GEOTECHNICAL EXPLORATION REPORT
I-515 CHARLESTON BOULEVARD INTERCHANGE PROJECT – HIGH MAST LIGHTS AND SPECIAL SIGNPOSTS
I-515 NB BETWEEN EAST WYOMING AVENUE AND NORTH EASTERN AVENUE
CLARK COUNTY, NEVADA

NOVA PROJECT NO.: G-19-192
APRIL 21, 2021

Prepared for:

CA GROUP, INC.

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TABLE OF CONTENTS

Page No.

FIGURES

APPENDIX A

APPENDIX B

APPENDIX C

GEOTECHNICAL EXPLORATION REPORT
I-515 CHARLESTON BOULEVARD INTERCHANGE PROJECT – HIGH MAST LIGHTS AND SPECIAL SIGNPOSTS
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CLARK COUNTY, NEVADA

1.0 INTRODUCTION

This report presents the results of our geotechnical exploration for the proposed embankment widening along I-515 north-bound between North Pecos Road and North Mojave Road in the City of Las Vegas and Clark County, Nevada and is specific to the design of high mast lights along the alignment. The general location of the site is shown on Figure No. 1, Vicinity Map.

The purpose of our services was to provide information and geotechnical engineering recommendations relative to:

- Subsurface soil conditions
- General geology of the area
- High mast light foundation design
- High mast light foundation construction considerations

This report is for the purpose of providing geotechnical engineering and/or testing information and requirements. The scope of our services for this project did not include any environmental assessment or investigation for the presence or absence of hazardous or toxic material in structures, soil, surface water, groundwater or air, below or around this site.

2.0 PROJECT INFORMATION

The project consists of the widening of approximately 1.7 miles of Interstate-515 from I-515/Charleston Boulevard interchange to I-515/Eastern Avenue interchange in the City of Las Vegas and Clark County, Nevada. The project includes addition of one auxiliary lane in each direction, however, the widening of the I-515 will only be performed along north-bound I-515. The project also includes widening of interchange ramps, and reconstruction and improvements of Charleston Boulevard from Honolulu Street to Sacramento Drive. The roadway widening will necessitate the widening of bridges over Mojave Road, Pecos Road, and Stewart Avenue, as well as the construction of new embankment and MSE wall retained embankment on the northbound side of the roadway. The project will also include construction of new high mast lighting along the alignment and with extended alignment south of Charleston Boulevard to Wyoming Avenue.

This report is specific to design and construction of high mast lights. New high mast lights will be constructed along the I-515 embankment between Wyoming Avenue and Eastern Avenue and at the interchange areas at Charleston Boulevard interchange and Eastern Avenue interchange. We understand all high mast lights will be 100 feet high.

3.0 SITE EXPLORATION

The scope of our services for this portion of the project included a subsurface exploration program. The subsurface exploration program consisted of drilling sixteen (16) borings to depths of approximately 25 feet below existing site grades within Right-of-Way of the I-515. Four (4) borings were drilled at the Charleston Interchange area, two (2) borings were drilled within the Eastern Interchange area and the remaining ten (10) borings were drilled along the I-515 embankment. The borings were logged during drilling by a graduate geologist and samples were obtained to aid in material classification and for possible laboratory testing. The approximate locations of the borings are shown on Figure No. 2a through 2f, Site Map. The locations of the borings were determined in the field by approximating distances from existing features or improvements. The locations of the borings should be considered accurate only to the degree implied by the method used. Results of the borings are presented in Appendix A.

4.0 SITE CONDITIONS

4.1 Surface

All borings were drilled on the embankment along the I-515 roadway except the borings drilled within the interchange area between the I-515 roadway and entry and exit roads. When drilled within the roadway embankment, the borings were drilled within the west-most lane of the northbound roadway. The I-515 roadway between West Wyoming Avenue and North Eastern Avenue consisted of three-lane roads each direction plus auxiliary lanes, with shoulders and median in each direction. The northbound and southbound lanes were separated by concrete barrier rails. Sound walls were present on both northbound and southbound along the entire stretch of the I-515 within the project area. The interchange area between the I-515 roadway and entry and exit roads were typically barren with sparse vegetation including some mature trees.

4.2 Subsurface

Fill was encountered in all explorations. Within the Charleston and Eastern interchange areas, the fill generally were 1 to 3 feet thick and typically consisted of silty sand to clayey sand soils with various amounts of gravels. Within the I-515 embankment/roadway areas, the fill generally were deep, varying in depths from 10.5 feet to full depth of exploration, and primarily consisted of clayey to silty sand with varying amounts of gravel. However, due to previous site development there could be deeper and/or poorer quality fill in other areas of the site beyond our explorations.

Natural soils at the site varied among the borings but generally consisted of lean (low-plasticity) to fat (high-plasticity) clay with various portions of sand varying to clayey sand soils. Occasional silty sand soils were also encountered in many borings at various depths. Caliche (cemented sand and gravel) was encountered in one boring (HML-R4) only and was moderately hard. Laboratory expansion index test results indicate that the on-site clay soils have a very low to medium expansion potential.

Groundwater was encountered in all explorations within the interchange areas and only 1 out of 10 explorations within the roadway embankment. The groundwater was measured at depths ranging from 2.3 feet to 14 feet below existing site grade, wherever encountered; however, groundwater levels can and should be considered to fluctuate due to seasonal variations, precipitation, surface drainage conditions and due to groundwater withdrawal and recharge. The groundwater level encountered at each boring is summarized in the following table:

Boring No.	Shallowest Groundwater Depth (feet)
HML-R1	N/E
HML-R2	N/E
HML-R3	2.3
HML-R4	5
HML-R5	2.5
HML-R6	2.8
HML-R7	N/E
HML-R8	17
HML-R9	N/E
HML-R10	N/E
HML-R11	N/E
HML-R12	N/E
HML-R13	N/E
HML-R14	N/E
HML-R15	14
HML-R16	11.2
N/E – Not encountered	

The boring logs and laboratory test results presented in Appendix A should be referred to for more detailed information.

5.0 GEOLOGIC INFORMATION

The site is located in the central portion of the Las Vegas Valley. This location places the site in an area underlain by thick alluvial deposits (hundreds of feet).

Two faults are mapped within the proposed improvement area.[1] One fault is mapped approximately 750 feet east of the intersection of I-515 and Mojave Road and the other fault is mapped crossing the I-515 alignment at the intersection of I-515 and Pecos Road. The mapped faults are generally north-south trending, Quaternary age faults.

As indicated on the Clark County Soil Guidelines Map, the site is located within 2,000 feet of a fault. According to published information, 90% of all fissures in the Las Vegas Valley occur within this 2,000-foot zone. The cumulative evidence indicates that fissures are the result of a subsurface erosional process. The erosional process occurs in tensional fractures at or near the surface in uncemented, relatively fine-grained soils. A visual evaluation of the existing surface was performed, but no visible surface expressions of fissures were noted. The nearest mapped fissure zone is approximately 1 mile east of the southern end of the alignment, near the I-515/Wyoming Avenue interchange.[2]

Liquefaction is defined as the condition when saturated, loose, finer-grained sand-type soils lose their support capabilities because of excessive pore water pressure which develops during a seismic event. However, the groundwater at the project site may be shallower, but due to nature and consistency of the on-site soils, liquefaction potential should be considered as low during the design seismic event.

6.0 RECOMMENDATIONS

6.1 General

Our recommendations are based on the available project information discussed in the report and the assumption that the soil conditions are similar to those disclosed by the explorations. If variations are noted during construction or if changes are made in site plan, structural loading, foundation type or elevation, we should be notified so we can supplement our recommendations, as applicable.

As indicated, there was fill on-site. The existing embankment fill will be considered engineered fill and does not require removal and replacement. Fill outside the embankment would be considered uncontrolled fill unless observation and testing was performed during placement. All uncontrolled fill should be removed and replaced with properly compacted fill. The uncontrolled fill soils can be re-used for controlled fill provided almost all oversized material, unsuitable material (as determined by the resident engineer), vegetation and debris is removed.

[1] Clark County Geographic Information System Management Office (GISMO), 2016

[2] Bell, John W., et. al., 2001, “Las Vegas Valley, 1998 Subsidence Report", Nevada Bureau of Mines and Geology, Open-File Report 01-4, Plate No. 1.

6.2 High Mast Lights Foundation

The proposed high mast light pole structure should receive adequate support from a foundation system consisting of individual drilled shaft foundations. We understand the NDOT has a standard foundation design details for high mast light poles. Assuming that the loads stated in their standard are still valid and based on soil conditions encountered during our explorations, it is our opinion that the drilled shafts within the roadway embankment and the interchange areas can be designed considering a “Stiff Clay, Sand, Gravel” soil foundation material. Based on this material, the standard foundation design for a 100-foot mast light requires that the light mast be supported on a single drilled shaft of 42 inches diameter with reinforcement including 13 - #8 bars and a drilled shaft length of at least 13 feet.

6.3 Special Signposts Foundations

We understand NDOT has a standard foundation design details for signposts including anchor bolts size, pedestal size, pile diameter, pile depth and pile reinforcement. The standard NDOT designs are based on various type of posts. This recommendation is specific for two posts planned at Station 977+15.00 (17-1) and 981+26.00 (17-2) near the intersection of I-515 and Mojave Road. Type VII and Type V posts are planned at 17-1 and 17-2, respectively, which we understand are typically approximately 25 feet in height. However, based on the planned improvements, it appears that the signposts will have to be approximately 40 feet high from the planned ground surface. To limit the height of the post to 30 feet and be able to use the standard Type VII and V posts, the pedestals are planned to stick up above the ground at least 10 feet, meaning, for analysis purposes, that the top of the drilled shaft will be 10 feet above the ground elevation.

Based on the standard NDOT foundation details, the foundation for Type V and VII consists of 36 inches diameter for both, 22 feet and 23 feet depth, respectively, and reinforcement of 16-#9 bar and 16-#11 bar, respectively. Structural loads for these posts were not available. Therefore, we back calculated the design loads per the NDOT recommended foundation details. Based on our analysis, loading consisting of 20 kips axial load, 2,400 kips-inch moment, and 8 kips shear will produce a maximum deflection of 1 inch. This load was then applied to the drilled shaft foundation sticking 10 feet above ground. Based on our evaluations for the load as noted above, the drilled shaft sticking up 10 feet up the group should be a 36 inches diameter shaft with reinforcement of 16-#11 bar. The total drilled shafts length should be at least 38 feet, meaning that the drilled shafts should be embedded at least 28 feet into the ground, for both Type V and VII. The results of the analysis are presented in Appendix B of this report. This design should be considered valid only for the stations discussed and for the loading noted above.

6.4 Drilled Shaft Construction Considerations

Drilled shaft construction should generally follow the recommendations in NDOT’s Standard Specifications for Road and Bridge Construction, Section 509, and NDOT’s Standard Plans for

Road and Bridge Construction, Section 603. Placement of concrete within drilled pile excavations should begin within 24 hours after completion of geotechnical/drilling inspection. If concreting is not begun within 24 hours the contractor shall remove the reinforcing cage, re-clean the bottom of the drilled shaft and have the shaft re-inspected prior to proceeding. Placement of concrete should begin within 12 hours of this re-cleaning and re-inspection procedure. It is anticipated that water may be encountered within the design shaft depth at various locations and is anticipated to be very shallow in the Charleston interchange area and relatively deep in the remaining areas. Free-fall concrete placement is not recommended. We recommend that the concrete be placed into the drilled shaft excavation using a tremie. Steps should be taken to ensure that the tip of the tremie remain at the bottom of the excavation until at least 5 feet of concrete has been placed and thereafter remains at least 5 feet below the top of the concrete.

We recommend the installation contractor review this report, the soils and conditions encountered, and adjust the means and methods for the drilled shaft installation accordingly. Based on our experience during drilling operations and the soil encountered, drilled shaft excavations within the clay soil should remain open and stable. Drilled shaft excavations within the granular soil primarily below the groundwater level may not remain open and stable and may require temporary casing.

Only specialty foundation subcontractors experienced in drilled pile construction should be considered for foundation installation. Contractors should satisfy themselves as to materials and conditions present, and applicable equipment and procedures to use.

The following inspections should be documented for each drilled shaft:

- Diameter of shaft
- Depth of shaft
- Depth and visual identification of soils encountered
- Depth groundwater was encountered
- Type of casing and length, if used
- Type of slurry, if used
- Any offset shaft is from design location (Should be verified by survey by others)
- Date and time of drilling completion
- Date and time of reinforcement placed
- Date and time of concrete placement started and completed
- Date and time of any casing removed
- Actual and theoretical concrete volume

6.5 Site Class

Seismic forces should be determined using the following values obtained from Figure 12.3-H in Section 12.3.5 of the NDOT Structures Manual (2008): a Peak Ground Acceleration Coefficient (PGA) of 0.15 g, a Short-Period Spectral Acceleration Coefficient (S_s) of 0.40 g, and a Long-Period Spectral Acceleration Coefficient (S_1) of 0.15 g.

Based on the information presented on the Clark County Shear Wave Velocity Profile Map, a Site Class D may be used for seismic design of the structures between Wyoming Avenue and near Pecos Road. The data for the other areas north of the Pecos Road is undocumented in the Map. Because of inadequate data to 100 feet depth in that area, a Site Class D should be used per ASCE 7-16.

6.6 Corrosivity

Based on test results and *Section 4.2* of *ACI 318*, the on-site soils classify as having negligible (**S0**) to moderate (**S1**) sulfate exposure; however, we recommend that Type V cement per ASTM C150, or equivalent high sulfate resistant cement, should be used in combination with a maximum water-cement ratio of 0.45 and a maximum 28-days compressive strength of at least 4,500 psi. Consideration should be given to providing protection to buried metal pipes or use of nonmetallic pipe where permitted by local building codes. Non-corrosive backfill, protective coatings and wrappings, sacrificial anodes, or a combination of these methods could be considered. It should be understood that Universal Engineering Sciences personnel are not experts regarding corrosion and/or corrosion protection and that we recommend a “Corrosion Engineer” be consulted for actual recommendations regarding the necessity and/or method of cathodic protection.

7.0 OTHER SERVICES

Universal Engineering Sciences should be retained to provide a general review of final design plans and specifications in order that grading and foundation recommendations may be interpreted and implemented. In the event that any changes of the proposed project are planned, the conclusions and recommendations contained in this report should be reviewed and the report modified or supplemented as necessary.

Universal Engineering Sciences should also be retained to provide services during excavation, grading, foundation and construction phases of work. Observation of foundation excavations should be performed prior to placement of reinforcing and concrete to confirm that satisfactory bearing materials are present. Field and laboratory testing of concrete and soils should be performed to determine whether applicable requirements have been met.

The analyses and recommendations in this report are based in part upon data obtained from the field exploration. The nature and extent of variations beyond the locations of the explorations may

not become evident until construction. If variations then appear evident, it may be necessary to re-evaluate the recommendations of this report.

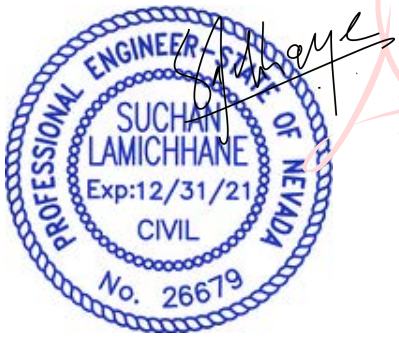
8.0 CLOSURE

Our professional services were performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable geotechnical engineers practicing in this or similar localities. No warranties, either expressed or implied, are intended or made. We prepared this report as an aid in design of the proposed project. This report is not a bidding document. Any contractor reviewing this report must draw his own conclusions regarding site conditions and specific construction techniques to be used on this project.

NOVA GEOTECHNICAL & INSPECTION SERVICES
D.B.A.
UNIVERSAL ENGINEERING SERVICES

Prepared by:

Suchan Lamichhane, PhD, PE
Senior Geotechnical Engineer/Project Manager



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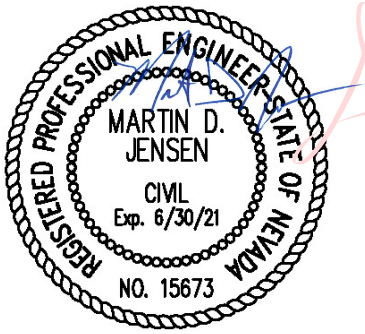
Reviewed by:

Martin D. Jensen, PE
Principal/Geotechnical Department Manager



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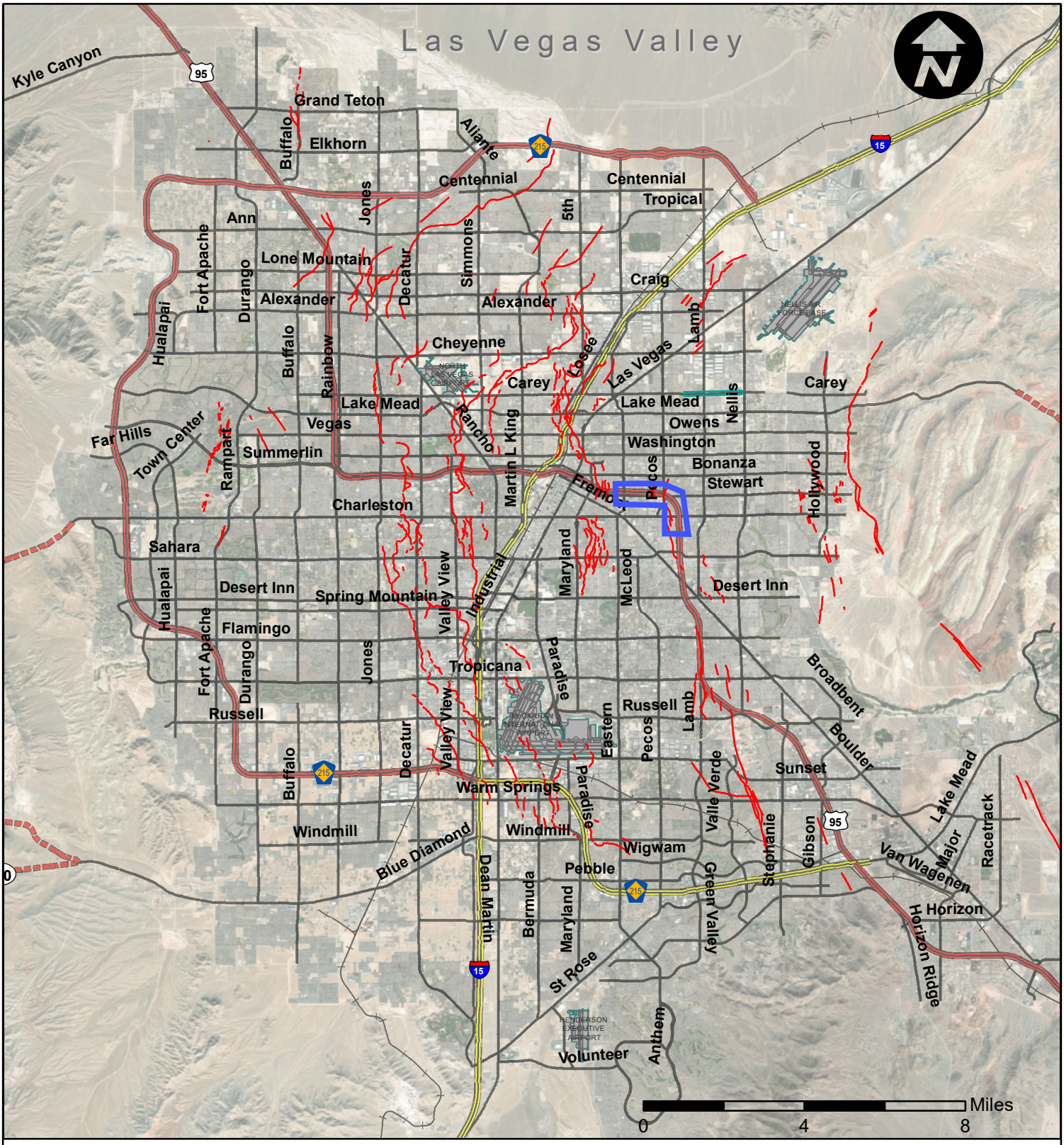


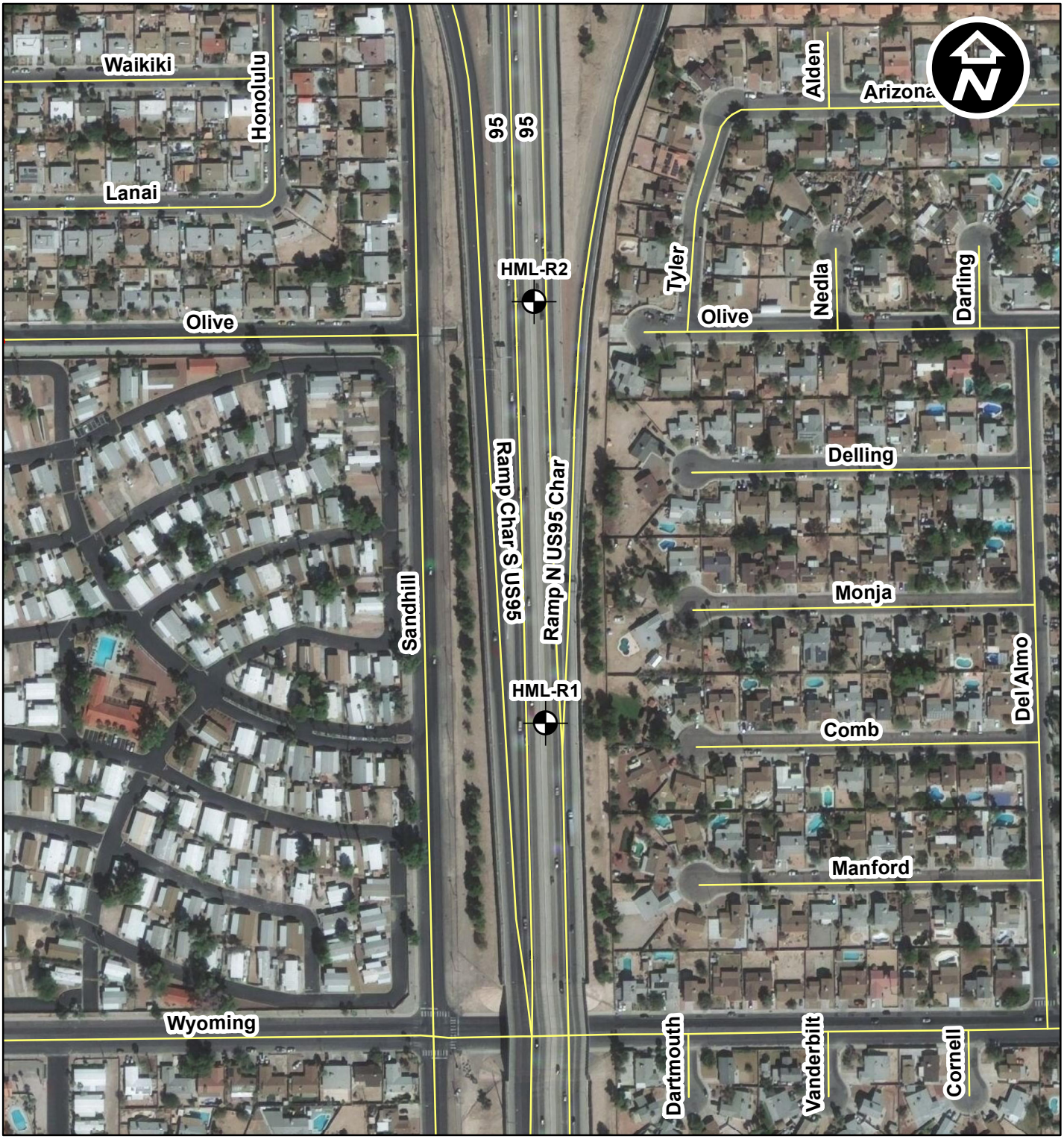
Legend

Las Vegas Faults (CCBD GISMO, 2016)

Approximate Project Location

The presented layers were obtained from various sources including ESRI, USGS, USDA, CCBD GISMO, CCFCD, GIS User Community among others. The GIS information is presented for reference only. No warranties, either expressed or implied, are intended or made. If you have any questions regarding this information, please contact NOVA.

NOVA Geotechnical & Inspection Services	PROJECT: **I-515 & Charleston Interchange Northbound I-515**	**VICINITY MAP**
	CLIENT: **C-A Group, Inc.**	PROJECT NO: **G-19-192** / FIGURE NO: **1**



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Approximate Boring Location

Las Vegas Faults (CCBD GISMO, 2016)

Feet

0 130 260 390 520 650

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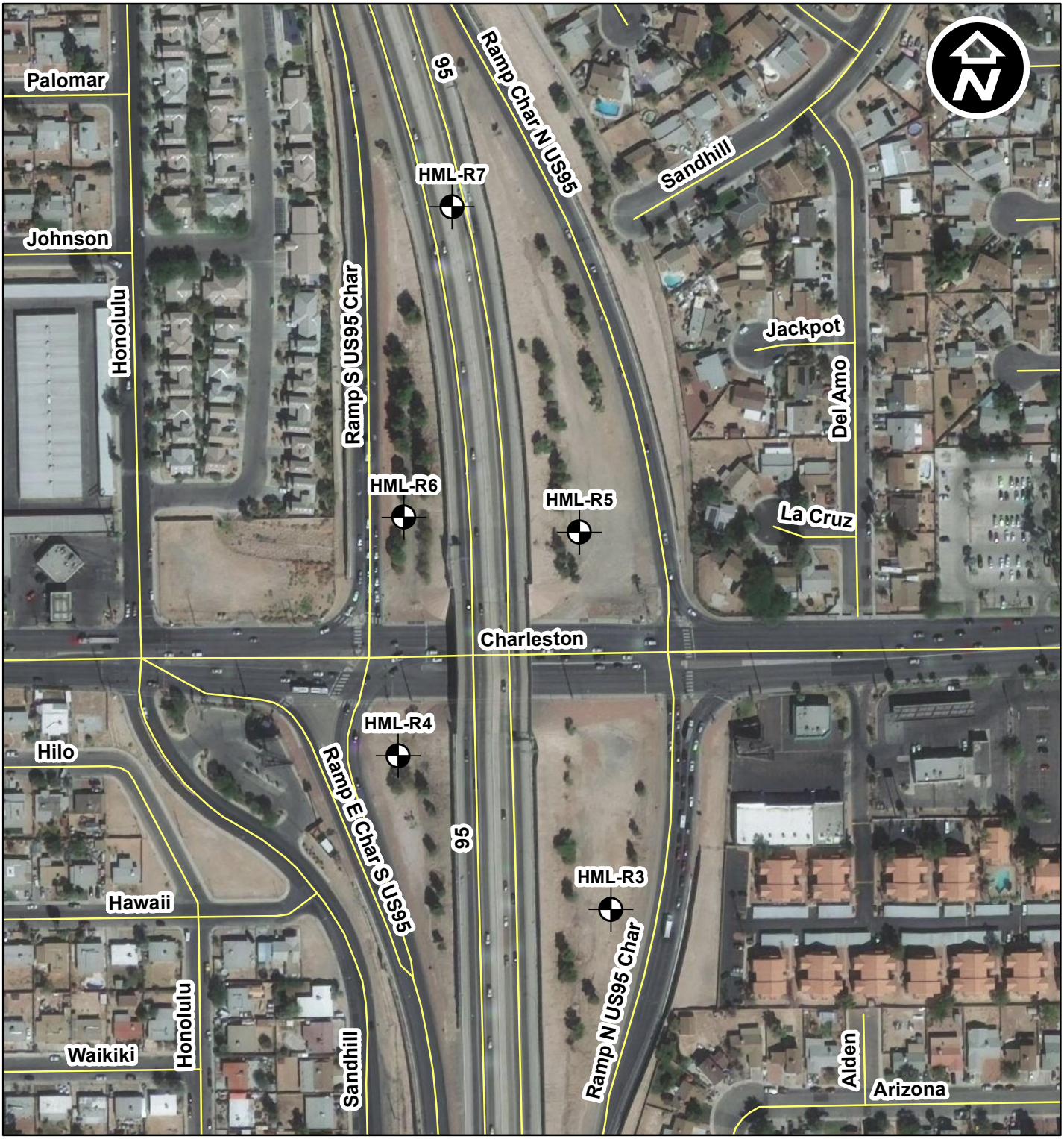
NOVA Geotechnical & Inspection Services	PROJECT: **I-515 Charleston Interchange Northbound I-515**	SITE MAP	
	CLIENT: **C-A Group, Inc.**	PROJECT NO: **G-19-192**	FIGURE NO: **2a**



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Approximate Boring Location

Las Vegas Faults (CCBD GISMO, 2016)

Feet

0 110 220 330 440 550

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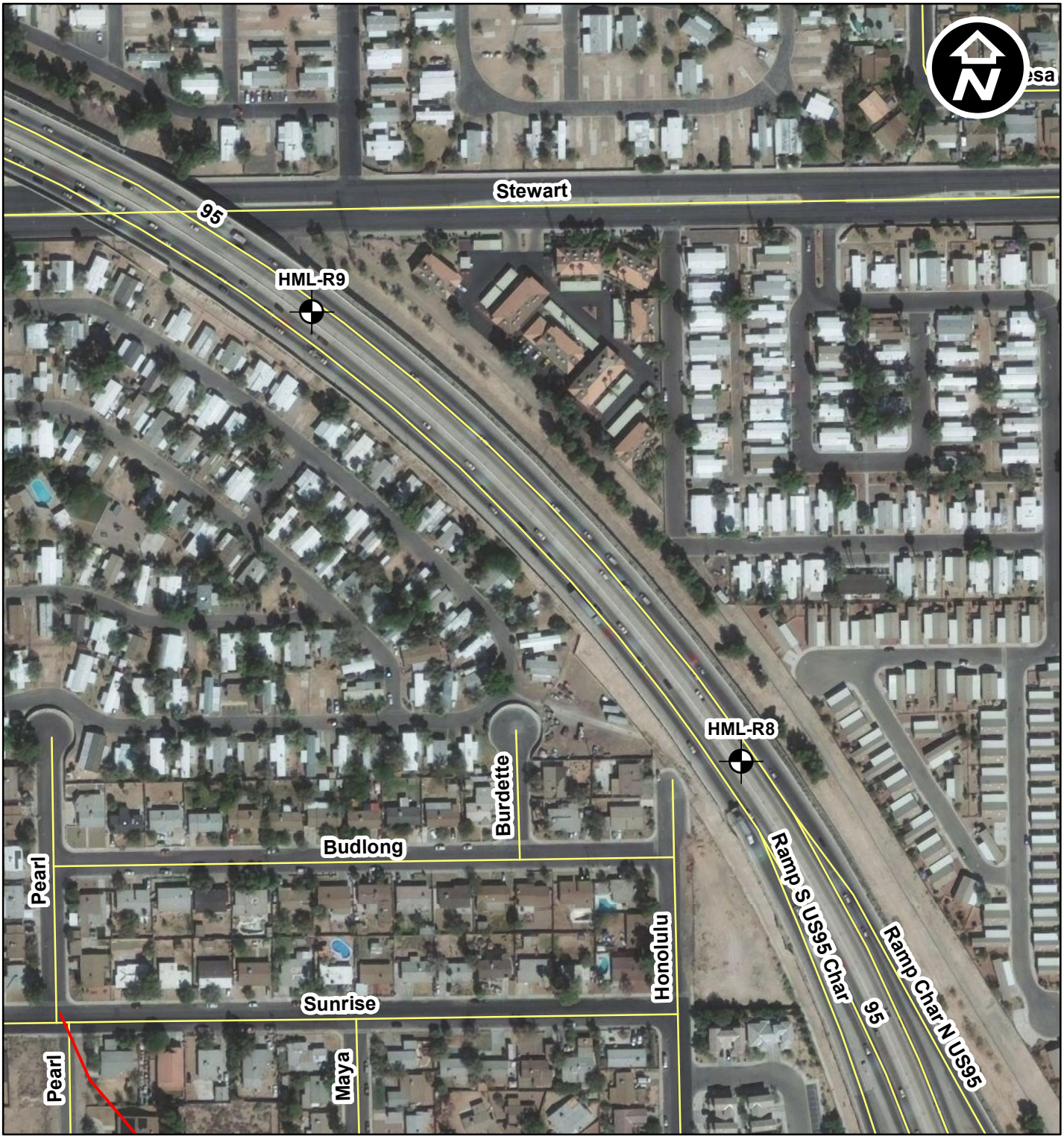
NOVA Geotechnical & Inspection Services	PROJECT: **I-515 Charleston Interchange Northbound I-515**	SITE MAP	
	CLIENT: **C-A Group, Inc.**	PROJECT NO: **G-19-192**	FIGURE NO: **2b**



Legend

Approximate Boring Location

Las Vegas Faults (CCBD GISMO, 2016)

Feet

0 110 220 330 440 550

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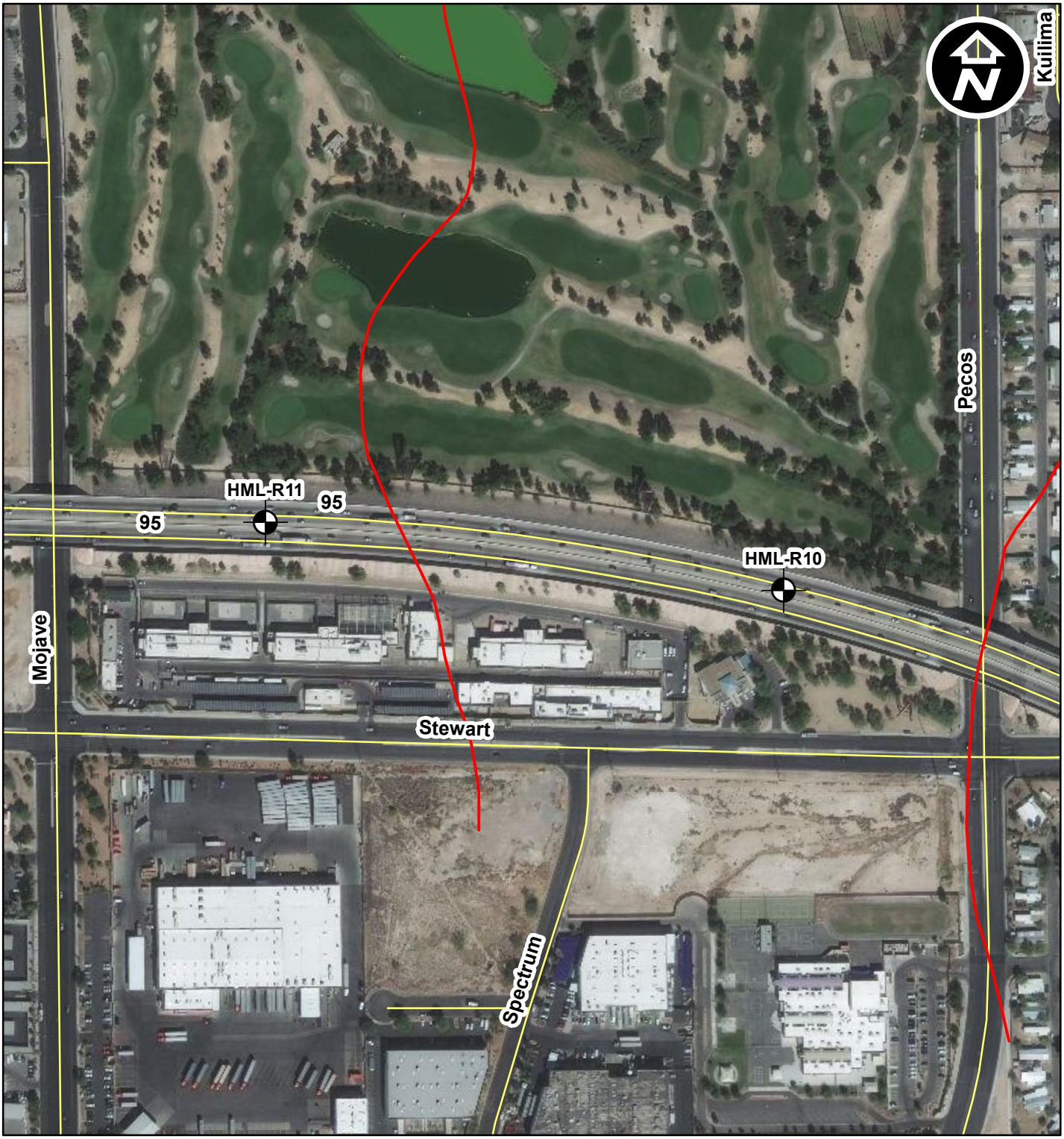
NOVA Geotechnical & Inspection Services	PROJECT: **I-515 Charleston Interchange Northbound I-515**	SITE MAP	
	CLIENT: **C-A Group, Inc.**	PROJECT NO: **G-19-192**	FIGURE NO: **2c**



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Approximate Boring Location

Las Vegas Faults (CCBD GISMO, 2016)

Feet

0 160 320 480 640 800

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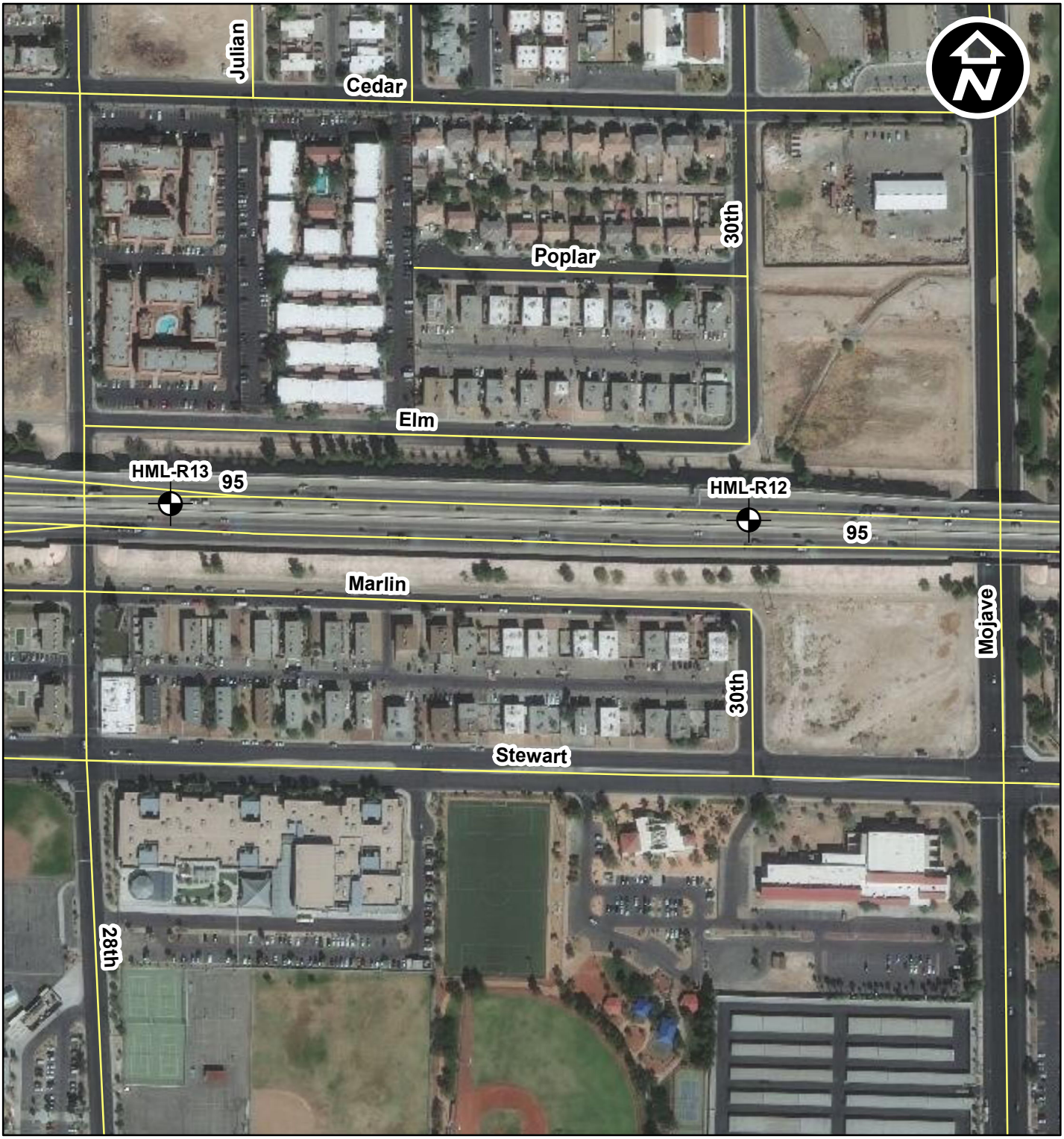
NOVA Geotechnical & Inspection Services	PROJECT: **I-515 Charleston Interchange Northbound I-515**	SITE MAP	
	CLIENT: **C-A Group, Inc.**	PROJECT NO: **G-19-192**	FIGURE NO: **2d**



Legend

Approximate Boring Location

Las Vegas Faults (CCBD GISMO, 2016)

Feet
0 130 260 390 520 650

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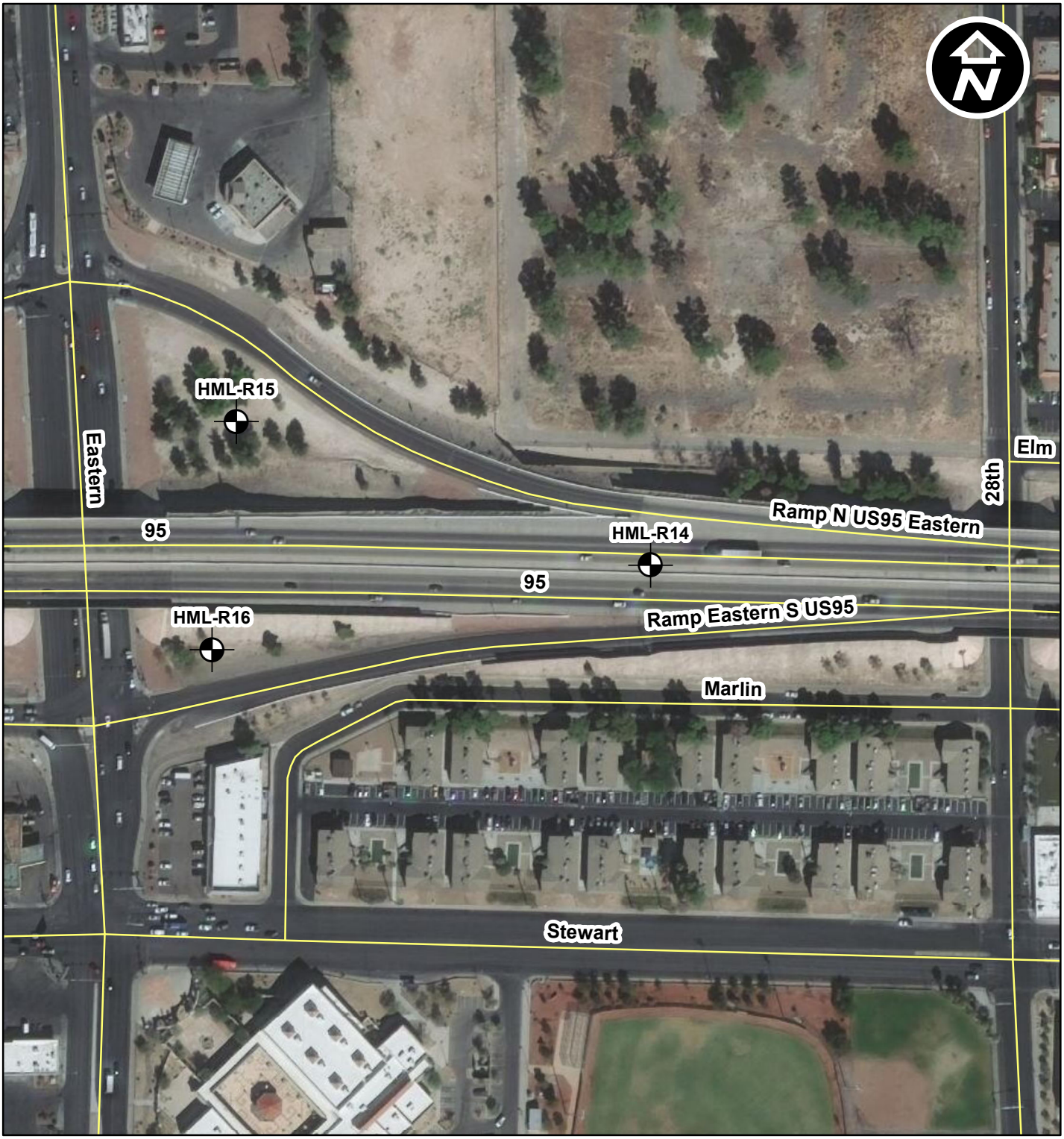
NOVA Geotechnical & Inspection Services	PROJECT: **I-515 Charleston Interchange Northbound I-515**	SITE MAP	
	CLIENT: **C-A Group, Inc.**	PROJECT NO: **G-19-192**	FIGURE NO: **2e**



Legend

Approximate Boring Location

Las Vegas Faults (CCBD GISMO, 2016)

Feet

0 90 180 270 360 450

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NOVA Geotechnical & Inspection Services	PROJECT: **I-515 Charleston Interchange Northbound I-515**	SITE MAP	
	CLIENT: **C-A Group, Inc.**	PROJECT NO: **G-19-192**	FIGURE NO: **2f**

APPENDIX A

APPENDIX A

Site Exploration

The subsurface conditions of the site were explored by drilling sixteen (16) borings to depths of approximately 25 feet each below existing site grades. Four (4) borings were drilled at the Charleston Interchange area, two (2) borings were drilled within the Eastern Interchange area and the remaining ten (10) borings were drilled along the I-515 embankment. Borings were drilled using a rotary drill rig utilizing hollow-stem augers.

Soils were logged during drilling by a graduate geologist and samples were obtained to aid in material classification and for possible laboratory testing. Boring logs are presented on Plates 1 through 16. Sampling was performed using either a split spoon sampler ("SPT" in boring logs) or a ring-lined barrel sampler ("CMS" in boring logs). The SPT and ring-lined sampler was driven in three 6-inch intervals into the substrata with blows from a 140-pound automatic hammer free-falling 30 inches. Penetration resistance (blow counts) were recorded for each 6-inch drive. Blow counts for the final 12 inches of the total 18 inches are presented as blows per foot in boring logs at the respective depths the samples were taken. It should be noted that the blow counts from R sampler are not equivalent to blow counts from SPT sampler. Pocket penetrometer tests were also performed on the clayey samples in field and are noted in the boring logs at the respective depth of the samples ("PP" in boring logs). Bag/bulk samples were also collected from the borings for laboratory testing. The soils are generally classified by the Unified Soil Classification System. Plate 17 presents an explanation of material classifications used in this report.

Laboratory Testing

Laboratory testing was performed on selected samples of on-site soils. Tests were performed in general accordance with applicable ASTM, NDOT or local standards. Field moisture content and dry density determinations were performed on relatively undisturbed ring-lined samples. Results of these tests are presented on the boring logs at the respective depths the samples were taken.

Atterberg Limits tests (NV T210, T211, & T212) and sieve analyses (NV T206) or percent passing the No. 200 sieve (ASTM D1140) were performed to determine the grain-size distribution or percent finer and soil classification of representative materials. The test results are presented on attached laboratory result graphs and summarized in the table Summary of Laboratory Results.

Expansion Index (EI) tests were performed on remolded samples of the representative soils. The tests were performed from 50 (±2) percent saturation moisture content to near saturated condition and a 1 psi (144 psf) surcharge load was applied. The test results are presented below:

SAMPLE	EXPANSION INDEX
HML-R3 @ 1-4 ft.	37
HML-R4 @ 3-5 ft.	19
HML-R5 @ 1-4 ft.	53
HML-R8 @ 2-5 ft.	0
HML-R12 @ 1-6 ft.	4
HML-R16 @ 2-4.5 ft.	0

Chemical tests were performed on representative samples by Terracon. Tests were performed to determine the percent chloride, water soluble sodium, sulfate and sodium sulfate, as well as the soil solubility. Test results are presented on attached graphs and summarized below:

SAMPLE LOCATION	pH	Water Soluble Sulfate (SO4), %	Chlorides, %	Resistivity, ohm-cm
HML-R3 @ 1-4 ft.	8.34	0.01	<0.01	547
HML-R6 @ 1-4 ft.	7.41	0.01	<0.01	2001
HML-R7 @ 2-7 ft.	7.98	0.04	<0.01	1001
HML-R9 @ 2-8 ft.	8.06	0.15	<0.01	867
HML-R11 @ 1.5-5 ft.	8.37	0.05	<0.01	800
HML-R13 @ 2-5 ft.	8.36	0.05	<0.01	934
HML-R16 @ 2-4.5 ft.	7.72	0.02	0.01	540

BORING NUMBER HML-R1

NOVA Geotechnical and Inspection Services
4480 W Hacienda Avenue, Ste 104
Las Vegas, Nevada

CLIENT CA Group, Inc.
PROJECT NAME I-515 Charleston Interchange
PROJECT NUMBER G-19-192
PROJECT LOCATION I-515 from Charleston Boulevard to Eastern Avenue
DATE STARTED 5/22/20 **COMPLETED** 5/22/20
GROUND ELEVATION _____ **HOLE SIZE** 8 inches
DRILLING CONTRACTOR CASCADE
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Augers
AT TIME OF DRILLING --- Groundwater not encountered.
LOGGED BY JS **CHECKED BY** SL
AT END OF DRILLING --- Groundwater not encountered.
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0						0.7	Concrete, 8.5 inches
						1.1	Aggregate Base, 13 inches
							FILL - Clayey sand with gravel, slightly moist, light brown
5	BULK 1	100					
	CMS 2	100	7-21-34 (55)	LL = NP PL = NP Fines = 31%			- FILL - Silty sand with gravel, slightly moist, light brown
10							
	SPT 3	100	7-8-11 (19)				
15							
	CMS 4	100	28-50/5"	MC = 3% DD = 120 pcf Fines = 49%			- FILL - Clayey gravel with sand, slightly moist, light brown
20							- FILL - Silty sand with gravel, slightly moist, light brown
	SPT 5	100	13-13-5 (18)			21.0	
					SC		(SC) Clayey SAND, medium dense, moist, brown
25							
	CMS 6	100	2-6-6 (12)	MC = 6% DD = 103 pcf		26.5	- loose

Bottom of borehole at 26.5 feet.

BORING NUMBER HML-R2

NOVA Geotechnical and Inspection Services
4480 W Hacienda Avenue, Ste 104
Las Vegas, Nevada

CLIENT CA Group, Inc.
PROJECT NAME I-515 Charleston Interchange
PROJECT NUMBER G-19-192
PROJECT LOCATION I-515 from Charleston Boulevard to Eastern Avenue
DATE STARTED 5/22/20 **COMPLETED** 5/22/20
GROUND ELEVATION _____ **HOLE SIZE** 8 inches
DRILLING CONTRACTOR CASCADE
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Augers
AT TIME OF DRILLING --- Groundwater not encountered.
LOGGED BY JS **CHECKED BY** SL
AT END OF DRILLING --- Groundwater not encountered.
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0						0.7	Concrete, 8 inches
						1.7	Aggregate Base, 12 inches
							FILL - Clayey SAND with gravel, slightly moist, light brown
5	BULK 1	100					
	CMS 2	100	17-24-42 (66)	MC = 9% DD = 118 pcf			
10							
	SPT 3	100	12-18-18 (36)	Fines = 27%			
15							- few gravel
	CMS 4	100	9-13-11 (24)				
20						20.0	
	SPT 5	100	10-11-5 (16)		ML	23.0	(ML) Sandy SILT, with gypsum, very stiff, slightly moist, light tan
25					SC		(SC) Clayey SAND, medium dense, slightly moist, light brown
	CMS 6	100	5-8-14 (22)	MC = 9% DD = 110 pcf		26.5	- medium dense

Bottom of borehole at 26.5 feet.

BORING NUMBER HML-R3

NOVA Geotechnical and Inspection Services
4480 W Hacienda Avenue, Ste 104
Las Vegas, Nevada

CLIENT CA Group, Inc.
PROJECT NAME I-515 Charleston Interchange
PROJECT NUMBER G-19-192
PROJECT LOCATION I-515 from Charleston Boulevard to Eastern Avenue
DATE STARTED 4/16/20 **COMPLETED** 4/16/20
GROUND ELEVATION **HOLE SIZE** 8 inches
DRILLING CONTRACTOR CASCADE
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Augers
AT TIME OF DRILLING 2.70 ft
LOGGED BY JS **CHECKED BY** SL
AT END OF DRILLING ---
NOTES
AFTER DRILLING 2.30 ft

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0							FILL - Clayey sand, trace gravel, slightly moist, light brown
	BULK 1	100					
3.0							(SC) Clayey SAND, very dense, lightly moist, light gray
5	CMS 2	50	25-50/2"	MC = 26% DD = 92 pcf			
10	SPT 3	100	3-5-6 (11)		SC		- trace gravel, medium dense
15							
15.0							(CH) Sandy FAT CLAY, medium stiff, moist, light brown
	CMS 4	33	2-3-4 (7)	PP = 2.25 tsf MC = 70% DD = 59 pcf			
20	SPT 5	100	2-2-4 (6)	LL = 69 PL = 25 Fines = 48%	CH		- varies to clayey sand, wet
25							
	CMS 6	33	2-5-9 (14)	MC = 30% DD = 91 pcf			
26.0					SC		(SC) Clayey SAND, moist, light gray
26.5							Bottom of borehole at 26.5 feet.

BORING NUMBER HML-R4

NOVA Geotechnical and Inspection Services
4480 W Hacienda Avenue, Ste 104
Las Vegas, Nevada

CLIENT CA Group, Inc.
PROJECT NAME I-515 Charleston Interchange
PROJECT NUMBER G-19-192
PROJECT LOCATION I-515 from Charleston Boulevard to Eastern Avenue
DATE STARTED 5/15/20 **COMPLETED** 5/15/20
GROUND ELEVATION _____ **HOLE SIZE** 8 inches
DRILLING CONTRACTOR CASCADE
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Augers
AT TIME OF DRILLING 5.00 ft
LOGGED BY JS **CHECKED BY** SL
AT END OF DRILLING 6.50 ft
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0							FILL: Silty SAND with gravel, trace cobbles, slightly moist, light brown
							3.0
5	BULK 1	100			SC		(SC) Clayey SAND, moist, light brown
	CMS 2	0	9-12-17 (29)	MC = 37% LL = 128 PL = 47 Fines = 55%			5.5
					CH		(CH) Sandy FAT CLAY, trace caliche fragments, very stiff, slightly moist, brown
10							9.0
	SPT 3	100	6-21-26 (47)	Fines = 48%	SC		(SC) Clayey SAND, slightly moist, light gray - dense
15	CMS 4	100	50/5"	MC = 21% DD = 115 pcf			15.5 - partially cemented, very dense
							CALICHE, moderately hard, dry, light gray - hard - moderately hard
20							18.5
	SPT 5	25	3-3-3 (6)	LL = 77 PL = 27 Fines = 65%	SC		(SC) Sandy FAT CLAY, wet, brown - stiff
25							
	CMS 6	100	6-6-23 (29)				26.0
					SM		26.5 (SM) Silty SAND, medium dense, moist, reddish-brown

Bottom of borehole at 26.5 feet.

BORING NUMBER HML-R5

NOVA Geotechnical and Inspection Services
4480 W Hacienda Avenue, Ste 104
Las Vegas, Nevada

CLIENT CA Group, Inc.
PROJECT NAME I-515 Charleston Interchange
PROJECT NUMBER G-19-192
PROJECT LOCATION I-515 from Charleston Boulevard to Eastern Avenue
DATE STARTED 5/15/20 **COMPLETED** 5/15/20
GROUND ELEVATION _____ **HOLE SIZE** 8 inches
DRILLING CONTRACTOR CASCADE
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Augers
AT TIME OF DRILLING 7.00 ft
LOGGED BY JS **CHECKED BY** SL
AT END OF DRILLING 2.50 ft
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0							FILL: Silty SAND, slightly moist, light brown
						1.0	
	BULK 1	100			SC		(SC) Clayey SAND, trace gravel, slightly moist, light tan
5							- moist, light gray
	CMS 2	100	5-9-11 (20)	MC = 22% DD = 106 pcf			- medium dense
							- wet, light brown
10						10.5	
	SPT 3	100	5-6-8 (14)	LL = 129 PL = 25 Fines = 64%	CH		(CH) Sandy fat CLAY, very stiff, moist, brown
						13.5	
15					SM		(SM) Silty SAND, wet, light brown
	CMS 4	100	3-3-5 (8)				- loose
20							
	SPT 5	100	2-5-5 (10)				- medium dense
25						25.0	
	CMS 6	100	5-7-8 (15)	MC = 98% DD = 57 pcf Fines = 96%	SC		(SC) Sandy LEAN CLAY, stiff, very moist, light brown
						26.5	

Bottom of borehole at 26.5 feet.

BORING NUMBER HML-R6

NOVA Geotechnical and Inspection Services
4480 W Hacienda Avenue, Ste 104
Las Vegas, Nevada

CLIENT CA Group, Inc.
PROJECT NAME I-515 Charleston Interchange
PROJECT NUMBER G-19-192
PROJECT LOCATION I-515 from Charleston Boulevard to Eastern Avenue
DATE STARTED 5/15/20 **COMPLETED** 5/15/20
GROUND ELEVATION _____ **HOLE SIZE** 8 inches
DRILLING CONTRACTOR CASCADE
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Augers
AT TIME OF DRILLING ---
LOGGED BY JS **CHECKED BY** SL
AT END OF DRILLING 2.80 ft
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0							FILL: Clayey SAND, moist, dark brown
						1.0	
	BULK 1	100			SC		(SC) Clayey SAND, moist, light gray
5							
	CMS 2	100	2-4-5 (9)	MC = 43% DD = 80 pcf Fines = 33%			- loose, very moist
							- light brown and gray
10							
	SPT 3	100	7-8-10 (18)				- medium dense - trace gravel
15						15.0	
	CMS 4	100	5-8-12 (20)	PP = 2.5 tsf LL = 77 PL = 20 Fines = 88%	CH		(CH) Sandy FAT CLAY, stiff, moist, reddish-brown
						17.0	
							(SC) Clayey SAND, very moist, light brown
20							
	SPT 5	100	3-3-6 (9)		SC		- loose
25							
	CMS 6	100	4-7-8 (15)	MC = 77% DD = 55 pcf			
						26.5	

Bottom of borehole at 26.5 feet.

BORING NUMBER HML-R7

NOVA Geotechnical and Inspection Services
4480 W Hacienda Avenue, Ste 104
Las Vegas, Nevada

CLIENT CA Group, Inc.
PROJECT NAME I-515 Charleston Interchange
PROJECT NUMBER G-19-192
PROJECT LOCATION I-515 from Charleston Boulevard to Eastern Avenue
DATE STARTED 4/6/20 **COMPLETED** 4/6/20
GROUND ELEVATION _____ **HOLE SIZE** 8 inches
DRILLING CONTRACTOR CASCADE
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Augers
AT TIME OF DRILLING --- Groundwater not encoutnered.
LOGGED BY JS **CHECKED BY** SL
AT END OF DRILLING --- Groundwater not encoutnered.
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0							0.8 Concrete, 10 inches
							1.5 Aggregate Base, 8 inches
							FILL: Clayey sand with gravel, slightly moist, light gray
							3.0 FILL: Silty sand with gravel, slightly moist, light brown
5	BULK 1	100					
	CMS 2	22	20-24-44 (68)				
10							
	SPT 3	100	13-15-13 (28)				
							13.0 (CL) Sandy LEAN CLAY, trace gravel, slightly moist, light brown
15							
	CMS 4	28	8-10-11 (21)	MC = 12% DD = 114 pcf LL = 39 PL = 21 Fines = 69%	CL		- slight odor, dark brown and black staining, moist
20							20.0
	SPT 5	100	26-31-29 (60)				(SC) Clayey SAND, dense, slightly moist, light gray
25					SC		- medium dense
	CMS 6	28	6-13-18 (31)	PP = 4.5+ tsf MC = 31% DD = 92 pcf LL = 63 PL = 27 Fines = 41%			26.5
							Bottom of borehole at 26.5 feet.

BORING NUMBER HML-R8

NOVA Geotechnical and Inspection Services
4480 W Hacienda Avenue, Ste 104
Las Vegas, Nevada

CLIENT CA Group, Inc.
PROJECT NAME I-515 Charleston Interchange
PROJECT NUMBER G-19-192
PROJECT LOCATION I-515 from Charleston Boulevard to Eastern Avenue
DATE STARTED 4/6/20 **COMPLETED** 4/6/20
GROUND ELEVATION _____ **HOLE SIZE** 8 inches
DRILLING CONTRACTOR CASCADE
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Augers
▽ **AT TIME OF DRILLING** 19.00 ft
LOGGED BY JS **CHECKED BY** SL
▼ **AT END OF DRILLING** 17.00 ft
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0						0.8	Concrete, 10 inches
						1.8	Aggregate base, 12 inches
	BULK 1	100					FILL - Clayey sand, slightly moist, light brown
5							
	CMS 2	33	4-8-12 (20)	MC = 53% DD = 62 pcf			- brown and gray
10						10.5	
	SPT 3	100	3-18-22 (40)	MC = 12% LL = 24 PL = NP Fines = 38%			(SM) Silty SAND, dense, moist, light brown with dark gray and black staning - trace organics
15							
	CMS 4	28	2-2-2 (4)	MC = 23% DD = 83 pcf	SM		- varies to clayey sand, very loose, very moist
20						20.0	
	SPT 5	100	3-3-3 (6)	PP = 2.5 tsf MC = 26% LL = 40 PL = 16 Fines = 59%	CL		(CL) Sandy LEAN CLAY, medium stiff, moist, light gray - sampler wet
25						25.0	
	CMS 6	28	3-4-8 (12)		SC		(SC) Clayey SAND, medium dense, very moist, light gray
						26.5	

Bottom of borehole at 26.5 feet.

BORING NUMBER HML-R9

NOVA Geotechnical and Inspection Services
4480 W Hacienda Avenue, Ste 104
Las Vegas, Nevada

CLIENT CA Group, Inc.
PROJECT NAME I-515 Charleston Interchange
PROJECT NUMBER G-19-192
PROJECT LOCATION I-515 from Charleston Boulevard to Eastern Avenue
DATE STARTED 4/7/20 **COMPLETED** 4/7/20
GROUND ELEVATION _____ **HOLE SIZE** 8 inches
DRILLING CONTRACTOR CASCADE
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Augers
AT TIME OF DRILLING --- Groundwater not encountered.
LOGGED BY JS **CHECKED BY** SL
AT END OF DRILLING --- Groundwater not encountered.
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0						0.8	Concrete, 9 inches
						1.8	Aggregate Base, 12 inches
							FILL - Clayey sand, slightly moist, light brown to light gray
							- FILL - Silty sand with gravel, slightly moist, light brown
5	BULK 1	100					
	CMS 2	33	18-14-14 (28)	MC = 21% DD = 110 pcf			
							- FILL - Clayey sand with gravel, slightly moist, light brown
10							- cobble
	SPT 3	100	10-11-10 (21)	LL = NP PL = NP Fines = 29%			- FILL - Silty sand with gravel, slightly moist, light brown
							- FILL - Clayey sand with gravel, slightly moist, light brown
15							
	CMS 4	33	8-29-45 (74)	MC = 5% DD = 133 pcf LL = NP PL = NP Fines = 19%			- FILL - Silty sand with gravel, slightly moist, light brown
							- FILL - Poorly graded gravel with silt and sand, slightly moist, brown
20							
	SPT 5	100	34-38-15 (53)				- FILL - Silty sand with gravel, slightly moist, light brown
						22.0	
					CL		(CL) Sandy LEAN CLAY, stiff, moist, dark gray to brown to black - trace gypsum, organics
25							
	CMS 6	33	6-11-12 (23)	MC = 27% DD = 96 pcf Fines = 78%		26.5	- light brown

Bottom of borehole at 26.5 feet.

BORING NUMBER HML-R10

NOVA Geotechnical and Inspection Services
4480 W Hacienda Avenue, Ste 104
Las Vegas, Nevada

CLIENT CA Group, Inc.
PROJECT NAME I-515 Charleston Interchange
PROJECT NUMBER G-19-192
PROJECT LOCATION I-515 from Charleston Boulevard to Eastern Avenue
DATE STARTED 4/7/20 **COMPLETED** 4/7/20
GROUND ELEVATION _____ **HOLE SIZE** 8 inches
DRILLING CONTRACTOR CASCADE
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Augers
AT TIME OF DRILLING --- Groundwater not encountered.
LOGGED BY JS **CHECKED BY** SL
AT END OF DRILLING --- Groundwater not encountered.
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0						0.8	Concrete, 9 inches
						1.7	Aggregate Base, 11 inches
	BULK 1	100		Fines = 30%			FILL - Silty sand with gravel, occasional cobbles, slightly moist, light brown
5	CMS 2	33	7-14-16 (30)	MC = 14% DD = 120 pcf			- FILL - Clayey sand, few gravels, slightly moist, light brown
10	SPT 3	100	5-9-13 (22)				
15	CMS 4	33	18-20-16 (36)	MC = 12% DD = 113 pcf			- traces of wood
20	SPT 5	100	50/5"	Fines = 17%			- FILL - Clayey sand with gravels, slightly moist, light brown
25						25.0	
	CMS 6	33	4-7-7 (14)	MC = 20% DD = 93 pcf	SC	26.5	(SC) Clayey SAND, trace black organics, medium dense, moist, gray to brown

Bottom of borehole at 26.5 feet.

