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GEOTECHNICAL DESIGN REPORT
MADAWASKA INTERNATIONAL BRIDGE NO. 2399 OVER ST. JOHN RIVER REPLACEMENT

MAINE DOT WIN 21736.00
MADAWASKA, MAINE, and
EDMUNDSTON, NEW BRUNSWICK

Prepared for:
HNTB Corporation
Westbrook, Maine

November 2020
09.0025984.03

Prepared by:

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VIA EMAIL

November 17, 2020
File No. 09.0025984.03

Mr. Joshua Olund, P.E.
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Re: Geotechnical Design Report
Madawaska-Edmundston International Bridge Replacement No. 2399
Maine Department of Transportation WIN 21736.00
Madawaska, Maine to Edmundston, New Brunswick

Dear Josh:

We are pleased to provide this Geotechnical Design Report (GDR) to HNTB Corporation (HNTB) for Bridge No. 2399 over the St. John River in Madawaska, Maine and Edmundston, New Brunswick. Our work was completed in accordance with Task Order No. GZA001.01 dated January 8, 2020, issued under the Subconsultant Agreement between HNTB and GZA GeoEnvironmental, Inc. (GZA) dated January 13, 2020, which incorporates GZA's proposal No. 09.P000075.20, dated October 8, 2019, GZA's contract modification No. CO-25984.03-1, dated April 29,2020, and the *Limitations* included in **Appendix A** of this report. GZA is providing geotechnical engineering services as a Subconsultant to HNTB, who is under contract with Maine Department of Transportation for design of the proposed bridge replacement.

It has been a pleasure serving HNTB on this phase of the project, and we look forward to our continued work with you through project completion. If you have any questions regarding the report, or if we can provide further assistance, please do not hesitate to contact the undersigned.

Very truly yours,

GZA GEOENVIRONMENTAL, INC.

Nicholas Williams, P.E.
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STATE OF MAINE
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1.0 INTRODUCTION

This report presents the results of GZA GeoEnvironmental, Inc.'s (GZA's) geotechnical evaluation for the proposed replacement of Maine Department of Transportation (MaineDOT) International Bridge No. 2399 over the St. John River in Madawaska, Maine and Edmundston, New Brunswick. Our services were completed in accordance with Task Order No. GZA001.01 dated January 8, 2020, issued under the Subconsultant Agreement between HNTB and GZA dated January 13, 2020, which incorporates GZA's proposal No. 09.P000075.20, dated October 8, 2019, and GZA's contract modification No. CO-25984.03-1, dated April 29, 2020. Our services are subject to the *Limitations* contained in **Appendix A** of this report.

GZA is providing geotechnical engineering services as a Subconsultant to HNTB, who is under contract with MaineDOT for design of the proposed bridge replacement.

1.1 BACKGROUND

1.1.1 Existing Conditions

The existing International Bridge is a 928-foot-long, four-span bridge carrying Bridge Avenue over the Maine Northern Railroad (MNR), St. John River and the Canadian National Railroad (CNR) from Madawaska, Maine to Edmundston, New Brunswick, Canada, the location of which is shown on the **Project Locus, Figure 1**. The bridge was built in 1920, and each span consists of a 232-foot-long through-truss structure.

The replacement bridge will extend from the proposed United States Land Port of Entry (U.S. LPOE) approximately 1,500 feet upstream of the existing bridge to a point just upstream of the existing Canadian abutment. From south to north, the bridge will span the MNR, the steep 63-foot-high U.S. riverbank, the St. John River, a moderately steep 40-foot-high Canadian riverbank, and the CNR.

The MNR ties into the Twin River railyard and traverses the top of the U.S. riverbank with railbed grades ranging from approximately El. 503 near the U.S. LPOE to El. 505 near the existing bridge. Elevations referenced in this report are in feet and refer to the North American Vertical Datum of 1988 (NAVD88).

The Madawaska riverbank slope north of the proposed U.S. abutment begins at approximately El. 503 at the railbed. From the railbed, the slope extends steeply down approximately 63 feet to the riverbed at approximately El. 440. The inclination varies from approximately 1.2H:1V to 1.4H:1V. The Madawaska riverbank is thickly vegetated with trees and brush. It has deep gully erosion and signs of sloughing and/or scarps in some areas.

The Edmundston riverbank slopes up from the riverbed to the CNR railbed at approximately El. 481. It is approximately 40 feet tall with inclination ranging from 1.7H:1V to 2.4H:1V, and is vegetated with brush and small trees.

1.1.2 Proposed Bridge and Improvements

Based on the HNTB 90 percent plans and subsequent design discussions, we understand the replacement bridge will consist of an approximately 1,850-foot-long, six-span bridge, as shown on the **Boring Location**

Plan, Figures 2 and **3**. The proposed superstructure consists of steel plate girder beams and a composite cast-in-place concrete deck, with span lengths of 300, 315, 315, 315, and 268 feet from south to north.

The U.S. abutment (Abutment 1) will be full height, with a total height of 44 feet from bottom of footing to top of abutment, and it will be located adjacent to the MNR railbed. The associated wingwalls will be structurally independent, full height, cast-in-place cantilever walls, with foundations stepping up away from the abutment. Wingwall heights will vary from 29 to 44 feet. An approximately 24-foot grade raise is planned to tie the new bridge into the proposed U.S. LPOE.

The five (5) piers are anticipated to be solid shaft piers with rounded noses supported by fully buried, square cast-in-place concrete footings or pile/pier caps. Pier 1 is located near the mid-slope of the Madawaska riverbank, approximately 40 feet below the railbed. Construction access to Pier 1 will be difficult. A temporary embankment carrying a construction access road is currently envisioned to extend from the MNR railway yard near the existing bridge at approximately El. 505, down to the proposed Pier 1 level at approximately El. 465. Current plans call for the temporary embankment fill to be removed, leaving a permanent 2H:1V slope on the Madawaska riverbank covered with riprap.

Piers 2 through 4 are located within the river and are anticipated to have footings/pile caps with tremie seals embedded below the river mudline. Pier 5 will be located at the base of the Edmundston riverbank approximately 40 feet below the railbed. A temporary road is envisioned be constructed from the CNR railway near El. 480 to the proposed Pier 5 level at El. 440. The temporary access road on the Canadian riverbank is proposed to have a configuration similar to those on the U.S. side. The permanent slope is planned to be covered with riprap with a geometry similar to the existing condition.

The Edmundston abutment (Abutment 2) will be located directly upstream from the existing abutment, adjacent to the CNR railbed. It is proposed to be a full height configuration up to approximately 30 feet high with flared wingwalls. The area directly north of the abutment and wingwalls, over the existing slope, will require fill heights up to 25 feet to tie into the grade at the LPOE. Staged construction will be required at Abutment 2 since the downstream end of the abutment and wingwall overlap the existing bridge approach. These areas will be constructed after the new bridge is open and the existing bridge is demolished.

1.2 OBJECTIVES AND SCOPE OF SERVICES

The objectives of our work were to evaluate subsurface conditions and provide final geotechnical design recommendations and construction considerations for bridge replacement. To meet these objectives, GZA completed the following Scope of Services:

- Conducted site visits to observe surficial conditions and reviewed mapped surficial geology of the site;
- Coordinated and observed preliminary and final design phase subsurface exploration programs, including two preliminary phase borings and 15 final design test borings to evaluate subsurface conditions;
- Coordinated and observed geophysical surveys, including seismic refraction across the proposed alignment to evaluate the approximate top of bedrock elevation for preliminary design and ground penetrating radar (GPR) at the existing Canadian Abutment to assess the geometry of the abutment and wingwalls;

- Conducted a laboratory testing program to evaluate engineering properties of the site soils and bedrock;
- Completed geotechnical evaluations for soil and bedrock properties; approach embankment design considerations; frost susceptibility and drainage of approach embankments; AASHTO load and resistance factors associated with geotechnical design elements; spread footing bearing and lateral resistance; drilled shaft design parameters, axial and lateral resistance; nominal resistance of pile foundations, pile drivability, and lateral pile design parameters; drilled micropile axial and lateral design parameters; global stability of temporary access roads and final conditions; and seismic design considerations;
- Developed geotechnical engineering recommendations including foundation design recommendations for spread footings, drilled shafts, driven piles, and drilled micropiles; lateral earth pressures and seismic design parameters; and temporary access road embankments; and
- Prepared this report summarizing our findings and design recommendations.

2.0 SUBSURFACE EXPLORATIONS

2.1 PRELIMINARY BORINGS

GZA oversaw a preliminary subsurface exploration program consisting of two (2) test borings (BB-MSJR-101 and -102). One boring was drilled near each proposed abutment. The approximate as-drilled boring locations were established by GZA using tape measurements to features shown on the site plan and are shown on **Figures 2 and 3**. The approximate elevations were interpolated between contours shown on the base plan provided by HNTB on January 23, 2019.

The borings were drilled to depths of approximately 47 to 122 feet below ground surface (bgs). New England Boring Contractors of Hermon, Maine provided drilling services and coordinated utility clearance. The drilling was completed between August 28, 2018 and September 5, 2018. GZA personnel monitored the drilling work and prepared logs of each boring which are included in **Appendix B**.

The borings were drilled using 4-inch driven-casing and drive-and-wash drilling techniques. Standard penetration testing (SPT) and split-spoon sampling were performed at 5-foot typical intervals in the overburden using a 24-inch-long, 1-3/8-inch inside-diameter sampler, driven with a 140-lb calibrated automatic hammer with a 30-inch drop. Approximately 20 feet of bedrock core was obtained in each boring using NQ2 coring equipment. Wet and dry photographs of the collected rock core are presented in **Appendix C**. At the completion of drilling, the borings were backfilled with cuttings and sand.

2.2 PRELIMINARY GEOPHYSICAL SURVEY

NDT Corporation (NDT) of Sterling, Massachusetts provided seismic refraction survey services to characterize the top of bedrock across the proposed bridge alignment in the river. Seismic refraction data were acquired by wading and with the assistance of a boat. The locations of the ends of the seismic refraction lines were surveyed by a MaineDOT crew and provided to GZA as an electronic data file, as shown on **Figures 2 and 3**. Seismic refraction data were acquired via a 12- and 24-channel system with 5- and 10-foot geophone spacing and seismic energy generated approximately every 50 feet with a Betsy

Seisgun (non-projectile) energy source. A GZA engineer provided oversight and assisted our geophysical subconsultant during the field work.

The seismic refraction lines are summarized as follows:

- Longitudinal along the bridge alignment from Sta. 108+12 to 114+12 and from Sta. 115+12 to 119+00. Due to water depth and current, seismic data could not be safely collected between Sta. 114+12 and Sta 115+12; and
- Four 200-foot-long transverse lines across the bridge alignment at Sta. 109+12, 111+12, 113+12, and 117+12.

The results of the seismic refraction survey are documented in a report prepared by NDT dated November 2018, which is presented in **Appendix D**. The report provides additional details on the seismic refraction line locations and interpretations.

2.3 DESIGN PHASE BORINGS

GZA oversaw a design phase test boring program consisting of 15 test borings, including 12 land-based borings (BB-MSJR-201 through -204, -209 through -214, -301, and -302), and three river borings (BB-MSJR-205, -206, and -208). The borings were drilled at the proposed abutments/wingwalls, pier substructures, and slopes. The land-based borings were drilled using an ATV-mounted or truck-mounted drill rig. The river borings were drilled from a platform-mounted skid rig placed on location via helicopter. The helicopter was necessary to mobilize to river locations where the water was too shallow or dangerous for a barge and too deep to ford. Boring BB-MSJR-207 was planned at Pier 4, but due to rising river levels at the time of the drilling program, it was not feasible to place the drill platform on that location, and the boring was not completed.

The borings were drilled to depths of approximately 31 to 100 feet bgs. New England Boring Contractors of Hermon, Maine and Logan Drilling Group of Allison, New Brunswick provided drilling services and coordinated utility clearance. The -200 series drilling was completed between October 27, 2019 and March 3, 2020; and the -300 series drilling was completed between June 10, 2020 and June 11, 2020. GZA personnel monitored the drilling work and prepared logs of each boring which are included in **Appendix B**.

The borings were drilled using 3- and 4-inch driven casing and drive-and-wash drilling techniques. SPT and split-spoon sampling were performed at 5-foot typical intervals in the overburden using a 24-inch-long, 1-3/8-inch inside-diameter sampler. The sampler was driven with a 140-lb calibrated automatic hammer with a 30-inch drop from the ATV-mounted/truck-mounted rig, and with a 140-lb safety hammer with a 30-inch drop and a rope-and-cathead from the platform-mounted rig. Approximately 10 to 30 feet of bedrock core was taken from borings BB-MSJR-203 through -206, -208 through -214, -301, and -302 using HQ and NQ coring equipment. Coring was not conducted in borings BB-MSJR-201 and -202, which were drilled for the Abutment 1 wingwalls. Wet and dry photographs of the collected rock core are presented in **Appendix C**.

2.4 GEOPHYSICAL SURVEY – GEOMETRY OF EXISTING CANADIAN ABUTMENT

NDT provided GPR survey services to characterize the geometry of prior bridge wingwalls at the Edmundston abutment, which were believed to be buried inside of the backfill behind the current western

return wall. GPR data were acquired along the existing roadway. The locations of the ends of the GPR lines were surveyed by a MaineDOT crew and provided to GZA as an electronic data file and shared with NDT. GPR data were acquired via a digital system coupled with 400 MHz and 200 MHz antennas. Pulsed electromagnetic signals were transmitted from the antenna at the ground surface and reflected back to the antenna from the buried interfaces encountered with differing electrical properties. A GZA engineer was on site to oversee and assist our geophysical subconsultant during the field work. GPR data were collected along transverse (east to west) lines of coverage set 5, 10, 20, 30, 40, 50, and 60 feet north from the edge of the bridge along the east curb. Longitudinal (north to south) lines were collected at a 5-foot spacing.

The results of the seismic refraction survey are documented in a report prepared by NDT dated November 25, 2019, which is presented in **Appendix E**. The report provides additional details on the GPR locations and interpretations.

3.0 LABORATORY TESTING

GZA retained Thielsch Engineering's Geotechnical Laboratory in Cranston, Rhode Island to complete a soil and rock testing program to assess the gradation and engineering characteristics of the soil and the strength of the bedrock. The testing program consisted of:

3.1 SOIL

- 40 gradation analysis / AASHTO Classification / Unified Soil Classification System / Frost Classification assessments;
- 1 set of Atterberg Limits;
- 30 moisture content tests; and
- 12 hydrometer tests.

3.2 ROCK

- 14 unconfined compressive strength / secant modulus tests; and
- 10 point-load tests (5 axial and 5 diametrical).

Results of the testing are included in **Appendix F**.

4.0 SUBSURFACE CONDITIONS

4.1 SURFICIAL AND BEDROCK GEOLOGY

Surficial geologic units mapped at the proposed International Bridge include fill, alluvial deposits, and glacial till deposits. The following are brief descriptions of the geologic units based on the Generalized Surficial Geology map of New Brunswick (Rampton et al, 2002):

- The alluvial deposits are described as sand, gravel, some silt, minor clay and organic sediment; generally more than 6 feet thick; deposited as channel, overbank, and flood basin deposits.
- Morainal sediments consisting of lodgment till, ablation till, and associated sand and gravel deposited directly by Late Wisconsinan ice or with minor reworking by water. Blanket and veneer layers of loamy lodgment till, minor ablation till, silt, sand, gravel, rubble with the composition of the till, likely mainly stony.

Bedrock at the site is mapped as slate and schist of the Sangerville Formation, based on the Bedrock Geologic Map of Maine (Osberg et al, 1985; on-line GIS version).

4.2 SUBSURFACE PROFILE

Three soil units were encountered in the test borings below topsoil and pavement: Fill, Alluvium, and Glacial Till. Alluvium was encountered only in the borings conducted along the Canadian embankment. The approximate thicknesses and generalized descriptions of the subsurface units are presented in the following table, in descending order from existing ground surface. Detailed descriptions of the materials encountered at specific locations are provided in the boring logs in **Appendix B**. The subsurface conditions are also shown in relation to the bridge alignment on the **Interpretive Subsurface Profile, Figures 4** and **5**. The thickness and elevation of each stratum is summarized on the attached **Table 1**.

GENERALIZED SUBSURFACE CONDITIONS		
Subsurface Unit	**Approximate Encountered Thickness (ft)**	**Generalized Description (see Note 1)**
Topsoil	0.5	Encountered in BB-MSJR-102 and BB-MSJR-204 only
Fill (Madawaska)	13.5 to 18.0	Variable ranging from: Grey, loose to very dense, GRAVEL, some fine to coarse SAND, little Silt to: Grey, loose to dense, fine to coarse SAND, little to some Gravel, little to some Silt, with concrete fragments, trace roots (USCS: GM, SM). • MaineDOT Frost Classification = I-III • Encountered in borings BB-MSJR-101, and BB-MSJR-201 through -204 • Probable cobbles and boulders encountered in BB-MSJR-101
Fill (Edmundston)	6.0 to 28.0	Variable ranging from: Grey/Brown, loose to dense fine to coarse SAND with varying amounts of Gravel and Silt to: Grey/Brown, stiff to very stiff, Sandy SILT, trace Gravel (USCS: SM, ML). • MaineDOT Frost Classification = I-III • Encountered in borings BB-MSJR-102, BB-MSJR-209 through -214, and BB-MSJR-301 and -302.
Alluvium	3.0 to 14.3	Variable ranging from: Grey to brown to black, loose to dense, fine to medium SAND, little Silt, trace to no Gravel, with traces of root fibers to Brown, medium stiff to stiff, Clayey SILT, some fine to coarse Sand (USCS: SM, ML). • MaineDOT Frost Classification = II-IV • Encountered in Edmundston borings along CNR: BB-MSJR-208 through -211, BB-MSJR-213, and BB-MSJR-301 and -302.
Glacial Till	1.3 to 87.1	Variable ranging from: Grey, dense to very dense, fine to coarse SAND, little to some Gravel, little to some Silt to: Hard, Clayey SILT, little fine Sand, little Gravel (USCS: SM, ML-CL). • MaineDOT Frost Classification = II-IV • Encountered in all borings • Boulders and Cobbles were encountered within the Glacial Till stratum in borings BB-MSJR-208 through -210. Likely present in other borings based on split spoon refusals.
Weathered Rock	0.5 to 8.8	Encountered probable weathered rock in borings BB-MSJR-209 and -214.
Encountered Top of Bedrock Elevation (see Note 1)	Madawaska Land Side: El. 414.4 to 418.7 River: El. 406.8 to 412.1 Edmundston Land Side: El. 425.6 to 488.4	
Notes: 1. Elevations were interpolated for Abutment 1, Pier 1, and Abutment 2		

4.2.1 Weathered Bedrock

Probable weathered rock was encountered at the locations described in the table above. Slate gravel pieces were recovered in the final 6 inches of the split spoon at BB-MSJR-214. The split spoon driven at BB-MSJR-209 met refusal in 2 inches within the stratum. After split spoon refusals in -209, cores were attempted to recover more of the material for classification which resulted in brown wash water return, with 45 to 75 percent recovery and 0 percent Rock Quality Designation (RQD). The recovered weathered rock in the spoons and cores was highly fractured Slate gravel pieces, which were easily broken with a

field knife or by hand. The transition from weathered rock to rock was interpreted to occur at the depth where the RQD first exceeds zero.

4.2.2 Bedrock

Bedrock was cored in fifteen (15) of the test borings drilled along the proposed alignment. The bedrock consists of Slate. Photographic logs of the recovered rock core specimens are included in **Appendix C**. A summary of rock core data for each boring conducted along the proposed bridge alignment is presented in **Table 2**.

GZA evaluated the top of bedrock elevation based on the shallowest of:

- Split spoon refusal (defined as 50 blows over < 1" of advancement);
- Increased roller cone resistance followed by advancement with the core barrel; or
- Initial advancement with the core barrel.

Bedrock was described as hard, fresh, aphanitic, blue/grey, SLATE. The primary joints were along the foliation, extremely close to moderately spaced, high angle to vertical, planar, smooth, fresh, tight to partially open. The secondary joints were typically moderately spaced, horizontal, smooth, stepped, fresh, and open. The RQD ranged from 0 to 95 percent, with an average RQD of 48 percent, indicating an average Rock Mass Quality of Fair.

Unconfined compressive strength (UCS) testing was conducted on fourteen core samples as summarized in the table below. The testing yielded unconfined compressive strengths ranged from 974 to 11,329 pounds per square inch (psi) and Young's modulus values ranging from 447 to 4,300 kips per square inch (ksi).

SUMMARY OF BEDROCK UNCONFINED COMPRESSIVE STRENGTH TEST RESULTS

Boring	Depth Below Existing Ground (ft bgs)	Depth Below Top of Rock (ft)	Elevation (ft, NAVD)	Unconfined Compressive Strength (psi)	Secant Modulus @ 50 of Failure Stress (ksi)	Unit Wt (pcf)
BB-MSJR-101	102.0	1.4	413.0	1,969	2,280	168.7
BB-MSJR-101	106.2	5.6	408.8	2,611	1,560	172.1
BB-MSJR-101	119.2	18.6	395.8	2,864	1,580	--
BB-MSJR-102	30.9	5.7	476.1	974	3,360	169.9
BB-MSJR-204	95.6	9.9	405.3	4,354	728	170.5
BB-MSJR-205	36.9	7.7	404.4	4,868	657	171.1
BB-MSJR-205	46.1	16.9	395.2	5,659	1,690	170.5
BB-MSJR-206	40.3	9.6	400.7	10,670	1,900	170.9
BB-MSJR-206	49.1	18.4	391.9	5,599	2,450	171.2
BB-MSJR-208	39.0	3.9	402.9	5,369	447	--
BB-MSJR-208	46.7	11.6	395.2	5,018	2,450	170.7
BB-MSJR-209	55.6	0.6	425.0	4,579	2,140	169.0
BB-MSJR-209	60.6	5.6	420.1	4,251	1,420	170.3
BB-MSJR-214	46.3	34.3	454.2	11,329	4,300	170.8

Five sets of point load tests (axial and diametrical) were performed on rock core samples as summarized in the table below. The size-corrected point load index, $I_{s(50mm)}$, ranged from 25 to 359 psi, which suggests unconfined compressive strengths ranging between 600 to 8,616 psi based on typical correlation factors between $I_{s(50mm)}$ and UCS.

SUMMARY OF BEDROCK POINT LOAD TEST RESULTS							
Boring	**Depth Below Existing Ground (ft bgs)**	**Depth Below Top of Rock (ft)**	**Elevation (ft, NAVD)**	**Point Load Test (Axial or Diametrical)**	**Point Load Index, Is_{50} (PSI)**	**Correlated UCS from Point Load Index (PSI)**	**Unit Wt (pcf)**
BB-MSJR-101	105.2	4.6	409.9	Diametrical	80	1,920	--
BB-MSJR-101	105.2	4.6	409.9	Axial	152	3,648	161.4
BB-MSJR-101	110.7	10.1	404.4	Diametrical	359	8,616	153.0
BB-MSJR-101	110.7	10.1	404.4	Axial	32	8,448	166.0
BB-MSJR-102	45.0	19.8	462.1	Diametrical	25	600	169.8
BB-MSJR-102	45.0	19.8	462.1	Axial	89	2,136	166.5
BB-MSJR-205	31.6	2.4	409.7	Diametrical	316	7,268	197.8
BB-MSJR-205	31.6	2.4	409.7	Axial	269	6,187	169.1
BB-MSJR-214	14.2	2.2	486.3	Diametrical	155	3,798	155.8
BB-MSJR-214	14.2	2.2	486.3	Axial	159	3,896	158.5

4.2.3 Groundwater

Groundwater was encountered in the Madawaska land borings at depths of approximately 9.7 to 25.0 feet bgs. The groundwater elevations ranged from approximately El. 507.7 near Abutment 1 to El. 480.1 near the crest of the Madawaska Riverbank. In the Edmundston land borings, groundwater was encountered at depths of approximately 8.0 to 29.3 feet. The elevations ranged from approximately El. 488.2 in the Canadian LPOE property to El. 451.2 along the CNR above the Edmundston Riverbank.

Water levels were measured in completed boreholes at times that varied from immediately after completion of drilling, to 48 hours after the removal of drill casing. The groundwater observations were made at the times and under the conditions stated in the boring logs.

The water level within the river typically averages an elevation of El. 445.0, and has a 1 year peak flow elevation (Q1.1) of El. 455.7, based on the 90 percent plans. Fluctuations in groundwater will occur due to variations in season, precipitation, river level and other factors. Consequently, water levels during and after construction are likely to vary from those encountered in the borings at the time the observations were made.

4.3 EXISTING SUBSTRUCTURES AT ABUTMENT 2

The 1921 existing bridge plans show the cast-in-place concrete wingwalls oriented perpendicular to the abutment. Because portions of the new abutment overlap, GPR testing was conducted to evaluate the existing substructures there.

NDT interpreted the GPR data to show the substructure was modified after the 1921 bridge construction to widen the approach to the left and add a concrete sidewalk on the right. NDT's results indicate the 1921 left and right wingwalls extend approximately 16 feet and 22 feet north of the abutment and are

oriented nearly perpendicular to the abutment. The top of wingwall was interpreted to be approximately 12 to 30 inches below the top of pavement on the left wingwall, and 3 to 5 feet below top of pavement on the right wingwall. Both wingwalls were interpreted to be battered on the inside and outside.

The GPR report is included in this report as **Appendix E**. The graphic from NDT's report displaying the interpreted geometry is shown below. The solid black lines show the limits of exposed existing abutment and wingwalls, as well as the sidewalk walls.

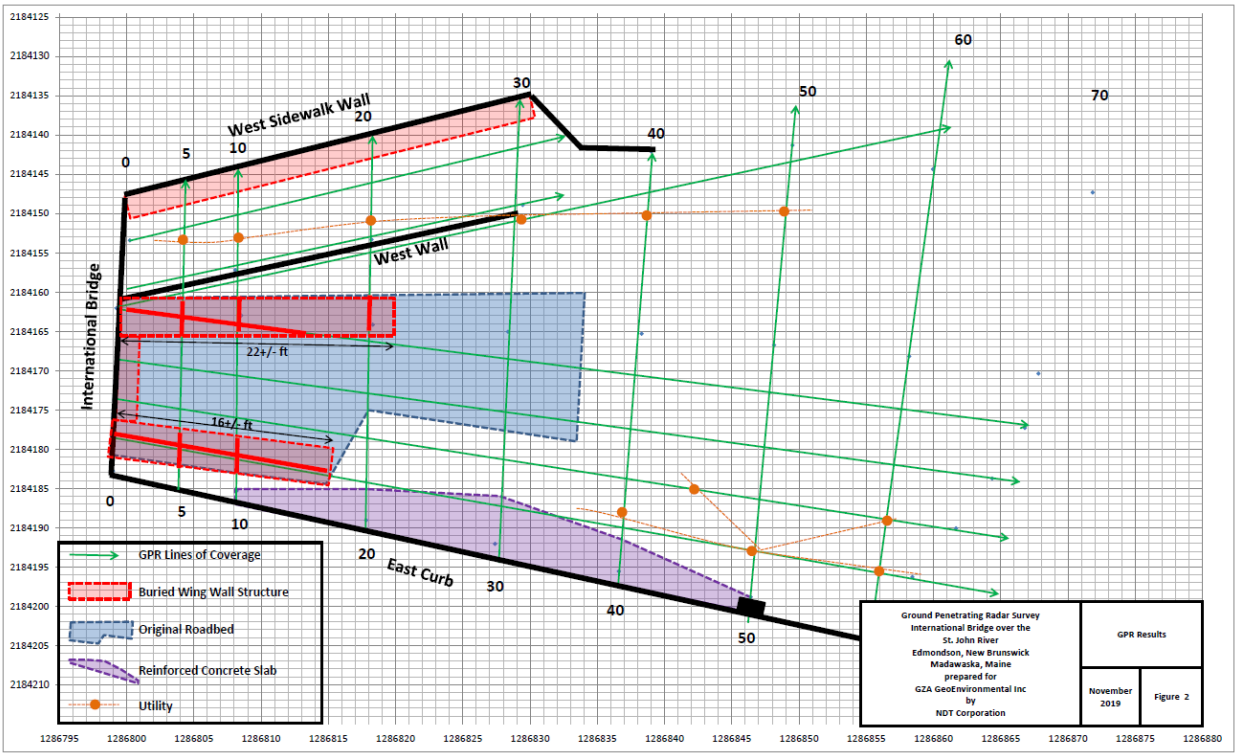


Figure A – NDT Interpretation of Buried Wingwalls at Canadian Abutment

5.0 ENGINEERING EVALUATIONS

5.1 GENERAL

GZA conducted geotechnical engineering evaluations based on the *2017 AASHTO LRFD Bridge Design Specifications, 8th Edition with Interims*, (AASHTO), and the *MaineDOT Bridge Design Guide, 2003 Edition*, with updates through 2018 (MaineDOT BDG, BDG). Supporting calculations developed by GZA for the project are attached in **Appendix G** of this report.

5.2 SOIL AND ROCK ENGINEERING PROPERTIES

5.2.1 Design Soil Properties

The soil properties developed for geotechnical analyses for this project are the unit weight, soil internal friction angle, and the horizontal subgrade modulus. Soil internal friction angles were based on empirical

correlations with SPT blow counts. The horizontal modulus of subgrade reaction (k) of the soil strata were calculated as a function of the internal friction angles, based on the LPile Technical Manual.

Three generalized soil profiles were considered to overlie bedrock across the alignment as follows:

- Madawaska – Medium dense to dense Fill over dense to very dense Glacial Till. Lower and upper bound friction angles were developed to represent the range of density of the Glacial Till and to account for this range in the foundation design;
- River Piers – Very dense Glacial Till; and
- Edmundston – Loose to dense Fill, over loose to medium dense Alluvium, over dense to very dense Glacial Till.

The soil engineering properties selected for each soil profile are shown in the following table.

SUMMARY OF DESIGN SOIL PROPERTIES					
Location	**Layer**	**Total Unit Weight, γ (pcf)**	**Internal Friction Angle, ϕ (degrees)**	**Horizontal Modulus of Subgrade Reaction, K above Groundwater (lb/in³)**	**Horizontal Modulus of Subgrade Reaction, K below Groundwater (lb/in³)**
Madawaska Landside (including Pier 1)	Fill	125	32	85	55
	Glacial Till (Lower Bound)	130	38	--	120
	Glacial Till (Upper Bound)	130	43	--	190
Piers 2 through 5	Glacial Till	130	43	--	190
Edmundston (Land Side)	Fill	125	31	65	45
	Alluvium	120	30	--	--
	Glacial Till	130	38	--	120

Where engineered fill materials were utilized, they were assumed to have unit weight and strength properties consistent with the BDG.

5.2.2 Design Bedrock Properties

The bedrock properties used to calculate axial capacity and lateral parameters for rock-socketed drilled shafts and micropiles and bearing resistance for spread footings on rock included the RQD, Geologic Strength Index (GSI), rock group constant (m_i), unconfined compressive strength (UCS), total unit weight (γ) and Secant Modulus (E).

The RQD was calculated for each rock core sample collected, with values ranging from 0 to 95 percent. A total of 262 lineal feet of rock core RQD data were reviewed from the borings drilled along the alignment. RQD values were relatively consistent across the site. GZA calculated the weighted-average RQD[1] for all

[1] The weighted-average RQD consists of the total length of core pieces greater than 4 inches divided by total length of rock cored for the boring(s) considered. This method of averaging prevents biasing that would occur if the percent RQD for each core run of varying length were equally weighted.

rock in the upper 15 feet of the river pier borings (BB-MSJR-204 through -206, and -208) for use in design (herein referred to as "average RQD").

The GSI, a visual measure of bedrock quality that considers the number and orientation of fractures in the rock, was characterized using AASHTO Figure 10.4.6.4-1. The structure was characterized as "Blocky with Good surface conditions," corresponding to a GSI ranging from 55 to 75 based on rock core drilling observations and descriptions. The rock group constant was selected based on the bedrock type (Slate).

The laboratory results for 6 out of the 10 UCS tests of the BB-MSJR-200 series borings that were considered to be in the "representative range" of strength values for bedrock at the site ranged from 4,251 to 5,659 psi. Other than the samples described below which had atypical sample dimensions, the 200-series results were judged more representative of intact rock, and they were also more consistent with previous test data from the 2010 test borings completed for the U.S. LPOE subsurface exploration. Therefore, these results were used to develop the design basis UCS, and the mean Secant Modulus was also calculated using the same representative six (6) UCS tests.

Laboratory UCS from four tests completed on the BB-MSJR-100 series borings (974 to 2,864 psi) appeared to have been affected by bedrock structure and to be unrepresentative of the intact strength of the rock.

Two of the -200 series borings' measured UCS values were tested with length-to-diameter ratios less than 2 due to inadequate length of full diameter core after trimming, which does not meet ASTM standards for the tests. These results were considered unreliable based on the observed stress-strain curves and were omitted. Two other measured UCS values were greater than 10 ksi and were considered outliers and were also omitted to avoid unconservative biasing of the average for the site, although these are considered to be reliable results and to represent stronger rock areas.

Design bedrock engineering properties are presented in the table below.

BEDROCK ENGINEERING PROPERTIES			
Parameter Description	**Parameter Symbol (units)**	**Design Values**	**Reference**
Rock Quality Designation	RQD	48	River Borings
Geologic Strength Index	GSI	65	AASHTO Figure 10.4.6.4-1
Rock Group Constant	m_i	7	AASHTO Table 10.4.6.4-1
Unconfined Compressive Strength, Intact Rock	UCS (psi)	5,000	Laboratory test data
Secant Modulus	E (ksi)	2008	Laboratory test data
Total Unit Weight	γ (pcf)	171	Laboratory test data

5.3 APPROACH EMBANKMENTS AND SLOPES

5.3.1 Approach Embankment Settlement and Stability

The Abutment 1 and 2 approaches will be raised up to 20 and 23 feet above existing grade, respectively, where the abutment backfill will extend over the existing slopes adjacent to the MNR and CNR. The

proposed abutments will bear at the base of the slopes. The new fill heights include grade raises up to 16 and 5 feet above existing grades at the proposed U.S. LPOE and existing Canadian LPOE. Cast-in-place concrete walls bearing on spread footings or piles are proposed to support the approach fills where they are greater than about 10 feet high at Abutment 1, and greater than about 3 feet high at Abutment 2. Embankment side slopes will be constructed at an inclination of 2H:1V or flatter.

The subsurface conditions beneath the approaches include fill and glacial till over bedrock. Therefore, it is our judgment that settlement and global stability are not significant geotechnical concerns for the permanent approaches or abutments.

5.3.2 Riverbank Slope Stability Evaluations

The existing 63-foot-high American riverbank has a slope of approximately 1.2H:1V to 1.4H:1V. Numerous indicators of surficial slope instability (e.g., erosion and scarp features) were observed by GZA in the area west of the existing bridge and near the proposed bridge alignment. This riverbank slope is not considered stable in the current condition. The existing 40-foot-high Canadian Riverbank has a slope of approximately 1.7H:1V to 2.4H:1V, with no visual indication of slope instability.

Two different fill slope conditions are anticipated. Permanent riverbank slopes in the vicinity of the bridge are proposed to be flattened to a 2H:1V inclination by filling out into the edge of the river. In addition, temporary access roads are envisioned for construction of Piers 1 and 5, that will be built near and/or over the permanent fills, from the river level up to levels required for pier cofferdam access. Considering the access requirements and project sequence, the lower portion of the permanent/temporary fill is anticipated to be constructed well in advance of the upper portion of the slope. Clearing the existing slopes is anticipated prior to temporary or permanent fill placement, but grubbing is not anticipated. The upper portion of the slope, to be constructed later, is anticipated to be cleared immediately prior to final embankment construction.

Evaluations were conducted using the computer analytical software *Slope/W 2018*, developed by Geo-Slope International, based on the Modified Bishop method. A grid and radius search technique was used to identify the factor of safety of slip surfaces at varying elevations and depths below the surface of the slope. A railroad surcharge of 1,882 psf was applied simultaneously on each of the tracks of the MNR and CNR. A 250-psf surcharge load was also included within the limits of the proposed temporary road. Results of the analyses including Slope/W output are presented in **Appendix G**. The plotted contours above the slope indicate relative factors of safety associated with center points of the analyzed circular surfaces.

5.3.2.1 Existing Riverbank Slopes

Analyses indicate that both riverbanks have existing factors of safety less than 1, with surficial sloughing indicated as the most likely mode of failure. On the U.S. side, some of the potential slip surfaces daylight within the nearest MNR rail line with a calculated safety factor of approximately 1 to 1.1.

5.3.2.2 Permanent Riverbank Slopes

Permanent fill slopes will be constructed with a 2H:1V inclination. This modification will require substantial fill placement on the U.S. riverbank, which is recommended to consist of the following materials:

- 2-foot-thick drainage layer (Underdrain Backfill material, Type C) placed along the existing slope below El. 470;
- Granular Borrow Fill (Underwater Backfill material below El. 470, standard Granular Borrow above El. 470); and
- 4-foot-thick, Heavy Riprap cover, toed into the riverbed.

Relatively minor grading will be required to achieve a 2H:1V inclination along the Canadian riverbank. We anticipate that new fill will primarily be new riprap cover.

Our Slope/W results indicate a factor of safety greater than 1.3 and 1.2 relative to potential slip surfaces that daylight through the railways in Madawaska and Edmundston respectively. Minimum factors of safety of 1.3 and 1.1 were calculated for shallower, surficial sloughing type failure surfaces in Madawaska and Edmundston, respectively. We did not include the beneficial impacts of the proposed completed foundations in our analyses of slopes at Piers 1 and 5. AASHTO requires a minimum factor of safety of 1.5 at these locations (slopes containing or supporting structures). The proposed foundations consist of driven piles, rock-socketed drilled shafts, or spread footings bearing on rock, all of which are expected to significantly increase the global stability of the permanent slopes. Therefore, we conclude stability is acceptable in the vicinity of Piers 1 and 5.

5.3.2.3 Temporary Road Fill Embankments

It is envisioned that the temporary slopes will be constructed atop the permanent fill, but not necessarily over the permanent heavy riprap layer. Based on discussions with the design team and MaineDOT, the basis for evaluation of the temporary slopes was to check that: 1) the configuration does not worsen the stability of the riverbank slopes as it relates to support of the MNR or CNR railbeds; and 2) the stability of the temporary fill embankment is adequate for use by heavy equipment during construction, and maintains a minimum factor of safety of 1.3.

We evaluated temporary road fill embankments to access Piers 1 and 5 as follows:

- 30-foot wide temporary road to be constructed outside the permanent fill (Granular Borrow for Underwater Backfill material placed over Underdrain Backfill material, Type C as previously described);
- Embankment inclinations ranging from 1.5H:1V to 2H:1V, minimum 25 and 20 feet above the riverbed in Madawaska and Edmundston, respectively, corresponding to lowest elevations of El. 467 in Madawaska and El. 460 in Edmundston;
- Removal/clearing of vegetation below the new fill, below the access road level;
- Slope above the temporary embankment to remain uncleared prior to final slope construction; and
- Soil properties for the temporary fill are either Granular Borrow Fill or Gravel Borrow Fill with a 2-foot-thick Plain Riprap slope cover.

Slope stability of proposed temporary embankments were evaluated for the Madawaska riverbank only, but these results are also considered valid for the temporary Edmundston slope since the same construction details and materials are proposed. Our results are summarized in the table below.

SUMMARY OF TEMPORARY EMBANKMENT GLOBAL STABILITY EVALUATION			
Location / Condition	**Stability Consideration**	**Proposed Temporary Embankment Slope, Required Fill Material**	**Minimum Calculated Factor of Safety**
Madawaska Riverbank / Proposed	Rail line envelope	1.5H:1V	1.3
Edmundston Riverbank / Proposed	Rail line envelope	1.5H:1V	1.2
Madawaska Riverbank / Proposed	Embankment slope	1.5H:1V, Gravel Borrow (2' Riprap cover)	1.2
Madawaska Riverbank / Proposed	Embankment slope	1.75H:1V, Gravel Borrow (2' Riprap cover)	1.3
Madawaska Riverbank / Proposed	Embankment slope	2H:1V, Granular Borrow (2' Riprap cover)	1.3

Our model results indicate that the analyzed temporary embankment configurations all increase the minimum factor of safety of a slip surface passing through the nearest railbed. Therefore, this concept meets the specified design criteria. That is, to not worsen impacts on the adjacent railroad properties. Our results indicate that the section we analyzed that used Gravel Borrow temporary fill material and a 1.5H:1V fill slope does not provide the desired 1.3 safety factor. For the analyzed fill materials, the temporary slope angle needs to be in the range of 1.75H:1V to 2H:1V in order to achieve the desired factor of safety of 1.3. Recommended temporary fill materials and slope inclinations are presented in **Section 6.1.2** of this report.

5.4 SCOUR CONSIDERATIONS

Laboratory data for the soil at and near riverbed elevations were evaluated to estimate D50 values for use by others for scour depth evaluation, as summarized in the table below.

LABORATORY DATA FOR SCOUR CONSIDERATIONS					
Boring, Sample ID	**Depth (feet)**	**Elevation (ft NAVD 88)**	**D_{50} (mm)**	**Classification**	
				USCS	**AASHTO**
BB-MSJR-205, 1D	0-2	441.3	0.048	SM	A-4
BB-MSJR-205, 2D	3-5	438.3	1.2	SM	A-2-4
BB-MSJR-206, 1D	0-2	441.0	0.0089	ML	A-4
BB-MSJR-206, 2D	3-5	438.0	0.0071	ML	A-4
BB-MSJR-208, 1D	0-2	441.9	4.0	GM	A-1-b
BB-MSJR-208, 2D	3-5	438.9	0.015	ML	A-4

5.5 EVALUATION OF FOUNDATION TYPES

Several foundation types were considered during preliminary design of the proposed bridge. Feasible foundation types for this project are influenced by the depth to bedrock and the strength and composition of the glacial till. Top of rock depths and elevations are summarized in the table below.

TOP OF ROCK DEPTHS BY SUBSTRUCTURE		
Substructure	**Encountered Top of Rock Depth (ft below mudline/ ground surface)**	**Encountered Top of Rock Elevation (ft NAVD 88)**
Abutment 1/Wingwalls	92	417
Pier 1	58	415
Pier 2	29	412
Pier 3	31	410
Pier 4	Not measured	Not measured
Pier 5	35	407
Abutment 2	18 to 24	462 to 471
Abutment 2 Left Wingwall	25 to 26	465 to 480
Abutment 2 Right Wingwall	12 to 20	470 to 488

Spread footings, drilled shafts, drilled micropiles and driven piles were considered for design. The foundation type assessments for each substructure location are presented below:

- Abutment 1 and Wingwalls: The subsurface conditions include approximately 15 feet of medium dense to very dense fill and 80 feet of dense to very dense glacial till over bedrock. Spread footings (bearing on structural fill or dense glacial till) and driven piles are practical foundation alternatives. Based primarily on cost and schedule considerations, spread footings bearing on soil were selected as the preferred alternative for Abutment 1 and its wingwalls.
- Pier 1: The subsurface conditions include approximately 45 feet of very dense glacial till over bedrock. Spread footings are not feasible due to potential future scour of the slope. Driven piles and drilled shafts are considered practical foundation alternatives. Driven piles would be the conventional choice for this subsurface profile, but may not be as cost effective as other alternatives, since they are not being used elsewhere on the project. Therefore, MaineDOT and the design team have elected to design both drilled shaft and driven pile alternatives to allow each contractor to choose and bid their preferred alternative.
- Pier 2 through Pier 5: The subsurface conditions include approximately 29 to 35 feet of very dense glacial till overlying bedrock, with significant cobbles and boulders in at least one pier location (Pier 5). Spread footings constructed inside cofferdams with tremie seals on bedrock and drilled shafts are both feasible alternatives. Piers with bedrock at these depths have historically been supported on spread footings with seals on rock on Maine bridge projects. During the contractor feedback process for the project, we understand there was concern expressed related to difficulty of driving sheets to bedrock and removing the very dense glacial till to prepare the bedrock surface. Therefore, MaineDOT and the design team have elected to design both drilled shaft and spread footing on tremie seal over rock alternatives to allow each contractor to choose and bid their preferred alternative.
- Abutment 2 and Wingwalls: The subsurface conditions include an average of approximately 16 feet of fill and approximately 5 feet of medium dense to dense glacial till over bedrock, but the overburden thickness varies from 12 to 26 feet within the abutment and wingwall footprint and the top of rock elevation varies by 26 feet within the footprint. Spread footings on rock and drilled micropiles are considered feasible alternatives for the encountered conditions. However, the constraints of the CNR (immediately adjacent and below) and LPOE property (above) would likely require an extensive excavation support system to allow excavation to bedrock for spread footings. In addition, steeply sloping rock would either require extensive doweling or benching of the bedrock surface for sliding resistance. Based on constructability and schedule benefits, abutments supported by drilled micropiles socketed into rock are considered the preferred alternative. A narrow abutment footprint and frost protection

insulation details were also developed to limit the extent of temporary excavation. At the uphill end of the northeast wingwall, top of rock elevation appears to rise to within approximately 2 feet of the planned pile cap elevation. Therefore, drilled micropiles are not necessary, and in this area the abutment support can transition to a spread footing bearing on rock.

Overhead sign support structures are also planned along the Madawaska approach embankment. Spread footings bearing on soil and drilled shafts are suitable foundation support alternatives. We understand that HNTB selected spread footing foundations as the preferred foundation type.

5.6 LOAD AND RESISTANCE FACTORS

AASHTO LRFD load factors should be applied to horizontal earth pressure (EH), vertical earth pressure (EV), earth surcharge (ES), and live load surcharge (LS) loads, using the load factors for permanent loads (γ_p) provided in LRFD Table 3.4.1-2 for strength limit state foundation design.

The recommended LRFD resistance factors for strength limit state design of foundations were derived from LRFD Tables 10.5.5.2.2-1, 10.5.5.2.3-1 and 10.5.5.2.4-1 and are presented in the following table.

GEOTECHNICAL RESISTANCE FACTORS – STRENGTH LIMIT STATE			
Foundation Resistance Type	**Method/Condition**	**Resistance Factor (ϕ)**	**AASHTO Reference**
SPREAD FOOTINGS			
Bearing	Footing on Soil	0.45	10.5.5.2.2-1
Sliding	Footing on Soil	0.8	10.5.5.2.2-1
Bearing	Footing on Rock	0.45	10.5.5.2.2-1
Sliding	Footing on Rock[1]	0.8	10.5.5.2.2-1
DRIVEN PILES			
Nominal Bearing Resistance of Single Pile – Dynamic Analysis	Axial Resistance	0.65	10.5.5.2.3-1
DRILLED SHAFTS			
Nominal Axial Compressive Resistance (Single Shaft)	Side Resistance in Rock, No Load Testing	0.55	10.5.5.2.4-1
Nominal Axial Tensile Resistance (Single Shaft)	Uplift Resistance in Rock, No Load Testing	0.4	10.5.5.2.4-1
Nominal Axial Compressive Resistance (Single Shaft)	End Bearing Resistance in Rock	0.5	10.5.5.2.4-1
DRILLED MICROPILES			
Nominal Axial Compressive Resistance of Single Micropile	Side Resistance in Rock, with Load Test	0.7	10.5.5.2.5-1
Nominal Axial Uplift Resistance of Single Micropile	Uplift Resistance in Rock, with Load Test	0.7	10.5.5.2.5-1

Notes:
1. Resistance factor for footing on rock was taken as equal to footing on sand.

Resistance factors for service and extreme limit state design should be taken as 1.0.

Structural resistance of driven piles should be checked at the strength limit state considering a resistance factor ϕ_c=0.50, per AASHTO LRFD Article 10.7.3.2.3 for hard driving condition.

5.7 SPREAD FOOTING ON SOIL DESIGN CONSIDERATIONS (ABUTMENT 1, WINGWALLS, AND OVERHEAD SIGN SUPPORTS)

HNTB provided GZA with the proposed effective footing widths and foundation elevations. Footing bearing levels are at El. 495 for the abutment and east wingwall and west tall wingwall, and they step up to El. 510 for the short west wingwall. The overhead sign structure (OHSS) footing bearing level is at El. 529.5. Based on these bearing elevations, we estimate that the abutment and wingwalls will bear on natural glacial till, and compacted structural fill, placed after removal of existing fill. It is anticipated that the OHSS foundation will bear on compacted granular fill placed after the construction of the abutment and wingwall footings.

Bearing resistance values were developed for the footings using the theoretical method (Munfakh et al., 2001) based on SPT data. Bearing resistances were evaluated in accordance with Articles 10.6.3.1.1 and 10.6.3.1.2a of AASHTO LRFD. To evaluate the service bearing resistance, a maximum footing settlement of ¾ inch was used for the abutment and wingwall footings, and 1 inch was used for the OHSS footing.

Nominal, factored, and service bearing resistance values were developed for a range of effective footing widths. The calculated bearing resistance values are presented in the following bearing charts which are also included in the calculations in **Appendix G**.

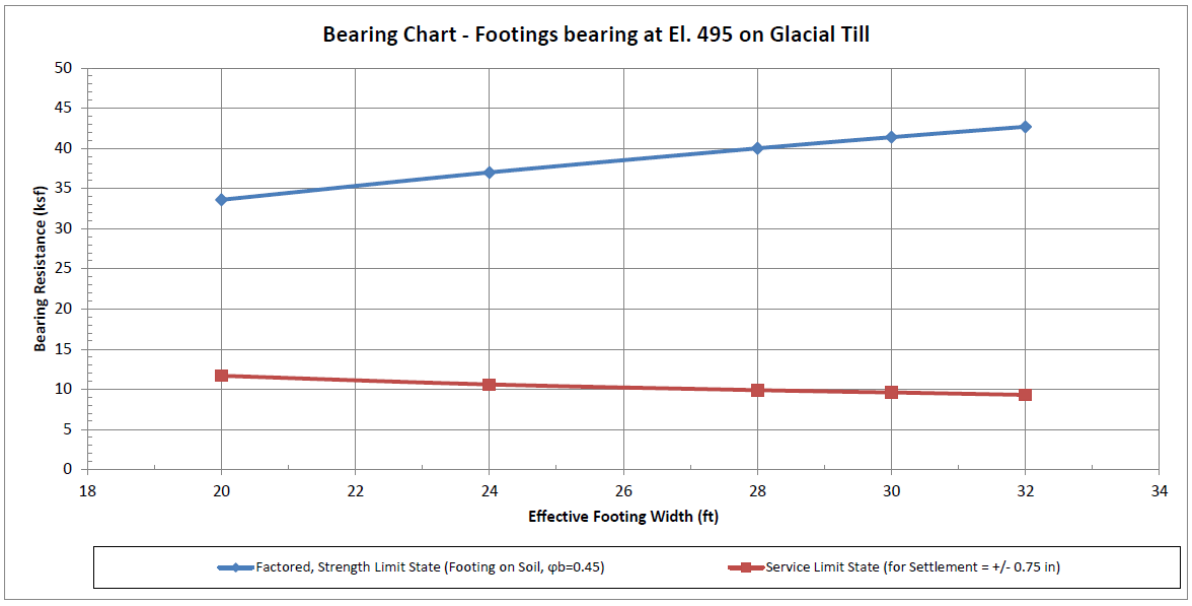


Figure B – Bearing Chart, Abutment 1 Footing

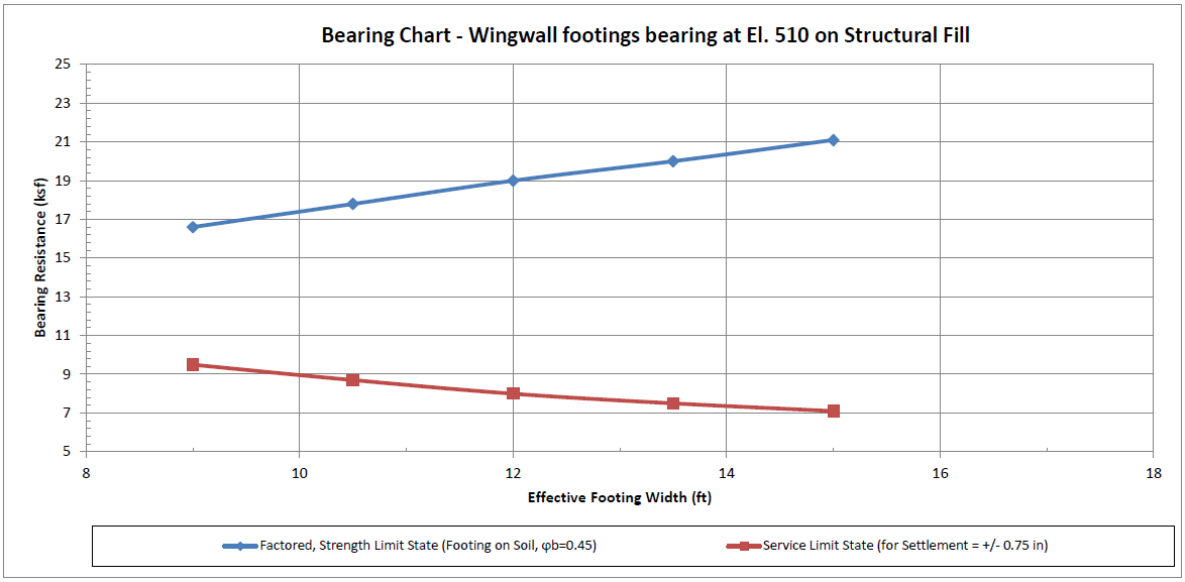


Figure C – Bearing Chart, Abutment 1 Wingwall Footings

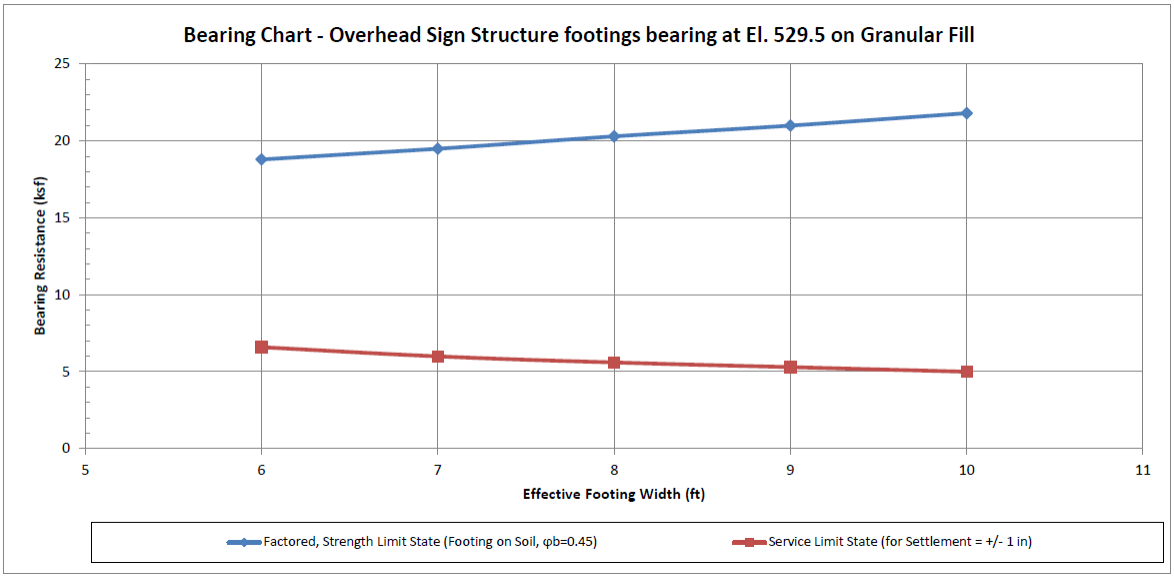


Figure D – Bearing Chart, Overhead Sign Support Footings

Recommendations for the type and placement of structural fill beneath footings are in **Section 6.4.1** of this report.

5.8 PILE DESIGN CONSIDERATIONS (PIER 1)

5.8.1 Pile Type and Loading

Steel HP14x117 H-section piles are one alternative to support the pile cap at Pier 1. HNTB provided a maximum factored axial load of 478 kips per pile for the strength condition; therefore, piles should be installed to a nominal axial resistance of at least 735 kips, calculated by dividing the maximum factored axial load by a geotechnical resistance factor of 0.65 for piles installed under hard driving conditions. The

resistance factor assumes dynamic pile testing with signal matching analysis will be conducted during construction in accordance with AASHTO requirements to assess nominal geotechnical pile resistance.

5.8.2 Pile Design Considerations

The skin friction and tip resistance in glacial till below the seal elevation were evaluated using the computer analytical software *APile* by Ensoft to consider whether piles might achieve the required nominal resistance in very dense glacial till and for use as an input in drivability analyses. GZA calculated the geotechnical pile resistance considering an unplugged pile with the lower bound friction angle (38 degrees) and a partially plugged pile with the upper bound friction angle (43 degrees) to characterize the range of anticipated pile behavior. The results of the axial resistance analyses indicate the pile may achieve the required geotechnical resistance at a depth as shallow as 31 feet if a plug begins to develop, or may be driven to or near bedrock at a depth of 38 feet if the pile does not plug. We estimate the side friction to represent approximately 40 and 15 percent of the nominal resistance for the 31- and 38-foot piles using upper and lower bound friction angles of the glacial till, respectively. The calculated side resistance was used as an input in wave equation analyses.

Since the piles will gain support largely in end bearing, there is no reduction for group interaction in axial compression. Axial tensile geotechnical (uplift) resistance was not evaluated because the structural loads provided by HNTB do not include uplift loading on the piles. By utilizing steel H-piles for support of the abutments, total and differential settlement will be limited to elastic compression of the piles and should be less than ½ inch.

Settlement of the glacial till supporting the piles is anticipated to be negligible during fill placement on the slope. Therefore, downdrag loading is not included in the pile design. Because the piles will be continuously embedded beneath the pile cap and seal, we judged the potential for pile section loss due to corrosion to be low, and it was not included in the design. If final estimated scour depth is determined to be below the tremie base elevation, the factored structural compressive resistance of the piles should be reduced to account for any unbraced length of pile.

5.8.3 Preliminary Wave Equation Analysis

GZA completed preliminary wave equation analyses to assess the drivability of an HP 14x117 pile with a nominal geotechnical resistance of 735 kips at the abutments. Preliminary analyses used a Delmag D36 diesel hammer with a ram weight of 7,930 pounds and a maximum rated energy of 82,820 foot-pounds (ft-lb).

To assess possible variations in transfer of energy to the pile tip, the 31-foot-long pile was assumed to be partially plugged (toe quake of 0.12) and the 38-foot-long pile was assumed to be driven to rock with moderately hard driving conditions (toe quake of 0.07). The results are summarized below.

SUMMARY OF WEAP ANALYSES – PIER I 14 X 117 PILES					
Embedded Pile Length	**% Side Friction**	**Driving System[1]**	**Required Nominal Geotechnical Resistance (kips)**	**Max Driving Stress (ksi)**	**Final Penetration Resistance (blows per inch)**
31 feet	40	Delmag D 36 (Fuel setting 3, 80% of maximum pressure)	735	34	11
38 feet	15	Delmag D 36 (Fuel setting 3, 80% of maximum pressure)	735	43	11

Since the driving stresses do not exceed the limiting driving stress of 45 ksi for ASTM A572 Grade 50 (50 ksi yield stress) steel, and the calculated penetration resistance is within the MaineDOT preferred range of 6 to 15 blows per inch, the analyzed hammer system is judged adequate to install the piles to the required nominal resistance noted. Results of the preliminary wave equation analyses are provided in **Appendix G**.

5.8.4 Lateral Pile Analysis

GZA developed a soil profile for HNTB's use in lateral pile evaluations at Pier 1. A range of pile tip elevations was estimated for partially plugged and unplugged conditions as previously described. We understand HNTB is using the analytical software *FBPier* by Bridge Software Institute for lateral pile evaluations. GZA developed recommended *FBPier* input parameters based on the soil engineering properties presented previously and the *BSI FBPier Parameters* manual, May 2011, which are presented in **Appendix G**.

5.9 DRILLED SHAFT DESIGN CONSIDERATIONS (PIERS 1 THROUGH 5)

Drilled shafts may be installed in the river and along the riverbanks. The ground surface/mudline will be subject to scour along the river bottom and the banks. Drilled shafts could be designed to gain axial and lateral resistance in glacial till, below the maximum design scour depth, and in bedrock. However, considering the scour potential and the likelihood that permanent casing will be installed through the soil profile and into rock, skin resistance was ignored in the soil, and we have assumed axial resistance will be developed entirely in bedrock. We understand that four, 6-foot-diameter drilled shafts with 5.5-foot-diameter rock sockets are currently anticipated to support each pier. Estimated depth to bedrock for each pier is shown in the table in **Section 5.5**. Based on the proposed pier cap elevations, the cased portion of the drilled shafts (from top of tremie seal to top of bedrock) would be on the order of 43 feet at Pier 1 and 22 to 27 feet at Piers 2 through 5.

5.9.1 Axial Resistance

The nominal and factored side resistances were estimated using procedures described in AASHTO Article 10.8.3.5.4b. GZA used the design bedrock parameters discussed in **Section 5.2.2** for all of the piers. The results of our engineering evaluations indicate the nominal side resistance for use in design is 24.8 ksf. The factored compression and tensile side resistances for strength load combinations are 13.6 and 9.9 ksf, respectively. For a 15-foot-long, 5.5-foot-diameter rock socket, the axial side resistance is 3,531 kips in compression and 2,568 kips in tension. The side resistance is controlled by the proposed concrete unconfined compressive strength (4,000 psi) because it is lower than the design bedrock strength. It is assumed that 100 percent of the axial resistance will be through skin friction.

5.9.2 Lateral Resistance

GZA conducted lateral shaft analyses considering the soil and rock properties discussed previously and pier cap geometry, shaft sizes, and load combinations provided by HNTB. GZA's analyses included development of soil and bedrock models for use in the analyses, development of stiffness matrices for a representative river pier (Pier 3), and for the land pier (Pier 1) for use in HNTB's structural bridge model, as well as additional analyses using loads provided by HNTB, which we understand are refined using stiffness matrices provided by GZA.

GZA conducted lateral shaft analyses using GROUP 2015® (Group). We developed design subsurface profiles for use in Group for fully scoured and non-scoured conditions, representing a range of possible lateral shaft response. We calculated p-y curves for the rock using two different p-y curve models to represent a range of bedrock socket lateral stiffness. The hyperbolic function developed by Gabr et al. (2002) as presented in the National Cooperative Highway Research Program (NCHRP) Synthesis 360, "Rock-Socketed Shafts for Highway Structure Foundations," was selected as the lower-bound stiffness. Gabr's correlation uses GSI, uniaxial compressive strength, Poisson's ratio, and effective unit weight of the intact rock, as well as rock mass modulus as input parameters. See **Appendix G** for the calculations of the Gabr (NCHRP) p-y curves. The Reese Weak Rock correlation was selected to model the upper-bound stiffness.

It was assumed by GZA and verified by HNTB that fully scoured conditions would control the bridge superstructure modeling from a deflection standpoint, so this was the condition analyzed for all of the piers. Piers 1 and 3 were also analyzed for the non-scour conditions with profiles of glacial till over bedrock to check whether a stiffer subsurface profile would increase the structural demand on the drilled shafts. Fully scoured conditions were analyzed by applying the NCHRP p-y curves to the bedrock. Non-scour conditions were analyzed with the Weak Rock p-y curves applied to the bedrock, and the upper bound Glacial Till parameters above the top of rock.

We completed an initial evaluation of the minimum required drilled socket depth based on the NCHRP p-y curves and the fully scoured condition using Pier 3 loads provided by HNTB. We also conducted a pushover analysis of a single drilled shaft. The results of these initial analyses showed that 15-foot socket lengths are appropriate. Subsequent analyses by HNTB found similar results.

GZA conducted the drilled shaft group analyses using 24 strength and service load cases provided for each pier by HNTB that included axial, lateral, and longitudinal loads and moments applied to the pile cap. HNTB provided the following drilled shaft design section:

- Permanent Casing: ¾-inch thick, 72-inch inside diameter, 50 ksi steel casing;
- Concrete: 28-day unconfined compressive strength of 4 ksi;
- Reinforcing: 40, No. 11, 75 ksi yield strength reinforcing bars with 6 inches of concrete cover; and
- Rock Socket: 66-inch diameter with 40, No. 11, 75 ksi yield strength reinforcing bars with 3 inches of concrete cover.

The analysis assumed that the permanent casing would experience up to 1/8-inch section loss due to corrosion. Top of rock was modeled 2 feet below the interpreted top of rock elevation assuming the casing would be embedded up to 2 feet.

Stiffness matrices were prepared by GZA and provided to HNTB for Piers 1 and 3, and are included in **Appendix G**. The results of subsequent Group analyses of refined loads for all five piers are also included in **Appendix G.** These were provided to HNTB for their check of the structural design for the calculated shaft loads and stresses.

The minimum and maximum axial compression loads calculated in Group for each shaft were 231 and 3,620 kips, respectively, for Strength Load combinations, and 1,027 and 2,615 kips, respectively, for Service Load combinations. The maximum calculated load at two shaft locations (both in Pier 4) of 3,620 kips exceeds the calculated factored geotechnical compressive side resistance by 89 kips. Therefore, based on the design side resistance values, these locations will rely on a very small percentage of available end bearing resistance. We conclude a 15-foot socket length is still appropriate, and with the shaft cleanout recommendations provided herein, it is our opinion that the end bearing will be adequate to provide the minimal end bearing support anticipated.

5.10 SPREAD FOOTING ON ROCK DESIGN CONSIDERATIONS (PIERS 2 THROUGH 5 AND ABUTMENT 2 NORTHEAST WINGWALL)

Nominal and factored bearing resistances were calculated for bedrock-bearing footings using the Rock Mass Rating- (RMR-) based empirical correlation presented in "Foundations on Rock," by Duncan Wyllie. RMR was evaluated in accordance with Table 10.4.6.4-1 of the *2012 AASHTO LRFD Bridge Design Specifications, 6th Edition* (AASHTO). The current (8th) Edition of the AASHTO Design Specifications does not include the RMR formulation included in the earlier version (6th Edition). However, Articles C10.4.6.4 and 10.6.2.6.2 of the 8th Edition refer to RMR-based design procedures for footings on rock, so the 6th Edition methodology was followed. The design bedrock properties utilized in the design are as follows:

DESIGN BEDROCK PROPERTIES FOR BEARING RESISTANCE EVALUATION					
Rock Type	**RQD (percent)**	**Unconfined Compressive Strength (ksi)**	**Rock Mass Rating (RMR)**	**m**	**s**
Slate	48	5.0	49	0.26	0.00021

Based on these parameters, the calculated nominal bearing resistance is 70 kips per square foot (ksf), resulting in a factored bearing resistance of 31 ksf for the strength and service limit states. Supporting calculations are provided in **Appendix G**. We estimate that post-construction settlement will be ½ inch or less in the service condition.

5.11 DRILLED MICROPILE DESIGN CONSIDERATIONS (ABUTMENT 2 AND WINGWALLS)

Rock-socketed micropiles that derive all axial resistance through side friction in the rock socket are planned for Abutment 2 and its wingwalls. The abutment and wingwalls will be supported by two rows of micropiles, including a front row with a 1H:4V batter and a rear plumb row. A total of 40 micropiles are planned to support the abutment and 30 micropiles are planned to support the wingwalls. We understand the front battered piles will primarily be loaded in compression and the rear piles will be loaded in tension.

GZA initially provided a range of micropile capacities for a few feasible sections for consideration by HNTB. HNTB selected the following drilled micropile sections:

- Permanent Casing: 11.875-inch outside diameter, 0.543-inch thick American Petroleum Institute (API) 5CT N80, steel pipe with a minimum yield strength (Fy) of 80 kips per square inch (ksi);
- Central Reinforcing Steel for Plumb Piles: Galvanized No. 18 Grade 75 All-Thread Bar, ASTM A615;
- Central Reinforcing Steel for Battered Piles: Galvanized No. 24 Grade 75 All-Thread Bar, ASTM A615; and
- Grout with an unconfined compressive strength of 5,000 psi.

GZA evaluated geotechnical axial resistance using the rock parameters and analytical method discussed previously for drilled shafts. Our evaluation concluded that the design may be based on a nominal side resistance of 24.8 ksf, which can also be used for service and extreme resistance cases. The factored compression and tensile side resistances is 17.3 ksf based on resistance factors from AASHTO LRFD Table 10.5.5.2.5-1. For the envisioned nominal 10.5-inch diameter rock socket, this results in factored compression and tensile side resistance of 48 kips per foot of rock socket length. End bearing should be ignored for micropile support.

GZA developed a soil profile for HNTB's lateral pile evaluations at Abutment 2. We understand HNTB is using the analytical software *FBPier* for lateral pile evaluations. We developed recommended *FBPier* input parameters based on the profile developed for Abutment 2 and the *BSI FBPier Parameters* manual, May 2011, which are presented in **Appendix G**.

5.12 SEISMIC DESIGN CONSIDERATIONS

Seismic site class was evaluated in general accordance with LRFD Table C3.10.3.1, considering the average SPT N-values in granular soils which encompasses most of the soil encountered in the borings. The average SPT N-value is generally greater than 50 blows per foot in the borings. Therefore, the bridge is assigned to Site Class C.

The available subsurface data indicates that the natural materials encountered at the site are sufficiently cohesive or dense that the potential for liquefaction is very low.

5.13 LATERAL EARTH PRESSURES

Article 3.6.4 of the BDG states that abutments with a height of 5 feet or more should be assumed to experience sufficient horizontal movement of the top of the wall to develop active conditions due to structural deformation of the stem and rotation of the foundation. For the proposed approximately 36-foot and 26-foot abutment heights (measured above the pile cap), lateral deformations of about 0.65-inch and 0.47-inch would be necessary at the top of Abutments 1 and 2, to reach a fully-active earth pressure condition. The structural engineer should confirm that this range of deflections is anticipated.

Based on Article 3.6.4 of the BDG, we conclude active earth pressure is appropriate for design of the abutments. Based on Figure C3.11.5.3-1 of LRFD, Abutment 1 is considered to be a long-heeled wall and Abutment 2 is considered to be a short-heeled wall. Therefore, Rankine theory should be used to calculate active earth pressures for Abutment 1, and Coulomb theory should be used for Abutment 2. The material properties will be controlled by the backfill material, which is anticipated to consist of BDG Type 4 soil. Soil properties for Type 4 soil are provided in **Section 6.3** of this report.

Given the location of the piers within the existing riverbank slopes, at-rest earth pressure should be used for design with consideration of the 2H:1V backfill slopes at Piers 1 and 5, and assuming that deflection will be insufficient to achieve active pressure conditions. The at-rest earth pressure coefficient of K_o=0.68 is recommended for design, based on equations from EM 1110-2-2502 of the *U.S. Army Corps of Engineers Manual*[2].

AASHTO Commentary C3.10.9.1 specifies that multi-span bridges are required to include acceleration-augmented (earthquake-induced) soil pressures for design. The dynamic earth pressure coefficient, K_{AE}, is calculated to be 0.35 for this project, which includes active earth pressure plus a dynamic component.

Design lateral earth pressure recommendations are provided in **Section 6.3** of this report.

5.14 FROST PROTECTION

Based on the MaineDOT BDG, Section 5.2.1, the Freezing Index for the site is 2,600. For site granular fills with an appreciable amount of fines, and low-moisture (<10 percent), the estimated depth of frost penetration is approximately 8 feet. Consequently, new foundation bearing levels should be set at least 8 feet bgs exposed to freezing temperatures.

5.14.1 Abutment 2 Insulation

Expanded polystyrene (EPS) geofoam insulation is proposed beneath and adjacent to the buried portion of Abutment 2 to limit frost penetration into the subgrade soils and allow embedment depth less than the full frost penetration depth. Engineering considerations for the proposed insulation detail include strength of the EPS to prevent undesirable deformation under the abutment concrete prior to curing and adequate thickness and lateral extent to result in a frost penetration path at least as long as the design frost penetration depth.

The conventional design basis for engineering applications is to keep the applied pressure and resulting strain below 1 percent to limit creep potential. We have also applied a resistance factor of 0.8 to the compressive resistance, in accordance with recommendations in the NCHRP *Geofoam Design Manual*. A 4-inch thick layer of EPS29 was selected as the insulation material, since it has a factored 1 percent strain compressive resistance of 2.06 ksf, well in excess of the weight of 5 feet of concrete that will be placed below the first construction joint.

The thermal resistance (R-value) provided by 4 inches of EPS geofoam is greater than that provided by the design 8-foot frost embedment depth as evaluated in **Appendix G**. The EPS cross-section detail was developed such that the distance from ground surfaces or the abutment face exposed to air to the bottom of the abutment is equal to or greater than the design frost depth.

[2] U.S. Army Corps of Engineers Engineer Manual 1110-2-2502, Retaining and Flood Walls

6.0 RECOMMENDATIONS

6.1 APPROACH EMBANKMENT AND SLOPE DESIGN

6.1.1 Permanent Slopes

Approach embankment and riverbank slopes should be designed with MaineDOT-typical slope angles of 2H:1V or flatter. Earth slopes above flood water levels should be provided with loam and seed for permanent erosion protection. Additional recommendations for the permanent riverbank slope reconstruction in the vicinity of the piers for both Madawaska and Edmundston are as follows:

- Clear vegetation below all new fill, without removing existing root systems (i.e., no grubbing);
- Construct a drainage layer consisting of a minimum 2-foot-thick Underdrain Backfill Material, Type C (MaineDOT Item 703.22) along the interface between the cleared slope and new fill;
- Place embankment fill material consisting of Granular Borrow for Underwater Backfill below El. 470 and Granular Borrow above El. 470 (MaineDOT Item 703.19) in accordance with MaineDOT Standard Specifications Section 203 (Specification Section 203); and
- Construct a 4-foot-thick Heavy Riprap layer (MaineDOT Item 703.28) underlain by protective aggregate cushion and erosion control geotextile in accordance with Standard Detail 610(02), Stone Scour Protection, near or below flood water levels.

6.1.2 Temporary Access Roads

Temporary embankment fill should be placed in accordance with embankment construction requirements presented in Specification Section 203 and the requirements of Special Provision SP105 – General Scope of Work, Temporary Access Roads and Embankments. The material type should be selected based on the preferred temporary slope inclination as follows:

TEMPORARY EMBANKMENT FILL MATERIALS		
Proposed Temporary Slope Inclination	**Fill Type Required**	**Minimum Friction Angle (degrees)**
1.75H:1V	Gravel Borrow (MaineDOT Item 703.20)	36
2H:1V	Granular Borrow (MaineDOT Item 703.19)	32

A minimum 2-foot-thick layer of Plain Riprap should be placed over the temporary slope. Vegetation removal above the level of the temporary access road should be limited to the extent practical prior to permanent embankment construction to maintain its function in promoting stability of the surficial soil.

If the Contractor elects to deviate from the proposed geometry or materials presented in the Construction Documents, a design submittal, stamped by a Professional Engineer, will be required from the Contractor that includes global stability analyses for the proposed temporary access road configuration and a construction sequence showing a minimum factor of 1.3. SP105 includes baseline soil properties for use in any alternative analyses proposed by the Contractor. If fill materials other than those identified in SP105 are proposed, or if higher friction angles are proposed, then laboratory testing of the proposed materials will be required in accordance with SP105.

6.2 SEISMIC DESIGN

The peak ground acceleration coefficient, short- and long-period spectral acceleration coefficients were interpolated from the AASHTO design guide maps (3.10.2.1-1 through -21 as appropriate). Based on the site coordinates, the recommended AASHTO Response Spectra (Site Class C) for a 7 percent probability of exceedance in 75 years are summarized for the site are as follows:

SITE CLASS C SEISMIC DESIGN PARAMETERS	
Parameter	**Design Value**
Fpga	1.2
Fa	1.2
Fv	1.7
As (Period = 0.0 sec)	0.112 g
SDs (Period = 0.2 sec)	0.245 g
SD1 (Period = 1.0 sec)	0.100 g

Per AASHTO Article 4.7.4.1, bridges in Seismic Zone 1 need not be analyzed for seismic loads, but the minimum requirements apply for superstructure connections and support lengths as specified in AASHTO Articles 4.7.4.4 and 3.10.9.

6.3 ABUTMENT AND WINGWALL DESIGN

- Abutment backfill should consist of MaineDOT 703.19 Granular Borrow for Underwater Backfill, MaineDOT BDG Type 4 soil. Recommended soil properties for Type 4 soils are as follows:
  - Internal Friction Angle of Soil = 32°;
  - Soil Total Unit Weight = 125 pcf;
  - Rankine Coefficient of Active Earth Pressure Coefficient, K_{ar} = 0.31 (use for design of Abutment 1 and Abutment 1 Wingwalls);
  - Coulomb Coefficient of Active Earth Pressure Coefficient, K_{ac} = 0.28 (use for design of Abutment 2 and Abutment 2 Wingwalls);
  - At-rest Earth Pressure Coefficient, Ko=0.68, for unbalanced loading on pier superstructure elements at Piers 1 and 5 embedded in a 2H:1V slope; and
  - Dynamic Active Earth Pressure Coefficient, K_{AE} = 0.35 (use for design of both Abutments and all wingwalls for extreme limit state load combinations that include an earthquake component).
- Live load surcharge should be applied as a uniform lateral surcharge pressure using the equivalent fill height (H_{eq}) values developed in accordance with LRFD Section 3.11.6.4, based on the abutment/wingwall height and distance from the wall backface to the edge of traffic. A minimum H_{eq} of 2 feet is recommended.
- Foundation drainage should be provided in accordance with Section 5.4.1.9 of the MaineDOT BDG. We recommend the use of French drains on the uphill side of abutments and wing walls to prevent buildup of differential hydrostatic pressure. The drains should be sloped to drain by gravity and

should outlet through a series of 4-inch-diameter weep holes, spaced approximately 10 feet center-to-center.

6.4 RECOMMENDATIONS FOR FOUNDATIONS

6.4.1 Abutment 1 and Wingwalls and Overhead Sign Structures (Spread Footings on Soil)

- Abutment 1 should be supported on spread footing foundations bearing on undisturbed glacial till, and Abutment 1 wingwalls should be supported on footings bearing on placed and compacted structural fill (Gravel Borrow, 703.20) or undisturbed glacial till. OHSS should be supported on spread footing foundations bearing on compacted Granular Borrow, 703.19, placed on glacial till. Factored strength limit bearing resistance and service limit bearing resistance are provided as a function of effective footing widths on the bearing charts included in **Section 5.7**.
- The structural designer should check the effective footing widths in their design against the bearing resistance plots in **Section 5.7** to determine the appropriate resistance values.
- The base resistance against sliding was evaluated in accordance with AASHTO Article 10.6.3.4 using $\phi_s' = \delta = 32$ degrees. Nominal sliding resistance for footings on glacial till is equal to the vertical force multiplied by the sliding resistance coefficient (tan δ), which is equal to 0.62. The factored sliding resistance coefficient is 0.50 for the strength condition.
- Footings founded on soil should be checked for overturning per AASHTO Article 10.6.3.3. Eccentricity of the footing reaction at the strength limit state should be limited such that the resultant reaction on the base of the footing is no further than B/3 from the centerline of the footing, where B is the principal dimension of the footing perpendicular to the axis of rotation.
- Passive resistance on the toe of footings should be neglected when evaluating sliding and overturning.
- The foundation embedment and bearing soils have MaineDOT Frost Classifications ranging from I to IV, indicating low to high frost susceptibility. Using the site Freezing Index of 2,600 and low-moisture content (<10 percent), we recommend using an 8.0-foot depth of frost penetration for design.

6.4.2 H-Pile Foundations (Alternative at Pier 1)

- Pier 1 may be supported on HP14x117 ASTM A572, Grade 50 steel (50 ksi yield stress) H-piles driven to the required nominal resistance, anticipated to be developed through a combination of side friction and end-bearing on or near the bedrock surface.
- To limit driving damage, the steel H-piles should be fitted with cast steel driving tips in accordance with Specification Section 501.10 – Pile Tips.
- Pile installation should be controlled using wave equation analysis and field logging of the pile installation with final penetration resistance based on dynamic pile testing with signal matching analysis.
- The piles should be driven to a nominal resistance of 735 kips, calculated by dividing the maximum factored pile load of 478 kips by a resistance factor of 0.65.
- Preliminary wave equation analyses indicate that the piles could be driven to a nominal resistance of 735 kips using a diesel hammer with a rated energy of 83,820 ft-lb for ASTM A572 Grade 50 steel HP14x117 piles without exceeding the allowable driving stress of 45 ksi (0.9Fy for 50 ksi steel), with a final penetration resistance within the MaineDOT specified range of 6 to 15 blows per inch.

- The pile tip elevations used in the drawings should correspond to the top of rock elevations encountered in the borings and shown on **Figure 4** (approximately El. 415). A provision is recommended to be provided in the drawings for extra pile length to account for variability in the top of rock surface and the potential for piles to penetrate a short distance into bedrock. However, it is also possible that the piles will develop a plug and will achieve nominal pile resistance within the glacial till as shallow as approximately El. 422.
- We recommend that two piles be dynamically tested at the end of initial drive to assess driving stress and establish the penetration resistance criteria to achieve the required nominal resistance for the production piles. The plans should also require a 24-hour restrike test on the test piles.
- Piles should be spliced in accordance with Specification Section 501.047.
- The structural engineer should complete structural evaluation of the piles, taking into account combined axial and bending stresses. This analysis should consider piles that may be exposed due to the design scour event, if appropriate.

6.4.3 Drilled Shaft Foundations (Alternative at Piers 1 through 5)

- Proposed Piers 1 through 5 may be supported on drilled shaft foundations designed for support primarily by side friction along the rock socket portion of the shaft. The recommended shaft configuration is as follows:
  - ¾-inch thick, 72-inch inside diameter, 50 ksi permanent steel casing embedded into bedrock;
  - Concrete with a minimum 28-day unconfined compressive strength of 4 ksi;
  - Reinforcing steel including 40, #11, 75 ksi yield strength bars;
  - 15-foot long, 66-inch diameter, bedrock socket with 40 #11, 75 ksi yield strength bars; and
  - Minimum concrete cover of 3 inches within the rock socket.
- We recommend that the top of the rock socket for measurement purposes be considered to be at the bottom of the casing. Means and methods of excavating the rock sockets for drilled shafts are the responsibility of the drilled shaft contractor. We anticipate that the permanent casing will need to be extended into the rock to create a seal for a stable socket excavation.
- The recommended nominal and factored unit side resistance values along the rock socket are summarized in the table below.

RECOMMENDED SHAFT SOCKET UNIT SIDE RESISTANCE		
Load Case	**Resistance Factor (ϕ)**	**Factored Unit Resistance (ksf)**
Nominal	1.0	24.8
Strength, Compression	0.55	13.6
Extreme, Compression	1.0	24.8
Strength, Tension	0.4	9.9
Extreme, Tension	0.8	19.8

For a 15-foot rock socket, the axial side resistance is 3,525 kips in compression and 2,566 kips in tension for the strength loading case.

- Up to 105 percent of the factored compressive resistance calculated from the table above may be assumed for the strength load resistance for this project, since end bearing was completely ignored in estimating the compressive resistance.

6.4.4 Spread Footings on Rock (Alternative at Piers 2 through 5 and Abutment 2 Wingwall)

- Footings supported on tremie seals bearing on sound, intact bedrock should be designed using a nominal bearing resistance, q_n, of 70 ksf. At the strength limit state, footings should be designed for a maximum factored bearing resistance of 31 ksf. A bearing resistance of 31 ksf should also be used for service limit state design.
- Spread footings founded on bedrock should be checked for eccentricity with AASHTO Article 10.6.3.3. Eccentricity of the footing reaction at the strength limit state should be limited such that the resultant reaction on the base of the footing is no further than 0.45 B from the centerline of the footing, where B is the footing width perpendicular to the axis of rotation.
- The recommended nominal sliding resistance between footings and bedrock subgrades is estimated as the vertical force multiplied by a factor of 0.7. Considering a resistance factor of 0.8 for sliding, we recommended a factored sliding resistance coefficient of 0.56 for the Strength Limit State.
- Based on the borings, we recommend using the following estimated top of bedrock elevation ranges for tremie seal evaluation.

ESTIMATED BEDROCK LEVELS FOR TREMIE SEAL EVALUATION	
Foundation Element	**Estimated Bedrock Elevation (feet, NAVD 88)**
Pier 1	El. 415
Pier 2	El. 412
Pier 3	El. 410
Pier 4	El. 408 (interpolated between piers)
Pier 5	El. 407 to El. 413

It is important to note that the top of intact rock cannot be known for the entire foundation area prior to construction. We expect that intact rock may be encountered above and below the anticipated levels. Some construction-phase engineering should be anticipated to address the potential variability of the encountered conditions.

- If the exposed bedrock surface after cleaning is below the design footing bearing level, the tremie seal may be thickened to the proposed footing bearing level.
- Concrete used for cofferdam seals, subfootings and footings should consist of Class S Concrete in accordance with Specification Section 502.05.
- Anchoring, doweling, benching or other means of improving sliding resistance are recommended if the prepared bedrock surface is steeper than 4H:1V in any direction.
- There is no minimum embedment required for frost protection of footings bearing directly on bedrock or on seal concrete bearing directly on bedrock.

6.4.5 Drilled Micropiles (Abutment 2 and Wingwalls)

- The proposed Abutment 2 and Abutment 2 wingwalls may be supported on micropiles consisting of the following components:
  - Permanent Casing: 11.875-inch outside diameter, 0.543-inch thick American Petroleum Institute (API) 5CT N80, steel pipe with Fy of 80 ksi;
  - Central Reinforcing Steel for Plumb Piles: #18 Grade 75 hot-dipped galvanized steel all-thread bar conforming to ASTM A615, extending through the entire casing and 11 feet into the socket;
  - Central Reinforcing Steel for Battered Piles: #24 Grade 75 hot-dipped galvanized steel all-thread bar conforming to ASTM A615, extending through the entire casing and 11 feet into the socket;
  - Grout: Minimum 28-day compressive strength of 5,000 psi consisting of a water-cement mixture with a maximum water-cement ratio of 0.45; and
  - Socket: Nominal 10.5-inch-diameter rock socket, extending below the bottom of the casing to resist design axial compression and tension loads using the resistance values presented below, plus a minimum clear distance of 6 inches between the bottom of the bar and bottom of the socket.
- The drilled micropiles may be designed using the recommended nominal and factored unit side resistance values summarized in the table below.

RECOMMENDED MICROPILE SOCKET UNIT SIDE RESISTANCE		
Load Case	**Resistance Factor (ϕ)**	**Factored Unit Side Resistance (ksf)**
Nominal	1.0	24.8
Strength, Compression	0.7	17.3
Extreme, Compression	1.0	24.8
Strength, Tension	0.7	17.3
Extreme, Tension	0.8	19.8

- HNTB provided maximum factored axial compression and tension loads of 490 kips (battered pile, northwest wingwall) and 220 kips (plumb pile, abutment), respectively, for the strength loading condition. A socket length of 11 feet is suitable to resist these loads.
- The 11.875-inch casing should be installed a minimum of 1 foot into bedrock prior to drilling the socket.
- An Abutment 2 and Abutment 2 Wingwall plan view drawing should be provided that includes boring locations and measured top of rock elevations at each boring for the Contractor's use in planning for casing lengths and for pricing.
- The structural engineer should complete structural evaluation of the drilled micropiles, taking into account combined axial and bending stresses.
- Four micropile tests should be completed, including a verification test on a sacrificial micropile and three proof tests on production micropiles (one at the abutment and one at each wingwall). The Factored Design Load used for each test should be the maximum factored axial compression force

(either compression or tension) for the entire abutment. Micropile tests should be conducted in accordance with the requirements of SP501, Foundation Piles (Micropiles).

6.5 ABUTMENT 2 AND WINGWALL INSULATION

- It is acceptable to design for a reduced embedment depth of Abutment 2 and its wingwalls, as long as the insulation detail provides frost protection equivalent to 8 feet of soil cover.
- We recommend that the insulation consist of a 4-inch-thick layer of EPS geofoam meeting the requirements of EPS29 in accordance with ASTM D6817 in order to withstand construction loading.
- EPS geofoam should be placed on a granular soil subgrade surface that is relatively free of irregular gravel and should be protected by a minimum of 6 inches of Concrete Fill.
- The thickness of the first abutment and wingwall concrete placement should be limited to 5 feet or less to limit the stress in the EPS and avoid creep prior to concrete curing.
- The insulation detail below may be used at Abutment 2 to provide the equivalent frost protection of 8 feet of soil cover.

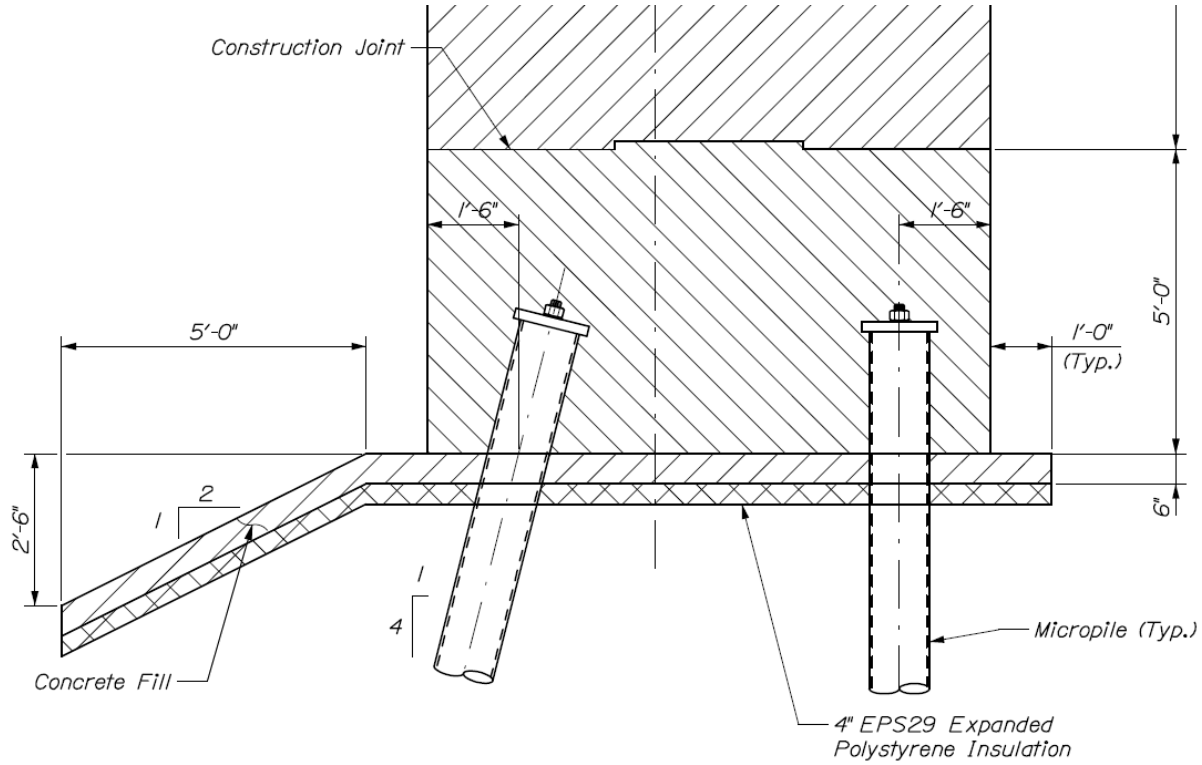


Figure E – Recommended EPS Geofoam Insulation Detail

7.0 CONSTRUCTION CONSIDERATIONS

This section describes geotechnical-related issues that have the potential to impact design and cost considerations for bridge construction.

7.1 PILE INSTALLATION CONTROL

We recommend that the H-pile installation be controlled using wave equation analysis of the contractor's proposed driving system, field logging of the pile installation, and determination of final penetration resistance based on dynamic pile testing with signal matching analysis. The piles should be driven to a nominal resistance calculated by dividing the maximum factored pile load by a resistance factor of 0.65.

For pile foundations at Pier 1, if selected, we recommend that the Dynamic Load Tests with Signal Matching be completed on two piles during initial driving and on restrikes completed a minimum of 24 hours after initial drive.

7.2 EXCAVATION, TEMPORARY LATERAL SUPPORT AND DEWATERING

The contractor should be responsible for design of all temporary support of excavation. Design should be completed by a professional engineer registered in the State of Maine and/or the Province of New Brunswick. In all cases, temporary excavations should comply with OSHA excavation safety and CNR requirements, which will be adopted as project criteria for work adjacent to MNR and CNR facilities.

The contractor should be responsible for controlling groundwater, surface runoff, infiltration, and water from all other sources by methods which preserve the undisturbed condition of the subgrade and permit foundation construction in-the-dry. Discharge of pumped groundwater and river water should comply with all local, State, and federal regulations.

Specific considerations for various substructures are presented below.

7.2.1 Abutments and Wingwalls

The abutment and wingwall foundations will be constructed within existing slopes, resulting in a wide range of excavation depths. Abutment 1 will have a toe-side excavation depth of approximately 8 to 10 feet, adjacent to the MNR railbed, and a maximum heel-side excavation depth of approximately 31 feet. Considering the presence of the MNR railbed, we anticipate that excavation support such as cantilevered steel sheeting or a track outage will be required for the toe-side excavation. Depending on other activities at the site, it may be feasible to use sloped open cut techniques for the heel side excavation.

Abutment 2 will have a toe-side excavation depth of approximately 4 feet adjacent to the CNR railbed, and maximum heel-side excavation depths of approximately 12 to 19 feet. It is anticipated that excavation can be completed without going any closer than 15 feet from centerline of the closest track and could therefore remain outside of the zone of support of the CNR railbed, and that sloped open cut techniques will be feasible . Considering the proximity of the Canadian LPOE and existing bridge approach, it is likely that a braced excavation system such as steel sheeting will be necessary on the other three other sides of the excavation.

The design submittal for the Abutment 2 excavation support should be required to include evaluation of the lateral stability and potential impacts on the adjacent railbed in accordance with CNR requirements.

Measured groundwater levels near Abutment 1 varied from about 17 to 20 feet deep (El. 505 to 508) near the back of the proposed wingwalls to approximately 10 feet deep (El. 493) at the toe-side of the abutment. Measured groundwater levels near Abutment 2 varied from about 12 to 14 feet deep (El. 466 to 467) near the abutment toe-side to approximately 16 to 19 feet deep (El. 485 to 488) behind the wingwalls. Since these elevations are near the required excavation depths at both abutments, limited dewatering may be required. We anticipate that the inflow of groundwater or surface water to the abutment excavation may be handled by open pumping from sumps installed at the bottoms of excavations.

7.2.2 Piers

The river piers are anticipated to be constructed within braced steel sheet pile cofferdams. The excavations are expected to extend to depths of approximately 12 feet below mudline for the shaft-supported option or approximately 30 to 35 feet below mudline for the footing-supported option. After the sheet piling and wale systems are installed, the cofferdams will be excavated in the wet to base of tremie seal level, the foundation piling will be installed or the bedrock subgrade prepared, and unreinforced concrete tremie seals will be poured. Once the seal concrete sets, the cofferdams may be unwatered to allow foundation construction to proceed in the dry. We anticipate that unwatering of the cofferdams will be achieved by open pumping from the top of tremie seal level.

Pier 1 will be constructed in the Madawaska riverbank. The existing grade is steeply sloping and varies by as much as 24 feet from back to front. Feasible excavation support systems include internally braced steel sheet piling, internally braced or tied back, driven soldier piles with timber lagging, or a temporary shotcrete-faced soil nail wall. Regardless of the wall system selected, the Contractor must consider the effects of the sloping ground on active and passive earth pressures in the cofferdam design.

The design submittal for the Pier 1 excavation support should be required to include evaluation of the global stability and potential impacts on the adjacent railbed in accordance with CNR requirements.

7.3 FOUNDATION SUBGRADE PREPARATION

7.3.1 Footings on Soil

Existing foundations, fill, topsoil, and other unsuitable material should be removed within the zone of influence of the new foundations to expose undisturbed, naturally deposited glacial till. The zone of influence is defined as the area between a line that extends 1 foot horizontally away from the footing bearing level and then down at a 1H:1V inclination away from the footing. After excavation, the exposed subgrade should be proof-compacted with a minimum of eight passes (four in each direction) of a 10-ton vibratory roller. Areas that exhibit weaving or rutting under compaction should be excavated to remove the suspect material, and refilled with compacted gravel borrow.

Where necessary, Gravel Borrow may be placed in lifts beneath the Abutment 1 wingwalls and compacted up to the footing bearing level in accordance with Specification Section 203.13, except that the required dry density should be 95 percent of the maximum density in accordance with AASHTO T 180.

We recommend that removal of unsuitable materials and placement and compaction of new fill be observed by the Geotechnical Engineer.

In the event that foundation subgrades become disturbed after steel placement, all loose material should be removed by hand excavation prior to concrete placement.

Effort should be made to prevent freezing of foundation subgrades. In the event that freezing occurs, the frozen material should be stripped and replaced with compacted Gravel Borrow or crushed stone.

7.3.2 Footings on Rock

We anticipate that bedrock bearing surface preparation in the pier cofferdams will be conducted in the wet, and that the bedrock surface will be variable in terms of elevation, slope and localized weathering. A combination of standard excavation equipment, hydraulic hoe ramming equipment, and/or air lifting may be needed to remove the overburden and fractured/weathered rock. All soil and loose, decomposed, highly-weathered and fractured bedrock should be removed from the footing bearing surface prior to placement of tremie seals.

The prepared bearing surfaces should be checked by depth probing in conjunction with visual means such as diver and/or remotely operated vehicle video inspection. Special Provision SP511, Cofferdams, has been prepared to define the project-specific requirements for subgrade preparation and quality assurance/quality control.

The Geotechnical Engineer and Designer should be provided soundings and cross-sections showing the prepared rock surface geometry prior to placement of concrete to evaluate whether benching, doweling, or subfooting reinforcement are needed for that foundation location. Based on the test borings we do not anticipate steeply sloping bedrock conditions at the abutments. However, if the exposed bedrock surface is steeper than 4H:1V, then anchoring, doweling, benching or other means should be employed to improve sliding resistance. A steeply inclined rock surface is anticipated beneath the Abutment 2 northeast wingwall and will likely require the use of these stabilizing techniques.

We recommend that the completed seals be cored to assess the quality of the tremie seal concrete and the condition of the contact between the tremie seal and bedrock. The concrete and bedrock coring activities should be observed by the Geotechnical Engineer to assess changes in conditions based on drill action and coring penetration rate. The Geotechnical Engineer, Designer and Resident should review and evaluate the core results. If the observed conditions indicate inadequate concrete quality and/or unsuitable material at the concrete/rock interface, additional coring will be recommended, and remedial seal repairs may be required.

7.4 DRILLED SHAFT CONSTRUCTION

Based on the subsurface exploration program, boulders are present in the glacial till soils, most significantly noted near Pier 5. The contractor should be aware of these potential obstructions during the bidding process.

Confirmatory test borings should be conducted at each pier location during construction for the drilled shaft bid alternate to evaluate the elevation and quality of the upper bedrock within the socket depth. This information is intended for use by the Department to make final determination of the top of rock and

socket elevations to develop pay quantities, and also by the Contractor relative to casing embedment into rock and to assess the potential for sloping rock. We recommend that the geotechnical engineer provide full-time oversight and independent logging of the confirmation borings to assess the conditions relative to those encountered in the design-phase test borings. We recommend confirmatory borings be completed as follows in accordance with SP501:

RECOMMENDED DRILLED SHAFT CONFIRMATORY TEST BORING LOCATIONS AND DEPTHS			
Pier	**Number of Confirmation Borings**	**Coordinates (Northing, Easting [feet]) and *Verbal Description***	**Required Core Depth(s)**
1	2	1285746, 2182993 1285769, 2183018 *Shaft locations at opposite corners of cap*	1 @ 20 feet 1 @ 5 feet
2	1	1285954, 2183236 *Shaft furthest from Design Phase boring*	5 feet
3	1	1286168, 2183468 *Shaft furthest from Design Phase boring*	5 feet
4	2	1286399, 2183683 1286398, 2183717 *Shaft locations at opposite corners of cap*	1 @ 20 feet 1 @ 5 feet
5	3	1286613, 2183914 1286596, 2183930 1286630, 2183931 *3 Shafts furthest from Design Phase boring*	5 feet each

Drilled shaft installation should be observed and logged by the contractor and by the geotechnical engineer to confirm the depth to rock is generally consistent with the confirmatory test borings, and to record the depth, diameter, shaft alignment, and socket length for each shaft prior to placement of concrete. Special care must be taken to ensure that the sidewalls of the rock sockets are clean so that side resistance within the rock socket can be fully mobilized.

Temporary casing is not specifically required for this project, since the permanent casing can be utilized to seal the excavation for drilling the rock socket. However, if temporary casing is used to expedite advancement of permanent casing through glacial till, the temporary casing should be removed prior to concrete placement for the shaft.

As previously noted, permanent casing should be advanced a sufficient distance into rock to adequately seal the casing against water and soil intrusion into the shaft excavation. The depth required to achieve the seal should be determined by the contractor. The top of the rock socket length is considered to begin at the bottom of the permanent casing.

At the completion of rock socket excavation and prior to the placement of underwater concrete, a miniature shaft inspection device (Mini-SID) should be used to provide a comprehensive underwater inspection of the prepared rock socket. The Mini-SID inspections should be recorded on reliable digital media in MPEG4 format. The date, shaft number, and camera position should be recorded in the video. The Mini-SID inspections should be conducted by a representative of the Contractor. Copies of all data (written, electronic, DVDs, digital files, etc.) obtained during inspections should be submitted to the

Department and become property of the Department. The inspection results should be reviewed and approved prior to concrete placement.

7.4.1 Nondestructive Testing of Drilled Shafts

Thermal Integrity Profiling (TIP) tests are recommended for each drilled shaft as the primary quality assurance method for the project. TIP testing should be conducted by a representative of the Department. TIP testing is used to identify voids or discontinuities in the shaft concrete, alignment of the reinforcing steel cage relative to the excavation, and to estimate the variation in shaft diameter with depth. The TIP method uses the temperature variations in multiple thermal wires attached to vertical steel reinforcing bars near the outside of the cage during concrete curing to assess the integrity of the drilled shaft. Data loggers are attached to the ends of the thermal wires within several hours of completion of concrete placement, and the data loggers record temperatures as the concrete cures. TIP data must be correlated with accurate concrete placement logs which include measured concrete level in the excavation plotted against actual concrete volumes, which should be taken by the Department's representative. TIP testing is generally completed between 8 and 48 hours after concrete placement. The TIP engineer can use a data set at any time within the logged temperature data to interpret the shaft properties.

Crosshole Sonic Logging (CSL) tests are recommended as a secondary quality assurance method for the project. CSL tubes should be specified to be installed in all drilled shafts in case they are needed for testing. CSL testing should be completed on selected shafts by an instrumentation engineer retained by the Contractor at drilled shafts where TIP test results are unsatisfactory and/or as directed by the Resident. Each CSL test should include testing of all possible conduit combinations for the full depth of each drilled shaft.

The Contractor should provide a drilled shaft construction submittal that includes a plan to correct faulty shafts if TIP or CSL tests reveal discontinuities in the shaft concrete.

Special Provision SP501, Drilled Shafts, has been prepared to define the project specific requirements for drilled shaft construction and Quality Assurance/Quality Control (QA/QC).

7.5 DRILLED MICROPILE CONSTRUCTION

It is anticipated that the micropiles will be installed in a sloping bedrock surface, with a variation of 20 feet or more in the top of rock elevation across the abutment and wingwalls. The battered piles will be battered away from the inclination of the sloping rock, resulting impact angles steeper that the slope of the rock surface. The contractor should select and adjust as necessary their means and methods for casing installation to prevent sliding of the casing along the rock surface and misalignment of the micropiles.

The drill holes should be tremie grouted from the bottom up. A plug should be placed in the tremie pipe prior to insertion into the pile to prevent water entry into the pipe. The tremie pipe should remain at least 5 feet below the top of grout level throughout the grout placement.

The Geotechnical Engineer should provide full-time observation during pile installation and assess the following portions of the work: depth to top of rock, plunge depth, bottom cleanliness, depth of hole, length of casing and reinforcing installed, centralizer placement and grout volume and strength.

An insulation detail is recommended in this report that includes 4 inches of EPS geofoam installed beneath the pile caps. We recommend that the insulation be placed after micropiles are installed, and it should be cut and fitted to provide a maximum offset of 4 inches between the insulation board and the nearest side of the micropiles. The remaining void space between piles and insulation will be filled with the overlying concrete fill.

Special Provision SP501, Micropiles, has been prepared to define the project specific requirements for micropile construction and QA/QC.

7.5.1 Micropile Testing

A minimum of one verification load test will be required on a sacrificial micropile prior to construction of production micropiles to verify the design grout-rock bond strength and to demonstrate the sufficiency of the chosen installation methods. Verification tests should be conducted using tension methods. A bond breaker should be placed around the portion of the reinforcing bar inside of the casing to ensure that the load is transferred into the socket.

We recommend that three proof tests be completed on production micropiles, including one at the abutment and one at each wingwall.

7.6 REUSE OF ON-SITE MATERIALS

Based on the test boring results, most of the fill and glacial till samples tested had more than 10 percent passing the No. 200 sieve, indicating the fill will not meet MaineDOT Specification requirements for Granular Borrow and/or Granular Borrow for Underwater Backfill and would not be suitable for use as structural backfill. The material is considered suitable for use as Common Borrow.

If the contractor wishes to reuse excavated material as embankment fill or in other areas, we recommend that the proposed material be stockpiled and tested for grain size distribution. Stockpiled materials meeting the appropriate MaineDOT specifications may be reused on the project.

TABLES

TABLE 1
Summary of Subsurface Explorations
Madawaska International Bridge #2399, Bridge Street over St. John River
Madawaska, ME - Edmundston, NB
WIN 21736.00

Exploration Designation	Ground Surface Elev. [1]	Northing [2]	Easting [2]	Station	Offset		Station (w/offset parallel to slope)[6]	Offset parellel to slope		Approximate Encountered Thickness of Stratum[4]				Groundwater		Top of Weathered Rock		Top of Intact Rock		Total Exploration Depth (ft)
					(feet)	Dir.		(feet)	Dir.	Topsoil	Fill	Alluvium	Glacial Till	Depth (ft)	Elev. [1]	Depth (ft)	Elev. [1]	Depth (ft)	Elev. [1]	
BB-MSJR-101	515	1285505.0	2182895.2	104.00 + 2.40	113.4	R	103 + 25.4	130.3	R	NE	13.5	NE	87.1	25	490.0	NE	--	100.6	414.4	121.5
BB-MSJR-102	507	1286839.2	2184097.0	122.00 + 0.20	46.2	L	122 + 33.2	55.5	L	0.5	13.0	NE	11.7	18.8	488.2	NE	--	25.2	481.8	46.8
BB-MSJR-201	524.5	1285429.3	2182758.7	102.00 + 32.90	42.0	R	-- + --	--	--	NE	18.0	NE	> 33	16.8	507.7	NE	--	NE	--	51.0
BB-MSJR-202	525.1	1285531.2	2182665.8	102.00 + 76.00	88.8	L	-- + --	--	--	NE	18.0	NE	> 33	19.8	505.3	NE	--	NE	--	51.0
BB-MSJR-203	502.9	1285583.7	2182799.7	103.00 + 90.00	9.2	L	-- + --	--	--	NE	14.2	NE	70.0	9.7	493.2	NE	--	84.2	418.7	95.2
BB-MSJR-204	500.9	1285707.8	2182979.1	106.00 + 1.80	21.4	R	105 + 72	36.7	R	0.9	16.1	NE	68.7	20.8	480.1	NE	--	85.7	415.2	100.1
BB-MSJR-205	441.3	1285977.8	2183232.4	109.00 + 71.20	5.0	L	-- + --	--	--	NE	NE	NE	29.2	River		NE	--	29.2	412.1	50.0
BB-MSJR-206	441.0	1286196.6	2183467.3	112.00 + 92.20	6.2	L	-- + --	--	--	NE	NE	NE	30.7	River		NE	--	30.7	410.3	49.4
BB-MSJR-208	441.9	1286610.3	2183944.3	119.00 + 23.10	13.7	R	119 + 8.8	19.8	R	NE	NE	3.0	32.1	River		NE	--	35.1	406.8	50.1
BB-MSJR-209	480.6	1286736.2	2183902.9	119.00 + 56.00	80.1	L	120 + 92.3	156.3	L	NE	20.0	9.0	17.2	12.8	467.8	46.2	434.4	55.0	425.6	85.0
BB-MSJR-210	480.5	1286738.2	2183981.4	120.00 + 17.00	31.3	L	120 + 96	80.5	L	NE	18.5	12.5	9.3	29.3	451.2	NE	--	40.3	440.2	60.0
BB-MSJR-211	480.4	1286750.1	2184047.2	121.00 + 6.80	31.1	L	121 + 14.1	28	L	NE	20.1	6.3	6.6	12.4	468.0	NE	--	33.0	447.4	50.0
BB-MSJR-212	504.9	1286835.7	2184034.7	121.00 + 43.10	90.5	L	122 + 28.4	115.3	L	NE	28.0	NE	1.5	NM	NM	NE	--	29.5	475.4	41.1
BB-MSJR-213	480.2	1286749.2	2184112.3	121.00 + 56.40	16.7	R	121 + 13.6	37.4	R	NE	20.3	6.2	5.1	8	472.2	NE	--	31.6	448.6	41.0
BB-MSJR-214	500.4	1286833.6	2184188.9	121.00 + 39.60	36.3	R	-- + --	--	--	NE	11.5	NE	NE	15.8	484.6	11.5	488.9	12.0	488.4	48.0
BB-MSJR-301	479.8	1286776.6	2184052.6	121.00 + 15.69	35.0	L	121 53.2	51.2	L	0.3	15.3	7.1	1.3	12.7	467.1	NE	--	24.0	455.8	34.0
BB-MSJR-302	479.6	1286778.9	2184131.9	121.00 + 73.52	18.9	R	121 56.5	25.8	R	NE	15.7	2.8	2.5	13.6	466.0	NE	--	21.0	458.6	31.0

Notes:

1) Elevations are in feet and reference the North American Vertical Datum of 1988 (NAVD 88).

2) As-completed exploration elevations for -100 series borings were interpreted from the 3D ground surface objects within the Microstation files provided by HNTB.

3) As-completed exploration elevations for -200 and -300 series borings were surveyed by MaineDOT or EXP and have been provided to GZA.

4) ">" indicates the boring was terminated at the depth indicated into the stratum, "NE" indicates stratum not encountered, "NM" indicates Groundwater not measured.

5) Stratum depths, thickness and elevations are rounded to the nearest 0.1 foot as interpreted on the boring logs, but this does not represent the precision of the data.

6) Boring stations and offsets from the centerline alignment, parallel relative to the slope were measured and used to better interpolate the interpretive subsurface profile perpindicular to the slope, as appropriate.

7) Drilling for land borings was conducted using a truck, or atv - mounted rig provided by New England Boring Contractors or Logan Drilling Corporation. SPT samples were conducted using calibrated automatic hammers.

8) Drilling for river piers was conducted using a platform-mounted rig transported on location by a combination of helicopter and boat. SPT samples were conducted using a cathead with a saftey hammer.

9) See boring logs in Appendix B for additional details of all borings.

