	60.0000000	36.0000000	CYT			
0.0002144	110124.	513699448.		16.5126501	0.0035399	-0.0070717
4.4998010	60.0000000	36.0000000	CYT			
0.0002194	110232.	502480243.		16.4792550	0.0036151	-0.0072439
4.4946924	60.0000000	36.0000000	CYT			
0.0002244	110333.	491734537.		16.4481084	0.0036905	-0.0074160
4.4988728	60.0000000	36.0000000	CYT			
0.0002294	110422.	481402056.		16.4192865	0.0037662	-0.0075879
4.4978985	60.0000000	36.0000000	CYT			
0.0002344	110503.	471477810.		16.3917003	0.0038418	-0.0077598
4.4939851	60.0000000	36.0000000	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	0.000	108847.697	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 Bending Stiffness Moment Capacity at Ult. Mom. Cap. in-kip	Ultimate (Factored) Axial Thrust kips	Ultimate (Factored) Moment Capacity in-kip
		kip-in^2		
1	0.65	108847.697	0.000	70751.000
		1495330789.936		

```
   1          0.70              108847.697                    0.000
76193.386          1436332370.413

   1          0.75              108847.697                    0.000
81635.773          1365459673.070
```

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

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head = 0.500000 inches
Moment at pile head = 7818000.0 in-lbs
Axial load at pile head = 0.0 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. Es*h lb/inch	Soil Spr. Lat. Load lb/inch	Distrib. p lb/in
0.00	0.5000	7818000.	-6580.0136	-0.003275	0.000	4.180E+11	0.000	0.000	0.000
1.078	0.4592	7732857.	-6580.0136	-0.003035	0.000	4.180E+11	0.000	0.000	0.000
2.157	0.4215	7647715.	-6580.0136	-0.002797	0.000	4.181E+11	0.000	0.000	0.000
3.235	0.3868	7562572.	-6580.0136	-0.002561	0.000	4.182E+11	0.000	0.000	0.000
4.313	0.3552	7477429.	-6580.0136	-0.002329	0.000	4.182E+11	0.000	0.000	0.000
5.392	0.3265	7392286.	-6580.0136	-0.002099	0.000	4.183E+11	0.000	0.000	0.000
6.470	0.3009	7307144.	-6580.0136	-0.001871	0.000	4.183E+11	0.000	0.000	0.000
7.548	0.2781	7222001.	-6580.0136	-0.001647	0.000	4.184E+11	0.000	0.000	0.000
8.626	0.2583	7136858.	-6580.0136	-0.001425	0.000	4.184E+11	0.000	0.000	0.000
9.705	0.2413	7051715.	-6580.0136	-0.001205	0.000	4.185E+11	0.000	0.000	0.000
10.783	0.2271	6966573.	-6580.0136	-0.001077	0.000	2.323E+12	0.000	0.000	0.000
11.861	0.2134	6881430.	-6580.0136	-0.001038	0.000	2.323E+12	0.000	0.000	0.000
12.940	0.2002	6796287.	-6580.0136	-0.001000	0.000	2.323E+12	0.000	0.000	0.000
14.018	0.1875	6711144.	-6580.0136	-0.000962	0.000	2.323E+12	0.000	0.000	0.000
15.096	0.1753	6626002.	-6580.0136	-0.000925	0.000	2.323E+12	0.000	0.000	0.000
16.174	0.1636	6540859.	-6580.0136	-0.000889	0.000	2.324E+12	0.000	0.000	0.000
17.253	0.1523	6455716.	-6580.0136	-0.000852	0.000	2.324E+12	0.000	0.000	0.000
18.331	0.1415	6370573.	-6580.0136	-0.000817	0.000	2.324E+12	0.000	0.000	0.000

19.409	0.1312	6285431.	-6580.0136	-0.000782	0.000	2.324E+12	0.000	0.000	0.000
20.488	0.1213	6200288.	-6580.0136	-0.000747	0.000	2.324E+12	0.000	0.000	0.000
21.566	0.1118	6115145.	-6580.0136	-0.000712	0.000	2.324E+12	0.000	0.000	0.000
22.644	0.1028	6030002.	-6580.0136	-0.000679	0.000	2.325E+12	0.000	0.000	0.000
23.723	0.0943	5944860.	-6580.0136	-0.000645	0.000	2.325E+12	0.000	0.000	0.000
24.801	0.0861	5859717.	-6580.0136	-0.000613	0.000	2.325E+12	0.000	0.000	0.000
25.879	0.0784	5774574.	-6580.0136	-0.000580	0.000	2.325E+12	0.000	0.000	0.000
26.957	0.0711	5689431.	-6580.0136	-0.000548	0.000	2.325E+12	0.000	0.000	0.000
28.036	0.0642	5604289.	-6580.0136	-0.000517	0.000	2.326E+12	0.000	0.000	0.000
29.114	0.0577	5519146.	-6580.0136	-0.000486	0.000	2.326E+12	0.000	0.000	0.000
30.192	0.0517	5434003.	-6580.0136	-0.000455	0.000	2.326E+12	0.000	0.000	0.000
31.271	0.0460	5348860.	-6674.3579	-0.000425	0.000	2.326E+12	-14.5823	4105.7868	0.000
32.349	0.0406	5261276.	-7056.2990	-0.000396	0.000	2.326E+12	-44.4522	14152.	0.000
33.427	0.0357	5166249.	-7775.9611	-0.000367	0.000	2.326E+12	-66.7819	24198.	0.000
34.506	0.0311	5060040.	-8741.3660	-0.000338	0.000	2.326E+12	-82.4352	34244.	0.000
35.584	0.0270	4940029.	-9871.5577	-0.000311	0.000	2.327E+12	-92.2520	44290.	0.000
36.662	0.0231	4804572.	-11096.	-0.000284	0.000	2.327E+12	-97.0440	54336.	0.000
37.741	0.0196	4652867.	-12356.	-0.000257	0.000	2.327E+12	-97.5905	64382.	0.000
38.819	0.0165	4484822.	-13599.	-0.000232	0.000	2.328E+12	-94.6335	74428.	0.000
39.897	0.0136	4300932.	-14786.	-0.000207	0.000	2.328E+12	-88.8735	84474.	0.000
40.975	0.0111	4102161.	-15885.	-0.000184	0.000	2.328E+12	-80.9647	94520.	0.000
42.054	0.008849	3889834.	-16872.	-0.000162	0.000	2.329E+12	-71.5117	104566.	0.000
43.132	0.006894	3665534.	-17729.	-0.000141	0.000	2.329E+12	-61.0661	114612.	0.000
44.210	0.005203	3431010.	-18449.	-0.000121	0.000	2.330E+12	-50.1234	124658.	0.000
45.289	0.003758	3188093.	-19026.	-0.000103	0.000	2.330E+12	-39.1212	134704.	0.000
46.367	0.002542	2938626.	-19463.	-8.580E-05	0.000	2.331E+12	-28.4381	144750.	0.000
47.445	0.001537	2684397.	-19766.	-7.020E-05	0.000	2.331E+12	-18.3923	154796.	0.000
48.524	0.000726	2427089.	-19945.	-5.601E-05	0.000	2.332E+12	-9.2425	164842.	0.000
49.602	8.788E-05	2168233.	-20013.	-4.326E-05	0.000	2.332E+12	-1.1877	174888.	0.000
50.680	-0.000394	1909179.	-19984.	-3.195E-05	0.000	2.333E+12	5.6323	184934.	0.000
51.758	-0.000739	1651067.	-19875.	-2.208E-05	0.000	2.333E+12	11.1355	194980.	0.000
52.837	-0.000965	1394821.	-19704.	-1.363E-05	0.000	2.334E+12			

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15.2970    205026.       0.000
    53.915  -0.001092   1141135.    -19488. -6.602E-06       0.000  2.334E+12
18.1469    215072.       0.000
    54.993  -0.001136    890487.    -19243. -9.706E-07       0.000  2.334E+12
19.7687    225118.       0.000
    56.072  -0.001117    643150.    -17727.  3.281E-06       0.000  2.334E+12
214.4529   2484476.      0.000
    57.150  -0.001051    431719.    -14994.  6.260E-06       0.000  2.334E+12
208.0612   2560645.      0.000
    58.228  -0.000955    255125.    -12365.  8.165E-06       0.000  2.334E+12
198.2733   2686770.      0.000
    59.306  -0.000840    111728. -9878.8938  9.181E-06       0.000  2.334E+12
185.9607   2864263.      0.000
    60.385  -0.000717   -533.1512 -7564.1445  9.490E-06       0.000  2.334E+12
171.8169   3099526.      0.000
    61.463  -0.000595    -84026. -5440.5974  9.255E-06       0.000  2.334E+12
156.4077   3404234.      0.000
    62.541  -0.000478   -141331. -3521.6246  8.631E-06       0.000  2.334E+12
140.1970   3797043.      0.000
    63.620  -0.000371   -175163. -1894.8444  7.753E-06       0.000  2.334E+12
111.2451   3878315.      0.000
    64.698  -0.000277   -190369.  -633.0960  6.740E-06       0.000  2.334E+12
83.7761    3911802.      0.000
    65.776  -0.000197   -191547.   297.0051  5.681E-06       0.000  2.334E+12
59.9843    3945288.      0.000
    66.855  -0.000130   -182682.   943.8960  4.644E-06       0.000  2.334E+12
40.0019    3978775.      0.000
    67.933 -7.656E-05   -167120.  1356.2822  3.674E-06       0.000  2.334E+12
23.7383    4012262.      0.000
    69.011 -3.501E-05   -147583.  1580.6836  2.802E-06       0.000  2.334E+12
10.9462    4045748.      0.000
    70.090 -4.050E-06   -126213.  1659.7636  2.043E-06       0.000  2.334E+12
1.2768     4079235.      0.000
    71.168  1.785E-05   -104629.  1631.3081  1.403E-06       0.000  2.334E+12
-5.6750    4112722.      0.000
    72.246  3.225E-05    -83996.  1527.7273  8.799E-07       0.000  2.334E+12
-10.3349   4146208.      0.000
    73.324  4.063E-05    -65093.  1375.9595  4.666E-07       0.000  2.334E+12
-13.1229   4179695.      0.000
    74.403  4.433E-05    -48387.  1197.6729  1.520E-07       0.000  2.334E+12
-14.4338   4213182.      0.000
    75.481  4.456E-05    -34098.  1009.6710 -7.662E-08       0.000  2.334E+12
-14.6246   4246668.      0.000
    76.559  4.235E-05    -22258.   824.4279 -2.328E-07       0.000  2.334E+12
-14.0074   4280155.      0.000
    77.638  3.854E-05    -12763.   650.6890 -3.299E-07       0.000  2.334E+12
-12.8464   4313641.      0.000
    78.716  3.381E-05 -5418.5056   494.0902 -3.803E-07       0.000  2.334E+12
-11.3581   4347128.      0.000
    79.794  2.869E-05    23.9592   357.7590 -3.953E-07       0.000  2.334E+12
-9.7138    4380615.      0.000
    80.873  2.358E-05  3840.0123   242.8726 -3.846E-07       0.000  2.334E+12
-8.0435    4414101.      0.000
    81.951  1.874E-05  6309.3081   149.1571 -3.564E-07       0.000  2.334E+12
-6.4415    4447588.      0.000
    83.029  1.435E-05  7700.0786    75.3190 -3.176E-07       0.000  2.334E+12
-4.9712    4481075.      0.000
    84.107  1.052E-05  8258.5037    19.4062 -2.734E-07       0.000  2.334E+12
-3.6709    4514561.      0.000
    85.186  7.281E-06  8202.2945   -20.9004 -2.277E-07       0.000  2.334E+12
-2.5590    4548048.      0.000
    86.264  4.628E-06  7717.6174   -48.0591 -1.836E-07       0.000  2.334E+12
-1.6387    4581535.      0.000
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    87.342  2.529E-06  6958.5634   -64.4981 -1.429E-07       0.000  2.334E+12
-0.9022    4615021.      0.000
    88.421  9.299E-07  6048.4592   -72.4961 -1.069E-07       0.000  2.334E+12
-0.3341    4648508.      0.000
    89.499 -2.358E-07  5082.4229   -74.1054 -7.600E-08       0.000  2.334E+12
0.0853     4681995.      0.000
    90.577 -1.037E-06  4130.6711   -71.1088 -5.046E-08       0.000  2.334E+12
0.3778     4715481.      0.000
    91.656 -1.542E-06  3242.1828   -65.0039 -3.002E-08       0.000  2.334E+12
0.5658     4748968.      0.000
    92.734 -1.814E-06  2448.4218   -57.0067 -1.424E-08       0.000  2.334E+12
0.6703     4782455.      0.000
    93.812 -1.910E-06  1766.8953   -48.0703 -2.557E-09       0.000  2.334E+12
0.7109     4815941.      0.000
    94.890 -1.880E-06  1204.4009   -38.9127  5.680E-09       0.000  2.334E+12
0.7045     4849428.      0.000
    95.969 -1.763E-06   759.8654   -30.0500  1.112E-08       0.000  2.334E+12
0.6653     4882915.      0.000
    97.047 -1.592E-06   426.7303   -21.8321  1.441E-08       0.000  2.334E+12
0.6049     4916401.      0.000
    98.125 -1.390E-06   194.8680   -14.4784  1.614E-08       0.000  2.334E+12
0.5318     4949888.      0.000
    99.204 -1.174E-06    52.0420    -8.1119  1.682E-08       0.000  2.334E+12
0.4523     4983374.      0.000
   100.282 -9.548E-07   -15.0610    -2.7909  1.692E-08       0.000  2.334E+12
0.3702     5016861.      0.000
   101.360 -7.363E-07   -20.1833    -0.2159  1.683E-08       0.000  2.334E+12
0.0278      488859.      0.000
   102.438 -5.193E-07   -20.6479     0.0965  1.671E-08       0.000  2.334E+12
0.0205      509788.      0.000
   103.517 -3.038E-07   -17.6869     0.3095  1.661E-08       0.000  2.334E+12
0.0125      530717.      0.000
   104.595 -8.954E-08   -12.6395     0.4148  1.652E-08       0.000  2.334E+12
0.003817    551647.       0.000
   105.673  1.238E-07    -6.9530     0.4040  1.647E-08       0.000  2.334E+12
-0.005478   572576.       0.000
   106.752  3.367E-07    -2.1838     0.2687  1.644E-08       0.000  2.334E+12
-0.0154     593505.       0.000
   107.830  5.493E-07       0.000    0.000   1.644E-08       0.000  2.334E+12
-0.0261     307217.       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              =      0.5000000 inches
Computed slope at pile head       =     -0.0032754 radians
Maximum bending moment            =      7818000. inch-lbs
Maximum shear force               =       -20013. lbs
Depth of maximum bending moment   =      0.000000 feet below pile head
Depth of maximum shear force      =     49.6018000 feet below pile head
Number of iterations              =              9
Number of zero deflection points  =              4
```

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 2

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head = 1.000000 inches
Moment at pile head = 7818000.0 in-lbs
Axial load at pile head = 0.0 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. Spr. Distrib. p lb/in
	Es*h lb/inch	Lat. Load lb/inch					
0.00	1.0000	7818000.	6374.9764	-0.004652	0.000	4.180E+11	
0.000	0.000	0.000					
1.078	0.9414	7900490.	6374.9764	-0.004409	0.000	4.180E+11	
0.000	0.000	0.000					
2.157	0.8859	7982979.	6374.9764	-0.004163	0.000	4.179E+11	
0.000	0.000	0.000					
3.235	0.8336	8065469.	6374.9764	-0.003915	0.000	4.179E+11	
0.000	0.000	0.000					
4.313	0.7846	8147959.	6374.9764	-0.003664	0.000	4.178E+11	
0.000	0.000	0.000					
5.392	0.7388	8230448.	6374.9764	-0.003410	0.000	4.178E+11	
0.000	0.000	0.000					
6.470	0.6963	8312938.	6374.9764	-0.003154	0.000	4.177E+11	
0.000	0.000	0.000					
7.548	0.6572	8395428.	6374.9764	-0.002895	0.000	4.177E+11	
0.000	0.000	0.000					
8.626	0.6214	8477917.	6374.9764	-0.002634	0.000	4.177E+11	
0.000	0.000	0.000					
9.705	0.5890	8560407.	6374.9764	-0.002370	0.000	4.176E+11	
0.000	0.000	0.000					
10.783	0.5601	8642896.	6374.9764	-0.002213	0.000	2.319E+12	
0.000	0.000	0.000					
11.861	0.5318	8725386.	6374.9764	-0.002165	0.000	2.319E+12	
0.000	0.000	0.000					
12.940	0.5041	8807876.	6374.9764	-0.002116	0.000	2.319E+12	
0.000	0.000	0.000					
14.018	0.4770	8890365.	6374.9764	-0.002066	0.000	2.319E+12	
0.000	0.000	0.000					
15.096	0.4506	8972855.	6374.9764	-0.002016	0.000	2.319E+12	
0.000	0.000	0.000					
16.174	0.4248	9055345.	6374.9764	-0.001966	0.000	2.319E+12	
0.000	0.000	0.000					
17.253	0.3997	9137834.	6374.9764	-0.001915	0.000	2.318E+12	
0.000	0.000	0.000					
18.331	0.3753	9220324.	6374.9764	-0.001864	0.000	2.318E+12	
0.000	0.000	0.000					
19.409	0.3515	9302814.	6374.9764	-0.001812	0.000	2.318E+12	
0.000	0.000	0.000					
20.488	0.3284	9385303.	6374.9764	-0.001760	0.000	2.318E+12	
0.000	0.000	0.000					
21.566	0.3059	9467793.	6374.9764	-0.001708	0.000	2.318E+12	
0.000	0.000	0.000					
22.644	0.2842	9550283.	6374.9764	-0.001655	0.000	2.318E+12	

0.000	0.000	0.000					
23.723	0.2631	9632772.	6374.9764	-0.001601	0.000	2.317E+12	
0.000	0.000	0.000					
24.801	0.2427	9715262.	6374.9764	-0.001547	0.000	2.317E+12	
0.000	0.000	0.000					
25.879	0.2231	9797751.	6374.9764	-0.001493	0.000	2.317E+12	
0.000	0.000	0.000					
26.957	0.2041	9880241.	6374.9764	-0.001438	0.000	2.317E+12	
0.000	0.000	0.000					
28.036	0.1859	9962731.	6374.9764	-0.001382	0.000	2.317E+12	
0.000	0.000	0.000					
29.114	0.1683	10045220.	6374.9764	-0.001325	0.000	2.203E+12	
0.000	0.000	0.000					
30.192	0.1516	10127710.	6374.9764	-0.001261	0.000	1.923E+12	
0.000	0.000	0.000					
31.271	0.1357	10210200.	6142.5423	-0.001188	0.000	1.680E+12	
-35.9260	3425.9248	0.000					
32.349	0.1208	10286674.	5081.6989	-0.001107	0.000	1.605E+12	
-128.0425	13712.	0.000					
33.427	0.1070	10341710.	2958.2146	-0.001024	0.000	1.599E+12	
-200.1723	24198.	0.000					
34.506	0.0943	10363230.	47.9415	-0.000940	0.000	1.596E+12	
-249.6519	34244.	0.000					
35.584	0.0827	10342951.	-3399.0072	-0.000856	0.000	1.599E+12	
-283.1232	44290.	0.000					
36.662	0.0722	10275267.	-7191.7705	-0.000773	0.000	1.606E+12	
-303.1025	54336.	0.000					
37.741	0.0627	10156833.	-11172.	-0.000695	0.000	1.783E+12	
-312.0530	64382.	0.000					
38.819	0.0542	9986152.	-15208.	-0.000630	0.000	2.317E+12	
-311.7943	74428.	0.000					
39.897	0.0464	9763266.	-19186.	-0.000575	0.000	2.317E+12	
-303.0331	84474.	0.000					
40.975	0.0393	9489642.	-23005.	-0.000521	0.000	2.318E+12	
-287.3316	94520.	0.000					
42.054	0.0329	9167909.	-26586.	-0.000469	0.000	2.318E+12	
-266.1719	104566.	0.000					
43.132	0.0272	8801610.	-29867.	-0.000419	0.000	2.319E+12	
-240.9431	114612.	0.000					
44.210	0.0221	8394970.	-32804.	-0.000371	0.000	2.320E+12	
-212.9304	124658.	0.000					
45.289	0.0176	7952677.	-35367.	-0.000325	0.000	2.321E+12	
-183.3062	134704.	0.000					
46.367	0.0137	7479693.	-37544.	-0.000282	0.000	2.322E+12	
-153.1223	144750.	0.000					
47.445	0.0103	6981072.	-39332.	-0.000242	0.000	2.323E+12	
-123.3039	154796.	0.000					
48.524	0.007429	6461805.	-40742.	-0.000204	0.000	2.324E+12	
-94.6466	164842.	0.000					
49.602	0.005017	5926691.	-41793.	-0.000170	0.000	2.325E+12	
-67.8139	174888.	0.000					
50.680	0.003032	5380223.	-42513.	-0.000138	0.000	2.326E+12	
-43.3361	184934.	0.000					
51.758	0.001434	4826499.	-42933.	-0.000110	0.000	2.327E+12	
-21.6118	194980.	0.000					
52.837	0.000184	4269156.	-43091.	-8.479E-05	0.000	2.328E+12	
-2.9089	205026.	0.000					
53.915	-0.000760	3711327.	-43029.	-6.262E-05	0.000	2.329E+12	
12.6329	215072.	0.000					
54.993	-0.001437	3155612.	-42785.	-4.355E-05	0.000	2.330E+12	
24.9984	225118.	0.000					
56.072	-0.001887	2604083.	-40818.	-2.756E-05	0.000	2.331E+12	
279.0609	1913590.	0.000					

```
    57.150  -0.002150   2099278.    -37085. -1.451E-05       0.000  2.332E+12
297.8848   1792728.       0.000
    58.228  -0.002262   1644349.    -33181. -4.124E-06       0.000  2.333E+12
305.5740   1747665.       0.000
    59.306  -0.002257   1240584.    -29229.  3.874E-06       0.000  2.334E+12
305.1973   1749865.       0.000
    60.385  -0.002162    887918.    -25322.  9.775E-06       0.000  2.334E+12
298.7340   1787770.       0.000
    61.463  -0.002004    585271.    -21529.  1.386E-05       0.000  2.334E+12
287.5922   1857079.       0.000
    62.541  -0.001804    330776.    -17903.  1.640E-05       0.000  2.334E+12
272.8430   1957522.       0.000
    63.620  -0.001579    121963.    -14485.  1.765E-05       0.000  2.334E+12
255.3381   2091786.       0.000
    64.698  -0.001347    -44097.    -11308.  1.787E-05       0.000  2.334E+12
235.7758   2265418.       0.000
    65.776  -0.001117   -170680. -8393.3056  1.727E-05       0.000  2.334E+12
214.7394   2487437.       0.000
    66.855  -0.000900   -261309. -5757.1277  1.608E-05       0.000  2.334E+12
192.7195   2771770.       0.000
    67.933  -0.000701   -319670. -3409.6069  1.447E-05       0.000  2.334E+12
170.1234   3140084.       0.000
    69.011  -0.000525   -349546. -1356.1160  1.261E-05       0.000  2.334E+12
147.2730   3627518.       0.000
    70.090  -0.000375   -354765.   360.9570  1.066E-05       0.000  2.334E+12
118.1252   4079235.       0.000
    71.168  -0.000250   -340205.  1638.3059  8.731E-06       0.000  2.334E+12
79.3073    4112722.       0.000
    72.246  -0.000149   -312367.  2459.7724  6.922E-06       0.000  2.334E+12
47.6621    4146208.       0.000
    73.324 -7.038E-05   -276548.  2915.2188  5.290E-06       0.000  2.334E+12
22.7337    4179695.       0.000
    74.403 -1.185E-05   -236923.  3087.2722  3.866E-06       0.000  2.334E+12
3.8596     4213182.       0.000
    75.481  2.968E-05   -196652.  3049.2325  2.664E-06       0.000  2.334E+12
-9.7392    4246668.       0.000
    76.559  5.710E-05   -158012.  2864.0310  1.681E-06       0.000  2.334E+12
-18.8863   4280155.       0.000
    77.638  7.318E-05   -122533.  2584.0001  9.034E-07       0.000  2.334E+12
-24.3964   4313641.       0.000
    78.716  8.048E-05    -91140.  2251.2388  3.111E-07       0.000  2.334E+12
-27.0366   4347128.       0.000
    79.794  8.123E-05    -64273.  1898.3921 -1.197E-07       0.000  2.334E+12
-27.5009   4380615.       0.000
    80.873  7.738E-05    -42011.  1549.6881 -4.143E-07       0.000  2.334E+12
-26.3963   4414101.       0.000
    81.951  7.051E-05    -24168.  1222.1092 -5.978E-07       0.000  2.334E+12
-24.2357   4447588.       0.000
    83.029  6.191E-05    -10384.   926.6016 -6.936E-07       0.000  2.334E+12
-21.4392   4481075.       0.000
    84.107  5.256E-05  -188.6424   669.2494 -7.229E-07       0.000  2.334E+12
-18.3382   4514561.       0.000
    85.186  4.320E-05  6935.9612   452.3661 -7.042E-07       0.000  2.334E+12
-15.1842   4548048.       0.000
    86.264  3.434E-05    11518.    275.4691 -6.530E-07       0.000  2.334E+12
-12.1578   4581535.       0.000
    87.342  2.630E-05    14065.    136.1220 -5.821E-07       0.000  2.334E+12
-9.3803    4615021.       0.000
    88.421  1.927E-05    15041.     30.6387 -5.014E-07       0.000  2.334E+12
-6.9237    4648508.       0.000
    89.499  1.332E-05    14858.    -45.3475 -4.185E-07       0.000  2.334E+12
-4.8211    4681995.       0.000
    90.577  8.441E-06    13867.    -96.4412 -3.389E-07       0.000  2.334E+12
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-3.0762    4715481.       0.000
    91.656  4.553E-06    12362.  -127.1551 -2.662E-07       0.000  2.334E+12
-1.6711    4748968.       0.000
    92.734  1.552E-06    10577.  -141.6784 -2.026E-07       0.000  2.334E+12
-0.5737    4782455.       0.000
    93.812 -6.902E-07  8695.4404  -143.7281 -1.492E-07       0.000  2.334E+12
0.2569     4815941.       0.000
    94.890 -2.309E-06  6857.1605  -136.4683 -1.061E-07       0.000  2.334E+12
0.8652     4849428.       0.000
    95.969 -3.435E-06  5163.7491  -122.4834 -7.275E-08       0.000  2.334E+12
1.2963     4882915.       0.000
    97.047 -4.191E-06  3687.3874  -103.7931 -4.821E-08       0.000  2.334E+12
1.5925     4916401.       0.000
    98.125 -4.683E-06  2477.6662   -81.8997 -3.112E-08       0.000  2.334E+12
1.7914     4949888.       0.000
    99.204 -4.997E-06  1567.8886   -57.8590 -1.991E-08       0.000  2.334E+12
1.9244     4983374.       0.000
   100.282 -5.198E-06   980.3220   -32.3690 -1.284E-08       0.000  2.334E+12
2.0154     5016861.       0.000
   101.360 -5.329E-06   730.2037   -18.0270 -8.103E-09       0.000  2.334E+12
0.2013     488859.        0.000
   102.438 -5.408E-06   513.7964   -15.3460 -4.655E-09       0.000  2.334E+12
0.2131     509788.        0.000
   103.517 -5.450E-06   333.0622   -12.5214 -2.307E-09       0.000  2.334E+12
0.2235     530717.        0.000
   104.595 -5.468E-06   189.7528    -9.5672 -8.578E-10       0.000  2.334E+12
0.2331     551647.        0.000
   105.673 -5.472E-06    85.4717    -6.4925 -9.482E-11       0.000  2.334E+12
0.2421     572576.        0.000
   106.752 -5.470E-06    21.7315    -3.3027  2.024E-10       0.000  2.334E+12
0.2509     593505.        0.000
   107.830 -5.467E-06     0.000      0.000  2.626E-10       0.000  2.334E+12
0.2596     307217.        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. 2:

```
Pile-head deflection             =      1.0000000 inches
Computed slope at pile head      =     -0.0046523 radians
Maximum bending moment           =      10363230. inch-lbs
Maximum shear force              =       -43091. lbs
Depth of maximum bending moment  =     34.5056000 feet below pile head
Depth of maximum shear force     =     52.8367000 feet below pile head
Number of iterations             =             17
Number of zero deflection points =              3
```

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 3

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head = 1.500000 inches
Moment at pile head = 7818000.0 in-lbs
Axial load at pile head = 0.0 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. Es*h lb/inch	Soil Spr. Lat. Load lb/inch	Distrib. p lb/in
0.00	1.5000	7818000.	13628.	-0.006066	0.000	4.180E+11	0.000	0.000	0.000
1.078	1.4231	7994345.	13628.	-0.005822	0.000	4.180E+11	0.000	0.000	0.000
2.157	1.3493	8170691.	13628.	-0.005571	0.000	4.178E+11	0.000	0.000	0.000
3.235	1.2789	8347036.	13628.	-0.005316	0.000	4.177E+11	0.000	0.000	0.000
4.313	1.2118	8523382.	13628.	-0.005054	0.000	4.176E+11	0.000	0.000	0.000
5.392	1.1481	8699727.	13628.	-0.004788	0.000	4.175E+11	0.000	0.000	0.000
6.470	1.0879	8876073.	13628.	-0.004515	0.000	4.174E+11	0.000	0.000	0.000
7.548	1.0312	9052418.	13628.	-0.004237	0.000	4.173E+11	0.000	0.000	0.000
8.626	0.9782	9228764.	13628.	-0.003954	0.000	4.172E+11	0.000	0.000	0.000
9.705	0.9289	9405109.	13628.	-0.003665	0.000	4.171E+11	0.000	0.000	0.000
10.783	0.8834	9581454.	13628.	-0.003492	0.000	2.317E+12	0.000	0.000	0.000
11.861	0.8385	9757800.	13628.	-0.003438	0.000	2.317E+12	0.000	0.000	0.000
12.940	0.7944	9934145.	13628.	-0.003383	0.000	2.317E+12	0.000	0.000	0.000
14.018	0.7510	10110491.	13628.	-0.003327	0.000	2.316E+12	0.000	0.000	0.000
15.096	0.7083	10286836.	13628.	-0.003257	0.000	1.604E+12	0.000	0.000	0.000
16.174	0.6667	10463182.	13628.	-0.003173	0.000	1.586E+12	0.000	0.000	0.000
17.253	0.6262	10639527.	13628.	-0.003087	0.000	1.568E+12	0.000	0.000	0.000
18.331	0.5868	10815873.	13628.	-0.002998	0.000	1.560E+12	0.000	0.000	0.000
19.409	0.5486	10992218.	13628.	-0.002907	0.000	1.560E+12	0.000	0.000	0.000
20.488	0.5116	11168563.	13628.	-0.002816	0.000	1.559E+12	0.000	0.000	0.000
21.566	0.4757	11344909.	13628.	-0.002722	0.000	1.559E+12	0.000	0.000	0.000
22.644	0.4411	11521254.	13628.	-0.002627	0.000	1.559E+12	0.000	0.000	0.000
23.723	0.4077	11697600.	13628.	-0.002531	0.000	1.559E+12	0.000	0.000	0.000
24.801	0.3756	11873945.	13628.	-0.002433	0.000	1.559E+12	0.000	0.000	0.000
25.879	0.3448	12050291.	13628.	-0.002334	0.000	1.559E+12	0.000	0.000	0.000

26.957	0.3152	12226636.	13628.	-0.002233	0.000	1.559E+12	0.000	0.000	0.000
28.036	0.2870	12402982.	13628.	-0.002131	0.000	1.559E+12	0.000	0.000	0.000
29.114	0.2601	12579327.	13628.	-0.002027	0.000	1.559E+12	0.000	0.000	0.000
30.192	0.2345	12755673.	13628.	-0.001922	0.000	1.559E+12	0.000	0.000	0.000
31.271	0.2103	12932018.	13368.	-0.001815	0.000	1.559E+12	-40.3155	2480.1463	0.000
32.349	0.1875	13101613.	12171.	-0.001707	0.000	1.558E+12	-144.5936	9976.3512	0.000
33.427	0.1662	13246999.	9619.4454	-0.001598	0.000	1.558E+12	-249.8159	19455.	0.000
34.506	0.1462	13350557.	5739.5162	-0.001487	0.000	1.558E+12	-349.8826	30969.	0.000
35.584	0.1277	13395533.	648.8400	-0.001376	0.000	1.558E+12	-436.9541	44290.	0.000
36.662	0.1106	13367348.	-5182.0861	-0.001265	0.000	1.558E+12	-464.2988	54336.	0.000
37.741	0.0949	13261425.	-11241.	-0.001155	0.000	1.558E+12	-472.2519	64382.	0.000
38.819	0.0807	13076430.	-17299.	-0.001045	0.000	1.558E+12	-464.0929	74428.	0.000
39.897	0.0679	12813731.	-23168.	-0.000938	0.000	1.559E+12	-443.0102	84474.	0.000
40.975	0.0564	12476858.	-28700.	-0.000833	0.000	1.559E+12	-412.0686	94520.	0.000
42.054	0.0463	12070990.	-33787.	-0.000731	0.000	1.559E+12	-374.1806	104566.	0.000
43.132	0.0375	11602473.	-38357.	-0.000633	0.000	1.559E+12	-332.0798	114612.	0.000
44.210	0.0299	11078354.	-42370.	-0.000539	0.000	1.560E+12	-288.2991	124658.	0.000
45.289	0.0235	10505964.	-45822.	-0.000450	0.000	1.581E+12	-245.1522	134704.	0.000
46.367	0.0183	9892527.	-48731.	-0.000379	0.000	2.317E+12	-204.5489	144750.	0.000
47.445	0.0137	9244843.	-51118.	-0.000326	0.000	2.318E+12	-164.3242	154796.	0.000
48.524	0.009855	8569644.	-52993.	-0.000276	0.000	2.320E+12	-125.5422	164842.	0.000
49.602	0.006592	7873426.	-54382.	-0.000230	0.000	2.321E+12	-89.0939	174888.	0.000
50.680	0.003897	7162291.	-55318.	-0.000188	0.000	2.322E+12	-55.6971	184934.	0.000
51.758	0.001719	6441830.	-55846.	-0.000150	0.000	2.324E+12	-25.8967	194980.	0.000
52.837	4.298E-06	5717033.	-56014.	-0.000117	0.000	2.325E+12	-0.0681	205026.	0.000
53.915	-0.001298	4992225.	-55875.	-8.679E-05	0.000	2.327E+12	21.5803	215072.	0.000
54.993	-0.002242	4271030.	-55483.	-6.104E-05	0.000	2.328E+12	39.0010	225118.	0.000
56.072	-0.002878	3556365.	-53001.	-3.929E-05	0.000	2.329E+12	344.6127	1549397.	0.000
57.150	-0.003259	2899400.	-48399.	-2.137E-05	0.000	2.331E+12	366.6931	1456101.	0.000
58.228	-0.003431	2303831.	-43592.	-6.928E-06	0.000	2.332E+12	376.2660	1419056.	0.000
59.306	-0.003438	1771262.	-38721.	4.377E-06	0.000	2.333E+12	376.6458	1417627.	0.000
60.385	-0.003318	1301756.	-33891.	1.290E-05	0.000	2.334E+12			

```
370.0030   1443079.      0.000
    61.463  -0.003104    894201.    -29181.  1.899E-05      0.000  2.334E+12
357.8949   1491902.      0.000
    62.541  -0.002826    546569.    -24656.  2.298E-05      0.000  2.334E+12
341.5088   1563487.      0.000
    63.620  -0.002509    256117.    -20365.  2.520E-05      0.000  2.334E+12
321.7914   1659290.      0.000
    64.698  -0.002174     19543.    -16345.  2.597E-05      0.000  2.334E+12
299.5212   1782665.      0.000
    65.776  -0.001837   -166880.    -12626.  2.556E-05      0.000  2.334E+12
275.3512   1939147.      0.000
    66.855  -0.001513   -307201. -9227.8945  2.425E-05      0.000  2.334E+12
249.8353   2137198.      0.000
    67.933  -0.001210   -405691. -6165.8841  2.227E-05      0.000  2.334E+12
223.4422   2389650.      0.000
    69.011  -0.000936   -466769. -3448.5498  1.985E-05      0.000  2.334E+12
196.5607   2716463.      0.000
    70.090  -0.000696   -494936. -1080.2620  1.719E-05      0.000  2.334E+12
169.4920   3150304.      0.000
    71.168  -0.000492   -494725.    937.7622  1.444E-05      0.000  2.334E+12
142.4224   3749084.      0.000
    72.246  -0.000322   -470668.   2527.6431  1.177E-05      0.000  2.334E+12
103.3163   4146208.      0.000
    73.324  -0.000187   -429312.   3587.0341  9.271E-06      0.000  2.334E+12
60.4277    4179695.      0.000
    74.403 -8.251E-05   -377838.   4151.8105  7.033E-06      0.000  2.334E+12
26.8666    4213182.      0.000
    75.481 -5.059E-06   -321866.   4336.3743  5.094E-06      0.000  2.334E+12
1.6604     4246668.      0.000
    76.559  4.930E-05   -265616.   4241.6018  3.465E-06      0.000  2.334E+12
-16.3088   4280155.      0.000
    77.638  8.461E-05   -212097.   3953.5937  2.141E-06      0.000  2.334E+12
-28.2070   4313641.      0.000
    78.716   0.000105   -163301.   3543.5188  1.100E-06      0.000  2.334E+12
-35.1760   4347128.      0.000
    79.794   0.000113   -120394.   3068.2545  3.136E-07      0.000  2.334E+12
-38.2829   4380615.      0.000
    80.873   0.000113    -83897.   2571.5698 -2.527E-07      0.000  2.334E+12
-38.4868   4414101.      0.000
    81.951   0.000107    -53843.   2085.6396 -6.345E-07      0.000  2.334E+12
-36.6206   4447588.      0.000
    83.029  9.640E-05    -29922.   1632.7221 -8.667E-07      0.000  2.334E+12
-33.3842   4481075.      0.000
    84.107  8.411E-05    -11590.   1226.8671 -9.818E-07      0.000  2.334E+12
-29.3464   4514561.      0.000
    85.186  7.099E-05   1828.4425   875.5620 -1.009E-06      0.000  2.334E+12
-24.9528   4548048.      0.000
    86.264  5.800E-05     11069.   581.2480 -9.731E-07      0.000  2.334E+12
-20.5377   4581535.      0.000
    87.342  4.581E-05     16871.   342.6664 -8.956E-07      0.000  2.334E+12
-16.3385   4615021.      0.000
    88.421  3.483E-05     19937.   156.0152 -7.936E-07      0.000  2.334E+12
-12.5111   4648508.      0.000
    89.499  2.527E-05     20908.    15.9091 -6.804E-07      0.000  2.334E+12
-9.1443    4681995.      0.000
    90.577  1.722E-05     20349.   -83.8488 -5.660E-07      0.000  2.334E+12
-6.2747    4715481.      0.000
    91.656  1.062E-05     18738.  -149.6717 -4.577E-07      0.000  2.334E+12
-3.8992    4748968.      0.000
    92.734  5.374E-06     16475.  -187.7499 -3.600E-07      0.000  2.334E+12
-1.9864    4782455.      0.000
    93.812  1.307E-06     13879.  -203.7474 -2.759E-07      0.000  2.334E+12
-0.4863    4815941.      0.000
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    94.890 -1.766E-06     11202.  -202.6123 -2.064E-07      0.000  2.334E+12
0.6617     4849428.      0.000
    95.969 -4.034E-06   8636.0193  -188.4822 -1.514E-07      0.000  2.334E+12
1.5223     4882915.      0.000
    97.047 -5.683E-06   6324.5771  -164.6632 -1.099E-07      0.000  2.334E+12
2.1593     4916401.      0.000
    98.125 -6.878E-06   4374.6662  -133.6701 -8.024E-08      0.000  2.334E+12
2.6312     4949888.      0.000
    99.204 -7.760E-06   2865.3010   -97.3126 -6.017E-08      0.000  2.334E+12
2.9884     4983374.      0.000
   100.282 -8.435E-06   1856.2945   -56.8187 -4.708E-08      0.000  2.334E+12
3.2705     5016861.      0.000
   101.360 -8.978E-06   1394.8795   -33.4647 -3.807E-08      0.000  2.334E+12
0.3392      488859.      0.000
   102.438 -9.421E-06    990.2560   -28.8689 -3.146E-08      0.000  2.334E+12
0.3711      509788.      0.000
   103.517 -9.792E-06    647.7748   -23.8693 -2.692E-08      0.000  2.334E+12
0.4016      530717.      0.000
   104.595 -1.012E-05    372.5385   -18.4803 -2.409E-08      0.000  2.334E+12
0.4313      551647.      0.000
   105.673 -1.042E-05    169.5192   -12.7080 -2.259E-08      0.000  2.334E+12
0.4609      572576.      0.000
   106.752 -1.070E-05     43.6669    -6.5504 -2.199E-08      0.000  2.334E+12
0.4909      593505.      0.000
   107.830 -1.098E-05        0.000       0.000 -2.187E-08      0.000  2.334E+12
0.5216      307217.      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. 3:

Pile-head deflection	=	1.5000000 inches
Computed slope at pile head	=	-0.0060664 radians
Maximum bending moment	=	13395533. inch-lbs
Maximum shear force	=	-56014. lbs
Depth of maximum bending moment	=	35.5839000 feet below pile head
Depth of maximum shear force	=	52.8367000 feet below pile head
Number of iterations	=	77
Number of zero deflection points	=	3

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 4

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head = 2.000000 inches
Moment at pile head = 7818000.0 in-lbs
Axial load at pile head = 0.0 lbs

Depth	Deflect.	Bending	Shear	Slope	Total	Bending	Soil Res.	Soil Spr.	Distrib.

X Es*h feet lb/inch	y Lat. Load inches lb/inch	Moment in-lbs	Force lbs	S radians	Stress psi*	Stiffness lb-in^2	p lb/in
0.00	2.0000	7818000.	22810.	-0.007437	0.000	4.180E+11	
0.000	0.000	0.000					
1.078	1.9053	8113157.	22810.	-0.007190	0.000	4.180E+11	
0.000	0.000	0.000					
2.157	1.8139	8408313.	22810.	-0.006935	0.000	4.177E+11	
0.000	0.000	0.000					
3.235	1.7259	8703470.	22810.	-0.006669	0.000	4.175E+11	
0.000	0.000	0.000					
4.313	1.6413	8998627.	22810.	-0.006395	0.000	4.174E+11	
0.000	0.000	0.000					
5.392	1.5604	9293783.	22810.	-0.006111	0.000	4.172E+11	
0.000	0.000	0.000					
6.470	1.4832	9588940.	22810.	-0.005819	0.000	4.170E+11	
0.000	0.000	0.000					
7.548	1.4098	9884097.	22810.	-0.005516	0.000	4.168E+11	
0.000	0.000	0.000					
8.626	1.3404	10179253.	22810.	-0.005205	0.000	4.167E+11	
0.000	0.000	0.000					
9.705	1.2751	10474410.	22810.	-0.004884	0.000	4.165E+11	
0.000	0.000	0.000					
10.783	1.2140	10769567.	22810.	-0.004677	0.000	1.560E+12	
0.000	0.000	0.000					
11.861	1.1541	11064723.	22810.	-0.004586	0.000	1.560E+12	
0.000	0.000	0.000					
12.940	1.0953	11359880.	22810.	-0.004493	0.000	1.559E+12	
0.000	0.000	0.000					
14.018	1.0378	11655036.	22810.	-0.004398	0.000	1.559E+12	
0.000	0.000	0.000					
15.096	0.9815	11950193.	22810.	-0.004300	0.000	1.559E+12	
0.000	0.000	0.000					
16.174	0.9265	12245350.	22810.	-0.004199	0.000	1.559E+12	
0.000	0.000	0.000					
17.253	0.8728	12540506.	22810.	-0.004096	0.000	1.559E+12	
0.000	0.000	0.000					
18.331	0.8205	12835663.	22810.	-0.003991	0.000	1.559E+12	
0.000	0.000	0.000					
19.409	0.7695	13130820.	22810.	-0.003883	0.000	1.558E+12	
0.000	0.000	0.000					
20.488	0.7200	13425976.	22810.	-0.003773	0.000	1.558E+12	
0.000	0.000	0.000					
21.566	0.6719	13721133.	22810.	-0.003660	0.000	1.558E+12	
0.000	0.000	0.000					
22.644	0.6253	14016290.	22810.	-0.003545	0.000	1.558E+12	
0.000	0.000	0.000					
23.723	0.5802	14311446.	22810.	-0.003428	0.000	1.558E+12	
0.000	0.000	0.000					
24.801	0.5366	14606603.	22810.	-0.003307	0.000	1.558E+12	
0.000	0.000	0.000					
25.879	0.4946	14901760.	22810.	-0.003185	0.000	1.558E+12	
0.000	0.000	0.000					
26.957	0.4541	15196916.	22810.	-0.003060	0.000	1.557E+12	
0.000	0.000	0.000					
28.036	0.4154	15492073.	22810.	-0.002932	0.000	1.557E+12	
0.000	0.000	0.000					
29.114	0.3783	15787230.	22810.	-0.002802	0.000	1.557E+12	
0.000	0.000	0.000					
30.192	0.3428	16082386.	22810.	-0.002670	0.000	1.557E+12	

STR-III

Δ = 2.0 "

LATERAL RESISTANCE = 22.81 K > 21.3 K

0.000	0.000	0.000					
31.271	0.3092	16377543.	22522.	-0.002535	0.000	1.557E+12	
-44.6104	1867.0886	0.000					
32.349	0.2772	16665230.	21191.	-0.002398	0.000	1.557E+12	
-161.0885	7518.3406	0.000					
33.427	0.2471	16925946.	18338.	-0.002258	0.000	1.556E+12	
-279.9383	14658.	0.000					
34.506	0.2188	17139791.	13979.	-0.002116	0.000	1.556E+12	
-393.7777	23287.	0.000					
35.584	0.1923	17287704.	8230.2636	-0.001973	0.000	1.556E+12	
-494.7288	33282.	0.000					
36.662	0.1677	17352784.	1301.2491	-0.001829	0.000	1.556E+12	
-576.2494	44452.	0.000					
37.741	0.1450	17321380.	-6564.1877	-0.001685	0.000	1.556E+12	
-639.4662	57064.	0.000					
38.819	0.1241	17182908.	-15093.	-0.001542	0.000	1.556E+12	
-678.7939	70759.	0.000					
39.897	0.1051	16930783.	-23924.	-0.001400	0.000	1.556E+12	
-686.1576	84474.	0.000					
40.975	0.0879	16563773.	-32518.	-0.001261	0.000	1.557E+12	
-642.0929	94520.	0.000					
42.054	0.0725	16089255.	-40461.	-0.001125	0.000	1.557E+12	
-585.7132	104566.	0.000					
43.132	0.0588	15516669.	-47620.	-0.000994	0.000	1.557E+12	
-520.7135	114612.	0.000					
44.210	0.0468	14856899.	-53903.	-0.000867	0.000	1.558E+12	
-450.5276	124658.	0.000					
45.289	0.0363	14121695.	-59266.	-0.000747	0.000	1.558E+12	
-378.2990	134704.	0.000					
46.367	0.0274	13323151.	-63698.	-0.000633	0.000	1.558E+12	
-306.8593	144750.	0.000					
47.445	0.0200	12473229.	-67228.	-0.000526	0.000	1.559E+12	
-238.7121	154796.	0.000					
48.524	0.0138	11583339.	-69911.	-0.000426	0.000	1.559E+12	
-176.0231	164842.	0.000					
49.602	0.008924	10663976.	-71831.	-0.000334	0.000	1.566E+12	
-120.6159	174888.	0.000					
50.680	0.005171	9724419.	-73089.	-0.000263	0.000	2.317E+12	
-73.9058	184934.	0.000					
51.758	0.002121	8772487.	-73774.	-0.000211	0.000	2.319E+12	
-31.9560	194980.	0.000					
52.837	-0.000296	7815204.	-73950.	-0.000165	0.000	2.321E+12	
4.6953	205026.	0.000					
53.915	-0.002150	6858708.	-73689.	-0.000124	0.000	2.323E+12	
35.7291	215072.	0.000					
54.993	-0.003509	5908194.	-73063.	-8.858E-05	0.000	2.325E+12	
61.0400	225118.	0.000					
56.072	-0.004442	4967900.	-69899.	-5.832E-05	0.000	2.327E+12	
428.0474	1246917.	0.000					
57.150	-0.005018	4099275.	-64186.	-3.312E-05	0.000	2.328E+12	
454.9554	1173189.	0.000					
58.228	-0.005299	3306825.	-58217.	-1.255E-05	0.000	2.330E+12	
467.5308	1141649.	0.000					
59.306	-0.005343	2592656.	-52155.	3.831E-06	0.000	2.331E+12	
469.4505	1136997.	0.000					
60.385	-0.005200	1957088.	-46122.	1.645E-05	0.000	2.332E+12	
463.1438	1152500.	0.000					
61.463	-0.004917	1399065.	-40211.	2.576E-05	0.000	2.334E+12	
450.3619	1185236.	0.000					
62.541	-0.004533	916448.	-34500.	3.218E-05	0.000	2.334E+12	
432.4461	1234374.	0.000					
63.620	-0.004084	506237.	-29046.	3.612E-05	0.000	2.334E+12	
410.4650	1300524.	0.000					

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    64.698  -0.003598    164752.    -23898.  3.798E-05       0.000  2.334E+12
385.2987   1385533.       0.000
    65.776  -0.003101   -112222.    -19091.  3.813E-05       0.000  2.334E+12
357.6879   1492570.       0.000
    66.855  -0.002612   -329307.    -14653.  3.691E-05       0.000  2.334E+12
328.2645   1626470.       0.000
    67.933  -0.002146   -491429.    -10604.  3.463E-05       0.000  2.334E+12
297.5703   1794399.       0.000
    69.011  -0.001715   -603728. -6957.3295  3.160E-05       0.000  2.334E+12
266.0672   2007085.       0.000
    70.090  -0.001328   -671479. -3721.0972  2.806E-05       0.000  2.334E+12
234.1387   2281112.       0.000
    71.168  -0.000989   -700027.  -898.8544  2.426E-05       0.000  2.334E+12
202.0792   2643511.       0.000
    72.246  -0.000700   -694741.  1508.8355  2.039E-05       0.000  2.334E+12
170.0636   3142007.       0.000
    73.324  -0.000461   -660980.  3502.3741  1.663E-05       0.000  2.334E+12
138.0663   3871756.       0.000
    74.403  -0.000270   -604102.  4964.2070  1.313E-05       0.000  2.334E+12
87.8809    4213182.       0.000
    75.481  -0.000122   -532510.  5791.2243  9.976E-06       0.000  2.334E+12
39.9465    4246668.       0.000
    76.559 -1.173E-05   -454230.  6074.7830  7.240E-06       0.000  2.334E+12
3.8816     4280155.       0.000
    77.638  6.566E-05   -375300.  5958.2769  4.941E-06       0.000  2.334E+12
-21.8893   4313641.       0.000
    78.716   0.000116   -300035.  5564.2357  3.069E-06       0.000  2.334E+12
-39.0154   4347128.       0.000
    79.794   0.000145   -231302.  4994.0441  1.596E-06       0.000  2.334E+12
-49.1158   4380615.       0.000
    80.873   0.000157   -170793.  4328.8107  4.813E-07       0.000  2.334E+12
-53.7055   4414101.       0.000
    81.951   0.000158   -119276.  3631.0229 -3.228E-07       0.000  2.334E+12
-54.1476   4447588.       0.000
    83.029   0.000149    -76825.  2946.6829 -8.665E-07       0.000  2.334E+12
-51.6269   4481075.       0.000
    84.107   0.000135    -43018.  2307.6834 -1.199E-06       0.000  2.334E+12
-47.1396   4514561.       0.000
    85.186   0.000118    -17104.  1734.2339 -1.365E-06       0.000  2.334E+12
-41.4952   4548048.       0.000
    86.264  9.978E-05  1862.7453  1237.2018 -1.408E-06       0.000  2.334E+12
-35.3282   4581535.       0.000
    87.342  8.163E-05    14914.    820.2728 -1.361E-06       0.000  2.334E+12
-29.1142   4615021.       0.000
    88.421  6.455E-05    23091.    481.8716 -1.256E-06       0.000  2.334E+12
-23.1906   4648508.       0.000
    89.499  4.913E-05    27385.    216.8130 -1.116E-06       0.000  2.334E+12
-17.7780   4681995.       0.000
    90.577  3.568E-05    28702.     17.6753 -9.603E-07       0.000  2.334E+12
-13.0016   4715481.       0.000
    91.656  2.428E-05    27842.  -124.0957 -8.036E-07       0.000  2.334E+12
-8.9112    4748968.       0.000
    92.734  1.488E-05    25490.  -217.3332 -6.557E-07       0.000  2.334E+12
-5.5000    4782455.       0.000
    93.812  7.310E-06    22218.  -270.5203 -5.235E-07       0.000  2.334E+12
-2.7208    4815941.       0.000
    94.890  1.334E-06    18489.  -291.3570 -4.106E-07       0.000  2.334E+12
-0.4998    4849428.       0.000
    95.969 -3.317E-06    14677.  -286.4925 -3.187E-07       0.000  2.334E+12
1.2516     4882915.       0.000
    97.047 -6.914E-06    11075.  -261.3980 -2.473E-07       0.000  2.334E+12
2.6271     4916401.       0.000
    98.125 -9.717E-06  7912.6947  -220.3520 -1.947E-07       0.000  2.334E+12
```



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3.7172     4949888.       0.000
    99.204 -1.195E-05  5372.6169  -166.5211 -1.578E-07       0.000  2.334E+12
4.6032     4983374.       0.000
   100.282 -1.380E-05  3603.2620  -102.1178 -1.330E-07       0.000  2.334E+12
5.3513     5016861.       0.000
   101.360 -1.539E-05  2729.8910   -63.7334 -1.154E-07       0.000  2.334E+12
0.5816      488859.       0.000
   102.438 -1.679E-05  1953.8934   -55.6914 -1.024E-07       0.000  2.334E+12
0.6614      509788.       0.000
   103.517 -1.804E-05  1288.6432   -46.6238 -9.344E-08       0.000  2.334E+12
0.7401      530717.       0.000
   104.595 -1.921E-05   747.3075   -36.5378 -8.779E-08       0.000  2.334E+12
0.8188      551647.       0.000
   105.673 -2.032E-05   343.0733   -25.4238 -8.477E-08       0.000  2.334E+12
0.8990      572576.       0.000
   106.752 -2.140E-05    89.3603   -13.2567 -8.357E-08       0.000  2.334E+12
0.9816      593505.       0.000
   107.830 -2.248E-05       0.000      0.000 -8.333E-08       0.000  2.334E+12
1.0674      307217.       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. 4:

Pile-head deflection	=	2.0000000 inches
Computed slope at pile head	=	-0.0074369 radians
Maximum bending moment	=	17352784. inch-lbs
Maximum shear force	=	-73950. lbs
Depth of maximum bending moment	=	36.6622000 feet below pile head
Depth of maximum shear force	=	52.8367000 feet below pile head
Number of iterations	=	12
Number of zero deflection points	=	3

Pile-head Deflection vs. Pile Length for Load Case 4

Boundary Condition Type 4, Deflection and Moment

Deflection	=	2.00000 in
Moment	=	7818000. in- lb
Axial Load	=	0. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment in-lbs	Maximum Shear lbs
107.8300	2.0000000	17352784.	-73950.
102.4385	2.0000000	17433150.	-74138.
97.0470	2.0000000	17376358.	-73738.
91.6555	2.0000000	17505856.	-74692.