BORING NUMBER HML-R11

NOVA Geotechnical and Inspection Services
4480 W Hacienda Avenue, Ste 104
Las Vegas, Nevada

CLIENT CA Group, Inc.
PROJECT NAME I-515 Charleston Interchange
PROJECT NUMBER G-19-192
PROJECT LOCATION I-515 from Charleston Boulevard to Eastern Avenue
DATE STARTED 4/14/20 **COMPLETED** 4/14/20
GROUND ELEVATION _____ **HOLE SIZE** 8 inches
DRILLING CONTRACTOR CASCADE
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Augers
AT TIME OF DRILLING --- Groundwater not encountered.
LOGGED BY JS **CHECKED BY** SL
AT END OF DRILLING --- Groundwater not encountered.
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0						0.7	Concrete, 8.5 inches
						1.5	Aggregate Base, 10 inches
	BULK 1	100					FILL - Silty sand with gravel, slightly moist, light brown
5							- FILL - clayey sand, slightly mosit, light brown - FILL - sandy lean clay, trace gravel, moist, light brown
	CMS 2	33	7-19-19 (38)	MC = 12% DD = 121 pcf			- FILL - Clayey sand, trace gravel, slightly mosit, light brown
							- light brown and gray
10							- FILL - Silty sand, trace gravel, slightly mosit, light brown
	SPT 3	100	5-6-7 (13)	LL = 29 PL = NP Fines = 48%			- trace clay, light brown and gray
15							
	CMS 4	28	7-11-35 (46)	MC = 13% DD = 94 pcf			
							- FILL - Silty sand with gravel, slightly mosit, light brown
20							
	SPT 5	100	13-16-13 (29)				
25							
	CMS 6	33	11-10-9 (19)	MC = 11% DD = 117 pcf LL = 26 PL = NP Fines = 32%		26.0	
					CH	26.5	(CH) Sandy FAT CLAY, some organic staining, medium stiff, moist, gray
							Bottom of borehole at 26.5 feet.

BORING NUMBER HML-R12

NOVA Geotechnical and Inspection Services
4480 W Hacienda Avenue, Ste 104
Las Vegas, Nevada

CLIENT CA Group, Inc.
PROJECT NAME I-515 Charleston Interchange
PROJECT NUMBER G-19-192
PROJECT LOCATION I-515 from Charleston Boulevard to Eastern Avenue
DATE STARTED 4/14/20 **COMPLETED** 4/14/20
GROUND ELEVATION _____ **HOLE SIZE** 8 inches
DRILLING CONTRACTOR CASCADE
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Augers
AT TIME OF DRILLING --- Groundwater not encountered.
LOGGED BY JS **CHECKED BY** SL
AT END OF DRILLING --- Groundwater not encountered.
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	GRAPHIC LOG	MATERIAL DESCRIPTION
0					0.7	Concrete, 8 inches
					1.6	Aggregate Base, 11 inches
						FILL - Clayey sand, varies to sandy lean clay, trace gravel, slightly moist, light brown
5	BULK 1	100				
	CMS 2	33	6-11-21 (32)	MC = 14% DD = 121 pcf LL = 31 PL = 13 Fines = 55%		- varies to sandy lean clay
10	SPT 3	28	11-8-22 (30)	MC = 10%		- light gray
15	CMS 4	35	23-49-50/5"			- FILL - Silty sand with gravel, slightly moist, light brown
20	SPT 5	100	12-19-27 (46)			
25						- FILL - Silty sand with gravel, slightly moist, light brown
	CMS 6	33	17-16-12 (28)	MC = 5% DD = 123 pcf Fines = 20%	26.5	- with clayey sand with gravel lenses

Bottom of borehole at 26.5 feet.

BORING NUMBER HML-R13

NOVA Geotechnical and Inspection Services
4480 W Hacienda Avenue, Ste 104
Las Vegas, Nevada

CLIENT CA Group, Inc.
PROJECT NAME I-515 Charleston Interchange
PROJECT NUMBER G-19-192
PROJECT LOCATION I-515 from Charleston Boulevard to Eastern Avenue
DATE STARTED 4/15/20 **COMPLETED** 4/15/20
GROUND ELEVATION _____ **HOLE SIZE** 8 inches
DRILLING CONTRACTOR CASCADE
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Augers
AT TIME OF DRILLING --- Groundwater not encountered.
LOGGED BY JS **CHECKED BY** SL
AT END OF DRILLING --- Groundwater not encountered.
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0						0.7	Concrete, 8.5 inches
						1.8	Aggregate Base, 13 inches
	BULK 1	100					FILL - Clayey sand, few gravels, slightly moist, light brown
5							- light gray
	CMS 2	33	10-9-11 (20)	MC = 8% DD = 119 pcf			
10							
	SPT 3	100	9-9-7 (16)	Fines = 30%			- FILL - Silty sand, some gravels, slightly moist, light brown
							- FILL - Clayey sand, trace gravel, slightly moist, light gray
15							
	CMS 4	33	7-17-26 (43)	MC = 13% DD = 120 pcf			
							- FILL - Silty sand with gravels, slightly moist, light brown
20							
	SPT 5	100	23-31-22 (53)			22.0	
					CH		(CH) FAT CLAY with sand, very stiff, slightly moist, light brown - trace wood chips
25							
	CMS 6	33	4-10-16 (26)	PP = 4.5+ tsf MC = 30% DD = 97 pcf LL = 96 PL = 32 Fines = 89%		26.5	
							Bottom of borehole at 26.5 feet.

BORING NUMBER HML-R14

NOVA Geotechnical and Inspection Services
4480 W Hacienda Avenue, Ste 104
Las Vegas, Nevada

CLIENT CA Group, Inc.
PROJECT NAME I-515 Charleston Interchange
PROJECT NUMBER G-19-192
PROJECT LOCATION I-515 from Charleston Boulevard to Eastern Avenue
DATE STARTED 4/15/20 **COMPLETED** 4/15/20
GROUND ELEVATION _____ **HOLE SIZE** 8 inches
DRILLING CONTRACTOR CASCADE
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Augers
AT TIME OF DRILLING --- Groundwater not encountered.
LOGGED BY JS **CHECKED BY** SL
AT END OF DRILLING --- Groundwater not encountered.
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	GRAPHIC LOG	MATERIAL DESCRIPTION
0						0.7 Concrete, 8 inches
						Aggregate Base, 12 inches 1.7
						FILL - Silty gravel with sand, slightly moist, light brown
	BULK 1	100				
5						
	CMS 2	33	15-9-14 (23)	MC = 14% DD = 119 pcf		- FILL - Clayey sand, trace gravel, slightly moist, brown
10						
	SPT 3	100	7-8-13 (21)	LL = 28 PL = 12 Fines = 60%		FILL: Sandy lean clay, slightly moist, light gray and brown
15						- with gravel
	CMS 4	33	7-22-32 (54)	MC = 12% DD = 122 pcf		
						- FILL - Silty sand with gravel, slightly moist, light brown
						- trace gravel
20						
	SPT 5	100	6-11-8 (19)	Fines = 43%		
25						- with gravel
	CMS 6	33	24-39-17 (56)	MC = 7% DD = 128 pcf		26.5

Bottom of borehole at 26.5 feet.

BORING NUMBER HML-R15

NOVA Geotechnical and Inspection Services
4480 W Hacienda Avenue, Ste 104
Las Vegas, Nevada

CLIENT CA Group, Inc.
PROJECT NAME I-515 Charleston Interchange
PROJECT NUMBER G-19-192
PROJECT LOCATION I-515 from Charleston Boulevard to Eastern Avenue
DATE STARTED 5/15/20 **COMPLETED** 5/15/20
GROUND ELEVATION _____ **HOLE SIZE** 8 inches
DRILLING CONTRACTOR CASCADE
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Augers
▽ **AT TIME OF DRILLING** 14.00 ft
LOGGED BY JS **CHECKED BY** SL
▼ **AT END OF DRILLING** 15.30 ft
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0							FILL: Silty SAND, slightly moist, light brown
						1.0	
	BULK 1	100			SC		(SC) Clayey SAND, slightly moist, light brown
						4.0	
5							(CL) Sandy lean CLAY, moist, brown
	CMS 2	100	9-14-17 (31)	PP = 4.5+ tsf MC = 20% DD = 108 pcf LL = 36 PL = 17 Fines = 74%	CL		- very stiff
						6.5	
					CH		(CH) Sandy fat CLAY, moist, reddish-brown
						8.0	
					SM		(SM) Silty SAND, moist, light brown
10							- clayey sand layers
	SPT 3	100	3-9-12 (21)	MC = 42% Fines = 57%		10.5	
					CL		(CL) Sandy lean CLAY, stiff, moist, light brown
						14.0 ▽	
15					SM		(SM) Silty SAND, wet, light brown
	CMS 4	100	22-29-22 (51)	MC = 2% DD = 83 pcf			▼ - dense
20						20.0	
	SPT 5	100	3-5-5 (10)	Fines = 43%	SC		(SC) Clayey SAND, trace caliche fragments, medium dense, wet, light brown
25							
	CMS 6	100	6-8-9 (17)	MC = 24% DD = 104 pcf			- medium dense
						26.5	

Bottom of borehole at 26.5 feet.

BORING NUMBER HML-R16

NOVA Geotechnical and Inspection Services
4480 W Hacienda Avenue, Ste 104
Las Vegas, Nevada

CLIENT CA Group, Inc.
PROJECT NAME I-515 Charleston Interchange
PROJECT NUMBER G-19-192
PROJECT LOCATION I-515 from Charleston Boulevard to Eastern Avenue
DATE STARTED 4/16/20 **COMPLETED** 4/16/20
GROUND ELEVATION _____ **HOLE SIZE** 8 inches
DRILLING CONTRACTOR CASCADE
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Augers
▽ **AT TIME OF DRILLING** 12.00 ft
LOGGED BY JS **CHECKED BY** SL
▼ **AT END OF DRILLING** 11.20 ft
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0							FILL - Silty sand with gravel, slightly moist, light brown
							2.5
	BULK 1	100			SC		(SC) Clayey SAND, slightly moist, light gray
							4.0
5							(SM) Silty SAND, dense, slightly moist, light brown
	CMS 2	28	9-20-37 (57)	MC = 4% DD = 107 pcf	SM		
							8.0
					SC		(SC) Clayey SAND, slightly moist, light brown
10							10.0
	SPT 3	100	12-13-9 (22)	Fines = 31%	SM		(SM) Silty SAND, medium dense, slightly moist, light brown
							▼ ▽
							- wet
15							
	CMS 4	33	5-5-12 (17)	MC = 22% DD = 104 pcf			16.0
					CL		(CL) Lean CLAY with Sand, very moist, light brown
20							- stiff, moist, brown
	SPT 5	100	5-2-19 (21)	PP = 1.0 tsf LL = 33 PL = 14 Fines = 79%			21.0
					SM		(SM) Silty SAND, wet, light brown
25							25.0
	CMS 6	22	5-6-14 (20)	MC = 19% DD = 109 pcf	SC		(SC) Clayey SAND, medium dense, wet, light brown
							26.0
					SM		26.5 (SM) Silty SAND, wet, light brown

Bottom of borehole at 26.5 feet.

KEY TO BORING LOGS

PARTICLE SIZE LIMITS								
CLAY	SILT	SAND			GRAVEL		COBBLES	BOULDERS
		FINE	MEDIUM	COARSE	FINE	COARSE		
.002 mm		#200	#40	#10	#4	¾ inch	3 inch	12 inch

USCS GROUP	TYPICAL SOIL DESCRIPTION
GW	Well graded gravels, gravel-sand mixtures, little or no fines
GP	Poorly graded gravels, gravel-sand mixtures, little or no fines
GC	Clayey gravels, poorly graded gravel-sand-clay mixtures
SW	Well graded sands, gravelly sands, little or no fines
SP	Poorly graded sands, gravelly sands, little or no fines
SM	Silty sands, poorly graded sand-silt mixtures
SC	Clayey sands, poorly graded sand-clay mixtures
ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands with slight plasticity
CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
OL	Organic silts and organic silt-clays of low plasticity
MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
CH	Inorganic clays of high plasticity, fat clays
OH	Organic clays of medium to high plasticity
PT	Peat and other highly organic soils

MOISTURE CONDITION CRITERIA

Description	Criteria
Dry	Absence of moisture, dusty, dry to touch.
Moist	Damp, no visible free water.
Wet	Visible free water, usually below groundwater table.
∇ ▼	Groundwater Elevation Symbols

SOIL CEMENTATION CRITERIA

Description	Criteria
Weak	Crumbles or breaks with handling or little finger pressure.
Moderate	Crumbles or breaks with considerable finger pressure.
Strong	Won't break or crumble w/finger pressure

STANDARD PENETRATION CLASSIFICATION*			
GRANULAR SOIL		CLAYEY SOIL	
BLOWS/FT	DENSITY	BLOWS/FT	CONSISTENCY
0 - 4	VERY LOOSE	0 - 1	VERY SOFT
5 – 10	LOOSE	2 - 4	SOFT
11 - 30	MEDIUM DENSE	5 - 8	MEDIUM STIFF
31 - 50	DENSE	9 - 15	STIFF
OVER 50	VERY DENSE	16 - 30	VERY STIFF
		31 - 60	HARD
		OVER 60	VERY HARD

*Standard Penetration Test (N) 140 lb hammer 30 inch free fall on 2 inch O.D. x 1.4 inch I.D. sampler.

Field Blow counts on California Modified Sampler (N_{CMS}) for ($6<N_{CMS}<50$) can be converted to $N_{SPT\ field}$ by:

$(N_{CMS\ field})(0.62) = N_{SPT\ field}$

TEST ABBREVIATIONS

CD CONSOLIDATED DRAINED	O ORGANIC CONTENT
CH CHEMICAL (CORROSIVENESS)	OC CONSOLIDATION
CM COMPACTION	PI PLASTICITY INDEX
CU CONSOLIDATED UNDRAINED	RQD ROCK QUALITY DESIGNATION
D DISPERSIVE SOILS	RV R-VALUE
DS DIRECT SHEAR	S SIEVE ANALYSIS
E EXPANSIVE SOIL	SL SHRINKAGE LIMIT
G SPECIFIC GRAVITY	U UNCONFINED COMPRESSION
H HYDROMETER	UU UNCONSOLIDATED UNDRAINED
HC HYDRO-COLLAPSE	UW UNIT WEIGHT
K PERMEABILITY	W MOISTURE CONTENT

SOIL COLOR DESIGNATIONS ARE FROM THE MUNSELL SOIL/ROCK COLOR CHARTS.

EXAMPLE: (7.5 YR 5/3) BROWN

SAMPLER NOTATION

CMS CALIF. MODIFIED SAMPLER[1]
CPT CONE PENETRATION TEST
CS CONTINUOUS SAMPLER[2]
PB PITCHER BARREL
RC ROCK CORE[3]
SH SHELBY TUBE[4]
SPT STANDARD PENETRATION TEST
TP TEST PIT

1- I.D.= 2.421 inch
2- I.D.=3.228 inch with tube; 3.50 inch w/o tube
3- NXB I.D.= 1.875 inch
4- I.D.= 2.875 inch

Revised August 2010

GRAIN SIZE DISTRIBUTION

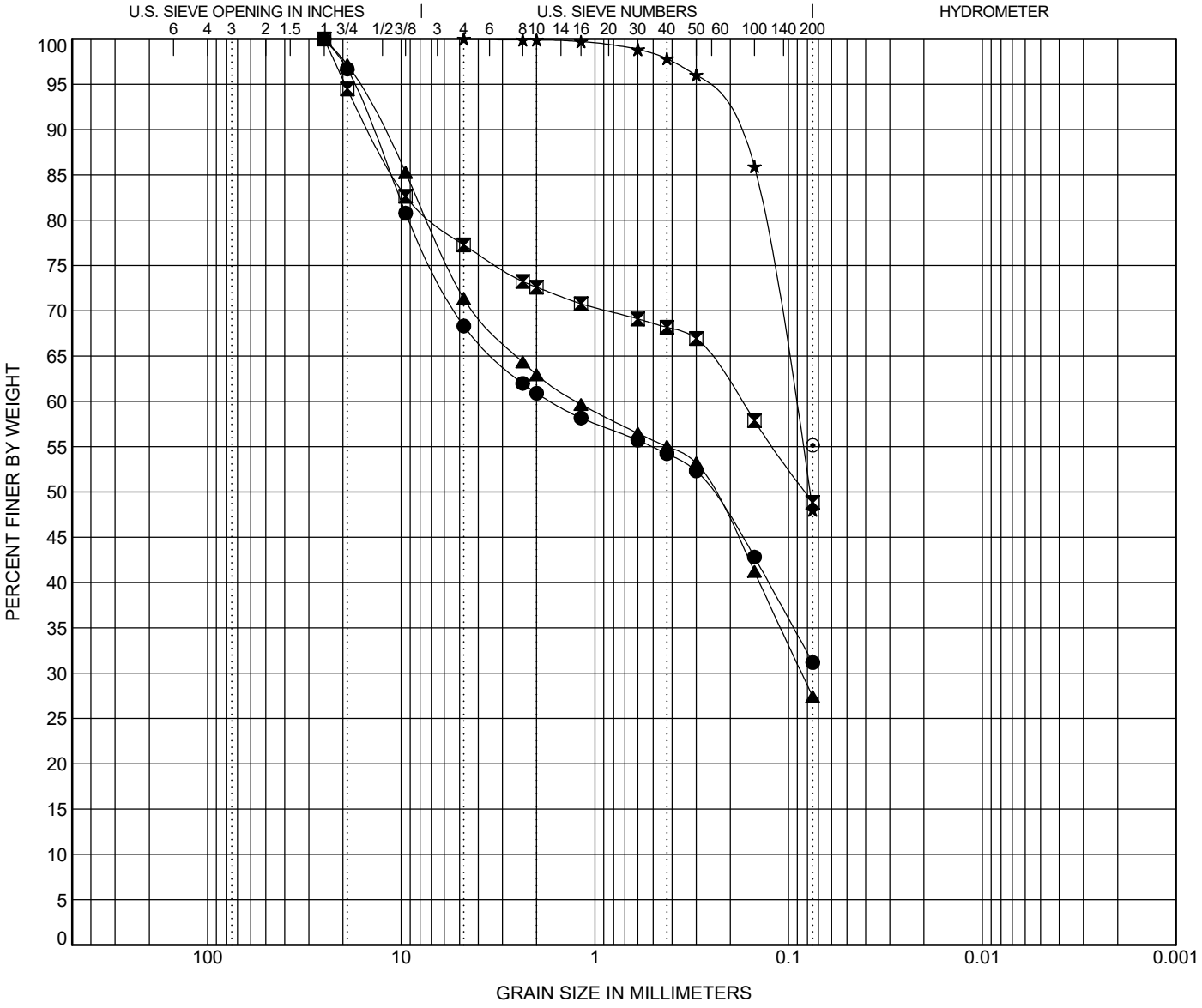
NOVA Geotechnical and Inspection Services
4480 W Hacienda Avenue, Ste 104
Las Vegas, Nevada

CLIENT CA Group, Inc.

PROJECT NAME I-515 Charleston Interchange

PROJECT NUMBER G-19-192

PROJECT LOCATION I-515 from Charleston Boulevard to Eastern Avenue



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	**HML-R1**	**5.0**	**SILTY SAND with GRAVEL(SM)**	**NP**	**NP**	**NP**		
⊠	**HML-R1**	**15.0**	**CLAYEY SAND WITH GRAVEL**					
▲	**HML-R2**	**10.0**	**CLAYEY SAND WITH GRAVEL**					
★	**HML-R3**	**20.0**	**CLAYEY SAND(SC)**	**69**	**25**	**44**		
⊙	**HML-R4**	**5.0**	**SANDY FAT CLAY(CH)**	**128**	**47**	**81**		

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**HML-R1**	**5.0**	**25**	**1.682**			**31.7**	**37.1**	**31.2**	
⊠	**HML-R1**	**15.0**	**25**	**0.176**			**22.7**	**28.4**	**48.9**	
▲	**HML-R2**	**10.0**	**25**	**1.248**	**0.085**		**28.7**	**43.9**	**27.4**	
★	**HML-R3**	**20.0**	**4.75**	**0.093**			**0.0**	**52.0**	**48.0**	
⊙	**HML-R4**	**5.0**	**0.075**						**55.2**	

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PROJECT NUMBER G-19-192
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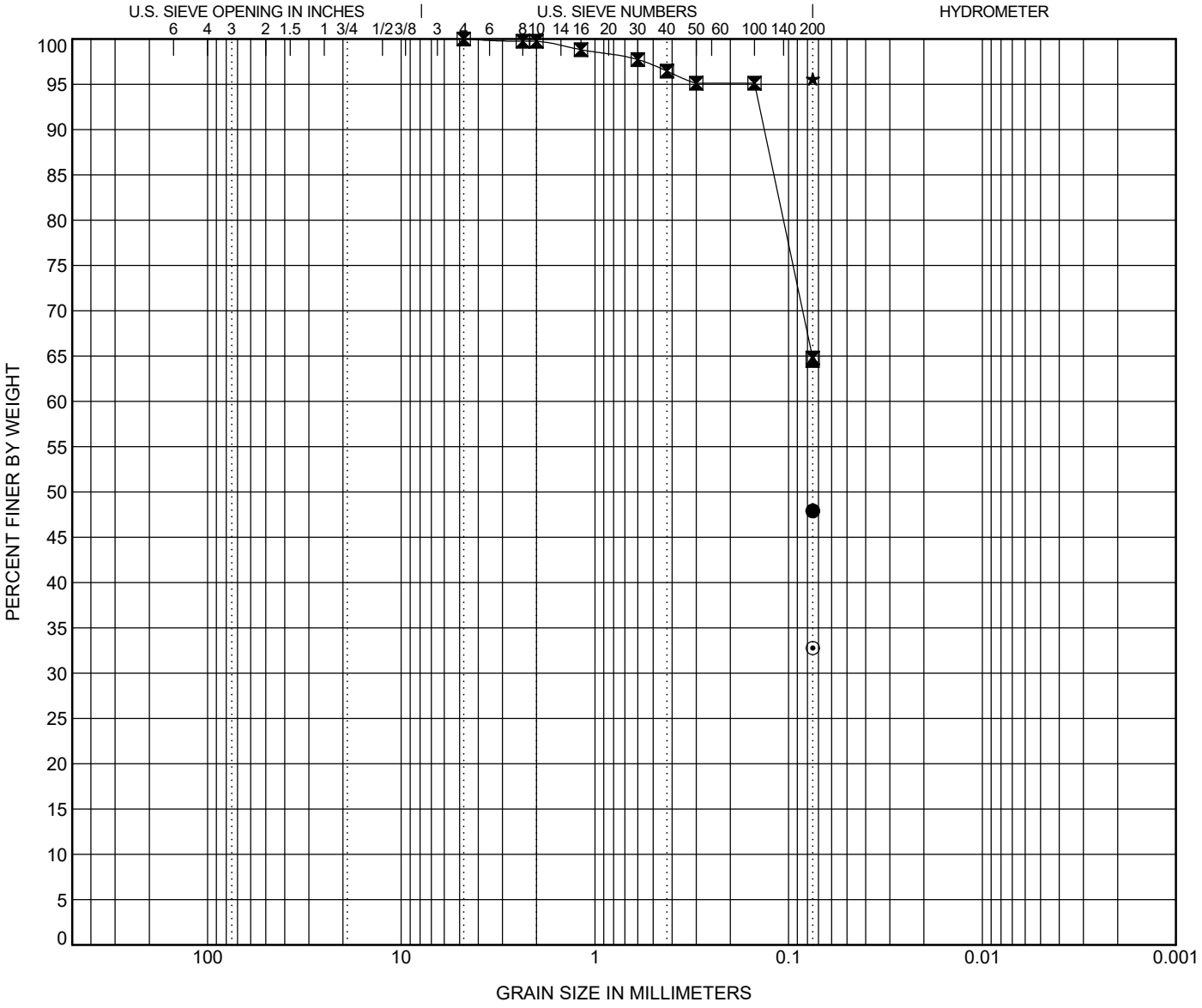

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	HML-R4	10.0	CLAYEY SAND					
⊠	HML-R4	20.0	SANDY FAT CLAY(CH)	77	27	50		
▲	HML-R5	10.0	SANDY FAT CLAY(CH)	129	25	104		
★	HML-R5	25.0	SANDY LEAN CLAY					
⊙	HML-R6	5.0	CLAYEY SAND					

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	HML-R4	10.0	0.075						47.9	
⊠	HML-R4	20.0	4.75				0.0	35.2	64.8	
▲	HML-R5	10.0	0.075						64.4	
★	HML-R5	25.0	0.075						95.6	
⊙	HML-R6	5.0	0.075						32.8	

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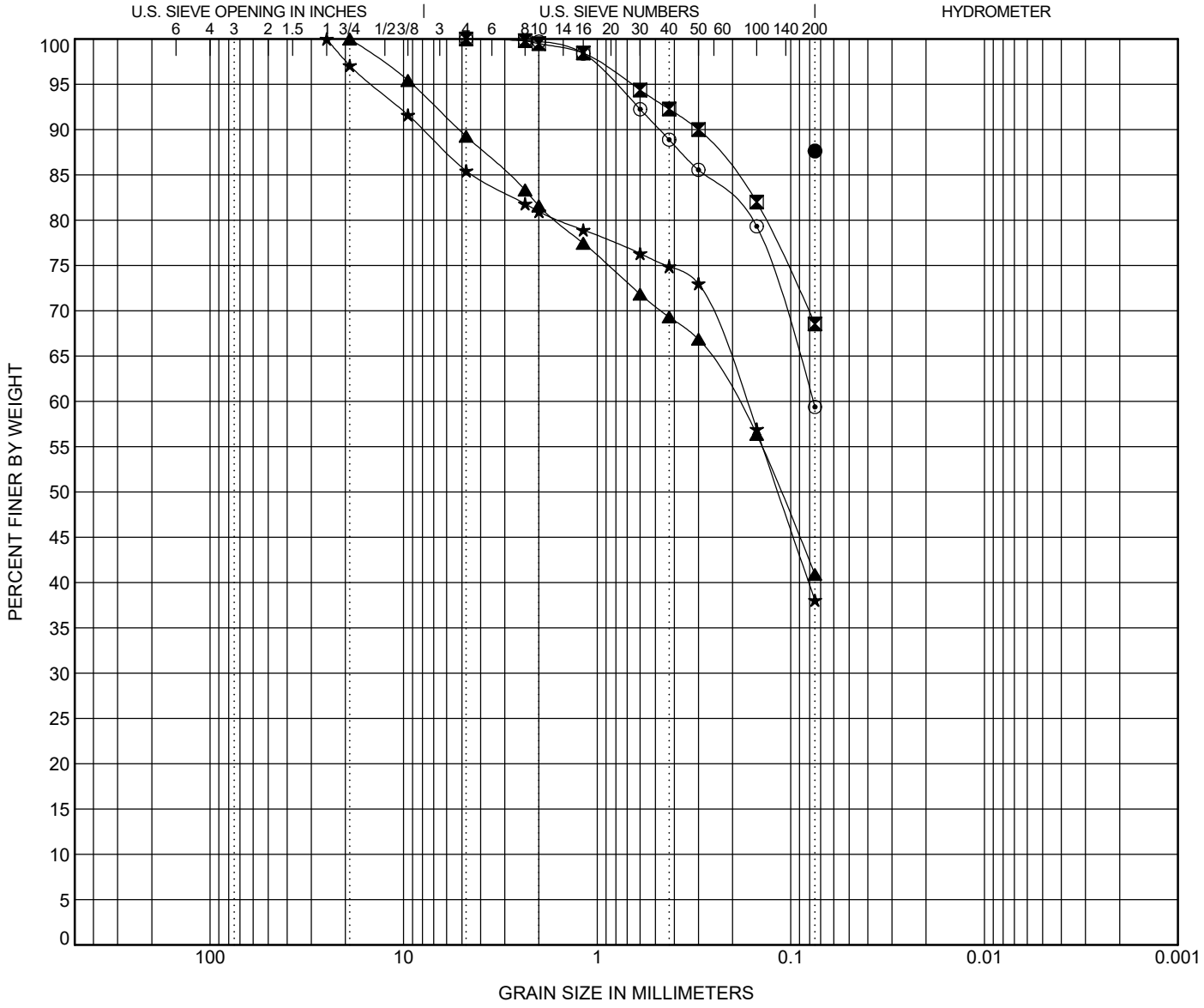

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	HML-R6	15.0	SANDY FAT CLAY	77	20	57		
⊠	HML-R7	15.0	SANDY LEAN CLAY(CL)	39	21	18		
▲	HML-R7	25.0	CLAYEY SAND(SC)	63	27	36		
★	HML-R8	10.0	SILTY SAND(SM)	24	NP	NP		
⊙	HML-R8	20.0	SANDY LEAN CLAY(CL)	40	16	24		

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	HML-R6	15.0	0.075						87.6	
⊠	HML-R7	15.0	4.75				0.0	31.4	68.6	
▲	HML-R7	25.0	19	0.191			10.7	48.4	40.9	
★	HML-R8	10.0	25	0.171			14.6	47.4	38.0	
⊙	HML-R8	20.0	4.75	0.077			0.0	40.6	59.4	

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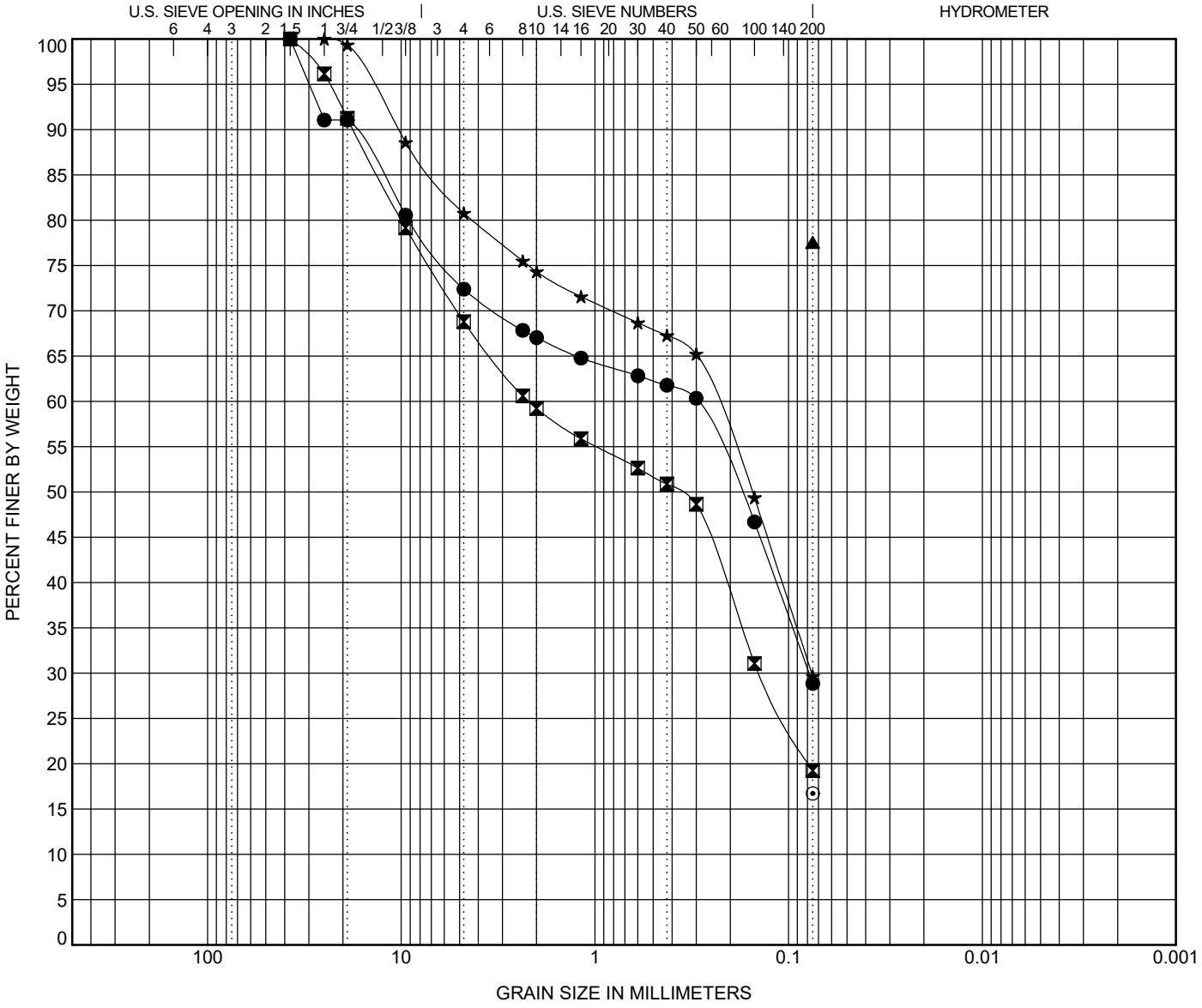

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	**HML-R9**	**10.0**	**SILTY SAND with GRAVEL(SM)**	**NP**	**NP**	**NP**		
⊠	**HML-R9**	**15.0**	**SILTY SAND with GRAVEL(SM)**	**NP**	**NP**	**NP**		
▲	**HML-R9**	**25.0**	**Sandy LEAN CLAY**					
★	**HML-R10**	**2.0**	**SILTY SAND WITH GRAVEL**					
⊙	**HML-R10**	**20.0**	**CLAYEY SAND WITH GRAVEL**					

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**HML-R9**	**10.0**	**37.5**	**0.295**	**0.078**		**27.6**	**43.5**	**28.9**	
⊠	**HML-R9**	**15.0**	**37.5**	**2.197**	**0.141**		**31.2**	**49.5**	**19.2**	
▲	**HML-R9**	**25.0**	**0.075**						**77.5**	
★	**HML-R10**	**2.0**	**25**	**0.239**	**0.076**		**19.2**	**51.1**	**29.7**	
⊙	**HML-R10**	**20.0**	**0.075**						**16.7**	

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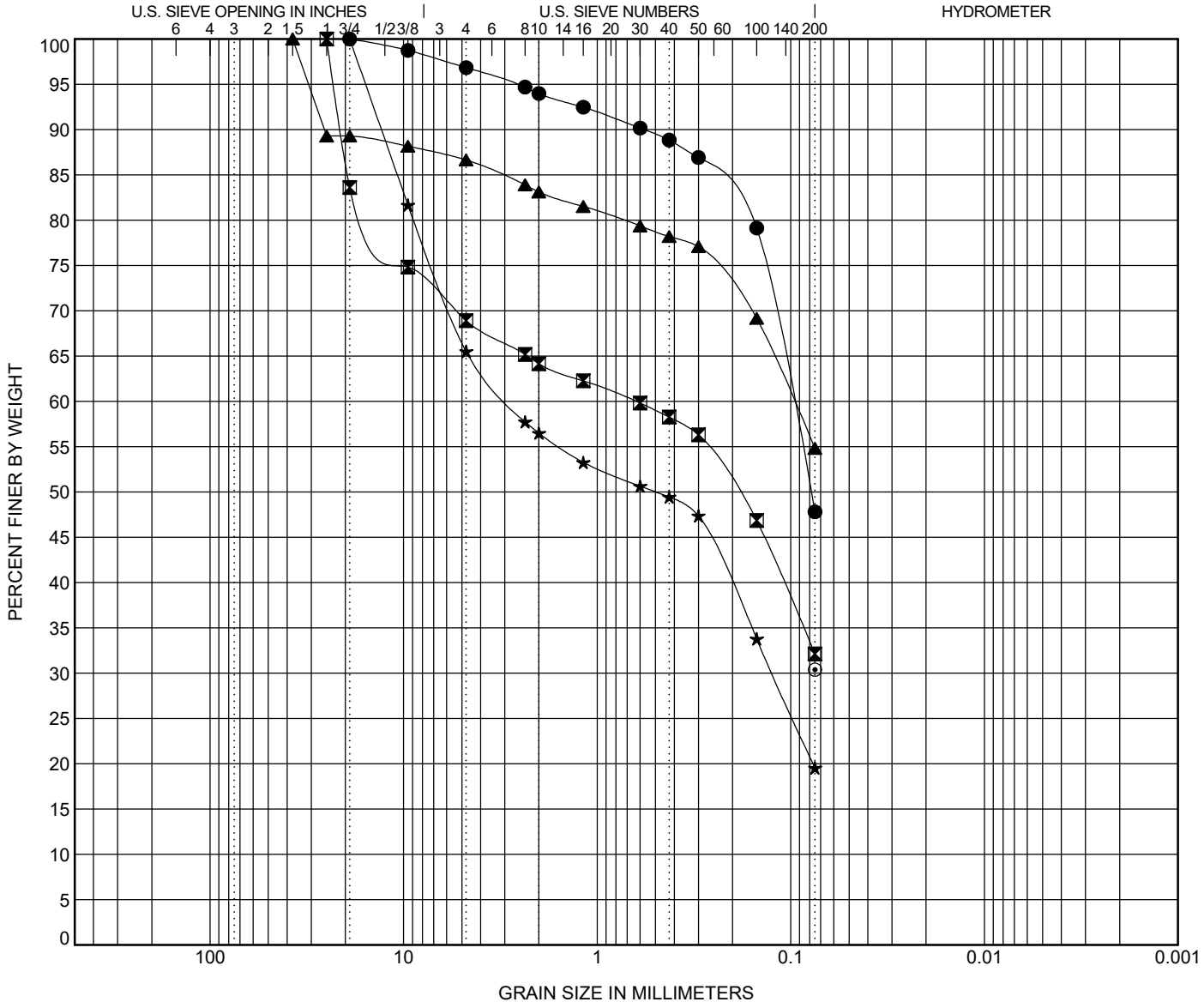

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	**HML-R11**	**10.0**	**SILTY SAND(SM)**	**29**	**NP**	**NP**		
⊠	**HML-R11**	**25.0**	**SILTY SAND with GRAVEL**	**26**	**NP**	**NP**		
▲	**HML-R12**	**5.0**	**SANDY LEAN CLAY(CL)**	**31**	**13**	**18**		
★	**HML-R12**	**25.0**	**CLAYEY SAND WITH GRAVEL**					
⊙	**HML-R13**	**10.0**	**SILTY SAND**					

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**HML-R11**	**10.0**	**19**	**0.098**			**3.2**	**49.0**	**47.8**	
⊠	**HML-R11**	**25.0**	**25**	**0.631**			**31.1**	**36.8**	**32.1**	
▲	**HML-R12**	**5.0**	**37.5**	**0.096**			**13.4**	**31.8**	**54.8**	
★	**HML-R12**	**25.0**	**19**	**2.893**	**0.125**		**34.5**	**46.0**	**19.5**	
⊙	**HML-R13**	**10.0**	**0.075**						**30.4**	

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PROJECT NUMBER G-19-192

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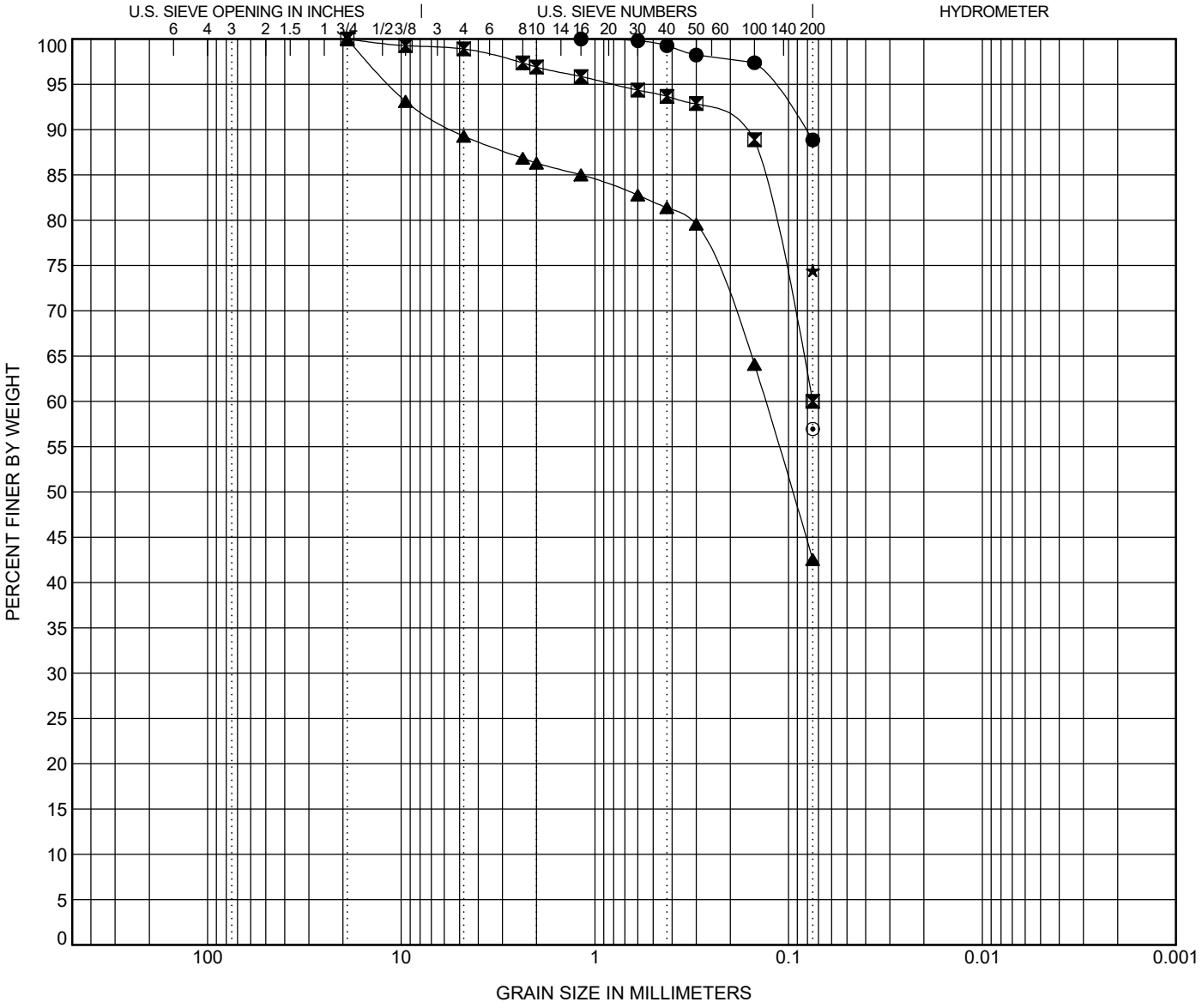

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	HML-R13	25.0	FAT CLAY(CH)	96	32	64		
⊠	HML-R14	10.0	SANDY LEAN CLAY(CL)	28	12	16		
▲	HML-R14	20.0	SILTY SAND					
★	HML-R15	5.0	LEAN CLAY with SAND(CL)	36	17	19		
⊙	HML-R15	10.0	SANDY LEAN CLAY					

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	HML-R13	25.0	1.18				0.0	11.1	88.9	
⊠	HML-R14	10.0	19				1.1	38.9	60.0	
▲	HML-R14	20.0	19	0.131			10.7	46.7	42.6	
★	HML-R15	5.0	0.075						74.4	
⊙	HML-R15	10.0	0.075						57.0	

GRAIN SIZE - GINT STD US LAB.GDT - 7/27/20 12:33 - C:\USERS\PUBLIC\DOCUMENTS\BENTLEY\GINTCL\PROJECTS\G-19-192.GPJ

GRAIN SIZE DISTRIBUTION

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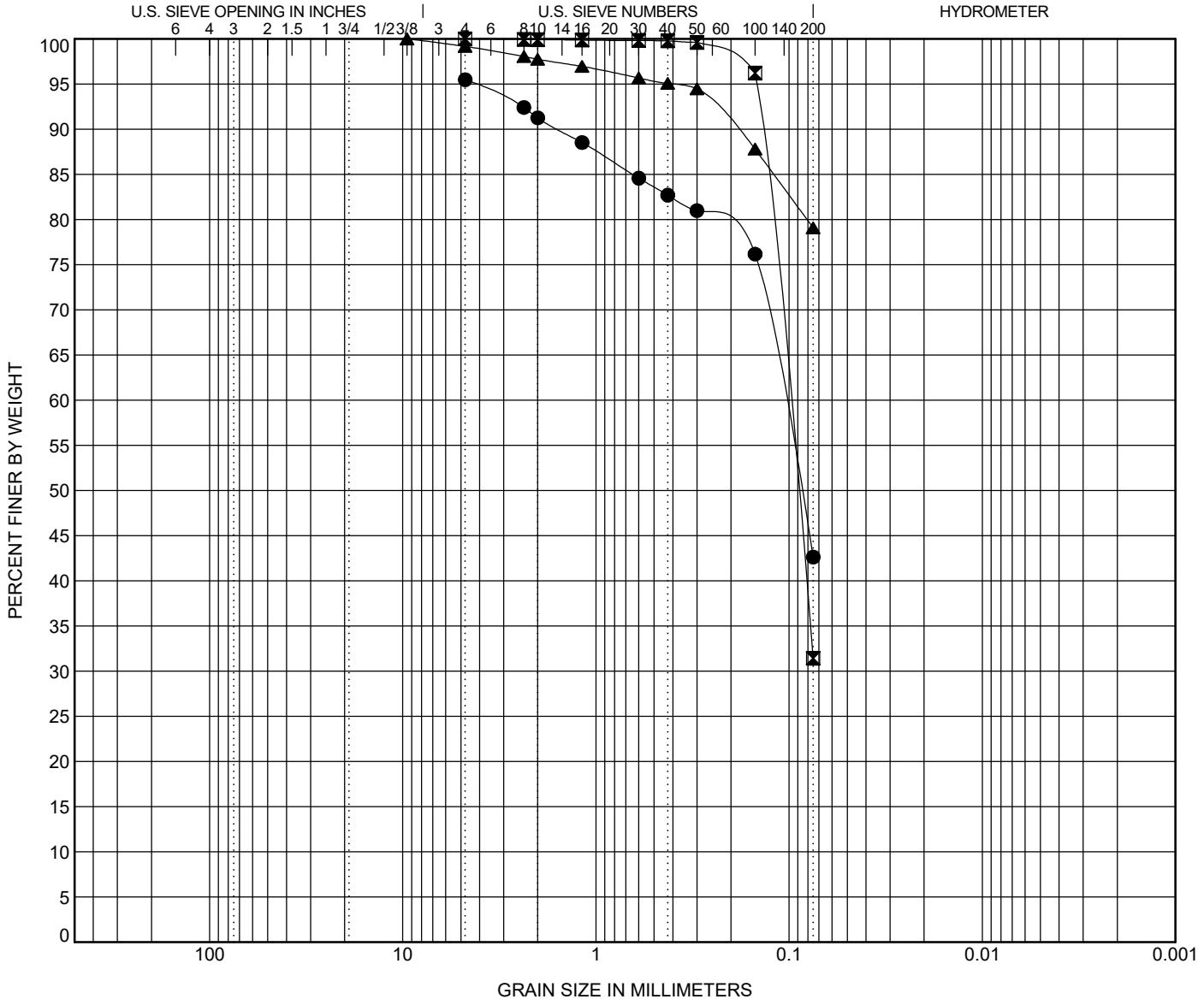


COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	**HML-R15**	**20.0**	**CLAYEY SAND**					
⊠	**HML-R16**	**10.0**	**SILTY SAND**					
▲	**HML-R16**	**20.0**	**LEAN CLAY with SAND(CL)**	**33**	**14**	**19**		

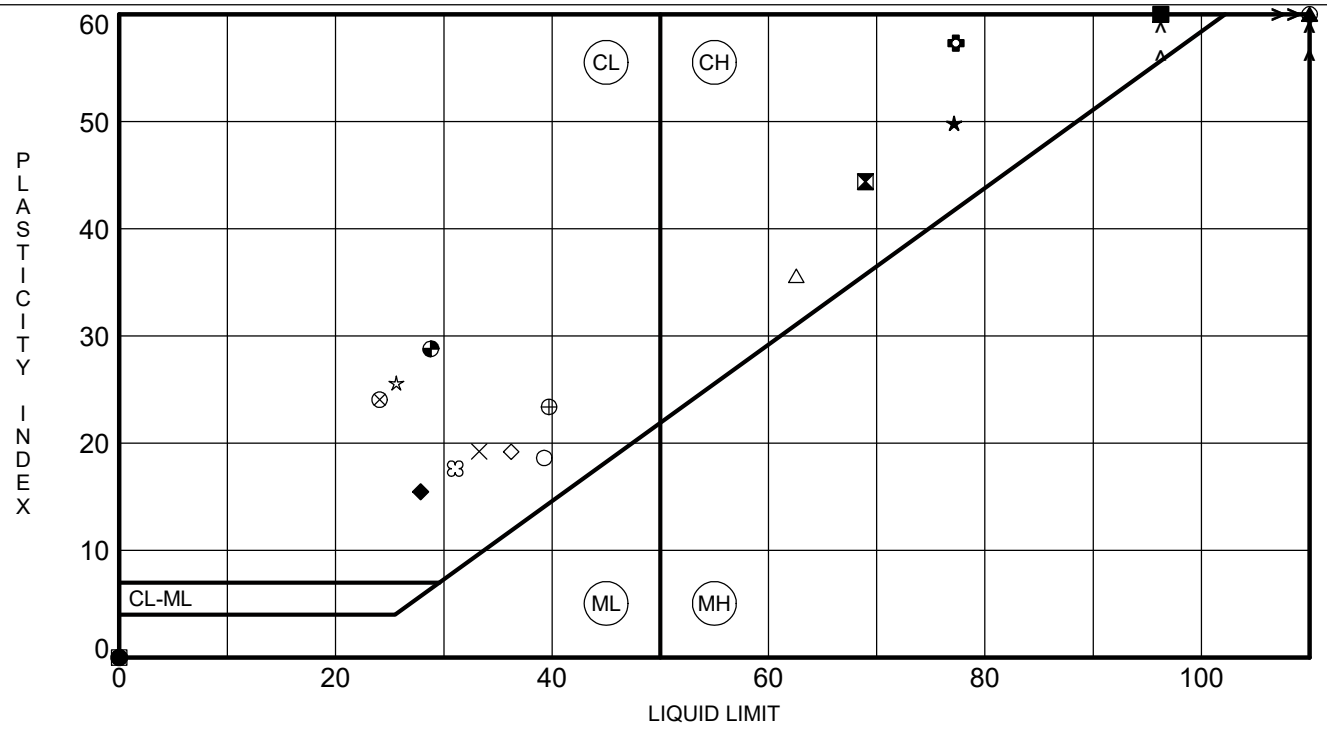
	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**HML-R15**	**20.0**	**4.75**	**0.107**				**52.8**	**42.6**	
⊠	**HML-R16**	**10.0**	**4.75**	**0.102**			**0.0**	**68.6**	**31.4**	
▲	**HML-R16**	**20.0**	**9.5**				**0.8**	**20.1**	**79.1**	

ATTERBERG LIMITS' RESULTS

NOVA Geotechnical and Inspection Services
4480 W Hacienda Avenue, Ste 104
Las Vegas, Nevada

CLIENT CA Group, Inc. **PROJECT NAME** I-515 Charleston Interchange

PROJECT NUMBER G-19-192 **PROJECT LOCATION** I-515 from Charleston Boulevard to Eastern Avenue



	BOREHOLE	DEPTH	LL	PL	PI	Fines	Classification
●	HML-R1	5.0	NP	NP	NP	31	SILTY SAND with GRAVEL(SM)
⊠	HML-R3	20.0	69	25	44	48	CLAYEY SAND(SC)
▲	HML-R4	5.0	128	47	81	55	SANDY FAT CLAY(CH)
★	HML-R4	20.0	77	27	50	65	SANDY FAT CLAY(CH)
⊙	HML-R5	10.0	129	25	104	64	SANDY FAT CLAY(CH)
✿	HML-R6	15.0	77	20	57	88	SANDY FAT CLAY
○	HML-R7	15.0	39	21	18	69	SANDY LEAN CLAY(CL)
△	HML-R7	25.0	63	27	36	41	CLAYEY SAND(SC)
⊗	HML-R8	10.0	24	NP	NP	38	SILTY SAND(SM)
⊕	HML-R8	20.0	40	16	24	59	SANDY LEAN CLAY(CL)
□	HML-R9	10.0	NP	NP	NP	29	SILTY SAND with GRAVEL(SM)
⊛	HML-R9	15.0	NP	NP	NP	19	SILTY SAND with GRAVEL(SM)
◕	HML-R11	10.0	29	NP	NP	48	SILTY SAND(SM)
☆	HML-R11	25.0	26	NP	NP	32	SILTY SAND with GRAVEL
⊠	HML-R12	5.0	31	13	18	55	SANDY LEAN CLAY(CL)
■	HML-R13	25.0	96	32	64	89	FAT CLAY(CH)
◆	HML-R14	10.0	28	12	16	60	SANDY LEAN CLAY(CL)
◇	HML-R15	5.0	36	17	19	74	LEAN CLAY with SAND(CL)
×	HML-R16	20.0	33	14	19	79	LEAN CLAY with SAND(CL)

CHEMICAL LABORATORY TEST REPORT

Report Number: 64171088.0016
Service Date: 06/21/20
Report Date: 06/21/20
Task:

Terracon
750 Pilot Rd, Ste F
Las Vegas, NV 89119-9007
702-597-9393

Client

Nova Geotechnical & Inspection Services LLC
Attn: Forest Grayson
4480 W. Hacienda Avenue Suite 104
Las Vegas, NV 89118

Project

I-515 Charleston HML

Project No. G-19-192 HML **Lab No.: 20-0605**

Results of Corrosivity Analysis

Sample No.:	--	--	--	--
Sample Location:	HML R3	HML R7	HML R9	HML R11
Sample Depth (ft.):	1.0 - 4.0	2.0 - 7.0	2.0 - 8.0	1.5 - 5.0
pH Analysis, AASHTO T289	8.34	7.98	8.06	8.37
Water Soluble Sulfate (SO4), AASHTO T290 (percent %)	0.01	0.04	0.15	0.05
Chlorides, AASHTO T291, (percent %)	<0.01	<0.01	<0.01	<0.01
Resistivity, AASHTO T288, (ohm-cm)	547	1001	867	800

Sample Submitted By Client
Analyzed By: Trisha Campo
Title: Chemist

Date Received: 5/26/2020
Started
Finished:
Lunch/NC:

Report Distribution

(1) Nova Geotechnical & Inspection Services (1) Nova Geotechnical & Inspection Services

Reviewed By: Trisha Campo

Trisha Campo
Chemist

CHEMICAL LABORATORY TEST REPORT

Report Number: 64171088.0017
Service Date: 07/16/20
Report Date: 07/16/20
Task:

Terracon
750 Pilot Rd, Ste F
Las Vegas, NV 89119-9007
702-597-9393

Client

Nova Geotechnical & Inspection Services LLC
Attn: Forest Grayson
4480 W. Hacienda Avenue Suite 104
Las Vegas, NV 89118

Project

G-19-192

Project No. 64171088 **Lab No.: 20-0701**

Results of Corrosivity Analysis

Sample No.:	--
Sample Location:	HML R6
Sample Depth:	1.0-4.0
pH Analysis, AASHTO T 289	7.41
Water Soluble Sulfate (SO4), AASHTO T 290 (percent %)	0.01
Chlorides, AASHTO T 291, (percent %)	<0.01
Resistivity, AASHTO T 288, (ohm-cm)	2001

Sample Submitted By Client **Date Received:** **6/25/2020**
Analyzed By: Trisha Campo **Started**
Title: Chemist **Finished:**
Lunch/NC:

Report Distribution

(1) Nova Geotechnical & Inspection Services (1) Nova Geotechnical & Inspection Services

Reviewed By: Trisha Campo
Chemist

CHEMICAL LABORATORY TEST REPORT

Report Number: 64171088.0016
Service Date: 06/21/20
Report Date: 06/21/20
Task:

Terracon
750 Pilot Rd, Ste F
Las Vegas, NV 89119-9007
702-597-9393

Client

Nova Geotechnical & Inspection Services LLC
Attn: Forest Grayson
4480 W. Hacienda Avenue Suite 104
Las Vegas, NV 89118

Project

I-515 Charleston HML

Project No. G-19-192 HML **Lab No.: 20-0605**

Results of Corrosivity Analysis

Sample No.:	--	--
Sample Location:	HML R13	HML R16
Sample Depth (ft.):	2.0 - 5.0	2.0 - 4.5
pH Analysis, AASHTO T289	8.36	7.72
Water Soluble Sulfate (SO4), AASHTO T290 (percent %)	0.05	0.02
Chlorides, AASHTO T291, (percent %)	<0.01	0.01
Resistivity, AASHTO T288, (ohm-cm)	934	540

Sample Submitted By Client **Date Received:** **5/26/2020**
Analyzed By: Trisha Campo **Started**
Title: Chemist **Finished:**
Lunch/NC:

Report Distribution

(1) Nova Geotechnical & Inspection Services (1) Nova Geotechnical & Inspection Services

Reviewed By: Trisha Campo

Trisha Campo
Chemist

SUMMARY OF LABORATORY RESULTS

NOVA Geotechnical and Inspection Services
4480 W Hacienda Avenue, Ste 104
Las Vegas, Nevada

CLIENT CA Group, Inc. **PROJECT NAME** I-515 Charleston Interchange

PROJECT NUMBER G-19-192 **PROJECT LOCATION** I-515 from Charleston Boulevard to Eastern Avenue

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	Class-ification	Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
HML-R1	5.0	NP	NP	NP	25	31	SM				
HML-R1	15.0				25	49		2.6	119.7		
HML-R1	25.0							6.4	103.2		
HML-R2	5.0							8.9	118.1		
HML-R2	10.0				25	27					
HML-R2	25.0							8.6	109.6		
HML-R3	5.0							26.3	92.0		
HML-R3	15.0							69.7	59.0		
HML-R3	20.0	69	25	44	4.75	48	SC				
HML-R3	25.0							30.4	90.5		
HML-R4	5.0	128	47	81	0.075	55	CH	37.2			
HML-R4	10.0				0.075	48					
HML-R4	15.0							21.2	114.6		
HML-R4	20.0	77	27	50	4.75	65	CH				
HML-R5	5.0							21.7	105.8		
HML-R5	10.0	129	25	104	0.075	64	CH				
HML-R5	25.0				0.075	96		97.6	56.8		
HML-R6	5.0				0.075	33		43.0	80.1		
HML-R6	15.0	77	20	57	0.075	88	CH				
HML-R6	25.0							76.6	54.5		
HML-R7	15.0	39	21	18	4.75	69	CL	12.0	114.2		
HML-R7	25.0	63	27	36	19	41	SC	31.1	92.4		
HML-R8	5.0							53.3	62.3		
HML-R8	10.0	24	NP	NP	25	38	SM	12.4			
HML-R8	15.0							23.1	82.6		
HML-R8	20.0	40	16	24	4.75	59	CL	26.1			
HML-R9	5.0							20.9	110.0		
HML-R9	10.0	NP	NP	NP	37.5	29	SM				
HML-R9	15.0	NP	NP	NP	37.5	19	SM	4.9	132.7		
HML-R9	25.0				0.075	78		26.7	96.4		
HML-R10	2.0				25	30					
HML-R10	5.0							13.5	120.0		
HML-R10	15.0							11.6	112.7		
HML-R10	20.0				0.075	17					
HML-R10	25.0							19.6	93.3		
HML-R11	5.0							12.0	120.6		
HML-R11	10.0	29	NP	NP	19	48	SM				
HML-R11	15.0							13.2	93.7		
HML-R11	25.0	26	NP	NP	25	32	SM	10.7	117.2		
HML-R12	5.0	31	13	18	37.5	55	CL	14.0	121.2		
HML-R12	10.0							10.5			
HML-R12	25.0				19	20		5.1	123.5		
HML-R13	5.0							8.1	119.3		

SUMMARY OF LABORATORY RESULTS

NOVA Geotechnical and Inspection Services
4480 W Hacienda Avenue, Ste 104
Las Vegas, Nevada

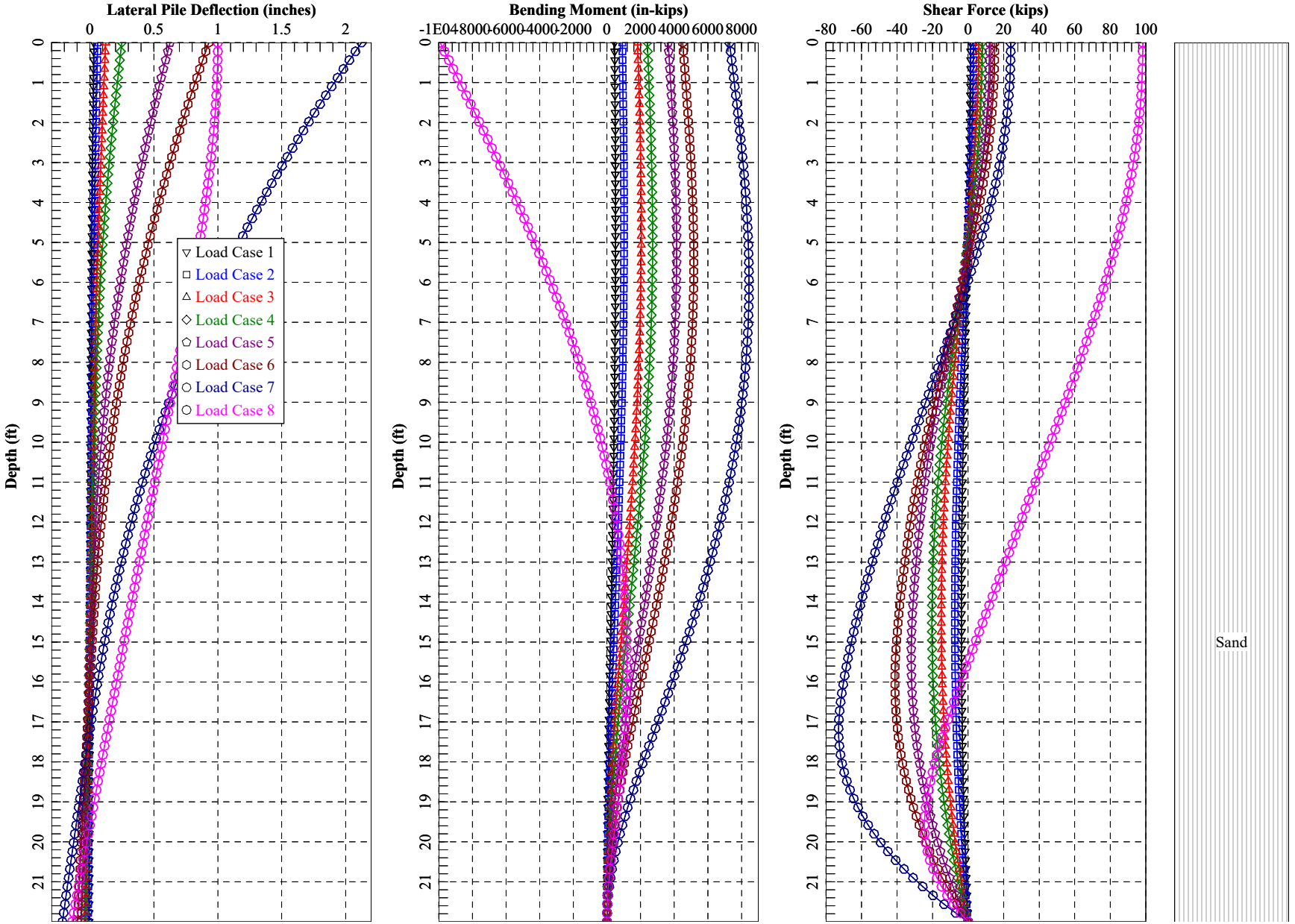
CLIENT CA Group, Inc. **PROJECT NAME** I-515 Charleston Interchange

PROJECT NUMBER G-19-192 **PROJECT LOCATION** I-515 from Charleston Boulevard to Eastern Avenue

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	Class-ification	Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
HML-R13	10.0				0.075	30					
HML-R13	15.0							13.3	119.7		
HML-R13	25.0	96	32	64	1.18	89	CH	30.0	97.1		
HML-R14	5.0							14.3	119.4		
HML-R14	10.0	28	12	16	19	60	CL				
HML-R14	15.0							12.0	121.8		
HML-R14	20.0				19	43					
HML-R14	25.0							7.1	128.0		
HML-R15	5.0	36	17	19	0.075	74	CL	20.5	107.5		
HML-R15	10.0				0.075	57		42.2			
HML-R15	15.0							1.6	82.7		
HML-R15	20.0				4.75	43					
HML-R15	25.0							24.3	104.0		
HML-R16	5.0							4.5	106.9		
HML-R16	10.0				4.75	31					
HML-R16	15.0							22.1	104.4		
HML-R16	20.0	33	14	19	9.5	79	CL				
HML-R16	25.0							19.4	108.5		

APPENDIX B

Sign Structure Type V


Lateral Pile Deflection (inches)
Bending Moment (in-kips)
Shear Force (kips)
Depth (ft)
Load Case 1
Load Case 2
Load Case 3
Load Case 4
Load Case 5
Load Case 6
Load Case 7
Load Case 8
Sand

Special-sign-structure-TypeV.lp9o

LPile for Windows, Version 2016-09.010

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

This copy of LPile is being used by:

SL
NOVA

Serial Number of Security Device: 500126473

This copy of LPile is licensed for exclusive use by:

Nova Engineering & Environmental

Use of this program by any entity other than Nova Engineering & Environmental
is a violation of the software license agreement.