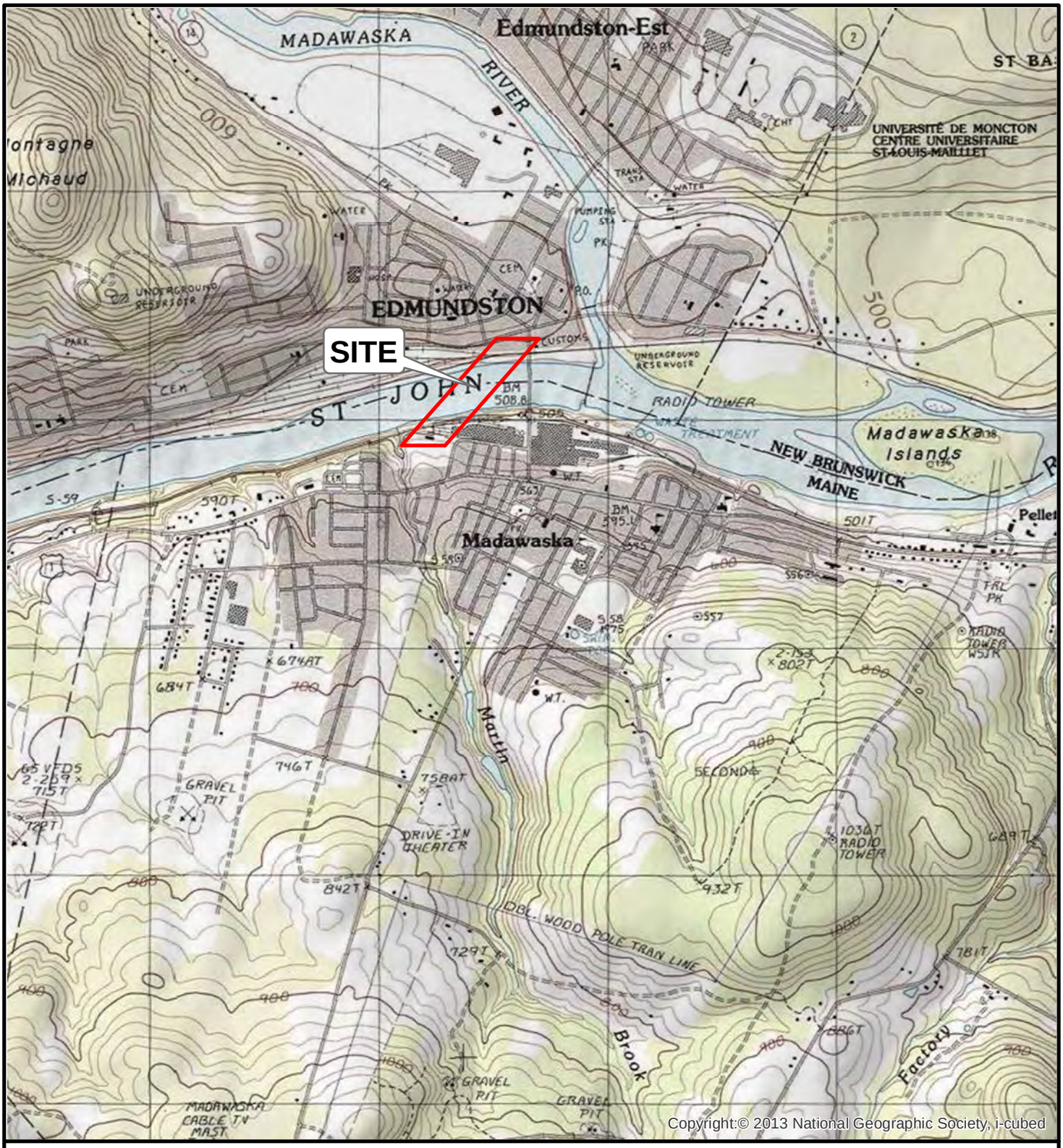
Table 2 - Rock Core Summary Table
Madawaska-Edmundston Int'l Bridge Replacement
Borings BB-MSJR-101, -102, -201 through -214, -301, and -302

Boring	Station (ft)	Offset	Dir	Run	GS Elevation	Depth (ft) of Core Run Below GS		Depth (ft) to Rock	Depth (ft) Below Top of Rock			Length of Core Run (ft)	Length of Core Run (ft) - Within Upper 15'	Rec (in)	Rec (%)	RQD (in)	RQD %	RQD(in) within Upper 15' (use for weighted avg)	RQD (%) within Upper 15'	Joint Spacing Desc.	Corr. Spacing (in)			Angle Description	Corr. Angle			Aperture Desc.	Corr. Aperture (in)			Rock Type
						Top	Bottom		Top	Bottom	Midpoint depth																				
BB-MSJR-101	104	113.4	R	R1	515.0	101.5	106.5	100.6	0.9	5.9	3.4	5.0	5.0	60	100%	28	47%	28	47%	Extremely Close to Moderate	<0.75	-	24	High Angle to Vertical	55	-	85	Tight to Partially Open	0.004	-	0.02	Slate
BB-MSJR-101	104	113.4	R	R2	515.0	106.5	111.5	100.6	5.9	10.9	8.4	5.0	5.0	60	100%	43	72%	43	72%	Close to Moderate	2.5	-	24	Horizontal	0	-	5	Partially Open to Open	0.01	-	0.1	Slate
BB-MSJR-101	104	113.4	R	R3	515.0	111.5	116.5	100.6	10.9	15.9	13.4	5.0	5.0	60	100%	42	70%	42	70%	Extremely Close to Moderate	<0.75	-	24	High Angle to Vertical	55	-	85	Tight to Partially Open	0.004	-	0.02	Slate
BB-MSJR-101	104	113.4	R	R4	515.0	116.5	121.5	100.6	15.9	20.9	18.4	5.0	-	60	100%	33	55%	-	--	Close to Moderate	2.5	-	24	High Angle to Vertical	55	-	85	Tight	0.004	-	0.01	Slate
BB-MSJR-102	122	46.2	L	R1	507.0	26.8	31.8	25.2	1.6	6.6	4.1	5.0	5.0	60	100%	46	77%	46	77%	Close to Moderate	2.5	-	24	High Angle to Vertical	55	-	85	Tight	0.004	-	0.01	Slate
BB-MSJR-102	122	46.2	L	R2	507.0	31.8	36.8	25.2	6.6	11.6	9.1	5.0	5.0	60	100%	50	83%	50	83%	Moderately Spaced	8	-	24	High Angle	55	-	85	Open	0.02	-	0.1	Slate
BB-MSJR-102	122	46.2	L	R3	507.0	36.8	41.8	25.2	11.6	16.6	14.1	5.0	5.0	60	100%	26	43%	26	43%	Very Close to Moderate	0.75	-	24	High Angle to Vertical	55	-	85	Partially Open to Open	0.01	-	0.1	Slate
BB-MSJR-102	122	46.2	L	R4	507.0	41.8	46.8	25.2	16.6	21.6	19.1	5.0	-	60	100%	14	23%	-	--	Extremely Close to Close	<0.75	-	8	High Angle to Vertical	55	-	85	Open	0.02	-	0.1	Slate
BB-MSJR-203	103	9.2	L	R1	502.9	85.2	90.2	84.2	1.0	6.0	3.5	5.0	5.0	60	100%	57	95%	57	95%	Very Close to Moderate	0.75	-	24	Moderately Dipping	35		55	Partially Open to Open	0.01	-	0.1	Slate
BB-MSJR-203	103	9.2	L	R2	502.9	90.2	95.2	84.2	6.0	11.0	8.5	5.0	5.0	60	100%	48	80%	48	80%	Moderately Spaced	8	-	24	Moderately Dipping	35		55	Open	0.02	-	0.1	Slate
BB-MSJR-204	106	21.4	R	R1	500.9	86.1	91.4	85.7	0.4	5.7	3.1	5.3	5.3	64	101%	0	0%	0	0%	Extremely Close to Close	<0.75	-	8	High Angle	55		85	Open	0.02	-	0.1	Slate
BB-MSJR-204	106	21.4	R	R2	500.9	91.4	95.1	85.7	5.7	9.4	7.6	3.7	3.7	44	99%	4	8%	4	8%	Very Close to Close	0.75	-	8	High Angle	55		85	Partially Open	0.01	-	0.02	Slate
BB-MSJR-204	106	21.4	R	R3	500.9	95.1	100.1	85.7	9.4	14.4	11.9	5.0	5.0	60	100%	48	80%	48	80%	Close to Moderate	2.5	-	24	Moderately Dipping to High Angle	35		85	Partially Open to Open	0.01	-	0.1	Slate
BB-MSJR-205	109	5	L	R1	441.3	30.0	35.0	29.2	0.8	5.8	3.3	5.0	5.0	60	100%	28	47%	28	47%	Extremely Close to Close	<0.75	-	8	High Angle	55		85	Tight	0.004	-	0.01	Slate
BB-MSJR-205	109	5	L	R2	441.3	35.0	40.0	29.2	5.8	10.8	8.3	5.0	5.0	60	100%	44	73%	44	73%	Very Close to Moderate	0.75	-	24	High Angle	55		85	Tight	0.004	-	0.01	Slate
BB-MSJR-205	109	5	L	R3	441.3	40.0	45.0	29.2	10.8	15.8	13.3	5.0	5.0	60	100%	36	60%	36	60%	Very Close to Moderate	0.75	-	24	High Angle	55		85	Tight to Partially Open	0.004	-	0.02	Slate
BB-MSJR-205	109	5	L	R4	441.3	45.0	50.0	29.2	15.8	20.8	18.3	5.0	-	60	100%	36	60%	-	--	Close	2.5	-	8	High Angle	55		85	Tight to Partially Open	0.004	-	0.02	Slate
BB-MSJR-206	112	6.2	L	R1	441.0	30.8	34.5	30.7	0.1	3.8	2.0	3.7	3.7	44	99%	22	50%	22	50%	Extremely Close to Close	<0.75	-	8	High Angle	55		85	Partially Open to Open	0.01	-	0.1	Slate
BB-MSJR-206	112	6.2	L	R2	441.0	34.5	39.4	30.7	3.8	8.7	6.3	4.9	4.9	59	100%	47	80%	47	80%	Close to Moderate	2.5	-	24	High Angle	55		85	Tight	0.004	-	0.01	Slate
BB-MSJR-206	112	6.2	L	R3	441.0	39.4	44.4	30.7	8.7	13.7	11.2	5.0	5.0	60	100%	32	53%	32	53%	Very Close to Moderate	0.75	-	24	High Angle	55		85	Tight to Partially Open	0.004	-	0.02	Slate
BB-MSJR-206	112	6.2	L	R4	441.0	44.4	49.4	30.7	13.7	18.7	16.2	5.0	5.0	60	100%	46	77%	46	77%	Close to Moderate	2.5	-	24	High Angle	55		85	Tight to Partially Open	0.004	-	0.02	Slate
BB-MSJR-208	119	13.7	R	R4	441.9	35.1	40.1	35.1	0.0	5.0	2.5	5.0	5.0	50	83%	18	30%	18	30%	Extremely Close to Close	<0.75	-	8	High Angle	55		85	tight to open	0.004	-	0.1	Slate
BB-MSJR-208	119	13.7	R	R5	441.9	40.1	45.1	35.1	5.0	10.0	7.5	5.0	5.0	60	100%	13	22%	13	22%	Extremely Close to Close	<0.75	-	8	High Angle	55		85	Partially Open to Open	0.01	-	0.1	Slate
BB-MSJR-208	119	13.7	R	R6	441.9	45.1	50.1	35.1	10.0	15.0	12.5	5.0	5.0	60	100%	24	40%	24	40%	Extremely Close to Close	<0.75	-	8	High Angle	55		85	Partially Open	0.01	-	0.02	Slate
BB-MSJR-209	119	80.1	L	R6	480.6	55.0	60.0	55.0	0.0	5.0	2.5	5.0	5.0	60	100%	57	95%	57	95%	Moderately Spaced	8	-	24	Moderately Dipping to High Angle	35		85	Partially Open to Open	0.01	-	0.1	Slate
BB-MSJR-209	119	80.1	L	R7	480.6	60.0	65.0	55.0	5.0	10.0	7.5	5.0	5.0	60	100%	33	55%	33	55%	Very Close to Close	0.75	-	8	Mod. Dipping to Vertical	35		90	open to mod. Wide	0.02	-	0.4	Slate
BB-MSJR-209	119	80.1	L	R8	480.6	65.0	70.0	55.0	10.0	15.0	12.5	5.0	5.0	60	100%	34	57%	34	57%	Close to Moderate	2.5	-	24	Moderately Dipping to High Angle	35		85	Partially Open	0.01	-	0.02	Slate
BB-MSJR-209	119	80.1	L	R9	480.6	70.0	75.0	55.0	15.0	20.0	17.5	5.0	5.0	60	100%	14	24%	14	24%	Very Close to Moderate	0.75	-	24	Mod. Dipping to Vertical	35		90	Partially Open to Open	0.01	-	0.1	Slate
BB-MSJR-209	119	80.1	L	R10	480.6	75.0	80.0	55.0	20.0	25.0	22.5	5.0	-	60	100%	56	93%	-	--	Very Close to Moderate	0.75	-	24	High Angle	55		85	tight to open	0.004	-	0.1	Slate
BB-MSJR-209	119	80.1	L	R11	480.6	80.0	85.0	55.0	25.0	30.0	27.5	5.0	-	60	100%	36	60%	-	--	Extremely Close to Close	<0.75	-	8	High Angle to Vertical	55		85	Open	0.02	-	0.1	Slate
BB-MSJR-210	120	31.3	L	R3	480.5	40.3	45.0	40.3	0.0	4.7	2.3	4.8	4.8	57	100%	7	12%	7	12%	Extremely Close to Close	<0.75	-	8	High Angle to Vertical	55		85	tight to open	0.004	-	0.1	Slate
BB-MSJR-210	120	31.3	L	R4	480.5	45.0	50.0	40.3	4.7	9.7	7.2	5.0	5.0	60	100%	0	0%	0	0%	Extremely Close	<0.75	-	0.75	High Angle to Vertical	55		85	Partially Open to Open	0.01	-	0.1	Slate
BB-MSJR-210	120	31.3	L	R5	480.5	50.0	55.0	40.3	9.7	14.7	12.2	5.0	5.0	60	100%	16	26%	16	26%	Extremely Close to Moderate	<0.75	-	24	High Angle to Vertical	55		85	Partially Open to Open	0.01	-	0.1	Slate
BB-MSJR-210	120	31.3	L	R6	480.5	55.0	60.0	40.3	14.7	19.7	17.2	5.0	5.0	60	100%	18	30%	18	30%	Extremely Close to Moderate	<0.75	-	24	High Angle to Vertical	55		85	Partially Open to Open	0.01	-	0.1	Slate
BB-MSJR-211	121	31.1	L	R1	480.4	33.0	34.0	33.0	0.0	1.0	0.5	1.0	1.0	12	100%	0	0%	0	0%	Highly Fractured	--	-	--	Highly Fractured	--		--	Highly Fractured	--	-	--	Slate
BB-MSJR-211	121	31.1	L	R2	480.4	34.0	36.0	33.0	1.0	3.0	2.0	2.0	2.0	24	100%	0	0%	0	0%	Extremely Close	<0.75	-	0.75	High Angle to Vertical	55		85	Partially Open to Open	0.01	-	0.1	Slate
BB-MSJR-211	121	31.1	L	R3	480.4	36.0	40.0	33.0	3.0	7.0	5.0	4.0	4.0	48	100%	29	60%	29	60%	Extremely Close to Close	<0.75	-	8	High Angle to Vertical	55		85	tight to open	0.004	-	0.1	Slate
BB-MSJR-211	121	31.1	L	R4	480.4	40.0	45.0	33.0	7.0	12.0	9.5	5.0	5.0	48	80%	31	51%	31	51%	Close to Moderate	2.5	-	24	High Angle to Vertical	55		85	Partially Open to Open	0.01	-	0.1	Slate
BB-MSJR-211	121	31.1	L	R5	480.4	45.0	50.0	33.0	12.0	17.0	14.5	5.0	5.0	49	82%	44	74%	44	74%	Close	2.5	-	8	Horizontal to Low Angle	0		35	Open	0.02	-	0.1	Slate
BB-MSJR-212	121	90.5	L	R1	504.9	29.5	31.1	29.5	0.0	1.6	0.8	1.6	1.6	19	99%	0	0%	0	0%	Highly Fractured	--	-	--	Highly Fractured	--		--	Highly Fractured	--	-	--	Slate
BB-MSJR-212	121	90.5	L	R2	504.9	31.1	36.1	29.5	1.6	6.6	4.1	5.0	5.0	60	100%	25	42%	25	42%	Extremely Close to Moderate	<0.75	-	24	High Angle	55		85	Open	0.02	-	0.1	Slate
BB-MSJR-212	121	90.5	L	R3	504.9	36.1	41.1	29.5	6.6	11.6	9.1	5.0	5.0	60	100%	29	48%	29	48%	Close to Moderate	2.5	-	24	High Angle to Vertical	55		85	Tight to Partially Open	0.004	-	0.02	Slate
BB-MSJR-213	121	16.7	R	R1	480.2	31.6	36.0	31.6	0.0	4.4	2.2	4.4	4.4	53	100%	16	30%	16	30%	Extremely Close to Close	<0.75	-	8	High Angle to Vertical	55		85	tight to open	0.004	-	0.1	Slate
BB-MSJR-213	121	16.7	R	R2	480.2	36.0	41.0	31.6	4.4	9.4	6.9	5.0	5.0	60	100%	35	58%	35	58%	Extremely Close to Moderate	<0.75	-	24	High Angle to Vertical	55		85	Tight to Partially Open	0.004	-	0.02	Slate
BB-MSJR-214	121	36.3	R	R1	500.4	12.0	14.0	12.0	0.0	2.0	1.0	2.0	2.0	24	100%	0	0%	0	0%	Extremely Close	<0.75	-	0.75	High Angle to Vertical	55		85	Open	0.02	-	0.1	Slate
BB-MSJR-214	121	36.3	R	R2	500.4	14.0	16.0	12.0	2.0	4.0	3.0	2.0	2.0	24	100%	4	17%	4	17%	Extremely Close to Moderate	<0.75	-	24	High Angle to Vertical	55		85	Open	0.02	-	0.1	Slate
BB-MSJR-214	121	36.3	R	R3	500.4	16.0	21.0	12.0	4.0	9.0	6.5	5.0	5.0	60	100%	31	52%	31	52%	Extremely Close to Moderate	<0.75	-	24	High Angle to Vertical	55		85	tight to open	0.004	-	0.1	Slate
BB-MSJR-214	121	36.3	R	R4	500.4	21.0	25.0	12.0	9.0	13.0	11.0	4.0	4.0	48	100%	27	56%	27	56%	Extremely Close to Moderate	<0.75	-	24	Moderately Dipping to High Angle	35		85	tight to open	0.004	-	0.1	Slate
BB-MSJR-214	121	36.3	R	R5	500.4	25.0	30.0	12.0	13.0	18.0	15.5	5.0	5.0	60	100%	37	62%	37	62%	Extremely Close to Moderate	<0.75	-	24	High Angle to Vertical	55		85	tight to open	0.004	-	0.1	Slate
BB-MSJR-214	121	36.3	R	R6	500.4	30.0	33.0	12.0	18.0	21.0	19.5	3.0	-	36	100%	31	87%	-	--	Extremely Close to Moderate	<0.75	-	24	High Angle to Vertical	55		85	open to mod. Wide	0.02	-	0.4	Slate
BB-MSJR-214	121	36.3	R	R7	500.4	33.0	38.0	12.0	21.0	26.0	23.5	5.0	-	60	100%	43	71%	-	--	Extremely Close to Moderate	<0.75	-	24	Moderately Dipping to High Angle	35		85	Partially Open	0.01	-	0.02	Slate
BB-MSJR-214	121	36.3	R	R8	500.4	38.0	43.0	12.0	26.0	31.0	28.5	5.0	-	60	100%	42	70%	-	--	Close	2.5	-	8	Moderately Dipping	35		55	Tight to Partially Open	0.004	-	0.02	Slate
BB-MSJR-214	121	36.3	R	R9	500.4	43.0	48.0	12.0	31.0	36.0	33.5	5.0	-	60	100%	50	83%	-	--	Moderately Spaced	8	-	24	Moderately Dipping	35		55	tight to open	0.004	-	0.1	Slate
BB-MSJR-301	121	35.0	L	R1	479.8	24.0	29.0	24.0	0.0	5.0	2.5	5.0	5.0	56	93%	44	73%	44	73%	Very Close	0.75	-	2.5	High Angle to Vertical	55		85	Very Tight to Tight	<.004	-	0.01	Slate
BB-MSJR-301	121	35.0	L	R2	479.8	29.0	34.0	24.0	5.0	10.0	7.5	5.0	5.0	60	100%	44	73%	44	73%	Extremely Close to Moderate	<0.75	-	24	High Angle	55		85	Very Tight to Tight	<.004	-	0.01	Slate
BB-MSJR-302	121	18.9	R	R1	479.6	21.0	26.0	21.0	0.0	5.0	2.5	5.0	5.0	60	100%	47	78%	47	78%	Close to Moderate	2.5	-	24	High Angle to Vertical	55		85	tight to open	0.004	-	0.1	Slate
BB-MSJR-302	121	18.9	R	R2	479.6	26.0	31.0	21.0	5.0	10.0	7.5	5.0	5.0	60	100%	51	85%	51	85%	Extremely Close to Moderate	<0.75	-	24	High Angle	55		85	Tight	0.004	-	0.01	Slate

Table 3 - Summary of Bedrock Laboratory Results
Madawaska-Edmundston Int'l Bridge Replacement
Boring BB-MSJR-101, -102, -204 through -209, and -214

SUMMARY OF BEDROCK STRENGTH TEST RESULTS																				
Boring	Lab. No. (THIELSCH)	Run	Depth Below Existing Ground (ft bgs)			Depth Below Top of Rock (ft)			Elevation (ft, NAVD)			Unconfined Compressive Strength (psi)	% Strain	Secant Modulus @ 50% of Failure Stress (ksi)	Poisson's Ratio	Point Load Test (Axial or Diometrical)	Point Load, Is_{50} (PSI)	Correlated Point Load Test Strength, (PSI)	Unit Wt (pcf)	Rock Type
BB-MSJR-101	S-13	R1	101.5	-	102.45	102.0	0.9	-	1.9	1.4	413.5	-	412.6	413.0	1,969	0.545	2,280	0.05				168.7	SLATE
BB-MSJR-101	S-14	R1	104.9	-	105.4	105.2	4.3	-	4.8	4.6	410.1	-	409.6	409.9					Diometrical	80	1,920	--	SLATE
BB-MSJR-101	S-14	R1	104.9	-	105.4	105.2	4.3	-	4.8	4.6	410.1	-	409.6	409.9					Axial	152	3,648	161.4	SLATE
BB-MSJR-101	S-19	R1	105.9	-	106.5	106.2	5.3	-	5.9	5.6	409.1	-	408.5	408.8	2,611	0.470	1,560	0.11				172.1	SLATE
BB-MSJR-101	S-20D	R2	110.5	-	110.8	110.7	9.9	-	10.2	10.1	404.5	-	404.2	404.4					Diometrical	359	8,616	153	SLATE
BB-MSJR-101	S-20A	R2	110.5	-	110.8	110.7	9.9	-	10.2	10.1	404.5	-	404.2	404.4					Axial	32	8,448	166	SLATE
BB-MSJR-101	S-15	R4	119.0	-	119.4	119.2	18.4	-	18.8	18.6	396.0	-	395.6	395.8	2,864	0.328	1,580	0.15					SLATE
BB-MSJR-102	S-16	R1	26.8	-	27.9	27.4	1.6	-	2.7	2.2	480.2	-	479.1	479.7									SLATE
BB-MSJR-102	S-17	R2	30.1	-	31.8	30.9	4.9	-	6.6	5.7	477.0	-	475.2	476.1	974	0.452	3,360	0.23				169.9	SLATE
BB-MSJR-102	S-18D	R4	44.7	-	45.2	45.0	19.5	-	20.0	19.8	462.3	-	461.8	462.1					Diometrical	25	600	169.8	SLATE
BB-MSJR-102	S-18A	R4	44.7	-	45.2	45.0	19.5	-	20.0	19.8	462.3	-	461.8	462.1					Axial	89	2,136	166.5	SLATE
BB-MSJR-204	S-27	R3	95.1	-	96.1	95.6	9.4	-	10.4	9.9	405.8	-	404.8	405.3	4,354	0.513	728	0.41				170.5	SLATE
BB-MSJR-205	S-28D	R1	31.3	-	31.9	31.6	2.1	-	2.7	2.4	410.0	-	409.4	409.7					Diometrical	316	7,268	197.8	SLATE
BB-MSJR-205	S-28A	R1	31.3	-	31.9	31.6	2.1	-	2.7	2.4	410.0	-	409.4	409.7					Axial	269	6,187	169.1	SLATE
BB-MSJR-205	S-29	R2	36.3	-	37.5	36.9	7.1	-	8.3	7.7	405.0	-	403.8	404.4	4,868	0.625	657	0.13				171.1	SLATE
BB-MSJR-205	S-33	R4	45.5	-	46.7	46.1	16.3	-	17.5	16.9	395.8	-	394.6	395.2	5,659	0.248	1690	0.13				170.5	SLATE
BB-MSJR-206	S-30	R3	39.4	-	41.2	40.3	8.7	-	10.5	9.6	401.6	-	399.8	400.7	10,670	0.356	1900	0.29				170.9	SLATE
BB-MSJR-206	S-31	R4	48.8	-	49.4	49.1	18.1	-	18.7	18.4	392.2	-	391.6	391.9	5,599	0.250	2450	0.1				171.2	SLATE
BB-MSJR-208	S-34	R4	38.8	-	39.2	39.0	3.7	-	4.1	3.9	403.1	-	402.7	402.9	5,369	0.766	447	0.27					SLATE
BB-MSJR-208	S-32	R6	46.3	-	47.1	46.7	11.2	-	12.0	11.6	395.6	-	394.8	395.2	5,018	0.165	2450	0.45				170.7	SLATE
BB-MSJR-209	S-36	R6	55.3	-	55.9	55.6	0.3	-	0.9	0.6	425.3	-	424.7	425.0	4,579	0.368	2,140	0.48				169	SLATE
BB-MSJR-209	S-37	R7	60.2	-	60.9	60.6	5.2	-	5.9	5.6	420.4	-	419.7	420.1	4,251	0.463	1,420	0.20				170.3	SLATE
BB-MSJR-214	S-38	R9	46	-	46.5	46.3	34.0	-	34.5	34.3	454.4	-	453.9	454.2	11,329	0.250	4,300	0.27				170.8	SLATE
BB-MSJR-214	S-35A	R2	14	-	14.3	14.2	2.0	-	2.3	2.2	486.4	-	486.1	486.3					Diometrical	155	3,798	155.8	SLATE
BB-MSJR-214	S-35D	R2	14	-	14.3	14.2	2.0	-	2.3	2.2	486.4	-	486.1	486.3					Axial	159	3,896	158.5	SLATE

FIGURES



USGS QUADRANGLE LOCATION

SOURCE : THIS MAP CONTAINS THE ESRI ARCGIS ONLINE USA TOPOGRAPHIC MAP SERVICE, PUBLISHED DECEMBER 12, 2009 BY ESRI ARCIMS SERVICES AND UPDATED AS NEEDED. THIS SERVICE USES UNIFORM NATIONALLY RECOGNIZED DATUM AND CARTOGRAPHY STANDARDS AND A VARIETY OF AVAILABLE SOURCES FROM SEVERAL DATA PROVIDERS. THIS MAP ALSO CONTAINS THE ESRI ARCGIS ONLINE USA COUNTIES WHICH PROVIDES DETAILED BOUNDARIES THAT ARE CONSISTENT WITH THE TRACT, BLOCK GROUP, AND STATE DATA SETS AND ARE EFFECTIVE AT REGIONAL AND STATE LEVELS.

Data Supplied by : esri USGS science for a changing world

0 1,000 2,000 4,000 6,000

SCALE IN FEET

PROJ. MGR.: ARB
DESIGNED BY: BLW
REVIEWED BY: CLS
OPERATOR: BLW

DATE: 01-16-2020

LOCUS PLAN

JOB NO. 09.0025984.03

MADAWASKA INTERNATIONAL BRIDGE
MADAWASKA, MAINE

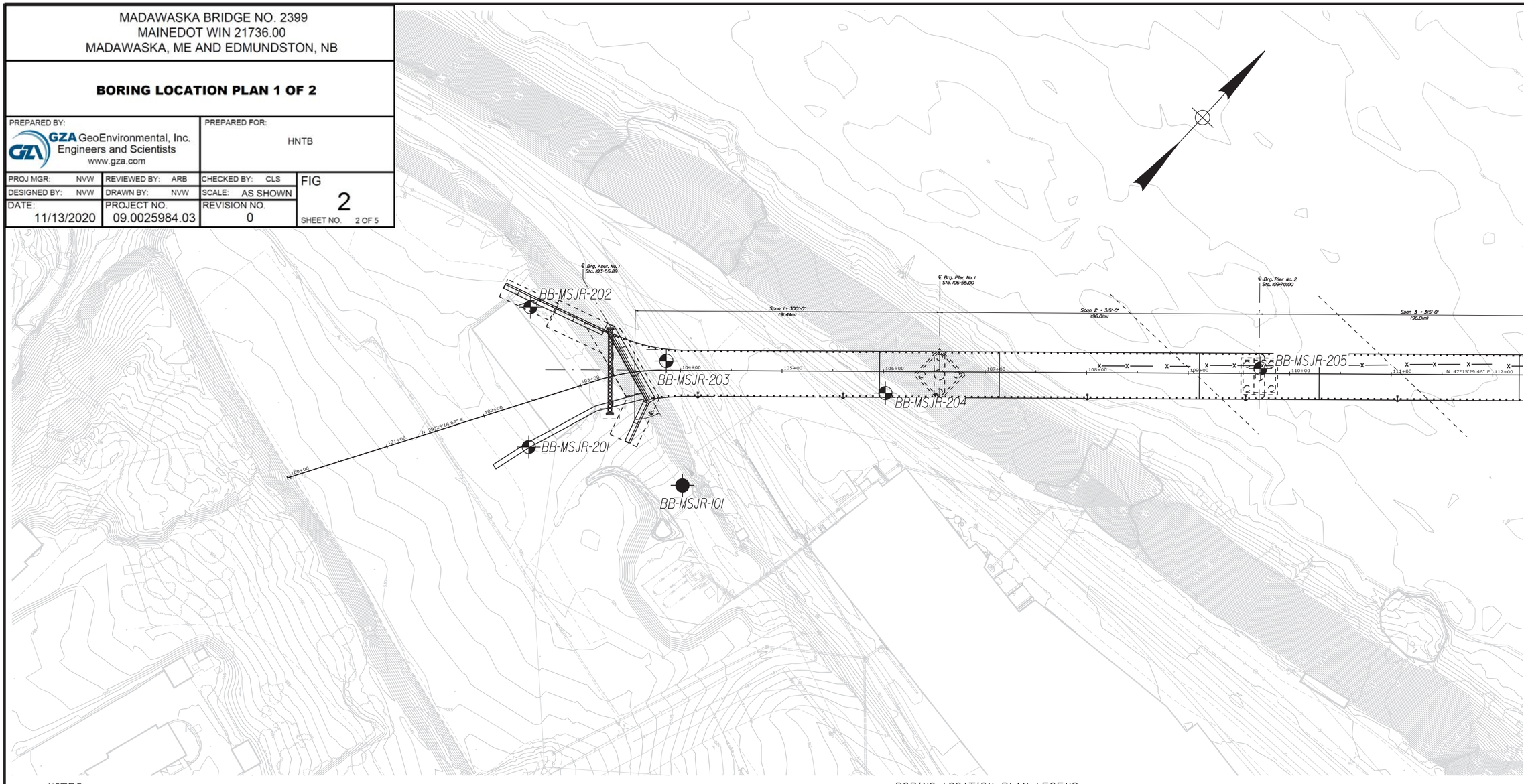
FIGURE NO. 1

© 2020 - GZA GeoEnvironmental, Inc. P:\09 Jobs\0025900s\09.0025984.00 - Madawaska Bridge Coordination Phase\09.0025984.01 - Preliminary Design, HNTB\Figures\GIS\Figure1-LocusPlan.mxd, 1/16/2020, 11:19:30 AM, benjamin.woodman

MADAWASKA BRIDGE NO. 2399
MAINEDOT WIN 21736.00
MADAWASKA, ME AND EDMUNDSTON, NB

BORING LOCATION PLAN 1 OF 2

PREPARED BY:		PREPARED FOR:	
GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		HNTB	
PROJ MGR: NVW	REVIEWED BY: ARB	CHECKED BY: CLS	FIG 2
DESIGNED BY: NVW	DRAWN BY: NVW	SCALE: AS SHOWN	
DATE: 11/13/2020	PROJECT NO. 09.0025984.03	REVISION NO. 0	SHEET NO. 2 OF 5



NOTES

1) Base map developed from electronic files (Topo.dgn and Contours.dgn) provided by HNTB on October 26, 2018, and from electronic files (Alignments.dgn and Bridge.dgn) provided by HNTB on March 9, 2020.

2) The 100-series borings were located approximately by GZA using tape measurements to features shown on the site plan. The 200-series and 300-series borings were surveyed by a MEDOT survey crew or EXP survey crew and supplied to GZA.

3) BB-MSJR-100 series bridge borings were performed by New England Boring Contractors and observed by GZA personnel between August 28 and September 5, 2018.

4) BB-MSJR-200 series bridge borings were performed by New England Boring Contractors or Logan Drilling Group, and observed by GZA personnel between October 28, 2019 and March 3, 2020.

5) BB-MSJR-300 series bridge borings were performed by Logan Drilling Group, and observed by GZA personnel between June 10 and June 11, 2020.

6) The location of the geophysical survey lines were provided in the Geophysical Seismic Refraction Top of Rock Survey Report by NDT on November 15, 2018.

BORING LOCATION PLAN LEGEND

- BB-MSJR-205 — Location and designation of completed 200-Series cased wash boring
- BB-MSJR-101 — Location and designation of preliminary 100-Series cased wash boring
- Geophysical Survey line along the proposed alignment
- Geophysical Survey line parallel to the river flow

PLAN

50 0 50 100
Scale in Feet

PREPARED BY: GZA

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

2173600

WIN 021736.00

BRIDGE PLANS

MAINEDOT BR. NO. 2399
NBDTI ASSET NO. E320

CHRISTOPHER L. SCOTT No. 7275 LICENSED PROFESSIONAL ENGINEER STATE OF MAINE

SIGNATURE 7275

P.E. NUMBER October 30, 2020

DATE

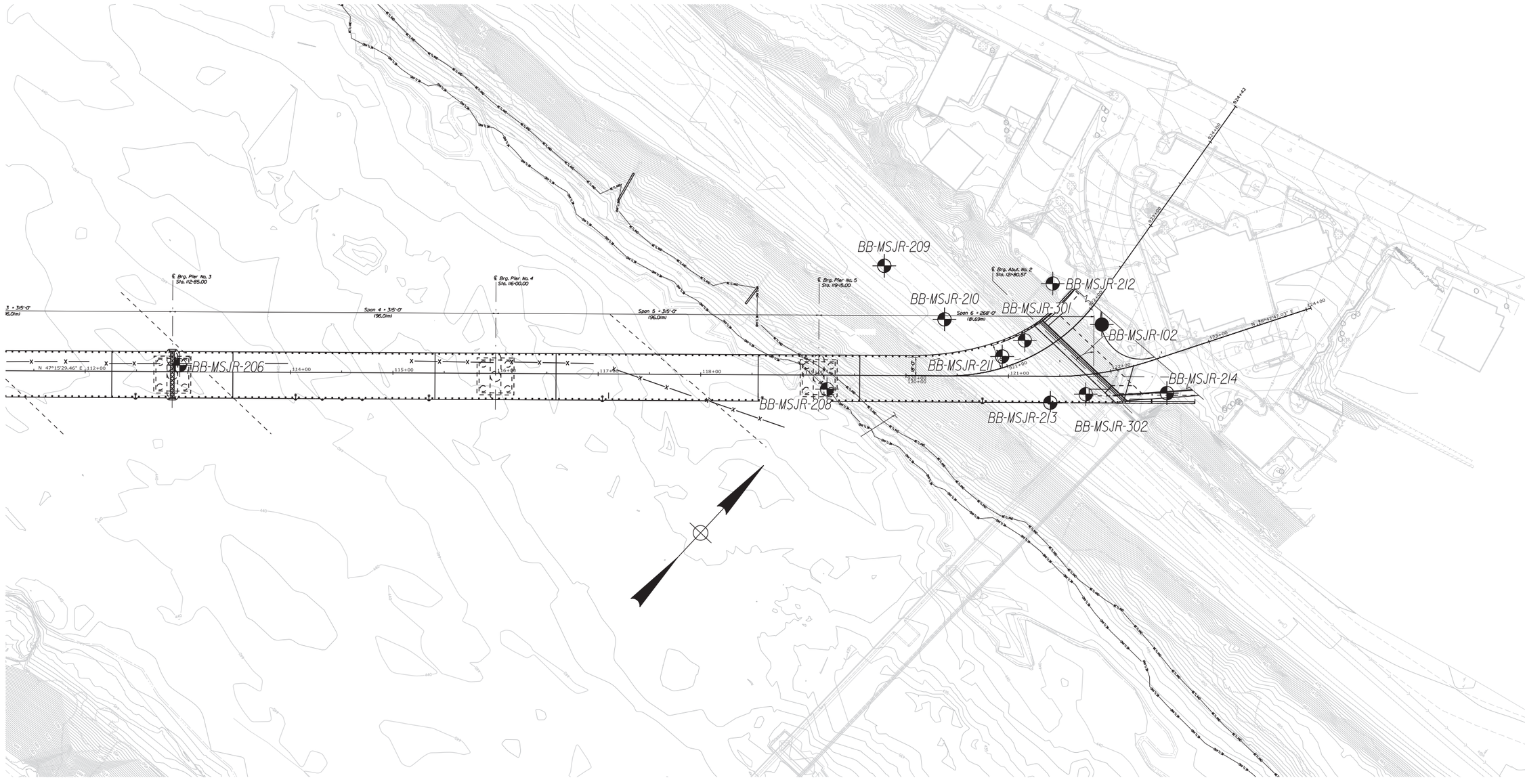
	BY	DATE
PROJ. MANAGER	A. Lothel	
DESIGN-DETAILED	NVW	7/20
CHECKED-REVIEWED	ARB	5/20
DESIGN2-DETAILED2		
DESIGN3-DETAILED3		
REVISIONS 1		
REVISIONS 2		
REVISIONS 3		
REVISIONS 4		
FIELD CHANGES		

INTERNATIONAL BRIDGE
SAINT JOHN RIVER
MADAWASKA, ME EDMUNDSTON, NB

BORING LOCATION PLAN 1 OF 2

SHEET NUMBER 21 OF 160

Filename: ...\Figures\BLP-Border1.dgn Division: Bridge Username: common Date:11/12/2020



NOTES

1) See Boring Location Plan 1 of 2.

LEGEND

- BB-MSJR-302, BB-MSJR-214 — Location and designation of completed 200-Series and 300-Series cased wash boring
- BB-MSJR-102 — Location and designation of preliminary 100-Series cased wash boring
- ×——× — Geophysical Survey line along the proposed alignment
- - - - - - - - - - — Geophysical Survey line parallel to the river flow

PLAN

50 0 50 100

Scale in Feet

MADAWASKA BRIDGE NO. 2399
MAINEDOT WIN 21736.00
MADAWASKA, ME AND EDMUNDSTON, NB

BORING LOCATION PLAN 2 OF 2

PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		PREPARED FOR: HNTB	
PROJ MGR: NVW	REVIEWED BY: ARB	CHECKED BY: CLS	FIG 3
DESIGNED BY: NVW	DRAWN BY: NVW	SCALE: AS SHOWN	
DATE: 11/13/2020	PROJECT NO. 09.0025984.03	REVISION NO. 0	SHEET NO. 3 OF 5

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

2173600

MAINEDOT BR. NO. 2399
NBDTI ASSET NO. E320

WIN 021736.00

BRIDGE PLANS

CHRISTOPHER L. SCOTT No. 7275 LICENSED PROFESSIONAL ENGINEER STATE OF MAINE

	BY	DATE
PROJ. MANAGER	A. LATHE	
DESIGN-DETAILED	NVW	7/20
CHECKED-REVIEWED	ARB	5/20
DESIGN2-DETAILED2	CLS	
DESIGN3-DETAILED3		
REVISIONS 1		
REVISIONS 2		
REVISIONS 3		
REVISIONS 4		
FIELD CHANGES		

SIGNATURE
7275
P.E. NUMBER
October 30, 2020
DATE

INTERNATIONAL BRIDGE
SAINT JOHN RIVER
MADAWASKA, ME EDMUNDSTON, NB

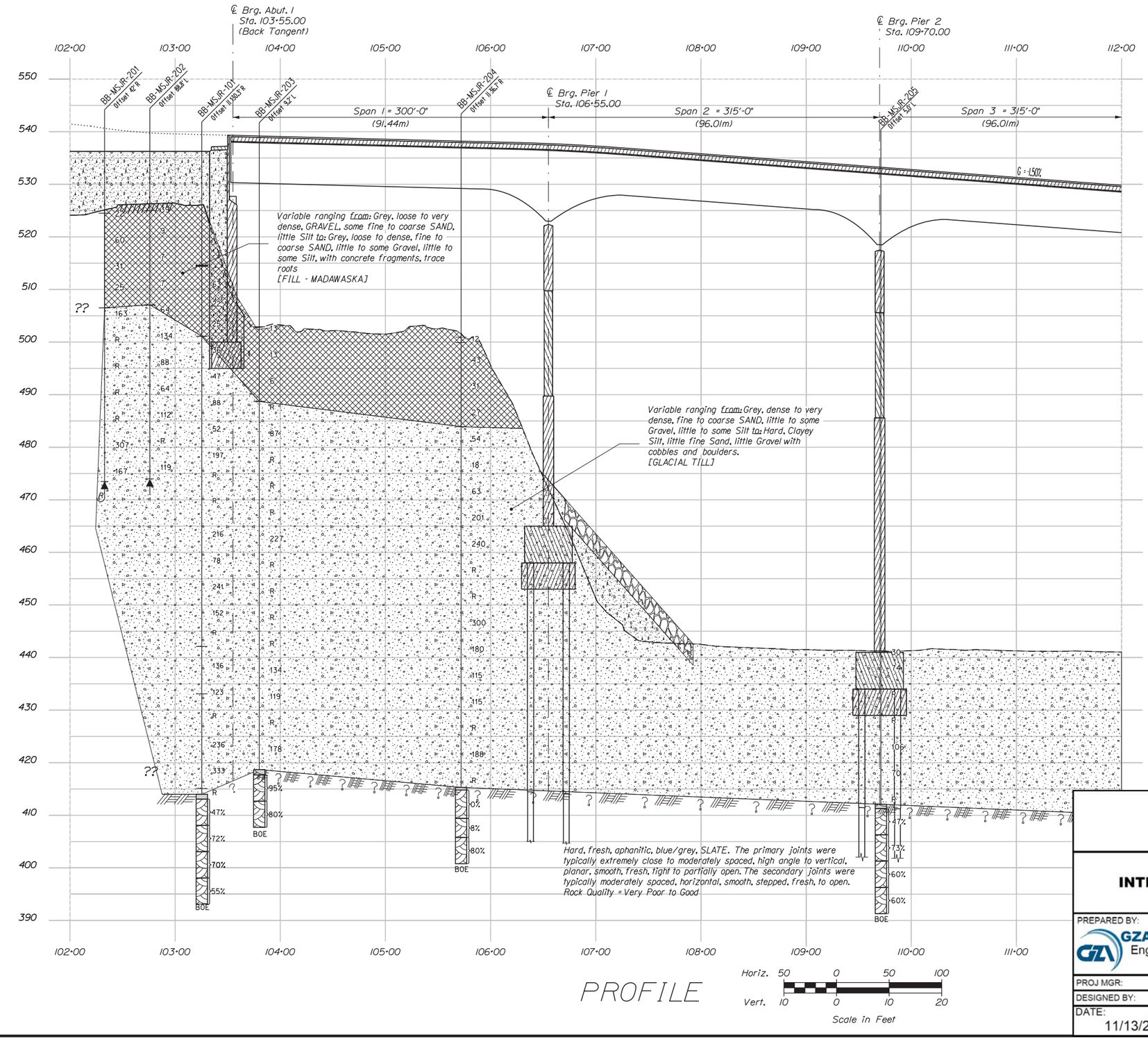
BORING LOCATION PLAN 2 OF 2

PREPARED BY: GZA

SHEET NUMBER
22
OF 160

Filename: ...\Figures\BLP-Border2.dgn Division: Bridge Username: common Date:11/12/2020

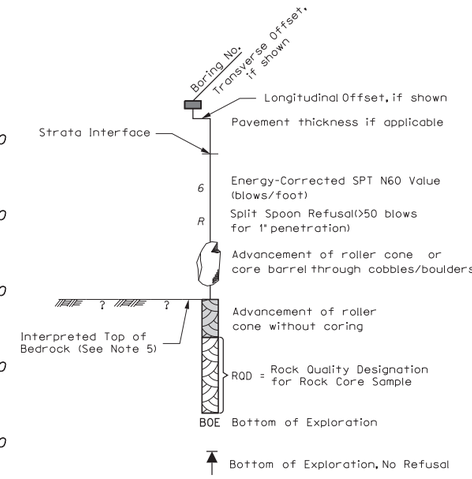
Division: Bridge Username: common Date:11/12/2020



PROFILE

Horiz. 50 0 50 100
Vert. 10 0 10 20
Scale in Feet

INTERPRETIVE SUBSURFACE PROFILE LEGEND



NOTES

1) Base map developed from electronic files provided by HNTB on September 10, 2020 (Files included Profiles.dgn).

2) BB-MSJR-100 series bridge borings were performed by New England Boring Contractors and observed by GZA personnel between August 28 and September 5, 2018.

3) BB-MSJR-200 and -300 series bridge borings were performed by New England Boring Contractors or Logan Drilling Group, and observed by GZA personnel between October 28, 2019 and March 3, 2020, and June 10 and June 11, 2020.

4) BB-MSJR-101, -102, -204, -208 through -213, -301, and -302 station and offsets are measured parallel to slope/river with respect to the bridge alignment.

5) This generalized interpretive soil profile is intended to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized, and have been developed by interpretations of widely spaced explorations and samples. Actual soil and bedrock transitions may vary and are probably more erratic. For more specific information refer to the exploration logs.

MADAWASKA BRIDGE NO. 2399
MAINEDOT WIN 21736.00
MADAWASKA, ME AND EDMUNDSTON, NB

INTERPRETIVE SUBSURFACE PROFILE 1 OF 2

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:
HNTB

PROJ MGR: NVW	REVIEWED BY: ARB	CHECKED BY: CLS	FIG 4
DESIGNED BY: NVW	DRAWN BY: NVW	SCALE: AS SHOWN	SHEET NO. 4 OF 5
DATE: 11/13/2020	PROJECT NO. 09.0025984.03	REVISION NO. 0	

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION
2173600
WIN 021736.00
BRIDGE PLANS
MAINEDOT BR. NO. 2399
NBDOT ASSET NO. E320

CHRISTOPHER L. SOLAN No. 7275 LICENSED PROFESSIONAL ENGINEER STATE OF MAINE

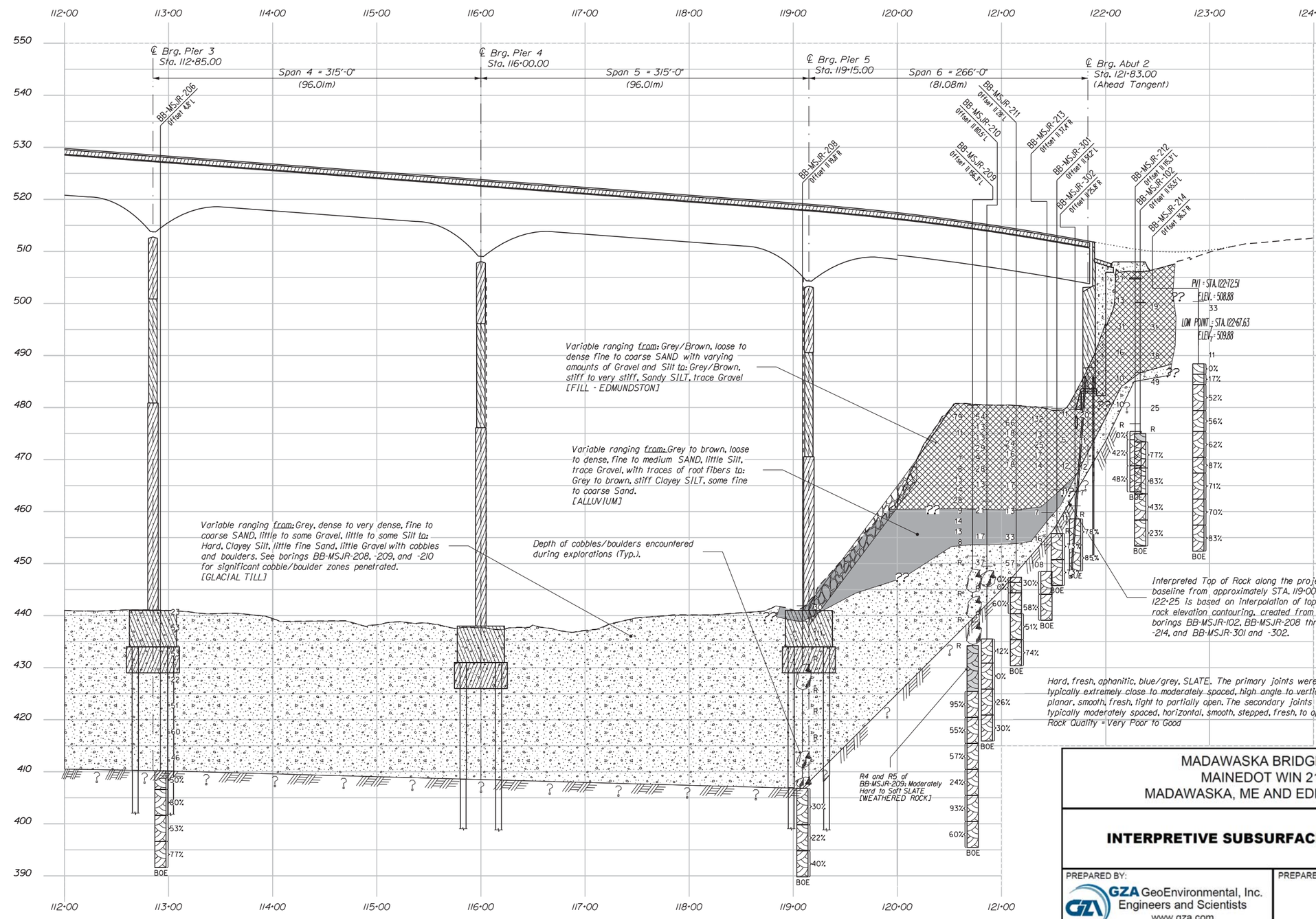
	SIGNATURE	P.E. NUMBER	DATE
		7275	October 30, 2020

	BY	DATE
A. Lothe		
PROJ. MANAGER	NVW	7/20
DESIGN-DETAILED	CLS	5/20
CHECKED-REVIEWED	ARB	
DESIGN2-DETAILED2		
DESIGN3-DETAILED3		
REVISIONS 1		
REVISIONS 2		
REVISIONS 3		
REVISIONS 4		
FIELD CHANGES		

INTERNATIONAL BRIDGE
SAINT JOHN RIVER
MADAWASKA, ME EDMUNDSTON, NB
INTERPRETIVE SUBSURFACE PROFILE 1 OF 2

SHEET NUMBER
23
OF 160

Division: Bridge Username: common Date:11/12/2020



NOTES

1) See Interpretive Subsurface Profile 1 of 2.

Horiz. 50 0 50 100
Vert. 10 0 10 20
Scale in Feet

PROFILE

MADAWASKA BRIDGE NO. 2399
MAINEDOT WIN 21736.00
MADAWASKA, ME AND EDMUNDSTON, NB

INTERPRETIVE SUBSURFACE PROFILE 2 OF 2

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:
HNTB

PROJ MGR: NVW	REVIEWED BY: ARB	CHECKED BY: CLS	FIG 5
DESIGNED BY: NVW	DRAWN BY: NVW	SCALE: AS SHOWN	SHEET NO. 5 OF 5
DATE: 11/13/2020	PROJECT NO. 09.0025984.03	REVISION NO. 0	

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

2173600

WIN 021736.00

BRIDGE PLANS

MAINEDOT BR. NO. 2399
NBDOT ASSET NO. E320

STATE OF MAINE — CHRISTOPHER L. LOTHEL — No. 7275 — LICENSED PROFESSIONAL ENGINEER

SIGNATURE
7275
P.E. NUMBER
October 30, 2020
DATE

	BY	DATE
PROJ. MANAGER	A. Lothel	
DESIGN-DETAILED	NVW	7/20
CHECKED-REVIEWED	CLS	5/20
DESIGN2-DETAILED2	ARB	
DESIGN3-DETAILED3		
REVISIONS 1		
REVISIONS 2		
REVISIONS 3		
REVISIONS 4		
FIELD CHANGES		

INTERNATIONAL BRIDGE
SAINT JOHN RIVER
MADAWASKA, ME EDMUNDSTON, NB

INTERPRETIVE SUBSURFACE PROFILE 2 OF 2

SHEET NUMBER
24
OF 160

APPENDIX A – LIMITATIONS

GEOTECHNICAL LIMITATIONS

Use of Report

1. GZA GeoEnvironmental, Inc. (GZA) prepared this report on behalf of, and for the exclusive use of our Client for the stated purpose(s) and location(s) identified in the Proposal for Services and/or Report. Use of this report, in whole or in part, at other locations, or for other purposes, may lead to inappropriate conclusions; and we do not accept any responsibility for the consequences of such use(s). Further, reliance by any party not expressly identified in the contract documents, for any use, without our prior written permission, shall be at that party's sole risk, and without any liability to GZA.

Standard of Care

2. GZA's findings and conclusions are based on the work conducted as part of the Scope of Services set forth in Proposal for Services and/or Report, and reflect our professional judgment. These findings and conclusions must be considered not as scientific or engineering certainties, but rather as our professional opinions concerning the limited data gathered during the course of our work. If conditions other than those described in this report are found at the subject location(s), or the design has been altered in any way, GZA shall be so notified and afforded the opportunity to revise the report, as appropriate, to reflect the unanticipated changed conditions.

3. GZA's services were performed using the degree of skill and care ordinarily exercised by qualified professionals performing the same type of services, at the same time, under similar conditions, at the same or a similar property. No warranty, expressed or implied, is made.

4. In conducting our work, GZA relied upon certain information made available by public agencies, Client and/or others. GZA did not attempt to independently verify the accuracy or completeness of that information. Inconsistencies in this information which we have noted, if any, are discussed in the Report.

Subsurface Conditions

5. The generalized soil profile(s) provided in our Report are based on widely-spaced subsurface explorations and are intended only to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized, and were based on our assessment of subsurface conditions. The composition of strata, and the transitions between strata, may be more variable and more complex than indicated. For more specific information on soil conditions at a specific location refer to the exploration logs. The nature and extent of variations between these explorations may not become evident until further exploration or construction. If variations or other latent conditions then become evident, it will be necessary to reevaluate the conclusions and recommendations of this report.

6. In preparing this report, GZA relied on certain information provided by the Client, state and local officials, and other parties referenced therein which were made available to GZA at the time of our evaluation. GZA did not attempt to independently verify the accuracy or completeness of all information reviewed or received during the course of this evaluation.

7. Water level readings have been made in test holes (as described in this Report) and monitoring wells at the specified times and under the stated conditions. These data have been reviewed and interpretations have been made in this Report. Fluctuations in the level of the groundwater however occur due to temporal or spatial variations in areal recharge rates, soil heterogeneities, the presence of subsurface utilities, and/or natural or artificially induced perturbations. The water table encountered in the course of the work may differ from that indicated in the Report.

8. GZA's services did not include an assessment of the presence of oil or hazardous materials at the property. Consequently, we did not consider the potential impacts (if any) that contaminants in soil or groundwater may have on construction activities, or the use of structures on the property.

9. Recommendations for foundation drainage, waterproofing, and moisture control address the conventional geotechnical engineering aspects of seepage control. These recommendations may not preclude an environment that allows the infestation of mold or other biological pollutants.

Compliance with Codes and Regulations

10. We used reasonable care in identifying and interpreting applicable codes and regulations. These codes and regulations are subject to various, and possibly contradictory, interpretations. Compliance with codes and regulations by other parties is beyond our control.

Cost Estimates

11. Unless otherwise stated, our cost estimates are only for comparative and general planning purposes. These estimates may involve approximate quantity evaluations. Note that these quantity estimates are not intended to be sufficiently accurate to develop construction bids, or to predict the actual cost of work addressed in this Report. Further, since we have no control over either when the work will take place or the labor and material costs required to plan and execute the anticipated work, our cost estimates were made by relying on our experience, the experience of others, and other sources of readily available information. Actual costs may vary over time and could be significantly more, or less, than stated in the Report.

Additional Services

12. GZA recommends that we be retained to provide services during any future: site observations, design, implementation activities, construction and/or property development/redevelopment. This will allow us the opportunity to: i) observe conditions and compliance with our design concepts and opinions; ii) allow for changes in the event that conditions are other than anticipated; iii) provide modifications to our design; and iv) assess the consequences of changes in technologies and/or regulations.

APPENDIX B – GZA BORING LOGS

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES
COARSE-GRAINED SOILS (more than half of material is larger than No. 4 sieve size)	GRAVELS (more than half of coarse fraction is larger than No. 4 sieve size)	CLEAN GRAVELS (little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines.
			GP	Poorly-graded gravels, gravel sand mixtures, little or no fines.
		GRAVEL WITH FINES (Appreciable amount of fines)	GM	Silty gravels, gravel-sand-silt mixtures.
			GC	Clayey gravels, gravel-sand-clay mixtures.
	SANDS (more than half of coarse fraction is smaller than No. 4 sieve size)	CLEAN SANDS (little or no fines)	SW	Well-graded sands, Gravelly sands, little or no fines
			SP	Poorly-graded sands, Gravelly sand, little or no fines.
		SANDS WITH FINES (Appreciable amount of fines)	SM	Silty sands, sand-silt mixtures
			SC	Clayey sands, sand-clay mixtures.
FINE-GRAINED SOILS (more than half of material is smaller than No. 200 sieve size)	SILTS AND CLAYS (liquid limit less than 50)		ML	Inorganic silts and very fine sands, rock flour, Silty or Clayey fine sands, or Clayey silts with slight plasticity.
			CL	Inorganic clays of low to medium plasticity, Gravelly clays, Sandy clays, Silty clays, lean clays.
			OL	Organic silts and organic Silty clays of low plasticity.
	SILTS AND CLAYS (liquid limit greater than 50)		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, organic silts.
	HIGHLY ORGANIC SOILS		Pt	Peat and other highly organic soils.

Desired Soil Observations (in this order, if applicable):

Color (Munsell color chart)
Moisture (dry, damp, moist, wet)
Density/Consistency (from above right hand side)
Texture (fine, medium, coarse, etc.)
Name (Sand, Silty Sand, Clay, etc., including portions - trace, little, etc.)
Gradation (well-graded, poorly-graded, uniform, etc.)
Plasticity (non-plastic, slightly plastic, moderately plastic, highly plastic)
Structure (layering, fractures, cracks, etc.)
Bonding (well, moderately, loosely, etc.,)
Cementation (weak, moderate, or strong)
Geologic Origin (till, marine clay, alluvium, etc.)
Groundwater level

MODIFIED BURMISTER SYSTEM

Descriptive Term	Portion of Total (%)
trace	0 - 10
little	11 - 20
some	21 - 35
adjective (e.g. Sandy, Clayey)	36 - 50

TERMS DESCRIBING DENSITY/CONSISTENCY

Coarse-grained soils (more than half of material is larger than No. 200 sieve): Includes (1) clean gravels; (2) Silty or Clayey gravels; and (3) Silty, Clayey or Gravelly sands. Density is rated according to standard penetration resistance (N-value).

Density of Cohesionless Soils	Standard Penetration Resistance N-Value (blows per foot)
Very loose	0 - 4
Loose	5 - 10
Medium Dense	11 - 30
Dense	31 - 50
Very Dense	> 50

Fine-grained soils (more than half of material is smaller than No. 200 sieve): Includes (1) inorganic and organic silts and clays; (2) Gravelly, Sandy or Silty clays; and (3) Clayey silts. Consistency is rated according to undrained shear strength as indicated.

Consistency of Cohesive soils	SPT N-Value (blows per foot)	Approximate Undrained Shear Strength (psf)	Field Guidelines
Very Soft	WOH, WOR, WOP, <2	0 - 250	Fist easily penetrates
Soft	2 - 4	250 - 500	Thumb easily penetrates
Medium Stiff	5 - 8	500 - 1000	Thumb penetrates with moderate effort
Stiff	9 - 15	1000 - 2000	Indented by thumb with great effort
Very Stiff	16 - 30	2000 - 4000	Indented by thumbnail
Hard	>30	over 4000	Indented by thumbnail with difficulty

Rock Quality Designation (RQD):

$$\text{RQD (\%)} = \frac{\text{sum of the lengths of intact pieces of core* > 4 inches}}{\text{length of core advance}}$$

*Minimum NQ rock core (1.88 in. OD of core)

Rock Quality Based on RQD

Rock Quality	RQD (%)
Very Poor	≤25
Poor	26 - 50
Fair	51 - 75
Good	76 - 90
Excellent	91 - 100

Desired Rock Observations (in this order, if applicable):

Color (Munsell color chart)
Texture (aphanitic, fine-grained, etc.)
Rock Type (granite, schist, sandstone, etc.)
Hardness (very hard, hard, mod. hard, etc.)
Weathering (fresh, very slight, slight, moderate, mod. severe, severe, etc.)
Geologic discontinuities/jointing:
- -dip (horiz - 0-5 deg., low angle - 5-35 deg., mod. dipping - 35-55 deg., steep - 55-85 deg., vertical - 85-90 deg.)
- -spacing (very close - <2 inch, close - 2-12 inch, mod. close - 1-3 feet, wide - 3-10 feet, very wide >10 feet)
- -tightness (tight, open, or healed)
- -infilling (grain size, color, etc.)

Formation (Waterville, Ellsworth, Cape Elizabeth, etc.)
RQD and correlation to rock quality (very poor, poor, etc.)
ref: ASTM D6032 and FHWA NHI-16-072 GEC 5 - Geotechnical Site Characterization, Table 4-12
Recovery (inch/inch and percentage)
Rock Core Rate (X.X ft - Y.Y ft (min:sec))

Maine Department of Transportation
Geotechnical Section
Key to Soil and Rock Descriptions and Terms
Field Identification Information

Sample Container Labeling Requirements:

WIN
Bridge Name / Town
Boring Number
Sample Number
Sample Depth
Blow Counts
Sample Recovery
Date
Personnel Initials

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: International Bridge Replacement
Bridge Street over St. John River
Location: Madawaska, ME - Edmundston, NB

Boring No.: BB-MSJR-101

WIN: 021736.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	515 (est.)	**Auger ID/OD:**	4.5" SSA
Operator:	Mike Porter	**Datum:**	NAVD 88	**Sampler:**	Standard Splitspoon
Logged By:	N. Williams	**Rig Type:**	Mobile B-24 Truck Rig	**Hammer Wt./Fall:**	140lb/30"
Date Start/Finish:	08-28-18/08-31-18	**Drilling Method:**	Drive & Wash	**Core Barrel:**	NQ
Boring Location:	N1285505.0, E2182895.2	**Casing ID/OD:**	4"/4.5"	**Water Level*:**	25.0'
Hammer Efficiency Factor:	0.937	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample Attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample Attempt
V = Field Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Field Vane Shear Test Attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = Weight of 140lb. Hammer
WOR/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/18	0.0 - 2.0	11-21-19-15	40	62	SSA			Grey, dry, very dense, GRAVEL, some fine to coarse sand, little silt, one 3/4" piece of Gravel, (Fill).	G#1 A-1-b, GM WC=4.2
	2D	24/12	4.5 - 6.5	5-6-8-7	14	22				Grey, dry, medium dense, fine to coarse SAND, some silt, some gravel, (Fill). Intermittent increases in resistance during roller cone advancement from 6.5'-10.0', indicating possible cobbles.	G#2 A-2-4, SM WC=11.7
5							51				
							40				
							56				
							103				
							66				
10	3D	24/12	10.0 - 12.0	9-8-8-10	16	25	41			Grey, moist, medium dense, medium to coarse SAND, some silt, little gravel, (Fill).	
							46				
							55				
							48	501.5		13.5	
							68				
15	4D	24/8	15.0 - 17.0	15-13-10-12	23	36	27			Grey, moist, dense, fine to coarse SAND, some gravel, little silt, (Glacial Till).	G#3 A-1-a, SM
							58				
							48				
							54				
							63				
20	5D	24/9	20.0 - 22.0	12-15-15-17	30	47	36			Grey, wet, hard, Clayey SILT, little fine sand, little gravel, (Glacial Till).	A-4, ML-CL LL=20 PL=14 PI=6
							59				
							85				
							116				
25							127				

Remarks:

1. Automatic Hammer NEBC #B-24 ETR = 0.937, calibrated on 7/3/18.
2. Reported water level was measured immediately after casing was removed.
3. PLD refers to point load diametrical and PLA refers to point load axial test, q_p is estimated from the point load strength.
4. Fine-Grained Soil Descriptions on this log are based on plasticity estimated using visual-manual classification techniques or laboratory Atterberg Limit tests if available, rather than the MaineDOT Standard based on percentages passing specific grain sizes.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: International Bridge Replacement
Bridge Street over St. John River
Location: Madawaska, ME - Edmundston, NB

Boring No.: BB-MSJR-101

WIN: 021736.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	515 (est.)	**Auger ID/OD:**	4.5" SSA
Operator:	Mike Porter	**Datum:**	NAVD 88	**Sampler:**	Standard Splitspoon
Logged By:	N. Williams	**Rig Type:**	Mobile B-24 Truck Rig	**Hammer Wt./Fall:**	140lb/30"
Date Start/Finish:	08-28-18/08-31-18	**Drilling Method:**	Drive & Wash	**Core Barrel:**	NQ
Boring Location:	N1285505.0, E2182895.2	**Casing ID/OD:**	4"/4.5"	**Water Level*:**	25.0'
Hammer Efficiency Factor: 0.937		**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
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MD = Unsuccessful Split Spoon Sample Attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample Attempt
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SSA = Solid Stem Auger
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WOR/C = Weight of Rods or Casing
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$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
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Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
25	6D	24/8	25.0 - 27.0	35-29-27-33	56	87	76			Grey, wet, very dense, Silty fine to coarse SAND, some gravel, (Glacial Till).	G#5 A-4, SM
							106				
							120				
							122				
							96				
30	7D	24/12	30.0 - 32.0	25-16-17-25	33	52	RC			Grey, wet, hard, Clayey SILT, little gravel, little fine sand, (Glacial Till).	
35	8D	24/16	35.0 - 37.0	40-45-81-77	126	197				Grey to tan, wet, very dense, fine to coarse SAND, some silt, little gravel (Glacial Till).	
40	9D	14/14	40.0 - 41.2	48-104-75/2"	-					Grey and tan, wet, very dense, Silty fine to coarse SAND, little gravel, (Glacial Till). Increase in resistance during roller c one advancement from 42.2'-42.7', with black rock chips in wash return indicating possible cobbles/ boulders.	
45	10D	13/12	45.0 - 46.1	78-113-50/1"	-					Grey and tan, wet, very dense, Silty fine to medium SAND, some gravel, clay seams, (Glacial Till).	
50											

Remarks:

1. Automatic Hammer NEBC #B-24 ETR = 0.937, calibrated on 7/3/18.
2. Reported water level was measured immediately after casing was removed.
3. PLD refers to point load diametrical and PLA refers to point load axial test, q_p is estimated from the point load strength.
4. Fine-Grained Soil Descriptions on this log are based on plasticity estimated using visual-manual classification techniques or laboratory Atterberg Limit tests if available, rather than the

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: International Bridge Replacement
Bridge Street over St. John River
Location: Madawaska, ME - Edmundston, NB

Boring No.: BB-MSJR-101

WIN: 021736.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	515 (est.)	**Auger ID/OD:**	4.5" SSA
Operator:	Mike Porter	**Datum:**	NAVD 88	**Sampler:**	Standard Splitspoon
Logged By:	N. Williams	**Rig Type:**	Mobile B-24 Truck Rig	**Hammer Wt./Fall:**	140lb/30"
Date Start/Finish:	08-28-18/08-31-18	**Drilling Method:**	Drive & Wash	**Core Barrel:**	NQ
Boring Location:	N1285505.0, E2182895.2	**Casing ID/OD:**	4"/4.5"	**Water Level*:**	25.0'
Hammer Efficiency Factor: 0.937		**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample Attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample Attempt
V = Field Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Field Vane Shear Test Attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = Weight of 140 lb. Hammer
WOR/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
50	11D	21/12	50.0 - 51.8	45-58-80-90/3"	138	216				Grey and tan, wet, very dense, fine to coarse SAND, some silt, some gravel. Sand seam in bottom of spoon sample, (Glacial Till).	G#6 A-2-4, SC-SM
55	12D	24/16	55.0 - 57.0	24-26-24-40	50	78				Grey and tan, wet, very dense, Gravelly fine to coarse SAND, little silt, (Glacial Till).	G#7 A-1-b, SM
60	13D	23/13	60.0 - 61.9	59-83-71-130/5"	154	240				Grey and tan, wet, very dense, Silty fine to coarse SAND, some gravel, (Glacial Till).	
65	14D	24/18	65.0 - 67.0	51-41-56-65	97	151				Grey and tan, wet, very dense, Silty fine to coarse SAND, some gravel, (Glacial Till).	
70	15D	15/15	70.0 - 71.3	84-84-100/3"	-					Grey, wet, very dense, Silty fine to coarse SAND, some gravel, (Glacial Till). From 72.5'-76.8', fine sand in wash water return with gravel lenses observed during roller cone advancement.	
75											

Remarks:

1. Automatic Hammer NEBC #B-24 ETR = 0.937, calibrated on 7/3/18.
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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: International Bridge Replacement
Bridge Street over St. John River
Location: Madawaska, ME - Edmundston, NB

Boring No.: BB-MSJR-101

WIN: 021736.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	515 (est.)	**Auger ID/OD:**	4.5" SSA
Operator:	Mike Porter	**Datum:**	NAVD 88	**Sampler:**	Standard Splitspoon
Logged By:	N. Williams	**Rig Type:**	Mobile B-24 Truck Rig	**Hammer Wt./Fall:**	140lb/30"
Date Start/Finish:	08-28-18/08-31-18	**Drilling Method:**	Drive & Wash	**Core Barrel:**	NQ
Boring Location:	N1285505.0, E2182895.2	**Casing ID/OD:**	4"/4.5"	**Water Level*:**	25.0'
Hammer Efficiency Factor: 0.937		**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = Weight of 140 lb. Hammer
WOR/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
75	16D	24/24	75.0 - 77.0	16-38-49-88	87	136				Olive, wet, very dense, Silty fine to medium SAND, trace gravel, silt lenses, organic odor, (Glacial Till).	G#8 A-4, SM
80	17D	24/20	80.0 - 82.0	30-31-48-30	79	123				Olive, wet, very dense, fine to medium SAND, little silt, organic odor, (Glacial Till).	
85	18D	13/8	85.0 - 86.1	45-129-50/1"	-					Grey and tan, wet, very dense, fine to coarse SAND, some silt, some gravel, (Glacial Till). Increased resistance during roller cone advancement from 86.1'-86.4', indicating possible cobbles/boulders.	
90	19D	24/19	90.0 - 92.0	67-65-86-131	151	236				Grey and tan, wet, very dense, fine to coarse SAND, some gravel, little silt, (Glacial Till).	G#9 A-1-b, SM
95	20D	24/12	95.0 - 97.0	69-75-138-130	213	333				Grey and tan, wet, very dense, fine to coarse SAND, some silt, some gravel, (Glacial Till).	
100											

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: International Bridge Replacement
Bridge Street over St. John River
Location: Madawaska, ME - Edmundston, NB

Boring No.: BB-MSJR-101

WIN: 021736.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	515 (est.)	**Auger ID/OD:**	4.5" SSA
Operator:	Mike Porter	**Datum:**	NAVD 88	**Sampler:**	Standard Splitspoon
Logged By:	N. Williams	**Rig Type:**	Mobile B-24 Truck Rig	**Hammer Wt./Fall:**	140lb/30"
Date Start/Finish:	08-28-18/08-31-18	**Drilling Method:**	Drive & Wash	**Core Barrel:**	NQ
Boring Location:	N1285505.0, E2182895.2	**Casing ID/OD:**	4"/4.5"	**Water Level*:**	25.0'
Hammer Efficiency Factor:	0.937	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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WO1P = Weight of One Person
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$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
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C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
100	21D	7/6	100.0 - 100.6	100-75/1"	-		RC	414.4		Olive, wet, very dense, fine to medium SAND, some silt, trace gravel, vertically fractured gravel in tip of spoon, (Glacial Till).	q_p=284 ksf
	R1	60/60	101.5 - 106.5	RQD = 47%			NQ			100.6 Split spoon refusal with vertically fractured rock in tip of spoon indicates probable bedrock encountered at 100.6'. Advanced roller cone from 100.6 to 101.5'. Practical roller cone refusal at 101.5'. Set up to core. R1: Hard, fresh, aphanitic, blue/grey, SLATE. Primary joints are extremely close to moderately spaced, high angle to vertical, planar, rough, fresh, tight to partially open. Secondary are moderately spaced, horizontal, smooth, stepped, fresh, open. -SANGERVILLE FORMATION- Rock Quality = Poor Recovery: 100% Rock Core Times (min:sec): 101.5-102.5' (6:47), 102.5-103.5' (2:22), 103.5-104.5' (4:05), 104.5-105.5' (2:42), 105.5-106.5' (2:42)	PLD, q_p=276 ksf PLA, q_p=525 ksf
105											
	R2	60/60	106.5 - 111.5	RQD = 72%						R2: Hard, fresh, aphanitic, blue/grey, SLATE. Primary joints are close to moderately spaced, horizontal, planar/stepped, smooth, fresh, partially open to open. Secondary joints are high angle, undulating, rough, fresh, tight. -SANGERVILLE FORMATION- Rock Quality = Fair Recovery = 100% Rock Core Times (min:sec): 106.5-107.5' (4:14), 107.5-108.5' (2:16), 108.5-109.5' (1:54), 109.5'-110.5' (2:01), 110.5-111.5' (2:08)	q_p=376 ksf
110											
	R3	60/60	111.5 - 116.5	RQD = 70%						R3: Hard, fresh, aphanitic, blue/grey, SLATE. Primary joints are extremely close to moderately spaced, high angle to vertical, planar, rough, fresh, tight to partially open. Secondary are moderately spaced, horizontal, smooth, stepped, fresh, open. -SANGERVILLE FORMATION- Rock Quality = Fair Recovery: 100% Rock Core Times (min:sec): 111.5-112.5' (2:54), 112.5-113.5' (2:30), 113.5-114.5' (2:12), 113.5-114.5' (1:53), 114.5-115.5' (1:52)	PLD, q_p=1241 ksf PLA, q_p=1217 ksf
115											
	R4	60/60	116.5 - 121.5	RQD = 55%						R4: Hard, fresh, aphanitic, blue/grey, SLATE. Joints are close to moderately spaced, high angle to vertical, planar to undulating, rough, fresh, tight. -SANGERVILLE FORMATION- Rock Quality = Fair Recovery = 100% Rock Core Times (min:sec): 116.5-117.5' (2:35), 117.5-118.5' (2:09), 118.5-119.5' (1:40), 119.5-120.5' (1:42), 120.5-121.5' (1:39)	q_p=412 ksf
120											
								393.5		121.5 **Bottom of Exploration at 121.5 feet below ground surface.**	
125											

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: International Bridge Replacement
Bridge Street over St. John River
Location: Madawaska, ME - Edmundston, NB

Boring No.: BB-MSJR-102

WIN: 021736.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	507 (est.)	**Auger ID/OD:**	4.5" SSA
Operator:	Mike Porter	**Datum:**	NAVD 88	**Sampler:**	Standard Splitspoon
Logged By:	N. Williams	**Rig Type:**	Mobile B-24 Truck Rig	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	09-04-18/09-05-18	**Drilling Method:**	Drive & Wash	**Core Barrel:**	NQ
Boring Location:	N1286839.2, E2184097.0	**Casing ID/OD:**	4"/4.5"	**Water Level*:**	18.8'
Hammer Efficiency Factor:	0.937	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
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WOH = Weight of 140lb. Hammer
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$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
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LL = Liquid Limit
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G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/20	0.5 - 2.5	WOH-5-7-10	12	19	SSA	506.5		-TOPSOIL- 0.5 Grey, moist, medium dense, Gravelly fine to coarse SAND, little silt, (Fill).	G#10 A-1-a, SM WC=6.6
	2D	24/22	4.5 - 6.5	13-12-8-6	20	31				Grey, dry, dense, Silty fine to coarse SAND, some gravel, (Fill).	G#11 A-4, SM WC=8.7
5							52				
							29				
							28				
							47				
							72				
10	3D	24/10	10.0 - 12.0	12-12-12-10	24	37				Grey, wet, dense, Silty fine to coarse SAND, some gravel, (Fill).	
							40				
							49	493.5		13.5	
							32				
15	4D	24/10	15.0 - 17.0	15-14-17-12	31	48	29			Grey, wet, dense, fine to coarse SAND, some gravel, some silt, (Glacial Till).	G#12 A-1-b, SM WC=13.2
							32				
							24				
							26				
							68				
20	5D	24/22	20.0 - 22.0	4-3-13-18	16	25	42			Top 11": Silty fine to medium SAND, some silt, trace gravel. Bottom 11": Grey, wet, medium dense, Silty fine to coarse SAND, some gravel (Glacial Till).	
							52				
							79				
							102				
25							382				

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: International Bridge Replacement
Bridge Street over St. John River
Location: Madawaska, ME - Edmundston, NB

Boring No.: BB-MSJR-102

WIN: 021736.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	507 (est.)	**Auger ID/OD:**	4.5" SSA
Operator:	Mike Porter	**Datum:**	NAVD 88	**Sampler:**	Standard Splitspoon
Logged By:	N. Williams	**Rig Type:**	Mobile B-24 Truck Rig	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	09-04-18/09-05-18	**Drilling Method:**	Drive & Wash	**Core Barrel:**	NQ
Boring Location:	N1286839.2, E2184097.0	**Casing ID/OD:**	4"/4.5"	**Water Level*:**	18.8'
Hammer Efficiency Factor:	0.937	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
25	6D	2/2	25.0 - 25.2	75/2"	R		NQ	481.8		Grey, wet, Sandy GRAVEL, some silt, possible bedrock, vertically foliated rock fragments, (Glacial Till).	
	R1	60/60	26.8 - 31.8	RQD = 77%						25.2 Split spoon refusal with vertically foliated rock fragments in tip of spoon indicates probable bedrock. Increased resistance during roller cone advancement at 25.2'-26.8'. Blue rock chips in wash return. Set up to core. R1: Hard, fresh, aphanitic, blue/grey, SLATE. Joints are close to moderately spaced, high angle to vertical, undulating, rough, fresh, tight. -SANGERVILLE FORMATION- Rock Quality = Good Recovery = 100% Rock Core Times (min:sec): 26.8-27.8' (3:08), 27.8-28.8' (2:16), 28.8-29.8' (1:42), 29.8-30.8' (2:44), 30.8-31.8' (1:40)	
30	R2	60/60	31.8 - 36.8	RQD = 83%						R2: Hard, fresh, aphanitic, blue/grey, SLATE. Joints are moderately spaced, high angle, undulating, rough, fresh, open. -SANGERVILLE FORMATION- Rock Quality = Good Recovery = 100% Rock Core Times (min:sec): 31.8-32.8' (1:54), 32.8-33.8' (2:01), 33.8-34.8' (1:29), 34.8-35.8' (1:42), 35.8-36.8' (2:00)	q_p=140 ksf
35	R3	60/60	36.8 - 41.8	RQD = 43%						R3: Hard, fresh, aphanitic, blue/grey, SLATE. Joints are very close to moderately spaced, high angle to vertical, undulating, rough, fresh to discolored, partially open to open, gravel infilling. -SANGERVILLE FORMATION- Rock Quality = Poor Recovery = 100% Rock Core Times (min:sec): 36.8-37.8' (2:50), 37.8-38.8' (1:26), 38.8-39.8' (1:34), 39.8-40.8' (1:38), 40.8-41.8' (1:34)	
40	R4	60/60	41.8 - 46.8	RQD = 23%						R4: Hard, fresh, aphanitic, blue/grey, SLATE. Joints are extremely close to close, high angle to vertical, undulating, rough, fresh to discolored, open. -SANGERVILLE FORMATION- Rock Quality = Very Poor Recovery = 100% Rock Core Times (min:sec): 41.8-42.8' (2:30), 42.8-43.8' (1:31), 43.8-44.8' (3:30), 44.8-45.8' (2:11), 45.8-46.8' (1:53)	PLD q_p=86 ksf PLA q_p=308 ksf
45								460.2		46.8 **Bottom of Exploration at 46.8 feet below ground surface.**	
50											

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: International Bridge Replacement
Bridge Street over St. John River
Location: Madawaska, ME - Edmundston, NB

Boring No.: BB-MSJR-201

WIN: 021736.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	524.5	**Auger ID/OD:**	4.5"
Operator:	Brad Enos	**Datum:**	NAVD 88	**Sampler:**	Standard Splitspoon
Logged By:	N. Williams	**Rig Type:**	Mobile B-24 Track Rig	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	10/27/19 - 10/27/19	**Drilling Method:**	Drive & Wash	**Core Barrel:**	--
Boring Location:	N1285429.3, E2182758.7	**Casing ID/OD:**	4"/4.5"	**Water Level*:**	16.8'
Hammer Efficiency Factor:	0.895	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/12	0.0 - 2.0	5-8-7-10	15	22	SSA			Grey, dry, medium dense, fine to coarse SAND, some silt, some gravel, (Fill), with concrete pieces.	
5	2D	24/10	5.0 - 7.0	15-16-24-11	40	60				Grey, dry, very dense, fine to coarse SAND, some silt, some gravel, (Fill), with concrete pieces.	G#46 A-1-b, SM WC=6.3
										Solid stem auger was advanced to 10.0' prior to sampling 3D. Drive & Wash techniques were used from 12.0'-24.0'. Washed ahead prior to casing advancement.	
10	3D	24/18	10.0 - 12.0	11-12-9-8	21	31				Grey, dry, dense, fine to coarse SAND, some silt, some gravel, (Fill). Bottom 2": moist, fine to medium Sand.	
							RC				
15	4D	24/3	14.0 - 16.0	12-8-9-12	17	25				Grey, dry, medium dense, medium to coarse SAND, some gravel, little silt, (Fill).	
								506.5		18.0	
										Intermittent increases in resistance observed during roller cone advancement throughout Glacial Till, indicates possible cobbles throughout stratum.	
20	5D	24/10	19.0 - 21.0	34-83-26-19	109	163				Grey, wet, very dense, fine to coarse SAND, some silt, little gravel, (Glacial Till).	
25	6D	3/3	24.0 - 24.3	75/3"	-					Grey, wet, very dense, Sandy GRAVEL, little silt, (Glacial Till). Possible weathered boulder.	

Remarks:

1. Automatic hammer NEBC #D19 Energy Transfer Ratio = 0.895
2. Reported water level was measured 48 hours after casing was removed.
3. Fine-Grained Soil Descriptions on this log are based on plasticity estimated using visual-manual classification techniques or laboratory Atterberg Limit tests if available, rather than the MaineDOT Standard based on percentages passing specific grain sizes.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: International Bridge Replacement
Bridge Street over St. John River
Location: Madawaska, ME - Edmundston, NB

Boring No.: BB-MSJR-201

WIN: 021736.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	524.5	**Auger ID/OD:**	4.5"
Operator:	Brad Enos	**Datum:**	NAVD 88	**Sampler:**	Standard Splitspoon
Logged By:	N. Williams	**Rig Type:**	Mobile B-24 Track Rig	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	10/27/19 - 10/27/19	**Drilling Method:**	Drive & Wash	**Core Barrel:**	--
Boring Location:	N1285429.3, E2182758.7	**Casing ID/OD:**	4"/4.5"	**Water Level*:**	16.8'
Hammer Efficiency Factor:	0.895	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample Attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample Attempt
V = Field Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Field Vane Shear Test Attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = Weight of 140 lb. Hammer
WOR/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
25											
	7D	9/9	29.0 - 29.8	42-100/3"	-					Grey, wet, hard, SILT, little fine to coarse sand, trace gravel, (Glacial Till).	G#47 A-4, ML WC=12.2
30											
	8D	7/7	34.0 - 34.6	69-100/1"	-					Grey, wet, hard, SILT, some fine to coarse sand, trace gravel, (Glacial Till).	
35											
	9D	12/12	39.0 - 40.0	72-150/6"	-					Grey, wet, very dense, fine to coarse SAND, some gravel, some silt, (Glacial Till).	
40											
	10D	18/18	44.0 - 45.5	41-75-131	206	307				Grey, wet, very dense, fine to coarse SAND, some gravel, some Silt, (Glacial Till).	G#48 A-2-4, SM WC=7.7
45											
	11D	24/24	49.0 - 51.0	46-71-41-188	112	167				Grey, wet, very dense, Silty fine to coarse SAND, trace gravel, (Glacial Till).	
50											

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: International Bridge Replacement
Bridge Street over St. John River
Location: Madawaska, ME - Edmundston, NB

Boring No.: BB-MSJR-201

WIN: 021736.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	524.5	**Auger ID/OD:**	4.5"
Operator:	Brad Enos	**Datum:**	NAVD 88	**Sampler:**	Standard Splitspoon
Logged By:	N. Williams	**Rig Type:**	Mobile B-24 Track Rig	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	10/27/19 - 10/27/19	**Drilling Method:**	Drive & Wash	**Core Barrel:**	--
Boring Location:	N1285429.3, E2182758.7	**Casing ID/OD:**	4"/4.5"	**Water Level*:**	16.8'
Hammer Efficiency Factor:	0.895	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
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G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
50								473.5		51.0 **Bottom of Exploration at 51.0 feet below ground surface.**	
55											
60											
65											
70											
75											

Remarks:

1. Automatic hammer NEBC #D19 Energy Transfer Ratio = 0.895
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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: International Bridge Replacement
Bridge Street over St. John River
Location: Madawaska, ME - Edmundston, NB

Boring No.: BB-MSJR-202

WIN: 021736.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	525.1	**Auger ID/OD:**	4.5"
Operator:	Brad Enos	**Datum:**	NAVD 88	**Sampler:**	Standard Splitspoon
Logged By:	L. Navarrete	**Rig Type:**	Mobile B-53 Track Rig	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	10/27/19 - 10/27/19	**Drilling Method:**	Drive & Wash	**Core Barrel:**	--
Boring Location:	N1285531.2, E2182665.8	**Casing ID/OD:**	4"/4.5"	**Water Level*:**	19.8'
Hammer Efficiency Factor:	0.895	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = Weight of 140lb. Hammer
WOR/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/12	0.0 - 2.0	5-15-11-8	26	39	SSA			Brown, dry, dense, fine to coarse SAND, some silt, little gravel, trace roots, (Fill).	
	2D	24/14	4.0 - 6.0	4-3-3-2	6	9				Brown, dry, loose, fine to coarse SAND, some gravel, some silt, (Fill).	G#49 A-1-b, SM WC=8.5
5										Solid stem auger advanced to 10.0' prior to sampling 3D. Drive & Wash techniques were used from 12.0'-24.0'. Washed ahead prior to casing advancement.	
	3D	24/10	9.0 - 11.0	1-3-2-4	5	7				Brown, moist, loose, fine to coarse SAND, some gravel, some silt, (Fill).	G#50 A-1-b, SM WC=11.2
10											
	4D	24/3	14.0 - 16.0	4-3-2-2	5	7				Grey/brown, wet, loose, GRAVEL, some silt, little fine to coarse sand, (Fill).	
15							15				
							15				
							23				
							72	507.1		18.0	
	MD1	0/0	19.0 - 19.0	71/0"	43	64	93			Increase in resistance during roller cone advancement at 18.0' indicates possible strata change. Black water return at 18.0'. No recovery. Advanced roller cone to 19.5' prior to sampling 5D.	
20	5D	24/14	19.5 - 21.5	15-27-16-11			33			Grey, wet, very dense, fine to coarse SAND, some silt, little gravel, (Glacial Till).	
							94				
							73				
							217				
25	6D	24/15	24.0 - 26.0	50-42-48-38	90	134				Grey, wet, very dense, Silty fine to coarse SAND, trace gravel, (Glacial Till).	

Remarks:

1. Automatic hammer NEBC #D19 Energy Transfer Ratio = 0.895
2. Reported water level was measured 48 hours after casing was removed.
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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: International Bridge Replacement
Bridge Street over St. John River
Location: Madawaska, ME - Edmundston, NB

Boring No.: BB-MSJR-202

WIN: 021736.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	525.1	**Auger ID/OD:**	4.5"
Operator:	Brad Enos	**Datum:**	NAVD 88	**Sampler:**	Standard Splitspoon
Logged By:	L. Navarrete	**Rig Type:**	Mobile B-53 Track Rig	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	10/27/19 - 10/27/19	**Drilling Method:**	Drive & Wash	**Core Barrel:**	--
Boring Location:	N1285531.2, E2182665.8	**Casing ID/OD:**	4"/4.5"	**Water Level*:**	19.8'
Hammer Efficiency Factor:	0.895	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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WOH = Weight of 140 lb. Hammer
WOR/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
25											
	7D	24/9	29.0 - 31.0	28-33-26-26	59	88				Grey, wet, very dense, Silty fine to coarse SAND, little gravel, (Glacial Till).	
30											
	8D	24/13	34.0 - 36.0	14-19-24-19	43	64				Grey, wet, hard, SILT, some gravel, some fine to coarse sand, (Glacial Till).	G#51 A-4, ML WC=8.8
35											
	9D	24/14	39.0 - 41.0	22-33-42-40	75	112				Grey, wet, hard, SILT, some fine to coarse sand, little gravel, (Glacial Till).	
40											
	10D	14/9	44.0 - 45.2	27-28-23/2"	-					Grey, wet, hard, SILT, some fine to coarse sand, trace gravel, (Glacial Till).	
45											
	11D	24/18	49.0 - 51.0	40-44-36-43	80	119				Grey, wet, very dense, fine to coarse SAND, some silt, little gravel, (Glacial Till).	
50											

Remarks:

1. Automatic hammer NEBC #D19 Energy Transfer Ratio = 0.895
2. Reported water level was measured 48 hours after casing was removed.
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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: International Bridge Replacement
Bridge Street over St. John River
Location: Madawaska, ME - Edmundston, NB

Boring No.: BB-MSJR-202

WIN: 021736.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	525.1	**Auger ID/OD:**	4.5"
Operator:	Brad Enos	**Datum:**	NAVD 88	**Sampler:**	Standard Splitspoon
Logged By:	L. Navarrete	**Rig Type:**	Mobile B-53 Track Rig	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	10/27/19 - 10/27/19	**Drilling Method:**	Drive & Wash	**Core Barrel:**	--
Boring Location:	N1285531.2, E2182665.8	**Casing ID/OD:**	4"/4.5"	**Water Level*:**	19.8'
Hammer Efficiency Factor:	0.895	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = Weight of 140 lb. Hammer
WOR/C = Weight of Rods or Casing
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S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
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N-uncorrected = Raw Field SPT N-value
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WC = Water Content, percent
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Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
50								474.1		51.0	
										Bottom of Exploration at 51.0 feet below ground surface.	
55											
60											
65											
70											
75											

Remarks:

1. Automatic hammer NEBC #D19 Energy Transfer Ratio = 0.895
2. Reported water level was measured 48 hours after casing was removed.
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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: International Bridge Replacement
Bridge Street over St. John River
Location: Madawaska, ME - Edmundston, NB

Boring No.: BB-MSJR-203

WIN: 021736.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	502.9	**Auger ID/OD:**	4.5"
Operator:	Brad Enos	**Datum:**	NAVD 88	**Sampler:**	Standard Splitspoon
Logged By:	L. Navarrete	**Rig Type:**	Mobile B-53 Track Rig	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	10/31/19 - 11/06/19	**Drilling Method:**	Drive & Wash	**Core Barrel:**	NQ
Boring Location:	N1285583.7, E2182799.7	**Casing ID/OD:**	4"/4.5"	**Water Level*:**	9.7'
Hammer Efficiency Factor:	0.895	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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G = Grain Size Analysis
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Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/8	0.0 - 2.0	1-4-5-6	9	13	SSA			Brown, moist, medium dense, fine to coarse SAND, some gravel, little silt, (Fill).	G#52 A-1-b, SP-SM WC=2.0
5	2D	24/9	5.0 - 7.0	7-6-3-4	9	13				Brown, moist, medium dense, fine to coarse SAND, some silt, trace gravel, (Fill).	
										Solid stem auger was advanced to 10.0' prior to sampling 3D. Drive & Wash techniques were used beyond 12.0'. Washed ahead prior to casing advancement.	
10	3D	24/12	10.0 - 12.0	2-3-1-1	4	6	RC			Brown, wet, loose, Gravelly fine to coarse SAND, little silt, (Fill).	G#53 A-1-b, SM WC=10.6
								488.7		14.2	
15	4D	9/0	15.0 - 15.8	150-75/3"	-					Increased resistance during roller cone advancement indicates possible strata change at 14.2'. No recovery.	
20	5D	24/15	20.0 - 22.0	20-25-33-29	58	87				Grey, wet, hard, SILT, trace gravel, trace fine sand, (Glacial Till).	
25											

Remarks:

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US CUSTOMARY UNITS

Project: International Bridge Replacement
Bridge Street over St. John River
Location: Madawaska, ME - Edmundston, NB

Boring No.: BB-MSJR-203

WIN: 021736.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	502.9	**Auger ID/OD:**	4.5"
Operator:	Brad Enos	**Datum:**	NAVD 88	**Sampler:**	Standard Splitspoon
Logged By:	L. Navarrete	**Rig Type:**	Mobile B-53 Track Rig	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	10/31/19 - 11/06/19	**Drilling Method:**	Drive & Wash	**Core Barrel:**	NQ
Boring Location:	N1285583.7, E2182799.7	**Casing ID/OD:**	4"/4.5"	**Water Level*:**	9.7'
Hammer Efficiency Factor:	0.895	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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HSA = Hollow Stem Auger
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WOH = Weight of 140 lb. Hammer
WOR/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
25	6D	9/9	25.0 - 25.8	92-108/3"	-					Grey, wet, very stiff, SILT, little fine to coarse sand, little gravel, (Glacial Till).	
30	7D	5/3	30.0 - 30.4	100/5"	-					Grey, wet, very dense, fine to coarse SAND, little silt, trace gravel, (Glacial Till). Increased resistance during roller cone advancement from 30.0'-30.5' indicates possible cobbles.	
35	8D	6/6	35.0 - 35.5	106/6"	-					Grey, wet, very dense, Sandy GRAVEL, some silt, (Glacial Till).	G#54 A-2-4, GC-GM WC=7.1
40	9D	20/16	40.0 - 41.7	44-94-58-19/2"	152	227				Top 10": Grey, wet, hard, Sandy SILT, little gravel, (Glacial Till). Bottom 10": Grey, wet, very dense, Silty fine SAND, trace medium to coarse sand, little gravel, (Glacial Till).	
45	10D	6/6	45.0 - 45.5	150/6"	-					Grey, wet, very dense, fine to coarse SAND, some silt, little gravel, (Glacial Till).	
50											

Remarks:

1. Automatic hammer NEBC #D19 Energy Transfer Ratio = 0.895
2. Reported water level was measured 48 hours after casing was removed.
3. Fine-Grained Soil Descriptions on this log are based on plasticity estimated using visual-manual classification techniques or laboratory Atterberg Limit tests if available, rather than the MaineDOT Standard based on percentages passing specific grain sizes.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: International Bridge Replacement
Bridge Street over St. John River
Location: Madawaska, ME - Edmundston, NB

Boring No.: BB-MSJR-203

WIN: 021736.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	502.9	**Auger ID/OD:**	4.5"
Operator:	Brad Enos	**Datum:**	NAVD 88	**Sampler:**	Standard Splitspoon
Logged By:	L. Navarrete	**Rig Type:**	Mobile B-53 Track Rig	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	10/31/19 - 11/06/19	**Drilling Method:**	Drive & Wash	**Core Barrel:**	NQ
Boring Location:	N1285583.7, E2182799.7	**Casing ID/OD:**	4"/4.5"	**Water Level*:**	9.7'
Hammer Efficiency Factor:	0.895	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
D = Split Spoon Sample
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MU = Unsuccessful Thin Wall Tube Sample Attempt
V = Field Vane Shear Test, PP = Pocket Penetrometer
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R = Rock Core Sample
SSA = Solid Stem Auger
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WOH = Weight of 140 lb. Hammer
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S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
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N-uncorrected = Raw Field SPT N-value
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Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
50	11D	11/11	50.0 - 50.9	60-51/5"	-					Grey, wet, very dense, Silty fine to coarse SAND, little gravel, (Glacial Till).	
55	12D	8/8	55.0 - 55.7	72-48/2"	-					Grey, wet, very dense, fine to coarse SAND, some silt, little gravel, (Glacial Till).	
60	13D	14/14	60.0 - 61.2	90-47-43/2"	-					Grey, wet, hard, SILT, little fine to coarse sand, little gravel, (Glacial Till).	
65	14D	18/18	65.0 - 66.5	23-37-52	90	134				Grey, wet, very dense, fine to medium SAND, little silt, (Glacial Till).	
70	15D	24/20	70.0 - 72.0	28-39-41-73	80	119				Grey, wet, very dense, fine to medium SAND, little silt, (Glacial Till).	
75											

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Bridge Street over St. John River
Location: Madawaska, ME - Edmundston, NB

Boring No.: BB-MSJR-203

WIN: 021736.00

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Operator:	Brad Enos	**Datum:**	NAVD 88	**Sampler:**	Standard Splitspoon
Logged By:	L. Navarrete	**Rig Type:**	Mobile B-53 Track Rig	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	10/31/19 - 11/06/19	**Drilling Method:**	Drive & Wash	**Core Barrel:**	NQ
Boring Location:	N1285583.7, E2182799.7	**Casing ID/OD:**	4"/4.5"	**Water Level*:**	9.7'
Hammer Efficiency Factor: 0.895		**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
75	16D	8/6	75.0 - 75.7	85-50/2"	-					Grey, wet, very dense, fine to coarse SAND, some silt, little gravel, (Glacial Till). Increase in resistance during roller cone advancement from 74.7'-80.1' indicates possible cobbles/boulders.	
80	17D	24/20	80.2 - 82.2	62-57-62-61	119	178				Grey, wet, very dense, fine to coarse SAND, little silt, trace gravel, (Glacial Till).	
								418.7		84.2	
85	R1	60/60	85.2 - 90.2	RQD = 95%			NQ			Increase in resistance during roller cone advancement at 84.2'. Consistent dark grey rock fragments encountered at 84.2' indicates probable rock. Advanced roller cone from 84.2'-85.2'. Set up to core at 85.2'. R1: Medium hard, fresh, aphanitic, grey, SLATE. Joints are very close to moderately spaced, moderately dipping, planar, smooth, fresh, partially open to open, with silt infilling. -SANGERVILLE FORMATION- Rock Quality = Excellent Recovery = 100% Rock Core Times (min:sec): 85.2-86.2' (3:04), 86.2-87.2' (2:31), 87.2-88.2' (2:33), 88.2-89.2' (2:37), 89.2-90.2' (3:10)	
90	R2	60/60	90.2 - 95.2	RQD = 80%						R2: 90.2'-90.9': Fractured into 2"-3" size gravel pieces. 90.9'-95.2': Medium hard, fresh, aphanitic, grey, SLATE. Joints are moderately spaced, moderately dipping, planar, smooth, fresh, open. -SANGERVILLE FORMATION- Rock Quality = Good Recovery = 100% Rock Core Times (min:sec): 90.2-91.2' (5:06), 91.2-92.2' (5:06), 92.2-93.2' (4:00), 93.2-94.2' (4:17), 94.2-95.2' (4:19)	
95								407.7		95.2 **Bottom of Exploration at 95.2 feet below ground surface.**	
100											

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: International Bridge Replacement
Bridge Street over St. John River
Location: Madawaska, ME - Edmundston, NB

Boring No.: BB-MSJR-204

WIN: 021736.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	500.9	**Auger ID/OD:**	4.5"
Operator:	Brad Enos	**Datum:**	NAVD 88	**Sampler:**	Standard Splitspoon
Logged By:	L. Navarrete	**Rig Type:**	Mobile B-53 Track Rig	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	11/05/19-11/06/19	**Drilling Method:**	Drive & Wash	**Core Barrel:**	NQ
Boring Location:	N1285707.8, E2182979.1	**Casing ID/OD:**	4"/4.5"	**Water Level*:**	20.8'
Hammer Efficiency Factor:	0.895	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
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N-uncorrected = Raw Field SPT N-value
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N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
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WC = Water Content, percent
LL = Liquid Limit
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G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
				Sample Information							
0	1D	24/17	0.0 - 2.0	3-4-4-5	8	12		500.0		0-1": Ballast 1"-10": Black, moist, medium stiff, SILT, some fine to medium sand, little roots, little wood fragments, (Topsoil).	
							14			0.9 10"-17": Brown, dry, medium dense, fine to coarse SAND, little silt, trace gravel (Fill). 1D sampled with 3" splitspoon.	
							26				
							26				
	2D	24/13	4.0 - 6.0	12-14-15-16	29	43	25			Brown, wet, dense, fine to coarse SAND, little silt, trace gravel, (Fill). 2D sampled with 3" splitspoon.	
5							5				
							63				
							41				
							43				
	3D	24/14	9.0 - 11.0	7-8-13-11	21	31	44			Brown, wet, dense, fine to coarse SAND, little silt, little gravel, (Fill).	
10							34				
							54				
							58				
							65				
	4D	24/14	14.0 - 16.0	12-12-6-10	18	27	50			Top 4": Brown, wet, medium dense, fine to coarse SAND, little silt, little gravel, (Fill). Bottom 10": Brown, wet, medium dense, fine SAND, little silt, trace medium to coarse sand, (Fill).	
15							35				
							24				
							61	483.9		17.0 Increase in resistance during roller cone advancement indicates probable stratum change at 17.0'.	
							78				
	5D	24/14	19.0 - 21.0	13-14-22-17	36	54	101			Brown, wet, dense, Silty fine to coarse SAND, little gravel, (Glacial Till).	
20							79				
							83				
							143				
							166				
	6D	24/14	24.0 - 26.0	7-6-6-8	12	18	42			Grey, wet, very stiff, SILT, little fine to coarse sand, trace gravel, (Glacial Till).	
25											

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: International Bridge Replacement
Bridge Street over St. John River
Location: Madawaska, ME - Edmundston, NB

Boring No.: BB-MSJR-204

WIN: 021736.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	500.9	**Auger ID/OD:**	4.5"
Operator:	Brad Enos	**Datum:**	NAVD 88	**Sampler:**	Standard Splitspoon
Logged By:	L. Navarrete	**Rig Type:**	Mobile B-53 Track Rig	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	11/05/19-11/06/19	**Drilling Method:**	Drive & Wash	**Core Barrel:**	NQ
Boring Location:	N1285707.8, E2182979.1	**Casing ID/OD:**	4"/4.5"	**Water Level*:**	20.8'
Hammer Efficiency Factor: 0.895		**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
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Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
25							39				
							56				
							44				
							57				
	7D	24/2	29.0 - 31.0	18-17-25-66	42	63	83			Grey, wet, hard, SILT, some gravel, little sand, (Glacial Till).	G#55 A-4, ML WC=4.9
30							90				
							130				
							85				
							92				
	8D	18/16	34.0 - 35.5	57-58-77	135	201	72			Grey, wet, very dense, fine to coarse SAND, some silt, little gravel, (Glacial Till).	
35							67				
							114				
							94				
							108				
	9D	18/18	39.0 - 40.5	46-61-100	161	240	56			Grey, wet, hard, Sandy SILT, little gravel, (Glacial Till).	G#56 A-4, ML WC=10.6
40							116				
							120				
							131				
							475				
	10D	6/6	44.0 - 44.5	99/6"	-		RC			Grey, wet, very dense, fine to coarse SAND, some silt, trace gravel, (Glacial Till).	
45										Advanced roller cone prior to casing advancement from 44.5'-85.7'.	
	11D	12/12	49.0 - 50.0	59-117/6"	-					Grey, wet, very dense, fine to coarse SAND, some silt, little gravel, (Glacial Till).	
50											

Remarks:

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Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: International Bridge Replacement
Bridge Street over St. John River
Location: Madawaska, ME - Edmundston, NB

Boring No.: BB-MSJR-204

WIN: 021736.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	500.9	**Auger ID/OD:**	4.5"
Operator:	Brad Enos	**Datum:**	NAVD 88	**Sampler:**	Standard Splitspoon
Logged By:	L. Navarrete	**Rig Type:**	Mobile B-53 Track Rig	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	11/05/19-11/06/19	**Drilling Method:**	Drive & Wash	**Core Barrel:**	NQ
Boring Location:	N1285707.8, E2182979.1	**Casing ID/OD:**	4"/4.5"	**Water Level*:**	20.8'
Hammer Efficiency Factor: 0.895		**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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50											
	12D	18/14	54.0 - 55.5	37-62-139	201	300				Grey, wet, very dense, fine to coarse SAND, some silt, trace gravel, (Glacial Till).	
55											
	13D	19/14	59.0 - 60.6	38-59-62-15/1"	121	180				Grey, wet, very dense, fine to coarse SAND, some silt, trace gravel, (Glacial Till).	
60											
	14D	24/20	64.0 - 66.0	35-34-43-48	77	115				Grey, wet, hard, Sandy SILT, trace gravel, (Glacial Till).	G#57 A-4, ML WC=14.4
65											
	15D	24/24	69.0 - 71.0	25-35-42-54	77	115				Grey, wet, very dense, fine SAND, little silt, (Glacial Till).	
70											
	16D	12/12	74.0 - 75.0	37-104/6"	-					Grey, wet, very dense, fine SAND, some silt, trace gravel, (Glacial Till).	
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Project: International Bridge Replacement
Bridge Street over St. John River
Location: Madawaska, ME - Edmundston, NB

Boring No.: BB-MSJR-204

WIN: 021736.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	500.9	**Auger ID/OD:**	4.5"
Operator:	Brad Enos	**Datum:**	NAVD 88	**Sampler:**	Standard Splitspoon
Logged By:	L. Navarrete	**Rig Type:**	Mobile B-53 Track Rig	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	11/05/19-11/06/19	**Drilling Method:**	Drive & Wash	**Core Barrel:**	NQ
Boring Location:	N1285707.8, E2182979.1	**Casing ID/OD:**	4"/4.5"	**Water Level*:**	20.8'
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Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
75											
	17D	18/3	79.0 - 80.5	54-68-58	126	188				Brown, wet, very dense, fine to coarse SAND, little gravel, trace silt, (Glacial Till).	
80											
	18D	9/4	84.0 - 84.8	60-78/3"	-					Grey, wet, very dense, fine to coarse SAND, little silt, trace gravel, (Glacial Till).	
85											
								415.2		85.7	
	R1	64/64	86.1 - 91.4	RQD = 0%			NQ			Increase in roller cone resistance and dark grey rock fragments observed in wash return at 85.7', indicates rock. Advanced roller cone to 86.1', set up to core. R1: Medium hard, fresh, aphanitic, grey, SLATE. Joints are extremely close to closely spaced, high angle, planar, smooth, fresh, open. Highly fractured from 86.1'-87.6'. -SANGERVILLE FORMATION- Rock Quality = Very Poor Recovery = 100% Rock Core Times (min:sec): 86.1-87.1' (2:39), 87.1-88.1' (3:11), 88.1-89.1' (2:48), 89.1-90.1' (2:55), 90.1-91.1' (3:06), 91.1-91.4' (1:24)	
90											
	R2	44/44	91.4 - 95.1	RQD = 8%						R2: Medium hard, fresh to slightly weathered, aphanitic, grey, SLATE. Primary joints are very close to closely spaced, high angle, planar, smooth, fresh to discolored, partially open, with silt infilling. Secondary joints are moderately spaced, low angle, planar, smooth, fresh, open. -SANGERVILLE FORMATION- Rock Quality = Very Poor Recovery = 100% Rock Core Times (min:sec): 91.4-92.4' (3:14), 92.4-93.4' (3:05), 93.4-94.4' (3:04), 94.4-95.1' (2:52)	
95											
	R3	60/60	95.1 - 100.1	RQD = 80%						R3: Medium hard, fresh, aphanitic, grey, SLATE. Joints are close to moderately spaced, high angle to moderately dipping, planar, smooth, fresh, partially open to open. -SANGERVILLE FORMATION- Rock Quality = Good Recovery = 100% Rock Core Times (min:sec): 95.1-96.1' (2:45), 96.1-97.1' (3:15), 97.1-98.1' (2:06), 98.1-99.1' (2:23), 99.1-100.1' (2:36)	q_p=627 ksf
100											

Remarks:

1. Automatic hammer NEBC #D19 Energy Transfer Ratio = 0.895
2. Reported water level was measured 24 hours after casing was removed.
3. Fine-Grained Soil Descriptions on this log are based on plasticity estimated using visual-manual classification techniques or laboratory Atterberg Limit tests if available, rather than the MaineDOT Standard based on percentages passing specific grain sizes.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: International Bridge Replacement
Bridge Street over St. John River
Location: Madawaska, ME - Edmundston, NB

Boring No.: BB-MSJR-204

WIN: 021736.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	500.9	**Auger ID/OD:**	4.5"
Operator:	Brad Enos	**Datum:**	NAVD 88	**Sampler:**	Standard Splitspoon
Logged By:	L. Navarrete	**Rig Type:**	Mobile B-53 Track Rig	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	11/05/19-11/06/19	**Drilling Method:**	Drive & Wash	**Core Barrel:**	NQ
Boring Location:	N1285707.8, E2182979.1	**Casing ID/OD:**	4"/4.5"	**Water Level*:**	20.8'
Hammer Efficiency Factor:	0.895	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample Attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample Attempt
V = Field Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Field Vane Shear Test Attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = Weight of 140 lb. Hammer
WOR/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
100								400.8			
										Bottom of Exploration at 100.1 feet below ground surface.	
										100.1	
105											
110											
115											
120											
125											

Remarks:

1. Automatic hammer NEBC #D19 Energy Transfer Ratio = 0.895
2. Reported water level was measured 24 hours after casing was removed.
3. Fine-Grained Soil Descriptions on this log are based on plasticity estimated using visual-manual classification techniques or laboratory Atterberg Limit tests if available, rather than the MaineDOT Standard based on percentages passing specific grain sizes.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: International Bridge Replacement
Bridge Street over St. John River
Location: Madawaska, ME - Edmundston, NB

Boring No.: BB-MSJR-205

WIN: 021736.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	441.3	**Auger ID/OD:**	
Operator:	Brad Enos	**Datum:**	NAVD 88	**Sampler:**	Standard Splitspoon
Logged By:	N. Williams	**Rig Type:**	Elevated Platform - CME	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	10/29/19-10/30/19	**Drilling Method:**	Drive & Wash	**Core Barrel:**	NX
Boring Location:	N1285977.8, E2183232.4	**Casing ID/OD:**	4"/4.5"	**Water Level*:**	River
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

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SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = Weight of 140lb. Hammer
WOR/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
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N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
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C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/10	0.0 - 2.0	9-15-15-21	30	30		441.0		Top 4": River Rock (0.3)	G#21 A-4, SM
										Grey/blue, wet, dense, Silty fine to coarse SAND, little gravel, (Glacial Till).	
							RC				
	2D	24/16	3.0 - 5.0	24-31-43-46	74	74				Grey/blue, wet, very dense, fine to coarse SAND, some gravel, some silt, (Glacial Till).	G#22 A-2-4, SM
5											
	3D	12/8	8.0 - 9.0	67-127/6"	-					Grey/blue, wet, very dense, fine to coarse SAND, some gravel, some silt, (Glacial Till).	
10											
	4D	13/7	13.0 - 14.1	66-145-60/1"	-					Grey/blue, wet, very dense, Silty fine to coarse SAND, trace gravel, (Glacial Till).	
15											
	5D	24/14	18.0 - 20.0	30-35-71-110	106	106				Grey/blue, wet, very dense, Silty fine to coarse SAND, some gravel, (Glacial Till). Less resistance at 21.5' during roller cone advancement. Sand observed in wash return indicates possible sand seam.	
20											
	6D	24/15	23.0 - 25.0	14-27-43-38	70	70				Grey, wet, very dense, fine to coarse SAND, some silt, some gravel, (Glacial Till). Less bonded structure than previous samples.	
25											

Remarks:

1. Mudline measured 7.2' below the top of deck. Deck surveyed at 448.5' by MEDOT survey crew.
2. Advanced roller cone prior to casing advancement.
3. PLD refers to point load diametrical and PLA refers to point load axial test; q_p is estimated from the point load strength.
4. Fine-Grained Soil Descriptions on this log are based on plasticity estimated using visual-manual classification techniques or laboratory Atterberg Limit tests if available, rather than the MaineDOT Standard based on percentages passing specific grain sizes.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: International Bridge Replacement
Bridge Street over St. John River
Location: Madawaska, ME - Edmundston, NB

Boring No.: BB-MSJR-205

WIN: 021736.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	441.3	**Auger ID/OD:**	
Operator:	Brad Enos	**Datum:**	NAVD 88	**Sampler:**	Standard Splitspoon
Logged By:	N. Williams	**Rig Type:**	Elevated Platform - CME	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	10/29/19-10/30/19	**Drilling Method:**	Drive & Wash	**Core Barrel:**	NX
Boring Location:	N1285977.8, E2183232.4	**Casing ID/OD:**	4"/4.5"	**Water Level*:**	River
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
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R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = Weight of 140 lb. Hammer
WOR/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
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N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
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WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
25											
	7D	14/10	28.0 - 29.2	13-64-85/2"	-					Grey, wet, very dense, fine to coarse SAND, some silt, some gravel, (Glacial Till).	
							NQ	412.1		29.2	PLD, q_p=1047 ksf
30	R1	60/60	30.0 - 35.0	RQD = 47%						Increase in resistance during roller c one advancement at 29.2', indicates rock. Advance roller cone to 30.0'. Advance 4" casing to 30.0'. Set up to core. R1: Hard, fresh, aphanitic, blue/grey, SLATE. Joints are extremely close from 30.0'-31.0' and closely spaced from 31.0'-35.0', high angle, planar, smooth, fresh, tight. 30.0'-31.0' highly fractured resulting in gravel pieces. -SANGERVILLE FORMATION- Rock Quality = Poor Recovery = 100% Rock Core Times (min:sec): 30.0-31.0' (6:12), 31.0-32.0' (3:00), 32.0-33.0' (2:42), 33.0-34.0' (2:42), 34.0-35.0' (2:24)	PLA, q_p=891 ksf
35	R2	60/60	35.0 - 40.0	RQD = 73%						R2: Hard, fresh, aphanitic, blue/grey, SLATE. Joints are very close to extremely close from 35.0-36.3' and close to moderately spaced from 36.3'-40.0', high angle, planar, smooth, fresh, tight. One decomposed joint at 36.3'. Probable drill breaks from 39.3'-40.0'. -SANGERVILLE FORMATION- Rock Quality = Fair Recovery = 100% Rock Core Times (min:sec): 35.0-36.0' (2:18), 36.0-37.0' (2:40), 37.0-38.0' (3:24), 38.0-39.0' (1:23), 39.0-40.0' (2:24)	q_p=701 ksf
40	R3	60/60	40.0 - 45.0	RQD = 60%						R3: Hard, fresh, aphanitic, blue/grey, SLATE. Joints are very close from 40.0'- 41.0' and close to moderately spaced from 41.0'-45.0', high angle, planar, smooth, fresh to discolored, tight to partially open. One drill break at 43.1'. -SANGERVILLE FORMATION- Rock Quality = Good Recovery = 100% Rock Core Times (min:sec): 40.0-41.0' (3:18), 41.0-42.0' (2:15), 42.0-43.0' (3:05), 43.0-44.0' (2:07), 44.0-45.0' (2:57)	
45	R4	60/60	45.0 - 50.0	RQD = 60%						R4: Hard, fresh, aphanitic, blue/grey, SLATE. Joints are closely spaced, high angle, planar, smooth, fresh, tight to partially open. -SANGERVILLE FORMATION- Rock Quality = Fair Recovery = 100% Rock Core Times (min:sec): 45.0-46.0' (3:50), 46.0-47.0' (2:22), 47.0-48.0' (1:50), 48.0-49.0' (1:45), 49.0-50.0' (3:25)	q_p=815 ksf
50											

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: International Bridge Replacement
Bridge Street over St. John River
Location: Madawaska, ME - Edmundston, NB

Boring No.: BB-MSJR-205

WIN: 021736.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	441.3	**Auger ID/OD:**	
Operator:	Brad Enos	**Datum:**	NAVD 88	**Sampler:**	Standard Splitspoon
Logged By:	N. Williams	**Rig Type:**	Elevated Platform - CME	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	10/29/19-10/30/19	**Drilling Method:**	Drive & Wash	**Core Barrel:**	NX
Boring Location:	N1285977.8, E2183232.4	**Casing ID/OD:**	4"/4.5"	**Water Level*:**	River
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

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SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = Weight of 140 lb. Hammer
WOR/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
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G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
50								391.3		50.0	
										Bottom of Exploration at 50.0 feet below ground surface.	
55											
60											
65											
70											
75											

Remarks:

1. Mudline measured 7.2' below the top of deck. Deck surveyed at 448.5' by MEDOT survey crew.
2. Advanced roller cone prior to casing advancement.
3. PLD refers to point load diametrical and PLA refers to point load axial test; q_p is estimated from the point load strength.
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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: International Bridge Replacement
Bridge Street over St. John River
Location: Madawaska, ME - Edmundston, NB

Boring No.: BB-MSJR-206

WIN: 021736.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	441.0	**Auger ID/OD:**	--
Operator:	Brad Enos	**Datum:**	NAVD 88	**Sampler:**	Standard Splitspoon
Logged By:	N. Williams	**Rig Type:**	Elevated Platform - CME	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	10/30/19-10/31/19	**Drilling Method:**	Drive/Spin & Wash	**Core Barrel:**	NQ
Boring Location:	N1286196.6, E2183467.3	**Casing ID/OD:**	3/3.5", 4/4.5"	**Water Level*:**	River
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
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R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = Weight of 140lb. Hammer
WOR/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
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N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
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WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
				Sample Information							
0	1D	24/12	0.0 - 2.0	6-12-11-17	23	23		440.7		Top 4": River Gravel (0.3)	G#23 A-4, ML
							43			Bottom 8": Grey, wet, very stiff, SILT, trace sand, (Glacial Till).	
							67				
	2D	24/16	3.0 - 5.0	17-25-28-32	53	53	RC			Grey, wet, hard, SILT, little sand, trace gravel, (Glacial Till).	G#24 A-4, ML
5											
	3D	24/12	8.0 - 10.0	21-26-27-29	53	53				Top 6": Grey, wet, hard, SILT, little gravel, little fine sand, (Glacial Till). Bottom 6": Grey/brown, wet, hard, SILT, some fine to medium sand, trace gravel, (Glacial Till).	
10											
	4D	24/16	13.0 - 15.0	6-8-14-20	22	22				Grey, wet, medium dense, fine to medium SAND, little silt, piece of wood in bottom of sample, (Glacial Till).	
15											
	5D	24/10	18.0 - 20.0	24-22-29-29	51	51				Grey, wet, very dense, Silty fine to coarse SAND, little gravel, (Glacial Till).	
20											
	6D	24/16	23.0 - 25.0	21-28-32-38	60	60				Grey, wet, very dense, fine to coarse SAND, little gravel, little silt, (Glacial Till).	
25											

Remarks:

1. Mudline measured 7.3' below top of deck. Deck surveyed at 448.3'.
2. Fine-Grained Soil Descriptions on this log are based on plasticity estimated using visual-manual classification techniques or laboratory Atterberg Limit tests if available, rather than the MaineDOT Standard based on percentages passing specific grain sizes.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: International Bridge Replacement
Bridge Street over St. John River
Location: Madawaska, ME - Edmundston, NB

Boring No.: BB-MSJR-206

WIN: 021736.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	441.0	**Auger ID/OD:**	--
Operator:	Brad Enos	**Datum:**	NAVD 88	**Sampler:**	Standard Splitspoon
Logged By:	N. Williams	**Rig Type:**	Elevated Platform - CME	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	10/30/19-10/31/19	**Drilling Method:**	Drive/Spin & Wash	**Core Barrel:**	NQ
Boring Location:	N1286196.6, E2183467.3	**Casing ID/OD:**	3/3.5", 4/4.5"	**Water Level*:**	River
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

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Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
25											
	7D	24/17	28.0 - 30.0	26-17-29-34	46	46				Dark grey, wet, very dense, fine to coarse SAND, little gravel, trace silt, (Glacial Till).	
30	R1	44/44	30.8 - 34.5	RQD = 50%			NQ	410.3		30.7 Roller cone refusal at 30.7'. Advance 3" casing and roller cone to 30.8' and set up to core. R1: Hard, slightly weathered, aphanitic, blue/grey, SLATE. Joints are extremely close to closely spaced, high angle, planar, rough, fresh to discolored, partially open to open. One vertical joint observed throughout core. -SANGERVILLE FORMATION- Rock Quality = Very Poor Recovery = 100% Rock Core Times (min:sec): 30.8-31.8' (1:47), 31.8-32.8' (1:25), 32.8-33.8' (2:13), 33.8-34.5' (1:49)	
	R2	59/59	34.5 - 39.4	RQD = 80%						R2: Hard, fresh, aphanitic, blue/grey, SLATE. Joints are close to moderately spaced, high angle, planar, smooth to rough, fresh, tight. -SANGERVILLE FORMATION- Rock Quality = Good Recovery = 100% Rock Core Times (min:sec): 34.5-35.5' (1:23), 35.5-36.5' (2:07), 36.5-37.5' (1:25), 37.5-38.5' (1:16), 38.5-39.4' (2:07)	
35											
	R3	60/60	39.4 - 44.4	RQD = 53%						R3: Hard, fresh, aphanitic, blue/grey, SLATE. Joints are very close to moderately spaced, high angle, planar, smooth, fresh, tight to partially open. -SANGERVILLE FORMATION- Rock Quality = Fair Recovery = 100% Rock Core Times (min:sec): 39.4-40.4' (1:23), 40.4-41.4' (2:07), 41.4-42.4' (1:38), 42.4-43.4' (1:44), 43.4-44.4' (3:29)	q_p=1536 ksf
40											
	R4	60/60	44.4 - 49.4	RQD = 77%						R4: Hard, fresh, aphanitic, blue/grey, SLATE. Joints are close to moderately spaced, high angle, planar, smooth, fresh, tight to partially open. -SANGERVILLE FORMATION- Rock Quality = Good Recovery = 100% Rock Core Times (min:sec): 44.4-45.4' (3:40), 45.4-46.4' (2:00), 46.4-47.4' (1:22), 47.4-48.4' (2:12), 48.4-49.4' (1:45)	q_p=806 ksf
45											
50								391.6		49.4 **Bottom of Exploration at 49.4 feet below ground surface.**	

Remarks:

1. Mudline measured 7.3' below top of deck. Deck surveyed at 448.3'.
2. Fine-Grained Soil Descriptions on this log are based on plasticity estimated using visual-manual classification techniques or laboratory Atterberg Limit tests if available, rather than the MaineDOT Standard based on percentages passing specific grain sizes.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: International Bridge Replacement
Bridge Street over St. John River
Location: Madawaska, ME - Edmundston, NB