86.2640	2.0000000	17405485.	-74206.
80.8725	2.0000000	17348862.	-73362.
75.4810	2.0000000	17350072.	-73687.
70.0895	2.0000000	17357343.	-73015.
64.6980	2.0000000	17216182.	-78947.
59.3065	2.0000000	15738755.	-87995.
53.9150	2.0000000	10950672.	-78793.
48.5235	2.0000000	7818000.	-57106.
43.1320	2.0000000	7818000.	-34729.
37.7405	2.0000000	7818000.	-19164.
37.7405	0.000000	41389480186.	-4569525710.
37.7405	0.000000	41389480186.	-4569525710.
37.7405	0.000000	41389480186.	-4569525710.
37.7405	0.000000	41389480186.	-4569525710.
37.7405	0.000000	41389480186.	-4569525710.
37.7405	0.000000	41389480186.	-4569525710.

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 5

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head = 0.500000 inches
Moment at pile head = 4380000.0 in-lbs
Axial load at pile head = 0.0 lbs

Depth X	Deflect. y	Bending Moment	Shear Force	Slope S	Total Stress	Bending Stiffness	Soil Res. Spr. Distrib. p
	Es*h Lat. Load						
feet	inches	in-lbs	lbs	radians	psi*	lb-in^2	lb/in
	lb/inch	lb/inch					
0.00	0.5000	4380000.	4861.7547	-0.001671	0.000	1.341E+12	
0.000	0.000	0.000					
1.078	0.4787	4442909.	4861.7547	-0.001629	0.000	1.341E+12	
0.000	0.000	0.000					
2.157	0.4579	4505818.	4861.7547	-0.001585	0.000	1.341E+12	
0.000	0.000	0.000					
3.235	0.4376	4568727.	4861.7547	-0.001542	0.000	1.340E+12	
0.000	0.000	0.000					
4.313	0.4180	4631637.	4861.7547	-0.001497	0.000	1.340E+12	
0.000	0.000	0.000					
5.392	0.3989	4694546.	4861.7547	-0.001452	0.000	1.340E+12	
0.000	0.000	0.000					
6.470	0.3804	4757455.	4861.7547	-0.001406	0.000	1.340E+12	
0.000	0.000	0.000					
7.548	0.3625	4820364.	4861.7547	-0.001360	0.000	1.340E+12	
0.000	0.000	0.000					
8.626	0.3452	4883273.	4861.7547	-0.001313	0.000	1.339E+12	
0.000	0.000	0.000					
9.705	0.3285	4946182.	4861.7547	-0.001266	0.000	1.339E+12	
0.000	0.000	0.000					
10.783	0.3124	5009092.	4861.7547	-0.001228	0.000	2.327E+12	
0.000	0.000	0.000					
11.861	0.2967	5072001.	4861.7547	-0.001200	0.000	2.326E+12	
0.000	0.000	0.000					
12.940	0.2814	5134910.	4861.7547	-0.001172	0.000	2.326E+12	
0.000	0.000	0.000					
14.018	0.2664	5197819.	4861.7547	-0.001143	0.000	2.326E+12	

0.000	0.000	0.000					
15.096	0.2518	5260728.	4861.7547	-0.001114	0.000	2.326E+12	
0.000	0.000	0.000					
16.174	0.2376	5323637.	4861.7547	-0.001084	0.000	2.326E+12	
0.000	0.000	0.000					
17.253	0.2237	5386547.	4861.7547	-0.001055	0.000	2.326E+12	
0.000	0.000	0.000					
18.331	0.2103	5449456.	4861.7547	-0.001024	0.000	2.326E+12	
0.000	0.000	0.000					
19.409	0.1972	5512365.	4861.7547	-0.000994	0.000	2.326E+12	
0.000	0.000	0.000					
20.488	0.1846	5575274.	4861.7547	-0.000963	0.000	2.326E+12	
0.000	0.000	0.000					
21.566	0.1723	5638183.	4861.7547	-0.000932	0.000	2.325E+12	
0.000	0.000	0.000					
22.644	0.1604	5701092.	4861.7547	-0.000900	0.000	2.325E+12	
0.000	0.000	0.000					
23.723	0.1490	5764002.	4861.7547	-0.000868	0.000	2.325E+12	
0.000	0.000	0.000					
24.801	0.1380	5826911.	4861.7547	-0.000836	0.000	2.325E+12	
0.000	0.000	0.000					
25.879	0.1274	5889820.	4861.7547	-0.000804	0.000	2.325E+12	
0.000	0.000	0.000					
26.957	0.1172	5952729.	4861.7547	-0.000771	0.000	2.325E+12	
0.000	0.000	0.000					
28.036	0.1074	6015638.	4861.7547	-0.000737	0.000	2.325E+12	
0.000	0.000	0.000					
29.114	0.0981	6078547.	4861.7547	-0.000704	0.000	2.325E+12	
0.000	0.000	0.000					
30.192	0.0892	6141456.	4861.7547	-0.000670	0.000	2.324E+12	
0.000	0.000	0.000					
31.271	0.0808	6204366.	4695.9727	-0.000635	0.000	2.324E+12	
-25.6240	4105.7868	0.000					
32.349	0.0728	6262985.	4015.3595	-0.000601	0.000	2.324E+12	
-79.5745	14152.	0.000					
33.427	0.0652	6308280.	2711.5249	-0.000566	0.000	2.324E+12	
-121.9518	24198.	0.000					
34.506	0.0581	6333157.	927.3672	-0.000530	0.000	2.324E+12	
-153.8153	34244.	0.000					
35.584	0.0515	6332279.	-1207.9587	-0.000495	0.000	2.324E+12	
-176.2298	44290.	0.000					
36.662	0.0453	6301896.	-3579.0604	-0.000460	0.000	2.324E+12	
-190.2578	54336.	0.000					
37.741	0.0396	6239656.	-6084.2232	-0.000425	0.000	2.324E+12	
-196.9509	64382.	0.000					
38.819	0.0343	6144441.	-8635.2100	-0.000391	0.000	2.324E+12	
-197.3406	74428.	0.000					
39.897	0.0295	6016184.	-11157.	-0.000357	0.000	2.325E+12	
-192.4288	84474.	0.000					
40.975	0.0251	5855708.	-13587.	-0.000324	0.000	2.325E+12	
-183.1785	94520.	0.000					
42.054	0.0211	5664562.	-15875.	-0.000292	0.000	2.325E+12	
-170.5049	104566.	0.000					
43.132	0.0175	5444868.	-17983.	-0.000261	0.000	2.326E+12	
-155.2679	114612.	0.000					
44.210	0.0144	5199177.	-19882.	-0.000231	0.000	2.326E+12	
-138.2643	124658.	0.000					
45.289	0.0115	4930336.	-21554.	-0.000203	0.000	2.327E+12	
-120.2223	134704.	0.000					
46.367	0.009100	4641365.	-22991.	-0.000176	0.000	2.327E+12	
-101.7960	144750.	0.000					
47.445	0.006985	4335351.	-24190.	-0.000151	0.000	2.328E+12	
-83.5620	154796.	0.000					

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    48.524   0.005182   4015345.    -25158.  -0.000128       0.000  2.329E+12
-66.0163    164842.      0.000
    49.602   0.003668   3684286.    -25906.  -0.000107       0.000  2.329E+12
-49.5733    174888.      0.000
    50.680   0.002418   3344927.    -26450. -8.727E-05       0.000  2.330E+12
-34.5642    184934.      0.000
    51.758   0.001409   2999781.    -26811. -6.965E-05       0.000  2.331E+12
-21.2372    194980.      0.000
    52.837   0.000616   2651079.    -27012. -5.397E-05       0.000  2.331E+12
-9.7579     205026.      0.000
    53.915  1.270E-05   2300743.    -27076. -4.023E-05       0.000  2.332E+12
-0.2111     215072.      0.000
    54.993  -0.000425   1950372.    -27030. -2.843E-05       0.000  2.332E+12
7.3979      225118.      0.000
    56.072  -0.000723   1601239.    -25862. -1.858E-05       0.000  2.333E+12
173.1261    3097805.     0.000
    57.150  -0.000906   1281094.    -23488. -1.059E-05       0.000  2.334E+12
193.7090    2766035.     0.000
    58.228  -0.000997    993382.    -20921. -4.288E-06       0.000  2.334E+12
203.1741    2636120.     0.000
    59.306  -0.001017    739688.    -18279.  5.161E-07       0.000  2.334E+12
205.1681    2610031.     0.000
    60.385  -0.000984    520345.    -15646.  4.009E-06       0.000  2.334E+12
201.7841    2653626.     0.000
    61.463  -0.000913    334789.    -13082.  6.380E-06       0.000  2.334E+12
194.4166    2754192.     0.000
    62.541  -0.000819    181784.    -10634.  7.812E-06       0.000  2.334E+12
184.0825    2908941.     0.000
    63.620  -0.000711     59600. -8332.5803  8.481E-06       0.000  2.334E+12
171.5685    3121352.     0.000
    64.698  -0.000599    -33857. -6203.5379  8.552E-06       0.000  2.334E+12
157.5054    3400369.     0.000
    65.776  -0.000490   -100942. -4263.1576  8.178E-06       0.000  2.334E+12
142.4081    3761259.     0.000
    66.855  -0.000388   -144184. -2570.4971  7.499E-06       0.000  2.334E+12
119.2168    3978775.     0.000
    67.933  -0.000296   -167465. -1205.6742  6.635E-06       0.000  2.334E+12
91.7361     4012262.     0.000
    69.011  -0.000216   -175386.  -175.2134  5.685E-06       0.000  2.334E+12
67.5363     4045748.     0.000
    70.090  -0.000149   -171999.   565.1007  4.722E-06       0.000  2.334E+12
46.8898     4079235.     0.000
    71.168 -9.381E-05   -160761.  1061.3786  3.799E-06       0.000  2.334E+12
29.8170     4112722.     0.000
    72.246 -5.042E-05   -144531.  1358.8115  2.953E-06       0.000  2.334E+12
16.1555     4146208.     0.000
    73.324 -1.739E-05   -125596.  1499.6853  2.204E-06       0.000  2.334E+12
5.6186      4179695.     0.000
    74.403  6.620E-06   -105721.  1522.0910  1.563E-06       0.000  2.334E+12
-2.1555     4213182.     0.000
    75.481  2.305E-05    -86206.  1459.2037  1.031E-06       0.000  2.334E+12
-7.5647     4246668.     0.000
    76.559  3.329E-05    -67958.  1339.0086  6.034E-07       0.000  2.334E+12
-11.0132    4280155.     0.000
    77.638  3.866E-05    -51553.  1184.3626  2.721E-07       0.000  2.334E+12
-12.8895    4313641.     0.000
    78.716  4.034E-05    -37307.  1013.2968  2.575E-08       0.000  2.334E+12
-13.5511    4347128.     0.000
    79.794  3.933E-05    -25330.   839.4764 -1.479E-07       0.000  2.334E+12
-13.3153    4380615.     0.000
    80.873  3.651E-05    -15582.   672.7520 -2.613E-07       0.000  2.334E+12
-12.4544    4414101.     0.000
    81.951  3.257E-05 -7919.8339   519.7481 -3.264E-07       0.000  2.334E+12
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-11.1946    4447588.     0.000
    83.029  2.806E-05 -2131.6733   384.4503 -3.543E-07       0.000  2.334E+12
-9.7176     4481075.     0.000
    84.107  2.340E-05  2029.4311   268.7595 -3.546E-07       0.000  2.334E+12
-8.1640     4514561.     0.000
    85.186  1.888E-05  4823.6075   172.9970 -3.356E-07       0.000  2.334E+12
-6.6374     4548048.     0.000
    86.264  1.471E-05  6506.4555    96.3463 -3.042E-07       0.000  2.334E+12
-5.2100     4581535.     0.000
    87.342  1.101E-05  7316.9730    37.2284 -2.659E-07       0.000  2.334E+12
-3.9275     4615021.     0.000
    88.421  7.834E-06  7469.8972    -6.3902 -2.249E-07       0.000  2.334E+12
-2.8144     4648508.     0.000
    89.499  5.192E-06  7151.6003   -36.7536 -1.843E-07       0.000  2.334E+12
-1.8787     4681995.     0.000
    90.577  3.063E-06  6518.7422   -56.1313 -1.465E-07       0.000  2.334E+12
-1.1164     4715481.     0.000
    91.656  1.402E-06  5698.9677   -66.6834 -1.126E-07       0.000  2.334E+12
-0.5146     4748968.     0.000
    92.734  1.498E-07  4793.0291   -70.3712 -8.350E-08       0.000  2.334E+12
-0.0554     4782455.     0.000
    93.812 -7.586E-07  3877.8177   -68.9027 -5.946E-08       0.000  2.334E+12
0.2824      4815941.     0.000
    94.890 -1.389E-06  3009.8825   -63.7081 -4.037E-08       0.000  2.334E+12
0.5205      4849428.     0.000
    95.969 -1.803E-06  2229.1031   -55.9376 -2.584E-08       0.000  2.334E+12
0.6805      4882915.     0.000
    97.047 -2.058E-06  1562.2624   -46.4765 -1.533E-08       0.000  2.334E+12
0.7818      4916401.     0.000
    98.125 -2.200E-06  1026.3291   -35.9728 -8.158E-09       0.000  2.334E+12
0.8416      4949888.     0.000
    99.204 -2.269E-06   631.3139   -24.8743 -3.563E-09       0.000  2.334E+12
0.8738      4983374.     0.000
   100.282 -2.292E-06   382.6030   -13.4707 -7.521E-10       0.000  2.334E+12
0.8888      5016861.     0.000
   101.360 -2.288E-06   282.7023    -7.1612  1.092E-09       0.000  2.334E+12
0.0865       488859.     0.000
   102.438 -2.264E-06   197.2769    -6.0248  2.423E-09       0.000  2.334E+12
0.0892       509788.     0.000
   103.517 -2.226E-06   126.7864    -4.8571  3.321E-09       0.000  2.334E+12
0.0913       530717.     0.000
   104.595 -2.178E-06    71.5801    -3.6657  3.871E-09       0.000  2.334E+12
0.0929       551647.     0.000
   105.673 -2.125E-06    31.9214    -2.4564  4.158E-09       0.000  2.334E+12
0.0941       572576.     0.000
   106.752 -2.071E-06     8.0102    -1.2335  4.269E-09       0.000  2.334E+12
0.0950       593505.     0.000
   107.830 -2.015E-06       0.000       0.000  4.291E-09       0.000  2.334E+12
0.0957       307217.     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. 5:

Pile-head deflection	=	0.5000000 inches
Computed slope at pile head	=	-0.0016711 radians
Maximum bending moment	=	6333157. inch-lbs
Maximum shear force	=	-27076. lbs
Depth of maximum bending moment	=	34.5056000 feet below pile head
Depth of maximum shear force	=	53.9150000 feet below pile head
Number of iterations	=	6
Number of zero deflection points	=	3

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 6

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head = 1.000000 inches
Moment at pile head = 4380000.0 in-lbs
Axial load at pile head = 0.0 lbs

Depth X	Deflect. y	Bending Moment	Shear Force	Slope S	Total Stress	Bending Stiffness	Soil p
Res. Soil Spr. Es*h	Distrib. Lat. Load						
feet	inches	in-lbs	lbs	radians	psi*	lb-in^2	lb/in
lb/inch	lb/inch						
0.00	1.0000	4380000.	15799.	-0.003088	0.000	1.341E+12	
0.000	0.000	0.000					
1.078	0.9603	4584431.	15799.	-0.003045	0.000	1.341E+12	
0.000	0.000	0.000					
2.157	0.9212	4788862.	15799.	-0.002999	0.000	1.340E+12	
0.000	0.000	0.000					
3.235	0.8827	4993293.	15799.	-0.002952	0.000	1.339E+12	
0.000	0.000	0.000					
4.313	0.8448	5197724.	15799.	-0.002903	0.000	1.338E+12	
0.000	0.000	0.000					
5.392	0.8076	5402155.	15799.	-0.002852	0.000	1.338E+12	
0.000	0.000	0.000					
6.470	0.7710	5606587.	15799.	-0.002798	0.000	1.337E+12	
0.000	0.000	0.000					
7.548	0.7351	5811018.	15799.	-0.002743	0.000	1.336E+12	
0.000	0.000	0.000					
8.626	0.7000	6015449.	15799.	-0.002622	0.000	4.193E+11	
0.000	0.000	0.000					
9.705	0.6673	6219880.	15799.	-0.002433	0.000	4.189E+11	
0.000	0.000	0.000					
10.783	0.6370	6424311.	15799.	-0.002319	0.000	2.324E+12	
0.000	0.000	0.000					
11.861	0.6073	6628742.	15799.	-0.002283	0.000	2.323E+12	
0.000	0.000	0.000					
12.940	0.5780	6833173.	15799.	-0.002246	0.000	2.323E+12	
0.000	0.000	0.000					
14.018	0.5491	7037604.	15799.	-0.002207	0.000	2.323E+12	
0.000	0.000	0.000					
15.096	0.5208	7242035.	15799.	-0.002167	0.000	2.322E+12	
0.000	0.000	0.000					
16.174	0.4931	7446466.	15799.	-0.002126	0.000	2.322E+12	
0.000	0.000	0.000					
17.253	0.4658	7650897.	15799.	-0.002084	0.000	2.321E+12	
0.000	0.000	0.000					

SCR-1

$\Delta = 1.0$ "

LATERAL RESISTANCE = 15.79 K

18.331	0.4391	7855328.	15799.	-0.002041	0.000	2.321E+12
0.000	0.000	0.000				
19.409	0.4130	8059760.	15799.	-0.001997	0.000	2.321E+12
0.000	0.000	0.000				
20.488	0.3875	8264191.	15799.	-0.001951	0.000	2.320E+12
0.000	0.000	0.000				
21.566	0.3625	8468622.	15799.	-0.001904	0.000	2.320E+12
0.000	0.000	0.000				
22.644	0.3382	8673053.	15799.	-0.001857	0.000	2.319E+12
0.000	0.000	0.000				
23.723	0.3145	8877484.	15799.	-0.001808	0.000	2.319E+12
0.000	0.000	0.000				
24.801	0.2914	9081915.	15799.	-0.001758	0.000	2.319E+12
0.000	0.000	0.000				
25.879	0.2690	9286346.	15799.	-0.001706	0.000	2.318E+12
0.000	0.000	0.000				
26.957	0.2472	9490777.	15799.	-0.001654	0.000	2.318E+12
0.000	0.000	0.000				
28.036	0.2262	9695208.	15799.	-0.001600	0.000	2.317E+12
0.000	0.000	0.000				
29.114	0.2058	9899639.	15799.	-0.001546	0.000	2.317E+12
0.000	0.000	0.000				
30.192	0.1862	10104070.	15799.	-0.001488	0.000	2.203E+12
0.000	0.000	0.000				
31.271	0.1673	10308502.	15553.	-0.001417	0.000	1.602E+12
-37.9623	2936.0747	0.000				
32.349	0.1495	10506576.	14429.	-0.001332	0.000	1.581E+12
-135.8167	11755.	0.000				
33.427	0.1328	10681911.	12034.	-0.001245	0.000	1.564E+12
-234.2826	22824.	0.000				
34.506	0.1173	10818019.	8510.6053	-0.001156	0.000	1.560E+12
-310.3826	34244.	0.000				
35.584	0.1029	10902159.	4223.6850	-0.001066	0.000	1.560E+12
-352.2221	44290.	0.000				
36.662	0.0897	10927325.	-491.9678	-0.000975	0.000	1.560E+12
-376.6493	54336.	0.000				
37.741	0.0777	10889427.	-5428.7687	-0.000885	0.000	1.560E+12
-386.4038	64382.	0.000				
38.819	0.0668	10786833.	-10414.	-0.000795	0.000	1.560E+12
-384.1942	74428.	0.000				
39.897	0.0571	10619911.	-15311.	-0.000707	0.000	1.570E+12
-372.6712	84474.	0.000				
40.975	0.0485	10390592.	-20015.	-0.000621	0.000	1.593E+12
-354.3463	94520.	0.000				
42.054	0.0410	10101944.	-24452.	-0.000549	0.000	2.242E+12
-331.5279	104566.	0.000				
43.132	0.0343	9757787.	-28563.	-0.000493	0.000	2.317E+12
-303.7701	114612.	0.000				
44.210	0.0283	9362769.	-32290.	-0.000439	0.000	2.318E+12
-272.3551	124658.	0.000				
45.289	0.0229	8922149.	-35596.	-0.000388	0.000	2.319E+12
-238.6259	134704.	0.000				
46.367	0.0182	8441575.	-38458.	-0.000340	0.000	2.320E+12
-203.7985	144750.	0.000				
47.445	0.0141	7926879.	-40870.	-0.000294	0.000	2.321E+12
-168.9554	154796.	0.000				
48.524	0.0106	7383894.	-42837.	-0.000252	0.000	2.322E+12
-135.0394	164842.	0.000				
49.602	0.007610	6818299.	-44376.	-0.000212	0.000	2.323E+12
-102.8492	174888.	0.000				
50.680	0.005110	6235484.	-45514.	-0.000176	0.000	2.324E+12
-73.0390	184934.	0.000				
51.758	0.003060	5640440.	-46285.	-0.000143	0.000	2.325E+12

-46.1169	194980.	0.000				
52.837	0.001417	5037673.	-46728.	-0.000113	0.000	2.327E+12
-22.4466	205026.	0.000				
53.915	0.000135	4431149.	-46888.	-8.671E-05	0.000	2.328E+12
-2.2498	215072.	0.000				
54.993	-0.000827	3824248.	-46809.	-6.377E-05	0.000	2.329E+12
14.3918	225118.	0.000				
56.072	-0.001515	3219757.	-45099.	-4.420E-05	0.000	2.330E+12
250.0184	2135574.	0.000				
57.150	-0.001971	2657127.	-41636.	-2.789E-05	0.000	2.331E+12
285.2111	1872244.	0.000				
58.228	-0.002237	2142251.	-37825.	-1.457E-05	0.000	2.332E+12
303.8171	1757676.	0.000				
59.306	-0.002348	1678244.	-33845.	-3.975E-06	0.000	2.333E+12
311.3133	1715413.	0.000				
60.385	-0.002339	1266361.	-29821.	4.190E-06	0.000	2.334E+12
310.7345	1718655.	0.000				
61.463	-0.002240	906505.	-25843.	1.021E-05	0.000	2.334E+12
304.0492	1756485.	0.000				
62.541	-0.002075	597558.	-21983.	1.438E-05	0.000	2.334E+12
292.6625	1824865.	0.000				
63.620	-0.001868	337611.	-18293.	1.697E-05	0.000	2.334E+12
277.6455	1923606.	0.000				
64.698	-0.001636	124152.	-14815.	1.825E-05	0.000	2.334E+12
259.8513	2055376.	0.000				
65.776	-0.001395	-45799.	-11582.	1.847E-05	0.000	2.334E+12
239.9799	2225620.	0.000				
66.855	-0.001158	-175570.	-8614.5522	1.786E-05	0.000	2.334E+12
218.6168	2443166.	0.000				
67.933	-0.000933	-268737.	-5930.4186	1.663E-05	0.000	2.334E+12
196.2544	2721628.	0.000				
69.011	-0.000728	-329044.	-3539.4595	1.497E-05	0.000	2.334E+12
173.3025	3082173.	0.000				
70.090	-0.000546	-360335.	-1447.2009	1.306E-05	0.000	2.334E+12
150.0860	3559085.	0.000				
71.168	-0.000390	-366497.	325.0088	1.104E-05	0.000	2.334E+12
123.8343	4112722.	0.000				
72.246	-0.000260	-351924.	1664.9016	9.052E-06	0.000	2.334E+12
83.2652	4146208.	0.000				
73.324	-0.000155	-323410.	2528.2637	7.180E-06	0.000	2.334E+12
50.1797	4179695.	0.000				
74.403	-7.404E-05	-286495.	3008.8889	5.489E-06	0.000	2.334E+12
24.1078	4213182.	0.000				
75.481	-1.329E-05	-245543.	3193.0720	4.015E-06	0.000	2.334E+12
4.3604	4246668.	0.000				
76.559	2.985E-05	-203861.	3157.3951	2.769E-06	0.000	2.334E+12
-9.8747	4280155.	0.000				
77.638	5.837E-05	-163832.	2967.6205	1.749E-06	0.000	2.334E+12
-19.4576	4313641.	0.000				
78.716	7.513E-05	-127061.	2678.4388	9.431E-07	0.000	2.334E+12
-25.2395	4347128.	0.000				
79.794	8.277E-05	-94516.	2333.8460	3.288E-07	0.000	2.334E+12
-28.0222	4380615.	0.000				
80.873	8.364E-05	-66663.	1967.9552	-1.180E-07	0.000	2.334E+12
-28.5314	4414101.	0.000				
81.951	7.972E-05	-43587.	1606.0816	-4.236E-07	0.000	2.334E+12
-27.4013	4447588.	0.000				
83.029	7.268E-05	-25099.	1265.9685	-6.140E-07	0.000	2.334E+12
-25.1680	4481075.	0.000				
84.107	6.383E-05	-10825.	959.0533	-7.136E-07	0.000	2.334E+12
-22.2701	4514561.	0.000				
85.186	5.421E-05	-279.1522	691.6986	-7.444E-07	0.000	2.334E+12
-19.0534	4548048.	0.000				

86.264	4.457E-05	7076.0640	466.3344	-7.255E-07	0.000	2.334E+12
-15.7798	4581535.	0.000				
87.342	3.543E-05	11789.	282.4804	-6.732E-07	0.000	2.334E+12
-12.6374	4615021.	0.000				
88.421	2.714E-05	14386.	137.6280	-6.007E-07	0.000	2.334E+12
-9.7516	4648508.	0.000				
89.499	1.989E-05	15351.	27.9790	-5.182E-07	0.000	2.334E+12
-7.1963	4681995.	0.000				
90.577	1.373E-05	15111.	-50.9589	-4.338E-07	0.000	2.334E+12
-5.0047	4715481.	0.000				
91.656	8.662E-06	14032.	-103.9070	-3.530E-07	0.000	2.334E+12
-3.1792	4748968.	0.000				
92.734	4.598E-06	12421.	-135.4706	-2.797E-07	0.000	2.334E+12
-1.6994	4782455.	0.000				
93.812	1.425E-06	10526.	-149.8968	-2.160E-07	0.000	2.334E+12
-0.5303	4815941.	0.000				
94.890	-9.931E-07	8542.2631	-150.9200	-1.632E-07	0.000	2.334E+12
0.3722	4849428.	0.000				
95.969	-2.798E-06	6620.5766	-141.6802	-1.212E-07	0.000	2.334E+12
1.0560	4882915.	0.000				
97.047	-4.128E-06	4875.6930	-124.6997	-8.929E-08	0.000	2.334E+12
1.5686	4916401.	0.000				
98.125	-5.109E-06	3393.4482	-101.9068	-6.636E-08	0.000	2.334E+12
1.9544	4949888.	0.000				
99.204	-5.846E-06	2238.4277	-74.6963	-5.075E-08	0.000	2.334E+12
2.2514	4983374.	0.000				
100.282	-6.422E-06	1460.3682	-44.0202	-4.050E-08	0.000	2.334E+12
2.4900	5016861.	0.000				
101.360	-6.894E-06	1099.2210	-26.2251	-3.340E-08	0.000	2.334E+12
0.2605	488859.	0.000				
102.438	-7.287E-06	781.6824	-22.6827	-2.819E-08	0.000	2.334E+12
0.2871	509788.	0.000				
103.517	-7.623E-06	512.2104	-18.8024	-2.460E-08	0.000	2.334E+12
0.3127	530717.	0.000				
104.595	-7.923E-06	295.0906	-14.5940	-2.236E-08	0.000	2.334E+12
0.3378	551647.	0.000				
105.673	-8.202E-06	134.5286	-10.0604	-2.117E-08	0.000	2.334E+12
0.3629	572576.	0.000				
106.752	-8.471E-06	34.7357	-5.1983	-2.070E-08	0.000	2.334E+12
0.3886	593505.	0.000				
107.830	-8.738E-06	0.000	0.000	-2.061E-08	0.000	2.334E+12
0.4149	307217.	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. 6:

Pile-head deflection	=	1.0000000 inches
Computed slope at pile head	=	-0.0030879 radians
Maximum bending moment	=	10927325. inch-lbs
Maximum shear force	=	-46888. lbs
Depth of maximum bending moment	=	36.6622000 feet below pile head
Depth of maximum shear force	=	53.9150000 feet below pile head
Number of iterations	=	55

Number of zero deflection points = 3

Pile-head Deflection vs. Pile Length for Load Case 6

Boundary Condition Type 4, Deflection and Moment

Deflection = 1.00000 in
Moment = 4380000. in- lb
Axial Load = 0. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment ln-lbs	Maximum Shear lbs
107.8300	1.0000000	10927325.	-46888.
102.4385	1.0000000	10901757.	-46579.
97.0470	1.0000000	10882998.	-46499.
91.6555	1.0000000	10940233.	-47007.
86.2640	1.0000000	10928176.	-46841.
80.8725	1.0000000	10877120.	-46234.
75.4810	1.0000000	10880881.	-46623.
70.0895	1.0000000	10900250.	-46250.
64.6980	1.0000000	10864859.	-49725.
59.3065	1.0000000	10479996.	-56731.
53.9150	1.0000000	7466044.	-51939.
48.5235	1.0000000	4380000.	-36352.
43.1320	1.0000000	4380000.	-21193.
37.7405	1.0000000	4380000.	-10810.
37.7405	0.000000	66239071156.	-7312996861.
37.7405	0.000000	66239071156.	-7312996861.
37.7405	0.000000	66239071156.	-7312996861.
37.7405	0.000000	66239071156.	-7312996861.
37.7405	0.000000	66239071156.	-7312996861.
37.7405	0.000000	66239071156.	-7312996861.

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 7

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head = 1.500000 inches
Moment at pile head = 4380000.0 in-lbs
Axial load at pile head = 0.0 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. Es*h lb/inch	Soil Spr. Distrib. Lat. Load lb/inch	p lb/in
0.00	1.5000	4380000.	23338.	-0.004687	0.000	1.341E+12	0.000	0.000	0.000
1.078	1.4396	4681982.	23338.	-0.004643	0.000	1.341E+12	0.000	0.000	0.000

2.157	1.3798	4983964.	23338.	-0.004596	0.000	1.339E+12	0.000	0.000	0.000
3.235	1.3207	5285946.	23338.	-0.004546	0.000	1.338E+12	0.000	0.000	0.000
4.313	1.2622	5587928.	23338.	-0.004494	0.000	1.337E+12	0.000	0.000	0.000
5.392	1.2044	5889909.	23338.	-0.004377	0.000	4.238E+11	0.000	0.000	0.000
6.470	1.1489	6191891.	23338.	-0.004191	0.000	4.190E+11	0.000	0.000	0.000
7.548	1.0959	6493873.	23338.	-0.003995	0.000	4.188E+11	0.000	0.000	0.000
8.626	1.0455	6795855.	23338.	-0.003790	0.000	4.186E+11	0.000	0.000	0.000
9.705	0.9978	7097837.	23338.	-0.003575	0.000	4.184E+11	0.000	0.000	0.000
10.783	0.9530	7399819.	23338.	-0.003445	0.000	2.322E+12	0.000	0.000	0.000
11.861	0.9087	7701801.	23338.	-0.003403	0.000	2.321E+12	0.000	0.000	0.000
12.940	0.8649	8003783.	23338.	-0.003359	0.000	2.321E+12	0.000	0.000	0.000
14.018	0.8218	8305765.	23338.	-0.003314	0.000	2.320E+12	0.000	0.000	0.000
15.096	0.7792	8607746.	23338.	-0.003266	0.000	2.320E+12	0.000	0.000	0.000
16.174	0.7372	8909728.	23338.	-0.003218	0.000	2.319E+12	0.000	0.000	0.000
17.253	0.6959	9211710.	23338.	-0.003167	0.000	2.318E+12	0.000	0.000	0.000
18.331	0.6553	9513692.	23338.	-0.003115	0.000	2.318E+12	0.000	0.000	0.000
19.409	0.6153	9815674.	23338.	-0.003061	0.000	2.317E+12	0.000	0.000	0.000
20.488	0.5760	10117656.	23338.	-0.002995	0.000	1.707E+12	0.000	0.000	0.000
21.566	0.5378	10419638.	23338.	-0.002914	0.000	1.590E+12	0.000	0.000	0.000
22.644	0.5006	10721620.	23338.	-0.002827	0.000	1.560E+12	0.000	0.000	0.000
23.723	0.4646	11023601.	23338.	-0.002737	0.000	1.560E+12	0.000	0.000	0.000
24.801	0.4298	11325583.	23338.	-0.002645	0.000	1.559E+12	0.000	0.000	0.000
25.879	0.3962	11627565.	23338.	-0.002549	0.000	1.559E+12	0.000	0.000	0.000
26.957	0.3638	11929547.	23338.	-0.002452	0.000	1.559E+12	0.000	0.000	0.000
28.036	0.3327	12231529.	23338.	-0.002351	0.000	1.559E+12	0.000	0.000	0.000
29.114	0.3030	12533511.	23338.	-0.002248	0.000	1.559E+12	0.000	0.000	0.000
30.192	0.2745	12835493.	23338.	-0.002143	0.000	1.559E+12	0.000	0.000	0.000
31.271	0.2475	13137475.	23066.	-0.002035	0.000	1.558E+12	-42.0777	2199.8198	0.000
32.349	0.2219	13432411.	21813.	-0.001925	0.000	1.558E+12	-151.4719	8833.7340	0.000
33.427	0.1977	13701987.	19134.	-0.001812	0.000	1.558E+12	-262.5858	17188.	0.000
34.506	0.1750	13927596.	15049.	-0.001698	0.000	1.558E+12	-368.8106	27274.	0.000
35.584	0.1538	14091455.	9670.0323	-0.001581	0.000	1.558E+12			

-462.6579	38936.	0.000				
36.662	0.1340	14177849.	3195.6970	-0.001464	0.000	1.558E+12
-538.0431	51936.	0.000				
37.741	0.1159	14174157.	-4015.2770	-0.001346	0.000	1.558E+12
-576.5159	64382.	0.000				
38.819	0.0992	14073937.	-11437.	-0.001229	0.000	1.558E+12
-570.6647	74428.	0.000				
39.897	0.0841	13878169.	-18680.	-0.001113	0.000	1.558E+12
-548.8238	84474.	0.000				
40.975	0.0704	13590509.	-25559.	-0.000999	0.000	1.558E+12
-514.3616	94520.	0.000				
42.054	0.0582	13216728.	-31931.	-0.000887	0.000	1.558E+12
-470.5007	104566.	0.000				
43.132	0.0474	12764170.	-37694.	-0.000780	0.000	1.559E+12
-420.2852	114612.	0.000				
44.210	0.0380	12241242.	-42785.	-0.000676	0.000	1.559E+12
-366.5519	124658.	0.000				
45.289	0.0300	11656941.	-47174.	-0.000577	0.000	1.559E+12
-311.9073	134704.	0.000				
46.367	0.0231	11020416.	-50866.	-0.000483	0.000	1.560E+12
-258.7086	144750.	0.000				
47.445	0.0175	10340575.	-53892.	-0.000395	0.000	1.599E+12
-209.0507	154796.	0.000				
48.524	0.0129	9625732.	-56308.	-0.000326	0.000	2.317E+12
-164.4147	164842.	0.000				
49.602	0.009033	8883360.	-58162.	-0.000275	0.000	2.319E+12
-122.0842	174888.	0.000				
50.680	0.005801	8120548.	-59488.	-0.000227	0.000	2.320E+12
-82.9064	184934.	0.000				
51.758	0.003155	7343854.	-60332.	-0.000184	0.000	2.322E+12
-47.5396	194980.	0.000				
52.837	0.001038	6559200.	-60746.	-0.000145	0.000	2.324E+12
-16.4547	205026.	0.000				
53.915	-0.000605	5771791.	-60788.	-0.000111	0.000	2.325E+12
10.0604	215072.	0.000				
54.993	-0.001833	4986067.	-60516.	-8.105E-05	0.000	2.327E+12
31.8972	225118.	0.000				
56.072	-0.002703	4205684.	-58149.	-5.550E-05	0.000	2.328E+12
333.9554	1598823.	0.000				
57.150	-0.003270	3481215.	-53612.	-3.414E-05	0.000	2.330E+12
367.3130	1453630.	0.000				
58.228	-0.003586	2818247.	-48747.	-1.665E-05	0.000	2.331E+12
384.6907	1387966.	0.000				
59.306	-0.003701	2219690.	-43730.	-2.672E-06	0.000	2.332E+12
390.7711	1366370.	0.000				
60.385	-0.003656	1686560.	-38689.	8.163E-06	0.000	2.333E+12
388.3821	1374775.	0.000				
61.463	-0.003489	1218458.	-33721.	1.622E-05	0.000	2.334E+12
379.4534	1407124.	0.000				
62.541	-0.003236	813889.	-28902.	2.185E-05	0.000	2.334E+12
365.4068	1461214.	0.000				
63.620	-0.002924	470502.	-24290.	2.541E-05	0.000	2.334E+12
347.3470	1537187.	0.000				
64.698	-0.002578	185272.	-19933.	2.723E-05	0.000	2.334E+12
326.1671	1637004.	0.000				
65.776	-0.002219	-45347.	-15865.	2.762E-05	0.000	2.334E+12
302.6080	1764449.	0.000				
66.855	-0.001863	-225299.	-12113.	2.687E-05	0.000	2.334E+12
277.2948	1925516.	0.000				
67.933	-0.001524	-358822.	-8696.6355	2.525E-05	0.000	2.334E+12
250.7593	2129272.	0.000				
69.011	-0.001210	-450361.	-5628.5909	2.301E-05	0.000	2.334E+12
223.4508	2389491.	0.000				

70.090	-0.000929	-504486.	-2916.5209	2.036E-05	0.000	2.334E+12
195.7384	2727786.	0.000				
71.168	-0.000683	-525838.	-563.8578	1.750E-05	0.000	2.334E+12
167.8993	3180064.	0.000				
72.246	-0.000476	-519078.	1428.7319	1.461E-05	0.000	2.334E+12
140.0839	3811488.	0.000				
73.324	-0.000305	-488863.	2972.8690	1.181E-05	0.000	2.334E+12
98.5846	4179695.	0.000				
74.403	-0.000170	-442143.	3968.6058	9.230E-06	0.000	2.334E+12
55.3208	4213182.	0.000				
75.481	-6.632E-05	-386159.	4467.3462	6.934E-06	0.000	2.334E+12
21.7667	4246668.	0.000				
76.559	9.553E-06	-326531.	4587.7286	4.959E-06	0.000	2.334E+12
-3.1599	4280155.	0.000				
77.638	6.200E-05	-267432.	4433.5548	3.312E-06	0.000	2.334E+12
-20.6699	4313641.	0.000				
78.716	9.527E-05	-211794.	4092.7529	1.984E-06	0.000	2.334E+12
-32.0059	4347128.	0.000				
79.794	0.000113	-161515.	3637.4339	9.488E-07	0.000	2.334E+12
-38.3702	4380615.	0.000				
80.873	0.000120	-117661.	3124.7317	1.749E-07	0.000	2.334E+12
-40.8753	4414101.	0.000				
81.951	0.000118	-80650.	2598.1685	-3.748E-07	0.000	2.334E+12
-40.5126	4447588.	0.000				
83.029	0.000110	-50422.	2089.3270	-7.382E-07	0.000	2.334E+12
-38.1361	4481075.	0.000				
84.107	9.876E-05	-26580.	1619.6606	-9.516E-07	0.000	2.334E+12
-34.4575	4514561.	0.000				
85.186	8.549E-05	-8506.4691	1202.3103	-1.049E-06	0.000	2.334E+12
-30.0499	4548048.	0.000				
86.264	7.162E-05	4535.2685	843.8351	-1.060E-06	0.000	2.334E+12
-25.3576	4581535.	0.000				
87.342	5.807E-05	13331.	545.7910	-1.010E-06	0.000	2.334E+12
-20.7094	4615021.	0.000				
88.421	4.547E-05	18660.	306.1229	-9.217E-07	0.000	2.334E+12
-16.3347	4648508.	0.000				
89.499	3.421E-05	21254.	120.3497	-8.111E-07	0.000	2.334E+12
-12.3792	4681995.	0.000				
90.577	2.448E-05	21774.	-17.4585	-6.918E-07	0.000	2.334E+12
-8.9210	4715481.	0.000				
91.656	1.631E-05	20802.	-113.9031	-5.737E-07	0.000	2.334E+12
-5.9858	4748968.	0.000				
92.734	9.632E-06	18827.	-175.6621	-4.639E-07	0.000	2.334E+12
-3.5599	4782455.	0.000				
93.812	4.305E-06	16256.	-209.0591	-3.666E-07	0.000	2.334E+12
-1.6021	4815941.	0.000				
94.890	1.434E-07	13416.	-219.7720	-2.844E-07	0.000	2.334E+12
-0.0538	4849428.	0.000				
95.969	-3.055E-06	10568.	-212.6607	-2.179E-07	0.000	2.334E+12
1.1529	4882915.	0.000				
97.047	-5.496E-06	7912.9667	-191.6922	-1.667E-07	0.000	2.334E+12
2.0881	4916401.	0.000				
98.125	-7.368E-06	5607.3512	-159.9466	-1.292E-07	0.000	2.334E+12
2.8187	4949888.	0.000				
99.204	-8.839E-06	3773.6770	-119.6866	-1.032E-07	0.000	2.334E+12
3.4041	4983374.	0.000				
100.282	-1.004E-05	2509.9584	-72.4817	-8.576E-08	0.000	2.334E+12
3.8921	5016861.	0.000				
101.360	-1.106E-05	1897.9093	-44.5975	-7.354E-08	0.000	2.334E+12
0.4178	488859.	0.000				
102.438	-1.194E-05	1355.8112	-38.8506	-6.452E-08	0.000	2.334E+12
0.4705	509788.	0.000				
103.517	-1.273E-05	892.4873	-32.4291	-5.829E-08	0.000	2.334E+12

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0.5220    530717.      0.000
   104.595 -1.345E-05   516.5710   -25.3417 -5.439E-08      0.000  2.334E+12
0.5734    551647.      0.000
   105.673 -1.414E-05   236.6648   -17.5849 -5.230E-08      0.000  2.334E+12
0.6255    572576.      0.000
   106.752 -1.480E-05    61.4879    -9.1450 -5.147E-08      0.000  2.334E+12
0.6790    593505.      0.000
   107.830 -1.547E-05     0.000      0.000 -5.130E-08      0.000  2.334E+12
0.7345    307217.      0.000
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* 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. 7:

Pile-head deflection	=	1.5000000 inches
Computed slope at pile head	=	-0.0046865 radians
Maximum bending moment	=	14177849. inch-lbs
Maximum shear force	=	-60788. lbs
Depth of maximum bending moment	=	36.6622000 feet below pile head
Depth of maximum shear force	=	53.9150000 feet below pile head
Number of iterations	=	122
Number of zero deflection points	=	3

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 8

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head = 2.000000 inches
Moment at pile head = 4380000.0 in-lbs
Axial load at pile head = 0.0 lbs

Depth X inches	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. Es*h lb/inch	Soil Spr. Distrib. p lat. Load lb/inch
0.00	2.0000	4380000.	32016.	-0.006115	0.000	1.341E+12	0.000	0.000
1.078	1.9212	4794278.	32016.	-0.006070	0.000	1.341E+12	0.000	0.000
2.157	1.8429	5208556.	32016.	-0.006022	0.000	1.338E+12	0.000	0.000
3.235	1.7653	5622835.	32016.	-0.005970	0.000	1.337E+12	0.000	0.000
4.313	1.6884	6037113.	32016.	-0.005849	0.000	4.190E+11	0.000	0.000
5.392	1.6139	6451391.	32016.	-0.005656	0.000	4.188E+11	0.000	0.000

6.470	1.5420	6865669.	32016.	-0.005451	0.000	4.186E+11	0.000	0.000
7.548	1.4729	7279948.	32016.	-0.005232	0.000	4.183E+11	0.000	0.000
8.626	1.4066	7694226.	32016.	-0.005000	0.000	4.181E+11	0.000	0.000
9.705	1.3435	8108504.	32016.	-0.004756	0.000	4.179E+11	0.000	0.000
10.783	1.2836	8522782.	32016.	-0.004606	0.000	2.320E+12	0.000	0.000
11.861	1.2243	8937061.	32016.	-0.004558	0.000	2.319E+12	0.000	0.000
12.940	1.1656	9351339.	32016.	-0.004507	0.000	2.318E+12	0.000	0.000
14.018	1.1076	9765617.	32016.	-0.004453	0.000	2.317E+12	0.000	0.000
15.096	1.0504	10179895.	32016.	-0.004385	0.000	1.616E+12	0.000	0.000
16.174	0.9941	10594173.	32016.	-0.004301	0.000	1.572E+12	0.000	0.000
17.253	0.9391	11008452.	32016.	-0.004212	0.000	1.560E+12	0.000	0.000
18.331	0.8851	11422730.	32016.	-0.004119	0.000	1.559E+12	0.000	0.000
19.409	0.8325	11837008.	32016.	-0.004022	0.000	1.559E+12	0.000	0.000
20.488	0.7811	12251286.	32016.	-0.003922	0.000	1.559E+12	0.000	0.000
21.566	0.7310	12665565.	32016.	-0.003819	0.000	1.559E+12	0.000	0.000
22.644	0.6822	13079843.	32016.	-0.003712	0.000	1.558E+12	0.000	0.000
23.723	0.6349	13494121.	32016.	-0.003601	0.000	1.558E+12	0.000	0.000
24.801	0.5890	13908399.	32016.	-0.003488	0.000	1.558E+12	0.000	0.000
25.879	0.5447	14322678.	32016.	-0.003370	0.000	1.558E+12	0.000	0.000
26.957	0.5018	14736956.	32016.	-0.003250	0.000	1.558E+12	0.000	0.000
28.036	0.4605	15151234.	32016.	-0.003126	0.000	1.557E+12	0.000	0.000
29.114	0.4209	15565512.	32016.	-0.002998	0.000	1.557E+12	0.000	0.000
30.192	0.3830	15979791.	32016.	-0.002867	0.000	1.557E+12	0.000	0.000
31.271	0.3467	16394069.	31719.	-0.002732	0.000	1.557E+12	-45.9762	1715.8072
32.349	0.3123	16800649.	30344.	-0.002594	0.000	1.556E+12	-166.4741	6898.6415
33.427	0.2796	17179356.	27391.	-0.002453	0.000	1.556E+12	-290.0346	13423.
34.506	0.2488	17509502.	22869.	-0.002309	0.000	1.556E+12	-408.8789	21268.
35.584	0.2198	17771187.	16892.	-0.002162	0.000	1.556E+12	-514.9278	30310.
36.662	0.1928	17946657.	9669.9633	-0.002014	0.000	1.556E+12	-601.3638	40358.
37.741	0.1677	18021438.	1448.1881	-0.001864	0.000	1.556E+12	-669.4290	51647.
38.819	0.1446	17984135.	-7497.5088	-0.001714	0.000	1.556E+12	-713.2562	63842.