Files Used for Analysis

Path to file locations:
\PROJECTS\Engineering & Enviro Projects\2019 Projects\G-19-192 I-515 Charleston Interchange - CA Group\DESIGN\Special Sign Structures\Revised-2-3-2021\

Name of input data file:
Special-sign-structure-TypeV.lp9d

Name of output report file:
Special-sign-structure-TypeV.lp9o

Name of plot output file:
Special-sign-structure-TypeV.lp9p

Name of runtime message file:
Special-sign-structure-TypeV.lp9r

Date and Time of Analysis

Date: February 3, 2021 Time: 15:04:12

Problem Title

I-515 Charleston

G-19-192

CA Group

NOVA

L1 98+26.00 Tyoe V Post

Program Options and Settings

Computational Options:
- Use unfactored loads in computations (conventional analysis)

Engineering Units Used for Data Input and Computations:
- US Customary System Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed	=	500
- Deflection tolerance for convergence	=	1.0000E-05 in
- Maximum allowable deflection	=	100.0000 in
- Number of pile increments	=	100

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

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

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

Pile Structural Properties and Geometry

Number of pile sections defined = 1
Total length of pile = 22.000 ft
Depth of ground surface below top of pile = 0.0000 ft

Pile diameters 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. A summary of values of pile diameter vs. depth follows.

Point No.	Depth Below Pile Head feet	Pile Diameter inches
1	0.000	36.0000
2	22.000	36.0000

Input Structural Properties for Pile Sections:

Pile Section No. 1:

Section 1 is a round drilled shaft, bored pile, or CIDH pile

Length of section	=	22.000000 ft
Shaft Diameter	=	36.000000 in
Shear capacity of section	=	0.0000 lbs

Ground Slope and Pile Batter Angles

Ground Slope Angle	=	26.600 degrees
	=	0.464 radians
Pile Batter Angle	=	0.000 degrees
	=	0.000 radians

Soil and Rock Layering Information

The soil profile is modelled using 1 layers

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

Distance from top of pile to top of layer	=	0.0000 ft
Distance from top of pile to bottom of layer	=	30.000000 ft
Effective unit weight at top of layer	=	120.000000 pcf
Effective unit weight at bottom of layer	=	120.000000 pcf
Friction angle at top of layer	=	30.000000 deg.
Friction angle at bottom of layer	=	30.000000 deg.
Subgrade k at top of layer	=	0.0000 pci
Subgrade k at bottom of layer	=	0.0000 pci

NOTE: Default values for subgrade k will be computed for this layer.

(Depth of the lowest soil layer extends 8.000 ft below the pile tip)

Summary of Input Soil Properties

Layer	Soil Type	Layer	Effective	Angle of

Layer Num.	Name (p-y Curve Type)	Depth ft	Unit Wt. pcf	Friction deg.	kpy pci
1	Sand	0.00	120.0000	30.0000	default
	(Reese, et al.)	30.0000	120.0000	30.0000	default

Static Loading Type

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

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 8

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length
1	1	V = 1500. lbs	M = 455000. in-lbs	20000.	Yes
2	1	V = 3000. lbs	M = 910000. in-lbs	20000.	Yes
3	1	V = 6000. lbs	M = 1820000. in-lbs	20000.	Yes
4	1	V = 8000. lbs	M = 2400000. in-lbs	20000.	Yes
5	1	V = 12000. lbs	M = 3640000. in-lbs	20000.	Yes
6	1	V = 15000. lbs	M = 4500000. in-lbs	20000.	Yes
7	1	V = 24000. lbs	M = 7280000. in-lbs	20000.	Yes
8	5	y = 1.000000 in	S = 0.0000 in/in	20000.	N.A.

V = shear force applied normal to pile axis
M = bending moment applied to pile head
y = lateral deflection normal to pile axis
S = pile slope relative to original pile batter angle

R = rotational stiffness applied to pile head
Values of top y vs. pile lengths can be computed only for load types with
specified shear loading (Load Types 1, 2, and 3).
Thrust force is assumed to be acting axially for all pile batter angles.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

---

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):

Length of Section	=	22.000000	ft
Shaft Diameter	=	36.000000	in
Concrete Cover Thickness	=	3.000000	in
Number of Reinforcing Bars	=	16	bars
Yield Stress of Reinforcing Bars	=	60000.	psi
Modulus of Elasticity of Reinforcing Bars	=	29000000.	psi
Gross Area of Shaft	=	1018.	sq. in.
Total Area of Reinforcing Steel	=	16.000000	sq. in.
Area Ratio of Steel Reinforcement	=	1.57	percent
Edge-to-Edge Bar Spacing	=	4.504648	in
Maximum Concrete Aggregate Size	=	0.750000	in
Ratio of Bar Spacing to Aggregate Size	=	6.01	
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	=	4792.176	kips
Tensile Load for Cracking of Concrete	=	-494.579	kips
Nominal Axial Tensile Capacity	=	-960.000	kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches

1	1.128000	1.000000	14.436000	0.00000
2	1.128000	1.000000	13.337125	5.524418
3	1.128000	1.000000	10.207793	10.207793
4	1.128000	1.000000	5.524418	13.337125
5	1.128000	1.000000	0.00000	14.436000
6	1.128000	1.000000	-5.524418	13.337125
7	1.128000	1.000000	-10.207793	10.207793
8	1.128000	1.000000	-13.337125	5.524418
9	1.128000	1.000000	-14.436000	0.00000
10	1.128000	1.000000	-13.337125	-5.524418
11	1.128000	1.000000	-10.207793	-10.207793
12	1.128000	1.000000	-5.524418	-13.337125
13	1.128000	1.000000	0.00000	-14.436000
14	1.128000	1.000000	5.524418	-13.337125
15	1.128000	1.000000	10.207793	-10.207793
16	1.128000	1.000000	13.337125	-5.524418

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

Minimum spacing between any two bars not equal to zero = 4.505 inches
between bars 11 and 12.

Ratio of bar spacing to maximum aggregate size = 6.01

Concrete Properties:

Compressive Strength of Concrete	=	4500. psi
Modulus of Elasticity of Concrete	=	3823676. psi
Modulus of Rupture of Concrete	=	-503.115295 psi
Compression Strain at Peak Stress	=	0.002001
Tensile Strain at Fracture of Concrete	=	-0.0001152
Maximum Coarse Aggregate Size	=	0.750000 in

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

Number	Axial Thrust Force kips
1	20.000

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

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

Axial Thrust Force = 20.000 kips

Bending Max Conc Curvature Stress rad/in. ksi	Bending Max Steel Moment Stress in-kip ksi	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Run Msg
6.25000E-07	256.8210160	410913626.	24.4523175	0.00001528	-0.00000722	
0.0679835	0.4399358					
0.00000125	512.9060872	410324870.	21.2329318	0.00002654	-0.00001846	
0.1176032	0.7631688					
0.00000188	768.1265327	409667484.	20.1599224	0.00003780	-0.00002970	
0.1669445	1.0864083					
0.00000250	1022.	408992021.	19.6234518	0.00004906	-0.00004094	
0.2160068	1.4096503					
0.00000313	1276.	408309234.	19.3015877	0.00006032	-0.00005218	
0.2647901	1.7328939					
0.00000375	1529.	407622768.	19.0870245	0.00007158	-0.00006342	
0.3132942	2.0561389					
0.00000438	1780.	406934191.	18.9337751	0.00008284	-0.00007466	
0.3615191	2.3793852					
0.00000500	2031.	406244296.	18.8188468	0.00009409	-0.00008591	
0.4094648	2.7026327					
0.00000563	2281.	405553519.	18.7294653	0.0001054	-0.00009715	
0.4571314	3.0258815					
0.00000625	2530.	404862125.	18.6579668	0.0001166	-0.0001084	
0.5045189	3.3491314					
0.00000688	2530.	368056477.	11.5769688	0.00007959	-0.0001679	
0.3455697	-4.8334543	C				
0.00000750	2530.	337385104.	11.4366253	0.00008577	-0.0001842	
0.3717667	-5.3033840	C				

```
0.00000813         2530.    311432404.    11.3174855    0.00009195    -0.0002005
 0.3978673    -5.7734050 C
0.00000875         2530.    289187232.    11.2129299    0.00009811    -0.0002169
 0.4237940    -6.2440440 C
0.00000938         2530.    269908083.    11.1226124     0.0001043    -0.0002332
 0.4496503    -6.7146022 C
0.00001000         2530.    253038828.    11.0438638     0.0001104    -0.0002496
 0.4754362    -7.1850795 C
0.00001063         2530.    238154191.    10.9744600     0.0001166    -0.0002659
 0.5011434    -7.6555320 C
0.00001125         2530.    224923403.    10.9110812     0.0001227    -0.0002823
 0.5266881    -8.1265347 C
0.00001188         2530.    213085329.    10.8546149     0.0001289    -0.0002986
 0.5521629    -8.5974544 C
0.00001250         2530.    202431062.    10.8040249     0.0001351    -0.0003149
 0.5775679    -9.0682909 C
0.00001313         2530.    192791488.    10.7584720     0.0001412    -0.0003313
 0.6029029    -9.5390440 C
0.00001375         2530.    184028239.    10.7172701     0.0001474    -0.0003476
 0.6281679   -10.0097135 C
0.00001438         2530.    176027011.    10.6798519     0.0001535    -0.0003640
 0.6533627   -10.4802992 C
0.00001500         2530.    168692552.    10.6457450     0.0001597    -0.0003803
 0.6784873   -10.9508009 C
0.00001563         2530.    161944850.    10.6143602     0.0001658    -0.0003967
 0.7035291   -11.4213055 C
0.00001625         2530.    155716202.    10.5847348     0.0001720    -0.0004130
 0.7284448   -11.8921187 C
0.00001688         2530.    149948935.    10.5574811     0.0001782    -0.0004293
 0.7532907   -12.3628452 C
0.00001750         2530.    144593616.    10.5323453     0.0001843    -0.0004457
 0.7780668   -12.8334847 C
0.00001813         2530.    139607629.    10.5091087     0.0001905    -0.0004620
 0.8027730   -13.3040372 C
0.00001875         2530.    134954042.    10.4875819     0.0001966    -0.0004784
 0.8274091   -13.7745023 C
0.00001938         2530.    130600685.    10.4675997     0.0002028    -0.0004947
 0.8519751   -14.2448798 C
0.00002000         2530.    126519414.    10.4490178     0.0002090    -0.0005110
 0.8764709   -14.7151696 C
0.00002063         2530.    122685492.    10.4317092     0.0002152    -0.0005273
 0.9008963   -15.1853714 C
0.00002125         2530.    119077096.    10.4155620     0.0002213    -0.0005437
 0.9252514   -15.6554849 C
0.00002188         2530.    115674893.    10.4004768     0.0002275    -0.0005600
 0.9495359   -16.1255105 C
0.00002250         2530.    112461701.    10.3863656     0.0002337    -0.0005763
 0.9737499   -16.5954469 C
```

```
0.00002313         2530.    109422196.    10.3731498     0.0002399    -0.0005926
 0.9978932   -17.0652943 C
0.00002375         2570.    108205932.    10.3607589     0.0002461    -0.0006089
 1.0219657   -17.5350527 C
0.00002438         2633.    108003183.    10.3491299     0.0002523    -0.0006252
 1.0459673   -18.0047217 C
0.00002563         2758.    107623756.    10.3279356     0.0002647    -0.0006578
 1.0937576   -18.9437903 C
0.00002688         2883.    107275017.    10.3091750     0.0002771    -0.0006904
 1.1412632   -19.8824992 C
0.00002813         3008.    106952863.    10.2925259     0.0002895    -0.0007230
 1.1884834   -20.8208460 C
0.00002938         3133.    106653879.    10.2777209     0.0003019    -0.0007556
 1.2354173   -21.7588289 C
0.00003063         3258.    106375199.    10.2645364     0.0003144    -0.0007881
 1.2820642   -22.6964469 C
0.00003188         3382.    106114335.    10.2525164     0.0003268    -0.0008207
 1.3283913   -23.6339426 C
0.00003313         3507.    105869273.    10.2416459     0.0003393    -0.0008532
 1.3744124   -24.5712070 C
0.00003438         3631.    105638365.    10.2319512     0.0003517    -0.0008858
 1.4201466   -25.5080867 C
0.00003563         3756.    105420094.    10.2233105     0.0003642    -0.0009183
 1.4655929   -26.4445803 C
0.00003688         3880.    105213160.    10.2156186     0.0003767    -0.0009508
 1.5107504   -27.3806857 C
0.00003813         4004.    105016432.    10.2087842     0.0003892    -0.0009833
 1.5556184   -28.3164008 C
0.00003938         4128.    104828922.    10.2027274     0.0004017    -0.0010158
 1.6001960   -29.2517233 C
0.00004063         4251.    104649763.    10.1973785     0.0004143    -0.0010482
 1.6444823   -30.1866511 C
0.00004188         4375.    104478194.    10.1926758     0.0004268    -0.0010807
 1.6884765   -31.1211820 C
0.00004313         4499.    104313538.    10.1885649     0.0004394    -0.0011131
 1.7321778   -32.0553136 C
0.00004438         4622.    104155198.    10.1849975     0.0004520    -0.0011455
 1.7755852   -32.9890438 C
0.00004563         4745.    104002641.    10.1819309     0.0004646    -0.0011779
 1.8186979   -33.9223702 C
0.00004688         4868.    103855389.    10.1793264     0.0004772    -0.0012103
 1.8615149   -34.8552906 C
0.00004813         4991.    103713016.    10.1771500     0.0004898    -0.0012427
 1.9040355   -35.7878025 C
0.00004938         5114.    103575138.    10.1753706     0.0005024    -0.0012751
 1.9462586   -36.7199036 C
0.00005063         5237.    103441408.    10.1739605     0.0005151    -0.0013074
 1.9881835   -37.6515916 C
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0.00005188         5359.    103311514.    10.1728946     0.0005277    -0.0013398
 2.0298091   -38.5828640 C
0.00005313         5482.    103185172.    10.1721502     0.0005404    -0.0013721
 2.0711345   -39.5137184 C
0.00005438         5604.    103062124.    10.1717067     0.0005531    -0.0014044
 2.1121589   -40.4441523 C
0.00005563         5726.    102942136.    10.1715454     0.0005658    -0.0014367
 2.1528812   -41.3741632 C
0.00005688         5848.    102824993.    10.1716491     0.0005785    -0.0014690
 2.1933005   -42.3037486 C
0.00005813         5970.    102710500.    10.1720023     0.0005912    -0.0015013
 2.2334159   -43.2329060 C
0.00005938         6092.    102598478.    10.1725907     0.0006040    -0.0015335
 2.2732265   -44.1616328 C
0.00006063         6213.    102488761.    10.1734012     0.0006168    -0.0015657
 2.3127311   -45.0899263 C
0.00006188         6335.    102381198.    10.1744219     0.0006295    -0.0015980
 2.3519289   -46.0177840 C
0.00006313         6456.    102275649.    10.1756417     0.0006423    -0.0016302
 2.3908188   -46.9452032 C
0.00006438         6577.    102171985.    10.1770505     0.0006551    -0.0016624
 2.4293999   -47.8721813 C
0.00006563         6698.    102070088.    10.1786388     0.0006680    -0.0016945
 2.4676712   -48.7987154 C
0.00006688         6819.    101969846.    10.1803981     0.0006808    -0.0017267
 2.5056316   -49.7248028 C
0.00006813         6940.    101871157.    10.1823203     0.0006937    -0.0017588
 2.5432800   -50.6504408 C
0.00006938         7061.    101773926.    10.1843980     0.0007065    -0.0017910
 2.5806156   -51.5756266 C
0.00007063         7181.    101678065.    10.1866244     0.0007194    -0.0018231
 2.6176372   -52.5003574 C
0.00007188         7301.    101583490.    10.1889930     0.0007323    -0.0018552
 2.6543437   -53.4246301 C
0.00007313         7421.    101490126.    10.1914980     0.0007453    -0.0018872
 2.6907342   -54.3484420 C
0.00007438         7541.    101397899.    10.1941338     0.0007582    -0.0019193
 2.7268074   -55.2717901 C
0.00007938         8020.    101039089.    10.2058878     0.0008101    -0.0020474
 2.8679070   -58.9604844 C
0.00008438         8496.    100693793.    10.2193811     0.0008623    -0.0021752
 3.0038431   -60.0000000 CY
0.00008938         8970.    100359113.    10.2344011     0.0009147    -0.0023028
 3.1345420   -60.0000000 CY
0.00009438         9422.     99840844.    10.2440209     0.0009668    -0.0024307
 3.2584192   -60.0000000 CY
0.00009938         9782.     98432398.    10.2217442     0.0010158    -0.0025617
 3.3694875   -60.0000000 CY
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3.4680307   -60.0000000 CY
0.0001094        10302.     94188985.    10.1214956     0.0011070    -0.0028305
3.5621831   -60.0000000 CY
0.0001144        10539.     92141746.    10.0722546     0.0011520    -0.0029655
3.6505124   -60.0000000 CY
0.0001194        10697.     89607793.     9.9991324     0.0011936    -0.0031039
3.7282583   -60.0000000 CY
0.0001244        10841.     87161896.     9.9280278     0.0012348    -0.0032427
3.8014227   -60.0000000 CY
0.0001294        10983.     84895122.     9.8617132     0.0012759    -0.0033816
3.8707905   -60.0000000 CY
0.0001344        11125.     82788421.     9.8001514     0.0013169    -0.0035206
3.9364929   -60.0000000 CY
0.0001394        11265.     80826721.     9.7441020     0.0013581    -0.0036594
3.9988024   -60.0000000 CY
0.0001444        11405.     78994858.     9.6930114     0.0013994    -0.0037981
4.0576815   -60.0000000 CY
0.0001494        11524.     77148580.     9.6380340     0.0014397    -0.0039378
4.1114413   -60.0000000 CY
0.0001544        11605.     75175455.     9.5717213     0.0014776    -0.0040799
4.1588767   -60.0000000 CY
0.0001594        11671.     73232217.     9.5025242     0.0015145    -0.0042230
4.2019266   -60.0000000 CY
0.0001644        11736.     71397687.     9.4363508     0.0015511    -0.0043664
4.2418639   -60.0000000 CY
0.0001694        11800.     69668448.     9.3748129     0.0015879    -0.0045096
4.2790529   -60.0000000 CY
0.0001744        11864.     68035396.     9.3175221     0.0016247    -0.0046528
4.3134654   -60.0000000 CY
0.0001794        11927.     66490440.     9.2641335     0.0016618    -0.0047957
4.3450725   -60.0000000 CY
0.0001844        11989.     65026367.     9.2143401     0.0016989    -0.0049386
4.3738448   -60.0000000 CY
0.0001894        12051.     63635601.     9.1671095     0.0017360    -0.0050815
4.3996558   -60.0000000 CY
0.0001944        12112.     62310648.     9.1209739     0.0017729    -0.0052246
4.4223625   -60.0000000 CY
0.0001994        12172.     61049486.     9.0778302     0.0018099    -0.0053676
4.4422294   -60.0000000 CY
0.0002044        12231.     59847390.     9.0374702     0.0018470    -0.0055105
4.4592245   -60.0000000 CY
0.0002094        12290.     58700085.     8.9997061     0.0018843    -0.0056532
4.4733150   -60.0000000 CY
0.0002144        12349.     57603691.     8.9643679     0.0019217    -0.0057958
4.4844672   -60.0000000 CY
0.0002194        12404.     56540551.     8.9296689     0.0019589    -0.0059386
4.4925813   -60.0000000 CY
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0.0002244	12453.	55501542.	8.8946790	0.0019957	-0.0060818
4.4976893	-60.0000000 CY				
0.0002294	12493.	54464036.	8.8567951	0.0020315	-0.0062260
4.4998772	-60.0000000 CY				
0.0002344	12522.	53427048.	8.8157063	0.0020662	-0.0063713
4.4958067	-60.0000000 CY				
0.0002394	12546.	52411494.	8.7720109	0.0020998	-0.0065177
4.4989777	-60.0000000 CY				
0.0002444	12566.	51422643.	8.7286794	0.0021331	-0.0066644
4.4998439	60.0000000 CY				
0.0002494	12586.	50471425.	8.6877405	0.0021665	-0.0068110
4.4961362	60.0000000 CY				
0.0002544	12606.	49556534.	8.6488287	0.0022000	-0.0069575
4.4990161	60.0000000 CY				
0.0002594	12625.	48675851.	8.6118324	0.0022337	-0.0071038
4.4999998	60.0000000 CY				
0.0002644	12644.	47826531.	8.5768829	0.0022675	-0.0072500
4.4950595	60.0000000 CY				
0.0002694	12663.	47007829.	8.5436037	0.0023014	-0.0073961
4.4983187	60.0000000 CY				
0.0002744	12681.	46218070.	8.5119046	0.0023355	-0.0075420
4.4998652	60.0000000 CY				
0.0003044	12782.	41993706.	8.3426223	0.0025393	-0.0084182
4.4953852	60.0000000 CY				
0.0003344	12873.	38499075.	8.2114586	0.0027457	-0.0092918
4.4984255	60.0000000 CY				
0.0003644	12958.	35561451.	8.1111358	0.0029555	-0.0101620
4.4990539	60.0000000 CY				
0.0003944	13035.	33053538.	8.0272829	0.0031658	-0.0110317
4.4980432	60.0000000 CYT				
0.0004244	13107.	30886201.	7.9598015	0.0033779	-0.0118996
4.4938248	60.0000000 CYT				
0.0004544	13157.	28956709.	7.8940922	0.0035869	-0.0127706
4.4879116	60.0000000 CYT				
0.0004844	13180.	27210403.	7.8240874	0.0037898	-0.0136477
4.4980322	60.0000000 CYT				
0.0005144	13180.	25623405.	7.7906535	0.0040073	-0.0145102
4.4830228	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	Axial Thrust	Nominal Mom. Cap.	Max. Comp.

No.	kips	in-kip	Strain
1	20.000	12974.168	0.00300000

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

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

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

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

Axial Load No.	Resist. Factor for Moment	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in^2
1	0.65	12974.	13.000000	8433.	100739365.
1	0.70	12974.	14.000000	9082.	100230575.
1	0.75	12974.	15.000000	9731.	98632718.

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 = 1500.0 lbs
Applied moment at pile head = 455000.0 in-lbs
Axial thrust load on pile head = 20000.0 lbs

Depth X	Deflect. y	Bending Moment	Shear Force	Slope S	Total Stress	Bending Stiffness	Soil Res. Es*h	Soil Spr. Distrib. p
feet	inches	in-lbs	lbs	radians	psi*	in-lb^2	lb/inch	lb/inch

0.00	0.03020	455000.	1500.	-2.74E-04	0.00	4.10E+11	0.00	0.00	0.00	
0.2200	0.02948	458974.	1495.	-2.71E-04	0.00	4.10E+11	-3.7115	332.4081	0.00	
0.4400	0.02876	462923.	1481.	-2.68E-04	0.00	4.10E+11	-7.2436	664.8162	0.00	
0.6600	0.02806	466821.	1457.	-2.65E-04	0.00	4.10E+11	-10.5992	997.2243	0.00	
0.8800	0.02736	470644.	1425.	-2.62E-04	0.00	4.10E+11	-13.7814	1330.	0.00	
1.1000	0.02667	474372.	1385.	-2.59E-04	0.00	4.10E+11	-16.7932	1662.	0.00	
1.3200	0.02599	477982.	1336.	-2.56E-04	0.00	4.10E+11	-19.6376	1994.	0.00	
1.5400	0.02532	481455.	1281.	-2.53E-04	0.00	4.10E+11	-22.3177	2327.	0.00	
1.7600	0.02466	484773.	1219.	-2.50E-04	0.00	4.10E+11	-24.8367	2659.	0.00	
1.9800	0.02400	487917.	1150.	-2.47E-04	0.00	4.10E+11	-27.1977	2992.	0.00	
2.2000	0.02335	490872.	1075.	-2.44E-04	0.00	4.10E+11	-29.4040	3324.	0.00	
2.4200	0.02271	493621.	995.0951	-2.41E-04	0.00	4.10E+11	-31.4586	3656.	0.00	
2.6400	0.02208	496151.	909.5282	-2.37E-04	0.00	4.10E+11	-33.3648	3989.	0.00	
2.8600	0.02146	498449.	819.1204	-2.34E-04	0.00	4.10E+11	-35.1259	4321.	0.00	
3.0800	0.02085	500501.	724.2505	-2.31E-04	0.00	4.10E+11	-36.7452	4654.	0.00	
3.3000	0.02024	502297.	625.2890	-2.28E-04	0.00	4.10E+11	-38.2257	4986.	0.00	
3.5200	0.01964	503827.	522.5973	-2.25E-04	0.00	4.10E+11	-39.5710	5319.	0.00	
3.7400	0.01905	505080.	416.5286	-2.21E-04	0.00	4.10E+11	-40.7841	5651.	0.00	
3.9600	0.01847	506049.	307.4272	-2.18E-04	0.00	4.10E+11	-41.8685	5983.	0.00	
4.1800	0.01790	506726.	195.6287	-2.15E-04	0.00	4.10E+11	-42.8273	6316.	0.00	
4.4000	0.01734	507105.	81.4602	-2.12E-04	0.00	4.10E+11	-43.6639	6648.	0.00	
4.6200	0.01678	507179.	-34.7598	-2.08E-04	0.00	4.10E+11	-44.3816	6981.	0.00	
4.8400	0.01624	506943.	-152.7216	-2.05E-04	0.00	4.10E+11	-44.9835	7313.	0.00	

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    5.0600    0.01570    506394.  -272.1241  -2.02E-04       0.00   4.10E+11
-45.4729      7645.       0.00
    5.2800    0.01517    505528.  -392.6744  -1.99E-04       0.00   4.10E+11
-45.8531      7978.       0.00
    5.5000    0.01465    504342.  -514.0885  -1.95E-04       0.00   4.10E+11
-46.1273      8310.       0.00
    5.7200    0.01414    502834.  -636.0906  -1.92E-04       0.00   4.10E+11
-46.2985      8643.       0.00
    5.9400    0.01364    501003.  -758.4132  -1.89E-04       0.00   4.10E+11
-46.3701      8975.       0.00
    6.1600    0.01315    498849.  -880.7973  -1.86E-04       0.00   4.10E+11
-46.3451      9307.       0.00
    6.3800    0.01266    496372.     -1003.  -1.82E-04       0.00   4.10E+11
-46.2265      9640.       0.00
    6.6000    0.01218    493573.     -1125.  -1.79E-04       0.00   4.10E+11
-46.0175      9972.       0.00
    6.8200    0.01171    490453.     -1246.  -1.76E-04       0.00   4.10E+11
-45.7209     10305.       0.00
    7.0400    0.01125    487013.     -1366.  -1.73E-04       0.00   4.10E+11
-45.3399     10637.       0.00
    7.2600    0.01080    483258.     -1485.  -1.70E-04       0.00   4.10E+11
-44.8772     10969.       0.00
    7.4800    0.01036    479190.     -1603.  -1.67E-04       0.00   4.10E+11
-44.3358     11302.       0.00
    7.7000    0.00992    474812.     -1719.  -1.64E-04       0.00   4.10E+11
-43.7183     11634.       0.00
    7.9200    0.00949    470130.     -1834.  -1.61E-04       0.00   4.10E+11
-43.0276     11967.       0.00
    8.1400    0.00907    465148.     -1946.  -1.58E-04       0.00   4.10E+11
-42.2664     12299.       0.00
    8.3600    0.00866    459871.     -2057.  -1.55E-04       0.00   4.10E+11
-41.4372     12632.       0.00
    8.5800    0.00826    454305.     -2165.  -1.52E-04       0.00   4.10E+11
-40.5426     12964.       0.00
    8.8000    0.00786    448456.     -2271.  -1.49E-04       0.00   4.10E+11
-39.5850     13296.       0.00
    9.0200    0.00747    442331.     -2374.  -1.46E-04       0.00   4.10E+11
-38.5669     13629.       0.00
    9.2400    0.00709    435937.     -2474.  -1.43E-04       0.00   4.10E+11
-37.4906     13961.       0.00
    9.4600    0.00672    429282.     -2572.  -1.40E-04       0.00   4.10E+11
-36.3583     14294.       0.00
    9.6800    0.00635    422374.     -2666.  -1.38E-04       0.00   4.10E+11
-35.1722     14626.       0.00
    9.9000    0.00599    415220.     -2757.  -1.35E-04       0.00   4.10E+11
-33.9345     14958.       0.00
   10.1200    0.00564    407829.     -2845.  -1.32E-04       0.00   4.10E+11
-32.6470     15291.       0.00
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10.3400	0.00529	400211.	-2930.	-1.30E-04	0.00	4.10E+11
-31.3117	15623.	0.00				
10.5600	0.00495	392374.	-3011.	-1.27E-04	0.00	4.11E+11
-29.9305	15956.	0.00				
10.7800	0.00462	384328.	-3088.	-1.25E-04	0.00	4.11E+11
-28.5050	16288.	0.00				
11.0000	0.00429	376084.	-3161.	-1.22E-04	0.00	4.11E+11
-27.0370	16620.	0.00				
11.2200	0.00398	367651.	-3230.	-1.20E-04	0.00	4.11E+11
-25.5281	16953.	0.00				
11.4400	0.00366	359041.	-3296.	-1.17E-04	0.00	4.11E+11
-23.9796	17285.	0.00				
11.6600	0.00336	350262.	-3357.	-1.15E-04	0.00	4.11E+11
-22.3929	17618.	0.00				
11.8800	0.00305	341328.	-3414.	-1.13E-04	0.00	4.11E+11
-20.7694	17950.	0.00				
12.1000	0.00276	332249.	-3467.	-1.11E-04	0.00	4.11E+11
-19.1103	18282.	0.00				
12.3200	0.00247	323037.	-3515.	-1.09E-04	0.00	4.11E+11
-17.4166	18615.	0.00				
12.5400	0.00219	313703.	-3558.	-1.07E-04	0.00	4.11E+11
-15.6893	18947.	0.00				
12.7600	0.00191	304259.	-3598.	-1.05E-04	0.00	4.11E+11
-13.9294	19280.	0.00				
12.9800	0.00163	294719.	-3632.	-1.03E-04	0.00	4.11E+11
-12.1377	19612.	0.00				
13.2000	0.00137	285093.	-3662.	-1.01E-04	0.00	4.11E+11
-10.3149	19944.	0.00				
13.4200	0.00110	275396.	-3686.	-9.90E-05	0.00	4.11E+11
-8.4616	20277.	0.00				
13.6400	8.43E-04	265640.	-3706.	-9.73E-05	0.00	4.11E+11
-6.5784	20609.	0.00				
13.8600	5.88E-04	255837.	-3721.	-9.56E-05	0.00	4.11E+11
-4.6657	20942.	0.00				
14.0800	3.38E-04	246002.	-3731.	-9.40E-05	0.00	4.11E+11
-2.7239	21274.	0.00				
14.3000	9.20E-05	236149.	-3735.	-9.24E-05	0.00	4.11E+11
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14.9600	-6.23E-04	206611.	-3717.	-8.82E-05	0.00	4.11E+11
5.3304	22604.	0.00				
15.1800	-8.54E-04	196820.	-3701.	-8.69E-05	0.00	4.11E+11
7.4154	22936.	0.00				
15.4000	-0.00108	187081.	-3678.	-8.56E-05	0.00	4.11E+11
9.5291	23269.	0.00				

15.6200	-0.00131	177408.	-3650.	-8.45E-05	0.00	4.11E+11
11.6718	23601.	0.00				
15.8400	-0.00153	167816.	-3617.	-8.33E-05	0.00	4.11E+11
13.8438	23933.	0.00				
16.0600	-0.00175	158321.	-3577.	-8.23E-05	0.00	4.11E+11
16.0453	24266.	0.00				
16.2800	-0.00196	148937.	-3532.	-8.13E-05	0.00	4.11E+11
18.2769	24598.	0.00				
16.5000	-0.00217	139681.	-3481.	-8.04E-05	0.00	4.11E+11
20.5390	24931.	0.00				
16.7200	-0.00239	130568.	-3423.	-7.95E-05	0.00	4.11E+11
22.8322	25263.	0.00				
16.9400	-0.00259	121615.	-3360.	-7.87E-05	0.00	4.11E+11
25.1570	25595.	0.00				
17.1600	-0.00280	112836.	-3290.	-7.79E-05	0.00	4.11E+11
27.5142	25928.	0.00				
17.3800	-0.00301	104249.	-3215.	-7.73E-05	0.00	4.11E+11
29.9044	26260.	0.00				
17.6000	-0.00321	95871.	-3133.	-7.66E-05	0.00	4.11E+11
32.3283	26593.	0.00				
17.8200	-0.00341	87717.	-3044.	-7.60E-05	0.00	4.11E+11
34.7868	26925.	0.00				
18.0400	-0.00361	79807.	-2949.	-7.55E-05	0.00	4.11E+11
37.2807	27257.	0.00				
18.2600	-0.00381	72156.	-2847.	-7.50E-05	0.00	4.11E+11
39.8108	27590.	0.00				
18.4800	-0.00401	64782.	-2739.	-7.46E-05	0.00	4.11E+11
42.3779	27922.	0.00				
18.7000	-0.00420	57704.	-2623.	-7.42E-05	0.00	4.11E+11
44.9830	28255.	0.00				
18.9200	-0.00440	50939.	-2501.	-7.38E-05	0.00	4.11E+11
47.6269	28587.	0.00				
19.1400	-0.00459	44507.	-2372.	-7.35E-05	0.00	4.11E+11
50.3105	28920.	0.00				
19.3600	-0.00479	38424.	-2235.	-7.32E-05	0.00	4.11E+11
53.0348	29252.	0.00				
19.5800	-0.00498	32712.	-2092.	-7.30E-05	0.00	4.11E+11
55.8005	29584.	0.00				
19.8000	-0.00517	27388.	-1941.	-7.28E-05	0.00	4.11E+11
58.6085	29917.	0.00				
20.0200	-0.00536	22473.	-1782.	-7.27E-05	0.00	4.11E+11
61.4596	30249.	0.00				
20.2400	-0.00556	17986.	-1616.	-7.25E-05	0.00	4.11E+11
64.3547	30582.	0.00				
20.4600	-0.00575	13948.	-1442.	-7.24E-05	0.00	4.11E+11
67.2945	30914.	0.00				
20.6800	-0.00594	10379.	-1261.	-7.23E-05	0.00	4.11E+11
70.2796	31246.	0.00				

```
   20.9000   -0.00613      7299.     -1071.  -7.23E-05       0.00   4.11E+11
73.3108     31579.       0.00
   21.1200   -0.00632      4731.  -873.5382  -7.22E-05       0.00   4.11E+11
76.3886     31911.       0.00
   21.3400   -0.00651      2695.  -667.7477  -7.22E-05       0.00   4.11E+11
79.5134     32244.       0.00
   21.5600   -0.00670      1213.  -453.6450  -7.22E-05       0.00   4.11E+11
82.6856     32576.       0.00
   21.7800   -0.00689   306.9396  -231.1046  -7.22E-05       0.00   4.11E+11
85.9056     32908.       0.00
   22.0000   -0.00708       0.00       0.00  -7.22E-05       0.00   4.11E+11
89.1736     16620.       0.00
```

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

Output Summary for Load Case No. 1:

```
Pile-head deflection             =     0.03019736 inches
Computed slope at pile head      =    -0.00027431 radians
Maximum bending moment           =        507179. inch-lbs
Maximum shear force              =         -3735. lbs
Depth of maximum bending moment  =     4.62000000 feet below pile head
Depth of maximum shear force     =    14.30000000 feet below pile head
Number of iterations             =              6
Number of zero deflection points =              1
```

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

Boundary Condition Type 1, Shear and Moment

```
Shear      =           1500. lbs
Moment     =         455000. in-lbs
Axial Load =          20000. lbs
```

Pile Length feet	Pile Head Deflection inches	Maximum Moment ln-lbs	Maximum Shear lbs

22.00000	0.03019736	507179.	-3735.
20.90000	0.03224342	505188.	-3944.
19.80000	0.03495096	502902.	-4169.
18.70000	0.03851715	500354.	-4410.
17.60000	0.04321056	497581.	-4673.
16.50000	0.04940645	494620.	-4960.
15.40000	0.05764359	491544.	-5280.
14.30000	0.06871819	488401.	-5641.
13.20000	0.08396886	485381.	-6060.
12.10000	0.10673470	483588.	-6598.
11.00000	0.14592803	482685.	-7371.
9.90000	0.22897946	481662.	-8559.
8.80000	0.44346977	480822.	-10310.
7.70000	1.11652704	481783.	-12858.

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 = 3000.0 lbs
Applied moment at pile head = 910000.0 in-lbs
Axial thrust load on pile head = 20000.0 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*	in-lb^2	lb/inch	lb/inch	lb/inch
0.00	0.06044	910000.	3000.	-5.50E-04	0.00	4.09E+11	0.00	0.00	0.00
0.2200	0.05900	917949.	2990.	-5.44E-04	0.00	4.09E+11	-7.4287	332.4081	0.00
0.4400	0.05757	925846.	2961.	-5.38E-04	0.00	4.09E+11	-14.4979	664.8162	0.00
0.6600	0.05616	933641.	2914.	-5.32E-04	0.00	4.09E+11	-21.2137	997.2243	0.00
0.8800	0.05476	941288.	2850.	-5.26E-04	0.00	4.09E+11	-27.5820	1330.	0.00
1.1000	0.05338	948743.	2769.	-5.20E-04	0.00	4.09E+11	-33.6090	1662.	0.00

1.3200	0.05202	955963.	2673.	-5.13E-04	0.00	4.09E+11
-39.3008	1994.	0.00				
1.5400	0.05067	962909.	2562.	-5.07E-04	0.00	4.09E+11
-44.6636	2327.	0.00				
1.7600	0.04934	969543.	2437.	-5.01E-04	0.00	4.09E+11
-49.7036	2659.	0.00				
1.9800	0.04803	975831.	2300.	-4.95E-04	0.00	4.09E+11
-54.4273	2992.	0.00				
2.2000	0.04673	981739.	2150.	-4.88E-04	0.00	4.09E+11
-58.8409	3324.	0.00				
2.4200	0.04545	987236.	1990.	-4.82E-04	0.00	4.09E+11
-62.9509	3656.	0.00				
2.6400	0.04419	992294.	1818.	-4.76E-04	0.00	4.09E+11
-66.7638	3989.	0.00				
2.8600	0.04294	996887.	1637.	-4.69E-04	0.00	4.09E+11
-70.2861	4321.	0.00				
3.0800	0.04171	1000990.	1448.	-4.63E-04	0.00	4.09E+11
-73.5242	4654.	0.00				
3.3000	0.04050	1004579.	1250.	-4.56E-04	0.00	4.09E+11
-76.4848	4986.	0.00				
3.5200	0.03930	1007636.	1044.	-4.50E-04	0.00	4.09E+11
-79.1743	5319.	0.00				
3.7400	0.03812	1010140.	831.8964	-4.43E-04	0.00	4.09E+11
-81.5994	5651.	0.00				
3.9600	0.03696	1012075.	613.6131	-4.37E-04	0.00	4.09E+11
-83.7667	5983.	0.00				
4.1800	0.03582	1013426.	389.9398	-4.30E-04	0.00	4.09E+11
-85.6827	6316.	0.00				
4.4000	0.03469	1014179.	161.5313	-4.24E-04	0.00	4.09E+11
-87.3540	6648.	0.00				
4.6200	0.03358	1014323.	-70.9752	-4.17E-04	0.00	4.09E+11
-88.7872	6981.	0.00				
4.8400	0.03249	1013848.	-306.9596	-4.11E-04	0.00	4.09E+11
-89.9888	7313.	0.00				
5.0600	0.03141	1012746.	-545.8191	-4.04E-04	0.00	4.09E+11
-90.9653	7645.	0.00				
5.2800	0.03035	1011009.	-786.9679	-3.97E-04	0.00	4.09E+11
-91.7232	7978.	0.00				
5.5000	0.02931	1008633.	-1030.	-3.91E-04	0.00	4.09E+11
-92.2689	8310.	0.00				
5.7200	0.02829	1005613.	-1274.	-3.84E-04	0.00	4.09E+11
-92.6087	8643.	0.00				
5.9400	0.02728	1001947.	-1519.	-3.78E-04	0.00	4.09E+11
-92.7491	8975.	0.00				
6.1600	0.02629	997635.	-1763.	-3.72E-04	0.00	4.09E+11
-92.6961	9307.	0.00				
6.3800	0.02532	992676.	-2008.	-3.65E-04	0.00	4.09E+11
-92.4561	9640.	0.00				

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    6.6000    0.02436    987073.     -2251.  -3.59E-04       0.00   4.09E+11
-92.0352     9972.       0.00
    6.8200    0.02343    980827.     -2493.  -3.52E-04       0.00   4.09E+11
-91.4392    10305.       0.00
    7.0400    0.02250    973944.     -2734.  -3.46E-04       0.00   4.09E+11
-90.6742    10637.       0.00
    7.2600    0.02160    966429.     -2972.  -3.40E-04       0.00   4.09E+11
-89.7460    10969.       0.00
    7.4800    0.02071    958288.     -3207.  -3.34E-04       0.00   4.09E+11
-88.6603    11302.       0.00
    7.7000    0.01984    949529.     -3440.  -3.27E-04       0.00   4.09E+11
-87.4227    11634.       0.00
    7.9200    0.01898    940160.     -3669.  -3.21E-04       0.00   4.09E+11
-86.0387    11967.       0.00
    8.1400    0.01814    930191.     -3894.  -3.15E-04       0.00   4.09E+11
-84.5137    12299.       0.00
    8.3600    0.01732    919633.     -4115.  -3.09E-04       0.00   4.09E+11
-82.8528    12632.       0.00
    8.5800    0.01651    908497.     -4331.  -3.03E-04       0.00   4.09E+11
-81.0612    12964.       0.00
    8.8000    0.01571    896795.     -4543.  -2.98E-04       0.00   4.09E+11
-79.1438    13296.       0.00
    9.0200    0.01494    884542.     -4749.  -2.92E-04       0.00   4.09E+11
-77.1055    13629.       0.00
    9.2400    0.01417    871751.     -4950.  -2.86E-04       0.00   4.09E+11
-74.9509    13961.       0.00
    9.4600    0.01342    858438.     -5145.  -2.81E-04       0.00   4.09E+11
-72.6844    14294.       0.00
    9.6800    0.01269    844617.     -5333.  -2.75E-04       0.00   4.09E+11
-70.3106    14626.       0.00
    9.9000    0.01197    830307.     -5516.  -2.70E-04       0.00   4.09E+11
-67.8334    14958.       0.00
   10.1200    0.01127    815523.     -5691.  -2.64E-04       0.00   4.10E+11
-65.2571    15291.       0.00
   10.3400    0.01058    800284.     -5860.  -2.59E-04       0.00   4.10E+11
-62.5852    15623.       0.00
   10.5600    0.00990    784609.     -6022.  -2.54E-04       0.00   4.10E+11
-59.8217    15956.       0.00
   10.7800    0.00923    768516.     -6176.  -2.49E-04       0.00   4.10E+11
-56.9699    16288.       0.00
   11.0000    0.00858    752026.     -6322.  -2.44E-04       0.00   4.10E+11
-54.0331    16620.       0.00
   11.2200    0.00794    735159.     -6461.  -2.39E-04       0.00   4.10E+11
-51.0145    16953.       0.00
   11.4400    0.00732    717937.     -6592.  -2.35E-04       0.00   4.10E+11
-47.9170    17285.       0.00
   11.6600    0.00670    700380.     -6714.  -2.30E-04       0.00   4.10E+11
-44.7434    17618.       0.00
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   11.8800    0.00610    682511.     -6828.  -2.26E-04       0.00   4.10E+11
-41.4962     17950.       0.00
   12.1000    0.00551    664353.     -6933.  -2.21E-04       0.00   4.10E+11
-38.1779     18282.       0.00
   12.3200    0.00493    645929.     -7029.  -2.17E-04       0.00   4.10E+11
-34.7907     18615.       0.00
   12.5400    0.00437    627261.     -7117.  -2.13E-04       0.00   4.10E+11
-31.3365     18947.       0.00
   12.7600    0.00381    608375.     -7195.  -2.09E-04       0.00   4.10E+11
-27.8172     19280.       0.00
   12.9800    0.00326    589295.     -7263.  -2.05E-04       0.00   4.10E+11
-24.2344     19612.       0.00
   13.2000    0.00273    570046.     -7323.  -2.02E-04       0.00   4.10E+11
-20.5895     19944.       0.00
   13.4200    0.00220    550654.     -7372.  -1.98E-04       0.00   4.10E+11
-16.8839     20277.       0.00
   13.6400    0.00168    531143.     -7412.  -1.94E-04       0.00   4.10E+11
-13.1186     20609.       0.00
   13.8600    0.00117    511541.     -7441.  -1.91E-04       0.00   4.10E+11
-9.2944     20942.       0.00
   14.0800   6.72E-04    491874.     -7461.  -1.88E-04       0.00   4.10E+11
-5.4122     21274.       0.00
   14.3000   1.80E-04    472169.     -7470.  -1.85E-04       0.00   4.10E+11
-1.4724     21607.       0.00
   14.5200  -3.04E-04    452453.     -7468.  -1.82E-04       0.00   4.10E+11
2.5246     21939.       0.00
   14.7400  -7.80E-04    432755.     -7456.  -1.79E-04       0.00   4.10E+11
6.5786     22271.       0.00
   14.9600   -0.00125    413103.     -7434.  -1.76E-04       0.00   4.10E+11
10.6896     22604.       0.00
   15.1800   -0.00171    393525.     -7400.  -1.74E-04       0.00   4.11E+11
14.8576     22936.       0.00
   15.4000   -0.00217    374050.     -7355.  -1.71E-04       0.00   4.11E+11
19.0830     23269.       0.00
   15.6200   -0.00261    354708.     -7299.  -1.69E-04       0.00   4.11E+11
23.3661     23601.       0.00
   15.8400   -0.00306    335529.     -7232.  -1.67E-04       0.00   4.11E+11
27.7077     23933.       0.00
   16.0600   -0.00349    316543.     -7153.  -1.64E-04       0.00   4.11E+11
32.1084     24266.       0.00
   16.2800   -0.00392    297781.     -7062.  -1.63E-04       0.00   4.11E+11
36.5691     24598.       0.00
   16.5000   -0.00435    279274.     -6959.  -1.61E-04       0.00   4.11E+11
41.0907     24931.       0.00
   16.7200   -0.00477    261052.     -6845.  -1.59E-04       0.00   4.11E+11
45.6744     25263.       0.00
   16.9400   -0.00519    243149.     -6718.  -1.57E-04       0.00   4.11E+11
50.3213     25595.       0.00
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   17.1600   -0.00560    225597.     -6579.  -1.56E-04       0.00   4.11E+11
55.0329     25928.       0.00
   17.3800   -0.00601    208428.     -6428.  -1.54E-04       0.00   4.11E+11
59.8104     26260.       0.00
   17.6000   -0.00642    191676.     -6263.  -1.53E-04       0.00   4.11E+11
64.6554     26593.       0.00
   17.8200   -0.00682    175375.     -6086.  -1.52E-04       0.00   4.11E+11
69.5695     26925.       0.00
   18.0400   -0.00722    159558.     -5896.  -1.51E-04       0.00   4.11E+11
74.5542     27257.       0.00
   18.2600   -0.00762    144261.     -5692.  -1.50E-04       0.00   4.11E+11
79.6112     27590.       0.00
   18.4800   -0.00801    129518.     -5475.  -1.49E-04       0.00   4.11E+11
84.7424     27922.       0.00
   18.7000   -0.00840    115367.     -5245.  -1.48E-04       0.00   4.11E+11
89.9493     28255.       0.00
   18.9200   -0.00879    101842.     -5000.  -1.48E-04       0.00   4.11E+11
95.2339     28587.       0.00
   19.1400   -0.00918     88980.     -4742.  -1.47E-04       0.00   4.11E+11
100.5978    28920.       0.00
   19.3600   -0.00957     76820.     -4469.  -1.46E-04       0.00   4.11E+11
106.0428    29252.       0.00
   19.5800   -0.00996     65399.     -4182.  -1.46E-04       0.00   4.11E+11
111.5707    29584.       0.00
   19.8000   -0.01034     54756.     -3880.  -1.46E-04       0.00   4.11E+11
117.1832    29917.       0.00
   20.0200   -0.01072     44929.     -3563.  -1.45E-04       0.00   4.11E+11
122.8819    30249.       0.00
   20.2400   -0.01111     35959.     -3231.  -1.45E-04       0.00   4.11E+11
128.6684    30582.       0.00
   20.4600   -0.01149     27885.     -2883.  -1.45E-04       0.00   4.11E+11
134.5442    30914.       0.00
   20.6800   -0.01187     20749.     -2520.  -1.45E-04       0.00   4.11E+11
140.5107    31246.       0.00
   20.9000   -0.01225     14593.     -2141.  -1.44E-04       0.00   4.11E+11
146.5692    31579.       0.00
   21.1200   -0.01263      9458.     -1746.  -1.44E-04       0.00   4.11E+11
152.7207    31911.       0.00
   21.3400   -0.01302      5387.     -1335.  -1.44E-04       0.00   4.11E+11
158.9663    32244.       0.00
   21.5600   -0.01340      2424.   -906.9273  -1.44E-04       0.00   4.11E+11
165.3067    32576.       0.00
   21.7800   -0.01378   613.6307   -462.0222  -1.44E-04       0.00   4.11E+11
171.7426    32908.       0.00
   22.0000   -0.01416       0.00       0.00  -1.44E-04       0.00   4.11E+11
178.2743    16620.       0.00

* This analysis computed pile response using nonlinear moment-curvature rela-
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tionships. 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	=	0.06044186 inches
Computed slope at pile head	=	-0.00054950 radians
Maximum bending moment	=	1014323. inch-lbs
Maximum shear force	=	-7470. lbs
Depth of maximum bending moment	=	4.62000000 feet below pile head
Depth of maximum shear force	=	14.30000000 feet below pile head
Number of iterations	=	6
Number of zero deflection points	=	1

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

Boundary Condition Type 1, Shear and Moment

Shear	=	3000. lbs
Moment	=	910000. in-lbs
Axial Load	=	20000. lbs

Pile Length feet	Pile Head Deflection inches	Maximum Moment ln-lbs	Maximum Shear lbs
22.00000	0.06044186	1014323.	-7470.
20.90000	0.06452999	1010350.	-7888.
19.80000	0.06994096	1005783.	-8337.
18.70000	0.07708198	1000752.	-8820.
17.60000	0.08658506	995654.	-9354.
16.50000	0.09957592	991296.	-9963.
15.40000	0.11817802	988357.	-10698.
14.30000	0.14738511	986220.	-11666.
13.20000	0.19994617	983501.	-13004.
12.10000	0.30488097	980114.	-14783.
11.00000	0.52790966	976636.	-17015.
9.90000	1.04647626	973750.	-19839.
8.80000	2.45756379	977895.	-23839.

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

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

Shear force at pile head = 6000.0 lbs
Applied moment at pile head = 1820000.0 in-lbs
Axial thrust load on pile head = 20000.0 lbs

Depth X	Deflect. y	Bending Moment	Shear Force	Slope S	Total Stress	Bending Stiffness	Soil Res. Es*h	Soil Spr. Distrib. p Lat. Load
feet	inches	in-lbs	lbs	radians	psi*	in-lb^2	lb/inch	lb/inch
0.00	0.1234	1820000.	6000.	-0.00112	0.00	4.07E+11	0.00	0.00
0.2200	0.1205	1835899.	5986.	-0.00111	0.00	4.07E+11	-10.2394	224.3485
0.4400	0.1176	1851725.	5945.	-0.00109	0.00	4.07E+11	-20.8122	467.2580
0.6600	0.1147	1867406.	5876.	-0.00108	0.00	4.07E+11	-31.6184	727.6343
0.8800	0.1119	1882866.	5778.	-0.00107	0.00	4.07E+11	-42.5593	1004.
1.1000	0.1091	1898029.	5652.	-0.00106	0.00	4.07E+11	-53.5380	1296.
1.3200	0.1063	1912818.	5496.	-0.00104	0.00	4.07E+11	-64.4593	1601.
1.5400	0.1036	1927157.	5311.	-0.00103	0.00	4.07E+11	-75.3244	1920.
1.7600	0.1008	1940970.	5098.	-0.00102	0.00	4.06E+11	-86.4903	2264.
1.9800	0.09817	1954180.	4855.	-0.00101	0.00	4.06E+11	-97.5322	2623.
2.2000	0.09553	1966710.	4583.	-9.94E-04	0.00	4.06E+11	-108.3790	2995.
2.4200	0.09292	1978483.	4283.	-9.81E-04	0.00	4.06E+11	-118.9613	3380.
2.6400	0.09035	1989427.	3955.	-9.69E-04	0.00	4.06E+11	-129.2114	3776.
2.8600	0.08781	1999469.	3601.	-9.56E-04	0.00	4.06E+11		

-139.0635	4181.	0.00				
3.0800	0.08530	2008542.	3221.	-9.43E-04	0.00	4.06E+11
-148.6179	4599.	0.00				
3.3000	0.08283	2016578.	2819.	-9.29E-04	0.00	4.06E+11
-156.4451	4986.	0.00				
3.5200	0.08040	2023523.	2398.	-9.16E-04	0.00	4.06E+11
-161.9663	5319.	0.00				
3.7400	0.07799	2029338.	1964.	-9.03E-04	0.00	4.06E+11
-166.9482	5651.	0.00				
3.9600	0.07563	2033990.	1518.	-8.90E-04	0.00	4.06E+11
-171.4042	5983.	0.00				
4.1800	0.07330	2037445.	1060.	-8.77E-04	0.00	4.06E+11
-175.3476	6316.	0.00				
4.4000	0.07100	2039679.	592.4515	-8.63E-04	0.00	4.06E+11
-178.7918	6648.	0.00				
4.6200	0.06874	2040665.	116.5362	-8.50E-04	0.00	4.06E+11
-181.7501	6981.	0.00				
4.8400	0.06651	2040384.	-366.5651	-8.37E-04	0.00	4.06E+11
-184.2357	7313.	0.00				
5.0600	0.06432	2038818.	-855.6219	-8.24E-04	0.00	4.06E+11
-186.2619	7645.	0.00				
5.2800	0.06216	2035953.	-1349.	-8.10E-04	0.00	4.06E+11
-187.8417	7978.	0.00				
5.5000	0.06004	2031778.	-1847.	-7.97E-04	0.00	4.06E+11
-188.9883	8310.	0.00				
5.7200	0.05795	2026286.	-2347.	-7.84E-04	0.00	4.06E+11
-189.7146	8643.	0.00				
5.9400	0.05590	2019470.	-2848.	-7.71E-04	0.00	4.06E+11
-190.0335	8975.	0.00				
6.1600	0.05388	2011330.	-3350.	-7.58E-04	0.00	4.06E+11
-189.9576	9307.	0.00				
6.3800	0.05190	2001864.	-3850.	-7.45E-04	0.00	4.06E+11
-189.4995	9640.	0.00				
6.6000	0.04995	1991078.	-4350.	-7.32E-04	0.00	4.06E+11
-188.6717	9972.	0.00				
6.8200	0.04803	1978975.	-4846.	-7.19E-04	0.00	4.06E+11
-187.4864	10305.	0.00				
7.0400	0.04615	1965566.	-5339.	-7.06E-04	0.00	4.06E+11
-185.9555	10637.	0.00				
7.2600	0.04430	1950859.	-5828.	-6.93E-04	0.00	4.06E+11
-184.0911	10969.	0.00				
7.4800	0.04249	1934869.	-6311.	-6.81E-04	0.00	4.06E+11
-181.9047	11302.	0.00				
7.7000	0.04071	1917611.	-6788.	-6.68E-04	0.00	4.07E+11
-179.4078	11634.	0.00				
7.9200	0.03896	1899101.	-7258.	-6.56E-04	0.00	4.07E+11
-176.6115	11967.	0.00				
8.1400	0.03725	1879360.	-7720.	-6.44E-04	0.00	4.07E+11

-173.5267	12299.	0.00				
8.3600	0.03556	1858409.	-8173.	-6.31E-04	0.00	4.07E+11
-170.1640	12632.	0.00				
8.5800	0.03391	1836271.	-8618.	-6.19E-04	0.00	4.07E+11
-166.5340	12964.	0.00				
8.8000	0.03229	1812972.	-9052.	-6.08E-04	0.00	4.07E+11
-162.6466	13296.	0.00				
9.0200	0.03071	1788538.	-9476.	-5.96E-04	0.00	4.07E+11
-158.5117	13629.	0.00				
9.2400	0.02915	1762999.	-9889.	-5.84E-04	0.00	4.07E+11
-154.1388	13961.	0.00				
9.4600	0.02762	1736386.	-10290.	-5.73E-04	0.00	4.07E+11
-149.5370	14294.	0.00				
9.6800	0.02612	1708729.	-10678.	-5.62E-04	0.00	4.07E+11
-144.7151	14626.	0.00				
9.9000	0.02465	1680064.	-11054.	-5.51E-04	0.00	4.07E+11
-139.6818	14958.	0.00				
10.1200	0.02321	1650424.	-11416.	-5.40E-04	0.00	4.07E+11
-134.4451	15291.	0.00				
10.3400	0.02180	1619847.	-11763.	-5.30E-04	0.00	4.07E+11
-129.0130	15623.	0.00				
10.5600	0.02042	1588370.	-12096.	-5.19E-04	0.00	4.07E+11
-123.3928	15956.	0.00				
10.7800	0.01906	1556032.	-12415.	-5.09E-04	0.00	4.08E+11
-117.5917	16288.	0.00				
11.0000	0.01773	1522874.	-12717.	-4.99E-04	0.00	4.08E+11
-111.6164	16620.	0.00				
11.2200	0.01642	1488938.	-13004.	-4.89E-04	0.00	4.08E+11
-105.4734	16953.	0.00				
11.4400	0.01515	1454266.	-13274.	-4.80E-04	0.00	4.08E+11
-99.1685	17285.	0.00				
11.6600	0.01389	1418903.	-13527.	-4.70E-04	0.00	4.08E+11
-92.7074	17618.	0.00				
11.8800	0.01266	1382893.	-13763.	-4.61E-04	0.00	4.08E+11
-86.0955	17950.	0.00				
12.1000	0.01146	1346282.	-13981.	-4.52E-04	0.00	4.08E+11
-79.3374	18282.	0.00				
12.3200	0.01027	1309118.	-14182.	-4.44E-04	0.00	4.08E+11
-72.4378	18615.	0.00				
12.5400	0.00911	1271449.	-14364.	-4.36E-04	0.00	4.08E+11
-65.4006	18947.	0.00				
12.7600	0.00797	1233324.	-14527.	-4.27E-04	0.00	4.08E+11
-58.2296	19280.	0.00				
12.9800	0.00686	1194792.	-14671.	-4.20E-04	0.00	4.08E+11
-50.9281	19612.	0.00				
13.2000	0.00576	1155905.	-14796.	-4.12E-04	0.00	4.09E+11
-43.4991	19944.	0.00				
13.4200	0.00468	1116714.	-14901.	-4.05E-04	0.00	4.09E+11

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-35.9452     20277.       0.00
   13.6400    0.00362   1077272.    -14985.  -3.98E-04       0.00   4.09E+11
-28.2684     20609.       0.00
   13.8600    0.00258   1037633.    -15050.  -3.91E-04       0.00   4.09E+11
-20.4707     20942.       0.00
   14.0800    0.00156    997851.    -15093.  -3.84E-04       0.00   4.09E+11
-12.5535     21274.       0.00
   14.3000   5.52E-04    957981.    -15116.  -3.78E-04       0.00   4.09E+11
-4.5178     21607.       0.00
   14.5200  -4.37E-04    918080.    -15117.  -3.72E-04       0.00   4.09E+11
3.6355     21939.       0.00
   14.7400   -0.00141    878203.    -15096.  -3.66E-04       0.00   4.09E+11
11.9061     22271.       0.00
   14.9600   -0.00237    838409.    -15054.  -3.61E-04       0.00   4.09E+11
20.2939     22604.       0.00
   15.1800   -0.00331    798756.    -14989.  -3.55E-04       0.00   4.10E+11
28.7991     22936.       0.00
   15.4000   -0.00425    759304.    -14902.  -3.50E-04       0.00   4.10E+11
37.4225     23269.       0.00
   15.6200   -0.00516    720112.    -14791.  -3.45E-04       0.00   4.10E+11
46.1648     23601.       0.00
   15.8400   -0.00607    681242.    -14658.  -3.41E-04       0.00   4.10E+11
55.0273     23933.       0.00
   16.0600   -0.00696    642755.    -14501.  -3.37E-04       0.00   4.10E+11
64.0114     24266.       0.00
   16.2800   -0.00785    604714.    -14320.  -3.33E-04       0.00   4.10E+11
73.1189     24598.       0.00
   16.5000   -0.00872    567182.    -14114.  -3.29E-04       0.00   4.10E+11
82.3518     24931.       0.00
   16.7200   -0.00958    530224.    -13885.  -3.25E-04       0.00   4.10E+11
91.7123     25263.       0.00
   16.9400   -0.01044    493905.    -13630.  -3.22E-04       0.00   4.10E+11
101.2029     25595.       0.00
   17.1600   -0.01128    458291.    -13350.  -3.19E-04       0.00   4.10E+11
110.8263     25928.       0.00
   17.3800   -0.01212    423450.    -13045.  -3.16E-04       0.00   4.10E+11
120.5853     26260.       0.00
   17.6000   -0.01295    389449.    -12713.  -3.14E-04       0.00   4.11E+11
130.4830     26593.       0.00
   17.8200   -0.01378    356357.    -12356.  -3.11E-04       0.00   4.11E+11
140.5225     26925.       0.00
   18.0400   -0.01460    324244.    -11971.  -3.09E-04       0.00   4.11E+11
150.7072     27257.       0.00
   18.2600   -0.01541    293182.    -11560.  -3.07E-04       0.00   4.11E+11
161.0405     27590.       0.00
   18.4800   -0.01622    263242.    -11121.  -3.05E-04       0.00   4.11E+11
171.5259     27922.       0.00
   18.7000   -0.01702    234497.    -10654.  -3.04E-04       0.00   4.11E+11
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182.1670	28255.	0.00				
18.9200	-0.01782	207022.	-10159.	-3.02E-04	0.00	4.11E+11
192.9673	28587.	0.00				
19.1400	-0.01862	180892.	-9635.	-3.01E-04	0.00	4.11E+11
203.9304	28920.	0.00				
19.3600	-0.01941	156183.	-9082.	-3.00E-04	0.00	4.11E+11
215.0601	29252.	0.00				
19.5800	-0.02020	132972.	-8499.	-2.99E-04	0.00	4.11E+11
226.3597	29584.	0.00				
19.8000	-0.02099	111340.	-7886.	-2.98E-04	0.00	4.11E+11
237.8327	29917.	0.00				
20.0200	-0.02177	91365.	-7243.	-2.97E-04	0.00	4.11E+11
249.4826	30249.	0.00				
20.2400	-0.02256	73128.	-6569.	-2.97E-04	0.00	4.11E+11
261.3124	30582.	0.00				
20.4600	-0.02334	56713.	-5863.	-2.97E-04	0.00	4.11E+11
273.3254	30914.	0.00				
20.6800	-0.02412	42203.	-5125.	-2.96E-04	0.00	4.11E+11
285.5241	31246.	0.00				
20.9000	-0.02491	29683.	-4355.	-2.96E-04	0.00	4.11E+11
297.9114	31579.	0.00				
21.1200	-0.02569	19239.	-3552.	-2.96E-04	0.00	4.11E+11
310.4894	31911.	0.00				
21.3400	-0.02647	10959.	-2716.	-2.96E-04	0.00	4.11E+11
323.2601	32244.	0.00				
21.5600	-0.02725	4932.	-1845.	-2.96E-04	0.00	4.11E+11
336.2251	32576.	0.00				
21.7800	-0.02803	1248.	-940.0094	-2.96E-04	0.00	4.11E+11
349.3857	32908.	0.00				
22.0000	-0.02881	0.00	0.00	-2.96E-04	0.00	4.11E+11
362.7426	16620.	0.00				

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

Output Summary for Load Case No. 3:

Pile-head deflection	=	0.12342563 inches
Computed slope at pile head	=	-0.00111735 radians
Maximum bending moment	=	2040665. inch-lbs
Maximum shear force	=	-15117. lbs
Depth of maximum bending moment	=	4.62000000 feet below pile head
Depth of maximum shear force	=	14.52000000 feet below pile head

Number of iterations = 6
Number of zero deflection points = 1

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

Boundary Condition Type 1, Shear and Moment

Shear = 6000. lbs
Moment = 1820000. in-lbs
Axial Load = 20000. lbs

Pile Length feet	Pile Head Deflection inches	Maximum Moment ln-lbs	Maximum Shear lbs
22.00000	0.12342563	2040665.	-15117.
20.90000	0.13317055	2037203.	-16060.
19.80000	0.14731771	2033785.	-17154.
18.70000	0.16911813	2029601.	-18482.
17.60000	0.20547133	2023984.	-20121.
16.50000	0.26886845	2016547.	-22023.
15.40000	0.37446173	2008236.	-24192.
14.30000	0.55609418	1999337.	-26723.
13.20000	0.88645931	1990121.	-29754.
12.10000	1.48790422	1978817.	-33189.
11.00000	3.11459193	1986949.	-38980.

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

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

Shear force at pile head = 8000.0 lbs
Applied moment at pile head = 2400000.0 in-lbs
Axial thrust load on pile head = 20000.0 lbs

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

feet	inches	in-lbs	lbs	radians	psi*	in-lb^2	lb/inch	lb/inch	lb/inch
0.00	0.2496	2400000.	8000.	-0.00292	0.00	4.05E+11	0.00	0.00	0.00
0.2200	0.2419	2421274.	7984.	-0.00290	0.00	4.05E+11	-12.2851	134.0714	0.00
0.4400	0.2343	2442461.	7935.	-0.00289	0.00	4.05E+11	-24.9802	281.5095	0.00
0.6600	0.2267	2463473.	7852.	-0.00287	0.00	4.05E+11	-37.9622	442.1505	0.00
0.8800	0.2191	2484220.	7734.	-0.00285	0.00	4.05E+11	-51.1087	615.7992	0.00
1.1000	0.2116	2504610.	7582.	-0.00284	0.00	4.05E+11	-64.2978	802.2251	0.00
1.3200	0.2041	2524551.	7395.	-0.00282	0.00	4.05E+11	-77.4088	1001.	0.00
1.5400	0.1967	2543951.	7173.	-0.00279	0.00	1.61E+11	-90.4038	1213.	0.00
1.7600	0.1894	2562719.	6917.	-0.00274	0.00	1.08E+11	-103.5680	1444.	0.00
1.9800	0.1822	2580762.	6626.	-0.00268	0.00	1.08E+11	-116.5179	1688.	0.00
2.2000	0.1752	2597990.	6302.	-0.00261	0.00	1.08E+11	-129.1683	1946.	0.00
2.4200	0.1684	2614314.	5945.	-0.00255	0.00	1.08E+11	-141.4371	2217.	0.00
2.6400	0.1618	2629648.	5556.	-0.00249	0.00	1.08E+11	-153.2453	2501.	0.00
2.8600	0.1553	2643912.	5137.	-0.00242	0.00	1.08E+11	-164.5171	2797.	0.00
3.0800	0.1490	2657025.	4688.	-0.00236	0.00	1.08E+11	-175.3535	3107.	0.00
3.3000	0.1428	2668913.	4211.	-0.00229	0.00	1.08E+11	-185.8802	3435.	0.00
3.5200	0.1369	2679502.	3707.	-0.00223	0.00	1.08E+11	-195.7625	3776.	0.00
3.7400	0.1311	2688723.	3178.	-0.00216	0.00	1.08E+11	-204.9433	4128.	0.00
3.9600	0.1255	2696512.	2626.	-0.00210	0.00	1.08E+11	-213.3689	4490.	0.00
4.1800	0.1200	2702811.	2053.	-0.00203	0.00	1.08E+11	-220.9892	4861.	0.00
4.4000	0.1147	2707565.	1461.	-0.00196	0.00	1.08E+11	-227.7582	5240.	0.00
4.6200	0.1097	2710729.	850.5082	-0.00190	0.00	1.08E+11	-234.3693	5643.	0.00

4.8400	0.1047	2712256.	223.3066	-0.00183	0.00	1.08E+11
-240.7835	6069.	0.00				
5.0600	0.09999	2712102.	-419.7630	-0.00176	0.00	1.08E+11
-246.3904	6505.	0.00				
5.2800	0.09542	2710226.	-1077.	-0.00170	0.00	1.08E+11
-251.1604	6949.	0.00				
5.5000	0.09103	2706597.	-1745.	-0.00163	0.00	1.08E+11
-255.0681	7398.	0.00				
5.7200	0.08681	2701186.	-2422.	-0.00156	0.00	1.08E+11
-258.0916	7849.	0.00				
5.9400	0.08276	2693973.	-3106.	-0.00150	0.00	1.08E+11
-260.2134	8300.	0.00				
6.1600	0.07889	2684943.	-3797.	-0.00143	0.00	1.08E+11
-262.7812	8793.	0.00				
6.3800	0.07520	2674078.	-4493.	-0.00137	0.00	1.08E+11
-265.0924	9307.	0.00				
6.6000	0.07167	2661362.	-5195.	-0.00130	0.00	1.08E+11
-266.6568	9822.	0.00				
6.8200	0.06832	2646785.	-5899.	-0.00124	0.00	1.08E+11
-266.6847	10305.	0.00				
7.0400	0.06514	2630344.	-6598.	-0.00117	0.00	1.08E+11
-262.4723	10637.	0.00				
7.2600	0.06213	2612072.	-7285.	-0.00111	0.00	1.08E+11
-258.1642	10969.	0.00				
7.4800	0.05929	2591996.	-7961.	-0.00105	0.00	1.08E+11
-253.8190	11302.	0.00				
7.7000	0.05661	2570149.	-8625.	-9.82E-04	0.00	1.08E+11
-249.4942	11634.	0.00				
7.9200	0.05410	2546559.	-9278.	-9.20E-04	0.00	1.09E+11
-245.2462	11967.	0.00				
8.1400	0.05176	2521256.	-9920.	-8.81E-04	0.00	4.05E+11
-241.1249	12299.	0.00				
8.3600	0.04945	2494272.	-10551.	-8.64E-04	0.00	4.05E+11
-236.6203	12632.	0.00				
8.5800	0.04719	2465638.	-11169.	-8.48E-04	0.00	4.05E+11
-231.7464	12964.	0.00				
8.8000	0.04498	2435388.	-11774.	-8.32E-04	0.00	4.05E+11
-226.5169	13296.	0.00				
9.0200	0.04280	2403559.	-12365.	-8.17E-04	0.00	4.05E+11
-220.9451	13629.	0.00				
9.2400	0.04066	2370189.	-12940.	-8.01E-04	0.00	4.05E+11
-215.0440	13961.	0.00				
9.4600	0.03857	2335319.	-13500.	-7.86E-04	0.00	4.05E+11
-208.8259	14294.	0.00				
9.6800	0.03652	2298993.	-14042.	-7.71E-04	0.00	4.05E+11
-202.3028	14626.	0.00				
9.9000	0.03450	2261256.	-14568.	-7.56E-04	0.00	4.06E+11
-195.4864	14958.	0.00				

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   10.1200    0.03253   2222156.    -15074.  -7.41E-04       0.00   4.06E+11
-188.3878     15291.       0.00
   10.3400    0.03059   2181742.    -15562.  -7.27E-04       0.00   4.06E+11
-181.0175     15623.       0.00
   10.5600    0.02869   2140066.    -16030.  -7.13E-04       0.00   4.06E+11
-173.3859     15956.       0.00
   10.7800    0.02683   2097181.    -16477.  -6.99E-04       0.00   4.06E+11
-165.5024     16288.       0.00
   11.0000    0.02500   2053141.    -16903.  -6.85E-04       0.00   4.06E+11
-157.3764     16620.       0.00
   11.2200    0.02321   2008004.    -17308.  -6.72E-04       0.00   4.06E+11
-149.0164     16953.       0.00
   11.4400    0.02145   1961828.    -17689.  -6.59E-04       0.00   4.06E+11
-139.7785     17205.       0.00
   11.6600    0.01972   1914677.    -18043.  -6.47E-04       0.00   4.07E+11
-128.5198     17202.       0.00
   11.8800    0.01803   1866629.    -18367.  -6.35E-04       0.00   4.07E+11
-117.0742     17139.       0.00
   12.1000    0.01637   1817765.    -18665.  -6.23E-04       0.00   4.07E+11
-108.8050     17543.       0.00
   12.3200    0.01475   1768141.    -18946.  -6.11E-04       0.00   4.07E+11
-103.9760     18615.       0.00
   12.5400    0.01315   1717793.    -19208.  -6.00E-04       0.00   4.07E+11
-94.3661     18947.       0.00
   12.7600    0.01158   1666786.    -19444.  -5.89E-04       0.00   4.07E+11
-84.5686     19280.       0.00
   12.9800    0.01004   1615190.    -19654.  -5.78E-04       0.00   4.07E+11
-74.5881     19612.       0.00
   13.2000    0.00853   1563072.    -19838.  -5.68E-04       0.00   4.08E+11
-64.4287     19944.       0.00
   13.4200    0.00704   1510506.    -19994.  -5.58E-04       0.00   4.08E+11
-54.0938     20277.       0.00
   13.6400    0.00558   1457562.    -20123.  -5.48E-04       0.00   4.08E+11
-43.5864     20609.       0.00
   13.8600    0.00415   1404313.    -20224.  -5.39E-04       0.00   4.08E+11
-32.9091     20942.       0.00
   14.0800    0.00274   1350835.    -20297.  -5.30E-04       0.00   4.08E+11
-22.0638     21274.       0.00
   14.3000    0.00135   1297202.    -20340.  -5.21E-04       0.00   4.08E+11
-11.0522     21607.       0.00
   14.5200  -1.50E-05   1243492.    -20355.  -5.13E-04       0.00   4.08E+11
0.1249     21939.       0.00
   14.7400   -0.00136   1189783.    -20340.  -5.05E-04       0.00   4.09E+11
11.4668     22271.       0.00
   14.9600   -0.00268   1136152.    -20294.  -4.98E-04       0.00   4.09E+11
22.9733     22604.       0.00
   15.1800   -0.00399   1082682.    -20218.  -4.91E-04       0.00   4.09E+11
34.6450     22936.       0.00
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15.4000	-0.00527	1029453.	-20111.	-4.84E-04	0.00	4.09E+11
46.4824	23269.	0.00				
15.6200	-0.00654	976547.	-19972.	-4.77E-04	0.00	4.09E+11
58.4869	23601.	0.00				
15.8400	-0.00779	924049.	-19802.	-4.71E-04	0.00	4.09E+11
70.6600	23933.	0.00				
16.0600	-0.00903	872043.	-19599.	-4.65E-04	0.00	4.09E+11
83.0037	24266.	0.00				
16.2800	-0.01025	820615.	-19363.	-4.60E-04	0.00	4.09E+11
95.5204	24598.	0.00				
16.5000	-0.01146	769852.	-19095.	-4.55E-04	0.00	4.10E+11
108.2127	24931.	0.00				
16.7200	-0.01265	719843.	-18792.	-4.50E-04	0.00	4.10E+11
121.0837	25263.	0.00				
16.9400	-0.01384	670678.	-18455.	-4.46E-04	0.00	4.10E+11
134.1367	25595.	0.00				
17.1600	-0.01501	622448.	-18083.	-4.41E-04	0.00	4.10E+11
147.3755	25928.	0.00				
17.3800	-0.01617	575245.	-17677.	-4.38E-04	0.00	4.10E+11
160.8037	26260.	0.00				
17.6000	-0.01732	529162.	-17234.	-4.34E-04	0.00	4.10E+11
174.4256	26593.	0.00				
17.8200	-0.01846	484295.	-16755.	-4.31E-04	0.00	4.10E+11
188.2454	26925.	0.00				
18.0400	-0.01959	440739.	-16240.	-4.28E-04	0.00	4.10E+11
202.2678	27257.	0.00				
18.2600	-0.02072	398593.	-15687.	-4.25E-04	0.00	4.10E+11
216.4972	27590.	0.00				
18.4800	-0.02183	357956.	-15096.	-4.23E-04	0.00	4.11E+11
230.9385	27922.	0.00				
18.7000	-0.02295	318928.	-14467.	-4.20E-04	0.00	4.11E+11
245.5965	28255.	0.00				
18.9200	-0.02405	281612.	-13799.	-4.19E-04	0.00	4.11E+11
260.4761	28587.	0.00				
19.1400	-0.02516	246112.	-13092.	-4.17E-04	0.00	4.11E+11
275.5822	28920.	0.00				
19.3600	-0.02626	212531.	-12344.	-4.15E-04	0.00	4.11E+11
290.9197	29252.	0.00				
19.5800	-0.02735	180979.	-11555.	-4.14E-04	0.00	4.11E+11
306.4934	29584.	0.00				
19.8000	-0.02844	151562.	-10725.	-4.13E-04	0.00	4.11E+11
322.3080	29917.	0.00				
20.0200	-0.02953	124392.	-9853.	-4.12E-04	0.00	4.11E+11
338.3680	30249.	0.00				
20.2400	-0.03062	99580.	-8939.	-4.11E-04	0.00	4.11E+11
354.6779	30582.	0.00				
20.4600	-0.03170	77240.	-7980.	-4.11E-04	0.00	4.11E+11
371.2417	30914.	0.00				

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   20.6800   -0.03279     57487.     -6978.  -4.10E-04       0.00   4.11E+11
388.0633     31246.       0.00
   20.9000   -0.03387     40439.     -5931.  -4.10E-04       0.00   4.11E+11
405.1462     31579.       0.00
   21.1200   -0.03495     26214.     -4839.  -4.10E-04       0.00   4.11E+11
422.4936     31911.       0.00
   21.3400   -0.03603     14935.     -3700.  -4.10E-04       0.00   4.11E+11
440.1081     32244.       0.00
   21.5600   -0.03712      6722.     -2514.  -4.10E-04       0.00   4.11E+11
457.9918     32576.       0.00
   21.7800   -0.03820      1702.     -1281.  -4.10E-04       0.00   4.11E+11
476.1466     32908.       0.00
   22.0000   -0.03928       0.00       0.00  -4.10E-04       0.00   4.11E+11
494.5733     16620.       0.00
```