Boring No.: BB-MSJR-208

WIN: 021736.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	441.9	**Auger ID/OD:**	--
Operator:	Brad Enos	**Datum:**	NAVD 88	**Sampler:**	Standard Splitspoon
Logged By:	N. Williams	**Rig Type:**	Elevated Platform - CME	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	10/31/19-11/01/19	**Drilling Method:**	Drive/Spin & Wash	**Core Barrel:**	NQ
Boring Location:	N1286610.3, E2183944.3	**Casing ID/OD:**	3/3.5", 4/4.5"	**Water Level*:**	River
Hammer Efficiency Factor:	0.6	**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample Attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample Attempt
V = Field Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Field Vane Shear Test Attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = Weight of 140lb. Hammer
WOR/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/6	0.0 - 2.0	8-9-21-11	30	30				Grey, wet, dense, Sandy GRAVEL, little silt, (Alluvial Deposit). Gravel in sample from top 2".	G#25 A-1-b, GM
								438.9		3.0	
							40				
5	2D	24/11	5.0 - 7.0	34-51-60-72	111	111	58			Grey, wet, hard, SILT, some fine to coarse sand, trace gravel, (Glacial Till).	G#26 A-4, ML
										7.5'-8.0': Increased resistance during roller cone advancement. Intermittent increases in resistance during roller cone advancement from 8.0'-10.0'.	
							RC				
10	3D	5/4	10.0 - 10.4	97/4"	-					Grey, wet, hard, SILT, some fine to coarse sand, trace gravel, (Glacial Till). Piece of quartz gravel in spoon tip.	
	R1	36/21	11.4 - 14.4				NQ	430.5		Increased resistance during roller cone advancement at 11.3'. 3" casing spun to 11.4'. Roller cone refusal at 11.4', set up to core.	
										11.4	
										R1: Grey, cobbles/boulders, 2"-8" long pieces recovered.	
	R2	12/12	14.5 - 15.5							R2: Grey, cobbles/boulders, 1"-3" long pieces recovered. Advanced 3" casing and washed ahead to 16.1'.	
15											
	4D	4/4	16.1 - 16.4	90/4"	-		RC	425.8		16.1	
										Grey, wet, hard, Clayey SILT, trace fine sand, trace gravel, (Glacial Till). Very high resistance during roller cone advancement from 17.3'-17.5'.	
20	5D	7/7	20.0 - 20.6	52-67/2"	-					Grey, wet, hard, Clayey SILT, some fine sand, trace gravel, (Glacial Till).	
25											

Remarks:

1. Mudline measured 9.0' below top of deck. Deck surveyed at 450.9'.
2. Casing driven with 300 lb hammer. Washed ahead after sampling 2D, prior to driving 4" casing.
3. Fine-Grained Soil Descriptions on this log are based on plasticity estimated using visual-manual classification techniques or laboratory Atterberg Limit tests if available, rather than the MaineDOT Standard based on percentages passing specific grain sizes.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: International Bridge Replacement
Bridge Street over St. John River
Location: Madawaska, ME - Edmundston, NB

Boring No.: BB-MSJR-208

WIN: 021736.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	441.9	**Auger ID/OD:**	--
Operator:	Brad Enos	**Datum:**	NAVD 88	**Sampler:**	Standard Splitspoon
Logged By:	N. Williams	**Rig Type:**	Elevated Platform - CME	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	10/31/19-11/01/19	**Drilling Method:**	Drive/Spin & Wash	**Core Barrel:**	NQ
Boring Location:	N1286610.3, E2183944.3	**Casing ID/OD:**	3/3.5", 4/4.5"	**Water Level*:**	River
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
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SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = Weight of 140 lb. Hammer
WOR/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
25	6D	15/12	25.0 - 26.3	38-64-99/3"	-					Grey, wet, very dense, Silty fine to coarse SAND, little gravel, (Glacial Till).	
	R3	46/13	28.2 - 32.0				NQ	413.8		28.1 Roller cone refusal at 28.1'. Advance 3" casing and roller cone to 28.2'. Set up to core. R3: Grey, cobbles/boulder, 1"-6" long pieces recovered. Broke through at 31.1' with core barrel.	
30								410.8		31.1 Attempted to use spoon to retrieve previously cored material at 31.0', no material recovered.	
							RC				
	R4	84/50	33.1 - 40.1	RQD = 30%			NQ	408.8		33.1 Roller cone refusal at 33.1'. Advance 3" casing and roller cone to 33.1'. Set up to core. R4: Began rock core at 33.1', lost resistance at 33.5'. Increased resistance at 35.1' suggests rock. Possible cobbles/boulders or highly weathered rock at 33.1'-35.1'.	
35								406.8		35.1 R4 (Beginning of rock core): Hard, slightly to moderately weathered, aphanitic, grey, SLATE. Highly fractured from 35.1'-36.3, and from 38.4'-38.6', resulting in gravel pieces. Joints are extremely close to closely spaced, high angle, planar, smooth, fresh to discolored, tight to open, one high angle, undulating joint at 36.5'. RQD calculated based on recovery from 35.1'-40.1'; upper 2' neglected. -SANGERVILLE FORMATION- Rock Quality = Poor Recovery = 60% Rock Core Times (min:sec): 35.1-36.1' (2:23), 36.1-37.1' (2:27), 37.1-38.1' (2:26), 38.1-39.1' (1:22), 29.1-40.1' (2:23)	q_p=773 ksf
40	R5	60/60	40.1 - 45.1	RQD = 22%						R5: Hard, slightly weathered, aphanitic, grey, SLATE. Highly fractured from 42.5'-43.1' resulting in fine gravel pieces. Joints are extremely close to closely spaced, high angle, planar, smooth to rough, fresh to discolored, partially open to open. -SANGERVILLE FORMATION- Rock Quality = Very Poor Recovery = 100% Rock Core Times (min:sec): 40.1-41.1' (1:30), 41.1-42.1' (1:20), 42.2-43.1' (1:16), 43.1-44.1' (1:24), 44.1-45.1' (2:46)	
45	R6	60/60	45.1 - 50.1	RQD = 40%						R6: Hard, slightly weathered to fresh, aphanitic, grey, SLATE, highly fractured from 46.1'-47.0' resulting in gravel pieces. Joints are extremely close to closely spaced, high angle, planar, smooth, fresh to discolored, partially open. One high angle, undulating, rough joint at 45.4'. -SANGERVILLE FORMATION- Rock Quality = Poor Recovery = 100% Rock Core Times (min:sec): 45.1-46.1' (1:15), 46.1-47.1' (2:07), 47.1-48.1' (1:25), 48.1-49.1' (1:34), 49.1-50.1' (2:30)	q_p=723 ksf
50											

Remarks:

1. Mudline measured 9.0' below top of deck. Deck surveyed at 450.9'.
2. Casing driven with 300 lb hammer. Washed ahead after sampling 2D, prior to driving 4" casing.
3. Fine-Grained Soil Descriptions on this log are based on plasticity estimated using visual-manual classification techniques or laboratory Atterberg Limit tests if available, rather than the MaineDOT Standard based on percentages passing specific grain sizes.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: International Bridge Replacement
Bridge Street over St. John River
Location: Madawaska, ME - Edmundston, NB

Boring No.: BB-MSJR-208

WIN: 021736.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	441.9	**Auger ID/OD:**	--
Operator:	Brad Enos	**Datum:**	NAVD 88	**Sampler:**	Standard Splitspoon
Logged By:	N. Williams	**Rig Type:**	Elevated Platform - CME	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	10/31/19-11/01/19	**Drilling Method:**	Drive/Spin & Wash	**Core Barrel:**	NQ
Boring Location:	N1286610.3, E2183944.3	**Casing ID/OD:**	3/3.5", 4/4.5"	**Water Level*:**	River
Hammer Efficiency Factor: 0.6		**Hammer Type:**	Automatic ☐ Hydraulic ☐ Rope & Cathead ☒		

Definitions:
D = Split Spoon Sample
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SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = Weight of 140 lb. Hammer
WOR/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
50								391.8		50.1	
										Bottom of Exploration at 50.1 feet below ground surface.	
55											
60											
65											
70											
75											

Remarks:

1. Mudline measured 9.0' below top of deck. Deck surveyed at 450.9'.
2. Casing driven with 300 lb hammer. Washed ahead after sampling 2D, prior to driving 4" casing.
3. Fine-Grained Soil Descriptions on this log are based on plasticity estimated using visual-manual classification techniques or laboratory Atterberg Limit tests if available, rather than the MaineDOT Standard based on percentages passing specific grain sizes.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: International Bridge Replacement
Bridge Street over St. John River
Location: Madawaska, ME - Edmundston, NB

Boring No.: BB-MSJR-209

WIN: 021736.00

Driller:	Logan Drilling Group	**Elevation (ft.)**	480.6	**Auger ID/OD:**	4/4.25"
Operator:	Al McGlinchey	**Datum:**	NAVD 88	**Sampler:**	Standard Splitspoon
Logged By:	L. Navarrete	**Rig Type:**	CME-55 Track Rig	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	2/25/20 - 2/26/20	**Drilling Method:**	Drive & Wash	**Core Barrel:**	NQ
Boring Location:	N1286736.2, E2183902.9	**Casing ID/OD:**	4/4.5"	**Water Level*:**	12.8'
Hammer Efficiency Factor:	0.789	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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SSA = Solid Stem Auger
HSA = Hollow Stem Auger
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WOH = Weight of 140lb. Hammer
WOR/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
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G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	G1		0.0 - 1.0				SSA			Brown, frozen, Silty fine to coarse SAND, trace gravel, (Fill).	
	1D	24/23	2.0 - 4.0	20-30-30-22	60	79				Grey, frozen, fine to medium SAND, little silt, trace gravel, (Fill).	
5	2D	24/17	5.0 - 7.0	4-4-4-5	8	11				Brown, dry, loose, fine to medium SAND, some silt, trace gravel, (Fill).	
10	3D	24/13	10.0 - 12.0	2-3-2-2	5	7				Brown, moist, loose, fine to coarse SAND, some silt, trace gravel, (Fill).	
	4D	24/6	12.0 - 14.0	3-2-4-4	6	8				Brown, moist, loose, fine to coarse SAND, some silt, trace gravel, (Fill).	
15	5D	24/11	14.0 - 16.0	3-5-5-5	10	13				Brown, wet, medium dense, fine to coarse SAND, some silt, some gravel, (Fill).	
	6D	24/10	16.0 - 18.0	3-6-5-5	11	14				Brown, wet, medium dense, Silty fine to coarse SAND, little gravel, (Fill).	
	7D	24/14	18.0 - 20.0	6-8-13-12	21	28				Brown, wet, medium dense, fine to coarse SAND, some silt, little gravel, (Fill).	
20								460.6		20.0	
	8D	24/21	20.0 - 22.0	3-3-4-5	7	9				Grey, moist, loose, fine to medium SAND, little silt, (Alluvium).	
	9D	24/3	22.0 - 24.0	5-5-6-7	11	14				Brown, wet, stiff, SILT, some fine to coarse sand, (Alluvium).	
25	10D	24/24	24.0 - 26.0	5-5-5-7	10	13				Brown, wet, medium dense, Silty fine SAND, trace fine gravel, (Alluvium).	G#39 A-4, SM

Remarks:

1. Automatic hammer Drilling Group CME 55, SN LDL0000342 Energy Transfer Ratio = 0.789.
2. Reported water level was measured 24 hours after casing was removed.
3. Fine-Grained Soil Descriptions on this log are based on plasticity estimated using visual-manual classification techniques or laboratory Atterberg Limit tests if available, rather than the MaineDOT Standard based on percentages passing specific grain sizes.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: International Bridge Replacement
Bridge Street over St. John River
Location: Madawaska, ME - Edmundston, NB

Boring No.: BB-MSJR-209

WIN: 021736.00

Driller:	Logan Drilling Group	**Elevation (ft.)**	480.6	**Auger ID/OD:**	4/4.25"
Operator:	Al McGlinchey	**Datum:**	NAVD 88	**Sampler:**	Standard Splitspoon
Logged By:	L. Navarrete	**Rig Type:**	CME-55 Track Rig	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	2/25/20 - 2/26/20	**Drilling Method:**	Drive & Wash	**Core Barrel:**	NQ
Boring Location:	N1286736.2, E2183902.9	**Casing ID/OD:**	4/4.5"	**Water Level*:**	12.8'
Hammer Efficiency Factor:	0.789	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
25											
	11D	24/24	26.0 - 28.0	1-3-3-2	6	8				Brown to grey, wet, loose, Silty fine SAND, trace gravel, (Alluvium). Auger drill action increased at 29.0'.	G#40 A-2-4, SM
								451.6		29.0	
30	12D	18/17	30.0 - 31.5	19-28-50/6"	--					Grey, moist to wet, very dense, fine to coarse SAND, some gravel, little silt, (Glacial Till).	
	R1	54/15	31.5 - 36.0				NQ	449.1		31.5	
										Set up to core at 31.5'. R1: Grey/white, cobbles/boulder, 3/4"-3" long pieces recovered.	
35											
								444.6		36.0	
	13D	12/10	36.0 - 37.0	33-54/6"	--					Grey, wet, very dense, fine to coarse SAND, some gravel, little silt, (Glacial Till).	G#41 A-1-b, SM
	R2	48/5	37.0 - 41.0					443.6		37.0	
										R2: Grey, cobbles/boulder, 3/8"-1" long pieces recovered.	
40											
								439.6		41.0	
	14D R3	10/10 50/12	41.0 - 41.8 41.8 - 46.0	42-50/4"	--			438.8		Grey, wet, very dense, fine to coarse SAND, some gravel, little silt, (Glacial Till).	
										41.8	
										Set up to core at 41.8'. R3: Grey, cobbles/boulder, 3/8"-3" long pieces recovered.	
45											
								434.6		46.0	
	15D R4	2/2 58/26	46.0 - 46.2 46.2 - 51.0	48/2" RQD = 0%	--			434.4		Grey, wet, very dense, fine to coarse SAND, some gravel, little silt, (Glacial Till).	
										46.2	
										Splitspoon refusal at 46.2'. Set up to core. R4: Medium hard to soft, moderately weathered, aphanitic, grey SLATE. Highly fractured into 1"-3" size pieces with high angle joints. Recovery loss indicates probable weathered rock. Rock Quality = Very Poor	
50											

Remarks:

1. Automatic hammer Drilling Group CME 55, SN LDL0000342 Energy Transfer Ratio = 0.789.
2. Reported water level was measured 24 hours after casing was removed.
3. Fine-Grained Soil Descriptions on this log are based on plasticity estimated using visual-manual classification techniques or laboratory Atterberg Limit tests if available, rather than the MaineDOT Standard based on percentages passing specific grain sizes.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: International Bridge Replacement
Bridge Street over St. John River
Location: Madawaska, ME - Edmundston, NB

Boring No.: BB-MSJR-209

WIN: 021736.00

Driller:	Logan Drilling Group	**Elevation (ft.)**	480.6	**Auger ID/OD:**	4/4.25"
Operator:	Al McGlinchey	**Datum:**	NAVD 88	**Sampler:**	Standard Splitspoon
Logged By:	L. Navarrete	**Rig Type:**	CME-55 Track Rig	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	2/25/20 - 2/26/20	**Drilling Method:**	Drive & Wash	**Core Barrel:**	NQ
Boring Location:	N1286736.2, E2183902.9	**Casing ID/OD:**	4/4.5"	**Water Level*:**	12.8'
Hammer Efficiency Factor:	0.789	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
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MD = Unsuccessful Split Spoon Sample Attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample Attempt
V = Field Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Field Vane Shear Test Attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = Weight of 140 lb. Hammer
WOR/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
50										Recovery = 45% Rock Core Times (min:sec): 46.2-47.0' (1:13), 47.0-48.0' (1:15), 48.0-49.0' (0:56), 49.0-50.0' (1:14), 50.0-51.0' (3:05)	
	R5	48/36	51.0 - 55.0	RQD = 0%						R5: Medium hard to soft, moderately weathered, aphanitic, grey SLATE. Highly fractured into 1"-4" size pieces with high angle joints. Recovery loss indicates probable weathered rock. Rock Quality = Very Poor Recovery = 75% Rock Core Times (min:sec): 51.0-52.0' (1:37), 52.0-53.0' (2:02), 53.0-54.0' (2:41), 54.0-55.0' (1:25)	
55								425.6		55.0	
	R6	60/60	55.0 - 60.0	RQD = 95%						R6: Hard, fresh, aphanitic, grey, SLATE. Joints are moderately spaced, moderately dipping to high angle, planar to undulating, smooth, fresh to discolored, open to partially open. Rock Quality = Excellent Recovery = 100% Rock Core Times (min:sec): 55.0-56.0' (1:05), 56.0-57.0' (1:10), 57.0-58.0' (1:09), 58.0-59.0' (0:59), 59.0-60.0' (1:11)	q_p=659 ksf
60	R7	60/60	60.0 - 65.0	RQD = 55%						R7: Hard, fresh to slightly weathered, aphanitic, grey, SLATE. Primary joints are very close to closely spaced, moderately dipping to vertical, fresh to discolored, undulating to planar, smooth, open to moderately wide. Secondary joints are widely spaced, low angle, undulating, smooth, discolored, partially open to open. Rock Quality = Fair Recovery = 100% Rock Core Times (min:sec): 60.0-61.0' (1:18), 61.0-62.0' (1:31), 62.0-63.0' (1:17), 63.0-64.0' (1:17), 64.0-65.0' (1:58)	q_p=612 ksf
65	R8	60/60	65.0 - 70.0	RQD = 57%						R8: Hard, fresh, aphanitic, grey, SLATE. Joints are close to moderately spaced, moderately dipping to high angle, planar to undulating, smooth, fresh, partially open, with some silt infilling. Rock Quality = Fair Recovery = 100% Rock Core Times (min:sec): 65.0-66.0' (1:21), 66.0-67.0' (1:19), 67.0-68.0' (1:16), 68.0-69.0' (1:08), 69.0-70.0' (1:43)	
70	R9	60/60	70.0 - 75.0	RQD = 24%						R9: Hard, fresh, aphanitic, grey, SLATE. Joints are very close to moderately spaced, moderately dipping to vertical, planar, smooth, fresh to decomposed, partially open to open, with some silt and sand infilling. Rock Quality = Very Poor Recovery = 100% Rock Core Times (min:sec): 70.0-71.0' (1:31), 71.0-72.0' (0:52), 72.0-73.0' (1:02), 73.0-74.0' (1:06), 74.0-75.0' (1:03)	
75											

Remarks:

1. Automatic hammer Drilling Group CME 55, SN LDL0000342 Energy Transfer Ratio = 0.789.
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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: International Bridge Replacement
Bridge Street over St. John River
Location: Madawaska, ME - Edmundston, NB

Boring No.: BB-MSJR-209

WIN: 021736.00

Driller:	Logan Drilling Group	**Elevation (ft.)**	480.6	**Auger ID/OD:**	4/4.25"
Operator:	Al McGlinchey	**Datum:**	NAVD 88	**Sampler:**	Standard Splitspoon
Logged By:	L. Navarrete	**Rig Type:**	CME-55 Track Rig	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	2/25/20 - 2/26/20	**Drilling Method:**	Drive & Wash	**Core Barrel:**	NQ
Boring Location:	N1286736.2, E2183902.9	**Casing ID/OD:**	4/4.5"	**Water Level*:**	12.8'
Hammer Efficiency Factor:	0.789	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
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SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = Weight of 140 lb. Hammer
WOR/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
75	R10	60/60	75.0 - 80.0	RQD = 93%						R10: Hard, fresh, aphanitic, grey, SLATE. Joints are very close to moderately spaced, high angle, planar, smooth, fresh, tight to open. Rock Quality = Excellent Recovery = 100% Rock Core Times (min:sec): 75.0-76.0' (1:33), 76.0-77.0' (1:33), 77.0-78.0' (1:34), 78.0-79.0' (1:17), 79.0-80.0' (2:05)	
80	R11	60/60	80.0 - 85.0	RQD = 60%						R11: Hard, fresh to slightly weathered, aphanitic, grey, SLATE. 80.0'-81.3': Joints are extremely close to closely spaced, high angle to vertical, undulating to planar, smooth, fresh, open. 81.3'-81.8': Highly fractured into gravel-size pieces. 81.8'-84.2': Joints are very close to moderately spaced, high angle to vertical, planar, smooth, fresh to discolored, tight to partially open. 84.2'-85.0': Highly fractured into gravel-size pieces. Rock Quality = Fair Recovery = 100% Rock Core Times (min:sec): 80.0-81.0' (2:15), 81.0-82.0' (0:57), 82.0-83.0' (1:21), 83.0-84.0' (1:55), 84.0-85.0' (1:57)	
85								395.6		85.0 **Bottom of Exploration at 85.0 feet below ground surface.**	
90											
95											
100											

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: International Bridge Replacement
Bridge Street over St. John River
Location: Madawaska, ME - Edmundston, NB

Boring No.: BB-MSJR-210

WIN: 021736.00

Driller:	Logan Drilling Group	**Elevation (ft.)**	480.5	**Auger ID/OD:**	4/4.25"
Operator:	Al McGlinchey	**Datum:**	NAVD 88	**Sampler:**	Standard Splitspoon
Logged By:	L. Navarrete	**Rig Type:**	CME-55 Track Rig	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	2/26/20 - 2/27/20	**Drilling Method:**	Drive & Wash	**Core Barrel:**	NQ/HQ
Boring Location:	N1286738.2, E2183981.4	**Casing ID/OD:**	3/3.5"	**Water Level*:**	29.3
Hammer Efficiency Factor:	0.789	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
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R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = Weight of 140lb. Hammer
WOR/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
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G = Grain Size Analysis
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Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	G1		0.0 - 1.0				SSA			Black to brown, frozen, Silty fine to coarse SAND, trace gravel, (Fill).	
	1D	24/24	2.0 - 4.0	17-20-21-14	41	54				Grey, frozen, fine to coarse SAND, some silt, trace gravel, (Fill).	
	2D	24/12	4.0 - 6.0	4-6-4-4	10	13				Brown, dry, medium dense, fine to coarse SAND, some silt, trace gravel, (Fill).	
5	3D	24/18	6.0 - 8.0	2-4-6-9	10	13				Brown, dry, medium dense, fine SAND, some silt, (Fill).	
	4D	24/18	8.0 - 10.0	11-11-11-6	22	29				Brown, dry, medium dense, fine to coarse SAND, some silt, little gravel, (Fill).	
10	5D	24/18	10.0 - 12.0	3-4-3-5	7	9				Brown, moist, loose, Silty fine to coarse SAND, little gravel, (Fill).	
	6D	24/13	12.0 - 14.0	4-2-19-16	21	28				Brown, moist, medium dense, fine to coarse SAND, some silt, little gravel, (Fill).	
15	7D	24/17	15.0 - 17.0	4-3-7-4	10	13				Brown, moist, medium dense, fine to coarse SAND, some silt, little grave, (Fill).	
								462.0		18.5	
20	8D	24/24	20.0 - 22.0	4-8-8-9	16	21				Grey to brown, moist, medium dense, fine SAND, little silt, (Alluvium).	
25											

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: International Bridge Replacement
Bridge Street over St. John River
Location: Madawaska, ME - Edmundston, NB

Boring No.: BB-MSJR-210

WIN: 021736.00

Driller:	Logan Drilling Group	**Elevation (ft.)**	480.5	**Auger ID/OD:**	4/4.25"
Operator:	Al McGlinchey	**Datum:**	NAVD 88	**Sampler:**	Standard Splitspoon
Logged By:	L. Navarrete	**Rig Type:**	CME-55 Track Rig	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	2/26/20 - 2/27/20	**Drilling Method:**	Drive & Wash	**Core Barrel:**	NQ/HQ
Boring Location:	N1286738.2, E2183981.4	**Casing ID/OD:**	3/3.5"	**Water Level*:**	29.3
Hammer Efficiency Factor:	0.789	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
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WOH = Weight of 140 lb. Hammer
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WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
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PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
25	9D	24/22	25.0 - 27.0	5-6-7-10	13	17				Brown, wet, medium dense, Silty fine SAND, trace gravel, (Alluvium).	G#42 A-4, SM
										Increase in resistance during NQ barrel advancement at 28.0' indicates possible cobbles.	
30	10D	24/22	30.0 - 32.0	15-14-14-25	28	37				T op 7": Brown, wet, dense, fine SAND, some silt, root fibers, (Alluvium).	
								449.5		31.0	
	R1	36/10	32.0 - 35.0				NQ			Bottom 15": Brown to grey, moist, dense, fine to coarse SAND, some gravel, some silt, (Glacial Till). Increase in resistance during NQ barrel advancement at 32.0'. Set up to core at 32.0'. R1: Grey/brown, cobbles, 3/8"-2" long pieces recovered. Rock Core Times (min:sec): 32.0-33.0' (1:30), 33.0-34.0' (2:10), 4.0-35.0' (2:45)	
35	11D R2	4/4 60/0	35.0 - 35.3 35.3 - 40.3	50/4"	--					Grey, wet, very dense, fine to coarse SAND, some gravel, some silt, (Glacial Till). Set up to core at 35.3'. R2: No recovery. Rock Core Times (min:sec): 35.3-36.0' (4:24), 36.0-37.0' (1:30), 37.0-38.0' (2:07), 38.0-39.0' (2:37), 39.0-40.0' (2:57) Set up to core at 40.3'.	
40	12D R3	3/3 56/56	40.0 - 40.3 40.3 - 45.0	50/3" RQD = 12%	--			440.2		Grey, wet, very dense, GRAVEL, some fine to coarse sand, trace silt, (Glacial Till). 40.3 Splitspoon refusal at 40.3'. Setup to core. R3: Hard, fresh to slightly weathered, aphanitic, grey, SLATE.40.3'-43.3': Joints are extremely close to closely spaced, high angle to vertical, planar to undulating, smooth, fresh to discolored, tight to open. 43.3'-45.0': Highly fractured into gravel-size pieces. Rock Quality = Very Poor Recovery = 100% Rock Core Times (min:sec): 40.3-41.0' (2:41), 41.0-42.0' (2:31), 42.0-43.0' (1:44), 43.0-44.0' (1:24), 44.0-45.0' (2:19)	
45	R4	60/60	45.0 - 50.0	RQD = 0%			HQ			NQ core barrel jam after R3. NQ casing removed and HQ casing advanced to 40.0' and set up to core. R4: Hard, fresh to slightly weathered, aphanitic, grey, SLATE. Joints are extremely close, high angle to vertical, planar to undulating, smooth, fresh to discolored, partially open to open, with silt infilling. Rock Quality = Very Poor Recovery = 100% Rock Core Times (min:sec): 45.0-46.0' (1:39), 46.0-47.0' (2:37), 47.0-	
50											

Remarks:

1. Automatic hammer Drilling Group CME 55, SN LDL0000342 Energy Transfer Ratio = 0.789.
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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: International Bridge Replacement
Bridge Street over St. John River
Location: Madawaska, ME - Edmundston, NB

Boring No.: BB-MSJR-210

WIN: 021736.00

Driller:	Logan Drilling Group	**Elevation (ft.)**	480.5	**Auger ID/OD:**	4/4.25"
Operator:	Al McGlinchey	**Datum:**	NAVD 88	**Sampler:**	Standard Splitspoon
Logged By:	L. Navarrete	**Rig Type:**	CME-55 Track Rig	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	2/26/20 - 2/27/20	**Drilling Method:**	Drive & Wash	**Core Barrel:**	NQ/HQ
Boring Location:	N1286738.2, E2183981.4	**Casing ID/OD:**	3/3.5"	**Water Level*:**	29.3
Hammer Efficiency Factor:	0.789	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
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Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
50	R5	60/60	50.0 - 55.0	RQD = 26%						48.0' (2:09), 49.0-49.0' (0:54), 49.0-50.0' (0:42) R5: Hard, fresh to slightly weathered, aphanitic, grey, SLATE. 45.0'-49.0': Joints are extremely close to moderately spaced, high angle to vertical, planar to undulating, rough to smooth, fresh to discolored, partially open to open, with silt infilling. 49.0'-50.0': highly fractured into gravel-size pieces. Rock Quality = Poor Recovery: 100% Rock Core Times (min:sec): 50.0-51.0' (1:07), 51.0-52.0' (1:19), 52.0-53.0' (1:15), 53.0-54.0' (1:21), 54.0-55.0' (4:30	
55	R6	60/60	55.0 - 60.0	RQD = 30%						R6: Hard, fresh to slightly weathered, aphanitic, grey, SLATE. Primary joints are extremely close to moderately spaced, high angle to vertical, undulating to planar, smooth, fresh to discolored, partially open to open, with silt infilling. Secondary joints are moderately spaced, horizontal to low angle, planar to undulating, rough, discolored, moderately wide. Rock Quality = Poor Recovery = 100% Rock Core Times (min:sec): 55.0-56.0' (1:48), 56.0-57.0' (2:04), 57.0-58.0' (1:46), 58.0-59.0' (1:51), 59.0-60.0' (2:32)	
60								420.5		60.0 **Bottom of Exploration at 60.0 feet below ground surface.**	
65											
70											
75											

Remarks:

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: International Bridge Replacement
Bridge Street over St. John River
Location: Madawaska, ME - Edmundston, NB

Boring No.: BB-MSJR-211

WIN: 021736.00

Driller:	Logan Drilling Group	**Elevation (ft.)**	480.4	**Auger ID/OD:**	4/4.5"
Operator:	Al McGlinchey	**Datum:**	NAVD 88	**Sampler:**	Standard Splitspoon
Logged By:	L. Navarrete	**Rig Type:**	CME-55 Track Rig	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	3/3/20 - 3/3/20	**Drilling Method:**	Drive & Wash	**Core Barrel:**	NQ
Boring Location:	N1286750.1, E2184047.2	**Casing ID/OD:**	3/3.5"	**Water Level*:**	12.4'
Hammer Efficiency Factor:	0.789	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample Attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample Attempt
V = Field Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Field Vane Shear Test Attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = Weight of 140lb. Hammer
WOR/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	G1		0.0 - 2.0				SSA			Brown, frozen, fine to coarse SAND, little silt, little gravel, (Fill).	
	1D	9/7	2.0 - 2.8	23-50/3"	--					Brown, frozen, fine to coarse SAND, little silt, little gravel, (Fill).	
	2D	24/23	3.0 - 5.0	10-33-17-14	50	66				Brown to grey, frozen, fine SAND, little silt, (Fill).	
5	3D	24/17	5.0 - 7.0	9-7-7-8	14	18				Brown to grey, dry, very stiff, Sandy SILT, trace gravel, (Fill).	G#43 A-4, ML
	4D	24/20	7.0 - 9.0	12-10-8-10	18	24				Brown, dry, medium dense, fine to coarse SAND, some gravel, little silt, (Fill).	G#44 A-1-b, SM
	5D	24/15	9.0 - 11.0	5-6-6-5	12	16				Brown, moist, medium dense, fine to coarse SAND, some silt, trace gravel, (Fill).	
10	6D	24/14	11.0 - 13.0	6-8-6-6	14	18				Brown, moist, medium dense, fine to coarse SAND, some silt, little gravel, (Fill).	
15	7D	24/9	15.0 - 17.0	9-7-6-7	13	17				Brown, moist, medium dense, fine to coarse SAND, some silt, little gravel, (Fill).	
							NQ				
20	8D	24/24	20.0 - 22.0	5-5-5-5	10	13		460.3		Top 1": Similar to 7D. 20.1 Bottom 23": Grey, wet, stiff, Clayey SILT, some fine sand, (Alluvium).	G#45 A-1-b, ML
25											

Remarks:

1. Automatic hammer Drilling Group CME 55, SN LDL0000342 Energy Transfer Ratio = 0.789.
2. Reported water level was measured immediately after casing was removed.
3. Fine-Grained Soil Descriptions on this log are based on plasticity estimated using visual-manual classification techniques or laboratory Atterberg Limit tests if available, rather than the MaineDOT Standard based on percentages passing specific grain sizes.

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* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: International Bridge Replacement
Bridge Street over St. John River
Location: Madawaska, ME - Edmundston, NB

Boring No.: BB-MSJR-211

WIN: 021736.00

Driller:	Logan Drilling Group	**Elevation (ft.)**	480.4	**Auger ID/OD:**	4/4.5"
Operator:	Al McGlinchey	**Datum:**	NAVD 88	**Sampler:**	Standard Splitspoon
Logged By:	L. Navarrete	**Rig Type:**	CME-55 Track Rig	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	3/3/20 - 3/3/20	**Drilling Method:**	Drive & Wash	**Core Barrel:**	NQ
Boring Location:	N1286750.1, E2184047.2	**Casing ID/OD:**	3/3.5"	**Water Level*:**	12.4'
Hammer Efficiency Factor:	0.789	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
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SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = Weight of 140 lb. Hammer
WOR/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
25	9D	24/24	25.0 - 27.0	3-7-18-21	25	33		454.0		Top 16": Grey, wet, dense, fine SAND, little silt, (Alluvium).	
										26.4	
										Bottom 8": Brown to grey, wet, stiff, SILT, some fine to medium sand, (Glacial Till).	
30	10D	24/14	30.0 - 32.0	38-23-20-20	43	57				Brown to grey, wet, very dense, fine to coarse SAND, some silt, some gravel, (Glacial Till).	
								447.4		33.0	
	R1	12/12	33.0 - 34.0	RQD = 0%						Increase in resistance during NQ barrel advancement at 33.0'. Set up to core. R1: Hard, fresh to slightly weathered, aphanitic, grey, SLATE. Highly fractured into gravel-size pieces. Rock Quality = Very Poor Recovery = 100% Rock Core Times (min:sec): 33.0-34.0' (1:15)	
	R2	24/24	34.0 - 36.0	RQD = 0%						R2: Hard, fresh to slightly weathered, aphanitic, grey, SLATE. 34.0-34.5': Highly fractured into gravel-size pieces. 34.5'-36.0': Joints are extremely close, high angle to vertical, undulating to planar, smooth, fresh to discolored, partially open to open. Rock Quality = Very Poor Recovery = 100% Rock Core Times (min:sec): 34.0-35.0' (2:32), 35.0-36.0' (2:18)	
35	R3	48/48	36.0 - 40.0	RQD = 60%						R3: Hard, fresh to slightly weathered, aphanitic, grey, SLATE. Primary joints are extremely close to closely spaced, high angle to vertical, planar to undulating, smooth, fresh to discolored, tight to open. Secondary joints are very close to moderately spaced, horizontal to low angle, planar, fresh to discolored, open. Rock Quality = Fair Recovery = 100% Rock Core Times (min:sec): 36.0-37.0' (2:15), 37.0-38.0' (1:38), 38.0-39.0' (1:45), 39.0-40.0' (1:28)	
40	R4	60/48	40.0 - 45.0	RQD = 51%						R4: Hard, fresh to slightly weathered, aphanitic, grey, SLATE. Primary joints are close to moderately spaced, high angle to vertical, planar, smooth, fresh to discolored, partially open to open. Secondary joints are closely s paced, moderately dipping, planar, smooth, fresh to discolored, tight, some silt infilling. Rock Quality = Fair Recovery = 80% Rock Core Times (min:sec): 40.0-41.0' (2:22), 41.0-42.0' (1:46), 42.0-43.0' (1:40), 43.0-44.0' (1:53), 44.0-45.0' (2:25)	
45	R5	60/49	45.0 - 50.0	RQD = 74%						R5: Hard, fresh, aphanitic, grey, SLATE. Joints are closely spaced, horizontal to low angle, undulating, rough, fresh, open. One high angle joint at 17.7', undulating, rough, fresh, open. Rock Quality = Fair	
50											

Remarks:

1. Automatic hammer Drilling Group CME 55, SN LDL0000342 Energy Transfer Ratio = 0.789.
2. Reported water level was measured immediately after casing was removed.
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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: International Bridge Replacement
Bridge Street over St. John River
Location: Madawaska, ME - Edmundston, NB

Boring No.: BB-MSJR-211

WIN: 021736.00

Driller:	Logan Drilling Group	**Elevation (ft.)**	480.4	**Auger ID/OD:**	4/4.5"
Operator:	Al McGlinchey	**Datum:**	NAVD 88	**Sampler:**	Standard Splitspoon
Logged By:	L. Navarrete	**Rig Type:**	CME-55 Track Rig	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	3/3/20 - 3/3/20	**Drilling Method:**	Drive & Wash	**Core Barrel:**	NQ
Boring Location:	N1286750.1, E2184047.2	**Casing ID/OD:**	3/3.5"	**Water Level*:**	12.4'
Hammer Efficiency Factor:	0.789	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
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V = Field Vane Shear Test, PP = Pocket Penetrometer
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R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = Weight of 140 lb. Hammer
WOR/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
50								430.4		Recovery = 82% Rock Core Times (min:sec): 45.0-46.0' (1:34), 46.0-47.0' (1:30), 47.0-48.0' (2:58), 48.0-49.0' (2:56), 49.0-50.0' (1:35)	
										50.0 **Bottom of Exploration at 50.0 feet below ground surface.**	
55											
60											
65											
70											
75											

Remarks:

1. Automatic hammer Drilling Group CME 55, SN LDL0000342 Energy Transfer Ratio = 0.789.
2. Reported water level was measured immediately after casing was removed.
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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: International Bridge Replacement
Bridge Street over St. John River
Location: Madawaska, ME - Edmundston, NB

Boring No.: BB-MSJR-212

WIN: 021736.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	504.9	**Auger ID/OD:**	4.5"
Operator:	Brad Enos	**Datum:**	NAVD 88	**Sampler:**	Standard Splitspoon
Logged By:	N. Williams	**Rig Type:**	Mobile Drill	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	10/29/19-10/29/19	**Drilling Method:**	Drive & Wash	**Core Barrel:**	NQ
Boring Location:	N1286835.7, E2184034.7	**Casing ID/OD:**	3/3.5", 4/4.5"	**Water Level*:**	NM
Hammer Efficiency Factor: 0.895		**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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WOH = Weight of 140lb. Hammer
WOR/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
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PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
				Sample Information							
0	1D	24/11	0.4 - 2.4	7-9-9-14	18	27	SSA	504.5		Top 5": ASPHALT (0.4) Brown, dry, medium dense, fine to coarse SAND, little silt, little gravel, (Fill).	
5	2D	24/10	4.0 - 6.0	5-3-6-4	9	13				Grey, moist, medium dense, fine to medium SAND, some silt, little gravel, (Fill). Probable reworked till. Gravel in spoon tip.	
10	3D	24/24	9.0 - 11.0	4-13-8-6	21	31	RC			Top 12": Grey, moist, hard, Clayey SILT, some fine to medium sand, trace gravel, (Fill). Bottom 12": Grey/brown, moist, fine to coarse SAND, some silt, some gravel, (Fill).	
15	4D	24/12	14.0 - 16.0	4-5-6-22	11	16				Grey, wet, very stiff, Silty CLAY, some fine to medium sand, some gravel, (Fill). Fine to medium sand in spoon tip (1" lens).	
20	5D	24/0	19.0 - 21.0	4-3-4-5	7	10				No recovery in 2" spoon. Collect sample interval with 3" spoon: 16" recovery in 3" spoon. Grey, wet, loose, Silty fine to medium SAND, some gravel.	
							39				
							49				
							46				
							41				
25	6D	24/10	24.0 - 26.0	4-4-3-2	7	10				Top 5": Grey, wet, loose, fine to medium SAND, some silt, little gravel, (Fill).	

Remarks:

1. Automatic hammer NEBC #D19 Energy Transfer Ratio = 0.895
2. Fine-Grained Soil Descriptions on this log are based on plasticity estimated using visual-manual classification techniques or laboratory Atterberg Limit tests if available, rather than the MaineDOT Standard based on percentages passing specific grain sizes.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: International Bridge Replacement
Bridge Street over St. John River
Location: Madawaska, ME - Edmundston, NB

Boring No.: BB-MSJR-212

WIN: 021736.00

Driller:	New England Boring Contractors	**Elevation (ft.)**	504.9	**Auger ID/OD:**	4.5"
Operator:	Brad Enos	**Datum:**	NAVD 88	**Sampler:**	Standard Splitspoon
Logged By:	N. Williams	**Rig Type:**	Mobile Drill	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	10/29/19-10/29/19	**Drilling Method:**	Drive & Wash	**Core Barrel:**	NQ
Boring Location:	N1286835.7, E2184034.7	**Casing ID/OD:**	3/3.5", 4/4.5"	**Water Level*:**	NM
Hammer Efficiency Factor: 0.895		**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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MV = Unsuccessful Field Vane Shear Test Attempt
R = Rock Core Sample
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WOH = Weight of 140 lb. Hammer
WOR/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
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N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane Shear Strength (psf)
WC = Water Content, percent
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G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
25										Bottom 5": Brown/orange, wet, loose, fine to medium SAND, trace silt, (Fill), stratified color.	
							54				
							63				
							111	476.9		28.0	
30	7D R1	3/2 19/19	29.0 - 29.3 29.5 - 31.1	85/4" RQD = 0%	-		NQ	475.4		Grey/brown, wet, very dense, fine to coarse SAND, little gravel, little silt, (Glacial Till/Decomposed Rock). Apparent residual bedrock structure. Advance roller cone to 29.5', advance 3" casing to 29.5'. Set up to core.	
	R2	60/60	31.1 - 36.1	RQD = 42%						29.5 R1: Hard, moderately weathered, aphanitic, blue/grey, SLATE. Highly fractured into gravel-size pieces. -SANGERVILLE FORMATION- Rock Quality = Very Poor Recovery = 100% Rock Core Times (min:sec): 29.5-30.5' (2:11), 30.5-31.1' (1:57)	
35	R3	60/60	36.1 - 41.1	RQD = 48%						R2: Hard, moderately to slightly weathered, aphanitic, blue/grey, SLATE. 31.1'-33.6': Joints are extremely close to very close, 33.6'-36.1': joints are moderately spaced, high angle, planar, smooth, fresh to discolored, open, some fine gravel infilling. 33.6'-36.1': one high angle joint, undulating, rough. -SANGERVILLE FORMATION- Rock Quality = Poor Recovery = 100% Rock Core Times (min:sec): 31.1-32.1' (2:11), 32.1-33.1' (2:30), 33.1-34.1' (2:47), 34.1-35.1' (3:03), 35.1-36.1' (1:59)	
40								463.8		R3: Hard, fresh, slightly weathered, aphanitic, blue/grey, SLATE. Joints are close to moderately spaced, high angle to vertical, planar to undulating, rough, fresh to discolored, tight to partially open. -SANGERVILLE FORMATION- Rock Quality = Poor Recovery = 100% Rock Core Times (min:sec): 36.1-37.1' (2:16), 37.1-38.1' (1:14), 38.1-39.1' (1:29), 39.1-40.1' (1:30), 40.1-41.1' (2:30)	
45										41.1 **Bottom of Exploration at 41.1 feet below ground surface.**	
50											

Remarks:

1. Automatic hammer NEBC #D19 Energy Transfer Ratio = 0.895
2. Fine-Grained Soil Descriptions on this log are based on plasticity estimated using visual-manual classification techniques or laboratory Atterberg Limit tests if available, rather than the MaineDOT Standard based on percentages passing specific grain sizes.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: International Bridge Replacement
Bridge Street over St. John River
Location: Madawaska, ME - Edmundston, NB

Boring No.: BB-MSJR-213

WIN: 021736.00

Driller:	Logan Drilling Group	**Elevation (ft.)**	480.2	**Auger ID/OD:**	4/4.5"
Operator:	Al McGlinchey	**Datum:**	NAVD 88	**Sampler:**	Standard Splitspoon
Logged By:	L. Navarrete	**Rig Type:**	CME-55 Track Rig	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	3/3/20 - 3/3/20	**Drilling Method:**	Drive & Wash	**Core Barrel:**	NQ/HQ
Boring Location:	N1286749.2, E2184112.3	**Casing ID/OD:**	3/3.5"	**Water Level*:**	8.0'
Hammer Efficiency Factor:	0.789	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	G1		0.0 - 2.0				SSA			Brown, frozen, fine to coarse, SAND, little gravel, little silt, (Fill).	
	1D	24/24	2.0 - 4.0	38-50-50-37	100	132				Top 12": Brown, frozen, fine to coarse SAND, some silt, little gravel, (Fill). Bottom 12": Brown to grey, frozen, fine SAND, little silt, (Fill).	
5	2D	24/22	5.0 - 7.0	5-5-5-6	10	13				Brown, dry, stiff, Sandy SILT, trace gravel, (Fill).	G#46 A-4, ML
	3D	24/21	7.0 - 9.0	5-9-10-9	19	25				Brown, dry, medium dense, fine to coarse SAND, some gravel, some silt, (Fill).	G#47 A-1-b, SM
	4D	24/12	9.0 - 11.0	7-7-6-8	13	17				Brown, moist, medium dense, fine to coarse SAND, little silt, little gravel, (Fill).	
10	5D	24/12	11.0 - 13.0	6-6-5-5	11	14				Brown, moist, medium dense, fine to coarse SAND, some silt, little gravel, (Fill).	
15	6D	24/12	15.0 - 17.0	7-6-7-7	13	17				Brown, moist, medium dense, fine to coarse SAND, little silt, little gravel, (Fill).	
20	7D	24/24	20.0 - 22.0	3-2-3-6	5	7		459.9		Top 4": Brown, moist, fine to coarse SAND, some silt, little gravel, (Fill). 20.3 Bottom 20": Brown to grey, moist, loose, fine to medium SAND, little silt, (Alluvium).	
25											

Remarks:

1. Automatic hammer Drilling Group CME 55, SN LDL0000342 Energy Transfer Ratio = 0.789.
2. Reported water level was measured immediately after casing was removed.
3. Fine-Grained Soil Descriptions on this log are based on plasticity estimated using visual-manual classification techniques or laboratory Atterberg Limit tests if available, rather than the MaineDOT Standard based on percentages passing specific grain sizes.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: International Bridge Replacement
Bridge Street over St. John River
Location: Madawaska, ME - Edmundston, NB

Boring No.: BB-MSJR-213

WIN: 021736.00

Driller:	Logan Drilling Group	**Elevation (ft.)**	480.2	**Auger ID/OD:**	4/4.5"
Operator:	Al McGlinchey	**Datum:**	NAVD 88	**Sampler:**	Standard Splitspoon
Logged By:	L. Navarrete	**Rig Type:**	CME-55 Track Rig	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	3/3/20 - 3/3/20	**Drilling Method:**	Drive & Wash	**Core Barrel:**	NQ/HQ
Boring Location:	N1286749.2, E2184112.3	**Casing ID/OD:**	3/3.5"	**Water Level*:**	12.4'
Hammer Efficiency Factor:	0.789	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample Attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample Attempt
V = Field Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Field Vane Shear Test Attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = Weight of 140 lb. Hammer
WOR/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
25	8D	24/24	25.0 - 27.0	8-5-7-28	12	16	NQ			Top 21": Brown to grey, wet, medium dense, Silty fine to coarse SAND, trace gravel, (Alluvium).	G#48 A-4, SM
								453.7		26.5	
										Bottom 3": Brown, wet, fine to coarse SAND, some silt, some gravel, (Glacial Till).	
30	9D	19/16	30.0 - 31.6	50-32-50-50/1"	82	108				Grey/orange, wet, very dense, fine to coarse SAND, some gravel, some silt, (Glacial Till).	G#49 A-1-b, SM
	R1	53/53	31.6 - 36.0	RQD = 30%				448.6		31.6	
										Splitspoon refusal at 31.6'. Set up to core. R1: Hard, fresh to slightly weathered, aphanitic, grey, SLATE. Primary joints are extremely close to close, high angle to vertical, planar, smooth, fresh to discolored, tight to open, with silt infilling. Secondary joints are closely spaced, horizontal to low angle, planar to undulating, smooth to rough, fresh to discolored, tight to partially open, with silt infilling. Rock Quality = Poor Recovery = 100% Rock Core Times (min:sec): 31.6-32.0' (1:53), 32.0-33.0' (1:28), 33.0-34.0' (1:24), 34.0-35.0' (1:38), 35.0-36.0' (1:30)	
35	R2	60/60	36.0 - 41.0	RQD = 58%						R2: Hard, fresh to slightly weathered, aphanitic, grey, SLATE. Joints are extremely close to moderately spaced, high angle to vertical, planar, smooth, fresh to discolored, tight to partially open, with little silt infilling. Rock Quality = Fair Recovery = 100% Rock Core Times (min:sec): 36.0-37.0' (1:16), 37.0-38.0' (1:20), 38.0-39.0' (1:34), 39.0-40.0' (1:29), 40.0-41.0' (1:16)	
40								439.2		41.0	
										Bottom of Exploration at 41.0 feet below ground surface.	
45											
50											

Remarks:

1. Automatic hammer Drilling Group CME 55, SN LDL0000342 Energy Transfer Ratio = 0.789.
2. Reported water level was measured immediately after casing was removed.
3. Fine-Grained Soil Descriptions on this log are based on plasticity estimated using visual-manual classification techniques or laboratory Atterberg Limit tests if available, rather than the MaineDOT Standard based on percentages passing specific grain sizes.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: International Bridge Replacement
Bridge Street over St. John River
Location: Madawaska, ME - Edmundston, NB

Boring No.: BB-MSJR-214

WIN: 021736.00

Driller:	Logan Drilling Group	**Elevation (ft.)**	500.4	**Auger ID/OD:**	--
Operator:	Al McGlinchey	**Datum:**	NAVD 88	**Sampler:**	Standard Splitspoon
Logged By:	L. Navarrete	**Rig Type:**	CME-55 Track Rig	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	2/27/20 - 2/28/20	**Drilling Method:**	Drive & Wash	**Core Barrel:**	HQ/NQ
Boring Location:	N1286833.6, E2184188.9	**Casing ID/OD:**	4/4.5"	**Water Level*:**	15.8'
Hammer Efficiency Factor:	0.789	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
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SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = Weight of 140lb. Hammer
WOR/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0							HQ				
	1D	22/6	1.0 - 2.8	1-2-23-42/4"	25	33				Brown, moist, medium dense, fine to coarse SAND, some silt, some gravel, (Fill).	
5	2D	24/0	5.0 - 7.0	1-1-4-4	5	7				No recovery.	
	3D	24/12	7.0 - 9.0	4-3-2-2	5	7				Brown, moist, loose, fine to coarse SAND, some gravel, some silt, (Fill).	
10	4D	24/7	10.0 - 12.0	6-3-5-22	8	11				Grey, wet, loose, GRAVEL, some fine to coarse sand, trace silt, (Fill).	
								488.9		11.5	
	R1	24/24	12.0 - 14.0	RQD = 0%				488.4		Slate gravel pieces recovered in splitspoon shoe indicates probable weathered bedrock. 12.0	
15	R2	24/24	14.0 - 16.0	RQD = 17%						R1: Hard, fresh to slightly weathered, aphanitic, grey, SLATE. Joints are extremely close, high angle to vertical, planar to undulating, smooth, fresh to discolored, open. Rock Quality = Very Poor Recovery = 100% Rock Core Times (min:sec): 12.0-13.0' (2:30), 13.0-14.0' (3:10)	PLD, q_p=547 ksf
	R3	60/60	16.0 - 21.0	RQD = 52%			NQ			R2: Hard, fresh, aphanitic, grey, SLATE. Primary joints are extremely close to moderately spaced, high angle to vertical, planar, smooth, fresh, open. One low angle joint at 14.3'. Rock Quality = Very Poor Recovery = 100% Rock Core Times (min:sec): 14.0-15.0' (1:30), 15.0-16.0' (2:10)	PLA, q_p=561 ksf
20	R4	48/48	21.0 - 25.0	RQD = 56%						R3: Hard, fresh to slightly weathered, aphanitic, grey, SLATE. Joints are extremely close to moderately spaced, high angle to vertical, planar to undulating, smooth, fresh to discolored, tight to open. Rock Quality = Fair Recovery = 100% Rock Core Times (min:sec): 16.0-17.0' (1:39), 17.0-18.0' (1:35), 18.0-19.0' (2:33), 19.0-20.0' (2:08), 20.0-21.0' (2:48)	
25										R4: Hard, fresh to slightly weathered, aphanitic, grey, SLATE. Joints are extremely close to moderately spaced, moderately dipping to high angle, planar to undulating, smooth, fresh to discolored, tight to open. 23.5'-24.0': Highly fractured into gravel-size pieces. One high angle joint at 24.5'. Rock Quality = Poor Recovery = 100%	

Remarks:

1. Automatic hammer Drilling Group CME 55, SN LDL0000342 Energy Transfer Ratio = 0.789.
2. Reported water level was measured 0.5 hours after borehole completion with casing in place.
3. PLD refers to point load diametrical and PLA refers to point load axial test; q_p is estimated from the point load strength.
4. Fine-Grained Soil Descriptions on this log are based on plasticity estimated using visual-manual classification techniques or laboratory Atterberg Limit tests if available, rather than the MaineDOT Standard based on percentages passing specific grain sizes.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: International Bridge Replacement
Bridge Street over St. John River
Location: Madawaska, ME - Edmundston, NB

Boring No.: BB-MSJR-214

WIN: 021736.00

Driller:	Logan Drilling Group	**Elevation (ft.)**	500.4	**Auger ID/OD:**	--
Operator:	Al McGlinchey	**Datum:**	NAVD 88	**Sampler:**	Standard Splitspoon
Logged By:	L. Navarrete	**Rig Type:**	CME-55 Track Rig	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	2/27/20 - 2/28/20	**Drilling Method:**	Drive & Wash	**Core Barrel:**	HQ/NQ
Boring Location:	N1286833.6, E2184188.9	**Casing ID/OD:**	4/4.5"	**Water Level*:**	15.8'
Hammer Efficiency Factor:	0.789	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
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MU = Unsuccessful Thin Wall Tube Sample Attempt
V = Field Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Field Vane Shear Test Attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = Weight of 140 lb. Hammer
WOR/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
25	R5	60/60	25.0 - 30.0	RQD = 62%						Rock Core Times (min:sec): 21.0-22.0' (2:11), 22.0-23.0' (1:32), 23.0-24.0' (1:26), 24.0-25.0' (1:21) R5: Hard, fresh to slightly weathered, aphanitic, grey, SLATE. Primary joints are extremely close to moderately spaced, high angle to vertical, planar to undulating, smooth, fresh to discolored, tight to open. One horizontal joint at 25.5', undulating, smooth, discolored, open. Rock Quality = Fair Recovery = 100%	
30	R6	36/36	30.0 - 33.0	RQD = 87%						Rock Core Times (min:sec): 25.0-26.0' (1:55), 26.0-27.0' (2:15), 27.0-28.0' (1:47), 28.0-29.0' (1:20), 29.0-30.0' (1:43) R6: Hard, fresh to slightly weathered, aphanitic, grey, SLATE. Joints are extremely close to moderately spaced, high angle to vertical, planar, smooth, fresh to discolored, open to moderately wide. Rock Quality = Good Recovery = 100%	
35	R7	60/60	33.0 - 38.0	RQD = 71%						Rock Core Times (min:sec): 30.0-31.0' (1:00), 31.0-32.0' (1:43), 32.0-33.0' (2:01) R7: Hard, fresh to slightly weathered, aphanitic, grey, SLATE. Joints are extremely close to moderately spaced, moderately dipping to high angle, undulating to planar, fresh, partially open. Rock Quality = Fair Recovery = 100%	
40	R8	60/60	38.0 - 43.0	RQD = 70%						Rock Core Times (min:sec): 33.0-34.0' (1:00), 34.0-35.0' (1:43), 35.0-36.0' (1:42), 36.0-37.0' (2:27), 37.0-38.0' (2:13) R8: Hard, fresh, aphanitic, grey, SLATE. Primary joints are close, moderately dipping, planar, fresh, smooth, tight to partially open. Secondary joints are extremely close to closely spaced, high angle, planar, smooth, fresh to discolored, open. Rock Quality = Fair Recovery = 100%	
45	R9	60/60	43.0 - 48.0	RQD = 83%						Rock Core Times (min:sec): 38.0-39.0' (1:37), 39.0-40.0' (2:27), 40.0-41.0' (1:29), 41.0-42.0' (2:39), 42.0-43.0' (2:38) R9: Hard, fresh, aphanitic, grey, SLATE. Joints are moderately spaced, moderately dipping, planar, fresh, smooth, tight to open. Rock Quality = Good Rock Core Times (min:sec): 43.0-44.0' (2:21), 44.0-45.0' (1:21), 45.0-46.0' (2:05), 46.0-47.0' (2:34), 47.0-48.0' (1:55)	q_p=1631 ksf
								452.4		48.0 **Bottom of Exploration at 48.0 feet below ground surface.**	
50											

Remarks:

1. Automatic hammer Drilling Group CME 55, SN LDL0000342 Energy Transfer Ratio = 0.789.
2. Reported water level was measured 0.5 hours after borehole completion with casing in place.
3. PLD refers to point load diametrical and PLA refers to point load axial test; q_p is estimated from the point load strength.
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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: International Bridge Replacement
Bridge Street over St. John River
Location: Madawaska, ME - Edmundston, NB

Boring No.: BB-MSJR-301

WIN: 021736.00

Driller:	Logan Drilling Group	**Elevation (ft.)**	479.8	**Auger ID/OD:**	4/4.25"
Operator:	Al McGlinchey	**Datum:**	NAVD 88	**Sampler:**	Standard Splitspoon
Logged By:	L. Navarrete	**Rig Type:**	CME-55 Track Rig	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	6/10/20 - 6/10/20	**Drilling Method:**	Drive & Wash	**Core Barrel:**	NQ
Boring Location:	N1286776.6, E2184052.6	**Casing ID/OD:**	3/3.5"	**Water Level*:**	12.7'
Hammer Efficiency Factor:	0.789	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample Attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample Attempt
V = Field Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Field Vane Shear Test Attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = Weight of 140lb. Hammer
WOR/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/16	0.0 - 2.0	4-5-3-3	8	11	SSA	479.5		Top 4": Brown, moist, fine to coarse SAND, some silt, trace gravel, with roots, (Topsoil).	
								479.2		0.3	
										Bottom 8": Dark brown, moist, medium dense, fine to coarse SAND, some silt, trace gravel, with glass and asphalt fragments, (Fill).	
5	2D	24/12	5.0 - 7.0	5-2-2-3	4	5				Top 5": Brown, dry, fine to coarse SAND, trace gravel, (Fill). Bottom 7": Grey, moist, medium stiff, SILT, trace fine sand, trace wood pieces, (Fill).	
10	3D	24/15	10.0 - 12.0	4-5-4-3	9	12				Grey to brown, moist, medium dense, fine to coarse SAND, some gravel, trace silt, (Fill).	
15	4D	24/14	15.0 - 17.0	5-5-3-3	8	11		464.2		Top 8": Grey to black, wet, medium dense, fine to coarse SAND, some silt, some gravel, trace roots, (Fill).	
								464.0		15.6	
										Bottom 6": Grey, wet, medium stiff, SILT, trace fine sand, with wood fragments, trace roots, (Alluvium).	
20	5D	24/14	20.0 - 22.0	5-4-4-3	8	11				Grey, wet, medium dense, fine SAND, little silt, (Alluvium).	
								457.1		22.8	
	6D	1/1	23.5 - 23.6	50/1"	--		NQ			Brown, wet, very dense, fine to coarse SAND, little silt, some gravel, (Glacial Till).	
25	R1	60/56	24.0 - 29.0	RQD = 73%				455.8		Split spoon refusal at 23.6. Began advancement with NQ barrel.	

Remarks:

1. Automatic hammer Drilling Group CME 55, SN LDL0000342 Energy Transfer Ratio = 0.789.
2. Reported water level was measured immediately after casing was removed.
3. Fine-Grained Soil Descriptions on this log are based on plasticity estimated using visual-manual classification techniques or laboratory Atterberg Limit tests if available, rather than the MaineDOT Standard based on percentages passing specific grain sizes.

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Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: International Bridge Replacement
Bridge Street over St. John River
Location: Madawaska, ME - Edmundston, NB

Boring No.: BB-MSJR-301

WIN: 021736.00

Driller:	Logan Drilling Group	**Elevation (ft.)**	479.8	**Auger ID/OD:**	4/4.25"
Operator:	Al McGlinchey	**Datum:**	NAVD 88	**Sampler:**	Standard Splitspoon
Logged By:	L. Navarrete	**Rig Type:**	CME-55 Track Rig	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	6/10/20 - 6/10/20	**Drilling Method:**	Drive & Wash	**Core Barrel:**	NQ
Boring Location:	N1286776.6, E2184052.6	**Casing ID/OD:**	3/3.5"	**Water Level*:**	12.7'
Hammer Efficiency Factor: 0.789		**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

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WOR/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
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WC = Water Content, percent
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Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
25										Increase in resistance during NQ barrel advancement at 24.0'. No recovery in core barrel from 23.6'-24.0' indicates probable Glacial till.	
										24.0	
										Set up to core at 24.0'. R1: Hard, fresh to slightly weathered, aphanitic, grey, SLATE with calcite stringers. Joints are very close, high angle to vertical, planar, smooth, fresh, very tight to tight. One low angle joint at 25.5'. -SANGERVILLE FORMATION- Rock Quality = Fair Recovery = 93% Rock Core Times (min:sec): 24.0-25.0' (0:56), 25.0-26.0' (1:02), 26.0-27.0' (1:11), 27.0-28.0' (1:31), 28.0-29.0' (1:36)	
	R2	60/60	29.0 - 34.0	RQD = 73%							
30										R2: Hard, fresh to slightly weathered, aphanitic, grey, SLATE. Joints are extremely close to moderately spaced, high angle, planar, smooth, fresh to discolored, very tight to tight, with silt infilling. -SANGERVILLE FORMATION- Rock Quality = Fair Recovery = 100% Rock Core Times (min:sec): 29.0-30.0' (1:55), 30.0-31.0' (1:51), 31.0-32.0' (1:29), 32.0-33.0' (1:07), 33.0-34.0' (1:14)	
								445.8		34.0	
35										**Bottom of Exploration at 34.0 feet below ground surface.**	
40											
45											
50											

Remarks:

1. Automatic hammer Drilling Group CME 55, SN LDL0000342 Energy Transfer Ratio = 0.789.
2. Reported water level was measured immediately after casing was removed.
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Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: International Bridge Replacement
Bridge Street over St. John River
Location: Madawaska, ME - Edmundston, NB

Boring No.: BB-MSJR-302

WIN: 021736.00

Driller:	Logan Drilling Group	**Elevation (ft.)**	479.6	**Auger ID/OD:**	4/4.25"
Operator:	Al McGlinchey	**Datum:**	NAVD 88	**Sampler:**	Standard Splitspoon
Logged By:	L. Navarrete	**Rig Type:**	CME-55 Track Rig	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	6/10/20 - 6/11/20	**Drilling Method:**	Drive & Wash	**Core Barrel:**	NQ
Boring Location:	N1286778.9, E2184131.9	**Casing ID/OD:**	3/3.5"	**Water Level*:**	13.6'
Hammer Efficiency Factor:	0.789	**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample Attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample Attempt
V = Field Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Field Vane Shear Test Attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = Weight of 140lb. Hammer
WOR/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
0	1D	24/18	0.0 - 2.0	6-8-7-6	15	20	SSA			Brown, moist, medium dense, fine to coarse SAND, little gravel, little silt, with roots, and asphalt fragments, (Fill).	
5	2D	24/16	5.0 - 7.0	8-5-3-4	8	11				Brown to black, moist, medium dense, fine to coarse SAND, some silt, some gravel, 3" silt seam from 5.8'-6.1', (Fill).	
10	3D	24/12	10.0 - 12.0	5-6-3-4	9	12				Brown, moist, medium dense, fine to coarse SAND, some gravel, little silt, (Fill).	
15	4D	24/19	15.0 - 17.0	1-2-3-2	5	7				Top 9": Brown to grey, wet, fine SAND, trace silt, (Fill).	
								463.9		15.7	
										Bottom 10": Grey to black, wet, medium stiff, SILT, trace fine sand, (Alluvium).	
								461.1		18.5	
20	5D	3/3	20.0 - 20.3	50/3"	--					Grey, wet, very dense, GRAVEL, some fine sand, (Glacial Till). Split spoon refusal at 20.3. Began advancement with NQ barrel. Increase in resistance during NQ barrel advancement at 21.0'. No recovery in core barrel from 20.3'-21.0' indicates probable Glacial till.	
	R1	60/60	21.0 - 26.0	RQD = 78%			NQ	458.6		21.0	
25										Setup to core at 21.0'. R1: Hard, fresh to slightly weathered, aphanitic, grey, SLATE. Joints are close to moderately spaced, high angle to vertical, planar, smooth, fresh to discolored, tight to open, with silt infilling. -SANGERVILLE FORMATION- Rock Quality = Good	

Remarks:

1. Automatic hammer Drilling Group CME 55, SN LDL0000342 Energy Transfer Ratio = 0.789.
2. Reported water level was measured immediately after casing was removed.
3. Fine-Grained Soil Descriptions on this log are based on plasticity estimated using visual-manual classification techniques or laboratory Atterberg Limit tests if available, rather than the MaineDOT Standard based on percentages passing specific grain sizes.

Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

Maine Department of Transportation

Soil/Rock Exploration Log
US CUSTOMARY UNITS

Project: International Bridge Replacement
Bridge Street over St. John River
Location: Madawaska, ME - Edmundston, NB

Boring No.: BB-MSJR-302

WIN: 021736.00

Driller:	Logan Drilling Group	**Elevation (ft.)**	479.6	**Auger ID/OD:**	4/4.25"
Operator:	Al McGlinchey	**Datum:**	NAVD 88	**Sampler:**	Standard Splitspoon
Logged By:	L. Navarrete	**Rig Type:**	CME-55 Track Rig	**Hammer Wt./Fall:**	140#/30"
Date Start/Finish:	6/10/20 - 6/11/20	**Drilling Method:**	Drive & Wash	**Core Barrel:**	NQ
Boring Location:	N1286778.9, E2184131.9	**Casing ID/OD:**	3/3.5"	**Water Level*:**	13.6'
Hammer Efficiency Factor: 0.789		**Hammer Type:**	Automatic ☒ Hydraulic ☐ Rope & Cathead ☐		

Definitions:
D = Split Spoon Sample
MD = Unsuccessful Split Spoon Sample Attempt
U = Thin Wall Tube Sample
MU = Unsuccessful Thin Wall Tube Sample Attempt
V = Field Vane Shear Test, PP = Pocket Penetrometer
MV = Unsuccessful Field Vane Shear Test Attempt
R = Rock Core Sample
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RC = Roller Cone
WOH = Weight of 140 lb. Hammer
WOR/C = Weight of Rods or Casing
WO1P = Weight of One Person
S_u = Peak/Remolded Field Vane Undrained Shear Strength (psf)
$S_{u(lab)}$ = Lab Vane Undrained Shear Strength (psf)
q_p = Unconfined Compressive Strength (ksf)
N-uncorrected = Raw Field SPT N-value
Hammer Efficiency Factor = Rig Specific Annual Calibration Value
N_{60} = SPT N-uncorrected Corrected for Hammer Efficiency
N_{60} = (Hammer Efficiency Factor/60%)*N-uncorrected
T_v = Pocket Torvane Shear Strength (psf)
WC = Water Content, percent
LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
G = Grain Size Analysis
C = Consolidation Test

Depth (ft.)	Sample Information: Sample No.	Pen./Rec. (in.)	Sample Depth (ft.)	Blows (/6 in.) Shear Strength (psf) or RQD (%)	N-uncorrected	N_{60}	Casing Blows	Elevation (ft.)	Graphic Log	Visual Description and Remarks	Laboratory Testing Results/ AASHTO and Unified Class.
25										Recovery = 100% Rock Core Times (min:sec): 21.0-22.0' (1:23), 22.0-23.0' (1:10), 23.0-24.0' (1:09), 24.0-25.0' (1:14), 25.0-26.0' (1:32)	
	R2	60/60	26.0 - 31.0	RQD = 85%						R2: Hard, fresh to slightly weathered, aphanitic, grey, SLATE. Joints are extremely close to moderately spaced, high angle, planar, smooth, fresh to discolored, tight. -SANGERVILLE FORMATION- Rock Quality = Good Recovery = 100% Rock Core Times (min:sec): 26.0-27.0' (1:31), 27.0-28.0' (1:18), 28.0-29.0' (1:15), 29.0-30.0' (1:09), 30.0-31.0' (1:32)	
30								448.6		31.0 **Bottom of Exploration at 31.0 feet below ground surface.**	
35											
40											
45											
50											

Remarks:

1. Automatic hammer Drilling Group CME 55, SN LDL0000342 Energy Transfer Ratio = 0.789.
2. Reported water level was measured immediately after casing was removed.
3. Fine-Grained Soil Descriptions on this log are based on plasticity estimated using visual-manual classification techniques or laboratory Atterberg Limit tests if available, rather than the MaineDOT Standard based on percentages passing specific grain sizes.

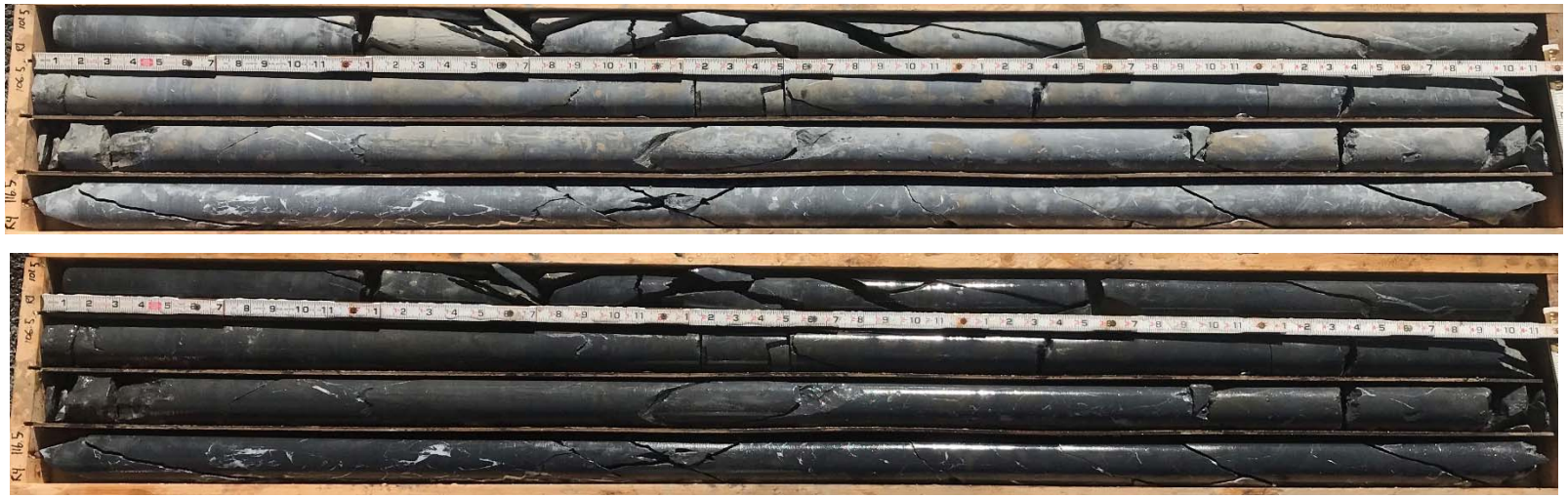
Stratification lines represent approximate boundaries between soil types; transitions may be gradual.

* Water level readings have been made at times and under conditions stated. Groundwater fluctuations may occur due to conditions other than those present at the time measurements were made.

APPENDIX C – ROCK CORE PHOTOGRAPHS

Madawaska-Edmundston International Bridge Crossing Replacement No. 2399
MaineDOT WIN 21736.00, Madawaska, Maine to Edmundston, New Brunswick
Rock Core Photographs

Boring No.	Run	Depth (ft)	Recovery (in)	Recovery (%)	RQD (in)	RQD (%)	Rock Type	Box Row
BB-MSJR-101	R1	101.5 - 106.5	60	100	28	47	SLATE	1
BB-MSJR-101	R2	106.5 - 111.5	60	100	43	72	SLATE	2
BB-MSJR-101	R3	111.5 - 116.5	60	100	42	70	SLATE	3
BB-MSJR-101	R4	116.5 - 121.5	60	100	33	55	SLATE	4



Notes: 1. Box row corresponds to the core box section in which the rock core sample is contained; Row 1=Top, Row 4=Bottom.
2. Top photo is dry, bottom photo is wet.

Madawaska-Edmundston International Bridge Crossing Replacement No. 2399
MaineDOT WIN 21736.00, Madawaska, Maine to Edmundston, New Brunswick
Rock Core Photographs

Boring No.	Run	Depth (ft)	Recovery (in)	Recovery (%)	RQD (in)	RQD (%)	Rock Type	Box Row
BB-MSJR-102	R1	26.8 - 31.8	60	100	46	77	SLATE	1
BB-MSJR-102	R2	31.8 - 36.8	60	100	50	83	SLATE	2
BB-MSJR-102	R3	36.8 - 41.8	60	100	26	43	SLATE	3
BB-MSJR-102	R4	41.8 - 46.8	60	100	14	23	SLATE	4

Notes: 1. Box row corresponds to the core box section in which the rock core sample is contained; Row 1=Top, Row 4=Bottom.
2. Top photo is dry, bottom photo is wet.

Madawaska-Edmundston International Bridge Crossing Replacement No. 2399
MaineDOT WIN 21736.00, Madawaska, Maine to Edmundston, New Brunswick
Rock Core Photographs

Boring No.	Run	Depth (ft)	Recovery (in)	Recovery (%)	RQD (in)	RQD (%)	Rock Type	Box Row
BB-MSJR-203	R1	85.2 - 90.2	60	100	57	95	SLATE	1
BB-MSJR-203	R2	90.2 - 95.2	60	100	48	80	SLATE	2
BB-MSJR-204	R1	86.1 - 91.4	64	100	0	0	SLATE	3,4
BB-MSJR-204	R2	91.4 - 95.1	44	100	4	8	SLATE	4

Notes: 1. Box row corresponds to the core box section in which the rock core sample is contained; Row 1=Top, Row 4=Bottom.
2. Top photo is dry, bottom photo is wet.

Madawaska-Edmundston International Bridge Crossing Replacement No. 2399
MaineDOT WIN 21736.00, Madawaska, Maine to Edmundston, New Brunswick
Rock Core Photographs

Boring No.	Run	Depth (ft)	Recovery (in)	Recovery (%)	RQD (in)	RQD (%)	Rock Type	Box Row
BB-MSJR-204	R2	91.4 - 95.1	44	100	4	8	SLATE	1
BB-MSJR-204	R3	95.1 - 100.1	60	100	44	80	SLATE	2,3

Notes: 1. Box row corresponds to the core box section in which the rock core sample is contained; Row 1=Top, Row 3=Bottom.
2. Top photo is dry, bottom photo is wet.

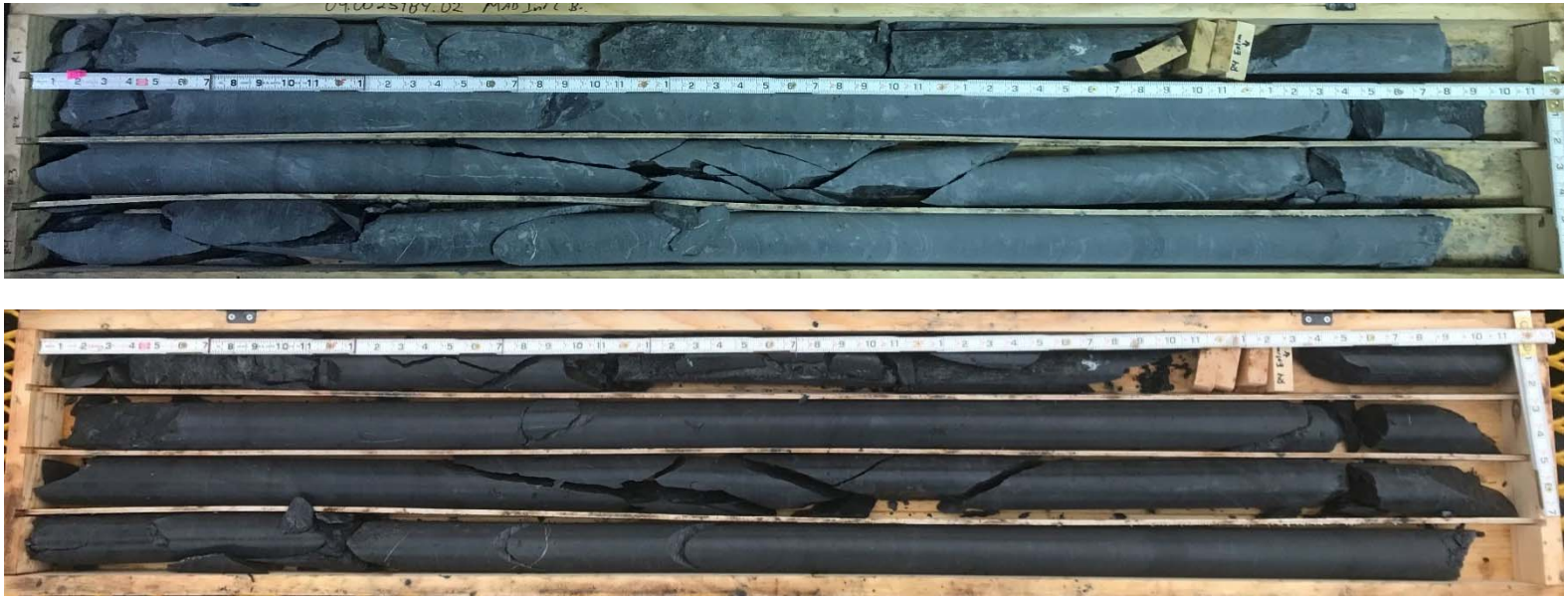
Madawaska-Edmundston International Bridge Crossing Replacement No. 2399
MaineDOT WIN 21736.00, Madawaska, Maine to Edmundston, New Brunswick
Rock Core Photographs

Boring No.	Run	Depth (ft)	Recovery (in)	Recovery (%)	RQD (in)	RQD (%)	Rock Type	Box Row
BB-MSJR-205	R1	30.0 - 35.0	60	100	28	47	SLATE	1
BB-MSJR-205	R2	35.0 - 40.0	60	100	44	73	SLATE	2
BB-MSJR-205	R3	40.0 - 45.0	60	100	36	60	SLATE	3
BB-MSJR-205	R4	45.0 - 50.0	60	100	36	60	SLATE	4

Notes: 1. Box row corresponds to the core box section in which the rock core sample is contained; Row 1=Top, Row 4=Bottom.
2. Top photo is dry, bottom photo is wet.

Madawaska-Edmundston International Bridge Crossing Replacement No. 2399
MaineDOT WIN 21736.00, Madawaska, Maine to Edmundston, New Brunswick
Rock Core Photographs

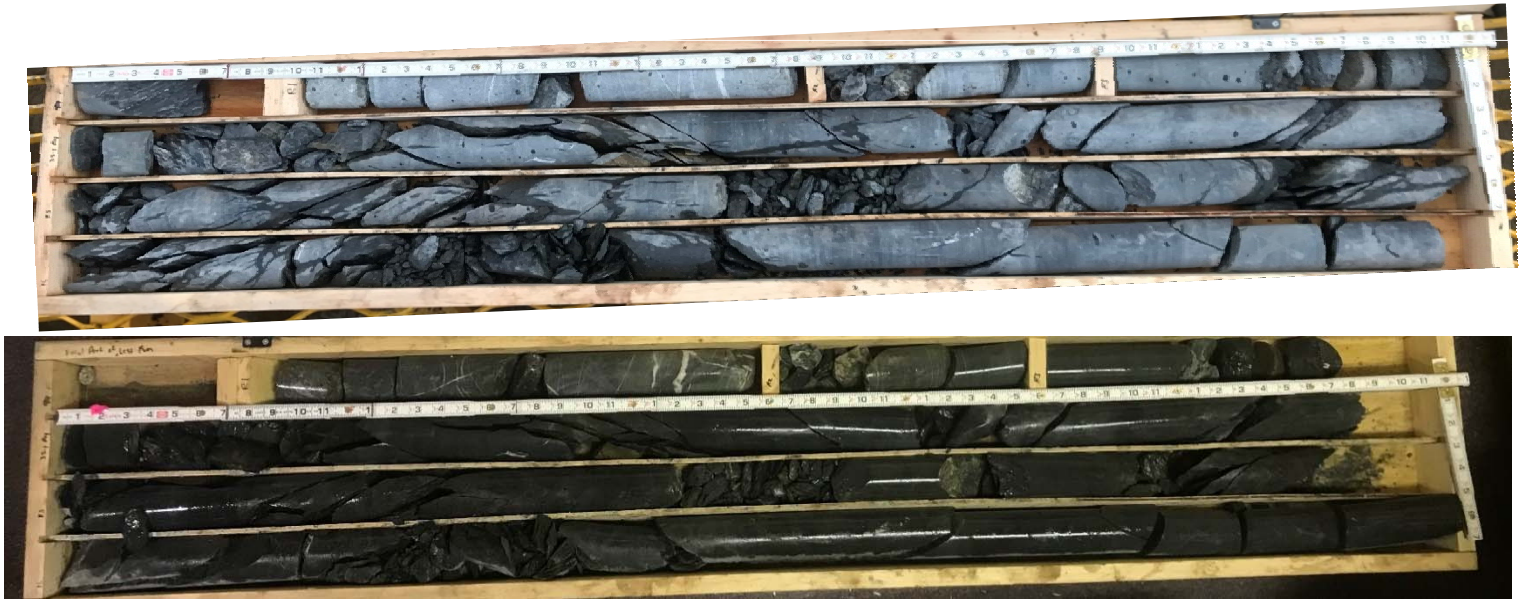
Boring No.	Run	Depth (ft)	Recovery (in)	Recovery (%)	RQD (in)	RQD (%)	Rock Type	Box Row
BB-MSJR-206	R1	30.8 - 34.5	44	100	22	50	SLATE	1
BB-MSJR-206	R2	34.5 - 39.4	59	100	47	80	SLATE	2
BB-MSJR-206	R3	39.4 - 44.4	60	100	32	53	SLATE	3
BB-MSJR-206	R4	44.4 - 49.4	60	100	46	77	SLATE	4



Notes: 1. Box row corresponds to the core box section in which the rock core sample is contained; Row 1=Top, Row 4=Bottom.
2. Top photo is dry, bottom photo is wet.

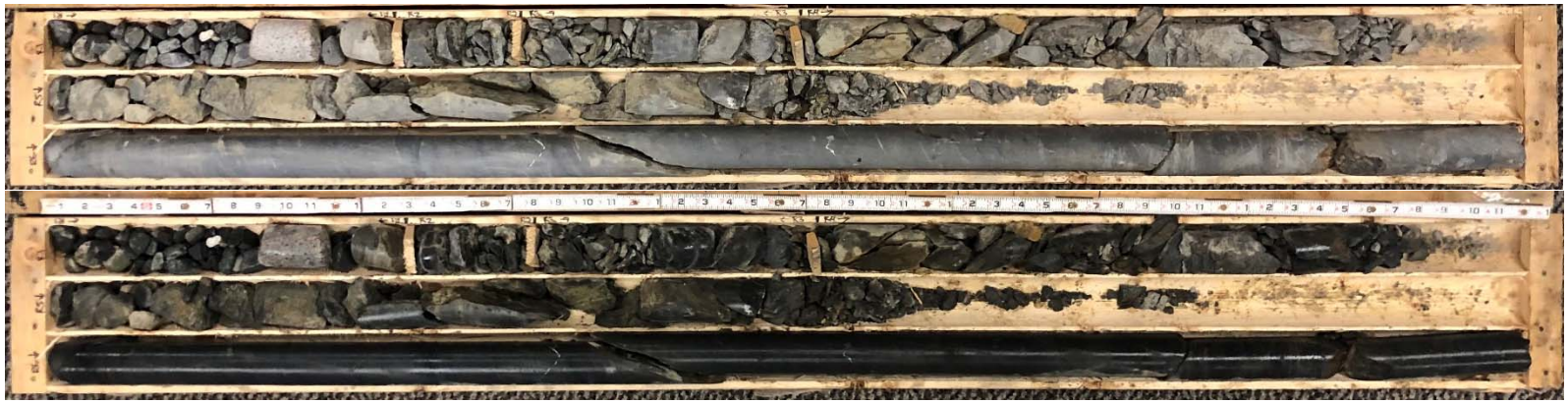
Madawaska-Edmundston International Bridge Crossing Replacement No. 2399
MaineDOT WIN 21736.00, Madawaska, Maine to Edmundston, New Brunswick
Rock Core Photographs

Boring No.	Run	Depth (ft)	Recovery (in)	Recovery (%)	RQD (in)	RQD (%)	Rock Type	Box Row
BB-MSJR-208	R1	11.4 - 14.4	21	58	--	--	COBBLE/BOULDER	1
BB-MSJR-208	R2	14.5 - 15.5	12	100	--	--	COBBLE/BOULDER	1
BB-MSJR-208	R3	28.2 - 32.0	13	28	--	--	COBBLE/BOULDER	1
BB-MSJR-208	R4	33.1 - 40.1	50	71	25	30	SLATE	2
BB-MSJR-208	R5	40.1 - 45.1	60	100	13	22	SLATE	3
BB-MSJR-208	R6	45.1 - 50.1	60	100	24	40	SLATE	4



Notes: 1. Box row corresponds to the core box section in which the rock core sample is contained; Row 1=Top, Row 4=Bottom.
2. Top photo is dry, bottom photo is wet.

Boring No.	Run	Depth (ft)	Recovery (in)	Recovery (%)	RQD (in)	RQD (%)	Rock Type	Box Row
BB-MSJR-209	R1	31.5 - 36	15	28	0	0	COBBLE/BOULDER	1
BB-MSJR-209	R2	37 - 41	5	10	0	0	COBBLE/BOULDER	1
BB-MSJR-209	R3	41.8 - 46	12	24	0	0	COBBLE/BOULDER	1
BB-MSJR-209	R4	46.2 - 51	26	45	0	0	WEATHERED SLATE	1
BB-MSJR-209	R5	51 - 55	36	75	0	0	WEATHERED SLATE	2
BB-MSJR-209	R6	55 - 60	60	100	57	95	SLATE	3



Notes: 1. Box row corresponds to the core box section in which the rock core sample is contained; Row 1=Top, Row 3=Bottom.
2. Top photo is dry, bottom photo is wet.

Madawaska-Edmundston International Bridge Crossing Replacement No. 2399
MaineDOT WIN 21736.00, Madawaska, Maine to Edmundston, New Brunswick
Rock Core Photographs

Boring No.	Run	Depth (ft)	Recovery (in)	Recovery (%)	RQD (in)	RQD (%)	Rock Type	Box Row
BB-MSJR-209	R7	60 - 65	60	100	33	55	SLATE	1
BB-MSJR-209	R8	65 - 70	60	100	34.5	57	SLATE	2
BB-MSJR-209	R9	70 - 75	60	100	19	32	SLATE	3

Notes: 1. Box row corresponds to the core box section in which the rock core sample is contained; Row 1=Top, Row 3=Bottom.
2. Top photo is dry, bottom photo is wet.

Boring No.	Run	Depth (ft)	Recovery (in)	Recovery (%)	RQD (in)	RQD (%)	Rock Type	Box Row
BB-MSJR-209	R10	75 - 80	60	100	56	93	SLATE	1
BB-MSJR-209	R11	80 - 85	60	100	36	60	SLATE	2

Notes: 1. Box row corresponds to the core box section in which the rock core sample is contained; Row 1=Top, Row 2=Bottom.
2. Top photo is dry, bottom photo is wet.

Madawaska-Edmundston International Bridge Crossing Replacement No. 2399
MaineDOT WIN 21736.00, Madawaska, Maine to Edmundston, New Brunswick
Rock Core Photographs

Boring No.	Run	Depth (ft)	Recovery (in)	Recovery (%)	RQD (in)	RQD (%)	Rock Type	Box Row
BB-MSJR-210	R1	32 - 35	10	28	0	0	COBBLE/BOULDER	1
BB-MSJR-210	R2	35.3 - 40	0	0	0	0	COBBLE/BOULDER	NA
BB-MSJR-210	R3	40.3 - 45	56	100	7	13	SLATE	1
BB-MSJR-210	R4	45 - 50	60	100	0	0	SLATE	2

Notes: 1. Box row corresponds to the core box section in which the rock core sample is contained; Row 1=Top, Row 2=Bottom.
2. Top photo is dry, bottom photo is wet.

Boring No.	Run	Depth (ft)	Recovery (in)	Recovery (%)	RQD (in)	RQD (%)	Rock Type	Box Row
BB-MSJR-210	R5	50 - 55	60	100	16	26	SLATE	1/2

Notes: 1. Box row corresponds to the core box section in which the rock core sample is contained; Row 1=Top, Row 2=Bottom.
2. Top photo is dry, bottom photo is wet.
3. Recovery appears to be greater than 100% because the core was not able to be completely reassembled

Boring No.	Run	Depth (ft)	Recovery (in)	Recovery (%)	RQD (in)	RQD (%)	Rock Type	Box Row
BB-MSJR-210	R6	55 - 60	60	100	18	30	SLATE	1/2

Notes: 1. Box row corresponds to the core box section in which the rock core sample is contained; Row 1=Top, Row 2=Bottom.
2. Top photo is dry, bottom photo is wet.
3. Recovery appears to be greater than 100% because the core was not able to be completely reassembled

Madawaska-Edmundston International Bridge Crossing Replacement No. 2399
MaineDOT WIN 21736.00, Madawaska, Maine to Edmundston, New Brunswick
Rock Core Photographs

Boring No.	Run	Depth (ft)	Recovery (in)	Recovery (%)	RQD (in)	RQD (%)	Rock Type	Box Row
BB-MSJR-211	R1	33 - 34	12	100	0	0	SLATE	1
BB-MSJR-211	R2	34 - 36	24	100	0	0	SLATE	1
BB-MSJR-211	R3	36 - 40	48	100	29	60	SLATE	2
BB-MSJR-211	R4	40 - 45	48	80	30.5	51	SLATE	3
BB-MSJR-211	R5	45 - 50	49	100	44.5	74	SLATE	4

Notes: 1. Box row corresponds to the core box section in which the rock core sample is contained; Row 1=Top, Row 4=Bottom.
2. Top photo is dry, bottom photo is wet.
3. Recovery less than 100% in BB-MSJR-211 R5 because the final 11 inches of core was left in the borehole.

Madawaska-Edmundston International Bridge Crossing Replacement No. 2399
MaineDOT WIN 21736.00, Madawaska, Maine to Edmundston, New Brunswick
Rock Core Photographs

Boring No.	Run	Depth (ft)	Recovery (in)	Recovery (%)	RQD (in)	RQD (%)	Rock Type	Box Row
BB-MSJR-212	R1	29.5 - 31.1	19	100	0	0	SLATE	1
BB-MSJR-212	R2	31.1 - 36.1	60	100	25	42	SLATE	1,2
BB-MSJR-212	R3	36.1 - 41.1	60	100	29	48	SLATE	2,3

Notes: 1. Box row corresponds to the core box section in which the rock core sample is contained; Row 1=Top, Row 3=Bottom.
2. Top photo is dry, bottom photo is wet.

Madawaska-Edmundston International Bridge Crossing Replacement No. 2399
MaineDOT WIN 21736.00, Madawaska, Maine to Edmundston, New Brunswick
Rock Core Photographs

Boring No.	Run	Depth (ft)	Recovery (in)	Recovery (%)	RQD (in)	RQD (%)	Rock Type	Box Row
BB-MSJR-213	R1	31.6 - 36	53	100	18	30	SLATE	1
BB-MSJR-213	R2	36 - 41	60	100	35	58	SLATE	2

Notes: 1. Box row corresponds to the core box section in which the rock core sample is contained; Row 1=Top, Row 2=Bottom.
2. Top photo is dry, bottom photo is wet.

Madawaska-Edmundston International Bridge Crossing Replacement No. 2399
MaineDOT WIN 21736.00, Madawaska, Maine to Edmundston, New Brunswick
Rock Core Photographs

Boring No.	Run	Depth (ft)	Recovery (in)	Recovery (%)	RQD (in)	RQD (%)	Rock Type	Box Row
BB-MSJR-214	R1	12 - 14	24	100	0	0	SLATE	1
BB-MSJR-214	R2	14 - 16	24	100	4	17	SLATE	1
BB-MSJR-214	R3	16 - 21	60	100	31	52	SLATE	2

Notes: 1. Box row corresponds to the core box section in which the rock core sample is contained; Row 1=Top, Row 2=Bottom.
2. Top photo is dry, bottom photo is wet.

Boring No.	Run	Depth (ft)	Recovery (in)	Recovery (%)	RQD (in)	RQD (%)	Rock Type	Box Row
BB-MSJR-214	R4	21 - 25	48	100	27	56	SLATE	1
BB-MSJR-214	R5	25 - 30	60	100	37	62	SLATE	2

Notes: 1. Box row corresponds to the core box section in which the rock core sample is contained; Row 1=Top, Row 2=Bottom.
2. Top photo is dry, bottom photo is wet.

Boring No.	Run	Depth (ft)	Recovery (in)	Recovery (%)	RQD (in)	RQD (%)	Rock Type	Box Row
BB-MSJR-214	R6	30 - 33	36	100	31	87	SLATE	1
BB-MSJR-214	R7	33 - 38	60	100	42.5	71	SLATE	2

Notes: 1. Box row corresponds to the core box section in which the rock core sample is contained; Row 1=Top, Row 2=Bottom.
2. Top photo is dry, bottom photo is wet.

Boring No.	Run	Depth (ft)	Recovery (in)	Recovery (%)	RQD (in)	RQD (%)	Rock Type	Box Row
BB-MSJR-214	R8	38 - 43	60	100	42	70	SLATE	1
BB-MSJR-214	R9	43 - 48	60	100	50	83	SLATE	2

Notes: 1. Box row corresponds to the core box section in which the rock core sample is contained; Row 1=Top, Row 2=Bottom.
2. Top photo is dry, bottom photo is wet.

Madawaska-Edmundston International Bridge Crossing Replacement No. 2399
MaineDOT WIN 21736.00, Madawaska, Maine to Edmundston, New Brunswick
Rock Core Photographs

Boring No.	Run	Depth (ft)	Recovery (in)	Recovery (%)	RQD (in)	RQD (%)	Rock Type	Box Row
BB-MSJR-301	R1	24 - 29	56	93	44	73	SLATE	1
BB-MSJR-301	R2	29 - 34	60	100	44	73	SLATE	2
BB-MSJR-302	R1	21 - 26	60	100	47	78	SLATE	3
BB-MSJR-302	R2	26 - 31	60	100	51	85	SLATE	4

Notes: 1. Box row corresponds to the core box section in which the rock core sample is contained; Row 1=Top, Row 4=Bottom.
2. Top photo is dry, bottom photo is wet.

APPENDIX D – NDT GEOPHYSICAL REPORT, RIVER SEISMIC REFRACTION

GEOPHYSICAL SEISMIC REFRACTION
TOP OF ROCK SURVEY

MADAWASKA INTERNATIONAL BRIDGE
CROSSING OVER THE ST JOHNS RIVER

MADAWASKA, MAINE

Prepared for

GZA GEOENVIRONMENTAL INC

NOVEMBER, 2018

NDT CORPORATION
Concrete & Geophysical Testing

NDT CORPORATION
153 Clinton Road, Sterling, MA 01564
Main: 978-563-1327 | Fax: 978-563-1340
eMail: Info@NDTCorporation.com

November 15, 2018

Mr. Andrew Blaisdell P.E. G.E
GZA GeoEnvironmental Inc
477 Congress Street, suite 700
Portland, Maine 04101

Subject: Geophysical Seismic Refraction top of bedrock profiling in the St. Johns River for the replacement of the International Bridge Madawaska, ME

Dear Mr. Blaisdell:

In accordance with your authorization to proceed, NDT Corporation conducted a geophysical seismic refraction survey along the proposed new alignment for the International Bridge Crossing the St. Johns River in Madawaska, Maine. The fieldwork was completed on October 30 and 31st, 2018. The objective of this survey was to determine the depth to rock and develop a top of rock profile along the proposed alignment to assist GZA with preliminary foundation design effort to replace the international bridge crossing the river.

We thank you for the opportunity to perform this work and look forward to being of service to you in the future. If you have any questions or require additional information, call the undersigned at 978-573-1327.

NDT Corporation

William Horne

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1.0 SUMMARY OF RESULTS

Seismic refraction data collected along the proposed alignment for the International Bridge crossing in Madawaska, Maine indicated 4-6 feet of water-saturated overburden with a velocity of 5,000+/- ft/sec; over-lying a dense glacial till with a velocity of 6,000 to 7,000 ft/sec; overlying a competent bedrock with a seismic velocity of 12,000 to 14,000 ft/sec.

In general the top of rock is relatively flat; ranging from 20 to 30 feet (Elev. 422 to 412) below the water line at the time of the survey across the 1100 foot survey area.

2.0 INTRODUCTION AND PURPOSE

NDT Corporation conducted a seismic refraction survey between stations 305+00 to 316+00 of the proposed new alignment for the International Bridge Crossing in Madawaska, Maine. Field work was conducted on October 30th and 31st, 2018 with the assistance of local boat pilot/guide Benjamin Bouchard. The purpose of this survey was to obtain top of bedrock information which will be used to assist GZA engineers in the preliminary foundation design effort to replace the international bridge crossing the river. The intent of this investigation is to evaluate the depth to top of bedrock along a new alignment upstream from the old bridge including a common abutment on the Canadian side and a new abutment roughly 1500' upstream on the American side. The area to be quantified is roughly 1100LF on a diagonal alignment across the middle of the river.

3.0 LOCATION AND SURVEY CONTROL

The general location of the proposed bridge alignme ure 1. The locations of the Seismic Refraction lines of ing and elevation control was provided by GZA surveyors at selected points along the alignment prior to the geophysical testing.

Note: Station 306+00 of original alignment corresponds with approximately 108+12 of the updated alignment

Station	306+00	308+00	310+00	311+50
Y	1285933.97	1286071.49	1286209.01	
X	2183175.99	2183321.21	2183466.43	
Mud-Line Elev. (ft)	441.5	441.2	440.8	437.8

The surveyors placed weighted buoys at these locations from which the 200 foot long Seismic Line layouts were referenced. Using the mud-line elevations provided the average water surface elevation is estimated to be ELEV. 442 feet at the time of the survey. Water depth measurements along the seismic lines were used to correlate seismic depth with project Elevations. Due to water depth and current seismic data could not be collected between Stations 311+00 and 312+00.

4.0 METHODS OF INVESTIGATION

4.1 SEISMIC REFRACTION:

Seismic refraction data was acquired with a 12 and 24 channel system with 5 and 10 foot geophone spacing and seismic energy generated approximately every 50 feet with a Betsy Seisgun (non-projectile) energy source. Seismic Refraction utilizes the natural energy transmitting properties of the soils and rocks and is based on the principle that the velocity at which seismic waves travel through the earth is a function of the physical

properties (elastic moduli and Poisson's ratio) of the materials. Refracted compressional wave data are used to evaluate material types and thickness, profile top of bedrock, and to determine the approximate depth to layer interfaces. A more complete discussion of the seismic refraction survey method is included in Appendix 1.

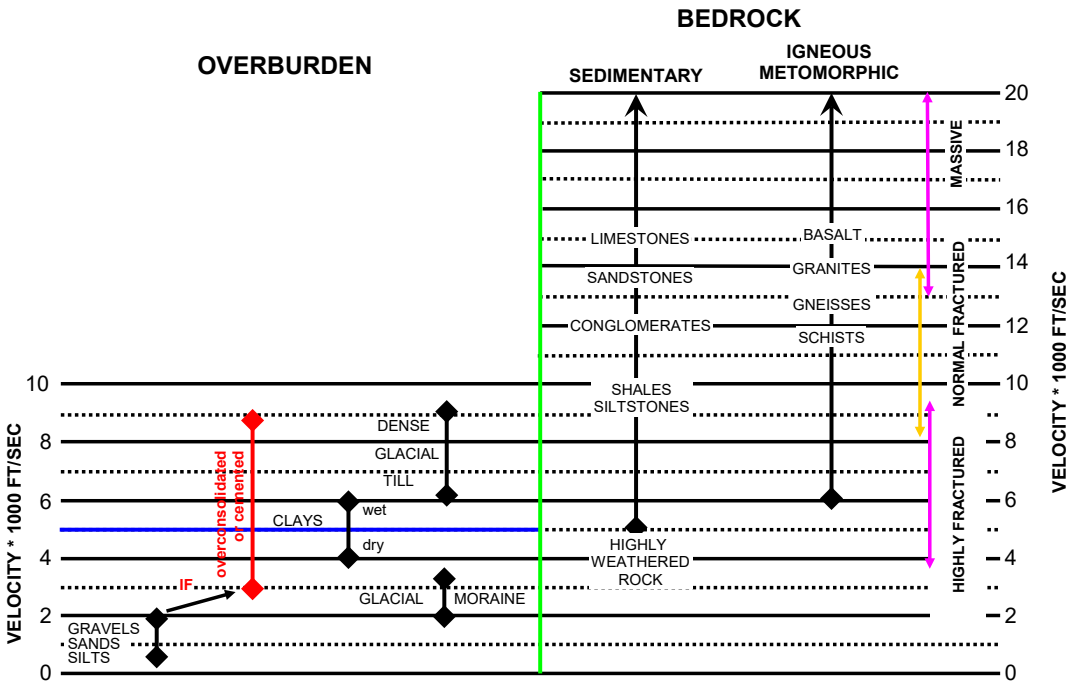
The seismic refraction data were interpreted using the critical distance method. Delayed bedrock wave arrivals were used to more accurately portray the bedrock surface between critical distance depth calculations. The delayed arrivals at individual geophone locations are an indicator of variability in the rock surface. Delayed arrivals indicate thicker overburden over the bedrock. Variations of 3+/- feet are not accurately profiled, particularly in shallow (less than 10 feet deep) bedrock areas.

Overburden with a 1,000-1,500+/- ft/sec velocity is consistent with normally consolidated soils/sands/fill material typical of natural soils, fluvial deposits, and/or construction fill. Till with a 2,600+/- ft/sec velocity value is consistent with unstratified glacial drift or ground moraine. These tills typically deposited by receding glaciers consisting of an admixture of clays, sands and gravels with occasional and sometimes frequent boulders associated with an ablation till. All of these materials when saturated with water have a seismic velocity of 5,000+/- ft/sec.

Till with velocities between 6,000 to 8,000 ft/sec is consistent with an over-consolidated basil till. These tills consist of sands, gravel, and rocks/boulders which were deposited as the glaciers advanced. Subjected to the full weight and pressure of the glaciers these tills are very dense and are associated with split-spoon sampling of 50-100+ blows per foot.

Bedrock velocities of less than 10,000 ft/sec are indicative of highly weathered and/or fractured rock typical of sedimentary and low grade metamorphic rocks such as shales, silt stones and schists. Bedrock with a velocity of 10,000 to 15,000 ft/sec is indicative of competent bedrock that will require drilling and blasting for removal. This velocity range is typical of competent sedimentary and metamorphic rocks such as sandstones, limestones, schists, and gneisses. Bedrock velocities greater than 15,000 ft/sec are indicative of massive bedrock typical in metamorphic and igneous rocks such as gneisses, granites and basalts.

Bedrock velocity ranges are determined by rock type and the degree of fracturing, bedding, joints, and weathering.



5.0 RESULTS

Seismic data indicated a thin water saturated overburden layer with a velocity of 5,000+/- feet; data indicates that the overburden ranged from 0 to 4-6 feet across the profile area. Below the water saturated overburden data indicates a 15 to 25 foot thick dense glacial till layer with a seismic velocity of 6,000 to 7,000 ft/sec overlying a competent bedrock with a seismic velocity of 12,000 to 14,000 ft/sec.

The seismic lines of coverage and top of rock (TOR) elevations are shown in Figure 2, a elevation plan map provided by GZA. Figure 3 shows the top of rock profile along the alignment from station 305+00 to 316+00. Figure 4 shows the top of rock profiles along 200 foot seismic lines collected "perpendicular" to the alignment (parallel to the shoreline) from up-stream to down-stream at stations 306+00, 308+00, 310+00 and 315+00. The depths plotted along the top of rock line are depths from the water surface (ELEV. 442) at the time of the survey.

Localized high and low areas exist. Definition of high and low areas is a function of the seismic spread length, number of "shots" taken, geophone spacing, velocity contrast, and the irregularity of the rock surface. Variations of 3+/- feet are not accurately profiled, particularly in shallow (less than 10 feet deep) bedrock areas.

Dense glacial till has a seismic velocity of 6,000 to 7,000 ft/sec and weathered bedrock often have velocities of 7,000-8,000 ft/sec. Due to this velocity contrast it is difficult to distinguish if a weathered rock layer is present at this site. The top of rock (TOR) elevations reported in this report and shown in the profiles is the top of "competent" rock.

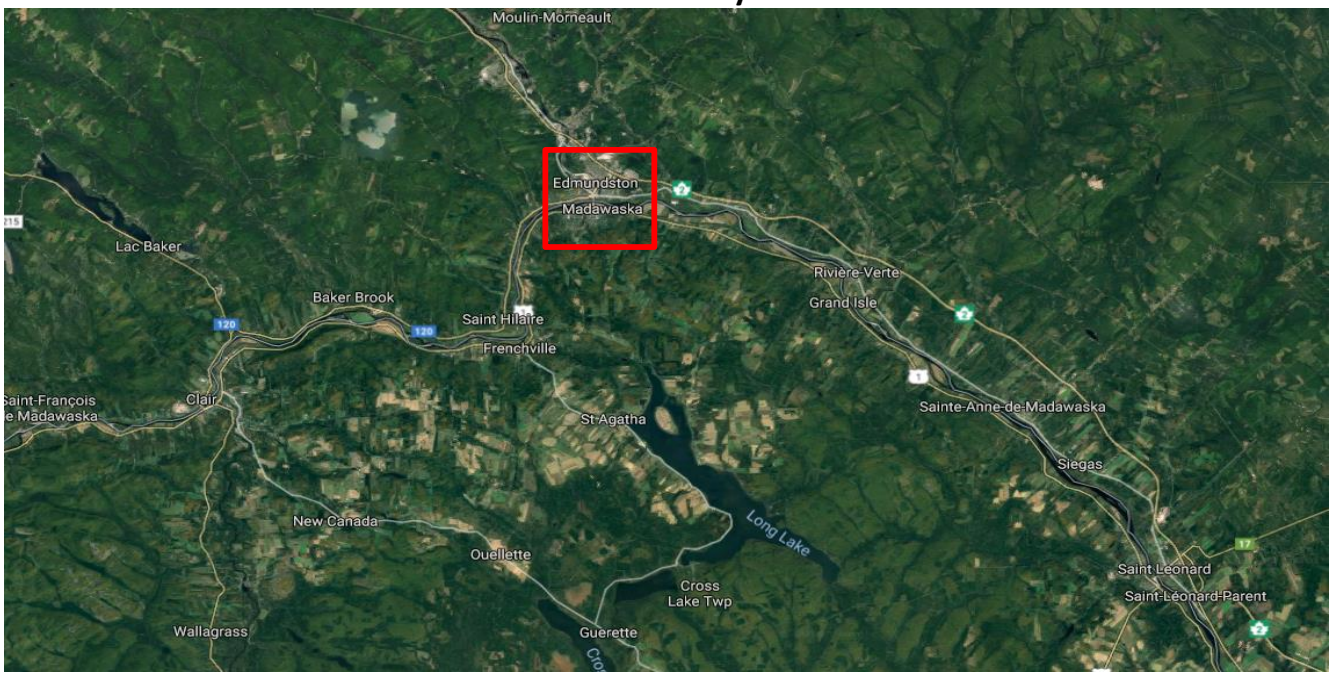
The table below lists the top of rock depths and elevations from the seismic data.

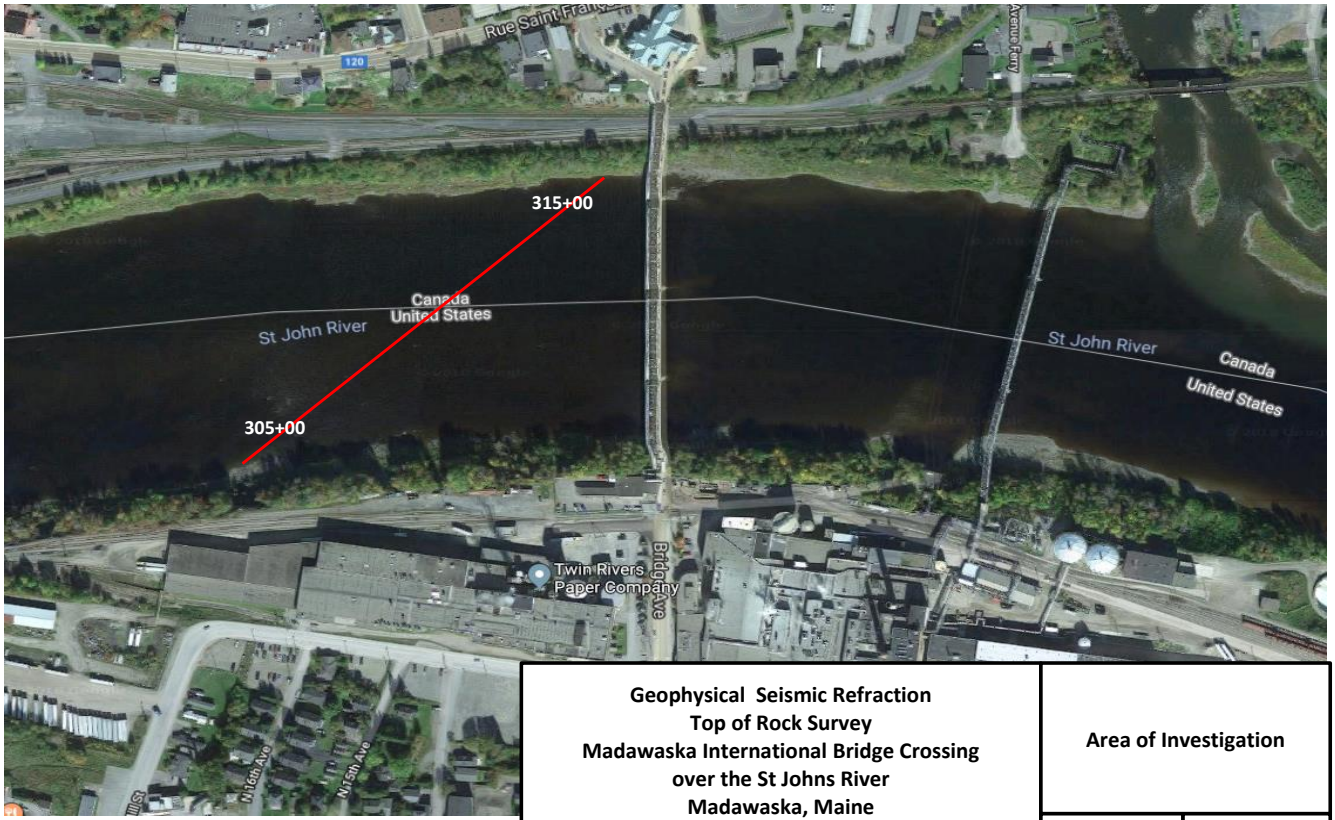
Station (feet)	Depth (TOR) (feet)	Elev. (TOR) (feet)
United States Shoreline		
305+00	26	416
305+50	18	424
306+00	22	420
306+50	26	416
307+00	27	415
307+50	26	416
308+00	26	416
308+50	26	416
309+00	25	417
309+50	26	416
310+00	27	415
310+50	29	413
311+00	30	412
311+50	x	x
312+00	29	413
312+50	29	413
313+00	29	413
313+50	30	412
314+00	27	415
314+50	24	418
315+00	24	418
315+50	25	417
316+00	31	411
Canadian Shoreline		

Depths and Elevations +/-3 feet

FIGURES

Area of Investigation
Madawaska International Bridge Crossing
Seismic Survey



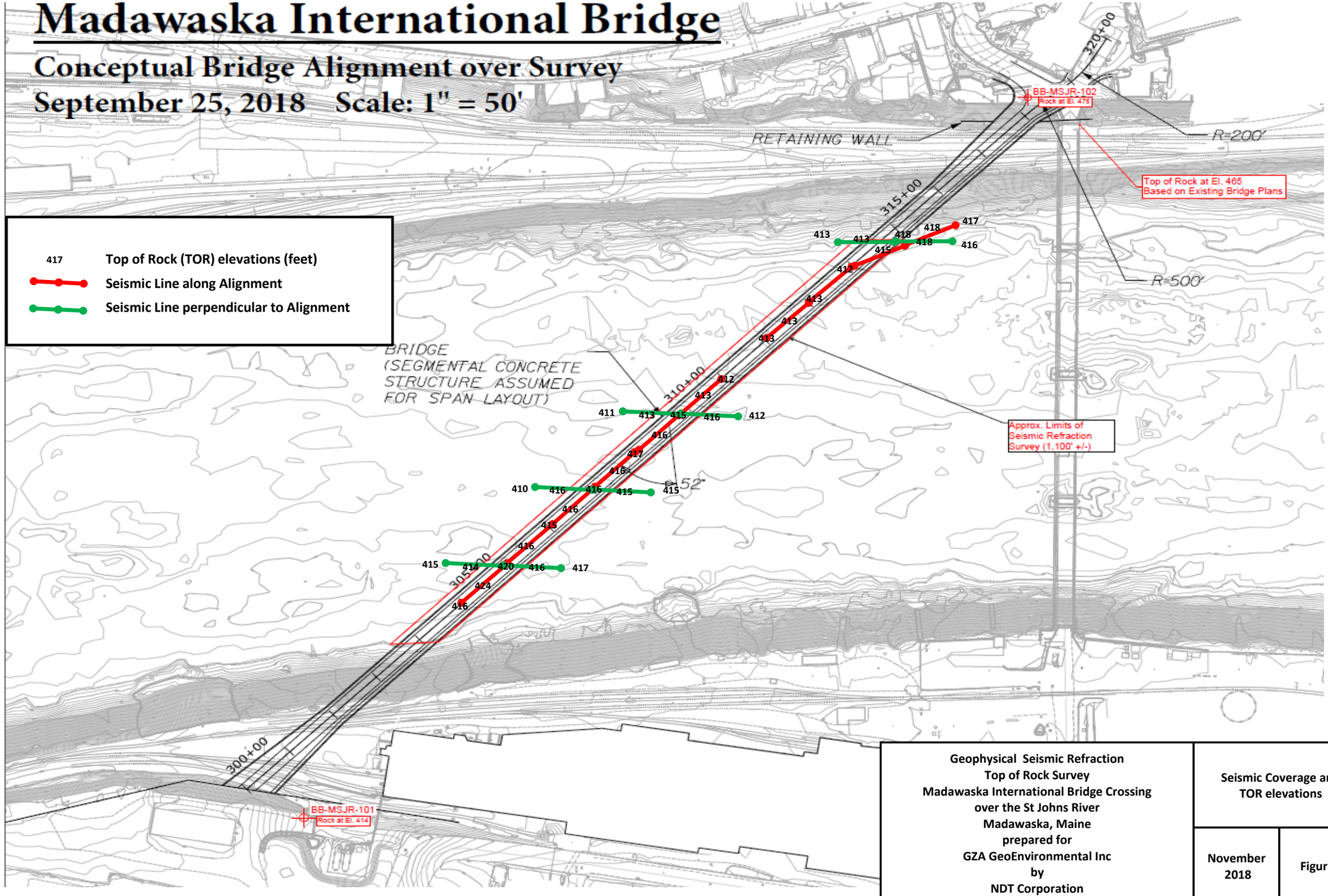


Geophysical Seismic Refraction Top of Rock Survey Madawaska International Bridge Crossing over the St Johns River Madawaska, Maine prepared for GZA GeoEnvironmental Inc by NDT Corporation	Area of Investigation	
	November 2018	Figure 1

Madawaska International Bridge

Conceptual Bridge Alignment over Survey

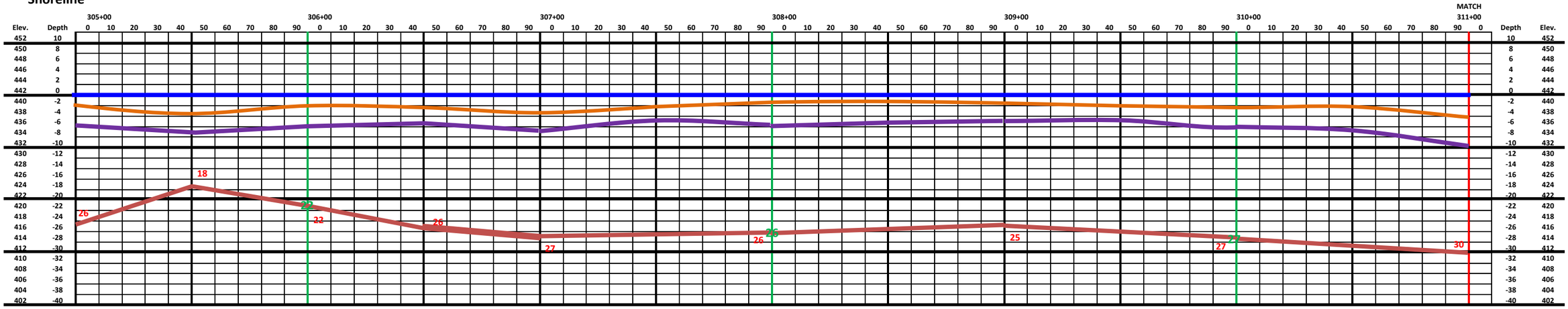
September 25, 2018 Scale: 1" = 50'



Geophysical Seismic Refraction Top of Rock Survey Madawaska International Bridge Crossing over the St Johns River Madawaska, Maine prepared for GZA GeoEnvironmental Inc by NDT Corporation	Seismic Coverage and TOR elevations	
	November 2018	Figure 2

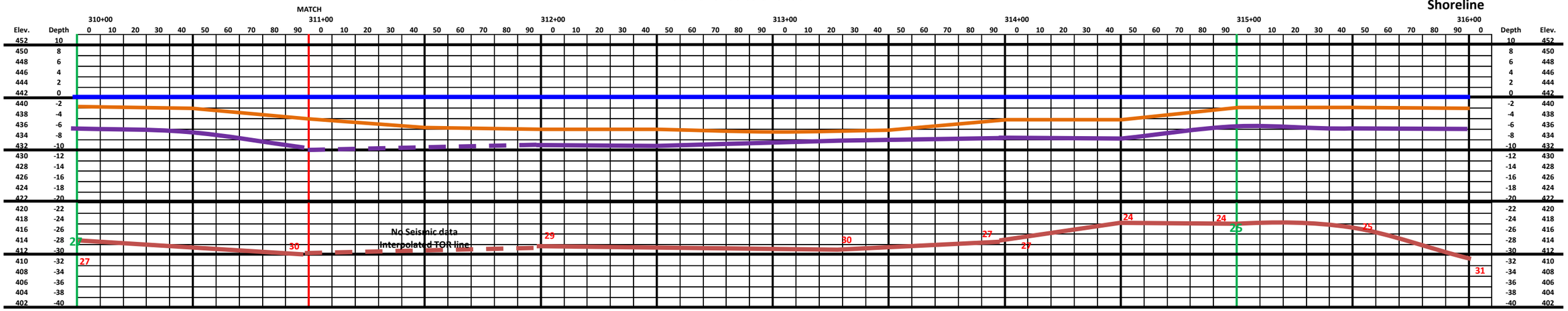
United States Shoreline

Seismic Profile along Alignment
Sta. 305+00 to 311+00



Seismic Profile along Alignment
Sta. 310+00 to 316+00

Canadian Shoreline



MATCH

Water Surface

5,000 ft/se

River Bed Bottom

5,000 ft/se

Top of Dense Glacial Till

6,000 - 7,000

Top of (competent) Bedrock

13,000 - 14,000

29 Depth to top of Rock (data along Alignment)

27 Depth to top of Rock (data from cross-lines)

Geophysical Seismic Refraction
Top of Rock Survey
Madawaska International Bridge Crossing
over the St Johns River
Madawaska, Maine
prepared for
GZA GeoEnvironmental Inc
by
NDT Corporation

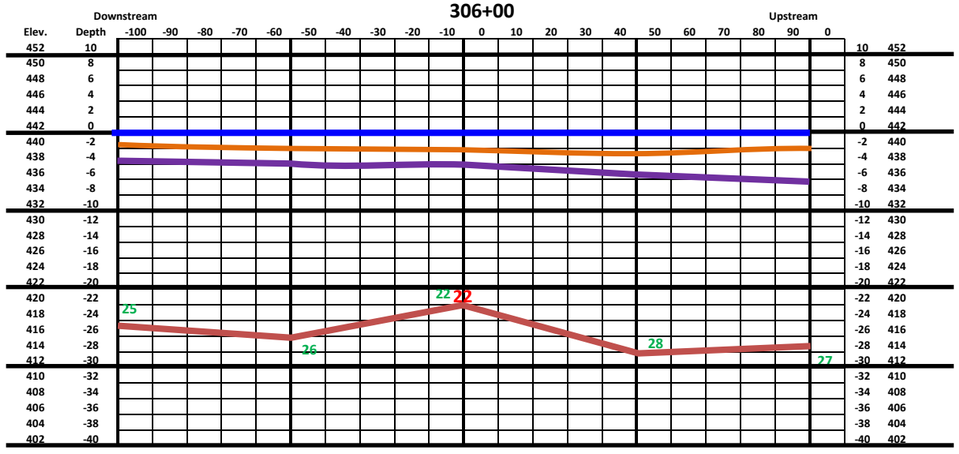
Seismic Profiles along Alignment

November 2018

Figure 3

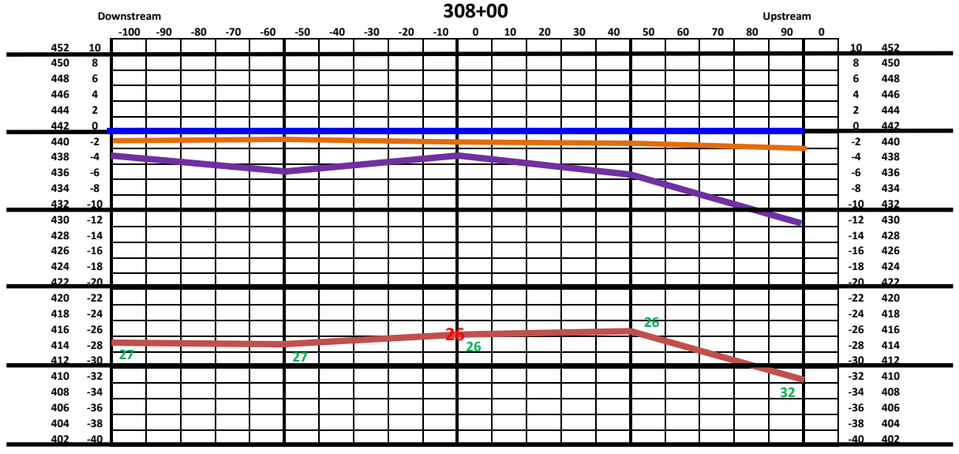
Seismic Profile Perpendicular to Alignment

306+00



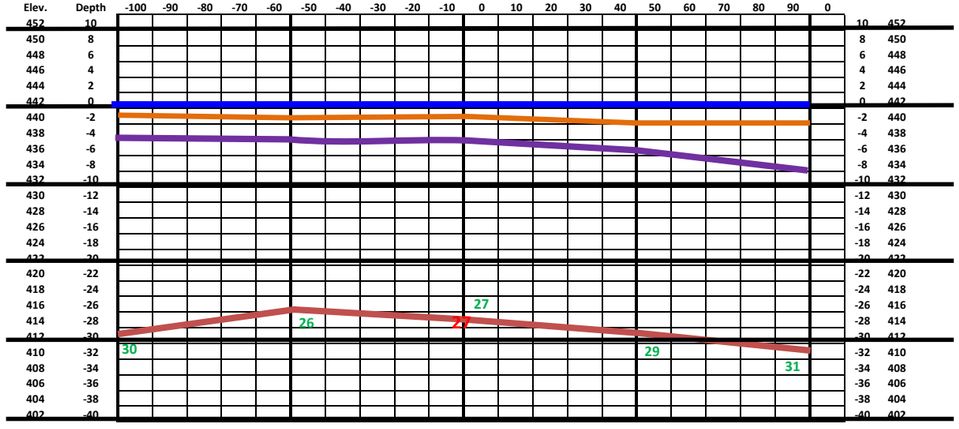
Seismic Profile Perpendicular to Alignment

308+00



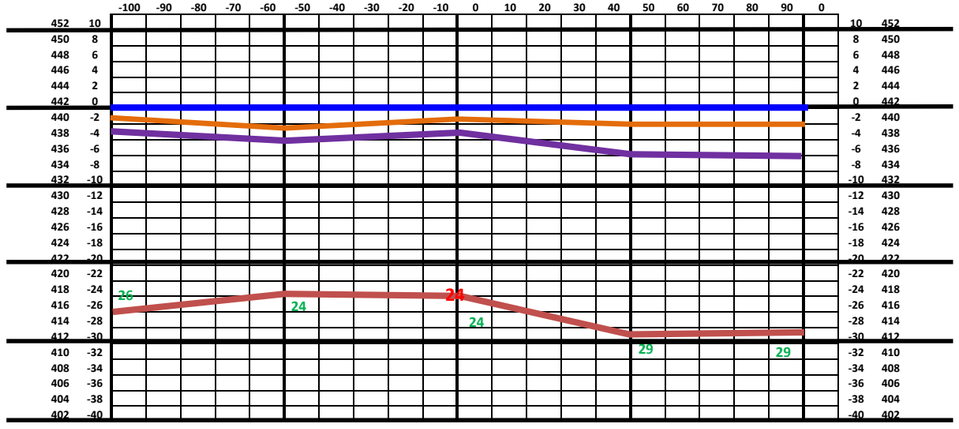
Seismic Profile Perpendicular to Alignment

310+00



Seismic Profile Perpendicular to Alignment

315+00



Water Surface

5,000 ft/se

River Bed Bottom

5,000 ft/se

Top of Dense Glacial Till

6,000 - 7,000

Top of (competent) Bedrock

13,000 - 14,000

29 Depth to top of Rock (data along Alignment)

27 Depth to top of Rock (data from cross-lines)

Geophysical Seismic Refraction
Top of Rock Survey
Madawaska International Bridge Crossing
over the St Johns River
Madawaska, Maine
prepared for
GZA GeoEnvironmental Inc
by
NDT Corporation

Seismic Profiles perpendicular to Alignment

November 2018

Figure 4

APPENDIX 1

SEISMIC REFRACTION

APPENDIX: SEISMIC REFRACTION

OVERVIEW

Seismic exploration methods utilize the natural energy transmitting properties of the soils and rocks and are based on the principle that the velocity at which seismic waves travel through the earth is a function of the physical properties (elastic moduli and Poisson's ratio) of the materials. Energy is generated at the ends and at the center of the seismic spread. The geophone/hydrophone is in direct contact with the earth/water and converts the earth's motion resulting from the energy generation into electric signals with a voltage proportional to the particle velocity of the ground motion. The field operator can amplify and filter the seismic signals to minimize background noise. Data are recorded on magnetic disk and can be printed in the field. Interpretations are based on the time required for a seismic wave to travel form a source to a series of geophones/hydrophones located at specific intervals along the ground surface. The resultant seismic velocities are used for:

* Material identification.
* Stratigraphic correlation.
* Depth determinations.
* Calculation of elastic moduli values and Poison's ratio.