39.897	0.1233	17827409.	-16896.	-0.001566	0.000	1.556E+12
-739.3724	77562.	0.000				
40.975	0.1041	17546887.	-26470.	-0.001418	0.000	1.556E+12
-740.4139	92077.	0.000				
42.054	0.0866	17142395.	-35790.	-0.001274	0.000	1.556E+12
-700.1489	104566.	0.000				
43.132	0.0711	16620676.	-44393.	-0.001134	0.000	1.557E+12
-629.5423	114612.	0.000				
44.210	0.0573	15993549.	-52037.	-0.000998	0.000	1.557E+12
-551.9893	124658.	0.000				
45.289	0.0452	15274002.	-58655.	-0.000868	0.000	1.557E+12
-470.9479	134704.	0.000				
46.367	0.0348	14475602.	-64222.	-0.000745	0.000	1.558E+12
-389.5538	144750.	0.000				
47.445	0.0260	13611978.	-68715.	-0.000628	0.000	1.558E+12
-304.7766	151893.	0.000				
48.524	0.0186	12697324.	-72217.	-0.000519	0.000	1.559E+12
-236.5222	164842.	0.000				
49.602	0.0125	11743069.	-74843.	-0.000418	0.000	1.559E+12
-169.3930	174888.	0.000				
50.680	0.007761	10760451.	-76656.	-0.000324	0.000	1.560E+12
-110.9184	184934.	0.000				
51.758	0.004144	9759262.	-77778.	-0.000252	0.000	2.317E+12
-62.4396	194980.	0.000				
52.837	0.001232	8747619.	-78308.	-0.000201	0.000	2.319E+12
-19.5180	205026.	0.000				
53.915	-0.001049	7732707.	-78322.	-0.000155	0.000	2.321E+12
17.4286	215072.	0.000				
54.993	-0.002771	6720714.	-77897.	-0.000114	0.000	2.323E+12
48.2120	225118.	0.000				
56.072	-0.004009	5716793.	-74954.	-7.979E-05	0.000	2.325E+12
406.7509	1312699.	0.000				
57.150	-0.004836	4780976.	-69432.	-5.059E-05	0.000	2.327E+12
446.7156	1195253.	0.000				
58.228	-0.005319	3919953.	-63511.	-2.641E-05	0.000	2.329E+12
468.4752	1139731.	0.000				
59.306	-0.005519	3137370.	-57392.	-6.807E-06	0.000	2.330E+12
477.2353	1118807.	0.000				
60.385	-0.005495	2434691.	-51224.	8.659E-06	0.000	2.332E+12
476.1688	1121310.	0.000				
61.463	-0.005295	1811738.	-45119.	2.044E-05	0.000	2.333E+12
467.4456	1142232.	0.000				
62.541	-0.004966	1267052.	-39166.	2.898E-05	0.000	2.334E+12
452.6681	1179517.	0.000				
63.620	-0.004545	798157.	-33435.	3.470E-05	0.000	2.334E+12
433.0829	1232855.	0.000				
64.698	-0.004068	401774.	-27983.	3.803E-05	0.000	2.334E+12
409.6955	1303228.	0.000				
65.776	-0.003561	73989.	-22852.	3.935E-05	0.000	2.334E+12
383.3416	1392818.	0.000				
66.855	-0.003050	-189613.	-18077.	3.903E-05	0.000	2.334E+12
354.7284	1505160.	0.000				
67.933	-0.002551	-393821.	-13682.	3.741E-05	0.000	2.334E+12
324.4612	1645562.	0.000				
69.011	-0.002081	-543704.	-9687.2142	3.481E-05	0.000	2.334E+12
293.0594	1821877.	0.000				
70.090	-0.001650	-644518.	-6102.7953	3.152E-05	0.000	2.334E+12
260.9638	2045935.	0.000				
71.168	-0.001266	-701639.	-2935.8348	2.779E-05	0.000	2.334E+12
228.5352	2336230.	0.000				
72.246	-0.000931	-720495.	-188.9179	2.384E-05	0.000	2.334E+12
196.0400	2723451.	0.000				
73.324	-0.000649	-706528.	2137.9396	1.989E-05	0.000	2.334E+12

163.6090	3263253.	0.000				
74.403	-0.000417	-665167.	4044.8565	1.608E-05	0.000	2.334E+12
131.1322	4071352.	0.000				
75.481	-0.000232	-601850.	5386.9303	1.257E-05	0.000	2.334E+12
76.3045	4246668.	0.000				
76.559	-9.141E-05	-525758.	6076.2313	9.446E-06	0.000	2.334E+12
30.2369	4280155.	0.000				
77.638	1.196E-05	-444602.	6246.0622	6.756E-06	0.000	2.334E+12
-3.9871	4313641.	0.000				
78.716	8.344E-05	-364115.	6038.9153	4.514E-06	0.000	2.334E+12
-28.0304	4347128.	0.000				
79.794	0.000129	-288320.	5575.4776	2.706E-06	0.000	2.334E+12
-43.6005	4380615.	0.000				
80.873	0.000153	-219826.	4954.7020	1.297E-06	0.000	2.334E+12
-52.3493	4414101.	0.000				
81.951	0.000162	-160096.	4254.9645	2.439E-07	0.000	2.334E+12
-55.8052	4447588.	0.000				
83.029	0.000160	-109711.	3535.9444	-5.040E-07	0.000	2.334E+12
-55.3297	4481075.	0.000				
84.107	0.000149	-68589.	2840.9298	-9.983E-07	0.000	2.334E+12
-52.0948	4514561.	0.000				
85.186	0.000134	-36190.	2199.3132	-1.289E-06	0.000	2.334E+12
-47.0762	4548048.	0.000				
86.264	0.000116	-11673.	1629.0968	-1.421E-06	0.000	2.334E+12
-41.0589	4581535.	0.000				
87.342	9.715E-05	5970.0227	1139.2770	-1.437E-06	0.000	2.334E+12
-34.6498	4615021.	0.000				
88.421	7.877E-05	17811.	732.0224	-1.371E-06	0.000	2.334E+12
-28.2972	4648508.	0.000				
89.499	6.166E-05	24914.	404.5919	-1.253E-06	0.000	2.334E+12
-22.3118	4681995.	0.000				
90.577	4.635E-05	28282.	150.9685	-1.105E-06	0.000	2.334E+12
-16.8893	4715481.	0.000				
91.656	3.306E-05	28821.	-36.7938	-9.471E-07	0.000	2.334E+12
-12.1321	4748968.	0.000				
92.734	2.184E-05	27329.	-167.4989	-7.914E-07	0.000	2.334E+12
-8.0703	4782455.	0.000				
93.812	1.257E-05	24486.	-249.9913	-6.478E-07	0.000	2.334E+12
-4.6801	4815941.	0.000				
94.890	5.071E-06	20860.	-292.5656	-5.221E-07	0.000	2.334E+12
-1.9004	4849428.	0.000				
95.969	-9.368E-07	16915.	-302.5734	-4.174E-07	0.000	2.334E+12
0.3535	4882915.	0.000				
97.047	-5.731E-06	13029.	-286.1988	-3.344E-07	0.000	2.334E+12
2.1774	4916401.	0.000				
98.125	-9.590E-06	9508.4234	-248.3766	-2.719E-07	0.000	2.334E+12
3.6686	4949888.	0.000				
99.204	-1.277E-05	6601.6485	-192.8300	-2.272E-07	0.000	2.334E+12
4.9170	4983374.	0.000				
100.282	-1.547E-05	4518.1370	-122.2111	-1.964E-07	0.000	2.334E+12
5.9982	5016861.	0.000				
101.360	-1.785E-05	3438.9230	-79.0409	-1.744E-07	0.000	2.334E+12
0.6744	488859.	0.000				
102.438	-1.998E-05	2472.6220	-69.5843	-1.580E-07	0.000	2.334E+12
0.7873	509788.	0.000				
103.517	-2.194E-05	1638.1364	-58.6694	-1.466E-07	0.000	2.334E+12
0.8998	530717.	0.000				
104.595	-2.378E-05	954.3052	-46.2900	-1.394E-07	0.000	2.334E+12
1.0136	551647.	0.000				
105.673	-2.555E-05	440.1878	-32.4188	-1.355E-07	0.000	2.334E+12
1.1304	572576.	0.000				
106.752	-2.728E-05	115.3316	-17.0093	-1.340E-07	0.000	2.334E+12
1.2514	593505.	0.000				

107.830 -2.901E-05 0.000 0.000 -1.337E-07 0.000 2.334E+12
1.3776 307217. 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. 8:

Pile-head deflection	=	2.0000000 inches
Computed slope at pile head	=	-0.0061147 radians
Maximum bending moment	=	18021438. inch-lbs
Maximum shear force	=	-78322. lbs
Depth of maximum bending moment	=	37.7405000 feet below pile head
Depth of maximum shear force	=	53.9150000 feet below pile head
Number of iterations	=	35
Number of zero deflection points	=	3

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 9

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

Shear force at pile head	=	21300.0 lbs
Applied moment at pile head	=	7818000.0 in-lbs
Axial thrust load on pile head	=	0.0 lbs

Depth X	Deflect. y	Bending Moment	Shear Force	Slope S	Total Stress	Bending Stiffness	Soil Res. Spr. Distrib. p
feet	inches	in-lbs	lbs	radians	psi*	lb-in^2	lb/in
0.00	1.9216	7818000.	21300.	-0.007232	0.000	4.180E+11	
0.000	0.000	0.000					
1.078	1.8296	8093613.	21300.	-0.006986	0.000	4.180E+11	
0.000	0.000	0.000					
2.157	1.7408	8369227.	21300.	-0.006731	0.000	4.177E+11	
0.000	0.000	0.000					
3.235	1.6554	8644840.	21300.	-0.006467	0.000	4.176E+11	
0.000	0.000	0.000					
4.313	1.5734	8920454.	21300.	-0.006195	0.000	4.174E+11	
0.000	0.000	0.000					
5.392	1.4951	9196067.	21300.	-0.005914	0.000	4.172E+11	
0.000	0.000	0.000					
6.470	1.4204	9471681.	21300.	-0.005624	0.000	4.171E+11	
0.000	0.000	0.000					
7.548	1.3495	9747294.	21300.	-0.005326	0.000	4.169E+11	
0.000	0.000	0.000					
8.626	1.2825	10022908.	21300.	-0.005019	0.000	4.168E+11	

0.000	0.000	0.000				
9.705	1.2196	10298521.	21300.	-0.004704	0.000	4.166E+11
0.000	0.000	0.000				
10.783	1.1608	10574135.	21300.	-0.004501	0.000	1.574E+12
0.000	0.000	0.000				
11.861	1.1031	10849748.	21300.	-0.004412	0.000	1.560E+12
0.000	0.000	0.000				
12.940	1.0466	11125362.	21300.	-0.004321	0.000	1.560E+12
0.000	0.000	0.000				
14.018	0.9913	11400975.	21300.	-0.004227	0.000	1.559E+12
0.000	0.000	0.000				
15.096	0.9372	11676589.	21300.	-0.004132	0.000	1.559E+12
0.000	0.000	0.000				
16.174	0.8844	11952202.	21300.	-0.004034	0.000	1.559E+12
0.000	0.000	0.000				
17.253	0.8328	12227816.	21300.	-0.003933	0.000	1.559E+12
0.000	0.000	0.000				
18.331	0.7826	12503429.	21300.	-0.003831	0.000	1.559E+12
0.000	0.000	0.000				
19.409	0.7337	12779043.	21300.	-0.003726	0.000	1.559E+12
0.000	0.000	0.000				
20.488	0.6862	13054656.	21300.	-0.003618	0.000	1.558E+12
0.000	0.000	0.000				
21.566	0.6401	13330270.	21300.	-0.003509	0.000	1.558E+12
0.000	0.000	0.000				
22.644	0.5954	13605883.	21300.	-0.003397	0.000	1.558E+12
0.000	0.000	0.000				
23.723	0.5522	13881497.	21300.	-0.003283	0.000	1.558E+12
0.000	0.000	0.000				
24.801	0.5104	14157110.	21300.	-0.003166	0.000	1.558E+12
0.000	0.000	0.000				
25.879	0.4702	14432724.	21300.	-0.003048	0.000	1.558E+12
0.000	0.000	0.000				
26.957	0.4315	14708337.	21300.	-0.002927	0.000	1.558E+12
0.000	0.000	0.000				
28.036	0.3945	14983950.	21300.	-0.002803	0.000	1.557E+12
0.000	0.000	0.000				
29.114	0.3590	15259564.	21300.	-0.002678	0.000	1.557E+12
0.000	0.000	0.000				
30.192	0.3252	15535177.	21300.	-0.002550	0.000	1.557E+12
0.000	0.000	0.000				
31.271	0.2930	15810791.	21015.	-0.002420	0.000	1.557E+12
-43.9866	1942.4730	0.000				
32.349	0.2626	16079040.	19704.	-0.002287	0.000	1.557E+12
-158.6868	7820.6307	0.000				
33.427	0.2338	16320719.	16895.	-0.002152	0.000	1.557E+12
-275.5418	15248.	0.000				
34.506	0.2069	16516263.	12606.	-0.002016	0.000	1.557E+12
-387.3567	24231.	0.000				
35.584	0.1817	16646951.	6953.2797	-0.001878	0.000	1.557E+12
-486.3466	34643.	0.000				
36.662	0.1582	16696208.	144.2605	-0.001739	0.000	1.557E+12
-566.0846	46287.	0.000				
37.741	0.1366	16650684.	-7578.9636	-0.001601	0.000	1.557E+12
-627.6500	59438.	0.000				
38.819	0.1168	16500071.	-15946.	-0.001463	0.000	1.557E+12
-665.5677	73722.	0.000				
39.897	0.0988	16238019.	-24424.	-0.001327	0.000	1.557E+12
-644.8326	84474.	0.000				
40.975	0.0825	15868001.	-32494.	-0.001194	0.000	1.557E+12
-602.4657	94520.	0.000				
42.054	0.0679	15397110.	-39941.	-0.001064	0.000	1.557E+12
-548.5813	104566.	0.000				

43.132	0.0549	14834369.	-46639.	-0.000938	0.000	1.558E+12
-486.7028	114612.	0.000				
44.210	0.0436	14190137.	-52506.	-0.000818	0.000	1.558E+12
-420.1003	124658.	0.000				
45.289	0.0338	13475566.	-57499.	-0.000703	0.000	1.558E+12
-351.7634	134704.	0.000				
46.367	0.0254	12702099.	-61615.	-0.000594	0.000	1.559E+12
-284.3813	144750.	0.000				
47.445	0.0184	11881016.	-64880.	-0.000492	0.000	1.559E+12
-220.3277	154796.	0.000				
48.524	0.0127	11023044.	-67352.	-0.000397	0.000	1.560E+12
-161.6525	164842.	0.000				
49.602	0.008144	10138005.	-69110.	-0.000312	0.000	1.653E+12
-110.0776	174888.	0.000				
50.680	0.004627	9234536.	-70250.	-0.000246	0.000	2.318E+12
-66.1242	184934.	0.000				
51.758	0.001776	8319996.	-70851.	-0.000197	0.000	2.320E+12
-26.7589	194980.	0.000				
52.837	-0.000475	7400975.	-70975.	-0.000153	0.000	2.322E+12
7.5192	205026.	0.000				
53.915	-0.002191	6483213.	-70691.	-0.000115	0.000	2.324E+12
36.4211	215072.	0.000				
54.993	-0.003441	5571549.	-70068.	-8.107E-05	0.000	2.326E+12
59.8612	225118.	0.000				
56.072	-0.004289	4669908.	-66959.	-5.258E-05	0.000	2.327E+12
420.7112	1269200.	0.000				
57.150	-0.004802	3838708.	-61357.	-2.894E-05	0.000	2.329E+12
445.1301	1199554.	0.000				
58.228	-0.005038	3082037.	-55527.	-9.718E-06	0.000	2.331E+12
455.9561	1171059.	0.000				
59.306	-0.005053	2401709.	-49623.	5.503E-06	0.000	2.332E+12
456.6339	1169312.	0.000				
60.385	-0.004896	1797836.	-43761.	1.715E-05	0.000	2.333E+12
449.4627	1187961.	0.000				
61.463	-0.004609	1269219.	-38031.	2.566E-05	0.000	2.334E+12
436.1129	1224319.	0.000				
62.541	-0.004232	813621.	-32506.	3.143E-05	0.000	2.334E+12
417.8700	1277764.	0.000				
63.620	-0.003796	427989.	-27242.	3.487E-05	0.000	2.334E+12
395.7623	1349135.	0.000				
64.698	-0.003329	108620.	-22284.	3.636E-05	0.000	2.334E+12
370.6393	1440578.	0.000				
65.776	-0.002855	-148691.	-17665.	3.625E-05	0.000	2.334E+12
343.2169	1555672.	0.000				
66.855	-0.002391	-348537.	-13412.	3.487E-05	0.000	2.334E+12
314.1058	1699844.	0.000				
67.933	-0.001952	-495790.	-9543.7596	3.253E-05	0.000	2.334E+12
283.8290	1881163.	0.000				
69.011	-0.001549	-595522.	-6071.6810	2.951E-05	0.000	2.334E+12
252.8303	2111797.	0.000				
70.090	-0.001189	-652921.	-3003.0321	2.605E-05	0.000	2.334E+12
221.4732	2410781.	0.000				
71.168	-0.000875	-673238.	-340.7047	2.237E-05	0.000	2.334E+12
190.0275	2809697.	0.000				
72.246	-0.000610	-661738.	1915.0411	1.867E-05	0.000	2.334E+12
158.6302	3365783.	0.000				
73.324	-0.000392	-623678.	3760.6209	1.510E-05	0.000	2.334E+12
126.6305	4179695.	0.000				
74.403	-0.000219	-564416.	5041.1278	1.181E-05	0.000	2.334E+12
71.2901	4213182.	0.000				
75.481	-8.636E-05	-493218.	5685.7332	8.879E-06	0.000	2.334E+12
28.3428	4246668.	0.000				
76.559	1.084E-05	-417274.	5845.9012	6.355E-06	0.000	2.334E+12

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EL. -67.73

-3.5866	4280155.	0.000				
77.638	7.811E-05	-341930.	5654.2253	4.251E-06	0.000	2.334E+12
-26.0397	4313641.	0.000				
78.716	0.000121	-270947.	5223.0805	2.552E-06	0.000	2.334E+12
-40.5999	4347128.	0.000				
79.794	0.000144	-206761.	4644.6754	1.228E-06	0.000	2.334E+12
-48.8008	4380615.	0.000				
80.873	0.000153	-150746.	3992.1107	2.365E-07	0.000	2.334E+12
-52.0624	4414101.	0.000				
81.951	0.000150	-103448.	3321.1091	-4.682E-07	0.000	2.334E+12
-51.6505	4447588.	0.000				
83.029	0.000141	-64799.	2672.1430	-9.346E-07	0.000	2.334E+12
-48.6565	4481075.	0.000				
84.107	0.000126	-34296.	2072.7394	-1.209E-06	0.000	2.334E+12
-43.9899	4514561.	0.000				
85.186	0.000109	-11158.	1539.7965	-1.335E-06	0.000	2.334E+12
-38.3840	4548048.	0.000				
86.264	9.153E-05	5553.1310	1081.7908	-1.351E-06	0.000	2.334E+12
-32.4073	4581535.	0.000				
87.342	7.425E-05	16838.	700.7939	-1.289E-06	0.000	2.334E+12
-26.4812	4615021.	0.000				
88.421	5.818E-05	23689.	394.2496	-1.176E-06	0.000	2.334E+12
-20.8996	4648508.	0.000				
89.499	4.380E-05	27041.	156.4886	-1.036E-06	0.000	2.334E+12
-15.8498	4681995.	0.000				
90.577	3.137E-05	27739.	-20.0218	-8.839E-07	0.000	2.334E+12
-11.4325	4715481.	0.000				
91.656	2.093E-05	26523.	-143.6831	-7.335E-07	0.000	2.334E+12
-7.6812	4748968.	0.000				
92.734	1.239E-05	24021.	-223.0043	-5.934E-07	0.000	2.334E+12
-4.5791	4782455.	0.000				
93.812	5.573E-06	20752.	-266.0493	-4.693E-07	0.000	2.334E+12
-2.0741	4815941.	0.000				
94.890	2.451E-07	17135.	-280.0629	-3.642E-07	0.000	2.334E+12
-0.0919	4849428.	0.000				
95.969	-3.853E-06	13504.	-271.2495	-2.793E-07	0.000	2.334E+12
1.4541	4882915.	0.000				
97.047	-6.983E-06	10116.	-244.6762	-2.138E-07	0.000	2.334E+12
2.6532	4916401.	0.000				
98.125	-9.387E-06	7171.7553	-204.2784	-1.659E-07	0.000	2.334E+12
3.5909	4949888.	0.000				
99.204	-1.128E-05	4829.0904	-152.9488	-1.326E-07	0.000	2.334E+12
4.3429	4983374.	0.000				
100.282	-1.282E-05	3213.5637	-92.6946	-1.103E-07	0.000	2.334E+12
4.9703	5016861.	0.000				
101.360	-1.413E-05	2430.2295	-57.0835	-9.470E-08	0.000	2.334E+12
0.5339	488859.	0.000				
102.438	-1.527E-05	1736.2892	-49.7369	-8.315E-08	0.000	2.334E+12
0.6016	509788.	0.000				
103.517	-1.628E-05	1143.0778	-41.5236	-7.516E-08	0.000	2.334E+12
0.6679	530717.	0.000				
104.595	-1.722E-05	661.6912	-32.4542	-7.016E-08	0.000	2.334E+12
0.7339	551647.	0.000				
105.673	-1.810E-05	303.1891	-22.5242	-6.749E-08	0.000	2.334E+12
0.8009	572576.	0.000				
106.752	-1.896E-05	78.7839	-11.7155	-6.643E-08	0.000	2.334E+12
0.8697	593505.	0.000				
107.830	-1.982E-05	0.000	0.000	-6.621E-08	0.000	2.334E+12
0.9411	307217.	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. 9:

Pile-head deflection	=	1.9215812	inches
Computed slope at pile head	=	-0.0072318	radians
Maximum bending moment	=	16696208.	inch-lbs
Maximum shear force	=	-70975.	lbs
Depth of maximum bending moment	=	36.6622000	feet below pile head
Depth of maximum shear force	=	52.8367000	feet below pile head
Number of iterations	=	156	
Number of zero deflection points	=	3	

Pile-head Deflection vs. Pile Length for Load Case 9

Boundary Condition Type 1, Shear and Moment

Shear	=	21300.	lb
Moment	=	7818000.	in- lb
Axial Load	=	0.	lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment ln-lbs	Maximum Shear lbs
107.8300	1.9215812	16696208.	-70975.
102.4385	1.9065175	16702307.	-70630.
97.0470	1.9202064	16697080.	-70720.
91.6555	1.9048298	16695646.	-71050.
86.2640	1.9100691	16690800.	-70832.
80.8725	1.9169604	16694425.	-70268.
75.4810	1.9172233	16694255.	-70639.
70.0895	1.9167070	16696400.	-69925.
64.6980	1.9349868	16687435.	-75999.
59.3065	2.1734811	16649048.	-94517.
53.9150	4.9634354	16496733.	-128736.

Computed Values of Pile Loading and Deflection for Lateral Loading for Load Case Number 10

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

Shear force at pile head	=	11000.0	lbs
Applied moment at pile head	=	4380000.0	in-lbs
Axial thrust load on pile head	=	0.0	lbs

Depth X	Deflect. y	Bending Moment	Shear Force	Slope S	Total Stress	Bending Stiffness	Soil Res. Soil Spr. Distrib. p
feet	inches	in-lbs	lbs	radians	psi*	lb-in^2	lb/in
lb/inch	lb/inch						
0.00	0.6959	4380000.	11000.	-0.002161	0.000	1.341E+12	0.000
0.000	0.000	0.000					
1.078	0.6682	4522336.	11000.	-0.002118	0.000	1.341E+12	0.000
0.000	0.000	0.000					
2.157	0.6411	4664671.	11000.	-0.002074	0.000	1.340E+12	0.000
0.000	0.000	0.000					
3.235	0.6145	4807007.	11000.	-0.002028	0.000	1.340E+12	0.000
0.000	0.000	0.000					
4.313	0.5886	4949342.	11000.	-0.001981	0.000	1.339E+12	0.000
0.000	0.000	0.000					
5.392	0.5633	5091678.	11000.	-0.001932	0.000	1.339E+12	0.000
0.000	0.000	0.000					
6.470	0.5386	5234014.	11000.	-0.001883	0.000	1.338E+12	0.000
0.000	0.000	0.000					
7.548	0.5145	5376349.	11000.	-0.001831	0.000	1.338E+12	0.000
0.000	0.000	0.000					
8.626	0.4912	5518685.	11000.	-0.001779	0.000	1.337E+12	0.000
0.000	0.000	0.000					
9.705	0.4685	5661020.	11000.	-0.001724	0.000	1.337E+12	0.000
0.000	0.000	0.000					
10.783	0.4466	5803356.	11000.	-0.001681	0.000	2.325E+12	0.000
0.000	0.000	0.000					
11.861	0.4250	5945692.	11000.	-0.001648	0.000	2.325E+12	0.000
0.000	0.000	0.000					
12.940	0.4039	6088027.	11000.	-0.001615	0.000	2.325E+12	0.000
0.000	0.000	0.000					
14.018	0.3832	6230363.	11000.	-0.001580	0.000	2.324E+12	0.000
0.000	0.000	0.000					
15.096	0.3630	6372698.	11000.	-0.001545	0.000	2.324E+12	0.000
0.000	0.000	0.000					
16.174	0.3432	6515034.	11000.	-0.001509	0.000	2.324E+12	0.000
0.000	0.000	0.000					
17.253	0.3239	6657370.	11000.	-0.001473	0.000	2.323E+12	0.000
0.000	0.000	0.000					
18.331	0.3051	6799705.	11000.	-0.001435	0.000	2.323E+12	0.000
0.000	0.000	0.000					
19.409	0.2868	6942041.	11000.	-0.001397	0.000	2.323E+12	0.000
0.000	0.000	0.000					
20.488	0.2690	7084376.	11000.	-0.001358	0.000	2.323E+12	0.000
0.000	0.000	0.000					
21.566	0.2517	7226712.	11000.	-0.001318	0.000	2.322E+12	0.000
0.000	0.000	0.000					
22.644	0.2349	7369048.	11000.	-0.001277	0.000	2.322E+12	0.000
0.000	0.000	0.000					
23.723	0.2186	7511383.	11000.	-0.001236	0.000	2.322E+12	0.000
0.000	0.000	0.000					
24.801	0.2029	7653719.	11000.	-0.001194	0.000	2.321E+12	0.000
0.000	0.000	0.000					
25.879	0.1877	7796054.	11000.	-0.001151	0.000	2.321E+12	0.000
0.000	0.000	0.000					
26.957	0.1731	7938390.	11000.	-0.001107	0.000	2.321E+12	0.000
0.000	0.000	0.000					
28.036	0.1591	8080726.	11000.	-0.001062	0.000	2.320E+12	0.000
0.000	0.000	0.000					
29.114	0.1456	8223061.	11000.	-0.001017	0.000	2.320E+12	0.000
0.000	0.000	0.000					
30.192	0.1328	8365397.	11000.	-0.000970	0.000	2.320E+12	0.000
0.000	0.000	0.000					

31.271	0.1205	8507732.	10775.	-0.000923	0.000	2.320E+12
-34.8238	3739.3251	0.000				
32.349	0.1089	8644237.	9779.0836	-0.000875	0.000	2.319E+12
-119.0626	14152.	0.000				
33.427	0.0978	8760807.	7824.9220	-0.000827	0.000	2.319E+12
-182.9810	24198.	0.000				
34.506	0.0875	8846740.	5143.5219	-0.000778	0.000	2.319E+12
-231.4677	34244.	0.000				
35.584	0.0777	8893917.	1924.8951	-0.000728	0.000	2.319E+12
-266.0171	44290.	0.000				
36.662	0.0686	8896555.	-1660.3346	-0.000679	0.000	2.319E+12
-288.1314	54336.	0.000				
37.741	0.0602	8850949.	-5460.9448	-0.000629	0.000	2.319E+12
-299.3072	64382.	0.000				
38.819	0.0523	8755230.	-9344.9522	-0.000580	0.000	2.319E+12
-301.0216	74428.	0.000				
39.897	0.0451	8609109.	-13199.	-0.000532	0.000	2.320E+12
-294.7175	84474.	0.000				
40.975	0.0386	8413644.	-16929.	-0.000484	0.000	2.320E+12
-281.7894	94520.	0.000				
42.054	0.0326	8170997.	-20458.	-0.000438	0.000	2.320E+12
-263.5700	104566.	0.000				
43.132	0.0272	7884219.	-23724.	-0.000393	0.000	2.321E+12
-241.3175	114612.	0.000				
44.210	0.0224	7557038.	-26684.	-0.000350	0.000	2.322E+12
-216.2046	124658.	0.000				
45.289	0.0182	7193656.	-29308.	-0.000309	0.000	2.322E+12
-189.3085	134704.	0.000				
46.367	0.0144	6798578.	-31578.	-0.000270	0.000	2.323E+12
-161.6035	144750.	0.000				
47.445	0.0112	6376442.	-33490.	-0.000233	0.000	2.324E+12
-133.9552	154796.	0.000				
48.524	0.008408	5931877.	-35050.	-0.000199	0.000	2.325E+12
-107.1150	164842.	0.000				
49.602	0.006046	5469378.	-36272.	-0.000167	0.000	2.326E+12
-81.7177	174888.	0.000				
50.680	0.004078	4993197.	-37177.	-0.000138	0.000	2.327E+12
-58.2802	184934.	0.000				
51.758	0.002469	4507257.	-37795.	-0.000112	0.000	2.328E+12
-37.2009	194980.	0.000				
52.837	0.001184	4015089.	-38157.	-8.814E-05	0.000	2.329E+12
-18.7603	205026.	0.000				
53.915	0.000188	3519780.	-38299.	-6.720E-05	0.000	2.329E+12
-3.1232	215072.	0.000				
54.993	-0.000555	3023948.	-38256.	-4.903E-05	0.000	2.331E+12
9.6592	225118.	0.000				
56.072	-0.001081	2529733.	-36825.	-3.362E-05	0.000	2.331E+12
211.6652	2533470.	0.000				
57.150	-0.001425	2070958.	-33884.	-2.086E-05	0.000	2.332E+12
242.9119	2205328.	0.000				
58.228	-0.001621	1652854.	-30636.	-1.053E-05	0.000	2.333E+12
258.9848	2067618.	0.000				
59.306	-0.001698	1278113.	-27246.	-2.400E-06	0.000	2.334E+12
265.0351	2020070.	0.000				
60.385	-0.001683	947748.	-23824.	3.770E-06	0.000	2.334E+12
263.8717	2028874.	0.000				
61.463	-0.001600	661564.	-20452.	8.231E-06	0.000	2.334E+12
257.3036	2080719.	0.000				
62.541	-0.001470	418461.	-17192.	1.123E-05	0.000	2.334E+12
246.6201	2171033.	0.000				
63.620	-0.001310	216650.	-14090.	1.299E-05	0.000	2.334E+12
232.8027	2300183.	0.000				
64.698	-0.001134	53818.	-11182.	1.374E-05	0.000	2.334E+12

216.6326	2472293.	0.000				
65.776	-0.000954	-72742.	-8494.9791	1.368E-05	0.000	2.334E+12
198.7500	2695303.	0.000				
66.855	-0.000780	-166025.	-6046.5602	1.302E-05	0.000	2.334E+12
179.6881	2981980.	0.000				
67.933	-0.000617	-229222.	-3849.5550	1.193E-05	0.000	2.334E+12
159.8905	3352212.	0.000				
69.011	-0.000471	-265649.	-1911.1590	1.055E-05	0.000	2.334E+12
139.7163	3837633.	0.000				
70.090	-0.000344	-278682.	-305.4736	9.045E-06	0.000	2.334E+12
108.4653	4079235.	0.000				
71.168	-0.000237	-273554.	883.6736	7.514E-06	0.000	2.334E+12
75.3344	4112722.	0.000				
72.246	-0.000150	-255813.	1681.2200	6.046E-06	0.000	2.334E+12
47.9378	4146208.	0.000				
73.324	-8.054E-05	-230045.	2159.6912	4.700E-06	0.000	2.334E+12
26.0168	4179695.	0.000				
74.403	-2.798E-05	-199922.	2386.9663	3.508E-06	0.000	2.334E+12
9.1119	4213182.	0.000				
75.481	1.023E-05	-168273.	2424.1925	2.487E-06	0.000	2.334E+12
-3.3580	4246668.	0.000				
76.559	3.638E-05	-137186.	2324.6183	1.640E-06	0.000	2.334E+12
-12.0326	4280155.	0.000				
77.638	5.268E-05	-108113.	2133.1503	9.602E-07	0.000	2.334E+12
-17.5615	4313641.	0.000				
78.716	6.123E-05	-81981.	1886.4520	4.332E-07	0.000	2.334E+12
-20.5692	4347128.	0.000				
79.794	6.389E-05	-59293.	1613.4316	4.162E-08	0.000	2.334E+12
-21.6300	4380615.	0.000				
80.873	6.230E-05	-40227.	1335.9837	-2.343E-07	0.000	2.334E+12
-21.2535	4414101.	0.000				
81.951	5.783E-05	-24719.	1069.8781	-4.143E-07	0.000	2.334E+12
-19.8769	4447588.	0.000				
83.029	5.158E-05	-12539.	825.7087	-5.176E-07	0.000	2.334E+12
-17.8630	4481075.	0.000				
84.107	4.443E-05	-3350.5606	609.8384	-5.616E-07	0.000	2.334E+12
-15.5029	4514561.	0.000				
85.186	3.705E-05	3242.6574	425.2930	-5.619E-07	0.000	2.334E+12
-13.0213	4548048.	0.000				
86.264	2.989E-05	7655.6823	272.5729	-5.317E-07	0.000	2.334E+12
-10.5838	4581535.	0.000				
87.342	2.329E-05	10297.	150.3649	-4.820E-07	0.000	2.334E+12
-8.3052	4615021.	0.000				
88.421	1.742E-05	11547.	56.1455	-4.214E-07	0.000	2.334E+12
-6.2578	4648508.	0.000				
89.499	1.238E-05	11750.	-13.3237	-3.568E-07	0.000	2.334E+12
-4.4797	4681995.	0.000				
90.577	8.185E-06	11202.	-61.6042	-2.932E-07	0.000	2.334E+12
-2.9827	4715481.	0.000				
91.656	4.793E-06	10155.	-92.2823	-2.340E-07	0.000	2.334E+12
-1.7590	4748968.	0.000				
92.734	2.129E-06	8814.0075	-108.7543	-1.814E-07	0.000	2.334E+12
-0.7870	4782455.	0.000				
93.812	9.812E-08	7340.8867	-114.0822	-1.366E-07	0.000	2.334E+12
-0.0365	4815941.	0.000				
94.890	-1.406E-06	5861.6511	-110.9083	-1.000E-07	0.000	2.334E+12
0.5271	4849428.	0.000				
95.969	-2.490E-06	4470.6676	-101.4179	-7.138E-08	0.000	2.334E+12
0.9398	4882915.	0.000				
97.047	-3.254E-06	3237.0373	-87.3393	-5.002E-08	0.000	2.334E+12
1.2363	4916401.	0.000				
98.125	-3.785E-06	2210.3975	-69.9737	-3.491E-08	0.000	2.334E+12
1.4478	4949888.	0.000				

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   99.204 -4.157E-06  1426.1729   -50.2479 -2.483E-08      0.000  2.334E+12
1.6011    4983374.      0.000
  100.282 -4.427E-06   910.0232   -28.7831 -1.836E-08      0.000  2.334E+12
1.7166    5016861.      0.000
  101.360 -4.632E-06   681.2892   -16.5448 -1.395E-08      0.000  2.334E+12
0.1750     488859.      0.000
  102.438 -4.788E-06   481.8580   -14.1919 -1.072E-08      0.000  2.334E+12
0.1887     509788.      0.000
  103.517 -4.910E-06   314.0133   -11.6685 -8.516E-09      0.000  2.334E+12
0.2014     530717.      0.000
  104.595 -5.009E-06   179.8860    -8.9841 -7.147E-09      0.000  2.334E+12
0.2135     551647.      0.000
  105.673 -5.095E-06    81.5119    -6.1440 -6.422E-09      0.000  2.334E+12
0.2254     572576.      0.000
  106.752 -5.175E-06    20.8847    -3.1497 -6.138E-09      0.000  2.334E+12
0.2374     593505.      0.000
  107.830 -5.254E-06       0.000     0.000 -6.080E-09      0.000  2.334E+12
0.2495     307217.      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. 10:

Pile-head deflection              =      0.6958919 inches
Computed slope at pile head       =     -0.0021611 radians
Maximum bending moment            =      8896555. inch-lbs
Maximum shear force               =       -38299. lbs
Depth of maximum bending moment   =     36.6622000 feet below pile head
Depth of maximum shear force      =     53.9150000 feet below pile head
Number of iterations              =              7
Number of zero deflection points  =              3


---------------------------------------------------------------------------
                      Results of Pile Buckling Analysis
---------------------------------------------------------------------------

Computation Pile-head LoadingCondition Used for Pile Buckling Analyses
-------------------------------------------------------------------

  Computations Used Shear and Moment Condition



---------------------------------------------------------------------------
          Pile-head Deflection vs. Pile Length for Load Case 10
---------------------------------------------------------------------------