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

Output Summary for Load Case No. 4:

```
Pile-head deflection             =     0.24958958 inches
Computed slope at pile head      =    -0.00291809 radians
Maximum bending moment           =       2712256. inch-lbs
Maximum shear force              =        -20355. lbs
Depth of maximum bending moment  =     4.84000000 feet below pile head
Depth of maximum shear force     =    14.52000000 feet below pile head
Number of iterations             =            175
Number of zero deflection points =              1
```

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

Boundary Condition Type 1, Shear and Moment

```
Shear      =           8000. lbs
Moment     =        2400000. in-lbs
Axial Load =          20000. lbs
```

Pile	Pile Head	Maximum	Maximum

Length feet	Deflection inches	Moment ln-lbs	Shear lbs
22.00000	0.24958958	2712256.	-20355.
20.90000	0.26633979	2708594.	-21878.
19.80000	0.29786695	2702643.	-23593.
18.70000	0.34695149	2695086.	-25534.
17.60000	0.42151135	2686299.	-27766.
16.50000	0.54625360	2676012.	-30329.
15.40000	0.75274941	2664491.	-33311.
14.30000	1.10900557	2650618.	-36727.
13.20000	1.71442309	2636240.	-40514.
12.10000	3.46832846	2647627.	-47504.

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

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

Shear force at pile head = 12000.0 lbs
Applied moment at pile head = 3640000.0 in-lbs
Axial thrust load on pile head = 20000.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness Es*h in-lb^2	Soil Res. Spr. Distrib. p Lat. Load lb/inch
0.00	0.6272	3640000.	12000.	-0.00673	0.00	1.06E+11	0.00
0.2200	0.6096	3672033.	11979.	-0.00664	0.00	1.06E+11	-15.6410
0.4400	0.5922	3703952.	11917.	-0.00655	0.00	1.06E+11	-31.9329
0.6600	0.5750	3735644.	11810.	-0.00646	0.00	1.05E+11	-48.7400
0.8800	0.5581	3766991.	11659.	-0.00636	0.00	1.05E+11	-65.9261
1.1000	0.5414	3797874.	11462.	-0.00627	0.00	1.05E+11	-83.3564
1.3200	0.5250	3828171.	11218.	-0.00617	0.00	1.05E+11	-100.8976

1.5400	0.5088	3857759.	10929.	-0.00608	0.00	1.05E+11
-118.4626	614.6593	0.00				
1.7600	0.4929	3886517.	10593.	-0.00598	0.00	1.05E+11
-136.1478	729.2307	0.00				
1.9800	0.4772	3914321.	10210.	-0.00588	0.00	1.05E+11
-153.6803	850.1433	0.00				
2.2000	0.4618	3941048.	9782.	-0.00578	0.00	1.05E+11
-170.9520	977.2180	0.00				
2.4200	0.4467	3966579.	9308.	-0.00568	0.00	1.05E+11
-187.8576	1110.	0.00				
2.6400	0.4318	3990795.	8790.	-0.00558	0.00	1.05E+11
-204.2944	1249.	0.00				
2.8600	0.4172	4013582.	8230.	-0.00548	0.00	1.05E+11
-220.1629	1393.	0.00				
3.0800	0.4029	4034829.	7629.	-0.00538	0.00	1.05E+11
-235.5503	1544.	0.00				
3.3000	0.3888	4054430.	6987.	-0.00528	0.00	1.05E+11
-250.5724	1701.	0.00				
3.5200	0.3750	4072278.	6307.	-0.00518	0.00	1.05E+11
-264.8542	1865.	0.00				
3.7400	0.3615	4088275.	5590.	-0.00508	0.00	1.05E+11
-278.3144	2033.	0.00				
3.9600	0.3482	4102327.	4838.	-0.00497	0.00	1.05E+11
-290.8747	2205.	0.00				
4.1800	0.3352	4114346.	4055.	-0.00487	0.00	1.05E+11
-302.4602	2382.	0.00				
4.4000	0.3225	4124252.	3243.	-0.00476	0.00	1.05E+11
-312.9993	2562.	0.00				
4.6200	0.3100	4131971.	2403.	-0.00466	0.00	1.05E+11
-323.4500	2754.	0.00				
4.8400	0.2979	4137429.	1535.	-0.00456	0.00	1.05E+11
-333.7526	2958.	0.00				
5.0600	0.2860	4140557.	641.6583	-0.00445	0.00	1.05E+11
-343.0449	3167.	0.00				
5.2800	0.2744	4141288.	-274.8391	-0.00435	0.00	1.05E+11
-351.2713	3380.	0.00				
5.5000	0.2630	4139565.	-1212.	-0.00424	0.00	1.05E+11
-358.3792	3597.	0.00				
5.7200	0.2520	4135339.	-2166.	-0.00414	0.00	1.05E+11
-364.3197	3817.	0.00				
5.9400	0.2412	4128568.	-3134.	-0.00404	0.00	1.05E+11
-369.0468	4040.	0.00				
6.1600	0.2307	4119219.	-4114.	-0.00393	0.00	1.05E+11
-374.0464	4281.	0.00				
6.3800	0.2204	4107259.	-5108.	-0.00383	0.00	1.05E+11
-378.5189	4534.	0.00				
6.6000	0.2104	4092654.	-6112.	-0.00373	0.00	1.05E+11
-381.8908	4791.	0.00				

6.8200	0.2007	4075383.	-7123.	-0.00362	0.00	1.05E+11
-384.1350	5052.	0.00				
7.0400	0.1913	4055429.	-8138.	-0.00352	0.00	1.05E+11
-385.2275	5316.	0.00				
7.2600	0.1822	4032784.	-9155.	-0.00342	0.00	1.05E+11
-385.1475	5582.	0.00				
7.4800	0.1733	4007450.	-10170.	-0.00332	0.00	1.05E+11
-383.8781	5849.	0.00				
7.7000	0.1646	3979435.	-11182.	-0.00322	0.00	1.05E+11
-382.4179	6132.	0.00				
7.9200	0.1563	3948750.	-12188.	-0.00312	0.00	1.05E+11
-379.8052	6416.	0.00				
8.1400	0.1482	3915412.	-13186.	-0.00302	0.00	1.05E+11
-375.9230	6697.	0.00				
8.3600	0.1403	3879449.	-14171.	-0.00292	0.00	1.05E+11
-370.7631	6974.	0.00				
8.5800	0.1328	3840897.	-15141.	-0.00282	0.00	1.05E+11
-364.3234	7245.	0.00				
8.8000	0.1254	3799800.	-16093.	-0.00273	0.00	1.05E+11
-356.6089	7505.	0.00				
9.0200	0.1184	3756213.	-17023.	-0.00263	0.00	1.05E+11
-348.0220	7763.	0.00				
9.2400	0.1115	3710196.	-17934.	-0.00254	0.00	1.05E+11
-342.1716	8099.	0.00				
9.4600	0.1049	3661789.	-18828.	-0.00245	0.00	1.06E+11
-335.2448	8433.	0.00				
9.6800	0.09861	3611040.	-19703.	-0.00236	0.00	1.06E+11
-327.2612	8762.	0.00				
9.9000	0.09250	3558006.	-20555.	-0.00227	0.00	1.06E+11
-318.2484	9083.	0.00				
10.1200	0.08664	3502749.	-21382.	-0.00218	0.00	1.06E+11
-308.2420	9393.	0.00				
10.3400	0.08100	3445339.	-22181.	-0.00209	0.00	1.06E+11
-297.2866	9690.	0.00				
10.5600	0.07559	3385853.	-22950.	-0.00201	0.00	1.06E+11
-285.4355	9969.	0.00				
10.7800	0.07040	3324373.	-23687.	-0.00192	0.00	1.06E+11
-272.7514	10229.	0.00				
11.0000	0.06543	3260987.	-24390.	-0.00184	0.00	1.06E+11
-259.3068	10463.	0.00				
11.2200	0.06067	3195790.	-25056.	-0.00176	0.00	1.07E+11
-245.1836	10669.	0.00				
11.4400	0.05612	3128880.	-25683.	-0.00168	0.00	1.07E+11
-230.4735	10842.	0.00				
11.6600	0.05178	3060359.	-26272.	-0.00161	0.00	1.07E+11
-215.2781	10976.	0.00				
11.8800	0.04763	2990335.	-26820.	-0.00153	0.00	1.07E+11
-199.7079	11068.	0.00				

12.1000	0.04368	2918914.	-27332.	-0.00146	0.00	1.07E+11
-188.5058	11392.	0.00				
12.3200	0.03992	2846176.	-27822.	-0.00139	0.00	1.07E+11
-182.5001	12068.	0.00				
12.5400	0.03635	2772162.	-28295.	-0.00132	0.00	1.08E+11
-176.0894	12789.	0.00				
12.7600	0.03295	2696917.	-28751.	-0.00125	0.00	1.08E+11
-169.2822	13561.	0.00				
12.9800	0.02973	2620489.	-29188.	-0.00119	0.00	1.08E+11
-162.0863	14391.	0.00				
13.2000	0.02668	2542928.	-29606.	-0.00113	0.00	1.09E+11
-154.5088	15287.	0.00				
13.4200	0.02379	2464286.	-30004.	-0.00109	0.00	4.05E+11
-146.5511	16261.	0.00				
13.6400	0.02095	2384623.	-30379.	-0.00107	0.00	4.05E+11
-137.7749	17365.	0.00				
13.8600	0.01814	2303998.	-30730.	-0.00106	0.00	4.05E+11
-128.0934	18641.	0.00				
14.0800	0.01537	2222480.	-31054.	-0.00104	0.00	4.06E+11
-117.3893	20157.	0.00				
14.3000	0.01265	2140143.	-31346.	-0.00103	0.00	4.06E+11
-103.5012	21607.	0.00				
14.5200	0.00996	2057084.	-31591.	-0.00101	0.00	4.06E+11
-82.7283	21939.	0.00				
14.7400	0.00730	1973448.	-31782.	-1.00E-03	0.00	4.06E+11
-61.5754	22271.	0.00				
14.9600	0.00468	1889381.	-31916.	-9.87E-04	0.00	4.07E+11
-40.0435	22604.	0.00				
15.1800	0.00209	1805035.	-31993.	-9.75E-04	0.00	4.07E+11
-18.1327	22936.	0.00				
15.4000	-4.72E-04	1720562.	-32011.	-9.64E-04	0.00	4.07E+11
4.1578	23269.	0.00				
15.6200	-0.00300	1636118.	-31970.	-9.53E-04	0.00	4.07E+11
26.8294	23601.	0.00				
15.8400	-0.00550	1551860.	-31869.	-9.42E-04	0.00	4.08E+11
49.8841	23933.	0.00				
16.0600	-0.00798	1467949.	-31706.	-9.33E-04	0.00	4.08E+11
73.3247	24266.	0.00				
16.2800	-0.01043	1384548.	-31481.	-9.23E-04	0.00	4.08E+11
97.1548	24598.	0.00				
16.5000	-0.01285	1301824.	-31193.	-9.15E-04	0.00	4.08E+11
121.3785	24931.	0.00				
16.7200	-0.01526	1219946.	-30840.	-9.07E-04	0.00	4.08E+11
146.0004	25263.	0.00				
16.9400	-0.01764	1139085.	-30422.	-8.99E-04	0.00	4.09E+11
171.0259	25595.	0.00				
17.1600	-0.02000	1059415.	-29936.	-8.92E-04	0.00	4.09E+11
196.4607	25928.	0.00				

17.3800	-0.02235	981115.	-29384.	-8.85E-04	0.00	4.09E+11
222.3110	26260.	0.00				
17.6000	-0.02468	904363.	-28762.	-8.79E-04	0.00	4.09E+11
248.5837	26593.	0.00				
17.8200	-0.02699	829344.	-28071.	-8.74E-04	0.00	4.09E+11
275.2858	26925.	0.00				
18.0400	-0.02929	756243.	-27308.	-8.69E-04	0.00	4.10E+11
302.4246	27257.	0.00				
18.2600	-0.03158	685249.	-26473.	-8.64E-04	0.00	4.10E+11
330.0081	27590.	0.00				
18.4800	-0.03385	616555.	-25565.	-8.60E-04	0.00	4.10E+11
358.0441	27922.	0.00				
18.7000	-0.03612	550357.	-24582.	-8.56E-04	0.00	4.10E+11
386.5408	28255.	0.00				
18.9200	-0.03837	486852.	-23523.	-8.53E-04	0.00	4.10E+11
415.5065	28587.	0.00				
19.1400	-0.04062	426243.	-22388.	-8.50E-04	0.00	4.10E+11
444.9494	28920.	0.00				
19.3600	-0.04286	368735.	-21173.	-8.47E-04	0.00	4.11E+11
474.8779	29252.	0.00				
19.5800	-0.04509	314537.	-19880.	-8.45E-04	0.00	4.11E+11
505.3003	29584.	0.00				
19.8000	-0.04732	263860.	-18505.	-8.43E-04	0.00	4.11E+11
536.2245	29917.	0.00				
20.0200	-0.04954	216921.	-17048.	-8.42E-04	0.00	4.11E+11
567.6585	30249.	0.00				
20.2400	-0.05176	173938.	-15507.	-8.40E-04	0.00	4.11E+11
599.6097	30582.	0.00				
20.4600	-0.05398	135133.	-13881.	-8.39E-04	0.00	4.11E+11
632.0854	30914.	0.00				
20.6800	-0.05619	100734.	-12169.	-8.39E-04	0.00	4.11E+11
665.0923	31246.	0.00				
20.9000	-0.05841	70971.	-10369.	-8.38E-04	0.00	4.11E+11
698.6363	31579.	0.00				
21.1200	-0.06062	46077.	-8479.	-8.38E-04	0.00	4.11E+11
732.7231	31911.	0.00				
21.3400	-0.06283	26289.	-6499.	-8.37E-04	0.00	4.11E+11
767.3572	32244.	0.00				
21.5600	-0.06504	11850.	-4427.	-8.37E-04	0.00	4.11E+11
802.5425	32576.	0.00				
21.7800	-0.06725	3004.	-2261.	-8.37E-04	0.00	4.11E+11
838.2820	32908.	0.00				
22.0000	-0.06946	0.00	0.00	-8.37E-04	0.00	4.11E+11
874.5774	16620.	0.00				

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual

stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 5:

Pile-head deflection	=	0.62723984 inches
Computed slope at pile head	=	-0.00673399 radians
Maximum bending moment	=	4141288. inch-lbs
Maximum shear force	=	-32011. lbs
Depth of maximum bending moment	=	5.28000000 feet below pile head
Depth of maximum shear force	=	15.40000000 feet below pile head
Number of iterations	=	204
Number of zero deflection points	=	1

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

Boundary Condition Type 1, Shear and Moment

Shear	=	12000. lbs
Moment	=	3640000. in-lbs
Axial Load	=	20000. lbs

Pile Length feet	Pile Head Deflection inches	Maximum Moment ln-lbs	Maximum Shear lbs
22.00000	0.62723984	4141288.	-32011.
20.90000	0.67704501	4134556.	-34598.
19.80000	0.75788515	4125300.	-37501.
18.70000	0.88765403	4113274.	-40724.
17.60000	1.09562912	4096769.	-44291.
16.50000	1.41506102	4075389.	-48222.
15.40000	1.94589118	4061322.	-52749.
14.30000	3.25215792	4070646.	-60340.

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

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

Shear force at pile head = 15000.0 lbs
Applied moment at pile head = 4500000.0 in-lbs
Axial thrust load on pile head = 20000.0 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*	in-lb^2	lb/inch	lb/inch	lb/inch
0.00	0.9308	4500000.	15000.	-0.00924	0.00	1.04E+11	0.00	0.00	0.00
0.2200	0.9065	4540085.	14977.	-0.00912	0.00	1.04E+11	-17.6553	51.4162	0.00
0.4400	0.8826	4580040.	14906.	-0.00901	0.00	1.04E+11	-36.0408	107.8046	0.00
0.6600	0.8590	4619738.	14786.	-0.00889	0.00	1.04E+11	-55.0130	169.0790	0.00
0.8800	0.8357	4659047.	14615.	-0.00877	0.00	1.04E+11	-74.4311	235.1408	0.00
1.1000	0.8127	4697831.	14392.	-0.00865	0.00	1.04E+11	-94.1569	305.8771	0.00
1.3200	0.7900	4735952.	14117.	-0.00853	0.00	1.04E+11	-114.0552	381.1590	0.00
1.5400	0.7676	4773271.	13790.	-0.00841	0.00	1.04E+11	-134.0135	460.9084	0.00
1.7600	0.7456	4809651.	13410.	-0.00829	0.00	1.04E+11	-154.0131	545.3577	0.00
1.9800	0.7238	4844950.	12977.	-0.00817	0.00	1.04E+11	-173.8772	634.1767	0.00
2.2000	0.7024	4879032.	12492.	-0.00804	0.00	1.04E+11	-193.4988	727.2442	0.00
2.4200	0.6814	4911758.	11956.	-0.00792	0.00	1.04E+11	-212.7747	824.4242	0.00
2.6400	0.6606	4942994.	11369.	-0.00779	0.00	1.04E+11	-231.6050	925.5637	0.00
2.8600	0.6402	4972610.	10734.	-0.00767	0.00	1.04E+11	-249.8932	1030.	0.00
3.0800	0.6201	5000477.	10050.	-0.00754	0.00	1.04E+11	-267.7314	1140.	0.00
3.3000	0.6004	5026472.	9320.	-0.00741	0.00	1.04E+11	-285.2412	1254.	0.00
3.5200	0.5810	5050471.	8545.	-0.00729	0.00	1.04E+11	-302.0173	1372.	0.00

3.7400	0.5619	5072359.	7727.	-0.00716	0.00	1.04E+11
-317.9377	1494.	0.00				
3.9600	0.5432	5092025.	6868.	-0.00703	0.00	1.04E+11
-332.9138	1618.	0.00				
4.1800	0.5248	5109363.	5970.	-0.00690	0.00	1.04E+11
-346.8602	1745.	0.00				
4.4000	0.5068	5124277.	5038.	-0.00677	0.00	1.04E+11
-359.6949	1874.	0.00				
4.6200	0.4891	5136677.	4071.	-0.00664	0.00	1.04E+11
-372.5264	2011.	0.00				
4.8400	0.4717	5146474.	3071.	-0.00650	0.00	1.04E+11
-385.2895	2156.	0.00				
5.0600	0.4547	5153578.	2038.	-0.00637	0.00	1.04E+11
-396.9874	2305.	0.00				
5.2800	0.4381	5157909.	976.3063	-0.00624	0.00	1.04E+11
-407.5550	2456.	0.00				
5.5000	0.4218	5159392.	-112.0141	-0.00611	0.00	1.04E+11
-416.9301	2610.	0.00				
5.7200	0.4058	5157963.	-1223.	-0.00598	0.00	1.04E+11
-425.0534	2765.	0.00				
5.9400	0.3902	5153564.	-2355.	-0.00585	0.00	1.04E+11
-431.8687	2922.	0.00				
6.1600	0.3749	5146148.	-3504.	-0.00572	0.00	1.04E+11
-438.8979	3090.	0.00				
6.3800	0.3600	5135667.	-4671.	-0.00559	0.00	1.04E+11
-445.3161	3265.	0.00				
6.6000	0.3454	5122074.	-5854.	-0.00545	0.00	1.04E+11
-450.5255	3443.	0.00				
6.8200	0.3312	5105335.	-7048.	-0.00532	0.00	1.04E+11
-454.4895	3622.	0.00				
7.0400	0.3173	5085422.	-8252.	-0.00519	0.00	1.04E+11
-457.1750	3803.	0.00				
7.2600	0.3038	5062315.	-9460.	-0.00506	0.00	1.04E+11
-458.5517	3985.	0.00				
7.4800	0.2906	5036005.	-10671.	-0.00494	0.00	1.04E+11
-458.5927	4166.	0.00				
7.7000	0.2777	5006493.	-11883.	-0.00481	0.00	1.04E+11
-459.1780	4365.	0.00				
7.9200	0.2652	4973774.	-13094.	-0.00468	0.00	1.04E+11
-458.5766	4565.	0.00				
8.1400	0.2530	4937851.	-14302.	-0.00456	0.00	1.04E+11
-456.5676	4764.	0.00				
8.3600	0.2412	4898740.	-15503.	-0.00443	0.00	1.04E+11
-453.1248	4961.	0.00				
8.5800	0.2296	4856465.	-16693.	-0.00431	0.00	1.04E+11
-448.2268	5153.	0.00				
8.8000	0.2184	4811059.	-17867.	-0.00418	0.00	1.04E+11
-441.8581	5341.	0.00				

9.0200	0.2075	4762566.	-19024.	-0.00406	0.00	1.04E+11
-434.4973	5527.	0.00				
9.2400	0.1970	4711040.	-20166.	-0.00394	0.00	1.04E+11
-430.6507	5772.	0.00				
9.4600	0.1867	4656505.	-21296.	-0.00382	0.00	1.04E+11
-425.5310	6016.	0.00				
9.6800	0.1768	4598998.	-22411.	-0.00371	0.00	1.04E+11
-419.1329	6259.	0.00				
9.9000	0.1672	4538564.	-23508.	-0.00359	0.00	1.04E+11
-411.4583	6498.	0.00				
10.1200	0.1578	4475257.	-24582.	-0.00348	0.00	1.04E+11
-402.5167	6733.	0.00				
10.3400	0.1488	4409138.	-25631.	-0.00336	0.00	1.04E+11
-392.3254	6960.	0.00				
10.5600	0.1401	4340278.	-26652.	-0.00325	0.00	1.05E+11
-380.9108	7179.	0.00				
10.7800	0.1316	4268758.	-27641.	-0.00314	0.00	1.05E+11
-368.3088	7387.	0.00				
11.0000	0.1235	4194666.	-28595.	-0.00304	0.00	1.05E+11
-354.5652	7581.	0.00				
11.2200	0.1156	4118097.	-29512.	-0.00293	0.00	1.05E+11
-339.7368	7759.	0.00				
11.4400	0.1080	4039154.	-30388.	-0.00283	0.00	1.05E+11
-323.8919	7918.	0.00				
11.6600	0.1006	3957949.	-31221.	-0.00273	0.00	1.05E+11
-307.1108	8055.	0.00				
11.8800	0.09357	3874598.	-32008.	-0.00263	0.00	1.05E+11
-289.4864	8167.	0.00				
12.1000	0.08676	3789224.	-32756.	-0.00254	0.00	1.05E+11
-276.8277	8424.	0.00				
12.3200	0.08019	3701916.	-33478.	-0.00244	0.00	1.06E+11
-270.3554	8901.	0.00				
12.5400	0.07387	3612718.	-34182.	-0.00235	0.00	1.06E+11
-263.2285	9408.	0.00				
12.7600	0.06778	3521682.	-34867.	-0.00226	0.00	1.06E+11
-255.4391	9949.	0.00				
12.9800	0.06193	3428860.	-35530.	-0.00217	0.00	1.06E+11
-246.9775	10529.	0.00				
13.2000	0.05630	3334312.	-36170.	-0.00209	0.00	1.06E+11
-237.8316	11152.	0.00				
13.4200	0.05089	3238103.	-36785.	-0.00201	0.00	1.06E+11
-227.9857	11827.	0.00				
13.6400	0.04570	3140300.	-37373.	-0.00193	0.00	1.07E+11
-217.4193	12561.	0.00				
13.8600	0.04070	3040978.	-37932.	-0.00185	0.00	1.07E+11
-206.1055	13368.	0.00				
14.0800	0.03591	2940216.	-38460.	-0.00178	0.00	1.07E+11
-194.0077	14263.	0.00				

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   14.3000    0.03131   2838097.    -38955.   -0.00171       0.00   1.07E+11
-181.0763     15269.       0.00
   14.5200    0.02689   2734713.    -39415.   -0.00164       0.00   1.08E+11
-167.2421     16419.       0.00
   14.7400    0.02265   2630159.    -39837.   -0.00157       0.00   1.08E+11
-152.4066     17763.       0.00
   14.9600    0.01858   2524540.    -40218.   -0.00153       0.00   4.05E+11
-136.4247     19384.       0.00
   15.1800    0.01455   2417970.    -40557.   -0.00152       0.00   4.05E+11
-120.3143     21826.       0.00
   15.4000    0.01057   2310560.    -40839.   -0.00150       0.00   4.05E+11
-93.1334     23269.       0.00
   15.6200    0.00662   2202500.    -41040.   -0.00149       0.00   4.06E+11
-59.1868     23601.       0.00
   15.8400    0.00271   2094026.    -41150.   -0.00147       0.00   4.06E+11
-24.5894     23933.       0.00
   16.0600   -0.00116   1985381.    -41169.   -0.00146       0.00   4.06E+11
10.6618     24266.       0.00
   16.2800   -0.00500   1876809.    -41093.   -0.00145       0.00   4.07E+11
46.5709     24598.       0.00
   16.5000   -0.00880   1768562.    -40922.   -0.00144       0.00   4.07E+11
83.1427     24931.       0.00
   16.7200   -0.01258   1660893.    -40653.   -0.00142       0.00   4.07E+11
120.3832     25263.       0.00
   16.9400   -0.01633   1554062.    -40286.   -0.00141       0.00   4.08E+11
158.2990     25595.       0.00
   17.1600   -0.02005   1448335.    -39817.   -0.00140       0.00   4.08E+11
196.8974     25928.       0.00
   17.3800   -0.02374   1343979.    -39245.   -0.00140       0.00   4.08E+11
236.1866     26260.       0.00
   17.6000   -0.02742   1241268.    -38569.   -0.00139       0.00   4.08E+11
276.1753     26593.       0.00
   17.8200   -0.03107   1140483.    -37786.   -0.00138       0.00   4.09E+11
316.8730     26925.       0.00
   18.0400   -0.03470   1041905.    -36895.   -0.00137       0.00   4.09E+11
358.2895     27257.       0.00
   18.2600   -0.03832    945824.    -35893.   -0.00137       0.00   4.09E+11
400.4351     27590.       0.00
   18.4800   -0.04192    852534.    -34779.   -0.00136       0.00   4.09E+11
443.3206     27922.       0.00
   18.7000   -0.04550    762333.    -33551.   -0.00136       0.00   4.10E+11
486.9570     28255.       0.00
   18.9200   -0.04907    675525.    -32207.   -0.00135       0.00   4.10E+11
531.3555     28587.       0.00
   19.1400   -0.05263    592421.    -30745.   -0.00135       0.00   4.10E+11
576.5275     28920.       0.00
   19.3600   -0.05618    513335.    -29162.   -0.00134       0.00   4.10E+11
622.4843     29252.       0.00
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   19.5800   -0.05972    438587.    -27457.   -0.00134       0.00   4.10E+11
669.2373     29584.       0.00
   19.8000   -0.06325    368503.    -25627.   -0.00134       0.00   4.11E+11
716.7975     29917.       0.00
   20.0200   -0.06678    303415.    -23671.   -0.00134       0.00   4.11E+11
765.1758     30249.       0.00
   20.2400   -0.07030    243660.    -21586.   -0.00133       0.00   4.11E+11
814.3827     30582.       0.00
   20.4600   -0.07382    189581.    -19370.   -0.00133       0.00   4.11E+11
864.4282     30914.       0.00
   20.6800   -0.07734    141526.    -17021.   -0.00133       0.00   4.11E+11
915.3215     31246.       0.00
   20.9000   -0.08085     99850.    -14536.   -0.00133       0.00   4.11E+11
967.0711     31579.       0.00
   21.1200   -0.08436     64915.    -11914.   -0.00133       0.00   4.11E+11
1020.     31911.       0.00
   21.3400   -0.08787     37087.     -9151.   -0.00133       0.00   4.11E+11
1073.     32244.       0.00
   21.5600   -0.09138     16738.     -6246.   -0.00133       0.00   4.11E+11
1128.     32576.       0.00
   21.7800   -0.09488      4247.     -3197.   -0.00133       0.00   4.11E+11
1183.     32908.       0.00
   22.0000   -0.09839       0.00       0.00   -0.00133       0.00   4.11E+11
1239.     16620.       0.00

* This analysis computed pile response using nonlinear moment-curvature rela-
  tionships. 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 inter-
  polated 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             =     0.93075524 inches
Computed slope at pile head      =    -0.00923557 radians
Maximum bending moment           =       5159392. inch-lbs
Maximum shear force              =        -41169. lbs
Depth of maximum bending moment  =     5.50000000 feet below pile head
Depth of maximum shear force     =    16.06000000 feet below pile head
Number of iterations             =             42
Number of zero deflection points =              1
```

Boundary Condition Type 1, Shear and Moment

Shear = 15000. lbs
Moment = 4500000. in-lbs
Axial Load = 20000. lbs

Pile Length feet	Pile Head Deflection inches	Maximum Moment ln-lbs	Maximum Shear lbs
22.00000	0.93075524	5159392.	-41169.
20.90000	1.02029298	5148082.	-44499.
19.80000	1.15659202	5132376.	-48191.
18.70000	1.36764958	5111314.	-52180.
17.60000	1.69324171	5087941.	-56466.
16.50000	2.26392757	5083151.	-61895.
15.40000	3.71008413	5094065.	-70966.

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

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

Shear force at pile head = 24000.0 lbs
Applied moment at pile head = 7280000.0 in-lbs
Axial thrust load on pile head = 20000.0 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/inch	Soil Res. Soil Spr. Distrib. p Lat. Load lb/inch
0.00	2.1245	7280000.	24000.	-0.01820	0.00	1.02E+11	0.00
0.2200	2.0767	7344316.	23973.	-0.01801	0.00	1.02E+11	-20.6635
0.4400	2.0294	7408478.	23889.	-0.01782	0.00	1.02E+11	-42.6511
0.6600	1.9826	7472333.	23746.	-0.01763	0.00	1.01E+11	