A variety of seismic wave types, differing in resultant particle motion, are generated by a near surface seismic energy source. The two types of seismic waves for seismic exploration are the compressional (P) wave and the shear (S) wave. Particle motion resulting from a (P-wave) is an oscillation, consisting of alternating compression and dilatation, orientated parallel to the direction of propagation. An S-wave causes particle motion transverse to the direction of propagation. The P-wave travels with a higher velocity of the two waves and is of greater importance for seismic surveying. The following discussions are concerned principally with P-waves.

Possible seismic wave paths include a direct wave path, a reflected wave path or a refracted wave path. These wave paths are illustrated in FIGURE A1. The different paths result in different travel times, so that the recorded seismic waveform will theoretically show three distinct wave arrivals. The direct and refracted wave paths are important to seismic refraction exploration while the reflected wave path is important for seismic reflection studies.

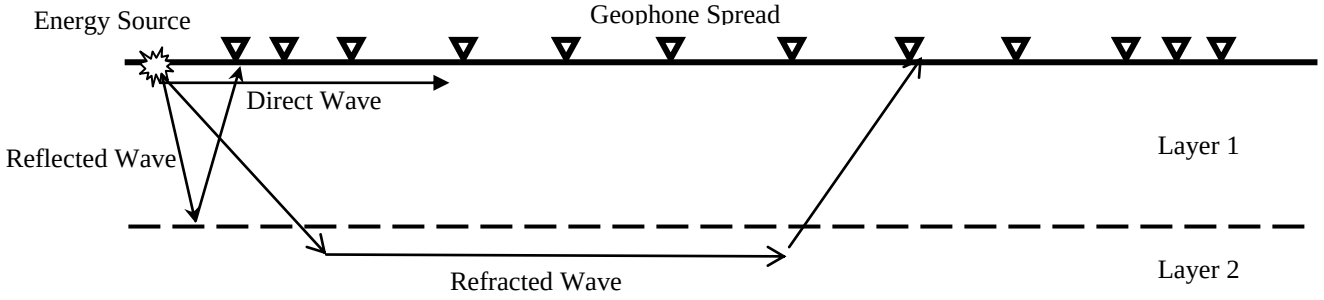


FIGURE A1:
SEISMIC WAVE PATHS FOR DIRECT WAVE, REFLECTED WAVE AND REFRACTED WAVE ILLUSTRATING EFFECTS OF A BOUNDARY BETWEEN MATERIALS WITH DIFFERENT ELASTIC PROPERTIES

Seismic waves incident on the interface between materials of different elastic properties at what is termed the critical angle are refracted and travel along the top of the lower layer. The critical angle is a function of the seismic velocities of the two materials. These same waves are then refracted back to the surface at the same angle. The recorded arrival times of these refracted waves, because they depend on the properties and geometry of the subsurface, can be analyzed to produce a vertical profile of the subsurface. Information such as the number, thickness and depths of stratigraphic layers, as well as clues to the composition of these units can be ascertained.

The first arrivals at the geophones/hydrophones located near the energy source are direct waves that travel through the near surface. At greater distances, the first arrival is a refracted wave. Lower layers typically are higher velocity materials, therefore the refracted wave will overtake both the direct wave and the reflected wave, because of the time gained travelling through the higher velocity material compensates for the longer wave path. Depth computations are based on the ratio of the layer velocities and the distance from the energy source to the point where refracted wave arrivals over take direct arrivals.

Although not the usual case, a constraint on refraction theory is that material velocities ideally should increase with depth. If a velocity inversion exists, i.e. where a higher velocity layer overlies a low velocity layer, depths and seismic velocities can be calculated but the uncertainty in calculations is increased unless borehole data are available.

APPLICATIONS

Seismic refraction technique is an accurate and effective method for determining the thickness of subsurface geologic layers. Applications for engineering design, assessment, and remediation as well as ground water and hydrogeologic studies include:

* Continuous profiling of subsurface layers including the bedrock surface
* Water-table depth determinations
* Mapping and general identification of significant stratigraphic layers
* Detection of sinkholes and cavities
* Detection of bedrock fracture zones
* Detection of filled-in areas
* Elastic moduli and Poisson's ratio values for subsurface layers

Seismic refraction investigations are particularly useful because seismic velocities can be used for material identification. FIGURE A2 presents a guide to material identification based on P-wave seismic velocities. In rocks and compacted overburden material, the seismic waves travel from grain to grain so that the measured seismic velocity value is a direct function of the solid material. In porous or fractured rock and most overburden materials the seismic waves travel partly or wholly though the fluid between the grains.

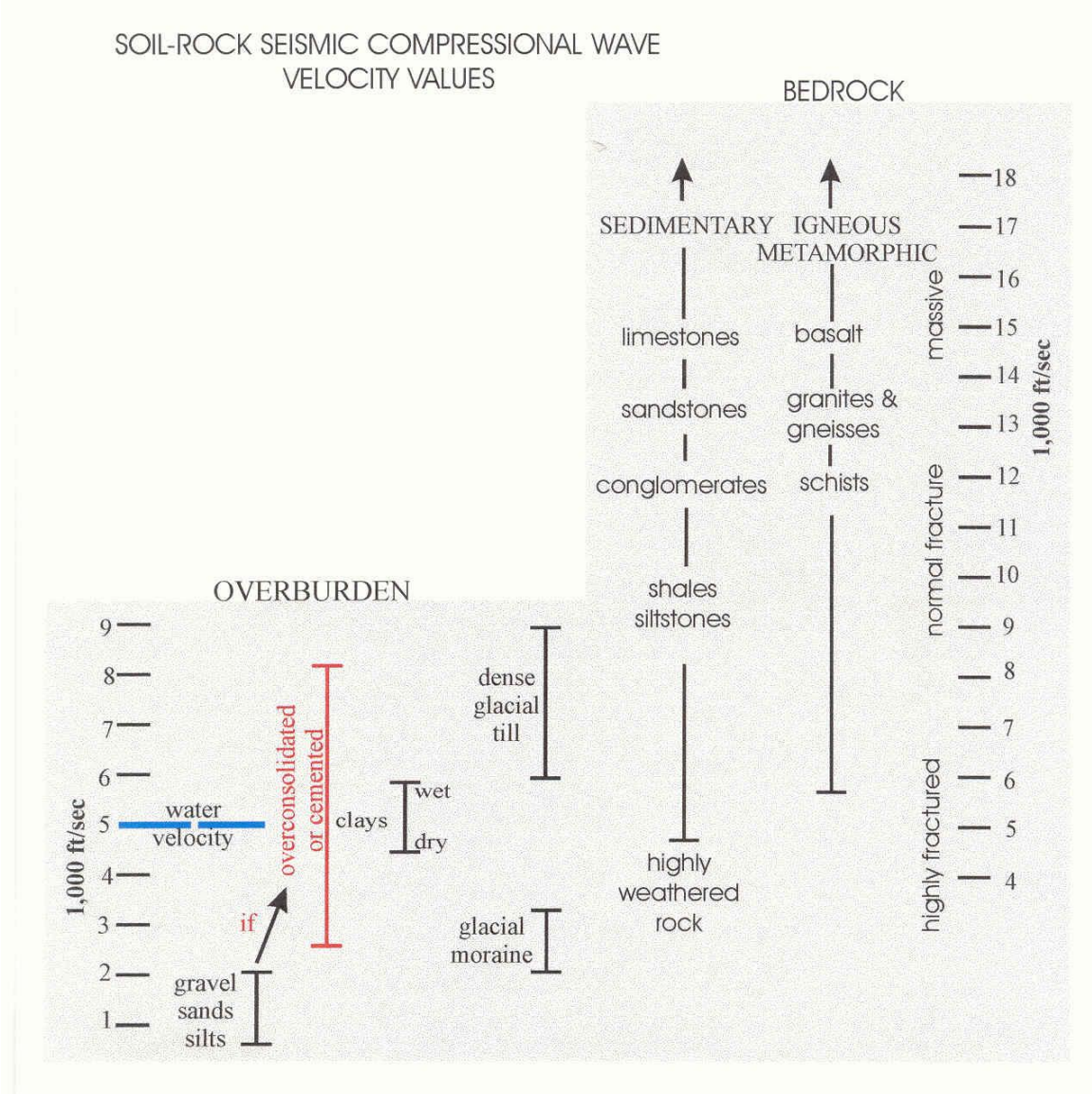


FIGURE A2:
GUIDE TO MATERIAL IDENTIFICATION BY P-WAVE VELOCITY

Seismic compressional wave velocities in unconsolidated deposits are significantly affected by water saturation. The seismic velocity values of unsaturated overburden materials such gravels, sands and silts generally fall in the range of 1,000 to 2,000 ft/sec. When these materials are water saturated, that is when the space between individual grains are 100% filled with water, the seismic velocities range from 4,800 to 5,100 ft/sec, equivalent to the compressional P-wave velocity of sound in water. This is because the seismic wave assumes the velocity of the faster medium, that of water. Even a small decrease in the saturation level will substantially lower the measured P-wave velocity of

the material. Because of this velocity contrast between saturated and unsaturated materials, the water table acts as a strong refractor.

Seismic investigations over unconsolidated deposits are used to map stratigraphic discontinuities and to unravel the gross stratigraphy of the subsurface. These can be vertically as in the case of a dense till layer beneath a layer of saturated material or horizontally as in the case of the boundaries of a fill material. Often these boundaries represent significant hydrologic boundaries, such as those between aquifers and aquicludes.

A common use of seismic refraction is the determination of the thickness of a saturated layer in unconsolidated sediments and the depth to relatively impermeable bedrock or dense glacial till. Continuous subsurface profiles and even contour maps of the top of a particular horizon or layer of interest can be developed from a suite of seismic refraction data.

Bedrock velocities FIGURE A2 vary over a broad range depending on variables, which include:

* Rock type
* Density
* Degree of jointing/fracturing
* Degree of weathering

Fracturing and weathering generally reduce seismic velocity values in bedrock. Low velocity zones in seismic data must be evaluated carefully to determine if they are due to overburden conditions or fractured/weathered or perhaps even faulted bedrock.

EQUIPMENT:

The basic equipment necessary to conduct a seismic refraction investigation consists of:

* Energy source
* Seismometers (Geophones/Hydrophones)
* Seismic cables
* Seismograph

Energy sources used for seismic surveys are categorized as either non-explosive or explosive. The energy for a non-explosive seismic signal can be provided by one of the following:

* Sledge Hammer (very shallow penetration)
* Weight Drop
* Seisgun
* Airgun
* Sparker
* Vibrators (for reflection surveys)

Explosive sources can be categorized as:

* Dynamite
* Primers
* Blasting Agents

Choice of energy source is dependent on site conditions, depth of investigation, and seismic technique chosen as well as local restrictions. Explosive sources may be prohibited in urban areas where non-explosive sources can be routinely used. Deeper investigations usually require a larger energy source: therefore, explosives may be required for sufficient penetration.

Geophones/Hydrophones are sensitive vibration detectors, which convert ground motion to an electric voltage for recording the seismic wave arrivals. Seismic cables, which link the geophones/hydrophones and seismograph are generally fabricated with pre-measured locations for the geophones/hydrophones and shot point definitions.

The seismograph can be single channel or multi-channel, although, multi-channel seismographs (12 to 24 channels) are preferred and necessary for all but the simplest of very shallow surveys. The seismograph, amplifies (increases the voltage output of the geophones), conditions/filters the data, and produces analog and digital archives of the data. The analog archive is in the form of a thermal print of the data, which can be printed directly after acquisition in the field. The digital archive is stored on magnetic disk and can be used for subsequent computer processing and enable more extensive and detailed interpretation of seismic data.

ACQUISITION CONSIDERATIONS:

Several concerns arise before data collection, which must be addressed before of any seismic survey:

* Geophone spacing and Spread length
* Energy Source (discussed above)
* On-site utilities and cultural features (buildings, high tension lines, buried utilities, etc.)
* Vibration generating activities
* Geology
* Topography

To acquire seismic refraction data, a specific number of geophones are spaced at regular intervals along a straight line on the ground surface; this line is commonly referred to as a seismic spread. The length of spread determines the depth of penetration; a longer spread is required for a greater depth of penetration. Spread length should be approximately three to five times the required depth of penetration. Required resolution will control the number of geophones in each spread and the distance between each geophone. Closer spacings and more geophones usually result in more detail and greater resolution.

Cultural effects such as vibration generating activities, on-site utilities, and building affect where data can be acquired, and where lines/spreads are located. High volume traffic areas may require nighttime acquisition. If the survey is to be conducted near a

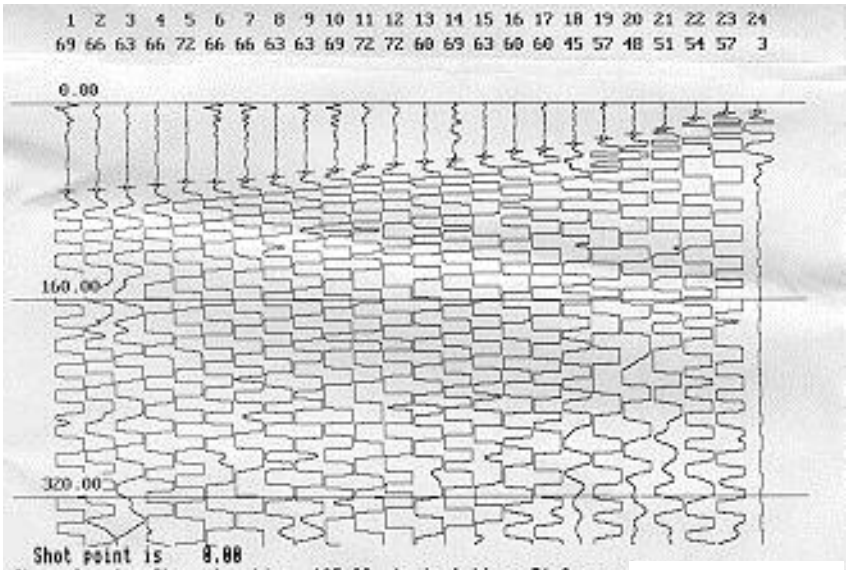
building where vibration-sensitive manufacturing is conducted, data acquisition may be constrained to particular time intervals and appropriate energy sources must be used. Over head and buried utilities must be located an avoided, for both safety and induced electrical noise concerns. Since the seismic method measures ground vibration, it is inherently sensitive to noise from a variety of sources such as traffic, wind, rain etc. Signal Enhancement, such as record stacking, accomplished by adding a number of seismic signals from a repeated source, causes the seismic signal to "grow" out of the noise level, permitting operation in noisier environments and at greater source to phone spacings.

Knowledge of site geology can be used to determine the energy source. Some geologic materials, such as loose, unsaturated alluvium, do not transmit seismic energy as well and a powerful energy source may be required. Geologic conditions also dictate whether or not drilled shotholes are required. Site geology can also dictate the positioning of seismic lines/spreads. Where a bedrock depression of a feature is suspected, seismic lines should be orientated perpendicular to the suspected trend of the feature. Seismic cross profiles may be necessary to confirm depths to a particular refracting horizon.

The topography of a site dictates whether or not surveyed elevations are required. If possible, refraction profile lines should be positioned along level topography. For highly variable topography, a continuous elevation profile may be required to ensure sufficiently accurate cross-sections and to permit the use of time corrections in the interpretation of the refraction data.

DATA PRESENTATION AND INTERPETATION:

Interpretation of seismic refraction data involves solving a number of mathematical equations with the refraction data as it is presented on a travel-time versus distance chart. Seismic refraction data FIGURE A3 can be processed by plotting the "First Arrival" travel times at each geophone location. The preferred format of data presentation is a graph (Travel Time Plot) illustrated in FIGURE A4, in which travel time in milliseconds is plotted against source-receiver distance. From such a chart, the velocities of each layer can be obtained directly from the increase slope of each straight-line segment. Using the velocities the critical angle of refraction for each boundary can be calculated using Snell's Law. Then, utilizing these velocities, and angles and the recorded distances to crossover points (where line segments cross); the depths and thickness of each layer can be calculated using simple geometric relationships.



Shot point is 0.00

Channel	1	Phone location	195.00	Arrival time	71.3 msec
Channel	2	Phone location	190.00	Arrival time	70.3 msec
Channel	3	Phone location	185.00	Arrival time	68.5 msec
Channel	4	Phone location	175.00	Arrival time	66.3 msec
Channel	5	Phone location	165.00	Arrival time	63.0 msec
Channel	6	Phone location	155.00	Arrival time	63.0 msec
Channel	7	Phone location	145.00	Arrival time	62.0 msec
Channel	8	Phone location	135.00	Arrival time	59.0 msec
Channel	9	Phone location	125.00	Arrival time	56.0 msec
Channel	10	Phone location	115.00	Arrival time	54.0 msec
Channel	11	Phone location	110.00	Arrival time	51.5 msec
Channel	12	Phone location	105.00	Arrival time	49.3 msec
Channel	13	Phone location	95.00	Arrival time	47.3 msec
Channel	14	Phone location	90.00	Arrival time	45.0 msec
Channel	15	Phone location	85.00	Arrival time	43.0 msec
Channel	16	Phone location	75.00	Arrival time	39.0 msec
Channel	17	Phone location	65.00	Arrival time	37.0 msec
Channel	18	Phone location	55.00	Arrival time	33.0 msec
Channel	19	Phone location	45.00	Arrival time	28.0 msec
Channel	20	Phone location	35.00	Arrival time	25.0 msec
Channel	21	Phone location	25.00	Arrival time	20.0 msec
Channel	22	Phone location	15.00	Arrival time	12.0 msec
Channel	23	Phone location	10.00	Arrival time	8.0 msec
Channel	24	Phone location	5.00	Arrival time	7.0 msec

FIGURE A3:
TYPICAL 24 CHANNEL ANALOG SEISMIC REFRACTION RECORD, WITH FIRST ARRIVAL TIMES

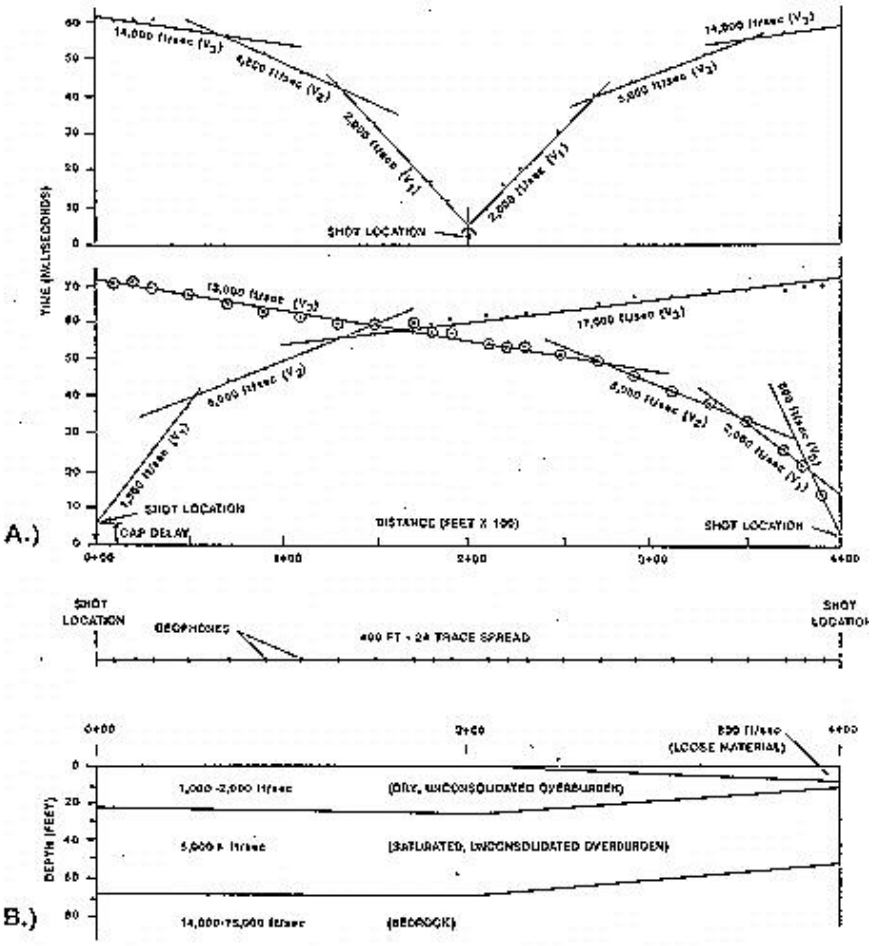


FIGURE A4:
A: TRAVEL-TIME PLOTS; UPPER PLOT IS A CENTER SHOT, LOWER PLOT IS TWO END SHOTS
B: RESULTING PROFILE OF SUBSURFACE MATERIALS SHOWING INTERFACE BETWEEN DIFFERENT SEISMIC VELOCITY LAYERS

The results of any seismic survey, refraction or reflection are usually presented in profile form showing elevations of seismic horizons/layers. Data acquired on a grid basis can be contoured and used to construct isopach maps. Seismic velocities and therefore, generalized material identifications should be presented on refraction profiles along with any test borings used for correlation to establish confidence in the overall subsurface data, both seismic and borings.

Where profiles indicate dipping boundaries, calculation of dips, true depths and true velocities involve more complicated equations. Further more, corrections for differing elevations and varying thicknesses of weathered zones must often be made. Fracturing and weathering generally reduce seismic velocity values in bedrock. Consequently, travel-time plots with late arrivals must be evaluated carefully to determine if the late arrival times (slower velocities) are due to overburden conditions or fractured/weathered bedrock.

Very thin layers or low velocity zones often complicate the travel-time chart as well. Although not the usual case, one constraint on refraction theory is that material velocities ideally should increase with depth. If a velocity inversion exists, i.e. where a higher velocity layer overlies a low velocity layer, depths and seismic velocities can be calculated but the uncertainty in calculations is increased unless borehole velocity data are available.

ADVANTAGES AND LIMITATIONS:

The seismic refraction technique, when properly employed, is the most accurate of the geophysical methods for determining subsurface layering and materials. It is extremely effective in that as much as 2,000 linear feet or more of profiling can be acquired in a field day. The resulting profiles can be used to minimize drilling and place drilling at locations where borehole information will be maximized resulting in cost-effective exploration. A standard drilling program runs the risk of missing key locations due to drillhole spacing. This risk is substantially reduced when refraction is used.

In summary, the advantages and limitations of the seismic techniques are:

Advantages:

* Material identification
* Subsurface data over broader areas at less cost than drilling
* Relatively accurate depth determination
* Correlation between drillholes
* Preliminary results available almost immediately
* Rapid data processing

Limitations:

* As depth of interest and geophone spacing increases, resolution decreases
* Thin layers may be undetected
* Velocity inversions may add uncertainty to calculations
* Susceptible to noise interference in urban areas, which require use of grounded cables and equipment, signal enhancement and alternative energy sources.

APPENDIX E – NDT GEOPHYSICAL REPORT, ABUTMENT GROUND PENETRATING RADAR

Ground Penetrating Radar Survey
International Bridge over the
St. John River

Canadian Abutment

Edmundston, New Brunswick
Madawaska, Maine

Prepared for

GZA

November, 2019

NDT CORPORATION
Concrete & Geophysical Testing

NDT CORPORATION
153 Clinton Road, Sterling, MA 01564
Main: 978-563-1327 | Fax: 978-563-1340
eMail: Info@NDTCorporation.com

November 25, 2019

Mr. Andrew R. Blaisdell, P.E., G.E.
Associate Principal / Geotechnical Engineer
GZA
477 Congress Street, Suite 700
Portland, Maine 04101

Dear Mr. Blaisdell:

NDT Corporation conducted ground penetrating radar (GPR) measurements on the North approach/abutment of the International Bridge over the St. John River in Edmundston, New Brunswick/Madawaska, Maine. Field work was conducted on November 7th, 2019. Based on preliminary information provided to NDT by GZA, the original wing walls may have been left in place/located under the pavement in the area of the existing Canadian bridge abutment. The objective of this investigation is to determine if these wing walls exist and to determine the depth below the pavement. This report presents the results of the GPR measurements to provide subsurface information to aid GZA engineers with the design for the bridge replacement project.

We thank you for the opportunity to perform this work and look forward to being of service to you in the future. If you have any questions or comments, contact the undersigned at 978-563-1327.

Sincerely,
NDT Corporation

William Horne

TABLE OF CONTENTS

1.0	INTRODUCTION AND PURPOSE	Page 1
2.0	LOCATION AND SURVEY CONTROL	Page 1
3.0	NONDESTRUCTIVE TESTING METHODS	Page 1
4.0	RESULTS	Page 2

FIGURES

APPENDIX 1 GPR Method of Investigation

APPENDIX 2 GPR Data for East to West Cross-lines

1.0 INTRODUCTION AND PURPOSE

Based on preliminary information provided to NDT by GZA, the original wing walls may have been left in place and are still present under the pavement in the area of the Canadian bridge abutment of the International Bridge over the St. John River in Edmundston, New Brunswick/Madawaska, Maine. The objective of this investigation is to determine if these wing walls exist and attempt to determine the depth below the pavement. NDT Corporation conducted a GPR survey on November 7th, 2019 along the north approach to the Canadian Abutment.

2.0 LOCATION AND SURVEY CONTROL

The location of the International Bridge over the St. John River in Edmundston, New Brunswick/Madawaska, Maine is shown on Figure 1. GPR data was collected along transverse (east to west) lines of coverage spaced at 5, 10, 20, 30, 40, 50, and 60 feet north from the edge of the bridge along the east curb. Longitudinal (north to south) lines at 5 foot spacing were collected with station 0 at the edge of the bridge. MEDOT surveyors were on site and picked up the "begin and end" locations of the GPR survey lines.

3.0 NONDESTRUCTIVE TESTING METHODS

3.1 Ground Penetrating Radar (GPR)

The GPR method uses a pulsed electromagnetic signal that is transmitted to and reflected by a target back to the point of transmission. The electromagnetic wave transmission and reflection is dependent on the dielectric constant and conductivity (electrical) properties of the material(s) being investigated. These electrical properties are highly dependent on moisture content, saturated or concentrated moist conditions provide both strong reflections and high attenuation.

GPR data were acquired using a digital system coupled with a 400 MHz, and 200 MHz antennas. The 400 MHz antenna has an approximate depth of investigation from the surface to depths of 5 to 10 feet; while the 200 MHz antenna has an approximate depth of investigation of 20 to 30 feet; the actual depth of investigation is dependent on the soil types and moisture conditions. Depths of investigation are usually deeper in dry sands and gravels than in moist silts and clays. Due to subsurface conditions the GPR data for both antennas was limited to approximately 6-8 feet.

Changes in materials: asphalt pavement, concrete, cobblestone and naturally deposited soils or fill soils placed in lifts during construction retain moisture between material interfaces and typically have horizontal or near horizontal bedding planes. These conditions cause a change in conductivity which shows as continuous reflective layers on GPR data. Filled utility trenches and old excavations may have similar characteristics. Appendix 1 has a more detailed description of the GPR method of investigation.

4.0 RESULTS

GPR results are summarized in Figure 2, a plan view of the north approach. Cross-sections with GPR data are shown in Appendix 2 (north approach). GPR located structures consistent with the location of the original wing walls, and indications that the original wing walls do exist below the finished roadway approach. The GPR was limited to only 6-8 feet of signal penetration so limited results on the geometry of the wing walls was obtained at depth.

GPR data located the original east wing wall (shade red on Figure 2) extending from the bridge abutment approximately 16+/- feet. This wing wall is approximately 4+/- feet wide at a depth of 12-18 inches from the top of pavement. Data indicates that at a depth of 3-4 feet below the top of pavement this wing wall batters in both the east and west directions.

GPR data located the original west wing wall (shade red on Figure 2) extending from the bridge abutment approximately 22+/- feet. This wing wall is approximately 4+/- feet wide at a depth of 30+/- inches from the top of pavement. Data indicates that at a depth of 5+/- feet below the top of pavement this wing wall batters in both the east and west directions.

The GPR data indicated a horizontal layer (shaded blue on Figure 2) at a depth of 12-24 inches. This area is expected to be the original roadway base left in place, possibly pavement or layered fill materials. This layer is approximately 20 feet wide extending from original abutment to original abutment, and was detected to extend from the abutment north approximately 35 +/- feet. The east edge of this layer between 20 to 35 feet north appears to have been disturbed, possibly removed during previous renovations.

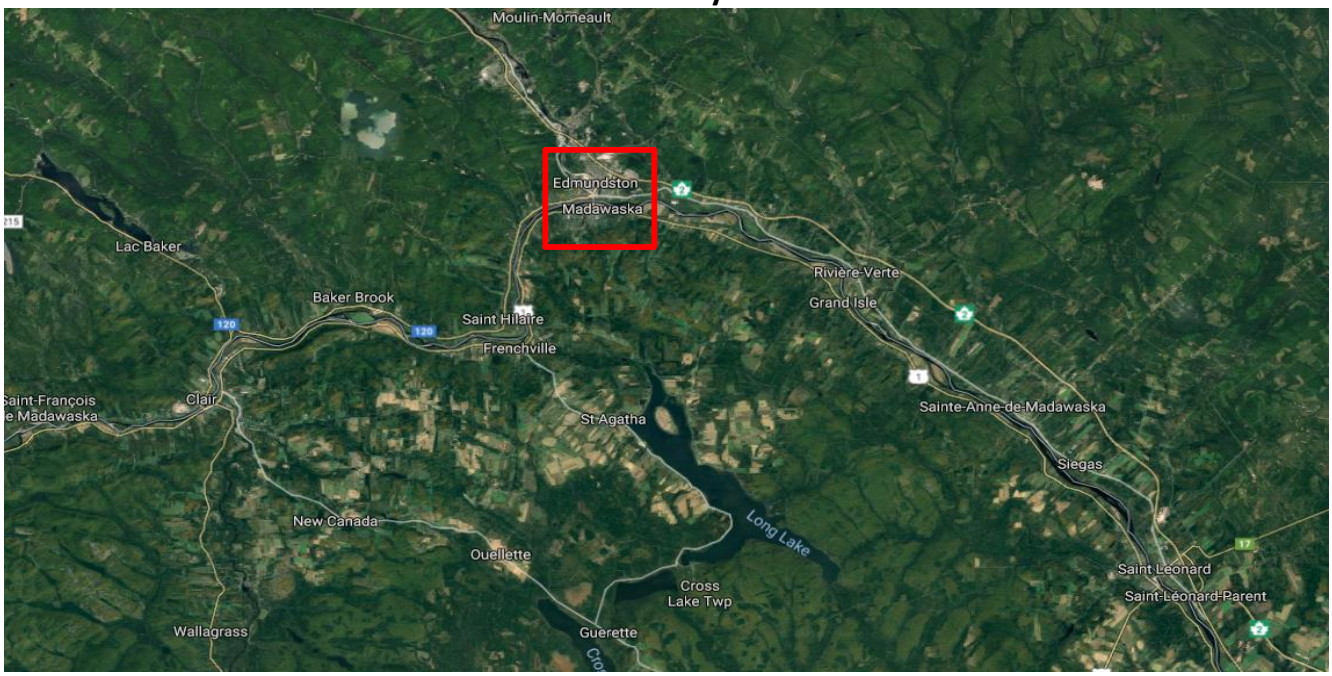
GPR data also located the back of the West “new” wing-wall (shade red on Figure 2) which extend approximately 3 feet east from the concrete wall on the west side of the sidewalk area at a depth of 2.5+/- feet. This was located along all lines of coverage on the sidewalk area.

GPR data detected a reinforced concrete slab along the east curb (shaded purple on Figure 2). This slab extendsfrom 10 feet north of the abutment to approximately 50 feet north at the visible drainage grate. The slab appears to be approximately 18-24 inches thick and is reinforced.

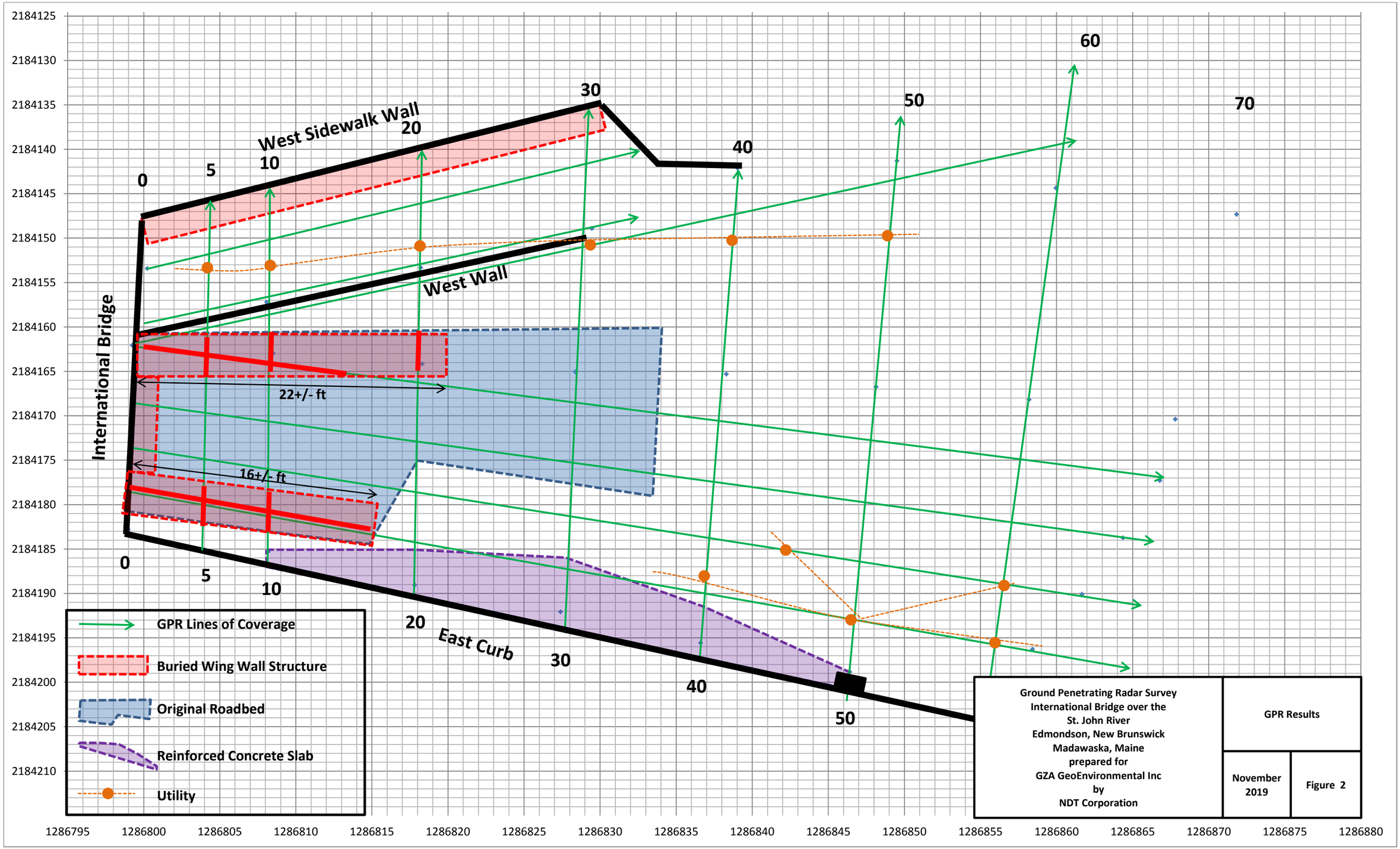
GPR data located several buried utilities (shown as orange circles with a dashed orange line).

FIGURES

Area of Investigation
Madawaska International Bridge Crossing
GPR Survey



Ground Penetrating Radar Survey International Bridge over the St. John River Edmondson, New Brunswick Madawaska, Maine prepared for GZA GeoEnvironmental Inc by NDT Corporation	Area of Investigation	
	November 2019	Figure 1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1286820
1286825
1286830
1286835
1286840
1286845
1286850
1286855
1286860
1286865
1286870
1286875
1286880
West Sidewalk Wall
West Wall
East Curb
International Bridge
0
5
10
20
30
40
50
60
70
22+/- ft
16+/- ft
GPR Lines of Coverage
Buried Wing Wall Structure
Original Roadbed
Reinforced Concrete Slab
Utility
Ground Penetrating Radar Survey
International Bridge over the
St. John River
Edmondson, New Brunswick
Madawaska, Maine
prepared for
GZA GeoEnvironmental Inc
by
NDT Corporation
GPR Results
November 2019
Figure 2

APPENDIX 1

GPR METHOD OF INVESTIGATION

APPENDIX: GROUND PENETRATING RADAR

Ground Penetrating Radar (GPR) is an electrical geophysical method for evaluating subsurface conditions by transmitting high frequency electromagnetic waves into the ground and detecting the energy reflected back to the surface. Electromagnetic signals are transmitted from the antenna (transmitter and receiver) at ground surface and reflected back to the antenna from interfaces with differing electrical (dielectric constant and conductivity) properties. The greater the contrast in the electrical properties between two materials, the more energy that is reflected to the surface and the more defined results are.

GPR SYSTEM:

GPR systems consist of: Control unit (pulse transmitter, digital recorder, data storage, monitor); and an antenna(s) and survey wheel.

The GPR control unit is a computer which controls data acquisition parameters, such as sampling rate, range, gain control, filtering, etc. The Control Unit also visually displays the data, digitally archives the data, and allows for play back of the data.

Coaxial cable connects the control unit to the antenna. The antenna(s) are sealed and shielded in fiberglass housing.. Selection of the antenna is dictated by the requirements of the survey. For high resolution, near-surface data, a high frequency antenna is used; for deeper penetration investigation, a lower frequency antenna is used. Typically the 100 to 400 MHz antennas are used for geologic surveys; 400 to 900MHz are used for utility, near surface voiding settlement, foundation, etc surveys while the 900 to 1500 MHz are used for concrete reinforcing assessment.

APPLICATIONS

Ground Penetrating Radar (GPR) can be used to locate underground pipes, buried drums, foundations, voids in rock and concrete, soil settlement, determine stratigraphy, depth to water table, buried artifacts, filled excavations, and locate voids/settlement behind walls and under floor slabs, etc. GPR is also a good tool for evaluating concrete structures such as

bridges, walls, beams, ceilings, etc where the GPR can locate rebar and conduits, quantify rebar spacing, cover variability over reinforcing, and concrete thickness.

GPR reflections typically occur at subsurface discontinuities such as:

- Buried metal objects (utilities, tanks, reinforcing)
- Open and water filled voids
- Water table
- Soil stratification
- Seepage paths
- Bedrock fractures

DETPH OF PENETRATION AND LIMITATIONS

The depth of penetration of GPR is site specific, limited by the attenuation of the electromagnetic energy. Signal attenuation is controlled by four different mechanisms:

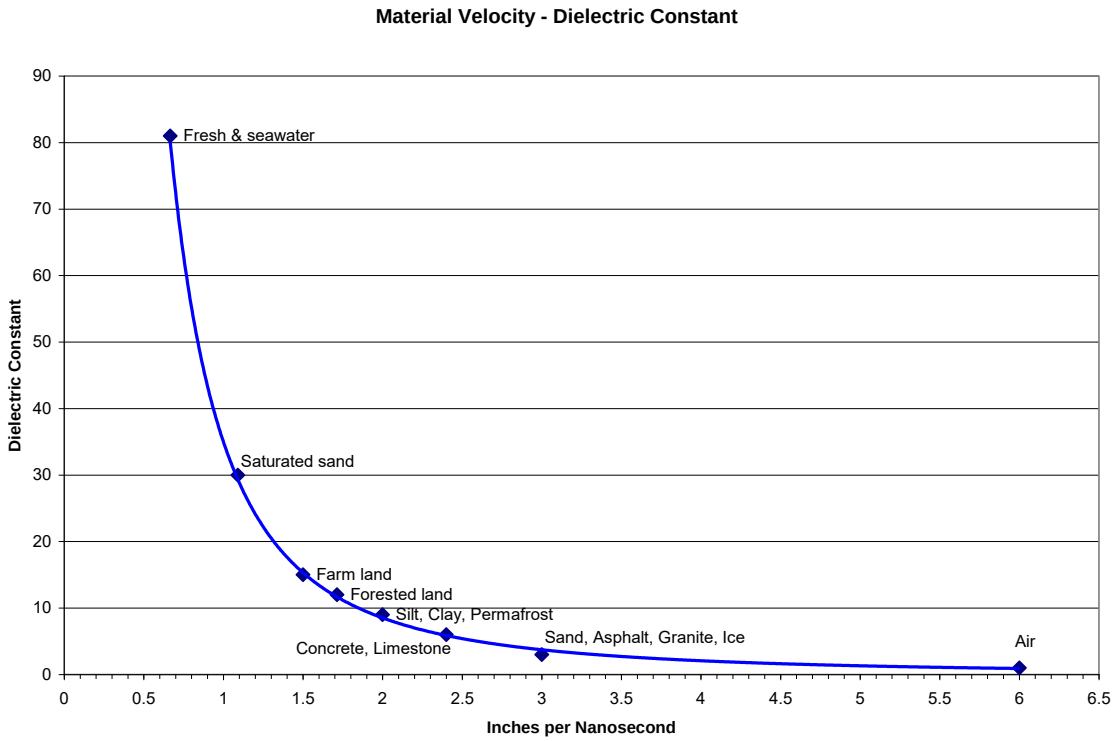
- Scattering: energy losses due to scattering occur when signals are dispersed in random directions, away from the receiving antenna, by closely spaced rebar or large irregular shaped objects, such as boulders or tree stumps.
- High conductivity layers: the greater the conductivity values of materials at a site, the more signal attenuation or less penetration. (Mineral content, high moisture content, water table, metal plates, etc.)

Signal penetration is also dependent on the frequency of the antenna. High frequency antennas have shallow penetration and high resolution. Low frequency antennas have greater depths of penetration, but the resolution of small and near surface targets is reduced. Listed below are antenna frequency, approximate depths of penetration and typical application. (Depths of penetration are in ideal conditions if a highly conductive layer, such as a brackish water table, steel plate, etc., is present all antennas will be limited to the depth of this layer.)

1500 and 1600 MHz	+/-2 feet	Asphalt/Concrete thickness Wire mesh/rebar/conduit location Voiding within and behind structures
900 MHz	3-5 feet	Concrete thickness Rebar and utility location Voiding within and behind structures
400 MHz	10-15 feet	Concrete/Masonry thickness Utility location Soil settlement/sinkhole development Geologic and Environmental mapping Archaeological Surveys
200 MHz	25-30	Soil settlement/sinkhole development

		Geologic and Environmental mapping Archaeological Surveys
100 MHz	+/-50	Soil settlement/sinkhole development Geologic and Environmental mapping Archaeological Surveys

Depth of investigation can be estimated using material dielectric constants and the diagram shown below. Typically 2 inches per nanosecond can be used as an average signal velocity for most materials and sites. When available an onsite depth calibration can be conducted to determine the electrical properties (speed of the signal) of the materials at the site. Depth calibrations typically consist of collecting GPR data over a metal target with a known depth. Known utilities, and buried metal plates are good targets for calibrations. GPR surveys can be very effective when coupled with other geophysical surveys and/or ground truth methods to verify, correlate and extrapolate GPR results. GPR surveys are a fast and cost effective method to collect data over large or obstructed sites, and isolate anomalies and areas where borings or other methods can be focused for the best interest of a project.

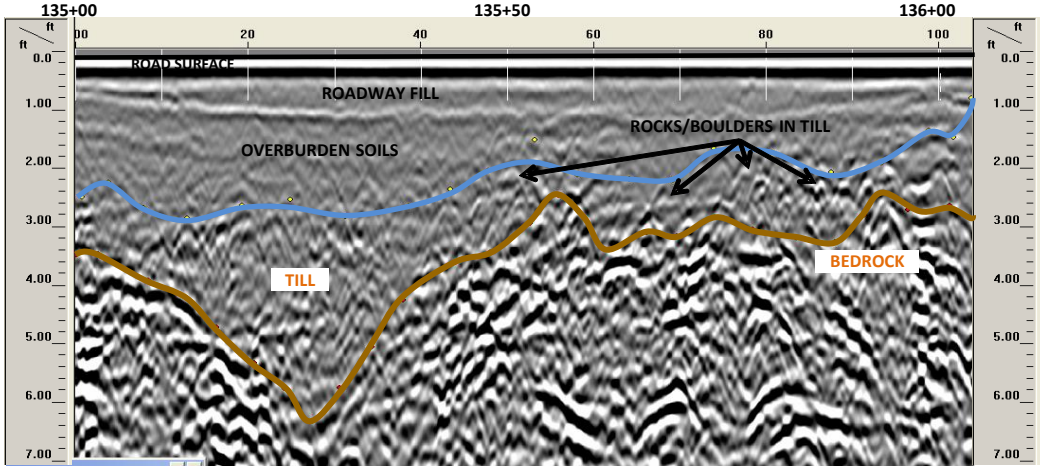


ACQUISITION AND INTERPRETATION:

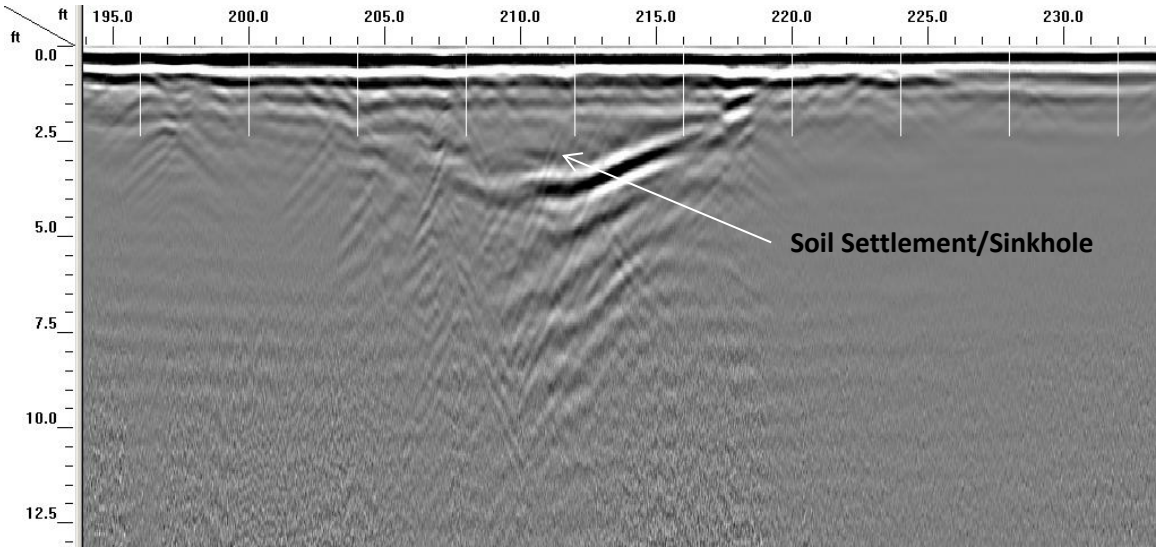
Radar data are typically acquired at a slow walking speed along a grid pattern of survey lines or a series of parallel lines. Data is displayed on LCD screen for field verification and quality control of results and digitally saved. Calibrated measuring wheels are used to automatically added footage/station markers to the digital data. The saved data can be printed or post processed.

Interpretation of GPR data is subjective. GPR results should be verified with borings or test pits. GPR lines indicate a cross-section in time/depth along a survey line.

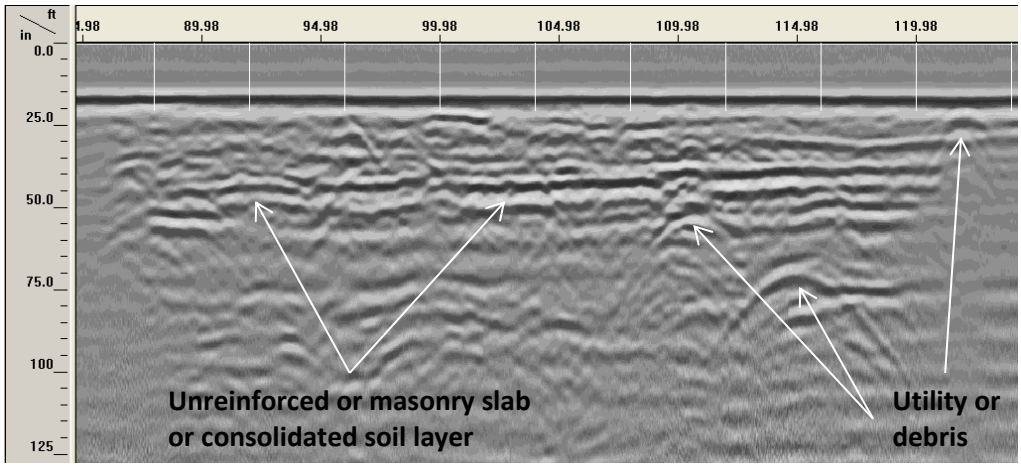
Natural soils or fill placed in lifts during construction retain moisture between material interfaces and typically have horizontal or near horizontal bedding planes. These conditions cause a change in conductivity which shows as continuous reflective layers on GPR data. The strength of a reflected signal and/or the continuity of the reflector across the record may be indicative of a stratigraphic contact, water table, top of rock, back of wall/slab.

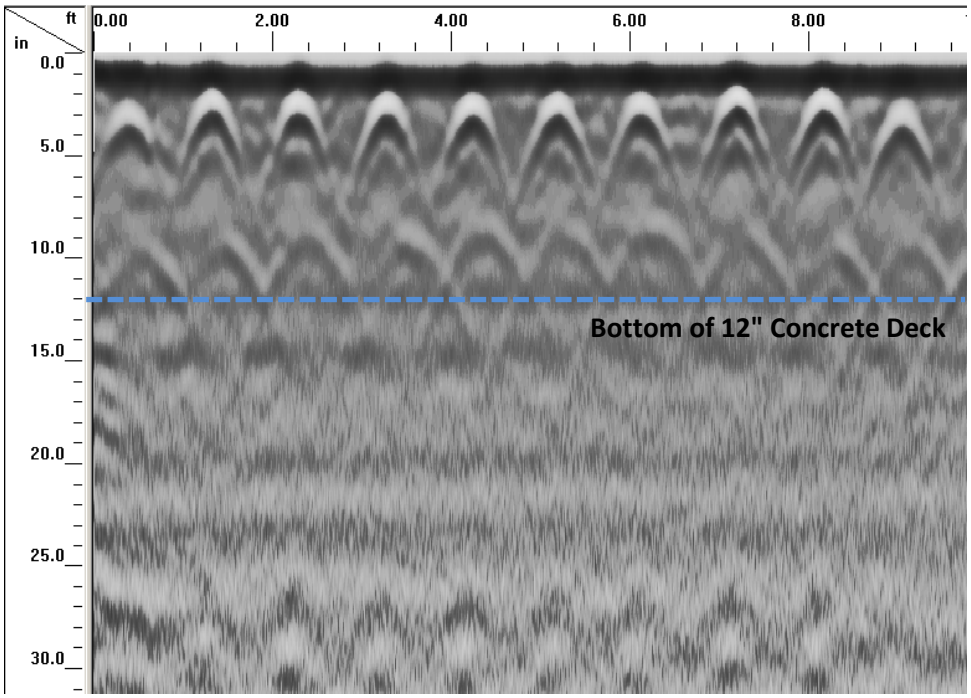


Locations where GPR data indicate theses horizontal bedding planes/layers are sloping, draped or disturbed can be indication of soil settlement, trenching and/or voiding. Areas where GPR data is less reflective, indicating fine soil materials (clays and silts) have been washed or eroded away or areas that are more reflective, indicating loose soil conditions where moisture has accumulated are also indicative of and associated with settlement, sinkholes, and voiding.



Often point targets, such as reinforcing, buried utilities, boulders, create a distinctive parabolic feature on GPR records. Point targets trending perpendicular to the direction of the line of coverage are detected, therefore to detect longitudinal reinforcing a transverse line of data would be collected and to detect transverse reinforcing, a longitudinal line of data would be collected. Plotting point targets of similar signal strength, depth, and shape located along the grid of GPR lines give the trend and location of individual utilities and/or reinforcing.





Top Reinforcing
12" spacing
2+/- inches cover

Bottom Reinforcing
12" spacing
8-9 inches cover

APPENDIX 2

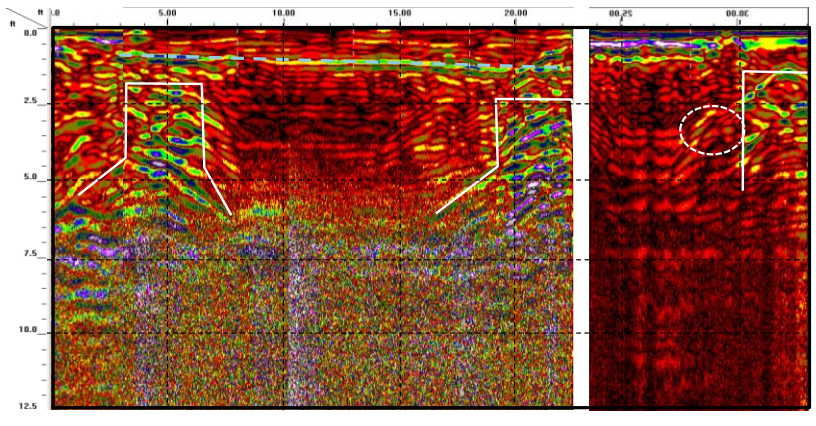
GPR Data for East to West Cross-lines

APPENDIX 2
GPR Data for Cross-lines of Coverage

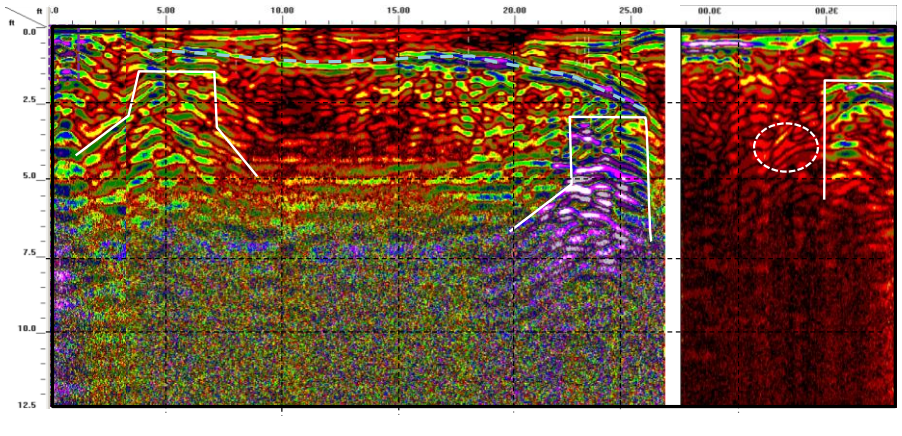
EAST

WEST

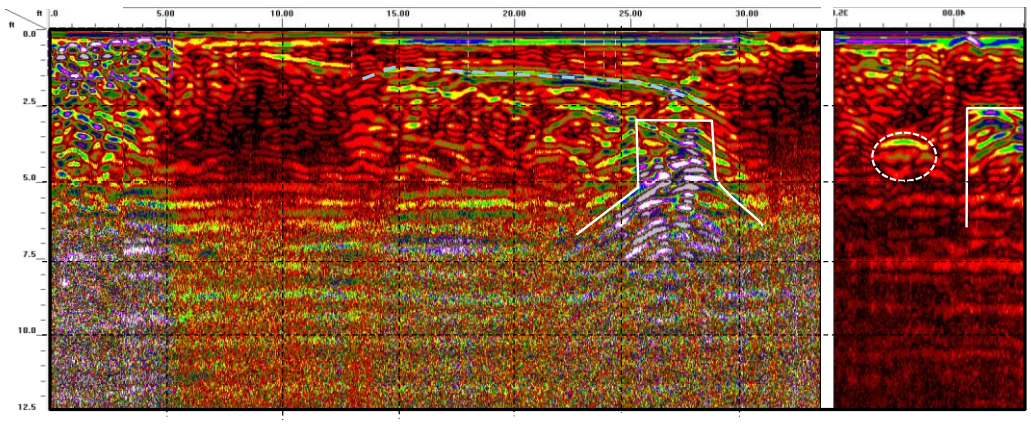
5'



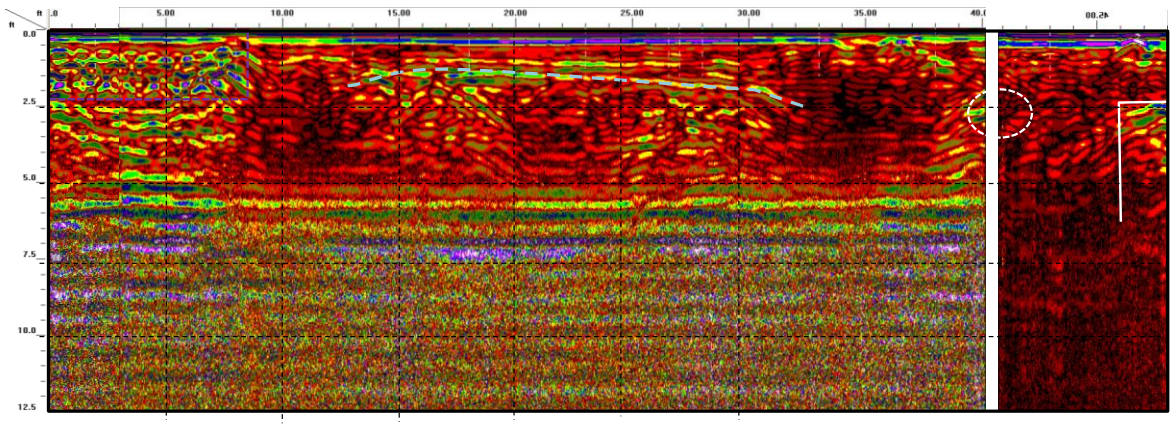
10'



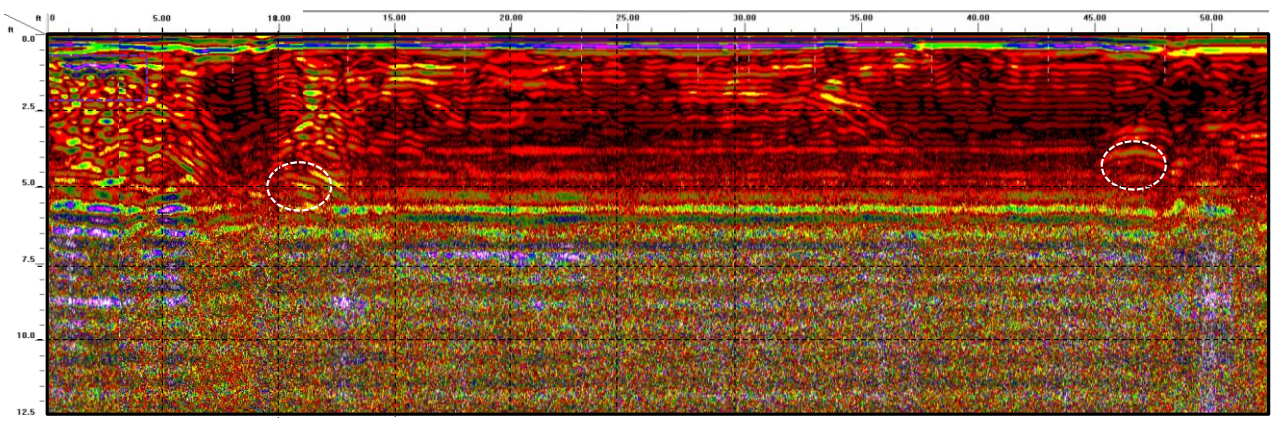
20'



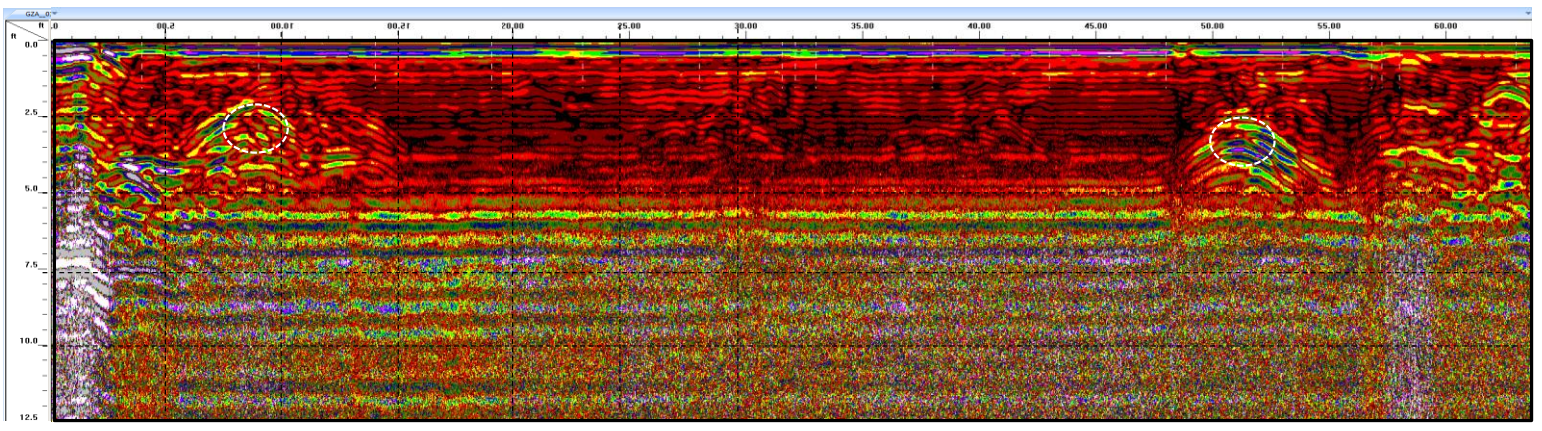
30'



40'



50'

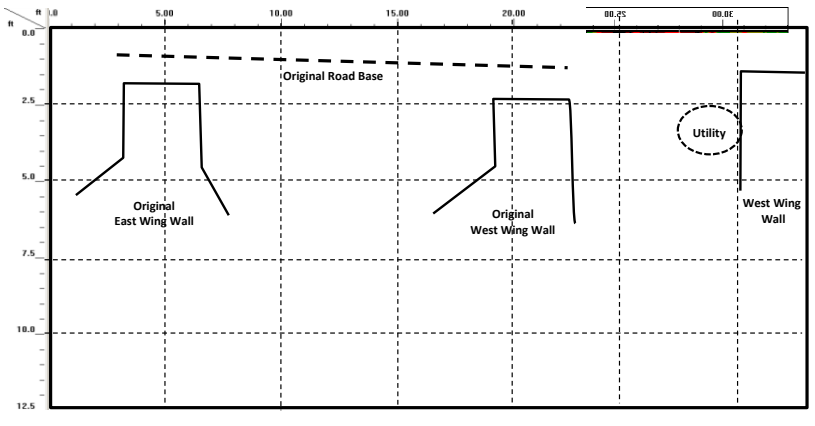


APPENDIX 2
Skech Interpetation of GPR Data for Cross-lines

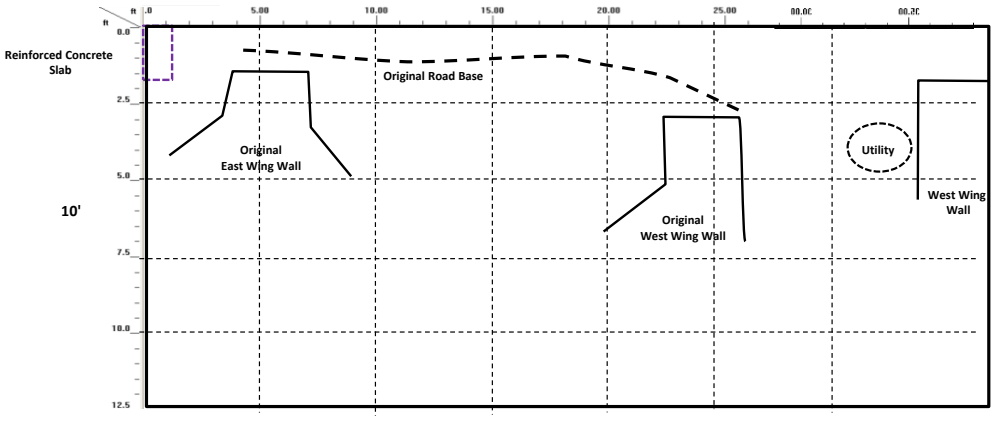
EAST

WEST

5'

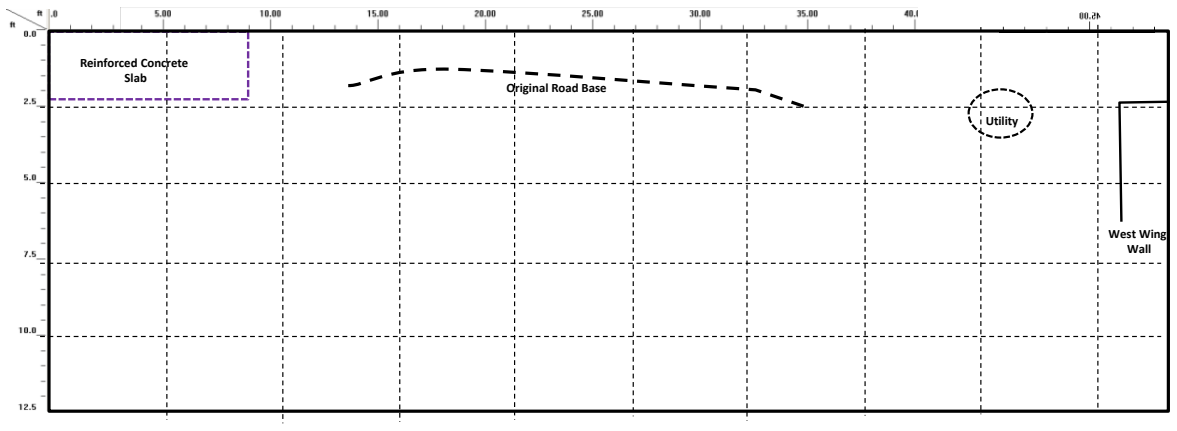


10'



20'

30'



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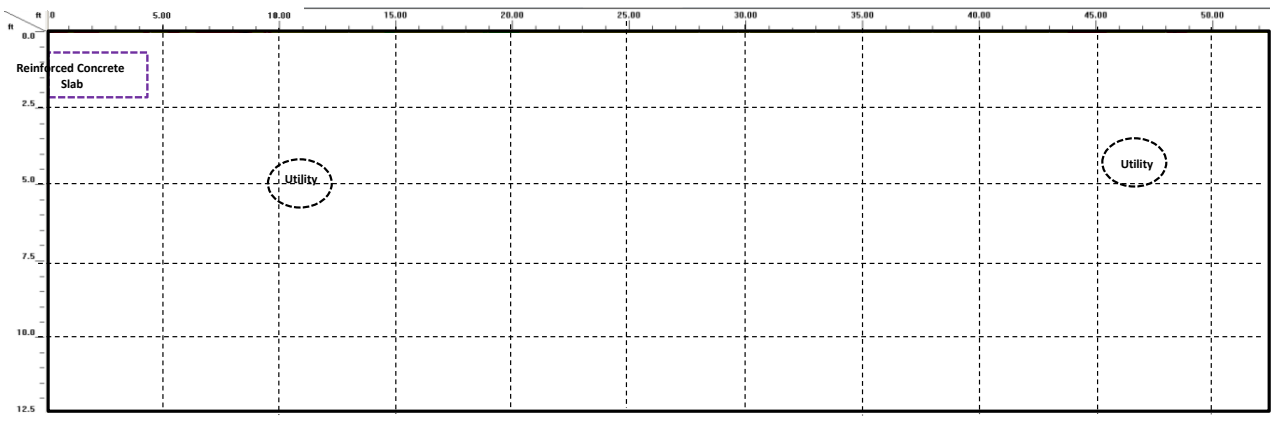

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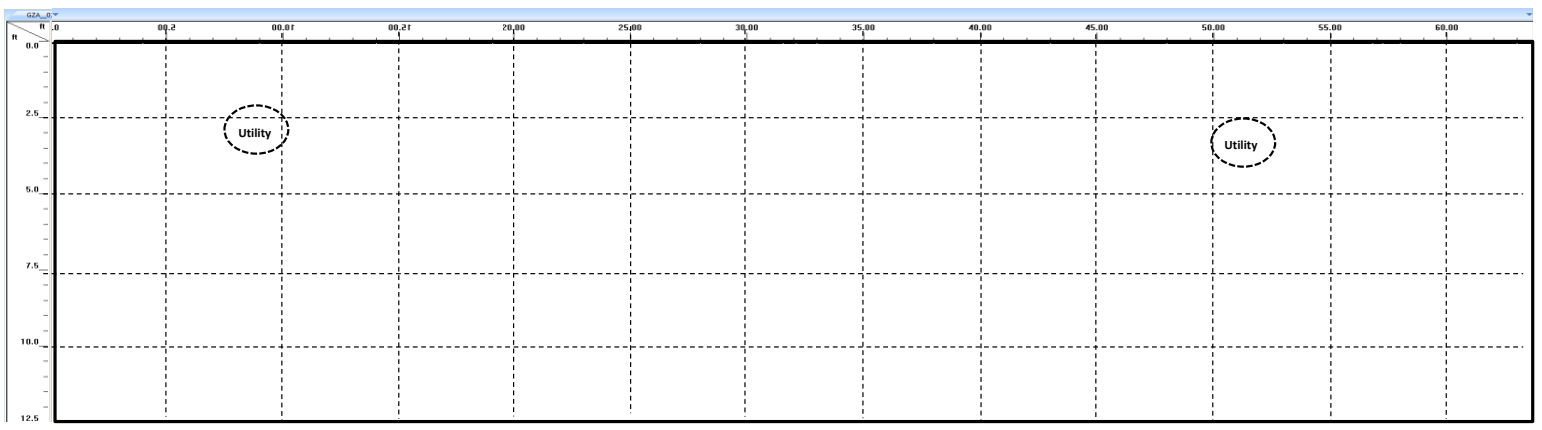


APPENDIX F – LABORATORY TEST RESULTS

THIELSCH ENGINEERING
195 Frances Avenue
Cranston RI, 02910
Phone: (401)-467-6454
Fax: (401)-467-2398
thielsch.com
Let's Build a Solid Foundation

Client Information:
GZA GeoEnvironmental
Portland, ME
PM: Andrew Blaisdell
Assigned By: NVW
Collected By: NVW

Project Information:
Madawaska Intern. Bridge #2399, WIN 21736.00
Madawaska , ME
GZA Project Number: 09.0025984.01
Summary Page: 1 of 1
Report Date: 10.09.18

LABORATORY TESTING DATA SHEET

Boring ID	Sample No.	Depth (ft)	Laboratory No.	Identification Tests								Proctor / CBR / Permeability Tests								Laboratory Log and Soil Description
				Water Content %	LL %	PL %	Gravel %	Sand %	Fines %	Org. %	G_s	Dry unit wt. pcf	Test Water Content %	γ_d MAX (pcf) W_{opt} (%)	γ_d MAX (pcf) W_{opt} (%) (Corr.)	Test Setup as % of Proctor	CBR @ 0.1"	CBR @ 0.2"	Perme-ability (cm/sec)	
				D2216	D4318		D6913			D2874	D854			D1557			D1883			
BB-MSJR-101	1D	0-2	S-1	4.2			49.8	34.7	15.5											Brown f-c GRAVEL, some f-c Sand, little Silt
BB-MSJR-101	2D	4.5-6.5	S-2	11.7			23.5	52.3	24.2											Brown f-c SAND, some Silt, some fine Gravel
BB-MSJR-101	4D	15-17	S-3	10.7			27.5	58.5	14.0											Brown f-c SAND, some fine Gravel, little Silt
BB-MSJR-101	5D	20-22	S-4	11.3	20	14														Olive clayey silt
BB-MSJR-101	6D	25-27	S-5				25.7	37.7	36.6											Grey silty fine to coarse SAND, some f-c Gravel
BB-MSJR-101	11D	50-51.8	S-6				23.6	43.5	32.9											Grey f-c SAND, some Clayey Silt, some fine Gravel
BB-MSJR-101	12D	55-57	S-7				39.5	42.3	18.2											Grey Gravelly fine to coarse SAND, little Silt
BB-MSJR-101	16D	75-77	S-8				3.4	57.0	39.6											Grey silty fine SAND, trace fine Gravel
BB-MSJR-101	19D	90-92	S-9				33.1	50.3	16.6											Grey f-c SAND, some f-c Gravel, little Silt
BB-MSJR-102	1D	0.5-2.5	S-10	6.6			43.1	43.3	13.6											Brown Gravelly fine to coarse SAND, little Silt
BB-MSJR-102	2D	4.5-6.5	S-11	8.7			20.9	42.7	36.4											Grey silty fine to coarse SAND, some fine Gravel
BB-MSJR-102	4D	15-17	S-12	13.2			30.7	43.9	25.4											Olive Brown f-c SAND, some f-c Gravel, some Silt & Clay

Reviewed By _____

10.10.2018

THIELSCH ENGINEERING

State of Maine - Department of Transportation

Laboratory Testing Summary Sheet

Madawaska International Bridge #2399

Town(s): Madawaska, ME

MDOT Project Number: 21736

GZA Project Number: 09.0025984.01

Boring & Sample Identification Number	Station (Feet)	Sample No.	Depth (Feet)	Lab Number	Organic %	W.C.	L.L.	P.I.	Classification		
									Unified	AASHTO	Frost
BB-MSJR-101		1D	0-2	S-1		4.22			GM	A-1-b	I
BB-MSJR-101		2D	4.5-6.5	S-2		11.7			SM	A-2-4(0)	II
BB-MSJR-101		4D	15-17	S-3		10.7			SM	A-1-a	II
BB-MSJR-101		5D	20-22	S-4		11.3	20	14	ML-CL	A-4	IV
BB-MSJR-101		6D	25-27	S-5					SM	A-4(0)	III
BB-MSJR-101		11D	50-51.8	S-6					SC-SM	A-2-4(0)	III
BB-MSJR-101		12D	55-57	S-7					SM	A-1-b	III
BB-MSJR-101		16D	75-77	S-8					SM	A-4(0)	III
BB-MSJR-101		19D	90-92	S-9					SM	A-1-b	II
BB-MSJR-102		1D	0.5-2.5	S-10		6.6			SM	A-1-a	II
BB-MSJR-102		2D	4.5-6.5	S-11		8.7			SM	A-4(0)	III
BB-MSJR-102		4D	15-17	S-12		13.2			SC-SM	A-1-b	III

Classification of these soil samples is in accordance with AASHTO Classification System M-145-40. This classification is followed by the "Frost Susceptibility Rating" from zero (non-frost susceptible) to Class IV (highly frost susceptible). The "Frost Susceptibility Rating" is based upon the MDOT and Corps of Engineers Classification Systems.

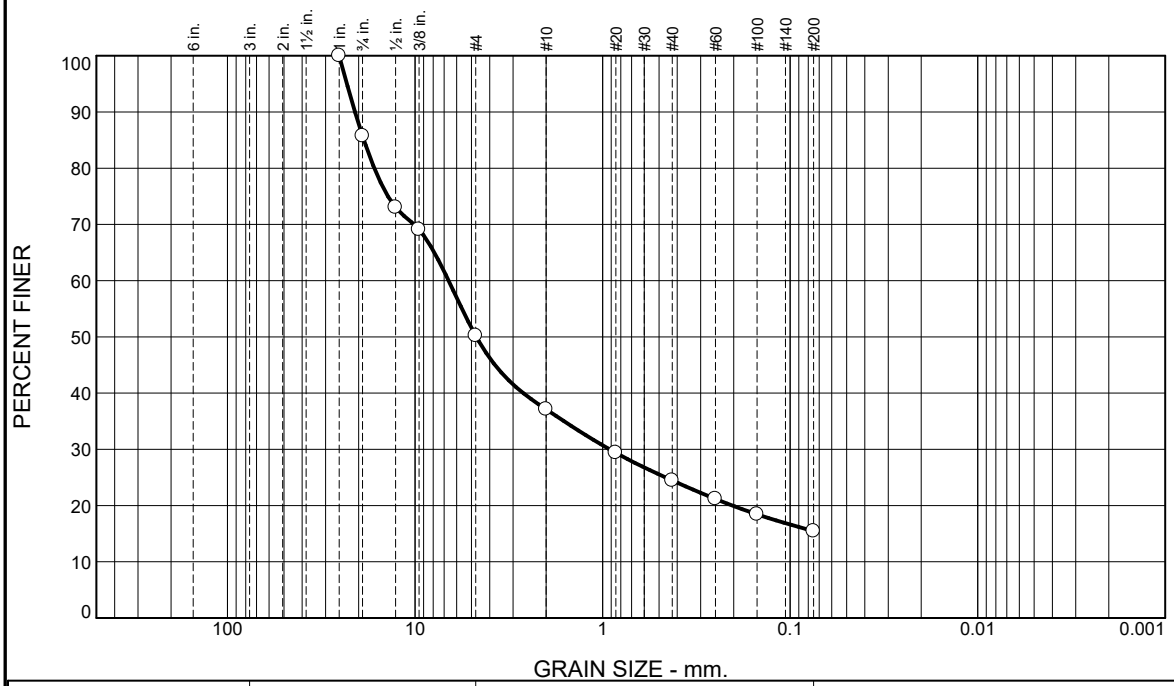
GSDC = Grain Size Distribution Curve as determined by AASHTO T 88-93 (1996) and/or ASTM D 422-63 (Reapproved 1998)

WC = water content as determined by AASHTO T 265-93 and/or ASTM D 2216-98

LL = Liquid limit as determined by AASHTO T 89-96 and/or ASTM D 4318-98

PI = Plasticity Index as determined by AASHTO 90-96 and/or ASTM D4318-98

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	14.3	35.5	13.1	12.6	9.0	15.5	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
0.75"	85.7		
0.5"	73.0		
0.375"	69.1		
#4	50.2		
#10	37.1		
#20	29.4		
#40	24.5		
#60	21.2		
#100	18.4		
#200	15.5		

* (no specification provided)

Material Description

Brown f-c GRAVEL, some f-c Sand, little Silt

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= GM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 20.8871 D_{85}= 18.7356 D_{60}= 6.6202
D_{50}= 4.7117 D_{30}= 0.9182 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 09.28.18 **Date Tested:** 10.03.18

Tested By: JD

Checked By: Rebecca Roth

Title: Laboratory Coordinator

Source of Sample: Borings **Depth:** 0-2' **Date Sampled:**
Sample Number: BB-MSJR-101 / 1D

Thielsch Engineering Inc.

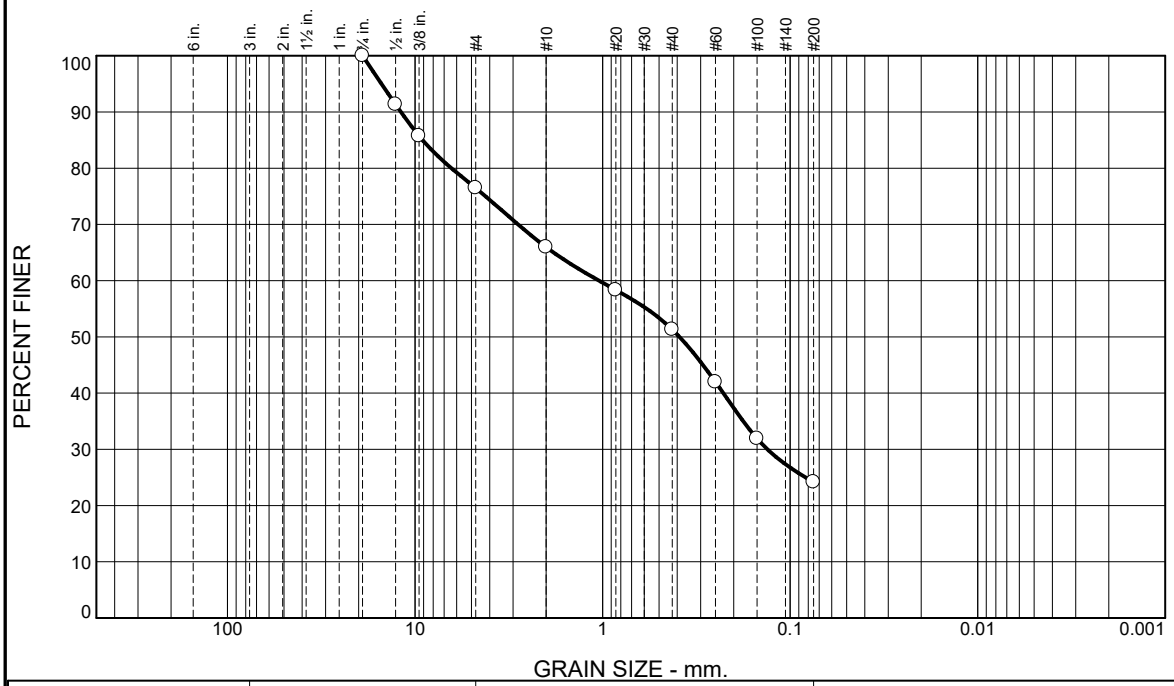
Cranston, RI

Client: GZA GeoEnvironmental

Project: Madawaska International Bridge #2399, WIN 21736.00
Madawaska, ME

Project No: 09.0025984.01 **Figure** S-1

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	23.5	10.5	14.7	27.1	24.2	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
0.75"	100.0		
0.5"	91.4		
0.375"	85.7		
#4	76.5		
#10	66.0		
#20	58.3		
#40	51.3		
#60	42.0		
#100	31.9		
#200	24.2		

* (no specification provided)

Material Description

Brown f-c SAND, some Silt, some fine Gravel

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-2-4(0)

Coefficients

D_{90}= 11.8959 D_{85}= 9.1192 D_{60}= 1.0447
D_{50}= 0.3891 D_{30}= 0.1321 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 09.28.18 **Date Tested:** 10.03.18

Tested By: JD

Checked By: Rebecca Roth

Title: Laboratory Coordinator

Source of Sample: Borings **Depth:** 4.5-6.5' **Date Sampled:**
Sample Number: BB-MSJR-101 / 2D

Thielsch Engineering Inc.

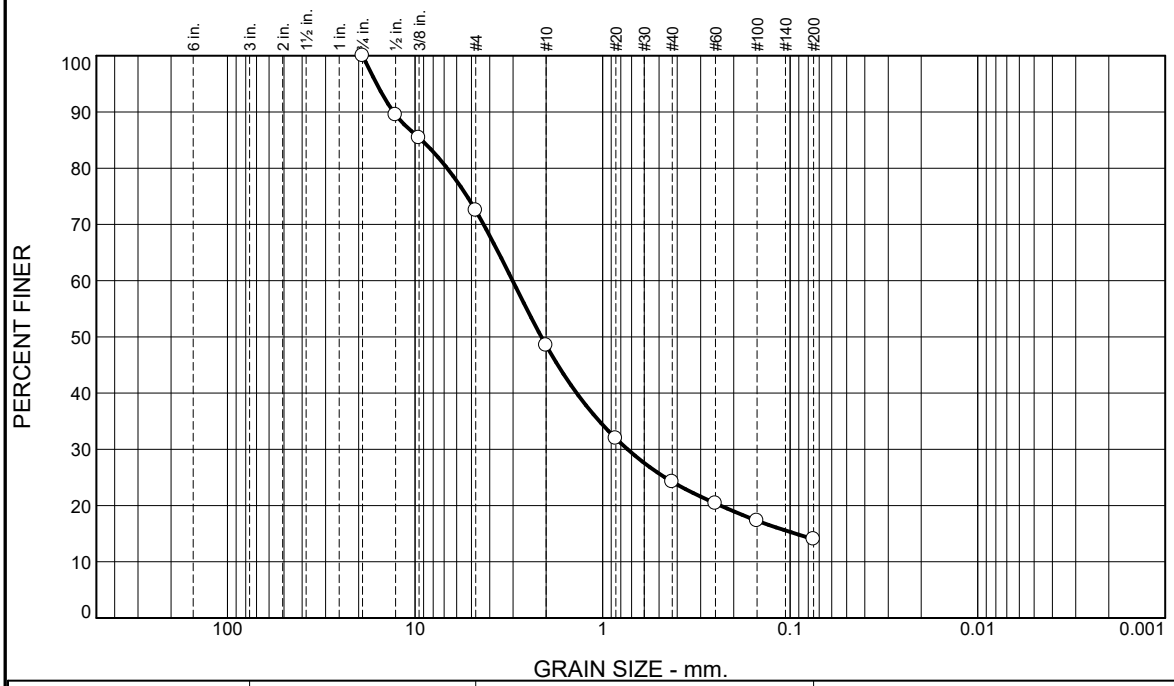
Cranston, RI

Client: GZA GeoEnvironmental

Project: Madawaska International Bridge #2399, WIN 21736.00 Madawaska, ME

Project No: 09.0025984.01 **Figure** S-2

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	27.5	24.0	24.3	10.2	14.0	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
0.75"	100.0		
0.5"	89.5		
0.375"	85.4		
#4	72.5		
#10	48.5		
#20	31.9		
#40	24.2		
#60	20.4		
#100	17.3		
#200	14.0		

* (no specification provided)

Material Description

Brown f-c SAND, some fine Gravel, little Silt

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-1-a

Coefficients

D_{90}= 13.0370 D_{85}= 9.2310 D_{60}= 3.0206
D_{50}= 2.1194 D_{30}= 0.7363 D_{15}= 0.0935
D_{10}= C_u= C_c=

Remarks

Date Received: 09.28.18 **Date Tested:** 10.03.18

Tested By: JD

Checked By: Rebecca Roth

Title: Laboratory Coordinator

Source of Sample: Borings **Depth:** 15-17' **Date Sampled:**
Sample Number: BB-MSJR-101 / 4D

Thielsch Engineering Inc.

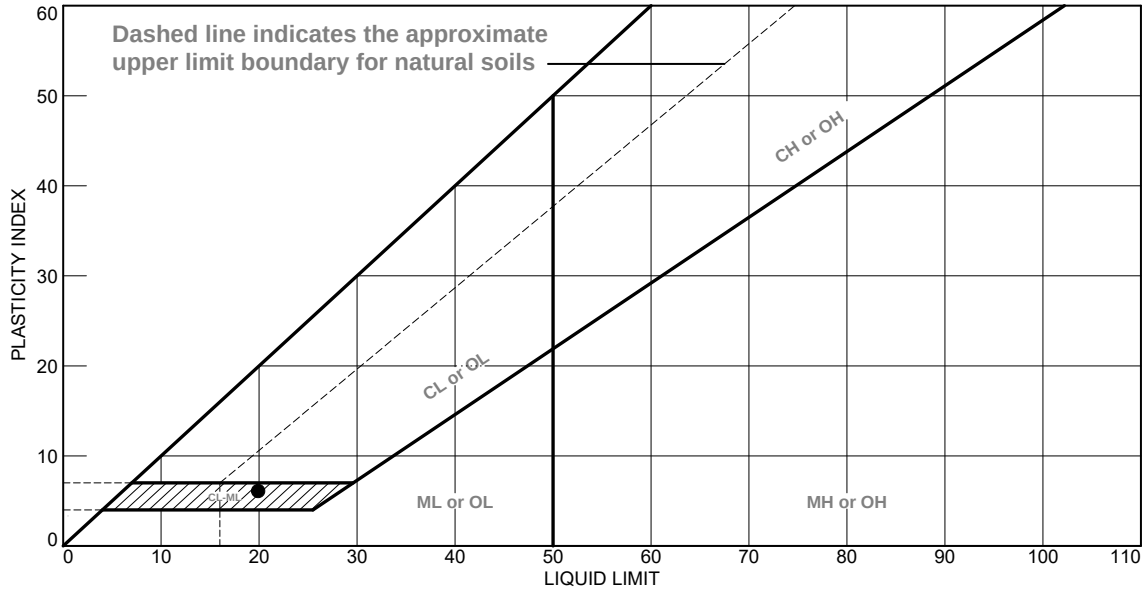
Cranston, RI

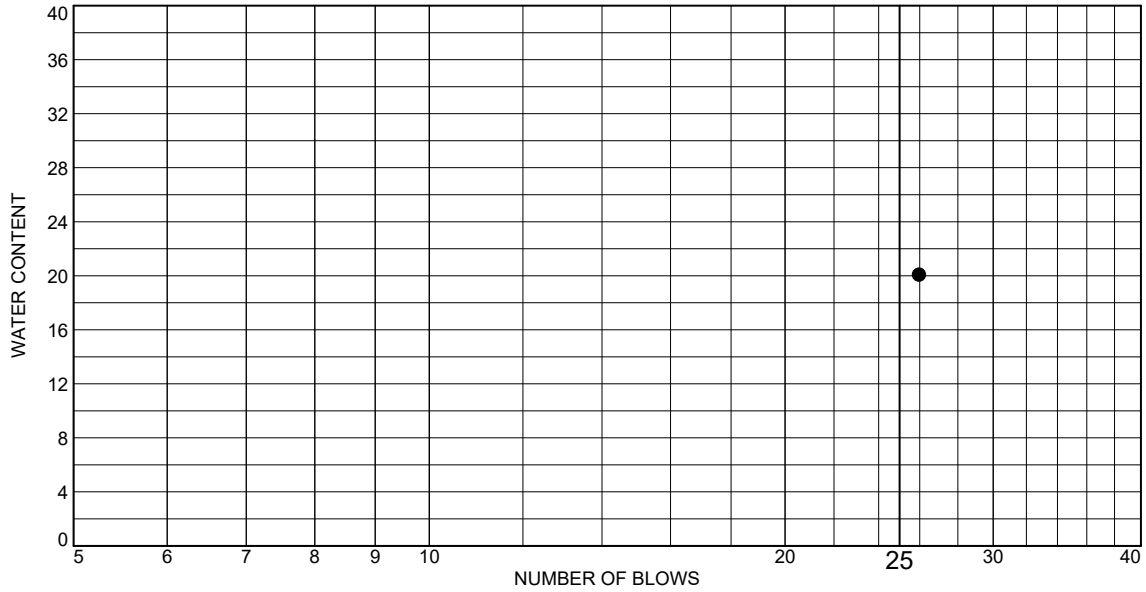
Client: GZA GeoEnvironmental

Project: Madawaska International Bridge #2399, WIN 21736.00
Madawaska, ME

Project No: 09.0025984.01 **Figure** S-3

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Olive clayey silt	20	14	6	39.7		

Project No. 09.0025984.01 **Client:** GZA GeoEnvironmental

Project:

Source of Sample: Borings **Depth:** 20-22'
Sample Number: BB-MSJR-101 / 5D

Thielsch Engineering Inc.

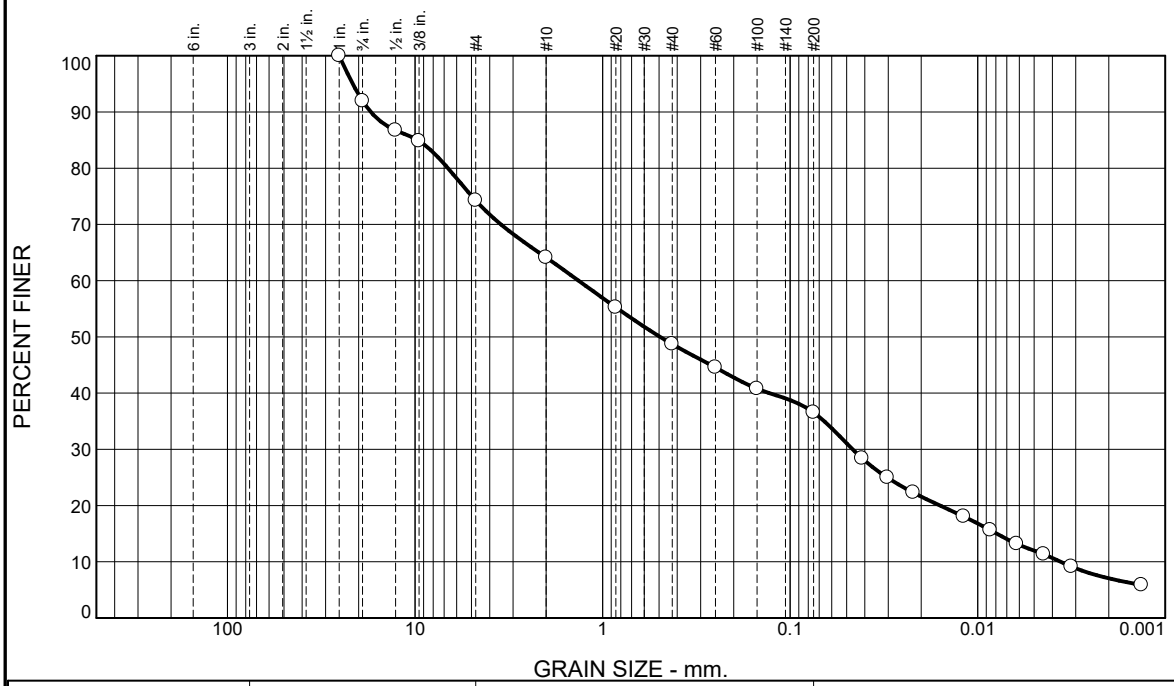
Cranston, RI

Remarks:
Sample contained 194.6g total material, 117.3g material was +#40. Single point Atterberg was performed due to lack of

Figure L-4

Tested By: RR **Checked By:** sa

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	8.1	17.6	10.2	15.4	12.1	24.6	12.0

Test Results (D7928 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
0.75"	91.9		
0.5"	86.7		
0.375"	84.9		
#4	74.3		
#10	64.1		
#20	55.2		
#40	48.7		
#60	44.6		
#100	40.8		
#200	36.6		
0.0413 mm.	28.4		
0.0303 mm.	25.0		
0.0220 mm.	22.3		
0.0119 mm.	18.0		
0.0086 mm.	15.6		
0.0062 mm.	13.2		
0.0044 mm.	11.3		
0.0032 mm.	9.1		
0.0013 mm.	5.9		

* (no specification provided)

Material Description

Grey silty fine to coarse SAND, some f-c Gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 17.2205 D_{85}= 9.6890 D_{60}= 1.3422
D_{50}= 0.4934 D_{30}= 0.0464 D_{15}= 0.0079
D_{10}= 0.0036 C_u= 371.54 C_c= 0.44

Remarks

Sample visually classified as plastic. Sample rolled to 1/4".

Date Received: 10.01.18 **Date Tested:** 10.04.18

Tested By: JD

Checked By: Rebecca Roth

Title: Laboratory Coordinator

Source of Sample: Borings **Depth:** 25-27' **Date Sampled:**
Sample Number: BB-MSJR-101 / 6D

Thielsch Engineering Inc.

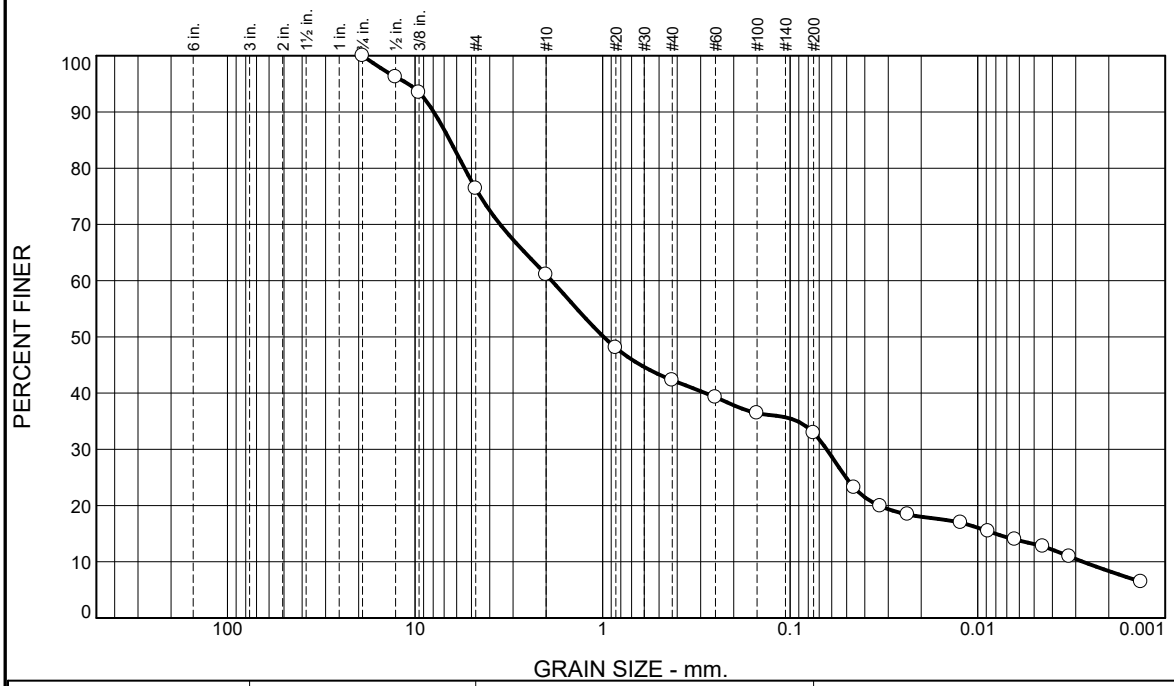
Cranston, RI

Client: GZA GeoEnvironmental

Project: Madawaska International Bridge #2399, WIN 21736.00
Madawaska, ME

Project No: 09.0025984.01 **Figure** S-5

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	23.6	15.3	18.8	9.4	19.7	13.2

Test Results (D7928 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
0.75"	100.0		
0.5"	96.2		
0.375"	93.5		
#4	76.4		
#10	61.1		
#20	48.1		
#40	42.3		
#60	39.3		
#100	36.4		
#200	32.9		
0.0456 mm.	23.2		
0.0330 mm.	19.9		
0.0236 mm.	18.4		
0.0123 mm.	16.9		
0.0088 mm.	15.4		
0.0063 mm.	14.0		
0.0045 mm.	12.7		
0.0032 mm.	10.9		
0.0013 mm.	6.5		

* (no specification provided)

Material Description

Grey f-c SAND, some Clayey Silt, some fine Gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= SC-SM **AASHTO (M 145)=** A-2-4(0)

Coefficients

D_{90}= 7.9365 D_{85}= 6.5270 D_{60}= 1.8676
D_{50}= 0.9874 D_{30}= 0.0639 D_{15}= 0.0080
D_{10}= 0.0027 C_u= 679.44 C_c= 0.79

Remarks

Sample visually classified as plastic. Sample rolled to 1/4".

Date Received: 10.01.18 **Date Tested:** 10.04.18

Tested By: JD

Checked By: Rebecca Roth

Title: Laboratory Coordinator

Source of Sample: Borings **Depth:** 50-51.8' **Date Sampled:**
Sample Number: BB-MSJR-101 / 11D

Thielsch Engineering Inc.

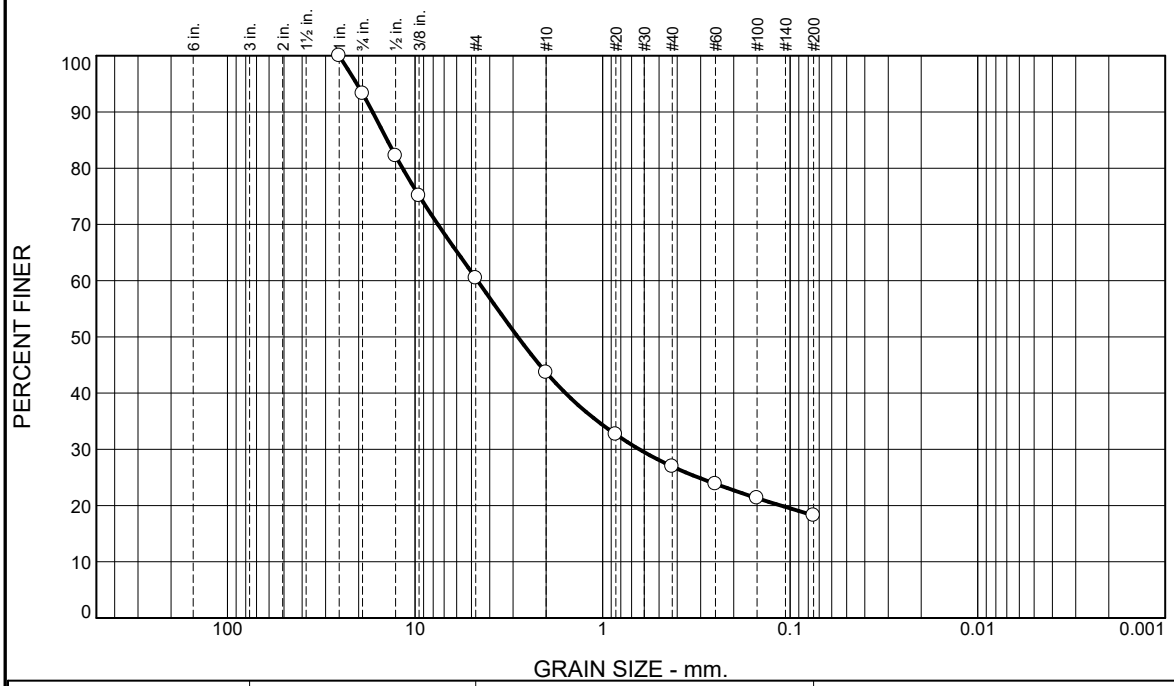
Cranston, RI

Client: GZA GeoEnvironmental

Project: Madawaska International Bridge #2399, WIN 21736.00
Madawaska, ME

Project No: 09.0025984.01 **Figure** S-6

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	6.7	32.8	16.8	16.8	8.7	18.2	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
0.75"	93.3		
0.5"	82.2		
0.375"	75.1		
#4	60.5		
#10	43.7		
#20	32.6		
#40	26.9		
#60	23.9		
#100	21.3		
#200	18.2		

* (no specification provided)

Material Description

Grey Gravelly fine to coarse SAND, little Silt

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 16.8433 D_{85}= 14.0738 D_{60}= 4.6432
D_{50}= 2.8330 D_{30}= 0.6372 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 09.28.18 **Date Tested:** 10.03.18

Tested By: JD

Checked By: Rebecca Roth

Title: Laboratory Coordinator

Source of Sample: Borings **Depth:** 55-57' **Date Sampled:**
Sample Number: BB-MSJR-101 / 12D

Thielsch Engineering Inc.

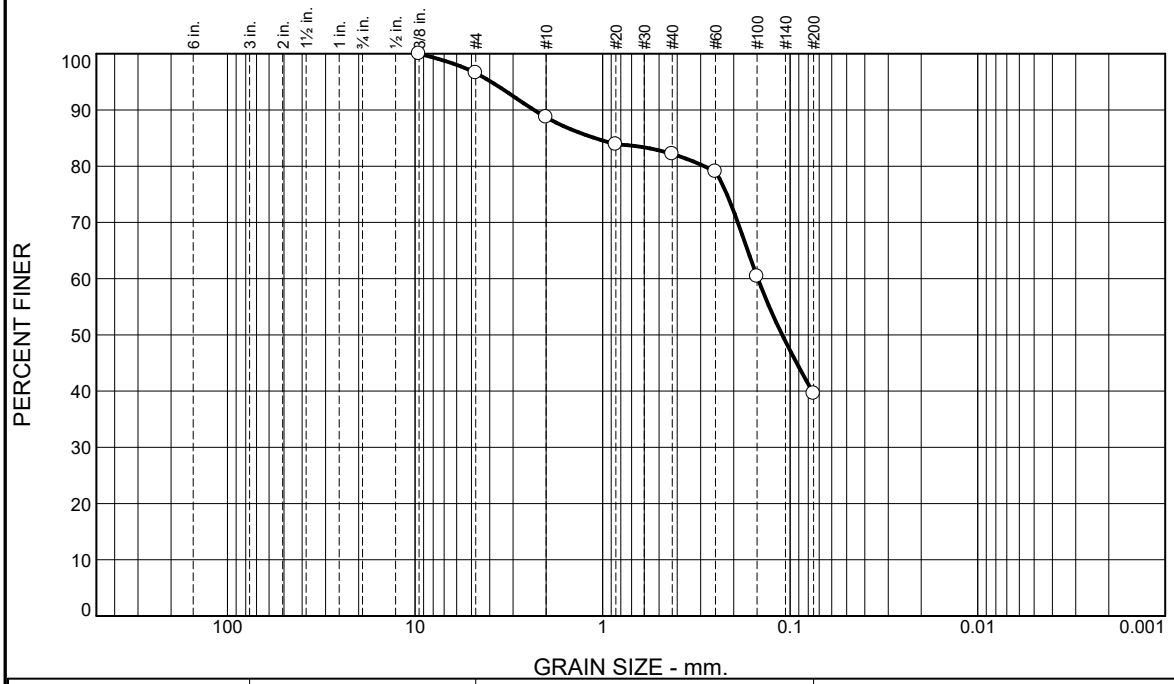
Cranston, RI

Client: GZA GeoEnvironmental

Project: Madawaska International Bridge #2399, WIN 21736.00
Madawaska, ME

Project No: 09.0025984.01 **Figure** S-7

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	3.4	7.9	6.5	42.6	39.6	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
0.375"	100.0		
#4	96.6		
#10	88.7		
#20	83.9		
#40	82.2		
#60	79.0		
#100	60.4		
#200	39.6		

* (no specification provided)

Material Description

Grey silty fine SAND, trace fine Gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 2.3209 D_{85}= 1.0978 D_{60}= 0.1485
D_{50}= 0.1103 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Sample visually classified as plastic. Sample rolled to 1/4".

Date Received: 09.28.18 **Date Tested:** 10.03.18

Tested By: JD

Checked By: Rebecca Roth

Title: Laboratory Coordinator

Source of Sample: Borings **Depth:** 75-77' **Date Sampled:**
Sample Number: BB-MSJR-101 / 16D

Thielsch Engineering Inc.

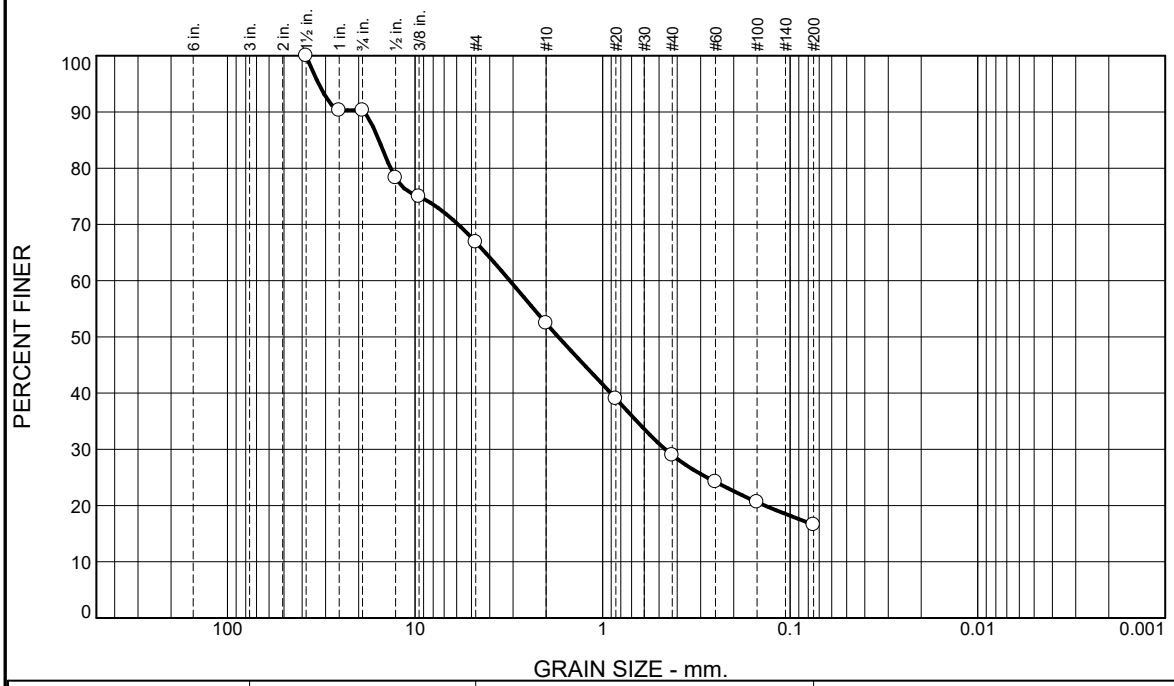
Cranston, RI

Client: GZA GeoEnvironmental

Project: Madawaska International Bridge #2399, WIN 21736.00
Madawaska, ME

Project No: 09.0025984.01 **Figure** S-8

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	9.7	23.4	14.5	23.4	12.4	16.6	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.5"	100.0		
1"	90.3		
0.75"	90.3		
0.5"	78.3		
0.375"	75.0		
#4	66.9		
#10	52.4		
#20	39.0		
#40	29.0		
#60	24.2		
#100	20.6		
#200	16.6		

* (no specification provided)

Material Description

Grey f-c SAND, some f-c Gravel, little Silt

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 18.6476 D_{85}= 15.6014 D_{60}= 3.1239
D_{50}= 1.7223 D_{30}= 0.4630 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 09.28.18 **Date Tested:** 10.03.18

Tested By: JD

Checked By: Rebecca Roth

Title: Laboratory Coordinator

Source of Sample: Borings **Depth:** 90-92' **Date Sampled:**
Sample Number: BB-MSJR-101 / 19D

Thielsch Engineering Inc.