Boundary Condition Type 1, Shear and Moment

Shear      =          11000.  lb
Moment     =        4380000. in- lb
Axial Load =              0.  lb
```


Pile Length feet	Pile Head Deflection inches	Maximum Moment in-lbs	Maximum Shear lbs
107.8300	0.6958919	8896555.	-38299.
102.4385	0.6951013	8903139.	-38173.
97.0470	0.6959158	8900401.	-38169.
91.6555	0.6942844	8896698.	-38357.
86.2640	0.6951490	8901199.	-38265.
80.8725	0.6959999	8902508.	-37959.
75.4810	0.6962323	8901952.	-38291.
70.0895	0.6964632	8902254.	-37915.
64.6980	0.7006732	8894894.	-40370.
59.3065	0.7613014	8865442.	-47149.
53.9150	1.3031333	8816877.	-63702.
48.5235	6.1818095	8737712.	-92329.

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

Case No.	Load Type	Pile-head Condition 1 V(lbs) or Maximum Shear in Pile No. lbs	Pile-head Condition 2 in-lb, rad., or Rotation y(inches) or in-lb/rad. radians		Axial Loading lbs	Pile-head Deflection inches	Maximum Moment in Pile in-lbs
1	4	y = 0.5000	M = 7818000.		0.0000000	0.50000000	7818000.
		-20013.	-0.00327536				
2	4	y = 1.0000	M = 7818000.		0.0000000	1.00000000	10363230.
		-43091.	-0.00465229				
3	4	y = 1.5000	M = 7818000.		0.0000000	1.50000000	13395533.
		-56014.	-0.00606644				
4	4	y = 2.0000	M = 7818000.		0.0000000	2.00000000	17352784.
		-73950.	-0.00743695				
5	4	y = 0.5000	M = 4380000.		0.0000000	0.50000000	6333157.
		-27076.	-0.00167107				
6	4	y = 1.0000	M = 4380000.		0.0000000	1.00000000	10927325.
		-46888.	-0.00308795				
7	4	y = 1.5000	M = 4380000.		0.0000000	1.50000000	14177849.
		-60788.	-0.00468652				
8	4	y = 2.0000	M = 4380000.		0.0000000	2.00000000	18021438.
		-78322.	-0.00611469				
9	1	V = 21300.	M = 7818000.		0.0000000	1.92158116	16696208.
		-70975.	-0.00723180				

10 1 V = 11000. M = 4380000. 0.0000000 0.69589191
8896555. -38299. -0.00216110

SER-1
Δ = 0.70" < 1.0"
OK

Results of Pile Buckling Analysis

Maximum Compression Loading for Pile Buckling Analysis = 698600. lb

Pile-head Condition 0, Shear Force and Moment

Shear = 14000. lb
Moment = 9502800. in- lb

Trial Thrust Number	Axial Thrust lbs	Pile Head Deflection inches	Maximum Moment in-lbs	Maximum Shear lbs
1	0.0000	1.76670	15227966.	-63426.
2	14257.	1.76925	15250930.	-63527.
3	28514.	1.77181	15273960.	-63628.
4	42771.	1.77438	15297055.	-63729.
5	57029.	1.77695	15320216.	-63830.
6	71286.	1.77953	15343443.	-63932.
7	85543.	1.78212	15366736.	-64034.
8	99800.	1.78472	15390097.	-64137.
9	114057.	1.78732	15413526.	-64240.
10	128314.	1.78994	15437021.	-64343.
11	142571.	1.79255	15460583.	-64446.
12	156829.	1.79518	15484214.	-64549.
13	171086.	1.79782	15507914.	-64653.
14	185343.	1.80046	15531682.	-64757.
15	199600.	1.80311	15555519.	-64862.
16	213857.	1.80577	15579424.	-64968.
17	228114.	1.80843	15603399.	-65074.
18	242371.	1.81111	15627445.	-65180.
19	256629.	1.81379	15651560.	-65287.
20	270886.	1.81645	15675743.	-65393.
21	285143.	1.81911	15699993.	-65500.
22	299400.	1.82178	15724316.	-65607.
23	313657.	1.82446	15748708.	-65714.
24	327914.	1.82714	15773168.	-65822.
25	342171.	1.82983	15797702.	-65930.
26	356429.	1.83253	15822307.	-66038.
27	370686.	1.83524	15846984.	-66146.
28	384943.	1.83795	15871733.	-66255.
29	399200.	1.84067	15896554.	-66364.
30	413457.	1.84340	15921448.	-66474.
31	427714.	1.84614	15946414.	-66583.
32	441971.	1.85001	15971736.	-66718.
33	456229.	1.85548	15997584.	-66890.
34	470486.	1.86096	16023568.	-67061.
35	484743.	1.86613	16049599.	-67227.
36	499000.	1.86898	16075056.	-67340.
37	513257.	1.87183	16100592.	-67453.
38	527514.	1.87470	16126203.	-67567.
39	541771.	1.87756	16151889.	-67681.
40	556029.	1.88044	16177657.	-67795.
41	570286.	1.88333	16203500.	-67910.
42	584543.	1.88623	16229421.	-68025.
43	598800.	1.88913	16255423.	-68140.

44	613057.	1.89206	16281508.	-68256.
45	627314.	1.89504	16307684.	-68373.
46	641571.	1.89802	16333942.	-68491.
47	655829.	1.90102	16360281.	-68608.
48	670086.	1.90402	16386702.	-68726.
49	684343.	1.90704	16413204.	-68844.
50	698600.	1.91006	16439788.	-68963.

Maximum moment is 40.70% of the plastic moment capacity of pile section 1

Hyperbolic Fit of Pile Buckling Behavior: Thrust Force = [y - y(1)]/(b + a[y - y(1)]

Pile buckling capacity estimated from hyperbolic curve = 4316155. lb
Maximum axial thrust from analysis = 698600. lb

Axial Buckling capacity is limited by the axial structural capacity of the pile.

Axial Buckling capacity is limited by the peak axial thrust reached in the buckling analysis.

Fitting parameter a (slope) = 2.3169E-07 lb
Fitting parameter b (intercept) = 1.7439E-07 lb
Lateral pile deflection at zero axial thrust, y(1) = 1.76670 in
R Squared = 0.87777

Note: The axial buckling capacity is a function of pile-head loading, pile-head fixity conditions, pile embedment, pile dimensions and stiffness, and local soil conditions. It is recommended that all analyses of pile buckling be performed using the maximum pile-head loads expected for the structure in order to compute the most conservative estimate of pile buckling capacity.

The pile buckling capacity estimated from the hyperbolic curve fitting method usually over-estimates the pile buckling capacity for nonlinear piles because buckling capacity may be controlled by the development of a plastic hinge in the pile. Please check the magnitude of maximum moment developed in the pile and compare the value to the plastic moment capacity for the pile. If the values are close, report the buckling capacity as the last computed value of axial thrust for which a solution was reported.

The analysis ended normally.

DELDOT BR1-159
VBENT RESULTANT FORCES
DESIGNED BY: SBM 10/16/2014

PIER 1

					k-ft	k	k
Worst Case	**Limit State**	**Load Case**	**Column**	**Top/Bot**	**M_u**	**P_u**	**V_u**
Max P_u	STR-I	1/2/3	1	T	540.1	777.5	
	SER-I	1/2/3	1	T	248.8	516.1	
Max V_u	STR-I	26	3	T	458.3		13.6
	SER-I	28	4	T	65.3		9.9

PIER 2

Worst Case	**Limit State**	**Load Case**	**Column**	**Top/Bot**	**M_u**	**P_u**	**V_u**
Max P_u	STR-I	2	4	T	252.0	689.2	
	SER-I	1/3	1	T	132.4	464.8	
Max V_u	STR-V	28	4	T	115.2		8.8
	SER-I	28	4	T	98.6		8.7

PIER 3

Worst Case	**Limit State**	**Load Case**	**Column**	**Top/Bot**	**M_u**	**P_u**	**V_u**
Max P_u	STR-I	4	4	T	141.4	688.3	
	SER-I	4	1	T	218.4	500.6	
Max V_u	STR-III	25	2	T	651.5		21.3
	SER-I	26	3	T	365.0		11.0

$R_R = 695^k$ δk

PIER 4

Worst Case	**Limit State**	**Load Case**	**Column**	**Top/Bot**	**M_u**	**P_u**	**V_u**
Max P_u	STR-I	1/2/3	1	T	377.0	709.1	
	SER-I	1/2/3	1	T	185.3	475.0	
Max V_u	STR-I	26	4	T	316.1		9.8
	SER-I	26	4	T	270.7		8.4

PIER 3

4'φ, 3/4" STEEL CASING @ EL -1.0

DEFLECTION	STR III (lbs)	SER-1 (lbs)
0.5	-6580	4,862
1.0	6374	15 799 ←
1.5	13 628	23 338
2.0	22,810	32,016

PIER 3

4'φ, 3/4" STEEL CASING @ EL -1.0

DEFLECTION	STR-III (lbs)	SER-1 (lbs)
0.5	-5902	7173
1.0	6973	18,443 ← δk
1.5	14 286	26, 371
→ 2.0	23, 443 δk	34, 639

CONTROLS

GEOTECHNICAL AXIAL CAPACITY
$= 695^k > 688^k$ δk

LATERAL CAPACITY, 2" DEFLECTION (STR III)
$22.81^k > 21.3^k$ δk ← CONTROLS

LATERAL CAPACITY 1" DEFLECTION (SER-1)
$15.79^k > 11.0^k$.

PIER 4

Boring No. JS-7 By: SJM Chk: AT

OG Elev. = 11.00

Sample No.	Depth of SS run (ft)	N-Values Field	q'_v (ksf)	C_N	N_{CORR}
2	4	55	0.190	1.788	98
3	6	4	0.286	1.653	7
4	8	5	0.381	1.556	8
5	10	3	0.476	1.482	4
6	12	16	0.571	1.421	23
7	14	4	0.666	1.369	5
8	16	8	0.762	1.325	11
9	18	5	0.857	1.285	6
11	22	9	1.047	1.218	11
12	24	9	1.142	1.189	11
13	26	13	1.238	1.162	15
14	28	24	1.333	1.138	27
15	30	34	1.428	1.114	38
16	32	20	1.523	1.093	22
17	34	23	1.618	1.073	25
18	36	22	1.714	1.053	23
19	38	20	1.809	1.035	21
20	40	40	1.904	1.018	41
21	43	42	2.047	0.994	42
22	48	21	2.286	0.957	20
23	53	11	2.523	0.924	10
24	58	14	2.761	0.894	13
25	63	48	2.999	0.866	42
26	68	62	3.237	0.841	52
27	73	95	3.475	0.817	78
28	78	75	3.713	0.795	60
29	83	49	3.951	0.774	38
30	88	55	4.189	0.755	42
31	93	40	4.427	0.736	29
32	98	94	4.665	0.719	68
				$N_{avg\ (Below\ BFE)}$	27

GWT= 5.0
γ = 110 lb/ft3
γ' = 47.6 lb/ft3

C_N= $0.77 x log (40/q'_v)$ (Ref. AASHTO Eqn 10.4.6.2.4-1)

N_{CORR} = $N_{Field} \times C_N$

LARGER

Boring No.JS-8 By: SJM Chk: AT

OG Elev. = 1.00 ✓

Sample No.	Depth of SS run (ft)	N-Values Field	q'_v (ksf)	C_N	N_{CORR}
2	2	8	0.095	2.020	16
3	4	2	0.190	1.788	4
4	6	3	0.286	1.653	5
5	8	21	0.381	1.556	33
6	10	15	0.476	1.482	22
7	12	17	0.571	1.421	24
8	14	16	0.666	1.369	22
9	16	15	0.762	1.325	20
10	18	11	0.857	1.285	14
11	23	16	1.095	1.203	19
12	28	10	1.333	1.138	11
13	33	22	1.571	1.083	24
14	38	28	1.809	1.035	29
15	43	28	2.047	0.994	28
16	48	27	2.286	0.957	26
17	53	27	2.523	0.924	25
18	58	28	2.761	0.894	25
19	63	47	2.999	0.866	41
20	68	42	3.237	0.841	35
21	73	0	3.475	0.817	0
22	78	79	3.713	0.795	63
23	83	85	3.951	0.774	66
24	88	50	4.189	0.755	38
25	93	50	4.427	0.736	37
26	98	50	4.665	0.719	36
				$N_{avg\ (Below\ BFE)}$	26

GWT= 5.0

(1) (2) (3) (4) (5) (6)

IGNORE

C_N= $0.77 x log (40/q'_v)$ (Ref. AASHTO Eqn 10.4.6.2.4-1)

N_{CORR} = $N_{Field} \times C_N$

McCORMICK TAYLOR

PROJECT BR 1-159 JOB NO. _____ SHEET NO. 1 OF 1

LOCATION PIER 4

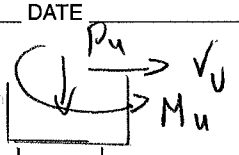
SUBJECT SOIL PROFILE (JS-7 & JS-8) (AXIAL & LATERAL CAPACITIES)

DESIGNED BY SJM DATE 7/14 CHECKED BY AT DATE 8/14

REVISED BY _____ DATE _____ BACK CHECKED BY _____ DATE _____

SOIL PROFILE BASED ON BORINGS JS-7 & JS-8

X, Depth Below Top of Col. $y_1 = 0$ — DEPTH BELOW OG X



REF./REM.
$P_u = 709.1^k$
$R_R = 1044^k$

ELEVATION

+6.29

MHWE +4.64

SOIL TYPE

LAYER THICKNESS (ft) — $x = 0$ +1.0

$x = 5.29'$

$x = 14.79'$ (10')

$x = 15.29'$ $y = 10'$

CASING Layer (1) Silty Clay with Sand + Gravel $N_{CORR} = 4-33$
$\gamma_s = 120$ pcf $\gamma' = 57.6$ pcf
$c = 750$ psf $\phi = 0°$ $\varepsilon_{50} = 0.02$ — 8.5

100 YR SCOUR.

— 9.0

(2) Med Dense Sand with Silt + Gravel $N_{CORR} = 14-24$
$\gamma_s = 125$ pcf $\gamma' = 62$ pcf
$\phi = 34°$ $c = 0$ psf $k = 60$ pci

(14') $x = 29.29'$ $y = 24'$ — 23.0

(3) Silt / Clay $N_{CORR} = 11-29$
$\gamma_s = 115$ pcf $\gamma' = 52.6$ pcf
$c = 750$ psf $\varepsilon_{50} = 0.02$
$\phi = 0$

(14') $x = 43.29'$ $y = 38'$ — 37.0

48" CASED

(4) Med Sand with Silt + Gravel
$\gamma_s = 135$ pcf $N_{CORR} = 25-28$
$\phi = 34°$ $\gamma' = 72.6$ pcf
$c = 0$ psf $k = 125$ pci

(15') $x = 58.29'$ $y = 53'$ — 52.0

(5) Very Stiff Silt / Clay $N_{CORR} = 25-41$
$\gamma_s = 125$ pcf $\gamma' = 62.6$ pcf
$c = 1000$ psf $\varepsilon_{50} = 0.007$
$\phi = 0°$

(15') $x = 73.29'$ $y = 68'$ — 67.0

(6) Dense Sand / Silt / Gravel $N_{CORR} = 36-66$
$\gamma_s = 135$ pcf $\gamma' = 72.6$ pcf
$c = 0$ $k = 125$ pci
$\phi = 34°$

(33') $x = 99.29'$ $y = 101'$ — 100

(7) Rock Schist $\gamma' = 87.6$ pcf
$\gamma_s = 150$ pcf $\phi = 46°$
$c_o = 200$ ksf $k = 500$ pci
$= 1389$ psi

(10.5') $x = 116.79'$ $y = 111.5'$ MIN. — 110.5

MIN BOTTOM OF DRILLED SHAFT

$y = 94'$
$R_R = 1044^k$ (521.87) EL. = −93.0

END $x = 99.29$

AXIAL CAPACITY

SHAFT for Windows, Version 2012.7.11

Serial Number : 228741384

VERTICALLY LOADED DRILLED SHAFT ANALYSIS

Path to file locations : Y:\Bridges\DELDOT\BR1-159_JAMES ST BRIDGE\FOUNDATION REPORT\SHAFT Output\
Name of input data file : Pier 41.sfd
Name of output file : Pier 41.sfo
Name of plot output file : Pier 41.sfp
Name of runtime file : Pier 41.sfr

Time and Date of Analysis

Date: October 24, 2014 Time: 14:02:15

BR1-159 Pier 4

PROPOSED DEPTH = 100.0 FT

NUMBER OF LAYERS = 7

WATER TABLE DEPTH = 0.0 FT.

SOIL INFORMATION

LAYER NO 1----CLAY

AT THE TOP

STRENGTH REDUCTION FACTOR-ALPHA	= 0.550E+00
END BEARING COEFFICIENT-Nc	= 0.800E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.750E+03
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.000E+00

AT THE BOTTOM

STRENGTH REDUCTION FACTOR-ALPHA	= 0.550E+00
END BEARING COEFFICIENT-Nc	= 0.800E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.750E+03
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.120E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.100E+02

LRFD RESISTANCE FACTOR (SIDE FRICTION)	= 0.450E+00
LRFD RESISTANCE FACTOR (TIP RESISTANCE)	= 0.400E+00

LAYER NO 2----SAND

AT THE TOP

SKIN FRICTION COEFFICIENT- BETA	= 0.107E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.340E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.125E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.100E+02

AT THE BOTTOM

SKIN FRICTION COEFFICIENT- BETA	= 0.839E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.340E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.125E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.240E+02

LRFD RESISTANCE FACTOR (SIDE FRICTION)	= 0.550E+00
LRFD RESISTANCE FACTOR (TIP RESISTANCE)	= 0.500E+00

LAYER NO 3----CLAY

AT THE TOP

STRENGTH REDUCTION FACTOR-ALPHA	= 0.550E+00
END BEARING COEFFICIENT-Nc	= 0.800E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.750E+03
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.115E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.240E+02

AT THE BOTTOM

STRENGTH REDUCTION FACTOR-ALPHA	= 0.550E+00
END BEARING COEFFICIENT-Nc	= 0.800E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.750E+03
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00

SOIL UNIT WEIGHT, LB/CU FT	= 0.115E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.380E+02
LRFD RESISTANCE FACTOR (SIDE FRICTION)	= 0.450E+00
LRFD RESISTANCE FACTOR (TIP RESISTANCE)	= 0.400E+00

LAYER NO 4----SAND

AT THE TOP

SKIN FRICTION COEFFICIENT- BETA	= 0.668E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.340E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.135E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.380E+02

AT THE BOTTOM

SKIN FRICTION COEFFICIENT- BETA	= 0.517E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.340E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.135E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.530E+02
LRFD RESISTANCE FACTOR (SIDE FRICTION)	= 0.550E+00
LRFD RESISTANCE FACTOR (TIP RESISTANCE)	= 0.500E+00

LAYER NO 5----CLAY

AT THE TOP

STRENGTH REDUCTION FACTOR-ALPHA	= 0.550E+00
END BEARING COEFFICIENT-Nc	= 0.800E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.100E+04
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.125E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.530E+02

AT THE BOTTOM

STRENGTH REDUCTION FACTOR-ALPHA	= 0.550E+00
END BEARING COEFFICIENT-Nc	= 0.800E+01
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.100E+04
INTERNAL FRICTION ANGLE, DEG.	= 0.000E+00
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.125E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.680E+02

LRFD RESISTANCE FACTOR (SIDE FRICTION)	= 0.450E+00
LRFD RESISTANCE FACTOR (TIP RESISTANCE)	= 0.400E+00

LAYER NO 6----SAND

AT THE TOP

SKIN FRICTION COEFFICIENT- BETA	= 0.387E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.340E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.135E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.680E+02

AT THE BOTTOM

SKIN FRICTION COEFFICIENT- BETA	= 0.250E+00
UNDRAINED SHEAR STRENGTH, LB/SQ FT	= 0.000E+00
INTERNAL FRICTION ANGLE, DEG.	= 0.340E+02
BLOWS PER FOOT FROM STANDARD PENETRATION TEST	= 0.000E+00
SOIL UNIT WEIGHT, LB/CU FT	= 0.135E+03
MAXIMUM LOAD TRANSFER FOR SOIL, LB/SQ FT	= 0.100E+11
DEPTH, FT	= 0.101E+03
LRFD RESISTANCE FACTOR (SIDE FRICTION)	= 0.550E+00
LRFD RESISTANCE FACTOR (TIP RESISTANCE)	= 0.500E+00

LAYER NO 7----WEAK ROCK

AT THE TOP

DIAMETER OF SOCKET, FT	= 0.350E+01
SLUMP OF CONCRETE, IN	= 0.000E+00
ANGLE OF INTERFACE FRICTION, DEG.	= 0.000E+00
UNIAXIAL COMPRESSION STRENGTH OF ROCK,LB/SQ FT	= 0.200E+06
ELASTIC MODULUS FOR THE INTACT ROCK, LB/SQ IN.	= 0.497E+07
ROCK QUALITY DESIGNATION (RQD) %	= 0.580E+02
DEPTH, FT	= 0.101E+03

AT THE BOTTOM

DIAMETER OF SOCKET, FT	= 0.350E+01
SLUMP OF CONCRETE, IN	= 0.000E+00
ANGLE OF INTERFACE FRICTION, DEG.	= 0.000E+00
UNIAXIAL COMPRESSION STRENGTH OF ROCK,LB/SQ FT	= 0.200E+06
ELASTIC MODULUS FOR THE INTACT ROCK, LB/SQ IN.	= 0.497E+07
ROCK QUALITY DESIGNATION (RQD) %	= 0.580E+02
DEPTH, FT	= 0.112E+03
LRFD RESISTANCE FACTOR (SIDE FRICTION)	= 0.550E+00
LRFD RESISTANCE FACTOR (TIP RESISTANCE)	= 0.500E+00

DRILLED SHAFT INFORMATION

DIAMETER OF STEM	= 4.000	FT.
DIAMETER OF BASE	= 4.000	FT.
END OF STEM TO BASE	= 0.000	FT.
ANGLE OF BELL	= 0.000	DEG.
IGNORED TOP PORTION	= 9.500	FT.
IGNORED BOTTOM PORTION	= 4.000	FT.
AREA OF ONE PERCENT STEEL	= 18.098	SQ.IN.
ELASTIC MODULUS, Ec	= 0.312E+07	LB/SQ IN
VOLUME OF UNDERREAM	= 0.000	CU.YDS.

PREDICTED RESULTS

QS = ULTIMATE SIDE RESISTANCE;
QB = ULTIMATE BASE RESISTANCE;
WT = WEIGHT OF DRILLED SHAFT (UPLIFT CAPACITY ONLY);
QU = TOTAL ULTIMATE RESISTANCE;
LRFD QS = TOTAL SIDE FRICTION USING LRFD RESISTANCE FACTOR TO THE ULTIMATE SIDE RESISTANCE;
LRFD QB = TOTAL BASE BEARING USING LRFD RESISTANCE FACTOR TO THE ULTIMATE BASE RESISTANCE
LRFD QU = TOTAL CAPACITY WITH LRFD RESISTANCE FACTOR.

LENGTH (FEET)	VOLUME (CU.YDS)	QS (TONS)	QB (TONS)	QU (TONS)	LRFD QS (TONS)	LRFD QB (TONS)	LRFD QU (TONS)
14.0	6.52	2.27	134.08	136.34	0.99	67.04	68.02
15.0	6.98	6.80	134.08	140.87	3.48	67.04	70.52
16.0	7.45	11.33	134.08	145.41	5.97	67.04	73.01
17.0	7.91	16.18	119.62	135.80	8.64	59.81	68.45
18.0	8.38	21.33	103.56	124.89	11.47	51.78	63.25
19.0	8.84	26.77	85.89	112.66	14.47	42.94	57.41
20.0	9.31	32.50	66.62	99.11	17.61	33.31	50.92
21.0	9.78	38.50	52.16	90.66	20.91	26.08	46.99
22.0	10.24	44.76	42.52	87.28	24.36	21.26	45.62
23.0	10.71	51.27	37.70	88.97	27.94	18.85	46.79
24.0	11.17	58.02	37.70	95.73	31.65	15.08	46.74
25.0	11.64	65.01	37.70	102.72	35.50	15.08	50.58
26.0	12.10	72.23	37.70	109.93	39.47	15.08	54.55
27.0	12.57	79.66	37.70	117.37	43.55	15.08	58.64
28.0	13.03	87.30	37.70	125.01	47.76	15.08	62.84
29.0	13.50	89.89	37.70	127.60	48.92	15.08	64.01
30.0	13.96	92.49	37.70	130.19	50.09	15.08	65.17
31.0	14.43	95.08	52.16	147.24	51.26	20.86	72.12
32.0	14.90	97.67	68.22	165.89	52.42	27.29	79.71
33.0	15.36	100.26	85.89	186.15	53.59	34.36	87.95
34.0	15.83	102.86	105.16	208.02	54.76	42.07	96.82
35.0	16.29	105.45	119.62	225.07	55.92	47.85	103.77
36.0	16.76	108.04	129.26	237.30	57.09	51.70	108.79
37.0	17.22	110.63	134.08	244.71	58.26	53.63	111.89
38.0	17.69	113.22	134.08	247.30	59.42	67.04	126.46
39.0	18.15	115.82	134.08	249.89	60.59	67.04	127.63
40.0	18.62	118.41	134.08	252.48	61.75	67.04	128.79
41.0	19.08	121.00	134.08	255.08	62.92	67.04	129.96
42.0	19.55	123.59	134.08	257.67	64.09	67.04	131.13
43.0	20.02	132.90	134.08	266.97	69.21	67.04	136.24
44.0	20.48	142.34	134.08	276.42	74.40	67.04	141.44
45.0	20.95	151.93	134.08	286.00	79.67	67.04	146.71
46.0	21.41	161.64	121.50	283.14	85.01	60.75	145.76

47.0	21.88	171.46	107.54	279.00	90.42	53.77	144.19
48.0	22.34	181.40	92.17	273.58	95.88	46.09	141.97
49.0	22.81	191.45	75.41	266.86	101.41	37.71	139.12
50.0	23.27	201.59	62.84	264.44	106.99	31.42	138.41
51.0	23.74	211.83	54.46	266.29	112.62	27.23	139.85
52.0	24.21	222.14	50.27	272.42	118.29	25.14	143.43
53.0	24.67	232.54	50.27	282.81	124.01	20.11	144.12
54.0	25.14	243.00	50.27	293.27	129.76	20.11	149.87
55.0	25.60	253.52	50.27	303.79	135.55	20.11	155.66
56.0	26.07	264.10	50.27	314.37	141.37	20.11	161.48
57.0	26.53	274.73	50.27	325.00	147.21	20.11	167.32
58.0	27.00	278.19	50.27	328.46	148.77	20.11	168.88
59.0	27.46	281.64	50.27	331.92	150.32	20.11	170.43
60.0	27.93	285.10	50.27	335.37	151.88	20.11	171.99
61.0	28.39	288.56	62.84	351.40	153.43	25.14	178.57
62.0	28.86	292.01	76.81	368.82	154.99	30.72	185.71
63.0	29.33	295.47	92.17	387.64	156.55	36.87	193.41
64.0	29.79	298.92	108.93	407.86	158.10	43.57	201.67
65.0	30.26	302.38	121.50	423.89	159.66	48.60	208.26
66.0	30.72	305.84	129.89	435.72	161.21	51.95	213.17
67.0	31.19	309.29	134.08	443.37	162.77	53.63	216.40
68.0	31.65	312.75	134.08	446.82	164.32	67.04	231.36
69.0	32.12	316.21	134.08	450.28	165.88	67.04	232.91
70.0	32.58	319.66	134.08	453.74	167.43	67.04	234.47
71.0	33.05	323.12	134.08	457.19	168.99	67.04	236.03
72.0	33.51	326.57	134.08	460.65	170.54	67.04	237.58
73.0	33.98	336.76	134.08	470.84	176.15	67.04	243.18
74.0	34.45	346.90	134.08	480.98	181.72	67.04	248.76
75.0	34.91	356.98	134.08	491.06	187.27	67.04	254.31
76.0	35.38	367.01	134.08	501.08	192.78	67.04	259.82
77.0	35.84	376.96	134.08	511.04	198.26	67.04	265.30
78.0	36.31	386.85	134.08	520.93	203.70	67.04	270.73
79.0	36.77	396.66	134.08	530.73	209.09	67.04	276.13
80.0	37.24	406.38	134.08	540.46	214.44	67.04	281.48
81.0	37.70	416.02	134.08	550.10	219.74	67.04	286.78
82.0	38.17	425.56	134.08	559.64	224.99	67.04	292.03
83.0	38.63	435.01	134.08	569.08	230.18	67.04	297.22
84.0	39.10	444.35	134.08	578.42	235.32	67.04	302.36
85.0	39.57	453.58	134.08	587.65	240.39	67.04	307.43
86.0	40.03	462.69	134.08	596.77	245.41	67.04	312.44
87.0	40.50	471.68	134.08	605.76	250.35	67.04	317.39
88.0	40.96	480.55	134.08	614.62	255.23	67.04	322.27
89.0	41.43	489.28	134.08	623.36	260.03	67.04	327.07
90.0	41.89	497.95	134.08	632.03	264.80	67.04	331.84
91.0	42.36	506.73	134.08	640.81	269.63	67.04	336.67
92.0	42.82	515.62	134.08	649.70	274.52	67.04	341.56
93.0	43.29	524.63	134.08	658.71	279.47	67.04	346.51
94.0	43.76	533.75	474.76	1008.51	284.49	237.38	521.87
95.0	44.22	542.99	853.29	1396.28	289.57	426.65	716.22
96.0	44.69	552.34	1269.68	1822.02	294.71	634.84	929.56
97.0	45.15	561.80	1723.92	2285.73	299.92	861.96	1161.88
98.0	45.62	571.38	2064.61	2635.99	305.19	1032.30	1337.49
99.0	46.08	581.07	2291.73	2872.80	310.52	1145.86	1456.38
100.0	46.55	590.88	2405.29	2996.17	315.91	1202.64	1518.56

$y = 94'$

$R_R = 1044^{k}$

RESULT FROM TREND (AVERAGED) LINE

TOP LOAD ton	TOP MOVEMENT IN.	TIP LOAD ton	TIP MOVEMENT IN.
0.1404E+00	0.4644E-04	0.3959E-01	0.1000E-04
0.7019E+00	0.2322E-03	0.1979E+00	0.5000E-04

0.1404E+01	0.4644E-03	0.3959E+00	0.1000E-03
0.7046E+02	0.2326E-01	0.1979E+02	0.5000E-02
0.1059E+03	0.3494E-01	0.2969E+02	0.7500E-02
0.1415E+03	0.4665E-01	0.3959E+02	0.1000E-01
0.3284E+03	0.1141E+00	0.9897E+02	0.2500E-01
0.5529E+03	0.2111E+00	0.1979E+03	0.5000E-01
0.7262E+03	0.2985E+00	0.2969E+03	0.7500E-01
0.8654E+03	0.3769E+00	0.3959E+03	0.1000E+00
0.1514E+04	0.7942E+00	0.9666E+03	0.2500E+00
0.1921E+04	0.1220E+01	0.1375E+04	0.5000E+00
0.2092E+04	0.1418E+01	0.1550E+04	0.6250E+00
0.2620E+04	0.2217E+01	0.2081E+04	0.1200E+01
0.2871E+04	0.3524E+01	0.2333E+04	0.2400E+01

RESULT FROM UPPER-BOUND LINE

TOP LOAD ton	TOP MOVEMENT IN.	TIP LOAD ton	TIP MOVEMENT IN.
0.2396E+00	0.6836E-04	0.5913E-01	0.1000E-04
0.1198E+01	0.3418E-03	0.2956E+00	0.5000E-04
0.2396E+01	0.6836E-03	0.5913E+00	0.1000E-03
0.1208E+03	0.3434E-01	0.2956E+02	0.5000E-02
0.1816E+03	0.5161E-01	0.4435E+02	0.7500E-02
0.2389E+03	0.6870E-01	0.5913E+02	0.1000E-01
0.4962E+03	0.1598E+00	0.1478E+03	0.2500E-01
0.7662E+03	0.2812E+00	0.2956E+03	0.5000E-01
0.9718E+03	0.3871E+00	0.4435E+03	0.7500E-01
0.1148E+04	0.4841E+00	0.5913E+03	0.1000E+00
0.2016E+04	0.1003E+01	0.1435E+04	0.2500E+00
0.2399E+04	0.1417E+01	0.1826E+04	0.5000E+00
0.2535E+04	0.1600E+01	0.1964E+04	0.6250E+00
0.2880E+04	0.2322E+01	0.2309E+04	0.1200E+01
0.2964E+04	0.3557E+01	0.2393E+04	0.2400E+01

RESULT FROM LOWER-BOUND LINE

TOP LOAD ton	TOP MOVEMENT IN.	TIP LOAD ton	TIP MOVEMENT IN.
0.6632E-01	0.2825E-04	0.2004E-01	0.1000E-04
0.3316E+00	0.1413E-03	0.1002E+00	0.5000E-04
0.6632E+00	0.2825E-03	0.2004E+00	0.1000E-03
0.3316E+02	0.1413E-01	0.1002E+02	0.5000E-02
0.4979E+02	0.2119E-01	0.1503E+02	0.7500E-02
0.6649E+02	0.2827E-01	0.2004E+02	0.1000E-01
0.1654E+03	0.7071E-01	0.5011E+02	0.2500E-01
0.3120E+03	0.1383E+00	0.1002E+03	0.5000E-01
0.4380E+03	0.2023E+00	0.1503E+03	0.7500E-01
0.5452E+03	0.2626E+00	0.2004E+03	0.1000E+00
0.1001E+04	0.5825E+00	0.4981E+03	0.2500E+00
0.1443E+04	0.1022E+01	0.9240E+03	0.5000E+00
0.1649E+04	0.1236E+01	0.1137E+04	0.6250E+00
0.2360E+04	0.2113E+01	0.1852E+04	0.1200E+01
0.2766E+04	0.3486E+01	0.2261E+04	0.2400E+01

PIER 4
LATERAL CAPACITY

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: Y:\Bridges\DELDOT\BR1-159_JAMES ST BRIDGE\FOUNDATION REPORT\LPILE Output\
Name of input data file: Pier 41af.lp7d
Name of output report file: Pier 41af.lp7o
Name of plot output file: Pier 41af.lp7p
Name of runtime messeage file: Pier 41af.lp7r

Date and Time of Analysis

Date: October 24, 2014 Time: 15:21:24

Problem Title

Project Name: BR1-159 Pier 4

Job Number:

Client: DelDOT

Engineer: SJM

Description: Pier 4 Lateral Capacity

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 = 99.29 ft

Depth of ground surface below top of pile = 14.79 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	48.0000000
2	3.290000	48.0000000
3	3.290000	49.0000000

4	99.290000	49.0000000

Input Structural Properties:

Pile Section No. 1:

Section Type	=	Drilled Shaft (Bored Pile)
Section Length	=	3.29000 ft
Section Diameter	=	48.00000 in

Pile Section No. 2:

Section Type	=	Drilled Shaft with Permanent Casing
Section Length	=	96.00000 ft
Section Diameter	=	49.00000 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 7 layers

Layer 1 is soft clay, p-y criteria by Matlock, 1970

Distance from top of pile to top of layer	=	14.79000 ft
Distance from top of pile to bottom of layer	=	15.29000 ft
Effective unit weight at top of layer	=	42.60000 pcf
Effective unit weight at bottom of layer	=	42.60000 pcf
Undrained cohesion at top of layer	=	750.00000 psf
Undrained cohesion at bottom of layer	=	750.00000 psf
Epsilon-50 at top of layer	=	0.02000
Epsilon-50 at bottom of layer	=	0.02000

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

Distance from top of pile to top of layer	=	15.29000 ft
Distance from top of pile to bottom of layer	=	29.29000 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	=	34.00000 deg.
Friction angle at bottom of layer	=	34.00000 deg.
Subgrade k at top of layer	=	60.00000 pci
Subgrade k at bottom of layer	=	60.00000 pci

Layer 3 is soft clay, p-y criteria by Matlock, 1970

Distance from top of pile to top of layer	=	29.29000 ft
Distance from top of pile to bottom of layer	=	43.29000 ft
Effective unit weight at top of layer	=	52.60000 pcf
Effective unit weight at bottom of layer	=	52.60000 pcf
Undrained cohesion at top of layer	=	750.00000 psf
Undrained cohesion at bottom of layer	=	750.00000 psf
Epsilon-50 at top of layer	=	0.02000
Epsilon-50 at bottom of layer	=	0.02000

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

Distance from top of pile to top of layer	=	43.29000 ft
Distance from top of pile to bottom of layer	=	58.29000 ft
Effective unit weight at top of layer	=	72.60000 pcf
Effective unit weight at bottom of layer	=	72.60000 pcf
Friction angle at top of layer	=	34.00000 deg.
Friction angle at bottom of layer	=	34.00000 deg.
Subgrade k at top of layer	=	125.00000 pci
Subgrade k at bottom of layer	=	125.00000 pci

Layer 5 is stiff clay with water-induced erosion

Distance from top of pile to top of layer	=	58.29000 ft
Distance from top of pile to bottom of layer	=	73.29000 ft
Effective unit weight at top of layer	=	62.60000 pcf
Effective unit weight at bottom of layer	=	62.60000 pcf
Undrained cohesion at top of layer	=	1000.00000 psf
Undrained cohesion at bottom of layer	=	1000.00000 psf
Epsilon-50 at top of layer	=	0.00700
Epsilon-50 at bottom of layer	=	0.00700
Subgrade k at top of layer	=	200.00000 pci
Subgrade k at bottom of layer	=	200.00000 pci

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

Distance from top of pile to top of layer	=	73.29000 ft
Distance from top of pile to bottom of layer	=	106.29000 ft
Effective unit weight at top of layer	=	72.60000 pcf
Effective unit weight at bottom of layer	=	72.60000 pcf
Friction angle at top of layer	=	34.00000 deg.
Friction angle at bottom of layer	=	34.00000 deg.
Subgrade k at top of layer	=	125.00000 pci
Subgrade k at bottom of layer	=	125.00000 pci

Layer 7 is weak rock, p-y criteria by Reese, 1997

Distance from top of pile to top of layer	=	106.29000 ft
Distance from top of pile to bottom of layer	=	116.79000 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	=	1389.00000 psi
Uniaxial compressive strength at bottom of layer	=	1389.00000 psi
Initial modulus of rock at top of layer	=	4970000. psi
Initial modulus of rock at bottom of layer	=	4970000. psi
RQD of rock at top of layer	=	0.0000 %
RQD of rock at bottom of layer	=	0.0000 %
k rm of rock at top of layer	=	0.0000
k rm of rock at bottom of layer	=	0.0000

(Depth of lowest soil layer extends 17.50 ft below pile tip)

Summary of Soil Properties

Layer Num.	Soil Type (p-y Curve Criteria)	Angle of Friction deg.	Uniaxial qu psi	RQD % or GSI	Strain Factor Epsilon 50	Layer Depth ft	kpy pci	Effective Unit Wt. Rock pcf	Undrained Cohesion Rock Mass krm psf
1	Soft Clay	--	--	--	0.02000	14.790	--	42.600	750.000
		--	--	--	0.02000	15.290	--	42.600	750.000
2	Sand (Reese, et al.)	34.000	--	--	--	15.290	60.000	62.600	--
		34.000	--	--	--	29.290	60.000	62.600	--
3	Soft Clay	--	--	--	0.02000	29.290	--	52.600	750.000
		--	--	--	0.02000	43.290	--	52.600	750.000
4	Sand (Reese, et al.)	34.000	--	--	--	43.290	125.000	72.600	--
		34.000	--	--	--	58.290	125.000	72.600	--
5	Stiff Clay with Free Water	--	--	--	0.00700	58.290	200.000	62.600	1000.000
		--	--	--	0.00700	73.290	200.000	62.600	1000.000
6	Sand (Reese, et al.)	34.000	--	--	--	73.290	125.000	72.600	--
		34.000	--	--	--	106.290	125.000	72.600	--
7	Weak Rock	--	1389.000	0.00	--	106.290	--	87.600	4970000.
		--	1389.000	0.00	--	116.790	--	87.600	4970000.

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 = 10

Load No.	Load Compute Type	Top y vs. Pile Length	Condition 1		Condition 2	Axial Thrust Force, lbs
1	4 No	y =	0.50000 in	M =	3793200. in-lbs	0.0000000
2	4 No	y =	1.00000 in	M =	3793200. in-lbs	0.0000000
3	4 No	y =	1.50000 in	M =	3793200. in-lbs	0.0000000
4	4 Yes	y =	2.00000 in	M =	3793200. in-lbs	0.0000000
5	4 No	y =	0.50000 in	M =	3248400. in-lbs	0.0000000
6	4 Yes	y =	1.00000 in	M =	3248400. in-lbs	0.0000000
7	4 No	y =	1.50000 in	M =	3248400. in-lbs	0.0000000
8	4 No	y =	2.00000 in	M =	3248400. in-lbs	0.0000000
9	1 Yes	V =	9800.00000 lbs	M =	3793200. in-lbs	0.0000000
10	1 Yes	V =	8400.00000 lbs	M =	3248400. in-lbs	0.0000000

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	=	3.29000 ft
Shaft Diameter	=	48.00000 in
Concrete Cover Thickness	=	4.00000 in
Number of Reinforcing Bars	=	50 bars
Yield Stress of Reinforcing Bars	=	60000. psi
Modulus of Elasticity of Reinforcing Bars	=	29000000. psi
Gross Area of Shaft	=	1809.55737 sq. in.
Total Area of Reinforcing Steel	=	39.50000 sq. in.
Area Ratio of Steel Reinforcement	=	2.18 percent
Edge-to-Edge Bar Spacing	=	2.89438 in
Maximum Concrete Aggregate Size	=	0.37500 in
Ratio of Bar Spacing to Aggregate Size	=	7.72
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	=	9140.470 kips
Tensile Load for Cracking of Concrete	=	-911.303 kips
Nominal Axial Tensile Capacity	=	-2370.000 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.00000	0.79000	19.49359	-0.49995
2	1.00000	0.79000	19.49359	0.49995
3	1.00000	0.79000	19.00549	4.36362
4	1.00000	0.79000	18.75683	5.33210
5	1.00000	0.79000	17.32321	8.95300
6	1.00000	0.79000	16.84151	9.82921
7	1.00000	0.79000	14.55245	12.97984
8	1.00000	0.79000	13.86798	13.70873
9	1.00000	0.79000	10.86731	16.19110
10	1.00000	0.79000	10.02307	16.72687
11	1.00000	0.79000	6.49933	18.38501
12	1.00000	0.79000	5.54837	18.69400
13	1.00000	0.79000	1.72297	19.42373
14	1.00000	0.79000	0.72505	19.48652
15	1.00000	0.79000	-3.16164	19.24199
16	1.00000	0.79000	-4.14382	19.05462
17	1.00000	0.79000	-7.84760	17.85119
18	1.00000	0.79000	-8.75233	17.42546
19	1.00000	0.79000	-12.04047	15.33875
20	1.00000	0.79000	-12.81090	14.70139
21	1.00000	0.79000	-15.47679	11.86251
22	1.00000	0.79000	-16.06451	11.05358
23	1.00000	0.79000	-17.94064	7.64091
24	1.00000	0.79000	-18.30872	6.71123
25	1.00000	0.79000	-19.27722	2.93920
26	1.00000	0.79000	-19.40254	1.94719
27	1.00000	0.79000	-19.40254	-1.94719
28	1.00000	0.79000	-19.27722	-2.93920
29	1.00000	0.79000	-18.30872	-6.71123
30	1.00000	0.79000	-17.94064	-7.64091
31	1.00000	0.79000	-16.06451	-11.05358
32	1.00000	0.79000	-15.47679	-11.86251
33	1.00000	0.79000	-12.81090	-14.70139

34	1.00000	0.79000	-12.04047	-15.33875
35	1.00000	0.79000	-8.75233	-17.42546
36	1.00000	0.79000	-7.84760	-17.85119
37	1.00000	0.79000	-4.14382	-19.05462
38	1.00000	0.79000	-3.16164	-19.24199
39	1.00000	0.79000	0.72505	-19.48652
40	1.00000	0.79000	1.72297	-19.42373
41	1.00000	0.79000	5.54837	-18.69400
42	1.00000	0.79000	6.49933	-18.38501
43	1.00000	0.79000	10.02307	-16.72687
44	1.00000	0.79000	10.86731	-16.19110
45	1.00000	0.79000	13.86798	-13.70873
46	1.00000	0.79000	14.55245	-12.97984
47	1.00000	0.79000	16.84151	-9.82921
48	1.00000	0.79000	17.32321	-8.95300
49	1.00000	0.79000	18.75683	-5.33210
50	1.00000	0.79000	19.00549	-4.36362

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

Minimum spacing between any two bars not equal to zero = -0.0001096 inches between Bars 1 and 2

Spacing to aggregate size ratio = -0.0002922

Concrete Properties:

Compressive Strength of Concrete	=	4500.00000 psi
Modulus of Elasticity of Concrete	=	3823676. psi
Modulus of Rupture of Concrete	=	-503.11528 psi
Compression Strain at Peak Stress	=	0.00200
Tensile Strain at Fracture of Concrete	=	-0.0001152
Maximum Coarse Aggregate Size	=	0.37500 in

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

Number	Axial Thrust Force kips
1	0.000

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 = 0.000 kips

Bending Max Concrete Curvature rad/in.	Bending Max Steel Stress ksi	Bending Moment in-kip	Run Msg	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in
0.000000625	845.9514339	1353522294.		24.0001518	0.0000150	-0.0000150	
0.0665544	0.4306528						
0.000001250	1688.2814444	1350625155.		24.0001524	0.0000300	-0.0000300	
0.1326129	0.8613055						
0.000001875	2526.9900314	1347728017.		24.0001529	0.0000450	-0.0000450	
0.1981756	1.2919583						
0.000002500	3362.0771951	1344830878.		24.0001534	0.0000600	-0.0000600	
0.2632425	1.7226111						
0.000003125	4193.5429353	1341933739.		24.0001540	0.0000750	-0.0000750	
0.3278135	2.1532639						
0.000003750	5021.3872521	1339036601.		24.0001545	0.0000900	-0.0000900	
0.3918887	2.5839168						
0.000004375	5845.6101456	1336139462.		24.0001551	0.0001050	-0.0001050	
0.4554681	3.0145696						
0.000005000	5845.6101456	1169122029.		14.1767436	0.0000709	-0.0001691	
0.3080092	-4.8695722		C				
0.000005625	5845.6101456	1039219581.		14.1814610	0.0000798	-0.0001902	
0.3458573	-5.4774992		C				
0.000006250	5845.6101456	935297623.		14.1861892	0.0000887	-0.0002113	
0.3835595	-6.0852532		C				
0.000006875	5845.6101456	850270567.		14.1909283	0.0000976	-0.0002324	
0.4211155	-6.6928337		C				
0.000007500	5845.6101456	779414686.		14.1956783	0.0001065	-0.0002535	
0.4585249	-7.3002399		C				
0.000008125	5845.6101456	719459710.		14.2004394	0.0001154	-0.0002746	
0.4957876	-7.9074715		C				
0.000008750	5845.6101456	668069731.		14.2052115	0.0001243	-0.0002957	
0.5329033	-8.5145276		C				
0.000009375	5845.6101456	623531749.		14.2099947	0.0001332	-0.0003168	
0.5698716	-9.1214077		C				
0.0000100	5845.6101456	584561015.		14.2147891	0.0001421	-0.0003379	
0.6066924	-9.7281112		C				
0.0000106	5845.6101456	550175073.		14.2195946	0.0001511	-0.0003589	
0.6433653	-10.3346374		C				
0.0000113	5845.6101456	519609791.		14.2244115	0.0001600	-0.0003800	
0.6798902	-10.9409857		C				
0.0000119	5845.6101456	492261907.		14.2292396	0.0001690	-0.0004010	
0.7162666	-11.5471556		C				
0.0000125	5845.6101456	467648812.		14.2340792	0.0001779	-0.0004221	
0.7524943	-12.1531463		C				
0.0000131	5845.6101456	445379821.		14.2389301	0.0001869	-0.0004431	
0.7885732	-12.7589572		C				
0.0000138	5845.6101456	425135283.		14.2437926	0.0001959	-0.0004641	
0.8245028	-13.3645877		C				
0.0000144	6023.7945632	419046578.		14.2486666	0.0002048	-0.0004852	
0.8602829	-13.9700371		C				
0.0000150	6283.5150883	418901006.		14.2535522	0.0002138	-0.0005062	
0.8959132	-14.5753048		C				
0.0000156	6543.0489845	418755135.		14.2584494	0.0002228	-0.0005272	
0.9313934	-15.1803901		C				
0.0000163	6802.3956702	418608964.		14.2633583	0.0002318	-0.0005482	
0.9667234	-15.7852924		C				
0.0000169	7061.5545606	418462492.		14.2682790	0.0002408	-0.0005692	

1.0019026	-16.3900109		C				
0.0000175	7320.5250670	418315718.		14.2732116	0.0002498	-0.0005902	
1.0369310	-16.9945451		C				
0.0000181	7579.3065976	418168640.		14.2781560	0.0002588	-0.0006112	
1.0718081	-17.5988942		C				
0.0000188	7837.8985565	418021256.		14.2831123	0.0002678	-0.0006322	
1.1065338	-18.2030577		C				
0.0000194	8096.3003444	417873566.		14.2880807	0.0002768	-0.0006532	
1.1411076	-18.8070346		C				
0.0000200	8354.5113583	417725568.		14.2930611	0.0002859	-0.0006741	
1.1755294	-19.4108245		C				
0.0000206	8612.5309914	417577260.		14.2980536	0.0002949	-0.0006951	
1.2097988	-20.0144267		C				
0.0000213	8870.3586334	417428642.		14.3030584	0.0003039	-0.0007161	
1.2439155	-20.6178403		C				
0.0000219	9127.9936698	417279711.		14.3080753	0.0003130	-0.0007370	
1.2778793	-21.2210647		C				
0.0000225	9385.4354826	417130466.		14.3131046	0.0003220	-0.0007580	
1.3116898	-21.8240993		C				
0.0000231	9642.6834500	416980906.		14.3181462	0.0003311	-0.0007789	
1.3453467	-22.4269432		C				
0.0000238	9899.7369459	416831029.		14.3232002	0.0003402	-0.0007998	
1.3788497	-23.0295958		C				
0.0000244	10157.	416680834.		14.3282668	0.0003493	-0.0008207	
1.4121986	-23.6320564		C				
0.0000256	10670.	416379475.		14.3384375	0.0003674	-0.0008626	
1.4784325	-24.8363989		C				
0.0000269	11182.	416076834.		14.3486590	0.0003856	-0.0009044	
1.5440460	-26.0399641		C				
0.0000281	11694.	415772890.		14.3589318	0.0004038	-0.0009462	
1.6090366	-27.2427466		C				
0.0000294	12204.	415467630.		14.3692563	0.0004221	-0.0009879	
1.6734018	-28.4447402		C				
0.0000306	12714.	415161043.		14.3796331	0.0004404	-0.0010296	
1.7371390	-29.6459388		C				
0.0000319	13223.	414853116.		14.3900627	0.0004587	-0.0010713	
1.8002456	-30.8463362		C				
0.0000331	13732.	414543834.		14.4005458	0.0004770	-0.0011130	
1.8627191	-32.0459262		C				
0.0000344	14239.	414233186.		14.4110828	0.0004954	-0.0011546	
1.9245567	-33.2447024		C				
0.0000356	14746.	413921159.		14.4216743	0.0005138	-0.0011962	
1.9857559	-34.4426584		C				
0.0000369	15252.	413607737.		14.4323209	0.0005322	-0.0012378	
2.0463138	-35.6397875		C				
0.0000381	15757.	413292908.		14.4430232	0.0005506	-0.0012794	
2.1062279	-36.8360832		C				
0.0000394	16261.	412976658.		14.4537818	0.0005691	-0.0013209	
2.1654952	-38.0315387		C				
0.0000406	16764.	412658972.		14.4645973	0.0005876	-0.0013624	
2.2241131	-39.2261471		C				
0.0000419	17267.	412339835.		14.4754703	0.0006062	-0.0014038	
2.2820786	-40.4199016		C				
0.0000431	17768.	412019235.		14.4864015	0.0006247	-0.0014453	
2.3393890	-41.6127951		C				
0.0000444	18269.	411697154.		14.4973914	0.0006433	-0.0014867	
2.3960413	-42.8048205		C				
0.0000456	18769.	411373579.		14.5084408	0.0006619	-0.0015281	
2.4520326	-43.9959704		C				
0.0000469	19268.	411048519.		14.5195502	0.0006806	-0.0015694	
2.5073600	-45.1862362		C				
0.0000481	19766.	410721909.		14.5307205	0.0006993	-0.0016107	
2.5620203	-46.3756131		C				

0.0000494	20263.	410393756.	14.5419521	0.0007180	-0.0016520	
2.6160105	-47.5640922	C				
0.0000506	20759.	410064046.	14.5532459	0.0007368	-0.0016932	
2.6693276	-48.7516657	C				
0.0000519	21255.	409732761.	14.5646025	0.0007555	-0.0017345	
2.7219685	-49.9383259	C				
0.0000531	21749.	409399885.	14.5760227	0.0007744	-0.0017756	
2.7739299	-51.1240649	C				
0.0000544	22243.	409065400.	14.5875072	0.0007932	-0.0018168	
2.8252088	-52.3088745	C				
0.0000556	22736.	408729291.	14.5990567	0.0008121	-0.0018579	
2.8758017	-53.4927466	C				
0.0000569	23227.	408391538.	14.6106719	0.0008310	-0.0018990	
2.9257055	-54.6756728	C				
0.0000581	23718.	408052124.	14.6223538	0.0008499	-0.0019401	
2.9749169	-55.8576448	C				
0.0000594	24208.	407711031.	14.6341029	0.0008689	-0.0019811	
3.0234323	-57.0386538	C				
0.0000606	24697.	407368552.	14.6457265	0.0008879	-0.0020221	
3.0712187	-58.2190319	C				
0.0000619	25185.	407024713.	14.6572221	0.0009069	-0.0020631	
3.1182718	-59.3987969	C				
0.0000631	25672.	406679201.	14.6687831	0.0009260	-0.0021040	
3.1646176	-60.0000000	CY				
0.0000644	26158.	406331998.	14.6804101	0.0009451	-0.0021449	
3.2102527	-60.0000000	CY				
0.0000656	26643.	405983085.	14.6921039	0.0009642	-0.0021858	
3.2551736	-60.0000000	CY				
0.0000669	27127.	405632443.	14.7038654	0.0009833	-0.0022267	
3.2993766	-60.0000000	CY				
0.0000681	27610.	405280053.	14.7156953	0.0010025	-0.0022675	
3.3428584	-60.0000000	CY				
0.0000694	28092.	404925896.	14.7275946	0.0010217	-0.0023083	
3.3856151	-60.0000000	CY				
0.0000706	28573.	404569952.	14.7395639	0.0010410	-0.0023490	
3.4276432	-60.0000000	CY				
0.0000719	29044.	404091673.	14.7500835	0.0010602	-0.0023898	
3.4687035	-60.0000000	CY				
0.0000731	29475.	403072266.	14.7537205	0.0010789	-0.0024311	
3.5079550	-60.0000000	CY				
0.0000744	29858.	401455043.	14.7495436	0.0010970	-0.0024730	
3.5452601	-60.0000000	CY				
0.0000794	31135.	392246336.	14.6948027	0.0011664	-0.0026436	
3.6813494	-60.0000000	CY				
0.0000844	32160.	381149774.	14.6090319	0.0012326	-0.0028174	
3.8013803	-60.0000000	CY				
0.0000894	33012.	369362560.	14.5055975	0.0012964	-0.0029936	
3.9079319	-60.0000000	CY				
0.0000944	33740.	357505362.	14.3951856	0.0013585	-0.0031715	
4.0031450	-60.0000000	CY				
0.0000994	34377.	345931693.	14.2834974	0.0014194	-0.0033506	
4.0883438	-60.0000000	CY				
0.0001044	34935.	334703122.	14.1715893	0.0014792	-0.0035308	
4.1641357	-60.0000000	CY				
0.0001094	35431.	323940666.	14.0579740	0.0015376	-0.0037124	
4.2307884	-60.0000000	CY				
0.0001144	35871.	313627073.	13.9461294	0.0015951	-0.0038949	
4.2891684	-60.0000000	CY				
0.0001194	36273.	303860741.	13.8392296	0.0016521	-0.0040779	
4.3399744	-60.0000000	CY				
0.0001244	36632.	294530941.	13.7351344	0.0017083	-0.0042617	
4.3832660	-60.0000000	CY				
0.0001294	36961.	285688006.	13.6338565	0.0017639	-0.0044461	

4.4193369	-60.0000000	CY				
0.0001344	37263.	277303670.	13.5348499	0.0018187	-0.0046313	
4.4484203	-60.0000000	CY				
0.0001394	37535.	269310170.	13.4391679	0.0018731	-0.0048169	
4.4708379	-60.0000000	CY				
0.0001444	37783.	261702218.	13.3473027	0.0019270	-0.0050030	
4.4868079	-60.0000000	CY				
0.0001494	38022.	254539263.	13.2620016	0.0019810	-0.0051890	
4.4965333	-60.0000000	CY				
0.0001544	38238.	247698346.	13.1787297	0.0020345	-0.0053755	
4.4999879	-60.0000000	CY				
0.0001594	38435.	241162765.	13.0959086	0.0020872	-0.0055628	
4.4991008	-60.0000000	CY				
0.0001644	38615.	234919408.	13.0163967	0.0021396	-0.0057504	
4.4961694	60.0000000	CY				
0.0001694	38781.	228965876.	12.9406891	0.0021918	-0.0059382	
4.4998350	60.0000000	CY				
0.0001744	38944.	223333425.	12.8709600	0.0022444	-0.0061256	
4.4972710	60.0000000	CY				
0.0001794	39093.	217937643.	12.8035616	0.0022966	-0.0063134	
4.4999672	60.0000000	CY				
0.0001844	39230.	212773812.	12.7393054	0.0023488	-0.0065012	
4.4971745	60.0000000	CY				
0.0001894	39357.	207826445.	12.6749886	0.0024003	-0.0066897	
4.4999003	60.0000000	CY				
0.0001944	39475.	203085332.	12.6125107	0.0024516	-0.0068784	
4.4956386	60.0000000	CY				
0.0001994	39581.	198527530.	12.5515567	0.0025025	-0.0070675	
4.4993210	60.0000000	CY				
0.0002044	39686.	194183848.	12.4946057	0.0025536	-0.0072564	
4.4949946	60.0000000	CY				
0.0002094	39789.	190038278.	12.4414757	0.0026049	-0.0074451	
4.4972998	60.0000000	CY				
0.0002144	39883.	186045078.	12.3892958	0.0026560	-0.0076340	
4.4997925	60.0000000	CY				
0.0002194	39974.	182216468.	12.3398762	0.0027071	-0.0078229	
4.4921838	60.0000000	CY				
0.0002244	40057.	178526610.	12.2917083	0.0027580	-0.0080120	
4.4971340	60.0000000	CY				
0.0002294	40137.	174983396.	12.2454771	0.0028088	-0.0082012	
4.4996503	60.0000000	CY				
0.0002344	40210.	171561779.	12.1978486	0.0028589	-0.0083911	
4.4945873	60.0000000	CY				
0.0002394	40279.	168266185.	12.1516759	0.0029088	-0.0085812	
4.4947195	60.0000000	CY				
0.0002444	40343.	165084525.	12.1063441	0.0029585	-0.0087715	
4.4982677	60.0000000	CY				
0.0002494	40406.	162028002.	12.0632455	0.0030083	-0.0089617	
4.4998905	60.0000000	CYT				
0.0002544	40468.	159086090.	12.0224625	0.0030582	-0.0091518	
4.4926204	60.0000000	CYT				
0.0002594	40529.	156254980.	11.9837750	0.0031083	-0.0093417	
4.4936508	60.0000000	CYT				
0.0002644	40585.	153511868.	11.9459332	0.0031582	-0.0095318	
4.4974059	60.0000000	CYT				
0.0002694	40638.	150860647.	11.9101831	0.0032083	-0.0097217	
4.4995166	60.0000000	CYT				
0.0002744	40690.	148301338.	11.8759269	0.0032585	-0.0099115	
4.4975184	60.0000000	CYT				
0.0003044	40923.	134448054.	11.6976495	0.0035605	-0.0110495	
4.4903477	60.0000000	CYT				
0.0003344	40940.	122436952.	11.6093256	0.0038819	-0.0121681	
4.4867102	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	0.000	40395.232	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 (Factored) Load No.	Resistance Factor for Moment	Bending Stiffness Nominal Moment Capacity at Ult. Mom. Cap. in-kip	Ultimate (Factored) Axial Thrust kips	Ultimate Moment Capacity in-kip
		kip-in^2		
1	0.65	40395.232	0.000	26256.900
		406260579.288		
1	0.70	40395.232	0.000	28276.662
		404789053.314		
1	0.75	40395.232	0.000	30296.424
		398293409.577		

Pile Section No. 2:

Dimensions and Properties of Drilled Shaft (Bored Pile) with Permanent Casing:

Length of Section	=	96.00000 ft
Outer Diameter of Casing	=	49.00000 in
Concrete Cover Thickness Inside Casing	=	4.50000 in
Casing Wall Thickness	=	0.50000 in
Moment of Inertia of Steel Casing	=	22403. in^4
Yield Stress of Casing	=	36000. psi
Elastic Modulus of Casing	=	29000000. psi
Number of Reinforcing Bars	=	50 bars
Area of Single Reinforcing Bar	=	0.79000 sq. in.
Edge-to-Edge Bar Spacing	=	2.76901 in
Maximum Concrete Aggregate Size	=	0.37500 in

Ratio of Bar Spacing to Aggregate Size	=	7.38
Offset of Center of Rebar Cage from Center of Pile	=	0.0000 in
Yield Stress of Reinforcing Bars	=	60000. psi
Modulus of Elasticity of Reinforcing Bars	=	29000000. psi
Gross Area of Pile	=	1885.74099 sq. in.
Area of Concrete	=	1770.05737 sq. in.
Cross-sectional Area of Steel Casing	=	76.18362 sq. in.
Area of All Steel (Casing and Bars)	=	115.68362 sq. in.
Area Ratio of All Steel to Gross Area of Pile	=	6.13 percent

Axial Structural Capacities:

Nom. Axial Structural Capacity = 0.85 Fc Ac + Fy As	=	11883.080 kips
Tensile Load for Cracking of Concrete	=	-1165.721 kips
Nominal Axial Tensile Capacity	=	-5112.610 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.00000	0.79000	18.99342	-0.49994
2	1.00000	0.79000	18.99342	0.49994
3	1.00000	0.79000	18.52104	4.23924
4	1.00000	0.79000	18.27238	5.20771
5	1.00000	0.79000	16.88491	8.71205
6	1.00000	0.79000	16.40321	9.58825
7	1.00000	0.79000	14.18784	12.63745
8	1.00000	0.79000	13.50337	13.36633
9	1.00000	0.79000	10.59930	15.76879
10	1.00000	0.79000	9.75507	16.30456
11	1.00000	0.79000	6.34476	17.90933
12	1.00000	0.79000	5.39382	18.21831
13	1.00000	0.79000	1.69156	18.92455
14	1.00000	0.79000	0.69365	18.98733
15	1.00000	0.79000	-3.06793	18.75068
16	1.00000	0.79000	-4.05010	18.56332
17	1.00000	0.79000	-7.63464	17.39863
18	1.00000	0.79000	-8.53937	16.97290
19	1.00000	0.79000	-11.72165	14.95336
20	1.00000	0.79000	-12.49207	14.31601
21	1.00000	0.79000	-15.07214	11.56851
22	1.00000	0.79000	-15.65986	10.75959
23	1.00000	0.79000	-17.47560	7.45678
24	1.00000	0.79000	-17.84368	6.52711
25	1.00000	0.79000	-18.78099	2.87651
26	1.00000	0.79000	-18.90631	1.88451
27	1.00000	0.79000	-18.90631	-1.88451
28	1.00000	0.79000	-18.78099	-2.87651
29	1.00000	0.79000	-17.84368	-6.52711
30	1.00000	0.79000	-17.47560	-7.45678
31	1.00000	0.79000	-15.65986	-10.75959
32	1.00000	0.79000	-15.07214	-11.56851
33	1.00000	0.79000	-12.49207	-14.31601
34	1.00000	0.79000	-11.72165	-14.95336
35	1.00000	0.79000	-8.53937	-16.97290
36	1.00000	0.79000	-7.63464	-17.39863
37	1.00000	0.79000	-4.05010	-18.56332
38	1.00000	0.79000	-3.06793	-18.75068
39	1.00000	0.79000	0.69365	-18.98733
40	1.00000	0.79000	1.69156	-18.92455

41	1.00000	0.79000	5.39382	-18.21831
42	1.00000	0.79000	6.34476	-17.90933
43	1.00000	0.79000	9.75507	-16.30456
44	1.00000	0.79000	10.59930	-15.76879
45	1.00000	0.79000	13.50337	-13.36633
46	1.00000	0.79000	14.18784	-12.63745
47	1.00000	0.79000	16.40321	-9.58825
48	1.00000	0.79000	16.88491	-8.71205
49	1.00000	0.79000	18.27238	-5.20771
50	1.00000	0.79000	18.52104	-4.23924

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

Minimum spacing between any two bars not equal to zero = -0.0001154 inches between Bars 1 and 2

Spacing to aggregate size ratio = -0.0003078

Concrete Properties:

Compressive Strength of Concrete	=	4500.00000 psi
Modulus of Elasticity of Concrete	=	3823676. psi
Modulus of Rupture of Concrete	=	-503.11528 psi
Compression Strain at Peak Stress	=	0.00200
Tensile Strain at Fracture of Concrete	=	-0.0001152
Maximum Coarse Aggregate Size	=	0.37500 in

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

Number	Axial Thrust Force kips
1	0.000

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 = 0.000 kips

Bending Max Concrete Curvature Stress rad/in.	Bending Max Steel Moment Stress in-kip	Bending Max Casing Stiffness Stress kip-in2	Run Msg	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in
ksi	ksi	ksi				
0.000000625	1246.1877906	1993900465.		24.5001275	0.0000153	-0.0000153
0.0679356	0.4396242	0.4396242				
0.000001250	2488.7459054	1990996724.		24.5001279	0.0000306	-0.0000306
0.1353544	0.8792484	0.8792484				
0.000001875	3727.6743445	1988092984.		24.5001283	0.0000459	-0.0000459
0.2022566	1.3188726	1.3188726				
0.000002500	4962.9731077	1985189243.		24.5001286	0.0000613	-0.0000612
0.2686421	1.7584968	1.7584968				
0.000003125	6194.6421952	1982285502.		24.5001290	0.0000766	-0.0000766
0.3345108	2.1981210	2.1981210				
0.000003750	7422.6816068	1979381762.		24.5001294	0.0000919	-0.0000919
0.3998628	2.6377453	2.6377453				
0.000004375	8647.0913427	1976478021.		24.5001298	0.0001072	-0.0001072
0.4646981	3.0773696	3.0773696				
0.000005000	8647.0913427	1729418269.		18.5144499	0.0000926	-0.0001524
0.4015395	-4.3848797	-4.3848797	C			
0.000005625	8647.0913427	1537260683.		18.5199878	0.0001042	-0.0001715
0.4505457	-4.9320864	-4.9320864	C			
0.000006250	8647.0913427	1383534615.		18.5255374	0.0001158	-0.0001905
0.4992868	-5.4790901	-5.4790901	C			
0.000006875	8647.0913427	1257758741.		18.5310987	0.0001274	-0.0002095
0.5477623	-6.0258903	-6.0258903	C			
0.000007500	8894.9772711	1185996969.		18.5366719	0.0001390	-0.0002285
0.5959719	-6.5724864	-6.5724864	C			
0.000008125	9632.8701085	1185584013.		18.5422569	0.0001507	-0.0002475
0.6439151	-7.1188776	-7.1188776	C			
0.000008750	10370.	1185170297.		18.5478538	0.0001623	-0.0002665
0.6915914	-7.6650633	-7.6650633	C			
0.000009375	11107.	1184755819.		18.5534628	0.0001739	-0.0002854
0.7390003	-8.2110429	-8.2110429	C			
0.0000100	11843.	1184340574.		18.5590837	0.0001856	-0.0003044
0.7861415	-8.7568157	-8.7568157	C			
0.0000106	12579.	1183924560.		18.5647167	0.0001973	-0.0003234
0.8330144	-9.3023810	-9.3023810	C			
0.0000113	13314.	1183507775.		18.5703619	0.0002089	-0.0003423
0.8796186	-9.8477382	-9.8477382	C			
0.0000119	14049.	1183090214.		18.5760192	0.0002206	-0.0003613
0.9259536	-10.3928865	-10.3928865	C			
0.0000125	14783.	1182671874.		18.5816888	0.0002323	-0.0003802
0.9720190	-10.9378253	-10.9378253	C			
0.0000131	15517.	1182252753.		18.5873707	0.0002440	-0.0003992
1.0178143	-11.4825539	-11.4825539	C			
0.0000138	16250.	1181832847.		18.5930649	0.0002557	-0.0004181
1.0633390	-12.0270716	-12.0270716	C			
0.0000144	16983.	1181412154.		18.5987715	0.0002674	-0.0004370
1.1085926	-12.5713777	-12.5713777	C			
0.0000150	17715.	1180990669.		18.6044906	0.0002791	-0.0004559
1.1535747	-13.1154716	-13.1154716	C			
0.0000156	18446.	1180568390.		18.6102222	0.0002908	-0.0004748
1.1982848	-13.6593524	-13.6593524	C			
0.0000163	19177.	1180145312.		18.6159664	0.0003025	-0.0004937
1.2427224	-14.2030196	-14.2030196	C			
0.0000169	19908.	1179721434.		18.6217231	0.0003142	-0.0005126
1.2868870	-14.7464723	-14.7464723	C			
0.0000175	20638.	1179296752.		18.6274926	0.0003260	-0.0005315
1.3307782	-15.2897100	-15.2897100	C			
0.0000181	21367.	1178871262.		18.6332748	0.0003377	-0.0005504
1.3743954	-15.8327318	-15.8327318	C			
0.0000188	22096.	1178444960.		18.6390698	0.0003495	-0.0005693
1.4177383	-16.3755370	-16.3755370	C			

0.0000194	22824.	1178017845.	18.6448776	0.0003612	-0.0005881
1.4608062	-16.9181250	-16.9181250 C			
0.0000200	23552.	1177589911.	18.6506984	0.0003730	-0.0006070
1.5035986	-17.4604949	-17.4604949 C			
0.0000206	24279.	1177161157.	18.6565321	0.0003848	-0.0006258
1.5461152	-18.0026461	-18.0026461 C			
0.0000213	25006.	1176731577.	18.6623788	0.0003966	-0.0006447
1.5883554	-18.5445778	-18.5445778 C			
0.0000219	25732.	1176301169.	18.6682387	0.0004084	-0.0006635
1.6303186	-19.0862892	-19.0862892 C			
0.0000225	26457.	1175869930.	18.6741116	0.0004202	-0.0006823
1.6720045	-19.6277796	-19.6277796 C			
0.0000231	27182.	1175437855.	18.6799978	0.0004320	-0.0007012
1.7134124	-20.1690483	-20.1690483 C			
0.0000238	27906.	1175004942.	18.6858973	0.0004438	-0.0007200
1.7545419	-20.7100945	-20.7100945 C			
0.0000244	28630.	1174571186.	18.6918101	0.0004556	-0.0007388
1.7953924	-21.2509174	-21.2509174 C			
0.0000256	30076.	1173701123.	18.7036758	0.0004793	-0.0007763
1.8762546	-22.3318905	-22.3318905 C			
0.0000269	31520.	1172827657.	18.7155957	0.0005030	-0.0008139
1.9559948	-23.4119610	-23.4119610 C			
0.0000281	32961.	1171950748.	18.7275700	0.0005267	-0.0008514
2.0346089	-24.4911229	-24.4911229 C			
0.0000294	34400.	1171070367.	18.7395995	0.0005505	-0.0008889
2.1120926	-25.5693697	-25.5693697 C			
0.0000306	35837.	1170186484.	18.7516845	0.0005743	-0.0009264
2.1884416	-26.6466950	-26.6466950 C			
0.0000319	37271.	1169299068.	18.7638256	0.0005981	-0.0009638
2.2636516	-27.7230922	-27.7230922 C			
0.0000331	38704.	1168408088.	18.7760234	0.0006220	-0.0010012
2.3377183	-28.7985549	-28.7985549 C			
0.0000344	40133.	1167513512.	18.7882783	0.0006458	-0.0010385
2.4106371	-29.8730762	-29.8730762 C			
0.0000356	41561.	1166615309.	18.8005910	0.0006698	-0.0010759
2.4824038	-30.9466494	-30.9466494 C			
0.0000369	42986.	1165713445.	18.8129619	0.0006937	-0.0011131
2.5530137	-32.0192676	-32.0192676 C			
0.0000381	44408.	1164807888.	18.8253917	0.0007177	-0.0011504
2.6224624	-33.0909239	-33.0909239 C			
0.0000394	45829.	1163898606.	18.8378808	0.0007417	-0.0011876
2.6907451	-34.1616112	-34.1616112 C			
0.0000406	47246.	1162985563.	18.8504300	0.0007658	-0.0012248
2.7578573	-35.2313223	-35.2313223 C			
0.0000419	48633.	1161383574.	18.8589255	0.0007897	-0.0012622
2.8233213	-36.3050459	-36.0000000 CY			
0.0000431	49871.	1156423145.	18.8470541	0.0008128	-0.0013003
2.8852227	-37.4036257	-36.0000000 CY			
0.0000444	51010.	1149514080.	18.8228946	0.0008353	-0.0013391
2.9444397	-38.5188780	-36.0000000 CY			
0.0000456	52078.	1141425698.	18.7908550	0.0008573	-0.0013783
3.0014606	-39.6463092	-36.0000000 CY			
0.0000469	53097.	1132740521.	18.7544646	0.0008791	-0.0014178
3.0566932	-40.7819777	-36.0000000 CY			
0.0000481	54073.	1123594301.	18.7144572	0.0009006	-0.0014575
3.1102262	-41.9253324	-36.0000000 CY			
0.0000494	55015.	1114223210.	18.6723249	0.0009219	-0.0014974
3.1622450	-43.0746302	-36.0000000 CY			
0.0000506	55923.	1104657286.	18.6281712	0.0009431	-0.0015376
3.2127721	-44.2299504	-36.0000000 CY			
0.0000519	56806.	1095064859.	18.5831473	0.0009640	-0.0015779
3.2619595	-45.3897808	-36.0000000 CY			
0.0000531	57667.	1085491449.	18.5375498	0.0009848	-0.0016183

3.3098579	-46.5537591	-36.0000000 CY			
0.0000544	58504.	1075932199.	18.4912920	0.0010055	-0.0016589
3.3564715	-47.7220844	-36.0000000 CY			
0.0000556	59322.	1066467855.	18.4449815	0.0010260	-0.0016996
3.4018904	-48.8938485	-36.0000000 CY			
0.0000569	60124.	1057124396.	18.3988175	0.0010464	-0.0017404
3.4461551	-50.0687283	-36.0000000 CY			
0.0000581	60910.	1047913654.	18.3524698	0.0010667	-0.0017814
3.4892404	-51.2472648	-36.0000000 CY			
0.0000594	61682.	1038848112.	18.3060172	0.0010869	-0.0018225
3.5311716	-52.4293420	-36.0000000 CY			
0.0000606	62440.	1029943371.	18.2600628	0.0011070	-0.0018636
3.5720391	-53.6139113	-36.0000000 CY			
0.0000619	63187.	1021207548.	18.2146955	0.0011270	-0.0019048
3.6118689	-54.8007587	-36.0000000 CY			
0.0000631	63923.	1012646783.	18.1699929	0.0011470	-0.0019461
3.6506854	-55.9896785	-36.0000000 CY			
0.0000644	64650.	1004265562.	18.1260229	0.0011669	-0.0019875
3.6885113	-57.1804715	-36.0000000 CY			
0.0000656	65367.	996065543.	18.0828308	0.0011867	-0.0020289
3.7253656	-58.3729718	-36.0000000 CY			
0.0000669	66074.	988019719.	18.0401664	0.0012064	-0.0020704
3.7612310	-59.5675802	-36.0000000 CY			
0.0000681	66773.	980156974.	17.9983515	0.0012261	-0.0021120
3.7961596	-60.0000000	-36.0000000 CY			
0.0000694	67466.	972477926.	17.9574311	0.0012458	-0.0021536
3.8301685	-60.0000000	-36.0000000 CY			
0.0000706	68142.	964843635.	17.9194255	0.0012656	-0.0021951
3.8635106	-60.0000000	36.0000000 CY			
0.0000719	68792.	957107775.	17.8855537	0.0012855	-0.0022364
3.8963346	-60.0000000	36.0000000 CY			
0.0000731	69423.	949380920.	17.8542977	0.0013056	-0.0022775
3.9284606	-60.0000000	36.0000000 CY			
0.0000744	70040.	941712434.	17.8260522	0.0013258	-0.0023186
3.9599353	-60.0000000	36.0000000 CY			
0.0000794	72378.	911849904.	17.7321611	0.0014075	-0.0024819
4.0780360	-60.0000000	36.0000000 CY			
0.0000844	74294.	880518603.	17.6293607	0.0014875	-0.0026469
4.1795572	-60.0000000	36.0000000 CY			
0.0000894	75780.	847889856.	17.5073060	0.0015647	-0.0028147
4.2643087	-60.0000000	36.0000000 CY			
0.0000944	77018.	816087263.	17.3824668	0.0016405	-0.0029839
4.3347927	-60.0000000	36.0000000 CY			
0.0000994	78074.	785647632.	17.2557305	0.0017148	-0.0031546
4.3917872	-60.0000000	36.0000000 CY			
0.0001044	78992.	756814015.	17.1323516	0.0017882	-0.0033262
4.4362794	-60.0000000	36.0000000 CY			
0.0001094	79801.	729607533.	17.0132920	0.0018608	-0.0034985
4.4687739	-60.0000000	36.0000000 CY			
0.0001144	80517.	703973935.	16.8993985	0.0019329	-0.0036715
4.4896725	-60.0000000	36.0000000 CY			
0.0001194	81155.	679836432.	16.7874938	0.0020040	-0.0038454
4.4992440	-60.0000000	36.0000000 CY			
0.0001244	81729.	657114104.	16.6801722	0.0020746	-0.0040198
4.4996552	-60.0000000	36.0000000 CY			
0.0001294	82242.	635688352.	16.5782931	0.0021448	-0.0041946
4.4997682	60.0000000	36.0000000 CY			
0.0001344	82714.	615544993.	16.4830044	0.0022149	-0.0043695
4.4997034	60.0000000	36.0000000 CY			
0.0001394	83139.	596511259.	16.3914553	0.0022846	-0.0045448
4.4993815	60.0000000	36.0000000 CY			
0.0001444	83520.	578491131.	16.3016668	0.0023536	-0.0047208
4.4985243	60.0000000	36.0000000 CY			

0.0001494	83870.	561472182.	16.2171924	0.0024224	-0.0048969
4.4967207	60.0000000	36.0000000	CY		
0.0001544	84197.	545405022.	16.1373405	0.0024912	-0.0050732
4.4999984	60.0000000	36.0000000	CY		
0.0001594	84492.	530143855.	16.0618326	0.0025599	-0.0052495
4.4992081	60.0000000	36.0000000	CY		
0.0001644	84764.	515674732.	15.9893153	0.0026282	-0.0054261
4.4963383	60.0000000	36.0000000	CY		
0.0001694	85016.	501939766.	15.9198154	0.0026964	-0.0056030
4.4998938	60.0000000	36.0000000	CY		
0.0001744	85250.	488887679.	15.8522568	0.0027642	-0.0057801
4.4973913	60.0000000	36.0000000	CY		
0.0001794	85470.	476485302.	15.7875418	0.0028319	-0.0059575
4.4999838	60.0000000	36.0000000	CY		
0.0001844	85672.	464662001.	15.7250435	0.0028993	-0.0061351
4.4971898	60.0000000	36.0000000	CY		
0.0001894	85863.	453401426.	15.6654328	0.0029666	-0.0063127
4.4999209	60.0000000	36.0000000	CY		
0.0001944	86039.	442646666.	15.6085953	0.0030339	-0.0064905
4.4956681	60.0000000	36.0000000	CYT		
0.0001994	86203.	432367621.	15.5537463	0.0031010	-0.0066683
4.4993979	60.0000000	36.0000000	CYT		
0.0002044	86354.	422528550.	15.5023858	0.0031683	-0.0068461
4.4940147	60.0000000	36.0000000	CYT		
0.0002094	86502.	413145390.	15.4543831	0.0032358	-0.0070236
4.4974792	60.0000000	36.0000000	CYT		
0.0002144	86628.	404097559.	15.4101001	0.0033035	-0.0072008
4.4998831	60.0000000	36.0000000	CYT		
0.0002194	86741.	395401075.	15.3687912	0.0033715	-0.0073778
4.4927456	60.0000000	36.0000000	CYT		
0.0002244	86847.	387060625.	15.3287878	0.0034394	-0.0075550
4.4976689	60.0000000	36.0000000	CYT		
0.0002294	86936.	379011338.	15.2937898	0.0035080	-0.0077314
4.4998877	60.0000000	36.0000000	CYT		
0.0002344	87016.	371267093.	15.2602682	0.0035766	-0.0079077
4.4910346	60.0000000	36.0000000	CYT		
0.0002394	87093.	363833635.	15.2284729	0.0036453	-0.0080841
4.4964573	60.0000000	36.0000000	CYT		
0.0002444	87157.	356654585.	15.2004065	0.0037146	-0.0082598
4.4994370	60.0000000	36.0000000	CYT		
0.0002494	87214.	349732331.	15.1732525	0.0037838	-0.0084355
4.4957504	60.0000000	36.0000000	CYT		
0.0002544	87270.	343075082.	15.1480720	0.0038533	-0.0086111
4.4929161	60.0000000	36.0000000	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	0.000	85950.433	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 (Factored) Load Capacity No.	Resistance Factor for Moment	Nominal Bending Stiffness Moment Capacity at Ult. Mom. Cap. in-kip	Ultimate (Factored) Axial Thrust kips	Ultimate Moment in-kip
		kip-in^2		
1	0.65	85950.433	0.000	55867.779
		1105241617.673		
1	0.70	85950.433	0.000	60165.302
		1056639830.845		
1	0.75	85950.433	0.000	64462.825
		1006420922.590		

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

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head = 0.500000 inches
Moment at pile head = 3793200.0 in-lbs
Axial load at pile head = 0.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness Es*h lb-in^2	Soil Res. Spr. Distrib. p Lat. Load lb/in	lb/inch
0.00	0.5000	3793200.	23022.	-0.002030	0.000	1.343E+12	0.000	0.000
0.993	0.4760	4067502.	23022.	-0.001995	0.000	1.343E+12	0.000	0.000
1.986	0.4525	4341804.	23022.	-0.001958	0.000	1.341E+12	0.000	0.000
2.979	0.4294	4616107.	23022.	-0.001918	0.000	1.340E+12	0.000	0.000
3.972	0.4067	4890409.	23022.	-0.001883	0.000	1.985E+12	0.000	0.000
4.965	0.3845	5164711.	23022.	-0.001853	0.000	1.985E+12	0.000	0.000
5.957	0.3626	5439013.	23022.	-0.001821	0.000	1.984E+12	0.000	0.000
6.950	0.3411	5713315.	23022.	-0.001787	0.000	1.983E+12	0.000	0.000

7.943	0.3200	5987618.	23022.	-0.001752	0.000	1.983E+12
0.000	0.000	0.000				
8.936	0.2993	6261920.	23022.	-0.001715	0.000	1.982E+12
0.000	0.000	0.000				
9.929	0.2791	6536222.	23022.	-0.001677	0.000	1.981E+12
0.000	0.000	0.000				
10.922	0.2594	6810524.	23022.	-0.001637	0.000	1.981E+12
0.000	0.000	0.000				
11.915	0.2401	7084826.	23022.	-0.001595	0.000	1.980E+12
0.000	0.000	0.000				
12.908	0.2214	7359129.	23022.	-0.001552	0.000	1.980E+12
0.000	0.000	0.000				
13.901	0.2031	7633431.	23022.	-0.001506	0.000	1.979E+12
0.000	0.000	0.000				
14.893	0.1855	7907733.	22051.	-0.001460	0.000	1.978E+12
-162.9463	10468.	0.000				
15.886	0.1684	8158903.	20762.	-0.001411	0.000	1.978E+12
-53.4715	3784.1319	0.000				
16.879	0.1518	8402482.	19487.	-0.001361	0.000	1.977E+12
-160.5122	12595.	0.000				
17.872	0.1359	8623274.	17025.	-0.001308	0.000	1.803E+12
-252.7019	22152.	0.000				
18.865	0.1207	8808192.	13669.	-0.001236	0.000	1.210E+12
-310.6423	30670.	0.000				
19.858	0.1065	8949011.	9732.5596	-0.001147	0.000	1.186E+12
-350.1920	39187.	0.000				
20.851	0.0933	9040115.	5419.9322	-0.001057	0.000	1.186E+12
-373.7190	47705.	0.000				
21.844	0.0813	9078166.	908.4458	-0.000966	0.000	1.186E+12
-383.5722	56223.	0.000				
22.837	0.0703	9061763.	-3652.9546	-0.000875	0.000	1.186E+12
-382.0975	64741.	0.000				
23.830	0.0604	8991117.	-8143.1114	-0.000784	0.000	1.186E+12
-371.6133	73258.	0.000				
24.823	0.0516	8867716.	-12468.	-0.000695	0.000	1.194E+12
-354.3880	81776.	0.000				
25.815	0.0439	8694005.	-16561.	-0.000609	0.000	1.244E+12
-332.5656	90294.	0.000				
26.808	0.0371	8473082.	-20376.	-0.000542	0.000	1.977E+12
-307.8920	98812.	0.000				
27.801	0.0310	8208451.	-23873.	-0.000491	0.000	1.977E+12
-279.0371	107329.	0.000				
28.794	0.0254	7904206.	-27007.	-0.000443	0.000	1.978E+12
-247.1194	115847.	0.000				
29.787	0.0204	7564880.	-29415.	-0.000396	0.000	1.979E+12
-157.0099	91599.	0.000				
30.780	0.0160	7203264.	-31239.	-0.000352	0.000	1.980E+12
-149.2179	111309.	0.000				
31.773	0.0120	6820465.	-32962.	-0.000310	0.000	1.981E+12
-139.9456	138504.	0.000				
32.766	0.008594	6417799.	-34563.	-0.000270	0.000	1.982E+12
-128.7800	178545.	0.000				
33.759	0.005609	5996850.	-36014.	-0.000233	0.000	1.983E+12
-114.9212	244138.	0.000				
34.752	0.003053	5559588.	-37274.	-0.000198	0.000	1.984E+12
-96.4579	376478.	0.000				
35.744	0.000895	5108632.	-38241.	-0.000166	0.000	1.985E+12
-65.8223	876543.	0.000				
36.737	-0.000898	4648332.	-38230.	-0.000137	0.000	1.986E+12
67.6298	897455.	0.000				
37.730	-0.002358	4197632.	-37257.	-0.000110	0.000	1.987E+12
95.7251	483662.	0.000				
38.723	-0.003518	3760522.	-36018.	-8.612E-05	0.000	1.988E+12

112.1388	379740.	0.000				
39.716	-0.004410	3339332.	-34612.	-6.485E-05	0.000	1.989E+12
123.8784	334668.	0.000				
40.709	-0.005064	2935727.	-33083.	-4.605E-05	0.000	1.990E+12
132.8256	312534.	0.000				
41.702	-0.005508	2550979.	-31459.	-2.963E-05	0.000	1.991E+12
139.7961	302420.	0.000				
42.695	-0.005770	2186077.	-29761.	-1.546E-05	0.000	1.991E+12
145.2257	299897.	0.000				
43.688	-0.005876	1841791.	-27898.	-3.407E-06	0.000	1.992E+12
167.3823	339402.	0.000				
44.680	-0.005851	1521267.	-25824.	6.649E-06	0.000	1.993E+12
180.8347	368249.	0.000				
45.673	-0.005718	1226415.	-23612.	1.486E-05	0.000	1.994E+12
190.4262	396829.	0.000				
46.666	-0.005497	958596.	-21338.	2.139E-05	0.000	1.994E+12
191.2617	414574.	0.000				
47.659	-0.005208	717929.	-19073.	2.640E-05	0.000	1.994E+12
188.9634	432319.	0.000				
48.652	-0.004868	504088.	-16852.	3.005E-05	0.000	1.994E+12
183.8734	450064.	0.000				
49.645	-0.004492	316351.	-14706.	3.250E-05	0.000	1.994E+12
176.3613	467810.	0.000				
50.638	-0.004093	153649.	-12662.	3.390E-05	0.000	1.994E+12
166.8113	485555.	0.000				
51.631	-0.003684	14629.	-10741.	3.441E-05	0.000	1.994E+12
155.6123	503300.	0.000				
52.624	-0.003273	-102300.	-8960.9847	3.415E-05	0.000	1.994E+12
143.1481	521046.	0.000				
53.617	-0.002870	-198908.	-7334.9804	3.325E-05	0.000	1.994E+12
129.7905	538791.	0.000				
54.609	-0.002481	-277090.	-5871.3426	3.182E-05	0.000	1.994E+12
115.8935	556536.	0.000				
55.602	-0.002112	-338819.	-4574.5242	2.998E-05	0.000	1.994E+12
101.7885	574282.	0.000				
56.595	-0.001767	-386099.	-3445.1766	2.782E-05	0.000	1.994E+12
87.7821	592027.	0.000				
57.588	-0.001449	-420917.	-2480.4566	2.541E-05	0.000	1.994E+12
74.1543	609772.	0.000				
58.581	-0.001161	-445207.	-1389.9331	2.282E-05	0.000	1.994E+12
108.8993	1117360.	0.000				
59.574	-0.000905	-454038.	-168.3859	2.013E-05	0.000	1.994E+12
96.1478	1265553.	0.000				
60.567	-0.000682	-449220.	901.4060	1.743E-05	0.000	1.994E+12
83.4258	1458549.	0.000				
61.560	-0.000490	-432558.	1819.7419	1.480E-05	0.000	1.994E+12
70.7246	1720496.	0.000				
62.553	-0.000329	-405856.	2586.3274	1.229E-05	0.000	1.994E+12
57.9533	2099667.	0.000				
63.546	-0.000197	-370927.	3198.6854	9.972E-06	0.000	1.994E+12
44.8362	2713978.	0.000				
64.538	-9.122E-05	-329633.	3647.6341	7.879E-06	0.000	1.994E+12
30.5236	3986733.	0.000				
65.531	-9.078E-06	-284005.	3886.8568	6.046E-06	0.000	1.994E+12
9.6319	12642211.	0.000				
66.524	5.285E-05	-237010.	3805.8463	4.489E-06	0.000	1.994E+12
-23.2302	5237431.	0.000				
67.517	9.790E-05	-193313.	3479.0907	3.203E-06	0.000	1.994E+12
-31.6185	3848194.	0.000				
68.510	0.000129	-154105.	3074.3450	2.165E-06	0.000	1.994E+12
-36.3215	3349983.	0.000				
69.503	0.000149	-120053.	2625.1877	1.346E-06	0.000	1.994E+12
-39.0733	3114087.	0.000				

70.496	0.000161	-91548.	2150.6486	7.141E-07	0.000	1.994E+12	
-40.5821	2998335.	0.000					
71.489	0.000167	-68804.	1663.2176	2.350E-07	0.000	1.994E+12	
-41.2373	2950707.	0.000					
72.482	0.000167	-51914.	1171.6242	-1.257E-07	0.000	1.994E+12	
-41.2808	2947616.	0.000					
73.475	0.000164	-40884.	875.1525	-4.030E-07	0.000	1.994E+12	
-8.4845	618227.	0.000					
74.468	0.000157	-31059.	774.5999	-6.179E-07	0.000	1.994E+12	
-8.3941	635972.	0.000					
75.460	0.000149	-22426.	675.9586	-7.777E-07	0.000	1.994E+12	
-8.1637	653717.	0.000					
76.453	0.000139	-14952.	580.7490	-8.894E-07	0.000	1.994E+12	
-7.8181	671462.	0.000					
77.446	0.000128	-8587.0591	490.2027	-9.598E-07	0.000	1.994E+12	
-7.3809	689208.	0.000					
78.439	0.000116	-3270.2977	405.2787	-9.952E-07	0.000	1.994E+12	
-6.8743	706953.	0.000					
79.432	0.000104	1070.5711	326.6835	-1.002E-06	0.000	1.994E+12	
-6.3186	724698.	0.000					
80.425	9.199E-05	4514.4404	254.8940	-9.851E-07	0.000	1.994E+12	
-5.7319	742444.	0.000					
81.418	8.041E-05	7144.5923	190.1831	-9.502E-07	0.000	1.994E+12	
-5.1303	760189.	0.000					
82.411	6.934E-05	9046.4287	132.6476	-9.019E-07	0.000	1.994E+12	
-4.5275	777934.	0.000					
83.404	5.892E-05	10306.	82.2350	-8.440E-07	0.000	1.994E+12	
-3.9347	795680.	0.000					
84.396	4.923E-05	11006.	38.7722	-7.804E-07	0.000	1.994E+12	
-3.3609	813425.	0.000					
85.389	4.032E-05	11229.	1.9918	-7.139E-07	0.000	1.994E+12	
-2.8130	831170.	0.000					
86.382	3.222E-05	11054.	-28.4411	-6.473E-07	0.000	1.994E+12	
-2.2954	848916.	0.000					
87.375	2.490E-05	10552.	-52.9050	-5.828E-07	0.000	1.994E+12	
-1.8110	866661.	0.000					
88.368	1.833E-05	9792.8168	-71.7994	-5.220E-07	0.000	1.994E+12	
-1.3606	884406.	0.000					
89.361	1.246E-05	8840.7669	-85.5246	-4.663E-07	0.000	1.994E+12	
-0.9433	902151.	0.000					
90.354	7.217E-06	7754.7995	-94.4639	-4.167E-07	0.000	1.994E+12	
-0.5572	919897.	0.000					
91.347	2.528E-06	6589.7298	-98.9684	-3.739E-07	0.000	1.994E+12	
-0.1989	937642.	0.000					
92.340	-1.693E-06	5396.4210	-99.3450	-3.381E-07	0.000	1.994E+12	
0.1357	955387.	0.000					
93.333	-5.529E-06	4222.3788	-95.8465	-3.093E-07	0.000	1.994E+12	
0.4515	973133.	0.000					
94.325	-9.064E-06	3112.4382	-88.6658	-2.874E-07	0.000	1.994E+12	
0.7538	990878.	0.000					
95.318	-1.238E-05	2109.5075	-77.9330	-2.718E-07	0.000	1.994E+12	
1.0478	1008623.	0.000					
96.311	-1.554E-05	1255.3267	-63.7152	-2.618E-07	0.000	1.994E+12	
1.3388	1026369.	0.000					
97.304	-1.862E-05	591.2003	-46.0212	-2.563E-07	0.000	1.994E+12	
1.6313	1044114.	0.000					
98.297	-2.165E-05	158.6588	-24.8095	-2.540E-07	0.000	1.994E+12	
1.9293	1061859.	0.000					
99.290	-2.467E-05	0.000	0.000	-2.535E-07	0.000	1.994E+12	
2.2352	539802.	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	=	0.5000000 inches
Computed slope at pile head	=	-0.0020301 radians
Maximum bending moment	=	9078166. inch-lbs
Maximum shear force	=	-38241. lbs
Depth of maximum bending moment	=	21.8438000 feet below pile head
Depth of maximum shear force	=	35.7444000 feet below pile head
Number of iterations	=	89
Number of zero deflection points	=	3

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 2

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head = 1.000000 inches
Moment at pile head = 3793200.0 in-lbs
Axial load at pile head = 0.0 lbs

Depth X	Deflect. y	Bending Moment	Shear Force	Slope S	Total Stress	Bending Stiffness	Soil Res. Spr. Distrib. p
Es*h	Lat. Load						
feet	inches	in-lbs	lbs	radians	psi*	lb-in^2	lb/in
lb/inch	lb/inch						
0.00	1.0000	3793200.	44719.	-0.003881	0.000	1.343E+12	
0.000	0.000	0.000					
0.993	0.9540	4326023.	44719.	-0.003845	0.000	1.343E+12	
0.000	0.000	0.000					
1.986	0.9084	4858845.	44719.	-0.003804	0.000	1.340E+12	
0.000	0.000	0.000					
2.979	0.8633	5391668.	44719.	-0.003758	0.000	1.338E+12	
0.000	0.000	0.000					
3.972	0.8188	5924491.	44719.	-0.003716	0.000	1.983E+12	
0.000	0.000	0.000					
4.965	0.7748	6457313.	44719.	-0.003679	0.000	1.982E+12	
0.000	0.000	0.000					
5.957	0.7312	6990136.	44719.	-0.003639	0.000	1.980E+12	
0.000	0.000	0.000					
6.950	0.6881	7522958.	44719.	-0.003595	0.000	1.979E+12	
0.000	0.000	0.000					
7.943	0.6455	8055781.	44719.	-0.003548	0.000	1.978E+12	
0.000	0.000	0.000					
8.936	0.6035	8588604.	44719.	-0.003498	0.000	1.977E+12	
0.000	0.000	0.000					
9.929	0.5621	9121426.	44719.	-0.003426	0.000	1.186E+12	
0.000	0.000	0.000					
10.922	0.5219	9654249.	44719.	-0.003332	0.000	1.186E+12	

0.000	0.000	0.000				
11.915	0.4827	10187072.	44719.	-0.003232	0.000	1.185E+12
0.000	0.000	0.000				
12.908	0.4448	10719894.	44719.	-0.003127	0.000	1.185E+12
0.000	0.000	0.000				
13.901	0.4082	11252717.	44719.	-0.003017	0.000	1.185E+12
0.000	0.000	0.000				
14.893	0.3730	11785540.	43494.	-0.002901	0.000	1.184E+12
-205.6665	6570.3140	0.000				
15.886	0.3391	12289165.	41885.	-0.002780	0.000	1.184E+12
-64.3614	2261.3904	0.000				
16.879	0.3067	12783654.	40340.	-0.002653	0.000	1.184E+12
-195.1019	7578.7694	0.000				
17.872	0.2759	13250446.	37193.	-0.002522	0.000	1.184E+12
-333.1587	14389.	0.000				
18.865	0.2466	13669942.	32418.	-0.002387	0.000	1.183E+12
-468.2829	22624.	0.000				
19.858	0.2190	14022959.	26106.	-0.002247	0.000	1.183E+12
-591.2137	32165.	0.000				
20.851	0.1931	14292046.	18441.	-0.002105	0.000	1.183E+12
-695.4464	42919.	0.000				
21.844	0.1688	14462405.	9662.9056	-0.001960	0.000	1.183E+12
-778.0657	54907.	0.000				
22.837	0.1464	14522309.	290.0922	-0.001814	0.000	1.183E+12
-795.2403	64741.	0.000				
23.830	0.1256	14469318.	-9048.5636	-0.001668	0.000	1.183E+12
-772.3321	73258.	0.000				
24.823	0.1066	14306685.	-18009.	-0.001523	0.000	1.183E+12
-731.6855	81776.	0.000				
25.815	0.0893	14040180.	-26400.	-0.001380	0.000	1.183E+12
-676.8758	90294.	0.000				
26.808	0.0737	13677585.	-34074.	-0.001241	0.000	1.183E+12
-611.3183	98812.	0.000				
27.801	0.0597	13228205.	-40923.	-0.001105	0.000	1.184E+12
-538.2317	107329.	0.000				
28.794	0.0474	12702416.	-46873.	-0.000975	0.000	1.184E+12
-460.6076	115847.	0.000				
29.787	0.0365	12111238.	-50752.	-0.000850	0.000	1.184E+12
-190.5658	62173.	0.000				
30.780	0.0271	11493007.	-52948.	-0.000731	0.000	1.185E+12
-178.0040	78209.	0.000				
31.773	0.0191	10849507.	-54981.	-0.000619	0.000	1.185E+12
-163.1963	101837.	0.000				
32.766	0.0124	10182838.	-56819.	-0.000513	0.000	1.185E+12
-145.3954	140051.	0.000				
33.759	0.006865	9495529.	-58418.	-0.000414	0.000	1.186E+12
-122.9239	213352.	0.000				
34.752	0.002497	8790769.	-59687.	-0.000323	0.000	1.215E+12
-90.2030	430416.	0.000				
35.744	-0.000843	8073204.	-59840.	-0.000256	0.000	1.978E+12
64.5282	911490.	0.000				
36.737	-0.003605	7364799.	-58815.	-0.000210	0.000	1.979E+12
107.4921	355318.	0.000				
37.730	-0.005837	6671655.	-57404.	-0.000167	0.000	1.981E+12
129.4904	264308.	0.000				
38.723	-0.007592	5996893.	-55769.	-0.000129	0.000	1.983E+12
144.9043	227409.	0.000				
39.716	-0.008917	5342702.	-53973.	-9.519E-05	0.000	1.984E+12
156.6417	209293.	0.000				
40.709	-0.009860	4710748.	-52051.	-6.502E-05	0.000	1.986E+12
165.8610	200416.	0.000				
41.702	-0.0105	4102340.	-50032.	-3.859E-05	0.000	1.987E+12
173.1523	197107.	0.000				

42.695	-0.0108	3518513.	-47935.	-1.575E-05	0.000	1.988E+12
178.8608	197689.	0.000				
43.688	-0.0108	2960078.	-45424.	3.659E-06	0.000	1.990E+12
242.5312	266529.	0.000				
44.680	-0.0107	2436073.	-42425.	1.981E-05	0.000	1.991E+12
260.9070	290724.	0.000				
45.673	-0.0104	1949108.	-39200.	3.293E-05	0.000	1.992E+12
280.5186	322310.	0.000				
46.666	-0.009908	1501965.	-35755.	4.325E-05	0.000	1.993E+12
297.7209	358019.	0.000				
47.659	-0.009339	1097088.	-32121.	5.102E-05	0.000	1.994E+12
312.2608	398374.	0.000				
48.652	-0.008692	736539.	-28331.	5.650E-05	0.000	1.994E+12
323.9263	444013.	0.000				
49.645	-0.007993	421977.	-24531.	5.996E-05	0.000	1.994E+12
313.8284	467810.	0.000				
50.638	-0.007264	151966.	-20898.	6.167E-05	0.000	1.994E+12
296.0080	485555.	0.000				
51.631	-0.006523	-76023.	-17493.	6.190E-05	0.000	1.994E+12
275.5579	503300.	0.000				
52.624	-0.005789	-264893.	-14344.	6.088E-05	0.000	1.994E+12
253.1396	521046.	0.000				
53.617	-0.005073	-417827.	-11469.	5.884E-05	0.000	1.994E+12
229.3854	538791.	0.000				
54.609	-0.004386	-538197.	-8881.9288	5.598E-05	0.000	1.994E+12
204.8881	556536.	0.000				
55.602	-0.003739	-629480.	-6587.8423	5.250E-05	0.000	1.994E+12
180.1937	574282.	0.000				
56.595	-0.003135	-695182.	-4586.2140	4.854E-05	0.000	1.994E+12
155.7965	592027.	0.000				
57.588	-0.002582	-738768.	-2870.8851	4.425E-05	0.000	1.994E+12
132.1360	609772.	0.000				
58.581	-0.002081	-763594.	-1215.2641	3.976E-05	0.000	1.994E+12
145.7740	834657.	0.000				
59.574	-0.001634	-767727.	422.7933	3.519E-05	0.000	1.994E+12
129.1878	941819.	0.000				
60.567	-0.001242	-753519.	1863.4403	3.064E-05	0.000	1.994E+12
112.6370	1080211.	0.000				
61.560	-0.000904	-723322.	3106.8874	2.623E-05	0.000	1.994E+12
96.0861	1266282.	0.000				
62.553	-0.000617	-679483.	4152.3111	2.204E-05	0.000	1.994E+12
79.3971	1532458.	0.000				
63.546	-0.000379	-624374.	4995.8818	1.814E-05	0.000	1.994E+12
62.2034	1956061.	0.000				
64.538	-0.000185	-560434.	5625.3484	1.460E-05	0.000	1.994E+12
43.4579	2799863.	0.000				
65.531	-3.088E-05	-490324.	5990.0416	1.146E-05	0.000	1.994E+12
17.7589	6852833.	0.000				
66.524	8.827E-05	-417693.	5916.9843	8.752E-06	0.000	1.994E+12
-30.0222	4052408.	0.000				
67.517	0.000178	-349325.	5484.3723	6.460E-06	0.000	1.994E+12
-42.5953	2856354.	0.000				
68.510	0.000242	-287003.	4934.3331	4.559E-06	0.000	1.994E+12
-49.7334	2446421.	0.000				
69.503	0.000286	-231741.	4315.9224	3.009E-06	0.000	1.994E+12
-54.0721	2250136.	0.000				
70.496	0.000314	-184156.	3656.4932	1.767E-06	0.000	1.994E+12
-56.6187	2148936.	0.000				
71.489	0.000328	-144609.	2974.1945	7.842E-07	0.000	1.994E+12
-57.9109	2100992.	0.000				
72.482	0.000333	-113282.	2282.0004	1.369E-08	0.000	1.994E+12
-58.2797	2087699.	0.000				
73.475	0.000329	-90230.	1833.1864	-5.944E-07	0.000	1.994E+12