```
-65.8449    87.6759       0.00
    0.8800     1.9364   7535718.     23540.   -0.01743       0.00   1.01E+11
-90.1269   122.8769       0.00
    1.1000     1.8906   7598465.     23269.   -0.01723       0.00   1.01E+11
-115.3794   161.1129       0.00
    1.3200     1.8454   7660397.     22930.   -0.01704       0.00   1.01E+11
-141.4845   202.4083       0.00
    1.5400     1.8007   7721333.     22521.   -0.01683       0.00   1.01E+11
-168.2879   246.7312       0.00
    1.7600     1.7565   7781085.     22041.   -0.01663       0.00   1.01E+11
-195.5002   293.8371       0.00
    1.9800     1.7128   7839464.     21488.   -0.01643       0.00   1.01E+11
-223.1316   343.9121       0.00
    2.2000     1.6697   7896276.     20862.   -0.01622       0.00   1.01E+11
-251.0573   396.9426       0.00
    2.4200     1.6272   7951329.     20162.   -0.01602       0.00   1.01E+11
-279.1528   452.9076       0.00
    2.6400     1.5852   8004424.     19388.   -0.01581       0.00   1.01E+11
-307.2934   511.7769       0.00
    2.8600     1.5437   8055367.     18540.   -0.01560       0.00   1.01E+11
-335.3545   573.5103       0.00
    3.0800     1.5028   8103962.     17617.   -0.01539       0.00   1.01E+11
-363.3970   638.3819       0.00
    3.3000     1.4625   8150012.     16621.   -0.01517       0.00   1.01E+11
-391.5078   706.7366       0.00
    3.5200     1.4227   8193323.     15551.   -0.01496       0.00   1.01E+11
-419.2770   778.0275       0.00
    3.7400     1.3835   8233700.     14408.   -0.01475       0.00   1.01E+11
-446.5869   852.1943       0.00
    3.9600     1.3448   8270954.     13195.   -0.01453       0.00   1.01E+11
-472.4207   927.3968       0.00
    4.1800     1.3068   8304903.     11922.   -0.01431       0.00   1.01E+11
-491.3982   992.7572       0.00
    4.4000     1.2693   8335416.     10602.   -0.01410       0.00   1.01E+11
-508.8939      1058.       0.00
    4.6200     1.2323   8362370.      9235.   -0.01388       0.00   1.01E+11
-526.5253      1128.       0.00
    4.8400     1.1960   8385644.      7822.   -0.01366       0.00   1.01E+11
-544.2182      1201.       0.00
    5.0600     1.1602   8405112.      6364.   -0.01344       0.00   1.01E+11
-560.5782      1276.       0.00
    5.2800     1.1250   8420663.      4864.   -0.01322       0.00   1.01E+11
-575.5445      1351.       0.00
    5.5000     1.0904   8432190.      3327.   -0.01300       0.00   1.01E+11
-589.0603      1426.       0.00
    5.7200     1.0564   8439600.      1756.   -0.01277       0.00   1.01E+11
-601.0717      1502.       0.00
    5.9400     1.0230   8442809.   155.0665   -0.01255       0.00   1.01E+11
```

-611.5280	1578.	0.00				
6.1600	0.9901	8441744.	-1473.	-0.01233	0.00	1.01E+11
-621.9737	1658.	0.00				
6.3800	0.9579	8436333.	-3128.	-0.01211	0.00	1.01E+11
-631.5880	1741.	0.00				
6.6000	0.9262	8426508.	-4806.	-0.01189	0.00	1.01E+11
-639.7754	1824.	0.00				
6.8200	0.8951	8412213.	-6504.	-0.01167	0.00	1.01E+11
-646.5060	1907.	0.00				
7.0400	0.8646	8393400.	-8218.	-0.01145	0.00	1.01E+11
-651.7522	1990.	0.00				
7.2600	0.8346	8370033.	-9943.	-0.01123	0.00	1.01E+11
-655.4882	2073.	0.00				
7.4800	0.8053	8342085.	-11677.	-0.01101	0.00	1.01E+11
-657.6906	2156.	0.00				
7.7000	0.7765	8309543.	-13420.	-0.01079	0.00	1.01E+11
-663.0526	2254.	0.00				
7.9200	0.7483	8272368.	-15176.	-0.01058	0.00	1.01E+11
-667.4676	2355.	0.00				
8.1400	0.7207	8230529.	-16942.	-0.01036	0.00	1.01E+11
-670.4343	2456.	0.00				
8.3600	0.6936	8184006.	-18714.	-0.01015	0.00	1.01E+11
-671.9154	2557.	0.00				
8.5800	0.6671	8132789.	-20488.	-0.00993	0.00	1.01E+11
-671.8750	2659.	0.00				
8.8000	0.6412	8076878.	-22260.	-0.00972	0.00	1.01E+11
-670.2778	2760.	0.00				
9.0200	0.6158	8016285.	-24026.	-0.00951	0.00	1.01E+11
-667.8435	2863.	0.00				
9.2400	0.5909	7951026.	-25794.	-0.00930	0.00	1.01E+11
-671.5267	3000.	0.00				
9.4600	0.5667	7881075.	-27570.	-0.00909	0.00	1.01E+11
-673.7278	3139.	0.00				
9.6800	0.5429	7806418.	-29349.	-0.00889	0.00	1.01E+11
-674.3341	3279.	0.00				
9.9000	0.5197	7727050.	-31128.	-0.00869	0.00	1.01E+11
-673.2896	3420.	0.00				
10.1200	0.4971	7642980.	-32902.	-0.00849	0.00	1.01E+11
-670.5420	3561.	0.00				
10.3400	0.4749	7554225.	-34666.	-0.00829	0.00	1.01E+11
-666.0432	3703.	0.00				
10.5600	0.4533	7460818.	-36416.	-0.00809	0.00	1.01E+11
-659.7500	3842.	0.00				
10.7800	0.4322	7362802.	-38147.	-0.00790	0.00	1.02E+11
-651.6252	3981.	0.00				
11.0000	0.4116	7260235.	-39854.	-0.00771	0.00	1.02E+11
-641.6379	4116.	0.00				
11.2200	0.3915	7153186.	-41533.	-0.00752	0.00	1.02E+11

-629.7653	4247.	0.00				
11.4400	0.3718	7041738.	-43177.	-0.00734	0.00	1.02E+11
-615.9934	4373.	0.00				
11.6600	0.3527	6925987.	-44782.	-0.00716	0.00	1.02E+11
-600.3182	4493.	0.00				
11.8800	0.3340	6806042.	-46344.	-0.00698	0.00	1.02E+11
-582.7475	4605.	0.00				
12.1000	0.3159	6682027.	-47867.	-0.00681	0.00	1.02E+11
-570.8171	4771.	0.00				
12.3200	0.2981	6554024.	-49368.	-0.00663	0.00	1.02E+11
-566.6027	5018.	0.00				
12.5400	0.2808	6422063.	-50857.	-0.00647	0.00	1.02E+11
-561.2698	5277.	0.00				
12.7600	0.2640	6286182.	-52330.	-0.00630	0.00	1.02E+11
-554.7861	5549.	0.00				
12.9800	0.2475	6146425.	-53785.	-0.00614	0.00	1.03E+11
-547.1177	5835.	0.00				
13.2000	0.2315	6002847.	-55217.	-0.00599	0.00	1.03E+11
-538.2285	6137.	0.00				
13.4200	0.2159	5855510.	-56625.	-0.00583	0.00	1.03E+11
-528.0800	6457.	0.00				
13.6400	0.2007	5704484.	-58004.	-0.00569	0.00	1.03E+11
-516.6298	6795.	0.00				
13.8600	0.1859	5549849.	-59351.	-0.00554	0.00	1.03E+11
-503.8316	7155.	0.00				
14.0800	0.1715	5391696.	-60662.	-0.00540	0.00	1.03E+11
-489.6332	7539.	0.00				
14.3000	0.1574	5230123.	-61934.	-0.00527	0.00	1.03E+11
-473.9755	7951.	0.00				
14.5200	0.1436	5065239.	-63163.	-0.00514	0.00	1.04E+11
-456.7899	8395.	0.00				
14.7400	0.1303	4897165.	-64344.	-0.00501	0.00	1.04E+11
-437.9960	8877.	0.00				
14.9600	0.1172	4726032.	-65473.	-0.00489	0.00	1.04E+11
-417.4972	9404.	0.00				
15.1800	0.1045	4551983.	-66551.	-0.00477	0.00	1.04E+11
-398.8005	10079.	0.00				
15.4000	0.09202	4375148.	-67577.	-0.00466	0.00	1.04E+11
-378.8517	10869.	0.00				
15.6200	0.07988	4195666.	-68548.	-0.00455	0.00	1.05E+11
-356.5636	11785.	0.00				
15.8400	0.06801	4013694.	-69456.	-0.00444	0.00	1.05E+11
-331.5688	12871.	0.00				
16.0600	0.05641	3829406.	-70294.	-0.00435	0.00	1.05E+11
-303.3610	14198.	0.00				
16.2800	0.04506	3642998.	-71053.	-0.00425	0.00	1.06E+11
-271.2019	15888.	0.00				
16.5000	0.03396	3454696.	-71720.	-0.00416	0.00	1.06E+11

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-233.9248     18187.       0.00
   16.7200    0.02308   3264758.    -72278.   -0.00408       0.00   1.06E+11
-189.4396     21672.       0.00
   16.9400    0.01241   3073496.    -72687.   -0.00400       0.00   1.07E+11
-120.3388     25595.       0.00
   17.1600    0.00195   2881392.    -72871.   -0.00393       0.00   1.07E+11
-19.1278     25928.       0.00
   17.3800   -0.00833   2689150.    -72787.   -0.00386       0.00   1.08E+11
82.8563     26260.       0.00
   17.6000   -0.01843   2497482.    -72433.   -0.00382       0.00   4.05E+11
185.6777     26593.       0.00
   17.8200   -0.02849   2307107.    -71804.   -0.00380       0.00   4.05E+11
290.6050     26925.       0.00
   18.0400   -0.03851   2118757.    -70896.   -0.00379       0.00   4.06E+11
397.6563     27257.       0.00
   18.2600   -0.04850   1933178.    -69702.   -0.00378       0.00   4.06E+11
506.8510     27590.       0.00
   18.4800   -0.05845   1751131.    -68217.   -0.00376       0.00   4.07E+11
618.2095     27922.       0.00
   18.7000   -0.06837   1573391.    -66435.   -0.00375       0.00   4.07E+11
731.7530     28255.       0.00
   18.9200   -0.07827   1400752.    -64350.   -0.00374       0.00   4.08E+11
847.5036     28587.       0.00
   19.1400   -0.08814   1234018.    -61957.   -0.00373       0.00   4.08E+11
965.4837     28920.       0.00
   19.3600   -0.09799   1074013.    -59249.   -0.00373       0.00   4.09E+11
1086.     29252.       0.00
   19.5800    -0.1078    921575.    -56221.   -0.00372       0.00   4.09E+11
1208.     29584.       0.00
   19.8000    -0.1176    777557.    -52867.   -0.00372       0.00   4.10E+11
1333.     29917.       0.00
   20.0200    -0.1274    642830.    -49180.   -0.00371       0.00   4.10E+11
1460.     30249.       0.00
   20.2400    -0.1372    518279.    -45154.   -0.00371       0.00   4.10E+11
1590.     30582.       0.00
   20.4600    -0.1470    404807.    -40784.   -0.00370       0.00   4.10E+11
1721.     30914.       0.00
   20.6800    -0.1568    303333.    -36062.   -0.00370       0.00   4.11E+11
1856.     31246.       0.00
   20.9000    -0.1666    214792.    -30983.   -0.00370       0.00   4.11E+11
1992.     31579.       0.00
   21.1200    -0.1763    140136.    -25539.   -0.00370       0.00   4.11E+11
2131.     31911.       0.00
   21.3400    -0.1861     80334.    -19726.   -0.00370       0.00   4.11E+11
2273.     32244.       0.00
   21.5600    -0.1958     36373.    -13536.   -0.00370       0.00   4.11E+11
2417.     32576.       0.00
   21.7800    -0.2056      9255.     -6963.   -0.00370       0.00   4.11E+11
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2563.     32908.       0.00
   22.0000    -0.2154       0.00       0.00   -0.00370       0.00   4.11E+11
2712.     16620.       0.00

* This analysis computed pile response using nonlinear moment-curvature rela-
  tionships. 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 inter-
  polated 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             =     2.12454045 inches
Computed slope at pile head      =    -0.01820184 radians
Maximum bending moment           =       8442809. inch-lbs
Maximum shear force              =        -72871. lbs
Depth of maximum bending moment  =     5.94000000 feet below pile head
Depth of maximum shear force     =    17.16000000 feet below pile head
Number of iterations             =             32
Number of zero deflection points =              1



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

Boundary Condition Type 1, Shear and Moment

Shear      =          24000. lbs
Moment     =        7280000. in-lbs
Axial Load =          20000. lbs


    Pile       Pile Head       Maximum       Maximum
   Length      Deflection      Moment         Shear
    feet         inches        ln-lbs          lbs
------------  ------------  ------------  ------------
   22.00000    2.12454045      8442809.       -72871.
   20.90000    2.41297190      8438249.       -78962.
   19.80000    2.91907032      8441510.       -86401.
   18.70000    3.97620460      8449533.       -96931.
   17.60000    7.62366626      8478226.      -116435.


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Pile-head conditions are Displacement and Pile-head Rotation (Loading Type 5)
Displacement of pile head = 1.000000 inches
Rotation of pile head = 0.000E+00 radians
Axial load on pile head = 20000.0 lbs

Depth X	Deflect. y	Bending Moment	Shear Force	Slope S	Total Stress	Bending Stiffness	Soil Res. Es*h	Soil Spr. p	Distrib. Lat. Load
feet	inches	in-lbs	lbs	radians	psi*	in-lb^2	lb/inch	lb/inch	lb/inch
0.00	1.0004	-9917883.	98318.	0.00	0.00	9.73E+10	0.00	0.00	0.00
0.2200	1.0000	-9658381.	98269.	-2.66E-04	0.00	9.73E+10	-18.2893	48.2836	0.00
0.4400	0.9990	-9398994.	98195.	-5.21E-04	0.00	9.99E+10	-37.6862	99.5959	0.00
0.6600	0.9972	-9139855.	98069.	-7.66E-04	0.00	1.00E+11	-58.0630	153.7091	0.00
0.8800	0.9949	-8881109.	97888.	-0.00100	0.00	1.00E+11	-79.2903	210.3973	0.00
1.1000	0.9920	-8622903.	97649.	-0.00123	0.00	1.01E+11	-101.2375	269.4349	0.00
1.3200	0.9884	-8365390.	97352.	-0.00146	0.00	1.01E+11	-123.7731	330.5954	0.00
1.5400	0.9843	-8108729.	96995.	-0.00167	0.00	1.01E+11	-146.7634	393.6476	0.00
1.7600	0.9796	-7853079.	96577.	-0.00188	0.00	1.01E+11	-170.0745	458.3573	0.00
1.9800	0.9743	-7598604.	96097.	-0.00208	0.00	1.01E+11	-193.5814	524.5109	0.00
2.2000	0.9686	-7345467.	95555.	-0.00228	0.00	1.02E+11	-217.1548	591.8791	0.00
2.4200	0.9623	-7093834.	94950.	-0.00246	0.00	1.02E+11	-240.6663	660.2286	0.00
2.6400	0.9556	-6843869.	94284.	-0.00264	0.00	1.02E+11	-263.9887	729.3215	0.00
2.8600	0.9484	-6595734.	93557.	-0.00282	0.00	1.02E+11	-286.9960	798.9141	0.00
3.0800	0.9407	-6349590.	92769.	-0.00298	0.00	1.02E+11	-309.7491	869.2759	0.00
3.3000	0.9326	-6105597.	91922.	-0.00314	0.00	1.03E+11			

-332.3367	940.7613	0.00				
3.5200	0.9241	-5863911.	91015.	-0.00330	0.00	1.03E+11
-354.3528	1012.	0.00				
3.7400	0.9152	-5624687.	90052.	-0.00345	0.00	1.03E+11
-375.6850	1084.	0.00				
3.9600	0.9059	-5388074.	89033.	-0.00359	0.00	1.03E+11
-396.2229	1155.	0.00				
4.1800	0.8963	-5154216.	87961.	-0.00372	0.00	1.04E+11
-415.8585	1225.	0.00				
4.4000	0.8863	-4923248.	86838.	-0.00385	0.00	1.04E+11
-434.4861	1294.	0.00				
4.6200	0.8759	-4695303.	85666.	-0.00397	0.00	1.04E+11
-453.4562	1367.	0.00				
4.8400	0.8653	-4470511.	84444.	-0.00409	0.00	1.04E+11
-472.7093	1442.	0.00				
5.0600	0.8543	-4249008.	83172.	-0.00420	0.00	1.05E+11
-491.0289	1517.	0.00				
5.2800	0.8431	-4030922.	81852.	-0.00430	0.00	1.05E+11
-508.3304	1592.	0.00				
5.5000	0.8316	-3816373.	80489.	-0.00440	0.00	1.05E+11
-524.5315	1665.	0.00				
5.7200	0.8199	-3605475.	79084.	-0.00449	0.00	1.06E+11
-539.5516	1737.	0.00				
5.9400	0.8079	-3398332.	77642.	-0.00458	0.00	1.06E+11
-553.3124	1808.	0.00				
6.1600	0.7957	-3195042.	76163.	-0.00466	0.00	1.07E+11
-567.3298	1882.	0.00				
6.3800	0.7833	-2995701.	74647.	-0.00474	0.00	1.07E+11
-580.7539	1957.	0.00				
6.6000	0.7707	-2800404.	73098.	-0.00481	0.00	1.08E+11
-592.9595	2031.	0.00				
6.8200	0.7579	-2609236.	71518.	-0.00488	0.00	1.08E+11
-603.8866	2104.	0.00				
7.0400	0.7449	-2422274.	69911.	-0.00492	0.00	4.05E+11
-613.4776	2174.	0.00				
7.2600	0.7319	-2239586.	68281.	-0.00493	0.00	4.06E+11
-621.7142	2243.	0.00				
7.4800	0.7189	-2061231.	66630.	-0.00495	0.00	4.06E+11
-628.5425	2308.	0.00				
7.7000	0.7058	-1887256.	64958.	-0.00496	0.00	4.07E+11
-638.2659	2387.	0.00				
7.9200	0.6927	-1717728.	63261.	-0.00497	0.00	4.07E+11
-647.2043	2467.	0.00				
8.1400	0.6796	-1552711.	61543.	-0.00498	0.00	4.08E+11
-654.8803	2544.	0.00				
8.3600	0.6664	-1392257.	59805.	-0.00499	0.00	4.08E+11
-661.2389	2620.	0.00				
8.5800	0.6532	-1236412.	58053.	-0.00500	0.00	4.08E+11

-666.2252	2693.	0.00				
8.8000	0.6400	-1085209.	56290.	-0.00501	0.00	4.09E+11
-669.7854	2763.	0.00				
9.0200	0.6268	-938675.	54518.	-0.00501	0.00	4.09E+11
-672.6253	2833.	0.00				
9.2400	0.6135	-796827.	52730.	-0.00502	0.00	4.10E+11
-681.8229	2934.	0.00				
9.4600	0.6003	-659732.	50919.	-0.00502	0.00	4.10E+11
-689.9814	3035.	0.00				
9.6800	0.5870	-527445.	49088.	-0.00503	0.00	4.10E+11
-697.0095	3135.	0.00				
9.9000	0.5737	-400016.	47240.	-0.00503	0.00	4.10E+11
-702.8064	3234.	0.00				
10.1200	0.5604	-277485.	45379.	-0.00503	0.00	4.11E+11
-707.3119	3332.	0.00				
10.3400	0.5471	-159884.	43507.	-0.00503	0.00	4.11E+11
-710.4667	3428.	0.00				
10.5600	0.5339	-47234.	41630.	-0.00503	0.00	4.11E+11
-712.2116	3522.	0.00				
10.7800	0.5206	60452.	39749.	-0.00503	0.00	4.11E+11
-712.4887	3613.	0.00				
11.0000	0.5073	163172.	37870.	-0.00503	0.00	4.11E+11
-711.2413	3702.	0.00				
11.2200	0.4940	260935.	35996.	-0.00503	0.00	4.11E+11
-708.4144	3786.	0.00				
11.4400	0.4807	353760.	34131.	-0.00503	0.00	4.11E+11
-703.9554	3866.	0.00				
11.6600	0.4674	441679.	32281.	-0.00503	0.00	4.10E+11
-697.8145	3941.	0.00				
11.8800	0.4541	524735.	30449.	-0.00503	0.00	4.10E+11
-689.9451	4011.	0.00				
12.1000	0.4409	602981.	28630.	-0.00502	0.00	4.10E+11
-688.0366	4120.	0.00				
12.3200	0.4276	676433.	26805.	-0.00502	0.00	4.10E+11
-694.3379	4287.	0.00				
12.5400	0.4144	745044.	24965.	-0.00501	0.00	4.10E+11
-699.8095	4458.	0.00				
12.7600	0.4012	808778.	23112.	-0.00501	0.00	4.10E+11
-704.4102	4636.	0.00				
12.9800	0.3880	867602.	21247.	-0.00500	0.00	4.09E+11
-708.0981	4819.	0.00				
13.2000	0.3748	921491.	19374.	-0.00500	0.00	4.09E+11
-710.8302	5008.	0.00				
13.4200	0.3616	970425.	17495.	-0.00499	0.00	4.09E+11
-712.5622	5203.	0.00				
13.6400	0.3484	1014393.	15613.	-0.00498	0.00	4.09E+11
-713.2489	5405.	0.00				
13.8600	0.3353	1053389.	13731.	-0.00498	0.00	4.09E+11

-712.8438	5613.	0.00				
14.0800	0.3221	1087417.	11851.	-0.00497	0.00	4.09E+11
-711.2989	5830.	0.00				
14.3000	0.3090	1116487.	9977.	-0.00496	0.00	4.09E+11
-708.5646	6054.	0.00				
14.5200	0.2959	1140618.	8111.	-0.00496	0.00	4.09E+11
-704.5897	6286.	0.00				
14.7400	0.2828	1159838.	6258.	-0.00495	0.00	4.09E+11
-699.3209	6527.	0.00				
14.9600	0.2698	1174183.	4421.	-0.00494	0.00	4.09E+11
-692.7028	6778.	0.00				
15.1800	0.2568	1183701.	2597.	-0.00493	0.00	4.09E+11
-688.9968	7084.	0.00				
15.4000	0.2437	1188416.	783.1831	-0.00493	0.00	4.09E+11
-684.9674	7419.	0.00				
15.6200	0.2307	1188356.	-1018.	-0.00492	0.00	4.09E+11
-679.5912	7775.	0.00				
15.8400	0.2178	1183560.	-2803.	-0.00491	0.00	4.09E+11
-672.7769	8156.	0.00				
16.0600	0.2048	1174074.	-4568.	-0.00490	0.00	4.09E+11
-664.4230	8564.	0.00				
16.2800	0.1919	1159957.	-6309.	-0.00490	0.00	4.09E+11
-654.4163	9004.	0.00				
16.5000	0.1790	1141279.	-8021.	-0.00489	0.00	4.09E+11
-642.6288	9479.	0.00				
16.7200	0.1661	1118121.	-9700.	-0.00488	0.00	4.09E+11
-628.9150	9997.	0.00				
16.9400	0.1532	1090580.	-11339.	-0.00487	0.00	4.09E+11
-613.1068	10565.	0.00				
17.1600	0.1403	1058765.	-12934.	-0.00487	0.00	4.09E+11
-595.0080	11193.	0.00				
17.3800	0.1275	1022803.	-14477.	-0.00486	0.00	4.09E+11
-574.3855	11893.	0.00				
17.6000	0.1147	982837.	-15963.	-0.00485	0.00	4.09E+11
-550.9576	12683.	0.00				
17.8200	0.1019	939031.	-17382.	-0.00485	0.00	4.09E+11
-524.3759	13588.	0.00				
18.0400	0.08909	891570.	-18727.	-0.00484	0.00	4.09E+11
-494.1974	14644.	0.00				
18.2600	0.07632	840665.	-19986.	-0.00484	0.00	4.09E+11
-459.8389	15907.	0.00				
18.4800	0.06356	786554.	-21148.	-0.00483	0.00	4.10E+11
-420.4972	17466.	0.00				
18.7000	0.05081	729512.	-22198.	-0.00483	0.00	4.10E+11
-374.9961	19482.	0.00				
18.9200	0.03808	669857.	-23118.	-0.00482	0.00	4.10E+11
-321.4534	22285.	0.00				
19.1400	0.02536	607960.	-23880.	-0.00482	0.00	4.10E+11

-256.4035	26692.	0.00				
19.3600	0.01265	544277.	-24404.	-0.00481	0.00	4.10E+11
-140.1507	29252.	0.00				
19.5800	-5.34E-05	479617.	-24588.	-0.00481	0.00	4.10E+11
0.5985	29584.	0.00				
19.8000	-0.01275	414960.	-24397.	-0.00481	0.00	4.10E+11
144.4541	29917.	0.00				
20.0200	-0.02543	351310.	-23821.	-0.00480	0.00	4.11E+11
291.4255	30249.	0.00				
20.2400	-0.03812	289692.	-22854.	-0.00480	0.00	4.11E+11
441.5228	30582.	0.00				
20.4600	-0.05079	231150.	-21486.	-0.00480	0.00	4.11E+11
594.7559	30914.	0.00				
20.6800	-0.06346	176753.	-19709.	-0.00480	0.00	4.11E+11
751.1347	31246.	0.00				
20.9000	-0.07613	127592.	-17516.	-0.00480	0.00	4.11E+11
910.6688	31579.	0.00				
21.1200	-0.08880	84777.	-14897.	-0.00480	0.00	4.11E+11
1073.	31911.	0.00				
21.3400	-0.1015	49444.	-11844.	-0.00480	0.00	4.11E+11
1239.	32244.	0.00				
21.5600	-0.1141	22747.	-8349.	-0.00480	0.00	4.11E+11
1408.	32576.	0.00				
21.7800	-0.1268	5866.	-4404.	-0.00480	0.00	4.11E+11
1581.	32908.	0.00				
22.0000	-0.1395	0.00	0.00	-0.00480	0.00	4.11E+11
1756.	16620.	0.00				

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

Output Summary for Load Case No. 8:

Pile-head deflection	=	1.00035532 inches
Computed slope at pile head	=	0.000000 radians
Maximum bending moment	=	-9917883. inch-lbs
Maximum shear force	=	98318. lbs
Depth of maximum bending moment	=	0.000000 feet below pile head
Depth of maximum shear force	=	0.000000 feet below pile head
Number of iterations	=	29
Number of zero deflection points	=	1

Summary of Pile-head Responses for Conventional Analyses

Definitions of Pile-head Loading Conditions:

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

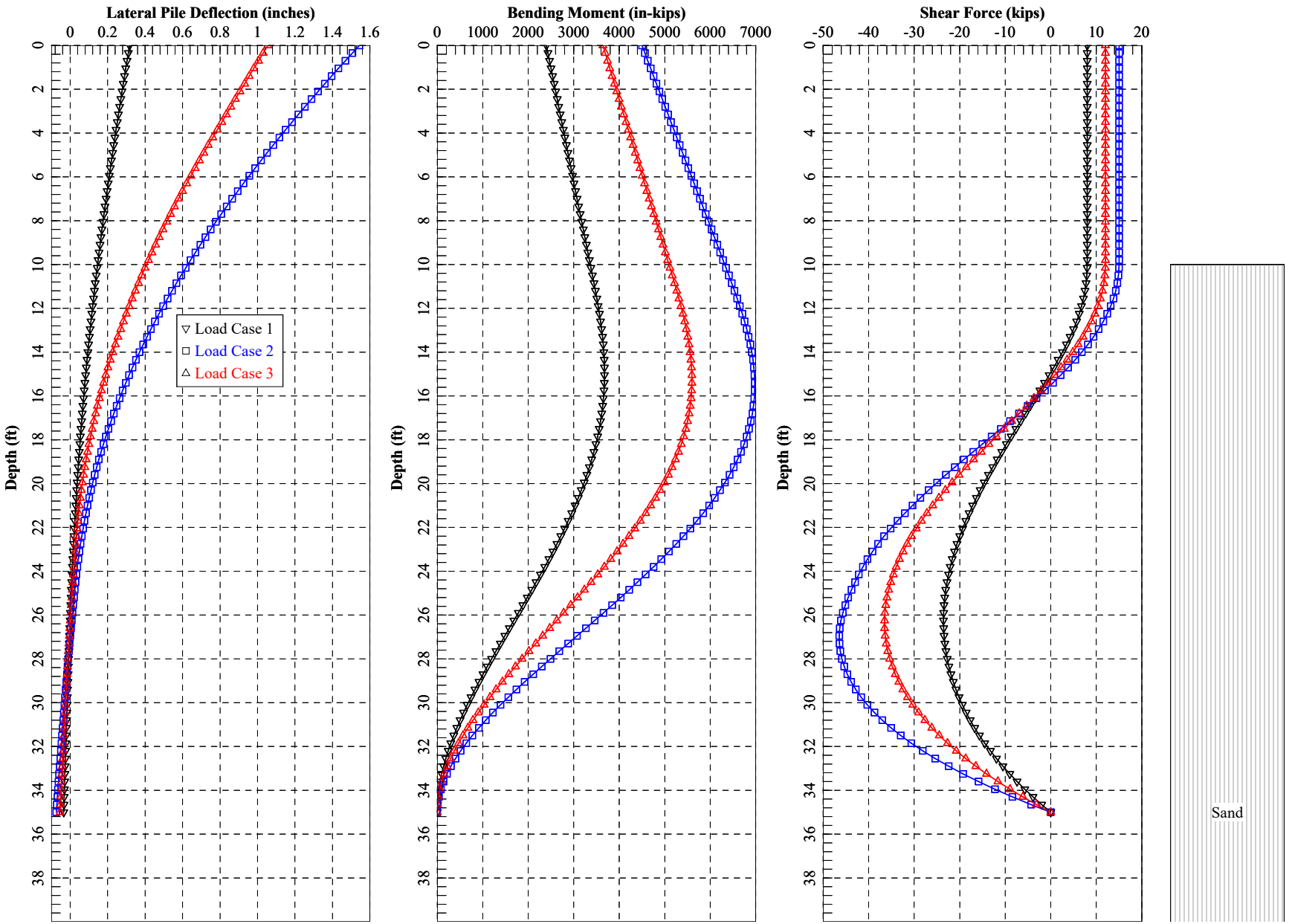
Load Case No.	Load Type 1	Load Pile-head Load 1	Load Type 2	Load Pile-head Load 2	Axial Loading lbs	Pile-head Deflection inches	Pile-head Rotation radians	Max Shear in Pile lbs	Max Moment in Pile in-lbs
1	V, lb	1500.	M, in-lb	455000.	20000.	0.03020	-2.74E-04	-3735.	507179.
2	V, lb	3000.	M, in-lb	910000.	20000.	0.06044	-5.50E-04	-7470.	1014323.
3	V, lb	6000.	M, in-lb	1820000.	20000.	0.1234	-0.00112	-15117.	2040665.
4	V, lb	8000.	M, in-lb	2400000.	20000.	0.2496	-0.00292	-20355.	2712256.
5	V, lb	12000.	M, in-lb	3640000.	20000.	0.6272	-0.00673	-32011.	4141288.
6	V, lb	15000.	M, in-lb	4500000.	20000.	0.9308	-0.00924	-41169.	5159392.
7	V, lb	24000.	M, in-lb	7280000.	20000.	2.1245	-0.01820	-72871.	8442809.
8	y, in	1.0000	S, rad	0.00	20000.	1.0004	0.00	98318.	-9917883.

Maximum pile-head deflection = 2.1245404511 inches
Maximum pile-head rotation = -0.0182018446 radians = -1.042889 deg.

The analysis ended normally.

Sign Structure Type V

With drilled shaft 10 feet above ground


Lateral Pile Deflection (inches)
0 0.2 0.4 0.6 0.8 1 1.2 1.4 1.6
Depth (ft)
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38
Load Case 1
Load Case 2
Load Case 3
Bending Moment (in-kips)
0 1000 2000 3000 4000 5000 6000 7000
Depth (ft)
Shear Force (kips)
-50 -40 -30 -20 -10 0 10 20
Depth (ft)
Sand

Special-sign-structure-TypeV-10ft-stick-up.lp9o

LPile for Windows, Version 2016-09.010

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:
\PROJECTS\Engineering & Enviro Projects\2019 Projects\G-19-192 I-515 Charleston Interchange - CA Group\DESIGN\Special Sign Structures\Revised-2-3-2021\

Name of input data file:
Special-sign-structure-TypeV-10ft-stick-up.lp9d

Name of output report file:
Special-sign-structure-TypeV-10ft-stick-up.lp9o

Name of plot output file:
Special-sign-structure-TypeV-10ft-stick-up.lp9p

Name of runtime message file:
Special-sign-structure-TypeV-10ft-stick-up.lp9r

Special-sign-structure-TypeV-10ft-stick-up.lp9o

Date and Time of Analysis

Date: February 3, 2021 Time: 14:31:33

Problem Title

I-515 Charleston

G-19-192

CA Group

NOVA

L1 98+26.00 Tyoe V Post - 10 feet stick up

Program Options and Settings

Computational Options:
- Use unfactored loads in computations (conventional analysis)

Engineering Units Used for Data Input and Computations:
- US Customary System Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed	=	500
- Deflection tolerance for convergence	=	1.0000E-05 in
- Maximum allowable deflection	=	100.0000 in
- Number of pile increments	=	100

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

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

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

Pile Structural Properties and Geometry

Number of pile sections defined = 1
Total length of pile = 35.000 ft
Depth of ground surface below top of pile = 10.0000 ft

Pile diameters 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. A summary of values of pile diameter vs. depth follows.

Point No.	Depth Below Pile Head feet	Pile Diameter inches
1	0.000	42.0000
2	35.000	42.0000

Input Structural Properties for Pile Sections:

Pile Section No. 1:

Section 1 is a round drilled shaft, bored pile, or CIDH pile

Length of section	=	35.000000 ft
Shaft Diameter	=	42.000000 in
Shear capacity of section	=	0.0000 lbs

Ground Slope and Pile Batter Angles

Ground Slope Angle	=	26.600 degrees
	=	0.464 radians
Pile Batter Angle	=	0.000 degrees
	=	0.000 radians

Soil and Rock Layering Information

The soil profile is modelled using 1 layers

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

Distance from top of pile to top of layer	=	10.000000 ft
Distance from top of pile to bottom of layer	=	60.000000 ft
Effective unit weight at top of layer	=	120.000000 pcf
Effective unit weight at bottom of layer	=	120.000000 pcf
Friction angle at top of layer	=	30.000000 deg.
Friction angle at bottom of layer	=	30.000000 deg.
Subgrade k at top of layer	=	0.0000 pci
Subgrade k at bottom of layer	=	0.0000 pci

NOTE: Default values for subgrade k will be computed for this layer.

(Depth of the lowest soil layer extends 25.000 ft below the pile tip)

Summary of Input Soil Properties

Layer	Soil Type	Layer	Effective	Angle of

Layer Num.	Name (p-y Curve Type)	Depth ft	Unit Wt. pcf	Friction deg.	kpy pci
1	Sand	10.0000	120.0000	30.0000	default
	(Reese, et al.)	60.0000	120.0000	30.0000	default

Static Loading Type

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

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 3

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length
1	1	V = 8000. lbs	M = 2400000. in-lbs	20000.	Yes
2	1	V = 15000. lbs	M = 4500000. in-lbs	20000.	Yes
3	1	V = 12000. lbs	M = 3640000. in-lbs	20000.	Yes

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

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

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

Number of Pile Sections Analyzed = 1

Pile Section No. 1:

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section	=	35.000000 ft
Shaft Diameter	=	42.000000 in
Concrete Cover Thickness	=	3.000000 in
Number of Reinforcing Bars	=	16 bars
Yield Stress of Reinforcing Bars	=	60000. psi
Modulus of Elasticity of Reinforcing Bars	=	29000000. psi
Gross Area of Shaft	=	1385. sq. in.
Total Area of Reinforcing Steel	=	24.960000 sq. in.
Area Ratio of Steel Reinforcement	=	1.80 percent
Edge-to-Edge Bar Spacing	=	5.338174 in
Maximum Concrete Aggregate Size	=	0.750000 in
Ratio of Bar Spacing to Aggregate Size	=	7.12
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	=	6701.445 kips
Tensile Load for Cracking of Concrete	=	-682.402 kips
Nominal Axial Tensile Capacity	=	-1497.600 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.410000	1.560000	17.295000	0.00000
2	1.410000	1.560000	15.978497	6.618510
3	1.410000	1.560000	12.229412	12.229412
4	1.410000	1.560000	6.618510	15.978497
5	1.410000	1.560000	0.00000	17.295000
6	1.410000	1.560000	-6.618510	15.978497
7	1.410000	1.560000	-12.229412	12.229412
8	1.410000	1.560000	-15.978497	6.618510
9	1.410000	1.560000	-17.295000	0.00000
10	1.410000	1.560000	-15.978497	-6.618510

11	1.410000	1.560000	-12.229412	-12.229412
12	1.410000	1.560000	-6.618510	-15.978497
13	1.410000	1.560000	0.00000	-17.295000
14	1.410000	1.560000	6.618510	-15.978497
15	1.410000	1.560000	12.229412	-12.229412
16	1.410000	1.560000	15.978497	-6.618510

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

Minimum spacing between any two bars not equal to zero = 5.338 inches
between bars 11 and 12.

Ratio of bar spacing to maximum aggregate size = 7.12

Concrete Properties:

Compressive Strength of Concrete	=	4500. psi
Modulus of Elasticity of Concrete	=	3823676. psi
Modulus of Rupture of Concrete	=	-503.115295 psi
Compression Strain at Peak Stress	=	0.002001
Tensile Strain at Fracture of Concrete	=	-0.0001152
Maximum Coarse Aggregate Size	=	0.750000 in

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

Number	Axial Thrust Force kips
1	20.000

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

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
Position of neutral axis is measured from edge of compression side of pile.

Compressive stresses and strains are positive in sign.
Tensile stresses and strains are negative in sign.

Axial Thrust Force = 20.000 kips

Bending Max Conc Curvature rad/in.	Bending Max Steel Stress ksi	Bending Moment in-kip	Run Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Msg
6.25000E-07	485.6689187	777070270.		25.6875863	0.00001605	-0.00001020	
0.0713459	0.4617813						
0.00000125	969.5853813	775668305.		23.3495463	0.00002919	-0.00002331	
0.1291744	0.8388086						
0.00000188		1452.		774206646.	22.5702515	0.00004232	-0.00003643
0.1866232	1.2158387						
0.00000250		1932.		772729760.	22.1806248	0.00005545	-0.00004955
0.2436923	1.5928703						
0.00000313		2410.		771246753.	21.9468627	0.00006858	-0.00006267
0.3003815	1.9699032						
0.00000375		2887.		769760678.	21.7910318	0.00008172	-0.00007578
0.3566908	2.3469372						
0.00000438		3361.		768272849.	21.6797330	0.00009485	-0.00008890
0.4126202	2.7239723						
0.00000500		3834.		766783924.	21.5962669	0.0001080	-0.0001020
0.4681698	3.1010087						
0.00000563		4305.		765294267.	21.5313555	0.0001211	-0.0001151
0.5233394	3.4780461						
0.00000625		4305.		688764840.	13.2211649	0.00008263	-0.0001799
0.3583780	-5.1781013	C					
0.00000688		4305.		626149855.	13.0995609	0.00009006	-0.0001987
0.3898046	-5.7201563	C					
0.00000750		4305.		573970700.	12.9987638	0.00009749	-0.0002175
0.4211288	-6.2620939	C					
0.00000813		4305.		529819108.	12.9139734	0.0001049	-0.0002363
0.4523505	-6.8039137	C					
0.00000875		4305.		491974886.	12.8417611	0.0001124	-0.0002551
0.4834695	-7.3456156	C					
0.00000938		4305.		459176560.	12.7786133	0.0001198	-0.0002740
0.5144461	-7.8874707	C					
0.00001000		4305.		430478025.	12.7228650	0.0001272	-0.0002928
0.5452819	-8.4294691	C					
0.00001063		4305.		405155788.	12.6740704	0.0001347	-0.0003116
0.5760156	-8.9713458	C					

0.00001125	4305.	382647134.	12.6310717	0.0001421	-0.0003304
0.6066471	-9.5131003 C				
0.00001188	4305.	362507811.	12.5929548	0.0001495	-0.0003492
0.6371761	-10.0547324 C				
0.00001250	4305.	344382420.	12.5589883	0.0001570	-0.0003680
0.6676025	-10.5962417 C				
0.00001313	4305.	327983257.	12.5285804	0.0001644	-0.0003868
0.6979262	-11.1376278 C				
0.00001375	4305.	313074927.	12.5012466	0.0001719	-0.0004056
0.7281470	-11.6788904 C				
0.00001438	4305.	299462974.	12.4765868	0.0001794	-0.0004244
0.7582648	-12.2200291 C				
0.00001500	4305.	286985350.	12.4542677	0.0001868	-0.0004432
0.7882793	-12.7610435 C				
0.00001563	4305.	275505936.	12.4340091	0.0001943	-0.0004620
0.8181904	-13.3019333 C				
0.00001625	4305.	264909554.	12.4155742	0.0002018	-0.0004807
0.8479979	-13.8426986 C				
0.00001688	4305.	255098089.	12.3987610	0.0002092	-0.0004995
0.8777018	-14.3833380 C				
0.00001750	4305.	245987443.	12.3831712	0.0002167	-0.0005183
0.9072861	-14.9239655 C				
0.00001813	4305.	237505117.	12.3686258	0.0002242	-0.0005371
0.9367467	-15.4646101 C				
0.00001875	4305.	229588280.	12.3552897	0.0002317	-0.0005558
0.9661039	-16.0051240 C				
0.00001938	4333.	223622879.	12.3430464	0.0002391	-0.0005746
0.9953576	-16.5455073 C				
0.00002000	4465.	223264459.	12.3317944	0.0002466	-0.0005934
1.0245076	-17.0857595 C				
0.00002063	4598.	222923999.	12.3214441	0.0002541	-0.0006121
1.0535537	-17.6258802 C				
0.00002125	4730.	222599906.	12.3119166	0.0002616	-0.0006309
1.0824958	-18.1658690 C				
0.00002188	4863.	222290766.	12.3031422	0.0002691	-0.0006496
1.1113336	-18.7057256 C				
0.00002250	4995.	221995324.	12.2950585	0.0002766	-0.0006684
1.1400670	-19.2454494 C				
0.00002313	5127.	221712461.	12.2876104	0.0002842	-0.0006871
1.1686958	-19.7850401 C				
0.00002375	5259.	221441174.	12.2807482	0.0002917	-0.0007058
1.1972199	-20.3244973 C				
0.00002438	5391.	221180564.	12.2744274	0.0002992	-0.0007246
1.2256391	-20.8638204 C				
0.00002563	5655.	220688209.	12.2632540	0.0003142	-0.0007620
1.2821620	-21.9420635 C				
0.00002688	5919.	220229830.	12.2538142	0.0003293	-0.0007994
1.3382632	-23.0197651 C				

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0.00002813         6182.    219800825.    12.2458811     0.0003444    -0.0008368
 1.3939412   -24.0969221 C
0.00002938         6445.    219397385.    12.2392665     0.0003595    -0.0008742
 1.4491946   -25.1735312 C
0.00003063         6707.    219016319.    12.2338130     0.0003747    -0.0009116
 1.5040219   -26.2495886 C
0.00003188         6970.    218654940.    12.2293878     0.0003898    -0.0009489
 1.5584217   -27.3250909 C
0.00003313         7232.    218310962.    12.2258784     0.0004050    -0.0009863
 1.6123926   -28.4000343 C
0.00003438         7493.    217982434.    12.2231885     0.0004202    -0.0010236
 1.6659330   -29.4744152 C
0.00003563         7754.    217667676.    12.2212354     0.0004354    -0.0010609
 1.7190414   -30.5482298 C
0.00003688         8015.    217365238.    12.2199479     0.0004506    -0.0010981
 1.7717163   -31.6214744 C
0.00003813         8276.    217073855.    12.2192638     0.0004659    -0.0011354
 1.8239563   -32.6941451 C
0.00003938         8536.    216792428.    12.2191291     0.0004811    -0.0011726
 1.8757597   -33.7662381 C
0.00004063         8796.    216519987.    12.2194964     0.0004964    -0.0012098
 1.9271250   -34.8377494 C
0.00004188         9056.    216255682.    12.2203240     0.0005117    -0.0012470
 1.9780506   -35.9086751 C
0.00004313         9315.    215998758.    12.2215751     0.0005271    -0.0012842
 2.0285350   -36.9790112 C
0.00004438         9574.    215748545.    12.2232171     0.0005424    -0.0013213
 2.0785765   -38.0487536 C
0.00004563         9832.    215504448.    12.2252209     0.0005578    -0.0013585
 2.1281735   -39.1178982 C
0.00004688        10091.    215265932.    12.2275607     0.0005732    -0.0013956
 2.1773244   -40.1864409 C
0.00004813        10348.    215032519.    12.2302133     0.0005886    -0.0014327
 2.2260275   -41.2543773 C
0.00004938        10606.    214803778.    12.2331579     0.0006040    -0.0014697
 2.2742812   -42.3217033 C
0.00005063        10863.    214579321.    12.2363758     0.0006195    -0.0015068
 2.3220837   -43.3884145 C
0.00005188        11120.    214358796.    12.2398502     0.0006349    -0.0015438
 2.3694334   -44.4545066 C
0.00005313        11376.    214141883.    12.2435659     0.0006504    -0.0015808
 2.4163286   -45.5199750 C
0.00005438        11632.    213928294.    12.2475091     0.0006660    -0.0016178
 2.4627674   -46.5848154 C
0.00005563        11888.    213717763.    12.2516673     0.0006815    -0.0016548
 2.5087482   -47.6490231 C
0.00005688        12143.    213510049.    12.2560290     0.0006971    -0.0016917
 2.5542691   -48.7125935 C
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0.00005813        12398.    213304930.    12.2605840     0.0007126    -0.0017286
 2.5993285   -49.7755220 C
0.00005938        12653.    213102202.    12.2653228     0.0007283    -0.0017655
 2.6439243   -50.8378039 C
0.00006063        12907.    212901679.    12.2702366     0.0007439    -0.0018024
 2.6880549   -51.8994343 C
0.00006188        13161.    212703188.    12.2753177     0.0007595    -0.0018392
 2.7317183   -52.9604083 C
0.00006313        13414.    212506571.    12.2805588     0.0007752    -0.0018760
 2.7749128   -54.0207211 C
0.00006438        13668.    212311679.    12.2859533     0.0007909    -0.0019128
 2.8176363   -55.0803677 C
0.00006563        13920.    212118377.    12.2914950     0.0008066    -0.0019496
 2.8598869   -56.1393429 C
0.00006688        14173.    211926537.    12.2971783     0.0008224    -0.0019864
 2.9016628   -57.1976417 C
0.00006813        14425.    211736041.    12.3029980     0.0008381    -0.0020231
 2.9429620   -58.2552589 C
0.00006938        14676.    211546780.    12.3089495     0.0008539    -0.0020598
 2.9837825   -59.3121891 C
0.00007063        14927.    211358651.    12.3150283     0.0008697    -0.0020965
 3.0241222   -60.0000000 CY
0.00007188        15178.    211171558.    12.3212304     0.0008856    -0.0021332
 3.0639792   -60.0000000 CY
0.00007313        15428.    210985410.    12.3275521     0.0009015    -0.0021698
 3.1033513   -60.0000000 CY
0.00007438        15678.    210800124.    12.3339898     0.0009173    -0.0022064
 3.1422366   -60.0000000 CY
0.00007938        16666.    209962931.    12.3587435     0.0009810    -0.0023528
 3.2924786   -60.0000000 CY
0.00008438        17482.    207195136.    12.3439141     0.0010415    -0.0025022
 3.4271322   -60.0000000 CY
0.00008938        18047.    201926711.    12.2731334     0.0010969    -0.0026568
 3.5431771   -60.0000000 CY
0.00009438        18587.    196951708.    12.2075095     0.0011521    -0.0028117
 3.6521502   -60.0000000 CY
0.00009938        19060.    191793890.    12.1341860     0.0012058    -0.0029679
 3.7519323   -60.0000000 CY
 0.0001044        19369.    185568944.    12.0288711     0.0012555    -0.0031282
 3.8384643   -60.0000000 CY
 0.0001094        19666.    179805257.    11.9310123     0.0013050    -0.0032888
 3.9192955   -60.0000000 CY
 0.0001144        19961.    174519094.    11.8410177     0.0013543    -0.0034494
 3.9947422   -60.0000000 CY
 0.0001194        20253.    169658065.    11.7603564     0.0014039    -0.0036099
 4.0652405   -60.0000000 CY
 0.0001244        20543.    165167105.    11.6878119     0.0014537    -0.0037701
 4.1307057   -60.0000000 CY
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0.0001294        20796.    160743758.    11.6126955     0.0015024    -0.0039314
4.1895830   -60.0000000 CY
0.0001344        20964.    156014369.    11.5191798     0.0015479    -0.0040959
4.2398759   -60.0000000 CY
0.0001394        21097.    151372131.    11.4208400     0.0015918    -0.0042620
4.2841460   -60.0000000 CY
0.0001444        21229.    147042886.    11.3305029     0.0016358    -0.0044279
4.3244425   -60.0000000 CY
0.0001494        21360.    142995050.    11.2473840     0.0016801    -0.0045937
4.3607178   -60.0000000 CY
0.0001544        21489.    139201123.    11.1708009     0.0017245    -0.0047593
4.3929229   -60.0000000 CY
0.0001594        21616.    135632194.    11.0984063     0.0017688    -0.0049249
4.4208413   -60.0000000 CY
0.0001644        21741.    132266443.    11.0293009     0.0018129    -0.0050908
4.4444591   -60.0000000 CY
0.0001694        21865.    129091861.    10.9653768     0.0018573    -0.0052565
4.4639786   -60.0000000 CY
0.0001744        21987.    126091861.    10.9062091     0.0019018    -0.0054220
4.4793465   -60.0000000 CY
0.0001794        22108.    123251698.    10.8514210     0.0019465    -0.0055873
4.4905078   -60.0000000 CY
0.0001844        22228.    120558223.    10.8006775     0.0019914    -0.0057524
4.4974059   -60.0000000 CY
0.0001894        22346.    117999670.    10.7536801     0.0020365    -0.0059173
4.4999822   -60.0000000 CY
0.0001944        22454.    115518082.    10.7069234     0.0020812    -0.0060826
4.4980178   -60.0000000 CY
0.0001994        22544.    113070904.    10.6548040     0.0021243    -0.0062494
4.4999955    60.0000000 CY
0.0002044        22615.    110655181.    10.6000364     0.0021664    -0.0064174
4.4973113    60.0000000 CY
0.0002094        22666.    108257161.    10.5410831     0.0022070    -0.0065867
4.4997952    60.0000000 CY
0.0002144        22708.    105928614.    10.4826002     0.0022472    -0.0067565
4.4947070    60.0000000 CY
0.0002194        22748.    103694633.    10.4268443     0.0022874    -0.0069264
4.4985604    60.0000000 CY
0.0002244        22787.    101557714.    10.3741789     0.0023277    -0.0070960
4.4999911    60.0000000 CY
0.0002294        22825.     99509521.    10.3247213     0.0023682    -0.0072655
4.4951061    60.0000000 CY
0.0002344        22862.     97544557.    10.2769807     0.0024087    -0.0074351
4.4986233    60.0000000 CY
0.0002394        22897.     95654525.    10.2291389     0.0024486    -0.0076051
4.4999771    60.0000000 CY
0.0002444        22932.     93838328.    10.1840776     0.0024887    -0.0077750
4.4934269    60.0000000 CY
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   0.0002494        22966.     92093173.    10.1413179     0.0025290    -0.0079448
   4.4974359    60.0000000 CY
   0.0002544        22999.     90415148.    10.1006727     0.0025694    -0.0081144
   4.4995967    60.0000000 CY
   0.0002594        23032.     88799692.    10.0621597     0.0026099    -0.0082839
   4.4962395    60.0000000 CY
   0.0002644        23065.     87242864.    10.0257394     0.0026506    -0.0084532
   4.4941912    60.0000000 CY
   0.0002694        23097.     85742683.     9.9910342     0.0026913    -0.0086224
   4.4977485    60.0000000 CY
   0.0002744        23129.     84296032.     9.9579550     0.0027322    -0.0087915
   4.4996548    60.0000000 CY
   0.0003044        23308.     76576561.     9.7834518     0.0029778    -0.0098059
   4.4931107    60.0000000 CY
   0.0003344        23469.     70188176.     9.6488057     0.0032263    -0.0108174
   4.4880298    60.0000000 CYT
   0.0003644        23611.     64797812.     9.5543720     0.0034814    -0.0118224
   4.4899365    60.0000000 CYT
   0.0003944        23726.     60161379.     9.4846725     0.0037405    -0.0128232
   4.4997631    60.0000000 CYT
   0.0004244        23726.     55908439.     9.4570439     0.0040133    -0.0138104
   4.4984534    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           Axial Thrust        Nominal Mom. Cap.      Max. Comp.
  No.              kips                 in-kip               Strain
 ----         ----------------     ------------------     ------------
   1               20.000             23322.366           0.00300000

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

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

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

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

Axial Load No.	Resist. Factor for Moment	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in^2
1	0.65	23322.	13.000000	15160.	211185300.
1	0.70	23322.	14.000000	16326.	210251294.
1	0.75	23322.	15.000000	17492.	207104844.

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 = 8000.0 lbs
Applied moment at pile head = 2400000.0 in-lbs
Axial thrust load on pile head = 20000.0 lbs

Depth X	Deflect. y	Bending Moment	Shear Force	Slope S	Total Stress	Bending Stiffness	Soil Res. Es*h	Soil Spr. Distrib. p Lat. Load
feet	inches	in-lbs	lbs	radians	psi*	in-lb^2	lb/inch	lb/inch
0.00	0.3173	2400000.	8000.	-0.00164	0.00	7.71E+11	0.00	0.00
0.3500	0.3105	2433737.	8000.	-0.00162	0.00	7.71E+11	0.00	0.00
0.7000	0.3037	2467473.	8000.	-0.00161	0.00	7.71E+11	0.00	0.00
1.0500	0.2969	2501207.	8000.	-0.00160	0.00	7.71E+11	0.00	0.00
1.4000	0.2903	2534941.	8000.	-0.00158	0.00	7.71E+11	0.00	0.00
1.7500	0.2836	2568673.	8000.	-0.00157	0.00	7.71E+11	0.00	0.00
2.1000	0.2771	2602404.	8000.	-0.00155	0.00	7.71E+11	0.00	0.00

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    2.4500     0.2706   2636134.      8000.   -0.00154       0.00   7.70E+11
0.00       0.00       0.00
    2.8000     0.2641   2669863.      8000.   -0.00153       0.00   7.70E+11
0.00       0.00       0.00
    3.1500     0.2578   2703591.      8000.   -0.00151       0.00   7.70E+11
0.00       0.00       0.00
    3.5000     0.2515   2737317.      8000.   -0.00150       0.00   7.70E+11
0.00       0.00       0.00
    3.8500     0.2452   2771042.      8000.   -0.00148       0.00   7.70E+11
0.00       0.00       0.00
    4.2000     0.2390   2804766.      8000.   -0.00147       0.00   7.70E+11
0.00       0.00       0.00
    4.5500     0.2329   2838488.      8000.   -0.00145       0.00   7.70E+11
0.00       0.00       0.00
    4.9000     0.2268   2872209.      8000.   -0.00143       0.00   7.70E+11
0.00       0.00       0.00
    5.2500     0.2208   2905929.      8000.   -0.00142       0.00   7.70E+11
0.00       0.00       0.00
    5.6000     0.2149   2939648.      8000.   -0.00140       0.00   7.70E+11
0.00       0.00       0.00
    5.9500     0.2091   2973365.      8000.   -0.00139       0.00   7.69E+11
0.00       0.00       0.00
    6.3000     0.2033   3007081.      8000.   -0.00137       0.00   7.69E+11
0.00       0.00       0.00
    6.6500     0.1975   3040795.      8000.   -0.00135       0.00   7.69E+11
0.00       0.00       0.00
    7.0000     0.1919   3074508.      8000.   -0.00134       0.00   7.69E+11
0.00       0.00       0.00
    7.3500     0.1863   3108220.      8000.   -0.00132       0.00   7.69E+11
0.00       0.00       0.00
    7.7000     0.1808   3141930.      8000.   -0.00130       0.00   7.69E+11
0.00       0.00       0.00
    8.0500     0.1754   3175639.      8000.   -0.00129       0.00   7.69E+11
0.00       0.00       0.00
    8.4000     0.1700   3209346.      8000.   -0.00127       0.00   7.69E+11
0.00       0.00       0.00
    8.7500     0.1647   3243052.      8000.   -0.00125       0.00   7.69E+11
0.00       0.00       0.00
    9.1000     0.1595   3276756.      8000.   -0.00123       0.00   7.69E+11
0.00       0.00       0.00
    9.4500     0.1543   3310459.      8000.   -0.00122       0.00   7.68E+11
0.00       0.00       0.00
    9.8000     0.1493   3344161.      8000.   -0.00120       0.00   7.68E+11
0.00       0.00       0.00
   10.1500     0.1443   3377860.      7983.   -0.00118       0.00   7.68E+11
-8.1157   236.2502       0.00
   10.5000     0.1394   3411416.      7908.   -0.00116       0.00   7.68E+11
-27.6771   834.0901       0.00
```

10.8500	0.1345	3444481.	7749.	-0.00114	0.00	7.68E+11
-47.8311	1493.	0.00				
11.2000	0.1298	3476701.	7505.	-0.00112	0.00	7.68E+11
-68.2350	2208.	0.00				
11.5500	0.1251	3507715.	7176.	-0.00110	0.00	7.68E+11
-88.5540	2973.	0.00				
11.9000	0.1205	3537166.	6762.	-0.00108	0.00	7.68E+11
-108.9079	3796.	0.00				
12.2500	0.1160	3564695.	6261.	-0.00106	0.00	7.68E+11
-129.4948	4689.	0.00				
12.6000	0.1116	3589937.	5675.	-0.00105	0.00	7.68E+11
-149.6061	5632.	0.00				
12.9500	0.1072	3612539.	5006.	-0.00103	0.00	7.67E+11
-169.0008	6620.	0.00				
13.3000	0.1029	3632157.	4257.	-0.00101	0.00	7.67E+11
-187.4465	7647.	0.00				
13.6500	0.09877	3648468.	3433.	-9.86E-04	0.00	7.67E+11
-205.0866	8721.	0.00				
14.0000	0.09467	3661159.	2547.	-9.66E-04	0.00	7.67E+11
-216.7244	9615.	0.00				
14.3500	0.09065	3670026.	1618.	-9.46E-04	0.00	7.67E+11
-225.6940	10456.	0.00				
14.7000	0.08672	3674909.	654.1358	-9.26E-04	0.00	7.67E+11
-233.2824	11298.	0.00				
15.0500	0.08288	3675676.	-338.7923	-9.05E-04	0.00	7.67E+11
-239.5405	12139.	0.00				
15.4000	0.07912	3672215.	-1355.	-8.85E-04	0.00	7.67E+11
-244.5193	12980.	0.00				
15.7500	0.07544	3664440.	-2390.	-8.65E-04	0.00	7.67E+11
-248.2693	13822.	0.00				
16.1000	0.07185	3652283.	-3438.	-8.45E-04	0.00	7.67E+11
-250.8405	14663.	0.00				
16.4500	0.06834	3635700.	-4495.	-8.25E-04	0.00	7.67E+11
-252.2826	15504.	0.00				
16.8000	0.06492	3614665.	-5555.	-8.05E-04	0.00	7.67E+11
-252.6444	16346.	0.00				
17.1500	0.06158	3589172.	-6615.	-7.86E-04	0.00	7.68E+11
-251.9743	17187.	0.00				
17.5000	0.05832	3559232.	-7670.	-7.66E-04	0.00	7.68E+11
-250.3196	18028.	0.00				
17.8500	0.05514	3524875.	-8716.	-7.47E-04	0.00	7.68E+11
-247.7267	18870.	0.00				
18.2000	0.05204	3486146.	-9749.	-7.28E-04	0.00	7.68E+11
-244.2410	19711.	0.00				
18.5500	0.04903	3443107.	-10765.	-7.09E-04	0.00	7.68E+11
-239.9068	20552.	0.00				
18.9000	0.04609	3395835.	-11762.	-6.90E-04	0.00	7.68E+11
-234.7671	21394.	0.00				

19.2500	0.04323	3344420.	-12736.	-6.72E-04	0.00	7.68E+11
-228.8635	22235.	0.00				
19.6000	0.04045	3288966.	-13683.	-6.53E-04	0.00	7.68E+11
-222.2364	23076.	0.00				
19.9500	0.03774	3229591.	-14601.	-6.36E-04	0.00	7.69E+11
-214.9246	23918.	0.00				
20.3000	0.03511	3166423.	-15487.	-6.18E-04	0.00	7.69E+11
-206.9653	24759.	0.00				
20.6500	0.03255	3099602.	-16338.	-6.01E-04	0.00	7.69E+11
-198.3941	25600.	0.00				
21.0000	0.03006	3029281.	-17153.	-5.84E-04	0.00	7.69E+11
-189.2449	26442.	0.00				
21.3500	0.02764	2955619.	-17927.	-5.68E-04	0.00	7.70E+11
-179.5498	27283.	0.00				
21.7000	0.02529	2878789.	-18660.	-5.52E-04	0.00	7.70E+11
-169.3391	28124.	0.00				
22.0500	0.02300	2798971.	-19348.	-5.37E-04	0.00	7.70E+11
-158.6411	28966.	0.00				
22.4000	0.02078	2716353.	-19991.	-5.22E-04	0.00	7.70E+11
-147.4826	29807.	0.00				
22.7500	0.01862	2631132.	-20586.	-5.07E-04	0.00	7.70E+11
-135.8879	30648.	0.00				
23.1000	0.01652	2543513.	-21132.	-4.93E-04	0.00	7.71E+11
-123.8798	31489.	0.00				
23.4500	0.01448	2453707.	-21626.	-4.79E-04	0.00	7.71E+11
-111.4787	32331.	0.00				
23.8000	0.01250	2361934.	-22067.	-4.66E-04	0.00	7.71E+11
-98.7034	33172.	0.00				
24.1500	0.01057	2268418.	-22454.	-4.54E-04	0.00	7.72E+11
-85.5703	34013.	0.00				
24.5000	0.00869	2173392.	-22786.	-4.41E-04	0.00	7.72E+11
-72.0941	34855.	0.00				
24.8500	0.00686	2077094.	-23059.	-4.30E-04	0.00	7.72E+11
-58.2872	35696.	0.00				
25.2000	0.00508	1979766.	-23275.	-4.19E-04	0.00	7.73E+11
-44.1602	36537.	0.00				
25.5500	0.00334	1881658.	-23430.	-4.08E-04	0.00	7.73E+11
-29.7217	37379.	0.00				
25.9000	0.00165	1783025.	-23524.	-3.98E-04	0.00	7.73E+11
-14.9783	38220.	0.00				
26.2500	-7.02E-06	1684127.	-23555.	-3.89E-04	0.00	7.73E+11
0.06530	39061.	0.00				
26.6000	-0.00162	1585230.	-23522.	-3.80E-04	0.00	7.74E+11
15.4062	39903.	0.00				
26.9500	-0.00320	1486603.	-23425.	-3.72E-04	0.00	7.74E+11
31.0433	40744.	0.00				
27.3000	-0.00474	1388524.	-23261.	-3.64E-04	0.00	7.74E+11
46.9773	41585.	0.00				

27.6500	-0.00626	1291272.	-23030.	-3.57E-04	0.00	7.75E+11	
63.2106	42427.	0.00					
28.0000	-0.00774	1195135.	-22729.	-3.50E-04	0.00	7.75E+11	
79.7471	43268.	0.00					
28.3500	-0.00920	1100405.	-22359.	-3.44E-04	0.00	7.75E+11	
96.5921	44109.	0.00					
28.7000	-0.01063	1007377.	-21917.	-3.38E-04	0.00	7.76E+11	
113.7526	44951.	0.00					
29.0500	-0.01204	916356.	-21403.	-3.33E-04	0.00	7.76E+11	
131.2366	45792.	0.00					
29.4000	-0.01342	827649.	-20814.	-3.28E-04	0.00	7.76E+11	
149.0535	46633.	0.00					
29.7500	-0.01479	741571.	-20150.	-3.24E-04	0.00	7.76E+11	
167.2137	47475.	0.00					
30.1000	-0.01614	658443.	-19409.	-3.20E-04	0.00	7.76E+11	
185.7282	48316.	0.00					
30.4500	-0.01748	578590.	-18589.	-3.17E-04	0.00	7.77E+11	
204.6092	49157.	0.00					
30.8000	-0.01881	502347.	-17689.	-3.14E-04	0.00	7.77E+11	
223.8694	49999.	0.00					
31.1500	-0.02012	430052.	-16708.	-3.11E-04	0.00	7.77E+11	
243.5218	50840.	0.00					
31.5000	-0.02142	362053.	-15643.	-3.09E-04	0.00	7.77E+11	
263.5799	51681.	0.00					
31.8500	-0.02271	298703.	-14493.	-3.07E-04	0.00	7.77E+11	
284.0570	52523.	0.00					
32.2000	-0.02400	240364.	-13256.	-3.06E-04	0.00	7.77E+11	
304.9666	53364.	0.00					
32.5500	-0.02528	187405.	-11930.	-3.05E-04	0.00	7.77E+11	
326.3215	54205.	0.00					
32.9000	-0.02656	140201.	-10514.	-3.04E-04	0.00	7.77E+11	
348.1344	55047.	0.00					
33.2500	-0.02784	99139.	-9005.	-3.03E-04	0.00	7.77E+11	
370.4168	55888.	0.00					
33.6000	-0.02911	64611.	-7401.	-3.03E-04	0.00	7.77E+11	
393.1796	56729.	0.00					
33.9500	-0.03038	37018.	-5701.	-3.03E-04	0.00	7.77E+11	
416.4320	57570.	0.00					
34.3000	-0.03165	16771.	-3902.	-3.02E-04	0.00	7.77E+11	
440.1818	58412.	0.00					
34.6500	-0.03292	4289.	-2003.	-3.02E-04	0.00	7.77E+11	
464.4352	59253.	0.00					
35.0000	-0.03419	0.00	0.00	-3.02E-04	0.00	7.77E+11	
489.1959	30047.	0.00					

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual

stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 1:

Pile-head deflection	=	0.31729934 inches
Computed slope at pile head	=	-0.00163606 radians
Maximum bending moment	=	3675676. inch-lbs
Maximum shear force	=	-23555. lbs
Depth of maximum bending moment	=	15.05000000 feet below pile head
Depth of maximum shear force	=	26.25000000 feet below pile head
Number of iterations	=	6
Number of zero deflection points	=	1

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

Boundary Condition Type 1, Shear and Moment

Shear	=	8000. lbs
Moment	=	2400000. in-lbs
Axial Load	=	20000. lbs

Pile Length feet	Pile Head Deflection inches	Maximum Moment ln-lbs	Maximum Shear lbs
35.00000	0.31729934	3675676.	-23555.
33.25000	0.34842555	3670027.	-25707.
31.50000	0.40379333	3662899.	-28433.
29.75000	0.51489179	3652705.	-32052.
28.00000	0.75509836	3639385.	-36545.
26.25000	1.28075124	3626469.	-42052.
24.50000	2.54366904	3617397.	-48988.
22.75000	6.40125602	3652285.	-59478.

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 = 15000.0 lbs
Applied moment at pile head = 4500000.0 in-lbs
Axial thrust load on pile head = 20000.0 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*	in-lb^2	lb/inch	lb/inch	lb/inch
0.00	1.5441	4500000.	15000.	-0.00902	0.00	2.23E+11	0.00	0.00	0.00
0.3500	1.5064	4563754.	15000.	-0.00893	0.00	2.23E+11	0.00	0.00	0.00
0.7000	1.4690	4627500.	15000.	-0.00884	0.00	2.23E+11	0.00	0.00	0.00
1.0500	1.4321	4691239.	15000.	-0.00876	0.00	2.23E+11	0.00	0.00	0.00
1.4000	1.3955	4754971.	15000.	-0.00867	0.00	2.23E+11	0.00	0.00	0.00
1.7500	1.3593	4818695.	15000.	-0.00858	0.00	2.22E+11	0.00	0.00	0.00
2.1000	1.3235	4882412.	15000.	-0.00848	0.00	2.22E+11	0.00	0.00	0.00
2.4500	1.2880	4946121.	15000.	-0.00839	0.00	2.22E+11	0.00	0.00	0.00
2.8000	1.2530	5009822.	15000.	-0.00830	0.00	2.22E+11	0.00	0.00	0.00
3.1500	1.2183	5073515.	15000.	-0.00820	0.00	2.22E+11	0.00	0.00	0.00
3.5000	1.1841	5137200.	15000.	-0.00811	0.00	2.22E+11	0.00	0.00	0.00
3.8500	1.1502	5200877.	15000.	-0.00801	0.00	2.22E+11	0.00	0.00	0.00
4.2000	1.1168	5264545.	15000.	-0.00791	0.00	2.21E+11	0.00	0.00	0.00
4.5500	1.0838	5328205.	15000.	-0.00781	0.00	2.21E+11	0.00	0.00	0.00
4.9000	1.0512	5391857.	15000.	-0.00771	0.00	2.21E+11	0.00	0.00	0.00
5.2500	1.0191	5455500.	15000.	-0.00760	0.00	2.21E+11	0.00	0.00	0.00
5.6000	0.9873	5519134.	15000.	-0.00750	0.00	2.21E+11	0.00	0.00	0.00

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    5.9500     0.9561   5582760.     15000.   -0.00739       0.00   2.21E+11
0.00       0.00       0.00
    6.3000     0.9252   5646376.     15000.   -0.00729       0.00   2.21E+11
0.00       0.00       0.00
    6.6500     0.8949   5709984.     15000.   -0.00718       0.00   2.21E+11
0.00       0.00       0.00
    7.0000     0.8649   5773582.     15000.   -0.00707       0.00   2.20E+11
0.00       0.00       0.00
    7.3500     0.8355   5837171.     15000.   -0.00696       0.00   2.20E+11
0.00       0.00       0.00
    7.7000     0.8065   5900751.     15000.   -0.00685       0.00   2.20E+11
0.00       0.00       0.00
    8.0500     0.7780   5964322.     15000.   -0.00673       0.00   2.20E+11
0.00       0.00       0.00
    8.4000     0.7499   6027882.     15000.   -0.00662       0.00   2.20E+11
0.00       0.00       0.00
    8.7500     0.7224   6091433.     15000.   -0.00650       0.00   2.20E+11
0.00       0.00       0.00
    9.1000     0.6953   6154975.     15000.   -0.00639       0.00   2.20E+11
0.00       0.00       0.00
    9.4500     0.6687   6218506.     15000.   -0.00627       0.00   2.20E+11
0.00       0.00       0.00
    9.8000     0.6427   6282028.     15000.   -0.00615       0.00   2.20E+11
0.00       0.00       0.00
   10.1500     0.6171   6345539.     14975.   -0.00603       0.00   2.20E+11
-11.8400    80.5851       0.00
   10.5000     0.5920   6408832.     14865.   -0.00591       0.00   2.19E+11
-40.5839   287.9135       0.00
   10.8500     0.5675   6471398.     14632.   -0.00578       0.00   2.19E+11
-70.5145   521.8880       0.00
   11.2000     0.5435   6532710.     14271.   -0.00566       0.00   2.19E+11
-101.1703   781.8795       0.00
   11.5500     0.5200   6592226.     13781.   -0.00553       0.00   2.19E+11
-132.0957      1067.       0.00
   11.9000     0.4970   6649402.     13161.   -0.00541       0.00   2.19E+11
-163.0968      1378.       0.00
   12.2500     0.4745   6703691.     12411.   -0.00528       0.00   2.19E+11
-194.0672      1718.       0.00
   12.6000     0.4527   6754545.     11533.   -0.00515       0.00   2.19E+11
-224.3904      2082.       0.00
   12.9500     0.4313   6801430.     10529.   -0.00502       0.00   2.19E+11
-253.7150      2471.       0.00
   13.3000     0.4105   6843828.      9404.   -0.00489       0.00   2.19E+11
-281.7033      2882.       0.00
   13.6500     0.3902   6881246.      8165.   -0.00476       0.00   2.19E+11
-308.4406      3320.       0.00
   14.0000     0.3706   6913213.      6816.   -0.00462       0.00   2.19E+11
-333.9437      3785.       0.00
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14.3500	0.3514	6939277.	5364.	-0.00449	0.00	2.19E+11
-357.4649	4272.	0.00				
14.7000	0.3328	6959024.	3818.	-0.00436	0.00	2.19E+11
-378.7457	4779.	0.00				
15.0500	0.3148	6972079.	2188.	-0.00422	0.00	2.19E+11
-397.5432	5304.	0.00				
15.4000	0.2974	6978110.	481.2911	-0.00409	0.00	2.19E+11
-415.0408	5862.	0.00				
15.7500	0.2805	6976809.	-1297.	-0.00395	0.00	2.19E+11
-431.8805	6467.	0.00				
16.1000	0.2641	6967878.	-3141.	-0.00382	0.00	2.19E+11
-446.1478	7094.	0.00				
16.4500	0.2484	6951066.	-5039.	-0.00369	0.00	2.19E+11
-457.6711	7739.	0.00				
16.8000	0.2332	6926169.	-6979.	-0.00355	0.00	2.19E+11
-466.2949	8399.	0.00				
17.1500	0.2185	6893035.	-8953.	-0.00342	0.00	2.19E+11
-473.5092	9101.	0.00				
17.5000	0.2044	6851538.	-10956.	-0.00329	0.00	2.19E+11
-480.1255	9864.	0.00				
17.8500	0.1909	6801560.	-12980.	-0.00316	0.00	2.19E+11
-484.0342	10650.	0.00				
18.2000	0.1779	6743033.	-15016.	-0.00303	0.00	2.19E+11
-485.1593	11454.	0.00				
18.5500	0.1655	6675937.	-17050.	-0.00290	0.00	2.19E+11
-483.4413	12272.	0.00				
18.9000	0.1535	6600302.	-19072.	-0.00277	0.00	2.19E+11
-479.4452	13115.	0.00				
19.2500	0.1422	6516199.	-21072.	-0.00265	0.00	2.19E+11
-473.2429	13981.	0.00				
19.6000	0.1313	6423738.	-23041.	-0.00252	0.00	2.19E+11
-463.9607	14840.	0.00				
19.9500	0.1210	6323082.	-24963.	-0.00240	0.00	2.20E+11
-451.6027	15679.	0.00				
20.3000	0.1111	6214450.	-26828.	-0.00228	0.00	2.20E+11
-436.2069	16484.	0.00				
20.6500	0.1018	6098113.	-28628.	-0.00216	0.00	2.20E+11
-420.9306	17365.	0.00				
21.0000	0.09297	5974341.	-30367.	-0.00205	0.00	2.20E+11
-407.1088	18392.	0.00				
21.3500	0.08460	5843378.	-32042.	-0.00194	0.00	2.20E+11
-390.8165	19401.	0.00				
21.7000	0.07671	5705511.	-33645.	-0.00183	0.00	2.21E+11
-372.1864	20378.	0.00				
22.0500	0.06927	5561071.	-35164.	-0.00172	0.00	2.21E+11
-351.3917	21306.	0.00				
22.4000	0.06227	5410422.	-36592.	-0.00161	0.00	2.21E+11
-328.6480	22166.	0.00				

22.7500	0.05571	5253968.	-37921.	-0.00151	0.00	2.21E+11	-304.2144	22936.	0.00
23.1000	0.04956	5092139.	-39145.	-0.00142	0.00	2.22E+11	-278.3937	23591.	0.00
23.4500	0.04382	4925391.	-40257.	-0.00132	0.00	2.22E+11	-251.5319	24107.	0.00
23.8000	0.03847	4754198.	-41256.	-0.00123	0.00	2.23E+11	-224.0153	24455.	0.00
24.1500	0.03350	4579046.	-42153.	-0.00114	0.00	2.23E+11	-203.2981	25488.	0.00
24.5000	0.02889	4400301.	-42982.	-0.00106	0.00	2.23E+11	-191.2828	27809.	0.00
24.8500	0.02463	4218174.	-43758.	-0.00100	0.00	7.66E+11	-178.3417	30415.	0.00
25.2000	0.02046	4032900.	-44476.	-9.81E-04	0.00	7.66E+11	-163.4120	33543.	0.00
25.5500	0.01639	3844741.	-45125.	-9.59E-04	0.00	7.67E+11	-145.8513	37379.	0.00
25.9000	0.01240	3654008.	-45669.	-9.39E-04	0.00	7.67E+11	-112.8761	38220.	0.00
26.2500	0.00850	3461281.	-46072.	-9.19E-04	0.00	7.68E+11	-79.0858	39061.	0.00
26.6000	0.00468	3267158.	-46331.	-9.01E-04	0.00	7.69E+11	-44.4884	39903.	0.00
26.9500	9.37E-04	3072249.	-46444.	-8.83E-04	0.00	7.69E+11	-9.0876	40744.	0.00
27.3000	-0.00274	2877178.	-46406.	-8.67E-04	0.00	7.70E+11	27.1162	41585.	0.00
27.6500	-0.00635	2682584.	-46214.	-8.52E-04	0.00	7.70E+11	64.1264	42427.	0.00
28.0000	-0.00990	2489120.	-45866.	-8.38E-04	0.00	7.71E+11	101.9499	43268.	0.00
28.3500	-0.01339	2297454.	-45356.	-8.25E-04	0.00	7.72E+11	140.5968	44109.	0.00
28.7000	-0.01683	2108266.	-44683.	-8.13E-04	0.00	7.72E+11	180.0801	44951.	0.00
29.0500	-0.02022	1922254.	-43842.	-8.02E-04	0.00	7.73E+11	220.4158	45792.	0.00
29.4000	-0.02356	1740129.	-42830.	-7.92E-04	0.00	7.73E+11	261.6227	46633.	0.00
29.7500	-0.02687	1562619.	-41642.	-7.83E-04	0.00	7.74E+11	303.7215	47475.	0.00
30.1000	-0.03014	1390465.	-40276.	-7.75E-04	0.00	7.74E+11	346.7353	48316.	0.00
30.4500	-0.03338	1224427.	-38728.	-7.68E-04	0.00	7.75E+11	390.6890	49157.	0.00
30.8000	-0.03659	1065281.	-36993.	-7.62E-04	0.00	7.75E+11	435.6086	49999.	0.00

```
   31.1500   -0.03978    913818.    -35067.  -7.56E-04       0.00   7.76E+11
481.5215     50840.       0.00
   31.5000   -0.04295    770849.    -32946.  -7.52E-04       0.00   7.76E+11
528.4557     51681.       0.00
   31.8500   -0.04610    637201.    -30625.  -7.48E-04       0.00   7.76E+11
576.4395     52523.       0.00
   32.2000   -0.04923    513721.    -28101.  -7.45E-04       0.00   7.77E+11
625.5009     53364.       0.00
   32.5500   -0.05235    401275.    -25369.  -7.42E-04       0.00   7.77E+11
675.6676     54205.       0.00
   32.9000   -0.05547    300748.    -22423.  -7.41E-04       0.00   7.77E+11
726.9661     55047.       0.00
   33.2500   -0.05857    213044.    -19260.  -7.39E-04       0.00   7.77E+11
779.4213     55888.       0.00
   33.6000   -0.06168    139089.    -15874.  -7.38E-04       0.00   7.77E+11
833.0559     56729.       0.00
   33.9500   -0.06478     79829.    -12260.  -7.38E-04       0.00   7.77E+11
887.8901     57570.       0.00
   34.3000   -0.06787     36231.     -8413.  -7.37E-04       0.00   7.77E+11
943.9406     58412.       0.00
   34.6500   -0.07097      9285.     -4328.  -7.37E-04       0.00   7.77E+11
1001.     59253.       0.00
   35.0000   -0.07407       0.00       0.00  -7.37E-04       0.00   7.77E+11
1060.     30047.       0.00

* This analysis computed pile response using nonlinear moment-curvature rela-
  tionships. 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 inter-
  polated 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             =     1.54405421 inches
Computed slope at pile head      =    -0.00901547 radians
Maximum bending moment           =       6978110. inch-lbs
Maximum shear force              =        -46444. lbs
Depth of maximum bending moment  =    15.40000000 feet below pile head
Depth of maximum shear force     =    26.95000000 feet below pile head
Number of iterations             =             60
Number of zero deflection points =              1
```

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

Boundary Condition Type 1, Shear and Moment

```
Shear      =          15000. lbs
Moment     =        4500000. in-lbs
Axial Load =          20000. lbs
```

Pile Length feet	Pile Head Deflection inches	Maximum Moment ln-lbs	Maximum Shear lbs
35.00000	1.54405421	6978110.	-46444.
33.25000	1.67163262	6966434.	-51745.
31.50000	1.92526708	6948143.	-58045.
29.75000	2.43218447	6923283.	-65491.
28.00000	3.43039932	6889638.	-74092.
26.25000	5.95019107	6907100.	-86419.