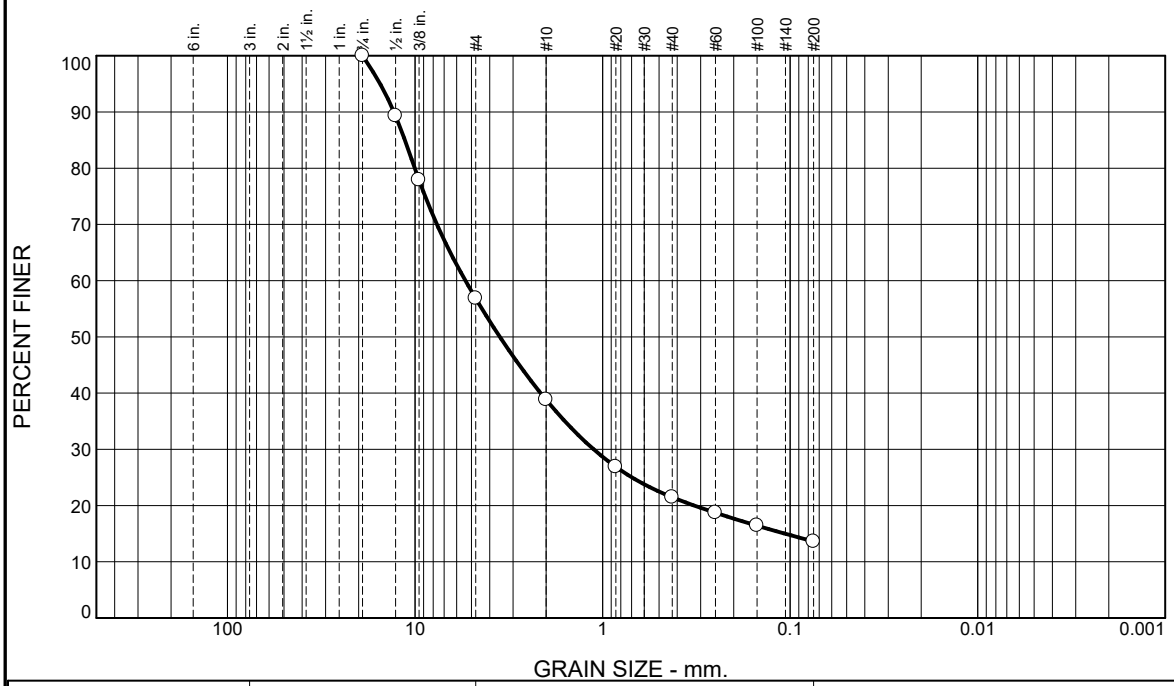
Cranston, RI

Client: GZA GeoEnvironmental

Project: Madawaska International Bridge #2399, WIN 21736.00
Madawaska, ME

Project No: 09.0025984.01 **Figure** S-9

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	43.1	18.1	17.3	7.9	13.6	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.75"	100.0		
0.5"	89.3		
0.375"	77.9		
#4	56.9		
#10	38.8		
#20	26.9		
#40	21.5		
#60	18.7		
#100	16.4		
#200	13.6		

* (no specification provided)

Material Description

Brown Gravelly fine to coarse SAND, little Silt

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-1-a

Coefficients

D_{90}= 12.9543 D_{85}= 11.3400 D_{60}= 5.3898
D_{50}= 3.5300 D_{30}= 1.1157 D_{15}= 0.1065
D_{10}= C_u= C_c=

Remarks

Date Received: 09.28.18 **Date Tested:** 10.03.18

Tested By: JD

Checked By: Rebecca Roth

Title: Laboratory Coordinator

Source of Sample: Borings **Depth:** 0.5-2.5' **Date Sampled:**
Sample Number: BB-MSJR-102 / 1D

Thielsch Engineering Inc.

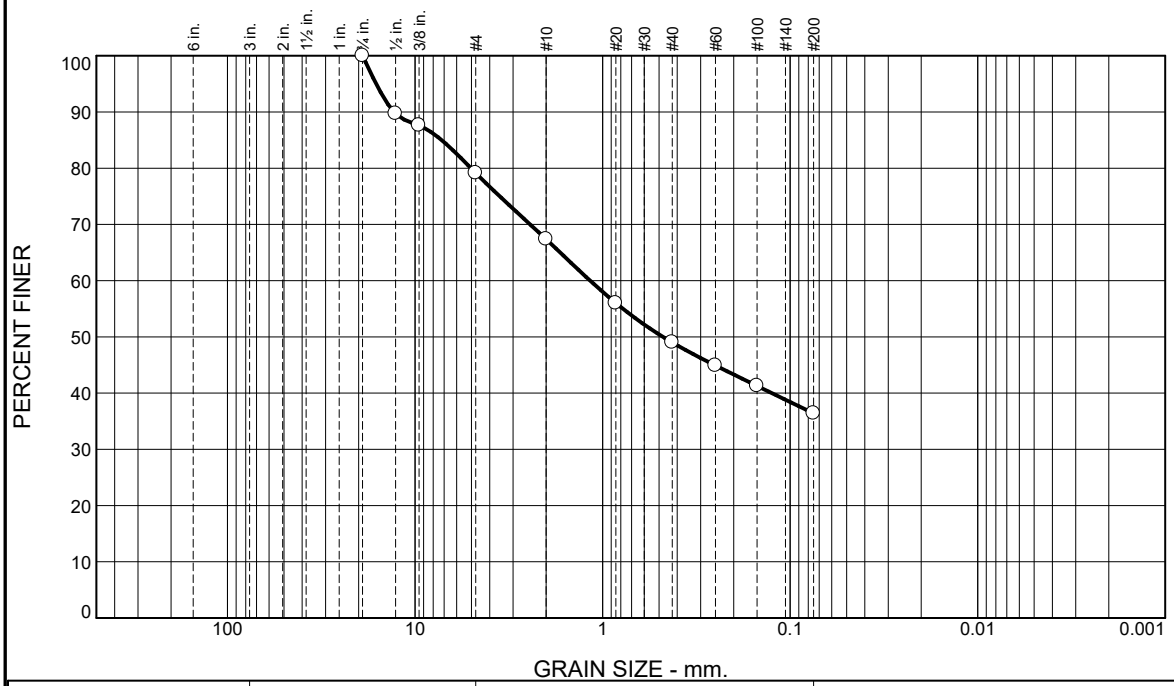
Cranston, RI

Client: GZA GeoEnvironmental

Project: Madawaska International Bridge #2399, WIN 21736.00 Madawaska, ME

Project No: 09.0025984.01 **Figure** S-10

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	20.9	11.7	18.4	12.6	36.4	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
0.75"	100.0		
0.5"	89.7		
0.375"	87.6		
#4	79.1		
#10	67.4		
#20	56.0		
#40	49.0		
#60	44.9		
#100	41.3		
#200	36.4		

* (no specification provided)

Material Description

Grey silty fine to coarse SAND, some fine Gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 12.9350 D_{85}= 7.2090 D_{60}= 1.1646
D_{50}= 0.4764 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Sample visually classified as plastic. Sample rolled to 1/4".

Date Received: 09.28.18 **Date Tested:** 10.03.18

Tested By: JD

Checked By: Rebecca Roth

Title: Laboratory Coordinator

Source of Sample: Borings **Depth:** 4.5-6.5' **Date Sampled:**
Sample Number: BB-MSJR-102 / 2D

Thielsch Engineering Inc.

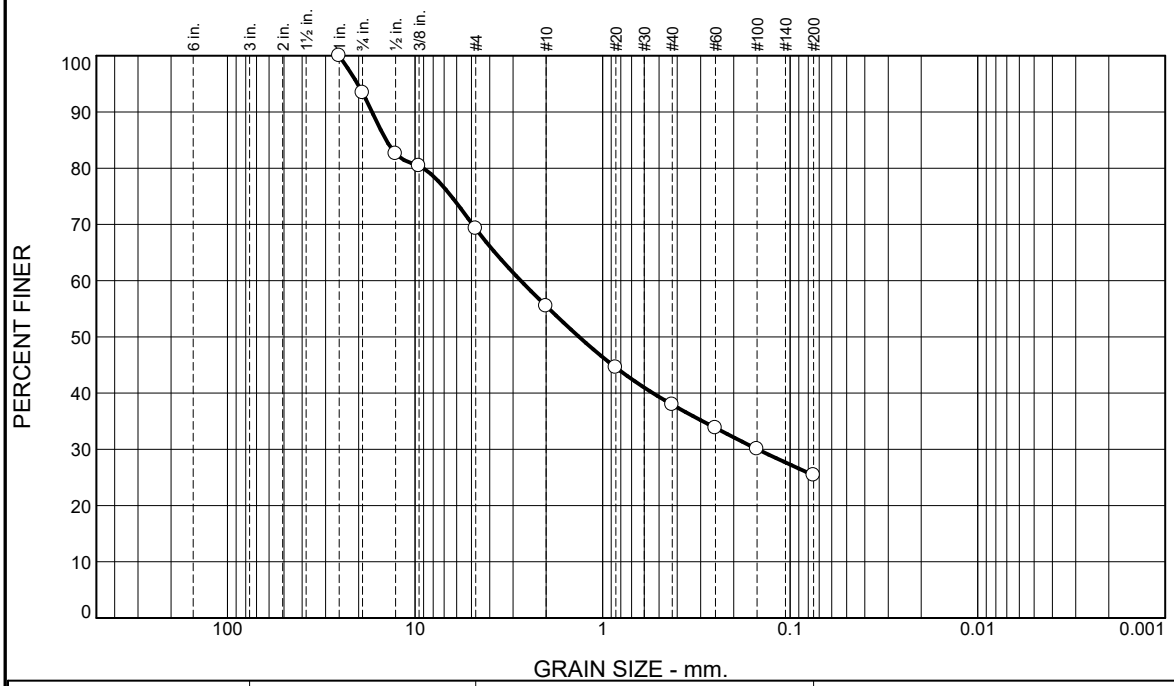
Cranston, RI

Client: GZA GeoEnvironmental

Project: Madawaska International Bridge #2399, WIN 21736.00 Madawaska, ME

Project No: 09.0025984.01 **Figure** S-11

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	6.6	24.1	13.8	17.6	12.5	25.4	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
0.75"	93.4		
0.5"	82.6		
0.375"	80.4		
#4	69.3		
#10	55.5		
#20	44.5		
#40	37.9		
#60	33.8		
#100	30.0		
#200	25.4		

* (no specification provided)

Material Description

Olive Brown f-c SAND, some fine to medium Gravel, some Silt & Clay

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= SC-SM **AASHTO (M 145)=** A-2-4(0)

Coefficients

D_{90}= 16.9607 D_{85}= 14.2610 D_{60}= 2.7327
D_{50}= 1.3343 D_{30}= 0.1490 D_{15}=
D_{10}= C_u= C_c=

Remarks

Sample visually classified as plastic. Sample rolled to 1/8".

Date Received: 09.28.18 **Date Tested:** 10.03.18

Tested By: JD

Checked By: Rebecca Roth

Title: Laboratory Coordinator

Source of Sample: Borings **Depth:** 15-17' **Date Sampled:**
Sample Number: BB-MSJR-102 / 4D

Thielsch Engineering Inc.

Cranston, RI

Client: GZA GeoEnvironmental

Project: Madawaska International Bridge #2399, WIN 21736.00 Madawaska, ME

Project No: 09.0025984.01 **Figure** S-12

THIELSCH ENGINEERING
195 Frances Avenue
Cranston RI, 02910
Phone: (401)-467-6454
Fax: (401)-467-2398
thielsch.com
Let's Build a Solid Foundation

Client Information:
GZA GeoEnvironmental
Portland, ME
PM: Andrew Blaisdell
Assigned By: NVW
Collected By: NVW

Project Information:
Madawaske Intnl. Bridge #2399 WIN 21736.00
Madawaska, ME
GZA Project Number: 09.0025984.02
Summary Page: 1 of 1
Report Date: 11.22.19

LABORATORY TESTING DATA SHEET, Report No.: 7419-L-152 Rev.1

Boring ID	Sample No.	Depth (Ft)	Laboratory No.	Identification Tests								Proctor / CBR / Permeability Tests								Laboratory Log and Soil Description
				As Received Water Content %	LL %	PL %	Gravel %	Sand %	Fines %	Org. %	G_s	Dry unit wt. pcf	Test Water Content %	γ_d MAX (pcf) W_{opt} (%)	γ_d MAX (pcf) W_{opt} (%) (Corr.)	Target Test Setup as % of Proctor	CBR @ 0.1"	CBR @ 0.2"	Permeability cm/sec	
				D2216	D4318		D6913			D2974	D854			D1557						
BB-MJSR-205	1D	0-2	S-21				12.8	51.6	35.6											Gray silty, clayey fine to coarse SAND, little fine Gravel
BB-MJSR-205	2D	3-5	S-22				30.9	43.6	25.5											Gray f-c SAND, some f-c Gravel, some Clayey Silt
BB-MJSR-206	1D	0-2	S-23				1.6	5.8	92.6											Gray SILT & CLAY, trace f-m Sand, trace fine Gravel
BB-MJSR-206	2D	3-5	S-24				5.3	12.4	82.3											Gray clayey SILT, little f-c Sand, trace fine Gravel
BB-MJSR-208	1D	0-2	S-25				48.2	35.5	16.3											Gray sandy fine to coarse GRAVEL, little Silt
BB-MJSR-208	2D	3-5	S-26				6.1	32.6	61.3											Gray clayey SILT, some f-c Sand, trace fine Gravel

Date Received: ***11.18.19***

Reviewed By:

Date Reviewed: ***11.26.19***

THIELSCH ENGINEERING

State of Maine - Department of Transportation

Laboratory Testing Summary Sheet

Madawaska International Bridge #2399

MDOT Project Number:

GZA Project Number: 09.0025984.01

Town(s): Madawaska, ME

Boring & Sample Identification Number	Station (Feet)	Sample No.	Depth (Feet)	Lab Number	Organic %	W.C.	L.L.	P.I.	Classification		
									Unified	AASHTO	Frost
BB-MSJR-205		1D	0-2	S-21					SC-SM	A-4	III
BB-MSJR-205		2D	3-5	S-22					SM	A-2-4	III
BB-MSJR-206		1D	0-2	S-23					CL	A-4	IV
BB-MSJR-206		2D	3-5	S-24					CL	A-4	IV
BB-MSJR-208		1D	0-2	S-25					GM	A-1-b	I
BB-MSJR-208		2D	5-7	S-26					CL	A-4	IV

Classification of these soil samples is in accordance with AASHTO Classification System M-145-40. This classification is followed by the "Frost Susceptibility Rating" from zero (non-frost susceptible) to Class IV (highly frost susceptible). The "Frost Susceptibility Rating" is based upon the MDOT and Corps of Engineers Classification Systems.

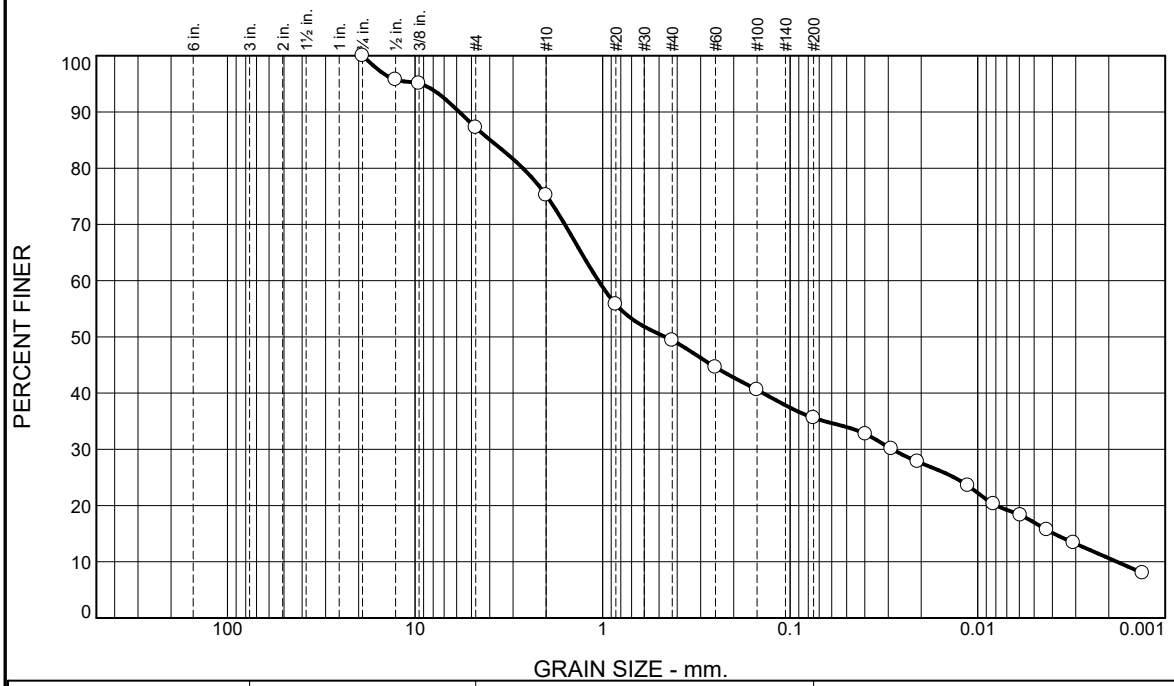
GSDC = Grain Size Distribution Curve as determined by AASHTO T 88-93 (1996) and/or ASTM D 422-63 (Reapproved 1998)

WC = water content as determined by AASHTO T 265-93 and/or ASTM D 2216-98

LL = Liquid limit as determined by AASHTO T 89-96 and/or ASTM D 4318-98

PI = Plasticity Index as determined by AASHTO 90-96 and/or ASTM D4318-98

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	12.8	12.0	25.8	13.8	25.0	10.6

Test Results (D7928 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
0.75"	100.0		
0.5"	95.7		
0.375"	95.1		
#4	87.2		
#10	75.2		
#20	55.8		
#40	49.4		
#60	44.6		
#100	40.6		
#200	35.6		
0.0396 mm.	32.7		
0.0289 mm.	30.1		
0.0209 mm.	27.8		
0.0113 mm.	23.5		
0.0082 mm.	20.3		
0.0059 mm.	18.3		
0.0043 mm.	15.7		
0.0031 mm.	13.4		
0.0013 mm.	8.0		

* (no specification provided)

Material Description

Gray silty, clayey fine to coarse SAND, little fine Gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= SC-SM **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 5.8057 D_{85}= 3.9706 D_{60}= 1.0542
D_{50}= 0.4631 D_{30}= 0.0285 D_{15}= 0.0039
D_{10}= 0.0018 C_u= 582.51 C_c= 0.43

Remarks

Sample visually classified as plastic. Sample rolled to 1/8".

Date Received: 11.18.19 **Date Tested:** 11.21.19

Tested By: IA / JM

Checked By: Steven Accetta

Title: Laboratory Coordinator

Source of Sample: BB-MSJR-205 **Depth:** 0-2' **Date Sampled:**
Sample Number: 1D

Thielsch Engineering Inc.

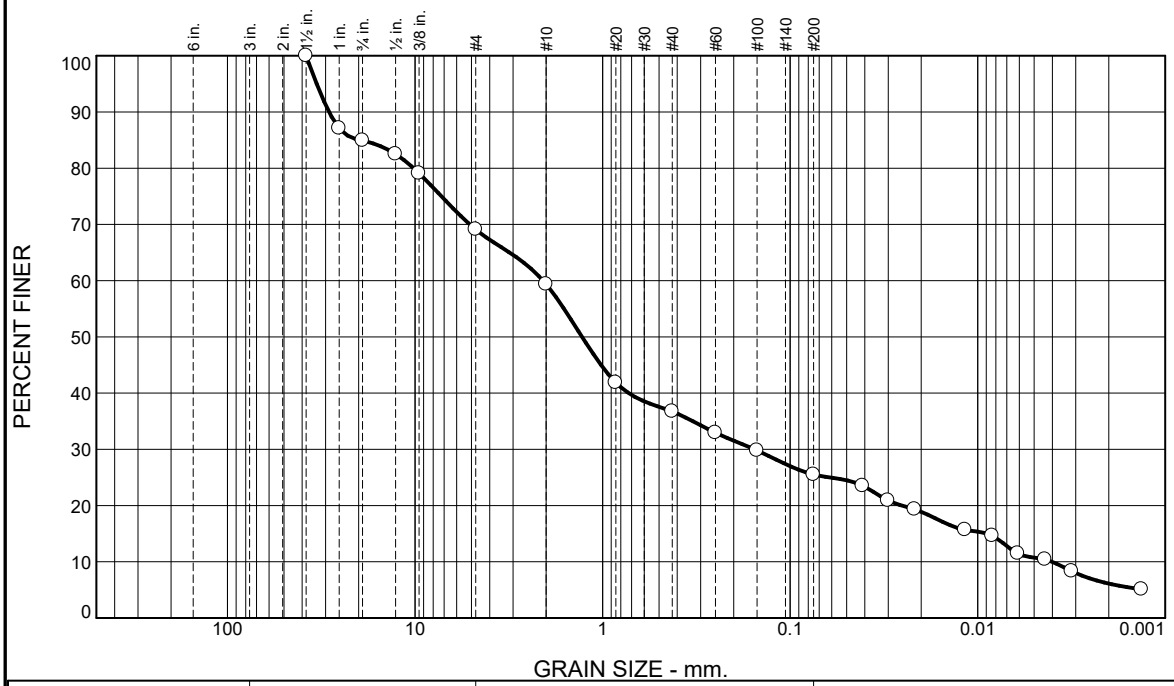
Cranston, RI

Client: GZA GeoEnvironmental

Project: Madawaska International Bridge #2399, WIN 21736.00
Madawaska, ME

Project No: 09.0025984.02 **Figure** S-21

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	15.1	15.8	9.7	22.7	11.2	19.4	6.1

Test Results (D7928 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1-1/2"	100.0		
1"	87.1		
3/4"	84.9		
1/2"	82.5		
3/8"	79.1		
#4	69.1		
#10	59.4		
#20	41.9		
#40	36.7		
#60	33.0		
#100	29.8		
#200	25.5		
0.0410 mm.	23.5		
0.0300 mm.	20.9		
0.0217 mm.	19.3		
0.0117 mm.	15.7		
0.0084 mm.	14.6		
0.0061 mm.	11.5		
0.0044 mm.	10.4		
0.0032 mm.	8.3		
0.0013 mm.	5.1		

* (no specification provided)

Material Description

Gray f-c SAND, some f-c Gravel, some Clayey Silt

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-2-4(0)

Coefficients

D_{90}= 28.7359 D_{85}= 19.5125 D_{60}= 2.0775
D_{50}= 1.2862 D_{30}= 0.1549 D_{15}= 0.0089
D_{10}= 0.0040 C_u= 518.21 C_c= 2.88

Remarks

Sample visually classified as plastic. Sample rolled to 1/4".

Date Received: 11.18.19 **Date Tested:** 11.21.19

Tested By: IA / JM

Checked By: Steven Accetta

Title: Laboratory Coordinator

Source of Sample: BB-MSJR-205 **Depth:** 3-5' **Date Sampled:**
Sample Number: 2D

Thielsch Engineering Inc.

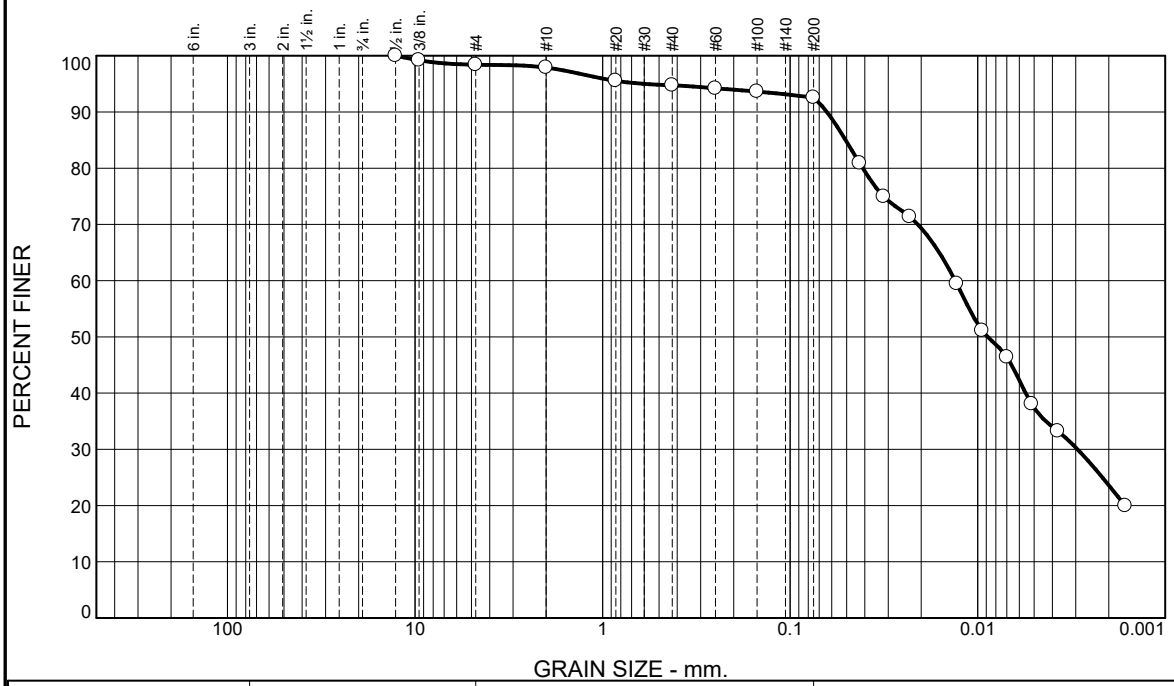
Cranston, RI

Client: GZA GeoEnvironmental

Project: Madawaska International Bridge #2399, WIN 21736.00
Madawaska, ME

Project No: 09.0025984.02 **Figure** S-22

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.6	0.5	3.2	2.1	69.0	23.6

Test Results (D7928 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
0.5"	100.0		
0.375"	99.2		
#4	98.4		
#10	97.9		
#20	95.5		
#40	94.7		
#60	94.2		
#100	93.6		
#200	92.6		
0.0426 mm.	80.9		
0.0317 mm.	74.9		
0.0230 mm.	71.4		
0.0129 mm.	59.5		
0.0095 mm.	51.1		
0.0070 mm.	46.4		
0.0052 mm.	38.0		
0.0037 mm.	33.2		
0.0016 mm.	19.9		

* (no specification provided)

Material Description

Gray clayey SILT, trace f-m Sand, trace fine Gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= CL **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 0.0636 D_{85}= 0.0506 D_{60}= 0.0132
D_{50}= 0.0088 D_{30}= 0.0029 D_{15}=
D_{10}= C_u= C_c=

Remarks

Sample visually classified as plastic. Sample rolled to 1/8".

Date Received: 11.18.19 **Date Tested:** 11.21.19

Tested By: IA / JM

Checked By: Steven Accetta

Title: Laboratory Coordinator

Source of Sample: BB-MSJR-206 **Depth:** 0-2' **Date Sampled:**
Sample Number: 1D

Thielsch Engineering Inc.

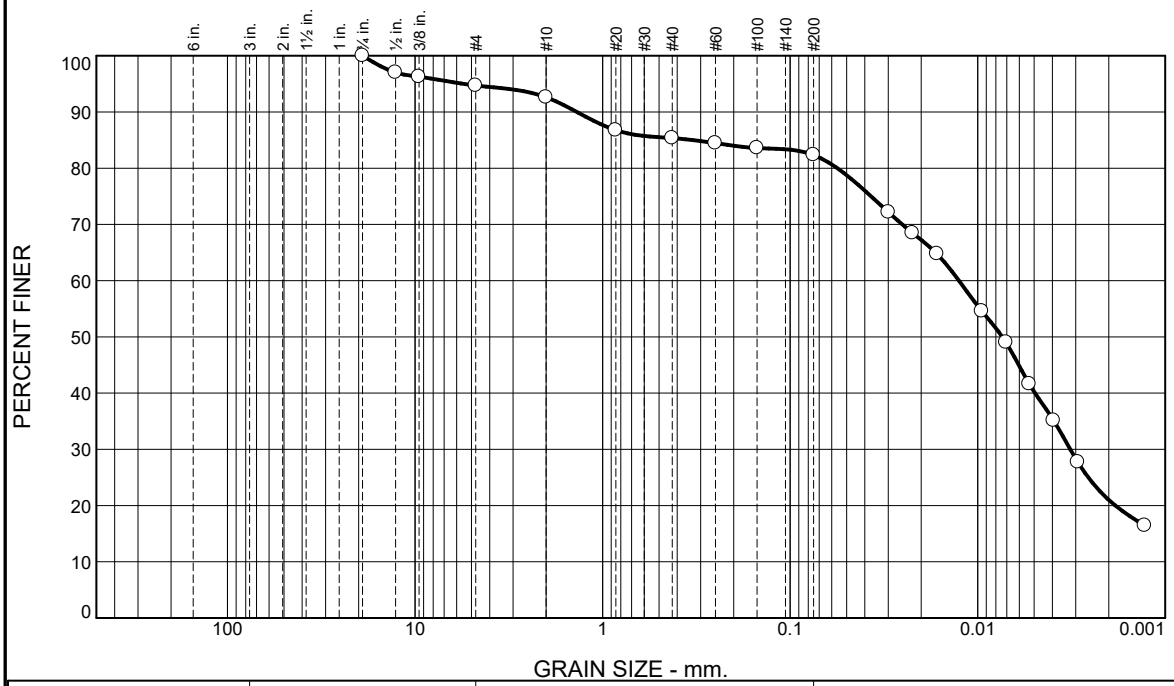
Cranston, RI

Client: GZA GeoEnvironmental

Project: Madawaska International Bridge #2399, WIN 21736.00
Madawaska, ME

Project No: 09.0025984.02 **Figure** S-23

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	5.3	2.1	7.2	3.1	61.3	21.0

Test Results (D7928 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
0.75"	100.0		
0.5"	97.0		
0.375"	96.3		
#4	94.7		
#10	92.6		
#20	86.8		
#40	85.4		
#60	84.5		
#100	83.6		
#200	82.3		
0.0299 mm.	72.2		
0.0223 mm.	68.5		
0.0165 mm.	64.8		
0.0095 mm.	54.6		
0.0071 mm.	49.0		
0.0053 mm.	41.6		
0.0039 mm.	35.1		
0.0029 mm.	27.7		
0.0013 mm.	16.4		

* (no specification provided)

Material Description

Gray clayey SILT, little f-c Sand, trace fine Gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= CL **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 1.3690 D_{85}= 0.3311 D_{60}= 0.0126
D_{50}= 0.0074 D_{30}= 0.0032 D_{15}=
D_{10}= C_u= C_c=

Remarks

Sample visually classified as plastic. Sample rolled to 1/8".

Date Received: 11.18.19 **Date Tested:** 11.21.19

Tested By: IA / JM

Checked By: Steven Accetta

Title: Laboratory Coordinator

Source of Sample: BB-MSJR-206 **Depth:** 3-5' **Date Sampled:**
Sample Number: 2D

Thielsch Engineering Inc.

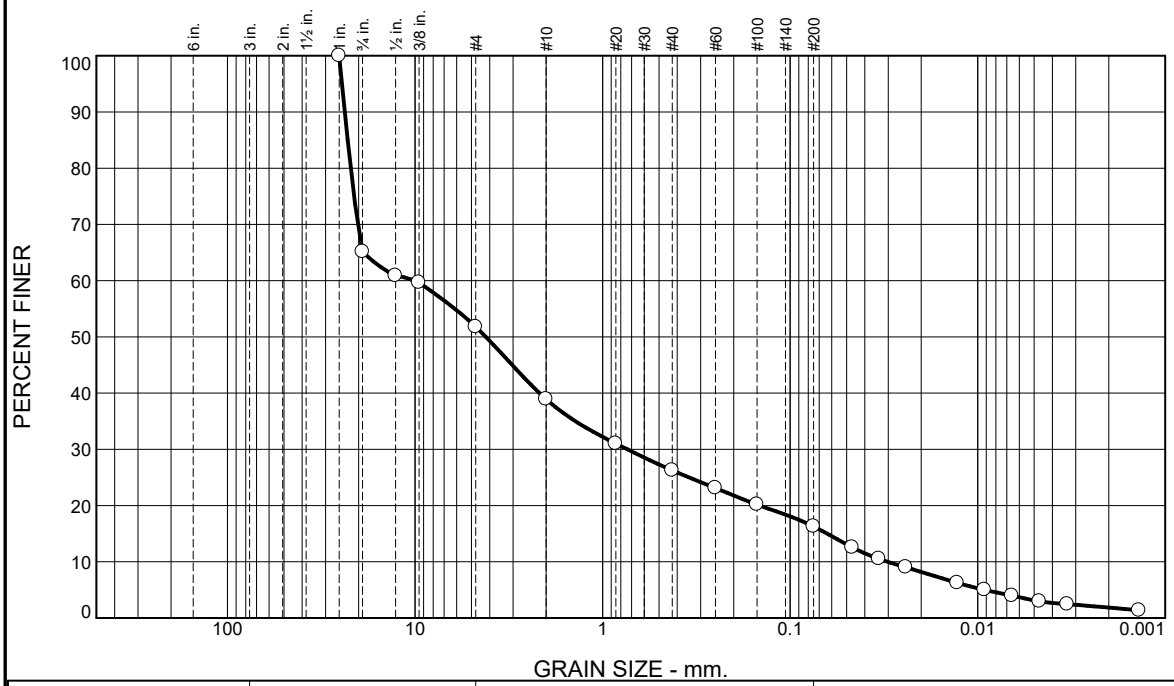
Cranston, RI

Client: GZA GeoEnvironmental

Project: Madawaska International Bridge #2399, WIN 21736.00
Madawaska, ME

Project No: 09.0025984.02 **Figure** S-24

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	34.9	13.3	12.9	12.6	10.0	14.4	1.9

Test Results (D7928 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
0.75"	65.1		
0.5"	60.9		
0.375"	59.7		
#4	51.8		
#10	38.9		
#20	31.0		
#40	26.3		
#60	23.1		
#100	20.2		
#200	16.3		
0.0466 mm.	12.6		
0.0337 mm.	10.5		
0.0242 mm.	9.0		
0.0128 mm.	6.3		
0.0092 mm.	5.0		
0.0066 mm.	4.0		
0.0047 mm.	3.0		
0.0033 mm.	2.5		
0.0014 mm.	1.4		

* (no specification provided)

Material Description

Gray sandy fine to coarse GRAVEL, little Silt

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= GM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 23.7013 D_{85}= 22.8638 D_{60}= 10.0701
D_{50}= 4.1929 D_{30}= 0.7382 D_{15}= 0.0634
D_{10}= 0.0302 C_u= 333.76 C_c= 1.79

Remarks

Date Received: 11.18.19 **Date Tested:** 11.21.19

Tested By: IA / JM

Checked By: Steven Accetta

Title: Laboratory Coordinator

Source of Sample: BB-MSJR-208 **Depth:** 0-2' **Date Sampled:**
Sample Number: 1D

Thielsch Engineering Inc.

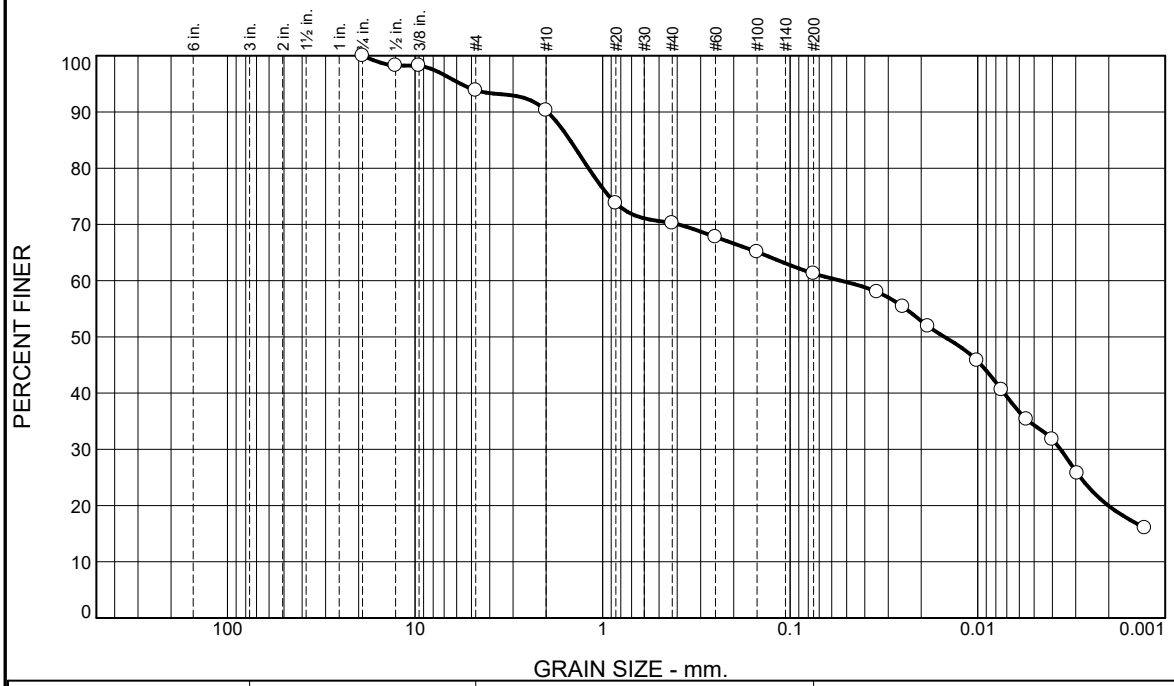
Cranston, RI

Client: GZA GeoEnvironmental

Project: Madawaska International Bridge #2399, WIN 21736.00
Madawaska, ME

Project No: 09.0025984.02 **Figure** S-25

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	6.1	3.6	20.1	8.9	41.4	19.9

Test Results (D7928 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
0.75"	100.0		
0.5"	98.2		
0.375"	98.2		
#4	93.9		
#10	90.3		
#20	73.8		
#40	70.2		
#60	67.8		
#100	65.1		
#200	61.3		
0.0344 mm.	58.0		
0.0251 mm.	55.4		
0.0184 mm.	51.9		
0.0101 mm.	45.8		
0.0074 mm.	40.6		
0.0055 mm.	35.3		
0.0040 mm.	31.8		
0.0029 mm.	25.7		
0.0013 mm.	16.0		

* (no specification provided)

Material Description

Gray clayey SILT, some f-c Sand, trace fine Gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= CL **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 1.9605 D_{85}= 1.4910 D_{60}= 0.0536
D_{50}= 0.0150 D_{30}= 0.0036 D_{15}=
D_{10}= C_u= C_c=

Remarks

Sample visually classified as plastic. Sample rolled to 1/8".

Date Received: 11.18.19 **Date Tested:** 11.21.19

Tested By: IA / JM

Checked By: Steven Accetta

Title: Laboratory Coordinator

Source of Sample: BB-MSJR-208 **Depth:** 5-7' **Date Sampled:**
Sample Number: 2D

Thielsch Engineering Inc.

Cranston, RI

Client: GZA GeoEnvironmental

Project: Madawaska International Bridge #2399, WIN 21736.00
Madawaska, ME

Project No: 09.0025984.02 **Figure** S-26

THIELSCH ENGINEERING
195 Frances Avenue
Cranston RI, 02910
Phone: (401)-467-6454
Fax: (401)-467-2398
thielsch.com
Let's Build a Solid Foundation

Client Information:
GZA GeoEnvironmental
South Portland, ME
PM: Nicholas Williams
Assigned By: Nicholas Williams
Collected By: LN

Project Information:
Madawaska Intl. Bridge #2399, WIN 21736.00
Madawaska, ME
GZA Project Number: 09.0025984.03
Summary Page: 1 of 1
Report Date: 04.08.2020

LABORATORY TESTING DATA SHEET, Report No.: 7420-C-144, Rev.3

Boring	Sample No.	Depth (Ft)	Laboratory No.	Identification Tests								Proctor / CBR / Permeability Tests								Laboratory Log and Soil Description
				As Received Water Content %	LL %	PL %	Gravel %	Sand %	Fines %	Org. %	G_s	Dry unit wt. pcf	Test Water Content %	γ_d MAX (pcf) W_{opt} (%)	γ_d MAX (pcf) W_{opt} (%) (Corr.)	Target Test Setup as % of Proctor	CBR @ 0.1"	CBR @ 0.2"	Permeability cm/sec	
				D2216	D4318		D6913			D2974	D854			D1557						
BB-MSJR-209	10D	24-26	S-39	20.5			3.1	55.2	41.7											Brown SILTY fine SAND, trace fine Gravel
BB-MSJR-209	11D	26-28	S-40	19.8			6.7	58.1	35.2											Gray CLAYEY SILTY fine SAND, trace f-c Gravel
BB-MSJR-209	13D	36-37	S-41	9.2			28.6	52.3	19.1											Gray f-c SAND, some fine Gravel, little Silt
BB-MSJR-210	9D	25-27	S-42	20.7			1.7	50.4	47.9											Brown SILTY fine SAND, trace fine Gravel
BB-MSJR-211	3D	5-7	S-43	9.7			2.4	41.5	56.1											Light Brown SANDY SILT, trace fine Gravel
BB-MSJR-211	4D	7-9	S-44	6.3			32.0	48.5	19.5											Brown f-c SAND, some f-c Gravel, little Silt
BB-MSJR-211	8D	20-22	S-45	20.2			0.0	27.0	73.0											Gray CLAYEY SILT, some fine Sand
BB-MSJR-213	2D	5-7	S-46	13.6			4.3	37.4	58.3											Light Brown SANDY SILT, trace fine Gravel
BB-MSJR-213	3D	7-9	S-47	7.7			27.9	51.8	20.3											Brown f-c SAND, some f-c Gravel, some Silt
BB-MSJR-213	8D	25-27	S-48	20.8			6.9	48.2	44.9											Brown CLAYEY SILTY fine to coarse SAND, trace fine Gravel
BB-MSJR-213	9D	30-31.6	S-49	9.7			30.1	48.3	21.6											Gray f-c SAND, some fine Gravel, some Silt

Date Received: *03.19.2020*

Reviewed By:

Date Reviewed: *04.08.2020*

THIELSCH ENGINEERING

State of Maine - Department of Transportation

Laboratory Testing Summary Sheet

Madawaska Intl Bridge #2399

MDOT Project Number: WIN 21736.00

GZA Project Number: 09.0025984.03

Town(s): Madawaska, ME

Boring & Sample Identification Number	Station (Feet)	Sample No.	Depth (Feet)	Lab Number	Organic %	W.C.	L.L.	P.I.	Classification		
									Unified	AASHTO	Frost
BB-MSJR-209		10D	24-26	S-39		20.5			SM	A-4(0)	III
BB-MSJR-209		11D	26-28	S-40		19.8			SM-SC	A-2-4(0)	III
BB-MSJR-209		13D	36-37	S-41		9.2			SM	A-1-b	II
BB-MSJR-210		9D	25-27	S-42		20.7			SM	A-4(0)	II
BB-MSJR-211		3D	5-7	S-43		9.7			ML	A-4(0)	III
BB-MSJR-211		4D	7-9	S-44		6.3			SM	A-1-b	II
BB-MSJR-211		8D	20-22	S-45		20.2			CL	A-6	IV
BB-MSJR-213		2D	5-7	S-46		13.6			ML	A-4(0)	II
BB-MSJR-213		3D	7-9	S-47		7.7			SM	A-1-b	II
BB-MSJR-213		8D	25-27	S-48		20.8			SM-SC	A-4(0)	III
BB-MSJR-213		9D	30-31.6	S-49		9.7			SM	A-1-b	II

Classification of these soil samples is in accordance with AASHTO Classification System M-145-40. This classification is followed by the "Frost Susceptibility Rating" from zero (non-frost susceptible) to Class IV (highly frost susceptible). The "Frost Susceptibility Rating" is based upon the MDOT and Corps of Engineers Classification Systems.

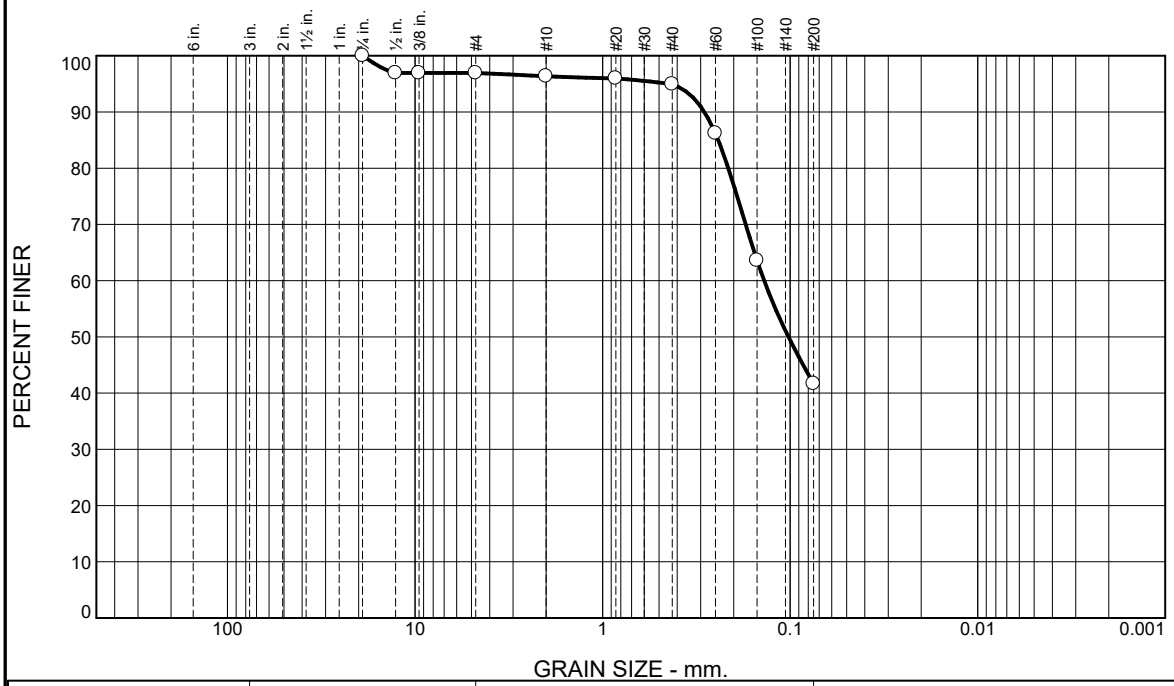
GSDC = Grain Size Distribution Curve as determined by AASHTO T 88-93 (1996) and/or ASTM D 422-63 (Reapproved 1998)

WC = Water content as determined by AASHTO T 265-93 and/or ASTM D 2216-98

LL = Liquid limit as determined by AASHTO T 89-96 and/or ASTM D 4318-98

PI = Plasticity index as determined by AASHTO 90-96 and/or ASTM D4318-98

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	3.1	0.6	1.4	53.2	41.7	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
0.75"	100.0		
0.5"	96.9		
0.375"	96.9		
#4	96.9		
#10	96.3		
#20	96.0		
#40	94.9		
#60	86.2		
#100	63.6		
#200	41.7		

* (no specification provided)

Material Description

Brown SILTY fine SAND, trace fine Gravel

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 0.2864 D_{85}= 0.2417 D_{60}= 0.1374
D_{50}= 0.1021 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Sample visually classified as non-plastic.

Date Received: 03.20.2020 **Date Tested:** 03.24.2020

Tested By: JM / MN

Checked By: Steven Accetta

Title: Laboratory Coordinator

Source of Sample: BB-MSJR-209 **Depth:** 24-26' **Date Sampled:**
Sample Number: 10D

Thielsch Engineering Inc.

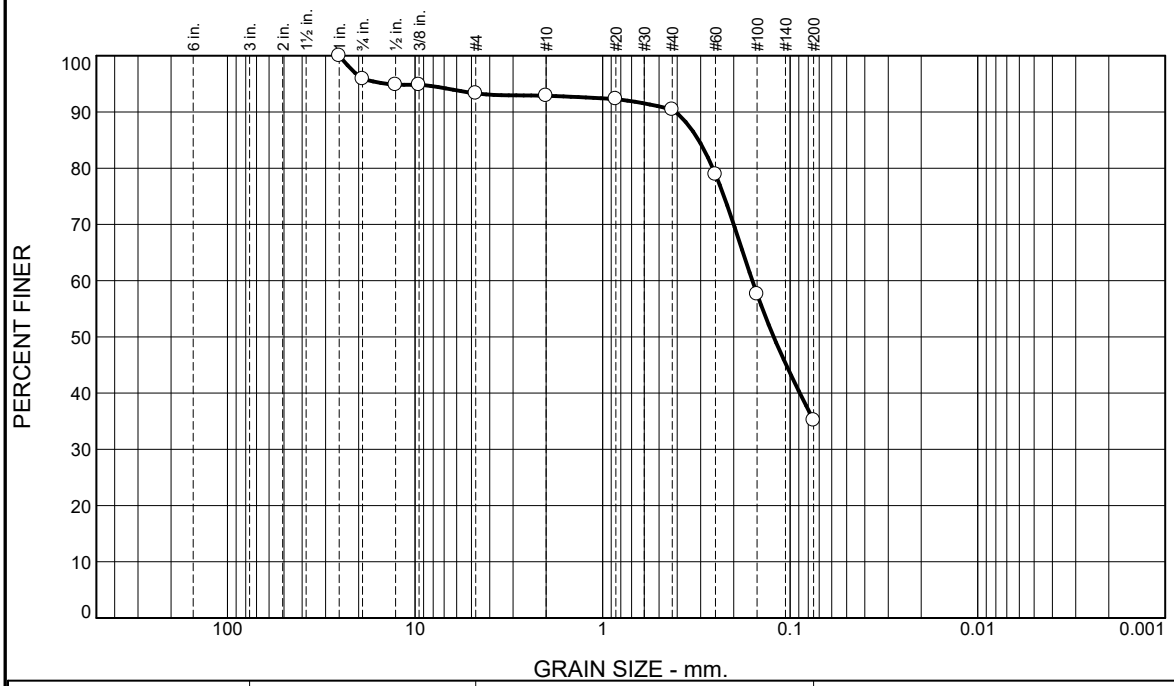
Cranston, RI

Client: GZA GeoEnvironmental

Project: Madawaska International Bridge #2399, WIN 21736.00
Madawaska, ME

Project No: 09.0025984.03 **Figure** S-39

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	4.1	2.6	0.4	2.4	55.3	35.2	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
0.75"	95.9		
0.5"	94.8		
0.375"	94.8		
#4	93.3		
#10	92.9		
#20	92.3		
#40	90.5		
#60	78.9		
#100	57.6		
#200	35.2		

* (no specification provided)

Material Description

Gray CLAYEY SILTY fine SAND, trace f-c Gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= SM-SC **AASHTO (M 145)=** A-2-4(0)

Coefficients

D_{90}= 0.4081 D_{85}= 0.3075 D_{60}= 0.1589
D_{50}= 0.1223 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Sample visually classified as plastic. Sample rolled to 1/4".

Date Received: 03.20.2020 **Date Tested:** 03.24.2020

Tested By: JM / MN

Checked By: Steven Accetta

Title: Laboratory Coordinator

Source of Sample: BB-MSJR-209 **Depth:** 26-28' **Date Sampled:**
Sample Number: 11D

Thielsch Engineering Inc.

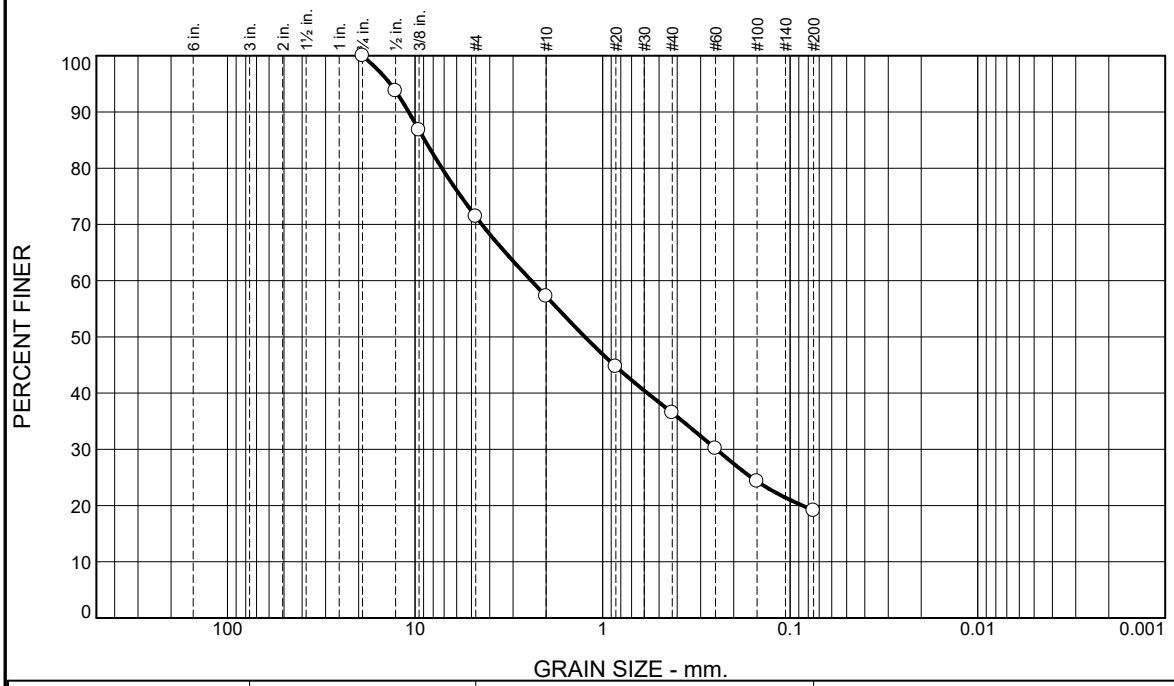
Cranston, RI

Client: GZA GeoEnvironmental

Project: Madawaska International Bridge #2399, WIN 21736.00
Madawaska, ME

Project No: 09.0025984.03 **Figure** S-40

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	28.6	14.2	20.7	17.4	19.1	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
0.75"	100.0		
0.5"	93.7		
0.375"	86.8		
#4	71.4		
#10	57.2		
#20	44.7		
#40	36.5		
#60	30.1		
#100	24.3		
#200	19.1		

* (no specification provided)

Material Description

Gray f-c SAND, some fine Gravel, little Silt

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 10.8197 D_{85}= 8.8768 D_{60}= 2.3999
D_{50}= 1.2418 D_{30}= 0.2472 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 03.20.2020 **Date Tested:** 03.24.2020

Tested By: JM / MN

Checked By: Steven Accetta

Title: Laboratory Coordinator

Source of Sample: BB-MSJR-209 **Depth:** 36-37' **Date Sampled:**
Sample Number: 13D

Thielsch Engineering Inc.

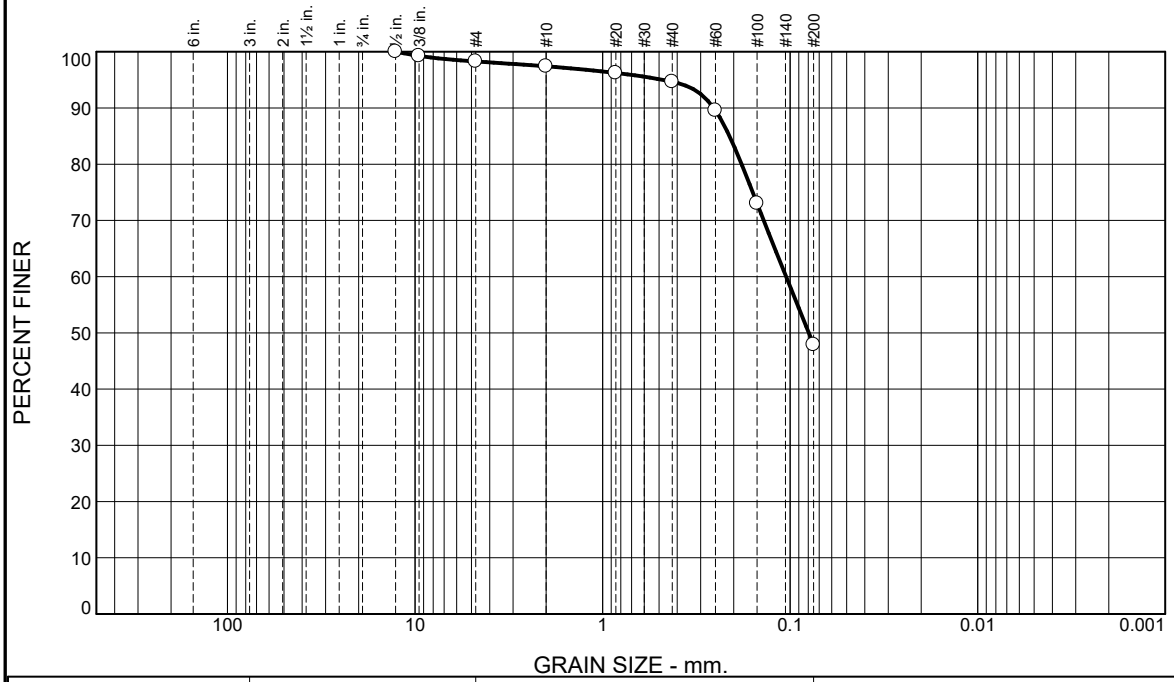
Cranston, RI

Client: GZA GeoEnvironmental

Project: Madawaska International Bridge #2399, WIN 21736.00
Madawaska, ME

Project No: 09.0025984.03 **Figure** S-41

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.7	0.9	2.8	46.7	47.9	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
0.5"	100.0		
0.375"	99.3		
#4	98.3		
#10	97.4		
#20	96.2		
#40	94.6		
#60	89.6		
#100	73.0		
#200	47.9		

* (no specification provided)

Material Description

Brown SILTY fine SAND, trace fine Gravel

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 0.2554 D_{85}= 0.2106 D_{60}= 0.1051
D_{50}= 0.0795 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Sample visually classified as non-plastic.

Date Received: 03.20.2020 **Date Tested:** 03.24.2020

Tested By: JM / MN

Checked By: Steven Accetta

Title: Laboratory Coordinator

Source of Sample: BB-MSJR-210 **Depth:** 25-27' **Date Sampled:**
Sample Number: 9D

Thielsch Engineering Inc.

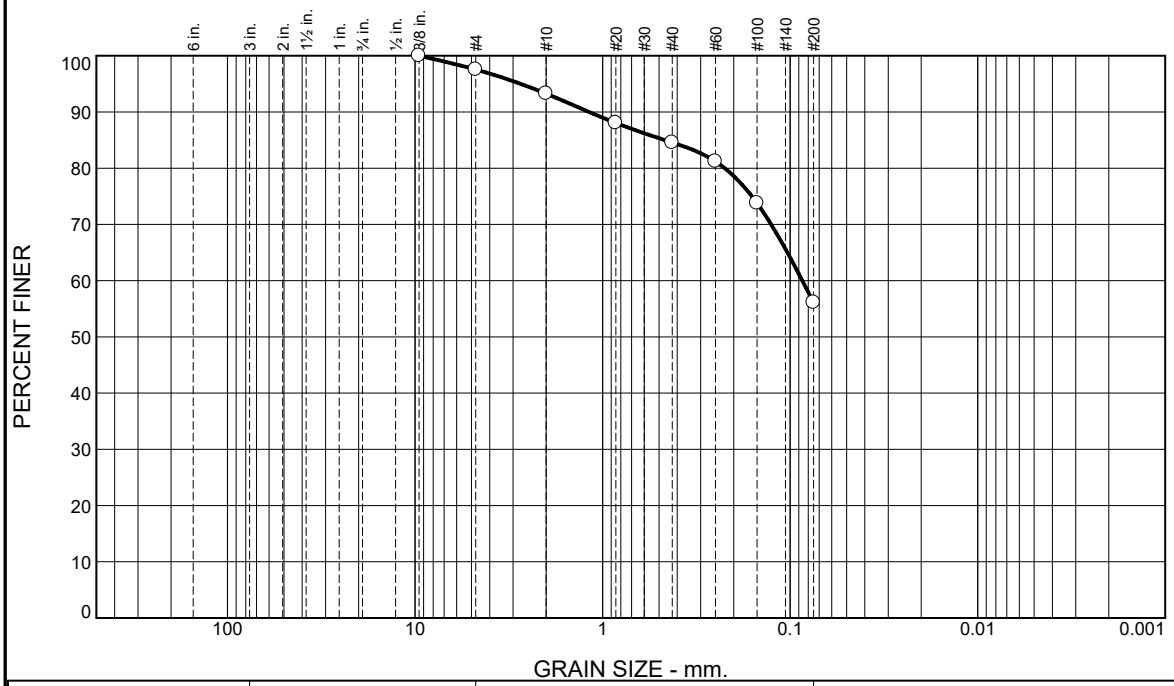
Cranston, RI

Client: GZA GeoEnvironmental

Project: Madawaska International Bridge #2399, WIN 21736.00
Madawaska, ME

Project No: 09.0025984.03 **Figure** S-42

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	2.4	4.3	8.7	28.5	56.1	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
0.375"	100.0		
#4	97.6		
#10	93.3		
#20	88.0		
#40	84.6		
#60	81.2		
#100	73.8		
#200	56.1		

* (no specification provided)

Material Description

Light Brown SANDY SILT, trace fine Gravel

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 1.1798 D_{85}= 0.4657 D_{60}= 0.0861
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Sample visually classified as plastic. Sample rolled to 1/4".

Date Received: 03.20.2020 **Date Tested:** 03.24.2020

Tested By: JM / MN

Checked By: Steven Accetta

Title: Laboratory Coordinator

Source of Sample: BB-MSJR-211 **Depth:** 5-7' **Date Sampled:**
Sample Number: 3D

Thielsch Engineering Inc.

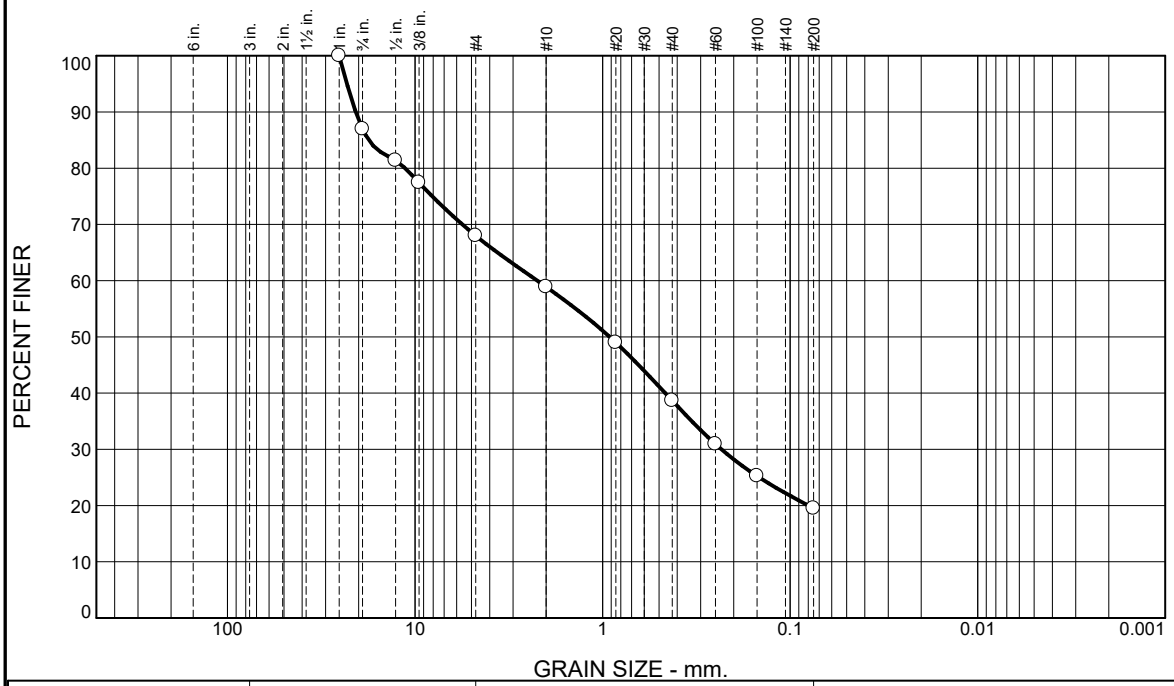
Cranston, RI

Client: GZA GeoEnvironmental

Project: Madawaska International Bridge #2399, WIN 21736.00
Madawaska, ME

Project No: 09.0025984.03 **Figure** S-43

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	13.0	19.0	9.1	20.2	19.2	19.5	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
0.75"	87.0		
0.5"	81.4		
0.375"	77.4		
#4	68.0		
#10	58.9		
#20	49.0		
#40	38.7		
#60	30.9		
#100	25.3		
#200	19.5		

* (no specification provided)

Material Description

Brown f-c SAND, some f-c Gravel, little Silt

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 20.7003 D_{85}= 17.6591 D_{60}= 2.2295
D_{50}= 0.9176 D_{30}= 0.2324 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 03.20.2020 **Date Tested:** 03.24.2020

Tested By: JM / MN

Checked By: Steven Accetta

Title: Laboratory Coordinator

Source of Sample: BB-MSJR-211 **Depth:** 7-9' **Date Sampled:**
Sample Number: 4D

Thielsch Engineering Inc.

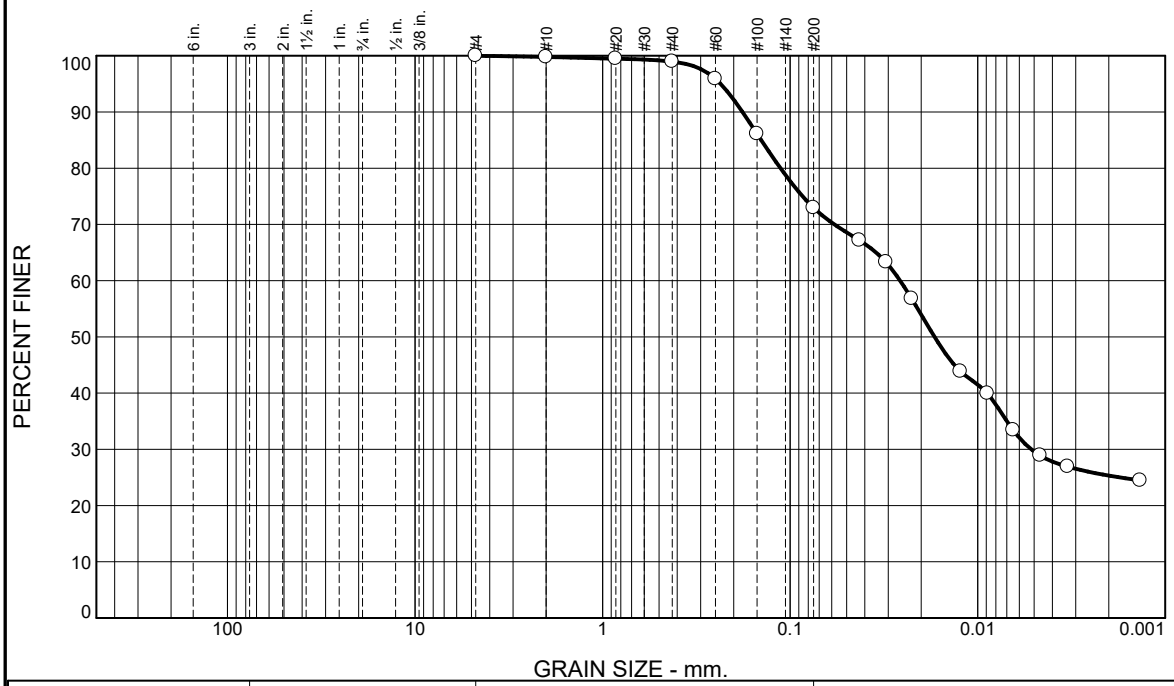
Cranston, RI

Client: GZA GeoEnvironmental

Project: Madawaska International Bridge #2399, WIN 21736.00
Madawaska, ME

Project No: 09.0025984.03 **Figure** S-44

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.2	0.9	25.9	47.7	25.3

Test Results (D7928 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#10	99.8		
#20	99.5		
#40	98.9		
#60	95.9		
#100	86.1		
#200	73.0		
0.0427 mm.	67.2		
0.0308 mm.	63.3		
0.0225 mm.	56.8		
0.0123 mm.	43.9		
0.0089 mm.	39.9		
0.0065 mm.	33.4		
0.0046 mm.	28.9		
0.0033 mm.	26.9		
0.0014 mm.	24.5		

* (no specification provided)

Material Description

Gray CLAYEY SILT, some fine Sand

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= CL **AASHTO (M 145)=** A-6

Coefficients

D_{90}= 0.1794 D_{85}= 0.1426 D_{60}= 0.0259
D_{50}= 0.0170 D_{30}= 0.0052 D_{15}=
D_{10}= C_u= C_c=

Remarks

Sample visually classified as plastic. Sample rolled to 1/8".

Date Received: 03.20.2020 **Date Tested:** 03.25.2020

Tested By: JM / MN

Checked By: Steven Accetta

Title: Laboratory Coordinator

Source of Sample: BB-MSJR-211 **Depth:** 20-22' **Date Sampled:**
Sample Number: 8D

Thielsch Engineering Inc.

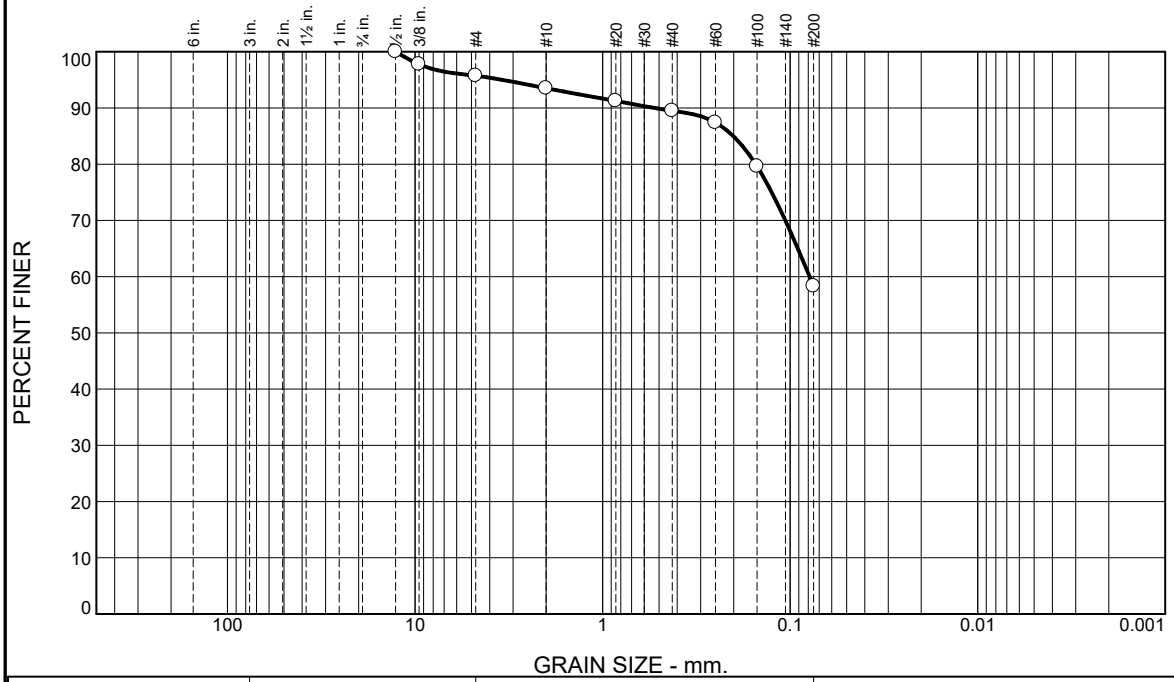
Cranston, RI

Client: GZA GeoEnvironmental

Project: Madawaska International Bridge #2399, WIN 21736.00
Madawaska, ME

Project No: 09.0025984.03 **Figure** S-45

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	4.3	2.2	4.0	31.2	58.3	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
0.5"	100.0		
0.375"	97.8		
#4	95.7		
#10	93.5		
#20	91.3		
#40	89.5		
#60	87.4		
#100	79.6		
#200	58.3		

* (no specification provided)

Material Description

Light Brown SANDY SILT, trace fine Gravel

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 0.5277 D_{85}= 0.2009 D_{60}= 0.0787
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Sample visually classified as non-plastic.

Date Received: 03.20.2020 **Date Tested:** 03.24.2020

Tested By: JM / MN

Checked By: Steven Accetta

Title: Laboratory Coordinator

Source of Sample: BB-MSJR-213 **Depth:** 5-7' **Date Sampled:**
Sample Number: 2D

Thielsch Engineering Inc.

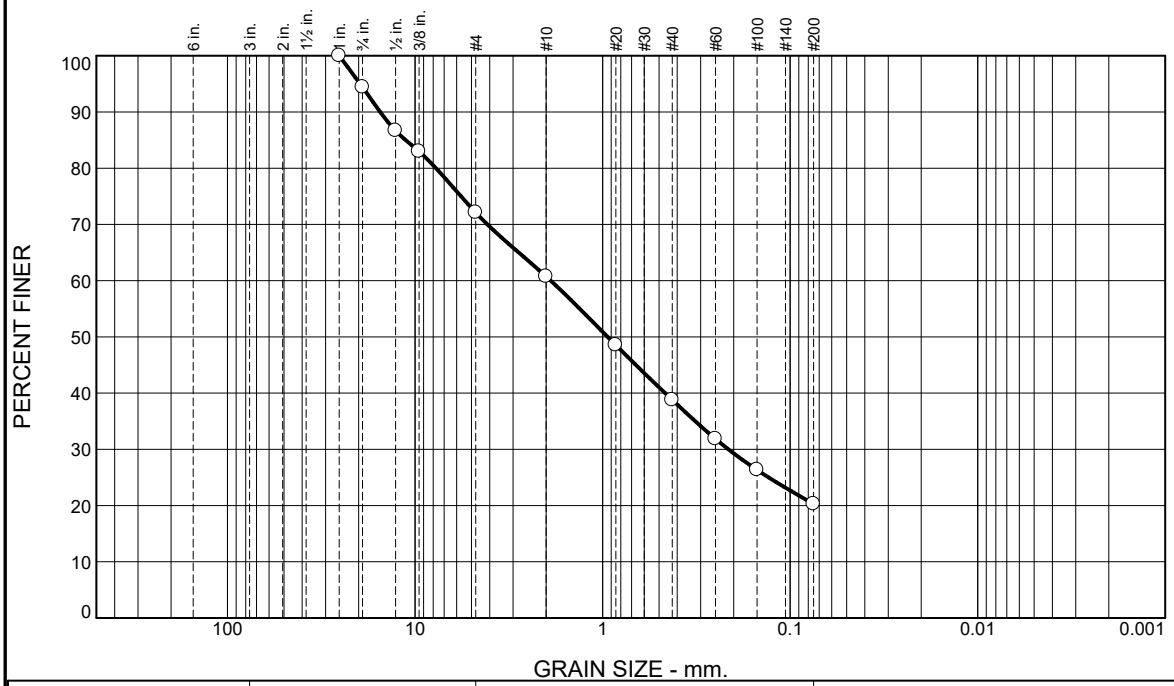
Cranston, RI

Client: GZA GeoEnvironmental

Project: Madawaska International Bridge #2399, WIN 21736.00
Madawaska, ME

Project No: 09.0025984.03 **Figure** S-46

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	5.6	22.3	11.4	21.9	18.5	20.3	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
0.75"	94.4		
0.5"	86.7		
0.375"	83.0		
#4	72.1		
#10	60.7		
#20	48.5		
#40	38.8		
#60	31.9		
#100	26.3		
#200	20.3		

* (no specification provided)

Material Description

Brown f-c SAND, some f-c Gravel, some Silt

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 15.3421 D_{85}= 11.2311 D_{60}= 1.8902
D_{50}= 0.9401 D_{30}= 0.2132 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 03.20.2020 **Date Tested:** 03.24.2020

Tested By: JM / MN

Checked By: Steven Accetta

Title: Laboratory Coordinator

Source of Sample: BB-MSJR-213 **Depth:** 7-9' **Date Sampled:**

Sample Number: 3D

Thielsch Engineering Inc.

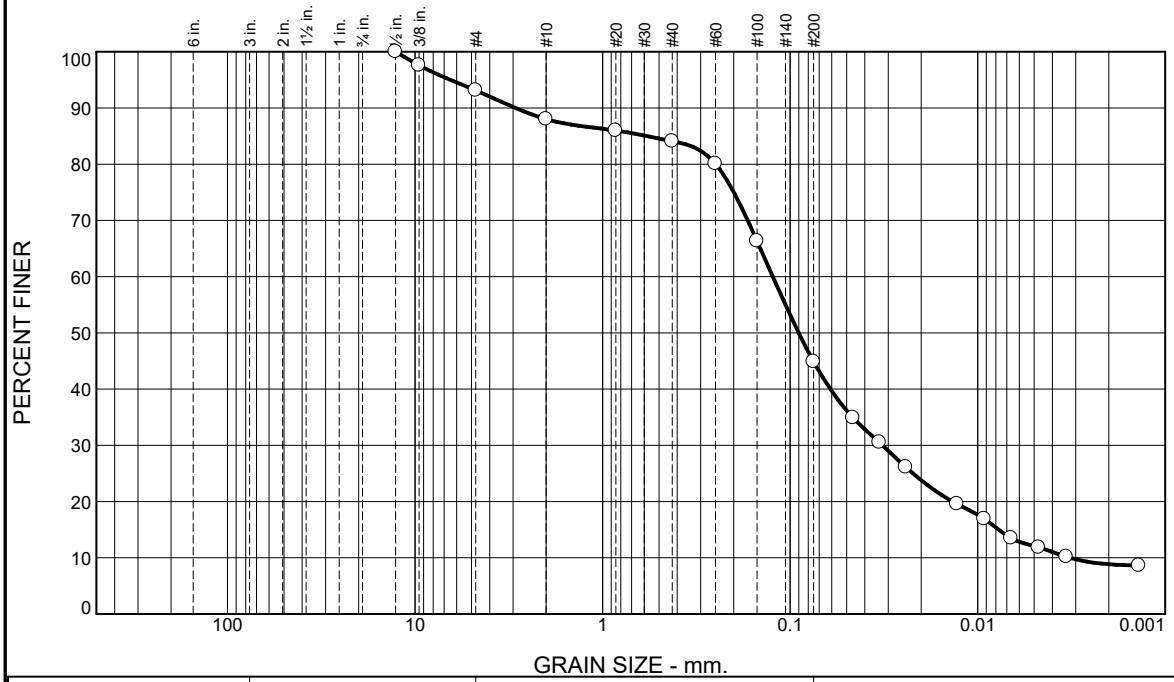
Cranston, RI

Client: GZA GeoEnvironmental

Project: Madawaska International Bridge #2399, WIN 21736.00
Madawaska, ME

Project No: 09.0025984.03 **Figure** S-47

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	6.9	5.1	3.9	39.2	36.1	8.8

Test Results (D7928 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
0.5"	100.0		
0.375"	97.6		
#4	93.1		
#10	88.0		
#20	86.0		
#40	84.1		
#60	80.1		
#100	66.3		
#200	44.9		
0.0462 mm.	34.9		
0.0334 mm.	30.5		
0.0242 mm.	26.1		
0.0129 mm.	19.6		
0.0092 mm.	16.9		
0.0066 mm.	13.5		
0.0047 mm.	11.9		
0.0034 mm.	10.2		
0.0014 mm.	8.6		

* (no specification provided)

Material Description

Brown CLAYEY SILTY fine to coarse SAND, trace fine Gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= SM-SC **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 2.9130 D_{85}= 0.5797 D_{60}= 0.1237
D_{50}= 0.0901 D_{30}= 0.0322 D_{15}= 0.0077
D_{10}= 0.0032 C_u= 38.29 C_c= 2.59

Remarks

Sample visually classified as plastic. Sample rolled to 1/4".

Date Received: 03.20.2020 **Date Tested:** 03.25.2020

Tested By: RR / MN

Checked By: Steven Accetta

Title: Laboratory Coordinator

Source of Sample: BB-MSJR-213 **Depth:** 25-27' **Date Sampled:**
Sample Number: 8D

Thielsch Engineering Inc.

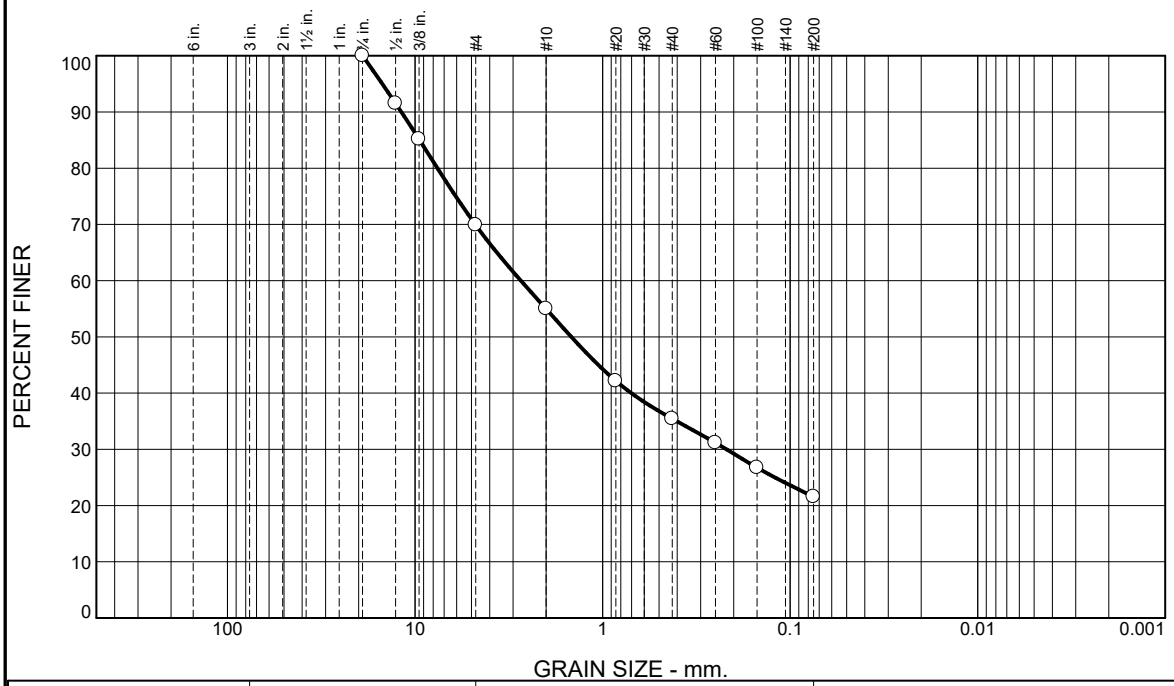
Cranston, RI

Client: GZA GeoEnvironmental

Project: Madawaska International Bridge #2399, WIN 21736.00
Madawaska, ME

Project No: 09.0025984.03 **Figure** S-48

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	30.1	14.9	19.6	13.8	21.6	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
0.75"	100.0		
0.5"	91.5		
0.375"	85.1		
#4	69.9		
#10	55.0		
#20	42.2		
#40	35.4		
#60	31.2		
#100	26.7		
#200	21.6		

* (no specification provided)

Material Description

Gray f-c SAND, some fine Gravel, some Silt

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 11.8373 D_{85}= 9.4623 D_{60}= 2.7281
D_{50}= 1.4673 D_{30}= 0.2185 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 03.20.2020 **Date Tested:** 03.24.2020

Tested By: JM / MN

Checked By: Steven Accetta

Title: Laboratory Coordinator

Source of Sample: BB-MSJR-213 **Depth:** 30-31.6' **Date Sampled:**

Sample Number: 9D

Thielsch Engineering Inc.

Cranston, RI

Client: GZA GeoEnvironmental

Project: Madawaska International Bridge #2399, WIN 21736.00
Madawaska, ME

Project No: 09.0025984.03 **Figure** S-49

THIELSCH ENGINEERING
195 Frances Avenue
Cranston RI, 02910
Phone: (401)-467-6454
Fax: (401)-467-2398
thielsch.com
Let's Build a Solid Foundation

Client Information:
GZA GeoEnvironmental
South Portland, ME
PM: Nicholas Williams
Assigned By: Nicholas Williams
Collected By: LN / NVW

Project Information:
Madawaksa International Bridge #2399, WIN 21736.00
Madawaska, ME
GZA Project Number: 09.0025984.03
Summary Page: 1 of 1
Report Date: 04.15.2020

LABORATORY TESTING DATA SHEET, Report No.: 7420-D-132

Boring	Sample No.	Depth (Ft)	Laboratory No.	Identification Tests								Proctor / CBR / Permeability Tests								Laboratory Log and Soil Description
				As Received Water Content %	LL %	PL %	Gravel %	Sand %	Fines %	Org. %	G_s	Dry unit wt. pcf	Test Water Content %	γ_d MAX (pcf) W_{opt} (%)	γ_d MAX (pcf) W_{opt} (%) (Corr.)	Target Test Setup as % of Proctor	CBR @ 0.1"	CBR @ 0.2"	Permeability cm/sec	
				D2216	D4318		D6913			D2974	D854			D1557						
BB-MSJR-201	2D	5-7	S-50	6.3			30.6	48.0	21.4											Brown f-c SAND, some fine Gravel, some Silt
BB-MSJR-201	7D	29-29.75	S-51	12.2			4.6	17.4	78.0											Light Brown CLAYEY SILT, little f-c Sand, trace fine Gravel
BB-MSJR-201	10D	44-44.25	S-52	7.7			22.8	43.7	33.5											Gray f-c SAND, some Clayey Silt, some fine Gravel
BB-MSJR-202	2D	4-6	S-53	8.5			23.5	52.9	23.6											Dark Brown f-c SAND, some Silt, some fine Gravel
BB-MSJR-202	3D	9-11	S-54	11.2			21.0	55.4	23.6											Dark Brown f-c SAND, some Silt, some fine Gravel
BB-MSJR-202	8D	34-36	S-55	8.8			29.5	27.8	42.7											Gray CLAYEY SILT, some f-c Gravel, some f-c Sand
BB-MSJR-203	1D	0-2	S-56	2.0			31.5	57.7	10.8											Light Brown f-c SAND, some f-c Gravel, little Silt
BB-MSJR-203	3D	10-12	S-57	10.6			36.1	49.3	14.6											Brown Gravelly fine to coarse SAND, little Silt
BB-MSJR-203	8D	34-36	S-58	7.1			41.4	37.6	21.0											Light Gray SANDY fine GRAVEL, some Clayey Silt
BB-MSJR-204	7D	29-31	S-59	4.9			22.6	15.7	61.7											Light Gray CLAYEY SILT, some f-c Gravel, little f-c Sand
BB-MSJR-204	9D	39-40.5	S-60	10.6			12.0	36.6	51.4											Light Gray SANDY CLAYEY SILT, little fine Gravel
BB-MSJR-204	14D	64-66	S-61	14.4			7.3	35.4	57.3											Gray SANDY CLAYEY SILT, trace fine Gravel

Date Received: *04.10.2020*

Reviewed By:

Date Reviewed: *04.16.2020*

THIELSCH ENGINEERING

State of Maine - Department of Transportation

Laboratory Testing Summary Sheet

Madawaska Intl Bridge #2399

MDOT Project Number: WIN 21736.00

GZA Project Number: 09.0025984.03

Town(s): Madawaska, ME

Boring & Sample Identification Number	Station (Feet)	Sample No.	Depth (Feet)	Lab Number	Organic %	W.C.	L.L.	P.I.	Classification		
									Unified	AASHTO	Frost
BB-MSJR-201		2D	5-7	S-50		6.3			SM	A-1-b	II
BB-MSJR-201		7D	29-29.75	S-51		12.2			CL	A-4	III
BB-MSJR-201		10D	44-44.25	S-52		7.7			SM	A-2-4(0)	III
BB-MSJR-202		2D	4-6	S-53		8.5			SM	A-1-b	II
BB-MSJR-202		3D	9-11	S-54		11.2			SM	A-1-b	II
BB-MSJR-202		8D	34-36	S-55		8.8			GC-GM	A-4(0)	III
BB-MSJR-203		1D	0-2	S-56		2.0			SP-SM	A-1-b	II
BB-MSJR-203		3D	10-12	S-57		10.6			SM	A-1-b	II
BB-MSJR-203		8D	34-36	S-58		7.1			GC-GM	A2-4	II
BB-MSJR-204		7D	29-31	S-59		4.9			ML	A-4(0)	III
BB-MSJR-204		9D	39-40.5	S-60		10.6			CL-ML	A-4(0)	III
BB-MSJR-204		14D	64-66	S-61		14.4			CL	A-4(0)	III

Classification of these soil samples is in accordance with AASHTO Classification System M-145-40. This classification is followed by the "Frost Susceptibility Rating" from zero (non-frost susceptible) to Class IV (highly frost susceptible). The "Frost Susceptibility Rating" is based upon the MDOT and Corps of Engineers Classification Systems.

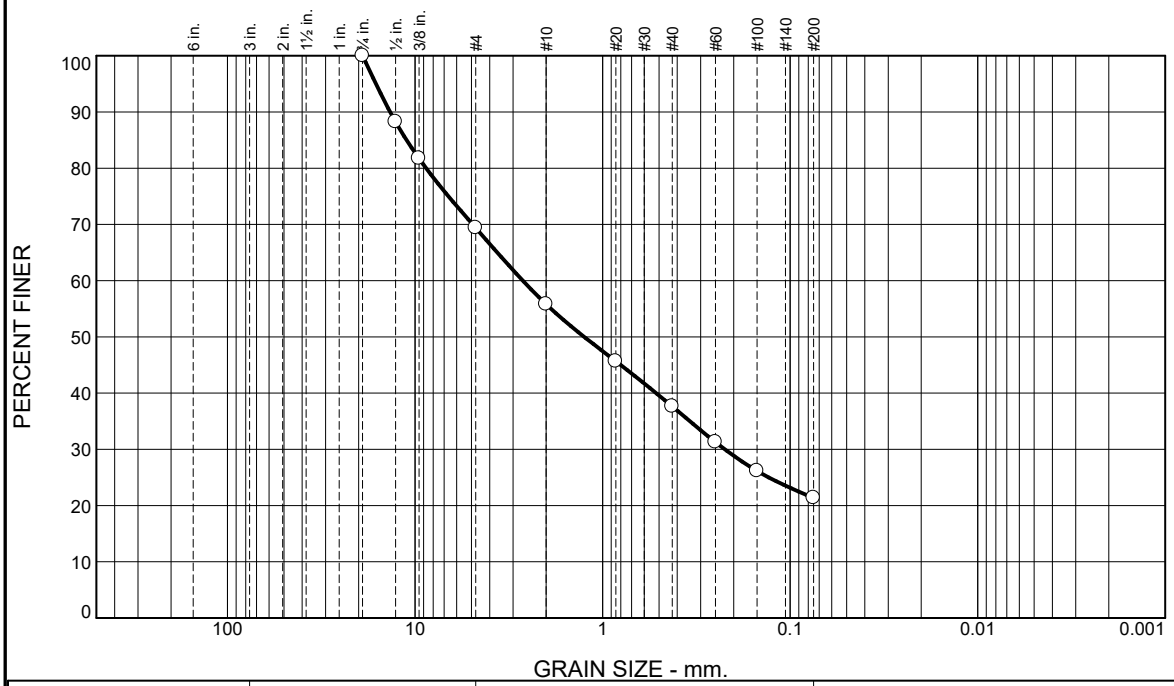
GSDC = Grain Size Distribution Curve as determined by AASHTO T 88-93 (1996) and/or ASTM D 422-63 (Reapproved 1998)

WC = Water content as determined by AASHTO T 265-93 and/or ASTM D 2216-98

LL = Liquid limit as determined by AASHTO T 89-96 and/or ASTM D 4318-98

PI = Plasticity index as determined by AASHTO 90-96 and/or ASTM D4318-98

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	30.6	13.6	18.2	16.2	21.4	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
0.75"	100.0		
0.5"	88.2		
0.375"	81.7		
#4	69.4		
#10	55.8		
#20	45.7		
#40	37.6		
#60	31.3		
#100	26.2		
#200	21.4		

* (no specification provided)

Material Description

Brown f-c SAND, some fine Gravel, some Silt

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 13.5822 D_{85}= 11.1011 D_{60}= 2.6632
D_{50}= 1.2525 D_{30}= 0.2228 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 04.10.2020 **Date Tested:** 04.14.2020

Tested By: JM

Checked By: Steven Accetta

Title: Laboratory Coordinator

Source of Sample: BB-MSJR-201 **Depth:** 5-7' **Date Sampled:**
Sample Number: 2D

Thielsch Engineering Inc.

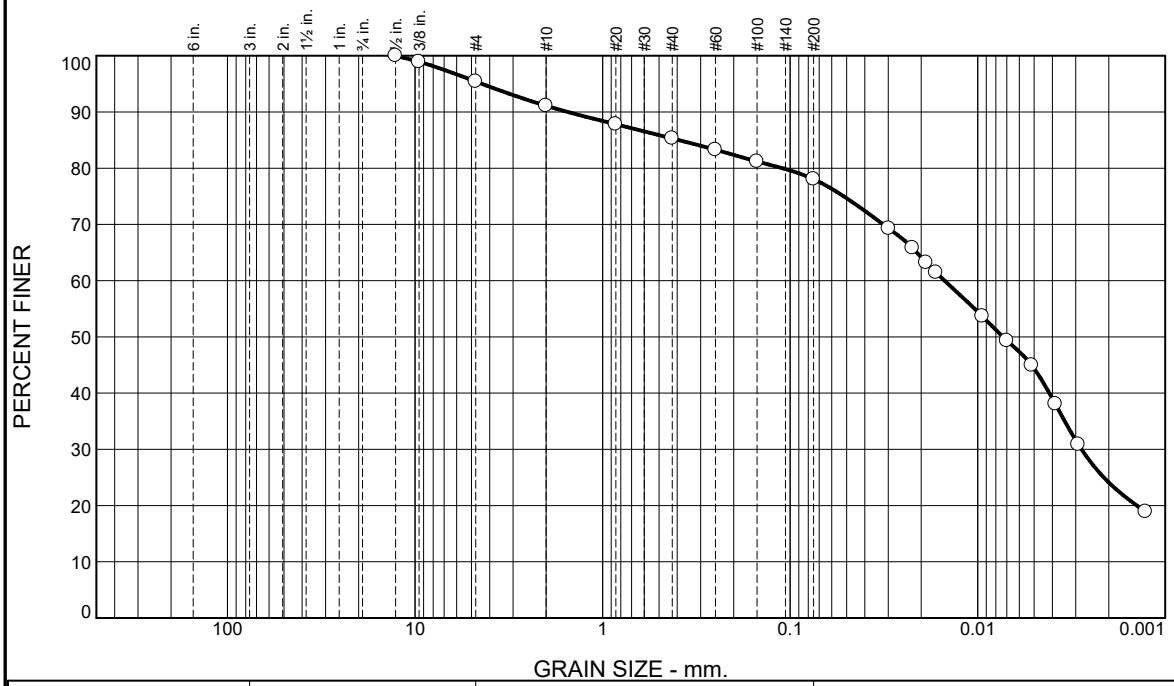
Cranston, RI

Client: GZA GeoEnvironmental

Project: Madawaska International Bridge #2399, WIN 21736.00
Madawaska, ME

Project No: 09.0025984.03 **Figure** S-50

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	4.6	4.3	5.8	7.3	53.9	24.1

Test Results (D7928 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
0.5"	100.0		
0.375"	98.9		
#4	95.4		
#10	91.1		
#20	87.8		
#40	85.3		
#60	83.3		
#100	81.2		
#200	78.0		
0.0298 mm.	69.3		
0.0222 mm.	65.8		
0.0188 mm.	63.2		
0.0167 mm.	61.5		
0.0094 mm.	53.7		
0.0070 mm.	49.3		
0.0051 mm.	45.0		
0.0039 mm.	38.0		
0.0029 mm.	30.9		
0.0013 mm.	18.9		

* (no specification provided)

Material Description

Light Brown CLAYEY SILT, little f-c Sand, trace fine Gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= CL **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 1.5314 D_{85}= 0.3928 D_{60}= 0.0150
D_{50}= 0.0073 D_{30}= 0.0028 D_{15}=
D_{10}= C_u= C_c=

Remarks

Sample visually classified as plastic. Sample rolled to 1/8".

Date Received: 04.10.2020 **Date Tested:** 04.15.2020

Tested By: JM

Checked By: Steven Accetta

Title: Laboratory Coordinator

Source of Sample: BB-MSJR-201 **Depth:** 29-29.75' **Date Sampled:**
Sample Number: 7D

Thielsch Engineering Inc.

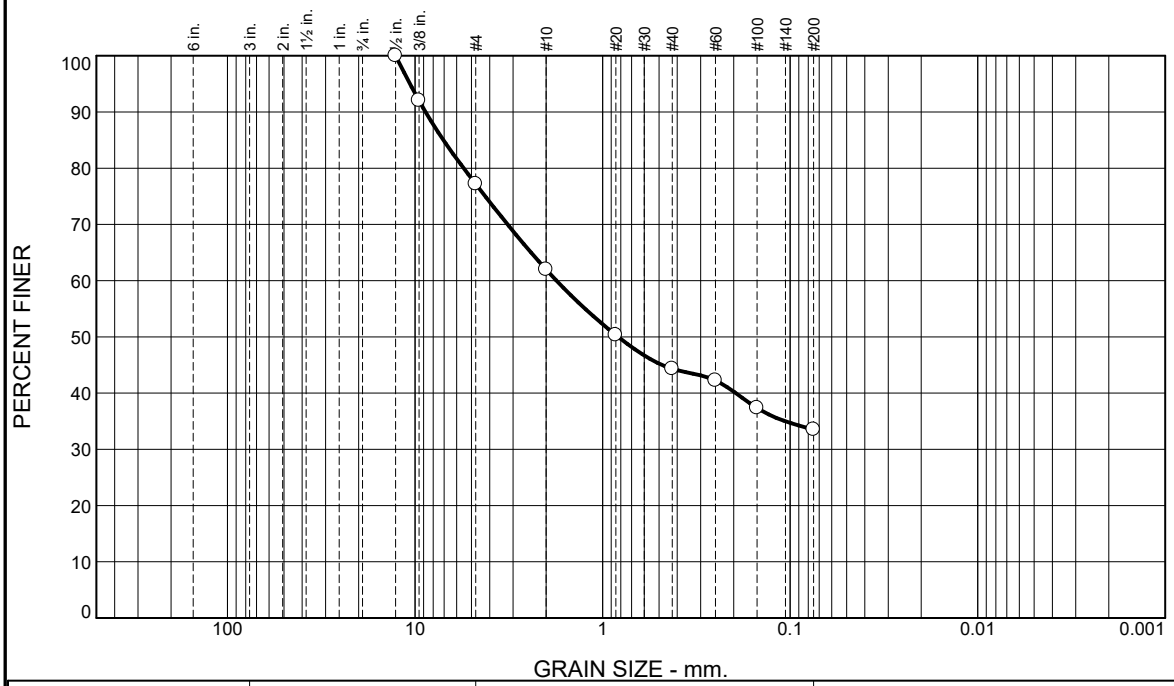
Cranston, RI

Client: GZA GeoEnvironmental

Project: Madawaska International Bridge #2399, WIN 21736.00
Madawaska, ME

Project No: 09.0025984.03 **Figure** S-51

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	22.8	15.2	17.7	10.8	33.5	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
0.5"	100.0		
0.375"	92.0		
#4	77.2		
#10	62.0		
#20	50.3		
#40	44.3		
#60	42.2		
#100	37.4		
#200	33.5		

* (no specification provided)

Material Description

Gray f-c SAND, some Clayey Silt, some fine Gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-2-4(0)

Coefficients

D_{90}= 8.7890 D_{85}= 7.0559 D_{60}= 1.7601
D_{50}= 0.8261 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Sample visually classified as plastic. Sample rolled to 1/4".

Date Received: 04.10.2020 **Date Tested:** 04.14.2020

Tested By: JM

Checked By: Steven Accetta

Title: Laboratory Coordinator

Source of Sample: BB-MSJR-201 **Depth:** 44-44.25' **Date Sampled:**
Sample Number: 10D

Thielsch Engineering Inc.

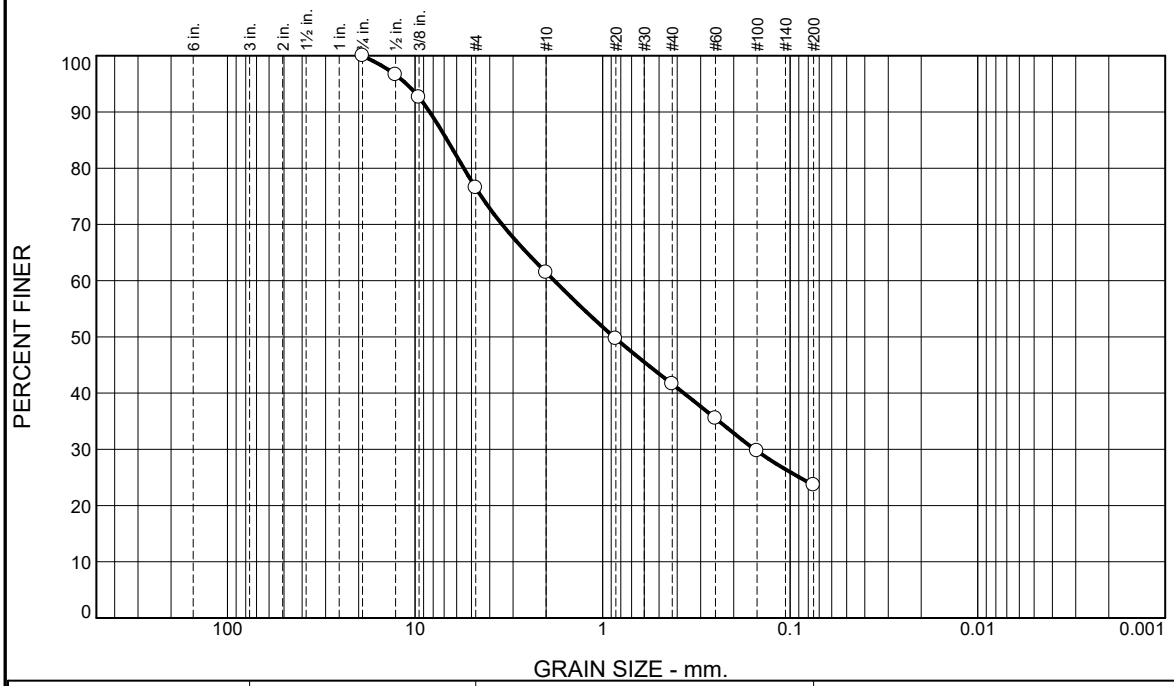
Cranston, RI

Client: GZA GeoEnvironmental

Project: Madawaska International Bridge #2399, WIN 21736.00
Madawaska, ME

Project No: 09.0025984.03 **Figure** S-52

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	23.5	15.0	19.9	18.0	23.6	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
0.75"	100.0		
0.5"	96.6		
0.375"	92.6		
#4	76.5		
#10	61.5		
#20	49.7		
#40	41.6		
#60	35.5		
#100	29.7		
#200	23.6		

* (no specification provided)

Material Description

Dark Brown f-c SAND, some Silt, some fine Gravel

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 8.3497 D_{85}= 6.7325 D_{60}= 1.8082
D_{50}= 0.8708 D_{30}= 0.1544 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 04.10.2020 **Date Tested:** 04.14.2020

Tested By: JM

Checked By: Steven Accetta

Title: Laboratory Coordinator

Source of Sample: BB-MSJR-202 **Depth:** 4-6' **Date Sampled:**
Sample Number: 2D

Thielsch Engineering Inc.

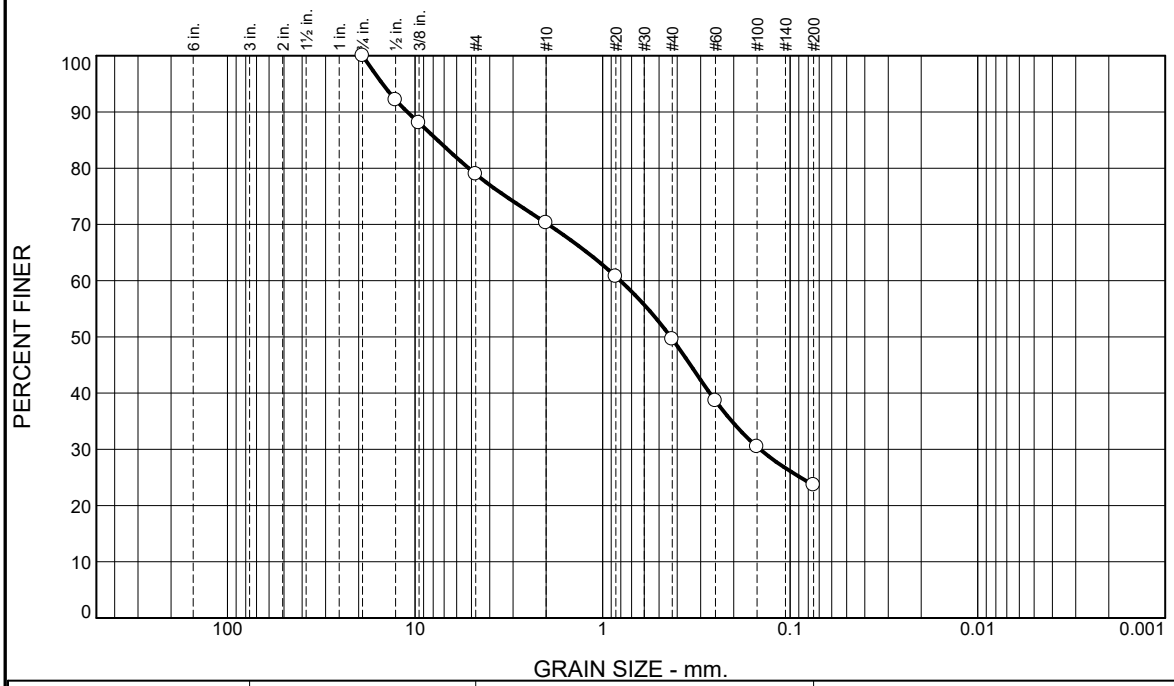
Cranston, RI

Client: GZA GeoEnvironmental

Project: Madawaska International Bridge #2399, WIN 21736.00
Madawaska, ME

Project No: 09.0025984.03 **Figure** S-53

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	21.0	8.7	20.7	26.0	23.6	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
0.75"	100.0		
0.5"	92.1		
0.375"	88.1		
#4	79.0		
#10	70.3		
#20	60.7		
#40	49.6		
#60	38.6		
#100	30.5		
#200	23.6		

* (no specification provided)

Material Description

Dark Brown f-c SAND, some Silt, some fine Gravel

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 10.9946 D_{85}= 7.5852 D_{60}= 0.8046
D_{50}= 0.4335 D_{30}= 0.1447 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 04.10.2020 **Date Tested:** 04.14.2020

Tested By: JM

Checked By: Steven Accetta

Title: Laboratory Coordinator

Source of Sample: BB-MSJR-202 **Depth:** 9-11' **Date Sampled:**
Sample Number: 3D

Thielsch Engineering Inc.

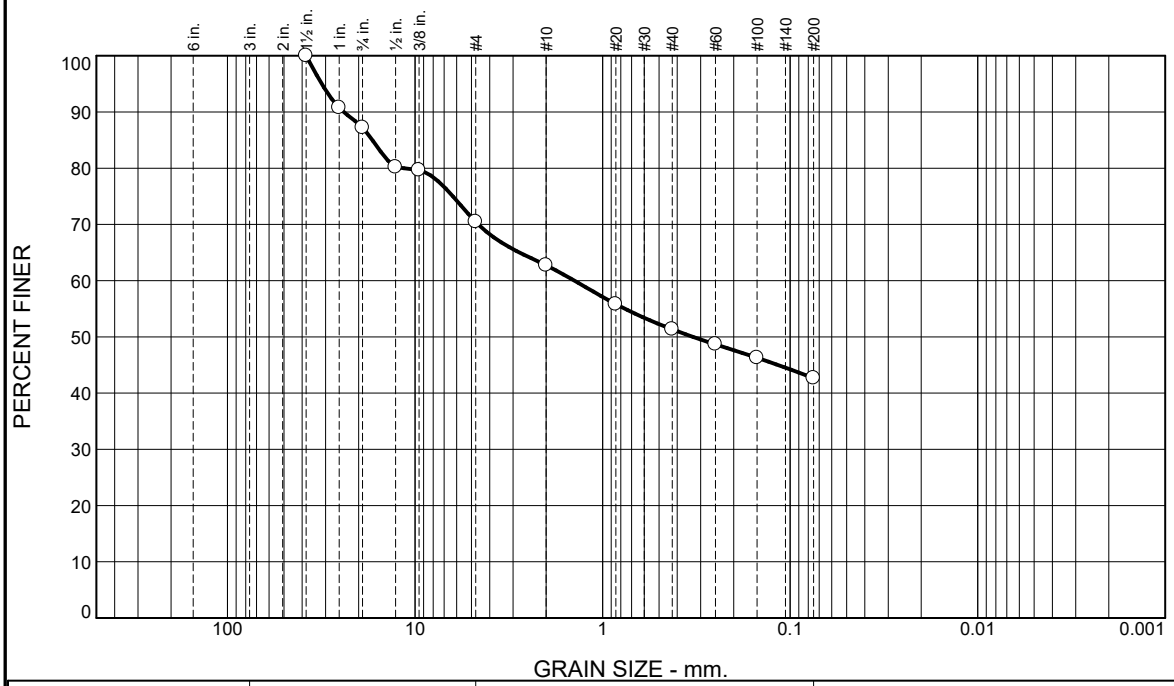
Cranston, RI

Client: GZA GeoEnvironmental

Project: Madawaska International Bridge #2399, WIN 21736.00
Madawaska, ME

Project No: 09.0025984.03 **Figure** S-54

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	12.8	16.7	7.8	11.4	8.6	42.7	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1-1/2"	100.0		
1"	90.7		
3/4"	87.2		
1/2"	80.2		
3/8"	79.6		
#4	70.5		
#10	62.7		
#20	55.8		
#40	51.3		
#60	48.7		
#100	46.3		
#200	42.7		

* (no specification provided)

Material Description

Gray CLAYEY SILT, some f-c Gravel, some f-c Sand

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= GC-GM **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 24.0351 D_{85}= 16.8846 D_{60}= 1.4131
D_{50}= 0.3290 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Sample visually classified as plastic. Sample rolled to 1/4".

Date Received: 04.10.2020 **Date Tested:** 04.14.2020

Tested By: JM

Checked By: Steven Accetta

Title: Laboratory Coordinator

Source of Sample: BB-MSJR-202 **Depth:** 34-36' **Date Sampled:**
Sample Number: 8D

Thielsch Engineering Inc.

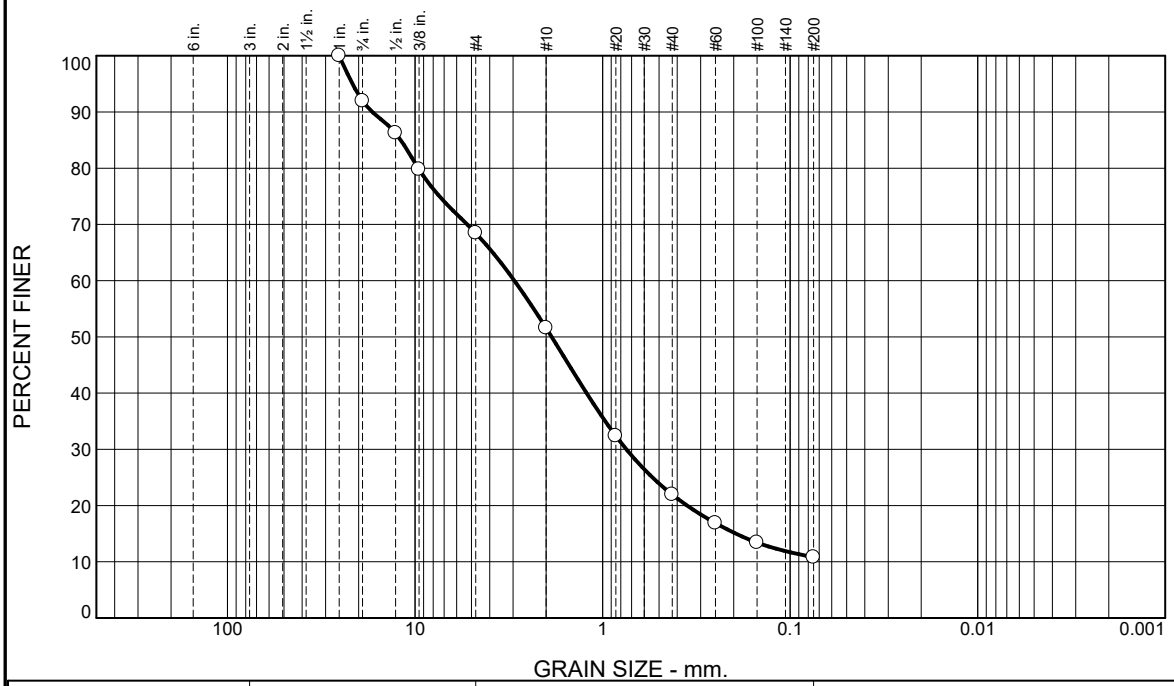
Cranston, RI

Client: GZA GeoEnvironmental

Project: Madawaska International Bridge #2399, WIN 21736.00
Madawaska, ME

Project No: 09.0025984.03 **Figure** S-55

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	8.0	23.5	16.9	29.7	11.1	10.8	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
0.75"	92.0		
0.5"	86.2		
0.375"	79.8		
#4	68.5		
#10	51.6		
#20	32.4		
#40	21.9		
#60	16.9		
#100	13.4		
#200	10.8		

* (no specification provided)

Material Description

Light Brown f-c SAND, some f-c Gravel, little Silt

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SP-SM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 16.9077 D_{85}= 11.9173 D_{60}= 2.9561
D_{50}= 1.8685 D_{30}= 0.7471 D_{15}= 0.1945
D_{10}= C_u= C_c=

Remarks

Date Received: 04.10.2020 **Date Tested:** 04.14.2020

Tested By: JM

Checked By: Steven Accetta

Title: Laboratory Coordinator

Source of Sample: BB-MSJR-203 **Depth:** 0-2' **Date Sampled:**
Sample Number: 1D

Thielsch Engineering Inc.

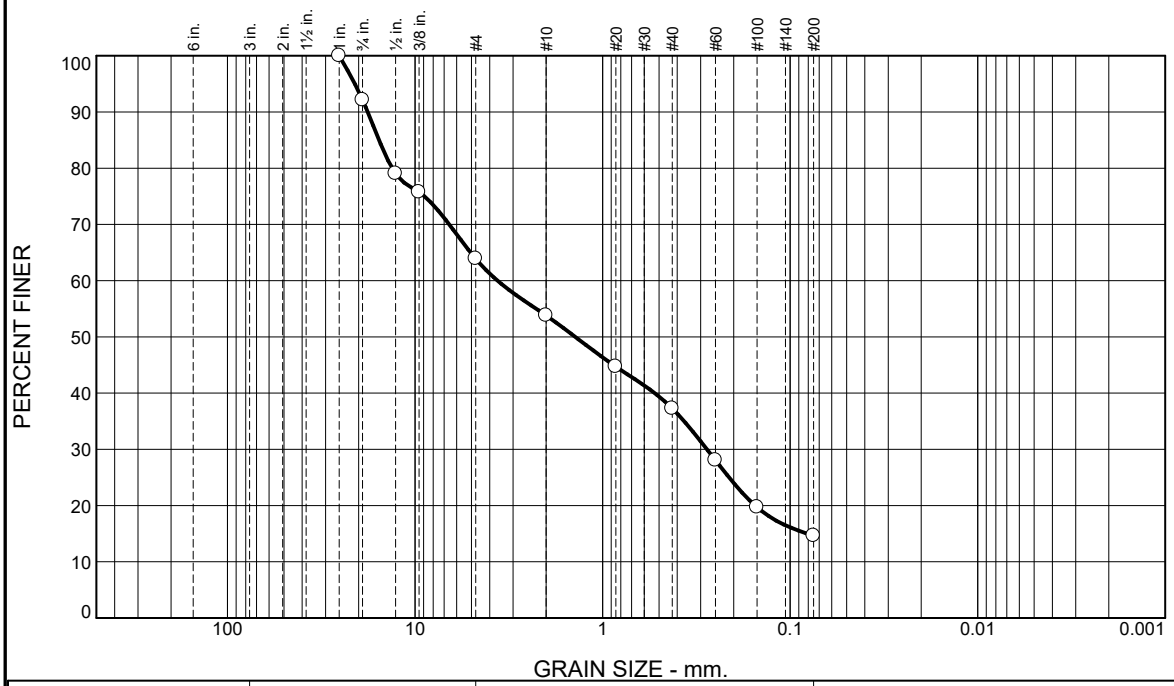
Cranston, RI

Client: GZA GeoEnvironmental

Project: Madawaska International Bridge #2399, WIN 21736.00
Madawaska, ME

Project No: 09.0025984.03 **Figure** S-56

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	7.9	28.2	10.1	16.5	22.7	14.6	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
0.75"	92.1		
0.5"	79.0		
0.375"	75.7		
#4	63.9		
#10	53.8		
#20	44.7		
#40	37.3		
#60	28.1		
#100	19.7		
#200	14.6		

* (no specification provided)

Material Description

Brown Gravelly fine to coarse SAND, little Silt

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 17.8928 D_{85}= 15.5683 D_{60}= 3.6334
D_{50}= 1.3982 D_{30}= 0.2776 D_{15}= 0.0810
D_{10}= C_u= C_c=

Remarks

Date Received: 04.10.2020 **Date Tested:** 04.14.2020

Tested By: JM

Checked By: Steven Accetta

Title: Laboratory Coordinator

Source of Sample: BB-MSJR-203 **Depth:** 10-12' **Date Sampled:**
Sample Number: 3D

Thielsch Engineering Inc.