```
-17.0575    618227.      0.000
    74.468   0.000318    -69598.  1630.3063 -1.072E-06      0.000  1.994E+12
-16.9977    635972.      0.000
    75.460   0.000303    -51380.  1429.9416 -1.433E-06      0.000  1.994E+12
-16.6353    653717.      0.000
    76.453   0.000284    -35523.  1235.3932 -1.693E-06      0.000  1.994E+12
-16.0213    671462.      0.000
    77.446   0.000263    -21941.  1049.3670 -1.865E-06      0.000  1.994E+12
-15.2047    689208.      0.000
    78.439   0.000240    -10517.   874.0028 -1.962E-06      0.000  1.994E+12
-14.2316    706953.      0.000
    79.432   0.000216 -1113.9276   710.9125 -1.996E-06      0.000  1.994E+12
-13.1445    724698.      0.000
    80.425   0.000192  6423.4422   561.2264 -1.981E-06      0.000  1.994E+12
-11.9816    742444.      0.000
    81.418   0.000169    12260.    425.6444 -1.925E-06      0.000  1.994E+12
-10.7770    760189.      0.000
    82.411   0.000146    16566.    304.4907 -1.839E-06      0.000  1.994E+12
-9.5597     777934.      0.000
    83.404   0.000125    19516.    197.7703 -1.731E-06      0.000  1.994E+12
-8.3542     795680.      0.000
    84.396   0.000105    21279.    105.2263 -1.609E-06      0.000  1.994E+12
-7.1801     813425.      0.000
    85.389  8.676E-05    22023.     26.3960 -1.480E-06      0.000  1.994E+12
-6.0523     831170.      0.000
    86.382  6.991E-05    21908.    -39.3355 -1.348E-06      0.000  1.994E+12
-4.9813     848916.      0.000
    87.375  5.463E-05    21086.    -92.6841 -1.220E-06      0.000  1.994E+12
-3.9737     866661.      0.000
    88.368  4.085E-05    19700.   -134.4194 -1.098E-06      0.000  1.994E+12
-3.0319     884406.      0.000
    89.361  2.847E-05    17883.   -165.3221 -9.857E-07      0.000  1.994E+12
-2.1553     902151.      0.000
    90.354  1.736E-05    15760.   -186.1463 -8.852E-07      0.000  1.994E+12
-1.3402     919897.      0.000
    91.347  7.373E-06    13447.   -197.5867 -7.979E-07      0.000  1.994E+12
-0.5802     937642.      0.000
    92.340 -1.655E-06    11052.   -200.2525 -7.247E-07      0.000  1.994E+12
0.1327      955387.      0.000
    93.333 -9.896E-06  8675.0247  -194.6465 -6.658E-07      0.000  1.994E+12
0.8083      973133.      0.000
    94.325 -1.752E-05  6413.2235  -181.1511 -6.207E-07      0.000  1.994E+12
1.4570      990878.      0.000
    95.318 -2.469E-05  4358.2657  -160.0211 -5.885E-07      0.000  1.994E+12
2.0898     1008623.      0.000
    96.311 -3.154E-05  2599.9849  -131.3835 -5.677E-07      0.000  1.994E+12
2.7172     1026369.      0.000
    97.304 -3.822E-05  1227.4505   -95.2453 -5.563E-07      0.000  1.994E+12
3.3489     1044114.      0.000
    98.297 -4.480E-05   330.3284   -51.5095 -5.516E-07      0.000  1.994E+12
3.9926     1061859.      0.000
    99.290 -5.136E-05     0.000      0.000 -5.506E-07      0.000  1.994E+12
4.6537      539802.      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. 2:

```
Pile-head deflection             =      1.0000000 inches
Computed slope at pile head      =     -0.0038805 radians
Maximum bending moment           =      14522309. inch-lbs
Maximum shear force              =        -59840. lbs
Depth of maximum bending moment  =     22.8367000 feet below pile head
Depth of maximum shear force     =     35.7444000 feet below pile head
Number of iterations             =             70
Number of zero deflection points =              3
```

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 3

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head = 1.500000 inches
Moment at pile head = 3793200.0 in-lbs
Axial load at pile head = 0.0 lbs

Depth X	Deflect. y	Bending Moment	Shear Force	Slope S	Total Stress	Bending Stiffness	Soil Res. Spr. Distrib. p
feet	inches	in-lbs	lbs	radians	psi*	lb-in^2	lb/in
0.00	1.5000	3793200.	64823.	-0.005697	0.000	1.343E+12	0.000
0.993	1.4323	4565551.	64823.	-0.005660	0.000	1.343E+12	0.000
1.986	1.3651	5337902.	64823.	-0.005616	0.000	1.338E+12	0.000
2.979	1.2985	6110253.	64823.	-0.005505	0.000	4.190E+11	0.000
3.972	1.2339	6882604.	64823.	-0.005398	0.000	1.981E+12	0.000
4.965	1.1699	7654955.	64823.	-0.005354	0.000	1.979E+12	0.000
5.957	1.1064	8427306.	64823.	-0.005305	0.000	1.977E+12	0.000
6.950	1.0435	9199657.	64823.	-0.005234	0.000	1.186E+12	0.000
7.943	0.9816	9972008.	64823.	-0.005137	0.000	1.185E+12	0.000
8.936	0.9210	10744359.	64823.	-0.005033	0.000	1.185E+12	0.000
9.929	0.8617	11516710.	64823.	-0.004921	0.000	1.185E+12	0.000
10.922	0.8038	12289061.	64823.	-0.004802	0.000	1.184E+12	0.000
11.915	0.7473	13061412.	64823.	-0.004674	0.000	1.184E+12	0.000
12.908	0.6924	13833763.	64823.	-0.004539	0.000	1.183E+12	0.000
13.901	0.6391	14606114.	64823.	-0.004395	0.000	1.183E+12	0.000

14.893	0.5876	15378465.	63397.	-0.004244	0.000	1.182E+12
-239.3203	4852.4148	0.000				
15.886	0.5380	16116841.	61538.	-0.004086	0.000	1.182E+12
-72.7275	1610.6911	0.000				
16.879	0.4903	16844893.	59781.	-0.003919	0.000	1.181E+12
-222.2336	5400.7641	0.000				
17.872	0.4446	17541396.	56181.	-0.003746	0.000	1.181E+12
-382.0481	10239.	0.000				
18.865	0.4010	18183663.	50689.	-0.003566	0.000	1.181E+12
-539.9012	16042.	0.000				
19.858	0.3596	18749284.	43388.	-0.003379	0.000	1.180E+12
-685.6145	22716.	0.000				
20.851	0.3205	19217573.	34468.	-0.003188	0.000	1.180E+12
-811.5757	30173.	0.000				
21.844	0.2837	19570649.	24183.	-0.002992	0.000	1.180E+12
-914.8156	38427.	0.000				
22.837	0.2492	19793856.	12803.	-0.002793	0.000	1.180E+12
-995.5391	47603.	0.000				
23.830	0.2171	19875733.	630.5125	-0.002593	0.000	1.180E+12
-1047.6715	57500.	0.000				
24.823	0.1874	19808881.	-12028.	-0.002393	0.000	1.180E+12
-1077.1040	68484.	0.000				
25.815	0.1601	19589120.	-24829.	-0.002194	0.000	1.180E+12
-1071.6414	79763.	0.000				
26.808	0.1351	19217226.	-37354.	-0.001998	0.000	1.180E+12
-1030.8295	90897.	0.000				
27.801	0.1125	18698993.	-49213.	-0.001806	0.000	1.180E+12
-959.7802	101672.	0.000				
28.794	0.0921	18044508.	-60187.	-0.001621	0.000	1.181E+12
-882.3364	114173.	0.000				
29.787	0.0739	17264764.	-66879.	-0.001443	0.000	1.181E+12
-240.9899	38880.	0.000				
30.780	0.0577	16450808.	-69679.	-0.001273	0.000	1.182E+12
-228.9521	47279.	0.000				
31.773	0.0435	15604349.	-72322.	-0.001111	0.000	1.182E+12
-214.7824	58801.	0.000				
32.766	0.0312	14727400.	-74781.	-0.000958	0.000	1.183E+12
-197.9689	75556.	0.000				
33.759	0.0207	13822347.	-77018.	-0.000815	0.000	1.183E+12
-177.5585	102281.	0.000				
34.752	0.0118	12892086.	-78978.	-0.000680	0.000	1.184E+12
-151.4244	152800.	0.000				
35.744	0.004477	11940330.	-80551.	-0.000555	0.000	1.184E+12
-112.6093	299678.	0.000				
36.737	-0.001422	10972586.	-80753.	-0.000440	0.000	1.185E+12
78.7466	659886.	0.000				
37.730	-0.006006	10016022.	-79505.	-0.000334	0.000	1.185E+12
130.6960	259270.	0.000				
38.723	-0.009391	9078012.	-77800.	-0.000238	0.000	1.186E+12
155.5266	197325.	0.000				
39.716	-0.0117	8162081.	-75852.	-0.000168	0.000	1.978E+12
171.4128	174724.	0.000				
40.709	-0.0134	7270484.	-73737.	-0.000122	0.000	1.980E+12
183.7063	163332.	0.000				
41.702	-0.0146	6404967.	-71490.	-8.068E-05	0.000	1.982E+12
193.4189	157934.	0.000				
42.695	-0.0153	5566907.	-69140.	-4.471E-05	0.000	1.984E+12
201.0976	156361.	0.000				
43.688	-0.0157	4757396.	-66137.	-1.372E-05	0.000	1.986E+12
302.9630	230548.	0.000				
44.680	-0.0157	3990895.	-62373.	1.252E-05	0.000	1.987E+12
328.8993	250391.	0.000				
45.673	-0.0154	3271084.	-58291.	3.428E-05	0.000	1.989E+12

356.1792	276309.	0.000				
46.666	-0.0148	2601838.	-53903.	5.187E-05	0.000	1.991E+12
380.5040	305630.	0.000				
47.659	-0.0141	1986609.	-49244.	6.560E-05	0.000	1.992E+12
401.5266	338747.	0.000				
48.652	-0.0133	1428382.	-44356.	7.581E-05	0.000	1.993E+12
418.9493	376147.	0.000				
49.645	-0.0123	929629.	-39283.	8.285E-05	0.000	1.994E+12
432.5312	418424.	0.000				
50.638	-0.0113	492280.	-34073.	8.710E-05	0.000	1.994E+12
442.0896	466298.	0.000				
51.631	-0.0102	117692.	-28862.	8.892E-05	0.000	1.994E+12
432.5923	503300.	0.000				
52.624	-0.009177	-195485.	-23894.	8.869E-05	0.000	1.994E+12
401.3278	521046.	0.000				
53.617	-0.008127	-451689.	-19313.	8.676E-05	0.000	1.994E+12
367.5242	538791.	0.000				
54.609	-0.007110	-655718.	-15146.	8.345E-05	0.000	1.994E+12
332.0957	556536.	0.000				
55.602	-0.006139	-812602.	-11404.	7.906E-05	0.000	1.994E+12
295.8863	574282.	0.000				
56.595	-0.005226	-927481.	-8094.8132	7.386E-05	0.000	1.994E+12
259.6595	592027.	0.000				
57.588	-0.004379	-1005498.	-5212.9102	6.809E-05	0.000	1.994E+12
224.0924	609772.	0.000				
58.581	-0.003603	-1051702.	-2735.1377	6.194E-05	0.000	1.994E+12
191.8227	634297.	0.000				
59.574	-0.002903	-1070675.	-566.6966	5.560E-05	0.000	1.994E+12
172.1685	706713.	0.000				
60.567	-0.002278	-1065206.	1367.6815	4.922E-05	0.000	1.994E+12
152.5333	797695.	0.000				
61.560	-0.001730	-1038084.	3068.1848	4.293E-05	0.000	1.994E+12
132.9106	915479.	0.000				
62.553	-0.001255	-992093.	4534.4835	3.687E-05	0.000	1.994E+12
113.2200	1074717.	0.000				
63.546	-0.000851	-930029.	5764.4453	3.113E-05	0.000	1.994E+12
93.2395	1305064.	0.000				
64.538	-0.000513	-854728.	6751.3417	2.579E-05	0.000	1.994E+12
72.4195	1680366.	0.000				
65.531	-0.000237	-769147.	7475.6556	2.094E-05	0.000	1.994E+12
49.1628	2475708.	0.000				
66.524	-1.447E-05	-676586.	7841.1549	1.662E-05	0.000	1.994E+12
12.1894	10033854.	0.000				
67.517	0.000159	-582295.	7673.4067	1.286E-05	0.000	1.994E+12
-40.3474	3014286.	0.000				
68.510	0.000292	-493732.	7107.7740	9.645E-06	0.000	1.994E+12
-54.5989	2227979.	0.000				
69.503	0.000389	-412920.	6406.8978	6.937E-06	0.000	1.994E+12
-63.0491	1929508.	0.000				
70.496	0.000457	-341058.	5624.2137	4.684E-06	0.000	1.994E+12
-68.3310	1780423.	0.000				
71.489	0.000501	-278897.	4791.0659	2.831E-06	0.000	1.994E+12
-71.5199	1701077.	0.000				
72.482	0.000525	-226889.	3928.9101	1.320E-06	0.000	1.994E+12
-73.2003	1662053.	0.000				
73.475	0.000532	-185273.	3328.2530	8.883E-08	0.000	1.994E+12
-27.6251	618227.	0.000				
74.468	0.000527	-147578.	2996.1421	-9.057E-07	0.000	1.994E+12
-28.1225	635972.	0.000				
75.460	0.000511	-113876.	2661.6377	-1.687E-06	0.000	1.994E+12
-28.0269	653717.	0.000				
76.453	0.000487	-84153.	2331.2792	-2.279E-06	0.000	1.994E+12
-27.4266	671462.	0.000				

77.446	0.000457	-58323.	2010.5666	-2.704E-06	0.000	1.994E+12
-26.4077	689208.	0.000				
78.439	0.000422	-36242.	1703.9959	-2.987E-06	0.000	1.994E+12
-25.0527	706953.	0.000				
79.432	0.000385	-17717.	1415.1135	-3.148E-06	0.000	1.994E+12
-23.4386	724698.	0.000				
80.425	0.000347	-2519.9509	1146.5855	-3.208E-06	0.000	1.994E+12
-21.6361	742444.	0.000				
81.418	0.000309	9605.6318	900.2797	-3.187E-06	0.000	1.994E+12
-19.7085	760189.	0.000				
82.411	0.000271	18933.	677.3548	-3.102E-06	0.000	1.994E+12
-17.7114	777934.	0.000				
83.404	0.000235	25747.	478.3564	-2.968E-06	0.000	1.994E+12
-15.6922	795680.	0.000				
84.396	0.000201	30332.	303.3143	-2.801E-06	0.000	1.994E+12
-13.6901	813425.	0.000				
85.389	0.000168	32975.	151.8407	-2.612E-06	0.000	1.994E+12
-11.7360	831170.	0.000				
86.382	0.000138	33951.	23.2260	-2.412E-06	0.000	1.994E+12
-9.8530	848916.	0.000				
87.375	0.000111	33528.	-83.4692	-2.210E-06	0.000	1.994E+12
-8.0567	866661.	0.000				
88.368	8.562E-05	31962.	-169.3283	-2.015E-06	0.000	1.994E+12
-6.3555	884406.	0.000				
89.361	6.276E-05	29493.	-235.4986	-1.831E-06	0.000	1.994E+12
-4.7517	902151.	0.000				
90.354	4.199E-05	26350.	-283.1207	-1.664E-06	0.000	1.994E+12
-3.2420	919897.	0.000				
91.347	2.310E-05	22746.	-313.2655	-1.517E-06	0.000	1.994E+12
-1.8181	937642.	0.000				
92.340	5.833E-06	18885.	-326.8827	-1.393E-06	0.000	1.994E+12
-0.4677	955387.	0.000				
93.333	-1.009E-05	14957.	-324.7583	-1.292E-06	0.000	1.994E+12
0.8243	973133.	0.000				
94.325	-2.495E-05	11146.	-307.4853	-1.214E-06	0.000	1.994E+12
2.0751	990878.	0.000				
95.318	-3.902E-05	7629.6383	-275.4450	-1.158E-06	0.000	1.994E+12
3.3031	1008623.	0.000				
96.311	-5.254E-05	4582.2240	-228.8031	-1.121E-06	0.000	1.994E+12
4.5261	1026369.	0.000				
97.304	-6.574E-05	2177.3515	-167.5192	-1.101E-06	0.000	1.994E+12
5.7609	1044114.	0.000				
98.297	-7.878E-05	590.3081	-91.3717	-1.093E-06	0.000	1.994E+12
7.0211	1061859.	0.000				
99.290	-9.178E-05	0.000	0.000	-1.091E-06	0.000	1.994E+12
8.3164	539802.	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. 3:

Pile-head deflection	=	1.5000000 inches
Computed slope at pile head	=	-0.0056969 radians
Maximum bending moment	=	19875733. inch-lbs

STR-1
D = 2"
LATERAL RESISTANCE = 81.31 K

Maximum shear force	=	-80753. lbs
Depth of maximum bending moment	=	23.8296000 feet below pile head
Depth of maximum shear force	=	36.7373000 feet below pile head
Number of iterations	=	25
Number of zero deflection points	=	3

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 4

Pile-head conditions are Displacement and Moment (Loading Type 4)

Displacement of pile head	=	2.000000 inches
Moment at pile head	=	3793200.0 in-lbs
Axial load at pile head	=	0.0 lbs