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

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

```
Shear force at pile head                              =      12000.0 lbs
Applied moment at pile head                           =    3640000.0 in-lbs
Axial thrust load on pile head                        =      20000.0 lbs
```

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness Es*h in-lb^2	Soil Res. Soil Spr. Distrib. p Lat. Load lb/inch	lb/inch	lb/inch
0.00	1.0554	3640000.	12000.	-0.00596	0.00	7.67E+11	0.00	0.00	0.00
0.3500	1.0304	3690900.	12000.	-0.00594	0.00	7.67E+11	0.00	0.00	0.00
0.7000	1.0055	3741798.	12000.	-0.00592	0.00	7.67E+11	0.00	0.00	0.00
1.0500	0.9807	3792694.	12000.	-0.00590	0.00	7.67E+11	0.00	0.00	0.00

1.4000	0.9560	3843589.	12000.	-0.00588	0.00	7.67E+11	0.00	0.00	0.00
1.7500	0.9313	3894482.	12000.	-0.00586	0.00	7.67E+11	0.00	0.00	0.00
2.1000	0.9068	3945373.	12000.	-0.00583	0.00	7.66E+11	0.00	0.00	0.00
2.4500	0.8823	3996262.	12000.	-0.00581	0.00	7.66E+11	0.00	0.00	0.00
2.8000	0.8580	4047149.	12000.	-0.00579	0.00	7.66E+11	0.00	0.00	0.00
3.1500	0.8337	4098035.	12000.	-0.00577	0.00	7.66E+11	0.00	0.00	0.00
3.5000	0.8095	4148918.	12000.	-0.00575	0.00	7.66E+11	0.00	0.00	0.00
3.8500	0.7854	4199800.	12000.	-0.00572	0.00	7.66E+11	0.00	0.00	0.00
4.2000	0.7614	4250680.	12000.	-0.00570	0.00	7.65E+11	0.00	0.00	0.00
4.5500	0.7375	4301558.	12000.	-0.00568	0.00	7.65E+11	0.00	0.00	0.00
4.9000	0.7138	4352433.	12000.	-0.00562	0.00	2.24E+11	0.00	0.00	0.00
5.2500	0.6903	4403302.	12000.	-0.00554	0.00	2.23E+11	0.00	0.00	0.00
5.6000	0.6672	4454164.	12000.	-0.00546	0.00	2.23E+11	0.00	0.00	0.00
5.9500	0.6445	4505019.	12000.	-0.00537	0.00	2.23E+11	0.00	0.00	0.00
6.3000	0.6221	4555867.	12000.	-0.00529	0.00	2.23E+11	0.00	0.00	0.00
6.6500	0.6000	4606708.	12000.	-0.00520	0.00	2.23E+11	0.00	0.00	0.00
7.0000	0.5784	4657541.	12000.	-0.00512	0.00	2.23E+11	0.00	0.00	0.00
7.3500	0.5571	4708367.	12000.	-0.00503	0.00	2.23E+11	0.00	0.00	0.00
7.7000	0.5361	4759186.	12000.	-0.00494	0.00	2.23E+11	0.00	0.00	0.00
8.0500	0.5156	4809997.	12000.	-0.00485	0.00	2.22E+11	0.00	0.00	0.00
8.4000	0.4954	4860800.	12000.	-0.00476	0.00	2.22E+11	0.00	0.00	0.00
8.7500	0.4756	4911596.	12000.	-0.00466	0.00	2.22E+11	0.00	0.00	0.00
9.1000	0.4563	4962384.	12000.	-0.00457	0.00	2.22E+11	0.00	0.00	0.00
9.4500	0.4373	5013163.	12000.	-0.00448	0.00	2.22E+11	0.00	0.00	0.00

9.8000	0.4187	5063935.	12000.	-0.00438	0.00	2.22E+11
0.00	0.00	0.00				
10.1500	0.4005	5114699.	11978.	-0.00428	0.00	2.22E+11
-10.5815	110.9790	0.00				
10.5000	0.3827	5165269.	11880.	-0.00419	0.00	2.22E+11
-36.1579	396.8529	0.00				
10.8500	0.3653	5215192.	11672.	-0.00409	0.00	2.22E+11
-62.6168	719.9490	0.00				
11.2000	0.3483	5264002.	11353.	-0.00399	0.00	2.21E+11
-89.5219	1079.	0.00				
11.5500	0.3318	5311224.	10920.	-0.00389	0.00	2.21E+11
-116.4446	1474.	0.00				
11.9000	0.3157	5356385.	10375.	-0.00379	0.00	2.21E+11
-143.3054	1907.	0.00				
12.2500	0.3000	5399008.	9717.	-0.00369	0.00	2.21E+11
-170.1177	2382.	0.00				
12.6000	0.2847	5438622.	8947.	-0.00358	0.00	2.21E+11
-196.2097	2894.	0.00				
12.9500	0.2699	5474767.	8071.	-0.00348	0.00	2.21E+11
-221.2658	3443.	0.00				
13.3000	0.2555	5506999.	7091.	-0.00337	0.00	2.21E+11
-244.9848	4027.	0.00				
13.6500	0.2415	5534901.	6015.	-0.00327	0.00	2.21E+11
-267.4779	4651.	0.00				
14.0000	0.2280	5558076.	4847.	-0.00316	0.00	2.21E+11
-288.7874	5319.	0.00				
14.3500	0.2150	5576148.	3593.	-0.00306	0.00	2.21E+11
-308.2142	6022.	0.00				
14.7000	0.2023	5588774.	2262.	-0.00295	0.00	2.21E+11
-325.5367	6757.	0.00				
15.0500	0.1902	5595649.	863.7113	-0.00285	0.00	2.21E+11
-340.5499	7521.	0.00				
15.4000	0.1784	5596508.	-595.3967	-0.00274	0.00	2.21E+11
-354.2634	8339.	0.00				
15.7500	0.1672	5591108.	-2111.	-0.00263	0.00	2.21E+11
-367.2217	9227.	0.00				
16.1000	0.1563	5579222.	-3675.	-0.00253	0.00	2.21E+11
-377.8047	10151.	0.00				
16.4500	0.1459	5560662.	-5279.	-0.00242	0.00	2.21E+11
-385.8795	11106.	0.00				
16.8000	0.1360	5535286.	-6911.	-0.00231	0.00	2.21E+11
-391.3313	12086.	0.00				
17.1500	0.1265	5502999.	-8564.	-0.00221	0.00	2.21E+11
-395.6015	13136.	0.00				
17.5000	0.1174	5463724.	-10233.	-0.00211	0.00	2.21E+11
-399.4730	14288.	0.00				
17.8500	0.1088	5417394.	-11914.	-0.00200	0.00	2.21E+11
-400.9799	15479.	0.00				

18.2000	0.1006	5363982.	-13596.	-0.00190	0.00	2.21E+11
-400.0857	16702.	0.00				
18.5500	0.09284	5303504.	-15270.	-0.00180	0.00	2.21E+11
-396.7718	17949.	0.00				
18.9000	0.08550	5236018.	-16924.	-0.00170	0.00	2.21E+11
-391.1137	19213.	0.00				
19.2500	0.07857	5161625.	-18550.	-0.00160	0.00	2.22E+11
-383.0338	20475.	0.00				
19.6000	0.07205	5080467.	-20136.	-0.00150	0.00	2.22E+11
-372.4295	21709.	0.00				
19.9500	0.06594	4992731.	-21673.	-0.00141	0.00	2.22E+11
-359.3808	22890.	0.00				
20.3000	0.06023	4898648.	-23150.	-0.00131	0.00	2.22E+11
-344.0045	23990.	0.00				
20.6500	0.05490	4798488.	-24563.	-0.00122	0.00	2.22E+11
-328.8627	25159.	0.00				
21.0000	0.04995	4692520.	-25914.	-0.00113	0.00	2.23E+11
-314.4967	26442.	0.00				
21.3500	0.04538	4580997.	-27194.	-0.00105	0.00	2.23E+11
-294.7904	27283.	0.00				
21.7000	0.04117	4464266.	-28392.	-9.61E-04	0.00	2.23E+11
-275.6785	28124.	0.00				
22.0500	0.03731	4342666.	-29511.	-8.78E-04	0.00	2.24E+11
-257.3118	28966.	0.00				
22.4000	0.03379	4216519.	-30555.	-8.26E-04	0.00	7.66E+11
-239.8305	29807.	0.00				
22.7500	0.03037	4086141.	-31524.	-8.03E-04	0.00	7.66E+11
-221.6494	30648.	0.00				
23.1000	0.02705	3951850.	-32416.	-7.81E-04	0.00	7.66E+11
-202.8040	31489.	0.00				
23.4500	0.02382	3813980.	-33225.	-7.60E-04	0.00	7.67E+11
-182.5465	32193.	0.00				
23.8000	0.02067	3672888.	-33943.	-7.39E-04	0.00	7.67E+11
-159.5535	32422.	0.00				
24.1500	0.01761	3528980.	-34576.	-7.19E-04	0.00	7.68E+11
-141.7606	33816.	0.00				
24.5000	0.01463	3382569.	-35129.	-7.00E-04	0.00	7.68E+11
-121.3795	34855.	0.00				
24.8500	0.01172	3234016.	-35593.	-6.82E-04	0.00	7.69E+11
-99.6350	35696.	0.00				
25.2000	0.00889	3083704.	-35965.	-6.65E-04	0.00	7.69E+11
-77.3730	36537.	0.00				
25.5500	0.00614	2932026.	-36242.	-6.49E-04	0.00	7.70E+11
-54.6071	37379.	0.00				
25.9000	0.00344	2779383.	-36422.	-6.33E-04	0.00	7.70E+11
-31.3478	38220.	0.00				
26.2500	8.17E-04	2626185.	-36504.	-6.18E-04	0.00	7.71E+11
-7.6025	39061.	0.00				

26.6000	-0.00175	2472853.	-36485.	-6.05E-04	0.00	7.71E+11
16.6242	39903.	0.00				
26.9500	-0.00426	2319812.	-36363.	-5.91E-04	0.00	7.71E+11
41.3306	40744.	0.00				
27.3000	-0.00672	2167500.	-36137.	-5.79E-04	0.00	7.72E+11
66.5176	41585.	0.00				
27.6500	-0.00913	2016360.	-35804.	-5.68E-04	0.00	7.72E+11
92.1889	42427.	0.00				
28.0000	-0.01149	1866845.	-35361.	-5.57E-04	0.00	7.73E+11
118.3505	43268.	0.00				
28.3500	-0.01381	1719417.	-34808.	-5.48E-04	0.00	7.73E+11
145.0109	44109.	0.00				
28.7000	-0.01609	1574546.	-34142.	-5.39E-04	0.00	7.74E+11
172.1808	44951.	0.00				
29.0500	-0.01833	1432712.	-33361.	-5.30E-04	0.00	7.74E+11
199.8728	45792.	0.00				
29.4000	-0.02054	1294403.	-32462.	-5.23E-04	0.00	7.75E+11
228.1016	46633.	0.00				
29.7500	-0.02273	1160117.	-31444.	-5.16E-04	0.00	7.75E+11
256.8832	47475.	0.00				
30.1000	-0.02488	1030362.	-30303.	-5.10E-04	0.00	7.75E+11
286.2352	48316.	0.00				
30.4500	-0.02701	905656.	-29038.	-5.05E-04	0.00	7.76E+11
316.1766	49157.	0.00				
30.8000	-0.02913	786527.	-27646.	-5.01E-04	0.00	7.76E+11
346.7271	49999.	0.00				
31.1500	-0.03122	673513.	-26124.	-4.97E-04	0.00	7.76E+11
377.9072	50840.	0.00				
31.5000	-0.03330	567166.	-24470.	-4.93E-04	0.00	7.77E+11
409.7378	51681.	0.00				
31.8500	-0.03536	468046.	-22681.	-4.91E-04	0.00	7.77E+11
442.2401	52523.	0.00				
32.2000	-0.03742	376727.	-20754.	-4.88E-04	0.00	7.77E+11
475.4350	53364.	0.00				
32.5500	-0.03947	293794.	-18686.	-4.86E-04	0.00	7.77E+11
509.3428	54205.	0.00				
32.9000	-0.04151	219846.	-16474.	-4.85E-04	0.00	7.77E+11
543.9831	55047.	0.00				
33.2500	-0.04354	155494.	-14115.	-4.84E-04	0.00	7.77E+11
579.3742	55888.	0.00				
33.6000	-0.04557	101362.	-11606.	-4.83E-04	0.00	7.77E+11
615.5328	56729.	0.00				
33.9500	-0.04760	58088.	-8943.	-4.83E-04	0.00	7.77E+11
652.4738	57570.	0.00				
34.3000	-0.04963	26323.	-6123.	-4.83E-04	0.00	7.77E+11
690.2092	58412.	0.00				
34.6500	-0.05166	6734.	-3143.	-4.83E-04	0.00	7.77E+11
728.7486	59253.	0.00				

```
   35.0000   -0.05368       0.00       0.00  -4.83E-04       0.00   7.77E+11
768.0979     30047.       0.00
```

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

Output Summary for Load Case No. 3:

```
Pile-head deflection             =     1.05542783 inches
Computed slope at pile head      =    -0.00595942 radians
Maximum bending moment           =       5596508. inch-lbs
Maximum shear force              =        -36504. lbs
Depth of maximum bending moment  =    15.40000000 feet below pile head
Depth of maximum shear force     =    26.25000000 feet below pile head
Number of iterations             =            120
Number of zero deflection points =              1
```

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

Boundary Condition Type 1, Shear and Moment

```
Shear      =          12000. lbs
Moment     =        3640000. in-lbs
Axial Load =          20000. lbs
```

Pile Length feet	Pile Head Deflection inches	Maximum Moment ln-lbs	Maximum Shear lbs
35.00000	1.05542783	5596508.	-36504.
33.25000	1.12891203	5588036.	-40585.
31.50000	1.27984799	5574488.	-45444.
29.75000	1.57905911	5557244.	-51265.
28.00000	2.20453389	5537248.	-58348.
26.25000	3.52851662	5513233.	-66671.
24.50000	8.09904335	5565712.	-81483.

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Summary of Pile-head Responses for Conventional Analyses

Definitions of Pile-head Loading Conditions:

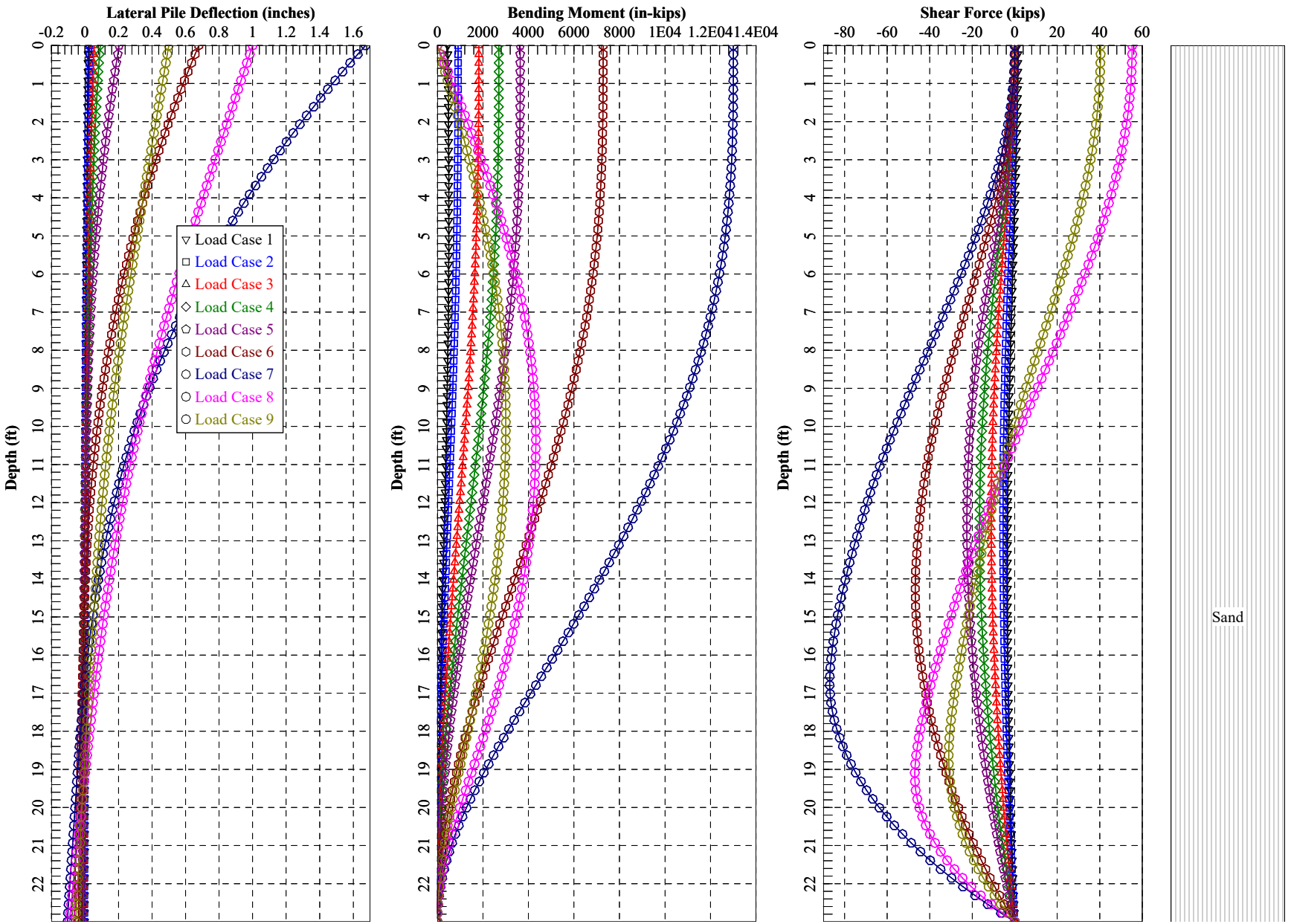
Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.
Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs
Load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

Load Case No.	Load Type 1	Pile-head Load 1	Load Type 2	Pile-head Load 2	Axial Loading lbs	Pile-head Deflection inches	Pile-head Rotation radians	Max Shear in Pile lbs	Max Moment in Pile in-lbs
1	V, lb	8000.	M, in-lb	2400000.	20000.	0.3173	-0.00164	-23555.	3675676.
2	V, lb	15000.	M, in-lb	4500000.	20000.	1.5441	-0.00902	-46444.	6978110.
3	V, lb	12000.	M, in-lb	3640000.	20000.	1.0554	-0.00596	-36504.	5596508.

Maximum pile-head deflection = 1.5440542089 inches
Maximum pile-head rotation = -0.0090154687 radians = -0.516548 deg.

The analysis ended normally.

Sign Structure Type VII


Lateral Pile Deflection (inches)
-0.2 0 0.2 0.4 0.6 0.8 1 1.2 1.4 1.6
Depth (ft)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22
Load Case 1
Load Case 2
Load Case 3
Load Case 4
Load Case 5
Load Case 6
Load Case 7
Load Case 8
Load Case 9
Bending Moment (in-kips)
0 2000 4000 6000 8000 1E04 1.2E04 1.4E04
Depth (ft)
Shear Force (kips)
-80 -60 -40 -20 0 20 40 60
Depth (ft)
Sand

Special-sign-structure-TypeVII.lp9o

LPile for Windows, Version 2016-09.010

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

This copy of LPile is being used by:

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Files Used for Analysis

Path to file locations:
\PROJECTS\Engineering & Enviro Projects\2019 Projects\G-19-192 I-515 Charleston Interchange - CA Group\DESIGN\Special Sign Structures\Revised-2-3-2021\

Name of input data file:
Special-sign-structure-TypeVII.lp9d

Name of output report file:
Special-sign-structure-TypeVII.lp9o

Name of plot output file:
Special-sign-structure-TypeVII.lp9p

Name of runtime message file:
Special-sign-structure-TypeVII.lp9r

Special-sign-structure-TypeVII.lp9o
Date and Time of Analysis

Date: April 21, 2021 Time: 11:18:06

Problem Title

I-515 Charleston

G-19-192

CA Group

NOVA

L1 977+15.00 Tyoe VII Post

Program Options and Settings

Computational Options:
- Use unfactored loads in computations (conventional analysis)

Engineering Units Used for Data Input and Computations:
- US Customary System Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed	=	500
- Deflection tolerance for convergence	=	1.0000E-05 in
- Maximum allowable deflection	=	100.0000 in
- Number of pile increments	=	100

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

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

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

Pile Structural Properties and Geometry

Number of pile sections defined	=	1
Total length of pile	=	23.000 ft
Depth of ground surface below top of pile	=	0.0000 ft

Pile diameters 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. A summary of values of pile diameter vs. depth follows.

Point No.	Depth Below Pile Head feet	Pile Diameter inches
1	0.000	36.0000
2	23.000	36.0000

Input Structural Properties for Pile Sections:

Pile Section No. 1:

Section 1 is a round drilled shaft, bored pile, or CIDH pile

Length of section	=	23.000000 ft
Shaft Diameter	=	36.000000 in
Shear capacity of section	=	0.0000 lbs

Ground Slope and Pile Batter Angles

Ground Slope Angle	=	26.600 degrees
	=	0.464 radians
Pile Batter Angle	=	0.000 degrees
	=	0.000 radians

Soil and Rock Layering Information

The soil profile is modelled using 1 layers

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

Distance from top of pile to top of layer	=	0.0000 ft
Distance from top of pile to bottom of layer	=	30.000000 ft
Effective unit weight at top of layer	=	120.000000 pcf
Effective unit weight at bottom of layer	=	120.000000 pcf
Friction angle at top of layer	=	32.000000 deg.
Friction angle at bottom of layer	=	32.000000 deg.
Subgrade k at top of layer	=	0.0000 pci
Subgrade k at bottom of layer	=	0.0000 pci

NOTE: Default values for subgrade k will be computed for this layer.

(Depth of the lowest soil layer extends 7.000 ft below the pile tip)

Summary of Input Soil Properties

Layer	Soil Type	Layer	Effective	Angle of

Layer Num.	Name (p-y Curve Type)	Depth ft	Unit Wt. pcf	Friction deg.	kpy pci
1	Sand	0.00	120.0000	32.0000	default
	(Reese, et al.)	30.0000	120.0000	32.0000	default

Static Loading Type

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

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 9

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length
1	1	V = 1500. lbs	M = 455000. in-lbs	20000.	No
2	1	V = 0.0000 lbs	M = 910000. in-lbs	20000.	No
3	1	V = 0.0000 lbs	M = 1820000. in-lbs	20000.	No
4	1	V = 0.0000 lbs	M = 2700000. in-lbs	20000.	No
5	1	V = 0.0000 lbs	M = 3640000. in-lbs	20000.	No
6	1	V = 0.0000 lbs	M = 7280000. in-lbs	20000.	No
7	1	V = 0.0000 lbs	M = 13000000. in-lbs	20000.	No
8	4	y = 1.000000 in	M = 0.0000 in-lbs	20000.	N.A.
9	4	y = 0.500000 in	M = 0.0000 in-lbs	20000.	N.A.

V = shear force applied normal to pile axis
M = bending moment applied to pile head

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

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

---

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):

Length of Section	=	23.000000 ft
Shaft Diameter	=	36.000000 in
Concrete Cover Thickness	=	3.000000 in
Number of Reinforcing Bars	=	16 bars
Yield Stress of Reinforcing Bars	=	60000. psi
Modulus of Elasticity of Reinforcing Bars	=	29000000. psi
Gross Area of Shaft	=	1018. sq. in.
Total Area of Reinforcing Steel	=	24.960000 sq. in.
Area Ratio of Steel Reinforcement	=	2.45 percent
Edge-to-Edge Bar Spacing	=	4.167632 in
Maximum Concrete Aggregate Size	=	0.750000 in
Ratio of Bar Spacing to Aggregate Size	=	5.56
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	=	5295.504 kips
Tensile Load for Cracking of Concrete	=	-520.555 kips
Nominal Axial Tensile Capacity	=	-1497.600 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar	Bar Diam.	Bar Area	X	Y

Number	inches	sq. in.	inches	inches
1	1.410000	1.560000	14.295000	0.00000
2	1.410000	1.560000	13.206858	5.470460
3	1.410000	1.560000	10.108091	10.108091
4	1.410000	1.560000	5.470460	13.206858
5	1.410000	1.560000	0.00000	14.295000
6	1.410000	1.560000	-5.470460	13.206858
7	1.410000	1.560000	-10.108091	10.108091
8	1.410000	1.560000	-13.206858	5.470460
9	1.410000	1.560000	-14.295000	0.00000
10	1.410000	1.560000	-13.206858	-5.470460
11	1.410000	1.560000	-10.108091	-10.108091
12	1.410000	1.560000	-5.470460	-13.206858
13	1.410000	1.560000	0.00000	-14.295000
14	1.410000	1.560000	5.470460	-13.206858
15	1.410000	1.560000	10.108091	-10.108091
16	1.410000	1.560000	13.206858	-5.470460

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

Minimum spacing between any two bars not equal to zero = 4.168 inches
between bars 11 and 12.

Ratio of bar spacing to maximum aggregate size = 5.56

Concrete Properties:

Compressive Strength of Concrete	=	4500. psi
Modulus of Elasticity of Concrete	=	3823676. psi
Modulus of Rupture of Concrete	=	-503.115295 psi
Compression Strain at Peak Stress	=	0.002001
Tensile Strain at Fracture of Concrete	=	-0.0001152
Maximum Coarse Aggregate Size	=	0.750000 in

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

Number	Axial Thrust Force kips
1	20.000

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

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

Axial Thrust Force = 20.000 kips

Bending Max Conc Curvature Stress rad/in. ksi	Bending Max Steel Moment Stress in-kip ksi	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Run Msg
6.25000E-07	270.3877218	432620355.	24.1785497	0.00001511	-0.00000739	
0.0672196	0.4349737					
0.00000125	540.0361389	432028911.	21.0954093	0.00002637	-0.00001863	
0.1168400	0.7581836					
0.00000188	808.8287888	431375354.	20.0677964	0.00003763	-0.00002987	
0.1661820	1.0813989					
0.00000250	1077.	430705494.	19.5540188	0.00004889	-0.00004111	
0.2152449	1.4046164					
0.00000313	1344.	430029035.	19.2457678	0.00006014	-0.00005236	
0.2640288	1.7278352					
0.00000375	1610.	429349261.	19.0402780	0.00007140	-0.00006360	
0.3125335	2.0510552					
0.00000438	1875.	428667587.	18.8935083	0.00008266	-0.00007484	
0.3607591	2.3742764					
0.00000500	2140.	427984725.	18.7834383	0.00009392	-0.00008608	
0.4087055	2.6974985					
0.00000563	2404.	427301069.	18.6978345	0.0001052	-0.00009732	
0.4563728	3.0207217					
0.00000625	2666.	426616857.	18.6293571	0.0001164	-0.0001086	
0.5037609	3.3439459					
0.00000688	2666.	387833507.	12.4454510	0.00008556	-0.0001619	
0.3713370	-4.6603008	C				

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0.00000750         2666.    355514048.    12.3307062    0.00009248    -0.0001775
 0.4006081    -5.1089214 C
0.00000813         2666.    328166813.    12.2334780    0.00009940    -0.0001931
 0.4297702    -5.5575742 C
0.00000875         2666.    304726327.    12.1505148     0.0001063    -0.0002087
 0.4588422    -6.0061318 C
0.00000938         2666.    284411238.    12.0789645     0.0001132    -0.0002243
 0.4878240    -6.4545940 C
0.00001000         2666.    266635536.    12.0155521     0.0001202    -0.0002398
 0.5166674    -6.9032899 C
0.00001063         2666.    250951093.    11.9594781     0.0001271    -0.0002554
 0.5454013    -7.3520233 C
0.00001125         2666.    237009365.    11.9099342     0.0001340    -0.0002710
 0.5740453    -7.8006589 C
0.00001188         2666.    224535188.    11.8658901     0.0001409    -0.0002866
 0.6025994    -8.2491966 C
0.00001250         2666.    213308429.    11.8265213     0.0001478    -0.0003022
 0.6310634    -8.6976360 C
0.00001313         2666.    203150884.    11.7911607     0.0001548    -0.0003177
 0.6594372    -9.1459769 C
0.00001375         2666.    193916753.    11.7592624     0.0001617    -0.0003333
 0.6877206    -9.5942191 C
0.00001438         2666.    185485590.    11.7303752     0.0001686    -0.0003489
 0.7159136   -10.0423623 C
0.00001500         2666.    177757024.    11.7041234     0.0001756    -0.0003644
 0.7440160   -10.4904063 C
0.00001563         2666.    170646743.    11.6796253     0.0001825    -0.0003800
 0.7719915   -10.9386072 C
0.00001625         2666.    164083407.    11.6571195     0.0001894    -0.0003956
 0.7998696   -11.3867574 C
0.00001688         2666.    158006243.    11.6364897     0.0001964    -0.0004111
 0.8276574   -11.8348053 C
0.00001750         2666.    152363163.    11.6175355     0.0002033    -0.0004267
 0.8553548   -12.2827507 C
0.00001813         2707.    149355042.    11.6000840     0.0002103    -0.0004422
 0.8829615   -12.7305937 C
0.00001875         2795.    149055898.    11.5839856     0.0002172    -0.0004578
 0.9104777   -13.1783332 C
0.00001938         2882.    148773428.    11.5691096     0.0002242    -0.0004733
 0.9379030   -13.6259694 C
0.00002000         2970.    148506061.    11.5553421     0.0002311    -0.0004889
 0.9652374   -14.0735019 C
0.00002063         3058.    148252420.    11.5425826     0.0002381    -0.0005044
 0.9924808   -14.5209305 C
0.00002125         3145.    148011288.    11.5307427     0.0002450    -0.0005200
 1.0196330   -14.9682550 C
0.00002188         3233.    147781587.    11.5197440     0.0002520    -0.0005355
 1.0466939   -15.4154751 C
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0.00002250         3320.    147562360.    11.5095168     0.0002590    -0.0005510
 1.0736633   -15.8625904 C
0.00002313         3408.    147352751.    11.4999990     0.0002659    -0.0005666
 1.1005411   -16.3096008 C
0.00002375         3495.    147151998.    11.4911350     0.0002729    -0.0005821
 1.1273273   -16.7565059 C
0.00002438         3582.    146959413.    11.4828749     0.0002799    -0.0005976
 1.1540216   -17.2033054 C
0.00002563         3757.    146596331.    11.4679912     0.0002939    -0.0006286
 1.2071342   -18.0965872 C
0.00002688         3931.    146259266.    11.4550381     0.0003079    -0.0006596
 1.2598780   -18.9894427 C
0.00002813         4105.    145944705.    11.4437611     0.0003219    -0.0006906
 1.3122517   -19.8818703 C
0.00002938         4278.    145649741.    11.4339489     0.0003359    -0.0007216
 1.3642545   -20.7738676 C
0.00003063         4452.    145371943.    11.4254249     0.0003499    -0.0007526
 1.4158852   -21.6654323 C
0.00003188         4625.    145109259.    11.4180400     0.0003640    -0.0007835
 1.4671426   -22.5565619 C
0.00003313         4798.    144859948.    11.4116678     0.0003780    -0.0008145
 1.5180258   -23.4472542 C
0.00003438         4971.    144622521.    11.4062003     0.0003921    -0.0008454
 1.5685336   -24.3375066 C
0.00003563         5144.    144395699.    11.4015446     0.0004062    -0.0008763
 1.6186649   -25.2273167 C
0.00003688         5317.    144178375.    11.3976205     0.0004203    -0.0009072
 1.6684185   -26.1166821 C
0.00003813         5489.    143969586.    11.3943582     0.0004344    -0.0009381
 1.7177934   -27.0056002 C
0.00003938         5661.    143768494.    11.3916969     0.0004485    -0.0009690
 1.7667884   -27.8940685 C
0.00004063         5833.    143574362.    11.3895834     0.0004627    -0.0009998
 1.8154024   -28.7820845 C
0.00004188         6004.    143386539.    11.3879707     0.0004769    -0.0010306
 1.8636341   -29.6696455 C
0.00004313         6176.    143204454.    11.3868173     0.0004911    -0.0010614
 1.9114825   -30.5567490 C
0.00004438         6347.    143027595.    11.3860865     0.0005053    -0.0010922
 1.9589463   -31.4433924 C
0.00004563         6518.    142855509.    11.3857455     0.0005195    -0.0011230
 2.0060243   -32.3295729 C
0.00004688         6688.    142687790.    11.3857651     0.0005337    -0.0011538
 2.0527154   -33.2152879 C
0.00004813         6859.    142524075.    11.3861193     0.0005480    -0.0011845
 2.0990184   -34.1005347 C
0.00004938         7029.    142364035.    11.3867844     0.0005622    -0.0012153
 2.1449320   -34.9853105 C
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0.00005063        7199.    142207377.    11.3877394     0.0005765    -0.0012460
 2.1904550   -35.8696125 C
0.00005188        7369.    142053832.    11.3889651     0.0005908    -0.0012767
 2.2355862   -36.7534380 C
0.00005313        7539.    141903160.    11.3904443     0.0006051    -0.0013074
 2.2803242   -37.6367841 C
0.00005438        7708.    141755140.    11.3921614     0.0006194    -0.0013381
 2.3246679   -38.5196479 C
0.00005563        7877.    141609572.    11.3941020     0.0006338    -0.0013687
 2.3686160   -39.4020266 C
0.00005688        8046.    141466272.    11.3962533     0.0006482    -0.0013993
 2.4121672   -40.2839172 C
0.00005813        8215.    141325074.    11.3986033     0.0006625    -0.0014300
 2.4553202   -41.1653167 C
0.00005938        8383.    141185823.    11.4011413     0.0006769    -0.0014606
 2.4980736   -42.0462222 C
0.00006063        8551.    141048379.    11.4038574     0.0006914    -0.0014911
 2.5404262   -42.9266307 C
0.00006188        8719.    140912612.    11.4067424     0.0007058    -0.0015217
 2.5823767   -43.8065390 C
0.00006313        8887.    140778401.    11.4097881     0.0007202    -0.0015523
 2.6239236   -44.6859441 C
0.00006438        9054.    140645637.    11.4129868     0.0007347    -0.0015828
 2.6650657   -45.5648428 C
0.00006563        9221.    140514216.    11.4163313     0.0007492    -0.0016133
 2.7058016   -46.4432321 C
0.00006688        9388.    140384044.    11.4198151     0.0007637    -0.0016438
 2.7461298   -47.3211086 C
0.00006813        9555.    140255032.    11.4234323     0.0007782    -0.0016743
 2.7860491   -48.1984692 C
0.00006938        9721.    140127098.    11.4271772     0.0007928    -0.0017047
 2.8255579   -49.0753105 C
0.00007063        9888.    140000166.    11.4310447     0.0008073    -0.0017352
 2.8646549   -49.9516293 C
0.00007188       10053.    139874164.    11.4350299     0.0008219    -0.0017656
 2.9033387   -50.8274222 C
0.00007313       10219.    139749026.    11.4391285     0.0008365    -0.0017960
 2.9416077   -51.7026859 C
0.00007438       10385.    139624689.    11.4433363     0.0008511    -0.0018264
 2.9794606   -52.5774168 C
0.00007938       11044.    139134238.    11.4611868     0.0009097    -0.0019478
 3.1266808   -56.0709430 C
0.00008438       11699.    138652509.    11.4805214     0.0009687    -0.0020688
 3.2671218   -59.5556614 C
0.00008938       12350.    138176947.    11.5011836     0.0010279    -0.0021896
 3.4006831   -60.0000000 CY
0.00009438       12996.    137705490.    11.5230544     0.0010875    -0.0023100
 3.5272601   -60.0000000 CY
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0.00009938        13626.    137115611.    11.5425378     0.0011470    -0.0024305
 3.6460613   -60.0000000 CY
 0.0001044        14168.    135739779.    11.5392099     0.0012044    -0.0025531
 3.7531268   -60.0000000 CY
 0.0001094        14568.    133194981.    11.4989015     0.0012577    -0.0026798
 3.8460491   -60.0000000 CY
 0.0001144        14919.    130435191.    11.4506704     0.0013097    -0.0028078
 3.9307077   -60.0000000 CY
 0.0001194        15266.    127885585.    11.4084106     0.0013619    -0.0029356
 4.0098425   -60.0000000 CY
 0.0001244        15568.    125169562.    11.3581278     0.0014127    -0.0030648
 4.0811109   -60.0000000 CY
 0.0001294        15783.    121993683.    11.2859161     0.0014601    -0.0031974
 4.1425615   -60.0000000 CY
 0.0001344        15975.    118880170.    11.2131096     0.0015068    -0.0033307
 4.1982066   -60.0000000 CY
 0.0001394        16165.    115979255.    11.1468574     0.0015536    -0.0034639
 4.2493433   -60.0000000 CY
 0.0001444        16353.    113268660.    11.0865030     0.0016006    -0.0035969
 4.2959176   -60.0000000 CY
 0.0001494        16540.    110729085.    11.0314789     0.0016478    -0.0037297
 4.3378736   -60.0000000 CY
 0.0001544        16726.    108343723.    10.9812918     0.0016952    -0.0038623
 4.3751542   -60.0000000 CY
 0.0001594        16906.    106079842.    10.9327181     0.0017424    -0.0039951
 4.4074132   -60.0000000 CY
 0.0001644        17057.    103766577.    10.8779989     0.0017881    -0.0041294
 4.4340474   -60.0000000 CY
 0.0001694        17171.    101376187.    10.8152670     0.0018318    -0.0042657
 4.4553256   -60.0000000 CY
 0.0001744        17260.     98981657.    10.7487600     0.0018743    -0.0044032
 4.4720184   -60.0000000 CY
 0.0001794        17343.     96686467.    10.6850469     0.0019166    -0.0045409
 4.4847812   -60.0000000 CY
 0.0001844        17425.     94510520.    10.6256740     0.0019591    -0.0046784
 4.4937148   -60.0000000 CY
 0.0001894        17506.     92438493.    10.5677347     0.0020013    -0.0048162
 4.4987372   -60.0000000 CY
 0.0001944        17585.     90467333.    10.5133885     0.0020435    -0.0049540
 4.4970514   -60.0000000 CY
 0.0001994        17663.     88589455.    10.4627114     0.0020860    -0.0050915
 4.4994383   -60.0000000 CY
 0.0002044        17739.     86798127.    10.4154303     0.0021287    -0.0052288
 4.4964774    60.0000000 CY
 0.0002094        17815.     85087159.    10.3713059     0.0021715    -0.0053660
 4.4996503    60.0000000 CY
 0.0002144        17890.     83450831.    10.3301407     0.0022145    -0.0055030
 4.4964390    60.0000000 CY
```

```
   0.0002194        17963.     81884474.    10.2916803     0.0022577    -0.0056398
   4.4995783    60.0000000 CY
   0.0002244        18036.     80382953.    10.2555266     0.0023011    -0.0057764
   4.4955243    60.0000000 CY
   0.0002294        18107.     78940064.    10.2200523     0.0023442    -0.0059133
   4.4991151    60.0000000 CY
   0.0002344        18177.     77555332.    10.1867921     0.0023875    -0.0060500
   4.4973179    60.0000000 CY
   0.0002394        18246.     76224093.    10.1557694     0.0024310    -0.0061865
   4.4978612    60.0000000 CY
   0.0002444        18315.     74944786.    10.1265843     0.0024747    -0.0063228
   4.4998905    60.0000000 CY
   0.0002494        18376.     73688369.    10.0965533     0.0025178    -0.0064597
   4.4950431    60.0000000 CY
   0.0002544        18435.     72470188.    10.0672895     0.0025609    -0.0065966
   4.4986179    60.0000000 CY
   0.0002594        18481.     71251795.    10.0341687     0.0026026    -0.0067349
   4.4999717    60.0000000 CY
   0.0002644        18525.     70071156.    10.0023067     0.0026444    -0.0068731
   4.4944685    60.0000000 CY
   0.0002694        18556.     68886916.     9.9662071     0.0026846    -0.0070129
   4.4978866    60.0000000 CY
   0.0002744        18587.     67742719.     9.9314727     0.0027249    -0.0071526
   4.4996918    60.0000000 CY
   0.0003044        18712.     61477277.     9.7219588     0.0029591    -0.0079984
   4.4923420    60.0000000 CY
   0.0003344        18826.     56302047.     9.5591767     0.0031963    -0.0088412
   4.4947587    60.0000000 CYT
   0.0003644        18923.     51931781.     9.4290095     0.0034357    -0.0096818
   4.4939251    60.0000000 CYT
   0.0003944        19006.     48192496.     9.3313804     0.0036801    -0.0105174
   4.4897861    60.0000000 CYT
   0.0004244        19022.     44822760.     9.2904612     0.0039426    -0.0113349
   4.4878980    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          Axial Thrust        Nominal Mom. Cap.      Max. Comp.
  No.             kips                in-kip               Strain
 ----        ---------------     -----------------     ------------
   1              20.000            18731.765          0.00300000
```

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

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

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

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

Axial Load No.	Resist. Factor for Moment	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in^2
1	0.65	18732.	13.000000	12176.	138304042.
1	0.70	18732.	14.000000	13112.	137596600.
1	0.75	18732.	15.000000	14049.	136041906.

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 = 1500.0 lbs
Applied moment at pile head = 455000.0 in-lbs
Axial thrust load on pile head = 20000.0 lbs

Depth X	Deflect. y	Bending Moment	Shear Force	Slope S	Total Stress	Bending Stiffness	Soil Res. Es*h	Soil Spr. p	Distrib. Lat. Load
feet	inches	in-lbs	lbs	radians	psi*	in-lb^2	lb/inch	lb/inch	lb/inch
0.00	0.02001	455000.	1500.	-2.11E-04	0.00	4.32E+11	0.00	0.00	0.00

```
    0.2300    0.01943    459152.      1494.  -2.08E-04       0.00   4.32E+11
-4.4576   633.2237       0.00
    0.4600    0.01886    463269.      1476.  -2.05E-04       0.00   4.32E+11
-8.6537      1266.       0.00
    0.6900    0.01830    467320.      1446.  -2.02E-04       0.00   4.32E+11
-12.5938      1900.       0.00
    0.9200    0.01774    471276.      1407.  -1.99E-04       0.00   4.32E+11
-16.2836      2533.       0.00
    1.1500    0.01720    475107.      1357.  -1.96E-04       0.00   4.32E+11
-19.7290      3166.       0.00
    1.3800    0.01666    478787.      1298.  -1.93E-04       0.00   4.32E+11
-22.9357      3799.       0.00
    1.6100    0.01613    482293.      1231.  -1.90E-04       0.00   4.32E+11
-25.9095      4433.       0.00
    1.8400    0.01561    485601.      1155.  -1.87E-04       0.00   4.32E+11
-28.6565      5066.       0.00
    2.0700    0.01510    488691.      1073.  -1.84E-04       0.00   4.32E+11
-31.1825      5699.       0.00
    2.3000    0.01460    491543.   983.4696  -1.81E-04       0.00   4.32E+11
-33.4936      6332.       0.00
    2.5300    0.01410    494140.   888.1260  -1.77E-04       0.00   4.32E+11
-35.5959      6965.       0.00
    2.7600    0.01362    496465.   787.2599  -1.74E-04       0.00   4.32E+11
-37.4954      7599.       0.00
    2.9900    0.01314    498504.   681.4225  -1.71E-04       0.00   4.32E+11
-39.1983      8232.       0.00
    3.2200    0.01267    500245.   571.1481  -1.68E-04       0.00   4.32E+11
-40.7107      8865.       0.00
    3.4500    0.01222    501676.   456.9539  -1.65E-04       0.00   4.32E+11
-42.0387      9498.       0.00
    3.6800    0.01177    502786.   339.3402  -1.62E-04       0.00   4.32E+11
-43.1886     10132.       0.00
    3.9100    0.01132    503567.   218.7903  -1.58E-04       0.00   4.32E+11
-44.1664     10765.       0.00
    4.1400    0.01089    504011.    95.7705  -1.55E-04       0.00   4.32E+11
-44.9784     11398.       0.00
    4.3700    0.01047    504113.   -29.2700  -1.52E-04       0.00   4.32E+11
-45.6306     12031.       0.00
    4.6000    0.01005    503866.  -155.8987  -1.49E-04       0.00   4.32E+11
-46.1293     12664.       0.00
    4.8300    0.00965    503268.  -283.7002  -1.45E-04       0.00   4.32E+11
-46.4805     13298.       0.00
    5.0600    0.00925    502316.  -412.2757  -1.42E-04       0.00   4.32E+11
-46.6902     13931.       0.00
    5.2900    0.00886    501008.  -541.2433  -1.39E-04       0.00   4.32E+11
-46.7645     14564.       0.00
    5.5200    0.00848    499344.  -670.2373  -1.36E-04       0.00   4.32E+11
-46.7094     15197.       0.00
```

5.7500	0.00811	497324.	-798.9087	-1.33E-04	0.00	4.32E+11
-46.5308	15831.	0.00				
5.9800	0.00775	494949.	-926.9246	-1.29E-04	0.00	4.32E+11
-46.2344	16464.	0.00				
6.2100	0.00740	492221.	-1054.	-1.26E-04	0.00	4.32E+11
-45.8261	17097.	0.00				
6.4400	0.00705	489145.	-1180.	-1.23E-04	0.00	4.32E+11
-45.3117	17730.	0.00				
6.6700	0.00672	485723.	-1304.	-1.20E-04	0.00	4.32E+11
-44.6966	18363.	0.00				
6.9000	0.00639	481960.	-1426.	-1.17E-04	0.00	4.32E+11
-43.9864	18997.	0.00				
7.1300	0.00607	477862.	-1547.	-1.14E-04	0.00	4.32E+11
-43.1866	19630.	0.00				
7.3600	0.00576	473435.	-1665.	-1.11E-04	0.00	4.32E+11
-42.3024	20263.	0.00				
7.5900	0.00546	468686.	-1780.	-1.08E-04	0.00	4.32E+11
-41.3390	20896.	0.00				
7.8200	0.00517	463621.	-1893.	-1.05E-04	0.00	4.32E+11
-40.3017	21530.	0.00				
8.0500	0.00488	458250.	-2002.	-1.02E-04	0.00	4.32E+11
-39.1952	22163.	0.00				
8.2800	0.00460	452579.	-2109.	-9.90E-05	0.00	4.32E+11
-38.0245	22796.	0.00				
8.5100	0.00433	446619.	-2212.	-9.62E-05	0.00	4.32E+11
-36.7942	23429.	0.00				
8.7400	0.00407	440379.	-2312.	-9.33E-05	0.00	4.32E+11
-35.5091	24062.	0.00				
8.9700	0.00382	433867.	-2408.	-9.05E-05	0.00	4.32E+11
-34.1733	24696.	0.00				
9.2000	0.00357	427096.	-2501.	-8.78E-05	0.00	4.32E+11
-32.7914	25329.	0.00				
9.4300	0.00333	420074.	-2589.	-8.51E-05	0.00	4.32E+11
-31.3673	25962.	0.00				
9.6600	0.00310	412813.	-2674.	-8.24E-05	0.00	4.32E+11
-29.9052	26595.	0.00				
9.8900	0.00288	405324.	-2754.	-7.98E-05	0.00	4.32E+11
-28.4087	27229.	0.00				
10.1200	0.00266	397619.	-2830.	-7.73E-05	0.00	4.32E+11
-26.8817	27862.	0.00				
10.3500	0.00245	389709.	-2902.	-7.47E-05	0.00	4.32E+11
-25.3275	28495.	0.00				
10.5800	0.00225	381606.	-2970.	-7.23E-05	0.00	4.32E+11
-23.7496	29128.	0.00				
10.8100	0.00205	373321.	-3034.	-6.99E-05	0.00	4.32E+11
-22.1512	29762.	0.00				
11.0400	0.00186	364868.	-3092.	-6.75E-05	0.00	4.32E+11
-20.5352	30395.	0.00				

11.2700	0.00168	356258.	-3147.	-6.52E-05	0.00	4.32E+11
-18.9045	31028.	0.00				
11.5000	0.00150	347505.	-3197.	-6.30E-05	0.00	4.32E+11
-17.2618	31661.	0.00				
11.7300	0.00133	338619.	-3242.	-6.08E-05	0.00	4.32E+11
-15.6096	32294.	0.00				
11.9600	0.00117	329615.	-3283.	-5.86E-05	0.00	4.32E+11
-13.9502	32928.	0.00				
12.1900	0.00101	320504.	-3319.	-5.66E-05	0.00	4.32E+11
-12.2858	33561.	0.00				
12.4200	8.57E-04	311299.	-3351.	-5.45E-05	0.00	4.32E+11
-10.6185	34194.	0.00				
12.6500	7.09E-04	302013.	-3378.	-5.26E-05	0.00	4.32E+11
-8.9500	34827.	0.00				
12.8800	5.67E-04	292660.	-3400.	-5.07E-05	0.00	4.33E+11
-7.2821	35461.	0.00				
13.1100	4.29E-04	283250.	-3418.	-4.89E-05	0.00	4.33E+11
-5.6161	36094.	0.00				
13.3400	2.97E-04	273798.	-3431.	-4.71E-05	0.00	4.33E+11
-3.9536	36727.	0.00				
13.5700	1.70E-04	264315.	-3440.	-4.54E-05	0.00	4.33E+11
-2.2955	37360.	0.00				
13.8000	4.67E-05	254815.	-3444.	-4.37E-05	0.00	4.33E+11
-0.6430	37993.	0.00				
14.0300	-7.17E-05	245310.	-3443.	-4.21E-05	0.00	4.33E+11
1.0030	38627.	0.00				
14.2600	-1.86E-04	235812.	-3438.	-4.06E-05	0.00	4.33E+11
2.6420	39260.	0.00				
14.4900	-2.96E-04	226335.	-3429.	-3.91E-05	0.00	4.33E+11
4.2733	39893.	0.00				
14.7200	-4.02E-04	216890.	-3415.	-3.77E-05	0.00	4.33E+11
5.8965	40526.	0.00				
14.9500	-5.04E-04	207490.	-3396.	-3.63E-05	0.00	4.33E+11
7.5113	41160.	0.00				
15.1800	-6.02E-04	198147.	-3373.	-3.50E-05	0.00	4.33E+11
9.1177	41793.	0.00				
15.4100	-6.97E-04	188873.	-3346.	-3.38E-05	0.00	4.33E+11
10.7156	42426.	0.00				
15.6400	-7.89E-04	179681.	-3314.	-3.26E-05	0.00	4.33E+11
12.3052	43059.	0.00				
15.8700	-8.77E-04	170582.	-3278.	-3.15E-05	0.00	4.33E+11
13.8868	43692.	0.00				
16.1000	-9.63E-04	161590.	-3238.	-3.05E-05	0.00	4.33E+11
15.4607	44326.	0.00				
16.3300	-0.00105	152715.	-3193.	-2.94E-05	0.00	4.33E+11
17.0275	44959.	0.00				
16.5600	-0.00113	143969.	-3144.	-2.85E-05	0.00	4.33E+11
18.5878	45592.	0.00				

16.7900	-0.00120	135366.	-3090.	-2.76E-05	0.00	4.33E+11	
20.1424	46225.	0.00					
17.0200	-0.00128	126915.	-3032.	-2.68E-05	0.00	4.33E+11	
21.6919	46859.	0.00					
17.2500	-0.00135	118630.	-2970.	-2.60E-05	0.00	4.33E+11	
23.2375	47492.	0.00					
17.4800	-0.00142	110522.	-2904.	-2.53E-05	0.00	4.33E+11	
24.7800	48125.	0.00					
17.7100	-0.00149	102602.	-2834.	-2.46E-05	0.00	4.33E+11	
26.3206	48758.	0.00					
17.9400	-0.00156	94883.	-2759.	-2.40E-05	0.00	4.33E+11	
27.8604	49391.	0.00					
18.1700	-0.00162	87376.	-2680.	-2.34E-05	0.00	4.33E+11	
29.4006	50025.	0.00					
18.4000	-0.00169	80093.	-2597.	-2.28E-05	0.00	4.33E+11	
30.9426	50658.	0.00					
18.6300	-0.00175	73046.	-2509.	-2.23E-05	0.00	4.33E+11	
32.4875	51291.	0.00					
18.8600	-0.00181	66246.	-2417.	-2.19E-05	0.00	4.33E+11	
34.0369	51924.	0.00					
19.0900	-0.00187	59706.	-2321.	-2.15E-05	0.00	4.33E+11	
35.5921	52558.	0.00					
19.3200	-0.00193	53436.	-2221.	-2.11E-05	0.00	4.33E+11	
37.1545	53191.	0.00					
19.5500	-0.00199	47450.	-2116.	-2.08E-05	0.00	4.33E+11	
38.7255	53824.	0.00					
19.7800	-0.00204	41758.	-2007.	-2.05E-05	0.00	4.33E+11	
40.3066	54457.	0.00					
20.0100	-0.00210	36374.	-1893.	-2.03E-05	0.00	4.33E+11	
41.8992	55090.	0.00					
20.2400	-0.00215	31309.	-1776.	-2.01E-05	0.00	4.33E+11	
43.5047	55724.	0.00					
20.4700	-0.00221	26575.	-1653.	-1.99E-05	0.00	4.33E+11	
45.1245	56357.	0.00					
20.7000	-0.00226	22185.	-1527.	-1.97E-05	0.00	4.33E+11	
46.7599	56990.	0.00					
20.9300	-0.00232	18151.	-1395.	-1.96E-05	0.00	4.33E+11	
48.4122	57623.	0.00					
21.1600	-0.00237	14485.	-1259.	-1.95E-05	0.00	4.33E+11	
50.0827	58257.	0.00					
21.3900	-0.00243	11202.	-1119.	-1.94E-05	0.00	4.33E+11	
51.7725	58890.	0.00					
21.6200	-0.00248	8313.	-973.4272	-1.94E-05	0.00	4.33E+11	
53.4827	59523.	0.00					
21.8500	-0.00253	5831.	-823.4255	-1.93E-05	0.00	4.33E+11	
55.2142	60156.	0.00					
22.0800	-0.00259	3769.	-668.6141	-1.93E-05	0.00	4.33E+11	
56.9680	60789.	0.00					

```
   22.3100   -0.00264      2142.  -508.9307  -1.93E-05       0.00   4.33E+11
58.7447     61423.       0.00
   22.5400   -0.00269   962.1628  -344.3111  -1.92E-05       0.00   4.33E+11
60.5449     62056.       0.00
   22.7700   -0.00275   243.5299  -174.6897  -1.92E-05       0.00   4.33E+11
62.3691     62689.       0.00
   23.0000   -0.00280       0.00       0.00  -1.92E-05       0.00   4.33E+11
64.2176     31661.       0.00
```

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

Output Summary for Load Case No. 1:

```
Pile-head deflection             =     0.02000727 inches
Computed slope at pile head      =    -0.00021091 radians
Maximum bending moment           =        504113. inch-lbs
Maximum shear force              =         -3444. lbs
Depth of maximum bending moment  =     4.37000000 feet below pile head
Depth of maximum shear force     =    13.80000000 feet below pile head
Number of iterations             =              6
Number of zero deflection points =              1
```

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                                =          0.0 lbs
Applied moment at pile head                             =     910000.0 in-lbs
Axial thrust load on pile head                          =      20000.0 lbs
```

Depth X	Deflect. y	Bending Moment	Shear Force	Slope S	Total Stress	Bending Stiffness	Soil Res. Es*h	Soil Spr. Distrib. p Lat. Load
feet	inches	in-lbs	lbs	radians	psi*	in-lb^2	lb/inch	lb/inch
----------	----------	----------	----------	----------	----------	----------		

```
---------- ---------- ----------
      0.00    0.02768    910000.   3.68E-08  -3.31E-04       0.00   4.31E+11
0.00       0.00       0.00
    0.2300    0.02677    910018.    -8.4759  -3.25E-04       0.00   4.31E+11
-6.1420   633.2237       0.00
    0.4600    0.02588    909989.   -33.3403  -3.19E-04       0.00   4.31E+11
-11.8757      1266.       0.00
    0.6900    0.02501    909869.   -73.4818  -3.14E-04       0.00   4.31E+11
-17.2123      1900.       0.00
    0.9200    0.02415    909618.  -127.8193  -3.08E-04       0.00   4.31E+11
-22.1628      2533.       0.00
    1.1500    0.02331    909198.  -195.3026  -3.02E-04       0.00   4.31E+11
-26.7382      3166.       0.00
    1.3800    0.02248    908573.  -274.9118  -2.96E-04       0.00   4.31E+11
-30.9496      3799.       0.00
    1.6100    0.02167    907713.  -365.6575  -2.90E-04       0.00   4.31E+11
-34.8081      4433.       0.00
    1.8400    0.02088    906587.  -466.5807  -2.85E-04       0.00   4.31E+11
-38.3247      5066.       0.00
    2.0700    0.02010    905169.  -576.7530  -2.79E-04       0.00   4.31E+11
-41.5103      5699.       0.00
    2.3000    0.01934    903434.  -695.2761  -2.73E-04       0.00   4.31E+11
-44.3760      6332.       0.00
    2.5300    0.01860    901361.  -821.2820  -2.67E-04       0.00   4.31E+11
-46.9326      6965.       0.00
    2.7600    0.01787    898930.  -953.9329  -2.61E-04       0.00   4.31E+11
-49.1912      7599.       0.00
    2.9900    0.01715    896124.     -1092.  -2.56E-04       0.00   4.31E+11
-51.1624      8232.       0.00
    3.2200    0.01646    892928.     -1236.  -2.50E-04       0.00   4.31E+11
-52.8570      8865.       0.00
    3.4500    0.01577    889329.     -1384.  -2.44E-04       0.00   4.31E+11
-54.2859      9498.       0.00
    3.6800    0.01511    885316.     -1535.  -2.39E-04       0.00   4.31E+11
-55.4595     10132.       0.00
    3.9100    0.01446    880881.     -1690.  -2.33E-04       0.00   4.31E+11
-56.3885     10765.       0.00
    4.1400    0.01382    876015.     -1846.  -2.27E-04       0.00   4.31E+11
-57.0832     11398.       0.00
    4.3700    0.01320    870715.     -2004.  -2.22E-04       0.00   4.31E+11
-57.5541     12031.       0.00
    4.6000    0.01260    864976.     -2164.  -2.16E-04       0.00   4.31E+11
-57.8113     12664.       0.00
    4.8300    0.01201    858796.     -2323.  -2.11E-04       0.00   4.31E+11
-57.8649     13298.       0.00
    5.0600    0.01144    852174.     -2483.  -2.05E-04       0.00   4.31E+11
-57.7249     13931.       0.00
    5.2900    0.01088    845113.     -2642.  -2.00E-04       0.00   4.31E+11
```

-57.4011	14564.	0.00				
5.5200	0.01033	837615.	-2799.	-1.94E-04	0.00	4.31E+11
-56.9031	15197.	0.00				
5.7500	0.00981	829682.	-2956.	-1.89E-04	0.00	4.31E+11
-56.2406	15831.	0.00				
5.9800	0.00929	821321.	-3110.	-1.84E-04	0.00	4.31E+11
-55.4228	16464.	0.00				
6.2100	0.00879	812537.	-3261.	-1.78E-04	0.00	4.31E+11
-54.4589	17097.	0.00				
6.4400	0.00831	803339.	-3410.	-1.73E-04	0.00	4.31E+11
-53.3578	17730.	0.00				
6.6700	0.00783	793733.	-3556.	-1.68E-04	0.00	4.31E+11
-52.1285	18363.	0.00				
6.9000	0.00738	783730.	-3698.	-1.63E-04	0.00	4.31E+11
-50.7794	18997.	0.00				
7.1300	0.00693	773340.	-3836.	-1.58E-04	0.00	4.31E+11
-49.3189	19630.	0.00				
7.3600	0.00650	762574.	-3970.	-1.53E-04	0.00	4.31E+11
-47.7553	20263.	0.00				
7.5900	0.00609	751444.	-4099.	-1.48E-04	0.00	4.31E+11
-46.0964	20896.	0.00				
7.8200	0.00569	739963.	-4224.	-1.44E-04	0.00	4.31E+11
-44.3500	21530.	0.00				
8.0500	0.00530	728143.	-4344.	-1.39E-04	0.00	4.32E+11
-42.5237	22163.	0.00				
8.2800	0.00492	716000.	-4459.	-1.34E-04	0.00	4.32E+11
-40.6246	22796.	0.00				
8.5100	0.00455	703546.	-4568.	-1.30E-04	0.00	4.32E+11
-38.6598	23429.	0.00				
8.7400	0.00420	690798.	-4672.	-1.25E-04	0.00	4.32E+11
-36.6360	24062.	0.00				
8.9700	0.00386	677771.	-4770.	-1.21E-04	0.00	4.32E+11
-34.5599	24696.	0.00				
9.2000	0.00353	664480.	-4863.	-1.17E-04	0.00	4.32E+11
-32.4376	25329.	0.00				
9.4300	0.00322	650941.	-4949.	-1.12E-04	0.00	4.32E+11
-30.2752	25962.	0.00				
9.6600	0.00291	637172.	-5030.	-1.08E-04	0.00	4.32E+11
-28.0784	26595.	0.00				
9.8900	0.00262	623189.	-5104.	-1.04E-04	0.00	4.32E+11
-25.8528	27229.	0.00				
10.1200	0.00234	609009.	-5172.	-1.00E-04	0.00	4.32E+11
-23.6035	27862.	0.00				
10.3500	0.00207	594648.	-5234.	-9.65E-05	0.00	4.32E+11
-21.3356	28495.	0.00				
10.5800	0.00181	580125.	-5290.	-9.28E-05	0.00	4.32E+11
-19.0538	29128.	0.00				
10.8100	0.00155	565456.	-5340.	-8.91E-05	0.00	4.32E+11

```
-16.7625     29762.       0.00
   11.0400    0.00131    550660.     -5383.  -8.55E-05       0.00   4.32E+11
-14.4659     30395.       0.00
   11.2700    0.00108    535753.     -5419.  -8.21E-05       0.00   4.32E+11
-12.1678     31028.       0.00
   11.5000   8.61E-04    520754.     -5450.  -7.87E-05       0.00   4.32E+11
-9.8721     31661.       0.00
   11.7300   6.48E-04    505679.     -5474.  -7.54E-05       0.00   4.32E+11
-7.5820     32294.       0.00
   11.9600   4.44E-04    490546.     -5492.  -7.22E-05       0.00   4.32E+11
-5.3007     32928.       0.00
   12.1900   2.49E-04    475372.     -5503.  -6.91E-05       0.00   4.32E+11
-3.0312     33561.       0.00
   12.4200   6.26E-05    460175.     -5509.  -6.62E-05       0.00   4.32E+11
-0.7759     34194.       0.00
   12.6500  -1.16E-04    444972.     -5508.  -6.33E-05       0.00   4.32E+11
1.4626     34827.       0.00
   12.8800  -2.87E-04    429780.     -5500.  -6.05E-05       0.00   4.32E+11
3.6823     35461.       0.00
   13.1100  -4.50E-04    414616.     -5487.  -5.78E-05       0.00   4.32E+11
5.8812     36094.       0.00
   13.3400  -6.06E-04    399497.     -5468.  -5.52E-05       0.00   4.32E+11
8.0577     36727.       0.00
   13.5700  -7.54E-04    384439.     -5443.  -5.27E-05       0.00   4.32E+11
10.2105     37360.       0.00
   13.8000  -8.96E-04    369458.     -5412.  -5.03E-05       0.00   4.32E+11
12.3382     37993.       0.00
   14.0300   -0.00103    354572.     -5375.  -4.80E-05       0.00   4.32E+11
14.4400     38627.       0.00
   14.2600   -0.00116    339795.     -5332.  -4.57E-05       0.00   4.32E+11
16.5151     39260.       0.00
   14.4900   -0.00128    325144.     -5284.  -4.36E-05       0.00   4.32E+11
18.5629     39893.       0.00
   14.7200   -0.00140    310634.     -5230.  -4.16E-05       0.00   4.32E+11
20.5832     40526.       0.00
   14.9500   -0.00151    296281.     -5170.  -3.97E-05       0.00   4.33E+11
22.5759     41160.       0.00
   15.1800   -0.00162    282100.     -5105.  -3.78E-05       0.00   4.33E+11
24.5409     41793.       0.00
   15.4100   -0.00172    268106.     -5035.  -3.61E-05       0.00   4.33E+11
26.4786     42426.       0.00
   15.6400   -0.00182    254313.     -4959.  -3.44E-05       0.00   4.33E+11
28.3894     43059.       0.00
   15.8700   -0.00191    240736.     -4878.  -3.28E-05       0.00   4.33E+11
30.2739     43692.       0.00
   16.1000   -0.00200    227390.     -4792.  -3.13E-05       0.00   4.33E+11
32.1328     44326.       0.00
   16.3300   -0.00209    214289.     -4701.  -2.99E-05       0.00   4.33E+11
```

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33.9671     44959.       0.00
   16.5600   -0.00217    201446.     -4604.  -2.86E-05       0.00   4.33E+11
35.7778     45592.       0.00
   16.7900   -0.00224    188876.     -4503.  -2.73E-05       0.00   4.33E+11
37.5660     46225.       0.00
   17.0200   -0.00232    176592.     -4397.  -2.62E-05       0.00   4.33E+11
39.3332     46859.       0.00
   17.2500   -0.00239    164607.     -4286.  -2.51E-05       0.00   4.33E+11
41.0808     47492.       0.00
   17.4800   -0.00246    152936.     -4170.  -2.41E-05       0.00   4.33E+11
42.8102     48125.       0.00
   17.7100   -0.00252    141590.     -4050.  -2.31E-05       0.00   4.33E+11
44.5232     48758.       0.00
   17.9400   -0.00258    130583.     -3925.  -2.23E-05       0.00   4.33E+11
46.2214     49391.       0.00
   18.1700   -0.00264    119929.     -3795.  -2.15E-05       0.00   4.33E+11
47.9067     50025.       0.00
   18.4000   -0.00270    109639.     -3660.  -2.07E-05       0.00   4.33E+11
49.5808     50658.       0.00
   18.6300   -0.00276     99728.     -3521.  -2.01E-05       0.00   4.33E+11
51.2458     51291.       0.00
   18.8600   -0.00281     90206.     -3377.  -1.95E-05       0.00   4.33E+11
52.9035     51924.       0.00
   19.0900   -0.00286     81087.     -3229.  -1.89E-05       0.00   4.33E+11
54.5560     52558.       0.00
   19.3200   -0.00292     72384.     -3076.  -1.84E-05       0.00   4.33E+11
56.2053     53191.       0.00
   19.5500   -0.00297     64109.     -2919.  -1.80E-05       0.00   4.33E+11
57.8533     53824.       0.00
   19.7800   -0.00302     56275.     -2757.  -1.76E-05       0.00   4.33E+11
59.5021     54457.       0.00
   20.0100   -0.00306     48894.     -2590.  -1.73E-05       0.00   4.33E+11
61.1536     55090.       0.00
   20.2400   -0.00311     41979.     -2419.  -1.70E-05       0.00   4.33E+11
62.8098     55724.       0.00
   20.4700   -0.00316     35542.     -2244.  -1.67E-05       0.00   4.33E+11
64.4726     56357.       0.00
   20.7000   -0.00320     29596.     -2063.  -1.65E-05       0.00   4.33E+11
66.1437     56990.       0.00
   20.9300   -0.00325     24155.     -1878.  -1.63E-05       0.00   4.33E+11
67.8251     57623.       0.00
   21.1600   -0.00329     19230.     -1689.  -1.62E-05       0.00   4.33E+11
69.5182     58257.       0.00
   21.3900   -0.00334     14834.     -1495.  -1.61E-05       0.00   4.33E+11
71.2248     58890.       0.00
   21.6200   -0.00338     10981.     -1296.  -1.60E-05       0.00   4.33E+11
72.9461     59523.       0.00
   21.8500   -0.00343      7684.     -1092.  -1.60E-05       0.00   4.33E+11
```

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74.6836     60156.       0.00
   22.0800   -0.00347      4955.  -883.3981  -1.59E-05       0.00   4.33E+11
76.4383     60789.       0.00
   22.3100   -0.00351      2809.  -669.9816  -1.59E-05       0.00   4.33E+11
78.2113     61423.       0.00
   22.5400   -0.00356      1259.  -451.6456  -1.59E-05       0.00   4.33E+11
80.0033     62056.       0.00
   22.7700   -0.00360    317.7163 -228.3366  -1.59E-05       0.00   4.33E+11
81.8149     62689.       0.00
   23.0000   -0.00365       0.00       0.00  -1.59E-05       0.00   4.33E+11
83.6464     31661.       0.00
```