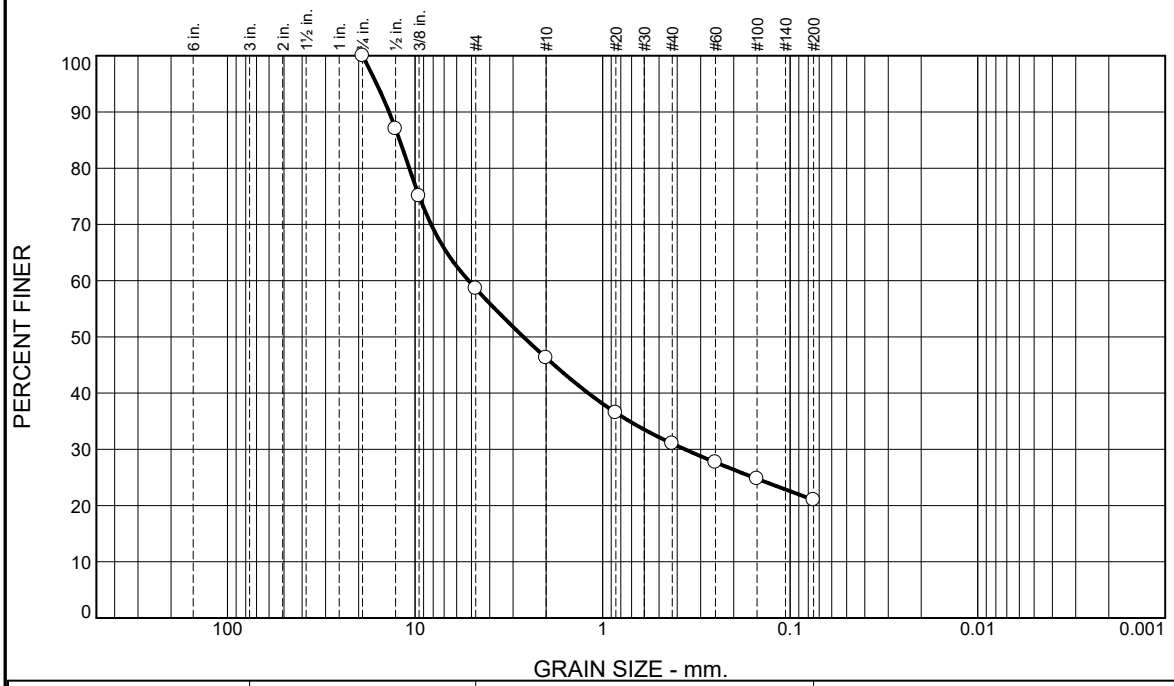
Cranston, RI

Client: GZA GeoEnvironmental

Project: Madawaska International Bridge #2399, WIN 21736.00
Madawaska, ME

Project No: 09.0025984.03 **Figure** S-57

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	41.4	12.3	15.3	10.0	21.0	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
0.75"	100.0		
0.5"	87.0		
0.375"	75.1		
#4	58.6		
#10	46.3		
#20	36.5		
#40	31.0		
#60	27.7		
#100	24.8		
#200	21.0		

* (no specification provided)

Material Description

Light Gray SANDY fine GRAVEL, some Clayey Silt

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= GC-GM **AASHTO (M 145)=** A2-4

Coefficients

D_{90}= 13.7508 D_{85}= 12.0792 D_{60}= 5.1850
D_{50}= 2.6440 D_{30}= 0.3640 D_{15}=
D_{10}= C_u= C_c=

Remarks

Sample visually classified as plastic. Sample rolled to 1/4".

Date Received: 04.10.2020 **Date Tested:** 04.14.2020

Tested By: JM

Checked By: Steven Accetta

Title: Laboratory Coordinator

Source of Sample: BB-MSJR-203 **Depth:** 34-36' **Date Sampled:**
Sample Number: 8D

Thielsch Engineering Inc.

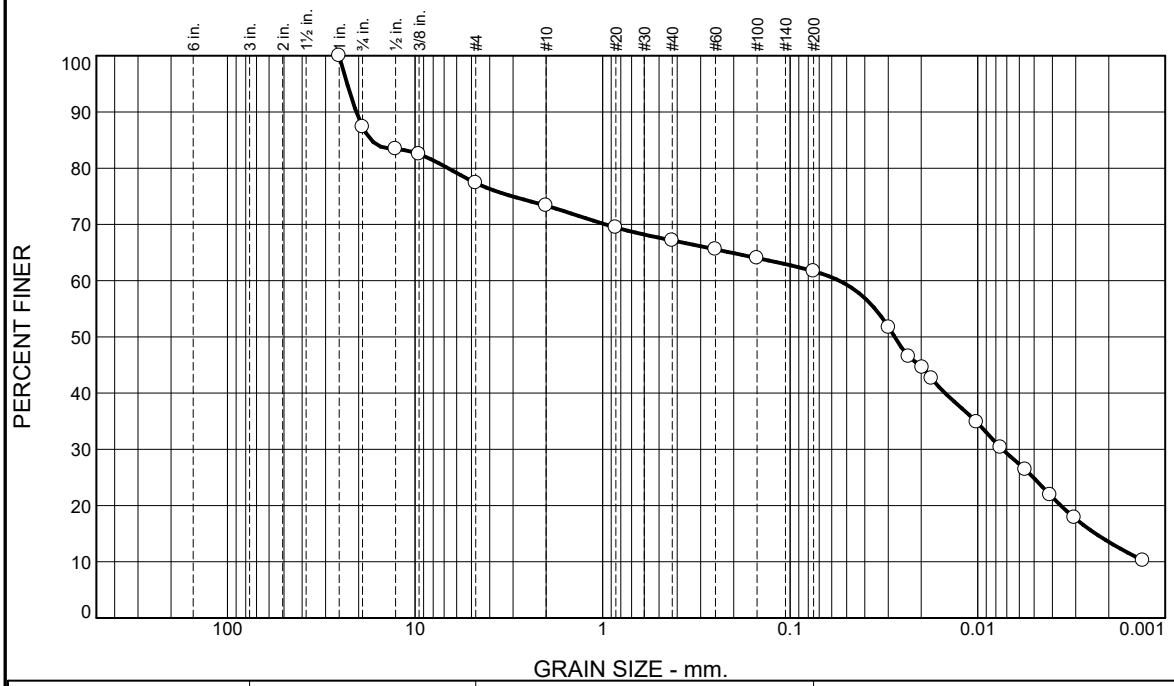
Cranston, RI

Client: GZA GeoEnvironmental

Project: Madawaska International Bridge #2399, WIN 21736.00
Madawaska, ME

Project No: 09.0025984.03 **Figure** S-58

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	12.7	9.9	4.1	6.1	5.5	48.2	13.5

Test Results (D7928 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1"	100.0		
0.75"	87.3		
0.5"	83.4		
0.375"	82.5		
#4	77.4		
#10	73.3		
#20	69.5		
#40	67.2		
#60	65.6		
#100	64.0		
#200	61.7		
0.0298 mm.	51.7		
0.0233 mm.	46.5		
0.0197 mm.	44.6		
0.0176 mm.	42.6		
0.0101 mm.	34.8		
0.0076 mm.	30.3		
0.0056 mm.	26.4		
0.0041 mm.	21.9		
0.0031 mm.	17.8		
0.0013 mm.	10.2		

* (no specification provided)

Material Description

Light Gray CLAYEY SILT, some f-c Gravel, little f-c Sand

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 20.5666 D_{85}= 17.1215 D_{60}= 0.0547
D_{50}= 0.0277 D_{30}= 0.0074 D_{15}= 0.0023
D_{10}= C_u= C_c=

Remarks

Sample visually classified as plastic. Sample rolled to 1/4".

Date Received: 04.10.2020 **Date Tested:** 04.15.2020

Tested By: JM

Checked By: Steven Accetta

Title: Laboratory Coordinator

Source of Sample: BB-MSJR-204 **Depth:** 29-31' **Date Sampled:**
Sample Number: 7D

Thielsch Engineering Inc.

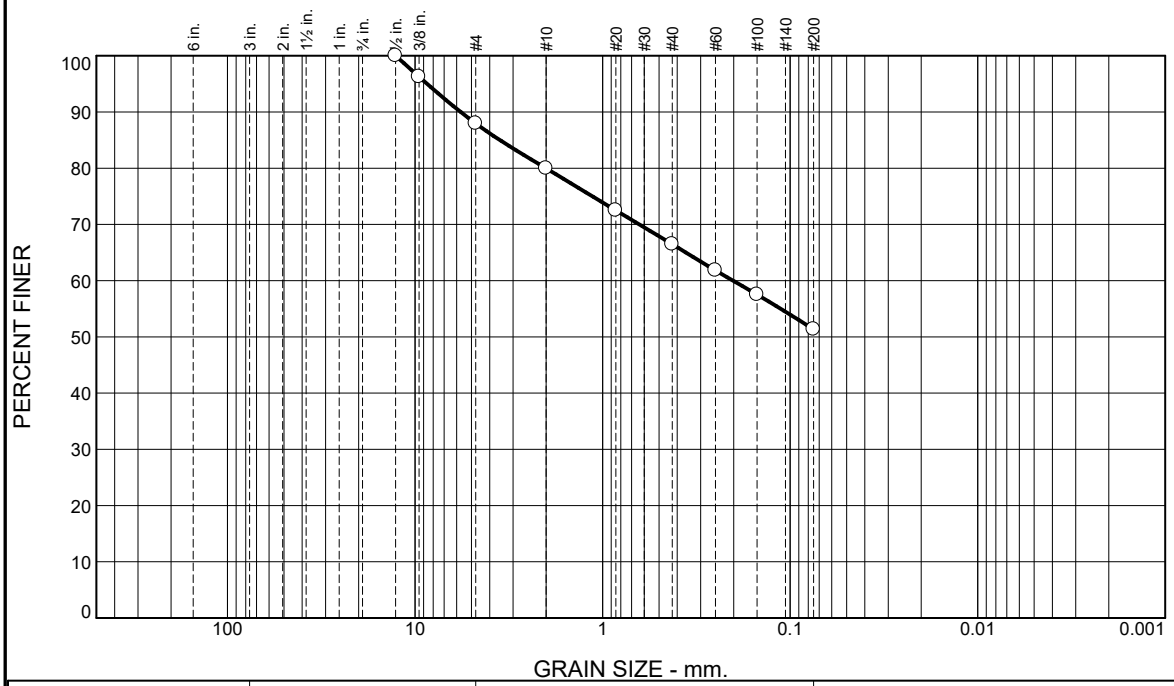
Cranston, RI

Client: GZA GeoEnvironmental

Project: Madawaska International Bridge #2399, WIN 21736.00
Madawaska, ME

Project No: 09.0025984.03 **Figure** S-59

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	12.0	8.0	13.5	15.1	51.4	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
0.5"	100.0		
0.375"	96.3		
#4	88.0		
#10	80.0		
#20	72.5		
#40	66.5		
#60	61.8		
#100	57.5		
#200	51.4		

* (no specification provided)

Material Description

Light Gray SANDY CLAYEY SILT, little fine Gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= CL-ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 5.7077 D_{85}= 3.5268 D_{60}= 0.2015
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Sample visually classified as plastic. Sample rolled to 1/8".

Date Received: 04.10.2020 **Date Tested:** 04.14.2020

Tested By: JM

Checked By: Steven Accetta

Title: Laboratory Coordinator

Source of Sample: BB-MSJR-204 **Depth:** 39-40.5 **Date Sampled:**
Sample Number: 9D

Thielsch Engineering Inc.

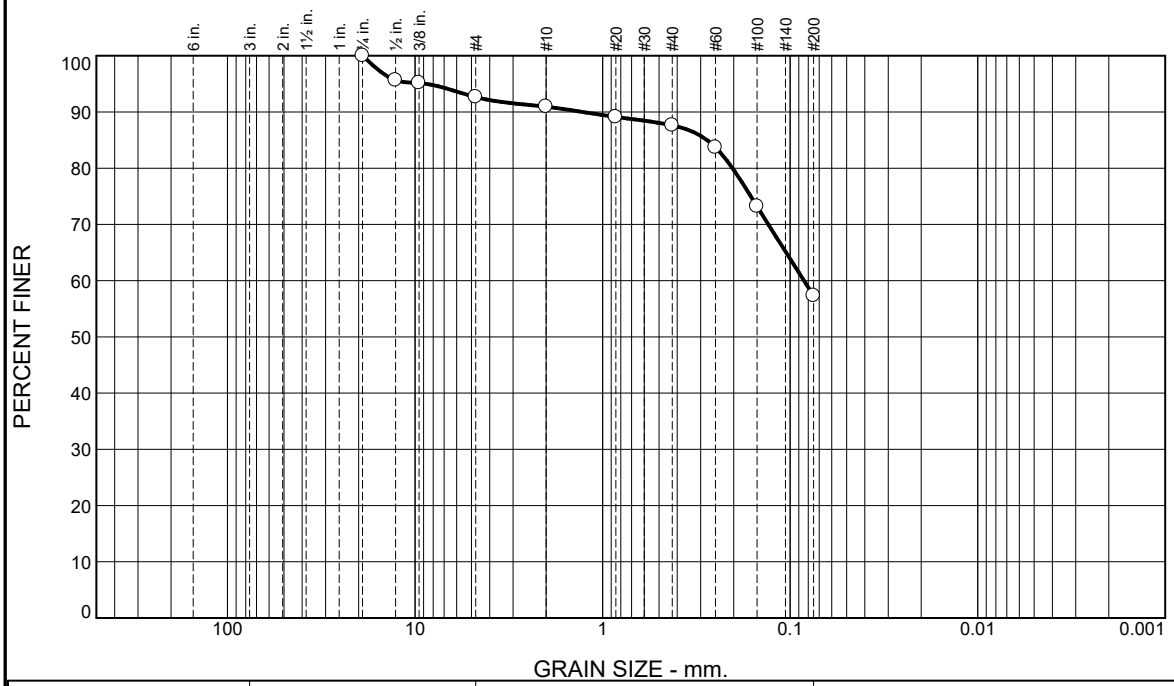
Cranston, RI

Client: GZA GeoEnvironmental

Project: Madawaska International Bridge #2399, WIN 21736.00
Madawaska, ME

Project No: 09.0025984.03 **Figure** S-60

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	7.3	1.8	3.3	30.3	57.3	

Test Results (D6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
0.75"	100.0		
0.5"	95.6		
0.375"	95.2		
#4	92.7		
#10	90.9		
#20	89.1		
#40	87.6		
#60	83.7		
#100	73.2		
#200	57.3		

* (no specification provided)

Material Description

Gray SANDY CLAYEY SILT, trace fine Gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= CL **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 1.2716 D_{85}= 0.2771 D_{60}= 0.0843
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Sample visually classified as plastic. Sample rolled to 1/8".

Date Received: 04.10.2020 **Date Tested:** 04.14.2020

Tested By: JM

Checked By: Steven Accetta

Title: Laboratory Coordinator

Source of Sample: BB-MSJR-204 **Depth:** 64-66' **Date Sampled:**
Sample Number: 14D

Thielsch Engineering Inc.

Cranston, RI

Client: GZA GeoEnvironmental

Project: Madawaska International Bridge #2399, WIN 21736.00
Madawaska, ME

Project No: 09.0025984.03 **Figure** S-61

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Client Information:
GZA GeoEnvironmental
Portland, ME
PM: Andrew Blaisdell
Assigned By: NVW
Collected By: NVW

Project Information:
Madawaska International Bridge #2399, WIN 21736.00
Madawaska, ME
GZA Project Number: 09.0025984.01
Summary Page: 1 of 2
Report Date: 10.4.18

LABORATORY TESTING DATA SHEET

Boring No.	Sample No.	Depth (ft)	Laboratory No.	Specimen Data: Mohs Hardness	Diameter (in)	Length (in)	(1) Unit Weight (PCF)	(2) Wet Density (PCF)	Bulk G_s	Compressive Strength Tests: (3) Other Tests	(4) Strength PSI	(5) Strain %	(6) E sec PSI EE+06	(7) Poisson's Ratio	$\sigma\tau$ PSI	Is PSI	(8) s_c PSI	Rock Formation or Description or Remarks
BB-MSJR-101	R1	101.5-102.45	S-13		1.980	4.849	168.7				1969	0.545	2.28	0.05				SLATE; broke along foliation
Notes: Minor break occurred after 1 KSI which did not affect Poisson's Ratio and Secant Modulus. Sample was quite frail which did affect Poisson's Ratio and Secant Modulus.																		
BB-MSJR-101	R1	104.9-105.4	S-14D		1.986	2.078				PLD						80	1920	SLATE
BB-MSJR-101	R1	104.9-105.4	S-14A		1.984	1.211	161.4			PLA						152	3648	SLATE
BB-MSJR-101	R4	119-119.4	S-15		1.9845	4.545	171.0				2864	0.328	1.58	0.15				SLATE; broke along foliation
Notes: Minor break occurred at 1.4 KSI which did affect Poisson's Ratio and secant Modulus. Secant Modulus and Poisson's Ratio were taken at 45% of Ultimate due to minor break before 50% of Ultimate. Sample was quite frail which did affect Poisson's Ratio and Secant Modulus.																		

Notes

(1) Volume Determined By Measuring Dimensions

(2) Determined by Measuring Dimensions and Weight of Saturated Sample

Notes

(3) PLD=Point Load (diametrical), PLA= Point Load (Axial) ST= Splitting Tensile U= Unconfined Compressive Strength

(4) Taken at Peak Deviator Stress

Notes

(5) Strain at Peak Deviator Stress

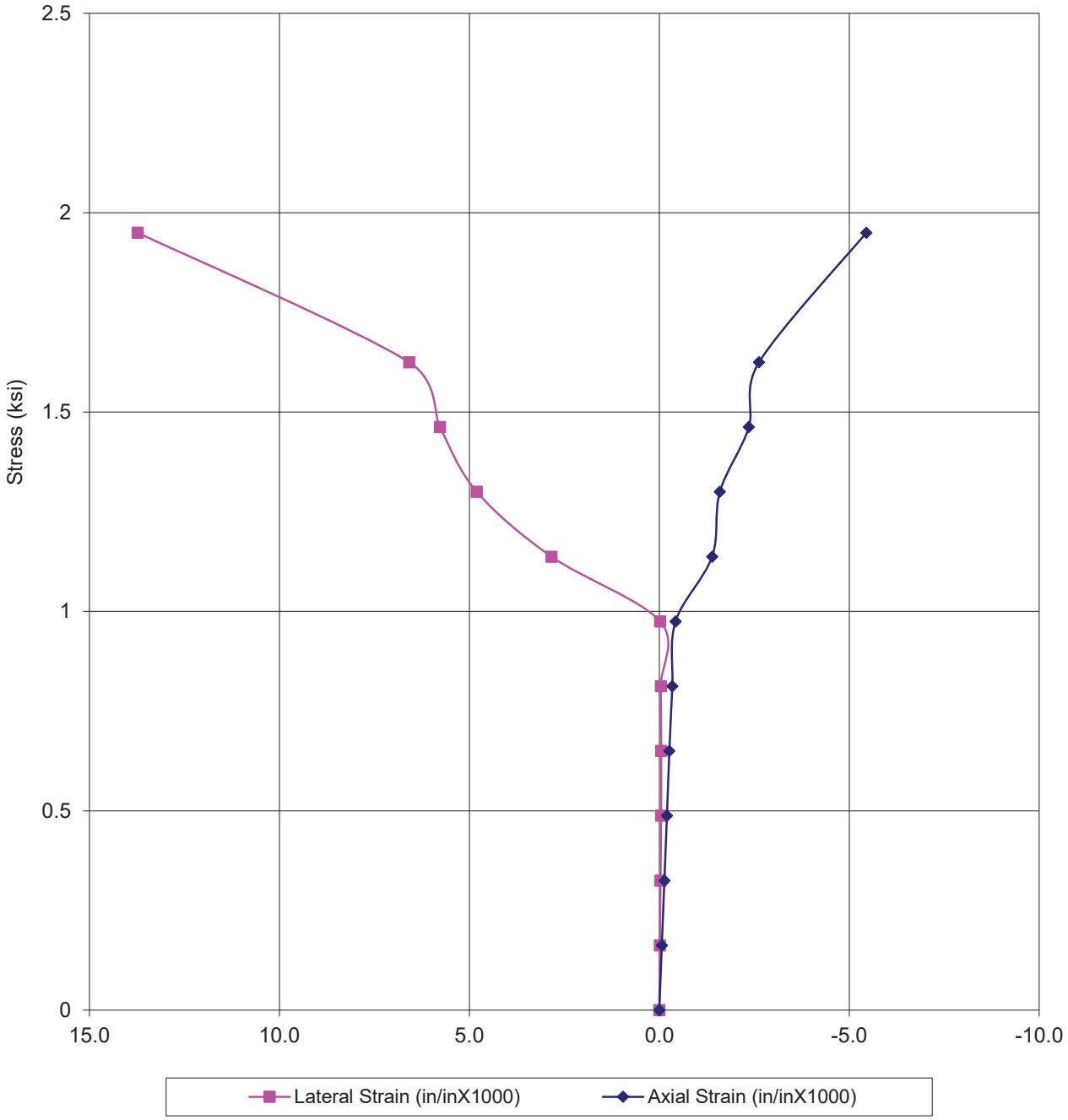
(6) Represents Secant Modulus at 50% of Total Failure Stress

(7) Represents Secant Poisson's Ratio at 50% of Total Failure Stress

(8) Estimated UCS from Table 1 of ASTM D5731 for NX cores (Is x 24)

Reviewed By _____ 10.05.2018

Madawaska International Bridge #2399
Madawaska , ME



Rock Unconfined Compression Testing - ASTM D7012

Boring No. BB-MSJR-101
Sample No. R1
Depth: 101.5-102.45'

File No. 09.0025984.01
Date: 10.1.18
Test No. U-13

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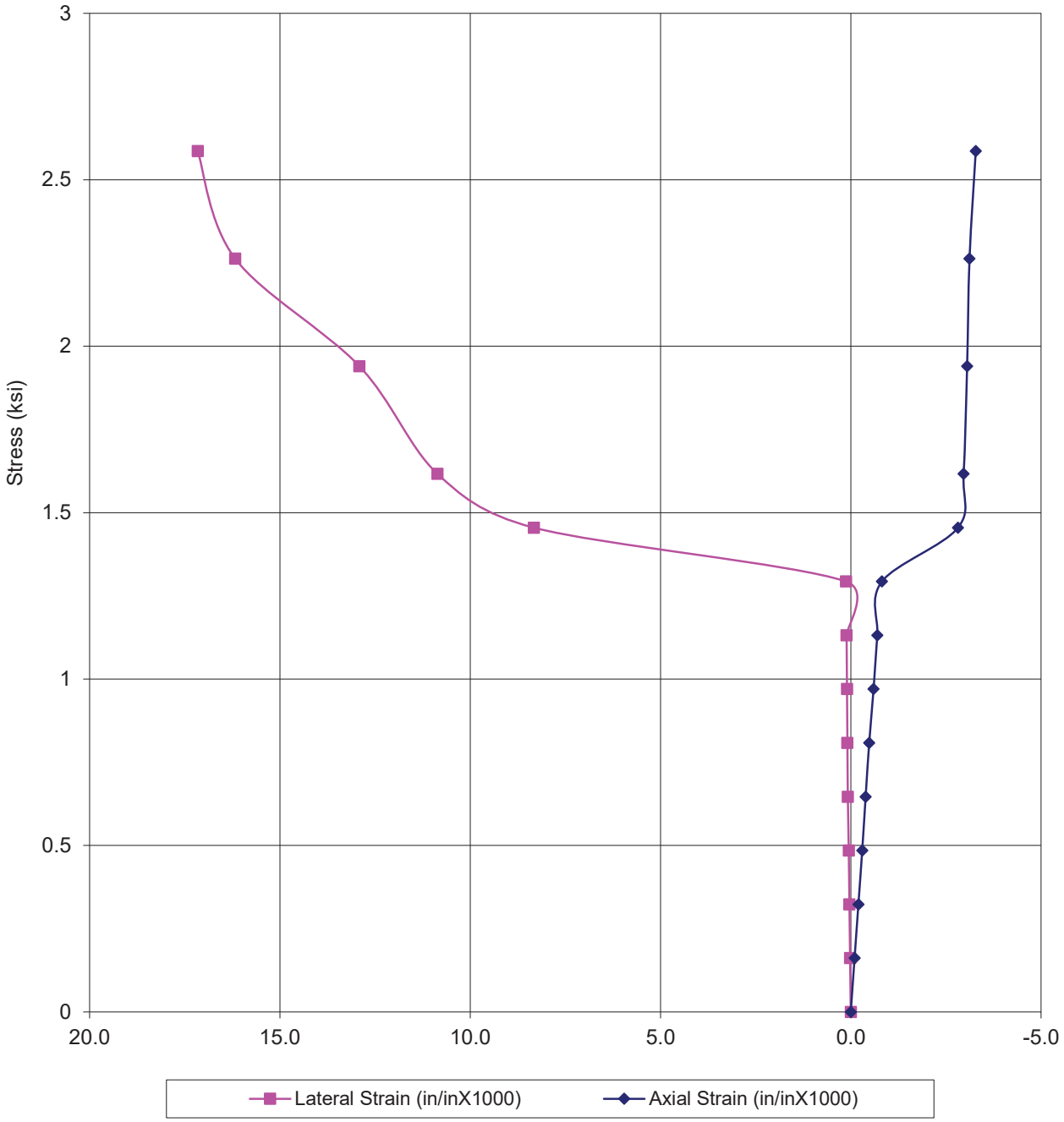
Madawaska , ME



Rock Unconfined Compression Testing - ASTM D7012

Boring No. BB-MSJR-101
Sample No. R4
Depth: 119-119.4'

File No. 09.0025984.01
Date: 10.1.18
Test No. U-15

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Client Information:
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PM: Andrew Blaisdell
Assigned By: NVW
Collected By: NVW

Project Information:
Madawaska International Bridge #2399, WIN 21736.00
Madawaska, ME
GZA Project Number: 09.0025984.01
Summary Page: 2 of 2
Report Date: 10.4.18

LABORATORY TESTING DATA SHEET

Boring No.	Sample No.	Depth (ft)	Laboratory No.	Specimen Data						Compressive Strength Tests								Rock Formation or Description or Remarks
				Mohs Hard-ness	Diameter (in)	Length (in)	(1) Unit Weight (PCF)	(2) Wet Density (PCF)	Bulk G_s	(3) Other Tests	(4) Strength PSI	(5) Strain %	(6) E sec PSI EE+06	(7) Poisson's Ratio	$\sigma\tau$ PSI	Is PSI	(8) s_c PSI	
BB-MSJR-102	R1	26.8-27.9	S-16															SLATE; broke during cutting
BB-MSJR-102	R2	30.05-31.8	S-17		1.987	4.747	169.9				974	0.452	3.36	0.23				SLATE; broke along foliation
Notes: Minor break occurred at roughly 0.85 KSI. Sample was very frail which affected Poisson's Ratio and Secant Modulus.																		
BB-MSJR-102	R4	44.7-45.2	S-18D		1.982	1.951	169.8			PLD						25	600	SLATE
BB-MSJR-102	R4	44.7-45.2	S-18A		1.986	0.850	166.5			PLA						89	2136	SLATE

Notes

(1) Volume Determined By Measuring Dimensions

(2) Determined by Measuring Dimensions and Weight of Saturated Sample

(3) PLD=Point Load (diametrical), PLA= Point Load (Axial) ST= Splitting Tensile U= Unconfined Compressive Strength

(4) Taken at Peak Deviator Stress

(5) Strain at Peak Deviator Stress

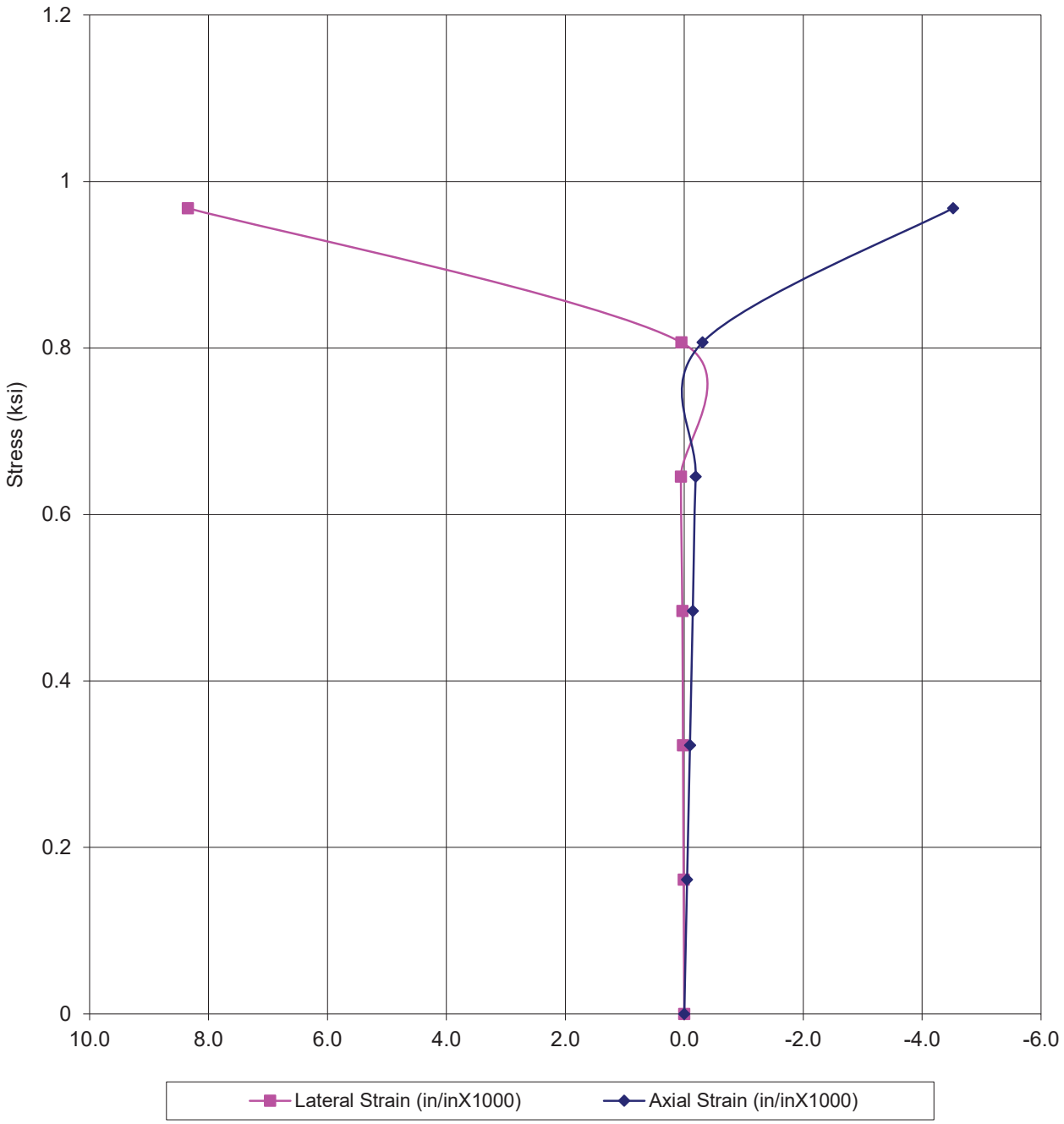
(6) Represents Secant Modulus at 50% of Total Failure Stress

(7) Represents Secant Poisson's Ratio at 50% of Total Failure Stress

(8) Estimated UCS from Table 1 of ASTM D5731 for NX cores (Is x 24)

Reviewed By _____ 10.05.2018

Madawaska International Bridge #2399
Madawaska , ME



Rock Unconfined Compression Testing - ASTM D7012

Boring No. BB-MSJR-102
Sample No. R2
Depth: 30.05-31.8'

File No. 09.0025984.01
Date: 10.1.18
Test No. U-17

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Assigned By: NVW
Collected By: NVW

Project Information:
Madawaska International Bridge #2399, WIN 21736.00
Madawaska, ME
GZA Project Number: 09.0025984.01
Summary Page: 2 of 2
Report Date: 11.2.18

LABORATORY TESTING DATA SHEET

Boring No.	Sample No.	Depth (ft)	Laboratory No.	Specimen Data: Mohs Hard-ness	Diameter (in)	Length (in)	(1) Unit Weight (PCF)	(2) Wet Density (PCF)	Bulk G_s	Compressive Strength Tests: (3) Other Tests	(4) Strength PSI	(5) Strain %	(6) E sec PSI EE+06	(7) Poisson's Ratio	$\sigma\tau$ PSI	Is PSI	(8) s_c PSI	Rock Formation or Description or Remarks
BB-MSJR-101	R1	105.9-106.5	S-19		1.978	4.668	172.1				2611	0.47	1.56	0.11				SLATE; broke along foliation
Notes: Minor break occurred at roughly 1.3 and 1.6 ksi that did not affect Poisson's Ratio and secant modulus.																		
BB-MSJR-101	R2	110.5-110.8	S-20D		1.991	1.943	153.0			PLD						359	8616	SLATE
BB-MSJR-101	R2	110.5-110.8	S-20A		1.985	1.347	166.0			PLA						352	8448	SLATE

Notes

(1) Volume Determined By Measuring Dimensions

(2) Determined by Measuring Dimensions and Weight of Saturated Sample

Notes

(3) PLD=Point Load (diametrical),

PLA= Point Load (Axial) ST= Splitting Tensile

U= Unconfined Compressive Strength

(4) Taken at Peak Deviator Stress

Notes

(5) Strain at Peak Deviator Stress

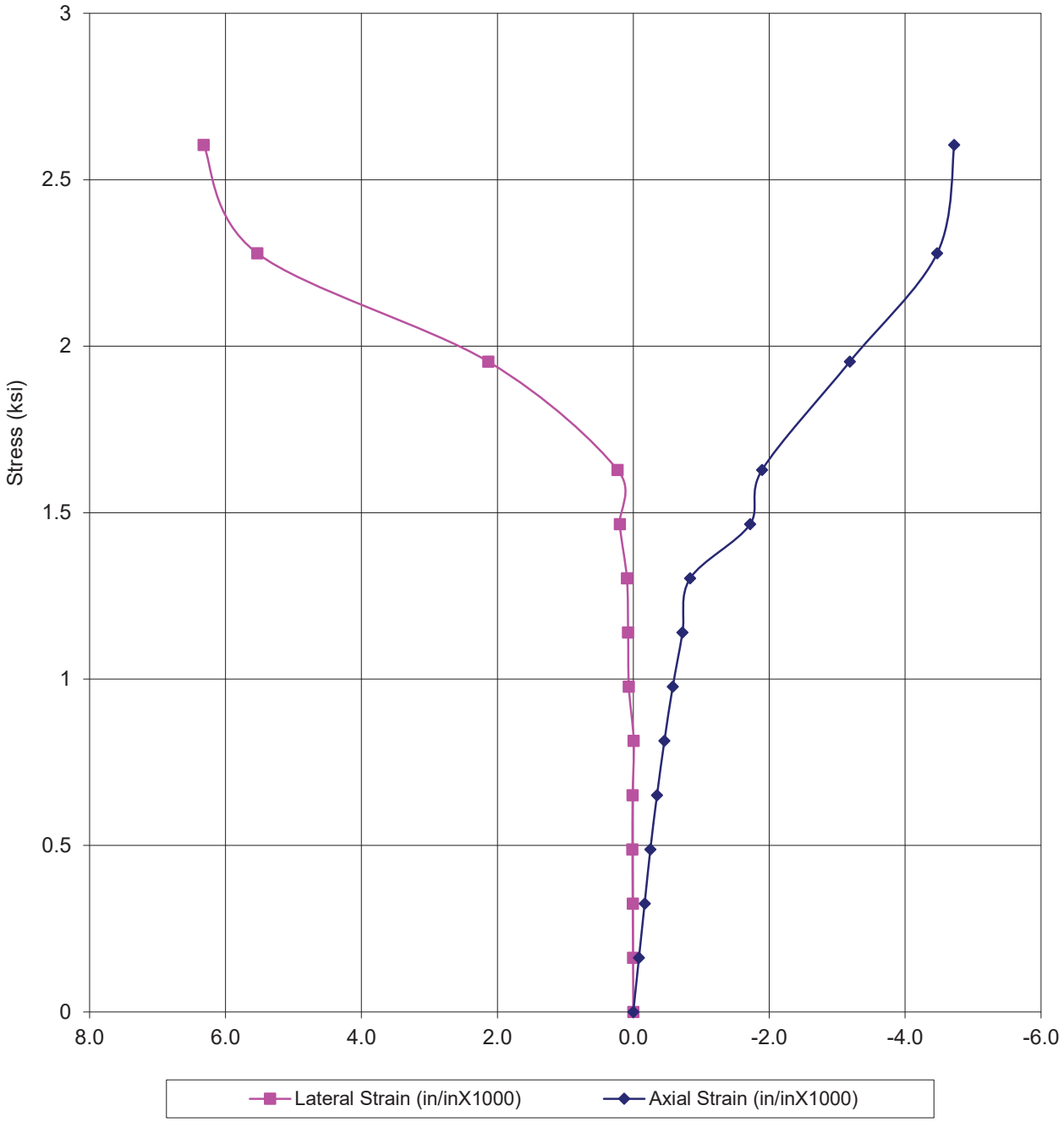
(6) Represents Secant Modulus at 50% of Total Failure Stress

(7) Represents Secant Poisson's Ratio at 50% of Total Failure Stress

(8) Estimated UCS from Table 1 of ASTM D5731 for NX cores (Is x 24)

Reviewed By 11.02.2018

Madawaska International Bridge #2399
Madawaska , ME



Rock Unconfined Compression Testing - ASTM D7012

Boring No. BB-MSJR-101
Sample No. R1
Depth: 105.9-106.5

File No. 09.0025984.01
Date: 11.2.18
Test No. U-19

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Collected By: NVW

Project Information:
Madawaska Intnl. Bridge WIN 21736.00
Madawaska, ME
GZA Project Number: 09.0025984.03 Task 1
Summary Page: 1 of 2
Report Date: 02.12.2020

LABORATORY TESTING DATA SHEET, Report No.: 7420-B-108

Boring No.	Sample No.	Depth (ft)	Laboratory No.	Specimen Data						Compressive Strength Tests								Rock Formation or Description or Remarks
				Mohs Hard-ness	Diameter (in)	Length (in)	(1) Unit Weight (PCF)	(2) Wet Density (PCF)	Bulk G_s	(3) Other Tests	(4) Strength PSI	(5) Strain %	(6) E sec PSI EE+06	(7) Poisson's Ratio	$\sigma\tau$ PSI	Is_{50} PSI	(8) s_c PSI	
BB-MSJR-204	R3	95.1-96.1	S-27		1.983	3.273	170.5				4354	0.513	0.728	0.41				Slate
Minor breaks at 972 and 2916 psi. All breaks were fresh.																		
BB-MSJR-205	R1	31.3-31.9	S-28D		1.982	0.964	197.8			PLD						316	7268	Slate
Breaks were fresh.																		
BB-MSJR-205	R1	31.3-31.9	S-28A		1.985	1.917	169.1			PLA						269	6187	Slate
Breaks were fresh.																		
BB-MSJR-205	R2	36.3-37.5	S-29		1.980	3.795	171.1				4868	0.625	0.657	0.13				Slate
Minor breaks at 1625 and 2599 psi along exisiting faults. Major break was fresh. Secant Modulus and Poisson's Ratio taken at 30% of the ultimate due to the minor break at 1625.																		

	Notes		Notes	
(1) Volume Determined By Measuring Dimensions (2) Determined by Measuring Dimensions and Weight of Saturated Sample		(3) PLD=Point Load (diametrical), PLA= Point Load (Axial) ST= Splitting Tensile U= Unconfined Compressive Strength (4) Taken at Peak Deviator Stress		(5) Strain at Peak Deviator Stress (6) Represents Secant Modulus at 50% of Total Failure Stress (7) Represents Secant Poisson's Ratio at 50% of Total Failure Stress (8) Estimated UCS from Table 1 of ASTM D5731 for NX cores (Is x 24)

Date Received: *02.03.2020* Reviewed By: Date Reviewed: *02.13.2020*

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Project Information:
Madawaska Intnl. Bridge WIN 21736.00
Madawaska, ME
GZA Project Number: 09.0025984.03 Task 1
Summary Page: 2 of 2
Report Date: 02.12.2020

LABORATORY TESTING DATA SHEET, Report No.: 7420-B-108

Boring No.	Sample No.	Depth (ft)	Laboratory No.	Specimen Data						Compressive Strength Tests								Rock Formation or Description or Remarks
				Mohs Hard-ness	Diameter (in)	Length (in)	(1) Unit Weight (PCF)	(2) Wet Density (PCF)	Bulk G_s	(3) Other Tests	(4) Strength PSI	(5) Strain %	(6) E sec PSI EE+06	(7) Poisson's Ratio	στ PSI	Is_{50} PSI	(8) s_c PSI	
BB-MSJR-206	R3	39.4-41.2	S-30		1.979	4.681	170.9				10670	0.356	1.90	0.29				Slate
Minor break at 1626psi along exisitng fault. Major break was fresh.																		
BB-MSJR-206	R4	48.8-49.4	S-31		1.980	4.675	171.2				5599	0.250	2.45	0.10				Slate
Break was fresh.																		
BB-MSJR-208	R6	46.3-47.1	S-32		1.978	4.682	170.7				5018	0.168	2.45	0.45				Slate
Minor break at 976 psi along existing fault. Major break was fresh. Secant Modulus and Poisson's Ratio were taken at 20% of ultimate due to the minor break at 976 psi.																		

(1) Volume Determined By Measuring Dimensions

(2) Determined by Measuring Dimensions and Weight of Saturated Sample

Notes

(3) PLD=Point Load (diametrical), PLA= Point Load (Axial) ST= Splitting Tensile U= Unconfined Compressive Strength

(4) Taken at Peak Deviator Stress

Notes

(5) Strain at Peak Deviator Stress

(6) Represents Secant Modulus at 50% of Total Failure Stress

(7) Represents Secant Poisson's Ratio at 50% of Total Failure Stress

(8) Estimated UCS from Table 1 of ASTM D5731 for NX cores (Is x 24)

Date Received: *02.03.2020*

Reviewed By:

Date Reviewed: *02.13.2020*

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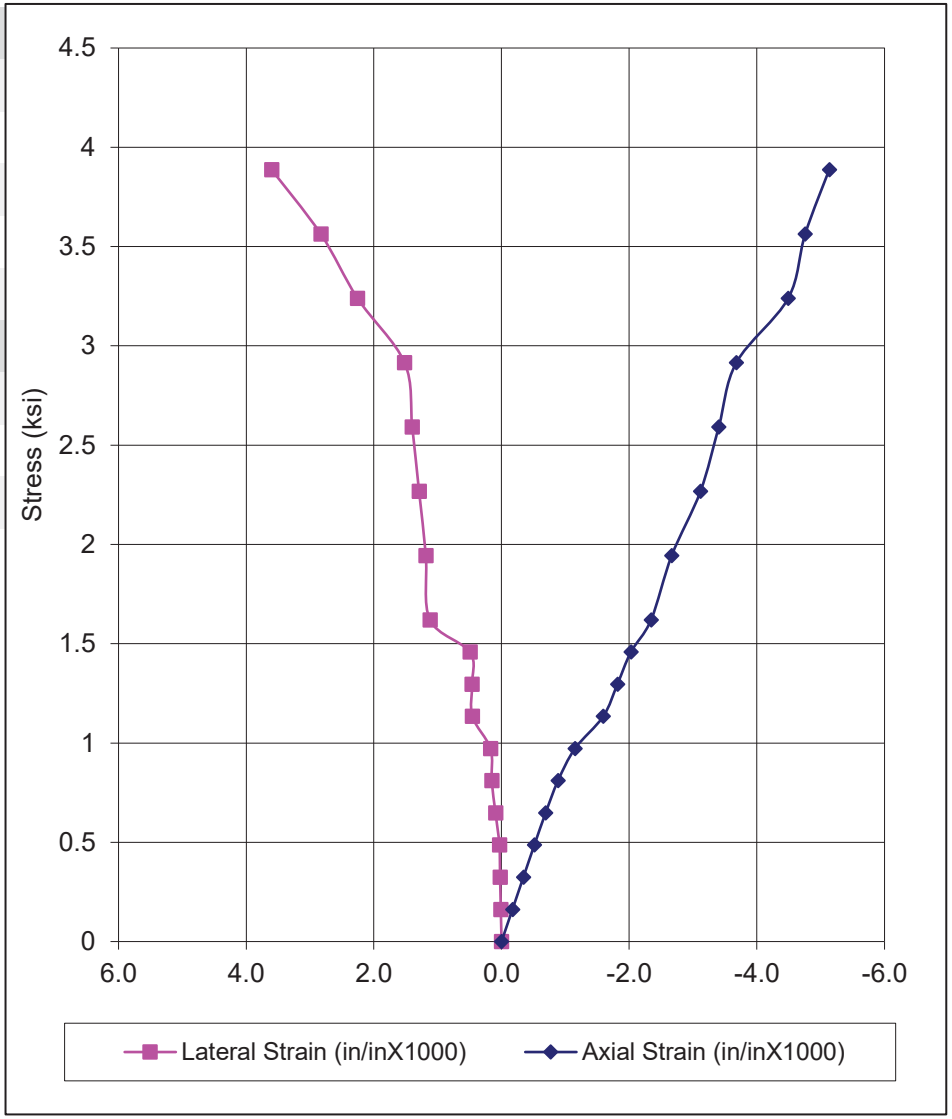
Project Information:
Madawaska Intnl. Bridge
Madawaska, ME
Project Number: 09.0025984.03 Task 1
Technician: JM
Report Date: 02.07.2020

ASTM D7012 Compressive Strength and Elastic Moduli of Intact Rock Core Specimens

Rock Information			
Boring ID:	BB-MSJR-204	**Diameter, D (in):**	1.9825
Sample #:	R3	**Length, L (in):**	3.2726
Depth (ft):	95.1-96.1	**L:D Ratio:**	1.65
Tested Depth (ft):	95.3-95.6	**Type:**	Slate
Features:	Slate, existing faults, cut short due to breaks in transit		

Compressive Test Information		Elastic Moduli Test Information	
Unit Weight (pcf):	170.4	**Poisson's Ratio @ 50%:**	0.41
Failure Stress (psi):	4,354	**Strain %:**	0.513
Failure Mode:	Fresh	**E sec PSI @ 50%:**	7.28E+05
Time to Failure (min)	2.70		



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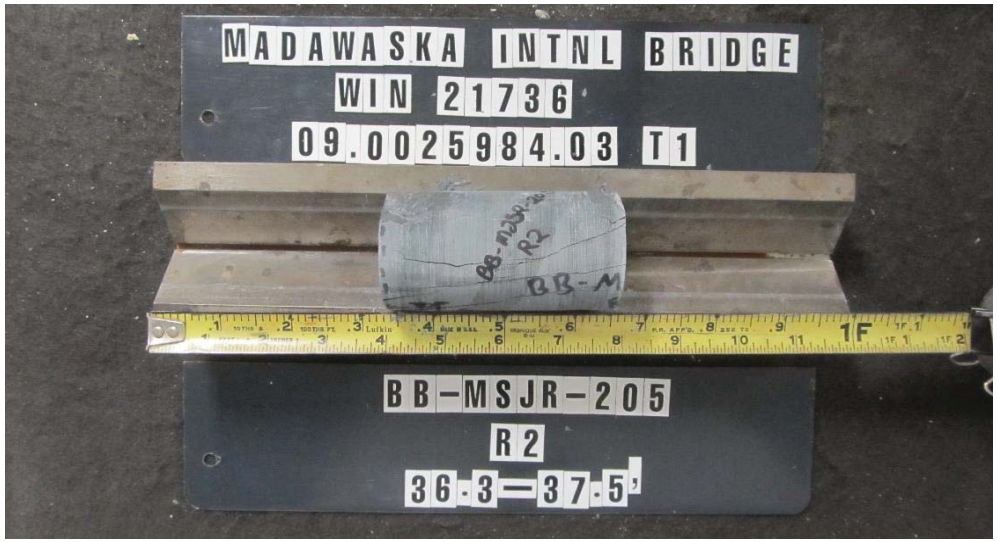
Collected by: NVW

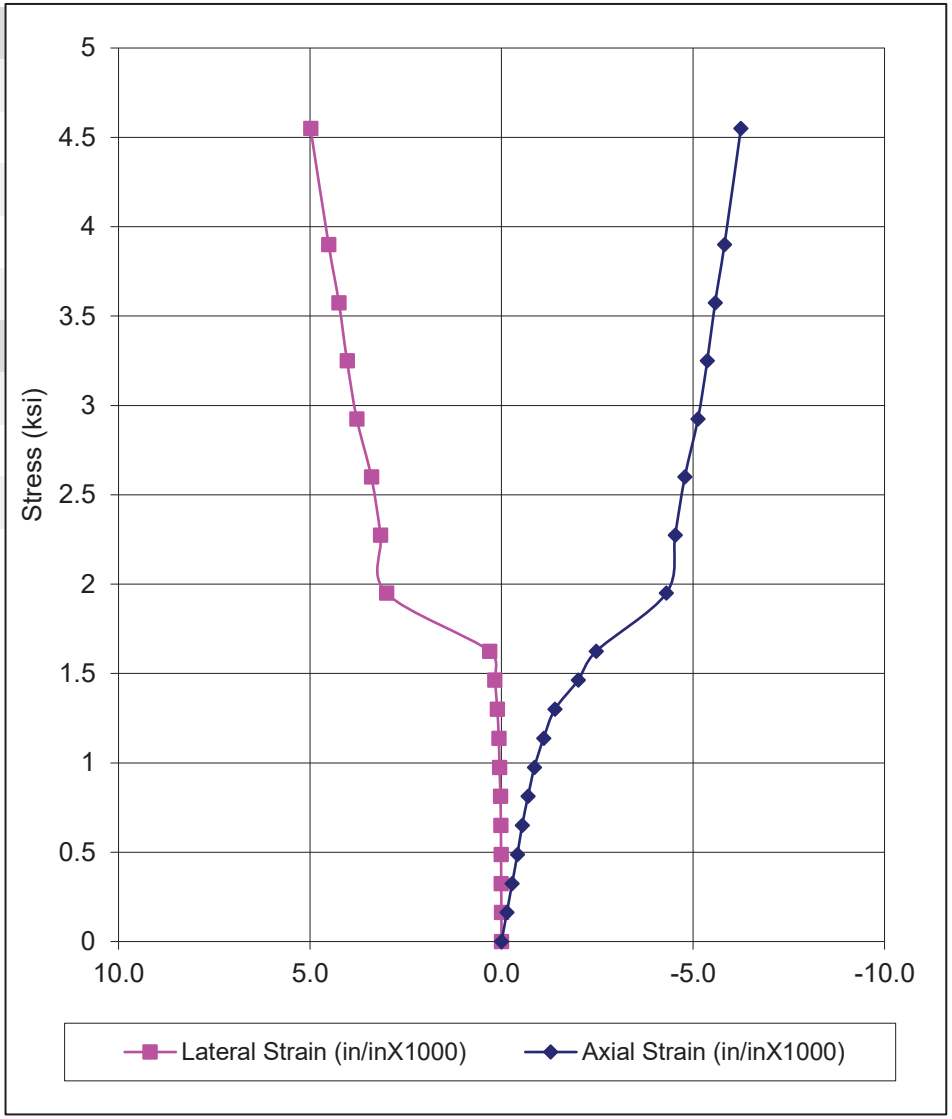
Project Information:
Madawaska Intnl. Bridge
Madawaska, ME
Project Number: 09.0025984.03 Task 1
Technician: JM
Report Date: 02.07.2020

ASTM D7012 Compressive Strength and Elastic Moduli of Intact Rock Core Specimens

Rock Information			
Boring ID:	BB-MSJR-205	**Diameter, D (in):**	1.9795
Sample #:	R2	**Length, L (in):**	3.7946
Depth (ft):	36.3-37.5	**L:D Ratio:**	1.92
Tested Depth (ft):	36.5-36.8	**Type:**	Slate
Features:	Slate, existing faults, cut short due to breaks in transit		

Compressive Test Information		Elastic Moduli Test Information	
Unit Weight (pcf):	171.1	**Poisson's Ratio @ 50%:**	0.13
Failure Stress (psi):	4,868	**Strain %:**	0.625
Failure Mode:	Fresh	**E sec PSI @ 50%:**	6.57E+05
Time to Failure (min)	3.07		





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Collected by: NVW

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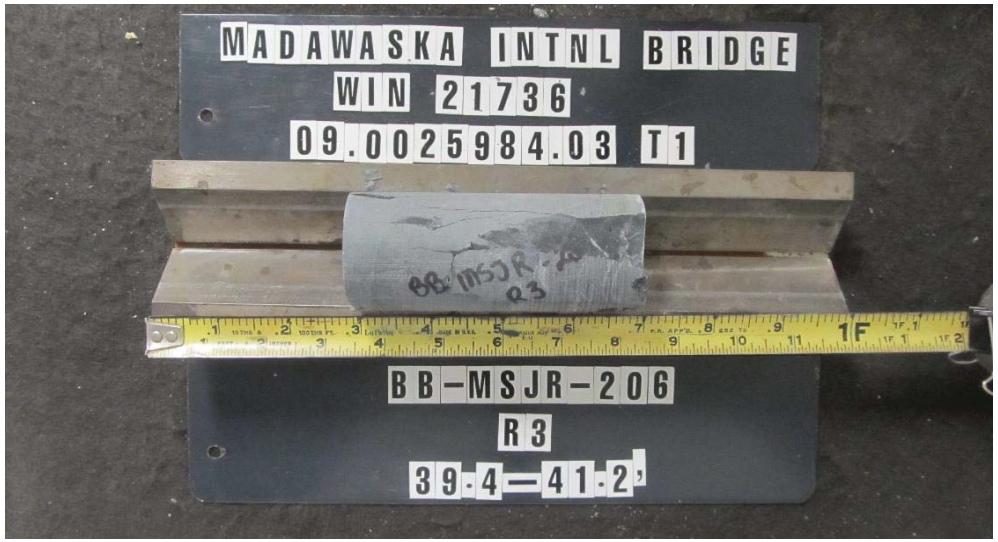
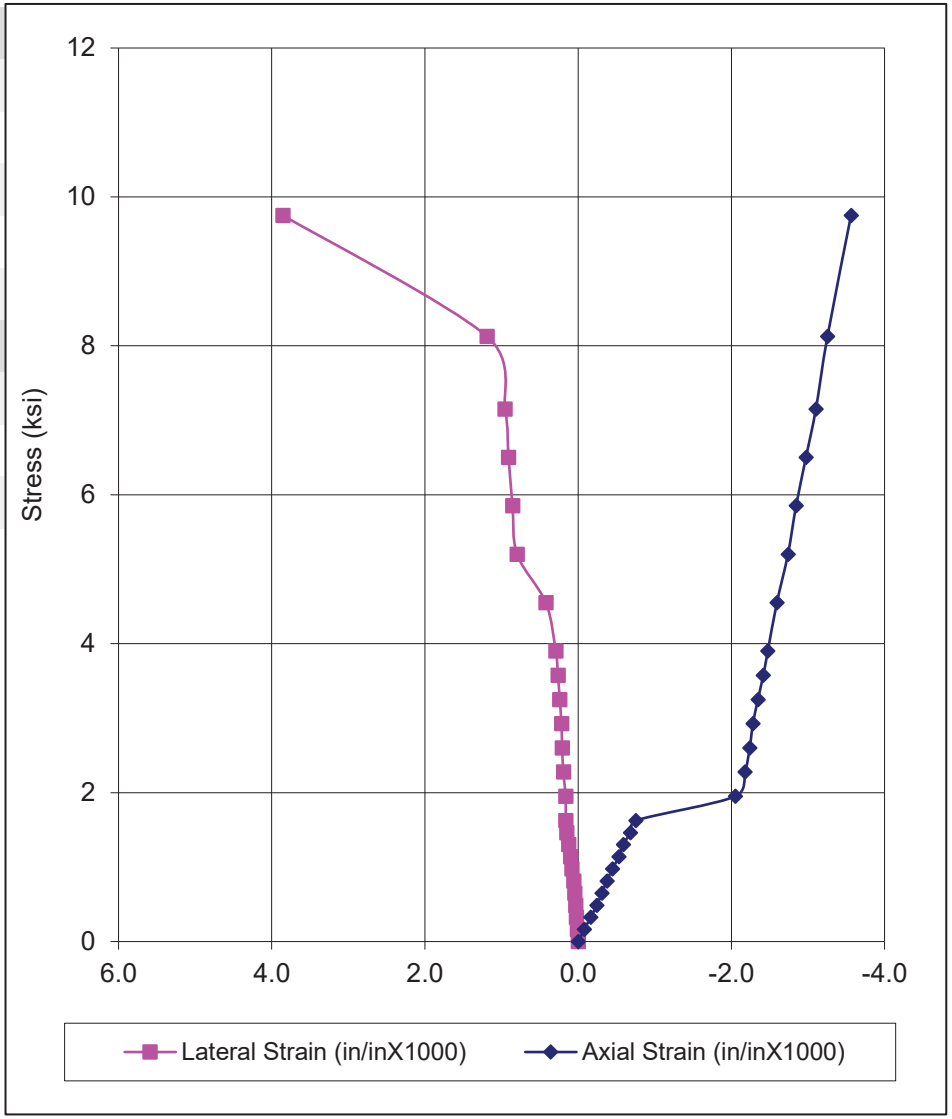
Madawaska, ME
Project Number: 09.0025984.03 Task 1
Technician: JM
Report Date: 02.07.2020

ASTM D7012 Compressive Strength and Elastic Moduli of Intact Rock Core Specimens

Rock Information			
Boring ID:	BB-MSJR-206	**Diameter, D (in):**	1.979
Sample #:	R3	**Length, L (in):**	4.6806
Depth (ft):	39.4-41.2	**L:D Ratio:**	2.37
Tested Depth (ft):	39.6-37.0	**Type:**	Slate
Features:	Slate, existing faults		

Compressive Test Information		Elastic Moduli Test Information	
Unit Weight (pcf):	170.9	**Poisson's Ratio @ 50%:**	0.29
Failure Stress (psi):	10,670	**Strain %:**	0.356
Failure Mode:	Fresh	**E sec PSI @ 50%:**	1.90E+06
Time to Failure (min)	3.07		





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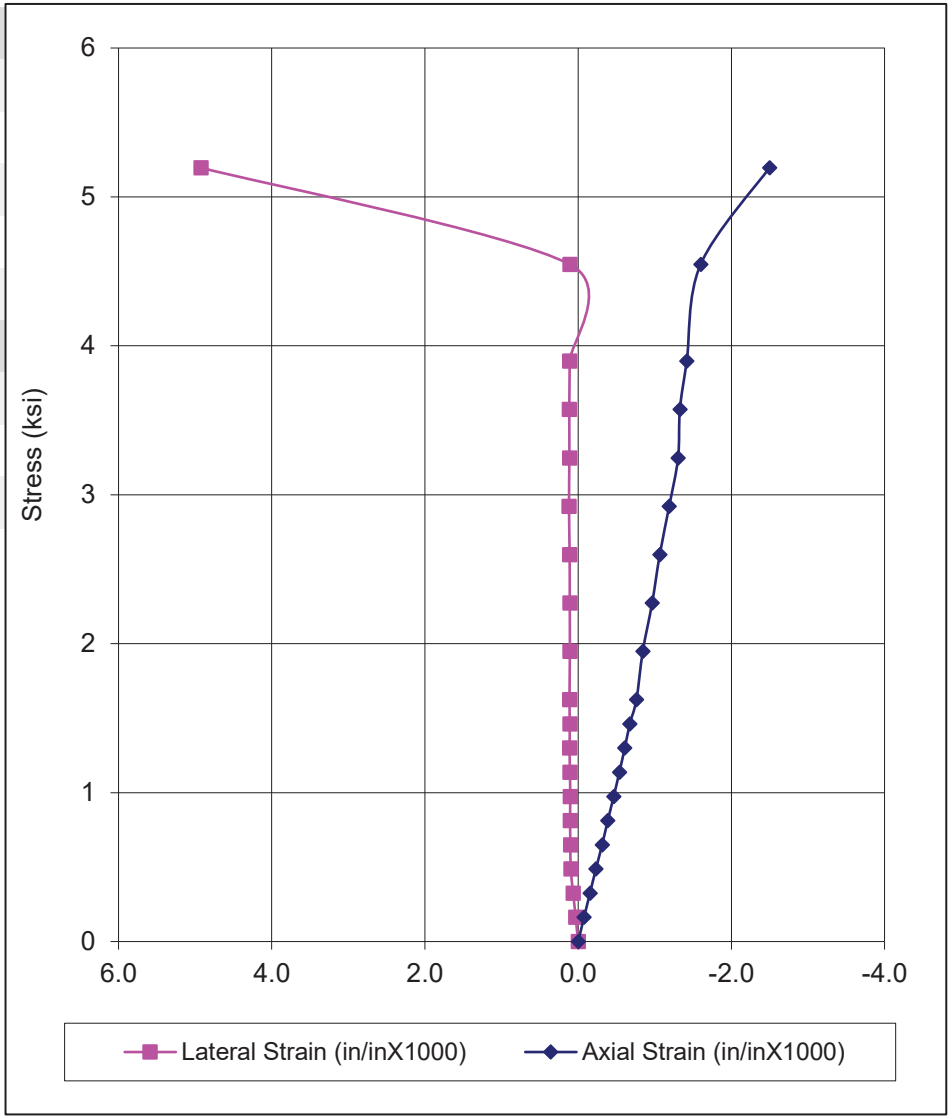
PM: Andrew Blaisdell
Assigned by: NVW
Collected by: NVW

Project Information:
Madawaska Intnl. Bridge
Madawaska, ME
Project Number: 09.0025984.03 Task 1
Technician: JM
Report Date: 02.07.2020

ASTM D7012 Compressive Strength and Elastic Moduli of Intact Rock Core Specimens

Rock Information			
Boring ID:	BB-MSJR-206	**Diameter, D (in):**	1.98
Sample #:	R4	**Length, L (in):**	4.6754
Depth (ft):	48.8-49.4	**L:D Ratio:**	2.36
Tested Depth (ft):	49.0-49.4	**Type:**	Slate
Features:	Slate, existing faults		

Compressive Test Information		Elastic Moduli Test Information	
Unit Weight (pcf):	171.2	**Poisson's Ratio @ 50%:**	0.10
Failure Stress (psi):	5,599	**Strain %:**	0.250
Failure Mode:	Fresh	**E sec PSI @ 50%:**	2.45E+06
Time to Failure (min)	3.07		



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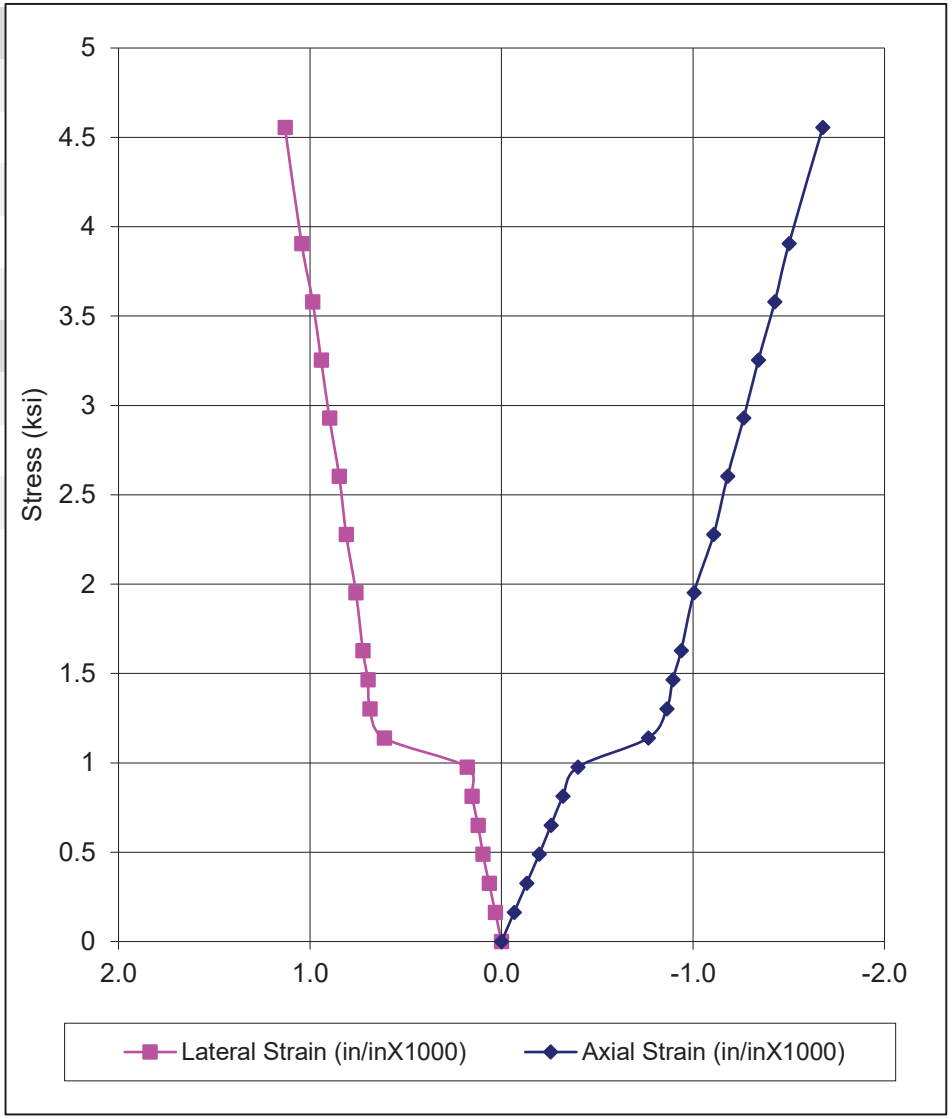
Project Information:
Madawaska Intnl. Bridge
Madawaska, ME
Project Number: 09.0025984.03 Task 1
Technician: JM
Report Date: 02.07.2020

ASTM D7012 Compressive Strength and Elastic Moduli of Intact Rock Core Specimens

Rock Information			
Boring ID:	BB-MSJR-208	**Diameter, D (in):**	1.978
Sample #:	R6	**Length, L (in):**	4.682
Depth (ft):	46.3-47.1'	**L:D Ratio:**	2.37
Tested Depth (ft):	47.6-48.0'	**Type:**	Slate
Features:	Slate, existing faults		

Compressive Test Information		Elastic Moduli Test Information	
Unit Weight (pcf):	170.7	**Poisson's Ratio @ 50%:**	0.45
Failure Stress (psi):	5,018	**Strain %:**	0.168
Failure Mode:	Fresh	**E sec PSI @ 50%:**	2.45E+06
Time to Failure (min)	2.48		



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Assigned By: NVW
Collected By: NVW

Project Information:
Madawaska Intnl. Bridge WIN 21736.00
Madawaska, ME
GZA Project Number: 09.0025984.03 Task 1
Summary Page: 1 of 1
Report Date: 02.14.2020

LABORATORY TESTING DATA SHEET, Report No.: 7420-B-123

Boring No.	Sample No.	Depth (ft)	Laboratory No.	Specimen Data						Compressive Strength Tests									Rock Formation or Description or Remarks
				Mohs Hard-ness	Diameter (in)	Length (in)	(1) Unit Weight (PCF)	(2) Wet Density (PCF)	Bulk G_s	(3) Other Tests	(4) Strength PSI	(5) Strain %	(6) E sec PSI EE+06	(7) Poisson's Ratio	στ PSI	Is_{50} PSI	(8) s_c PSI		
BB-MSJR-205	R4	45.5-46.7	S-33		1.987	4.612	170.5				5659	0.248	1.69	0.13					Slate
Minor break at 1129psi. All breaks were fresh. Young's Modulus and Poisson's Ratio was taken at 20% of the Ultimate due to minor break.																			
BB-MSJR-208	R4	38.8-39.2	S-34		1.987	3.271	168.0				5369	0.766	0.447	0.27					Slate
Minor breaks at 968 and 3549 psi. All breaks were fresh. Young's Modulus and Poisson's Ratio was taken at 30% of the Ultimate due to minor break.																			

(1) Volume Determined By Measuring Dimensions

(2) Determined by Measuring Dimensions and Weight of Saturated Sample

Notes

(3) PLD=Point Load (diametrical), PLA= Point Load (Axial) ST= Splitting Tensile U= Unconfined Compressive Strength

(4) Taken at Peak Deviator Stress

Notes

(5) Strain at Peak Deviator Stress

(6) Represents Secant Modulus at 50% of Total Failure Stress

(7) Represents Secant Poisson's Ratio at 50% of Total Failure Stress

(8) Estimated UCS from Table 1 of ASTM D5731 for NX cores (Is x 24)

Date Received: *02.11.2020* Reviewed By: Date Reviewed: *02.14.2020*

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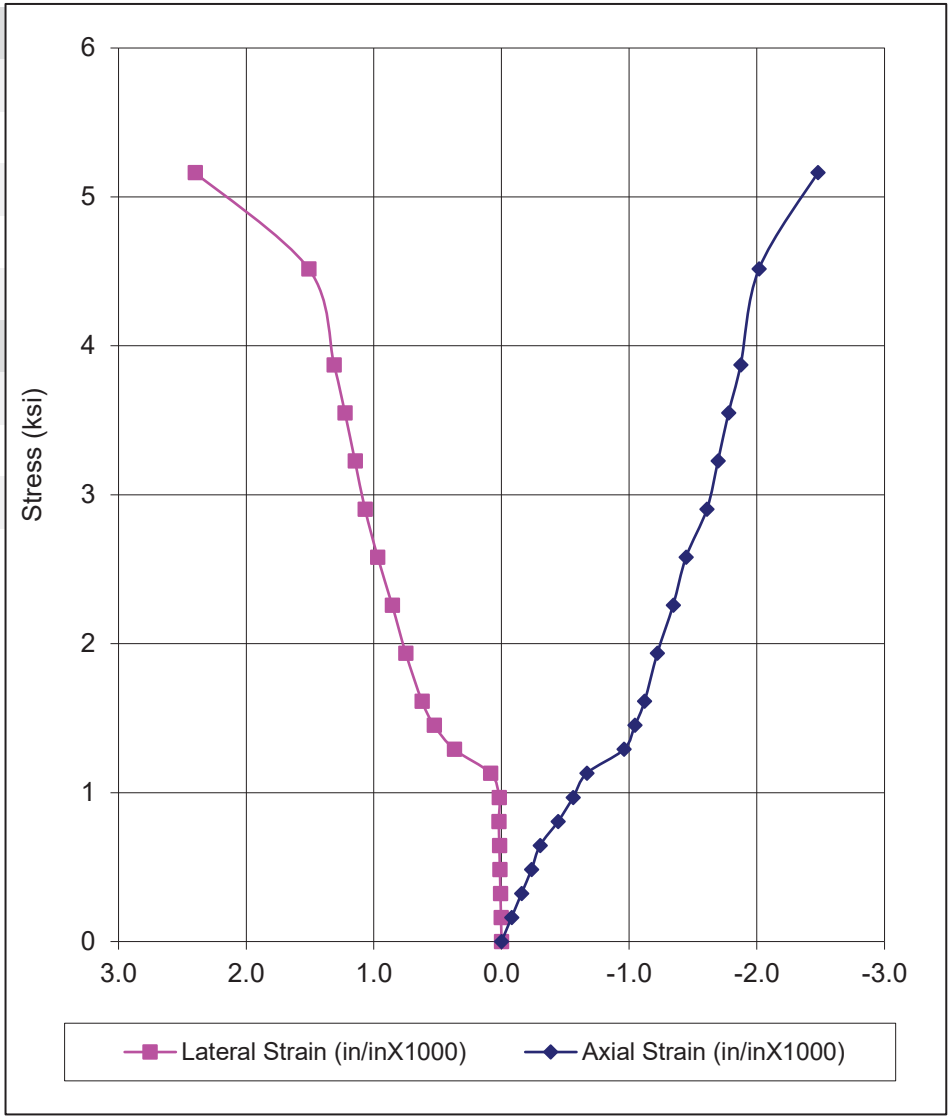
Collected by: NVW

Project Information:
Madawaska Intnl. Bridge
Madawaska, ME
Project Number: 09.0025984.03 Task 1
Technician: JM
Report Date: 02.14.2020

ASTM D7012 Compressive Strength and Elastic Moduli of Intact Rock Core Specimens

Rock Information			
Boring ID:	BB-MSJR-205	**Diameter, D (in):**	1.9865
Sample #:	R4	**Length, L (in):**	4.6124
Depth (ft):	45.5-46.7	**L:D Ratio:**	2.32
Tested Depth (ft):	45.8-46.2	**Type:**	Slate
Features:	Slate		

Compressive Test Information		Elastic Moduli Test Information	
Unit Weight (pcf):	170.5	**Poisson's Ratio @ 50%:**	0.13
Failure Stress (psi):	5,659	**Strain %:**	0.248
Failure Mode:	Fresh	**E sec PSI @ 50%:**	1.69E+06
Time to Failure (min)	2.40		



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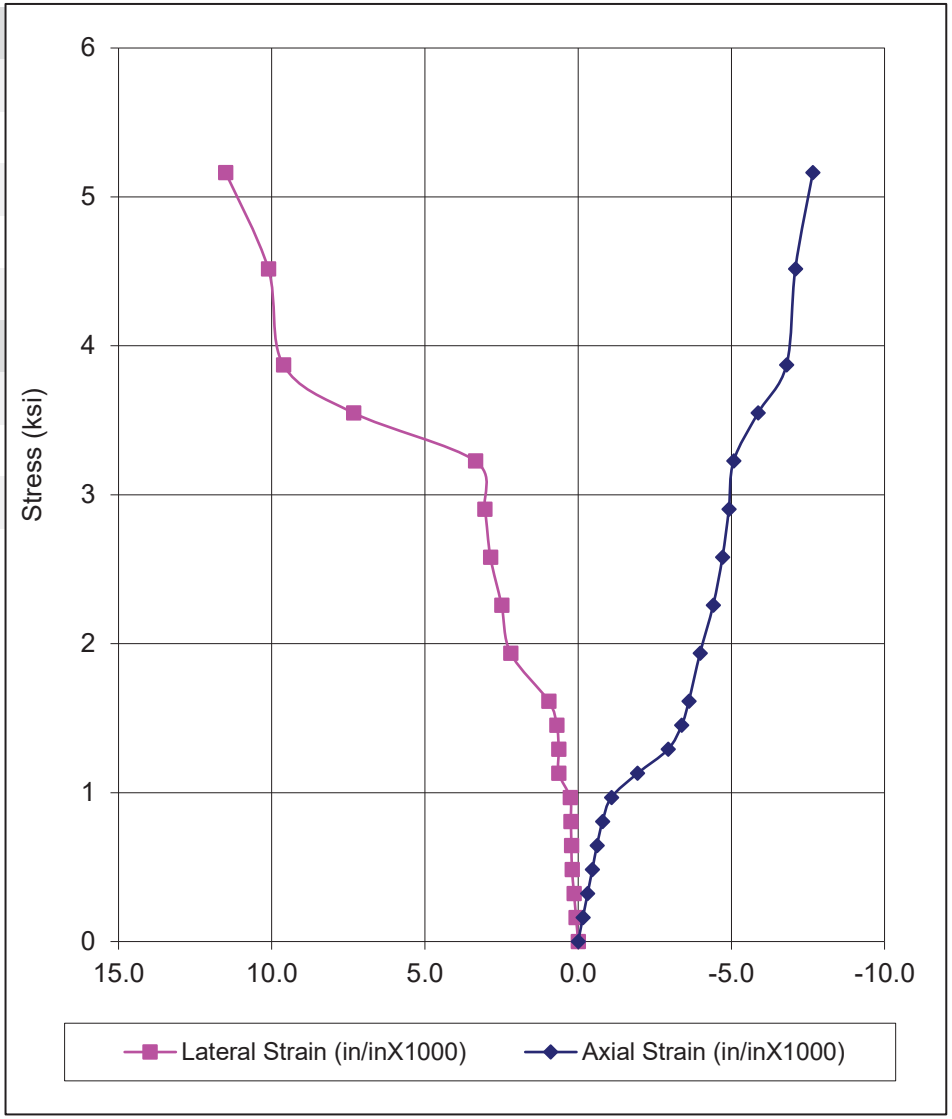
Madawaska Intnl. Bridge
Madawaska, ME
Project Number: 09.0025984.03 Task 1
Technician: JM
02.12.2020

ASTM D7012 Compressive Strength and Elastic Moduli of Intact Rock Core Specimens

Rock Information			
Boring ID:	BB-MSJR-208	**Diameter, D (in):**	1.987
Sample #:	R4	**Length, L (in):**	3.271
Depth (ft):	38.8-39.2	**L:D Ratio:**	1.65
Tested Depth (ft):	38.8-39.1	**Type:**	Slate
Features:	Slate, divet		

Compressive Test Information		Elastic Moduli Test Information	
Unit Weight (pcf):	168.0	**Poisson's Ratio @ 50%:**	0.27
Failure Stress (psi):	5,369	**Strain %:**	0.766
Failure Mode:	Fresh	**E sec PSI @ 50%:**	4.47E+05
Time to Failure (min)	2.63		



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PM: Nicholas Williams
Assigned By: Nicholas Williams
Collected By: LN

Project Information:
Madawaska Intnl. Bridge #2399 WIN 21736.00
Madawaks, ME and Edmundston, NB
GZA Project Number: 09.0025984.03 Task 1
Summary Page: 1 of 2
Report Date: 03.25.2020

LABORATORY TESTING DATA SHEET, Report No.: 7420-C-145

Boring No.	Sample No.	Depth (ft)	Laboratory No.	Specimen Data						Compressive Strength Tests								Rock Formation or Description or Remarks
				Mohs Hard-ness	Diameter (in)	Length (in)	(1) Unit Weight (PCF)	(2) Wet Density (PCF)	Bulk G_s	(3) Other Tests	(4) Strength PSI	(5) Strain %	(6) E sec PSI EE+06	(7) Poisson's Ratio	στ PSI	Is_{50} PSI	(8) s_c PSI	
BB-MSJR-214	R2	14.0-14.3	S-35A		2.359	1.394	158.5			PLA						159	3896	Slate
Break was fresh.																		
BB-MSJR-214	R2	14.0-14.3	S-35D		2.274	1.872	155.8			PLD						155	3798	Slate
Break was fresh.																		
BB-MSJR-209	R6	55.3-55.9	S-36		1.759	4.731	169.0				4579	0.368	2.14	0.48				Slate
Minor break at 2882psi was along existing fault. Major break was fresh.																		
BB-MSJR-209	R7	60.2-60.9	S-37		1.750	4.709	170.3				4251	0.463	1.42	0.20				Slate
Minor break at 2912psi. All breaks were fresh.																		

(1) Volume Determined By Measuring Dimensions

(2) Determined by Measuring Dimensions and Weight of Saturated Sample

Notes

(3) PLD=Point Load (diametrical), PLA= Point Load (Axial) ST= Splitting Tensile U= Unconfined Compressive Strength

(4) Taken at Peak Deviator Stress

Notes

(5) Strain at Peak Deviator Stress

(6) Represents Secant Modulus at 50% of Total Failure Stress

(7) Represents Secant Poisson's Ratio at 50% of Total Failure Stress

(8) Estimated UCS from Table 1 of ASTM D5731 for 60mm Diameter cores (Is x 24.5)

Date Received: *03.20.2020*

Reviewed By:

Date Reviewed: *03.25.2020*

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Madawaska Intnl. Bridge #2399 WIN 21736.00
Madawaks, ME and Edmundston, NB
GZA Project Number: 09.0025984.03 Task 1
Summary Page: 2 of 2
Report Date: 03.25.2020

LABORATORY TESTING DATA SHEET, Report No.: 7420-C-145

Boring No.	Sample No.	Depth (ft)	Laboratory No.	Specimen Data						Compressive Strength Tests									Rock Formation or Description or Remarks
				Mohs Hard-ness	Diameter (in)	Length (in)	(1) Unit Weight (PCF)	(2) Wet Density (PCF)	Bulk G_s	(3) Other Tests	(4) Strength PSI	(5) Strain %	(6) E sec PSI EE+06	(7) Poisson's Ratio	στ PSI	Is_{50} PSI	(8) s_c PSI		
BB-MSJR-214	R9	46.0-46.5	S-38		1.855	4.526	170.8				11329	0.250	4.30	0.27					Slate
Break was fresh.																			
BB-MSJR-209	R10	77.6-78.1	20-S-789																Hold for UCS Testing

(1) Volume Determined By Measuring Dimensions

(2) Determined by Measuring Dimensions and Weight of Saturated Sample

Notes

(3) PLD=Point Load (diametrical), PLA= Point Load (Axial) ST= Splitting Tensile U= Unconfined Compressive Strength

(4) Taken at Peak Deviator Stress

Notes

(5) Strain at Peak Deviator Stress

(6) Represents Secant Modulus at 50% of Total Failure Stress

(7) Represents Secant Poisson's Ratio at 50% of Total Failure Stress

(8) Estimated UCS from Table 1 of ASTM D5731 for NX cores (Is x 24)

Date Received: *03.20.2020*

Reviewed By:

Date Reviewed: *03.25.2020*

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Assigned by: Nicholas Williams
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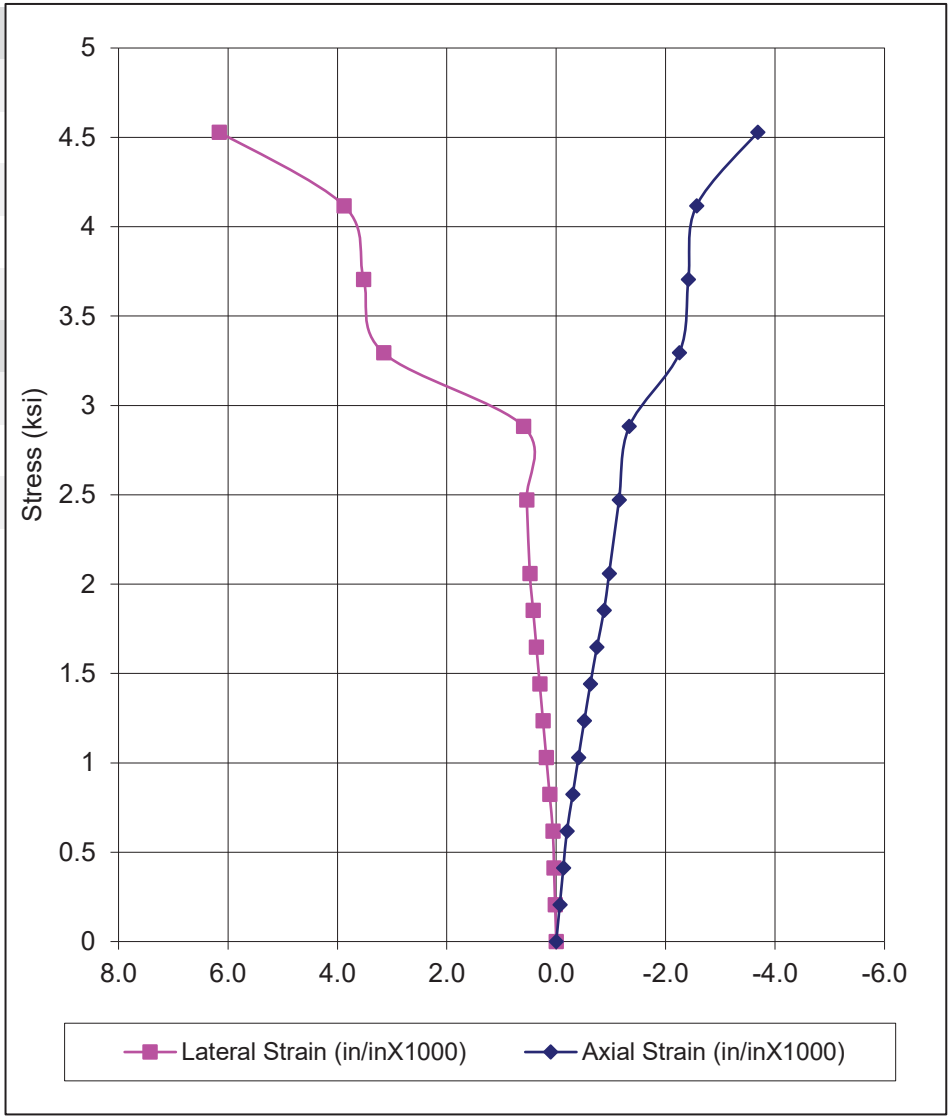
Project Information:
Madawaska Intnl. Bridge
Madawaska, ME and Edmunston, NB
Project Number: 09.0025984.03 T1
Technician: JM
Report Date: 03.23.2020

ASTM D7012 Compressive Strength and Elastic Moduli of Intact Rock Core Specimens

Rock Information			
Boring ID:	BB-MSJR-209	**Diameter, D (in):**	1.7585
Sample #:	R6	**Length, L (in):**	4.7314
Depth (ft):	55.5-55.9	**L:D Ratio:**	2.69
Tested Depth (ft):	55.5-55.9	**Type:**	Slate
Features:	Existing fault		

Compressive Test Information		Elastic Moduli Test Information	
Unit Weight (pcf):	169.0	**Poisson's Ratio @ 50%:**	0.48
Failure Stress (psi):	4,579	**Strain %:**	0.368
Failure Mode:	Fresh	**E sec PSI @ 50%:**	2.14E+06
Time to Failure (min)	3.13		



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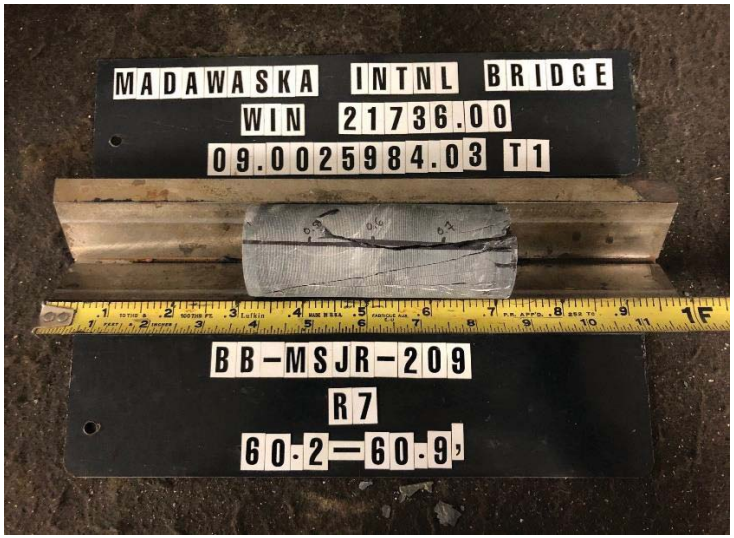
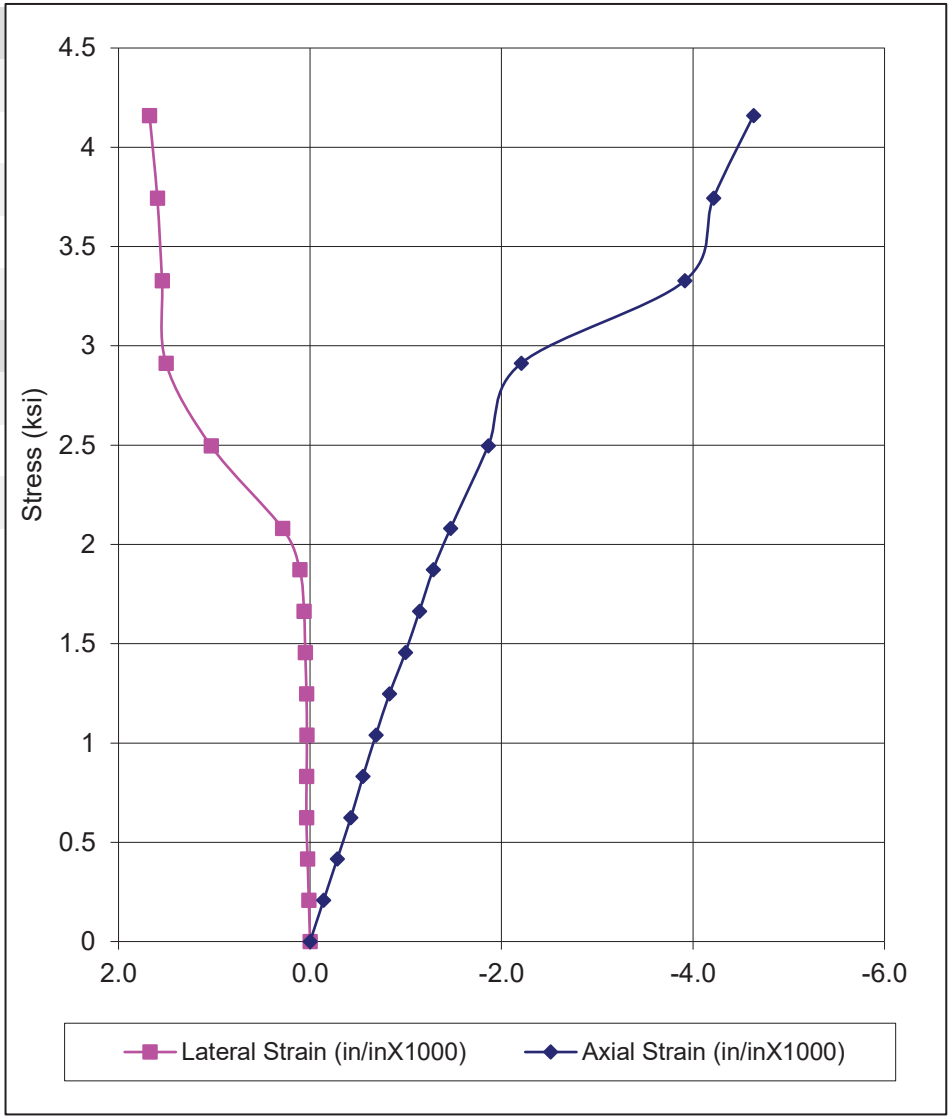
Collected by: LN

Project Information:
Madawaska Intnl. Bridge
Madawaska, ME and Edmunston, NB
Project Number: 09.0025984.03 T1
Technician: JM
Report Date: 03.23.2020

ASTM D7012 Compressive Strength and Elastic Moduli of Intact Rock Core Specimens

Rock Information			
Boring ID:	BB-MSJR-209	**Diameter, D (in):**	1.750
Sample #:	R7	**Length, L (in):**	4.709
Depth (ft):	60.2-60.9	**L:D Ratio:**	2.69
Tested Depth (ft):	60.4-60.8	**Type:**	Slate
Features:	Existing fault		
Compressive Test Information		**Elastic Moduli Test Information**	
Unit Weight (pcf):	170.3	**Poisson's Ratio @ 50%:**	0.20
Failure Stress (psi):	4,251	**Strain %:**	0.463
Failure Mode:	Fresh	**E sec PSI @ 50%:**	1.42E+06
Time to Failure (min)	2.73		





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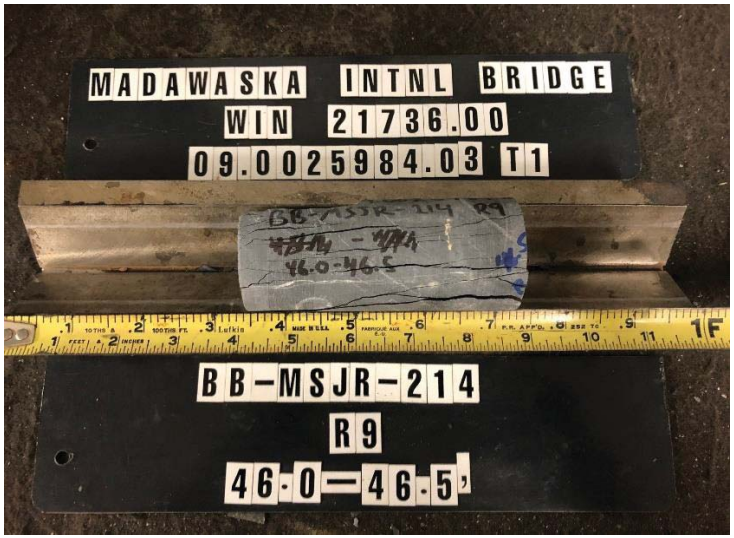
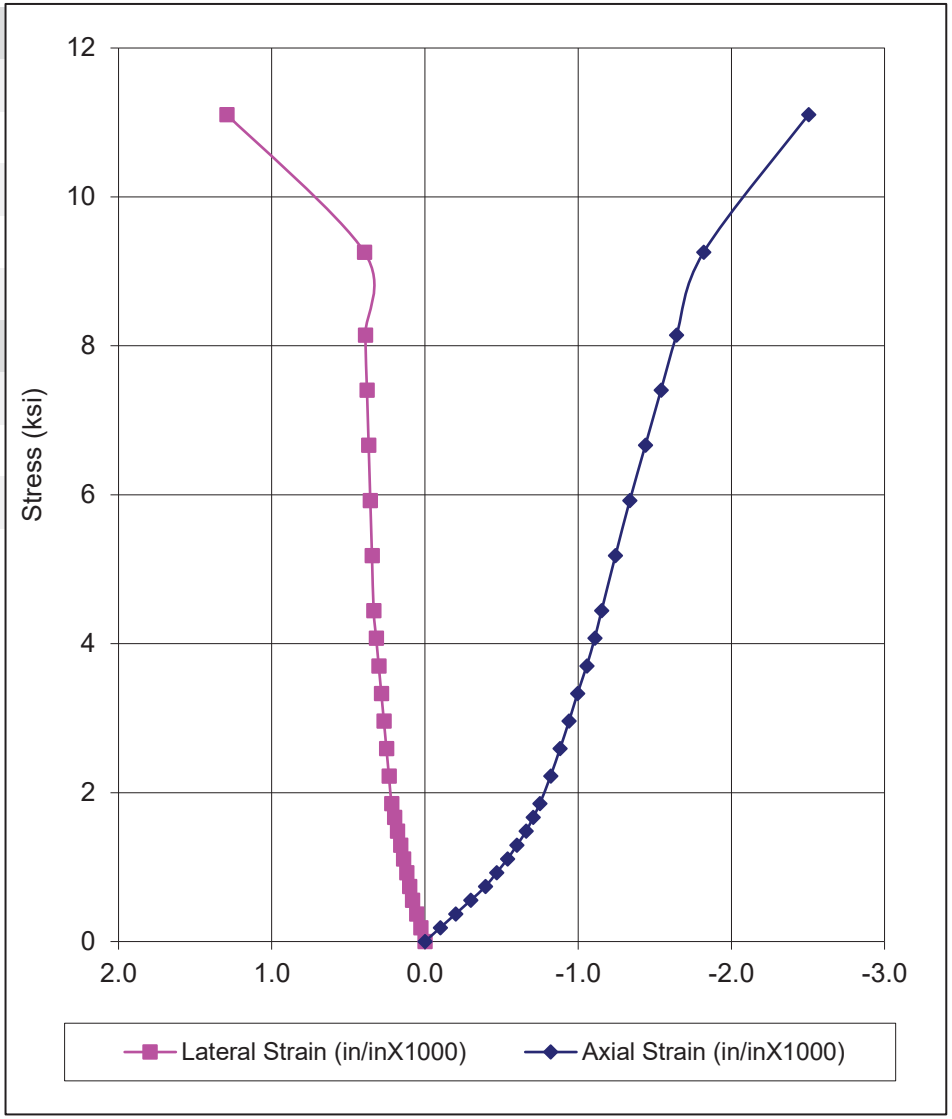
Project Number: 09.0025984.03 T1
Technician: JM
Report Date: 03.23.2020

ASTM D7012 Compressive Strength and Elastic Moduli of Intact Rock Core Specimens

Rock Information			
Boring ID:	BB-MSJR-214	**Diameter, D (in):**	1.8545
Sample #:	R2	**Length, L (in):**	4.5258
Depth (ft):	46.0-46.5	**L:D Ratio:**	2.44
Tested Depth (ft):	46.1-46.5	**Type:**	Slate
Features:	Not weathered		

Compressive Test Information		Elastic Moduli Test Information	
Unit Weight (pcf):	170.8	**Poisson's Ratio @ 50%:**	0.27
Failure Stress (psi):	11,329	**Strain %:**	0.250
Failure Mode:	Fresh	**E sec PSI @ 50%:**	4.30E+06
Time to Failure (min)	4.58		





APPENDIX G – GEOTECHNICAL ENGINEERING CALCULATIONS

Soil Properties

Correlation of SPT N-Values to Internal Friction Angle (ϕ) Using LRFD

Rev. 0

Project: Madawaska International Bridge over St John's River
Location: Madawaska, ME-Edmundston, NB
Calculated By: NVW **Date:** 7/21/2020
Checked By: ARB **Date:** 7/25/2020

Objective: To estimate the internal friction angle (ϕ') of subsurface strata for **Abutments 1 & 2, and Piers 1 - 5** of the Madawaska International Bridge based on Standard Penetration Test (SPT) measurements and empirical correlations using N_{field}, N_{corr} and $(N_1)_{60}$ for use in LRFD analyses.

Method: Correlations between SPT N-values and the soil internal friction angle were considered based on two (2) equations presented in NCHRP Report 651 and in Table 10.4.6.2.4-1 of the AASHTO, 8th Edition (2017). The correlated friction angle using these two (2) correlations are presented in this document. The recommended internal friction angle to be used for design is based on the correlation presented by Peck, Hanson and Thornburn (PHT, 1974) as mentioned in Kulhawy and Mayne (1990) and recommended in NCHRP Report 651 (below).

$$\phi \approx 54 - 27.6034 * e^{-0.014*(N_1)_{60}}$$

Given Information: SPT measurements and subsurface conditions in the all borings, BB-MSJR-101, -102, -201 through -206, -208 through -214, -301, and -302, performed by New England Boring Contractors and Logan Drilling Group, and observed by GZA.

Assumptions: Split spoon samples and SPTs were performed using an automatic hammer or rope and cathead with a safety hammer. The respective assumed hammer efficiency for the rope and cathead and calibrated automatic hammer efficiencies for automatic hammers can be found on the boring logs and were used to calculate N60.

Analysis Results:

	Layer	Range of SPT $(N_1)_{60}$ - Values	Recomm. ϕ[1] (degrees)	Notes
Abutment 1 & Pier 1	Fill	6 to 80	32	Based on the comparison of the boring log results, Abutment 1 and Pier 1 showed similar soil strata.
	Glacial Till (Lower Bound)	14 to 222	38	
	Glacial Till (Upper Bound)		43	
Piers 2 through 5	Glacial Till	28 to 142	43	No Fill encountered at Piers 1 thorugh 5 boring locations.
Abutment 2	Fill	7 to 168	31	
	Alluvium	6 to 168	30	
	Glacial Till	10 to 95	38	

Attachments:
1) Figures
2) Calculations

References:

1) AASHTO LRFD Bridge Design Specifications, 8th Edition, 2017.
2) Boring Logs .
2) NCHRP Report 651, "LRFD Design and Construction of Shallow Foundations for Highway Bridge Structures," 2010.
3) FHWA NHI-06-088, "Soils and Foundations," Volume 1, December 2006.
4) Youd, T.L., et. al., "Liquefaction Resistance of Soils: Summary Report From the 1996 NCEER and 1998 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils," Journal of Geotechnical and GeoEnvironmental Engineering, October 2001.
5) Peck, Hanson, and Thornburn; "Foundation Engineering" 2nd ed., Wiley, New York, 1974
6) Kulhawy, F. and Mayne, P (1990). *Manual on Estimation of Soil Properties for Foundation Design,* Report EPRI-EL-6800. Electric Power Research Institute, Palo Alto, CA.

Estimation of Horizontal Modulus of Subgrade Reaction (k)

Rev. 0

Project: Madawaska International Bridge over St John's River
Location: Madawaska, ME-Edmundston, NB
Calculated By: NVW **Date:** 7/21/2020
Checked By: ARB **Date:** 7/25/2020

Objective: To estimate the horizontal modulus of subgrade reaction (k) of subsurface strata for the Madawaska International Bridge for use in lateral analyses. K values will be estimated using strata internal friction angles (ϕ').

Method(s): Correlations between the horizontal modulus of subgrade reaction and the soil internal friction angle of a given stratum are based on Figure 3-34 presented in the 2016 LPile Technical Manual.

Given Information: SPT measurements and subsurface conditions in the all borings, BB-MSJR-101, -102, -201 through -206, -208 through -214, -301, and -302, performed by New England Boring Contractors and Logan Drilling Group, and observed by GZA.

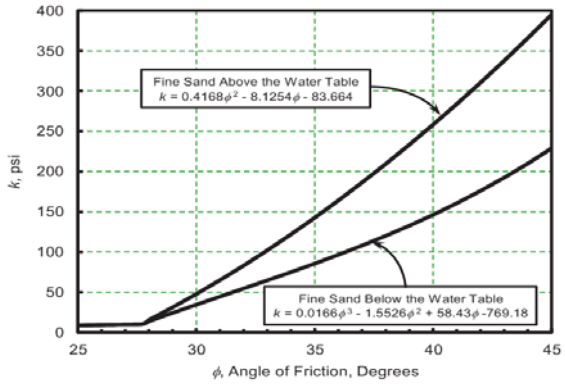


Figure 3-34 Value of k versus Friction Angle for Fine Sand Used in LPile

Assumptions:

Split spoon samples and SPTs were performed using an automatic hammer or rope and cathead with a safety hammer. The respective assumed hammer efficiency for the rope and cathead and calibrated automatic hammer efficiencies for automatic hammers can be found on the boring logs and were used to calculate N60.

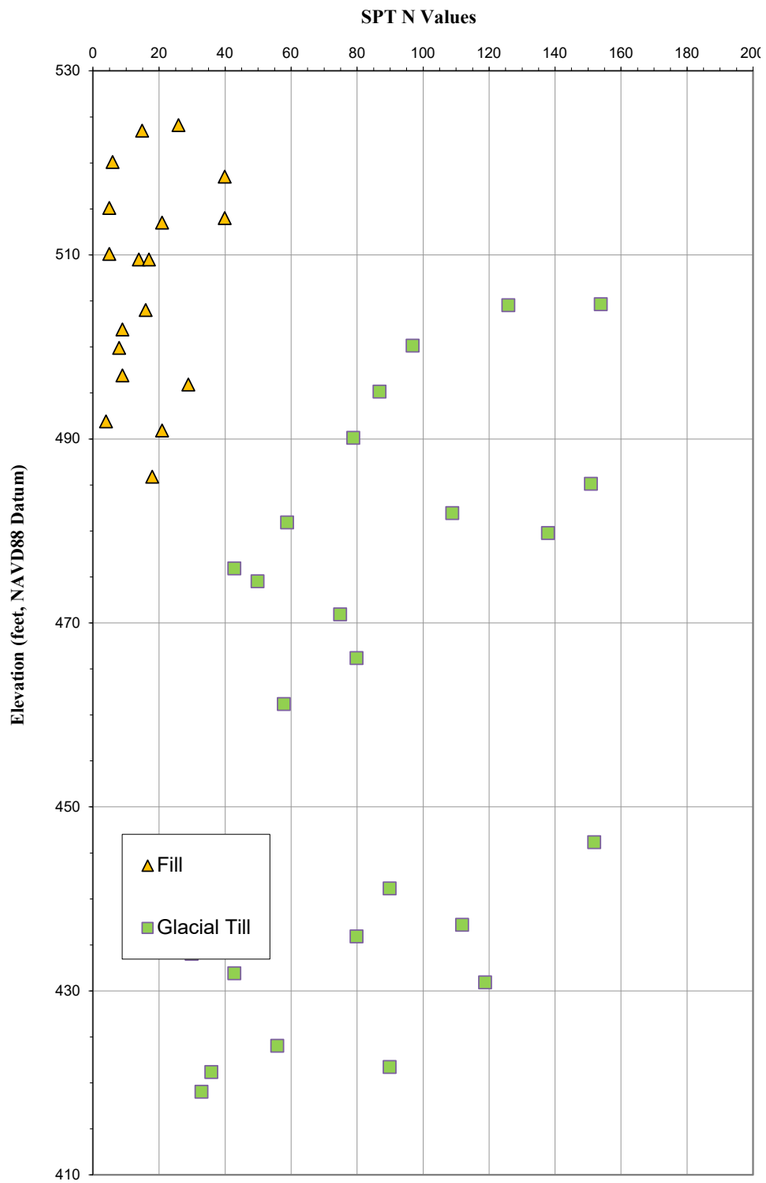
Analysis Results:

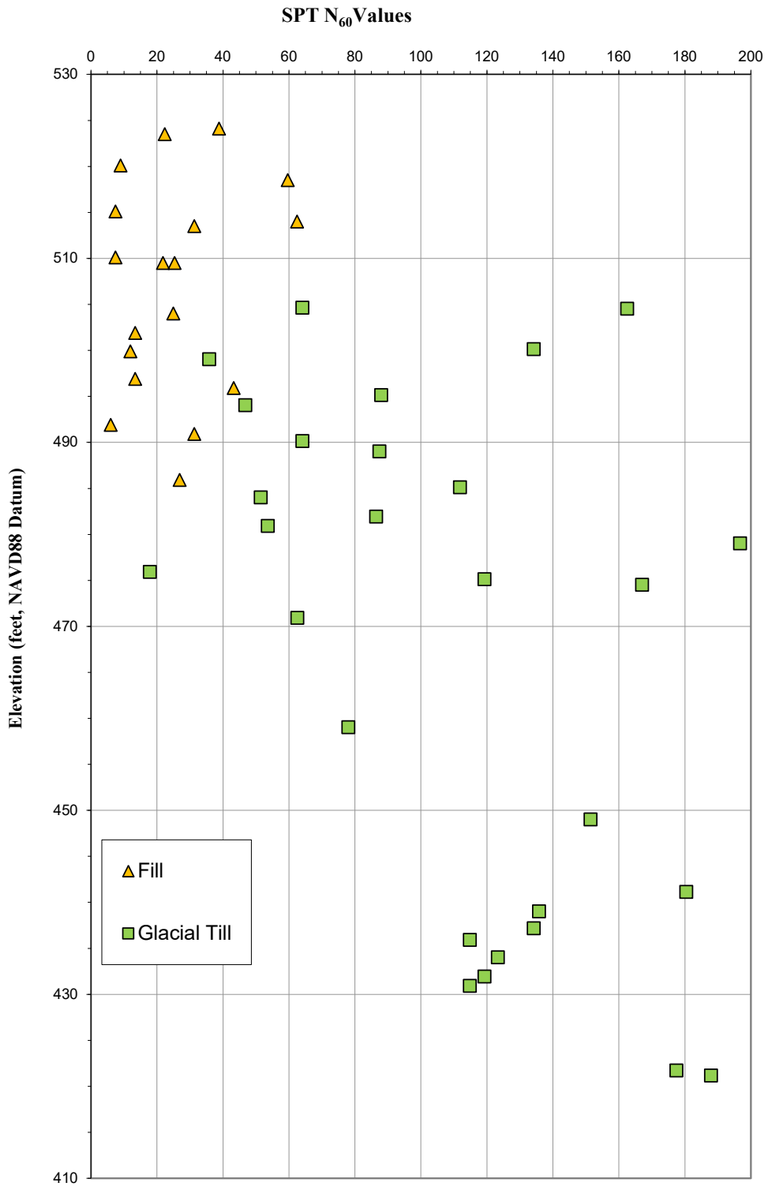
	Layer	ϕ[1] (degrees)	Unit Weight above GWL[2] (pcf)	Unit Weight below GWL (pcf)	Recomm. K above GWL (lb/in^3)	Recomm. K below GWL (lb/in^3)
Abutment 1 & Pier 1	Fill	32	125	63	85	55
	Glacial Till (Lower Bound)	38	130	68	210	120
	Glacial Till (Upper Bound)	43	130	68	340	190
Piers 2 through 5	Glacial Till	43	130	68	340	190
Abutment 2	Fill	31	125	63	65	45
	Alluvium	30	120	58	50	35
	Glacial Till	38	130	68	210	120

Notes:
1) ϕ is based on the Peck, Hanson, & Thornburn (1974) empirical correlation, as mentioned by Kulhawy & Mayne (1990).
2) GWL = groundwater level.

References:

1) Technical Manual for LPile 2016 by Ensoft, Inc., dated January 14, 2016.