Depth X	Deflect. y	Bending Moment	Shear Force	Slope S	Total Stress	Bending Stiffness	Soil Res. Spr. Es*h	Distrib. Lat. Load p
feet	inches	in-lbs	lbs	radians	psi*	lb-in^2	lb/inch	lb/inch
0.00	2.0000	3793200.	81307.	-0.007274	0.000	1.343E+12	0.000	0.000
0.993	1.9135	4761952.	81307.	-0.007236	0.000	1.343E+12	0.000	0.000
1.986	1.8276	5730703.	81307.	-0.007190	0.000	1.336E+12	0.000	0.000
2.979	1.7422	6699455.	81307.	-0.007069	0.000	4.187E+11	0.000	0.000
3.972	1.6591	7668207.	81307.	-0.006950	0.000	1.979E+12	0.000	0.000
4.965	1.5766	8636959.	81307.	-0.006888	0.000	1.328E+12	0.000	0.000
5.957	1.4950	9605710.	81307.	-0.006801	0.000	1.186E+12	0.000	0.000
6.950	1.4145	10574462.	81307.	-0.006700	0.000	1.185E+12	0.000	0.000
7.943	1.3353	11543214.	81307.	-0.006589	0.000	1.185E+12	0.000	0.000
8.936	1.2575	12511966.	81307.	-0.006468	0.000	1.184E+12	0.000	0.000
9.929	1.1812	13480717.	81307.	-0.006337	0.000	1.183E+12	0.000	0.000
10.922	1.1065	14449469.	81307.	-0.006196	0.000	1.183E+12	0.000	0.000
11.915	1.0335	15418221.	81307.	-0.006046	0.000	1.182E+12	0.000	0.000
12.908	0.9624	16386973.	81307.	-0.005886	0.000	1.182E+12	0.000	0.000
13.901	0.8933	17355724.	81307.	-0.005715	0.000	1.181E+12	0.000	0.000
14.893	0.8262	18324476.	79709.	-0.005535	0.000	1.181E+12	-268.1067	3866.3393
15.886	0.7614	19255167.	77637.	-0.005346	0.000	1.180E+12	-79.7319	1247.7438
16.879	0.6988	20174539.	75701.	-0.005147	0.000	1.180E+12	-245.2116	4180.7710
17.872	0.6387	21059099.	71715.	-0.004938	0.000	1.179E+12		

-423.9029	7907.5402	0.000				
18.865	0.5811	21883482.	65604.	-0.004721	0.000	1.179E+12
-601.8395	12339.	0.000				
19.858	0.5262	22622426.	57443.	-0.004496	0.000	1.178E+12
-768.1652	17393.	0.000				
20.851	0.4740	23252319.	47419.	-0.004264	0.000	1.178E+12
-914.3620	22984.	0.000				
21.844	0.4246	23752408.	35791.	-0.004027	0.000	1.177E+12
-1037.5366	29115.	0.000				
22.837	0.3781	24105205.	22830.	-0.003784	0.000	1.177E+12
-1138.1018	35869.	0.000				
23.830	0.3344	24296434.	8851.3482	-0.003539	0.000	1.177E+12
-1208.3089	43051.	0.000				
24.823	0.2937	24316129.	-5816.0656	-0.003293	0.000	1.177E+12
-1253.7406	50860.	0.000				
25.815	0.2559	24157839.	-20812.	-0.003048	0.000	1.177E+12
-1263.3831	58816.	0.000				
26.808	0.2211	23820197.	-35721.	-0.002805	0.000	1.177E+12
-1239.2853	66792.	0.000				
27.801	0.1891	23306623.	-50151.	-0.002567	0.000	1.178E+12
-1182.8497	74536.	0.000				
28.794	0.1599	22625128.	-63881.	-0.002335	0.000	1.178E+12
-1121.8561	83593.	0.000				
29.787	0.1334	21784372.	-72313.	-0.002110	0.000	1.179E+12
-293.5231	26207.	0.000				
30.780	0.1096	20901947.	-75751.	-0.001894	0.000	1.179E+12
-283.5571	30820.	0.000				
31.773	0.0883	19979267.	-79060.	-0.001688	0.000	1.180E+12
-271.9011	36686.	0.000				
32.766	0.0694	19017988.	-82219.	-0.001491	0.000	1.180E+12
-258.3542	44357.	0.000				
33.759	0.0528	18020032.	-85203.	-0.001304	0.000	1.181E+12
-242.6094	54772.	0.000				
34.752	0.0383	16987634.	-87984.	-0.001128	0.000	1.181E+12
-224.1623	69697.	0.000				
35.744	0.0259	15923414.	-90523.	-0.000962	0.000	1.182E+12
-202.0964	92944.	0.000				
36.737	0.0154	14830504.	-92766.	-0.000807	0.000	1.183E+12
-174.4539	134919.	0.000				
37.730	0.006685	13712828.	-94613.	-0.000663	0.000	1.183E+12
-135.4901	241479.	0.000				
38.723	-0.000391	12575918.	-95099.	-0.000531	0.000	1.184E+12
53.8297	1642114.	0.000				
39.716	-0.005958	11446649.	-93963.	-0.000410	0.000	1.185E+12
136.9337	273821.	0.000				
40.709	-0.0102	10336819.	-92149.	-0.000300	0.000	1.185E+12
167.4877	196523.	0.000				
41.702	-0.0131	9250767.	-90040.	-0.000202	0.000	1.186E+12
186.6557	169609.	0.000				
42.695	-0.0150	8191213.	-87739.	-0.000131	0.000	1.977E+12
199.5134	158873.	0.000				
43.688	-0.0162	7159982.	-84706.	-8.440E-05	0.000	1.980E+12
309.5740	227335.	0.000				
44.680	-0.0170	6172699.	-80803.	-4.431E-05	0.000	1.982E+12
345.5444	242554.	0.000				
45.673	-0.0173	5234470.	-76465.	-1.004E-05	0.000	1.984E+12
382.6559	263834.	0.000				
46.666	-0.0172	4350564.	-71704.	1.872E-05	0.000	1.986E+12
416.5347	288320.	0.000				
47.659	-0.0168	3525791.	-66561.	4.233E-05	0.000	1.988E+12
446.7864	316213.	0.000				
48.652	-0.0162	2764444.	-61081.	6.117E-05	0.000	1.990E+12
473.0523	347823.	0.000				

49.645	-0.0154	2070253.	-55314.	7.564E-05	0.000	1.992E+12
495.0243	383563.	0.000				
50.638	-0.0144	1446337.	-49312.	8.615E-05	0.000	1.993E+12
512.4546	423949.	0.000				
51.631	-0.0133	895170.	-43130.	9.315E-05	0.000	1.994E+12
525.1616	469612.	0.000				
52.624	-0.0122	418556.	-36828.	9.708E-05	0.000	1.994E+12
532.7504	521046.	0.000				
53.617	-0.0110	17573.	-30688.	9.838E-05	0.000	1.994E+12
497.9172	538791.	0.000				
54.609	-0.009838	-312724.	-24984.	9.750E-05	0.000	1.994E+12
459.5360	556536.	0.000				
55.602	-0.008688	-577785.	-19752.	9.484E-05	0.000	1.994E+12
418.7345	574282.	0.000				
56.595	-0.007578	-783401.	-15014.	9.077E-05	0.000	1.994E+12
376.5500	592027.	0.000				
57.588	-0.006525	-935561.	-10781.	8.563E-05	0.000	1.994E+12
333.9156	609772.	0.000				
58.581	-0.005538	-1040318.	-7375.4685	7.973E-05	0.000	1.994E+12
237.8009	511654.	0.000				
59.574	-0.004625	-1111316.	-4664.1483	7.330E-05	0.000	1.994E+12
217.3172	559882.	0.000				
60.567	-0.003791	-1151463.	-2197.3598	6.654E-05	0.000	1.994E+12
196.7542	618397.	0.000				
61.560	-0.003039	-1163678.	24.2811	5.962E-05	0.000	1.994E+12
176.1671	690666.	0.000				
62.553	-0.002370	-1150884.	2000.5997	5.271E-05	0.000	1.994E+12
155.5748	782088.	0.000				
63.546	-0.001783	-1116004.	3731.3152	4.593E-05	0.000	1.994E+12
134.9405	901685.	0.000				
64.538	-0.001276	-1061968.	5215.1301	3.943E-05	0.000	1.994E+12
114.1304	1066103.	0.000				
65.531	-0.000844	-991730.	6447.9883	3.329E-05	0.000	1.994E+12
92.8153	1310952.	0.000				
66.524	-0.000482	-908315.	7418.9913	2.761E-05	0.000	1.994E+12
70.1758	1733926.	0.000				
67.517	-0.000186	-814938.	8096.3923	2.247E-05	0.000	1.994E+12
43.5317	2795469.	0.000				
68.510	5.312E-05	-715381.	8217.0187	1.789E-05	0.000	1.994E+12
-23.2835	5222883.	0.000				
69.503	0.000241	-619130.	7782.8846	1.391E-05	0.000	1.994E+12
-49.5896	2453309.	0.000				
70.496	0.000384	-529918.	7114.1830	1.047E-05	0.000	1.994E+12
-62.6577	1941729.	0.000				
71.489	0.000490	-449602.	6319.3362	7.546E-06	0.000	1.994E+12
-70.7641	1719324.	0.000				
72.482	0.000564	-379331.	5445.5434	5.069E-06	0.000	1.994E+12
-75.9094	1602800.	0.000				
73.475	0.000611	-319837.	4804.3956	2.980E-06	0.000	1.994E+12
-31.7127	618227.	0.000				
74.468	0.000635	-264844.	4413.4525	1.233E-06	0.000	1.994E+12
-33.9104	635972.	0.000				
75.460	0.000641	-214666.	4002.0588	-1.995E-07	0.000	1.994E+12
-35.1455	653717.	0.000				
76.453	0.000631	-169477.	3580.9878	-1.347E-06	0.000	1.994E+12
-35.5349	671462.	0.000				
77.446	0.000608	-129332.	3159.6132	-2.240E-06	0.000	1.994E+12
-35.1964	689208.	0.000				
78.439	0.000577	-94185.	2745.9178	-2.908E-06	0.000	1.994E+12
-34.2458	706953.	0.000				
79.432	0.000539	-63898.	2346.5336	-3.380E-06	0.000	1.994E+12
-32.7942	724698.	0.000				
80.425	0.000497	-38268.	1966.8088	-3.685E-06	0.000	1.994E+12

```
-30.9458    742444.      0.000
    81.418   0.000451    -17030.  1610.8974 -3.851E-06      0.000  1.994E+12
-28.7969    760189.      0.000
    82.411   0.000405   119.4952  1281.8651 -3.901E-06      0.000  1.994E+12
-26.4340    777934.      0.000
    83.404   0.000358    13516.    981.8083 -3.860E-06      0.000  1.994E+12
-23.9331    795680.      0.000
    84.396   0.000313    23516.    711.9819 -3.750E-06      0.000  1.994E+12
-21.3595    813425.      0.000
    85.389   0.000269    30483.    472.9312 -3.588E-06      0.000  1.994E+12
-18.7672    831170.      0.000
    86.382   0.000227    34785.    264.6249 -3.393E-06      0.000  1.994E+12
-16.1988    848916.      0.000
    87.375   0.000188    36788.     86.5860 -3.180E-06      0.000  1.994E+12
-13.6865    866661.      0.000
    88.368   0.000152    36849.    -61.9820 -2.960E-06      0.000  1.994E+12
-11.2519    884406.      0.000
    89.361   0.000118    35311.   -182.0762 -2.744E-06      0.000  1.994E+12
-8.9070     902151.      0.000
    90.354  8.620E-05    32510.   -274.7850 -2.541E-06      0.000  1.994E+12
-6.6550     919897.      0.000
    91.347  5.708E-05    28763.   -341.1894 -2.358E-06      0.000  1.994E+12
-4.4916     937642.      0.000
    92.340  3.000E-05    24379.   -382.2784 -2.200E-06      0.000  1.994E+12
-2.4056     955387.      0.000
    93.333  4.661E-06    19654.   -398.8774 -2.068E-06      0.000  1.994E+12
-0.3807     973133.      0.000
    94.325 -1.928E-05    14874.   -391.5942 -1.965E-06      0.000  1.994E+12
1.6033      990878.      0.000
    95.318 -4.216E-05    10322.   -360.7818 -1.890E-06      0.000  1.994E+12
3.5689     1008623.      0.000
    96.311 -6.430E-05  6277.0806  -306.5205 -1.840E-06      0.000  1.994E+12
5.5393     1026369.      0.000
    97.304 -8.600E-05  3018.1397  -228.6218 -1.812E-06      0.000  1.994E+12
7.5366     1044114.      0.000
    98.297  -0.000107   829.1148  -126.6551 -1.801E-06      0.000  1.994E+12
9.5794     1061859.      0.000
    99.290  -0.000129      0.000      0.000 -1.798E-06      0.000  1.994E+12
11.6808     539802.      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. 4:

```
Pile-head deflection              =      2.0000000 inches
Computed slope at pile head       =     -0.0072742 radians
Maximum bending moment            =      24316129. inch-lbs
Maximum shear force               =        -95099. lbs
Depth of maximum bending moment   =     24.8225000 feet below pile head
Depth of maximum shear force      =     38.7231000 feet below pile head
Number of iterations              =             54
Number of zero deflection points  =              3
```


Pile-head Deflection vs. Pile Length for Load Case 4

Boundary Condition Type 4, Deflection and Moment

```
Deflection =         2.00000 in
Moment     =      3793200. in- lb
Axial Load =            0.  lb
```

Pile Length feet	Pile Head Deflection inches	Maximum Moment in-lbs	Maximum Shear lbs
99.2900	2.0000000	24316129.	-95099.
94.3255	2.0000000	24504975.	-96727.
89.3610	2.0000000	24213305.	-94256.
84.3965	2.0000000	24239414.	-94583.
79.4320	2.0000000	24150574.	-94044.
74.4675	2.0000000	24343237.	-95428.
69.5030	2.0000000	24345289.	-95426.
64.5385	2.0000000	24303128.	-94434.
59.5740	2.0000000	24348518.	-94824.
54.6095	2.0000000	23971285.	-96823.
49.6450	2.0000000	22353775.	-103165.
44.6805	2.0000000	17016700.	-96258.
39.7160	2.0000000	9445260.	-73026.
34.7515	2.0000000	6214615.	-64898.
29.7870	2.0000000	4592931.	-56652.
24.8225	2.0000000	3793200.	-30756.
19.8580	2.0000000	3793200.	-17460.
19.8580	0.000000	4.792396E+11	-1.005555E+11
19.8580	0.000000	4.792396E+11	-1.005555E+11
19.8580	0.000000	4.792396E+11	-1.005555E+11

Computed Values of Pile Loading and Deflection for Lateral Loading for Load Case Number 5

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head = 0.500000 inches
Moment at pile head = 3248400.0 in-lbs
Axial load at pile head = 0.0 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. Spr. Distrib. p lb/in
	Es*h	Lat. Load					
	lb/inch	lb/inch					
0.00	0.5000	3248400.	25024.	-0.001991	0.000	1.345E+12	
0.000	0.000	0.000					
0.993	0.4764	3546558.	25024.	-0.001961	0.000	1.345E+12	
0.000	0.000	0.000					
1.986	0.4533	3844717.	25024.	-0.001928	0.000	1.343E+12	
0.000	0.000	0.000					
2.979	0.4305	4142875.	25024.	-0.001893	0.000	1.342E+12	

0.000	0.000	0.000				
3.972	0.4082	4441033.	25024.	-0.001861	0.000	1.986E+12
0.000	0.000	0.000				
4.965	0.3862	4739192.	25024.	-0.001833	0.000	1.986E+12
0.000	0.000	0.000				
5.957	0.3645	5037350.	25024.	-0.001804	0.000	1.985E+12
0.000	0.000	0.000				
6.950	0.3432	5335508.	25024.	-0.001773	0.000	1.984E+12
0.000	0.000	0.000				
7.943	0.3222	5633667.	25024.	-0.001740	0.000	1.983E+12
0.000	0.000	0.000				
8.936	0.3017	5931825.	25024.	-0.001705	0.000	1.983E+12
0.000	0.000	0.000				
9.929	0.2816	6229983.	25024.	-0.001669	0.000	1.982E+12
0.000	0.000	0.000				
10.922	0.2619	6528142.	25024.	-0.001630	0.000	1.981E+12
0.000	0.000	0.000				
11.915	0.2427	6826300.	25024.	-0.001590	0.000	1.981E+12
0.000	0.000	0.000				
12.908	0.2240	7124458.	25024.	-0.001548	0.000	1.980E+12
0.000	0.000	0.000				
13.901	0.2059	7422617.	25024.	-0.001504	0.000	1.979E+12
0.000	0.000	0.000				
14.893	0.1882	7720775.	24049.	-0.001459	0.000	1.979E+12
-163.7347	10366.	0.000				
15.886	0.1711	7995689.	22753.	-0.001412	0.000	1.978E+12
-53.6972	3739.6013	0.000				
16.879	0.1546	8262980.	21473.	-0.001363	0.000	1.977E+12
-161.2962	12435.	0.000				
17.872	0.1386	8507374.	18976.	-0.001312	0.000	1.977E+12
-257.7119	22152.	0.000				
18.865	0.1233	8715181.	15551.	-0.001244	0.000	1.236E+12
-317.3530	30670.	0.000				
19.858	0.1090	8877937.	11525.	-0.001158	0.000	1.190E+12
-358.3712	39187.	0.000				
20.851	0.0957	8989817.	7107.4696	-0.001068	0.000	1.186E+12
-383.1463	47705.	0.000				
21.844	0.0835	9047305.	2477.5200	-0.000978	0.000	1.186E+12
-394.0299	56223.	0.000				
22.837	0.0724	9048855.	-2213.3222	-0.000887	0.000	1.186E+12
-393.3676	64741.	0.000				
23.830	0.0624	8994562.	-6841.3337	-0.000796	0.000	1.186E+12
-383.4833	73258.	0.000				
24.823	0.0534	8885829.	-11310.	-0.000706	0.000	1.188E+12
-366.6552	81776.	0.000				
25.815	0.0455	8725045.	-15550.	-0.000620	0.000	1.239E+12
-345.0818	90294.	0.000				
26.808	0.0386	8515272.	-19516.	-0.000552	0.000	1.977E+12
-320.5212	98812.	0.000				
27.801	0.0324	8259996.	-23162.	-0.000502	0.000	1.977E+12
-291.6227	107329.	0.000				
28.794	0.0267	7963322.	-26446.	-0.000453	0.000	1.978E+12
-259.5180	115847.	0.000				
29.787	0.0216	7629805.	-28944.	-0.000406	0.000	1.979E+12
-159.8915	88277.	0.000				
30.780	0.0170	7273590.	-30805.	-0.000361	0.000	1.980E+12
-152.3707	106684.	0.000				
31.773	0.0130	6895744.	-32567.	-0.000318	0.000	1.980E+12
-143.4515	131725.	0.000				
32.766	0.009428	6497534.	-34213.	-0.000278	0.000	1.981E+12
-132.7832	167806.	0.000				
33.759	0.006346	6080473.	-35717.	-0.000240	0.000	1.983E+12
-119.7127	224760.	0.000				

34.752	0.003700	5646417.	-37042.	-0.000205	0.000	1.983E+12
-102.7911	331047.	0.000				
35.744	0.001457	5197769.	-38116.	-0.000173	0.000	1.985E+12
-77.3664	632591.	0.000				
36.737	-0.000413	4738138.	-38265.	-0.000143	0.000	1.986E+12
52.3503	1508890.	0.000				
37.730	-0.001945	4285938.	-37418.	-0.000116	0.000	1.987E+12
89.8115	550119.	0.000				
38.723	-0.003171	3846489.	-36237.	-9.133E-05	0.000	1.988E+12
108.3345	407094.	0.000				
39.716	-0.004122	3422418.	-34870.	-6.955E-05	0.000	1.989E+12
121.1242	350153.	0.000				
40.709	-0.004828	3015543.	-33370.	-5.027E-05	0.000	1.989E+12
130.7372	322637.	0.000				
41.702	-0.005319	2627228.	-31768.	-3.337E-05	0.000	1.991E+12
138.1854	309520.	0.000				
42.695	-0.005623	2258530.	-30087.	-1.875E-05	0.000	1.991E+12
143.9846	305077.	0.000				
43.688	-0.005766	1910272.	-28243.	-6.283E-06	0.000	1.992E+12
165.4798	341930.	0.000				
44.680	-0.005773	1585506.	-26189.	4.170E-06	0.000	1.993E+12
179.3624	370180.	0.000				
45.673	-0.005667	1286203.	-23996.	1.275E-05	0.000	1.994E+12
188.7385	396829.	0.000				
46.666	-0.005469	1013694.	-21738.	1.963E-05	0.000	1.994E+12
190.2978	414574.	0.000				
47.659	-0.005199	768200.	-19480.	2.495E-05	0.000	1.994E+12
188.6493	432319.	0.000				
48.652	-0.004875	549486.	-17259.	2.889E-05	0.000	1.994E+12
184.1308	450064.	0.000				
49.645	-0.004511	356913.	-15107.	3.159E-05	0.000	1.994E+12
177.1093	467810.	0.000				
50.638	-0.004122	189482.	-13052.	3.323E-05	0.000	1.994E+12
167.9687	485555.	0.000				
51.631	-0.003719	45897.	-11115.	3.393E-05	0.000	1.994E+12
157.0991	503300.	0.000				
52.624	-0.003313	-75386.	-9316.0475	3.384E-05	0.000	1.994E+12
144.8873	521046.	0.000				
53.617	-0.002913	-176101.	-7668.2525	3.309E-05	0.000	1.994E+12
131.7091	538791.	0.000				
54.609	-0.002525	-258117.	-6181.0922	3.179E-05	0.000	1.994E+12
117.9234	556536.	0.000				
55.602	-0.002155	-323393.	-4859.7938	3.006E-05	0.000	1.994E+12
103.8677	574282.	0.000				
56.595	-0.001808	-373924.	-3705.7090	2.797E-05	0.000	1.994E+12
89.8552	592027.	0.000				
57.588	-0.001488	-411699.	-2716.6148	2.563E-05	0.000	1.994E+12
76.1727	609772.	0.000				
58.581	-0.001198	-438660.	-1604.0328	2.308E-05	0.000	1.994E+12
110.5836	1100068.	0.000				
59.574	-0.000938	-449923.	-362.1554	2.043E-05	0.000	1.994E+12
97.8760	1242866.	0.000				
60.567	-0.000711	-447290.	728.4579	1.775E-05	0.000	1.994E+12
85.1927	1427859.	0.000				
61.560	-0.000515	-432564.	1668.0947	1.512E-05	0.000	1.994E+12
72.5333	1676999.	0.000				
62.553	-0.000351	-407540.	2456.5974	1.261E-05	0.000	1.994E+12
59.8235	2033160.	0.000				
63.546	-0.000215	-374024.	3091.9674	1.028E-05	0.000	1.994E+12
46.8287	2597078.	0.000				
64.538	-0.000106	-333860.	3566.6263	8.160E-06	0.000	1.994E+12
32.8468	3701598.	0.000				
65.531	-2.039E-05	-289033.	3848.1486	6.299E-06	0.000	1.994E+12

```
14.4091   8420898.      0.000
    66.524  4.437E-05   -242160.   3807.1160  4.712E-06      0.000  1.994E+12
-21.2968   5718292.      0.000
    67.517  9.190E-05   -198311.   3497.7206  3.396E-06      0.000  1.994E+12
-30.6379   3972396.      0.000
    68.510   0.000125   -158811.   3102.0897  2.329E-06      0.000  1.994E+12
-35.7721   3401673.      0.000
    69.503   0.000147   -124389.   2657.8549  1.483E-06      0.000  1.994E+12
-38.7965   3136236.      0.000
    70.496   0.000161    -95475.   2185.4531  8.258E-07      0.000  1.994E+12
-40.5002   3004145.      0.000
    71.489   0.000167    -72311.   1698.1167  3.245E-07      0.000  1.994E+12
-41.3033   2945618.      0.000
    72.482   0.000168    -55010.   1205.0497 -5.593E-08      0.000  1.994E+12
-41.4621   2934253.      0.000
    73.475   0.000166    -43595.    906.8121 -3.505E-07      0.000  1.994E+12
-8.5996    618227.      0.000
    74.468   0.000160    -33401.    804.7008 -5.806E-07      0.000  1.994E+12
-8.5407    635972.      0.000
    75.460   0.000152    -24419.    704.1706 -7.533E-07      0.000  1.994E+12
-8.3342    653717.      0.000
    76.453   0.000142    -16621.    606.8281 -8.760E-07      0.000  1.994E+12
-8.0056    671462.      0.000
    77.446   0.000131  -9958.5439   513.9833 -9.554E-07      0.000  1.994E+12
-7.5792    689208.      0.000
    78.439   0.000119  -4372.5174   426.6650 -9.982E-07      0.000  1.994E+12
-7.0779    706953.      0.000
    79.432   0.000107    208.7120   345.6407 -1.011E-06      0.000  1.994E+12
-6.5227    724698.      0.000
    80.425  9.521E-05   3863.9612   271.4397 -9.985E-07      0.000  1.994E+12
-5.9326    742444.      0.000
    81.418  8.345E-05   6677.0109   204.3793 -9.670E-07      0.000  1.994E+12
-5.3241    760189.      0.000
    82.411  7.216E-05   8734.2386   144.5923 -9.209E-07      0.000  1.994E+12
-4.7117    777934.      0.000
    83.404  6.150E-05     10123.     92.0553 -8.646E-07      0.000  1.994E+12
-4.1071    795680.      0.000
    84.396  5.156E-05     10928.     46.6171 -8.017E-07      0.000  1.994E+12
-3.5201    813425.      0.000
    85.389  4.240E-05     11233.      8.0268 -7.355E-07      0.000  1.994E+12
-2.9576    831170.      0.000
    86.382  3.403E-05     11119.    -24.0392 -6.687E-07      0.000  1.994E+12
-2.4249    848916.      0.000
    87.375  2.646E-05     10661.    -49.9527 -6.036E-07      0.000  1.994E+12
-1.9249    866661.      0.000
    88.368  1.965E-05   9928.8032   -70.1094 -5.421E-07      0.000  1.994E+12
-1.4586    884406.      0.000
    89.361  1.354E-05   8989.9304   -84.9086 -4.856E-07      0.000  1.994E+12
-1.0256    902151.      0.000
    90.354  8.079E-06   7905.4642   -94.7345 -4.351E-07      0.000  1.994E+12
-0.6238    919897.      0.000
    91.347  3.177E-06   6732.4449   -99.9399 -3.914E-07      0.000  1.994E+12
-0.2500    937642.      0.000
    92.340 -1.247E-06   5523.9361  -100.8337 -3.547E-07      0.000  1.994E+12
0.1000     955387.      0.000
    93.333 -5.277E-06   4329.6179   -97.6708 -3.253E-07      0.000  1.994E+12
0.4310     973133.      0.000
    94.325 -8.998E-06   3196.4807   -90.6452 -3.028E-07      0.000  1.994E+12
0.7483     990878.      0.000
    95.318 -1.249E-05   2169.5800   -79.8868 -2.868E-07      0.000  1.994E+12
1.0575    1008623.      0.000
    96.311 -1.583E-05   1292.8096   -65.4618 -2.764E-07      0.000  1.994E+12
1.3638    1026369.      0.000
```


SER 1

"

$\delta = 1.0$

LATERAL RESISTANCE = 46.59 k


```
    97.304 -1.908E-05    609.6523   -47.3760 -2.708E-07      0.000  1.994E+12
1.6720    1044114.      0.000
    98.297 -2.228E-05    163.8578   -25.5838 -2.684E-07      0.000  1.994E+12
1.9860    1061859.      0.000
    99.290 -2.548E-05       0.000      0.000 -2.680E-07      0.000  1.994E+12
2.3085     539802.      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. 5:

Pile-head deflection              =      0.5000000 inches
Computed slope at pile head       =     -0.0019910 radians
Maximum bending moment            =      9048855. inch-lbs
Maximum shear force               =       -38265. lbs
Depth of maximum bending moment   =     22.8367000 feet below pile head
Depth of maximum shear force      =     36.7373000 feet below pile head
Number of iterations              =             32
Number of zero deflection points  =              3


---------------------------------------------------------------------------
                Computed Values of Pile Loading and Deflection
                  for Lateral Loading for Load Case Number 6
---------------------------------------------------------------------------

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head                              =     1.000000 inches
Moment at pile head                                    =    3248400.0 in-lbs
Axial load at pile head                                =          0.0 lbs

   Depth    Deflect.    Bending    Shear       Slope      Total    Bending   Soil
Res.  Soil Spr.   Distrib.
     X         y        Moment     Force         S       Stress   Stiffness      p
      Es*h    Lat. Load
   feet      inches      in-lbs      lbs       radians      psi*     lb-in^2     lb/in
     lb/inch    lb/inch
---------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
---------- ---------- ----------
      0.00     1.0000   3248400.    46591.  -0.003836      0.000  1.345E+12
0.000      0.000      0.000
     0.993     0.9545   3803523.    46591.  -0.003805      0.000  1.345E+12
0.000      0.000      0.000
     1.986     0.9093   4358647.    46591.  -0.003769      0.000  1.341E+12
0.000      0.000      0.000
     2.979     0.8647   4913770.    46591.  -0.003727      0.000  1.339E+12
0.000      0.000      0.000
     3.972     0.8205   5468893.    46591.  -0.003689      0.000  1.984E+12
0.000      0.000      0.000
     4.965     0.7767   6024016.    46591.  -0.003655      0.000  1.983E+12
0.000      0.000      0.000
     5.957     0.7334   6579140.    46591.  -0.003617      0.000  1.981E+12
0.000      0.000      0.000
```

6.950	0.6906	7134263.	46591.	-0.003575	0.000	1.980E+12
0.000	0.000	0.000				
7.943	0.6482	7689386.	46591.	-0.003531	0.000	1.979E+12
0.000	0.000	0.000				
8.936	0.6064	8244509.	46591.	-0.003483	0.000	1.977E+12
0.000	0.000	0.000				
9.929	0.5652	8799633.	46591.	-0.003415	0.000	1.212E+12
0.000	0.000	0.000				
10.922	0.5251	9354756.	46591.	-0.003325	0.000	1.186E+12
0.000	0.000	0.000				
11.915	0.4860	9909879.	46591.	-0.003228	0.000	1.185E+12
0.000	0.000	0.000				
12.908	0.4481	10465003.	46591.	-0.003125	0.000	1.185E+12
0.000	0.000	0.000				
13.901	0.4115	11020126.	46591.	-0.003017	0.000	1.185E+12
0.000	0.000	0.000				
14.893	0.3762	11575249.	45362.	-0.002904	0.000	1.184E+12
-206.2671	6532.1437	0.000				
15.886	0.3423	12101090.	43749.	-0.002785	0.000	1.184E+12
-64.5231	2245.7028	0.000				
16.879	0.3099	12617771.	42199.	-0.002660	0.000	1.184E+12
-195.6576	7522.9390	0.000				
17.872	0.2789	13106677.	39042.	-0.002531	0.000	1.184E+12
-334.2175	14276.	0.000				
18.865	0.2496	13548135.	34252.	-0.002397	0.000	1.183E+12
-469.9207	22434.	0.000				
19.858	0.2218	13922883.	27917.	-0.002258	0.000	1.183E+12
-593.4899	31877.	0.000				
20.851	0.1958	14213378.	20220.	-0.002117	0.000	1.183E+12
-698.3958	42507.	0.000				
21.844	0.1714	14404726.	11403.	-0.001972	0.000	1.183E+12
-781.7218	54342.	0.000				
22.837	0.1488	14485099.	1930.2625	-0.001827	0.000	1.183E+12
-808.3072	64741.	0.000				
23.830	0.1279	14450723.	-7568.6194	-0.001681	0.000	1.183E+12
-786.1605	73258.	0.000				
24.823	0.1087	14304742.	-16697.	-0.001536	0.000	1.183E+12
-746.0372	81776.	0.000				
25.815	0.0913	14052852.	-25261.	-0.001394	0.000	1.183E+12
-691.5233	90294.	0.000				
26.808	0.0755	13702791.	-33110.	-0.001254	0.000	1.183E+12
-626.0480	98812.	0.000				
27.801	0.0614	13263855.	-40133.	-0.001118	0.000	1.184E+12
-552.8468	107329.	0.000				
28.794	0.0488	12746435.	-46256.	-0.000987	0.000	1.184E+12
-474.9304	115847.	0.000				
29.787	0.0378	12161593.	-50234.	-0.000862	0.000	1.184E+12
-192.8352	60705.	0.000				
30.780	0.0283	11549376.	-52459.	-0.000743	0.000	1.184E+12
-180.5513	75991.	0.000				
31.773	0.0202	10911527.	-54524.	-0.000630	0.000	1.185E+12
-166.1297	98215.	0.000				
32.766	0.0133	10250094.	-56401.	-0.000523	0.000	1.185E+12
-148.9249	133357.	0.000				
33.759	0.007685	9567519.	-58048.	-0.000424	0.000	1.186E+12
-127.5551	197752.	0.000				
34.752	0.003211	8866837.	-59391.	-0.000331	0.000	1.198E+12
-97.9146	363371.	0.000				
35.744	-0.000213	8152254.	-59725.	-0.000263	0.000	1.978E+12
41.7958	2337631.	0.000				
36.737	-0.003051	7443604.	-58870.	-0.000216	0.000	1.979E+12
101.8414	397658.	0.000				
37.730	-0.005356	6749412.	-57513.	-0.000173	0.000	1.981E+12

125.9269	280137.	0.000				
38.723	-0.007177	6073097.	-55915.	-0.000135	0.000	1.983E+12
142.2869	236225.	0.000				
39.716	-0.008563	5416982.	-54146.	-0.000100	0.000	1.984E+12
154.5970	215120.	0.000				
40.709	-0.009561	4782813.	-52247.	-6.944E-05	0.000	1.986E+12
164.2153	204644.	0.000				
41.702	-0.0102	4171957.	-50245.	-4.258E-05	0.000	1.987E+12
171.8093	200354.	0.000				
42.695	-0.0106	3585491.	-48163.	-1.932E-05	0.000	1.988E+12
177.7610	200272.	0.000				
43.688	-0.0107	3024261.	-45672.	4.743E-07	0.000	1.989E+12
240.3265	268168.	0.000				
44.680	-0.0106	2497148.	-42697.	1.700E-05	0.000	1.991E+12
259.0192	292133.	0.000				
45.673	-0.0103	2006806.	-39492.	3.048E-05	0.000	1.992E+12
278.9381	323529.	0.000				
46.666	-0.009838	1556062.	-36064.	4.113E-05	0.000	1.993E+12
296.4588	359042.	0.000				
47.659	-0.009292	1147405.	-32444.	4.921E-05	0.000	1.994E+12
311.3269	399183.	0.000				
48.652	-0.008665	782945.	-28663.	5.498E-05	0.000	1.994E+12
323.3286	444579.	0.000				
49.645	-0.007982	464385.	-24869.	5.871E-05	0.000	1.994E+12
313.4096	467810.	0.000				
50.638	-0.007266	190317.	-21238.	6.066E-05	0.000	1.994E+12
296.1193	485555.	0.000				
51.631	-0.006537	-41713.	-17829.	6.111E-05	0.000	1.994E+12
276.1239	503300.	0.000				
52.624	-0.005810	-234543.	-14670.	6.028E-05	0.000	1.994E+12
254.0853	521046.	0.000				
53.617	-0.005100	-391303.	-11783.	5.841E-05	0.000	1.994E+12
230.6375	538791.	0.000				
54.609	-0.004418	-515321.	-9179.2764	5.570E-05	0.000	1.994E+12
206.3765	556536.	0.000				
55.602	-0.003773	-610042.	-6866.4418	5.234E-05	0.000	1.994E+12
181.8524	574282.	0.000				
56.595	-0.003171	-678946.	-4844.4016	4.849E-05	0.000	1.994E+12
157.5642	592027.	0.000				
57.588	-0.002617	-725482.	-3107.6933	4.429E-05	0.000	1.994E+12
133.9570	609772.	0.000				
58.581	-0.002116	-753001.	-1434.0799	3.987E-05	0.000	1.994E+12
146.9731	827743.	0.000				
59.574	-0.001667	-759655.	218.7724	3.536E-05	0.000	1.994E+12
130.4721	932384.	0.000				
60.567	-0.001273	-747788.	1675.2237	3.085E-05	0.000	1.994E+12
114.0056	1066985.	0.000				
61.560	-0.000932	-719735.	2935.5251	2.647E-05	0.000	1.994E+12
97.5467	1246903.	0.000				
62.553	-0.000642	-677835.	3999.0452	2.229E-05	0.000	1.994E+12
80.9742	1501888.	0.000				
63.546	-0.000401	-624440.	4862.4895	1.840E-05	0.000	1.994E+12
63.9623	1900859.	0.000				
64.538	-0.000204	-561964.	5515.2098	1.486E-05	0.000	1.994E+12
45.6024	2664504.	0.000				
65.531	-4.693E-05	-493014.	5916.9397	1.170E-05	0.000	1.994E+12
21.8314	5543066.	0.000				
66.524	7.496E-05	-420966.	5881.9103	8.972E-06	0.000	1.994E+12
-27.7114	4404431.	0.000				
67.517	0.000167	-352851.	5470.7348	6.660E-06	0.000	1.994E+12
-41.3079	2949223.	0.000				
68.510	0.000234	-290600.	4933.5119	4.738E-06	0.000	1.994E+12
-48.8695	2491746.	0.000				

69.503	0.000280	-235287.	4323.8466	3.167E-06	0.000	1.994E+12
-53.4680	2276959.	0.000				
70.496	0.000309	-187565.	3670.5143	1.903E-06	0.000	1.994E+12
-56.1994	2166024.	0.000				
71.489	0.000325	-147820.	2992.3703	9.012E-07	0.000	1.994E+12
-57.6329	2111968.	0.000				
72.482	0.000331	-116258.	2302.8185	1.122E-07	0.000	1.994E+12
-58.1142	2094341.	0.000				
73.475	0.000328	-92945.	1855.2777	-5.129E-07	0.000	1.994E+12
-17.0093	618227.	0.000				
74.468	0.000318	-72047.	1652.7022	-1.006E-06	0.000	1.994E+12
-16.9947	635972.	0.000				
75.460	0.000304	-53562.	1452.1440	-1.381E-06	0.000	1.994E+12
-16.6707	653717.	0.000				
76.453	0.000285	-37443.	1256.9856	-1.653E-06	0.000	1.994E+12
-16.0883	671462.	0.000				
77.446	0.000264	-23608.	1070.0100	-1.835E-06	0.000	1.994E+12
-15.2971	689208.	0.000				
78.439	0.000242	-11945.	893.4290	-1.942E-06	0.000	1.994E+12
-14.3435	706953.	0.000				
79.432	0.000218	-2318.4085	728.9210	-1.984E-06	0.000	1.994E+12
-13.2705	724698.	0.000				
80.425	0.000194	5424.5805	577.6767	-1.975E-06	0.000	1.994E+12
-12.1171	742444.	0.000				
81.418	0.000171	11447.	440.4495	-1.925E-06	0.000	1.994E+12
-10.9176	760189.	0.000				
82.411	0.000149	15920.	317.6109	-1.843E-06	0.000	1.994E+12
-9.7019	777934.	0.000				
83.404	0.000127	19016.	209.2066	-1.738E-06	0.000	1.994E+12
-8.4947	795680.	0.000				
84.396	0.000107	20906.	115.0145	-1.619E-06	0.000	1.994E+12
-7.3162	813425.	0.000				
85.389	8.862E-05	21757.	34.6003	-1.492E-06	0.000	1.994E+12
-6.1819	831170.	0.000				
86.382	7.162E-05	21730.	-32.6272	-1.362E-06	0.000	1.994E+12
-5.1028	848916.	0.000				
87.375	5.617E-05	20979.	-87.3653	-1.234E-06	0.000	1.994E+12
-4.0855	866661.	0.000				
88.368	4.221E-05	19648.	-130.3690	-1.113E-06	0.000	1.994E+12
-3.1330	884406.	0.000				
89.361	2.965E-05	17873.	-162.4079	-1.001E-06	0.000	1.994E+12
-2.2450	902151.	0.000				
90.354	1.836E-05	15778.	-184.2278	-9.002E-07	0.000	1.994E+12
-1.4177	919897.	0.000				
91.347	8.199E-06	13482.	-196.5175	-8.127E-07	0.000	1.994E+12
-0.6452	937642.	0.000				
92.340	-1.005E-06	11095.	-199.8816	-7.393E-07	0.000	1.994E+12
0.0805	955387.	0.000				
93.333	-9.418E-06	8719.3768	-194.8192	-6.801E-07	0.000	1.994E+12
0.7692	973133.	0.000				
94.325	-1.721E-05	6452.7449	-181.7097	-6.348E-07	0.000	1.994E+12
1.4313	990878.	0.000				
95.318	-2.454E-05	4389.3064	-160.8049	-6.024E-07	0.000	1.994E+12
2.0777	1008623.	0.000				
96.311	-3.157E-05	2620.8291	-132.2282	-5.814E-07	0.000	1.994E+12
2.7191	1026369.	0.000				
97.304	-3.840E-05	1238.3602	-95.9829	-5.699E-07	0.000	1.994E+12
3.3650	1044114.	0.000				
98.297	-4.515E-05	333.5941	-51.9673	-5.652E-07	0.000	1.994E+12
4.0234	1061859.	0.000				
99.290	-5.187E-05	0.000	0.000	-5.642E-07	0.000	1.994E+12
4.6998	539802.	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. 6:

Pile-head deflection	=	1.0000000 inches
Computed slope at pile head	=	-0.0038361 radians
Maximum bending moment	=	14485099. inch-lbs
Maximum shear force	=	-59725. lbs
Depth of maximum bending moment	=	22.8367000 feet below pile head
Depth of maximum shear force	=	35.7444000 feet below pile head
Number of iterations	=	19
Number of zero deflection points	=	3

Pile-head Deflection vs. Pile Length for Load Case 6

Boundary Condition Type 4, Deflection and Moment

Deflection = 1.00000 in
Moment = 3248400. in- lb
Axial Load = 0. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment ln-lbs	Maximum Shear lbs
99.2900	1.0000000	14485099.	-59725.
94.3255	1.0000000	14512574.	-60266.
89.3610	1.0000000	14469042.	-59513.
84.3965	1.0000000	14501442.	-59604.
79.4320	1.0000000	14479766.	-59587.
74.4675	1.0000000	14475799.	-59899.
69.5030	1.0000000	14490612.	-59958.
64.5385	1.0000000	14466042.	-59467.
59.5740	1.0000000	14492129.	-59216.
54.6095	1.0000000	14419858.	-59632.
49.6450	1.0000000	14095902.	-64295.
44.6805	1.0000000	11698517.	-65012.
39.7160	1.0000000	7318660.	-52586.
34.7515	1.0000000	4764147.	-45304.
29.7870	1.0000000	3517542.	-39252.
24.8225	1.0000000	3248400.	-21638.

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 7

Pile-head conditions are Displacement and Moment (Loading Type 4)

Displacement of pile head = 1.500000 inches
Moment at pile head = 3248400.0 in-lbs
Axial load at pile head = 0.0 lbs

Depth X	Deflect. y	Bending Moment	Shear Force	Slope S	Total Stress	Bending Stiffness	Soil Res. Es*h	Spr. Distrib. Lat. Load p
feet	inches	in-lbs	lbs	radians	psi*	lb-in^2	lb/inch	lb/inch
0.00	1.5000	3248400.	66691.	-0.005538	0.000	1.345E+12	0.000	0.000
0.993	1.4342	4043012.	66691.	-0.005506	0.000	1.345E+12	0.000	0.000
1.986	1.3688	4837623.	66691.	-0.005466	0.000	1.340E+12	0.000	0.000
2.979	1.3039	5632235.	66691.	-0.005420	0.000	1.337E+12	0.000	0.000
3.972	1.2397	6426847.	66691.	-0.005375	0.000	1.982E+12	0.000	0.000
4.965	1.1758	7221459.	66691.	-0.005334	0.000	1.980E+12	0.000	0.000
5.957	1.1125	8016070.	66691.	-0.005288	0.000	1.978E+12	0.000	0.000
6.950	1.0498	8810682.	66691.	-0.005221	0.000	1.209E+12	0.000	0.000
7.943	0.9881	9605294.	66691.	-0.005129	0.000	1.186E+12	0.000	0.000
8.936	0.9276	10399906.	66691.	-0.005028	0.000	1.185E+12	0.000	0.000
9.929	0.8683	11194517.	66691.	-0.004920	0.000	1.185E+12	0.000	0.000
10.922	0.8104	11989129.	66691.	-0.004803	0.000	1.184E+12	0.000	0.000
11.915	0.7539	12783741.	66691.	-0.004679	0.000	1.184E+12	0.000	0.000
12.908	0.6989	13578353.	66691.	-0.004546	0.000	1.183E+12	0.000	0.000
13.901	0.6455	14372964.	66691.	-0.004405	0.000	1.183E+12	0.000	0.000
14.893	0.5939	15167576.	65260.	-0.004256	0.000	1.182E+12	-240.1681	4818.2032
15.886	0.5441	15928093.	63395.	-0.004100	0.000	1.182E+12	-72.9453	1597.3645
16.879	0.4962	16678254.	61632.	-0.003935	0.000	1.182E+12	-222.9768	5354.0205
17.872	0.4503	17396762.	58019.	-0.003763	0.000	1.181E+12	-383.4551	10146.
18.865	0.4065	18060832.	52506.	-0.003585	0.000	1.181E+12	-542.0646	15887.
19.858	0.3649	18647950.	45174.	-0.003399	0.000	1.180E+12	-688.6083	22484.
20.851	0.3255	19137312.	36214.	-0.003209	0.000	1.180E+12	-815.4441	29847.
21.844	0.2884	19510911.	25877.	-0.003014	0.000	1.180E+12	-919.6065	37986.
22.837	0.2537	19753960.	14434.	-0.002815	0.000	1.180E+12	-1001.3106	47024.
23.830	0.2214	19854861.	2186.9494	-0.002615	0.000	1.180E+12	-1054.4177	56756.
24.823	0.1914	19806075.	-10557.	-0.002415	0.000	1.180E+12	-1084.8070	67534.

25.815	0.1638	19603286.	-23456.	-0.002216	0.000	1.180E+12	-1080.3244	78580.
26.808	0.1386	19247132.	-36091.	-0.002020	0.000	1.180E+12	-1040.6230	89469.
27.801	0.1157	18743248.	-48073.	-0.001828	0.000	1.180E+12	-970.6606	99982.
28.794	0.0950	18101567.	-59185.	-0.001642	0.000	1.181E+12	-894.4813	112163.
29.787	0.0765	17332903.	-65966.	-0.001463	0.000	1.181E+12	-243.8777	37964.
30.780	0.0601	16529618.	-68802.	-0.001293	0.000	1.182E+12	-232.1406	45988.
31.773	0.0457	15693378.	-71486.	-0.001130	0.000	1.182E+12	-218.3603	56886.
32.766	0.0332	14826138.	-73991.	-0.000977	0.000	1.183E+12	-202.0874	72502.
33.759	0.0225	13930210.	-76282.	-0.000832	0.000	1.183E+12	-182.5095	96796.
34.752	0.0134	13008372.	-78310.	-0.000696	0.000	1.184E+12	-157.9040	140489.
35.744	0.005878	12064118.	-79985.	-0.000570	0.000	1.184E+12	-123.2829	249885.
36.737	-0.000189	11102363.	-80481.	-0.000453	0.000	1.185E+12	40.0266	2523065.
37.730	-0.004926	10146289.	-79514.	-0.000347	0.000	1.185E+12	122.3454	295925.
38.723	-0.008448	9207584.	-77890.	-0.000249	0.000	1.186E+12	150.1419	211763.
39.716	-0.0109	8290194.	-75999.	-0.000178	0.000	1.977E+12	167.3038	183433.
40.709	-0.0127	7396554.	-73928.	-0.000131	0.000	1.979E+12	180.4098	169371.
41.702	-0.0140	6528526.	-71717.	-8.895E-05	0.000	1.981E+12	190.7051	162474.
42.695	-0.0148	5687571.	-69396.	-5.224E-05	0.000	1.983E+12	198.8341	159953.
43.688	-0.0152	4874842.	-66437.	-2.053E-05	0.000	1.985E+12	297.9331	233082.
44.680	-0.0153	4104410.	-62729.	6.406E-06	0.000	1.987E+12	324.4060	252626.
45.673	-0.0151	3380030.	-58698.	2.884E-05	0.000	1.989E+12	352.1976	278324.
46.666	-0.0146	2705649.	-54354.	4.706E-05	0.000	1.990E+12	377.0562	307434.
47.659	-0.0140	2084797.	-49733.	6.140E-05	0.000	1.992E+12	398.6347	340335.
48.652	-0.0132	1520535.	-44876.	7.218E-05	0.000	1.993E+12	416.6341	377499.
49.645	-0.0122	1015420.	-39827.	7.976E-05	0.000	1.994E+12	430.8106	419506.
50.638	-0.0112	571464.	-34634.	8.450E-05	0.000	1.994E+12	440.9784	467061.
51.631	-0.0102	190110.	-29434.	8.677E-05	0.000	1.994E+12	431.8071	503300.
52.624	-0.009182	-129944.	-24470.	8.695E-05	0.000	1.994E+12	401.5227	521046.
53.617	-0.008150	-392996.	-19882.	8.539E-05	0.000	1.994E+12	368.5570	538791.
54.609	-0.007147	-603727.	-15698.	8.241E-05	0.000	1.994E+12	333.8259	556536.
55.602	-0.006186	-767068.	-11933.	7.832E-05	0.000	1.994E+12	298.1777	574282.

56.595	-0.005281	-888078.	-8593.1871	7.337E-05	0.000	1.994E+12
262.3824	592027.	0.000				
57.588	-0.004438	-971840.	-5676.9967	6.781E-05	0.000	1.994E+12
227.1248	609772.	0.000				
58.581	-0.003665	-1023359.	-3171.4747	6.185E-05	0.000	1.994E+12
193.4482	628970.	0.000				
59.574	-0.002964	-1047415.	-982.5663	5.567E-05	0.000	1.994E+12
173.9786	699361.	0.000				
60.567	-0.002338	-1046773.	974.4294	4.941E-05	0.000	1.994E+12
154.5197	787439.	0.000				
61.560	-0.001787	-1024195.	2699.6601	4.322E-05	0.000	1.994E+12
135.0748	900805.	0.000				
62.553	-0.001308	-982441.	4192.9099	3.723E-05	0.000	1.994E+12
115.5798	1052761.	0.000				
63.546	-0.000900	-924279.	5452.4577	3.153E-05	0.000	1.994E+12
95.8460	1269545.	0.000				
64.538	-0.000557	-852511.	6472.6793	2.622E-05	0.000	1.994E+12
75.4069	1613723.	0.000				
65.531	-0.000275	-770038.	7237.4684	2.137E-05	0.000	1.994E+12
52.9694	2297527.	0.000				
66.524	-4.746E-05	-680045.	7684.2517	1.704E-05	0.000	1.994E+12
22.0269	5530345.	0.000				
67.517	0.000131	-586925.	7597.3201	1.325E-05	0.000	1.994E+12
-36.6191	3321328.	0.000				
68.510	0.000268	-499004.	7067.3035	1.001E-05	0.000	1.994E+12
-52.3486	2323860.	0.000				
69.503	0.000370	-418514.	6389.3168	7.269E-06	0.000	1.994E+12
-61.4572	1979563.	0.000				
70.496	0.000442	-346749.	5623.1441	4.982E-06	0.000	1.994E+12
-67.1514	1811757.	0.000				
71.489	0.000489	-284517.	4802.2866	3.096E-06	0.000	1.994E+12
-70.6365	1722398.	0.000				
72.482	0.000515	-232313.	3949.2937	1.552E-06	0.000	1.994E+12
-72.5456	1677093.	0.000				
73.475	0.000526	-190407.	3354.6353	2.891E-07	0.000	1.994E+12
-27.2729	618227.	0.000				
74.468	0.000522	-152373.	3026.0812	-7.351E-07	0.000	1.994E+12
-27.8777	635972.	0.000				
75.460	0.000508	-118297.	2693.9254	-1.544E-06	0.000	1.994E+12
-27.8774	653717.	0.000				
76.453	0.000485	-88178.	2364.8527	-2.161E-06	0.000	1.994E+12
-27.3602	671462.	0.000				
77.446	0.000457	-61943.	2044.5070	-2.609E-06	0.000	1.994E+12
-26.4125	689208.	0.000				
78.439	0.000423	-39458.	1737.5243	-2.912E-06	0.000	1.994E+12
-25.1171	706953.	0.000				
79.432	0.000387	-20539.	1447.5849	-3.091E-06	0.000	1.994E+12
-23.5517	724698.	0.000				
80.425	0.000350	-4962.7394	1177.4811	-3.168E-06	0.000	1.994E+12
-21.7875	742444.	0.000				
81.418	0.000312	7520.2057	929.1973	-3.160E-06	0.000	1.994E+12
-19.8890	760189.	0.000				
82.411	0.000274	17180.	703.9991	-3.086E-06	0.000	1.994E+12
-17.9124	777934.	0.000				
83.404	0.000238	24296.	502.5278	-2.962E-06	0.000	1.994E+12
-15.9062	795680.	0.000				
84.396	0.000204	29155.	324.8983	-2.803E-06	0.000	1.994E+12
-13.9104	813425.	0.000				
85.389	0.000171	32038.	170.7971	-2.620E-06	0.000	1.994E+12
-11.9568	831170.	0.000				
86.382	0.000141	33225.	39.5784	-2.425E-06	0.000	1.994E+12
-10.0694	848916.	0.000				
87.375	0.000114	32982.	-69.6433	-2.227E-06	0.000	1.994E+12

-8.2644	866661.	0.000				
88.368	8.826E-05	31565.	-157.9060	-2.034E-06	0.000	1.994E+12
-6.5512	884406.	0.000				
89.361	6.515E-05	29219.	-226.3203	-1.853E-06	0.000	1.994E+12
-4.9327	902151.	0.000				
90.354	4.411E-05	26172.	-275.9965	-1.687E-06	0.000	1.994E+12
-3.4059	919897.	0.000				
91.347	2.495E-05	22642.	-307.9818	-1.541E-06	0.000	1.994E+12
-1.9631	937642.	0.000				
92.340	7.389E-06	18833.	-323.2063	-1.417E-06	0.000	1.994E+12
-0.5925	955387.	0.000				
93.333	-8.827E-06	14940.	-322.4410	-1.316E-06	0.000	1.994E+12
0.7209	973133.	0.000				
94.325	-2.398E-05	11149.	-306.2659	-1.238E-06	0.000	1.994E+12
1.9942	990878.	0.000				
95.318	-3.834E-05	7641.7636	-275.0517	-1.182E-06	0.000	1.994E+12
3.2454	1008623.	0.000				
96.311	-5.215E-05	4594.9376	-228.9544	-1.146E-06	0.000	1.994E+12
4.4925	1026369.	0.000				
97.304	-6.564E-05	2185.8720	-167.9239	-1.125E-06	0.000	1.994E+12
5.7520	1044114.	0.000				
98.297	-7.897E-05	593.3778	-91.7293	-1.117E-06	0.000	1.994E+12
7.0379	1061859.	0.000				
99.290	-9.226E-05	0.000	0.000	-1.115E-06	0.000	1.994E+12
8.3596	539802.	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. 7:

Pile-head deflection	=	1.5000000	inches
Computed slope at pile head	=	-0.0055379	radians
Maximum bending moment	=	19854861.	inch-lbs
Maximum shear force	=	-80481.	lbs
Depth of maximum bending moment	=	23.8296000	feet below pile head
Depth of maximum shear force	=	36.7373000	feet below pile head
Number of iterations	=	31	
Number of zero deflection points	=	3	

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 8

Pile-head conditions are Displacement and Moment (Loading Type 4)

Displacement of pile head	=	2.000000	inches
Moment at pile head	=	3248400.0	in-lbs
Axial load at pile head	=	0.0	lbs

Depth	Deflect.	Bending	Shear	Slope	Total	Bending	Soil Res.	Soil Spr.	Distrib.
X	y	Moment	Force	S	Stress	Stiffness	p		

Es*h feet lb/inch	Lat. Load inches lb/inch	in-lbs	lbs	radians	psi*	lb-in^2	lb/in
0.00	2.0000	3248400.	83036.	-0.007191	0.000	1.345E+12	
0.000	0.000	0.000					
0.993	1.9145	4237754.	83036.	-0.007158	0.000	1.345E+12	
0.000	0.000	0.000					
1.986	1.8294	5227109.	83036.	-0.007116	0.000	1.338E+12	
0.000	0.000	0.000					
2.979	1.7449	6216463.	83036.	-0.007004	0.000	4.189E+11	
0.000	0.000	0.000					
3.972	1.6625	7205818.	83036.	-0.006894	0.000	1.980E+12	
0.000	0.000	0.000					
4.965	1.5806	8195172.	83036.	-0.006848	0.000	1.977E+12	
0.000	0.000	0.000					
5.957	1.4993	9184527.	83036.	-0.006777	0.000	1.186E+12	
0.000	0.000	0.000					
6.950	1.4191	10173881.	83036.	-0.006680	0.000	1.185E+12	
0.000	0.000	0.000					
7.943	1.3402	11163236.	83036.	-0.006572	0.000	1.185E+12	
0.000	0.000	0.000					
8.936	1.2625	12152590.	83036.	-0.006455	0.000	1.184E+12	
0.000	0.000	0.000					
9.929	1.1863	13141945.	83036.	-0.006328	0.000	1.184E+12	
0.000	0.000	0.000					
10.922	1.1117	14131299.	83036.	-0.006191	0.000	1.183E+12	
0.000	0.000	0.000					
11.915	1.0388	15120654.	83036.	-0.006043	0.000	1.182E+12	
0.000	0.000	0.000					
12.908	0.9677	16110008.	83036.	-0.005886	0.000	1.182E+12	
0.000	0.000	0.000					
13.901	0.8986	17099363.	83036.	-0.005718	0.000	1.181E+12	
0.000	0.000	0.000					
14.893	0.8314	18088717.	81435.	-0.005541	0.000	1.181E+12	
-268.6720	3850.1159	0.000					
15.886	0.7665	19039931.	79359.	-0.005354	0.000	1.180E+12	
-79.8746	1241.5781	0.000					
16.879	0.7039	19979805.	77419.	-0.005157	0.000	1.180E+12	
-245.7027	4159.1209	0.000					
17.872	0.6436	20884798.	73424.	-0.004950	0.000	1.179E+12	
-424.8385	7864.4741	0.000					
18.865	0.5859	21729480.	67300.	-0.004735	0.000	1.179E+12	
-603.2831	12268.	0.000					
19.858	0.5308	22488519.	59117.	-0.004511	0.000	1.178E+12	
-770.1676	17288.	0.000					
20.851	0.4784	23138223.	49066.	-0.004281	0.000	1.178E+12	
-916.9521	22837.	0.000					
21.844	0.4288	23657754.	37404.	-0.004044	0.000	1.178E+12	
-1040.7448	28918.	0.000					
22.837	0.3820	24029538.	24400.	-0.003803	0.000	1.177E+12	
-1141.9638	35614.	0.000					
23.830	0.3382	24239207.	10372.	-0.003558	0.000	1.177E+12	
-1212.8124	42729.	0.000					
24.823	0.2973	24276701.	-4352.6307	-0.003313	0.000	1.177E+12	
-1258.8577	50458.	0.000					
25.815	0.2592	24135485.	-19413.	-0.003068	0.000	1.177E+12	
-1269.1228	58327.	0.000					
26.808	0.2242	23814101.	-34395.	-0.002825	0.000	1.177E+12	
-1245.7422	66217.	0.000					
27.801	0.1919	23315869.	-48906.	-0.002587	0.000	1.178E+12	
-1190.0034	73875.	0.000					

28.794	0.1625	22648701.	-62726.	-0.002354	0.000	1.178E+12
-1129.8152	82834.	0.000				
29.787	0.1358	21821141.	-71215.	-0.002129	0.000	1.179E+12
-295.2664	25901.	0.000				
30.780	0.1118	20951665.	-74675.	-0.001913	0.000	1.179E+12
-285.4113	30425.	0.000				
31.773	0.0902	20041671.	-78007.	-0.001706	0.000	1.180E+12
-273.8807	36164.	0.000				
32.766	0.0711	19092796.	-81190.	-0.001509	0.000	1.180E+12
-260.4820	43644.	0.000				
33.759	0.0543	18106943.	-84201.	-0.001321	0.000	1.181E+12
-244.9223	53756.	0.000				
34.752	0.0396	17086319.	-87011.	-0.001143	0.000	1.181E+12
-226.7248	68154.	0.000				
35.744	0.0270	16033510.	-89583.	-0.000976	0.000	1.182E+12
-205.0349	90344.	0.000				
36.737	0.0164	14951593.	-91865.	-0.000820	0.000	1.183E+12
-178.0669	129601.	0.000				
37.730	0.007495	13844397.	-93765.	-0.000675	0.000	1.183E+12
-140.8317	223876.	0.000				
38.723	0.000281	12717209.	-94896.	-0.000541	0.000	1.184E+12
-49.0647	2081242.	0.000				
39.716	-0.005408	11583055.	-94399.	-0.000419	0.000	1.184E+12
132.4895	291879.	0.000				
40.709	-0.009709	10467710.	-92627.	-0.000308	0.000	1.185E+12
164.9431	202409.	0.000				
41.702	-0.0128	9375780.	-90543.	-0.000209	0.000	1.186E+12
184.9030	172703.	0.000				
42.695	-0.0147	8310100.	-88261.	-0.000136	0.000	1.977E+12
198.2115	160864.	0.000				
43.688	-0.0160	7272558.	-85251.	-8.956E-05	0.000	1.980E+12
307.0382	228517.	0.000				
44.680	-0.0168	6278604.	-81375.	-4.881E-05	0.000	1.982E+12
343.5451	243426.	0.000				
45.673	-0.0172	5333421.	-77058.	-1.392E-05	0.000	1.984E+12
381.1567	264467.	0.000				
46.666	-0.0171	4442347.	-72312.	1.542E-05	0.000	1.986E+12
415.5286	288735.	0.000				
47.659	-0.0168	3610264.	-67178.	3.956E-05	0.000	1.988E+12
446.2691	316414.	0.000				
48.652	-0.0162	2841533.	-61701.	5.888E-05	0.000	1.990E+12
473.0200	347803.	0.000				
49.645	-0.0154	2139954.	-55931.	7.379E-05	0.000	1.991E+12
495.4719	383304.	0.000				
50.638	-0.0144	1508713.	-49921.	8.470E-05	0.000	1.993E+12
513.3753	423422.	0.000				
51.631	-0.0134	950352.	-43726.	9.205E-05	0.000	1.994E+12
526.5463	468777.	0.000				
52.624	-0.0123	466741.	-37403.	9.628E-05	0.000	1.994E+12
534.8670	520125.	0.000				
53.617	-0.0111	59061.	-31229.	9.786E-05	0.000	1.994E+12
501.4333	538791.	0.000				
54.609	-0.009921	-277435.	-25481.	9.720E-05	0.000	1.994E+12
463.3897	556536.	0.000				
55.602	-0.008772	-548146.	-20202.	9.474E-05	0.000	1.994E+12
422.8190	574282.	0.000				
56.595	-0.007663	-758833.	-15414.	9.083E-05	0.000	1.994E+12
380.7671	592027.	0.000				
57.588	-0.006608	-915466.	-11131.	8.583E-05	0.000	1.994E+12
338.1761	609772.	0.000				
58.581	-0.005618	-1024090.	-7689.8781	8.003E-05	0.000	1.994E+12
239.5100	507974.	0.000				
59.574	-0.004701	-1098712.	-4957.8098	7.369E-05	0.000	1.994E+12

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219.0908    555327.       0.000
    60.567  -0.003862  -1142232. -2469.5618  6.700E-05       0.000  1.994E+12
198.5827    612688.       0.000
    61.560  -0.003104  -1157561.  -225.8449  6.012E-05       0.000  1.994E+12
178.0442    683382.       0.000
    62.553  -0.002429  -1147614.  1773.1172  5.324E-05       0.000  1.994E+12
157.4986    772552.       0.000
    63.546  -0.001836  -1115308.  3527.0650  4.648E-05       0.000  1.994E+12
136.9164    888724.       0.000
    64.538  -0.001322  -1063566.  5034.8457  3.997E-05       0.000  1.994E+12
116.1773   1047437.       0.000
    65.531  -0.000883   -995330.  6292.8007  3.381E-05       0.000  1.994E+12
94.9811    1281318.       0.000
    66.524  -0.000516   -913611.  7291.0836  2.811E-05       0.000  1.994E+12
72.5892    1676923.       0.000
    67.517  -0.000213   -821586.  8001.7532  2.293E-05       0.000  1.994E+12
46.7027    2608215.       0.000
    68.510   3.057E-05  -722932.  8175.1472  1.831E-05       0.000  1.994E+12
-17.5971   6858789.       0.000
    69.503   0.000223   -626776.  7786.1735  1.428E-05       0.000  1.994E+12
-47.6955   2548205.       0.000
    70.496   0.000371   -537391.  7135.5474  1.080E-05       0.000  1.994E+12
-61.5176   1976561.       0.000
    71.489   0.000480   -456739.  6351.9040  7.830E-06       0.000  1.994E+12
-70.0236   1736756.       0.000
    72.482   0.000557   -386027.  5485.3613  5.312E-06       0.000  1.994E+12
-75.4330   1612355.       0.000
    73.475   0.000607   -326025.  4848.3516  3.185E-06       0.000  1.994E+12
-31.4945    618227.       0.000
    74.468   0.000633   -270493.  4459.3392  1.403E-06       0.000  1.994E+12
-33.8045    635972.       0.000
    75.460   0.000640   -219760.  4048.6311 -6.218E-08       0.000  1.994E+12
-35.1363    653717.       0.000
    76.453   0.000632   -174016.  3627.1820 -1.239E-06       0.000  1.994E+12
-35.6075    671462.       0.000
    77.446   0.000611   -133326.  3204.5408 -2.157E-06       0.000  1.994E+12
-35.3364    689208.       0.000
    78.439   0.000580    -97653.  2788.8562 -2.847E-06       0.000  1.994E+12
-34.4397    706953.       0.000
    79.432   0.000543    -66869.  2386.9151 -3.339E-06       0.000  1.994E+12
-33.0295    724698.       0.000
    80.425   0.000501    -40774.  2004.2081 -3.660E-06       0.000  1.994E+12
-31.2111    742444.       0.000
    81.418   0.000456    -19109.  1645.0178 -3.839E-06       0.000  1.994E+12
-29.0820    760189.       0.000
    82.411   0.000409  -1573.4721 1312.5245 -3.901E-06       0.000  1.994E+12
-26.7298    777934.       0.000
    83.404   0.000363     12168.  1008.9256 -3.869E-06       0.000  1.994E+12
-24.2318    795680.       0.000
    84.396   0.000317     22469.   735.5629 -3.766E-06       0.000  1.994E+12
-21.6544    813425.       0.000
    85.389   0.000273     29696.   493.0554 -3.610E-06       0.000  1.994E+12
-19.0525    831170.       0.000
    86.382   0.000231     34218.   281.4333 -3.419E-06       0.000  1.994E+12
-16.4700    848916.       0.000
    87.375   0.000192     36402.   100.2699 -3.208E-06       0.000  1.994E+12
-13.9398    866661.       0.000
    88.368   0.000155     36608.   -51.1906 -2.990E-06       0.000  1.994E+12
-11.4842    884406.       0.000
    89.361   0.000120     35182.  -173.9137 -2.775E-06       0.000  1.994E+12
-9.1159     902151.       0.000
    90.354   8.858E-05    32463.  -268.9626 -2.573E-06       0.000  1.994E+12
-6.8388     919897.       0.000
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    91.347   5.907E-05    28773.  -337.3997 -2.390E-06       0.000  1.994E+12
-4.6489     937642.       0.000
    92.340   3.162E-05    24423.  -380.1988 -2.231E-06       0.000  1.994E+12
-2.5353     955387.       0.000
    93.333   5.901E-06    19713.  -398.1740 -2.100E-06       0.000  1.994E+12
-0.4820     973133.       0.000
    94.325  -1.841E-05    14935.  -391.9230 -1.996E-06       0.000  1.994E+12
1.5312      990878.       0.000
    95.318  -4.166E-05    10374.  -361.7898 -1.920E-06       0.000  1.994E+12
3.5269     1008623.       0.000
    96.311  -6.417E-05  6313.5023 -307.8456 -1.871E-06       0.000  1.994E+12
5.5281     1026369.       0.000
    97.304  -8.624E-05  3037.9768 -229.8920 -1.843E-06       0.000  1.994E+12
7.5570     1044114.       0.000
    98.297  -0.000108    835.2682 -127.4875 -1.831E-06       0.000  1.994E+12
9.6324     1061859.       0.000
    99.290  -0.000130       0.000     0.000 -1.829E-06       0.000  1.994E+12
11.7675     539802.       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. 8:

Pile-head deflection             =      2.0000000 inches
Computed slope at pile head      =     -0.0071912 radians
Maximum bending moment           =      24276701. inch-lbs
Maximum shear force              =        -94896. lbs
Depth of maximum bending moment  =     24.8225000 feet below pile head
Depth of maximum shear force     =     38.7231000 feet below pile head
Number of iterations             =             16
Number of zero deflection points =              3


---------------------------------------------------------------------------
                Computed Values of Pile Loading and Deflection
                  for Lateral Loading for Load Case Number 9
---------------------------------------------------------------------------

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

Shear force at pile head                                =       9800.0 lbs
Applied moment at pile head                             =    3793200.0 in-lbs
Axial thrust load on pile head                          =          0.0 lbs

   Depth    Deflect.    Bending    Shear       Slope      Total    Bending   Soil
Res.  Soil Spr.   Distrib.
     X          y        Moment     Force         S       Stress   Stiffness      p
     Es*h    Lat. Load
   feet       inches     in-lbs      lbs       radians     psi*      lb-in^2    lb/in
     lb/inch    lb/inch
---------- ---------- ---------- ---------- ---------- ---------- ----------
---------- ---------- ----------
      0.00     0.2690    3793200.  9800.0000  -0.001199       0.000  1.343E+12
```