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

Output Summary for Load Case No. 2:

```
Pile-head deflection             =     0.02767648 inches
Computed slope at pile head      =    -0.00033109 radians
Maximum bending moment           =        910018. inch-lbs
Maximum shear force              =         -5509. lbs
Depth of maximum bending moment  =     0.23000000 feet below pile head
Depth of maximum shear force     =    12.42000000 feet below pile head
Number of iterations             =              6
Number of zero deflection points =              1
```

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

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

```
Shear force at pile head                          =          0.0 lbs
Applied moment at pile head                       =    1820000.0 in-lbs
Axial thrust load on pile head                    =      20000.0 lbs
```

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

feet	inches	in-lbs	lbs	radians	psi*	in-lb^2	lb/inch	lb/inch	lb/inch
0.00	0.05562	1820000.	6.81E-09	-6.66E-04	0.00	4.29E+11	0.00	0.00	0.00
0.2300	0.05380	1820036.	-13.9597	-6.54E-04	0.00	4.29E+11	-10.1157	518.9304	0.00
0.4600	0.05201	1819995.	-56.1494	-6.42E-04	0.00	4.29E+11	-20.4565	1085.	0.00
0.6900	0.05026	1819797.	-127.0277	-6.30E-04	0.00	4.29E+11	-30.9046	1697.	0.00
0.9200	0.04853	1819364.	-226.7322	-6.19E-04	0.00	4.29E+11	-41.3450	2351.	0.00
1.1500	0.04684	1818614.	-355.0872	-6.07E-04	0.00	4.29E+11	-51.6659	3044.	0.00
1.3800	0.04518	1817470.	-511.6137	-5.95E-04	0.00	4.29E+11	-61.7591	3773.	0.00
1.6100	0.04356	1815856.	-693.3735	-5.84E-04	0.00	4.29E+11	-69.9509	4433.	0.00
1.8400	0.04196	1813707.	-896.1895	-5.72E-04	0.00	4.29E+11	-77.0171	5066.	0.00
2.0700	0.04040	1810972.	-1118.	-5.60E-04	0.00	4.29E+11	-83.4182	5699.	0.00
2.3000	0.03887	1807600.	-1356.	-5.49E-04	0.00	4.29E+11	-89.1761	6332.	0.00
2.5300	0.03737	1803549.	-1609.	-5.37E-04	0.00	4.29E+11	-94.3129	6965.	0.00
2.7600	0.03590	1798778.	-1876.	-5.25E-04	0.00	4.29E+11	-98.8505	7599.	0.00
2.9900	0.03447	1793254.	-2154.	-5.14E-04	0.00	4.29E+11	-102.8106	8232.	0.00
3.2200	0.03307	1786945.	-2442.	-5.02E-04	0.00	4.29E+11	-106.2150	8865.	0.00
3.4500	0.03170	1779828.	-2739.	-4.91E-04	0.00	4.29E+11	-109.0852	9498.	0.00
3.6800	0.03036	1771878.	-3044.	-4.79E-04	0.00	4.29E+11	-111.4426	10132.	0.00
3.9100	0.02905	1763079.	-3354.	-4.68E-04	0.00	4.29E+11	-113.3084	10765.	0.00
4.1400	0.02778	1753416.	-3669.	-4.57E-04	0.00	4.29E+11	-114.7035	11398.	0.00
4.3700	0.02653	1742879.	-3986.	-4.45E-04	0.00	4.29E+11	-115.6488	12031.	0.00
4.6000	0.02532	1731460.	-4306.	-4.34E-04	0.00	4.29E+11	-116.1648	12664.	0.00
4.8300	0.02413	1719156.	-4627.	-4.23E-04	0.00	4.29E+11	-116.2718	13298.	0.00

```
    5.0600    0.02298   1705965.     -4948.  -4.12E-04       0.00   4.29E+11
-115.9900     13931.       0.00
    5.2900    0.02186   1691891.     -5267.  -4.01E-04       0.00   4.29E+11
-115.3390     14564.       0.00
    5.5200    0.02077   1676937.     -5584.  -3.90E-04       0.00   4.29E+11
-114.3384     15197.       0.00
    5.7500    0.01970   1661111.     -5898.  -3.80E-04       0.00   4.29E+11
-113.0071     15831.       0.00
    5.9800    0.01867   1644424.     -6207.  -3.69E-04       0.00   4.29E+11
-111.3642     16464.       0.00
    6.2100    0.01767   1626888.     -6512.  -3.59E-04       0.00   4.29E+11
-109.4279     17097.       0.00
    6.4400    0.01669   1608518.     -6811.  -3.48E-04       0.00   4.29E+11
-107.2163     17730.       0.00
    6.6700    0.01574   1589331.     -7103.  -3.38E-04       0.00   4.29E+11
-104.7471     18363.       0.00
    6.9000    0.01482   1569345.     -7389.  -3.28E-04       0.00   4.29E+11
-102.0377     18997.       0.00
    7.1300    0.01393   1548581.     -7666.  -3.18E-04       0.00   4.29E+11
-99.1048     19630.       0.00
    7.3600    0.01307   1527062.     -7935.  -3.08E-04       0.00   4.30E+11
-95.9649     20263.       0.00
    7.5900    0.01224   1504811.     -8196.  -2.98E-04       0.00   4.30E+11
-92.6340     20896.       0.00
    7.8200    0.01143   1481854.     -8447.  -2.88E-04       0.00   4.30E+11
-89.1276     21530.       0.00
    8.0500    0.01064   1458218.     -8688.  -2.79E-04       0.00   4.30E+11
-85.4609     22163.       0.00
    8.2800    0.00989   1433930.     -8918.  -2.70E-04       0.00   4.30E+11
-81.6483     22796.       0.00
    8.5100    0.00915   1409020.     -9138.  -2.61E-04       0.00   4.30E+11
-77.7039     23429.       0.00
    8.7400    0.00845   1383517.     -9347.  -2.52E-04       0.00   4.30E+11
-73.6415     24062.       0.00
    8.9700    0.00776   1357453.     -9544.  -2.43E-04       0.00   4.30E+11
-69.4741     24696.       0.00
    9.2000    0.00711   1330859.     -9730.  -2.34E-04       0.00   4.30E+11
-65.2143     25329.       0.00
    9.4300    0.00647   1303767.     -9904.  -2.26E-04       0.00   4.30E+11
-60.8742     25962.       0.00
    9.6600    0.00586   1276212.    -10066.  -2.18E-04       0.00   4.30E+11
-56.4654     26595.       0.00
    9.8900    0.00527   1248226.    -10216.  -2.09E-04       0.00   4.30E+11
-51.9988     27229.       0.00
   10.1200    0.00470   1219843.    -10353.  -2.01E-04       0.00   4.30E+11
-47.4851     27862.       0.00
   10.3500    0.00416   1191099.    -10478.  -1.94E-04       0.00   4.30E+11
-42.9342     28495.       0.00
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10.5800	0.00363	1162027.	-10590.	-1.86E-04	0.00	4.30E+11
-38.3556	29128.	0.00				
10.8100	0.00313	1132662.	-10690.	-1.79E-04	0.00	4.31E+11
-33.7581	29762.	0.00				
11.0400	0.00265	1103039.	-10776.	-1.72E-04	0.00	4.31E+11
-29.1503	30395.	0.00				
11.2700	0.00218	1073195.	-10851.	-1.65E-04	0.00	4.31E+11
-24.5398	31028.	0.00				
11.5000	0.00174	1043163.	-10912.	-1.58E-04	0.00	4.31E+11
-19.9342	31661.	0.00				
11.7300	0.00131	1012978.	-10961.	-1.51E-04	0.00	4.31E+11
-15.3401	32294.	0.00				
11.9600	9.02E-04	982677.	-10997.	-1.45E-04	0.00	4.31E+11
-10.7639	32928.	0.00				
12.1900	5.11E-04	952293.	-11020.	-1.39E-04	0.00	4.31E+11
-6.2114	33561.	0.00				
12.4200	1.36E-04	921862.	-11031.	-1.33E-04	0.00	4.31E+11
-1.6878	34194.	0.00				
12.6500	-2.22E-04	891417.	-11029.	-1.27E-04	0.00	4.31E+11
2.8021	34827.	0.00				
12.8800	-5.65E-04	860993.	-11016.	-1.21E-04	0.00	4.31E+11
7.2541	35461.	0.00				
13.1100	-8.92E-04	830624.	-10989.	-1.16E-04	0.00	4.31E+11
11.6643	36094.	0.00				
13.3400	-0.00120	800344.	-10951.	-1.11E-04	0.00	4.31E+11
16.0295	36727.	0.00				
13.5700	-0.00150	770186.	-10901.	-1.06E-04	0.00	4.31E+11
20.3468	37360.	0.00				
13.8000	-0.00179	740182.	-10839.	-1.01E-04	0.00	4.31E+11
24.6140	37993.	0.00				
14.0300	-0.00206	710366.	-10765.	-9.62E-05	0.00	4.32E+11
28.8290	38627.	0.00				
14.2600	-0.00232	680769.	-10680.	-9.18E-05	0.00	4.32E+11
32.9904	39260.	0.00				
14.4900	-0.00257	651423.	-10583.	-8.75E-05	0.00	4.32E+11
37.0971	39893.	0.00				
14.7200	-0.00280	622360.	-10475.	-8.35E-05	0.00	4.32E+11
41.1486	40526.	0.00				
14.9500	-0.00303	593609.	-10356.	-7.96E-05	0.00	4.32E+11
45.1445	41160.	0.00				
15.1800	-0.00324	565203.	-10226.	-7.59E-05	0.00	4.32E+11
49.0850	41793.	0.00				
15.4100	-0.00345	537170.	-10085.	-7.23E-05	0.00	4.32E+11
52.9706	42426.	0.00				
15.6400	-0.00364	509540.	-9934.	-6.90E-05	0.00	4.32E+11
56.8023	43059.	0.00				
15.8700	-0.00383	482343.	-9772.	-6.58E-05	0.00	4.32E+11
60.5812	43692.	0.00				

16.1000	-0.00400	455607.	-9599.	-6.28E-05	0.00	4.32E+11	
64.3088	44326.	0.00					
16.3300	-0.00417	429361.	-9417.	-6.00E-05	0.00	4.32E+11	
67.9871	44959.	0.00					
16.5600	-0.00434	403633.	-9224.	-5.73E-05	0.00	4.32E+11	
71.6180	45592.	0.00					
16.7900	-0.00449	378450.	-9022.	-5.49E-05	0.00	4.32E+11	
75.2041	46225.	0.00					
17.0200	-0.00464	353840.	-8809.	-5.25E-05	0.00	4.32E+11	
78.7480	46859.	0.00					
17.2500	-0.00478	329829.	-8587.	-5.03E-05	0.00	4.32E+11	
82.2525	47492.	0.00					
17.4800	-0.00492	306445.	-8355.	-4.83E-05	0.00	4.32E+11	
85.7208	48125.	0.00					
17.7100	-0.00505	283714.	-8114.	-4.64E-05	0.00	4.33E+11	
89.1561	48758.	0.00					
17.9400	-0.00517	261662.	-7863.	-4.47E-05	0.00	4.33E+11	
92.5620	49391.	0.00					
18.1700	-0.00529	240315.	-7603.	-4.31E-05	0.00	4.33E+11	
95.9420	50025.	0.00					
18.4000	-0.00541	219699.	-7333.	-4.16E-05	0.00	4.33E+11	
99.2998	50658.	0.00					
18.6300	-0.00552	199839.	-7055.	-4.03E-05	0.00	4.33E+11	
102.6394	51291.	0.00					
18.8600	-0.00563	180761.	-6767.	-3.91E-05	0.00	4.33E+11	
105.9645	51924.	0.00					
19.0900	-0.00574	162490.	-6470.	-3.80E-05	0.00	4.33E+11	
109.2793	52558.	0.00					
19.3200	-0.00584	145051.	-6164.	-3.70E-05	0.00	4.33E+11	
112.5876	53191.	0.00					
19.5500	-0.00594	128470.	-5848.	-3.61E-05	0.00	4.33E+11	
115.8936	53824.	0.00					
19.7800	-0.00604	112772.	-5524.	-3.53E-05	0.00	4.33E+11	
119.2012	54457.	0.00					
20.0100	-0.00614	97982.	-5190.	-3.47E-05	0.00	4.33E+11	
122.5143	55090.	0.00					
20.2400	-0.00623	84125.	-4848.	-3.41E-05	0.00	4.33E+11	
125.8369	55724.	0.00					
20.4700	-0.00633	71226.	-4496.	-3.36E-05	0.00	4.33E+11	
129.1728	56357.	0.00					
20.7000	-0.00642	59312.	-4135.	-3.32E-05	0.00	4.33E+11	
132.5256	56990.	0.00					
20.9300	-0.00651	48407.	-3764.	-3.28E-05	0.00	4.33E+11	
135.8989	57623.	0.00					
21.1600	-0.00660	38537.	-3384.	-3.26E-05	0.00	4.33E+11	
139.2959	58257.	0.00					
21.3900	-0.00669	29728.	-2995.	-3.23E-05	0.00	4.33E+11	
142.7198	58890.	0.00					

21.6200	-0.00678	22007.	-2597.	-3.22E-05	0.00	4.33E+11	
146.1736	59523.	0.00					
21.8500	-0.00687	15399.	-2188.	-3.21E-05	0.00	4.33E+11	
149.6597	60156.	0.00					
22.0800	-0.00695	9931.	-1770.	-3.20E-05	0.00	4.33E+11	
153.1805	60789.	0.00					
22.3100	-0.00704	5630.	-1343.	-3.19E-05	0.00	4.33E+11	
156.7379	61423.	0.00					
22.5400	-0.00713	2523.	-905.1623	-3.19E-05	0.00	4.33E+11	
160.3336	62056.	0.00					
22.7700	-0.00722	636.7619	-457.6252	-3.19E-05	0.00	4.33E+11	
163.9687	62689.	0.00					
23.0000	-0.00731	0.00	0.00	-3.19E-05	0.00	4.33E+11	
167.6438	31661.	0.00					

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

Output Summary for Load Case No. 3:

Pile-head deflection	=	0.05562256 inches
Computed slope at pile head	=	-0.00066556 radians
Maximum bending moment	=	1820036. inch-lbs
Maximum shear force	=	-11031. lbs
Depth of maximum bending moment	=	0.23000000 feet below pile head
Depth of maximum shear force	=	12.42000000 feet below pile head
Number of iterations	=	6
Number of zero deflection points	=	1

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

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

Shear force at pile head	=	0.0 lbs
Applied moment at pile head	=	2700000.0 in-lbs
Axial thrust load on pile head	=	20000.0 lbs

Depth	Deflect.	Bending	Shear	Slope	Total	Bending	Soil

X	y	Moment	Force	S	Stress	Stiffness	p	Res. Soil Spr. Es*h	Distrib. Lat. Load
feet	inches	in-lbs	lbs	radians	psi*	in-lb^2	lb/inch	lb/inch	lb/inch
0.00	0.09142	2700000.	4.30E-08	-0.00139	0.00	1.50E+11	0.00	0.00	0.00
0.2300	0.08765	2700076.	-15.8607	-0.00134	0.00	1.50E+11	-11.4932	361.9164	0.00
0.4600	0.08401	2700061.	-63.7799	-0.00129	0.00	1.50E+11	-23.2309	763.2145	0.00
0.6900	0.08051	2699866.	-144.2530	-0.00124	0.00	1.50E+11	-35.0829	1203.	0.00
0.9200	0.07714	2699402.	-257.4228	-0.00119	0.00	1.50E+11	-46.9242	1679.	0.00
1.1500	0.07392	2698577.	-403.0942	-0.00114	0.00	1.50E+11	-58.6348	2189.	0.00
1.3800	0.07083	2697303.	-580.7488	-0.00109	0.00	1.50E+11	-70.1004	2732.	0.00
1.6100	0.06787	2695492.	-790.0263	-0.00105	0.00	1.50E+11	-81.5500	3316.	0.00
1.8400	0.06506	2693057.	-1031.	-9.96E-04	0.00	1.50E+11	-93.1061	3950.	0.00
2.0700	0.06238	2689911.	-1304.	-9.46E-04	0.00	1.51E+11	-104.3903	4619.	0.00
2.3000	0.05983	2685966.	-1607.	-8.97E-04	0.00	1.51E+11	-115.3326	5320.	0.00
2.5300	0.05742	2681140.	-1940.	-8.48E-04	0.00	1.52E+11	-125.8680	6050.	0.00
2.7600	0.05515	2675353.	-2301.	-8.08E-04	0.00	2.27E+11	-135.9373	6803.	0.00
2.9900	0.05297	2668528.	-2689.	-7.81E-04	0.00	3.66E+11	-145.4500	7579.	0.00
3.2200	0.05084	2660594.	-3104.	-7.63E-04	0.00	4.27E+11	-154.8387	8406.	0.00
3.4500	0.04876	2651480.	-3543.	-7.45E-04	0.00	4.27E+11	-163.6317	9263.	0.00
3.6800	0.04672	2641118.	-4006.	-7.28E-04	0.00	4.27E+11	-171.5159	10132.	0.00
3.9100	0.04474	2629449.	-4483.	-7.11E-04	0.00	4.27E+11	-174.4878	10765.	0.00
4.1400	0.04280	2616450.	-4968.	-6.94E-04	0.00	4.27E+11	-176.7421	11398.	0.00
4.3700	0.04090	2602103.	-5458.	-6.77E-04	0.00	4.27E+11	-178.3100	12031.	0.00
4.6000	0.03906	2586397.	-5951.	-6.61E-04	0.00	4.27E+11			

-179.2226	12664.	0.00				
4.8300	0.03726	2569325.	-6446.	-6.44E-04	0.00	4.27E+11
-179.5102	13298.	0.00				
5.0600	0.03550	2550885.	-6941.	-6.27E-04	0.00	4.27E+11
-179.2033	13931.	0.00				
5.2900	0.03380	2531079.	-7435.	-6.11E-04	0.00	4.27E+11
-178.3316	14564.	0.00				
5.5200	0.03213	2509913.	-7925.	-5.95E-04	0.00	4.27E+11
-176.9244	15197.	0.00				
5.7500	0.03051	2487399.	-8411.	-5.79E-04	0.00	4.27E+11
-175.0107	15831.	0.00				
5.9800	0.02894	2463550.	-8890.	-5.63E-04	0.00	4.27E+11
-172.6188	16464.	0.00				
6.2100	0.02741	2438386.	-9363.	-5.47E-04	0.00	4.27E+11
-169.7765	17097.	0.00				
6.4400	0.02592	2411928.	-9827.	-5.31E-04	0.00	4.27E+11
-166.5112	17730.	0.00				
6.6700	0.02448	2384200.	-10281.	-5.16E-04	0.00	4.27E+11
-162.8497	18363.	0.00				
6.9000	0.02307	2355231.	-10725.	-5.00E-04	0.00	4.27E+11
-158.8180	18997.	0.00				
7.1300	0.02171	2325051.	-11158.	-4.85E-04	0.00	4.27E+11
-154.4417	19630.	0.00				
7.3600	0.02040	2293694.	-11577.	-4.70E-04	0.00	4.28E+11
-149.7457	20263.	0.00				
7.5900	0.01912	2261196.	-11984.	-4.56E-04	0.00	4.28E+11
-144.7542	20896.	0.00				
7.8200	0.01788	2227594.	-12376.	-4.41E-04	0.00	4.28E+11
-139.4908	21530.	0.00				
8.0500	0.01668	2192929.	-12753.	-4.27E-04	0.00	4.28E+11
-133.9784	22163.	0.00				
8.2800	0.01553	2157242.	-13115.	-4.13E-04	0.00	4.28E+11
-128.2389	22796.	0.00				
8.5100	0.01441	2120577.	-13461.	-3.99E-04	0.00	4.28E+11
-122.2940	23429.	0.00				
8.7400	0.01332	2082981.	-13790.	-3.85E-04	0.00	4.28E+11
-116.1641	24062.	0.00				
8.9700	0.01228	2044498.	-14102.	-3.72E-04	0.00	4.28E+11
-109.8693	24696.	0.00				
9.2000	0.01127	2005178.	-14396.	-3.59E-04	0.00	4.28E+11
-103.4287	25329.	0.00				
9.4300	0.01030	1965070.	-14673.	-3.46E-04	0.00	4.28E+11
-96.8607	25962.	0.00				
9.6600	0.00936	1924223.	-14931.	-3.34E-04	0.00	4.29E+11
-90.1828	26595.	0.00				
9.8900	0.00845	1882688.	-15171.	-3.21E-04	0.00	4.29E+11
-83.4119	27229.	0.00				
10.1200	0.00758	1840517.	-15391.	-3.09E-04	0.00	4.29E+11

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-76.5640     27862.       0.00
   10.3500    0.00675   1797762.    -15593.  -2.98E-04       0.00   4.29E+11
-69.6542     28495.       0.00
   10.5800    0.00594   1754476.    -15776.  -2.86E-04       0.00   4.29E+11
-62.6970     29128.       0.00
   10.8100    0.00517   1710712.    -15939.  -2.75E-04       0.00   4.29E+11
-55.7060     29762.       0.00
   11.0400    0.00442   1666523.    -16083.  -2.64E-04       0.00   4.29E+11
-48.6940     30395.       0.00
   11.2700    0.00371   1621962.    -16208.  -2.54E-04       0.00   4.29E+11
-41.6729     31028.       0.00
   11.5000    0.00302   1577083.    -16313.  -2.43E-04       0.00   4.29E+11
-34.6540     31661.       0.00
   11.7300    0.00236   1531940.    -16399.  -2.33E-04       0.00   4.30E+11
-27.6477     32294.       0.00
   11.9600    0.00173   1486586.    -16466.  -2.24E-04       0.00   4.30E+11
-20.6636     32928.       0.00
   12.1900    0.00113   1441073.    -16513.  -2.14E-04       0.00   4.30E+11
-13.7105     33561.       0.00
   12.4200   5.49E-04   1395456.    -16542.  -2.05E-04       0.00   4.30E+11
-6.7965     34194.       0.00
   12.6500  -5.63E-06   1349786.    -16551.  -1.96E-04       0.00   4.30E+11
0.07109     34827.       0.00
   12.8800  -5.36E-04   1304117.    -16541.  -1.88E-04       0.00   4.30E+11
6.8858     35461.       0.00
   13.1100   -0.00104   1258499.    -16513.  -1.80E-04       0.00   4.30E+11
13.6418     36094.       0.00
   13.3400   -0.00153   1212985.    -16466.  -1.72E-04       0.00   4.30E+11
20.3340     36727.       0.00
   13.5700   -0.00199   1167626.    -16401.  -1.64E-04       0.00   4.30E+11
26.9581     37360.       0.00
   13.8000   -0.00243   1122471.    -16317.  -1.57E-04       0.00   4.31E+11
33.5104     37993.       0.00
   14.0300   -0.00286   1077571.    -16216.  -1.50E-04       0.00   4.31E+11
39.9879     38627.       0.00
   14.2600   -0.00326   1032976.    -16097.  -1.43E-04       0.00   4.31E+11
46.3884     39260.       0.00
   14.4900   -0.00365    988733.    -15960.  -1.37E-04       0.00   4.31E+11
52.7102     39893.       0.00
   14.7200   -0.00401    944892.    -15806.  -1.30E-04       0.00   4.31E+11
58.9523     40526.       0.00
   14.9500   -0.00437    901499.    -15635.  -1.24E-04       0.00   4.31E+11
65.1142     41160.       0.00
   15.1800   -0.00470    858602.    -15447.  -1.19E-04       0.00   4.31E+11
71.1962     41793.       0.00
   15.4100   -0.00502    816248.    -15242.  -1.13E-04       0.00   4.31E+11
77.1990     42426.       0.00
   15.6400   -0.00533    774480.    -15021.  -1.08E-04       0.00   4.31E+11
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83.1238     43059.       0.00
   15.8700   -0.00562    733346.    -14783.  -1.04E-04       0.00   4.32E+11
88.9726     43692.       0.00
   16.1000   -0.00590    692890.    -14529.  -9.90E-05       0.00   4.32E+11
94.7476     44326.       0.00
   16.3300   -0.00617    653154.    -14260.  -9.47E-05       0.00   4.32E+11
100.4515    44959.       0.00
   16.5600   -0.00642    614184.    -13975.  -9.06E-05       0.00   4.32E+11
106.0875    45592.       0.00
   16.7900   -0.00667    576022.    -13675.  -8.68E-05       0.00   4.32E+11
111.6594    46225.       0.00
   17.0200   -0.00690    538710.    -13359.  -8.33E-05       0.00   4.32E+11
117.1710    46859.       0.00
   17.2500   -0.00713    502291.    -13028.  -7.99E-05       0.00   4.32E+11
122.6268    47492.       0.00
   17.4800   -0.00734    466805.    -12682.  -7.68E-05       0.00   4.32E+11
128.0315    48125.       0.00
   17.7100   -0.00755    432294.    -12321.  -7.40E-05       0.00   4.32E+11
133.3900    48758.       0.00
   17.9400   -0.00775    398800.    -11946.  -7.13E-05       0.00   4.32E+11
138.7076    49391.       0.00
   18.1700   -0.00794    366362.    -11556.  -6.89E-05       0.00   4.32E+11
143.9897    50025.       0.00
   18.4000   -0.00813    335021.    -11151.  -6.66E-05       0.00   4.32E+11
149.2421    50658.       0.00
   18.6300   -0.00831    304816.    -10732.  -6.46E-05       0.00   4.32E+11
154.4704    51291.       0.00
   18.8600   -0.00849    275788.    -10298.  -6.27E-05       0.00   4.33E+11
159.6809    51924.       0.00
   19.0900   -0.00866    247976.     -9850.  -6.11E-05       0.00   4.33E+11
164.8794    52558.       0.00
   19.3200   -0.00882    221421.     -9388.  -5.96E-05       0.00   4.33E+11
170.0721    53191.       0.00
   19.5500   -0.00899    196160.     -8912.  -5.82E-05       0.00   4.33E+11
175.2651    53824.       0.00
   19.7800   -0.00915    172235.     -8421.  -5.71E-05       0.00   4.33E+11
180.4645    54457.       0.00
   20.0100   -0.00930    149684.     -7915.  -5.60E-05       0.00   4.33E+11
185.6763    55090.       0.00
   20.2400   -0.00946    128548.     -7396.  -5.51E-05       0.00   4.33E+11
190.9065    55724.       0.00
   20.4700   -0.00961    108866.     -6862.  -5.44E-05       0.00   4.33E+11
196.1609    56357.       0.00
   20.7000   -0.00976     90678.     -6313.  -5.38E-05       0.00   4.33E+11
201.4450    56990.       0.00
   20.9300   -0.00990     74025.     -5750.  -5.32E-05       0.00   4.33E+11
206.7642    57623.       0.00
   21.1600   -0.01005     58947.     -5171.  -5.28E-05       0.00   4.33E+11
```

```
212.1236     58257.       0.00
   21.3900   -0.01019     45484.     -4579.  -5.25E-05       0.00   4.33E+11
217.5279     58890.       0.00
   21.6200   -0.01034     33679.     -3971.  -5.22E-05       0.00   4.33E+11
222.9817     59523.       0.00
   21.8500   -0.01048     23572.     -3348.  -5.20E-05       0.00   4.33E+11
228.4887     60156.       0.00
   22.0800   -0.01063     15205.     -2709.  -5.19E-05       0.00   4.33E+11
234.0527     60789.       0.00
   22.3100   -0.01077      8622.     -2056.  -5.18E-05       0.00   4.33E+11
239.6765     61423.       0.00
   22.5400   -0.01091      3864.     -1386.  -5.18E-05       0.00   4.33E+11
245.3625     62056.       0.00
   22.7700   -0.01106   975.7289  -701.0960  -5.18E-05       0.00   4.33E+11
251.1126     62689.       0.00
   23.0000   -0.01120       0.00       0.00  -5.18E-05       0.00   4.33E+11
256.9279     31661.       0.00
```

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

Output Summary for Load Case No. 4:

```
Pile-head deflection             =     0.09142426 inches
Computed slope at pile head      =    -0.00139299 radians
Maximum bending moment           =       2700076. inch-lbs
Maximum shear force              =        -16551. lbs
Depth of maximum bending moment  =     0.23000000 feet below pile head
Depth of maximum shear force     =    12.65000000 feet below pile head
Number of iterations             =            189
Number of zero deflection points =              1
```

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

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

```
Shear force at pile head                          =          0.0 lbs
Applied moment at pile head                       =    3640000.0 in-lbs
```

Axial thrust load on pile head = 20000.0 lbs

Depth X	Deflect. y	Bending Moment	Shear Force	Slope S	Total Stress	Bending Stiffness	Soil Res. p	Soil Spr. Es*h	Distrib. Lat. Load
feet	inches	in-lbs	lbs	radians	psi*	in-lb^2	lb/inch	lb/inch	lb/inch
0.00	0.2038	3640000.	-1.46E-07	-0.00304	0.00	1.47E+11	0.00	0.00	0.00
0.2300	0.1955	3640166.	-19.5622	-0.00297	0.00	1.47E+11	-14.1755	200.0763	0.00
0.4600	0.1874	3640220.	-78.7829	-0.00290	0.00	1.47E+11	-28.7380	423.1448	0.00
0.6900	0.1795	3640051.	-178.5098	-0.00283	0.00	1.47E+11	-43.5278	669.1602	0.00
0.9200	0.1718	3639547.	-319.1540	-0.00276	0.00	1.47E+11	-58.3883	937.9642	0.00
1.1500	0.1643	3638595.	-500.6985	-0.00270	0.00	1.47E+11	-73.1657	1229.	0.00
1.3800	0.1569	3637081.	-722.7072	-0.00263	0.00	1.47E+11	-87.7102	1543.	0.00
1.6100	0.1498	3634895.	-984.7483	-0.00256	0.00	1.47E+11	-102.1747	1883.	0.00
1.8400	0.1428	3631928.	-1287.	-0.00249	0.00	1.47E+11	-116.6278	2254.	0.00
2.0700	0.1360	3628068.	-1628.	-0.00242	0.00	1.47E+11	-130.6909	2652.	0.00
2.3000	0.1294	3623209.	-2007.	-0.00235	0.00	1.47E+11	-144.2564	3076.	0.00
2.5300	0.1230	3617247.	-2423.	-0.00229	0.00	1.47E+11	-157.2211	3527.	0.00
2.7600	0.1168	3610084.	-2874.	-0.00222	0.00	1.47E+11	-169.4864	4005.	0.00
2.9900	0.1108	3601625.	-3358.	-0.00215	0.00	1.47E+11	-180.9589	4509.	0.00
3.2200	0.1049	3591785.	-3873.	-0.00208	0.00	1.47E+11	-192.1203	5053.	0.00
3.4500	0.09928	3580478.	-4417.	-0.00202	0.00	1.47E+11	-202.4567	5628.	0.00
3.6800	0.09381	3567624.	-4989.	-0.00195	0.00	1.47E+11	-211.8714	6234.	0.00
3.9100	0.08852	3553153.	-5585.	-0.00188	0.00	1.47E+11	-220.2965	6869.	0.00
4.1400	0.08342	3537000.	-6204.	-0.00182	0.00	1.47E+11	-227.6694	7533.	0.00

4.3700	0.07850	3519109.	-6841.	-0.00175	0.00	1.47E+11
-233.9333	8225.	0.00				
4.6000	0.07376	3499433.	-7494.	-0.00168	0.00	1.47E+11
-239.6599	8967.	0.00				
4.8300	0.06921	3477927.	-8163.	-0.00162	0.00	1.47E+11
-245.1066	9775.	0.00				
5.0600	0.06483	3454551.	-8846.	-0.00155	0.00	1.47E+11
-249.4690	10620.	0.00				
5.2900	0.06064	3429270.	-9539.	-0.00149	0.00	1.47E+11
-252.7118	11503.	0.00				
5.5200	0.05662	3402061.	-10239.	-0.00142	0.00	1.47E+11
-254.8061	12421.	0.00				
5.7500	0.05277	3372908.	-10944.	-0.00136	0.00	1.47E+11
-255.7293	13374.	0.00				
5.9800	0.04910	3341803.	-11649.	-0.00130	0.00	1.48E+11
-255.4659	14359.	0.00				
6.2100	0.04561	3308748.	-12355.	-0.00124	0.00	1.48E+11
-255.9489	15489.	0.00				
6.4400	0.04228	3273740.	-13061.	-0.00117	0.00	1.48E+11
-255.6008	16685.	0.00				
6.6700	0.03912	3236782.	-13764.	-0.00111	0.00	1.48E+11
-254.2459	17935.	0.00				
6.9000	0.03613	3197884.	-14458.	-0.00105	0.00	1.48E+11
-248.7087	18997.	0.00				
7.1300	0.03331	3157088.	-15129.	-9.94E-04	0.00	1.48E+11
-236.9034	19630.	0.00				
7.3600	0.03065	3114484.	-15766.	-9.36E-04	0.00	1.48E+11
-224.9948	20263.	0.00				
7.5900	0.02814	3070163.	-16371.	-8.78E-04	0.00	1.48E+11
-213.0772	20896.	0.00				
7.8200	0.02580	3024215.	-16942.	-8.21E-04	0.00	1.48E+11
-201.2420	21530.	0.00				
8.0500	0.02361	2976732.	-17482.	-7.66E-04	0.00	1.48E+11
-189.5779	22163.	0.00				
8.2800	0.02157	2927801.	-17989.	-7.11E-04	0.00	1.49E+11
-178.1703	22796.	0.00				
8.5100	0.01968	2877510.	-18466.	-6.57E-04	0.00	1.49E+11
-167.1018	23429.	0.00				
8.7400	0.01795	2825944.	-18912.	-6.04E-04	0.00	1.49E+11
-156.4519	24062.	0.00				
8.9700	0.01635	2773182.	-19330.	-5.52E-04	0.00	1.49E+11
-146.2968	24696.	0.00				
9.2000	0.01490	2719303.	-19720.	-5.01E-04	0.00	1.49E+11
-136.7099	25329.	0.00				
9.4300	0.01358	2664381.	-20085.	-4.67E-04	0.00	3.97E+11
-127.7611	25962.	0.00				
9.6600	0.01232	2608483.	-20426.	-4.49E-04	0.00	4.27E+11
-118.7014	26595.	0.00				

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    9.8900    0.01110   2551681.    -20740.  -4.33E-04       0.00   4.27E+11
-109.5212     27229.       0.00
   10.1200    0.00993   2494044.    -21030.  -4.16E-04       0.00   4.27E+11
-100.2421     27862.       0.00
   10.3500    0.00880   2435642.    -21294.  -4.00E-04       0.00   4.27E+11
-90.8849     28495.       0.00
   10.5800    0.00772   2376547.    -21532.  -3.85E-04       0.00   4.27E+11
-81.4689     29128.       0.00
   10.8100    0.00668   2316830.    -21743.  -3.70E-04       0.00   4.28E+11
-72.0124     29762.       0.00
   11.0400    0.00568   2256564.    -21929.  -3.55E-04       0.00   4.28E+11
-62.5329     30395.       0.00
   11.2700    0.00472   2195821.    -22089.  -3.41E-04       0.00   4.28E+11
-53.0463     31028.       0.00
   11.5000    0.00380   2134673.    -22222.  -3.27E-04       0.00   4.28E+11
-43.5679     31661.       0.00
   11.7300    0.00292   2073192.    -22329.  -3.13E-04       0.00   4.28E+11
-34.1116     32294.       0.00
   11.9600    0.00207   2011451.    -22410.  -3.00E-04       0.00   4.28E+11
-24.6904     32928.       0.00
   12.1900    0.00126   1949521.    -22465.  -2.87E-04       0.00   4.28E+11
-15.3161     33561.       0.00
   12.4200   4.84E-04   1887473.    -22495.  -2.75E-04       0.00   4.29E+11
-5.9995     34194.       0.00
   12.6500  -2.58E-04   1825380.    -22499.  -2.63E-04       0.00   4.29E+11
3.2495     34827.       0.00
   12.8800  -9.67E-04   1763310.    -22477.  -2.51E-04       0.00   4.29E+11
12.4222     35461.       0.00
   13.1100   -0.00164   1701334.    -22430.  -2.40E-04       0.00   4.29E+11
21.5109     36094.       0.00
   13.3400   -0.00229   1639522.    -22358.  -2.29E-04       0.00   4.29E+11
30.5088     36727.       0.00
   13.5700   -0.00291   1577941.    -22262.  -2.19E-04       0.00   4.29E+11
39.4102     37360.       0.00
   13.8000   -0.00350   1516660.    -22141.  -2.09E-04       0.00   4.30E+11
48.2101     37993.       0.00
   14.0300   -0.00407   1455746.    -21996.  -2.00E-04       0.00   4.30E+11
56.9046     38627.       0.00
   14.2600   -0.00460   1395265.    -21827.  -1.90E-04       0.00   4.30E+11
65.4909     39260.       0.00
   14.4900   -0.00512   1335282.    -21635.  -1.82E-04       0.00   4.30E+11
73.9666     39893.       0.00
   14.7200   -0.00561   1275862.    -21419.  -1.73E-04       0.00   4.30E+11
82.3305     40526.       0.00
   14.9500   -0.00607   1217069.    -21180.  -1.65E-04       0.00   4.30E+11
90.5822     41160.       0.00
   15.1800   -0.00652   1158965.    -20919.  -1.58E-04       0.00   4.30E+11
98.7220     41793.       0.00
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15.4100	-0.00694	1101613.	-20635.	-1.50E-04	0.00	4.31E+11
106.7510	42426.	0.00				
15.6400	-0.00735	1045074.	-20330.	-1.44E-04	0.00	4.31E+11
114.6709	43059.	0.00				
15.8700	-0.00774	989408.	-20003.	-1.37E-04	0.00	4.31E+11
122.4844	43692.	0.00				
16.1000	-0.00811	934675.	-19654.	-1.31E-04	0.00	4.31E+11
130.1946	44326.	0.00				
16.3300	-0.00846	880933.	-19284.	-1.25E-04	0.00	4.31E+11
137.8052	44959.	0.00				
16.5600	-0.00880	828240.	-18893.	-1.20E-04	0.00	4.31E+11
145.3207	45592.	0.00				
16.7900	-0.00912	776654.	-18482.	-1.14E-04	0.00	4.31E+11
152.7461	46225.	0.00				
17.0200	-0.00943	726232.	-18050.	-1.10E-04	0.00	4.32E+11
160.0868	46859.	0.00				
17.2500	-0.00973	677029.	-17598.	-1.05E-04	0.00	4.32E+11
167.3487	47492.	0.00				
17.4800	-0.01001	629100.	-17127.	-1.01E-04	0.00	4.32E+11
174.5383	48125.	0.00				
17.7100	-0.01028	582501.	-16635.	-9.71E-05	0.00	4.32E+11
181.6623	48758.	0.00				
17.9400	-0.01055	537285.	-16124.	-9.36E-05	0.00	4.32E+11
188.7278	49391.	0.00				
18.1700	-0.01080	493507.	-15593.	-9.03E-05	0.00	4.32E+11
195.7422	50025.	0.00				
18.4000	-0.01104	451219.	-15044.	-8.73E-05	0.00	4.32E+11
202.7133	50658.	0.00				
18.6300	-0.01128	410476.	-14474.	-8.45E-05	0.00	4.32E+11
209.6489	51291.	0.00				
18.8600	-0.01151	371329.	-13886.	-8.20E-05	0.00	4.32E+11
216.5571	51924.	0.00				
19.0900	-0.01173	333832.	-13279.	-7.98E-05	0.00	4.32E+11
223.4461	52558.	0.00				
19.3200	-0.01195	298037.	-12653.	-7.77E-05	0.00	4.33E+11
230.3241	53191.	0.00				
19.5500	-0.01216	263997.	-12008.	-7.60E-05	0.00	4.33E+11
237.1994	53824.	0.00				
19.7800	-0.01237	231763.	-11344.	-7.44E-05	0.00	4.33E+11
244.0802	54457.	0.00				
20.0100	-0.01257	201389.	-10660.	-7.30E-05	0.00	4.33E+11
250.9747	55090.	0.00				
20.2400	-0.01277	172926.	-9958.	-7.18E-05	0.00	4.33E+11
257.8908	55724.	0.00				
20.4700	-0.01297	146427.	-9237.	-7.08E-05	0.00	4.33E+11
264.8364	56357.	0.00				
20.7000	-0.01316	121946.	-8496.	-6.99E-05	0.00	4.33E+11
271.8189	56990.	0.00				

20.9300	-0.01336	99536.	-7736.	-6.92E-05	0.00	4.33E+11
278.8457	57623.	0.00				
21.1600	-0.01355	79250.	-6957.	-6.86E-05	0.00	4.33E+11
285.9236	58257.	0.00				
21.3900	-0.01373	61142.	-6158.	-6.82E-05	0.00	4.33E+11
293.0589	58890.	0.00				
21.6200	-0.01392	45266.	-5339.	-6.79E-05	0.00	4.33E+11
300.2576	59523.	0.00				
21.8500	-0.01411	31677.	-4500.	-6.76E-05	0.00	4.33E+11
307.5251	60156.	0.00				
22.0800	-0.01430	20431.	-3641.	-6.74E-05	0.00	4.33E+11
314.8660	60789.	0.00				
22.3100	-0.01448	11583.	-2762.	-6.73E-05	0.00	4.33E+11
322.2844	61423.	0.00				
22.5400	-0.01467	5191.	-1862.	-6.73E-05	0.00	4.33E+11
329.7836	62056.	0.00				
22.7700	-0.01485	1310.	-941.7104	-6.73E-05	0.00	4.33E+11
337.3659	62689.	0.00				
23.0000	-0.01504	0.00	0.00	-6.73E-05	0.00	4.33E+11
345.0329	31661.	0.00				

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

Output Summary for Load Case No. 5:

Pile-head deflection	=	0.20383798 inches
Computed slope at pile head	=	-0.00303793 radians
Maximum bending moment	=	3640220. inch-lbs
Maximum shear force	=	-22499. lbs
Depth of maximum bending moment	=	0.46000000 feet below pile head
Depth of maximum shear force	=	12.65000000 feet below pile head
Number of iterations	=	53
Number of zero deflection points	=	1

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

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

Shear force at pile head = 0.0 lbs
Applied moment at pile head = 7280000.0 in-lbs
Axial thrust load on pile head = 20000.0 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*	in-lb^2	lb/inch	lb/inch	lb/inch
0.00	0.6790	7280000.	3.32E-08	-0.00802	0.00	1.42E+11	0.00	0.00	0.00
0.2300	0.6571	7280439.	-26.8774	-0.00788	0.00	1.42E+11	-19.4764	81.8106	0.00
0.4600	0.6355	7280722.	-108.5901	-0.00774	0.00	1.42E+11	-39.7358	172.5728	0.00
0.6900	0.6143	7280694.	-247.0586	-0.00760	0.00	1.42E+11	-60.6037	272.2714	0.00
0.9200	0.5936	7280197.	-443.7248	-0.00746	0.00	1.42E+11	-81.9081	380.8665	0.00
1.1500	0.5732	7279068.	-699.5368	-0.00732	0.00	1.42E+11	-103.4629	498.2078	0.00
1.3800	0.5532	7277143.	-1015.	-0.00717	0.00	1.42E+11	-125.0835	624.0926	0.00
1.6100	0.5336	7274258.	-1390.	-0.00703	0.00	1.42E+11	-146.7358	759.0295	0.00
1.8400	0.5143	7270247.	-1825.	-0.00689	0.00	1.42E+11	-168.3650	903.4530	0.00
2.0700	0.4955	7264945.	-2319.	-0.00675	0.00	1.42E+11	-189.6982	1057.	0.00
2.3000	0.4771	7258191.	-2871.	-0.00661	0.00	1.42E+11	-210.5911	1218.	0.00
2.5300	0.4590	7249825.	-3481.	-0.00647	0.00	1.42E+11	-230.9034	1388.	0.00
2.7600	0.4414	7239692.	-4145.	-0.00633	0.00	1.42E+11	-250.4993	1566.	0.00
2.9900	0.4241	7227643.	-4862.	-0.00619	0.00	1.42E+11	-269.2472	1752.	0.00
3.2200	0.4072	7213536.	-5631.	-0.00605	0.00	1.42E+11	-287.6474	1950.	0.00
3.4500	0.3907	7197229.	-6449.	-0.00591	0.00	1.42E+11	-305.1117	2155.	0.00
3.6800	0.3746	7178591.	-7314.	-0.00577	0.00	1.42E+11	-321.5049	2369.	0.00
3.9100	0.3589	7157495.	-8222.	-0.00563	0.00	1.42E+11			

-336.7219	2590.	0.00				
4.1400	0.3435	7133828.	-9170.	-0.00549	0.00	1.42E+11
-350.6628	2817.	0.00				
4.3700	0.3285	7107481.	-10156.	-0.00535	0.00	1.42E+11
-363.2324	3051.	0.00				
4.6000	0.3140	7078359.	-11175.	-0.00522	0.00	1.42E+11
-375.3310	3299.	0.00				
4.8300	0.2998	7046371.	-12227.	-0.00508	0.00	1.42E+11
-387.3733	3567.	0.00				
5.0600	0.2859	7011425.	-13311.	-0.00494	0.00	1.42E+11
-398.0743	3842.	0.00				
5.2900	0.2725	6973439.	-14423.	-0.00481	0.00	1.42E+11
-407.3609	4126.	0.00				
5.5200	0.2594	6932342.	-15558.	-0.00467	0.00	1.42E+11
-415.1649	4417.	0.00				
5.7500	0.2467	6888075.	-16712.	-0.00454	0.00	1.42E+11
-421.4228	4715.	0.00				
5.9800	0.2343	6840591.	-17882.	-0.00441	0.00	1.43E+11
-426.0765	5018.	0.00				
6.2100	0.2224	6789853.	-19065.	-0.00427	0.00	1.43E+11
-431.4224	5355.	0.00				
6.4400	0.2108	6735822.	-20262.	-0.00414	0.00	1.43E+11
-435.5569	5704.	0.00				
6.6700	0.1995	6678466.	-21468.	-0.00401	0.00	1.43E+11
-438.2309	6063.	0.00				
6.9000	0.1886	6617764.	-22679.	-0.00388	0.00	1.43E+11
-439.4121	6430.	0.00				
7.1300	0.1781	6553708.	-23891.	-0.00376	0.00	1.43E+11
-439.0731	6806.	0.00				
7.3600	0.1679	6486301.	-25100.	-0.00363	0.00	1.43E+11
-437.1919	7188.	0.00				
7.5900	0.1580	6415556.	-26303.	-0.00351	0.00	1.43E+11
-434.2353	7584.	0.00				
7.8200	0.1485	6341497.	-27496.	-0.00338	0.00	1.43E+11
-430.4030	7999.	0.00				
8.0500	0.1393	6264152.	-28676.	-0.00326	0.00	1.43E+11
-424.9020	8416.	0.00				
8.2800	0.1305	6183563.	-29839.	-0.00314	0.00	1.43E+11
-417.7228	8834.	0.00				
8.5100	0.1220	6099786.	-30980.	-0.00302	0.00	1.43E+11
-408.8651	9249.	0.00				
8.7400	0.1138	6012888.	-32094.	-0.00291	0.00	1.43E+11
-398.3398	9659.	0.00				
8.9700	0.1060	5922950.	-33176.	-0.00279	0.00	1.43E+11
-386.1699	10059.	0.00				
9.2000	0.09841	5830063.	-34229.	-0.00268	0.00	1.44E+11
-376.7306	10566.	0.00				
9.4300	0.09117	5734300.	-35255.	-0.00257	0.00	1.44E+11

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-366.4887     11094.       0.00
    9.6600    0.08424   5635740.    -36250.   -0.00246       0.00   1.44E+11
-354.8351     11626.       0.00
    9.8900    0.07760   5534470.    -37212.   -0.00235       0.00   1.44E+11
-341.8155     12157.       0.00
   10.1200    0.07126   5430591.    -38135.   -0.00225       0.00   1.44E+11
-327.4892     12684.       0.00
   10.3500    0.06520   5324211.    -39018.   -0.00214       0.00   1.44E+11
-311.9298     13204.       0.00
   10.5800    0.05943   5215450.    -39856.   -0.00204       0.00   1.44E+11
-295.2262     13711.       0.00
   10.8100    0.05393   5104434.    -40646.   -0.00194       0.00   1.44E+11
-277.4830     14201.       0.00
   11.0400    0.04870   4991299.    -41386.   -0.00185       0.00   1.45E+11
-258.8210     14669.       0.00
   11.2700    0.04373   4876187.    -42074.   -0.00175       0.00   1.45E+11
-239.3777     15108.       0.00
   11.5000    0.03902   4759247.    -42707.   -0.00166       0.00   1.45E+11
-219.3075     15512.       0.00
   11.7300    0.03456   4640631.    -43283.   -0.00157       0.00   1.45E+11
-198.7809     15875.       0.00
   11.9600    0.03034   4520496.    -43803.   -0.00148       0.00   1.45E+11
-177.9848     16189.       0.00
   12.1900    0.02636   4399000.    -44278.   -0.00140       0.00   1.45E+11
-165.7300     17350.       0.00
   12.4200    0.02261   4276237.    -44720.   -0.00132       0.00   1.46E+11
-154.5800     18866.       0.00
   12.6500    0.01909   4152292.    -45130.   -0.00124       0.00   1.46E+11
-142.6133     20621.       0.00
   12.8800    0.01578   4027257.    -45506.   -0.00116       0.00   1.46E+11
-129.7642     22698.       0.00
   13.1100    0.01268   3901229.    -45845.   -0.00109       0.00   1.46E+11
-115.9275     25233.       0.00
   13.3400    0.00978   3774313.    -46144.   -0.00101       0.00   1.47E+11
-100.9272     28470.       0.00
   13.5700    0.00708   3646625.    -46400.  -9.44E-04       0.00   1.47E+11
-84.4485     32899.        0.00
   13.8000    0.00457   3518290.    -46603.  -8.77E-04       0.00   1.47E+11
-62.9668     37993.        0.00
   14.0300    0.00225   3389472.    -46734.  -8.12E-04       0.00   1.47E+11
-31.4319     38627.        0.00
   14.2600   9.28E-05   3260410.    -46779.  -7.50E-04       0.00   1.48E+11
-1.3205     39260.         0.00
   14.4900   -0.00189   3131336.    -46743.  -6.90E-04       0.00   1.48E+11
27.3486     39893.         0.00
   14.7200   -0.00372   3002466.    -46630.  -6.33E-04       0.00   1.48E+11
54.5627     40526.         0.00
   14.9500   -0.00539   2874009.    -46444.  -5.78E-04       0.00   1.49E+11
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80.3155     41160.       0.00
   15.1800   -0.00691   2746160.    -46189.  -5.26E-04       0.00   1.49E+11
104.6066     41793.       0.00
   15.4100   -0.00829   2619106.    -45868.  -4.92E-04       0.00   4.27E+11
127.4413     42426.       0.00
   15.6400   -0.00963   2493022.    -45485.  -4.76E-04       0.00   4.27E+11
150.1809     43059.       0.00
   15.8700   -0.01092   2368081.    -45039.  -4.60E-04       0.00   4.27E+11
172.8294     43692.       0.00
   16.1000   -0.01217   2244455.    -44531.  -4.45E-04       0.00   4.28E+11
195.3926     44326.       0.00
   16.3300   -0.01338   2122317.    -43961.  -4.31E-04       0.00   4.28E+11
217.8776     44959.       0.00
   16.5600   -0.01455   2001838.    -43329.  -4.18E-04       0.00   4.28E+11
240.2934     45592.       0.00
   16.7900   -0.01568   1883189.    -42635.  -4.05E-04       0.00   4.29E+11
262.6504     46225.       0.00
   17.0200   -0.01678   1766540.    -41879.  -3.94E-04       0.00   4.29E+11
284.9603     46859.       0.00
   17.2500   -0.01786   1652061.    -41062.  -3.83E-04       0.00   4.29E+11
307.2361     47492.       0.00
   17.4800   -0.01890   1539922.    -40183.  -3.72E-04       0.00   4.30E+11
329.4919     48125.       0.00
   17.7100   -0.01991   1430292.    -39243.  -3.63E-04       0.00   4.30E+11
351.7432     48758.       0.00
   17.9400   -0.02090   1323341.    -38241.  -3.54E-04       0.00   4.30E+11
374.0061     49391.       0.00
   18.1700   -0.02186   1219238.    -37178.  -3.46E-04       0.00   4.30E+11
396.2979     50025.       0.00
   18.4000   -0.02281   1118155.    -36054.  -3.38E-04       0.00   4.31E+11
418.6365     50658.       0.00
   18.6300   -0.02373   1020259.    -34867.  -3.32E-04       0.00   4.31E+11
441.0405     51291.       0.00
   18.8600   -0.02464    925723.    -33619.  -3.25E-04       0.00   4.31E+11
463.5292     51924.       0.00
   19.0900   -0.02553    834718.    -32309.  -3.20E-04       0.00   4.31E+11
486.1219     52558.       0.00
   19.3200   -0.02640    747415.    -30936.  -3.15E-04       0.00   4.31E+11
508.8388     53191.       0.00
   19.5500   -0.02726    663989.    -29500.  -3.10E-04       0.00   4.32E+11
531.6997     53824.       0.00
   19.7800   -0.02811    584612.    -28000.  -3.06E-04       0.00   4.32E+11
554.7249     54457.       0.00
   20.0100   -0.02895    509461.    -26437.  -3.03E-04       0.00   4.32E+11
577.9342     55090.       0.00
   20.2400   -0.02978    438712.    -24810.  -3.00E-04       0.00   4.32E+11
601.3474     55724.       0.00
   20.4700   -0.03061    372544.    -23117.  -2.97E-04       0.00   4.32E+11
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624.9838     56357.       0.00
   20.7000   -0.03142    311136.    -21360.  -2.95E-04       0.00   4.32E+11
648.8623     56990.       0.00
   20.9300   -0.03223    254671.    -19535.  -2.93E-04       0.00   4.33E+11
673.0010     57623.       0.00
   21.1600   -0.03304    203333.    -17644.  -2.92E-04       0.00   4.33E+11
697.4171     58257.       0.00
   21.3900   -0.03384    157307.    -15685.  -2.90E-04       0.00   4.33E+11
722.1268     58890.       0.00
   21.6200   -0.03464    116782.    -13658.  -2.89E-04       0.00   4.33E+11
747.1451     59523.       0.00
   21.8500   -0.03544     81949.    -11561.  -2.89E-04       0.00   4.33E+11
772.4857     60156.       0.00
   22.0800   -0.03624     53000.     -9393.  -2.88E-04       0.00   4.33E+11
798.1607     60789.       0.00
   22.3100   -0.03703     30131.     -7154.  -2.88E-04       0.00   4.33E+11
824.1804     61423.       0.00
   22.5400   -0.03783     13540.     -4843.  -2.88E-04       0.00   4.33E+11
850.5533     62056.       0.00
   22.7700   -0.03862      3429.     -2459.  -2.88E-04       0.00   4.33E+11
877.2855     62689.       0.00
   23.0000   -0.03942       0.00       0.00  -2.88E-04       0.00   4.33E+11
904.3811     31661.       0.00
```

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

Output Summary for Load Case No. 6:

```
Pile-head deflection             =     0.67901206 inches
Computed slope at pile head      =    -0.00802317 radians
Maximum bending moment           =       7280722. inch-lbs
Maximum shear force              =        -46779. lbs
Depth of maximum bending moment  =     0.46000000 feet below pile head
Depth of maximum shear force     =    14.26000000 feet below pile head
Number of iterations             =             42
Number of zero deflection points =              1
```

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

Shear force at pile head = 0.0 lbs
Applied moment at pile head = 13000000.0 in-lbs
Axial thrust load on pile head = 20000.0 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*	in-lb^2	lb/inch	lb/inch	lb/inch
0.00	1.6734	1.30E+07	1.01E-07	-0.01695	0.00	1.38E+11	0.00	0.00	0.00
0.2300	1.6270	1.30E+07	-34.7961	-0.01669	0.00	1.38E+11	-25.2146	42.7736	0.00
0.4600	1.5813	1.30E+07	-141.4730	-0.01643	0.00	1.38E+11	-52.0876	90.9148	0.00
0.6900	1.5363	1.30E+07	-324.3931	-0.01617	0.00	1.38E+11	-80.4633	144.5555	0.00
0.9200	1.4920	1.30E+07	-587.4891	-0.01591	0.00	1.38E+11	-110.1860	203.8275	0.00
1.1500	1.4485	1.30E+07	-934.2637	-0.01565	0.00	1.38E+11	-141.1000	268.8623	0.00
1.3800	1.4056	1.30E+07	-1368.	-0.01539	0.00	1.38E+11	-173.0496	339.7900	0.00
1.6100	1.3635	1.30E+07	-1891.	-0.01513	0.00	1.38E+11	-205.7560	416.4896	0.00
1.8400	1.3221	1.30E+07	-2501.	-0.01487	0.00	1.38E+11	-236.6366	493.9958	0.00
2.0700	1.2814	1.30E+07	-3195.	-0.01461	0.00	1.38E+11	-266.0660	573.0637	0.00
2.3000	1.2415	1.30E+07	-3969.	-0.01435	0.00	1.38E+11	-294.8496	655.5003	0.00
2.5300	1.2022	1.30E+07	-4821.	-0.01409	0.00	1.38E+11	-322.8287	741.1297	0.00
2.7600	1.1637	1.29E+07	-5750.	-0.01383	0.00	1.38E+11	-349.8529	829.7603	0.00
2.9900	1.1259	1.29E+07	-6751.	-0.01357	0.00	1.38E+11	-375.7798	921.1823	0.00
3.2200	1.0888	1.29E+07	-7823.	-0.01331	0.00	1.38E+11	-401.1056	1017.	0.00
3.4500	1.0524	1.29E+07	-8963.	-0.01305	0.00	1.38E+11	-425.2358	1115.	0.00

3.6800	1.0167	1.29E+07	-10168.	-0.01279	0.00	1.38E+11
-448.0327	1216.	0.00				
3.9100	0.9818	1.28E+07	-11435.	-0.01254	0.00	1.38E+11
-469.3910	1320.	0.00				
4.1400	0.9475	1.28E+07	-12757.	-0.01228	0.00	1.38E+11
-489.2112	1425.	0.00				
4.3700	0.9140	1.28E+07	-14133.	-0.01202	0.00	1.38E+11
-507.4001	1532.	0.00				
4.6000	0.8812	1.27E+07	-15558.	-0.01177	0.00	1.38E+11
-525.2701	1645.	0.00				
4.8300	0.8490	1.27E+07	-17033.	-0.01151	0.00	1.38E+11
-543.4440	1767.	0.00				
5.0600	0.8176	1.26E+07	-18556.	-0.01126	0.00	1.38E+11
-560.1401	1891.	0.00				
5.2900	0.7869	1.26E+07	-20122.	-0.01101	0.00	1.38E+11
-575.2904	2018.	0.00				
5.5200	0.7568	1.25E+07	-21729.	-0.01076	0.00	1.38E+11
-588.8304	2147.	0.00				
5.7500	0.7275	1.25E+07	-23370.	-0.01051	0.00	1.38E+11
-600.6991	2279.	0.00				
5.9800	0.6988	1.24E+07	-25042.	-0.01026	0.00	1.38E+11
-610.8386	2412.	0.00				
6.2100	0.6708	1.23E+07	-26743.	-0.01001	0.00	1.38E+11
-621.6497	2558.	0.00				
6.4400	0.6436	1.22E+07	-28472.	-0.00977	0.00	1.38E+11
-631.1678	2707.	0.00				
6.6700	0.6169	1.22E+07	-30225.	-0.00952	0.00	1.38E+11
-639.1361	2859.	0.00				
6.9000	0.5910	1.21E+07	-31998.	-0.00928	0.00	1.38E+11
-645.5035	3015.	0.00				
7.1300	0.5657	1.20E+07	-33786.	-0.00904	0.00	1.38E+11
-650.0359	3172.	0.00				
7.3600	0.5411	1.19E+07	-35583.	-0.00880	0.00	1.39E+11
-652.6290	3329.	0.00				
7.5900	0.5171	1.18E+07	-37388.	-0.00857	0.00	1.39E+11
-654.9611	3496.	0.00				
7.8200	0.4938	1.17E+07	-39200.	-0.00833	0.00	1.39E+11
-658.0160	3678.	0.00				
8.0500	0.4711	1.16E+07	-41017.	-0.00810	0.00	1.39E+11
-659.0845	3861.	0.00				
8.2800	0.4490	1.15E+07	-42835.	-0.00787	0.00	1.39E+11
-658.1065	4045.	0.00				
8.5100	0.4276	1.13E+07	-44647.	-0.00765	0.00	1.39E+11
-655.0273	4228.	0.00				
8.7400	0.4068	1.12E+07	-46448.	-0.00742	0.00	1.39E+11
-649.7983	4408.	0.00				
8.9700	0.3866	1.11E+07	-48231.	-0.00720	0.00	1.39E+11
-642.3780	4586.	0.00				

9.2000	0.3671	1.10E+07	-50001.	-0.00698	0.00	1.39E+11
-640.0782	4813.	0.00				
9.4300	0.3481	1.08E+07	-51763.	-0.00677	0.00	1.39E+11
-636.9588	5050.	0.00				
9.6600	0.3297	1.07E+07	-53514.	-0.00655	0.00	1.39E+11
-631.9013	5290.	0.00				
9.8900	0.3119	1.05E+07	-55249.	-0.00634	0.00	1.40E+11
-624.8733	5529.	0.00				
10.1200	0.2947	1.04E+07	-56961.	-0.00614	0.00	1.40E+11
-615.8520	5768.	0.00				
10.3500	0.2780	1.02E+07	-58645.	-0.00593	0.00	1.40E+11
-604.8254	6004.	0.00				
10.5800	0.2619	1.00E+07	-60297.	-0.00573	0.00	1.40E+11
-591.7931	6236.	0.00				
10.8100	0.2464	9875190.	-61909.	-0.00554	0.00	1.40E+11
-576.7683	6461.	0.00				
11.0400	0.2314	9702424.	-63478.	-0.00535	0.00	1.40E+11
-559.7787	6678.	0.00				
11.2700	0.2169	9525383.	-64997.	-0.00516	0.00	1.40E+11
-540.8682	6883.	0.00				
11.5000	0.2029	9344211.	-66461.	-0.00497	0.00	1.40E+11
-520.0985	7075.	0.00				
11.7300	0.1894	9159068.	-67865.	-0.00479	0.00	1.41E+11
-497.5506	7249.	0.00				
11.9600	0.1765	8970124.	-69205.	-0.00461	0.00	1.41E+11
-473.3269	7403.	0.00				
12.1900	0.1640	8777566.	-70496.	-0.00444	0.00	1.41E+11
-462.4574	7784.	0.00				
12.4200	0.1520	8581474.	-71761.	-0.00427	0.00	1.41E+11
-453.6086	8238.	0.00				
12.6500	0.1404	8381919.	-72999.	-0.00410	0.00	1.41E+11
-443.6693	8720.	0.00				
12.8800	0.1293	8178974.	-74208.	-0.00394	0.00	1.41E+11
-432.6292	9232.	0.00				
13.1100	0.1187	7972725.	-75385.	-0.00378	0.00	1.42E+11
-420.4771	9778.	0.00				
13.3400	0.1085	7763265.	-76528.	-0.00363	0.00	1.42E+11
-407.2001	10362.	0.00				
13.5700	0.09865	7550694.	-77632.	-0.00348	0.00	1.42E+11
-392.7828	10989.	0.00				
13.8000	0.08925	7335123.	-78694.	-0.00333	0.00	1.42E+11
-377.2054	11665.	0.00				
14.0300	0.08024	7116670.	-79712.	-0.00319	0.00	1.42E+11
-360.4428	12398.	0.00				
14.2600	0.07162	6895465.	-80682.	-0.00306	0.00	1.42E+11
-342.4614	13198.	0.00				
14.4900	0.06336	6671643.	-81601.	-0.00293	0.00	1.43E+11
-323.2163	14080.	0.00				

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   14.7200    0.05546   6445352.    -82464.   -0.00280       0.00   1.43E+11
-302.6458     15062.       0.00
   14.9500    0.04790   6216749.    -83269.   -0.00268       0.00   1.43E+11
-280.6645     16173.       0.00
   15.1800    0.04067   5986001.    -84016.   -0.00256       0.00   1.43E+11
-260.2844     17664.       0.00
   15.4100    0.03376   5753264.    -84705.   -0.00245       0.00   1.44E+11
-238.7623     19519.       0.00
   15.6400    0.02716   5518702.    -85330.   -0.00234       0.00   1.44E+11
-214.7882     21830.       0.00
   15.8700    0.02084   5282499.    -85886.   -0.00224       0.00   1.44E+11
-187.7281     24858.       0.00
   16.1000    0.01481   5044859.    -86361.   -0.00214       0.00   1.45E+11
-156.5020     29165.       0.00
   16.3300    0.00904   4806022.    -86741.   -0.00204       0.00   1.45E+11
-118.9401     36302.       0.00
   16.5600    0.00353   4566274.    -86986.   -0.00195       0.00   1.45E+11
-58.2791     45592.       0.00
   16.7900   -0.00175   4326077.    -87026.   -0.00187       0.00   1.46E+11
29.2625     46225.       0.00
   17.0200   -0.00680   4086099.    -86826.   -0.00179       0.00   1.46E+11
115.3813     46859.       0.00
   17.2500   -0.01163   3846995.    -86391.   -0.00172       0.00   1.46E+11
200.1477     47492.       0.00
   17.4800   -0.01627   3609412.    -85723.   -0.00165       0.00   1.47E+11
283.6431     48125.       0.00
   17.7100   -0.02072   3373986.    -84827.   -0.00158       0.00   1.47E+11
365.9590     48758.       0.00
   17.9400   -0.02499   3141344.    -83704.   -0.00152       0.00   1.48E+11
447.1963     49391.       0.00
   18.1700   -0.02910   2912105.    -82359.   -0.00146       0.00   1.49E+11
527.4647     50025.       0.00
   18.4000   -0.03306   2686882.    -80794.   -0.00141       0.00   1.51E+11
606.8815     50658.       0.00
   18.6300   -0.03689   2466278.    -79010.   -0.00138       0.00   4.27E+11
685.5993     51291.       0.00
   18.8600   -0.04068   2250897.    -77008.   -0.00136       0.00   4.28E+11
765.2459     51924.       0.00
   19.0900   -0.04442   2041344.    -74785.   -0.00135       0.00   4.28E+11
845.8652     52558.       0.00
   19.3200   -0.04813   1838233.    -72338.   -0.00134       0.00   4.29E+11
927.5025     53191.       0.00
   19.5500   -0.05180   1642188.    -69664.   -0.00133       0.00   4.29E+11
1010.     53824.       0.00
   19.7800   -0.05545   1453837.    -66760.   -0.00132       0.00   4.30E+11
1094.     54457.       0.00
   20.0100   -0.05907   1273819.    -63623.   -0.00131       0.00   4.30E+11
1179.     55090.       0.00
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   20.2400   -0.06266   1102782.    -60250.   -0.00130       0.00   4.31E+11
1265.     55724.       0.00
   20.4700   -0.06624    941383.    -56638.   -0.00129       0.00   4.31E+11
1353.     56357.       0.00
   20.7000   -0.06980    790286.    -52782.   -0.00129       0.00   4.31E+11
1441.     56990.       0.00
   20.9300   -0.07335    650168.    -48680.   -0.00128       0.00   4.32E+11
1531.     57623.       0.00
   21.1600   -0.07688    521716.    -44327.   -0.00128       0.00   4.32E+11
1623.     58257.       0.00
   21.3900   -0.08041    405626.    -39720.   -0.00128       0.00   4.32E+11
1716.     58890.       0.00
   21.6200   -0.08393    302605.    -34854.   -0.00127       0.00   4.32E+11
1810.     59523.       0.00
   21.8500   -0.08744    213372.    -29726.   -0.00127       0.00   4.33E+11
1906.     60156.       0.00
   22.0800   -0.09095    138658.    -24331.   -0.00127       0.00   4.33E+11
2003.     60789.       0.00
   22.3100   -0.09446     79204.    -18666.   -0.00127       0.00   4.33E+11
2102.     61423.       0.00
   22.5400   -0.09797     35764.    -12725.   -0.00127       0.00   4.33E+11
2203.     62056.       0.00
   22.7700    -0.1015      9103.     -6504.   -0.00127       0.00   4.33E+11
2305.     62689.       0.00
   23.0000    -0.1050       0.00       0.00   -0.00127       0.00   4.33E+11
2409.     31661.       0.00

* This analysis computed pile response using nonlinear moment-curvature rela-
  tionships. 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 inter-
  polated 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             =     1.67342225 inches
Computed slope at pile head      =    -0.01695318 radians
Maximum bending moment           =      13001962. inch-lbs
Maximum shear force              =        -87026. lbs
Depth of maximum bending moment  =     0.69000000 feet below pile head
Depth of maximum shear force     =    16.79000000 feet below pile head
Number of iterations             =            124
Number of zero deflection points =              1
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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 = 1.000000 inches
Moment at pile head = 0.0 in-lbs
Axial load at pile head = 20000.0 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*	in-lb^2	lb/inch	lb/inch	lb/inch
0.00	1.0000	0.00	55265.	-0.00624	0.00	4.33E+11	0.00	0.00	0.00
0.2300	0.9828	152877.	55235.	-0.00624	0.00	4.33E+11	-22.1734	62.2713	0.00
0.4600	0.9655	305585.	55141.	-0.00624	0.00	4.32E+11	-45.4411	129.8923	0.00
0.6900	0.9483	457947.	54983.	-0.00624	0.00	4.32E+11	-69.6195	202.6190	0.00
0.9200	0.9311	609778.	54756.	-0.00623	0.00	4.32E+11	-94.5270	280.1939	0.00
1.1500	0.9139	760889.	54460.	-0.00623	0.00	4.31E+11	-119.9834	362.3442	0.00
1.3800	0.8967	911085.	54093.	-0.00622	0.00	4.31E+11	-145.8107	448.7805	0.00
1.6100	0.8796	1060171.	53655.	-0.00622	0.00	4.31E+11	-171.8637	539.2932	0.00
1.8400	0.8624	1207947.	53145.	-0.00621	0.00	4.30E+11	-198.0096	633.6937	0.00
2.0700	0.8453	1354214.	52562.	-0.00620	0.00	4.30E+11	-224.0689	731.6237	0.00
2.3000	0.8282	1498774.	51908.	-0.00619	0.00	4.30E+11	-249.8883	832.7814	0.00
2.5300	0.8111	1641430.	51183.	-0.00618	0.00	4.29E+11	-275.3181	936.8494	0.00
2.7600	0.7940	1781988.	50389.	-0.00617	0.00	4.29E+11	-300.2119	1043.	0.00
2.9900	0.7770	1920259.	49527.	-0.00616	0.00	4.29E+11	-324.4266	1152.	0.00
3.2200	0.7600	2056057.	48598.	-0.00615	0.00	4.28E+11	-348.4539	1265.	0.00

3.4500	0.7431	2189200.	47605.	-0.00613	0.00	4.28E+11
-371.6907	1381.	0.00				
3.6800	0.7262	2319512.	46548.	-0.00612	0.00	4.28E+11
-393.9872	1497.	0.00				
3.9100	0.7093	2446821.	45431.	-0.00610	0.00	4.27E+11
-415.2227	1616.	0.00				
4.1400	0.6925	2570966.	44258.	-0.00609	0.00	4.27E+11
-435.2798	1735.	0.00				
4.3700	0.6757	2691794.	43030.	-0.00605	0.00	1.50E+11
-454.0444	1855.	0.00				
4.6000	0.6591	2809161.	41751.	-0.00600	0.00	1.49E+11
-472.6827	1979.	0.00				
4.8300	0.6426	2922925.	40420.	-0.00595	0.00	1.49E+11
-491.7527	2112.	0.00				
5.0600	0.6262	3032939.	39039.	-0.00590	0.00	1.48E+11
-509.6425	2246.	0.00				
5.2900	0.6100	3139069.	37609.	-0.00584	0.00	1.48E+11
-526.2663	2381.	0.00				
5.5200	0.5940	3241186.	36135.	-0.00578	0.00	1.48E+11
-541.5346	2516.	0.00				
5.7500	0.5781	3339174.	34622.	-0.00572	0.00	1.48E+11
-555.3009	2651.	0.00				
5.9800	0.5625	3432929.	33072.	-0.00565	0.00	1.47E+11
-567.4597	2785.	0.00				
6.2100	0.5469	3522358.	31488.	-0.00559	0.00	1.47E+11
-580.3788	2929.	0.00				
6.4400	0.5316	3607362.	29870.	-0.00552	0.00	1.47E+11
-592.0616	3074.	0.00				
6.6700	0.5165	3687852.	28222.	-0.00545	0.00	1.47E+11
-602.2197	3218.	0.00				
6.9000	0.5015	3763751.	26548.	-0.00538	0.00	1.47E+11
-610.7878	3361.	0.00				
7.1300	0.4868	3834993.	24853.	-0.00531	0.00	1.46E+11
-617.7038	3503.	0.00				
7.3600	0.4722	3901526.	23141.	-0.00524	0.00	1.46E+11
-622.9088	3641.	0.00				
7.5900	0.4578	3963310.	21415.	-0.00516	0.00	1.46E+11
-627.9008	3785.	0.00				
7.8200	0.4437	4020306.	19674.	-0.00509	0.00	1.46E+11
-633.6155	3941.	0.00				
8.0500	0.4298	4072472.	17920.	-0.00501	0.00	1.46E+11
-637.6285	4095.	0.00				
8.2800	0.4160	4119776.	16157.	-0.00493	0.00	1.46E+11
-639.8770	4245.	0.00				
8.5100	0.4025	4162201.	14390.	-0.00486	0.00	1.46E+11
-640.3020	4390.	0.00				
8.7400	0.3892	4199745.	12625.	-0.00478	0.00	1.46E+11
-638.8477	4530.	0.00				

8.9700	0.3761	4232418.	10866.	-0.00470	0.00	1.46E+11
-635.4628	4663.	0.00				
9.2000	0.3633	4260245.	9110.	-0.00462	0.00	1.46E+11
-637.4162	4843.	0.00				
9.4300	0.3507	4283213.	7348.	-0.00454	0.00	1.46E+11
-638.8898	5029.	0.00				
9.6600	0.3383	4301309.	5585.	-0.00445	0.00	1.46E+11
-638.7706	5212.	0.00				
9.8900	0.3261	4314535.	3825.	-0.00437	0.00	1.46E+11
-637.0167	5392.	0.00				
10.1200	0.3141	4322904.	2071.	-0.00429	0.00	1.46E+11
-633.5911	5567.	0.00				
10.3500	0.3024	4326442.	329.5744	-0.00421	0.00	1.46E+11
-628.4627	5736.	0.00				
10.5800	0.2909	4325188.	-1396.	-0.00413	0.00	1.46E+11
-621.6072	5898.	0.00				
10.8100	0.2796	4319194.	-3099.	-0.00404	0.00	1.46E+11
-613.0074	6051.	0.00				
11.0400	0.2686	4308526.	-4777.	-0.00396	0.00	1.46E+11
-602.6545	6193.	0.00				
11.2700	0.2577	4293263.	-6424.	-0.00388	0.00	1.46E+11
-590.5489	6324.	0.00				
11.5000	0.2471	4273497.	-8034.	-0.00380	0.00	1.46E+11
-576.7010	6441.	0.00				
11.7300	0.2368	4249333.	-9605.	-0.00372	0.00	1.46E+11
-561.1324	6541.	0.00				
11.9600	0.2266	4220891.	-11129.	-0.00364	0.00	1.46E+11
-543.8771	6624.	0.00				
12.1900	0.2167	4188301.	-12626.	-0.00356	0.00	1.46E+11
-540.7673	6888.	0.00				
12.4200	0.2070	4151587.	-14118.	-0.00348	0.00	1.46E+11
-540.0884	7203.	0.00				
12.6500	0.1975	4110754.	-15606.	-0.00340	0.00	1.46E+11
-538.5728	7528.	0.00				
12.8800	0.1882	4065815.	-17090.	-0.00333	0.00	1.46E+11
-536.2069	7865.	0.00				
13.1100	0.1791	4016787.	-18565.	-0.00325	0.00	1.46E+11
-532.9776	8213.	0.00				
13.3400	0.1702	3963695.	-20030.	-0.00317	0.00	1.46E+11
-528.8725	8574.	0.00				
13.5700	0.1616	3906569.	-21483.	-0.00310	0.00	1.46E+11
-523.8795	8948.	0.00				
13.8000	0.1531	3845449.	-22921.	-0.00303	0.00	1.46E+11
-517.9870	9336.	0.00				
14.0300	0.1449	3780380.	-24341.	-0.00295	0.00	1.47E+11
-511.1835	9738.	0.00				
14.2600	0.1368	3711412.	-25741.	-0.00288	0.00	1.47E+11
-503.4575	10156.	0.00				

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   14.4900     0.1290   3638605.    -27119.   -0.00281       0.00   1.47E+11
-494.7972     10590.       0.00
   14.7200     0.1213   3562026.    -28471.   -0.00275       0.00   1.47E+11
-485.1906     11041.       0.00
   14.9500     0.1138   3481746.    -29796.   -0.00268       0.00   1.47E+11
-474.6247     11512.       0.00
   15.1800     0.1065   3397848.    -31096.   -0.00262       0.00   1.47E+11
-467.3049     12112.       0.00
   15.4100    0.09935   3310386.    -32376.   -0.00255       0.00   1.48E+11
-460.2288     12785.       0.00
   15.6400    0.09239   3219415.    -33635.   -0.00249       0.00   1.48E+11
-452.1827     13508.       0.00
   15.8700    0.08559   3124996.    -34870.   -0.00243       0.00   1.48E+11
-443.1076     14289.       0.00
   16.1000    0.07895   3027199.    -36079.   -0.00238       0.00   1.48E+11
-432.9356     15134.       0.00
   16.3300    0.07247   2926100.    -37259.   -0.00232       0.00   1.49E+11
-421.5870     16055.       0.00
   16.5600    0.06614   2821787.    -38405.   -0.00227       0.00   1.49E+11
-408.9678     17065.       0.00
   16.7900    0.05996   2714356.    -39514.   -0.00222       0.00   1.49E+11
-394.9657     18182.       0.00
   17.0200    0.05391   2603914.    -40583.   -0.00218       0.00   4.27E+11
-379.4442     19427.       0.00
   17.2500    0.04791   2490579.    -41606.   -0.00217       0.00   4.27E+11
-361.8401     20847.       0.00
   17.4800    0.04195   2374488.    -42577.   -0.00215       0.00   4.27E+11
-341.8694     22493.       0.00
   17.7100    0.03603   2255792.    -43489.   -0.00214       0.00   4.28E+11
-319.1609     24446.       0.00
   17.9400    0.03016   2134663.    -44334.   -0.00212       0.00   4.28E+11
-293.2086     26834.       0.00
   18.1700    0.02432   2011301.    -45102.   -0.00211       0.00   4.28E+11
-263.2831     29877.       0.00
   18.4000    0.01852   1885932.    -45781.   -0.00210       0.00   4.29E+11
-228.2449     34014.       0.00
   18.6300    0.01275   1758823.    -46352.   -0.00208       0.00   4.29E+11
-186.0780     40272.       0.00
   18.8600    0.00702   1630297.    -46791.   -0.00207       0.00   4.29E+11
-131.9976     51924.       0.00
   19.0900    0.00131   1500764.    -47008.   -0.00206       0.00   4.30E+11
-24.9225     52558.        0.00
   19.3200   -0.00437   1371041.    -46926.   -0.00205       0.00   4.30E+11
84.2587     53191.        0.00
   19.5500   -0.01003   1241960.    -46540.   -0.00205       0.00   4.30E+11
195.5728     53824.       0.00
   19.7800   -0.01566   1114368.    -45843.   -0.00204       0.00   4.31E+11
309.0486     54457.       0.00
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```
   20.0100   -0.02128    989129.    -44831.   -0.00203       0.00   4.31E+11
424.7164     55090.       0.00
   20.2400   -0.02688    867126.    -43496.   -0.00203       0.00   4.31E+11
542.6075     55724.       0.00
   20.4700   -0.03246    749255.    -41833.   -0.00202       0.00   4.31E+11
662.7543     56357.       0.00
   20.7000   -0.03803    636433.    -39834.   -0.00202       0.00   4.32E+11
785.1892     56990.       0.00
   20.9300   -0.04358    529592.    -37495.   -0.00201       0.00   4.32E+11
909.9451     57623.       0.00
   21.1600   -0.04913    429683.    -34808.   -0.00201       0.00   4.32E+11
1037.     58257.       0.00
   21.3900   -0.05467    337673.    -31767.   -0.00201       0.00   4.32E+11
1167.     58890.       0.00
   21.6200   -0.06021    254549.    -28366.   -0.00200       0.00   4.33E+11
1298.     59523.       0.00
   21.8500   -0.06574    181317.    -24596.   -0.00200       0.00   4.33E+11
1433.     60156.       0.00
   22.0800   -0.07126    118998.    -20453.   -0.00200       0.00   4.33E+11
1570.     60789.       0.00
   22.3100   -0.07679     68637.    -15929.   -0.00200       0.00   4.33E+11
1709.     61423.       0.00
   22.5400   -0.08231     31293.    -11016.   -0.00200       0.00   4.33E+11
1851.     62056.       0.00
   22.7700   -0.08784      8048.     -5709.   -0.00200       0.00   4.33E+11
1995.     62689.       0.00
   23.0000   -0.09336      0.00       0.00   -0.00200       0.00   4.33E+11
2142.     31661.       0.00

* This analysis computed pile response using nonlinear moment-curvature rela-
  tionships. 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 inter-
  polated 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             =     1.00000000 inches
Computed slope at pile head      =    -0.00624146 radians
Maximum bending moment           =       4326442. inch-lbs
Maximum shear force              =         55265. lbs
Depth of maximum bending moment  =    10.35000000 feet below pile head
Depth of maximum shear force     =       0.000000 feet below pile head
Number of iterations             =             40
Number of zero deflection points =              1
```

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

Pile-head conditions are Displacement and Moment (Loading Type 4)
Displacement of pile head = 0.500000 inches
Moment at pile head = 0.0 in-lbs
Axial load at pile head = 20000.0 lbs

Depth X	Deflect. y	Bending Moment	Shear Force	Slope S	Total Stress	Bending Stiffness	Soil Res. Es*h	Soil Spr. Distrib. p Lat. Load
feet	inches	in-lbs	lbs	radians	psi*	in-lb^2	lb/inch	lb/inch
0.00	0.5000	0.00	40415.	-0.00321	0.00	4.33E+11	0.00	0.00
0.2300	0.4911	111723.	40390.	-0.00321	0.00	4.33E+11	-18.0346	101.3449
0.4600	0.4823	223308.	40314.	-0.00321	0.00	4.33E+11	-36.9210	211.2834
0.6900	0.4735	334611.	40185.	-0.00320	0.00	4.32E+11	-56.4990	329.3609
0.9200	0.4646	445485.	40002.	-0.00320	0.00	4.32E+11	-76.6092	455.0895
1.1500	0.4558	555774.	39762.	-0.00320	0.00	4.32E+11	-97.0925	587.9444
1.3800	0.4470	665324.	39465.	-0.00319	0.00	4.32E+11	-117.7908	727.3608
1.6100	0.4382	773976.	39111.	-0.00319	0.00	4.31E+11	-138.7256	873.8582
1.8400	0.4294	881572.	38699.	-0.00318	0.00	4.31E+11	-159.8730	1028.
2.0700	0.4206	987949.	38229.	-0.00318	0.00	4.31E+11	-180.9401	1187.
2.3000	0.4118	1092947.	37701.	-0.00317	0.00	4.31E+11	-201.7941	1352.
2.5300	0.4031	1196408.	37116.	-0.00316	0.00	4.30E+11	-222.3039	1522.
2.7600	0.3943	1298175.	36474.	-0.00316	0.00	4.30E+11	-242.3406	1696.
2.9900	0.3856	1398095.	35779.	-0.00315	0.00	4.30E+11	-261.7775	1873.

3.2200	0.3770	1496021.	35030.	-0.00314	0.00	4.30E+11
-281.1157	2058.	0.00				
3.4500	0.3683	1591805.	34228.	-0.00313	0.00	4.29E+11
-299.7690	2246.	0.00				
3.6800	0.3597	1685305.	33376.	-0.00312	0.00	4.29E+11
-317.6002	2437.	0.00				
3.9100	0.3511	1776384.	32476.	-0.00311	0.00	4.29E+11
-334.5003	2629.	0.00				
4.1400	0.3426	1864916.	31531.	-0.00309	0.00	4.29E+11
-350.3626	2823.	0.00				
4.3700	0.3340	1950777.	30544.	-0.00308	0.00	4.28E+11
-365.0830	3017.	0.00				
4.6000	0.3255	2033857.	29516.	-0.00307	0.00	4.28E+11
-379.5620	3218.	0.00				
4.8300	0.3171	2114045.	28448.	-0.00306	0.00	4.28E+11
-394.2288	3432.	0.00				
5.0600	0.3087	2191228.	27341.	-0.00304	0.00	4.28E+11
-407.7820	3646.	0.00				
5.2900	0.3003	2265305.	26199.	-0.00303	0.00	4.28E+11
-420.1367	3862.	0.00				
5.5200	0.2919	2336181.	25024.	-0.00301	0.00	4.27E+11
-431.2103	4077.	0.00				
5.7500	0.2837	2403771.	23821.	-0.00300	0.00	4.27E+11
-440.9225	4290.	0.00				
5.9800	0.2754	2468001.	22592.	-0.00298	0.00	4.27E+11
-449.1959	4502.	0.00				
6.2100	0.2672	2528808.	21340.	-0.00297	0.00	4.27E+11
-458.3380	4735.	0.00				
6.4400	0.2590	2586124.	20064.	-0.00295	0.00	4.27E+11
-466.4077	4970.	0.00				
6.6700	0.2509	2639885.	18767.	-0.00293	0.00	3.00E+11
-473.1309	5204.	0.00				
6.9000	0.2429	2690041.	17454.	-0.00289	0.00	1.51E+11
-478.4621	5438.	0.00				
7.1300	0.2349	2736550.	16128.	-0.00284	0.00	1.49E+11
-482.3972	5667.	0.00				
7.3600	0.2272	2779381.	14793.	-0.00279	0.00	1.49E+11
-484.8954	5891.	0.00				
7.5900	0.2195	2818515.	13452.	-0.00274	0.00	1.49E+11
-486.6653	6118.	0.00				
7.8200	0.2120	2853939.	12107.	-0.00269	0.00	1.49E+11
-488.1206	6353.	0.00				
8.0500	0.2047	2885643.	10760.	-0.00263	0.00	1.49E+11
-488.0768	6581.	0.00				
8.2800	0.1975	2913625.	9415.	-0.00258	0.00	1.49E+11
-486.4992	6798.	0.00				
8.5100	0.1905	2937898.	8077.	-0.00253	0.00	1.49E+11
-483.3577	7004.	0.00				

8.7400	0.1836	2958486.	6749.	-0.00247	0.00	1.49E+11
-478.6284	7196.	0.00				
8.9700	0.1768	2975425.	5437.	-0.00242	0.00	1.48E+11
-472.2933	7372.	0.00				
9.2000	0.1702	2988764.	4137.	-0.00236	0.00	1.48E+11
-469.7434	7616.	0.00				
9.4300	0.1638	2998521.	2844.	-0.00230	0.00	1.48E+11
-466.6932	7864.	0.00				
9.6600	0.1575	3004720.	1562.	-0.00225	0.00	1.48E+11
-462.3470	8102.	0.00				
9.8900	0.1514	3007393.	294.0878	-0.00219	0.00	1.48E+11
-456.7036	8327.	0.00				
10.1200	0.1454	3006585.	-956.8445	-0.00214	0.00	1.48E+11
-449.7691	8537.	0.00				
10.3500	0.1396	3002347.	-2187.	-0.00208	0.00	1.48E+11
-441.5567	8731.	0.00				
10.5800	0.1339	2994743.	-3393.	-0.00203	0.00	1.48E+11
-432.0877	8905.	0.00				
10.8100	0.1284	2983844.	-4570.	-0.00197	0.00	1.48E+11
-421.3917	9058.	0.00				
11.0400	0.1230	2969733.	-5717.	-0.00191	0.00	1.49E+11
-409.5069	9186.	0.00				
11.2700	0.1178	2952498.	-6829.	-0.00186	0.00	1.49E+11
-396.4810	9287.	0.00				
11.5000	0.1128	2932241.	-7904.	-0.00180	0.00	1.49E+11
-382.3710	9358.	0.00				
11.7300	0.1079	2909067.	-8938.	-0.00175	0.00	1.49E+11
-367.2439	9396.	0.00				
11.9600	0.1031	2883093.	-9930.	-0.00170	0.00	1.49E+11
-351.1768	9400.	0.00				
12.1900	0.09851	2854442.	-10894.	-0.00164	0.00	1.49E+11
-347.3778	9733.	0.00				
12.4200	0.09404	2823140.	-11851.	-0.00159	0.00	1.49E+11
-345.8556	10150.	0.00				
12.6500	0.08972	2789202.	-12802.	-0.00154	0.00	1.49E+11
-343.8861	10578.	0.00				
12.8800	0.08555	2752641.	-13748.	-0.00149	0.00	1.49E+11
-341.4773	11017.	0.00				
13.1100	0.08151	2713476.	-14687.	-0.00144	0.00	1.49E+11
-338.6382	11466.	0.00				
13.3400	0.07761	2671729.	-15617.	-0.00139	0.00	2.02E+11
-335.3792	11926.	0.00				
13.5700	0.07382	2627424.	-16537.	-0.00137	0.00	4.27E+11
-331.6192	12399.	0.00				
13.8000	0.07007	2580593.	-17447.	-0.00135	0.00	4.27E+11
-327.2159	12889.	0.00				
14.0300	0.06636	2531268.	-18343.	-0.00133	0.00	4.27E+11
-322.1543	13398.	0.00				

```
   14.2600    0.06270   2479489.    -19224.   -0.00132       0.00   4.27E+11
-316.4183     13927.       0.00
   14.4900    0.05909   2425298.    -20088.   -0.00130       0.00   4.27E+11
-309.9913     14479.       0.00
   14.7200    0.05552   2368744.    -20934.   -0.00129       0.00   4.27E+11
-302.8554     15056.       0.00
   14.9500    0.05199   2309883.    -21759.   -0.00127       0.00   4.28E+11
-294.9913     15660.       0.00
   15.1800    0.04850   2248774.    -22566.   -0.00126       0.00   4.28E+11
-289.7061     16485.       0.00
   15.4100    0.04506   2185458.    -23359.   -0.00124       0.00   4.28E+11
-284.5593     17431.       0.00
   15.6400    0.04165   2119972.    -24136.   -0.00123       0.00   4.28E+11
-278.5654     18461.       0.00
   15.8700    0.03828   2052365.    -24895.   -0.00121       0.00   4.28E+11
-271.6528     19588.       0.00
   16.1000    0.03494   1982687.    -25634.   -0.00120       0.00   4.28E+11
-263.7378     20832.       0.00
   16.3300    0.03164   1910999.    -26349.   -0.00119       0.00   4.29E+11
-254.7209     22218.       0.00
   16.5600    0.02838   1837370.    -27038.   -0.00118       0.00   4.29E+11
-244.4813     23778.       0.00
   16.7900    0.02515   1761878.    -27697.   -0.00117       0.00   4.29E+11
-232.8697     25560.       0.00
   17.0200    0.02194   1684612.    -28321.   -0.00115       0.00   4.29E+11
-219.6963     27632.       0.00
   17.2500    0.01877   1605672.    -28907.   -0.00114       0.00   4.29E+11
-204.7116     30097.       0.00
   17.4800    0.01563   1525171.    -29448.   -0.00113       0.00   4.30E+11
-187.5733     33123.       0.00
   17.7100    0.01251   1443241.    -29939.   -0.00112       0.00   4.30E+11
-167.7831     37005.       0.00
   17.9400    0.00942   1360033.    -30370.   -0.00112       0.00   4.30E+11
-144.5516     42336.       0.00
   18.1700    0.00636   1275723.    -30728.   -0.00111       0.00   4.30E+11
-115.2318     50025.       0.00
   18.4000    0.00331   1190534.    -30971.   -0.00110       0.00   4.30E+11
-60.8287     50658.       0.00
   18.6300   2.92E-04   1104882.    -31063.   -0.00109       0.00   4.31E+11
-5.4206     51291.       0.00
   18.8600   -0.00271   1019188.    -31000.   -0.00108       0.00   4.31E+11
51.0067     51924.       0.00
   19.0900   -0.00570    933883.    -30780.   -0.00108       0.00   4.31E+11
108.4687     52558.       0.00
   19.3200   -0.00866    849403.    -30400.   -0.00107       0.00   4.31E+11
166.9823     53191.       0.00
   19.5500   -0.01162    766195.    -29857.   -0.00107       0.00   4.31E+11
226.5653     53824.       0.00
```

```
   19.7800   -0.01456    684713.    -29148.   -0.00106       0.00   4.32E+11
287.2366     54457.       0.00
   20.0100   -0.01749    605418.    -28269.   -0.00106       0.00   4.32E+11
349.0156     55090.       0.00
   20.2400   -0.02040    528782.    -27219.   -0.00106       0.00   4.32E+11
411.9225     55724.       0.00
   20.4700   -0.02331    455284.    -25994.   -0.00105       0.00   4.32E+11
475.9775     56357.       0.00
   20.7000   -0.02621    385411.    -24590.   -0.00105       0.00   4.32E+11
541.2010     56990.       0.00
   20.9300   -0.02910    319661.    -23005.   -0.00105       0.00   4.32E+11
607.6133     57623.       0.00
   21.1600   -0.03199    258539.    -21235.   -0.00105       0.00   4.33E+11
675.2342     58257.       0.00
   21.3900   -0.03487    202561.    -19276.   -0.00104       0.00   4.33E+11
744.0828     58890.       0.00
   21.6200   -0.03775    152250.    -17126.   -0.00104       0.00   4.33E+11
814.1773     59523.       0.00
   21.8500   -0.04063    108142.    -14780.   -0.00104       0.00   4.33E+11
885.5344     60156.       0.00
   22.0800   -0.04350     70780.    -12236.   -0.00104       0.00   4.33E+11
958.1696     60789.       0.00
   22.3100   -0.04638     40716.     -9489.   -0.00104       0.00   4.33E+11
1032.     61423.       0.00
   22.5400   -0.04925     18515.     -6537.   -0.00104       0.00   4.33E+11
1107.     62056.       0.00
   22.7700   -0.05212      4748.     -3375.   -0.00104       0.00   4.33E+11
1184.     62689.       0.00
   23.0000   -0.05499       0.00       0.00   -0.00104       0.00   4.33E+11
1262.     31661.       0.00

* This analysis computed pile response using nonlinear moment-curvature rela-
  tionships. 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 inter-
  polated 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             =     0.50000000 inches
Computed slope at pile head      =    -0.00320694 radians
Maximum bending moment           =       3007393. inch-lbs
Maximum shear force              =         40415. lbs
Depth of maximum bending moment  =     9.89000000 feet below pile head
Depth of maximum shear force     =       0.000000 feet below pile head
Number of iterations             =             55
```

Number of zero deflection points = 1

Summary of Pile-head Responses for Conventional Analyses

Definitions of Pile-head Loading Conditions:

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

Load Case No.	Load Type	Load Pile-head Load 1	Load Type	Load Pile-head Load 2	Axial Loading lbs	Pile-head Deflection inches	Pile-head Rotation radians	Max Shear in Pile lbs	Max Moment in Pile in-lbs
1	V, lb	1500.	M, in-lb	455000.	20000.	0.02001	-2.11E-04	-3444.	504113.
2	V, lb	0.00	M, in-lb	910000.	20000.	0.02768	-3.31E-04	-5509.	910018.
3	V, lb	0.00	M, in-lb	1820000.	20000.	0.05562	-6.66E-04	-11031.	1820036.
4	V, lb	0.00	M, in-lb	2700000.	20000.	0.09142	-0.00139	-16551.	2700076.
5	V, lb	0.00	M, in-lb	3640000.	20000.	0.2038	-0.00304	-22499.	3640220.
6	V, lb	0.00	M, in-lb	7280000.	20000.	0.6790	-0.00802	-46779.	7280722.
7	V, lb	0.00	M, in-lb	1.30E+07	20000.	1.6734	-0.01695	-87026.	1.30E+07
8	y, in	1.0000	M, in-lb	0.00	20000.	1.0000	-0.00624	55265.	4326442.
9	y, in	0.5000	M, in-lb	0.00	20000.	0.5000	-0.00321	40415.	3007393.

Maximum pile-head deflection = 1.6734222518 inches
Maximum pile-head rotation = -0.0169531841 radians = -0.971346 deg.

The analysis ended normally.

Special-sign-structure-TypeVII.lp9o

Sign Structure Type VII

With drilled shaft 10 feet above ground

Lateral Pile Deflection (inches)
0
0.2
0.4
0.6
0.8
1
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38
▽ Load Case 1

Bending Moment (in-kips)
0
1000
2000
3000
4000
5000
6000
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38

Shear Force (kips)
-40
-30
-20
-10
0
10
20
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38

Sand

Special-sign-structure-TypeVII-10ft-stick-up.lp9o

LPile for Windows, Version 2016-09.010

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:
\PROJECTS\Engineering & Enviro Projects\2019 Projects\G-19-192 I-515 Charleston Interchange - CA Group\DESIGN\Special Sign Structures\Revised-2-3-2021\

Name of input data file:
Special-sign-structure-TypeVII-10ft-stick-up.lp9d

Name of output report file:
Special-sign-structure-TypeVII-10ft-stick-up.lp9o

Name of plot output file:
Special-sign-structure-TypeVII-10ft-stick-up.lp9p

Name of runtime message file:
Special-sign-structure-TypeVII-10ft-stick-up.lp9r

Special-sign-structure-TypeVII-10ft-stick-up.lp9o

Date and Time of Analysis

Date: February 3, 2021 Time: 14:57:36

Problem Title

I-515 Charleston

G-19-192

CA Group

NOVA

L1 977+15.00 Tyoe VII Post - 10 feet stick up

Program Options and Settings

Computational Options:
- Use unfactored loads in computations (conventional analysis)

Engineering Units Used for Data Input and Computations:
- US Customary System Units (pounds, feet, inches)

Analysis Control Options:

- Maximum number of iterations allowed	=	500
- Deflection tolerance for convergence	=	1.0000E-05 in
- Maximum allowable deflection	=	100.0000 in
- Number of pile increments	=	100

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

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

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

Pile Structural Properties and Geometry

Number of pile sections defined = 1
Total length of pile = 38.000 ft
Depth of ground surface below top of pile = 10.0000 ft

Pile diameters 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. A summary of values of pile diameter vs. depth follows.

Point No.	Depth Below Pile Head feet	Pile Diameter inches
1	0.000	42.0000
2	38.000	42.0000

Input Structural Properties for Pile Sections:

Pile Section No. 1:

Section 1 is a round drilled shaft, bored pile, or CIDH pile

Length of section	=	38.000000 ft
Shaft Diameter	=	42.000000 in
Shear capacity of section	=	0.0000 lbs

Ground Slope and Pile Batter Angles

Ground Slope Angle	=	26.600 degrees
	=	0.464 radians
Pile Batter Angle	=	0.000 degrees
	=	0.000 radians

Soil and Rock Layering Information

The soil profile is modelled using 1 layers

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

Distance from top of pile to top of layer	=	10.000000 ft
Distance from top of pile to bottom of layer	=	60.000000 ft
Effective unit weight at top of layer	=	120.000000 pcf
Effective unit weight at bottom of layer	=	120.000000 pcf
Friction angle at top of layer	=	30.000000 deg.
Friction angle at bottom of layer	=	30.000000 deg.
Subgrade k at top of layer	=	0.0000 pci
Subgrade k at bottom of layer	=	0.0000 pci

NOTE: Default values for subgrade k will be computed for this layer.

(Depth of the lowest soil layer extends 22.000 ft below the pile tip)

Summary of Input Soil Properties

Layer	Soil Type	Layer	Effective	Angle of

Layer Num.	Name (p-y Curve Type)	Depth ft	Unit Wt. pcf	Friction deg.	kpy pci
1	Sand	10.0000	120.0000	30.0000	default
	(Reese, et al.)	60.0000	120.0000	30.0000	default

Static Loading Type

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

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 1

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length
1	1	V = 12000. lbs	M = 3640000. in-lbs	20000.	Yes

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

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

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

Number of Pile Sections Analyzed = 1

Pile Section No. 1:

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section	=	38.000000 ft
Shaft Diameter	=	42.000000 in
Concrete Cover Thickness	=	3.000000 in
Number of Reinforcing Bars	=	16 bars
Yield Stress of Reinforcing Bars	=	60000. psi
Modulus of Elasticity of Reinforcing Bars	=	29000000. psi
Gross Area of Shaft	=	1385. sq. in.
Total Area of Reinforcing Steel	=	24.960000 sq. in.
Area Ratio of Steel Reinforcement	=	1.80 percent
Edge-to-Edge Bar Spacing	=	5.338174 in
Maximum Concrete Aggregate Size	=	0.750000 in
Ratio of Bar Spacing to Aggregate Size	=	7.12
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	=	6701.445 kips
Tensile Load for Cracking of Concrete	=	-682.402 kips
Nominal Axial Tensile Capacity	=	-1497.600 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.410000	1.560000	17.295000	0.00000
2	1.410000	1.560000	15.978497	6.618510
3	1.410000	1.560000	12.229412	12.229412
4	1.410000	1.560000	6.618510	15.978497
5	1.410000	1.560000	0.00000	17.295000
6	1.410000	1.560000	-6.618510	15.978497
7	1.410000	1.560000	-12.229412	12.229412
8	1.410000	1.560000	-15.978497	6.618510
9	1.410000	1.560000	-17.295000	0.00000
10	1.410000	1.560000	-15.978497	-6.618510
11	1.410000	1.560000	-12.229412	-12.229412
12	1.410000	1.560000	-6.618510	-15.978497
13	1.410000	1.560000	0.00000	-17.295000
14	1.410000	1.560000	6.618510	-15.978497

15	1.410000	1.560000	12.229412	-12.229412
16	1.410000	1.560000	15.978497	-6.618510

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

Minimum spacing between any two bars not equal to zero = 5.338 inches
between bars 11 and 12.

Ratio of bar spacing to maximum aggregate size = 7.12

Concrete Properties:

Compressive Strength of Concrete	=	4500. psi
Modulus of Elasticity of Concrete	=	3823676. psi
Modulus of Rupture of Concrete	=	-503.115295 psi
Compression Strain at Peak Stress	=	0.002001
Tensile Strain at Fracture of Concrete	=	-0.0001152
Maximum Coarse Aggregate Size	=	0.750000 in

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

Number	Axial Thrust Force kips
1	20.000

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

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

Axial Thrust Force = 20.000 kips

Bending Max Conc Curvature rad/in.	Bending Max Steel Stress ksi	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Run Msg
6.25000E-07	485.6689187	777070270.	25.6875863	0.00001605	-0.00001020	0.0713459	0.4617813	
0.00000125	969.5853813	775668305.	23.3495463	0.00002919	-0.00002331	0.1291744	0.8388086	
0.00000188	1452.	774206646.	22.5702515	0.00004232	-0.00003643	0.1866232	1.2158387	
0.00000250	1932.	772729760.	22.1806248	0.00005545	-0.00004955	0.2436923	1.5928703	
0.00000313	2410.	771246753.	21.9468627	0.00006858	-0.00006267	0.3003815	1.9699032	
0.00000375	2887.	769760678.	21.7910318	0.00008172	-0.00007578	0.3566908	2.3469372	
0.00000438	3361.	768272849.	21.6797330	0.00009485	-0.00008890	0.4126202	2.7239723	
0.00000500	3834.	766783924.	21.5962669	0.0001080	-0.0001020	0.4681698	3.1010087	
0.00000563	4305.	765294267.	21.5313555	0.0001211	-0.0001151	0.5233394	3.4780461	
0.00000625	4305.	688764840.	13.2211649	0.00008263	-0.0001799	0.3583780	-5.1781013	C
0.00000688	4305.	626149855.	13.0995609	0.00009006	-0.0001987	0.3898046	-5.7201563	C
0.00000750	4305.	573970700.	12.9987638	0.00009749	-0.0002175	0.4211288	-6.2620939	C
0.00000813	4305.	529819108.	12.9139734	0.0001049	-0.0002363	0.4523505	-6.8039137	C
0.00000875	4305.	491974886.	12.8417611	0.0001124	-0.0002551	0.4834695	-7.3456156	C
0.00000938	4305.	459176560.	12.7786133	0.0001198	-0.0002740	0.5144461	-7.8874707	C
0.00001000	4305.	430478025.	12.7228650	0.0001272	-0.0002928	0.5452819	-8.4294691	C
0.00001063	4305.	405155788.	12.6740704	0.0001347	-0.0003116	0.5760156	-8.9713458	C
0.00001125	4305.	382647134.	12.6310717	0.0001421	-0.0003304	0.6066471	-9.5131003	C
0.00001188	4305.	362507811.	12.5929548	0.0001495	-0.0003492	0.6371761	-10.0547324	C

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0.00001250         4305.    344382420.    12.5589883     0.0001570    -0.0003680
 0.6676025   -10.5962417 C
0.00001313         4305.    327983257.    12.5285804     0.0001644    -0.0003868
 0.6979262   -11.1376278 C
0.00001375         4305.    313074927.    12.5012466     0.0001719    -0.0004056
 0.7281470   -11.6788904 C
0.00001438         4305.    299462974.    12.4765868     0.0001794    -0.0004244
 0.7582648   -12.2200291 C
0.00001500         4305.    286985350.    12.4542677     0.0001868    -0.0004432
 0.7882793   -12.7610435 C
0.00001563         4305.    275505936.    12.4340091     0.0001943    -0.0004620
 0.8181904   -13.3019333 C
0.00001625         4305.    264909554.    12.4155742     0.0002018    -0.0004807
 0.8479979   -13.8426986 C
0.00001688         4305.    255098089.    12.3987610     0.0002092    -0.0004995
 0.8777018   -14.3833380 C
0.00001750         4305.    245987443.    12.3831712     0.0002167    -0.0005183
 0.9072861   -14.9239655 C
0.00001813         4305.    237505117.    12.3686258     0.0002242    -0.0005371
 0.9367467   -15.4646101 C
0.00001875         4305.    229588280.    12.3552897     0.0002317    -0.0005558
 0.9661039   -16.0051240 C
0.00001938         4333.    223622879.    12.3430464     0.0002391    -0.0005746
 0.9953576   -16.5455073 C
0.00002000         4465.    223264459.    12.3317944     0.0002466    -0.0005934
 1.0245076   -17.0857595 C
0.00002063         4598.    222923999.    12.3214441     0.0002541    -0.0006121
 1.0535537   -17.6258802 C
0.00002125         4730.    222599906.    12.3119166     0.0002616    -0.0006309
 1.0824958   -18.1658690 C
0.00002188         4863.    222290766.    12.3031422     0.0002691    -0.0006496
 1.1113336   -18.7057256 C
0.00002250         4995.    221995324.    12.2950585     0.0002766    -0.0006684
 1.1400670   -19.2454494 C
0.00002313         5127.    221712461.    12.2876104     0.0002842    -0.0006871
 1.1686958   -19.7850401 C
0.00002375         5259.    221441174.    12.2807482     0.0002917    -0.0007058
 1.1972199   -20.3244973 C
0.00002438         5391.    221180564.    12.2744274     0.0002992    -0.0007246
 1.2256391   -20.8638204 C
0.00002563         5655.    220688209.    12.2632540     0.0003142    -0.0007620
 1.2821620   -21.9420635 C
0.00002688         5919.    220229830.    12.2538142     0.0003293    -0.0007994
 1.3382632   -23.0197651 C
0.00002813         6182.    219800825.    12.2458811     0.0003444    -0.0008368
 1.3939412   -24.0969221 C
0.00002938         6445.    219397385.    12.2392665     0.0003595    -0.0008742
 1.4491946   -25.1735312 C
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0.00003188	6970.	218654940.	12.2293878	0.0003898	-0.0009489
1.5584217	-27.3250909 C				
0.00003313	7232.	218310962.	12.2258784	0.0004050	-0.0009863
1.6123926	-28.4000343 C				
0.00003438	7493.	217982434.	12.2231885	0.0004202	-0.0010236
1.6659330	-29.4744152 C				
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1.7190414	-30.5482298 C				
0.00003688	8015.	217365238.	12.2199479	0.0004506	-0.0010981
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1.8239563	-32.6941451 C				
0.00003938	8536.	216792428.	12.2191291	0.0004811	-0.0011726
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4.4999822   -60.0000000 CY
0.0001944        22454.    115518082.    10.7069234     0.0020812    -0.0060826
4.4980178   -60.0000000 CY
0.0001994        22544.    113070904.    10.6548040     0.0021243    -0.0062494
4.4999955    60.0000000 CY
0.0002044        22615.    110655181.    10.6000364     0.0021664    -0.0064174
4.4973113    60.0000000 CY
0.0002094        22666.    108257161.    10.5410831     0.0022070    -0.0065867
4.4997952    60.0000000 CY
0.0002144        22708.    105928614.    10.4826002     0.0022472    -0.0067565
4.4947070    60.0000000 CY
0.0002194        22748.    103694633.    10.4268443     0.0022874    -0.0069264
4.4985604    60.0000000 CY
0.0002244        22787.    101557714.    10.3741789     0.0023277    -0.0070960
4.4999911    60.0000000 CY
0.0002294        22825.     99509521.    10.3247213     0.0023682    -0.0072655
4.4951061    60.0000000 CY
0.0002344        22862.     97544557.    10.2769807     0.0024087    -0.0074351
4.4986233    60.0000000 CY
0.0002394        22897.     95654525.    10.2291389     0.0024486    -0.0076051
4.4999771    60.0000000 CY
0.0002444        22932.     93838328.    10.1840776     0.0024887    -0.0077750
4.4934269    60.0000000 CY
0.0002494        22966.     92093173.    10.1413179     0.0025290    -0.0079448
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    0.0002694        23097.     85742683.     9.9910342     0.0026913    -0.0086224
    4.4977485    60.0000000 CY
    0.0002744        23129.     84296032.     9.9579550     0.0027322    -0.0087915
    4.4996548    60.0000000 CY
    0.0003044        23308.     76576561.     9.7834518     0.0029778    -0.0098059
    4.4931107    60.0000000 CY
    0.0003344        23469.     70188176.     9.6488057     0.0032263    -0.0108174
    4.4880298    60.0000000 CYT
    0.0003644        23611.     64797812.     9.5543720     0.0034814    -0.0118224
    4.4899365    60.0000000 CYT
    0.0003944        23726.     60161379.     9.4846725     0.0037405    -0.0128232
    4.4997631    60.0000000 CYT
    0.0004244        23726.     55908439.     9.4570439     0.0040133    -0.0138104
    4.4984534    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           Axial Thrust        Nominal Mom. Cap.      Max. Comp.
  No.              kips                 in-kip               Strain
 ----         ----------------     ------------------     ------------
   1               20.000             23322.366           0.00300000

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

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

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

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

Axial     Resist.       Nominal     Ult. (Fac)    Ult. (Fac)   Bend. Stiff.
Load      Factor      Moment Cap    Ax. Thrust    Moment Cap    at Ult Mom
```

No.	for Moment	in-kips	kips	in-kips	kip-in^2
1	0.65	23322.	13.000000	15160.	211185300.
1	0.70	23322.	14.000000	16326.	210251294.
1	0.75	23322.	15.000000	17492.	207104844.

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 = 12000.0 lbs
Applied moment at pile head = 3640000.0 in-lbs
Axial thrust load on pile head = 20000.0 lbs

Depth X	Deflect. y	Bending Moment	Shear Force	Slope S	Total Stress	Bending Stiffness	Soil Res. Es*h	Soil Spr. Lat. Load p
feet	inches	in-lbs	lbs	radians	psi*	in-lb^2	lb/inch	lb/inch
0.00	1.0075	3640000.	12000.	-0.00581	0.00	7.67E+11	0.00	0.00
0.3800	0.9810	3695249.	12000.	-0.00579	0.00	7.67E+11	0.00	0.00
0.7600	0.9547	3750497.	12000.	-0.00577	0.00	7.67E+11	0.00	0.00
1.1400	0.9284	3805742.	12000.	-0.00575	0.00	7.67E+11	0.00	0.00
1.5200	0.9022	3860985.	12000.	-0.00573	0.00	7.67E+11	0.00	0.00
1.9000	0.8762	3916226.	12000.	-0.00570	0.00	7.66E+11	0.00	0.00
2.2800	0.8502	3971465.	12000.	-0.00568	0.00	7.66E+11	0.00	0.00
2.6600	0.8244	4026702.	12000.	-0.00565	0.00	7.66E+11	0.00	0.00
3.0400	0.7986	4081937.	12000.	-0.00563	0.00	7.66E+11	0.00	0.00

```
    3.4200     0.7730   4137169.     12000.   -0.00561       0.00   7.66E+11
0.00       0.00       0.00
    3.8000     0.7475   4192399.     12000.   -0.00558       0.00   7.66E+11
0.00       0.00       0.00
    4.1800     0.7221   4247627.     12000.   -0.00556       0.00   7.65E+11
0.00       0.00       0.00
    4.5600     0.6968   4302853.     12000.   -0.00553       0.00   7.65E+11
0.00       0.00       0.00
    4.9400     0.6717   4358076.     12000.   -0.00547       0.00   2.24E+11
0.00       0.00       0.00
    5.3200     0.6469   4413291.     12000.   -0.00538       0.00   2.23E+11
0.00       0.00       0.00
    5.7000     0.6226   4468498.     12000.   -0.00529       0.00   2.23E+11
0.00       0.00       0.00
    6.0800     0.5986   4523697.     12000.   -0.00520       0.00   2.23E+11
0.00       0.00       0.00
    6.4600     0.5751   4578887.     12000.   -0.00511       0.00   2.23E+11
0.00       0.00       0.00
    6.8400     0.5521   4634068.     12000.   -0.00501       0.00   2.23E+11
0.00       0.00       0.00
    7.2200     0.5294   4689241.     12000.   -0.00492       0.00   2.23E+11
0.00       0.00       0.00
    7.6000     0.5072   4744406.     12000.   -0.00482       0.00   2.23E+11
0.00       0.00       0.00
    7.9800     0.4854   4799561.     12000.   -0.00472       0.00   2.22E+11
0.00       0.00       0.00
    8.3600     0.4641   4854707.     12000.   -0.00463       0.00   2.22E+11
0.00       0.00       0.00
    8.7400     0.4432   4909845.     12000.   -0.00453       0.00   2.22E+11
0.00       0.00       0.00
    9.1200     0.4228   4964973.     12000.   -0.00442       0.00   2.22E+11
0.00       0.00       0.00
    9.5000     0.4029   5020092.     12000.   -0.00432       0.00   2.22E+11
0.00       0.00       0.00
    9.8800     0.3834   5075201.     12000.   -0.00422       0.00   2.22E+11
0.00       0.00       0.00
   10.2600     0.3644   5130301.     11959.   -0.00411       0.00   2.22E+11
-18.1147   226.6626       0.00
   10.6400     0.3459   5185015.     11813.   -0.00401       0.00   2.22E+11
-45.6448   601.7037       0.00
   11.0200     0.3279   5238769.     11541.   -0.00390       0.00   2.21E+11
-73.9240      1028.       0.00
   11.4000     0.3104   5290977.     11139.   -0.00379       0.00   2.21E+11
-102.3996      1505.       0.00
   11.7800     0.2933   5341046.     10607.   -0.00368       0.00   2.21E+11
-130.5956      2030.       0.00
   12.1600     0.2768   5388389.      9947.   -0.00357       0.00   2.21E+11
-158.9521      2619.       0.00
```

12.5400	0.2608	5432416.	9160.	-0.00346	0.00	2.21E+11
-186.5009	3262.	0.00				
12.9200	0.2452	5472556.	8249.	-0.00335	0.00	2.21E+11
-212.8395	3958.	0.00				
13.3000	0.2302	5508259.	7222.	-0.00323	0.00	2.21E+11
-237.5857	4706.	0.00				
13.6800	0.2157	5539012.	6086.	-0.00312	0.00	2.21E+11
-260.8575	5514.	0.00				
14.0600	0.2018	5564330.	4847.	-0.00300	0.00	2.21E+11
-282.5874	6386.	0.00				
14.4400	0.1883	5583762.	3514.	-0.00289	0.00	2.21E+11
-302.0229	7313.	0.00				
14.8200	0.1754	5596903.	2098.	-0.00277	0.00	2.21E+11
-318.8932	8289.	0.00				
15.2000	0.1630	5603403.	611.8836	-0.00266	0.00	2.21E+11
-332.9520	9313.	0.00				
15.5800	0.1512	5602968.	-937.5077	-0.00254	0.00	2.21E+11
-346.6055	10455.	0.00				
15.9600	0.1398	5595316.	-2544.	-0.00243	0.00	2.21E+11
-357.8864	11670.	0.00				
16.3400	0.1290	5580212.	-4195.	-0.00231	0.00	2.21E+11
-366.2592	12943.	0.00				
16.7200	0.1188	5557481.	-5877.	-0.00220	0.00	2.21E+11
-371.5810	14268.	0.00				
17.1000	0.1090	5527014.	-7579.	-0.00208	0.00	2.21E+11
-374.7323	15677.	0.00				
17.4800	0.09976	5488744.	-9294.	-0.00197	0.00	2.21E+11
-377.7643	17267.	0.00				
17.8600	0.09104	5442608.	-11018.	-0.00186	0.00	2.21E+11
-378.0333	18934.	0.00				
18.2400	0.08284	5388602.	-12736.	-0.00174	0.00	2.21E+11
-375.5092	20671.	0.00				
18.6200	0.07513	5326777.	-14436.	-0.00163	0.00	2.21E+11
-370.1906	22467.	0.00				
19.0000	0.06793	5257245.	-16078.	-0.00153	0.00	2.21E+11
-349.9245	23488.	0.00				
19.3800	0.06123	5180427.	-17625.	-0.00142	0.00	2.22E+11
-328.6914	24480.	0.00				
19.7600	0.05501	5096764.	-19075.	-0.00131	0.00	2.22E+11
-307.2561	25472.	0.00				
20.1400	0.04926	5006703.	-20427.	-0.00121	0.00	2.22E+11
-285.8881	26464.	0.00				
20.5200	0.04399	4910687.	-21683.	-0.00111	0.00	2.22E+11
-264.8458	27455.	0.00				
20.9000	0.03917	4809156.	-22844.	-0.00101	0.00	2.22E+11
-244.3764	28447.	0.00				
21.2800	0.03481	4702534.	-23914.	-9.09E-04	0.00	2.23E+11
-224.7154	29439.	0.00				

21.6600	0.03088	4591230.	-24896.	-8.14E-04	0.00	2.23E+11	-206.0863
30430.	0.00						
22.0400	0.02738	4475633.	-25796.	-7.21E-04	0.00	2.23E+11	-188.7002
31422.	0.00						
22.4200	0.02430	4356104.	-26620.	-6.31E-04	0.00	2.24E+11	-172.7562
32414.	0.00						
22.8000	0.02163	4232974.	-27375.	-5.74E-04	0.00	7.65E+11	-158.4402
33406.	0.00						
23.1800	0.01907	4106547.	-28064.	-5.49E-04	0.00	7.66E+11	-143.8278
34397.	0.00						
23.5600	0.01662	3977128.	-28686.	-5.25E-04	0.00	7.66E+11	-128.9668
35389.	0.00						
23.9400	0.01428	3845025.	-29240.	-5.02E-04	0.00	7.67E+11	-113.9015
36381.	0.00						
24.3200	0.01204	3710551.	-29725.	-4.80E-04	0.00	7.67E+11	-98.6723
37373.	0.00						
24.7000	0.00990	3574023.	-30140.	-4.58E-04	0.00	7.68E+11	-83.3164
38364.	0.00						
25.0800	0.00786	3435761.	-30484.	-4.37E-04	0.00	7.68E+11	-67.8668
39356.	0.00						
25.4600	0.00592	3296086.	-30758.	-4.17E-04	0.00	7.68E+11	-52.3531
40348.	0.00						
25.8400	0.00406	3155321.	-30962.	-3.98E-04	0.00	7.69E+11	-36.8012
41339.	0.00						
26.2200	0.00229	3013788.	-31094.	-3.80E-04	0.00	7.69E+11	-21.2336
42331.	0.00						
26.6000	5.97E-04	2871813.	-31155.	-3.62E-04	0.00	7.70E+11	-5.6691
43323.	0.00						
26.9800	-0.00102	2729718.	-31146.	-3.46E-04	0.00	7.70E+11	9.8769
44315.	0.00						
27.3600	-0.00256	2587827.	-31065.	-3.30E-04	0.00	7.71E+11	25.3923
45306.	0.00						
27.7400	-0.00403	2446463.	-30914.	-3.15E-04	0.00	7.71E+11	40.8683
46298.	0.00						
28.1200	-0.00543	2305947.	-30693.	-3.01E-04	0.00	7.72E+11	56.2993
47290.	0.00						
28.5000	-0.00677	2166600.	-30401.	-2.88E-04	0.00	7.72E+11	71.6828
48282.	0.00						
28.8800	-0.00805	2028743.	-30039.	-2.75E-04	0.00	7.72E+11	87.0192
49273.	0.00						
29.2600	-0.00928	1892694.	-29607.	-2.64E-04	0.00	7.73E+11	102.3115
50265.	0.00						
29.6400	-0.01046	1758772.	-29106.	-2.53E-04	0.00	7.73E+11	117.5658
51257.	0.00						
30.0200	-0.01159	1627293.	-28535.	-2.43E-04	0.00	7.74E+11	132.7903
52249.	0.00						
30.4000	-0.01268	1498574.	-27895.	-2.34E-04	0.00	7.74E+11	147.9957
53240.	0.00						

30.7800	-0.01372	1372933.	-27186.	-2.25E-04	0.00	7.74E+11	
163.1948	54232.	0.00					
31.1600	-0.01473	1250683.	-26407.	-2.18E-04	0.00	7.75E+11	
178.4026	55224.	0.00					
31.5400	-0.01571	1132143.	-25558.	-2.11E-04	0.00	7.75E+11	
193.6355	56215.	0.00					
31.9200	-0.01665	1017629.	-24641.	-2.04E-04	0.00	7.75E+11	
208.9118	57207.	0.00					
32.3000	-0.01757	907458.	-23653.	-1.99E-04	0.00	7.76E+11	
224.2510	58199.	0.00					
32.6800	-0.01846	801949.	-22595.	-1.94E-04	0.00	7.76E+11	
239.6739	59191.	0.00					
33.0600	-0.01934	701424.	-21467.	-1.89E-04	0.00	7.76E+11	
255.2019	60182.	0.00					
33.4400	-0.02019	606205.	-20268.	-1.85E-04	0.00	7.77E+11	
270.8572	61174.	0.00					
33.8200	-0.02103	516618.	-18996.	-1.82E-04	0.00	7.77E+11	
286.6625	62166.	0.00					
34.2000	-0.02185	432991.	-17653.	-1.79E-04	0.00	7.77E+11	
302.6404	63158.	0.00					
34.5800	-0.02266	355657.	-16236.	-1.77E-04	0.00	7.77E+11	
318.8135	64149.	0.00					
34.9600	-0.02346	284952.	-14745.	-1.75E-04	0.00	7.77E+11	
335.2038	65141.	0.00					
35.3400	-0.02426	221217.	-13178.	-1.74E-04	0.00	7.77E+11	
351.8325	66133.	0.00					
35.7200	-0.02505	164798.	-11535.	-1.72E-04	0.00	7.77E+11	
368.7197	67124.	0.00					
36.1000	-0.02583	116045.	-9815.	-1.72E-04	0.00	7.77E+11	
385.8842	68116.	0.00					
36.4800	-0.02661	75317.	-8015.	-1.71E-04	0.00	7.77E+11	
403.3427	69108.	0.00					
36.8600	-0.02739	42975.	-6136.	-1.71E-04	0.00	7.77E+11	
421.1102	70100.	0.00					
37.2400	-0.02817	19390.	-4174.	-1.71E-04	0.00	7.77E+11	
439.1986	71091.	0.00					
37.6200	-0.02895	4937.	-2129.	-1.71E-04	0.00	7.77E+11	
457.6173	72083.	0.00					
38.0000	-0.02973	0.00	0.00	-1.70E-04	0.00	7.77E+11	
476.3721	36537.	0.00					

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

Output Summary for Load Case No. 1:

```
Pile-head deflection             =     1.00748020 inches
Computed slope at pile head      =    -0.00581453 radians
Maximum bending moment           =       5603403. inch-lbs
Maximum shear force              =        -31155. lbs
Depth of maximum bending moment  =    15.20000000 feet below pile head
Depth of maximum shear force     =    26.60000000 feet below pile head
Number of iterations             =            105
Number of zero deflection points =              1
```

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

Boundary Condition Type 1, Shear and Moment

```
Shear      =          12000. lbs
Moment     =        3640000. in-lbs
Axial Load =          20000. lbs
```

Pile Length feet	Pile Head Deflection inches	Maximum Moment ln-lbs	Maximum Shear lbs
38.00000	1.00748020	5603403.	-31155.
36.10000	1.02359989	5600361.	-34310.
34.20000	1.08433288	5592871.	-38277.
32.30000	1.19729809	5581691.	-43119.
30.40000	1.43945281	5564776.	-48970.
28.50000	1.97166624	5544066.	-56231.
26.60000	3.17478820	5517361.	-64872.
24.70000	6.92956812	5550178.	-78582.

Summary of Pile-head Responses for Conventional Analyses

Definitions of Pile-head Loading Conditions:

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

Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

Load Case No.	Load Type 1	Load Pile-head 1	Load Type 2	Load Pile-head 2	Axial Loading lbs	Pile-head Deflection inches	Pile-head Rotation radians	Max Shear in Pile lbs	Max Moment in Pile in-lbs
1	V, lb	12000.	M, in-lb	3640000.	20000.	1.0075	-0.00581	-31155.	5603403.

Maximum pile-head deflection = 1.0074802044 inches
Maximum pile-head rotation = -0.0058145337 radians = -0.333148 deg.

The analysis ended normally.

SPT CAL

SPT HAMMER ENERGY MEASUREMENTS

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Date: 02/15/2020

Project Title: Cascade Las Vegas 2020
P.O. Number: 02/15/2020
CME 85 02-34463 Auto Hammer

Energy Transfer Ratio = 72.6 @ 45.0 blows per minute

Testing was performed on February 15, 2020 in Las Vegas, NV

Hammer Energy Measurements performed in accordance to ASTM D4633 using an approved and calibrated SPT Analyzer from Pile Dynamics, Inc.

APPENDIX C

PRESENTATION OF SPT ANALYZER TEST DATA

1. Introduction

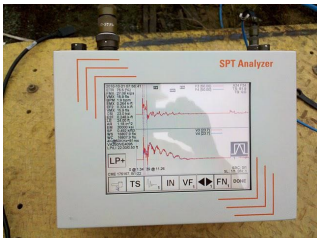
This report presents the results of SPT Hammer Energy Measurements recorded with an SPT Analyzer from Pile Dynamics carried out on February 15, 2020 in Las Vegas, NV

2. Field Equipment and Procedures

The CME 85 had a mounted CME Auto Hammer. The CME Auto Hammer uses a 140 lb. weight dropped 30” on to an anvil above the bore hole. AWJ drill rod connects the anvil to a split spoon type soil sampler inside an 8” o.d. hollow stem auger at the designated sample depth. After a seeding blow the sampler is driven 18”. The number of blows required to penetrate the last 12" is referred to as the “N value”, which is related to soil strength.

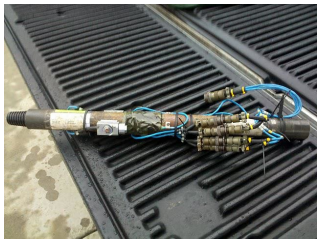
The first recording was taken at 3' below ground surface and then every 3' to final recording at 15'.

3. Instrumentation



An SPT Analyzer from Pile Dynamics was used to record and the process the data. The raw data was stored directly in the SPT Analyzer computer with subsequent analysis in the office with PDA-W and PDIPlot software. The measurements and analysis were conducted in general accordance with ASTM D4945 and ASTM D6066 test standards.

The SPT Analyzer is fully compliant with the minimum digital sampling frequency requirements of ASTM D4633-05 (50 kHz) and EN ISO 22476-3:2005 (100 kHz), as well as with the low pass filter, (cutoff frequency of 5000 Hz instead of 3000 Hz) requirements of ASTM D4633-05. All equipment and analysis also conform to ASTM D6066.



A 2' instrumented section of AWJ rod, with two sets of accelerometers and strain transducers mounted on opposite sides of the drill rod, was placed below the anvil. It measured strain and acceleration of every hammer blow. The SPT Analyzer then calculates the amount of energy transferred to the rod by force and velocity measurements.

4. Observations

The drill rig motor is diesel fueled. The drill and sample equipment looked to be well operated and maintained.

5. Results

Results from the SPT Hammer Energy Measurements are summarized below. It shows the Energy Transfer Ratio (ETR) at each sampling depth. ETR is the ratio of the measured maximum transferred energy to rated energy of the hammer which is the product of the weight of the hammer times the height of the fall. 140 lb x 30" = 4200 lb-in = 0.350 kip-ft.

Energy Transfer Ratio = 72.6 @ 45.0 blows per minute

N60=(ETR/60)N

Depth	ETR%	BPM
3	71.9	45.1
6	72.2	45.7
9	73.1	44.7
12	72.8	45.2
15	73.2	44.5
Average	72.6	45.0

If you have any questions please do not hesitate to call or email.

Thank you,

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