Notes:

1. Project datum = North American Vertical Datum (NAVD 88).

2. Standard Penetration Test (SPT) field values shown for borings BB-MSJR-101, and -201 through -204.

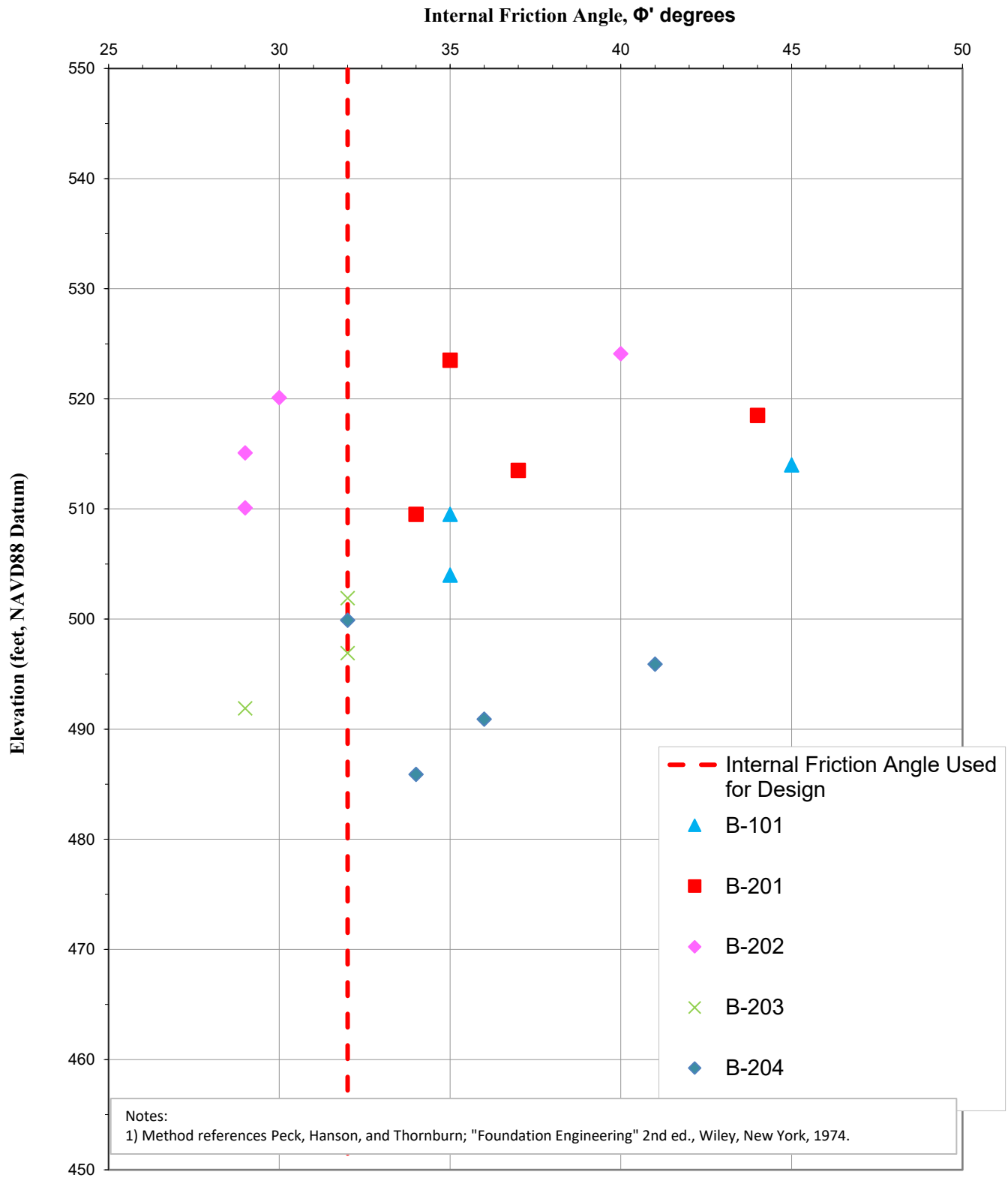
3. Corrected, N_{60} values plotted on the figure are based on the following:

$$N_{60} = (ER/60\%)N$$

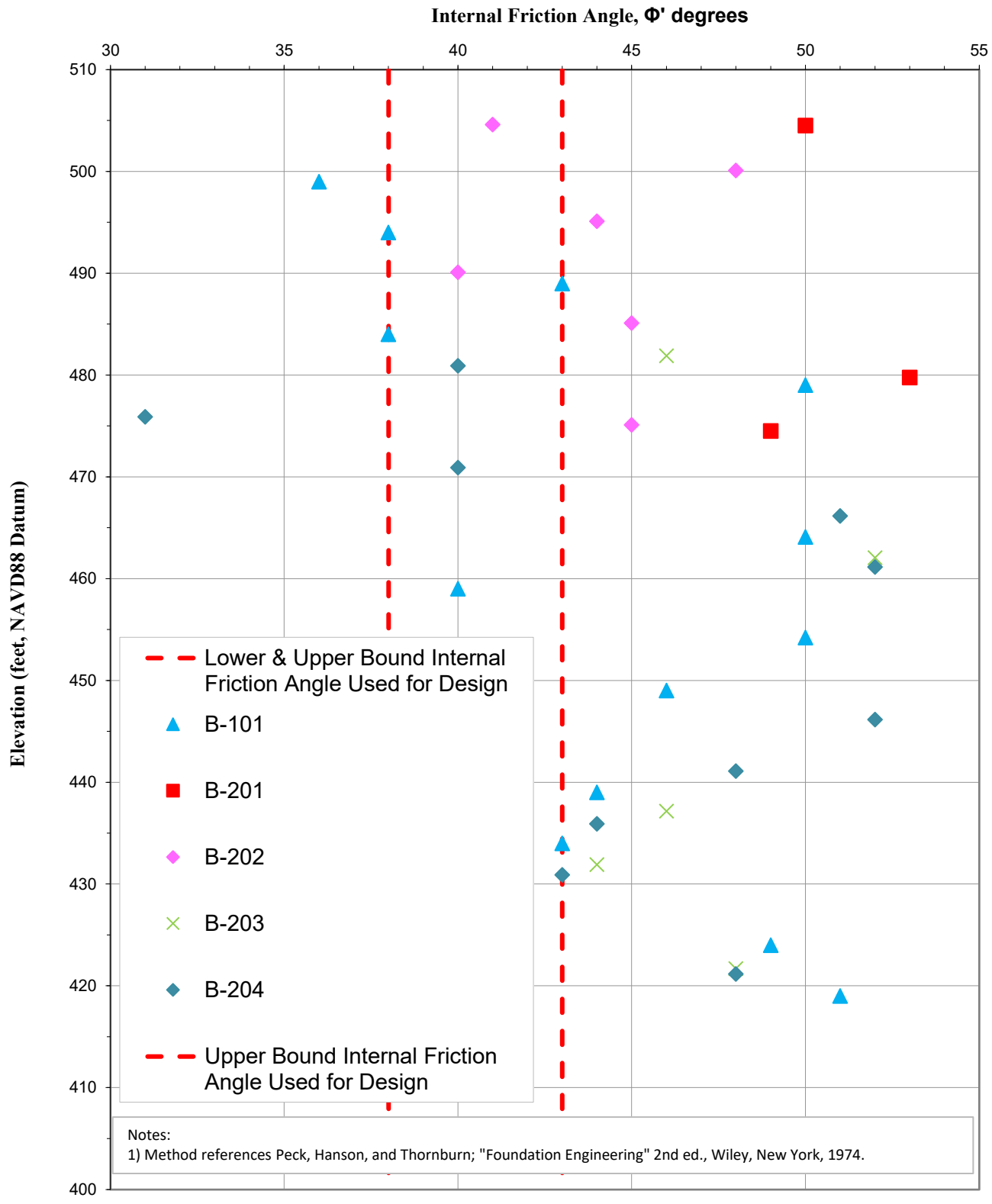
where:
Er = Hammer efficiency - calibrated
N = Measured SPT N-value in field

GZA	PROJ MGR: NVW DESIGNED BY: NVW REVIEWED BY:ARB	**INTERNATIONAL BRIDGE OVER THE ST JOHN'S RIVER MADAWASKA, MAINE - EDMUNDSTON, NEW BRUNSWICK**
	DRAWN BY: NVW DATE: 7/21/2020	**UNCORRECTED AND CORRECTED N-VALUES VERSUS ELEVATION BY STRATUM - Abutment 1 & Pier 1**

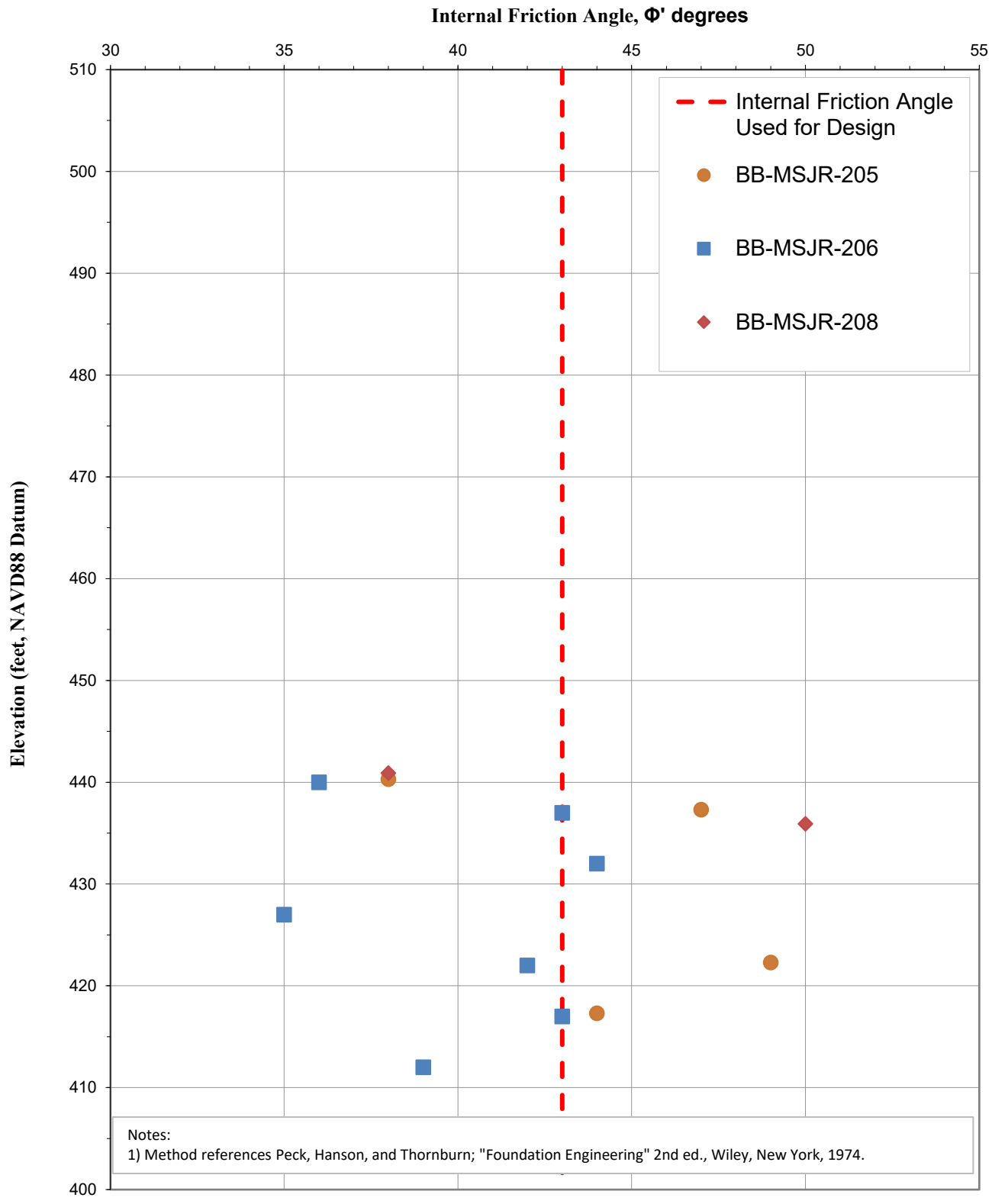
FIGURE 1



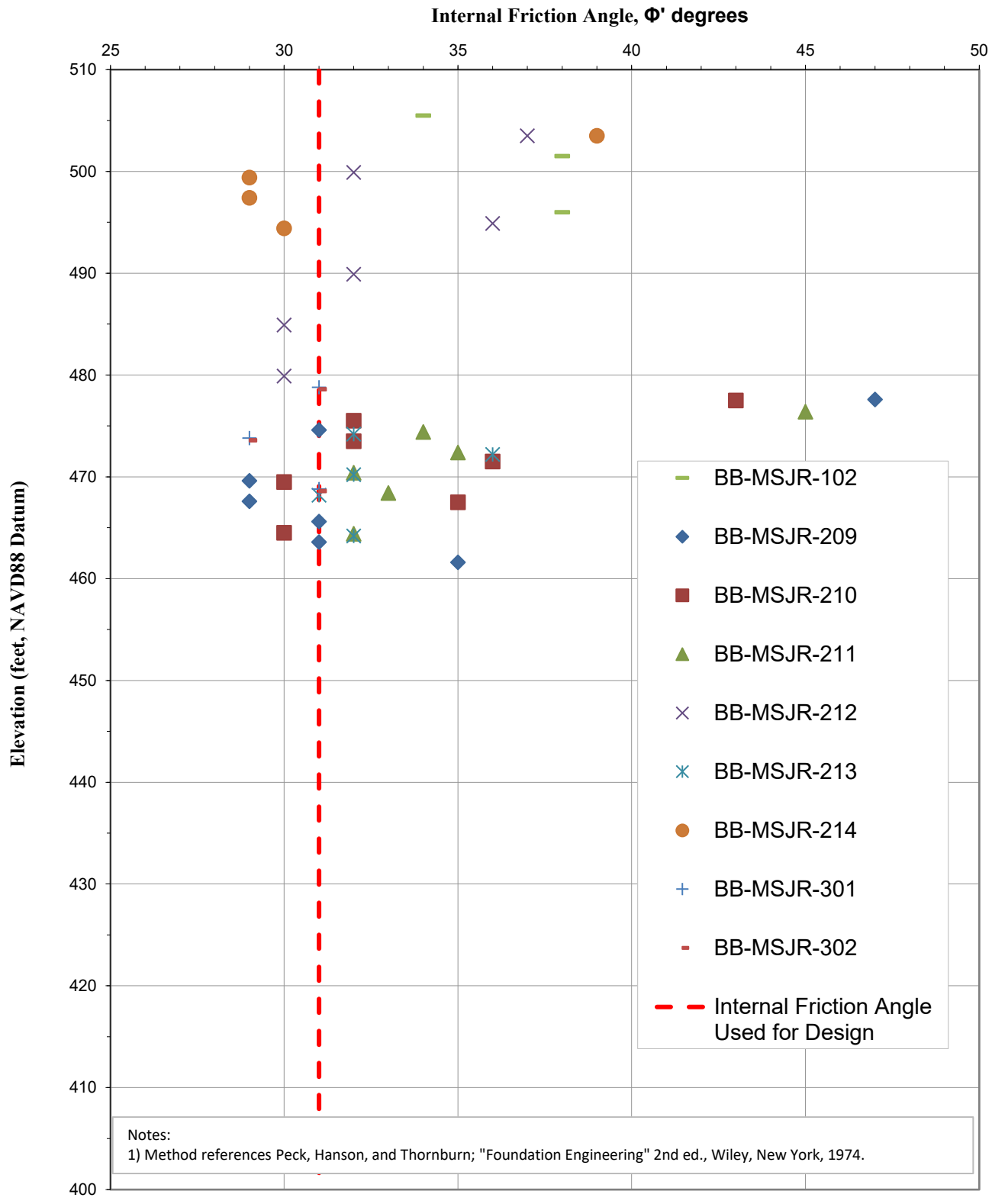
PROJ MGR: NVW DESIGNED BY: NVW REVIEWED BY:ARB	DRAWN BY: NVW DATE: 7/21/2020	**INTERNATIONAL BRIDGE OVER ST JOHN'S RIVER MADAWASKA, ME - EDMUNDSTON, NB**	**FIGURE 2**
GZA		**INTERNAL FRICTION ANGLES BASED ON STANDARD PENETRATION TEST (SPT) N-VALUES FOR FILL - Abutment 1 & Pier 1**	



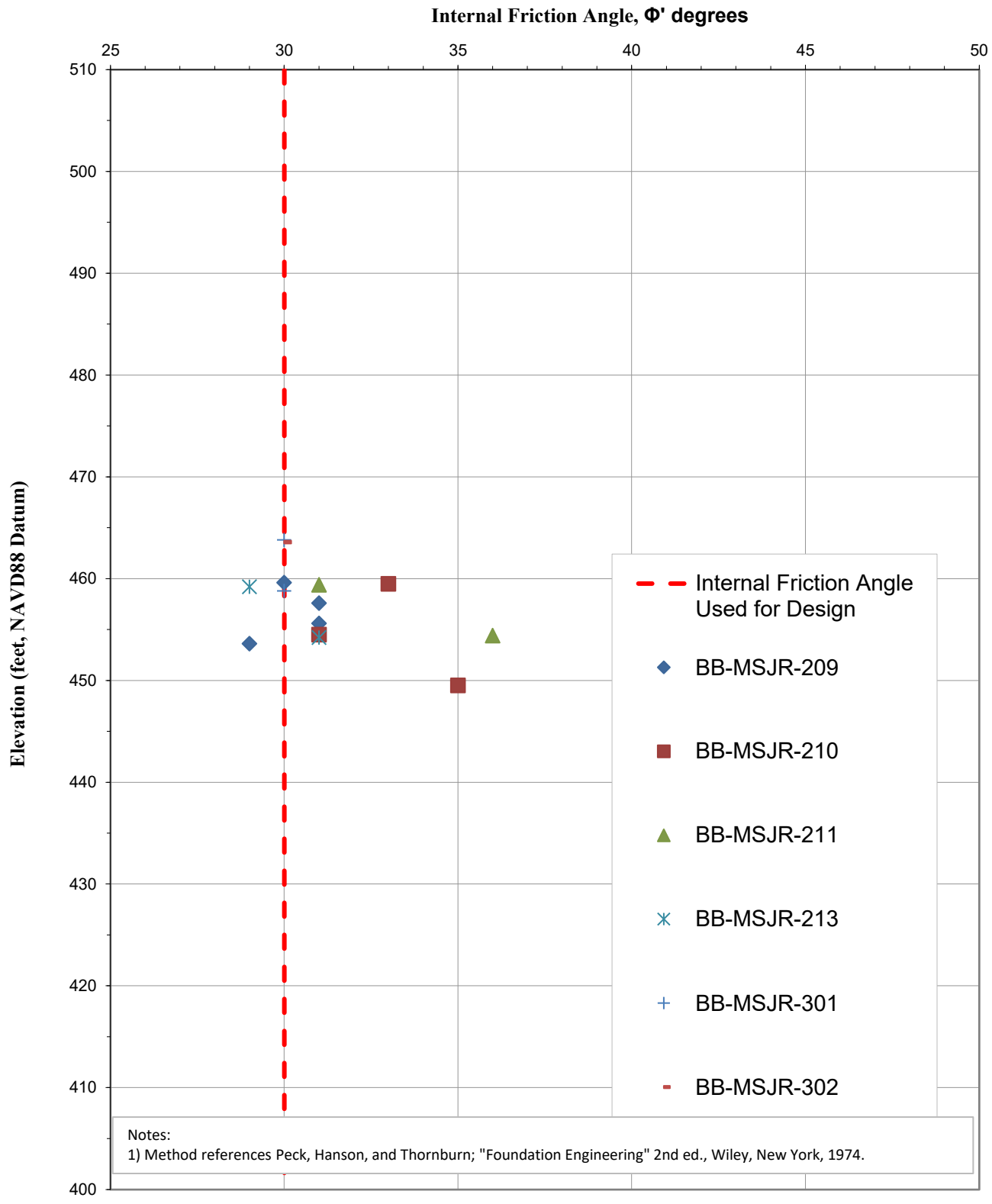
PROJ MGR: NVW DESIGNED BY: NVW REVIEWED BY:ARB	DRAWN BY: NVW DATE: 7/21/2020	**INTERNATIONAL BRIDGE OVER ST JOHN'S RIVER MADAWASKA, ME - EDMUNDSTON, NB**	**FIGURE 3**
GZA		**INTERNAL FRICTION ANGLES BASED ON STANDARD PENETRATION TEST (SPT) N-VALUES FOR GLACIAL TILL - Abutment 1 & Pier 1**	



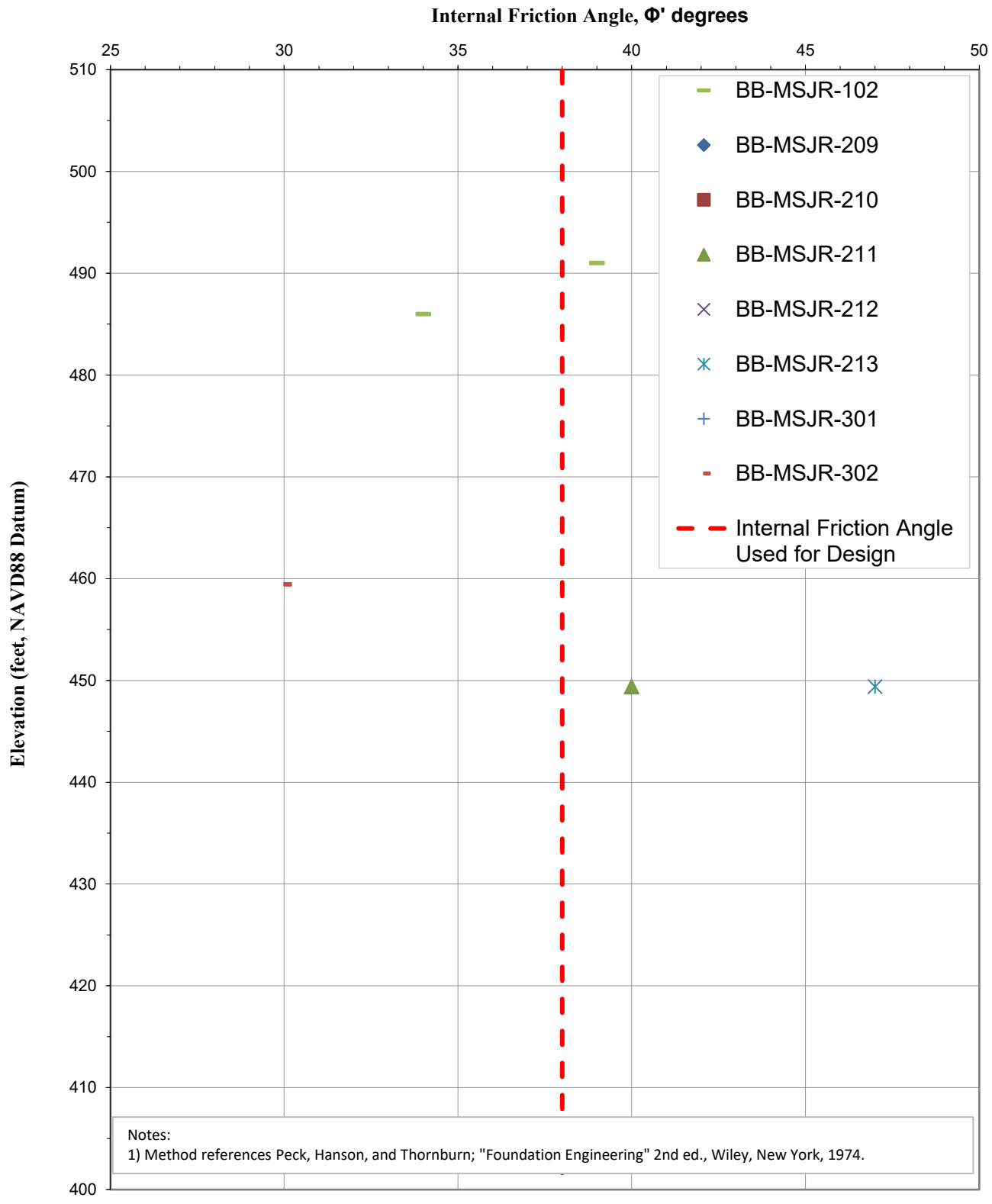
PROJ MGR: NVW DESIGNED BY: NVW REVIEWED BY:ARB	DRAWN BY: NVW DATE: 7/21/2020	**INTERNATIONAL BRIDGE OVER ST JOHN'S RIVER MADAWASKA, ME - EDMUNDSTON, NB**	**FIGURE 4**
GZA		**INTERNAL FRICTION ANGLES BASED ON STANDARD PENETRATION TEST (SPT) N-VALUES FOR GLACIAL TILL - Piers 2-5**	



PROJ MGR: NVW DESIGNED BY: NVW REVIEWED BY:ARB	DRAWN BY: NVW DATE: 7/21/2020	**INTERNATIONAL BRIDGE OVER ST JOHN'S RIVER MADAWASKA, ME - EDMUNDSTON, NB**	**FIGURE 5**
GZA		**INTERNAL FRICTION ANGLES BASED ON STANDARD PENETRATION TEST (SPT) N-VALUES FOR FILL - Abutment 2**	



PROJ MGR: NVW DESIGNED BY: NVW REVIEWED BY:ARB	DRAWN BY: NVW DATE: 7/21/2020	**INTERNATIONAL BRIDGE OVER ST JOHN'S RIVER MADAWASKA, ME - EDMUNDSTON, NB**	**FIGURE 6**
GZA		**INTERNAL FRICTION ANGLES BASED ON STANDARD PENETRATION TEST (SPT) N-VALUES FOR ALLUVIUM - Abutment 2**	



PROJ MGR: NVW DESIGNED BY: NVW REVIEWED BY:ARB	DRAWN BY: NVW DATE: 7/21/2020	**INTERNATIONAL BRIDGE OVER ST JOHN'S RIVER MADAWASKA, ME - EDMUNDSTON, NB**	**FIGURE 7**
GZA		**INTERNAL FRICTION ANGLES BASED ON STANDARD PENETRATION TEST (SPT) N-VALUES FOR GLACIAL TILL - Abutment 2**	

Bedrock Properties

Bedrock Design Properties

Project: Madawaska International Bridge **Project No.:** 09.0025984.03

Location: Madawaska, ME - Edmundston, NB

Calculated By: N. Williams **Date:** 7/21/2020

Checked By: A.Blaisdell **Date:** 8/25/2020

Objective: Evaluate the bedrock properties of Slate encountered across the site for use in foundation design.

Subsurface: Rock core data from test borings BB-MSJR-204 through -208, including rock type and RQD, and laboratory test data including unit weight, unconfined compressive strength, secant modulus of elasticity and Poisson's ratio for specimens, were assessed as follows:

Approach:

1) Determine the design RQD based on the weighted average within the upper 15' of bedrock in the river pier borings (design length of socket).
2) Determine Design Unit Weight, Unconfined Compressive Strength,Secant Modulus, and Poisson's Ratio values. Results were averaged from laboratory test results from samples where the Length to Diamater ratio (L/D) was >2. L/D ratios < 2 are considered unreliable per ASTM standard. Preliminary laboratory results were considered not representative when compared to previous tested data from 2010 and final design laboratory test results.
3) Compiled laboratory test results and RQD values are tabulated, plotted and evaluated on pages 3 through 5.
4) Evaluate Geologic Strength Index (GSI) and rock constant in accordance with AASHTO methodology.

Madawaska International Bridge
Madawaska, ME - Edmundston, NB
09.0025984.03

Calculated by N. Williams Date: 7/30/2020
Checked by A.Blaisdell Date: 8/25/2020

Calculation: GSI-Based Rock Parameters

References: 1) AASHTO LRFD Bridge Design Specifications, 8th Ed. (2017)

Parameter Description	Parameter Symbol	Design Values	Reference
Rock Type		Slate	Rock ID per boring logs/geologic mapping
Comparable Rock Type/Texture		Slate	AASHTO Table 10.4.6.4-1
Unconfined compressive strength of intact rock	q_u (psi)	5,000	Average of samples omitting results from L/D ratios <2, and upper outliers
Elastic Secant Modulus of Intact Rock	E_i (ksi)	2,000	Average of samples omitting results from L/D ratios <2, from lab UCS tests, 50%[2] strain
Poisson's Ratio of Intact Rock	ν	0.27	Average of samples omitting results from L/D ratios <2, from 50%[3] strain
Rock Total Unit Weight	γ' (psf)	171	Average value from 13 lab UCS, PLD, and PLA tests
Rock Effective Unit Weight	γ' (psf)	108.6	
Geological Strength Index	GSI	65	AASHTO FIG 10.4.6.4-1
Hoek - Brown 2002	D	0	Hoek - Brown 2002
Rock Quality Designation	RQD (%)	48	Based on weighted average of upper 15' of river pier borings .
Empirically determined rock mass parameter	s	0.020476	AASHTO Eq. 10.4.6.4-2
Empirically determined rock mass parameter	a	0.502	AASHTO Eq. 10.4.6.4-3
Rock group constant	m_i	7	AASHTO Table 10.4.6.4-1
Empirically determined rock mass parameter	m_b	2.01	AASHTO Eq. 10.4.6.4-4
Equivalent Rock Mass Modulus, Hoek & Brown	E_m1 (ksi)	2,019	AASHTO Table 10.4.6.5-1 - eq. from table
Equivalent Rock Mass Modulus, Yang	E_m2 (ksi)	400	AASHTO Table 10.4.6.5-1 - eq. from table
Average Equivalent Rock Modulus	E_m (ksi)	1,210	

Notes:
1. Yellow cell is user input, white is calculated.
2. Secant Modulus/Poisson's Ratio taken at 45% in one of four UCS tests due to frail sample.

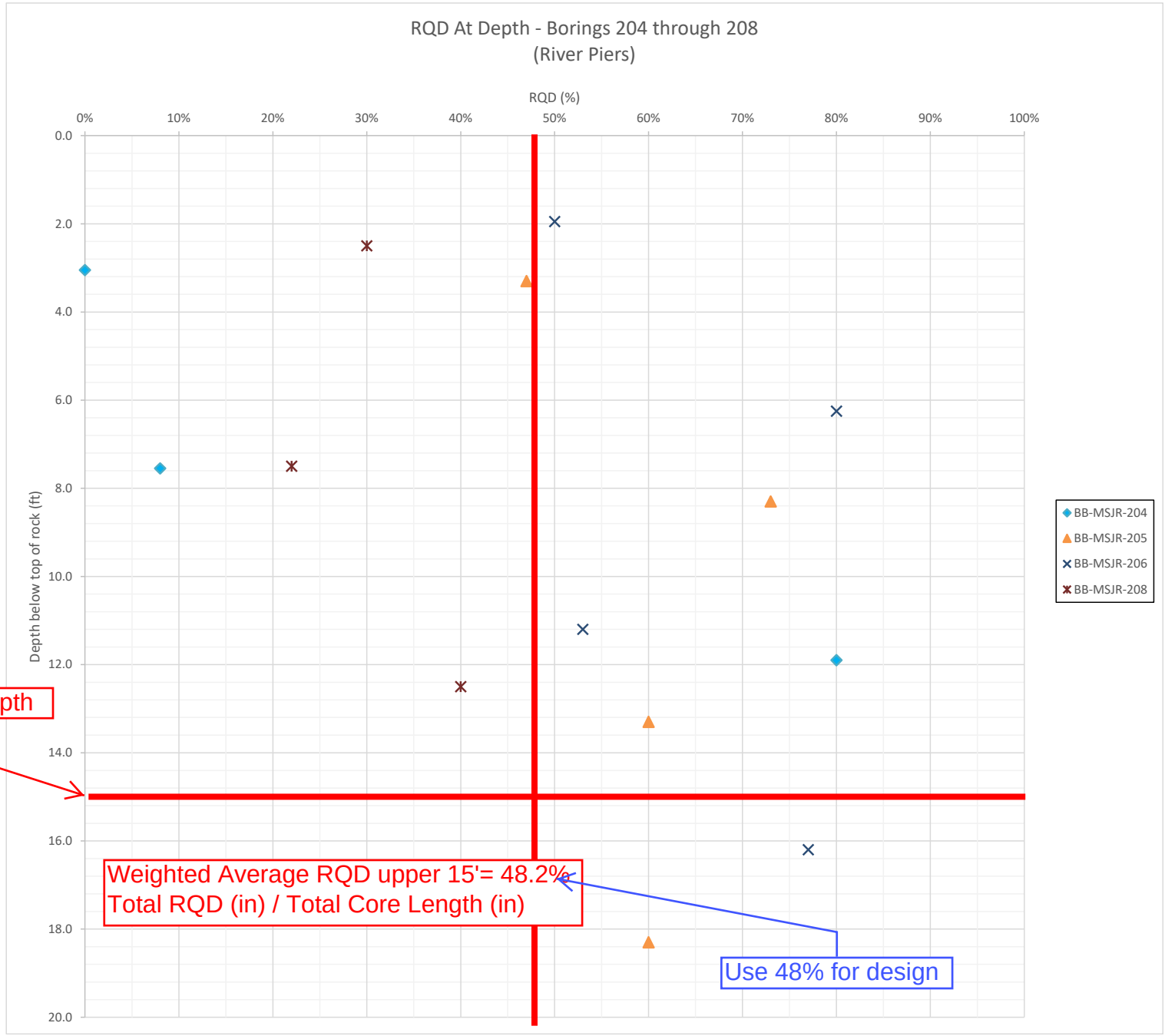
Boring	Run	GS Elevation	Depth to Rock (ft)	Depth (ft) Below Top of Rock			Length of Core Run (ft)	RQD %
				Top		Bottom		
BB-MSJR-204	R1	500.9	85.7	0.4	-	5.7	5.3	0%
BB-MSJR-204	R2	500.9	85.7	5.7	-	9.4	3.7	8%
BB-MSJR-204	R3	500.9	85.7	9.4	-	14.4	5.0	80%
BB-MSJR-205	R1	441.3	29.2	0.8	-	5.8	5.0	47%
BB-MSJR-205	R2	441.3	29.2	5.8	-	10.8	5.0	73%
BB-MSJR-205	R3	441.3	29.2	10.8	-	15.8	5.0	60%
BB-MSJR-205	R4	441.3	29.2	15.8	-	20.8	5.0	60%
BB-MSJR-206	R1	441.0	30.7	0.1	-	3.8	3.7	50%
BB-MSJR-206	R2	441.0	30.7	3.8	-	8.7	4.9	80%
BB-MSJR-206	R3	441.0	30.7	8.7	-	13.7	5.0	53%
BB-MSJR-206	R4	441.0	30.7	13.7	-	18.7	5.0	77%
BB-MSJR-208	R4	441.9	35.1	0.0	-	5.0	5.0	30%
BB-MSJR-208	R5	441.9	35.1	5.0	-	10.0	5.0	22%
BB-MSJR-208	R6	441.9	35.1	10.0	-	15.0	5.0	40%

200 Series River Pier Rock Core Summary Table

Boring	SUMMARY OF BEDROCK STRENGTH TEST RESULTS CONSIDERED FOR DESIGN												
	Lab. No. (THIELSCH)	Run	Depth of Sample into Rock (ft)			UCS (psi)	% Strain	Secant Modulus @ 50% of Failure Stress (ksi)	Poisson's Ratio	Point Load Test (Axial or Diometrical)	Point Load, Is (PSI)	Point Load, Sc (PSI)	Unit Wt (pcf)
BB-MSJR-204	S-27	R3	9.4	-	10.4	4,354	0.513	728	0.41				170.5
BB-MSJR-205	S-28D	R1	2.1	-	2.7					Diometrical	316	7,268	197.8
BB-MSJR-205	S-28A	R1	2.1	-	2.7					Axial	269	6,187	169.1
BB-MSJR-205	S-29	R2	7.1	-	8.3	4,868	0.625	657	0.13				171.1
BB-MSJR-205	S-33	R4	16.3	-	17.5	5,659	0.248	1690	0.13				170.5
BB-MSJR-206	S-30	R3	8.7	-	10.5	10,670	0.356	1900	0.29				170.9
BB-MSJR-206	S-31	R4	18.1	-	18.7	5,599	0.250	2450	0.1				171.2
BB-MSJR-208	S-34	R4	3.7	-	4.1	5,369	0.766	447	0.27				
BB-MSJR-208	S-32	R6	11.2	-	12.0	5,018	0.165	2450	0.45				170.7
BB-MSJR-209	S-36	R6	0.3	-	0.9	4,579	0.368	2,140	0.48				169
BB-MSJR-209	S-37	R7	5.2	-	5.9	4,251	0.463	1,420	0.20				170.3
BB-MSJR-214	S-38	R9	34.0	-	34.5	11,329	0.250	4,300	0.27				170.8
BB-MSJR-214	S-35A	R2	2.0	-	2.3					Diometrical	155	3,798	155.8
BB-MSJR-214	S-35D	R2	2.0	-	2.3					Axial	159	3,896	158.5

200 Series Rock Core Laboratory Test Results

Design RQD value

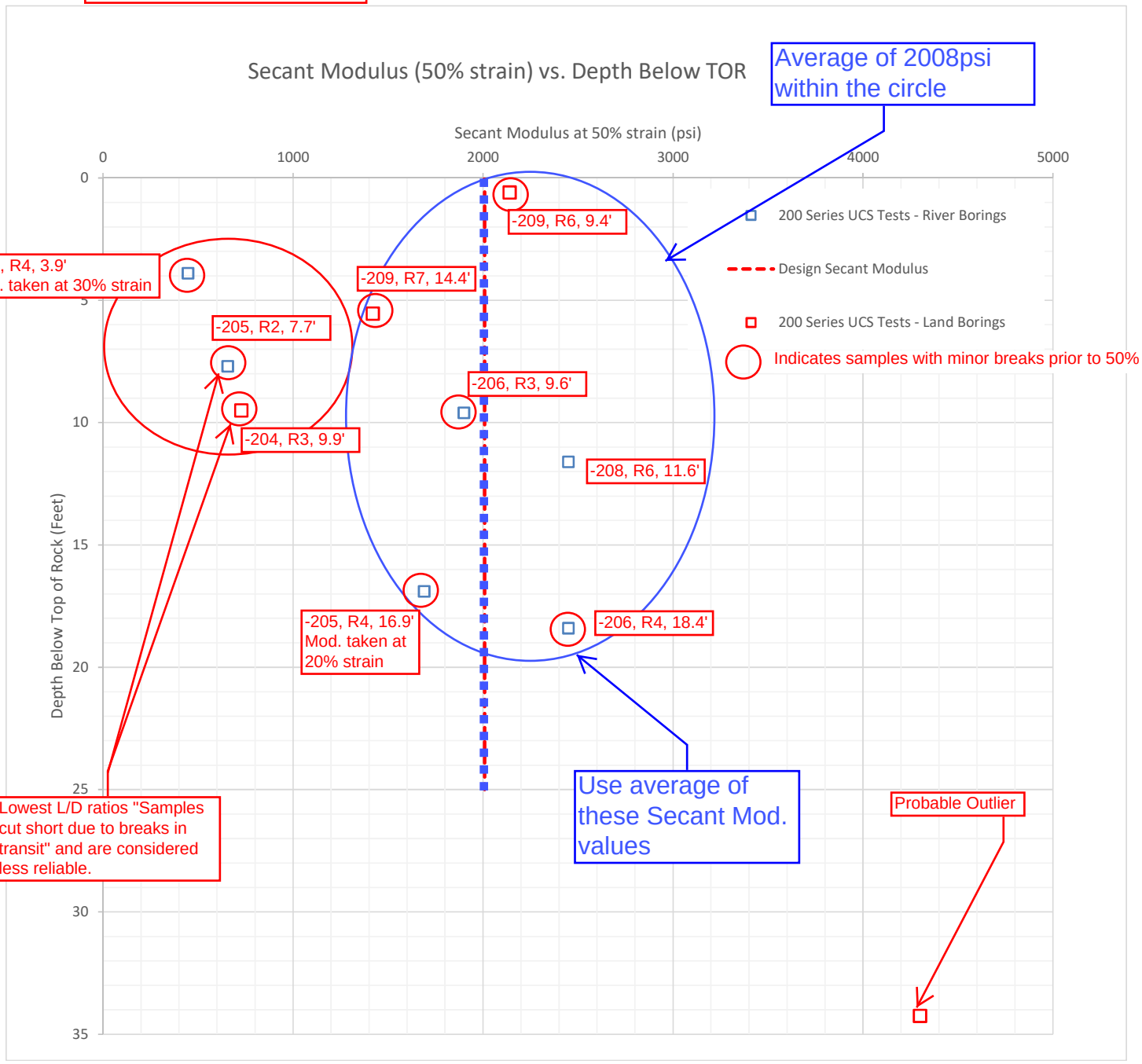


Planned socket depth

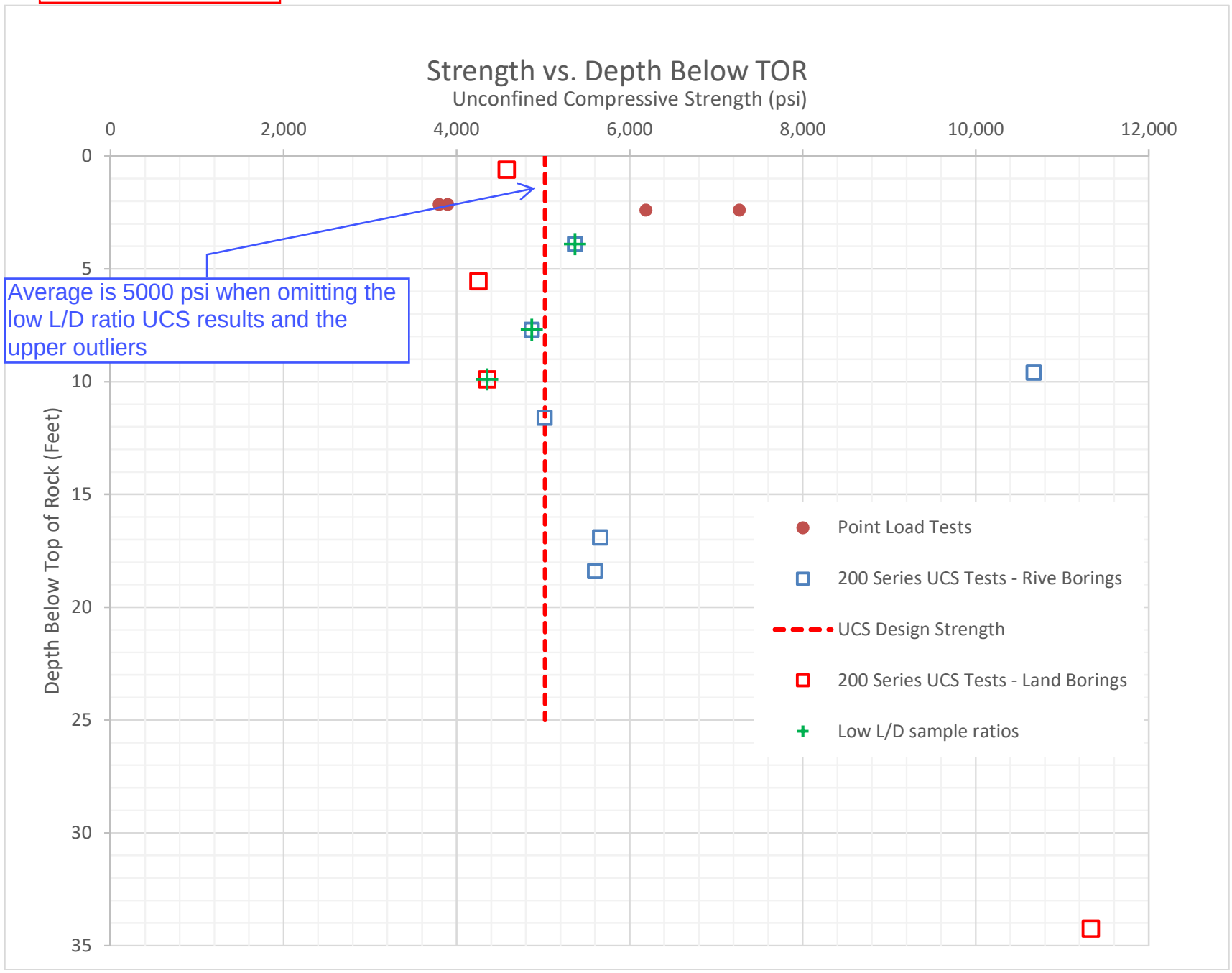
Weighted Average RQD upper 15'= 48.2%
Total RQD (in) / Total Core Length (in)

Use 48% for design

Design Secant Modulus



Design Rock Strength



Calculated by N.Williams Date: 3/25/2020
Checked by A.Blaisdell Date: 3/27/2020

Design GSI

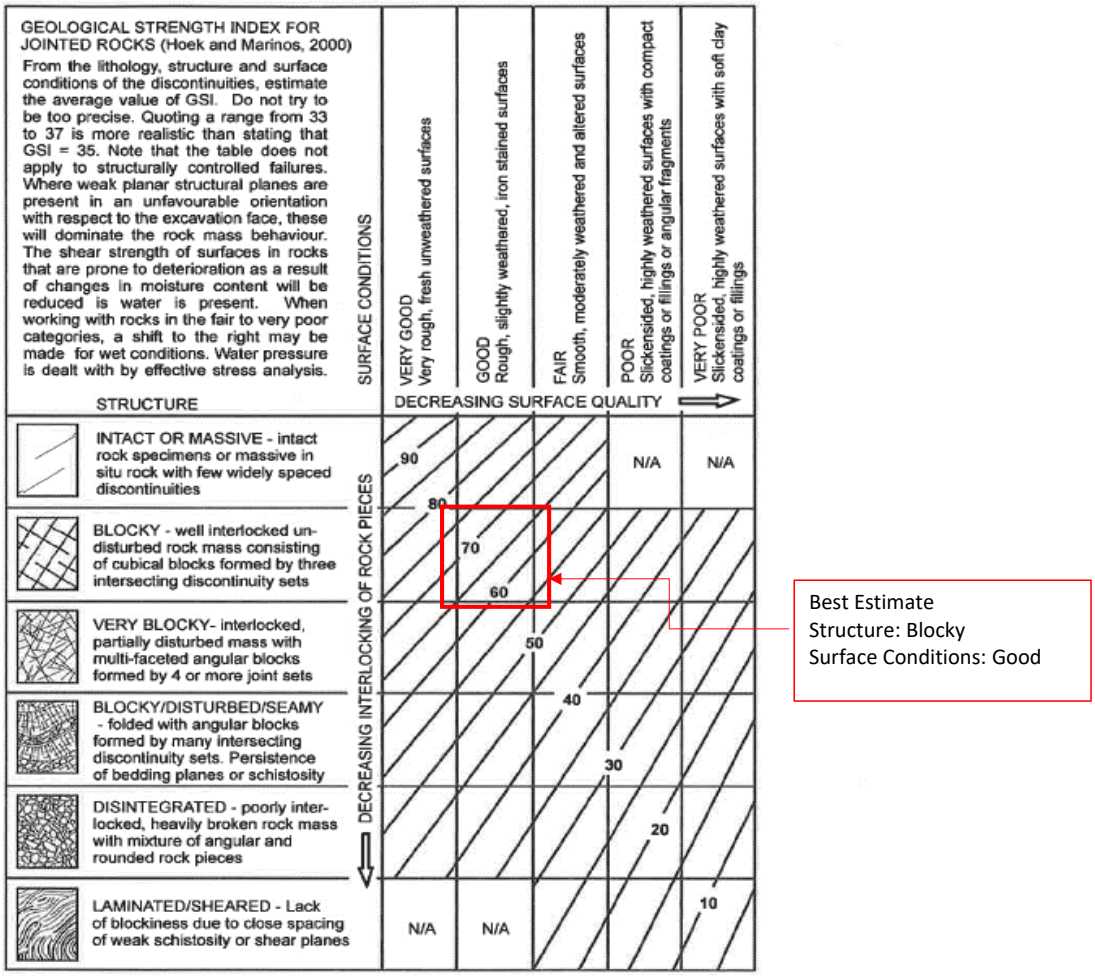


Figure 10.4.6.4-1—Determination of *GSI* for Jointed Rock Mass (Hoek and Marinos, 2000)

Best Estimate
Structure: Blocky
Surface Conditions: Good

Calculated by N.Williams Date: 3/25/2020
Checked by A.Blaisdell Date: 3/27/2020

Design Rock Constant

Table 10.4.6.4-1—Values of the Constant m_i by Rock Group (after Marinos and Hoek 2000; with updated values from Rocscience, Inc., 2007)

Rock type	Class	Group	Texture			
			Coarse	Medium	Fine	Very fine
SEDIMENTARY	Clastic		Conglomerate (21 ± 3) Breccia (19 ± 5)	Sandstone 17 ± 4	Siltstone 7 ± 2 Greywacke (18 ± 3)	Claystone 4 ± 2 Shale (6 ± 2) Marl (7 ± 2)
	Non-Clastic	Carbonates	Crystalline Limestone (12 ± 3)	Sparitic Limestone (10 ± 5)	Micritic Limestone (8 ± 3)	Dolomite (9 ± 3)
		Evaporites		Gypsum 10 ± 2	Anhydrite 12 ± 2	
		Organic				Chalk 7 ± 2
METAMORPHIC	Non Foliated		Marble 9 ± 3	Hornfels (19 ± 4)) Metasandstone (19 ± 3)	Quartzite 20 ± 3	
	Slightly foliated		Migmatite (29 ± 3)	Amphibolite 26 ± 6	Gneiss 28 ± 5	
	Foliated*			Schist (10 ± 3)	Phyllite (7 ± 3)	Slate 7 ± 4
IGNEOUS	Plutonic	Light	Granite 32 ± 3	Diorite 25 ± 5 Granodiorite (29 ± 3)		
		Dark	Gabbro 27 ± 3	Dolerite (16 ± 5) Norite 20 ± 5		
	Hypabyssal			Porphyries (20 ± 5)	Diabase (15 ± 5)	Peridotite (25 ± 5)
	Volcanic	Lava		Rhyolite (25 ± 5) Andesite 25 ± 5	Dacite (25 ± 3)) Basalt (25 ± 5)	
		Pyroclastic	Agglomerate (19 ± 3)	Volcanic breccia (19 ± 5)	Tuff (13 ± 5)	

Slate,
use mean value

Slope Stability

GZA
GeoEnvironmental, Inc
477 Congress Street, Suite 700
Portland, Maine 04101
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Fax 207-879-0099
http://www.gza.com

Engineers and Scientists

JOB: 09.0025984.03
SUBJECT: Madawaska Int'l Bridge Stability Eval
SHEET: 1 OF 3
CALCULATED BY NVW 11-11-20
CHECKED BY ARB 11/13/2020

Objective

Evaluate global stability of the riverbank slopes at typical cross sections along the bridge alignment, normal to the slope using the profile and properties shown in the Interpretive Subsurface Profile and Soil Engineering Properties Calculation. The global stability evaluations will be analyzed under the existing conditions, proposed temporary embankments for construction access, and finished slope conditions.

References

1. American Association of State Highway and Transportation Officials, AASHTO LRFD Bridge Design Specifications: Customary U.S. Units, 8th edition, 2017 with interims. (AASHTO LRFD).
2. MaineDOT Bridge Design Guide, Chapter 3

Analysis

Soil Properties

See Soil Engineering Properties Calculation for existing materials and MaineDOT BDG design properties of new fills. Design soil properties are shown on the Slope/W output. The existing slope geometry was taken from cross sections provided by HNTB and is shown on Sheets 5 and 17.

Stability Calculation and Performance Criteria

Considering the temporary embankment slopes:
1) The minimum factor of safety for a potential slip surface daylighting in the rail line envelope is equal to or greater than the current factor of safety.
2) The minimum factor of safety for a slip surface daylighting in the temporary access roadway is selected as 1.3. This corresponds to approximate resistance factor 0.75, for a slope that does not contain or support a structural element, as specified in AASHTO LRFD Article 11.6.2.3.

Considering the the permanent condition of the riverbanks:
1) The minimum factor of safety for a potential slip surface daylighting in the rail line envelope is equal to or greater than the current factor of safety.

GZA evaluated the stability of the existing, temporary and permanent riverbank configurations statically, using the computer analytical software *Slope/W 2018*, developed by Geo-Slope International, based on the Modified Bishop method.

Analysis

Temporary Embankments: The proposed embankments were analyzed with a 30' wide roadway including a 250 psf construction surcharge with side slopes ranging from 1.5H:1V to 2H:1V. The proposed fill materials consisted of a 2' thick layer of Underdrain Backfill material on the slope interface, permanent embankment fill consisting of Granular Borrow, temporary embankment fill consisting of either Granular or Gravel Borrow , and temporary 2-foot thick rip-rap slope cover.

Permanent/Finished Conditions: The proposed permanent conditions consisted of Granular Borrow placed over the existing riverbank to achieve 2H:1V side slopes where required, and 4-foot thick rip-rap slope cover.

Minimum Safety factors for the existing riverbank slopes referenced herein for each temporary slope analysis condition refer to the minimum factor of safety against rotation for a slip surface that daylights within the nearest rail line envelope.

The attached Slope-W outputs (Sheets 5-23) show the following minimum global factors of safety for slip survace daylighting in the rail envelope:

Existing Riverbank Conditions

The stability of exising conditions were compared to the temporary embankment concept with a 1.5H to 1V slope inclination. The results are summarized below.

Riverbank	Min. Existing Factor of Safety Relative to RR	Min. Factor of Safety Relative to RR w/Addition of Temp. Embankment
Madawaska	1	1.3
Edmundston	1	1.2

The results show that the addition of temporary embankments increases the minimum factor of safety of a slip surface passing through the nearest rail line envelope. Therefore, this concept is considered suitable as it relates to impacts on the adjacent railroad properties.

Temporary Embankment Conditions.

The additional temporary embankment was initially evaluated with a side slope of 1.5:1, which required 8' of riprap to achieve a minimum factor of safety of 1.3, and was considered not practical. Therefore, based on our results and the material engineering properties considered, temporary fill embankment slopes were analyzed at 1.75H:1V and 2H:1V.

The results for the proposed temporary embankments are presented for Madawaska only (Sheets 9-16), but these results are also considered valid for Edmundston since the same construction details and materials are proposed.

Riverbank	Condition	Fill	Min. Factor of Safety
Madawaska	1.75:1V	Gravel Borrow	1.3
Madawaska	2H:1V	Granular Borrow	1.3

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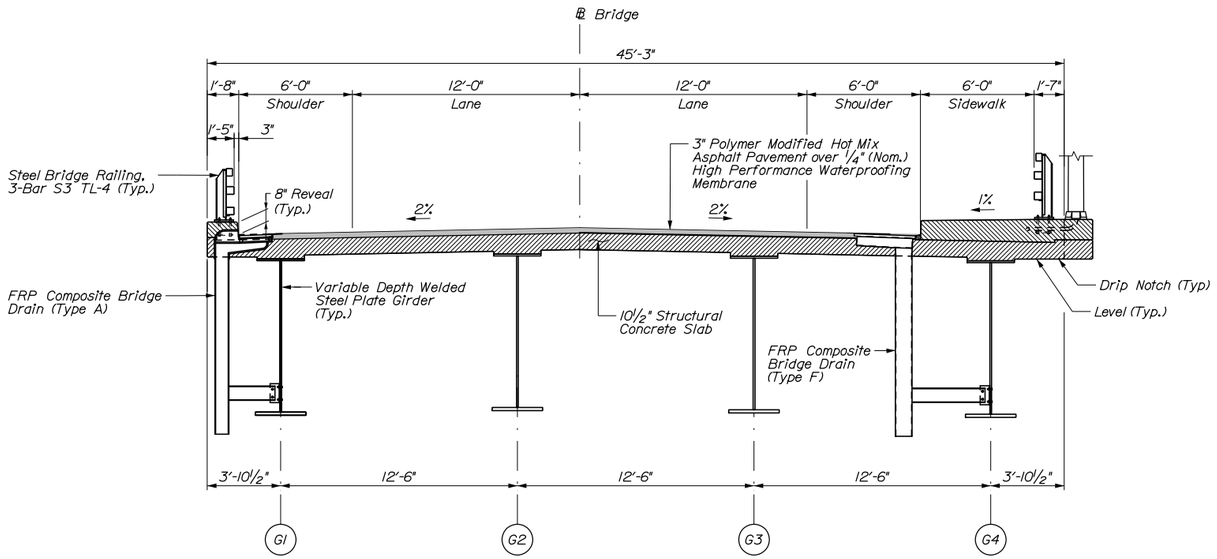
Engineers and Scientists

JOB: 09.0025984.03
SUBJECT: Madawaska Int'l Bridge Stability Eval
SHEET: 3 OF 3
CALCULATED BY NVW 11-11-20
CHECKED BY ARB 11/13/2020

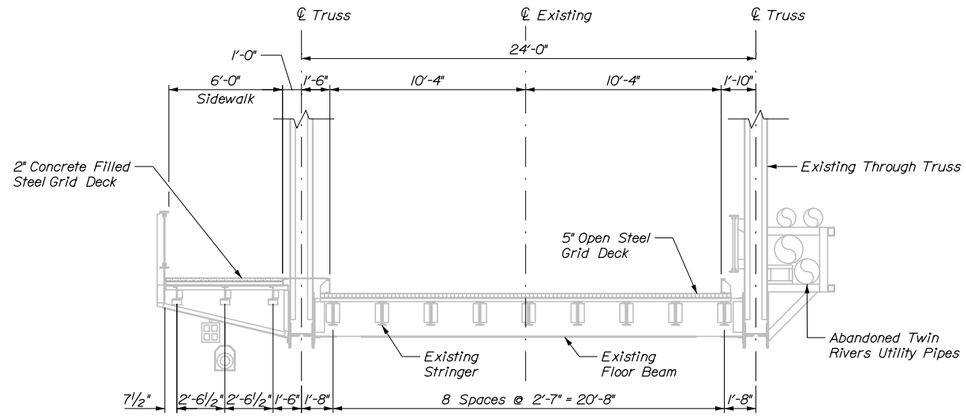
Permanent Embankment Conditions

Our results indicate a minimum factor of safety for a slip surface daylighting in the rail line envelope is greater than 1.3 at the Madawaska slope, and between 1.2 and 1.3 at the Edmundston slope, for the final slope configuration (Sheets 22-23).

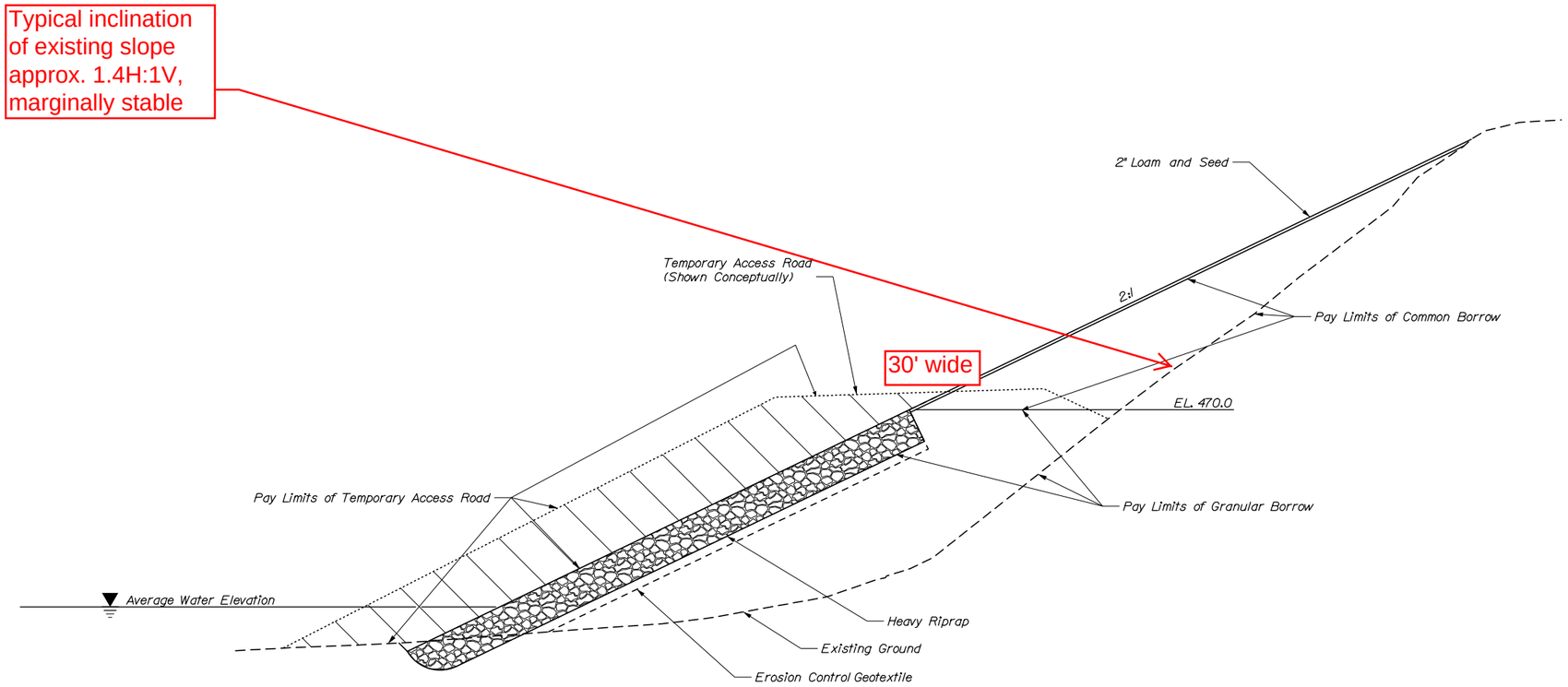
Riverbank	Condition	Fill	Min. Factor of Safety Relative to the Railway	Min. Factor of Safety
Madawaska	2H:1V	Granular Borrow	>1.3	1.4
Edmundston	2H:1V	Granular Borrow	>1.2	1.1



PROPOSED BRIDGE SECTION



EXISTING BRIDGE SECTION



CHANNEL BANK SECTION

(U.S. Channel Bank Shown, Canadian Channel Bank Similar)

DRAFT PLANS
6/1/2020

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

BRIDGE PLANS

WIN 021736.00

MAINEDOT BR. NO. 2399
NBDOTI ASSET NO. E320

	A. LATHE	BY	DATE
PROJ. MANAGER			
DESIGN-DETAILED	J. Burns	P. Bishop	12\19
CHECKED-REVIEWED	J. Waugh	J. Olund	12\19
DESIGN2-DETAILED2	–	–	–
DESIGN3-DETAILED3	–	–	–
REVISIONS 1	–	–	–
REVISIONS 2	–	–	–
REVISIONS 3	–	–	–
REVISIONS 4	–	–	–
FIELD CHANGES	–	–	–

SIGNATURE

P.E. NUMBER

DATE

INTERNATIONAL BRIDGE
SAINT JOHN RIVER
MADAWASKA, ME EDMUNDSTON, NB

TYPICAL SECTIONS

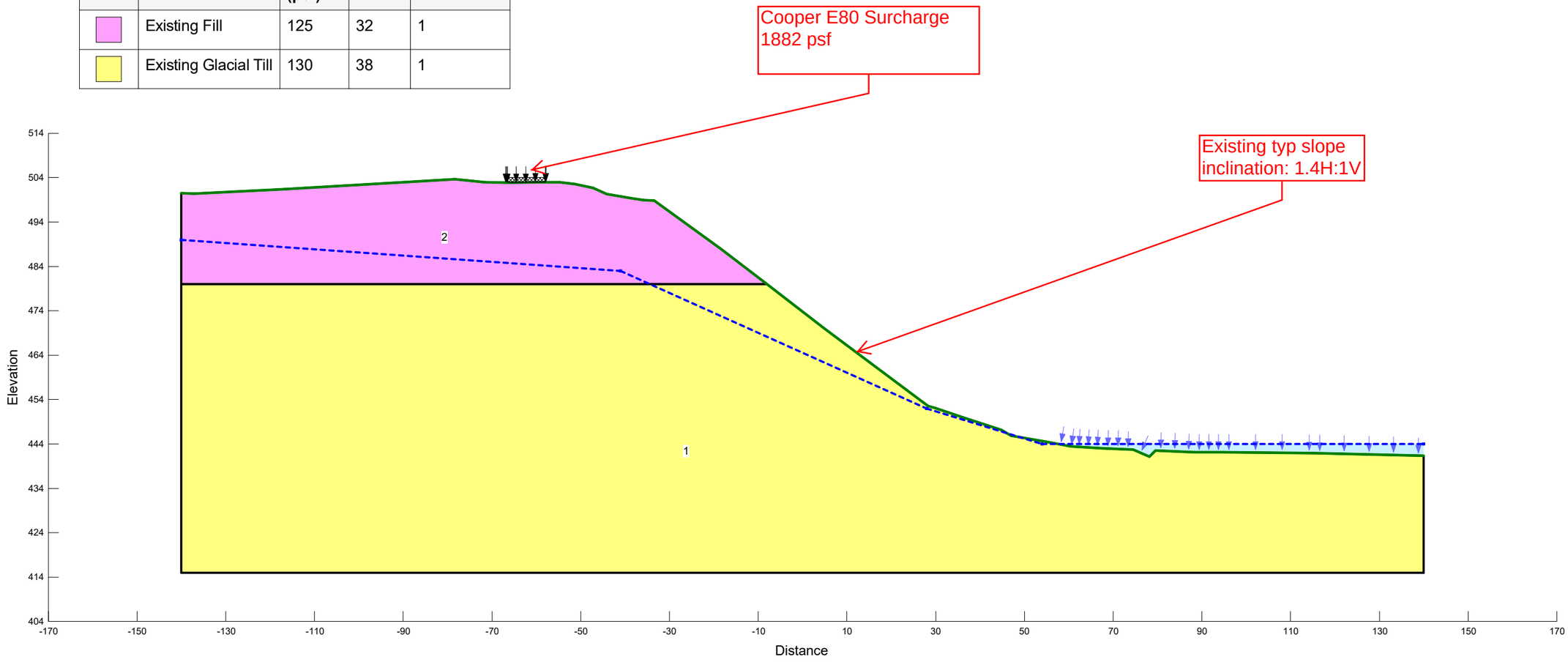
SHEET NUMBER
18

HNTB

Date:6/1/2020
Username:
Division:
Filename: 018_Typical Sections.dgn

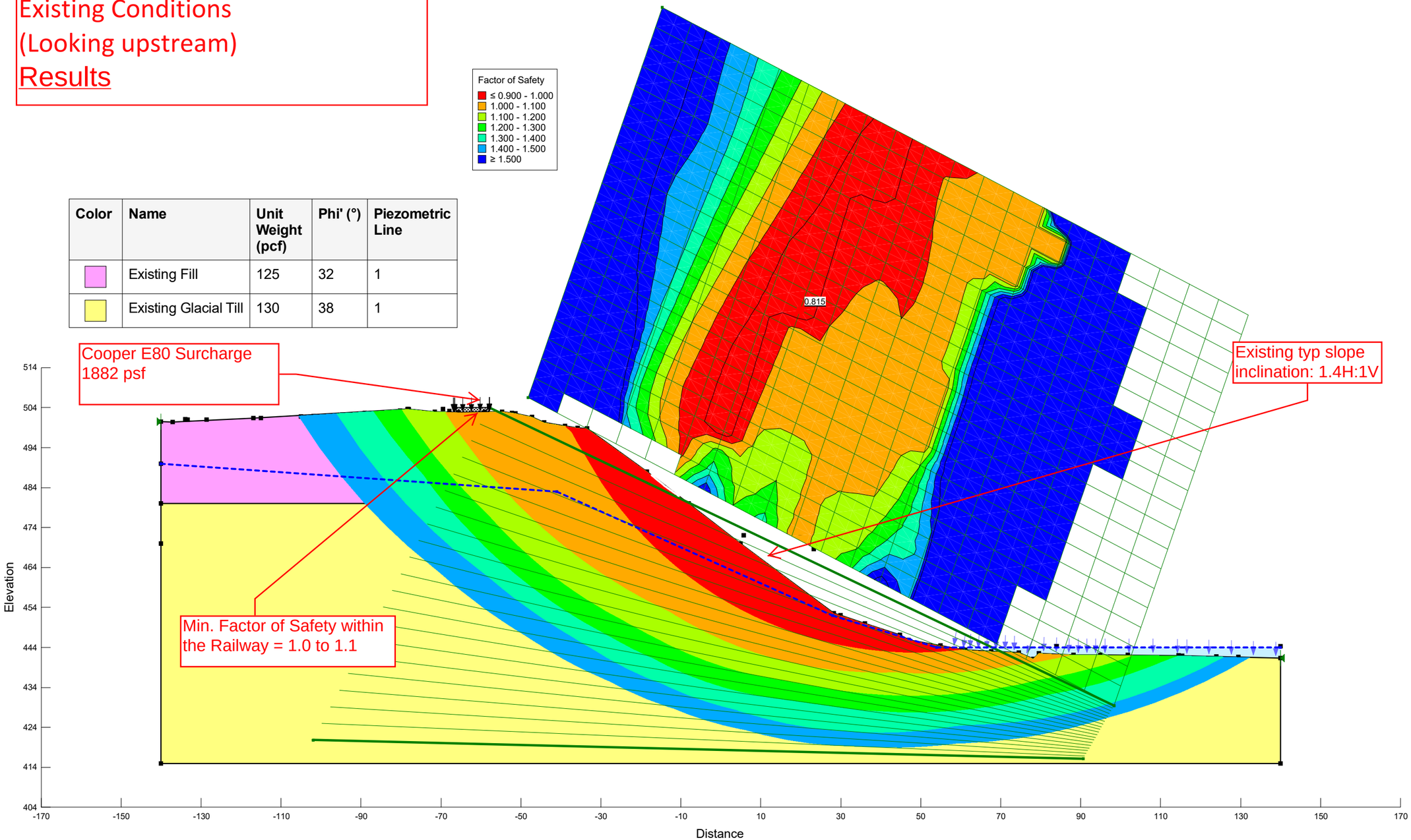
Madawaska
Pier 1 Location
Existing Conditions
(Looking upstream)
Definition

Color	Name	Unit Weight (pcf)	Phi' (°)	Piezometric Line
	Existing Fill	125	32	1
	Existing Glacial Till	130	38	1



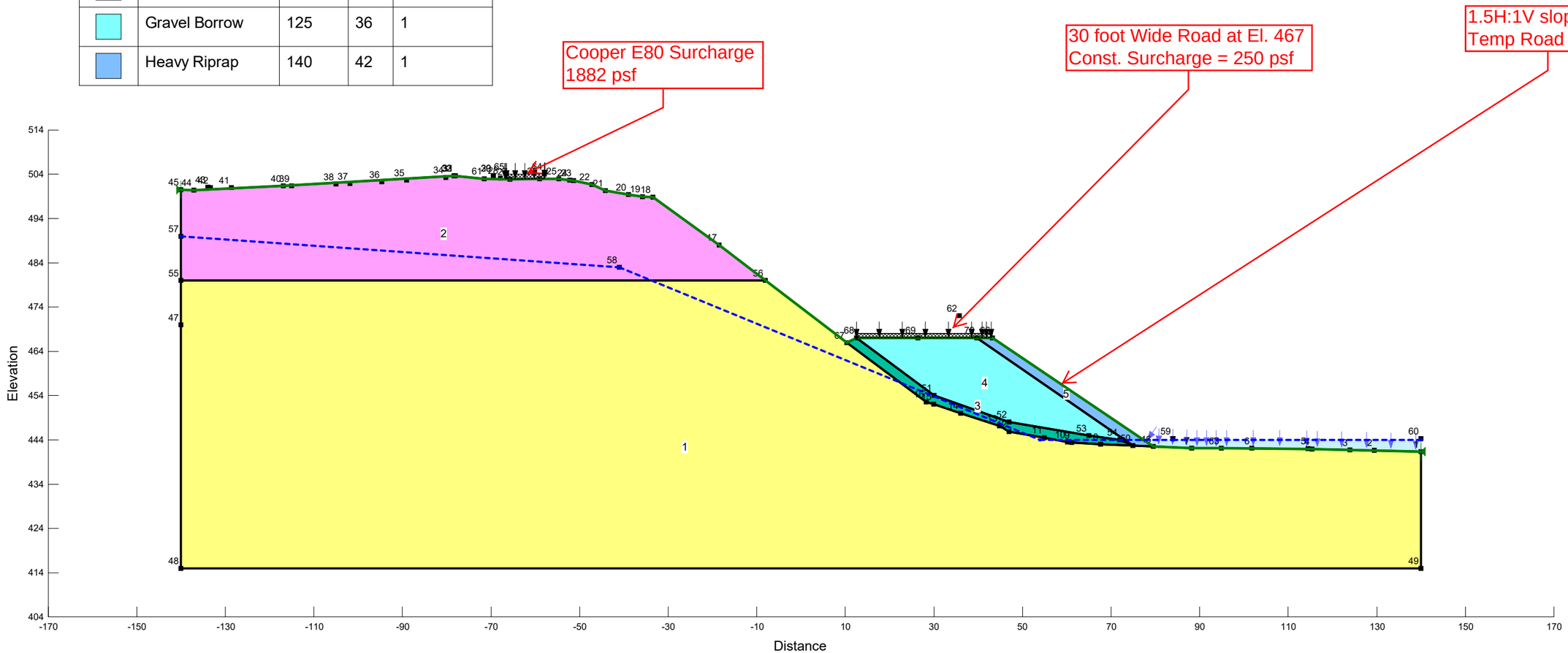
Madawaska
Pier 1 Location
Existing Conditions
(Looking upstream)
Results

Color	Name	Unit Weight (pcf)	Phi' (°)	Piezometric Line
	Existing Fill	125	32	1
	Existing Glacial Till	130	38	1



Madawaska
Pier 1 Location
Temporary Road EL. 467
Lower 30' Temp. Road
1.5H:1V with 2' Riprap cover
Gravel Borrow Fill
Definition

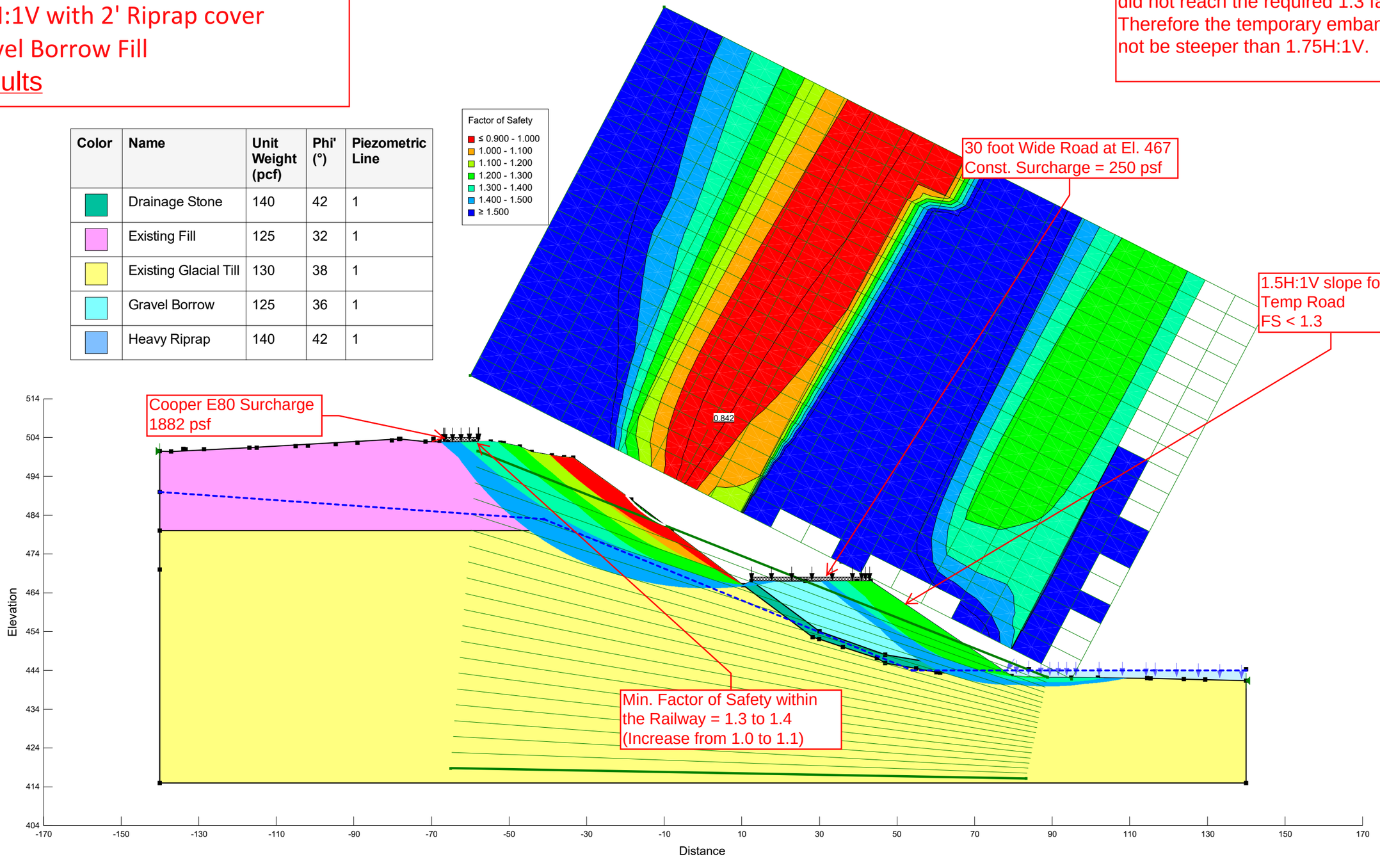
Color	Name	Unit Weight (pcf)	Phi' (°)	Piezometric Line
	Drainage Stone	140	42	1
	Existing Fill	125	32	1
	Existing Glacial Till	130	38	1
	Gravel Borrow	125	36	1
	Heavy Riprap	140	42	1



Madawaska
Pier 1 Location
Temporary Road EL. 467
Lower 30' Temp. Road
1.5H:1V with 2' Riprap cover
Gravel Borrow Fill
Results

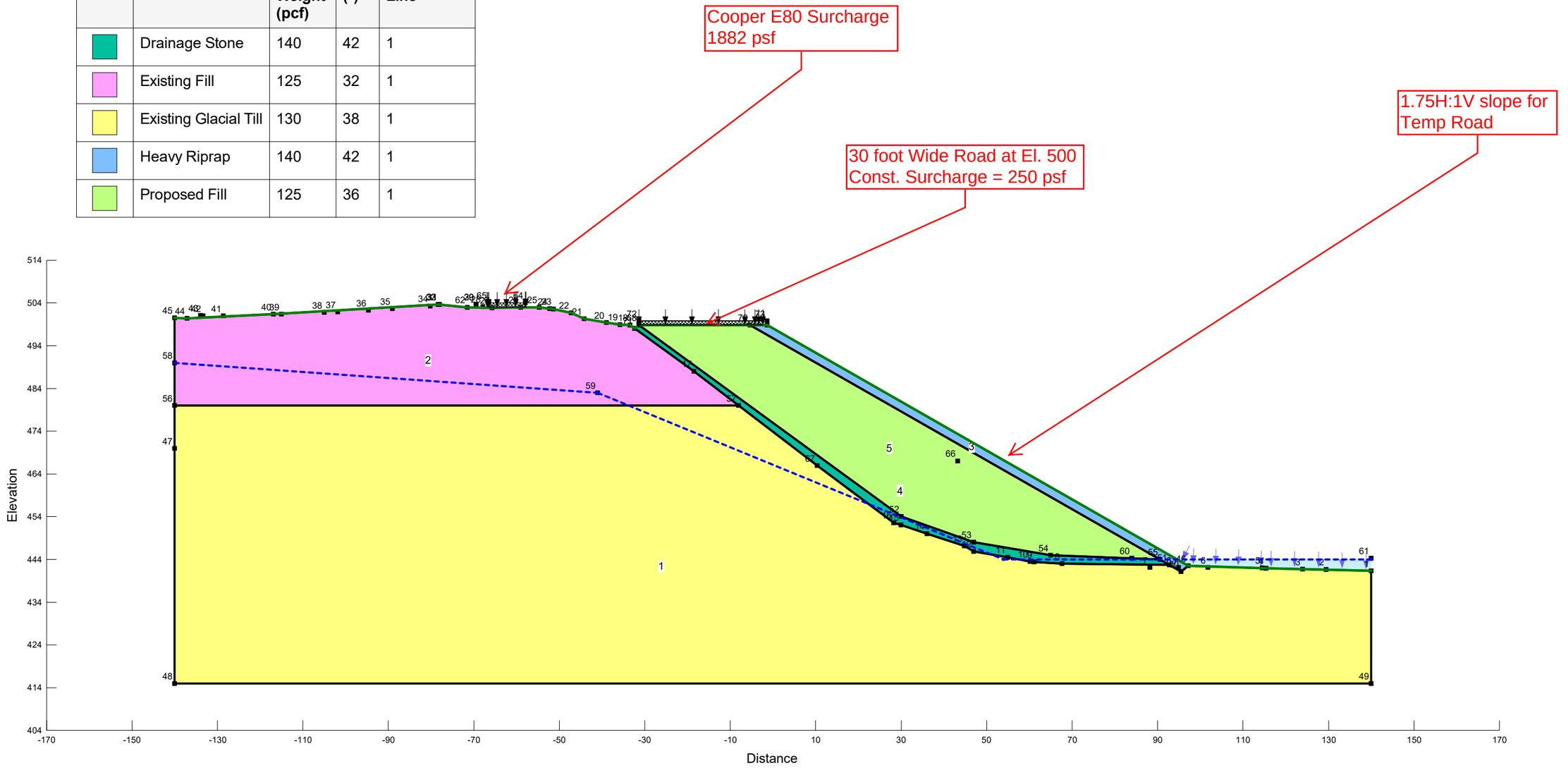
Results: 1.5H:1V embankment slopes were initially analyzed and showed improved factors of safety with regards to the railroads as shown here, however even with increased friction angle of the temporary fill, the factor of safety within the roadway footprint did not reach the required 1.3 factor of safety. Therefore the temporary embankment slopes can not be steeper than 1.75H:1V.

Color	Name	Unit Weight (pcf)	Phi' (°)	Piezometric Line
	Drainage Stone	140	42	1
	Existing Fill	125	32	1
	Existing Glacial Till	130	38	1
	Gravel Borrow	125	36	1
	Heavy Riprap	140	42	1

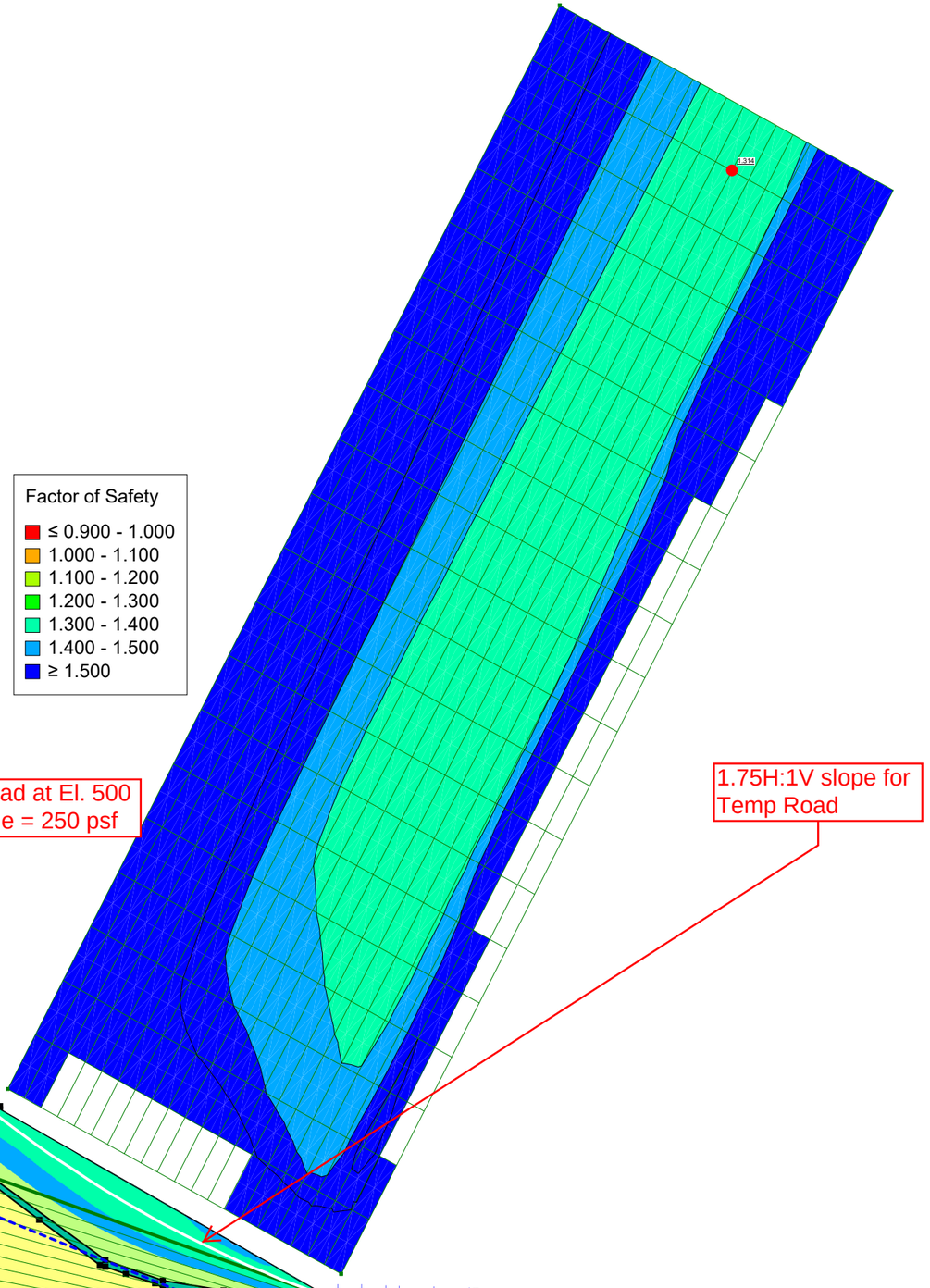


Madawaska
Pier 1 Location
Temporary Road EL. 500
Upper 30' Temp. Road
1.75H:1V with 2' Riprap cover
Gravel Borrow Fill
Definition

Color	Name	Unit Weight (pcf)	Phi' (°)	Piezometric Line
	Drainage Stone	140	42	1
	Existing Fill	125	32	1
	Existing Glacial Till	130	38	1
	Heavy Riprap	140	42	1
	Proposed Fill	125	36	1



Madawaska
Pier 1 Location
Temporary Road EL. 500
Upper 30' Temp. Road
1.75H:1V with 2' Riprap cover
Gravel Borrow Fill
Results

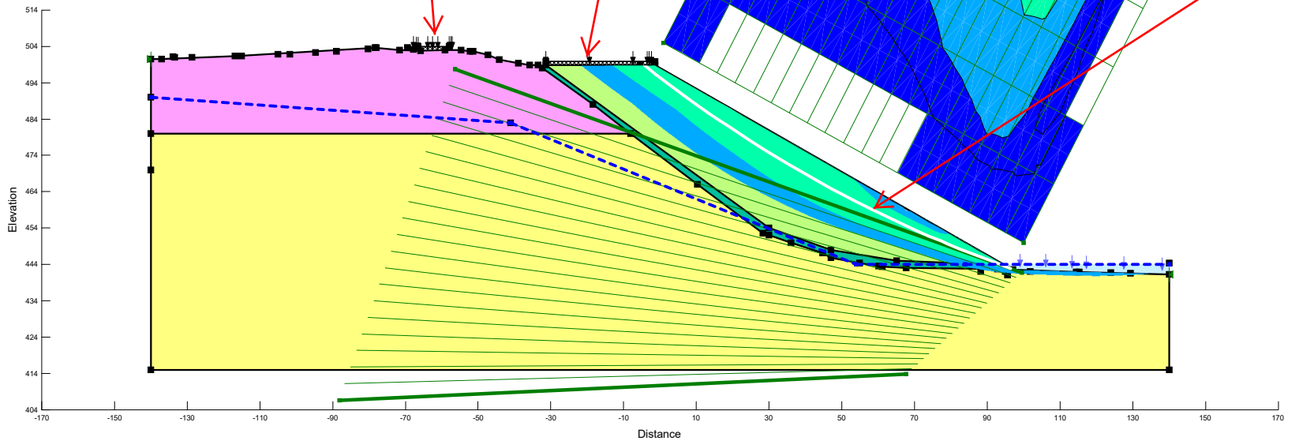


Cooper E80 Surcharge
1882 psf

30 foot Wide Road at El. 500
Const. Surcharge = 250 psf

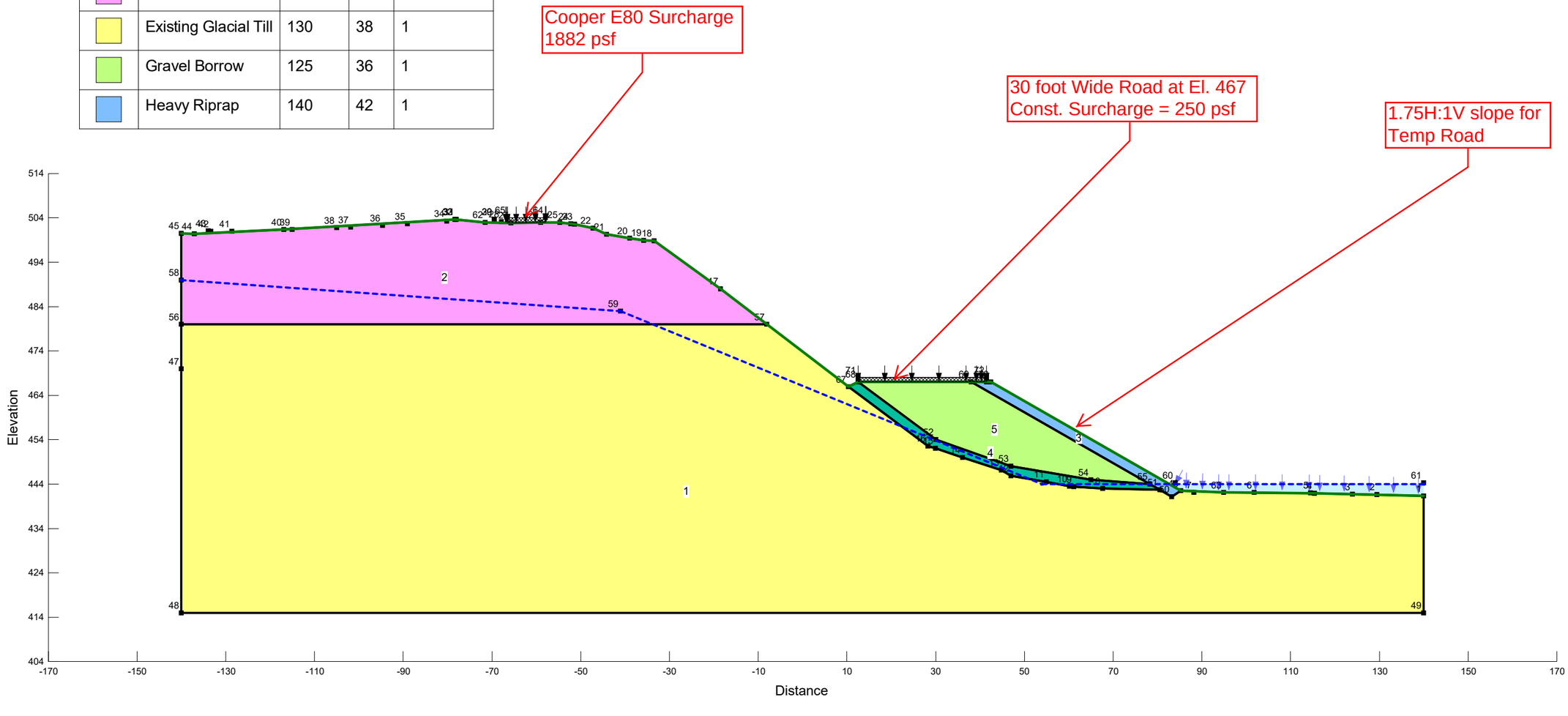
1.75H:1V slope for
Temp Road

Color	Name	Unit Weight (pcf)	Phi' (°)	Piezometric Line
	Drainage Stone	140	42	1
	Existing Fill	125	32	1
	Existing Glacial Till	130	38	1
	Gravel Borrow	125	36	1
	Heavy Riprap	140	42	1



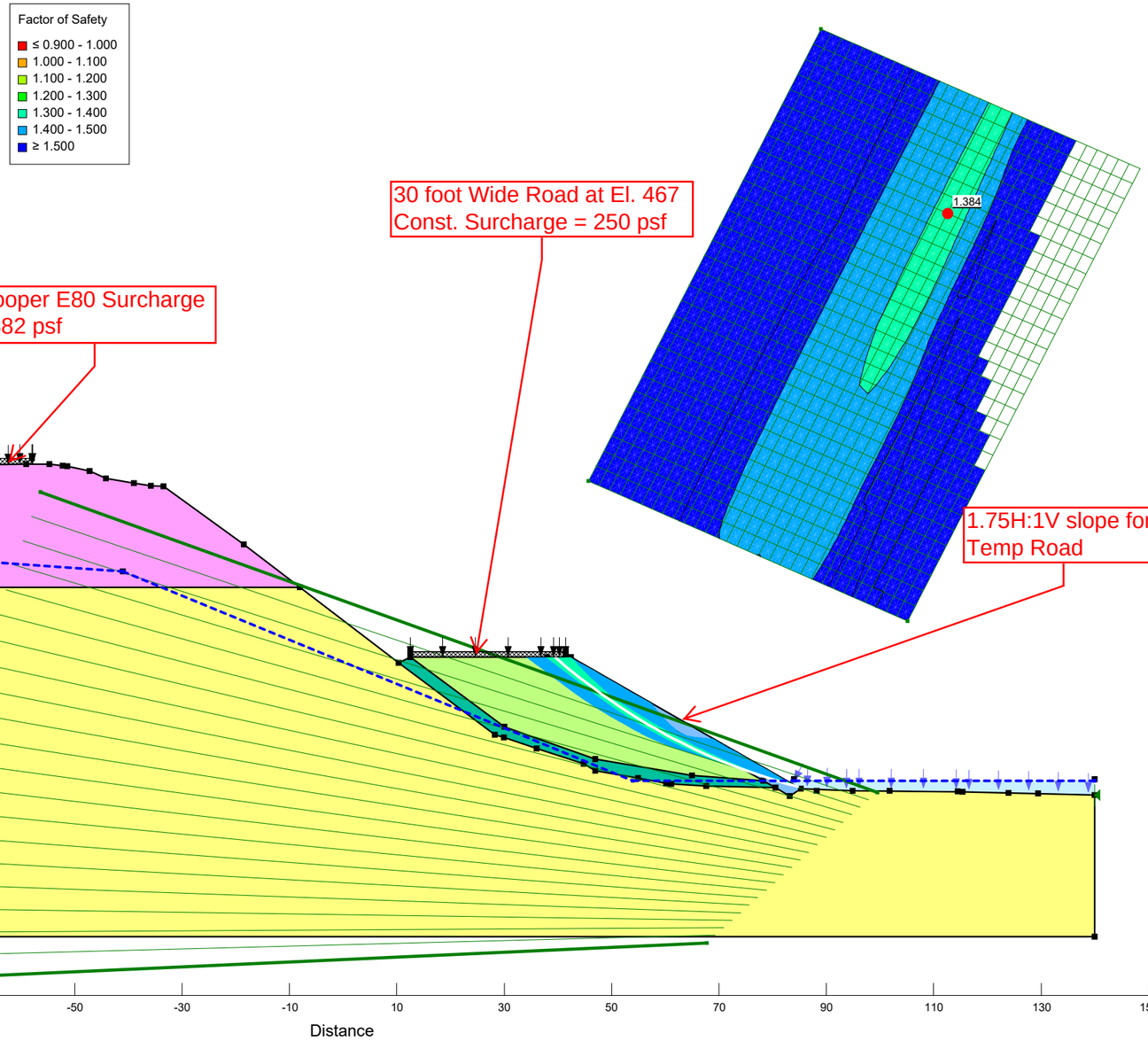
Madawaska
Pier 1 Location
Temporary Road EL. 467
Lower 30' Temp. Road
1.75H:1V with 2' Riprap cover
Gravel Borrow Fill
Definition

Color	Name	Unit Weight (pcf)	Phi' (°)	Piezometric Line
	Drainage Stone	140	42	1
	Existing Fill	125	32	1
	Existing Glacial Till	130	38	1
	Gravel Borrow	125	36	1
	Heavy Riprap	140	42	1



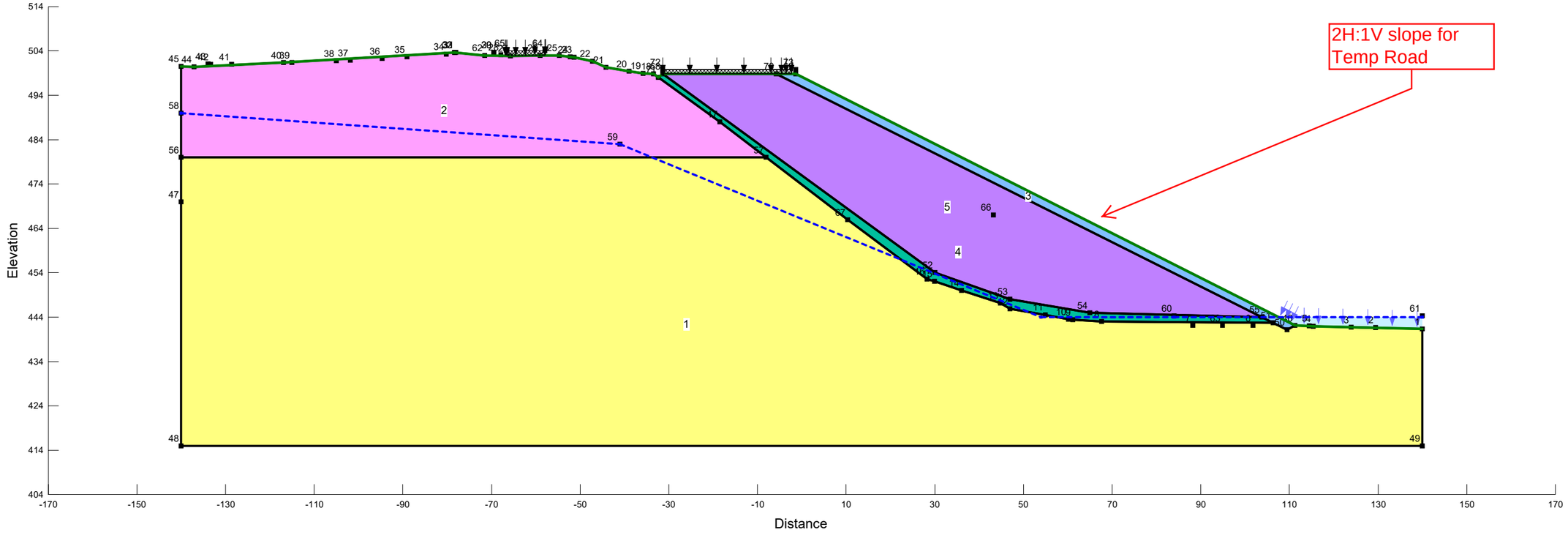
Madawaska
Pier 1 Location
Temporary Road EL. 467
Lower 30' Temp. Road
1.75H:1V with 2' Riprap cover
Gravel Borrow Fill
Results

Color	Name	Unit Weight (pcf)	Phi' (°)	Piezometric Line
	Drainage Stone	140	42	1
	Existing Fill	125	32	1
	Existing Glacial Till	130	38	1
	Gravel Borrow	125	36	1
	Heavy Riprap	140	42	1



Madawaska
Pier 1 Location
Temporary Road EL. 467
Lower 30' Temp. Road
2H:1V with 2' Riprap cover
Granular Borrow Fill
Definition

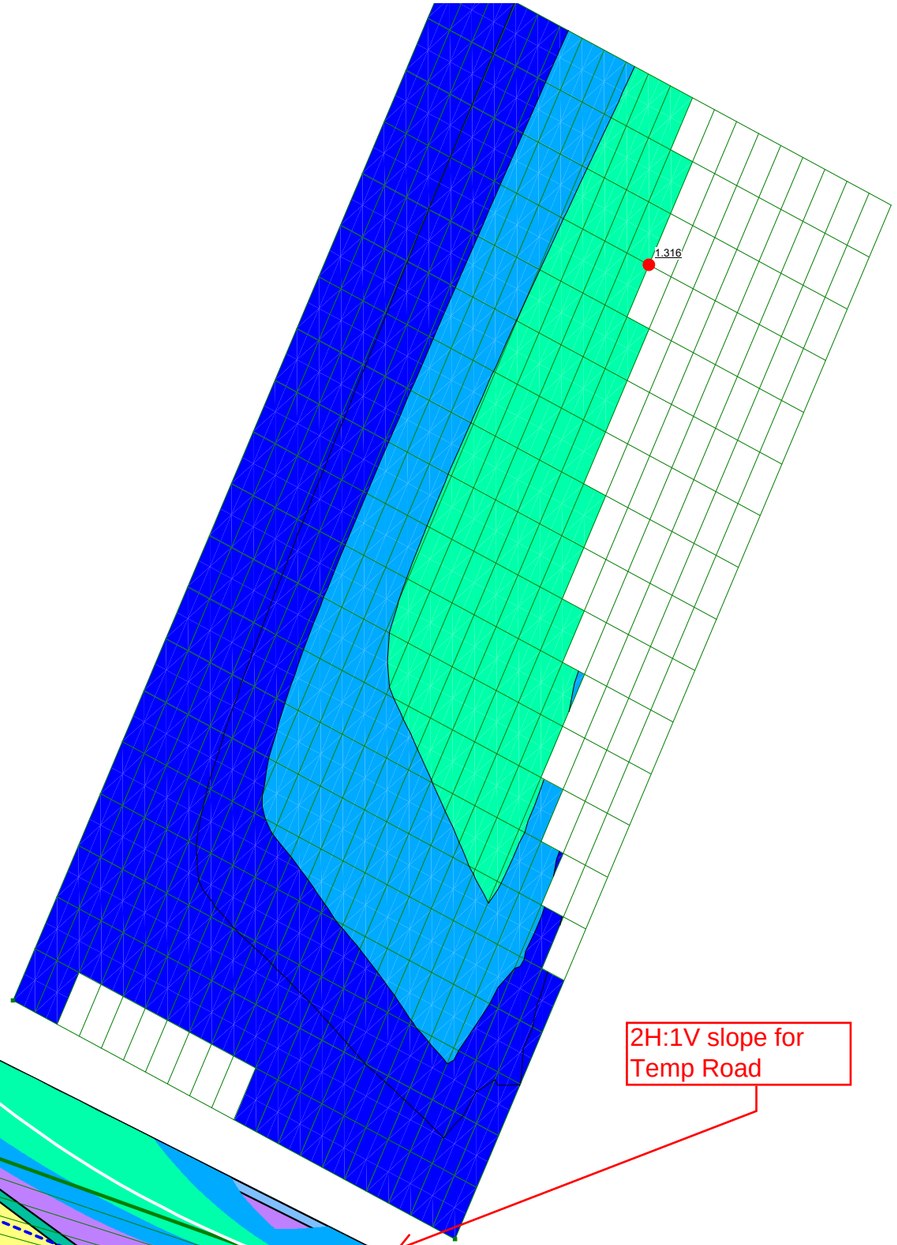
Color	Name	Unit Weight (pcf)	Phi' (°)	Piezometric Line
	Drainage Stone	140	42	1
	Existing Fill	125	32	1
	Existing Glacial Till	130	38	1
	Granular Borrow	125	32	1
	Heavy Riprap	140	42	1

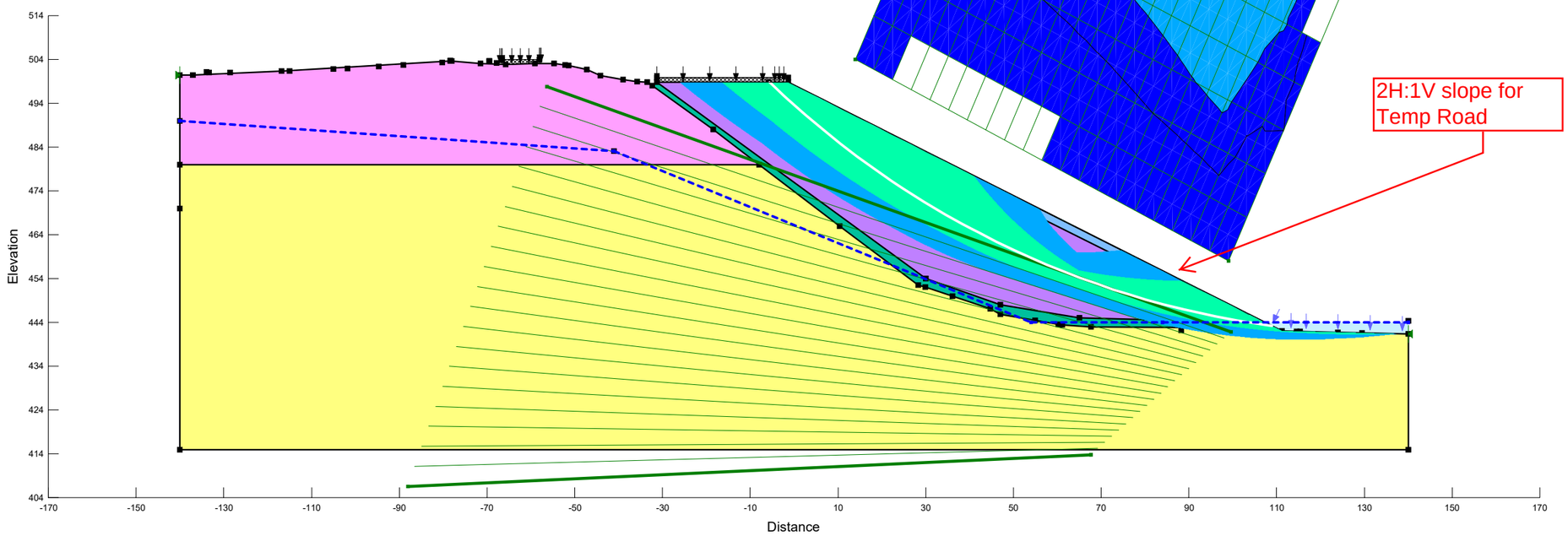


Madawaska
Pier 1 Location
Temporary Road EL. 467
Lower 30' Temp. Road
2H:1V with 2' Riprap cover
Granular Borrow Fill
Results

Color	Name	Unit Weight (pcf)	Phi' (°)	Piezometric Line
	Drainage Stone	140	42	1
	Existing Fill	125	32	1
	Existing Glacial Till	130	38	1
	Granular Borrow	125	32	1
	Heavy Riprap	140	42	1

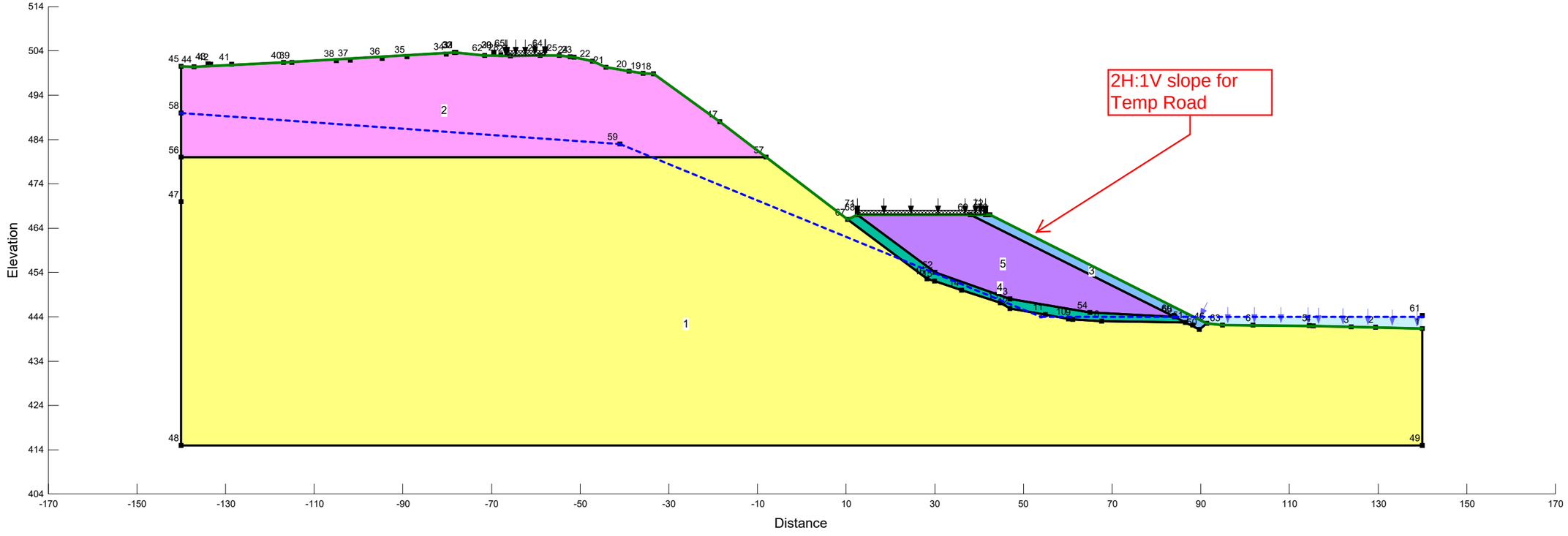
Factor of Safety
- ≤ 0.900 - 1.000
- 1.000 - 1.100
- 1.100 - 1.200
- 1.200 - 1.300
- 1.300 - 1.400
- 1.400 - 1.500
- ≥ 1.500





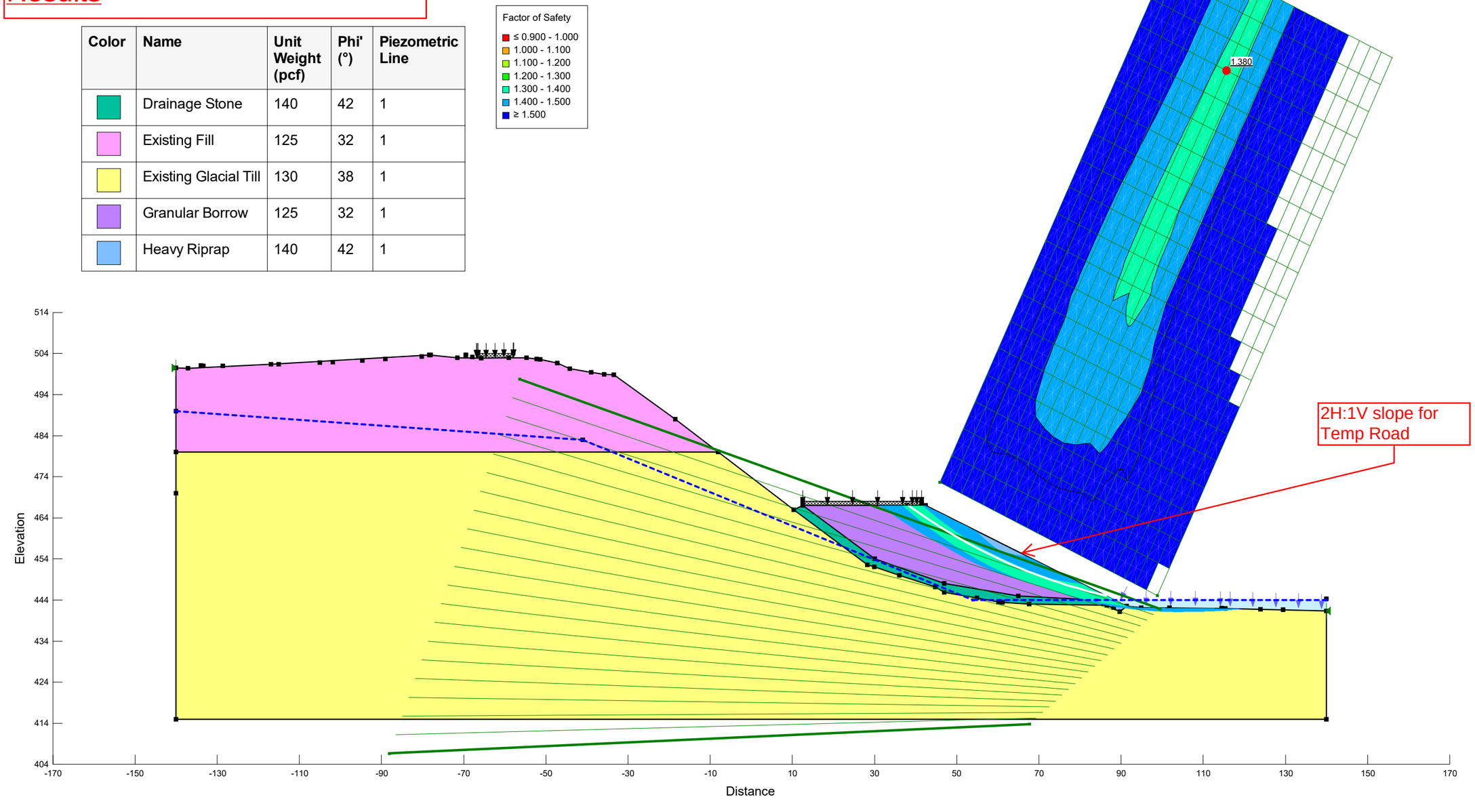
Madawaska
Pier 1 Location
Temporary Road EL. 467
Lower 30' Temp. Road
2H:1V with 2' Riprap cover
Granular Borrow Fill
Definition

Color	Name	Unit Weight (pcf)	Phi' (°)	Piezometric Line
	Drainage Stone	140	42	1
	Existing Fill	125	32	1
	Existing Glacial Till	130	38	1
	Granular Borrow	125	32	1
	Heavy Riprap	140	42	1



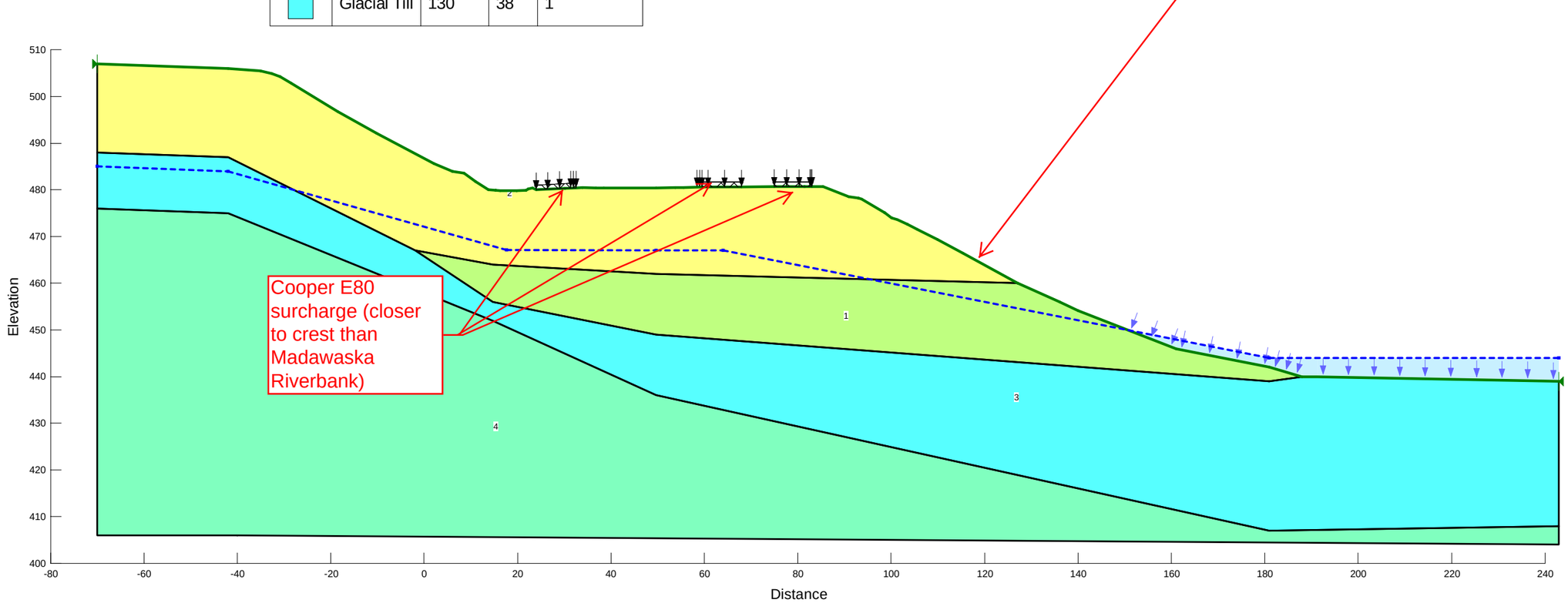
Madawaska
Pier 1 Location
Temporary Road EL. 467
Lower 30' Temp. Road
2H:1V with 2' Riprap cover
Granular Borrow Fill
Results

Color	Name	Unit Weight (pcf)	Phi' (°)	Piezometric Line
	Drainage Stone	140	42	1
	Existing Fill	125	32	1
	Existing Glacial Till	130	38	1
	Granular Borrow	125	32	1
	Heavy Riprap	140	42	1



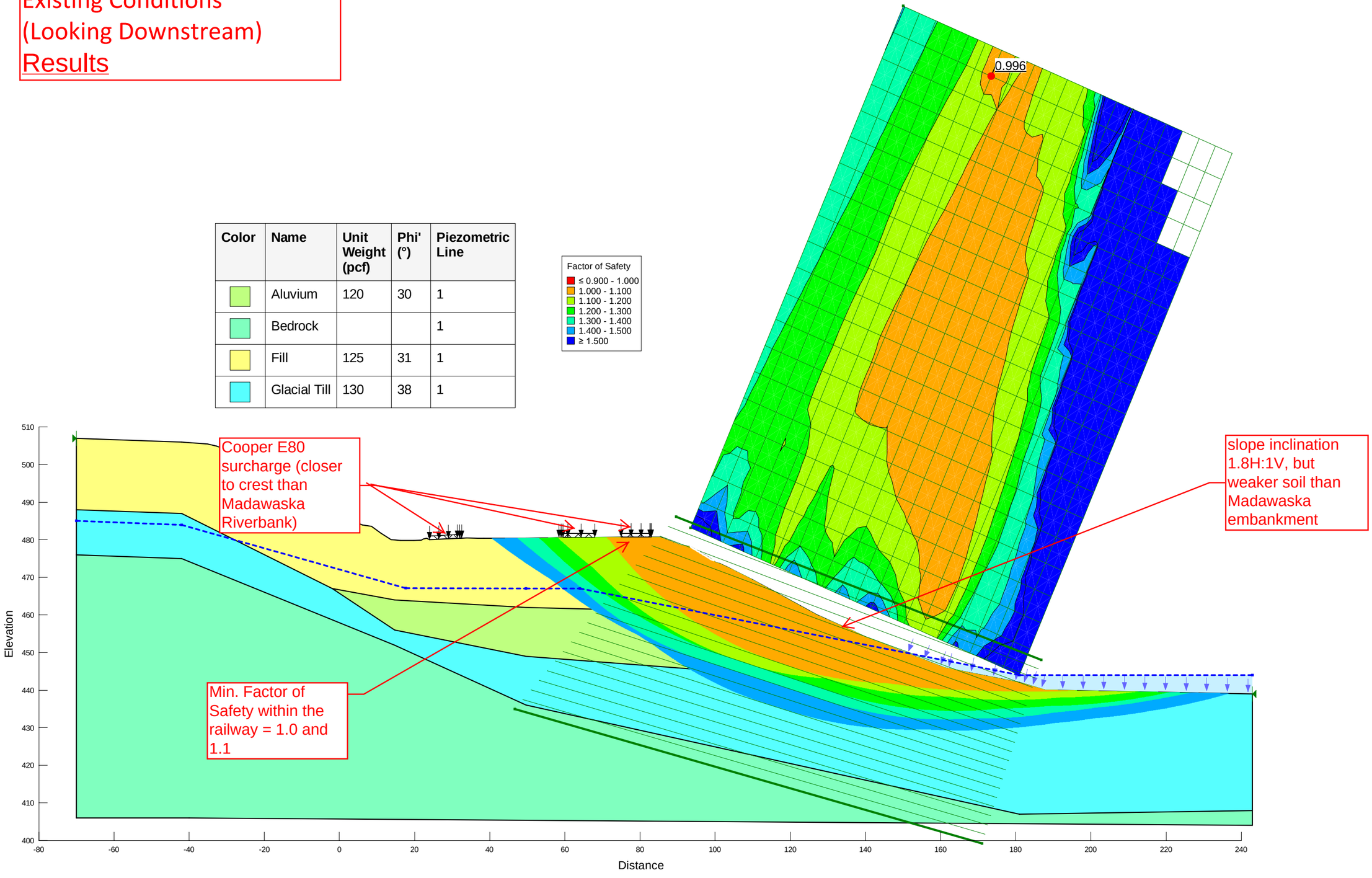
Edmundston
Pier 5 Location
Existing Conditions
(Looking Downstream)
Definition

Color	Name	Unit Weight (pcf)	Phi' (°)	Piezometric Line
	Aluvium	120	30	1
	Bedrock			1
	Fill	125	31	1
	Glacial Till	130	38	1



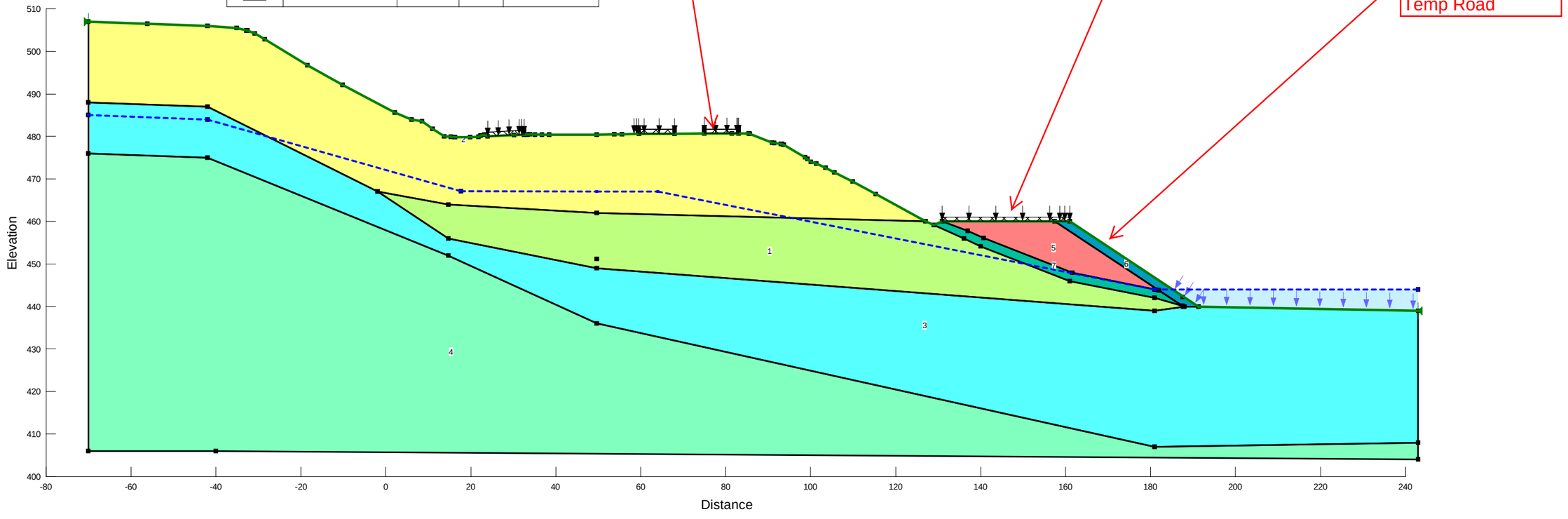
Edmundston
Pier 5 Location
Existing Conditions
(Looking Downstream)
Results

Color	Name	Unit Weight (pcf)	Phi' (°)	Piezometric Line
	Aluvium	120	30	1
	Bedrock			1
	Fill	125	31	1
	Glacial Till	130	38	1



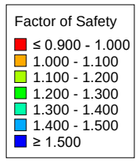
Edmundston
Pier 5 Location
Lower 30' Temp. Road
1.5H:1V with 2' Riprap cover
Gravel Borrow Fill
(Looking Downstream)
Definition

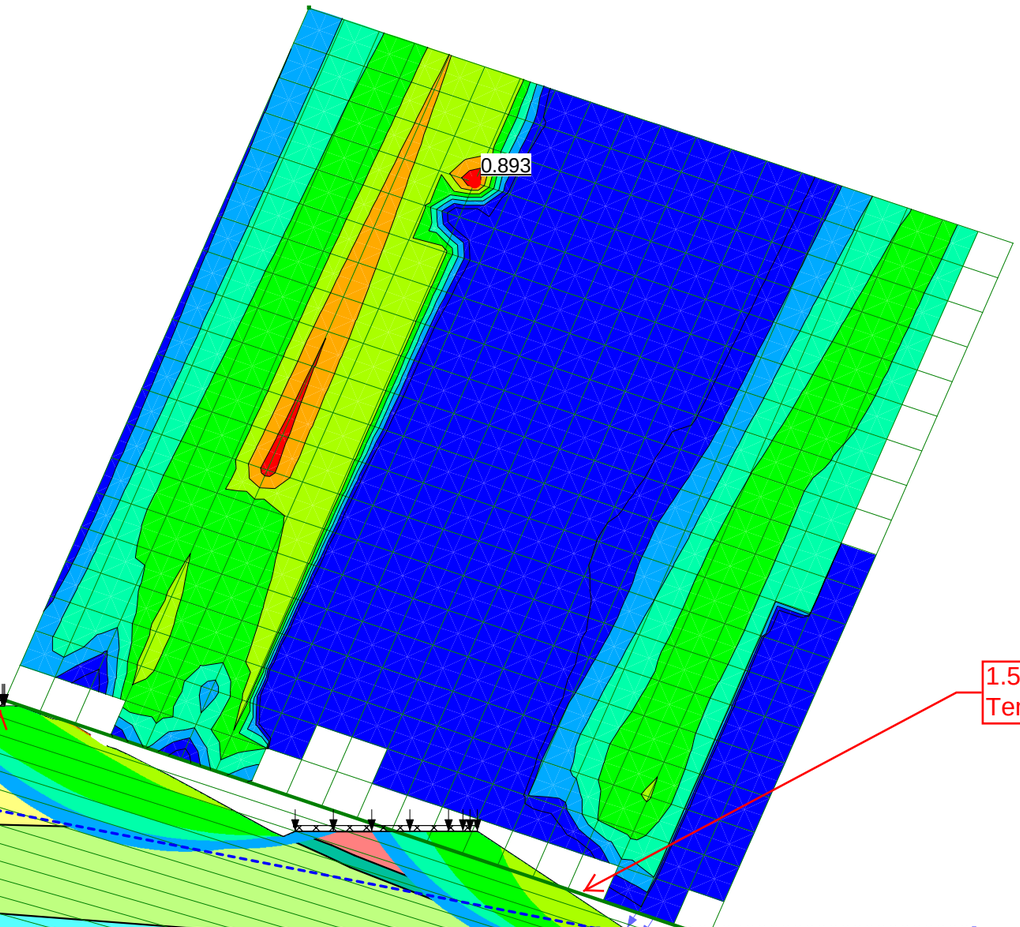
Color	Name	Unit Weight (pcf)	Phi' (°)	Piezometric Line
	Aluvium	120	30	1
	Bedrock			1
	Drainage Stone	140	42	1
	Fill	125	31	1
	Glacial Till	130	38	1
	Gravel Borrow	125	36	1
	Heavy Riprap	140	42	1

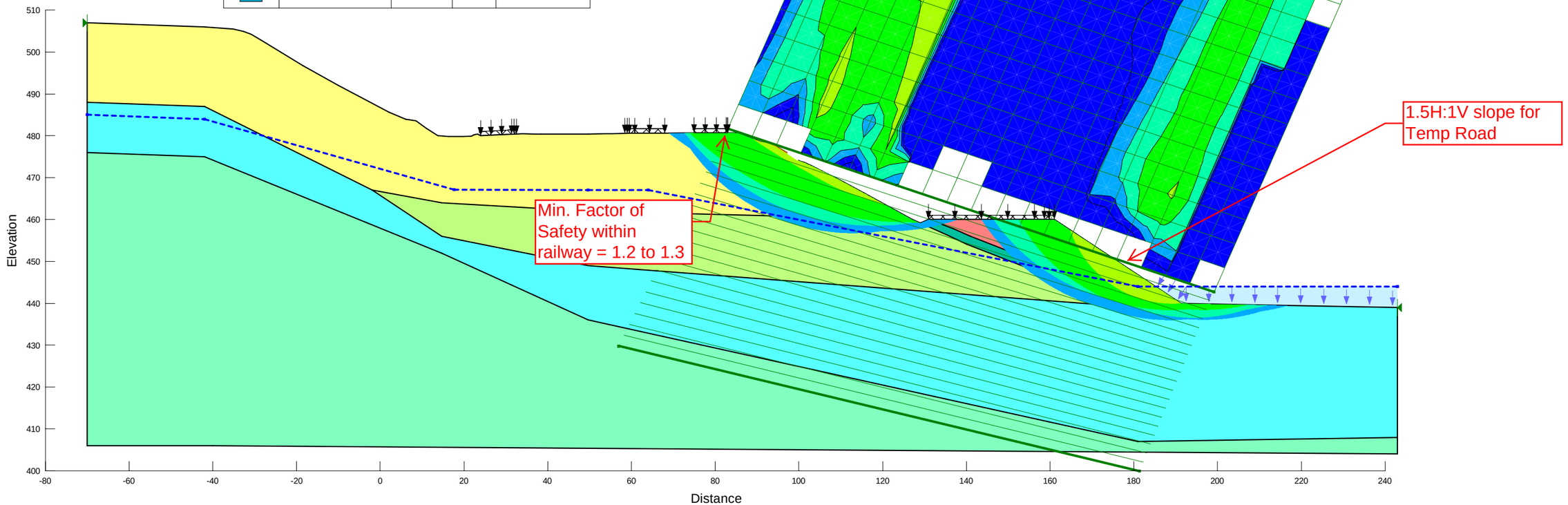


Edmundston
Pier 5 Location
Lower 30' Temp. Road
1.5H:1V with 2' Riprap cover
Gravel Borrow Fill
(Looking Downstream)
Results

Color	Name	Unit Weight (pcf)	Phi' (°)	Piezometric Line
	Aluvium	120	30	1
	Bedrock			1
	Drainage Stone	140	42	1
	Fill	125	31	1
	Glacial Till	130	38	1
	Gravel Borrow	125	36	1
	Heavy Riprap	140	42	1





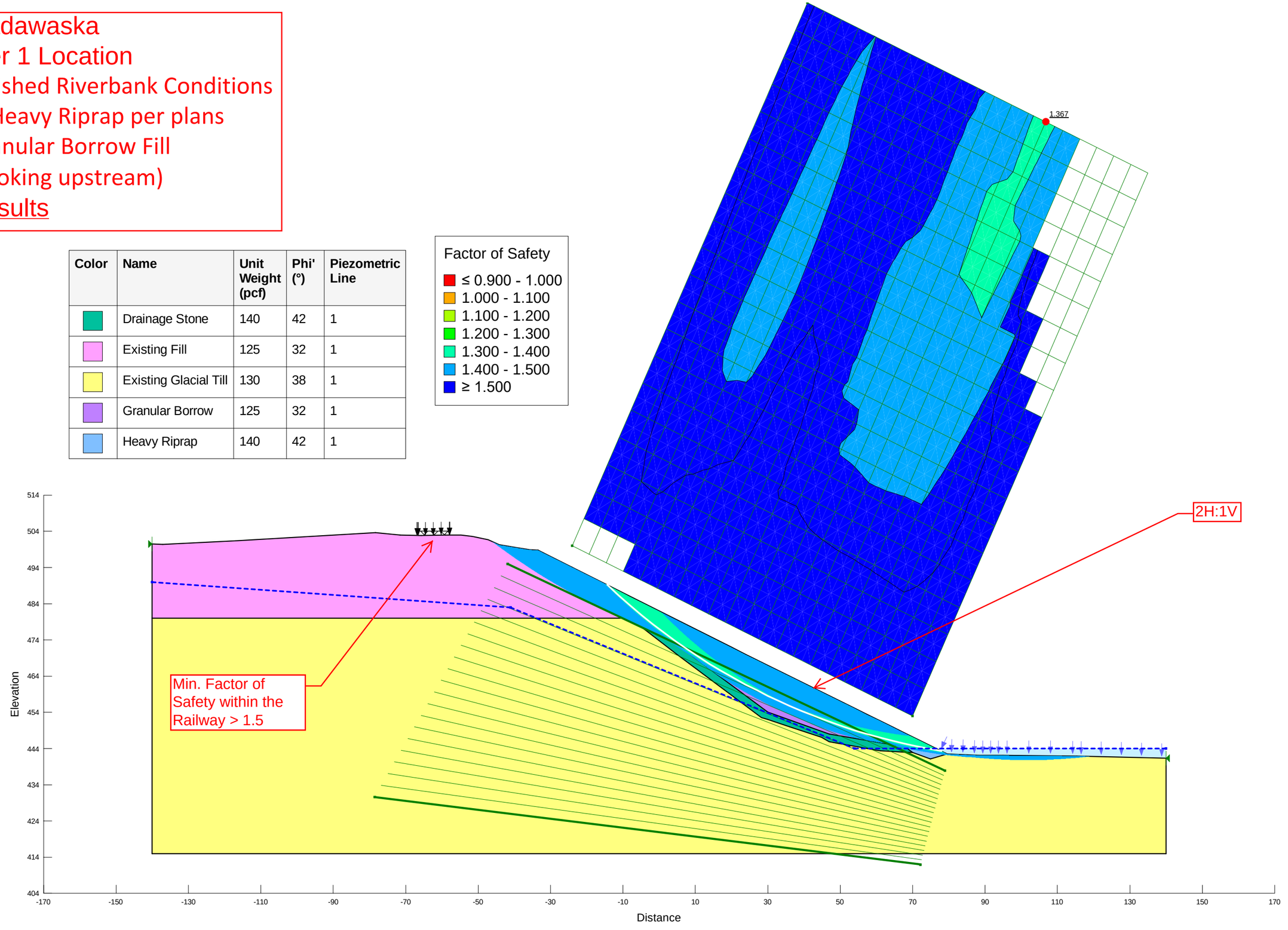


Permanent Riverbank Slope Conditions

Madawaska
Pier 1 Location
Finished Riverbank Conditions
3' Heavy Riprap per plans
Granular Borrow Fill
(Looking upstream)
Results

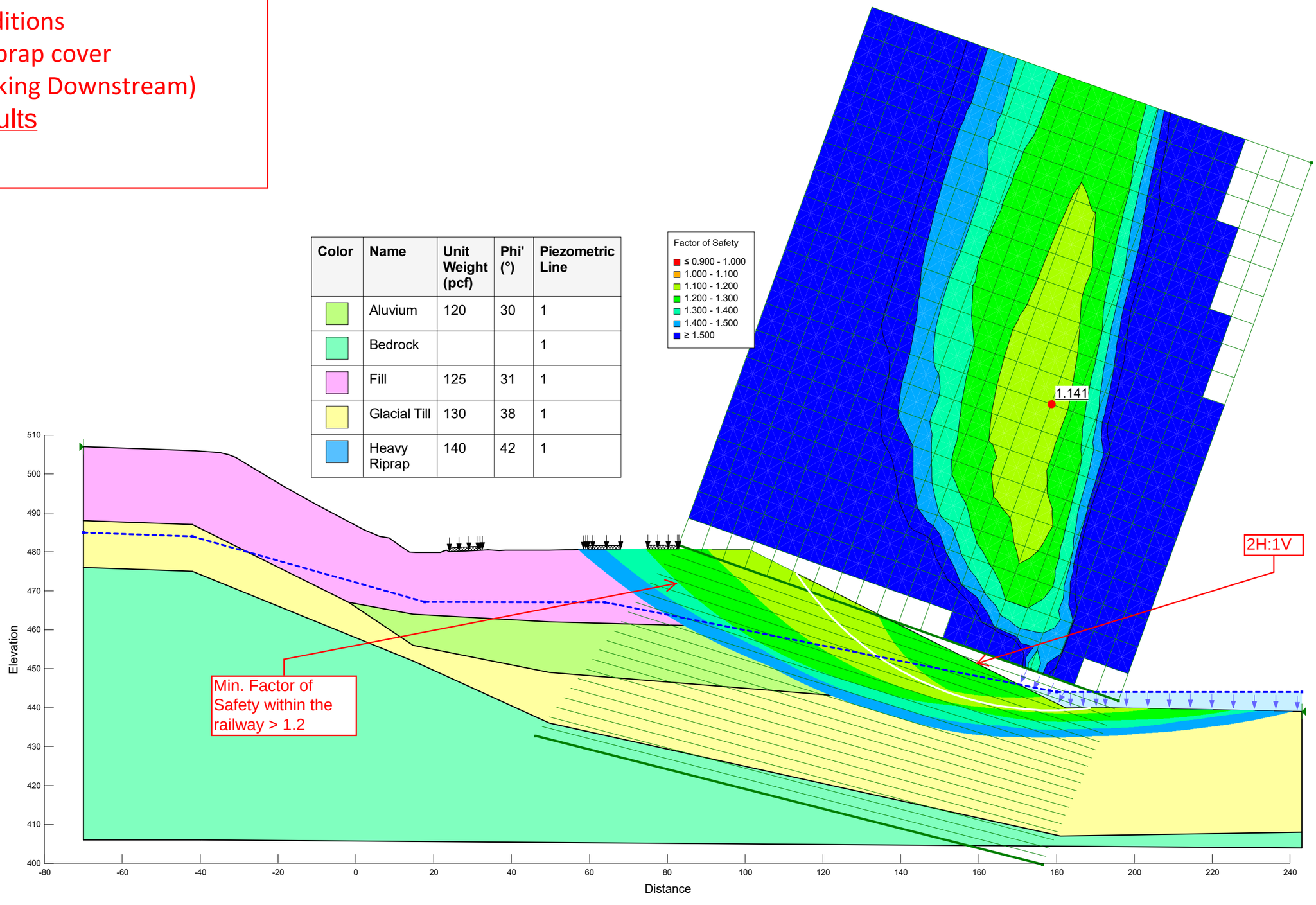
Color	Name	Unit Weight (pcf)	Phi' (°)	Piezometric Line
	Drainage Stone	140	42	1
	Existing Fill	125	32	1
	Existing Glacial Till	130	38	1
	Granular Borrow	125	32	1
	Heavy Riprap	140	42	1

Factor of Safety
- ≤ 0.900 - 1.000
- 1.000 - 1.100
- 1.100 - 1.200
- 1.200 - 1.300
- 1.300 - 1.400
- 1.400 - 1.500
- ≥ 1.500



Edmundston
Pier 5 Location
Finished Riverbank
Conditions
4' Riprap cover
(Looking Downstream)
Results

Color	Name	Unit Weight (pcf)	Phi' (°)	Piezometric Line
	Aluvium	120	30	1
	Bedrock			1
	Fill	125	31	1
	Glacial Till	130	38	1
	Heavy Riprap	140	42	1



Footings Bearing on Soil

GZA
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Suite 150
South Portland, Maine 04106
207-879-9190
Fax 207-879-0099

Engineers and Scientists

JOB: 09.0025984.03 Madawaska Int'l Bridge # 2399
SUBJECT: Abutment Bearing on Str. Fill (Short WWs)
SHEET: 1 OF 8
CALCULATED BY N. Williams 7/30/2020
CHECKED BY A. Blaisdell 8/25/2020

Objective

Calculate soil bearing resistance for Madawaska Abutment East/West Wingwall (Short) foundations bearing on compacted Structural Fill at approx. Elevation 510 and 518, placed after overexcavation of existing fill to expose natural glacial till.
Evaluate strength and service limit bearing resistance for a range of effective footing widths.