0.000	0.000	0.000				
0.993	0.2549	3909965.	9800.0000	-0.001164	0.000	1.343E+12
0.000	0.000	0.000				
1.986	0.2413	4026730.	9800.0000	-0.001129	0.000	1.342E+12
0.000	0.000	0.000				
2.979	0.2280	4143495.	9800.0000	-0.001093	0.000	1.342E+12
0.000	0.000	0.000				
3.972	0.2152	4260260.	9800.0000	-0.001062	0.000	1.987E+12
0.000	0.000	0.000				
4.965	0.2027	4377025.	9800.0000	-0.001036	0.000	1.986E+12
0.000	0.000	0.000				
5.957	0.1905	4493790.	9800.0000	-0.001009	0.000	1.986E+12
0.000	0.000	0.000				
6.950	0.1787	4610555.	9800.0000	-0.000982	0.000	1.986E+12
0.000	0.000	0.000				
7.943	0.1671	4727320.	9800.0000	-0.000954	0.000	1.986E+12
0.000	0.000	0.000				
8.936	0.1560	4844085.	9800.0000	-0.000925	0.000	1.985E+12
0.000	0.000	0.000				
9.929	0.1451	4960850.	9800.0000	-0.000896	0.000	1.985E+12
0.000	0.000	0.000				
10.922	0.1346	5077615.	9800.0000	-0.000866	0.000	1.985E+12
0.000	0.000	0.000				
11.915	0.1245	5194380.	9800.0000	-0.000835	0.000	1.985E+12
0.000	0.000	0.000				
12.908	0.1147	5311146.	9800.0000	-0.000803	0.000	1.984E+12
0.000	0.000	0.000				
13.901	0.1053	5427911.	9800.0000	-0.000771	0.000	1.984E+12
0.000	0.000	0.000				
14.893	0.0963	5544676.	9019.6740	-0.000738	0.000	1.984E+12
-130.9843	16199.	0.000				
15.886	0.0877	5642846.	8014.8784	-0.000704	0.000	1.983E+12
-37.6791	5116.3104	0.000				
16.879	0.0796	5735667.	7248.0789	-0.000670	0.000	1.983E+12
-91.0347	13634.	0.000				
17.872	0.0718	5815565.	5910.7840	-0.000636	0.000	1.983E+12
-133.4416	22152.	0.000				
18.865	0.0644	5876519.	4128.1108	-0.000600	0.000	1.983E+12
-165.7952	30670.	0.000				
19.858	0.0575	5913936.	2014.4369	-0.000565	0.000	1.983E+12
-189.0028	39187.	0.000				
20.851	0.0509	5924522.	-326.7048	-0.000529	0.000	1.983E+12
-203.9776	47705.	0.000				
21.844	0.0448	5906151.	-2802.6521	-0.000494	0.000	1.983E+12
-211.6311	56223.	0.000				
22.837	0.0392	5857736.	-5331.5509	-0.000459	0.000	1.983E+12
-212.8659	64741.	0.000				
23.830	0.0339	5779102.	-7842.1986	-0.000424	0.000	1.983E+12
-208.5675	73258.	0.000				
24.823	0.0291	5670859.	-10274.	-0.000389	0.000	1.983E+12
-199.5963	81776.	0.000				
25.815	0.0246	5534281.	-12576.	-0.000356	0.000	1.984E+12
-186.7805	90294.	0.000				
26.808	0.0206	5371188.	-14706.	-0.000323	0.000	1.984E+12
-170.9090	98812.	0.000				
27.801	0.0170	5183832.	-16635.	-0.000291	0.000	1.985E+12
-152.7254	107329.	0.000				
28.794	0.0137	4974794.	-18336.	-0.000261	0.000	1.985E+12
-132.9228	115847.	0.000				
29.787	0.0107	4746886.	-19883.	-0.000231	0.000	1.986E+12
-126.7442	140562.	0.000				
30.780	0.008155	4500986.	-21349.	-0.000204	0.000	1.986E+12
-119.2620	174239.	0.000				

31.773	0.005889	4238155.	-22716.	-0.000178	0.000	1.987E+12
-110.2644	223091.	0.000				
32.766	0.003925	3959670.	-23964.	-0.000153	0.000	1.987E+12
-99.1750	301025.	0.000				
33.759	0.002245	3667106.	-25059.	-0.000130	0.000	1.988E+12
-84.6862	449512.	0.000				
34.752	0.000826	3362520.	-25935.	-0.000109	0.000	1.989E+12
-62.3745	899926.	0.000				
35.744	-0.000353	3049079.	-26019.	-8.981E-05	0.000	1.989E+12
48.2888	1629779.	0.000				
36.737	-0.001314	2742494.	-25274.	-7.247E-05	0.000	1.990E+12
76.8073	696303.	0.000				
37.730	-0.002080	2446812.	-24269.	-5.694E-05	0.000	1.991E+12
91.8153	525960.	0.000				
38.723	-0.002671	2164164.	-23113.	-4.314E-05	0.000	1.991E+12
102.3112	456371.	0.000				
39.716	-0.003108	1896041.	-21847.	-3.100E-05	0.000	1.992E+12
110.2525	422661.	0.000				
40.709	-0.003410	1643570.	-20496.	-2.041E-05	0.000	1.992E+12
116.4369	406864.	0.000				
41.702	-0.003594	1407628.	-19080.	-1.129E-05	0.000	1.993E+12
121.2766	402003.	0.000				
42.695	-0.003679	1188903.	-17613.	-3.533E-06	0.000	1.994E+12
125.0153	404887.	0.000				
43.688	-0.003679	987925.	-16203.	2.971E-06	0.000	1.994E+12
111.5619	361338.	0.000				
44.680	-0.003608	802785.	-14855.	8.321E-06	0.000	1.994E+12
114.7955	379083.	0.000				
45.673	-0.003480	633942.	-13480.	1.261E-05	0.000	1.994E+12
115.9153	396829.	0.000				
46.666	-0.003308	481554.	-12104.	1.595E-05	0.000	1.994E+12
115.0841	414574.	0.000				
47.659	-0.003100	345504.	-10748.	1.842E-05	0.000	1.994E+12
112.4940	432319.	0.000				
48.652	-0.002869	225424.	-9432.7094	2.012E-05	0.000	1.994E+12
108.3577	450064.	0.000				
49.645	-0.002621	120726.	-8174.1578	2.116E-05	0.000	1.994E+12
102.9009	467810.	0.000				
50.638	-0.002364	30637.	-6987.1069	2.161E-05	0.000	1.994E+12
96.3557	485555.	0.000				
51.631	-0.002106	-45774.	-5883.1392	2.156E-05	0.000	1.994E+12
88.9546	503300.	0.000				
52.624	-0.001851	-109556.	-4871.0929	2.110E-05	0.000	1.994E+12
80.9259	521046.	0.000				
53.617	-0.001603	-161850.	-3957.1366	2.029E-05	0.000	1.994E+12
72.4894	538791.	0.000				
54.609	-0.001367	-203853.	-3144.8851	1.920E-05	0.000	1.994E+12
63.8539	556536.	0.000				
55.602	-0.001146	-236791.	-2435.5441	1.788E-05	0.000	1.994E+12
55.2150	574282.	0.000				
56.595	-0.000941	-261891.	-1828.0734	1.639E-05	0.000	1.994E+12
46.7541	592027.	0.000				
57.588	-0.000755	-280354.	-1319.3586	1.477E-05	0.000	1.994E+12
38.6380	609772.	0.000				
58.581	-0.000589	-293331.	-626.0510	1.306E-05	0.000	1.994E+12
77.7396	1572669.	0.000				
59.574	-0.000444	-295272.	239.4226	1.130E-05	0.000	1.994E+12
67.5375	1813019.	0.000				
60.567	-0.000320	-287626.	983.6502	9.556E-06	0.000	1.994E+12
57.3874	2138475.	0.000				
61.560	-0.000216	-271832.	1607.0974	7.885E-06	0.000	1.994E+12
47.2635	2605675.	0.000				
62.553	-0.000132	-249329.	2109.2823	6.328E-06	0.000	1.994E+12

MOMENT FIXITY @ 65.53', EL. -59.24

37.0325	3346504.	0.000				
63.546	-6.533E-05	-221569.	2486.3644	4.921E-06	0.000	1.994E+12
26.2639	4789802.	0.000				
64.538	-1.459E-05	-190080.	2720.5851	3.691E-06	0.000	1.994E+12
13.0520	10658455.	0.000				
65.531	2.262E-05	-156738.	2710.6079	2.655E-06	0.000	1.994E+12
-14.7268	7757851.	0.000				
66.524	4.867E-05	-125487.	2491.5223	1.811E-06	0.000	1.994E+12
-22.0486	5398014.	0.000				
67.517	6.578E-05	-97367.	2206.5753	1.145E-06	0.000	1.994E+12
-25.7822	4669859.	0.000				
68.510	7.596E-05	-72906.	1887.4043	6.367E-07	0.000	1.994E+12
-27.7934	4359371.	0.000				
69.503	8.095E-05	-52390.	1550.5123	2.624E-07	0.000	1.994E+12
-28.7568	4232383.	0.000				
70.496	8.222E-05	-35958.	1206.2345	-1.582E-09	0.000	1.994E+12
-29.0331	4207508.	0.000				
71.489	8.092E-05	-23646.	861.4110	-1.797E-07	0.000	1.994E+12
-28.8484	4247844.	0.000				
72.482	7.793E-05	-15430.	520.6521	-2.964E-07	0.000	1.994E+12
-28.3509	4334344.	0.000				
73.475	7.385E-05	-11239.	328.9256	-3.761E-07	0.000	1.994E+12
-3.8321	618227.	0.000				
74.468	6.897E-05	-7592.3349	284.1644	-4.324E-07	0.000	1.994E+12
-3.6815	635972.	0.000				
75.460	6.355E-05	-4467.8902	241.4603	-4.684E-07	0.000	1.994E+12
-3.4867	653717.	0.000				
76.453	5.781E-05	-1838.4319	201.2798	-4.872E-07	0.000	1.994E+12
-3.2579	671462.	0.000				
77.446	5.194E-05	328.5257	163.9726	-4.918E-07	0.000	1.994E+12
-3.0044	689208.	0.000				
78.439	4.609E-05	2068.9703	129.7818	-4.846E-07	0.000	1.994E+12
-2.7348	706953.	0.000				
79.432	4.039E-05	3421.1751	98.8537	-4.682E-07	0.000	1.994E+12
-2.4567	724698.	0.000				
80.425	3.493E-05	4424.6141	71.2493	-4.448E-07	0.000	1.994E+12
-2.1769	742444.	0.000				
81.418	2.979E-05	5119.0169	46.9564	-4.162E-07	0.000	1.994E+12
-1.9009	760189.	0.000				
82.411	2.502E-05	5543.5674	25.9017	-3.844E-07	0.000	1.994E+12
-1.6333	777934.	0.000				
83.404	2.063E-05	5736.2452	7.9624	-3.507E-07	0.000	1.994E+12
-1.3779	795680.	0.000				
84.396	1.666E-05	5733.3084	-7.0222	-3.164E-07	0.000	1.994E+12
-1.1374	813425.	0.000				
85.389	1.309E-05	5568.9097	-19.2394	-2.826E-07	0.000	1.994E+12
-0.9134	831170.	0.000				
86.382	9.924E-06	5274.8402	-28.8935	-2.502E-07	0.000	1.994E+12
-0.7071	848916.	0.000				
87.375	7.131E-06	4880.3881	-36.1960	-2.199E-07	0.000	1.994E+12
-0.5187	866661.	0.000				
88.368	4.684E-06	4412.3037	-41.3574	-1.921E-07	0.000	1.994E+12
-0.3477	884406.	0.000				
89.361	2.552E-06	3894.8575	-44.5801	-1.673E-07	0.000	1.994E+12
-0.1932	902151.	0.000				
90.354	6.974E-07	3349.9772	-46.0521	-1.457E-07	0.000	1.994E+12
-0.0538	919897.	0.000				
91.347	-9.189E-07	2797.4532	-45.9421	-1.273E-07	0.000	1.994E+12
0.0723	937642.	0.000				
92.340	-2.336E-06	2255.1952	-44.3954	-1.122E-07	0.000	1.994E+12
0.1873	955387.	0.000				
93.333	-3.593E-06	1739.5295	-41.5314	-1.003E-07	0.000	1.994E+12
0.2934	973133.	0.000				

94.325	-4.725E-06	1265.5196	-37.4421	-9.129E-08	0.000	1.994E+12
0.3930	990878.	0.000				
95.318	-5.768E-06	847.2985	-32.1921	-8.498E-08	0.000	1.994E+12
0.4883	1008623.	0.000				
96.311	-6.750E-06	498.3951	-25.8190	-8.096E-08	0.000	1.994E+12
0.5815	1026369.	0.000				
97.304	-7.697E-06	232.0415	-18.3365	-7.877E-08	0.000	1.994E+12
0.6745	1044114.	0.000				
98.297	-8.627E-06	61.4440	-9.7375	-7.790E-08	0.000	1.994E+12
0.7689	1061859.	0.000				
99.290	-9.553E-06	0.000	0.000	-7.771E-08	0.000	1.994E+12
0.8656	539802.	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. 9:

Pile-head deflection	=	0.2690203 inches
Computed slope at pile head	=	-0.0011985 radians
Maximum bending moment	=	5924522. inch-lbs
Maximum shear force	=	-26019. lbs
Depth of maximum bending moment	=	20.8509000 feet below pile head
Depth of maximum shear force	=	35.7444000 feet below pile head
Number of iterations	=	7
Number of zero deflection points	=	3

Pile-head Deflection vs. Pile Length for Load Case 9

Boundary Condition Type 1, Shear and Moment

Shear	=	9800. lb
Moment	=	3793200. in- lb
Axial Load	=	0. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment ln-lbs	Maximum Shear lbs
99.2900	0.2690203	5924522.	-26019.
94.3255	0.2695863	5934130.	-26043.
89.3610	0.2699814	5940652.	-26147.
84.3965	0.2702661	5944497.	-26216.
79.4320	0.2707969	5947288.	-26214.
74.4675	0.2709583	5949149.	-26246.
69.5030	0.2771793	6028742.	-26681.
64.5385	0.2721635	5957875.	-26290.
59.5740	0.2725484	5964215.	-26156.
54.6095	0.2778979	6028103.	-26774.
49.6450	0.2776121	5967157.	-28198.

44.6805	0.3250785	5925240.	-32523.
39.7160	0.5892194	5855354.	-39254.
34.7515	1.6161080	5814142.	-59025.
29.7870	4.3278180	5736006.	-76744.

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 10

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

Shear force at pile head = 8400.0 lbs
Applied moment at pile head = 3248400.0 in-lbs
Axial thrust load on pile head = 0.0 lbs

Depth X	Deflect. y	Bending Moment	Shear Force	Slope S	Total Stress	Bending Stiffness	Soil Res. Spr. Distrib. p
feet	inches	in-lbs	lbs	radians	psi*	lb-in^2	lb/in
Es*h lb/inch	Lat. Load lb/inch						
0.00	0.2292	3248400.	8400.0000	-0.001023	0.000	1.345E+12	
0.000	0.000	0.000					
0.993	0.2172	3348484.	8400.0000	-0.000994	0.000	1.345E+12	
0.000	0.000	0.000					
1.986	0.2055	3448569.	8400.0000	-0.000964	0.000	1.344E+12	
0.000	0.000	0.000					
2.979	0.1942	3548653.	8400.0000	-0.000933	0.000	1.344E+12	
0.000	0.000	0.000					
3.972	0.1833	3648737.	8400.0000	-0.000906	0.000	1.988E+12	
0.000	0.000	0.000					
4.965	0.1726	3748822.	8400.0000	-0.000884	0.000	1.988E+12	
0.000	0.000	0.000					
5.957	0.1622	3848906.	8400.0000	-0.000861	0.000	1.988E+12	
0.000	0.000	0.000					
6.950	0.1521	3948990.	8400.0000	-0.000838	0.000	1.987E+12	
0.000	0.000	0.000					
7.943	0.1422	4049075.	8400.0000	-0.000814	0.000	1.987E+12	
0.000	0.000	0.000					
8.936	0.1327	4149159.	8400.0000	-0.000789	0.000	1.987E+12	
0.000	0.000	0.000					
9.929	0.1234	4249243.	8400.0000	-0.000764	0.000	1.987E+12	
0.000	0.000	0.000					
10.922	0.1145	4349328.	8400.0000	-0.000738	0.000	1.986E+12	
0.000	0.000	0.000					
11.915	0.1059	4449412.	8400.0000	-0.000712	0.000	1.986E+12	
0.000	0.000	0.000					
12.908	0.0975	4549496.	8400.0000	-0.000685	0.000	1.986E+12	
0.000	0.000	0.000					
13.901	0.0895	4649580.	8400.0000	-0.000657	0.000	1.986E+12	
0.000	0.000	0.000					
14.893	0.0819	4749665.	7660.8781	-0.000629	0.000	1.986E+12	
-124.0679	18056.	0.000					
15.886	0.0745	4832136.	6731.0597	-0.000600	0.000	1.985E+12	
-32.0100	5116.3104	0.000					
16.879	0.0676	4910063.	6079.7680	-0.000571	0.000	1.985E+12	
-77.3148	13634.	0.000					
17.872	0.0609	4977015.	4944.2365	-0.000541	0.000	1.985E+12	
-113.2938	22152.	0.000					

18.865	0.0547	5027882.	3431.0209	-0.000511	0.000	1.985E+12
-140.7123	30670.	0.000				
19.858	0.0488	5058774.	1637.4980	-0.000481	0.000	1.985E+12
-160.3457	39187.	0.000				
20.851	0.0432	5066903.	-348.2221	-0.000451	0.000	1.985E+12
-172.9742	47705.	0.000				
21.844	0.0380	5050476.	-2447.3155	-0.000420	0.000	1.985E+12
-179.3764	56223.	0.000				
22.837	0.0332	5008585.	-4590.1895	-0.000390	0.000	1.985E+12
-180.3231	64741.	0.000				
23.830	0.0287	4941094.	-6716.3478	-0.000360	0.000	1.985E+12
-176.5705	73258.	0.000				
24.823	0.0246	4848537.	-8774.1764	-0.000331	0.000	1.985E+12
-168.8534	81776.	0.000				
25.815	0.0208	4732009.	-10721.	-0.000302	0.000	1.986E+12
-157.8792	90294.	0.000				
26.808	0.0174	4593068.	-12521.	-0.000274	0.000	1.986E+12
-144.3220	98812.	0.000				
27.801	0.0143	4433639.	-14148.	-0.000247	0.000	1.986E+12
-128.8176	107329.	0.000				
28.794	0.0115	4255922.	-15583.	-0.000221	0.000	1.987E+12
-111.9586	115847.	0.000				
29.787	0.009034	4062312.	-16962.	-0.000196	0.000	1.987E+12
-119.6394	157797.	0.000				
30.780	0.006843	3851717.	-18345.	-0.000172	0.000	1.988E+12
-112.4985	195890.	0.000				
31.773	0.004927	3625152.	-19635.	-0.000150	0.000	1.988E+12
-103.9147	251311.	0.000				
32.766	0.003270	3383835.	-20810.	-0.000129	0.000	1.989E+12
-93.3340	340124.	0.000				
33.759	0.001854	3129268.	-21839.	-0.000109	0.000	1.989E+12
-79.4887	510836.	0.000				
34.752	0.000662	2863416.	-22658.	-9.149E-05	0.000	1.990E+12
-57.9985	1044214.	0.000				
35.744	-0.000326	2589331.	-22724.	-7.517E-05	0.000	1.991E+12
46.9325	1714471.	0.000				
36.737	-0.001129	2321908.	-22010.	-6.047E-05	0.000	1.991E+12
72.9819	769905.	0.000				
37.730	-0.001767	2064846.	-21057.	-4.735E-05	0.000	1.992E+12
86.9322	586118.	0.000				
38.723	-0.002258	1820126.	-19963.	-3.573E-05	0.000	1.992E+12
96.7118	510377.	0.000				
39.716	-0.002619	1589134.	-18767.	-2.553E-05	0.000	1.993E+12
104.1121	473717.	0.000				
40.709	-0.002866	1372923.	-17492.	-1.668E-05	0.000	1.993E+12
109.8713	456730.	0.000				
41.702	-0.003016	1172309.	-16156.	-9.075E-06	0.000	1.994E+12
114.3729	451820.	0.000				
42.695	-0.003082	987932.	-14773.	-2.621E-06	0.000	1.994E+12
117.8442	455506.	0.000				
43.688	-0.003079	820285.	-13514.	2.782E-06	0.000	1.994E+12
93.3622	361338.	0.000				
44.680	-0.003016	665891.	-12386.	7.223E-06	0.000	1.994E+12
95.9635	379083.	0.000				
45.673	-0.002906	525121.	-11238.	1.078E-05	0.000	1.994E+12
96.8000	396829.	0.000				
46.666	-0.002759	398092.	-10089.	1.354E-05	0.000	1.994E+12
96.0088	414574.	0.000				
47.659	-0.002584	284693.	-8958.9659	1.558E-05	0.000	1.994E+12
93.7507	432319.	0.000				
48.652	-0.002388	184604.	-7863.0723	1.698E-05	0.000	1.994E+12
90.2043	450064.	0.000				
49.645	-0.002179	97320.	-6815.9818	1.782E-05	0.000	1.994E+12

85.5587	467810.	0.000				
50.638	-0.001963	22182.	-5829.6319	1.818E-05	0.000	1.994E+12
80.0085	485555.	0.000				
51.631	-0.001746	-41598.	-4913.6393	1.812E-05	0.000	1.994E+12
73.7486	503300.	0.000				
52.624	-0.001531	-94908.	-4075.3179	1.772E-05	0.000	1.994E+12
66.9707	521046.	0.000				
53.617	-0.001324	-138711.	-3319.7393	1.702E-05	0.000	1.994E+12
59.8596	538791.	0.000				
54.609	-0.001126	-174017.	-2649.8260	1.608E-05	0.000	1.994E+12
52.5911	556536.	0.000				
55.602	-0.000940	-201856.	-2066.4681	1.496E-05	0.000	1.994E+12
45.3305	574282.	0.000				
56.595	-0.000769	-223260.	-1568.6546	1.369E-05	0.000	1.994E+12
38.2317	592027.	0.000				
57.588	-0.000614	-239236.	-1153.6109	1.231E-05	0.000	1.994E+12
31.4369	609772.	0.000				
58.581	-0.000476	-250750.	-549.9765	1.084E-05	0.000	1.994E+12
69.8882	1748857.	0.000				
59.574	-0.000356	-252342.	226.5703	9.341E-06	0.000	1.994E+12
60.4617	2024317.	0.000				
60.567	-0.000254	-245351.	891.1063	7.854E-06	0.000	1.994E+12
51.0863	2400549.	0.000				
61.560	-0.000169	-231107.	1444.0817	6.430E-06	0.000	1.994E+12
41.7353	2947287.	0.000				
62.553	-0.000100	-210939.	1884.9619	5.109E-06	0.000	1.994E+12
32.2702	3832068.	0.000				
63.546	-4.697E-05	-186189.	2209.5966	3.923E-06	0.000	1.994E+12
22.2225	5637240.	0.000				
64.538	-6.859E-06	-158285.	2396.1491	2.893E-06	0.000	1.994E+12
9.0919	15793336.	0.000				
65.531	2.198E-05	-129090.	2362.4821	2.035E-06	0.000	1.994E+12
-14.7432	7991464.	0.000				
66.524	4.163E-05	-101988.	2152.3735	1.344E-06	0.000	1.994E+12
-20.5253	5874380.	0.000				
67.517	5.402E-05	-77800.	1890.2336	8.073E-07	0.000	1.994E+12
-23.4771	5178302.	0.000				
68.510	6.087E-05	-56944.	1601.5137	4.047E-07	0.000	1.994E+12
-24.9869	4891186.	0.000				
69.503	6.366E-05	-39636.	1300.0948	1.161E-07	0.000	1.994E+12
-25.6087	4792860.	0.000				
70.496	6.363E-05	-25964.	994.7144	-7.989E-08	0.000	1.994E+12
-25.6519	4803023.	0.000				
71.489	6.176E-05	-15933.	691.0842	-2.051E-07	0.000	1.994E+12
-25.3150	4883924.	0.000				
72.482	5.875E-05	-9495.4638	392.9500	-2.810E-07	0.000	1.994E+12
-24.7294	5015437.	0.000				
73.475	5.506E-05	-6568.8658	228.6070	-3.290E-07	0.000	1.994E+12
-2.8570	618227.	0.000				
74.468	5.091E-05	-4047.8507	195.3992	-3.608E-07	0.000	1.994E+12
-2.7172	635972.	0.000				
75.460	4.646E-05	-1912.5814	164.0242	-3.786E-07	0.000	1.994E+12
-2.5493	653717.	0.000				
76.453	4.189E-05	-139.2188	134.7746	-3.847E-07	0.000	1.994E+12
-2.3605	671462.	0.000				
77.446	3.730E-05	1299.0437	107.8595	-3.812E-07	0.000	1.994E+12
-2.1574	689208.	0.000				
78.439	3.280E-05	2431.0305	83.4124	-3.701E-07	0.000	1.994E+12
-1.9462	706953.	0.000				
79.432	2.848E-05	3286.7273	61.4990	-3.530E-07	0.000	1.994E+12
-1.7321	724698.	0.000				
80.425	2.439E-05	3896.5264	42.1262	-3.315E-07	0.000	1.994E+12
-1.5197	742444.	0.000				

81.418	2.058E-05	4290.5781	25.2511	-3.071E-07	0.000	1.994E+12
-1.3129	760189.	0.000				
82.411	1.707E-05	4498.2491	10.7894	-2.808E-07	0.000	1.994E+12
-1.1146	777934.	0.000				
83.404	1.389E-05	4547.6861	-1.3750	-2.538E-07	0.000	1.994E+12
-0.9273	795680.	0.000				
84.396	1.102E-05	4465.4825	-11.3827	-2.269E-07	0.000	1.994E+12
-0.7526	813425.	0.000				
85.389	8.480E-06	4276.4404	-19.3901	-2.007E-07	0.000	1.994E+12
-0.5915	831170.	0.000				
86.382	6.240E-06	4003.4240	-25.5626	-1.760E-07	0.000	1.994E+12
-0.4446	848916.	0.000				
87.375	4.285E-06	3667.2932	-30.0682	-1.531E-07	0.000	1.994E+12
-0.3117	866661.	0.000				
88.368	2.592E-06	3286.9120	-33.0712	-1.323E-07	0.000	1.994E+12
-0.1924	884406.	0.000				
89.361	1.132E-06	2879.2192	-34.7281	-1.139E-07	0.000	1.994E+12
-0.0857	902151.	0.000				
90.354	-1.221E-07	2459.3544	-35.1828	-9.794E-08	0.000	1.994E+12
0.009424	919897.	0.000				
91.347	-1.201E-06	2040.8275	-34.5634	-8.449E-08	0.000	1.994E+12
0.0945	937642.	0.000				
92.340	-2.135E-06	1635.7226	-32.9800	-7.351E-08	0.000	1.994E+12
0.1712	955387.	0.000				
93.333	-2.953E-06	1254.9262	-30.5231	-6.487E-08	0.000	1.994E+12
0.2412	973133.	0.000				
94.325	-3.681E-06	908.3695	-27.2624	-5.841E-08	0.000	1.994E+12
0.3061	990878.	0.000				
95.318	-4.345E-06	605.2744	-23.2474	-5.388E-08	0.000	1.994E+12
0.3678	1008623.	0.000				
96.311	-4.965E-06	354.3939	-18.5081	-5.102E-08	0.000	1.994E+12
0.4277	1026369.	0.000				
97.304	-5.561E-06	164.2341	-13.0570	-4.947E-08	0.000	1.994E+12
0.4873	1044114.	0.000				
98.297	-6.144E-06	43.2500	-6.8920	-4.885E-08	0.000	1.994E+12
0.5476	1061859.	0.000				
99.290	-6.725E-06	0.000	0.000	-4.872E-08	0.000	1.994E+12
0.6093	539802.	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. 10:

Pile-head deflection	=	0.2291784 inches
Computed slope at pile head	=	-0.0010230 radians
Maximum bending moment	=	5066903. inch-lbs
Maximum shear force	=	-22724. lbs
Depth of maximum bending moment	=	20.8509000 feet below pile head
Depth of maximum shear force	=	35.7444000 feet below pile head
Number of iterations	=	7
Number of zero deflection points	=	3

Pile-head Deflection vs. Pile Length for Load Case 10

Boundary Condition Type 1, Shear and Moment

Shear = 8400. lb
Moment = 3248400. in- lb
Axial Load = 0. lb

Pile Length feet	Pile Head Deflection inches	Maximum Moment ln-lbs	Maximum Shear lbs
99.2900	0.2291784	5066903.	-22724.
94.3255	0.2297628	5075797.	-22722.
89.3610	0.2300386	5082277.	-22859.
84.3965	0.2303329	5085583.	-22925.
79.4320	0.2307949	5088648.	-22924.
74.4675	0.2310115	5090253.	-22945.
69.5030	0.2368836	5165562.	-23359.
64.5385	0.2321047	5098661.	-23003.
59.5740	0.2325030	5104450.	-22882.
54.6095	0.2374594	5165143.	-23460.
49.6450	0.2365516	5108226.	-24660.
44.6805	0.2723614	5075565.	-28253.
39.7160	0.4601834	5006097.	-33509.
34.7515	1.1178307	4975222.	-48264.
29.7870	2.8363199	4912651.	-64394.

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 Maximum Shear in Pile V(lbs) or y(inches) lbs	Pile-head Condition 2 Pile-head Rotation in-lb, rad., or in-lb/rad. radians	Axial Loading lbs	Pile-head Deflection inches	Maximum Moment in Pile in-lbs
1	4	y = 0.5000	M = 3793200.	0.0000000	0.50000000	
9078166.		-38241.	-0.00203011			
2	4	y = 1.0000	M = 3793200.	0.0000000	1.00000000	
14522309.		-59840.	-0.00388053			
3	4	y = 1.5000	M = 3793200.	0.0000000	1.50000000	
19875733.		-80753.	-0.00569689			

4	4	y = 2.0000	M = 3793200.	0.0000000	2.00000000	
24316129.		-95099.	-0.00727423			
5	4	y = 0.5000	M = 3248400.	0.0000000	0.50000000	
9048855.		-38265.	-0.00199099			
6	4	y = 1.0000	M = 3248400.	0.0000000	1.00000000	
14485099.		-59725.	-0.00383607			
7	4	y = 1.5000	M = 3248400.	0.0000000	1.50000000	
19854861.		-80481.	-0.00553789			
8	4	y = 2.0000	M = 3248400.	0.0000000	2.00000000	
24276701.		-94896.	-0.00719118			
9	1	V = 9800.0000	M = 3793200.	0.0000000	0.26902032	
5924522.		-26019.	-0.00119853			
10	1	V = 8400.0000	M = 3248400.	0.0000000	0.22917844	
5066903.		-22724.	-0.00102301			

The analysis ended normally.

SER 1 $\Delta = 0.23 < 1''$ OK

DELDOT BR1-159
VBENT RESULTANT FORCES
DESIGNED BY: SBM 10/16/2014

PIER 1

					k-ft	k	k
Worst Case	**Limit State**	**Load Case**	**Column**	**Top/Bot**	**M_u**	**P_u**	**V_u**
Max P_u	STR-I	1/2/3	1	T	540.1	777.5	
	SER-I	1/2/3	1	T	248.8	516.1	
Max V_u	STR-I	26	3	T	458.3		13.6
	SER-I	28	4	T	65.3		9.9

PIER 2

Worst Case	**Limit State**	**Load Case**	**Column**	**Top/Bot**	**M_u**	**P_u**	**V_u**
Max P_u	STR-I	2	4	T	252.0	689.2	
	SER-I	1/3	1	T	132.4	464.8	
Max V_u	STR-V	28	4	T	115.2		8.8
	SER-I	28	4	T	98.6		8.7

PIER 3

Worst Case	**Limit State**	**Load Case**	**Column**	**Top/Bot**	**M_u**	**P_u**	**V_u**
Max P_u	STR-I	4	4	T	141.4	688.3	
	SER-I	4	1	T	218.4	500.6	
Max V_u	STR-III	25	2	T	651.5		21.3
	SER-I	26	3	T	365.0		11.0

PIER 4

$R_R = 1044^k$

Worst Case	**Limit State**	**Load Case**	**Column**	**Top/Bot**	**M_u**	**P_u**	**V_u**
Max P_u	STR-I	1/2/3	1	T	377.0	709.1	
	SER-I	1/2/3	1	T	185.3	475.0	
Max V_u	STR-I	26	4	T	316.1		9.8
	SER-I	26	4	T	270.7		8.4

GEOTECHNICAL AXIAL CAPACITY
$= 1044^k > 709.1^k$ OK
LATERAL CAPACITY, 2" DEFLECTION (STR-1)
$= 81.31^k > 9.8^k$
LATERAL CAPACITY, 1" DEFLECTION (SER-1)
$= 46.59^k > 8.4^k$

PIER 4

4' ϕ, 1/2" STEEL CASING @ EL +3.0

DEFLECTION	STR-1 (lbs)	SER1 (lbs)
0.5	23,022	25,024
1.0	44,719	46,591 8K
1.5	64,823	66,691
2.0	81,307 8K	83,036

APPENDIX C-3

Scour Analysis Summary

July 30, 2014

TABLE 12
SCOUR DEPTH SUMMARY – PROPOSED JULY 2014 BRIDGE
Scenario 2: FEMA Flows With Normal Depths as DS Controls

Scour at NORTH ABUTMENT

Discharge Frequency	Scour Depths				Elevation at Total Scour Depth	Bottom of Footing/Pile Cap Elevation
	Long Term (ft.)	Contraction (ft.)	Local (ft.)	Total (ft.)		
50 Year	Negligible	0	0	0	NA	
100 Year	Negligible	0	0	0	NA	
500 Year	Negligible	1.14	8.85	9.99	3.5	

Scour at PIER 4

Discharge Frequency	Scour Depths				Elevation at Total Scour Depth	Bottom of Footing/Pile Cap Elevation
	Long Term (ft.)	Contraction (ft.)	Local (ft.)	Total (ft.)		
50 Year	Negligible	0	6.07	6.07	-8	
100 Year	Negligible	0.1	6.53	6.63	-8.5	
500 Year	Negligible	0	7.20	7.20	-9	

Scour at PIER 3

Discharge Frequency	Scour Depths				Elevation at Total Scour Depth	Bottom of Footing/Pile Cap Elevation
	Long Term (ft.)	Contraction (ft.)	Local (ft.)	Total (ft.)		
50 Year	Negligible	0	6.92	6.92	-22	
100 Year	Negligible	0.1	7.20	7.30	-22	
500 Year	Negligible	0	7.20	7.20	-22	

Scour at PIER 2

Discharge Frequency	Scour Depths				Elevation at Total Scour Depth	Bottom of Footing/Pile Cap Elevation
	Long Term (ft.)	Contraction (ft.)	Local (ft.)	Total (ft.)		
50 Year	Negligible	0	0	0	NA	
100 Year	Negligible	0.1	7.18	7.28	-18	
500 Year	Negligible	0	7.20	7.20	-18	

Scour at PIER 1

Discharge Frequency	Scour Depths				Elevation at Total Scour Depth	Bottom of Footing/Pile Cap Elevation
	Long Term (ft.)	Contraction (ft.)	Local (ft.)	Total (ft.)		
50 Year	Negligible	0	0	0	NA	
100 Year	Negligible	0	0	0	NA	
500 Year	Negligible	0	2.27	2.27	6	

Scour at SOUTH ABUTMENT

Discharge Frequency	Scour Depths				Elevation at Total Scour Depth	Bottom of Footing/Pile Cap Elevation
	Long Term (ft.)	Contraction (ft.)	Local (ft.)	Total (ft.)		
50 Year	Negligible	0	0	0	NA	
100 Year	Negligible	0	0	0	NA	
500 Year	Negligible	0	3.04	3.04	5	

APPENDIX D

Special Provisions

SECTION 606 DRILLED SHAFTS

606.01 Description.

A. Furnish all materials, labor, tools, equipment, services and incidentals necessary to construct the drilled shafts in accordance with the Contract Documents and this Specification.

606.02 Materials.

A. Provide materials as specified in the following:
   1. Steel Casings as per Section 1XXX
   2. Reinforcing Steel as per Section 1XXX
      a. Bundle vertical bars when necessary to maximize clear space between vertical reinforcement bars.
      b. Use rolled hoops or bundled spirals when necessary to maximize clear space between horizontal reinforcement.
   3. Welding Material as per Section 1XXX
   4. Portland Cement Concrete, Class A or B, as per Section 1XXX
      a. Comply to the following concrete slump requirements:
         i. Dry placement methods: 5 to 7 inches
         ii. Casing removal methods: 8 to 10 inches
         iii. Tremie Placement methods: 8 to 10 inches
      b. Slump loss to less than 4 inches is not permitted during the period equal to the anticipated pour period plus two hours. Slump life may be extended through the use of retarders and mid-range water reducers with the approval of the Engineer.
      c. Unless otherwise specified on the Plans or as directed by the engineer, the following mix characteristics must be met:
         i. A maximum course aggregate size of 3/8” in wet hole pours or shafts with dense reinforcing configurations. Dense reinforcing configuration is defined as cases where the clear spacing between verticals or spiral/hoops is less than 10 times the aggregate size.
         ii. Use of rounded in lieu of crushed aggregates.
         iii. Use of fly ash as a cement replacement and as a fluidifier.
   5. Slurry as per Section 1XXX
   6. Access Tubes for Crosshole Sonic Log Testing as per Section 1XXX
   7. Grout as per Section 1XXX

606.03 Construction.

A. *Submittals, Approvals, and Meetings.* At the time of bid, submit the qualifications of the Contractor (i.e., the drilled shaft specialty contractor) to verify the successful completion by the Contractor of at least three separate foundation projects within the last five years with drilled shafts of similar size (diameter and depth) and similar subsurface geotechnical conditions to those shown in the Plans. Include a brief description of each project and the owner's contact person's name and current phone number for each project listed.
   1. *Experience and Personnel.* At least two weeks prior to the start of drilled shaft construction, submit a list identifying the on-site supervisors and drill rig operators assigned to the project to the Engineer for approval. In the list, include a detailed summary of each individual's experience in drilled shaft excavation operations, and placement of assembled reinforcing cages and concrete in drilled shafts.
      a. On-site supervisors must have a minimum of two years’ experience in supervising construction of drilled shaft foundations of similar size (diameter and depth) and difficulty to those shown in the Plans, and similar geotechnical conditions to those described in the geotechnical report. The work experience must be direct supervisory

responsibility for the on-site drilled shaft construction operations. Project management level positions indirectly supervising on-site drilled shaft construction operations are not acceptable for this experience requirement.

b. Drill rig operators must have a minimum one year experience in construction of drilled shaft foundations.

The Engineer will approve or reject the Contractor's qualifications and field personnel within ten working days after receipt of the submission. Do not start work on any drilled shaft until the Contractor's qualifications and field personnel are approved by the Engineer. The Engineer may suspend the drilled shaft construction if the Contractor substitutes field personnel without prior approval by the Engineer. The Contractor is fully liable for the additional costs resulting from the suspension of work, and no adjustments in contract time resulting from such suspension of work will be allowed.

2. *Drilled Shaft Installation Plan*. At least four weeks prior to the start of drilled shaft construction, submit a Drilled Shaft Installation Plan narrative for acceptance by the Engineer. In preparing the narrative, reference the available subsurface geotechnical data provided in the Contract boring logs and any geotechnical report(s) prepared for this project. In this narrative, provide at a minimum the following information:
   a. Description of overall construction operation sequence and the sequence of drilled shaft construction when in groups or lines.
   b. A list, description, and capacities of proposed equipment, including but not limited to cranes, drills, augers, bailing buckets, final cleaning equipment and drilling unit. As appropriate, describe why the equipment was selected, and describe equipment suitability to the anticipated site and subsurface conditions. Include a project history of the drilling equipment demonstrating the successful use of the equipment on shafts of equal or greater size in similar subsurface geotechnical conditions.
   c. Details of drilled shaft excavation methods, including proposed drilling methods, methods for cleanout of the bottom of the excavation hole, and a disposal plan for excavated material and drilling slurry (if applicable). If appropriate, include a review of method suitability to the anticipated site and subsurface geotechnical conditions including boulders and obstruction removal techniques if such are indicated in the Contract subsurface geotechnical information or Contract Documents.
   d. Details of the method(s) to be used to ensure drilled shaft hole stability (i.e., prevention of caving, bottom heave, etc. using temporary casing, slurry, or other means) during excavation and concrete placement. Include a review of method suitability to the anticipated site and subsurface geotechnical conditions.
   e. Provide detailed procedures for mixing, using, maintaining, and disposing of the slurry. Also provide a detailed mix design (including all additives and their specific purpose in the slurry mix) and a discussion of its suitability to the anticipated subsurface geotechnical conditions for the proposed slurry.
      In the submittal, include a detailed plan for quality control of the selected slurry, including tests to be performed, test methods to be used, and minimum and/or maximum property requirements which must be met to ensure that the slurry functions as intended, considering the anticipated subsurface conditions and shaft construction methods, in accordance with the slurry manufacturer's recommendations and these Specifications. As a minimum, include the following tests in the slurry quality control plan:

Property	Test Method
Density	Mud Weight (Density), API 13B-1, Section 1

Viscosity	Marsh Funnel and Cup, API 13B-1, Section 2.2
pH	Glass Electrode, pH Meter, or pH Paper
Sand Content	Sand, API 13B-1, Section 5

f. Reinforcing steel working drawings, details of reinforcement placement including type and location of all splices, reinforcement cage support and centralization methods, type and location of all spacers, crosshole sonic logging tubes and other instrumentation, and procedures for lifting and setting the reinforcement cage.
g. When casings are proposed or required, provide the following:
    i. Casing dimensions and detailed procedures for permanent casing installation.
    ii. Temporary casing installation and removal.
    iii. Methods of advancing the casing, along with the means to be utilized for excavating the drilled shaft hole in accordance with Subsection 606.03 of this Specification.
h. When using temporary casing, details of the method to extract the temporary casing and maintaining shaft reinforcement in proper alignment and location, and maintaining the concrete slump to keep concrete workable during casing extraction.
i. Details of concrete placement, including proposed equipment and procedures for delivering concrete to the drilled shaft, placement of the concrete into the shaft including initial placement and the raising of the tremie or pump line during placement, size of tremie and pump lines, operational procedures for pumping, and a sample uniform yield form to be used by the Contractor for plotting the volume of concrete placed versus the depth of shaft for all shaft concrete placement.
j. The method to be used to form a horizontal construction joint during concrete placement.
k. When applicable, include a description of the material to be used to temporarily backfill a drilled shaft excavation hole during a stoppage of the excavation operation, as well as the method used to place and remove the material.
l. Details of procedures to prevent loss of slurry or concrete into waterways, sewers and other areas to be protected.
m. Describe the method and materials that will be used to fill or eliminate all voids below the top of shaft between the plan shaft diameter and excavated shaft diameter, or between the shaft casing and surrounding soil, if permanent casing is specified.
n. Details of any required load tests including equipment, instrumentation, procedures, calibration data for test equipment, calculations and drawings.
o. Details and procedures for protecting existing structures, utilities, roadways and other facilities during drilled shaft installation.
p. Other information required by the Plans or specified herein.

The Engineer will evaluate the Drilled Shaft Installation Plan for conformance with the Contract Plans and Specifications within ten working days after receipt of the submission. At the option of the Department, a Shaft Installation Plan Submittal Meeting may be scheduled following review of the Contractor's initial submittal of the Plan. Those attending the Shaft Installation Plan Submittal Meeting, if held, must include the following:

a. The superintendent, on-site supervisors, and other Contractor personnel involved in the preparation and execution of the Drilled Shaft Installation Plan.
b. The Project Engineer and Department's personnel involved with the structural, geotechnical, and construction review of the Drilled Shaft Installation Plan together with Department's personnel who will provide inspection and oversight during the drilled shaft construction phase of project.

Submit any significant updates or modifications to the Drilled Shaft Installation Plan whenever such updates or modifications are proposed to the Engineer. The Engineer will evaluate the new information for conformance with the Contract Plans and Specifications within ten working days after receipt of the submission.

3. *Slurry Technical Assistance.* If slurry is used to construct the drilled shafts, provide, or arrange for, technical assistance from the slurry manufacturer as specified in Subsection 606.03(D)(4)(a) of this Specification. Submit the following to the Engineer:
   a. The name and current phone number of the slurry manufacturer's technical representative assigned to the project.
   b. The name(s) of the Contractor's personnel assigned to the project and trained by the slurry manufacturer's technical representative in the proper use of the slurry. In the submittal, include a signed training certification letter from the slurry manufacturer for each individual, including the date of the training.
4. *Approvals.* Do not begin work until all the required submittals have been accepted in writing by the Engineer. All procedural acceptances given by the Engineer will be subject to trial in the field and will not relieve the Contractor of the responsibility to satisfactorily complete the work.
5. *Drilled Shaft Preconstruction Conference.* Hold a shaft preconstruction conference at least five working days prior to the Contractor beginning any shaft construction work at the site to discuss investigative boring information, construction procedures, personnel, and equipment to be used, and other elements of the accepted Shaft Installation Plan as specified in Subsection 606.03(A)(2) of this Specification. If slurry is used to construct the shafts, the frequency of scheduled site visits to the project site by the slurry manufacturer's representative will be discussed. Those attending must include:
   a. The superintendent, on site supervisors, and other key personnel identified by the Contractor as being in charge of excavating the shaft, placing the casing and slurry as applicable, placing the steel reinforcing bars, and placing the concrete. If slurry is used to construct the shafts, the slurry manufacturer's representative and a Contractor's employee trained in the use of the slurry, as identified to the Engineer in accordance with Subsection 606.03(D)(4)(a) of this Specification, must also attend.
   b. The Project Engineer, key inspection personnel, and appropriate representatives of the Department.

   If the Contractor's key personnel change, or if the Contractor proposes a significant revision of the approved Drilled Shaft Installation Plan, an additional conference may be held at the request of the Engineer before any additional shaft construction operations are performed.
6. *Logs of Shaft Construction*. Prepare inspection logs documenting each shaft construction activity, including casing installation, excavation, shaft bottom inspection, reinforcement installation and concrete placement. Fully document the work performed with frequent reference to the date, time and casing/excavation elevation in the logs. In addition, prepare and submit the logs documenting any subsurface investigation borings or rock core holes performed for the Contract at drilled shaft foundation locations.

   In the records for temporary and permanent casing, include at least the following information:
   a. Identification number and location of the shaft.
   b. Diameter and wall thickness of the casing.
   c. Dimensions of any casing reinforcement.
   d. Top and bottom elevations of the casing.
   e. Method and equipment used for casing installation.
   f. Any problems encountered during casing installation.
   g. Name of the inspector.

In the shaft excavation log, include at least the following information:

a. Identification number, location and surface elevation of the shaft.
b. Description and approximate top and bottom elevation of each soil or rock material encountered.
c. Seepage or groundwater conditions.
d. Type and dimensions of tools and equipment used, and any changes to the tools and equipment.
e. Type of drilling fluid used, if any, and the results of slurry tests.
f. Any problems encountered.
g. Elevation of any changes in the shaft diameter.
h. Method used for bottom cleaning.
i. Final bottom elevation of the shaft.
j. Name of the inspector and the date, time and name of any changes in the inspector.

In the concrete placement records, include at least the following information:

a. Concrete mix used.
b. Time of start and end of concrete placement.
c. Volume and start/end time for each truck load placed.
d. Concrete test results.
e. Concrete surface elevation and corresponding tremie tip elevation periodically during concrete placement.
f. Concrete yield curve (volume versus concrete elevation, actual and theoretical).
g. Name of the inspector.

Submit the logs for each shaft construction activity to the Engineer within 24 hours of the completion of that activity. Submit a full set of shaft inspection logs for an individual drilled shaft to the Engineer within 48 hours of the completion of concrete placement at the shaft.

B. *Drilled Shaft Excavation***.** Excavate the drilled shafts to the required depth as shown in the Plans or as directed by the Engineer. Once the excavation operation has been started, conduct the excavation in a continuous operation until the excavation of the shaft is completed, except for pauses and stops as noted, using approved equipment capable of excavating through the type of material expected. Pauses during this excavation operation, except for casing splicing and removal of obstructions, will not be allowed. Provide temporary casing at the site in sufficient quantities to meet the needs of the anticipated construction method.

Pauses, defined as interruptions of the excavation operation, will be allowed only for casing splicing and removal of obstructions. Drilled shaft excavation operation interruptions not conforming to this definition are considered as stops.

If the drilled shaft excavation is not complete at the end of the shift or series of continuous shifts, the drilled shaft excavation operation may be stopped, provided the Contractor, before the end of the work day, protects the shaft as indicated in Subsection 606.03(C) of this Specification.

If slurry is present in the shaft excavation, conform to the requirements of Subsection 606.03(D)(4)(b) of this Specification regarding the maintenance of the minimum level of drilling slurry throughout the stoppage of the shaft excavation operation, and recondition the slurry to the required slurry properties in accordance with Section 606.02 of this Specification prior to recommencing shaft excavation operations.

Ensure the excavation and drilling equipment have adequate capacity, including power, torque and down thrust to excavate a hole of both the maximum diameter and to a depth of 20 feet, or 20 percent, beyond the maximum shaft length shown on the Plans, whichever is greater.

Blasting will only be permitted if specifically stated on the Plans or authorized in writing by the Engineer.

Perform sidewall overreaming when the time for shaft excavation exceeds 36 hours or as directed by the Engineer (measured from the beginning of excavation below the casing when casing is used) before the start of concrete placement. Also perform sidewall overreaming when the sidewall of the hole is determined by the Engineer to have softened due to the excavation methods, swelled due to delays in the start of concrete placement, or degraded because of slurry cake buildup. Overreaming thickness must be a minimum of 1/2-inch and a maximum of 3 inches. Overreaming may be accomplished with a grooving tool, overreaming bucket, or other equipment approved by the Engineer. If overreaming is required as a result of the excavation time exceeding the time limit specified herein, or as a result of excavation methods not in compliance with the approved Drilled Shaft Installation Plan, the Contractor will bear the costs associated with both sidewall overreaming and additional drilled shaft concrete related to overreaming.

Complete excavation to the foundation cap elevation before drilled shaft construction begins, unless otherwise noted in the Contract Documents or approved by the Engineer. Any disturbance to the foundation cap area caused by shaft installation will be repaired by the Contractor prior to placing the cap concrete.

When drilled shafts are to be installed in conjunction with embankment construction, construct drilled shafts after placement of the embankment fill unless otherwise shown on the Contract Documents or approved by the Engineer. Do not cap the drilled shafts installed prior to the completion of the embankment fill until the fill has been placed to the bottom of cap level.

C. *Drilled Shaft Excavation Protection*. Do not leave drilled shaft excavations open overnight unless cased full depth or otherwise protected against sidewall instability. An open excavation is defined as a drilled shaft that has not been filled with concrete, or temporarily backfilled with a material approved by the Engineer in accordance with Subsection 606.03(A)(2) of this Specification or protected in accordance with Subsection 606.03(D). The use of slurry to protect a drilled shaft during a drilling stoppage or overnight shutdown may be approved by the Engineer.

Casing of drilled shafts in stable rock formations during stoppages is not required, unless shown on the Plans or specified herein.

D. *Drilled Shaft Excavation Protection Methods*. The Contractor bears full responsibility for selection and execution of the method(s) of stabilizing and maintaining the drilled shaft excavation. Protect the walls and bottom of the drilled shaft excavation so that side wall caving and bottom heave is prevented from occurring, and so that the soil adjacent to the drilled shaft is not disturbed. The Contractor may excavate the drilled shaft without excavation protection provided the Contractor can demonstrate that the soil/rock is stable and above the water table and zones of seepage. Acceptable protection methods include the use of casing, drilling slurry, or both.

1. *Temporary Casing Construction Method*. In stable soils, conduct casing installation and removal operations and drilled shaft excavation operations such that the adjacent soil outside the casing and drilled shaft excavation for the full height of the drilled shaft is not disturbed. Disturbed soil is defined as soil whose geotechnical properties have been changed from those of the original in-situ soil, and whose altered condition adversely affects the performance of the drilled shaft foundation.

If utilizing casing that is adequately sealed into competent soils such that water cannot enter the excavation, the Contractor may, with the Engineer's approval, continue excavation in soils below the water table provided the water level within the casing do not rise or exhibit flow.

As the temporary casing is withdrawn, a sufficient head of fluid concrete must be maintained to ensure that water or slurry outside the temporary casing will not breach the column of freshly placed concrete.

Extract the casing at a slow, uniform rate with the pull in line with the shaft axis. Avoid excessive rotation of the casing to limit deformation of the reinforcing steel cage.

Remove all temporary casings from the excavation as concrete placement is completed, unless permission has been received from the Engineer to leave specified temporary casings in place.

2. *Permanent Casing Construction Method*. When permanent casing is specified, excavation will conform to the specified outside diameter of the drilled shaft. After the casing has been filled with concrete, fill all void space occurring between the casing and drilled shaft excavation with a material which approximates the geotechnical properties of the in-situ soils, in accordance with the Drilled Shaft Installation Plan specified in Subsection 606.03(A)(2) of this Specification and as approved by the Engineer.

   When the shaft extends above ground or through a body of water, the portion exposed above ground or through a body of water may be formed with removable casing except when the permanent casing is specified. Strip the removable casing from the shaft in a manner that will not damage the concrete. Casings can be removed when the concrete has attained sufficient strength provided:
   a. Curing of the concrete is continued for a 72-hour period.
   b. The shaft concrete is not exposed to salt water or moving water for 7 days.
   c. The concrete reaches a compressive strength of at least 2500 psi, as determined from concrete cylinder breaks.

   Use of removable casing is permitted only if specified on the Plans or approved by the Engineer. Use removable casing in accordance with the equipment and procedures shown in the approved Drilled Shaft Installation Plan, and comply with all other requirements specified herein.
3. *Alternative Casing Methods*. When approved by the Engineer, installation of casing using rotating, oscillating, or vibrating methods will be permitted. Use this alternative casing method in accordance with the equipment and procedures shown in the approved Drilled Shaft Installation Plan, and comply with all other requirements specified herein.

   Equip drilled shaft casing with cutting teeth or a cutting shoe and install by rotating, oscillating, or vibrating the casing.
4. *Slurry*. Use slurry in accordance with Subsection 606.02 of this Specification to maintain a stable excavation during excavation and concrete placement operations once water begins to enter the drilled shaft excavation and remain present.

   Use slurry to maintain stability during drilled shaft excavation and concrete placement operations in the event that water begins to enter the drilled shaft excavation at a rate of greater than twelve inches per hour, or if the Contactor is not able to restrict the amount of water in the drilled shaft to less than three inches prior to concrete placement, or to

equilibrate water pressure on the sides and base of the drilled shaft excavation when groundwater is encountered or anticipated based on the available subsurface data.

a. *Slurry Technical Assistance*. If slurry is used, the manufacturer's representative, as identified to the Engineer in accordance with Subsection 606.03(A)(3) of this Specification, must:
   i. Provide technical assistance for the use of the slurry.
   ii. Be present at the site prior to introduction of the slurry into a drilled hole.
   iii. Remain at the site during the construction and completion of a minimum of one drilled shaft to adjust the slurry mix to the specific site conditions.

   After the manufacturer's representative is no longer present at the site, the Contractor's employee trained in the use of the slurry, as identified to the Engineer in accordance with Subsection 606.03(A)(3) of this Specification, must be present at the site throughout the remainder of shaft slurry operations for this project to perform the duties specified above.

b. *Minimum Level of Slurry in the Excavation*. When slurry is used to maintain a stable excavation, maintain the slurry level in the excavation to obtain hydrostatic equilibrium throughout the construction operation at a height required to provide and maintain a stable hole, but not less than 5 feet above the water table or surface of surrounding water body if at an offshore location.

   Provide casing, or other means, as necessary to meet these requirements.

   Maintain the slurry level above all unstable zones a sufficient distance to prevent bottom heave, caving or sloughing of those zones.

   Throughout all stops in drilled shaft excavation operations, monitor and maintain the slurry level in the excavation the greater of the following elevations:
   i. No lower than the water level elevation outside the drilled shaft.
   ii. Elevation as required to provide and maintain a stable hole.

c. *Cleaning Slurry*. Clean, re-circulate, de-sand, or replace the slurry, as needed, in order to maintain the required slurry properties. Sand content will only be required to be within specified limits immediately prior to concrete placement.

E. *Obstructions*. When obstructions are encountered, notify the Engineer promptly. An obstruction is defined as a specific object (including, but not limited to, boulders, logs, and man-made objects) encountered during the drilled shaft excavation operation which prevents or hinders the advance of the drilled shaft excavation. When efforts to advance past the obstruction to the design drilled shaft tip elevation result in the rate of advance of the drilled shaft drilling equipment being significantly reduced relative to the rate of advance for the portion of the drilled shaft excavation in the geological unit that contains the obstruction, then remove, bypass or break up the obstruction under force account. Blasting will not be permitted unless approved in writing by the Engineer.

   Drilling tools that are lost in the excavation will not be considered obstructions, and will be promptly removed by the Contractor. All costs due to lost tool removal will be borne by the Contractor including, but not limited to, costs associated with the repair of hole degradation due to removal operations or an excessive time that the hole remains open.

F. *Protection of Existing Structures*. Control operations to prevent damage to existing structures, utilities, roadways and other facilities. Include preventive measures, but which are not limited to, selecting construction methods and procedures that will prevent excessive caving of the drilled shaft excavation and monitoring and controlling the vibrations from the driving of casing or sheeting, drilling of the shaft, or from blasting, if permitted by the Engineer.

G. *Slurry Sampling and Testing*. Mix and thoroughly hydrate mineral slurry and polymer slurry in slurry tanks, lined ponds, or storage areas. Draw sample sets from the slurry storage facility and test the samples for conformance with the appropriate specified material properties before beginning slurry placement in the drilled hole. Conform the slurry to the quality control plan included in the Drilled Shaft Installation Plan in accordance with Subsection 606.03(A)(2) of this Specification and as approved by the Engineer. A sample set must be composed of samples taken at mid-height and within two feet of the bottom of the storage area.

   Sample and test all slurry in the presence of the Engineer, unless otherwise approved by the Engineer. Record the date, time, names of the persons sampling and testing the slurry, and the results of the tests. Submit a copy of the recorded slurry test results to the Engineer at the completion of each drilled shaft, and during construction of each drilled shaft when requested by the Engineer.

   Take and test sample sets of all slurry, composed of samples taken at mid-height and within two feet of the bottom of the drilled shaft, during drilling as necessary to verify the control of the properties of the slurry. As a minimum, take and test the sample sets of polymer slurry at least once every four hours after beginning its use during each shift.

   Take and test sample sets of all slurry, as specified, immediately prior to placing concrete.

   Demonstrate to the satisfaction of the Engineer that stable conditions are being maintained. If the Engineer determines that stable conditions are not being maintained, immediately take action to stabilize the shaft. Submit a revised Drilled Shaft Installation Plan which addresses the problem and prevents future instability. Do not continue with drilled shaft construction until the damage which has already occurred is repaired in accordance with the Specifications, and until receiving the Engineer's approval of the revised Drilled Shaft Installation Plan.

H. *Drilled Shaft Excavation Inspection*. Use appropriate means such as a cleanout bucket, air lift or hydraulic pump to clean the bottom of the excavation of all drilled shafts. The base of the drilled shaft excavation cannot be covered with more than three inches of sediment or loose or disturbed material just prior to placing concrete in soil shafts or more than one-half inch for 50 percent of the shaft area in rock sockets.

   The excavated drilled shaft will be inspected and approved by the Engineer prior to proceeding with construction. Sound the bottom of the excavated drilled shaft with an airlift pipe, a tape with a heavy weight attached to the end of the tape, a borehole camera with visual sediment depth measurement gauge, or other means acceptable to the Engineer to determine that the drilled shaft bottom meets the requirements in the Contract.

I. *Assembly and Placement of Reinforcing Steel*. Prior to and during fabrication of the steel reinforcing cage, support the reinforcing bars off the ground surface, and protect the reinforcing bars from contamination with mud and other deleterious materials.

   Rigidly brace the reinforcing cage to retain its configuration during handling and construction. Individual or loose bars will not be permitted. Tie all (100%) intersections of vertical and horizontal bars. Show bracing and any extra reinforcing steel required for fabrication of the cage on the working drawings.

   Carefully position and securely fasten the reinforcement to provide the minimum clearances specified or shown on the Plans, and to ensure that no displacement of the reinforcing steel cage occurs during placement of the concrete.

Splicing of the reinforcement cage during placement of the cage in the shaft excavation will not be permitted unless otherwise shown on the Plans or approved by the Engineer.

If the reinforcing cage is spliced during placement of the cage into the drilled shaft excavation, the splice details and location of the splices must be in accordance with the Plans and the approved Drilled Shaft Installation Plan. In addition, perform the work within the time limits specified in Subsection 606.03(A).

Securely hold the steel reinforcing cage in position throughout the concrete placement operation. Tie and support the reinforcing steel in the drilled shaft so that the location of the reinforcing steel will remain within allowable tolerance. Use concrete spacers or other approved non-corrosive spacing devices at sufficient intervals (near the bottom, the top and at intervals not exceeding 10 feet vertically) to ensure concentric spacing for the entire cage length. The number of spacers required at each level will be one spacer for each foot of excavation diameter, with a minimum of four spacers at each level. The spacers must be of adequate dimension to ensure an annular space between the outside of the reinforcing cage and the side of the excavation along the entire length of the drilled shaft as shown in the Plans. Provide acceptable feet made of plastic, or concrete (bottom supports) to ensure that the bottom of the cage is maintained at the proper distance above the base of the excavation unless the cage is suspended from a fixed base during the concrete pour.

Remove bracing steel which constricts the interior of the reinforcing cage after lifting the cage if freefall concrete or wet tremie methods of concrete placement are to be used.

Check the elevation of the top of the steel cage before and after the concrete is placed. If the upward displacement of the rebar cage exceeds 2 inches, or if the downward displacement exceeds 6 inches, the drilled shaft will be considered defective. Make corrections to the satisfaction of the Engineer. Do not construct additional drilled shafts until the rebar cage support has been modified in a manner satisfactory to the Engineer.

J. *Concrete Placement, Curing and Protection*. Commence the Concrete placement as soon as possible after completion of drilled shaft excavation by the Contractor and inspection by the Engineer. Immediately prior to commencing concrete placement, the drilled shaft excavation and the properties of the slurry (if used) must conform to Subsection 606.02 of this Specification. Continue the concrete placement in one operation to the top of the drilled shaft, or as shown in the Plans.

If water is not present (a dry shaft), deposit the concrete through the center of the reinforcement cage by a method which prevents segregation of aggregates. Place the concrete such that the free-fall is vertical down the center of the drilled shaft without hitting the sides, the steel reinforcing bars, or the steel reinforcing bar cage bracing.

If water exists in amounts greater than three inches in depth or enters at a rate of more than twelve inches per hour then fill the drilled shaft excavation with slurry to at least the level specified in Subsection 606.03(D)(4)(b) and concrete placed by tremie methods.

Do not exceed the time limit for concrete placement as defined in the approved Drilled Shaft Installation Plan and demonstrated by a successful technique shaft or test shaft. Commence the concrete placement time at the mixing of the concrete and extend through to the completion of placement of the concrete in the drilled shaft excavation, including removal of any temporary casing. For wet placement methods, the placement time starts at the batching of the initial load of concrete to be placed in the shaft. Prior to concrete placement, provide test results of both a trial

mix and a slump loss test conducted by an approved testing laboratory using approved methods to demonstrate that the concrete meets this defined placement time limit. Maintain the concrete mix with a slump of 4 inches or greater over the defined placement time limit as demonstrated by trial mix and slump loss tests. Conduct the trial mix and slump loss tests at ambient temperatures appropriate for site conditions. Ambient air temperature at the time of concrete placement is not permitted to be greater than the ambient temperature at the time of the concrete trial tests and slump loss tests.

Do not use admixtures such as water reducers, plasticizers, and retarders in the concrete mix unless permitted in the Contract Documents and detailed in the approved Drilled Shaft Installation Plan. Adjust all admixtures, when approved for use, for the conditions encountered on the job so the concrete remains in a workable plastic state throughout the defined placement time limit.

Throughout the underwater concrete placement operation, the discharge end of the tube must remain submerged in the concrete at least five feet and the tube must always contain enough concrete to prevent water from entering. The concrete placement must be continuous until the work is completed, resulting in a seamless, uniform shaft. If the concrete placement operation is interrupted, the Engineer may require the Contractor to prove by core drilling or other tests that the drilled shaft contains no voids or horizontal joints. If testing reveals voids or joints, repair them or replace the drilled shaft at no expense to the Department. Responsibility for coring and testing costs, and calculation of time extension, will be in accordance with Subsection 606.03(M) of this Specification.

Before placing any fresh concrete against concrete deposited in water or slurry (construction joint), remove all scum, laitance, loose gravel and sediment on the surface of the concrete deposited in water or slurry, and chip off any high spots on the surface of the existing concrete that would prevent any steel reinforcing bar cage from being placed in the position required by the Plans.

Complete a concrete yield plot for each wet shaft poured by tremie methods. This yield plot will be submitted to the Department within twenty four (24) hours of completion of the concrete pour.

Do not perform casing installation or drilled shaft excavation operations within a clear distance of three diameters of a newly poured drilled shaft within twenty (24) hours of the placement of concrete and only when the concrete has reached a minimum compressive strength of 1800 psi.

K. *Tremies*. When placing concrete underwater, use a concrete pump or gravity tremie. A tremie must have a hopper at the top that empties into a watertight tube at least eight inches in diameter. If a pump is used, a watertight tube must be used with a minimum diameter of four inches. The discharge end of the tube on the tremie or concrete pump line must include a device to seal out water while the tube is first filled with concrete. In lieu of a seal at the discharge end of the pipe, the Contractor may opt to place a “Pig” or “Rabbit” in the hopper prior to concrete placement which moves through the tremie when pushed by the concrete, forcing water or slurry from the tremie pipe.

Do not use hopper and tubes that contain aluminum parts that will have contact with the concrete. The inside and outside surfaces of the tubes must be clean and smooth to allow both flow of concrete and the unimpeded withdrawal of the tube during concrete placement.

L. *Drilled Shaft Construction Tolerances*. Construct the drilled shafts so that the center of the poured shaft at the top of the drilled shaft or mudline, whichever is lower, is within the following horizontal tolerances:

Drilled Shaft Diameter	Tolerance
Greater than 2'-0" and less than 5'-0"	4"
5'-0" or larger	6"

Drilled shafts in soil must be within 1.5 percent of plumb. Drilled shafts in rock must be within 2.0 percent of plumb. Plumbness will be measured from the top of poured drilled shaft elevation or mudline, whichever is lower.

During drilling or excavation of the drilled shaft, make frequent checks on the plumbness, alignment, and dimensions of the drilled shaft. Any deviation exceeding the allowable tolerances will be corrected with a procedure approved by the Engineer.

Do not allow the drilled shaft steel reinforcing bars to be higher than six inches above or three inches below the plan elevation.

The reinforcing cage must be concentric with the drilled shaft excavation within a tolerance of 1-1/2 inches.

The top elevation of the completed drilled shaft must have a tolerance of plus one inch or minus three inches.

Do not allow the diameter of the drilled shaft to be less than the diameter shown on the Plans.

Ensure that tolerances for casings are in accordance with American Pipe Institute tolerances applicable to regular steel pipe.

Drilled shaft excavations and completed drilled shafts not constructed within the required tolerances will be considered defective. The Contractor is responsible for correcting all defective drilled shafts to the satisfaction of the Engineer. Materials and work necessary, including engineering analysis and redesign, to complete corrections for out-of-tolerance drilled shafts will be furnished without either cost to the Department or an extension of the completion date of the project. Redesign drawings and computations submitted will be signed by a registered Professional Engineer licensed in the State of Delaware.

M. *Integrity Testing*. Crosshole sonic log (CSL) testing must be performed on all drilled shafts. Accommodate the crosshole sonic log testing by furnishing and installing access tubes in accordance with Section 1XXX of this Specification.

Install access tubes for crosshole sonic log testing in all drilled shafts, except as otherwise noted herein, to permit access for the crosshole sonic log test probes. If, in the opinion of the Engineer, the condition of the drilled shaft excavation permits drilled shaft construction in the dry, the Engineer may specify that the testing be omitted.

Securely attach the access tubes to the interior of the reinforcement cage of the drilled shaft. Furnish and install one access tube for each foot of drilled shaft diameter, rounded to the nearest whole number, unless otherwise shown in the Plans. A minimum of three tubes will be required. Place the access tubes around the drilled shaft, inside the spiral or hoop reinforcement and three inches clear of the vertical reinforcement, at a uniform spacing measured along the circle passing

through the centers of the access tubes. If these minimums cannot be met due to close spacing of the vertical reinforcement, then bundle the access tubes with the vertical reinforcement.

If trimming the cage is required and access tubes for crosshole sonic log testing are attached to the cage, either shift the access tubes up the cage, or cut the access tubes provided that the cut tube ends are adapted to receive the watertight cap as specified.

Install the access tubes in straight alignment and as near to parallel to the vertical axis of the reinforcement cage as possible. Extend the access tubes from the bottom of the drilled shaft to at least two feet above the top of the drilled shaft. Splice joints in the access tubes, if required to achieve full length access tubes, must be watertight. Clear the access tubes of all debris and extraneous materials before installing the access tubes. Care must be taken to prevent damaging the access tubes during reinforcement cage installation and concrete placement operations in the drilled shaft excavation.

Fill the access tubes with potable water before concrete placement, and reinstall the top watertight threaded caps.

Prior to performing any crosshole sonic log testing operations specified in this subsection, remove the concrete at the top of the drilled shaft down to sound concrete.

The Department will perform crosshole sonic log testing and analysis on all completed drilled shafts designated for testing by the Engineer. The Department will require advance notice from the Contractor to schedule all crosshole sonic log testing. The Contractor will give at least forty eight (48) hours' notice to the Engineer of the time the concrete in each drilled shaft to be sufficiently cured to allow for crosshole sonic log testing.

Perform the testing after the drilled shaft concrete has cured at least ninety six (96) hours. Additional curing time prior to testing may be required if the drilled shaft concrete contains admixtures, such as set retarding admixture or water reducing admixture. The additional curing time prior to testing required under these circumstances will not serve as grounds for additional compensation or extension of time to the Contractor. Do not perform any subsequent construction on the completed drilled shaft until the CSL tests are approved and the drilled shaft accepted by the Engineer.

After placing the drilled shaft concrete and before beginning the crosshole sonic log testing of a drilled shaft, inspect the access tubes. Replace each access tube that the test probe cannot pass through, at the Contractor's expense, with a two inch diameter hole cored through the concrete for the entire length of the drilled shaft. Unless directed otherwise by the Engineer, locate the cored holes approximately six inches inside the reinforcement and do not damage the drilled shaft reinforcement. Log descriptions of inclusions and voids in cored holes and submit a copy of the log to the Engineer. Findings from cored holes must be preserved, identified as to location, and made available for inspection by the Engineer.

The Engineer will determine final acceptance of each drilled shaft, based on the crosshole sonic log test results and analysis for the tested shafts and a review of the visual inspection reports for the subject drilled shaft, and will provide a response to the Contractor within three working days after receiving the test results and analysis submittal.

The Engineer may approve continuing with drilled shaft construction prior to approval and acceptance of the first shaft if the Engineer's observations of the construction of the first shaft are

satisfactory, including, but not limited to, conformance to the Drilled Shaft Installation Plan as approved by the Engineer, and the Engineer's review of Contractor's daily reports and inspector's daily logs concerning excavation, steel reinforcing bar placement, and concrete placement.

If the Engineer determines that the concrete placed under slurry for a given drilled shaft is structurally inadequate, that drilled shaft will be rejected. The placement of concrete under slurry will be suspended until the Contractor submits to the Engineer written changes to the methods of drilled shaft construction needed to prevent future structurally inadequate drilled shafts, and receives the Engineer's written approval of the submittal.

If the Engineer determines that additional investigation is necessary, or if the Contractor requests, the Engineer may direct that additional testing be performed at a drilled shaft. At the Engineer's request, drill a corehole in any questionable quality drilled shaft (as determined from crosshole sonic log testing and analysis or by observation of the Engineer) to explore the drilled shaft condition. The number, locations, diameter and depth of the core holes and lengths of individual core runs will be determined by the Engineer. Coring procedures must minimize abrasion and erosion of the core samples, and must avoid damage to the steel reinforcement. Log descriptions of inclusions and voids in cored holes and submit a copy of the log to the Engineer. Preserve the recovered core in suitably labeled wood core boxes, identified as to location and depth, and made available for inspection by the Engineer. The Engineer may direct water pressure testing in the core holes, and/or unconfined compression testing and other laboratory testing on selected samples from the concrete core.

If subsequent testing at a drilled shaft indicates the presence of a defect(s) in the drilled shaft, the testing costs and the delay costs resulting from the additional testing will be borne by the Contractor. If this additional testing indicates that the drilled shaft has no defect, the testing costs and the delay costs resulting from the additional testing will be paid by the Department, and, if the drilled shaft construction is on the critical path of the Contractor's schedule, a time extension equal to the delay created by the additional testing will be granted.

For all drilled shafts determined to be unacceptable, submit a plan for further investigation or remedial action to the Engineer for approval. All modifications to the dimensions of the drilled shafts, as shown in the Plans, required by the investigation and remedial action plan must be supported by calculations and working drawings. All investigation and remedial correction procedures and designs must be prepared by a registered Professional Engineer licensed in the State of Delaware, and submitted to the Engineer for approval. Do not begin repair operations until receiving the Engineer's written approval of the investigation and remedial action plan.

Prior to beginning coring, submit the method and equipment to be used to drill and remove cores from drilled shaft concrete to the Engineer, and do not begin coring until the Engineer's written approval has been received. The coring method and equipment will include for complete core recovery and will minimize abrasion and erosion of the core.

Dewater all access tubes and cored holes and fill with grout after tests are completed and the drilled shaft is accepted. Fill the access tubes and cored holes using grout tubes that extend to the bottom of the tube or hole or into the grout already placed.

Alternative non-destructive tests such as Gamma-Gamma, Sonic Echo/Impulse Response, or Thermal Integrity Profiling may be specified on the Plans or directed by the Engineer to use alongside, or in lieu of, CSL testing. Comply with all requirements for the alternate test methods in accordance with the Plans or Special Provisions.

N. *Drilled Shaft Load Tests.* Install test shafts at the locations shown on the Plans unless otherwise directed or approved by the Engineer.

Install test shafts to the same dimensions, details and elevations shown on the Plans, and install using the same equipment and installation procedures proposed for installation of the foundation drilled shafts.

If the equipment or procedures are changed following the completion of load testing, install additional load test shafts, and conduct additional load tests as directed by the Engineer at no additional cost to the Department.

Complete all load testing and have the results evaluated by the Engineer before installing any production drilled shafts, unless otherwise authorized by the Engineer.

1. *Static Load Tests*. Perform static load tests in accordance with the procedures specified in ASTM D 1143.
2. *Force Pulse (Rapid) Load Tests*. Perform force pulse (rapid) load tests in accordance with the procedures specified in ASTM D 7383.
3. *Bi-Directional Load Cell Testing*. Install load cells and load test instrumentation in accordance with the bi-directional load cell supplier recommendations, instructions, and procedure manual(s), as approved by the Engineer.

   The bi-directional load cells must be capable of expanding to not less than 6 inches while maintaining the applied test load.

   The Contractor must be responsible for coordinating with the load cell supplier to determine and/or verify all required equipment, materials, quantities, procedures, and all other applicable items necessary to complete the load testing shown on the Plans.

   Furnish an acceptable pressurized gas source, a hydraulic pump, hydraulic lines, calibrated hydraulic gauge and other equipment and material necessary to perform the load tests. Furnish fresh, potable water from an approved source to form the hydraulic fluid used to pressurize the bi-directional load cells.

   Furnish, install and monitor vibrating wire strain gauges as shown on the Plans and as directed by the Engineer. Place the strain gauges in pairs on opposite sides of the reinforcing cage at the elevations shown on the Plans, unless otherwise directed by the Engineer.

   Attach two LVDT vibrating wire displacement gauges to each load cell to monitor the expansion and contraction of the load cell. In addition, mount two LVDT gauges on an independent reference beam and set on opposite sides of the top of the test shaft to monitor axial shaft displacement.

   Set two telltale rods on the top of each load cell to monitor the displacement of the top of the load cell. The telltale must consist of a 3/8-inch diameter stainless steel rod, greased for reducing friction and corrosion, and placed inside a constant 3/4-inch diameter pipe. Individual sections of telltales must be joint coupled flush so that each rod is of uniform diameter throughout its length.

   Furnish a portable computer and electronic logging equipment to simultaneously monitor all instrumentation at time intervals designated by the Engineer.

Assemble the load cells, piping and other attachments in preparation for installation in accordance with the requirements of the bi-directional load cell supplier, unless otherwise specified herein or directed by the Engineer. The following guidelines must be followed.

a. Weld steel top and bottom bearing plates to the load cells. Provide holes through the bearing plates, as appropriate, to facilitate placement of tremie concrete.
b. Coat the upper surface of the bottom steel bearing plate with grease prior to installation into the shaft, to prevent concrete bonding with the bottom plate.
c. Attach the load cells and plate assembly to the reinforcement cage. Securely fasten all hydraulic hoses, telltale casing, slip joints, etc. to the rebar cage. Prior to installation into the drilled shaft excavation, protect the top of any piping to keep dirt, concrete or other deleterious materials from entering the piping.
d. Limit the deflection of the cage to a maximum of 2 feet between pick points while lifting the cage from the horizontal position to vertical. Provide additional support, bracing, strong backs, etc. to maintain the deflection within the specified tolerance.

For each load test, place the load on the drilled shaft in increments of five percent of the estimated maximum test load shown on the Plans, or until the nominal resistance load (as indicated by the instruments) is approached, or to the maximum capacity of the load cell, whichever occurs first. Unless the maximum capacity of the load cell has been reached, apply increments of 2.5 percent of the estimated maximum test load until the limiting load is attained, or the drilled shaft top displacement reaches 2 inches, or to the maximum extension of the load cell. When the load cell will be used for a subsequent loading stage, the Engineer may interrupt the loading sequence at a load cell opening of approximately 3 inches, or less. Maintain each load increment for a minimum period of 5 minutes, with complete sets of readings obtained and recorded from all gauges and instruments at 1, 2 and 5 minutes after application of the load increment. Apply each increment of load within the minimum length of time practical and take the instrument system readings immediately. It is intended that the addition of a load increment and the completion of the instrument system readings be completed within 5 to 15 minutes. The Engineer may elect to hold the maximum applied load for up to one hour.

Remove the load in decrements of about 10 percent of the maximum test load. Remove each decrement of load within the minimum length of time practical and take the instrument system readings immediately. It is intended that the removal of a load decrement and the completion of the instrument system readings be completed within 5 to 15 minutes. The Engineer may also require a reloading cycle with ten loading increments and five unloading decrements. Record the final recovery of the drilled shaft for a period up to one hour after the last unload interval.

Submit a preliminary test report containing the load displacement curves and other test data to the Engineer within three days of completing each load test. Submit the final report on the load tests to the Engineer within ten days after completion of each load test. Include at least the following items in the test report:

a. Test shaft identification number and location.
b. Date(s) of testing.
c. Description of the test shaft details, instrumentation and test procedures.
d. Tables presenting all instrumentation data.
e. Plots of load versus displacement (up and down) for each load cell level, for each stage of the test.
f. Plots of load along the length of the drilled shaft determined from the strain gauge data for at least ten applied load increments.

g. Summary of unit side resistance along the length of the drilled shaft and end bearing resistance.
h. Plots of creep displacement for each load increment.
i. Plot of equivalent top-of-shaft displacement for the test shaft, developed from the load test data.

After completion of the load test to the satisfaction of the Engineer, and when authorized in writing by the Engineer, flush all hydraulic fluid from the bi-directional load cells and hydraulic lines, and replace with cement grout in accordance with the approved Drilled Shaft Installation Plan. Also grout any voids remaining outside the load cells after completion of the load test.

O. *Technique Shafts.* Demonstrate the adequacy of its methods, techniques and equipment by successfully constructing a technique shaft or shafts in accordance with the requirements shown on the Plans and these Specifications. Position the technique shaft(s) at the location(s) shown on the Plans or as directed by the Engineer, but not less than a clear distance of three drilled shaft diameters from the closest production shaft. Drill the technique shaft(s) to the maximum diameter and maximum depth of any production drilled shaft shown in the Plans. Unless shown otherwise on the Plans, reinforce the technique shaft(s) with the same reinforcement as the corresponding size production shaft, and also include CSL tubes as specified herein. Technique shaft(s) must be completed and accepted by the Engineer prior to initiating installation of the load test shafts and foundation drilled shafts. Failure by the Contractor to demonstrate to the Engineer the adequacy of methods and equipment will be reason for the Engineer to require alterations in equipment and/or method by the Contractor to eliminate unsatisfactory results. Any additional technique shaft(s) required demonstrating the adequacy of altered methods or construction equipment will be at the Contractor's expense. Once approval has been given by the Engineer to construct production drilled shafts, no changes will be permitted in the methods or equipment used to construct the satisfactory technique shaft(s) without the written approval of the Engineer.

The technique shaft(s) will be used by the Engineer to determine if the Contractor can:

1. Control dimensions and alignment of excavations within tolerance.
2. Install casing and remove temporary casing.
3. Seal the casing into impervious materials.
4. Control the size of the excavation under caving conditions by the use of a mineral or polymer slurry or by other means.
5. Properly clean the completed drilled shaft excavation.
6. Construct drilled shafts in open water areas.
7. Handle and install reinforcing cages.
8. Satisfactorily place concrete meeting the Specification requirements within the prescribed time limit.
9. Satisfactorily execute any other necessary construction operation.

When authorized in writing by the Engineer, cut off the technique shaft(s) not less than 2 feet below finished grade and left in place. Restore the disturbed areas at the sites of the technique shaft(s) as nearly as practical to their original condition.

606.04 Method of Measurement.

A. The Engineer will measure drilled shafts by the length in ft (m) from the plan top of shaft elevation to the final bottom of shaft elevation. The Engineer will not separately measure excavation, blasting, slurry, reinforcing steel, concrete, grout, integrity testing tubes, or non-destructive testing.

B. The Engineer will measure technique shafts by the length in ft (m) from the existing ground surface elevation at the center of the trial shaft hole prior to drilling to the authorized bottom elevation of the hole. The Engineer will not separately measure excavation, blasting, slurry, reinforcing steel, concrete, grout, integrity testing tubes, or non-destructive testing.
C. The Engineer will measure permanent casing by the length in ft (m) of each size casing used, as measured along the casing from the top of the shaft elevation or the top of casing, whichever is lower, to the bottom of the casing.
D. The Engineer will measure load tests by the number of load tests completed according to the specified loading procedures and to the designated maximum load shown on the plans. Payment will include all costs related to the performance of the load test and for the reporting of procedures and results.
E. The Engineer will measure exploratory drilling by the length in ft (m) from the ground elevation where the drilling begins to the bottom of the exploration hole.

606.05 Basis of Payment.

A. The Engineer will pay for accepted quantities at the contract unit price as follows:

Item No.	Item Description	UOM
606000	DRILLED SHAFT, 30"	LF
606001	DRILLED SHAFT, 36"	LF
606002	DRILLED SHAFT, 42"	LF
606003	DRILLED SHAFT, 48"	LF
606004	DRILLED SHAFT, 60"	LF
606005	DRILLED SHAFT, 72"	LF
606010	TECHNIQUE SHAFT, 30"	LF
606011	TECHNIQUE SHAFT, 36"	LF
606012	TECHNIQUE SHAFT, 42"	LF
606013	TECHNIQUE SHAFT, 48"	LF
606014	TECHNIQUE SHAFT, 60"	LF
606015	TECHNIQUE SHAFT, 72"	LF
606020	PERMANENT CASING FOR DRILLED SHAFT, 30" DIAMETER	LF
606021	PERMANENT CASING FOR DRILLED SHAFT, 36" DIAMETER	LF
606022	PERMANENT CASING FOR DRILLED SHAFT, 42" DIAMETER	LF

606023	PERMANENT CASING FOR DRILLED SHAFT, 48" DIAMETER	LF
606024	PERMANENT CASING FOR DRILLED SHAFT, 60" DIAMETER	LF
606025	PERMANENT CASING FOR DRILLED SHAFT, 72" DIAMETER	LF
606030	LOAD TESTING OF DRILLED SHAFTS	EACH
606031	EXPLORATORY DRILLING	LF

B. Such payment is full compensation for furnishing all materials, equipment, labor, and incidentals to complete the work as specified.

ITEM 302XXX – LIGHTWEIGHT AGGREGATE FILL

Description:

This item consists of furnishing all labor, materials, and equipment required for the installation of lightweight aggregate fill as shown on the drawings or as directed by the Engineer.

Materials:

Lightweight Aggregate Fill shall be a lightweight expanded shale aggregate or approved rotary kiln-produced expanded shale substitute meeting all the requirements of a recently completed (2 years max.) ASTM C 330 certification. No by-product slags, coal derived by-product aggregates (cinders, bottom ash, fly ash) or pumice, scoria, or tuff shall be permitted.

The lightweight aggregate fill shall have a proven record of durability and be non-corrosive (less than 100 ppm chloride when measured by AASHTO T 260), and meet the following physical property requirements:

A. Delivered Gradation:

Sieve Size	Percent by Weight Passing
¾"	100-90
½"	70-50
#4	10-0

B. The dry loose unit weight shall be less than 45 pounds per cubic foot (pcf). The lightweight aggregate fill producer shall submit verification of a compacted density of less than 60 pcf when measured by a one-point compaction ("Proctor") test conducted in accordance with ASTM D698, "Standard Test methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-Ibf /cu ft)" (AASHTO T-99).

C. The lightweight aggregate producer shall submit verification that the angle of internal friction shall be greater than 40° when measured in a triaxial compression test on a laboratory sample with a minimum diameter of 10 inches. (ASTM D 698).

D. The maximum Los Angeles Abrasion loss when tested in accordance with ASTM C 131 Modified (8 grading) shall be <30 percent.

E. The minimum permeability shall be 25cm/sec when tested in accordance with ASTM D 2434.

F. The pH shall be between 6.5 and 9.0

G. Absorption: ASTM C 127 (24 hours) Maximum: 15%
Minimum: 9%

H. Soundness: ASTM C 88 Maximum 3% loss using the Magnesium Sulfate method

Construction Methods:

The lightweight aggregate shall be installed after the respective excavation has been approved by the Engineer. Compaction shall be completed and verified in a manner meeting the recommendations and requirement of the material manufacturer. Any aggregate which has been degraded, or has been contaminated by soil, debris or other deleterious materials shall be removed and replaced at the Contractor's expense.

Method of Measurement:

The quantity of lightweight aggregate fill will be measurement in cubic yards of material actually placed and accepted. Measurement will be computed using the method of average end areas between original cross sections and final cross sections after placement of the lightweight aggregate fill.

Basis of Payment:

Payment shall be made at the contract unit price per cubic yard for lightweight aggregate. This price shall be full compensation for furnishing all materials, for preparing and placing these materials, and for all labor, equipment tools, and incidentals necessary to complete the item.