References

1. American Association of State Highway and Transportation Officials, AASHTO LRFD Bridge Design Specifications: Customary U.S. Units, 8th edition, 2017 (AASHTO LRFD), Articles 10.5.5.2.2 and 10.6.3.1.
2. Terzaghi, Peck & Mesri, Soil Mechanics in Engineering Practice, Third Edition, 1996.

Soil Properties and Geotechnical Inputs

$\phi_f := 36deg$ — Friction angle of soil (Gravel Borrow, Item 703.20, or Type D Subbase Gravel, Item 703.06, compacted to 95% of maximum dry density per Modified Proctor). Underlying glacial till has higher friction angle, fill controls.

$\phi_b := 0.45$ — Bearing resistance factor as specified in Table 10.5.5.2.2-1 (Theoretical Method, SPT Data, Strength Limit)

$c := 0ksf$ — Cohesion, taken as undrained shear strength from correlated N values and Pocket Penetrometer data

$\gamma := 125pcf$ — Unit weight of soil above or below the bearing depth of the footing

$N_c := 50.6$ — Cohesion term bearing capacity factor as specified in Table 10.6.3.1.2a-1

$N_q := 37.8$ — Surcharge term bearing capacity factor as specified in Table 10.6.3.1.2a-1

$N_\gamma := 56.3$ — Total unit weight term bearing capacity factor as specified in Table 10.6.3.1.2a-1

C_{wq}, $C_{w\gamma}$:= — Correction factors to account for the location of the groundwater table as specified in Table 10.6.3.1.2a-2

Depth to water table at or above depth of footing (D_f) $C_{wq} := 0.5$ $C_{w\gamma} := .5$

d_q:= — Correction factor to account for the shearing resistance along the failure surface passing through cohesionless material above the bearing elevation as specified in Table 10.6.3.1.2a-4

s_c, s_γ, s_q:= — Footing shape correction factors as specified in Table 10.6.3.1.2a-2

$S_c := 0.75in$ — Allowable settlement

q_s= — Service limit bearing resistance for allowable settlement, Resistance Factor = 1.0

$N_{60} := 30$ — Assumed Nvalue for placed and compacted fill

Load inclination factors are omitted considering modest embedment offooting per C10.6.3.1.2a.

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JOB: 09.0025984.03 Madawaska Int'l Bridge # 2399
SUBJECT: Abutment Bearing on Str. Fill (Short WWs)
SHEET: 2 OF 8
CALCULATED BY N. Williams 7/30/2020
CHECKED BY A. Blaisdell 8/25/2020

Footing Dimensions

$$B_1 := \begin{pmatrix} 9 \\ 10.5 \\ 12 \\ 13.5 \\ 15 \end{pmatrix} ft$$ Range of effective footing widths considered (includes eccentricity)

$L_1 := 30ft$ Max Length of footing controls for Service, Min length = 27 ft (max controls in service)

$D_f := 8ft$ Footing embedment depth

Strength Limit Design

$q_n = cN_{cm} + \gamma D_f N_{qm} C_{wq} + 0.5\gamma B N_{\gamma m} C_{w\gamma}$ Nominal Bearing Resistance Formula

$q.D = \varphi_b \times q_n$ Factored Bearing Resistance Formula

Correction Factors

$$d_{qtable} := \frac{D_f}{B_1} \qquad d_{qtable} = \begin{pmatrix} 0.89 \\ 0.76 \\ 0.67 \\ 0.59 \\ 0.53 \end{pmatrix}$$ Using Table 10.6.3.1.2a-4

$d_q := 1$ dq assumed soil above footing less competent than soil below footing.

$$s_c := 1 + \left(\frac{B_1}{L_1}\right)\left(\frac{N_q}{N_c}\right) \qquad s_c = \begin{pmatrix} 1.22 \\ 1.26 \\ 1.3 \\ 1.34 \\ 1.37 \end{pmatrix}$$

$$s_q := 1 + \left(\frac{B_1}{L_1}\tan(\phi_f)\right) \qquad s_q = \begin{pmatrix} 1.22 \\ 1.25 \\ 1.29 \\ 1.33 \\ 1.36 \end{pmatrix}$$

$$s_\gamma := 1 - 0.4\left(\frac{B_1}{L_1}\right) \qquad s_\gamma = \begin{pmatrix} 0.88 \\ 0.86 \\ 0.84 \\ 0.82 \\ 0.8 \end{pmatrix}$$

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Engineers and Scientists

JOB: 09.0025984.03 Madawaska Int'l Bridge # 2399
SUBJECT: Abutment Bearing on Str. Fill (Short WWs)
SHEET: 3 OF 8
CALCULATED BY N. Williams 7/30/2020
CHECKED BY A. Blaisdell 8/25/2020

Bearing Capacity Factors

$$N_{cm} := N_c \cdot s_c \qquad N_{cm} = \begin{pmatrix} 61.94 \\ 63.83 \\ 65.72 \\ 67.61 \\ 69.5 \end{pmatrix}$$

$$N_{qm} := N_q \cdot s_q \cdot d_q \qquad N_{qm} = \begin{pmatrix} 46 \\ 47.4 \\ 48.8 \\ 50.2 \\ 51.5 \end{pmatrix}$$

$$N_{\gamma m} := N_\gamma \cdot s_\gamma \qquad N_{\gamma m} = \begin{pmatrix} 49.5 \\ 48.4 \\ 47.3 \\ 46.2 \\ 45 \end{pmatrix}$$

Nominal Bearing Resistance

$$q_n := \overrightarrow{\left(c \cdot N_{cm} + \gamma \cdot D_f \cdot N_{qm} \cdot C_{wq} + 0.5 \cdot \gamma \cdot B_1 \cdot N_{\gamma m} \cdot C_{w\gamma}\right)} \qquad q_n = \begin{pmatrix} 37 \\ 39.6 \\ 42.1 \\ 44.6 \\ 46.9 \end{pmatrix} \cdot ksf$$

Factored Bearing Resistance - Strength Limit State

$$q_D := \phi_b \cdot q_n \qquad q_D = \begin{pmatrix} 16.6 \\ 17.8 \\ 19 \\ 20 \\ 21.1 \end{pmatrix} \cdot ksf \qquad \text{for} \quad B_1 = \begin{pmatrix} 9 \\ 10.5 \\ 12 \\ 13.5 \\ 15 \end{pmatrix} \cdot ft$$

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Engineers and Scientists

JOB: 09.0025984.03 Madawaska Int'l Bridge # 2399
SUBJECT: Abutment Bearing on Str. Fill (Short WWs)
SHEET: 4 OF 8
CALCULATED BY N. Williams 7/30/2020
CHECKED BY A. Blaisdell 8/25/2020

Service Limit Design

Evaluate service limit bearing resistance for the specified allowable settlement using the semi-empirical SPT Method by Burland and Burbidge (1985) provided in Terzaghi, Peck & Mesri, 96.

$S_{cm} := S_c \cdot \frac{1}{1mm}$ $S_{cm} = 19$ Allowable settlement in millimeters and unitless

$B_{1m} := B_1 \cdot \frac{1}{1m}$ $B_{1m} = \begin{pmatrix} 2.7 \\ 3.2 \\ 3.7 \\ 4.1 \\ 4.6 \end{pmatrix}$ Effective footing width in meters and unitless

$S_{cmr} := S_{cm} \cdot \left[\frac{\left[1.25 \cdot \left(\frac{L_1}{B_1} \right) \right]}{\left(\frac{L_1}{B_1} \right) + 0.25} \right]^2$ $S_{cmr} = \begin{pmatrix} 25.8 \\ 25.2 \\ 24.6 \\ 24 \\ 23.5 \end{pmatrix}$ Correction formula for rectangular footings (Terzaghi EQ 50.14)

$EQ_1 := S_{cm} \cdot \left(\frac{S_{cm}}{S_{cmr}} \right)$ $EQ_1 = \begin{pmatrix} 14.09 \\ 14.42 \\ 14.75 \\ 15.09 \\ 15.43 \end{pmatrix}$

$EQ_2 := \frac{N_{60}^{1.4}}{1.7 \cdot B_{1m}^{0.75}}$ $EQ_2 = \begin{pmatrix} 32 \\ 29 \\ 26 \\ 24 \\ 22 \end{pmatrix}$

$q_{snc} := \overrightarrow{(EQ_1 \cdot EQ_2)}$ $q_{snc} =$

	0
0	454.7
1	414.5
2	383.7
3	359.3
4	339.5

Formula results are in kPa (Terzaghi EQ 50.28)

Results represent normally consolidated soil.

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Engineers and Scientists

JOB: 09.0025984.03 Madawaska Int'l Bridge # 2399
SUBJECT: Abutment Bearing on Str. Fill (Short WWs)
SHEET: 5 OF 8
CALCULATED BY N. Williams 7/30/2020
CHECKED BY A. Blaisdell 8/25/2020

$q_s := q_{snc}$ $\quad q_s = \begin{pmatrix} 455 \\ 415 \\ 384 \\ 359 \\ 339 \end{pmatrix}$

Assumes sand is normally consolidated at current effective stress

$q_{sm} := q_s \cdot 1kPa$ $\quad q_{sm} = \begin{pmatrix} 455 \\ 415 \\ 384 \\ 359 \\ 339 \end{pmatrix} \cdot kPa$

Service limit bearing resistance for allowable settlement (metric units)

$q_{se} := q_{sm}$ $\quad q_{se} = \begin{pmatrix} 9.5 \\ 8.7 \\ 8 \\ 7.5 \\ 7.1 \end{pmatrix} \cdot ksf$

Service limit bearing resistance for allowable settlement (English units)

for $\quad B_1 = \begin{pmatrix} 9 \\ 10.5 \\ 12 \\ 13.5 \\ 15 \end{pmatrix} \cdot ft$

Proposed effective footing widths and corresponding factored bearing pressure provided by HNTB.

US Abutment 1/Wingwall	Controlling Load Combination & Service I	Effective Footing Width, B-2e (ft)	Bottom of Footing Elevation	Bearing Pressure, σ_v (ksf)
West Wingwall - Short	Strength I	14.59	510	6.28
	Service I	14.92		4.61

Maximum factored bearing pressures for both strength and service load conditions are less than the factored bearing resistances for the respective effective footing widths, therefore; the factored bearing pressures are considered acceptable.

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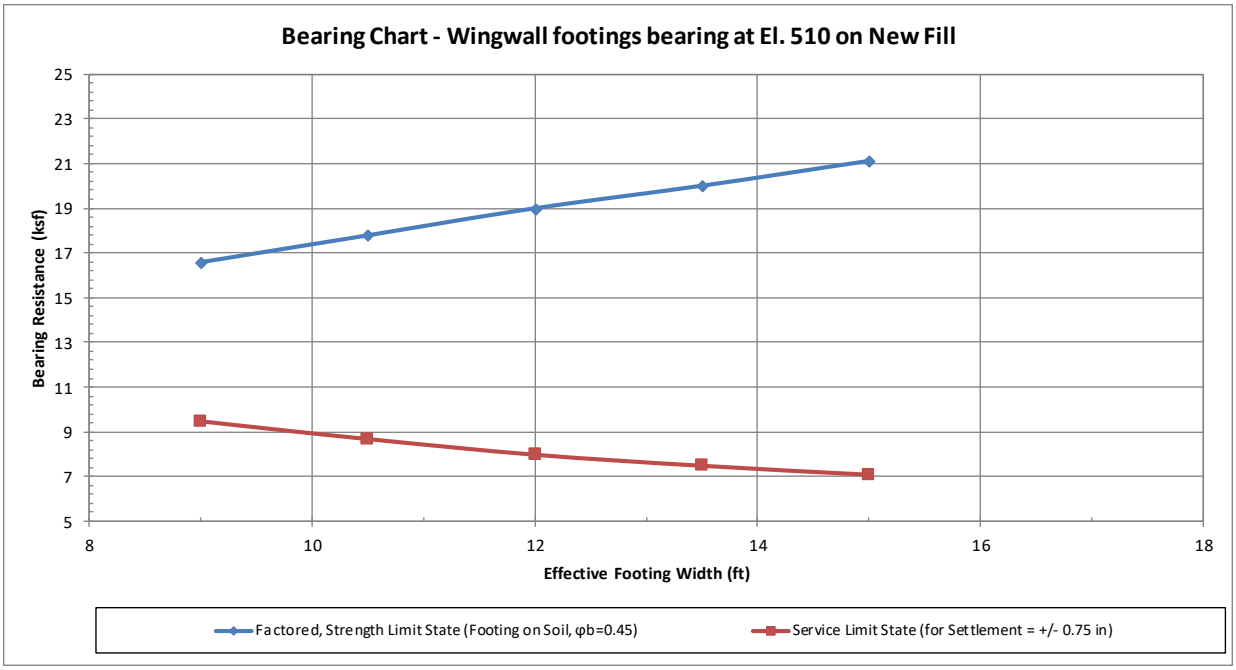
JOB: 09.0025984.03 Madawaska Int'l Bridge # 2399
SUBJECT: Abutment Bearing on Str. Fill (Short WWs)
SHEET: 6 OF 8
CALCULATED BY N. Williams 7/30/2020
CHECKED BY A. Blaisdell 8/25/2020

Bearing Chart

Abutment 1 East/West Wingwall (Short) Footings bearing at EL 510 and EL 518 with a given effective width should be sized to keep Factored Bearing Pressure (Strength condition) below the Blue curve and Service Bearing Pressure below the Red Curve.



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SUBJECT: Abutment Bearing on Str. Fill (Short WWs)
SHEET: 7 OF 8
CALCULATED BY N. Williams 7/30/2020
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Table 10.6.3.1.2a-1—Bearing Capacity Factors N_c (Prandtl, 1921), N_q (Reissner, 1924), and N_γ (Vesic, 1975)

ϕ_f	N_c	N_q	N_γ	ϕ_f	N_c	N_q	N_γ
0	5.14	1.0	0.0	23	18.1	8.7	8.2
1	5.4	1.1	0.1	24	19.3	9.6	9.4
2	5.6	1.2	0.2	25	20.7	10.7	10.9
3	5.9	1.3	0.2	26	22.3	11.9	12.5
4	6.2	1.4	0.3	27	23.9	13.2	14.5
5	6.5	1.6	0.5	28	25.8	14.7	16.7
6	6.8	1.7	0.6	29	27.9	16.4	19.3
7	7.2	1.9	0.7	30	30.1	18.4	22.4
8	7.5	2.1	0.9	31	32.7	20.6	26.0
9	7.9	2.3	1.0	32	35.5	23.2	30.2
10	8.4	2.5	1.2	33	38.6	26.1	35.2
11	8.8	2.7	1.4	34	42.2	29.4	41.1
12	9.3	3.0	1.7	35	46.1	33.3	48.0
13	9.8	3.3	2.0	36	50.6	37.8	56.3
14	10.4	3.6	2.3	37	55.6	42.9	66.2
15	11.0	3.9	2.7	38	61.4	48.9	78.0
16	11.6	4.3	3.1	39	67.9	56.0	92.3
17	12.3	4.8	3.5	40	75.3	64.2	109.4
18	13.1	5.3	4.1	41	83.9	73.9	130.2
19	13.9	5.8	4.7	42	93.7	85.4	155.6
20	14.8	6.4	5.4	43	105.1	99.0	186.5
21	15.8	7.1	6.2	44	118.4	115.3	224.6
22	16.9	7.8	7.1	45	133.9	134.9	271.8

Table 10.6.3.1.2a-2—Coefficients C_{wq} and $C_{w\gamma}$ for Various Groundwater Depths

D_w	C_{wq}	$C_{w\gamma}$
0.0	0.5	0.5
D_f	1.0	0.5
$>1.5B + D_f$	1.0	1.0

Where the position of groundwater is at a depth less than 1.5 times the footing width below the footing base, the bearing resistance is affected. The highest anticipated groundwater level should be used in design.

Table 10.6.3.1.2a-3—Shape Correction Factors s_c, s_γ, s_q

Factor	Friction Angle	Cohesion Term (s_c)	Unit Weight Term (s_γ)	Surcharge Term (s_q)
Shape Factors s_c, s_γ, s_q	$\phi_f = 0$	$1+\left(\frac{B}{5L}\right)$	1.0	1.0
	$\phi_f > 0$	$1+\left(\frac{B}{L}\right)\left(\frac{N_q}{N_c}\right)$	$1-0.4\left(\frac{B}{L}\right)$	$1+\left(\frac{B}{L}\tan\phi_f\right)$

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SUBJECT: Abutment Bearing on Str. Fill (Short WWs)
SHEET: 8 OF 8
CALCULATED BY N. Williams 7/30/2020
CHECKED BY A. Blaisdell 8/25/2020

Table 10.6.3.1.2a-4—Depth Correction Factor d_q

Friction Angle, ϕ_f (degrees)	D_f/B	d_q
32	1	1.20
	2	1.30
	4	1.35
	8	1.40
37	1	1.20
	2	1.25
	4	1.30
	8	1.35
42	1	1.15
	2	1.20
	4	1.25
	8	1.30

The depth correction factor should be used only when the soils above the footing bearing elevation are as competent as the soils beneath the footing level; otherwise, the depth correction factor should be taken as 1.0.

Linear interpolations may be made for friction angles in between those values shown in Table 10.6.3.1.2a-4.

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JOB: 09.0025984.03 Madawaska Int'l Bridge # 2399
SUBJECT: Abutment Bearing on G. Till (AB1&Tall WWs)
SHEET: 1 OF 8
CALCULATED BY N. Williams 7/30/2020
CHECKED BY A. Blaisdell 8/25/2020

Objective

Calculate soil bearing resistance for Abutment 1 and East/West (Tall) Wingwall foundations bearing on dense Glacial Till at approx. El. 495 with a friction angle equal to 38 degrees using the Theoretical method (Munfakh et al., 2001) in Sand using SPT data. Evaluate strength and service limit bearing resistance for a range of effective footing widths.

References

1. American Association of State Highway and Transportation Officials, AASHTO LRFD Bridge Design Specifications: Customary U.S. Units, 8th edition, 2017 (AASHTO LRFD), Articles 10.5.5.2.2 and 10.6.3.1.
2. Terzaghi, Peck & Mesri, Soil Mechanics in Engineering Practice, Third Edition, 1996.

Soil Properties and Geotechnical Inputs

$\phi_f := 38deg$ Friction angle of Glacial Till (Lower bound value based on correlations with SPT data, see soil properties calculation)

$\phi_b := 0.45$ Bearing resistance factor as specified in Table 10.5.5.2.2-1 (Theoretical Method, SPT Data, Strength Limit)

$c := 0ksf$ Cohesion, taken as undrained shear strength from correlated N values and Pocket Penetrometer data

$\gamma_t := 130pcf$ Unit weight of soil below the bearing depth of the footing

$\gamma_f := 125pcf$ Unit weight of soil above or below the bearing depth of the footing

$N_c := 61.4$ Cohesion term bearing capacity factor as specified in Table 10.6.3.1.2a-1

$N_q := 48.9$ Surcharge term bearing capacity factor as specified in Table 10.6.3.1.2a-1

$N_\gamma := 78.0$ Total unit weight term bearing capacity factor as specified in Table 10.6.3.1.2a-1

C_{wq}, $C_{w\gamma}$:= Correction factors to account for the location of the groundwater table as specified in Table 10.6.3.1.2a-2

Depth to water table at or above depth of footing (D_f) $C_{wq} := .5$ $C_{w\gamma} := .5$

d_q:= Correction factor to account for the shearing resistance along the failure surface passing through cohesionless material above the bearing elevation as specified in Table 10.6.3.1.2a-4

s_c, s_γ, s_q:= Footing shape correction factors as specified in Table 10.6.3.1.2a-2

$S_c := 0.75in$ Allowable settlement

q_s= Service limit bearing resistance for allowable settlement, Resistance Factor = 1.0

$N_{60} := 50$ Average N_{60} value from SPT within 10' of bottom of footing (El. 495)

Load inclination factors are omitted considering modest embedment offooting per C10.6.3.1.2a.

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JOB: 09.0025984.03 Madawaska Int'l Bridge # 2399
SUBJECT: Abutment Bearing on G. Till (AB1&Tall WWs)
SHEET: 2 OF 8
CALCULATED BY N. Williams 7/30/2020
CHECKED BY A. Blaisdell 8/25/2020

Footing Dimensions

$B_1 := \begin{pmatrix} 20 \\ 24 \\ 28 \\ 30 \\ 32 \end{pmatrix} ft$ Range of effective footing widths considered (includes eccentricity)

$L_1 := 40ft$ Max Length of footing controls for Service, Min length = 20ft (max controls in service)

$D_f := 8ft$ Footing embedment depth

Strength Limit Design

$q_n = cN_{cm} + \gamma D_f N_{qm} C_{wq} + 0.5\gamma B N_{\gamma m} C_{w\gamma}$ Nominal Bearing Resistance Formula

$q.D = \varphi_b \times q_n$ Factored Bearing Resistance Formula

Correction Factors

$d_{qtable} := \frac{D_f}{B_1}$ $d_{qtable} = \begin{pmatrix} 0.4 \\ 0.33 \\ 0.29 \\ 0.27 \\ 0.25 \end{pmatrix}$ Using Table 10.6.3.1.2a-4

$d_q := 1$ dq assumed soil above footing less competent than soil below footing.

$s_c := 1 + \left(\frac{B_1}{L_1}\right)\left(\frac{N_q}{N_c}\right)$ $s_c = \begin{pmatrix} 1.4 \\ 1.48 \\ 1.56 \\ 1.6 \\ 1.64 \end{pmatrix}$

$s_q := 1 + \left(\frac{B_1}{L_1}\tan(\phi_f)\right)$ $s_q = \begin{pmatrix} 1.39 \\ 1.47 \\ 1.55 \\ 1.59 \\ 1.63 \end{pmatrix}$

$s_\gamma := 1 - 0.4\left(\frac{B_1}{L_1}\right)$ $s_\gamma = \begin{pmatrix} 0.8 \\ 0.76 \\ 0.72 \\ 0.7 \\ 0.68 \end{pmatrix}$

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JOB: 09.0025984.03 Madawaska Int'l Bridge # 2399
SUBJECT: Abutment Bearing on G. Till (AB1&Tall WWs)
SHEET: 3 OF 8
CALCULATED BY N. Williams 7/30/2020
CHECKED BY A. Blaisdell 8/25/2020

Bearing Capacity Factors

$$N_{cm} := N_c \cdot s_c \qquad N_{cm} = \begin{pmatrix} 85.85 \\ 90.74 \\ 95.63 \\ 98.08 \\ 100.52 \end{pmatrix}$$

$$N_{qm} := N_q \cdot s_q \cdot d_q \qquad N_{qm} = \begin{pmatrix} 68 \\ 71.8 \\ 75.6 \\ 77.6 \\ 79.5 \end{pmatrix}$$

$$N_{\gamma m} := N_\gamma \cdot s_\gamma \qquad N_{\gamma m} = \begin{pmatrix} 62.4 \\ 59.3 \\ 56.2 \\ 54.6 \\ 53 \end{pmatrix}$$

Nominal Bearing Resistance

$$q_n := \overrightarrow{\left(c \cdot N_{cm} + \gamma_f \cdot D_f \cdot N_{qm} \cdot C_{wq} + 0.5 \cdot \gamma_t \cdot B_1 \cdot N_{\gamma m} \cdot C_{w\gamma}\right)} \qquad q_n = \begin{pmatrix} 74.6 \\ 82.1 \\ 88.9 \\ 92 \\ 94.9 \end{pmatrix} \cdot ksf$$

Factored Bearing Resistance - Strength Limit State

$$q_D := \phi_b \cdot q_n \qquad q_D = \begin{pmatrix} 33.6 \\ 37 \\ 40 \\ 41.4 \\ 42.7 \end{pmatrix} \cdot ksf \qquad \text{for} \quad B_1 = \begin{pmatrix} 20 \\ 24 \\ 28 \\ 30 \\ 32 \end{pmatrix} \cdot ft$$

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SUBJECT: Abutment Bearing on G. Till (AB1&Tall WWs)
SHEET: 4 OF 8
CALCULATED BY N. Williams 7/30/2020
CHECKED BY A. Blaisdell 8/25/2020

Service Limit Design

Evaluate service limit bearing resistance for the specified allowable settlement using the semi-empirical SPT Method by Burland and Burbidge (1985) provided in Terzaghi, Peck & Mesri, 96.

$S_{cm} := S_c \cdot \frac{1}{1mm}$ $S_{cm} = 19$ Allowable settlement in millimeters and unitless

$B_{1m} := B_1 \cdot \frac{1}{1m}$ $B_{1m} = \begin{pmatrix} 6.1 \\ 7.3 \\ 8.5 \\ 9.1 \\ 9.8 \end{pmatrix}$ Effective footing width in meters and unitless

$S_{cmr} := S_{cm} \cdot \left[\frac{\left[1.25 \cdot \left(\frac{L_1}{B_1} \right) \right]}{\left(\frac{L_1}{B_1} \right) + 0.25} \right]^2$ $S_{cmr} = \begin{pmatrix} 23.5 \\ 22.5 \\ 21.6 \\ 21.1 \\ 20.7 \end{pmatrix}$ Correction formula for rectangular footings (Terzaghi EQ 50.14)

$EQ_1 := S_{cm} \cdot \left(\frac{S_{cm}}{S_{cmr}} \right)$ $EQ_1 = \begin{pmatrix} 15.43 \\ 16.12 \\ 16.83 \\ 17.19 \\ 17.56 \end{pmatrix}$

$EQ_2 := \frac{N_{60}^{1.4}}{1.7 \cdot B_{1m}^{0.75}}$ $EQ_2 = \begin{pmatrix} 36 \\ 32 \\ 28 \\ 27 \\ 25 \end{pmatrix}$

$q_{snc} := \overrightarrow{(EQ_1 \cdot EQ_2)}$ $q_{snc} =$

	0
0	559.4
1	509.8
2	474.1
3	459.8
4	447.4

Formula results are in kPa (Terzaghi EQ 50.28)

Results represent normally consolidated soil.

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JOB: 09.0025984.03 Madawaska Int'l Bridge # 2399
SUBJECT: Abutment Bearing on G. Till (AB1&Tall WWs)
SHEET: 5 OF 8
CALCULATED BY N. Williams 7/30/2020
CHECKED BY A. Blaisdell 8/25/2020

$q_s := q_{snc}$ $\quad q_s = \begin{pmatrix} 559 \\ 510 \\ 474 \\ 460 \\ 447 \end{pmatrix}$

Assumes sand is normally consolidated at current effective stress (likely conservative)

$q_{sm} := q_s \cdot 1\text{kPa}$ $\quad q_{sm} = \begin{pmatrix} 559 \\ 510 \\ 474 \\ 460 \\ 447 \end{pmatrix} \cdot \text{kPa}$

Service limit bearing resistance for allowable settlement (metric units)

$q_{se} := q_{sm}$ $\quad q_{se} = \begin{pmatrix} 11.7 \\ 10.6 \\ 9.9 \\ 9.6 \\ 9.3 \end{pmatrix} \cdot \text{ksf}$

Service limit bearing resistance for allowable settlement (English units)

for $\quad B_1 = \begin{pmatrix} 20 \\ 24 \\ 28 \\ 30 \\ 32 \end{pmatrix} \cdot \text{ft}$

Proposed effective footing widths and corresponding factored bearing pressure provided by HNTB.

US Abutment 1/Wingwall	Controlling Load Combination & Service I	Effective Footing Width, B-2e (ft)	Bottom of Footing Elevation	Factored Bearing Pressure, σ_v (ksf)
Abutment 1	Strength V	19.32	495	11.99
	Service I	19.65		9.34
West Wingwall - Tall	Strength I	23.57	495	8.86
	Service I	24.25		6.32
East Wingwall - Tall	Strength I	27.44	495	8.65
	Service I	27.39		6.21

Maximum factored bearing pressures for both strength and service load conditions are less than the factored bearing resistances for the respective effective footing widths, therefore; the factored bearing pressures are considered acceptable.

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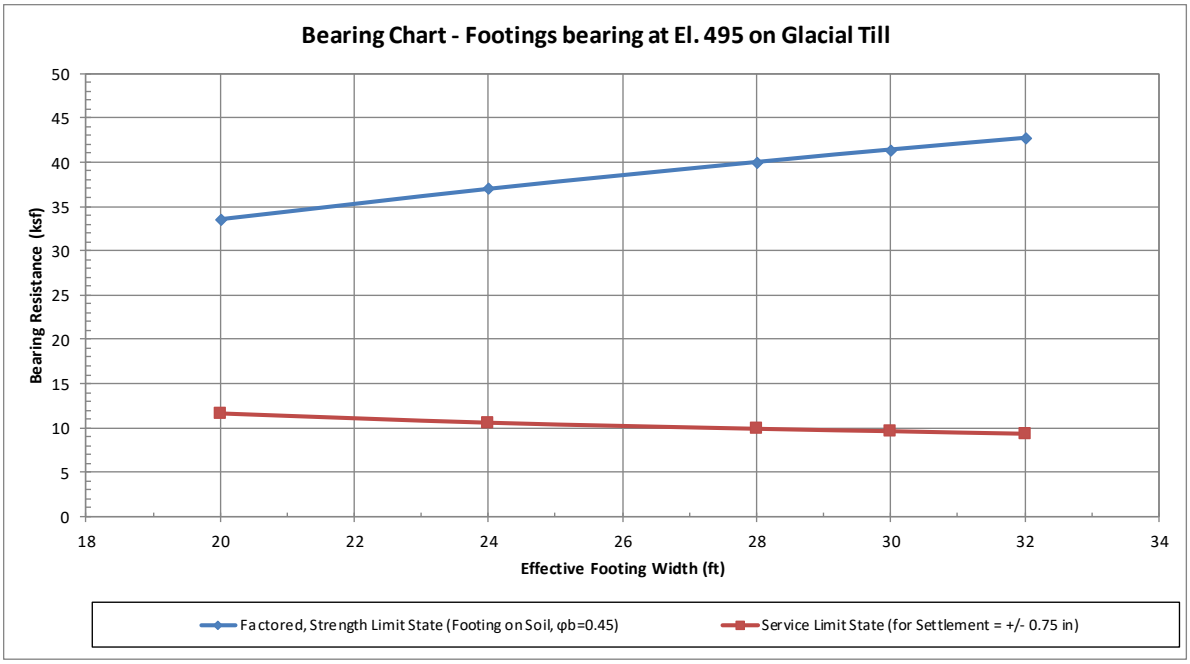
JOB: 09.0025984.03 Madawaska Int'l Bridge # 2399
SUBJECT: Abutment Bearing on G. Till (AB1&Tall WWs)
SHEET: 6 OF 8
CALCULATED BY N. Williams 7/30/2020
CHECKED BY A. Blaisdell 8/25/2020

Bearing Chart

Abutment 1 & East/West (Tall) Wingwall Footings bearing at El. 495 with a given effective width should be sized to keep Factored Bearing Pressure (Strength condition) below the Blue curve and Service Bearing Pressure below the Red Curve.



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SUBJECT: Abutment Bearing on G. Till (AB1&Tall WWs)
SHEET: 7 OF 8
CALCULATED BY N. Williams 7/30/2020
CHECKED BY A. Blaisdell 8/25/2020

Table 10.6.3.1.2a-1—Bearing Capacity Factors N_c (Prandtl, 1921), N_q (Reissner, 1924), and N_γ (Vesic, 1975)

ϕ_f	N_c	N_q	N_γ	ϕ_f	N_c	N_q	N_γ
0	5.14	1.0	0.0	23	18.1	8.7	8.2
1	5.4	1.1	0.1	24	19.3	9.6	9.4
2	5.6	1.2	0.2	25	20.7	10.7	10.9
3	5.9	1.3	0.2	26	22.3	11.9	12.5
4	6.2	1.4	0.3	27	23.9	13.2	14.5
5	6.5	1.6	0.5	28	25.8	14.7	16.7
6	6.8	1.7	0.6	29	27.9	16.4	19.3
7	7.2	1.9	0.7	30	30.1	18.4	22.4
8	7.5	2.1	0.9	31	32.7	20.6	26.0
9	7.9	2.3	1.0	32	35.5	23.2	30.2
10	8.4	2.5	1.2	33	38.6	26.1	35.2
11	8.8	2.7	1.4	34	42.2	29.4	41.1
12	9.3	3.0	1.7	35	46.1	33.3	48.0
13	9.8	3.3	2.0	36	50.6	37.8	56.3
14	10.4	3.6	2.3	37	55.6	42.9	66.2
15	11.0	3.9	2.7	38	61.4	48.9	78.0
16	11.6	4.3	3.1	39	67.9	56.0	92.3
17	12.3	4.8	3.5	40	75.3	64.2	109.4
18	13.1	5.3	4.1	41	83.9	73.9	130.2
19	13.9	5.8	4.7	42	93.7	85.4	155.6
20	14.8	6.4	5.4	43	105.1	99.0	186.5
21	15.8	7.1	6.2	44	118.4	115.3	224.6
22	16.9	7.8	7.1	45	133.9	134.9	271.8

Table 10.6.3.1.2a-2—Coefficients C_{wq} and $C_{w\gamma}$ for Various Groundwater Depths

D_w	C_{wq}	$C_{w\gamma}$
0.0	0.5	0.5
D_f	1.0	0.5
$>1.5B + D_f$	1.0	1.0

Where the position of groundwater is at a depth less than 1.5 times the footing width below the footing base, the bearing resistance is affected. The highest anticipated groundwater level should be used in design.

Table 10.6.3.1.2a-3—Shape Correction Factors s_c, s_γ, s_q

Factor	Friction Angle	Cohesion Term (s_c)	Unit Weight Term (s_γ)	Surcharge Term (s_q)
Shape Factors s_c, s_γ, s_q	$\phi_f = 0$	$1+\left(\frac{B}{5L}\right)$	1.0	1.0
	$\phi_f > 0$	$1+\left(\frac{B}{L}\right)\left(\frac{N_q}{N_c}\right)$	$1-0.4\left(\frac{B}{L}\right)$	$1+\left(\frac{B}{L}\tan\phi_f\right)$

Table 10.6.3.1.2a-4—Depth Correction Factor d_q

Friction Angle, ϕ_f (degrees)	D_f/B	d_q
32	1	1.20
	2	1.30
	4	1.35
	8	1.40
37	1	1.20
	2	1.25
	4	1.30
	8	1.35
42	1	1.15
	2	1.20
	4	1.25
	8	1.30

The depth correction factor should be used only when the soils above the footing bearing elevation are as competent as the soils beneath the footing level; otherwise, the depth correction factor should be taken as 1.0.

Linear interpolations may be made for friction angles in between those values shown in Table 10.6.3.1.2a-4.

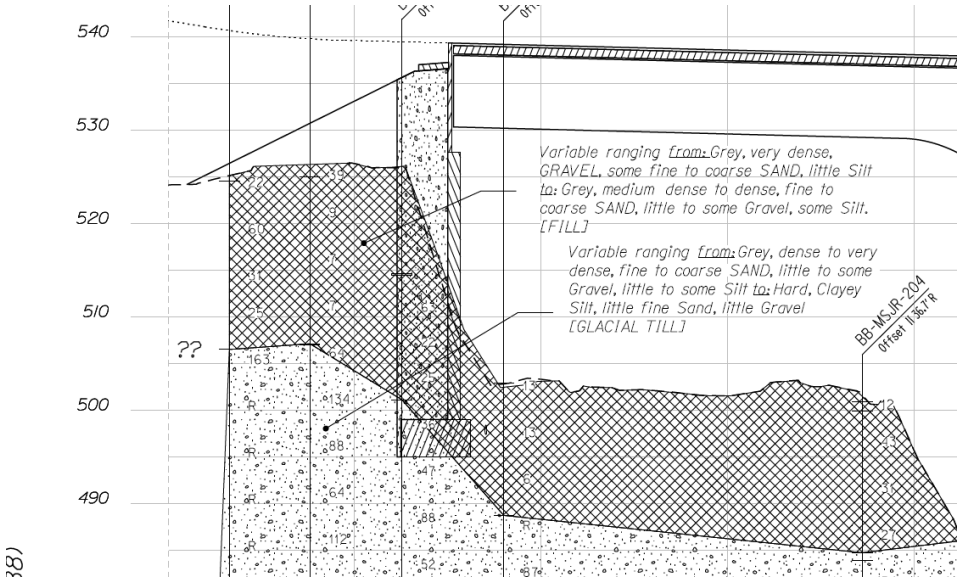
Footing on Soil

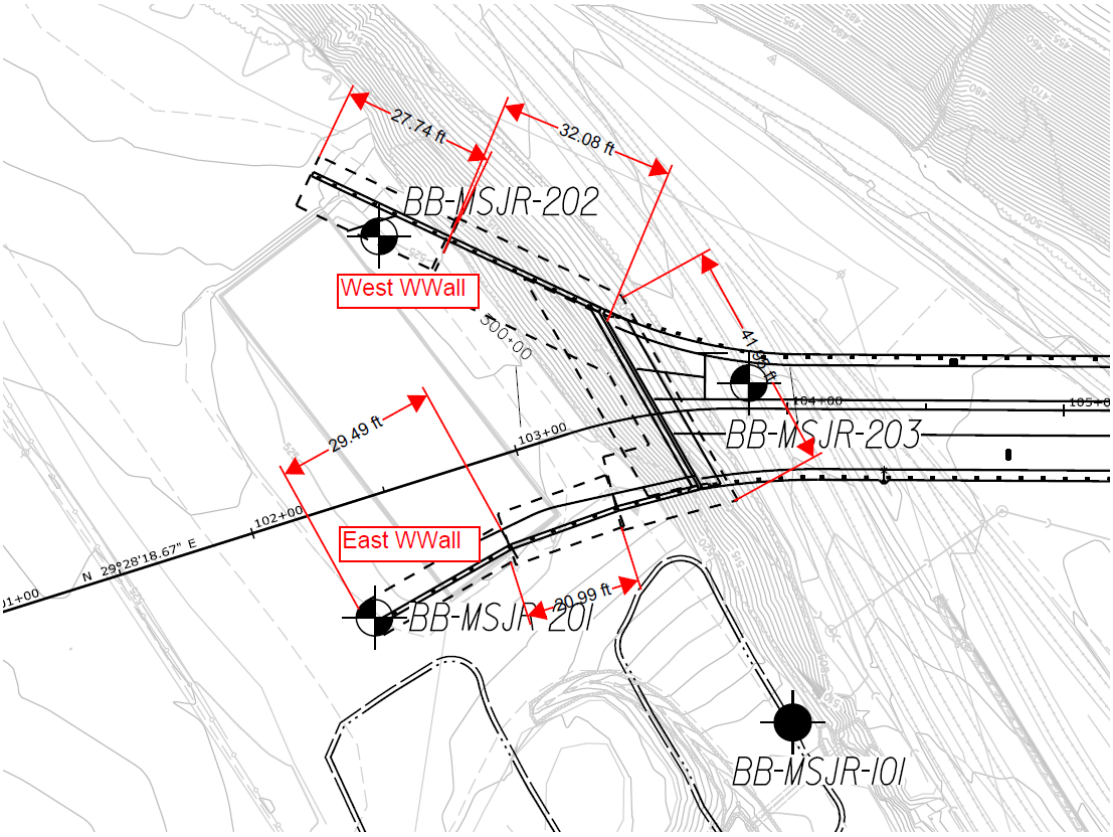
Abutment 1 & Wingwall effective footing widths and controlling bearing pressures provided by HNTB

Factored

US Abutment 1/Wingwall	Controlling Load Combination & Service I	Effective Footing Width, B-2e (ft)	Bottom of Footing Elevation	Bearing Pressure, σ_v (ksf)	Bearing Soil Type
Abutment 1	Strength I	19.32	495.00	11.99	G. Till
	Service I	19.65		9.34	
West Wingwall - Tall	Strength IV	23.57	495.00	8.86	G. Till
	Service I	24.25		6.32	
West Wingwall - Short	Strength I	14.59	510.00	6.28	Fill (Newly placed & Compacted)
	Service I	14.92		4.61	
East Wingwall - Tall	Strength IV	27.44	495.00	8.65	G. Till
	Service I	27.39		6.21	

Profile at Abut. 1





	Footing Lengths (ft)
Abutment 1	40
West Wingwall - Tall	30
West Wingwall - Short	20
East Wingwall - Tall	30
East Wingwall - Short	27

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JOB: 09.0025984.03 Madawaska Int'l Bridge # 2399
SUBJECT: Overhead Sign Structure Bearing on Str. Fill
SHEET: 1 OF 8
CALCULATED BY N. Williams 10/16/2020
CHECKED BY A. Blaisdell 10/21/2020

Objective

Calculate soil bearing resistance for Madawaska Abutment Overhead Sign Structure foundation bearing on compacted Granular Borrow at approx. Elevation 529. Evaluate strength and service limit bearing resistance for a range of effective footing widths.

References

1. American Association of State Highway and Transportation Officials, AASHTO LRFD Bridge Design Specifications: Customary U.S. Units, 8th edition, 2017 (AASHTO LRFD), Articles 10.5.5.2.2 and 10.6.3.1.
2. Terzaghi, Peck & Mesri, Soil Mechanics in Engineering Practice, Third Edition, 1996.

Soil Properties and Geotechnical Inputs

$\phi_f := 32deg$ — Friction angle of soil (Granular Borrow, Item 703.19, compacted to 90% of maximum dry density per Modified Proctor per Standard Specification 203.13). Underlying glacial till has higher friction angle, fill controls.

$\phi_b := 0.45$ — Bearing resistance factor as specified in Table 10.5.5.2.2-1 (Theoretical Method, SPT Data, Strength Limit)

$c := 0ksf$ — Cohesion, taken as undrained shear strength from correlated N values and Pocket Penetrometer data

$\gamma := 125pcf$ — Unit weight of soil above or below the bearing depth of the footing

$N_c := 35.5$ — Cohesion term bearing capacity factor as specified in Table 10.6.3.1.2a-1

$N_q := 23.2$ — Surcharge term bearing capacity factor as specified in Table 10.6.3.1.2a-1

$N_\gamma := 30.2$ — Total unit weight term bearing capacity factor as specified in Table 10.6.3.1.2a-1

C_{wq}, $C_{w\gamma}$:= — Correction factors to account for the location of the groundwater table as specified in Table 10.6.3.1.2a-2

Depth to water table at or below depth of footing (D_f) (GW depth 22.5' below bottom of footing) — $C_{wq} := 1$ $C_{w\gamma} := 0.5$

d_q:= — Correction factor to account for the shearing resistance along the failure surface passing through cohesionless material above the bearing elevation as specified in Table 10.6.3.1.2a-4

s_c, s_γ, s_q:= — Footing shape correction factors as specified in Table 10.6.3.1.2a-2

$S_c := 1in$ — Allowable settlement (Settlement calculation assumes uniform bearing pressure; actual settlement for OHSSwith transient loading is likely half of this value or less).

q_s= — Service limit bearing resistance for allowable settlement, Resistance Factor = 1.0

$N_{60} := 15$ — Assumed Nvalue for placed and compacted granular borrow fill material

Load inclination factors are omitted considering modest embedment offooting per C10.6.3.1.2a.

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JOB: 09.0025984.03 Madawaska Int'l Bridge # 2399
SUBJECT: Overhead Sign Structure Bearing on Str. Fill
SHEET: 2 OF 8
CALCULATED BY N. Williams 10/16/2020
CHECKED BY A. Blaisdell 10/21/2020

Footing Dimensions

$$B_1 := \begin{pmatrix} 6 \\ 7 \\ 8 \\ 9 \\ 10 \end{pmatrix} ft$$ Range of effective footing widths considered (includes eccentricity)

$L_1 := 18ft$ Max Length of footing controls for Service and Strength, Min length = 9.5 ft

$D_f := 10.5ft$ Footing embedment depth (Final Grade Elevation (540) - Bottom of Footing Elevation (529.5)

Strength Limit Design

$q_n = cN_{cm} + \gamma D_f N_{qm} C_{wq} + 0.5\gamma B N_{\gamma m} C_{w\gamma}$ Nominal Bearing Resistance Formula

$q.D = \varphi_b \times q_n$ Factored Bearing Resistance Formula

Correction Factors

$$d_{qtable} := \frac{D_f}{B_1} \qquad d_{qtable} = \begin{pmatrix} 1.75 \\ 1.5 \\ 1.31 \\ 1.17 \\ 1.05 \end{pmatrix}$$ Using Table 10.6.3.1.2a-4

$d_q := 1$ dq assumed soil above footing less competent than soil below footing.

$$s_c := 1 + \left(\frac{B_1}{L_1}\right)\left(\frac{N_q}{N_c}\right) \qquad s_c = \begin{pmatrix} 1.22 \\ 1.25 \\ 1.29 \\ 1.33 \\ 1.36 \end{pmatrix}$$

$$s_q := 1 + \left(\frac{B_1}{L_1}\tan(\phi_f)\right) \qquad s_q = \begin{pmatrix} 1.21 \\ 1.24 \\ 1.28 \\ 1.31 \\ 1.35 \end{pmatrix}$$

$$s_\gamma := 1 - 0.4\left(\frac{B_1}{L_1}\right) \qquad s_\gamma = \begin{pmatrix} 0.87 \\ 0.84 \\ 0.82 \\ 0.8 \\ 0.78 \end{pmatrix}$$

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Bearing Capacity Factors

$$N_{cm} := N_c \cdot s_c \qquad N_{cm} = \begin{pmatrix} 43.23 \\ 44.52 \\ 45.81 \\ 47.1 \\ 48.39 \end{pmatrix}$$

$$N_{qm} := N_q \cdot s_q \cdot d_q \qquad N_{qm} = \begin{pmatrix} 28 \\ 28.8 \\ 29.6 \\ 30.4 \\ 31.3 \end{pmatrix}$$

$$N_{\gamma m} := N_\gamma \cdot s_\gamma \qquad N_{\gamma m} = \begin{pmatrix} 26.2 \\ 25.5 \\ 24.8 \\ 24.2 \\ 23.5 \end{pmatrix}$$

Nominal Bearing Resistance

$$q_n := \overrightarrow{\left(c \cdot N_{cm} + \gamma \cdot D_f \cdot N_{qm} \cdot C_{wq} + 0.5 \cdot \gamma \cdot B_1 \cdot N_{\gamma m} \cdot C_{w\gamma}\right)} \qquad q_n = \begin{pmatrix} 41.7 \\ 43.4 \\ 45.1 \\ 46.8 \\ 48.4 \end{pmatrix} \cdot ksf$$

Factored Bearing Resistance - Strength Limit State

$$q_D := \phi_b \cdot q_n \qquad q_D = \begin{pmatrix} 18.8 \\ 19.5 \\ 20.3 \\ 21 \\ 21.8 \end{pmatrix} \cdot ksf \qquad \text{for} \quad B_1 = \begin{pmatrix} 6 \\ 7 \\ 8 \\ 9 \\ 10 \end{pmatrix} \cdot ft$$

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Service Limit Design

Evaluate service limit bearing resistance for the specified allowable settlement using the semi-empirical SPT Method by Burland and Burbidge (1985) provided in Terzaghi, Peck & Mesri, 96.

$S_{cm} := S_c \cdot \frac{1}{1mm}$ $S_{cm} = 25.4$ Allowable settlement in millimeters and unitless

$B_{1m} := B_1 \cdot \frac{1}{1m}$ $B_{1m} = \begin{pmatrix} 1.8 \\ 2.1 \\ 2.4 \\ 2.7 \\ 3 \end{pmatrix}$ Effective footing width in meters and unitless

$S_{cmr} := S_{cm} \cdot \left[\frac{\left[1.25 \cdot \left(\frac{L_1}{B_1} \right) \right]}{\left(\frac{L_1}{B_1} \right) + 0.25} \right]^2$ $S_{cmr} = \begin{pmatrix} 33.8 \\ 33 \\ 32.1 \\ 31.4 \\ 30.6 \end{pmatrix}$ Correction formula for rectangular footings (Terzaghi EQ 50.14)

$EQ_1 := S_{cm} \cdot \left(\frac{S_{cm}}{S_{cmr}} \right)$ $EQ_1 = \begin{pmatrix} 19.08 \\ 19.57 \\ 20.07 \\ 20.57 \\ 21.09 \end{pmatrix}$

$EQ_2 := \frac{N_{60}^{1.4}}{1.7 \cdot B_{1m}^{0.75}}$ $EQ_2 = \begin{pmatrix} 17 \\ 15 \\ 13 \\ 12 \\ 11 \end{pmatrix}$

$q_{snc} := \overrightarrow{(EQ_1 \cdot EQ_2)}$ $q_{snc} =$

	0
0	316.2
1	289.0
2	268.1
3	251.6
4	238.3

Formula results are in kPa (Terzaghi EQ 50.28)

Results represent normally consolidated soil.

$q_s := q_{snc}$ $\quad q_s = \begin{pmatrix} 316 \\ 289 \\ 268 \\ 252 \\ 238 \end{pmatrix}$

Assumes sand is normally consolidated at current effective stress

$q_{sm} := q_s \cdot 1\,kPa$ $\quad q_{sm} = \begin{pmatrix} 316 \\ 289 \\ 268 \\ 252 \\ 238 \end{pmatrix} \cdot kPa$

Service limit bearing resistance for allowable settlement (metric units)

$q_{se} := q_{sm}$ $\quad q_{se} = \begin{pmatrix} 6.6 \\ 6 \\ 5.6 \\ 5.3 \\ 5 \end{pmatrix} \cdot ksf$

Service limit bearing resistance for allowable settlement (English units)

for $\quad B_1 = \begin{pmatrix} 6 \\ 7 \\ 8 \\ 9 \\ 10 \end{pmatrix} \cdot ft$

Proposed effective footing widths and maximum factored bearing pressures provided by HNTB:

Minimum effective footing width: 6.1
Maximum effective footing width: 9.6
Strength: 5.76 ksf
Service: 3.69 ksf

Maximum factored bearing pressures for both strength and service load conditions are less than the factored bearing resistances for the smallest and largest effective footing widths, respectively. Therefore, the factored bearing pressures are considered acceptable.

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JOB: 09.0025984.03 Madawaska Int'l Bridge # 2399
SUBJECT: Overhead Sign Structure Bearing on Str. Fill
SHEET: 6 OF 8
CALCULATED BY N. Williams 10/16/2020
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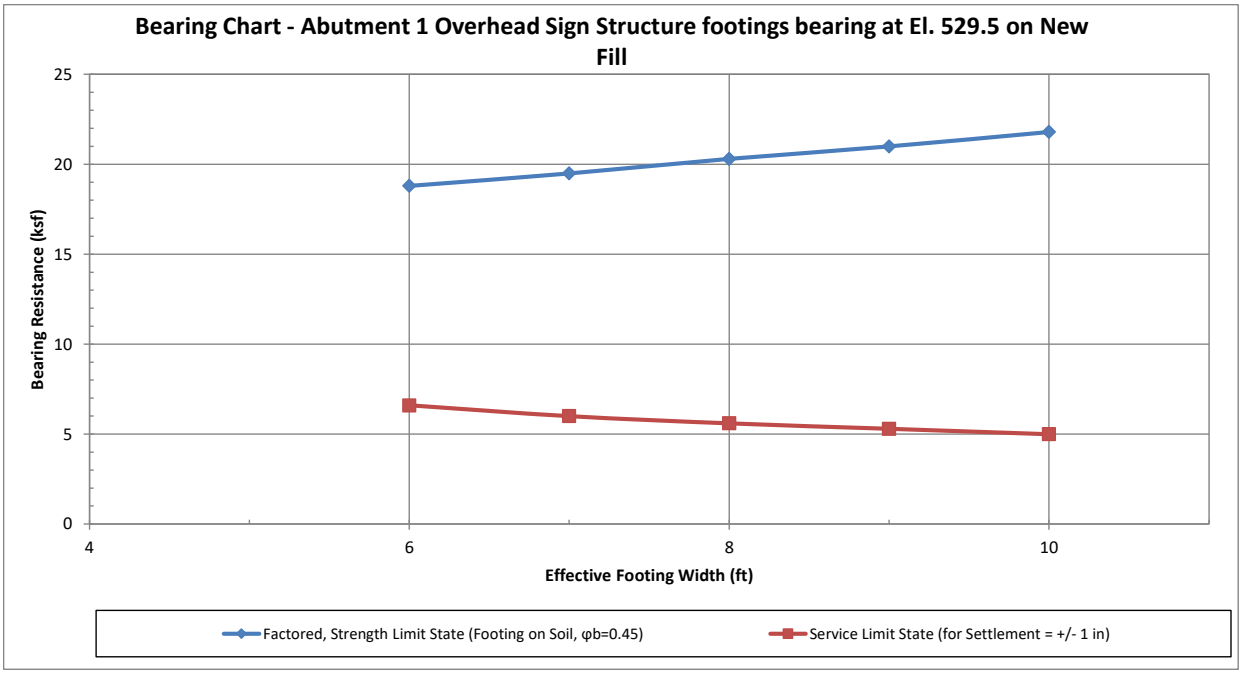
Bearing Chart

Abutment 1 OHSS Footing bearing at EL 529.5 with a given effective width should be sized to keep Factored Bearing Pressure (Strength condition) below the Blue curve and Service Bearing Pressure below the Red Curve.



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SHEET: 7 OF 8
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Table 10.6.3.1.2a-1—Bearing Capacity Factors N_c (Prandtl, 1921), N_q (Reissner, 1924), and N_γ (Vesic, 1975)

ϕ_f	N_c	N_q	N_γ	ϕ_f	N_c	N_q	N_γ
0	5.14	1.0	0.0	23	18.1	8.7	8.2
1	5.4	1.1	0.1	24	19.3	9.6	9.4
2	5.6	1.2	0.2	25	20.7	10.7	10.9
3	5.9	1.3	0.2	26	22.3	11.9	12.5
4	6.2	1.4	0.3	27	23.9	13.2	14.5
5	6.5	1.6	0.5	28	25.8	14.7	16.7
6	6.8	1.7	0.6	29	27.9	16.4	19.3
7	7.2	1.9	0.7	30	30.1	18.4	22.4
8	7.5	2.1	0.9	31	32.7	20.6	26.0
9	7.9	2.3	1.0	32	35.5	23.2	30.2
10	8.4	2.5	1.2	33	38.6	26.1	35.2
11	8.8	2.7	1.4	34	42.2	29.4	41.1
12	9.3	3.0	1.7	35	46.1	33.3	48.0
13	9.8	3.3	2.0	36	50.6	37.8	56.3
14	10.4	3.6	2.3	37	55.6	42.9	66.2
15	11.0	3.9	2.7	38	61.4	48.9	78.0
16	11.6	4.3	3.1	39	67.9	56.0	92.3
17	12.3	4.8	3.5	40	75.3	64.2	109.4
18	13.1	5.3	4.1	41	83.9	73.9	130.2
19	13.9	5.8	4.7	42	93.7	85.4	155.6
20	14.8	6.4	5.4	43	105.1	99.0	186.5
21	15.8	7.1	6.2	44	118.4	115.3	224.6
22	16.9	7.8	7.1	45	133.9	134.9	271.8

Table 10.6.3.1.2a-2—Coefficients C_{wq} and $C_{w\gamma}$ for Various Groundwater Depths

D_w	C_{wq}	$C_{w\gamma}$
0.0	0.5	0.5
D_f	1.0	0.5
$>1.5B + D_f$	1.0	1.0

Where the position of groundwater is at a depth less than 1.5 times the footing width below the footing base, the bearing resistance is affected. The highest anticipated groundwater level should be used in design.

Table 10.6.3.1.2a-3—Shape Correction Factors s_c, s_γ, s_q

Factor	Friction Angle	Cohesion Term (s_c)	Unit Weight Term (s_γ)	Surcharge Term (s_q)
Shape Factors s_c, s_γ, s_q	$\phi_f = 0$	$1+\left(\frac{B}{5L}\right)$	1.0	1.0
	$\phi_f > 0$	$1+\left(\frac{B}{L}\right)\left(\frac{N_q}{N_c}\right)$	$1-0.4\left(\frac{B}{L}\right)$	$1+\left(\frac{B}{L}\tan\phi_f\right)$

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SUBJECT: Overhead Sign Structure Bearing on Str. Fill
SHEET: 8 OF 8
CALCULATED BY N. Williams 10/16/2020
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Table 10.6.3.1.2a-4—Depth Correction Factor d_q

Friction Angle, ϕ_f (degrees)	D_f/B	d_q
32	1	1.20
	2	1.30
	4	1.35
	8	1.40
37	1	1.20
	2	1.25
	4	1.30
	8	1.35
42	1	1.15
	2	1.20
	4	1.25
	8	1.30

The depth correction factor should be used only when the soils above the footing bearing elevation are as competent as the soils beneath the footing level; otherwise, the depth correction factor should be taken as 1.0.

Linear interpolations may be made for friction angles in between those values shown in Table 10.6.3.1.2a-4.

Pile Evaluations

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JOB: 09.0025984.03 Mad. Int'l Bridge
SUBJECT: Axial Pile Resistance
SHEET: 1 OF 16
CALCULATED BY E. Tome, 8/25/20
REVIEWED BY A. Blaisdell 8/27/2020

Objective

Evaluate the axial geotechnical resistance of the pier piles for the Madwaksa International Bridge Replacement in Madawaska, ME. Evaluations were conducted to assess a suitable driving system to install piles to the required geotechnical nominal resistance of 735 kips for the Pier 1 piles.

Methodology

Evaluate proposed pile section for governing factored axial compression resistance as follows.

1. Nominal Compressive Resistance
2. Factored Structural Compressive Resistance - Strength Limit State
3. Factored Structural Compressive Resistance - Extreme/Service Limit State
4. Geotechnical Resistance (Static Analysis)
5. Geotechnical Resistance (Drivability Analysis)
6. Factored Geotechnical Resistance - Strength Limit State
7. Factored Geotechnical Resistance - Extreme/Service Limit State

References

1. American Association of State Highway and Transportation Officials, AASHTO LRFD Bridge Design Specifications: Customary U.S. Units, 8th edition. (AASHTO LRFD)

Soil Properties

Consider Madawaska Bridge Interpretive Subsurface Profile (see Figure 4), upper and lower bound friction angles were applied to the glacial till representing 1/2 plugged and non-plugged pile conditions, respectively. The subsurface layering and properties relative to pile design are presented in the Apile outputs on pages 7 through 10 for 1/2 Plugged piles and 13 through 16 for Non Plugged piles.

Note that the soil profiles in APile extend below top of rock, but the results are used either to estimate skin friction at the top of rock depth or depth at which geotechnical resistance is achieved.

Structural Properties

HP14x117, ASTM A572, Gr. 50

Yield Strength of Steel	$F_y := 50ksi$
Area of section	$A_s := 34.4in^2$
Young's Modulus of Steel	$E_s := 30000 \cdot ksi$
Radius of gyration (weak axis)	$r_x := 5.96in$

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JOB: 09.0025984.03 Mad. Int'l Bridge
SUBJECT: Axial Pile Resistance
SHEET: 2 OF 16
CALCULATED BY E. Tome, 8/25/20
REVIEWED BY A. Blaisdell 8/27/2020

1. Nominal Structural Compressive Resistance P_n

Nominal Compressive Resistance: $P_n := 0.66^{\lambda} \cdot F_y \cdot A_s$ AASHTO Eq. 6.9.5.1-1

Determine normalized column slenderness factor λ

$$\lambda := \left(\frac{K \cdot l}{r_s \cdot \pi}\right)^2 \cdot \frac{F_y}{E}$$ AASHTO Eq. 6.9.4.1-3 pg. 6-74

$\lambda := 0$ Where the pile is fully embedded, AASHTO 10.7.3.13.1.

Giving: $P_n := 0.66^{\lambda} \cdot F_y \cdot A_s$ $P_n = 1720 \cdot kip$

2. Factored Structural Compressive Resistance - Strength Limit State:

Factor for piles in compression under hard driving conditions:

From Article 6.5.4.2 $\phi_c := 0.5$

Factored Compressive Resistance for Strength Limit State:

$P_r := \phi_c \cdot P_n$ AASHTO Eq. 6.9.2.1-1 pg. 6-71

$P_r = 860 \cdot kip$

Note: This is the maximum structural resistance assuming no unbraced length, actual structural resistance should be checked by the structural engineer.

3. Factored Structural Compressive Resistance - Service/Extreme Limit State:

Resistance Factors for Extreme Limit States:

From Article 10.5.5.1 and 10.5.5.3 $\phi := 1$

Factored Compressive Resistance for Service/Extreme Limit State:

$P_r := \phi \cdot P_n$ AASHTO Eq. 6.9.2.1-1 pg. 6-71

$P_r = 1720 \cdot kip$

4. Geotechnical Axial Resistance - Static Analysis

AASHTO Article 10.7.3.2.3 states that the nominal resistance of piles driven to point bearing on hard rock is controlled by the structural limit state or potential for driving damage to occur during hard driving.

Required nominal resistance of 735 kips for the pile configurations based on a maximum factored pile loads of 478 kips and a 0.65 resistance factor.

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Based on geotechnical resistance calculation results, which are presented in the Axial Resistance Charts on Page 5 & 13 of this calculation, the required nominal resistance is achieved with 31-foot and 38-foot piles of penetration for the 1/2 Plugged and Non Plugged piles, respectively. The result indicate Pier piles will be either driven into glacial till or on/near bedrock to achieve the geotechnical resistance.

The estimated % skin friction resistance is about 27% to 40% for the piles at the required nominal pile resistance, based on the estimated friction resistance. We anticipate driving resistance in the lower bound glacial till properties may be lower than the calculated static resistance, due to remolding of silty soils, so 15% was used for the unplugged condition.

5. Geotechnical Axial Resistance - Drivability Analysis

$\sigma_{dr} := 0.9 \cdot \phi_{da} \cdot f_y$ AASHTO Eq. 10.7.8.1

$f_y := 50ksi$ yield Strength of steel

$\phi_{da} := 1.0$ AASHTO Table 10.5.5.2.3-1 Refers to Article 6.5.4.2, Pg. 6-28

$\sigma_{dr} := 0.9 \cdot \phi_{da} \cdot f_y$ $\sigma_{dr} = 45 \cdot ksi$ Driving Stress in pile cannot exceed 45 ksi

1/2 Plugged - Drive pile through 31 feet of soil to rock with toe quake representative of tip resistance in soil (0.12 in) and a half plug in the bottom 5 feet. Model pile length as 33 feet (2 foot stickup at end of drive).

No Plug - Drive pile through 38 feet of soil to rock with toe quake representative of moderately hard driving conditions /bedrock (0.07 in) and no plug. Model pile length as 40 feet (2 foot stickup at end of drive).

Drive piles with a Delmag D36 open-ended diesel hammer with a rated energy of 83,820 ft-lbs (fuel setting 3, 3 below maximum).
The proposed hammer is sized to achieve the required nominal pile resistance for each of the potential driving scenarios; not the maximum driveability resistance for the pile section and profile.

GRLWEAP Output is attached on Sheets 5 through 6 for the 1/2 plugged pile and sheets 11 through 12 for the non plugged piles.

1/2 Pluggd $R_{ndr1} := 735kip$ Required nominal geotechnical resistance, pile driving stress =33.7 ksi, final penetration resistance=11 bpi.

No Plug $R_{ndr2} := 735kip$ Required nominal geotechnical resistance, pile driving stress =42.5 ksi, final penetration resistance=11 bpi.

6. Factored Drivability Resistance - Strength Limit State:

Strength Limit State Factored Drivability Resistance:

PDA, WEAP and CAPWAP used to establishing driving criteria $\phi_{dyn} := 0.65$ AASHTO Table 10.5.5.2.3-1

1/2 Plugged: $R_{ndr1_factored} := R_{ndr1} \cdot \phi_{dyn}$

$R_{ndr1_factored} = 478 \cdot kip$

No Plug: $R_{ndr2_factored} := R_{ndr2} \cdot \phi_{dyn}$

$R_{ndr2_factored} = 478 \cdot kip$

7. Factored Drivability Resistance - Service/Extreme Limit States:

Service and Extreme Limit State Factored Drivability Resistance:

Resistance Factors for Extreme Limit States: $\phi_{serv_ext} := 1$

From Article 10.5.5.1 and 10.5.5.3

1/2 Plugged: $R_{ndr1_serv_ext} := R_{ndr1} \cdot \phi_{serv_ext}$

$R_{ndr1_serv_ext} = 735 \cdot kip$

No Plug: $R_{ndr2_serv_ext} := R_{ndr2} \cdot \phi_{serv_ext}$

$R_{ndr2_serv_ext} = 735 \cdot kip$

Summary of Results - Axial Loading:

ASTM A572, HP 14X117	Structural Resistance (kips)	Geotechnical Static Resistance (kips)	Required Geotechnical Resistance (kips)	Governing Resistance (kips)
Strength Limit State, Design	860	n/a	478	478
Service/Extreme Limit State, Design	1720	n/a	735	735

Since the driving stresses do not exceed the limiting driving stress of 45 ksi for ASTM A572 steel (50 ksi yield stress), and the calculated penetration resistance for the pier is within the MaineDOT preferred range of 6 to 15 blows per inch, the analyzed hammer system is judged acceptable to install the piles to the required nominal resistance.

Pile Length = 31'
Upper Bound Soil Friction = 43 degrees
1/2 Plug

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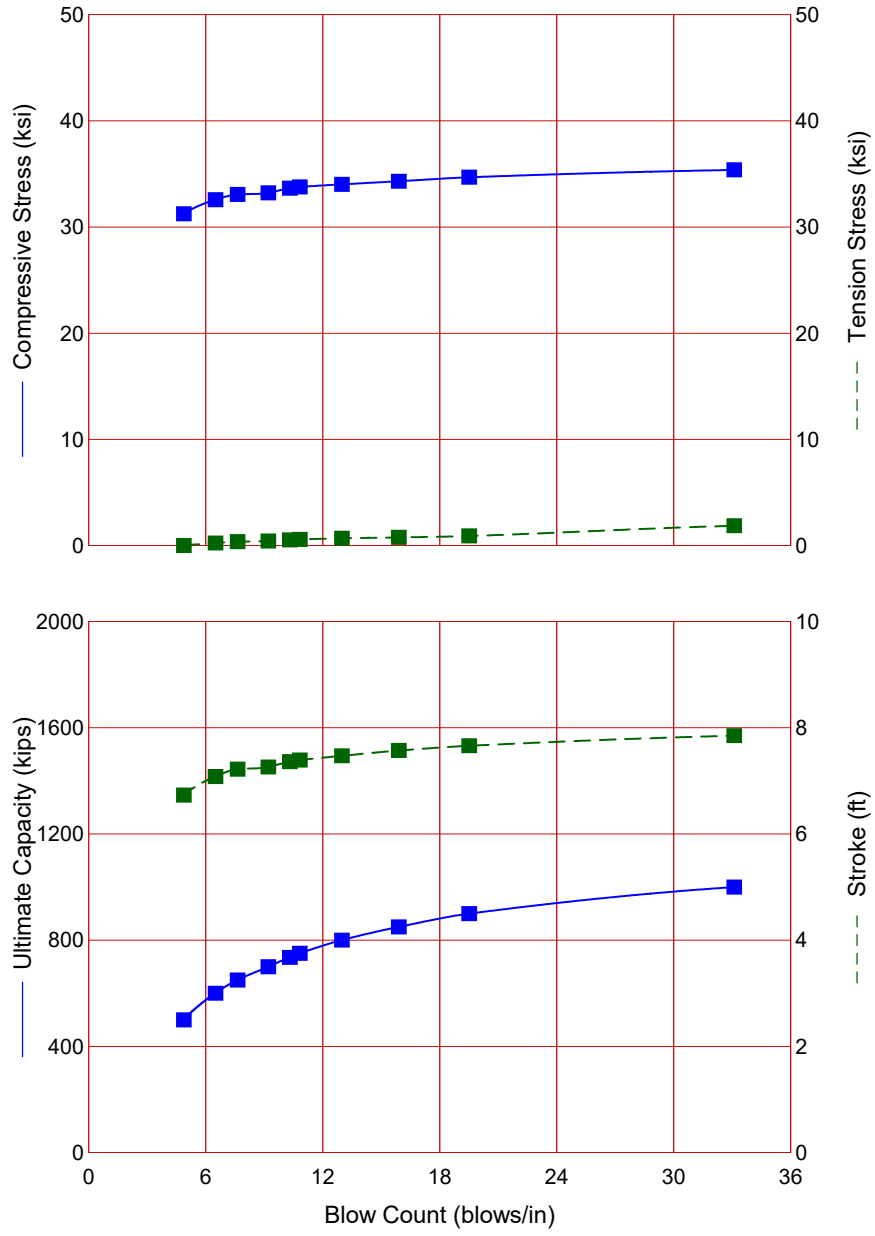
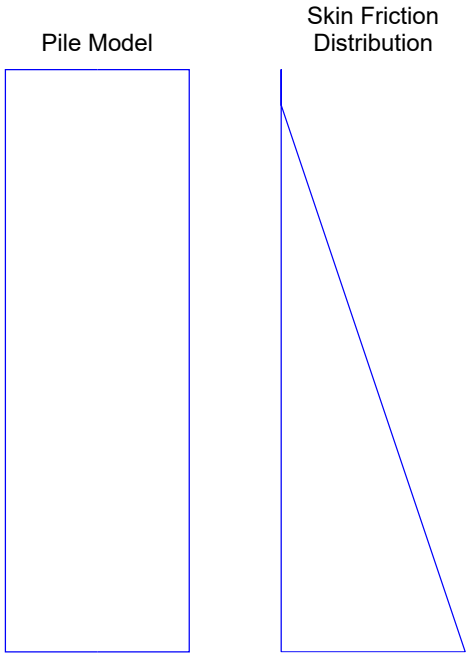
Madawaska Intl Bridge Pier 1 GRLWEAP Version 2010

Ultimate Capacity kips	Maximum Compression Stress ksi	Maximum Tension Stress ksi	Blow Count blows/in	Stroke ft	Energy kips-ft
500.0	31.23	0.02	4.9	6.73	22.32
600.0	32.56	0.25	6.5	7.08	23.28
650.0	33.07	0.37	7.6	7.22	23.65
700.0	33.21	0.44	9.2	7.26	23.59
735.0	33.65	0.55	10.3	7.36	23.84
750.0	33.76	0.59	10.8	7.39	23.93
800.0	34.01	0.70	13.0	7.47	24.12
850.0	34.31	0.78	15.9	7.57	24.30
900.0	34.68	0.91	19.5	7.66	24.64
1000.0	35.38	1.87	33.1	7.85	25.19



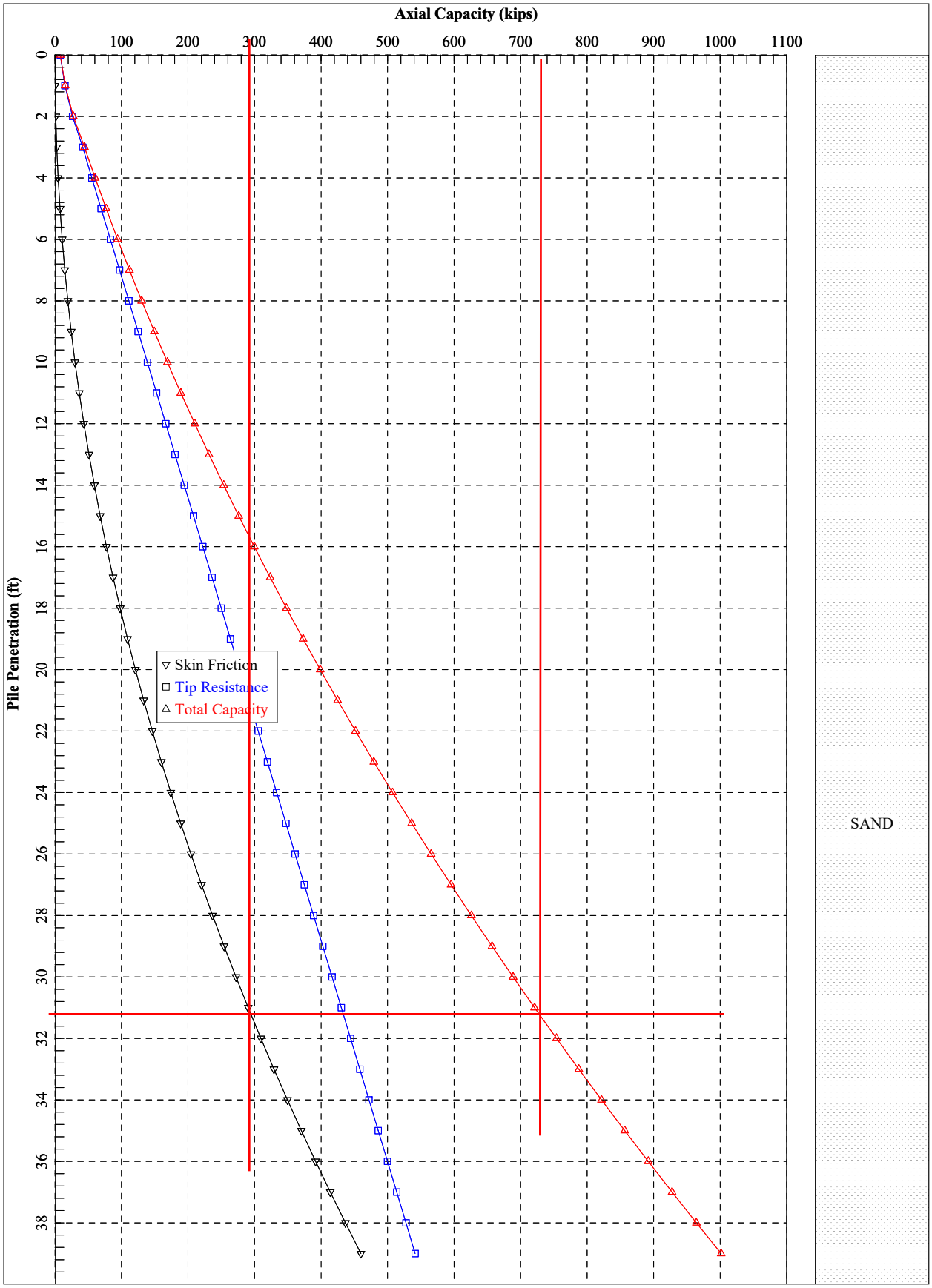
DELMAG D 36

Ram Weight	7.93	kips
Efficiency	0.800	
Pressure	964 (81%)	psi
Helmet Weight	1.90	kips
Hammer Cushion	60155	kips/in
COR of H.C.	0.800	
Skin Quake	0.100	in
Toe Quake	0.120	in
Skin Damping	0.050	sec/ft
Toe Damping	0.150	sec/ft
Pile Length	33.00	ft
Pile Penetration	31.00	ft
Pile Top Area	34.40	in2



Res. Shaft = 40 %
(Proportional)

Axial Pile Calc.
Pile Length = 31'
Upper Bound Soil Friction = 43 degrees
1/2 Plug



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                APILE for Windows, Version 2018.8.5

                 Serial Number :  653550831

                 A Program for Analyzing the Axial Capacity
                 and Short-term Settlement of Driven Piles
                           under Axial Loading.
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     Path to file locations      : P:\09 Jobs\0025900s\09.0025984.00 - Madawaska Bridge Coordination Phase\09.0025984.03 -
Int'l Br. GDR\Work\Calcs\Pier 1 Piles\Apile\14x117\43 degrees\FHWA\
     Name of input data file     : Pier1_14x117 FHWA.ap8d
     Name of output file         : Pier1_14x117 FHWA.ap8o
     Name of plot output file    : Pier1_14x117 FHWA.ap8p

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               Date:  August 21, 2020     Time:  15:17:07



1
          *********************
          * INPUT INFORMATION *
          *********************



          New Pile

          DESIGNER   :

          JOB NUMBER :


          METHOD FOR UNIT LOAD TRANSFERS :

          - FHWA (Federal Highway Administration)
```

```
            Unfactored Unit Side Friction and Unit Side Resistance are used.


          COMPUTATION METHOD(S) FOR PILE CAPACITY :

          - FHWA (Federal Highway Administration)


          TYPE OF LOADING :
          - COMPRESSION


          PILE TYPE :

          H-Pile/Steel Pile


          DATA FOR AXIAL STIFFNESS :

          - MODULUS OF ELASTICITY     = 0.290E+08 PSI
          - CROSS SECTION AREA        =    122.90 IN2


          NONCIRCULAR PILE PROPERTIES :

          - TOTAL PILE LENGTH, TL     =     41.00 FT.
          - BATTER ANGLE              =      0.00 DEG
          - PILE STICKUP LENGTH, PSL  =      2.00 FT.
          - ZERO FRICTION LENGTH, ZFL =      0.00 FT.
          - PERIMETER OF PILE         =     58.20 IN.
          - TIP AREA OF PILE          =    122.90 IN2
          - INCREMENT OF PILE LENGTH
            USED IN COMPUTATION       =      1.00 FT.


          SOIL INFORMATIONS :


                          LATERAL    EFFECTIVE    FRICTION   BEARING
                   SOIL   EARTH      UNIT         ANGLE      CAPACITY
           DEPTH   TYPE   PRESSURE   WEIGHT       DEGREES    FACTOR
             FT.                     LB/CF
              0.00   SAND      0.00        67.60        43.00      0.00
             50.00   SAND      0.00        67.60        43.00      0.00


          MAXIMUM   MAXIMUM   UNDISTURB  REMOLDED
```

UNIT FRICTION KSF	UNIT BEARING KSF	SHEAR STRENGTH KSF	SHEAR STRENGTH KSF	BLOW COUNT	UNIT SKIN FRICTION KSF	UNIT END BEARING KSF
0.10E+08*	0.10E+08*	0.00	0.00	0.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	0.00	0.00	0.00

* MAXIMUM UNIT FRICTION AND/OR MAXIMUM UNIT BEARING
WERE SET TO BE 0.10E+08 BECAUSE THE USER DOES NOT
PLAN TO LIMIT THE COMPUTED DATA.

DEPTH FT.	LRFD FACTOR ON UNIT FRICTION	LRFD FACTOR ON UNIT BEARING
0.00	1.000	1.000
50.00	1.000	1.000

1

****
* COMPUTATION RESULT *
****

****
* FED. HWY. METHOD *
****

PILE PENETRATION FT.	TOTAL SKIN FRICTION KIP	END BEARING KIP	ULTIMATE CAPACITY KIP
0.00	0.0	8.0	8.0
1.00	0.3	15.0	15.3
2.00	1.2	26.4	27.6
3.00	2.7	41.7	44.4
4.00	4.8	55.5	60.4
5.00	7.6	69.4	77.0
6.00	10.9	83.3	94.2
7.00	14.8	97.2	112.0
8.00	19.4	111.1	130.4
9.00	24.5	125.0	149.5
10.00	30.2	138.9	169.1
11.00	36.6	152.8	189.3
12.00	43.5	166.6	210.2
13.00	51.1	180.5	231.6
14.00	59.3	194.4	253.7
15.00	68.0	208.3	276.3
16.00	77.4	222.2	299.6
17.00	87.4	236.1	323.5
18.00	98.0	250.0	347.9
19.00	109.2	263.8	373.0
20.00	121.0	277.7	398.7
21.00	133.4	291.6	425.0
22.00	146.4	305.5	451.9
23.00	160.0	319.4	479.4
24.00	174.2	333.3	507.5
25.00	189.0	347.2	536.2
26.00	204.4	361.0	565.5
27.00	220.4	374.9	595.4
28.00	237.1	388.8	625.9
29.00	254.3	402.7	657.0
30.00	272.2	416.6	688.7
31.00	290.6	430.5	721.1
32.00	309.6	444.4	754.0
33.00	329.3	458.3	787.6
34.00	349.6	472.1	821.7
35.00	370.4	486.0	856.5
36.00	391.9	499.9	891.8
37.00	414.0	513.8	927.8
38.00	436.7	527.7	964.3
39.00	459.9	541.5	1001.5

NOTES:
- AN ASTERISK IS PLACED IN THE END-BEARING COLUMN
IF THE TIP RESISTANCE IS CONTROLLED BY THE FRICTION
OF SOIL PLUG INSIDE AN OPEN-ENDED PIPE PILE.

****
* COMPUTE LOAD-DISTRIBUTION AND LOAD-SETTLEMENT *
* CURVES FOR AXIAL LOADING *
****

T-Z CURVE NO.	NO. OF POINTS	DEPTH TO CURVE FT.	LOAD TRANSFER PSI	PILE MOVEMENT IN.
1	10	0.0000E+00		
			0.0000E+00	0.0000E+00
			0.0000E+00	0.1000E-01
			0.0000E+00	0.2000E-01
			0.0000E+00	0.4000E-01
			0.0000E+00	0.6000E-01
			0.0000E+00	0.8000E-01
			0.0000E+00	0.9000E-01
			0.0000E+00	0.1000E+00

```
                                        0.0000E+00      0.5000E+00
                                        0.0000E+00      0.2000E+01
     2          10      0.2503E+02
                                        0.0000E+00      0.0000E+00
                                        0.2167E+01      0.1000E-01
                                        0.4334E+01      0.2000E-01
                                        0.8668E+01      0.4000E-01
                                        0.1300E+02      0.6000E-01
                                        0.1734E+02      0.8000E-01
                                        0.1950E+02      0.9000E-01
                                        0.2167E+02      0.1000E+00
                                        0.2167E+02      0.5000E+00
                                        0.2167E+02      0.2000E+01
     3          10      0.4996E+02
                                        0.0000E+00      0.0000E+00
                                        0.3377E+01      0.1000E-01
                                        0.6754E+01      0.2000E-01
                                        0.1351E+02      0.4000E-01
                                        0.2026E+02      0.6000E-01
                                        0.2702E+02      0.8000E-01
                                        0.3039E+02      0.9000E-01
                                        0.3377E+02      0.1000E+00
                                        0.3377E+02      0.5000E+00
                                        0.3377E+02      0.2000E+01


 TIP   LOAD        TIP MOVEMENT
     KIP               IN.

 0.0000E+00         0.0000E+00
 0.3384E+02         0.9263E-02
 0.6769E+02         0.1853E-01
 0.1354E+03         0.3705E-01
 0.2708E+03         0.2408E+00
 0.4061E+03         0.7781E+00
 0.4874E+03         0.1352E+01
 0.5415E+03         0.1853E+01
 0.5415E+03         0.2779E+01
 0.5415E+03         0.3705E+01


               LOAD VERSUS SETTLEMENT CURVE
               ****************************

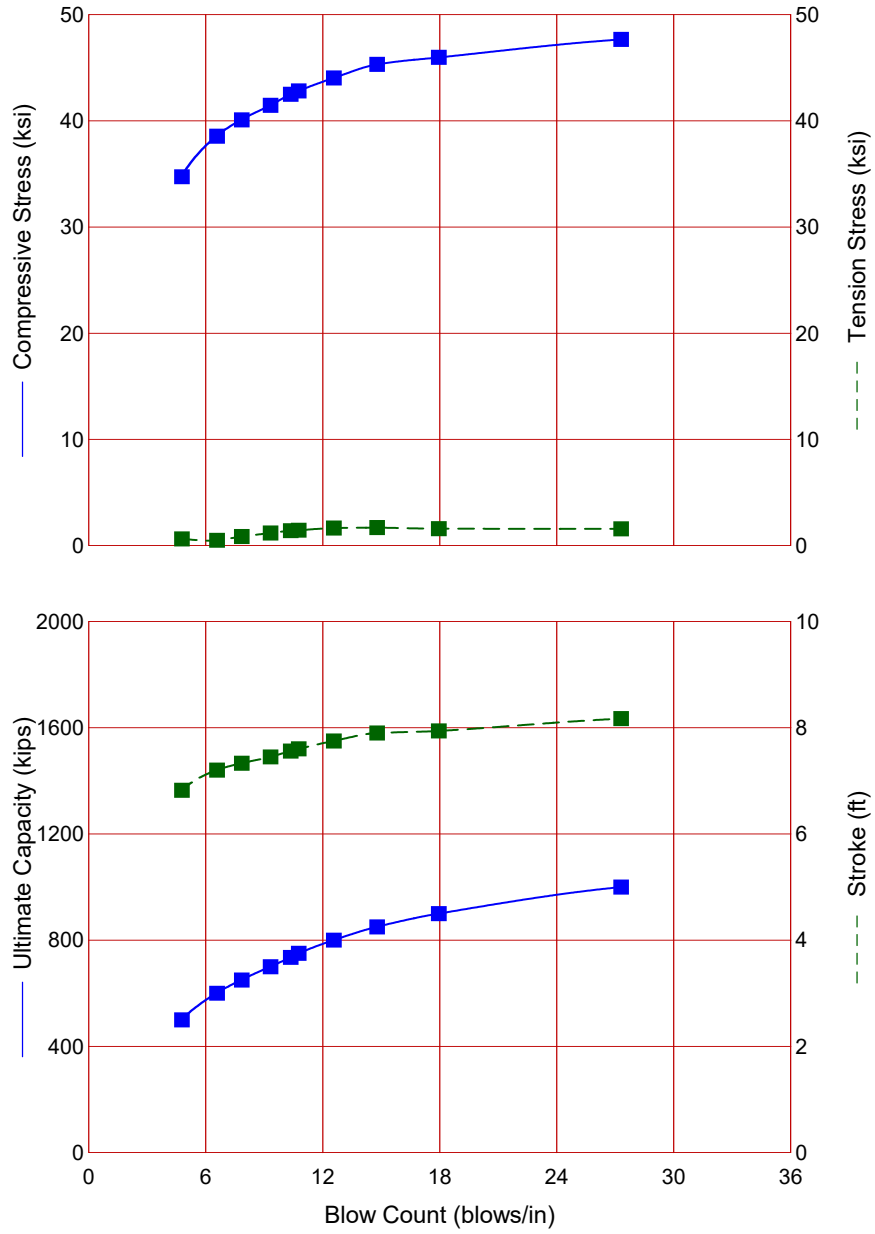

 TOP  LOAD     TOP MOVEMENT       TIP  LOAD      TIP MOVEMENT
    KIP              IN.              KIP              IN.
 0.9316E+00      0.2008E-03      0.3654E+00      0.1000E-03
```

```
 0.9316E+01      0.2008E-02      0.3654E+01      0.1000E-02
 0.4658E+02      0.1004E-01      0.1827E+02      0.5000E-02
 0.9349E+02      0.2010E-01      0.3654E+02      0.1000E-01
 0.4212E+03      0.9467E-01      0.1440E+03      0.5000E-01
 0.6344E+03      0.1675E+00      0.1772E+03      0.1000E+00
 0.7932E+03      0.5894E+00      0.3361E+03      0.5000E+00
 0.8947E+03      0.1103E+01      0.4375E+03      0.1000E+01
 0.9987E+03      0.2118E+01      0.5415E+03      0.2000E+01
```

Pile Length = 38' (Driven to Rock)
Lower Bound Soil Friction = 38 degrees
No Plug

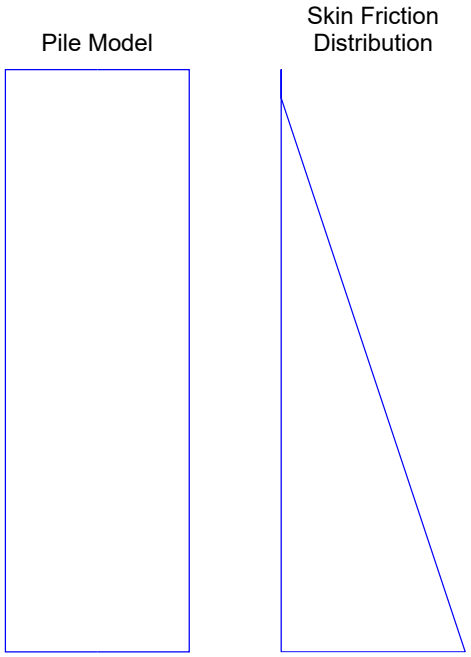
21-Aug-2020
Madawaska Intl Bridge Pier 1 GRLWEAP Version 2010

Ultimate Capacity kips	Maximum Compression Stress ksi	Maximum Tension Stress ksi	Blow Count blows/in	Stroke ft	Energy kips-ft
500.0	34.73	0.63	4.8	6.82	23.23
600.0	38.54	0.50	6.6	7.20	24.26
650.0	40.09	0.86	7.8	7.33	24.76
700.0	41.44	1.19	9.3	7.45	25.19
735.0	42.48	1.41	10.4	7.56	25.55
750.0	42.81	1.46	10.8	7.60	25.79
800.0	44.02	1.66	12.6	7.75	26.31
850.0	45.30	1.70	14.8	7.90	26.84
900.0	45.96	1.60	18.0	7.94	27.07
1000.0	47.65	1.59	27.3	8.17	27.90

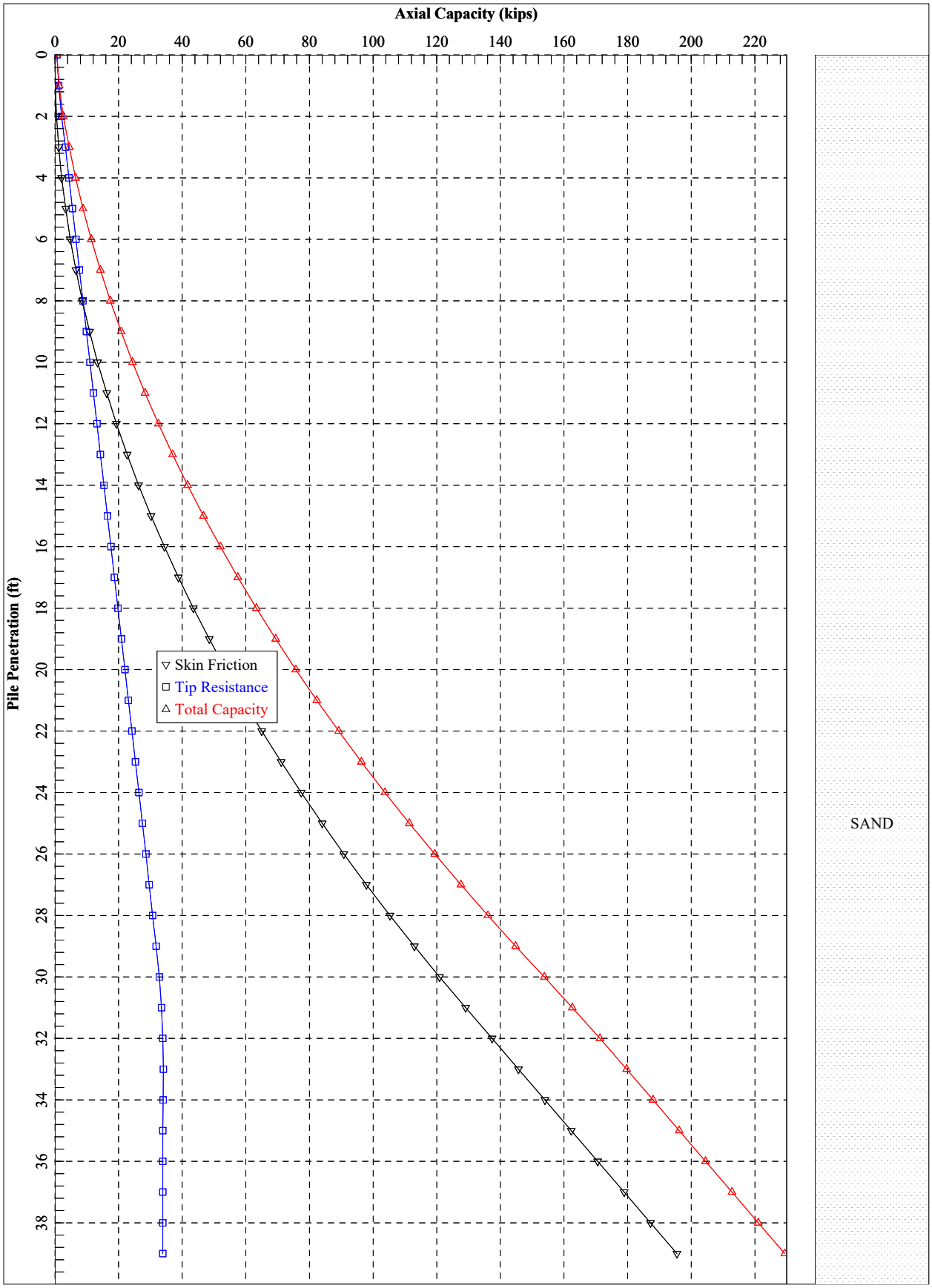


DELMAG D 36

Ram Weight	7.93	kips
Efficiency	0.800	
Pressure	963 (80%)	psi
Helmet Weight	1.90	kips
Hammer Cushion	60155	kips/in
COR of H.C.	0.800	
Skin Quake	0.100	in
Toe Quake	0.070	in
Skin Damping	0.050	sec/ft
Toe Damping	0.150	sec/ft
Pile Length	41.00	ft
Pile Penetration	39.00	ft
Pile Top Area	34.40	in2



Axial Pile Calc.
Pile Length = 38' (Driven to Rock)
Lower Bound Soil Friction = 38 degrees
No Plug



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

                APILE for Windows, Version 2018.8.5

                 Serial Number :  653550831

                 A Program for Analyzing the Axial Capacity
                 and Short-term Settlement of Driven Piles
                           under Axial Loading.
                (c) Copyright ENSOFT, Inc., 1987-2015
                     All Rights Reserved

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


     This program is licensed to :

     GZA GeoEnvironmental, Inc.
     Portland, OR

     Path to file locations      : P:\09 Jobs\0025900s\09.0025984.00 - Madawaska Bridge Coordination Phase\09.0025984.03 -
Int'l Br. GDR\Work\Calcs\Pier 1 Piles\Apile\14x117\38 degrees\ArmyCorp\
     Name of input data file     : Pier1_14x117.ap8d
     Name of output file         : Pier1_14x117.ap8o
     Name of plot output file    : Pier1_14x117.ap8p

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

               Date:  August 20, 2020     Time:  11:20:13



1
          *********************
          * INPUT INFORMATION *
          *********************



          New Pile

          DESIGNER   :

          JOB NUMBER :


          METHOD FOR UNIT LOAD TRANSFERS :

          - USACE (U.S. Army Corps of Engineers)
```

```
            Unfactored Unit Side Friction and Unit Side Resistance are used.


          COMPUTATION METHOD(S) FOR PILE CAPACITY :

          - USACE (U.S. Army Corps of Engineers)
            # Critical Depth Method for Sand:
              10 to 20 Pile Diameter based on the Density
            Use Long Pile Option


          TYPE OF LOADING :
          - COMPRESSION


          PILE TYPE :

          H-Pile/Steel Pile


          DATA FOR AXIAL STIFFNESS :

          - MODULUS OF ELASTICITY     = 0.290E+08 PSI
          - CROSS SECTION AREA        =     34.40 IN2


          NONCIRCULAR PILE PROPERTIES :

          - TOTAL PILE LENGTH, TL     =     41.00 FT.
          - BATTER ANGLE              =      0.00 DEG
          - PILE STICKUP LENGTH, PSL  =      2.00 FT.
          - ZERO FRICTION LENGTH, ZFL =      0.00 FT.
          - PERIMETER OF PILE         =     58.20 IN.
          - TIP AREA OF PILE          =     34.40 IN2
          - INCREMENT OF PILE LENGTH
            USED IN COMPUTATION       =      1.00 FT.



          SOIL INFORMATIONS :



                          LATERAL    EFFECTIVE    FRICTION   BEARING
                  SOIL    EARTH      UNIT         ANGLE      CAPACITY
           DEPTH  TYPE    PRESSURE   WEIGHT       DEGREES    FACTOR
            FT.                       LB/CF
             0.00  SAND      1.25        67.60        38.00      0.00
            50.00  SAND      1.25        67.60        38.00      0.00
```

MAXIMUM UNIT FRICTION KSF	MAXIMUM UNIT BEARING KSF	UNDISTURB SHEAR STRENGTH KSF	REMOLDED SHEAR STRENGTH KSF	BLOW COUNT	UNIT SKIN FRICTION KSF	UNIT END BEARING KSF
0.10E+08*	0.22E+03	0.00	0.00	0.00	0.00	0.00
0.10E+08*	0.22E+03	0.00	0.00	0.00	0.00	0.00

* MAXIMUM UNIT FRICTION AND/OR MAXIMUM UNIT BEARING
WERE SET TO BE 0.10E+08 BECAUSE THE USER DOES NOT
PLAN TO LIMIT THE COMPUTED DATA.

DEPTH FT.	LRFD FACTOR ON UNIT FRICTION	LRFD FACTOR ON UNIT BEARING
0.00	1.000	1.000
50.00	1.000	1.000

1

****
* COMPUTATION RESULT *
****

****
* ARMY CORPS METHOD *
****

PILE PENETRATION FT.	TOTAL SKIN FRICTION KIP	END BEARING KIP	ULTIMATE CAPACITY KIP
0.00	0.0	0.6	0.6
1.00	0.1	1.2	1.3
2.00	0.5	2.1	2.6
3.00	1.2	3.3	4.5
4.00	2.1	4.4	6.5
5.00	3.4	5.5	8.8
6.00	4.8	6.6	11.4
7.00	6.6	7.7	14.3
8.00	8.6	8.8	17.4
9.00	10.9	9.9	20.8
10.00	13.4	11.0	24.4
11.00	16.3	12.1	28.3
12.00	19.3	13.2	32.5
13.00	22.7	14.3	37.0
14.00	26.3	15.4	41.7
15.00	30.2	16.5	46.7
16.00	34.4	17.6	52.0
17.00	38.8	18.7	57.5
18.00	43.5	19.8	63.3
19.00	48.5	20.9	69.4
20.00	53.7	22.0	75.7
21.00	59.2	23.1	82.3
22.00	65.0	24.2	89.2
23.00	71.1	25.3	96.3
24.00	77.4	26.4	103.7
25.00	84.0	27.5	111.4
26.00	90.8	28.6	119.4
27.00	97.9	29.6	127.6
28.00	105.3	30.7	136.1
29.00	113.0	31.8	144.8
30.00	120.9	32.8	153.8
31.00	129.1	33.5	162.6
32.00	137.4	33.9	171.3
33.00	145.7	34.1	179.7
34.00	154.0	34.0	188.0
35.00	162.3	33.9	196.2
36.00	170.6	33.9	204.5
37.00	178.9	33.9	212.8
38.00	187.2	33.9	221.1
39.00	195.5	33.9	229.4

NOTES:
- AN ASTERISK IS PLACED IN THE END-BEARING COLUMN
IF THE TIP RESISTANCE IS CONTROLLED BY THE FRICTION
OF SOIL PLUG INSIDE AN OPEN-ENDED PIPE PILE.

****
* COMPUTE LOAD-DISTRIBUTION AND LOAD-SETTLEMENT *
* CURVES FOR AXIAL LOADING *
****

T-Z CURVE NO.	NO. OF POINTS	DEPTH TO CURVE FT.	LOAD TRANSFER PSI	PILE MOVEMENT IN.
1	10	0.0000E+00		
			0.0000E+00	0.0000E+00
			0.0000E+00	0.1000E-01
			0.0000E+00	0.2000E-01
			0.0000E+00	0.4000E-01
			0.0000E+00	0.6000E-01

```
                                    0.0000E+00      0.8000E-01
                                    0.0000E+00      0.1200E+00
                                    0.0000E+00      0.1600E+00
                                    0.0000E+00      0.5000E+00
                                    0.0000E+00      0.1000E+02
     2          10      0.2503E+02
                                    0.0000E+00      0.0000E+00
                                    0.1106E+01      0.1000E-01
                                    0.1985E+01      0.2000E-01
                                    0.3291E+01      0.4000E-01
                                    0.4216E+01      0.6000E-01
                                    0.4905E+01      0.8000E-01
                                    0.5864E+01      0.1200E+00
                                    0.6499E+01      0.1600E+00
                                    0.8343E+01      0.5000E+00
                                    0.9554E+01      0.1000E+02
     3          10      0.4996E+02
                                    0.0000E+00      0.0000E+00
                                    0.1131E+01      0.1000E-01
                                    0.2065E+01      0.2000E-01
                                    0.3519E+01      0.4000E-01
                                    0.4597E+01      0.6000E-01
                                    0.5429E+01      0.8000E-01
                                    0.6629E+01      0.1200E+00
                                    0.7452E+01      0.1600E+00
                                    0.9982E+01      0.5000E+00
                                    0.1177E+02      0.1000E+02


 TIP   LOAD        TIP MOVEMENT
     KIP              IN.

 0.0000E+00         0.0000E+00
 0.3523E+00         0.1000E-03
 0.2491E+01         0.5000E-02
 0.3523E+01         0.1000E-01
 0.7877E+01         0.5000E-01
 0.1114E+02         0.1000E+00
 0.1575E+02         0.2000E+00
 0.2491E+02         0.5000E+00
 0.3523E+02         0.1000E+01
 0.4982E+02         0.2000E+01


               LOAD VERSUS SETTLEMENT CURVE
               ****************************
```

```
  TOP  LOAD     TOP MOVEMENT       TIP  LOAD      TIP MOVEMENT
     KIP            IN.              KIP            IN.
 0.5555E+00      0.3190E-03      0.3523E+00      0.1000E-03
 0.2086E+01      0.1695E-02      0.7451E+00      0.1000E-02
 0.8889E+01      0.7809E-02      0.2491E+01      0.5000E-02
 0.1548E+02      0.1478E-01      0.3523E+01      0.1000E-01
 0.5064E+02      0.6593E-01      0.7877E+01      0.5000E-01
 0.7817E+02      0.1253E+00      0.1114E+02      0.1000E+00
 0.1617E+03      0.5560E+00      0.2491E+02      0.5000E+00
 0.1749E+03      0.1062E+01      0.3523E+02      0.1000E+01
 0.1952E+03      0.2071E+01      0.4982E+02      0.2000E+01
```

Table 1 - FBPier Input Parameters, Pier 1
Madawaska International Bridge Replacement
PIN 21736.00
Madawaska, ME - Edmundston, NB

Project:	Madawaska, ME - Edmundston, NB International Bridge	Computed:	NVW	Date:	4/6/2020
Subject:	FB-Pier Parameters	Checked:	ARB	Date:	
Task:	2	Page:		of:	
Job #:	09.0025984.03				

Pier 1

Pile Section **HP14x117**
Water Elevation: **465** ft

Stratum	Design Stratum Thickness (ft)	Approx. Elevation (ft)	Lateral Model					Axial[2]				Torsional	Tip Model		
			Effective Unit Weight (pcf)	Internal Friction Angle (Φ)[3]	P-Y Model	Subgrade Modulus (pci)[3]	Coefficient of Lateral Earth Pressure, K[2,4]	T-Z Model	Poisson's Ratio, ν	Shear Modulus, G (ksi)[2,4]	Ultimate Unit Skin Friction[4] (psf)	Torsional Shear Stress[4] (psf)	Tip Soil Model	Ultimate End Bearing[4] (ksi)	End Condition
PIER 1 - No Soil Plug, Driven to Rock															
Glacial Till	38	453 to 415	68	38	Sand (Reese)	120	0.38	Driven Pile	0.40	2.67	1100	1100			
Bedrock		415 to --	109		--	--		--	--	--	--	--	Driven Pile	3.7	Not Plugged
PIER 1 - Partially Plugged Pile															
Glacial Till	31	453 to 422	68	43	Sand (Reese)	190	0.32	Driven Pile	0.40	2.67	2000	2000	Driven Pile	2.4	Plugged

Notes.

1. Elevations are in feet and reference the North American Vertical Datum of 1988 (NAVD 88).
2. Lateral, axial and torsional model parameters for soil interpolated or calculated from default inputs and equations from BSI "Parameters of Soil Models for Studying Soil-Pile Interaction Analysis Using FB-MultiPier", dated May 2011.
3. Calculated lower and upper bound internal friction angles and lateral subgrade moduli based on conditions encountered at borings BB-MSJR-101, and -201 through -204 in Madawaska, within stratum.
4. Equations:

Subgrade Modulus: Calculated based on internal friction angles based on Figure 3-34 presented in the 2016 LPile technical manual. Lower bound friction angle for no soil plug, upper bound friction angle for plugged condition.
Coefficient of Lateral Earth Pressure: $K = 1 - \sin(\varphi)$
Young's Modulus, Sand (BSI FBPier Parameters, May 2011): $E = \alpha * p_a * N_{60}$
Shear Modulus, Sand (BSI FBPier Parameters, May 2011): $G(ksi) = E/(2 * (1 + v))$, maximum shear modulus for FBPier is 2.67
Ultimate Unit Skin Friction and Torsional Shear Stress, Sand: Taken from US Army Corps APile output and Meyerhof displacement pile method for plugged and non-plugged conditions respectively.
Ultimate End Bearing in Till is based on Nordlund limiting unit pile tip resistance AASHTO Table 10.7.3.8.6f-9
Ultimate End Bearing in rock was taken as the nominal shaft tip resistance (Jointed Rock Mass). See Bedrock Shaft Design Parameters

Drilled Shaft Design Parameters

Drilled Shaft Design Parameters in Bedrock

Project: Madawaska International Bridge **Project No.:** 09.0025984.03

Location: Madawaska, ME - Edmundston, NB

Calculated By: N. Williams **Date:** 7/30/2020

Checked By: A.Blaisdell **Date:** 8/25/2020

Objective: Develop foundation design parameters for drilled shafts in bedrock, including axial support and p-y curves for lateral evaluation using AASHTO methodology and NCHRP Synthesis 360.

Inputs: Rock core data from test borings BB-MSJR-204 through -208, including rock type and RQD, and laboratory test data including unit weight, unconfined compressive strength, secant modulus of elasticity and Poisson's ratio for specimens, assessed in the Design Bedrock Properties.

Approach:
1) Evaluate side and tip resistance of drilled shaft socket in rock using rock properties to assess shaft length. Use resistance factors from AASHTO Table 10.5.5.2.4-1 & 10.5.5.2.5-1. See pages 2-3.
2) Develop p-y curves for bedrock using Gabr et al (2002) method as presented in the National Cooperative Highway Research Program (NCHRP) Synthesis 360, "Rock Socketed Shafts for Highway Structure Foundations." Develop curves for 6' diameter shaft embeded into a 5.5' diameter 15' rock socket for Lower Bound Stiffness conditions. Also calculate Reese Weak Rock curves for comparison and for use in Upper Bound stiffness condition. Perform lateral analyses for shafts considering both conditions to check which controls. See calculations and plotted curves on pages 5-8.

Madawaska International Bridge
Madawaska, ME - Edmundston, NB
09.0025984.03

Calculated by N. Williams Date: 7/21/2020
Checked by A.Blaisdell Date: 8/25/2020

Calculation: Drilled Shaft Side Resistance in Rock

References: 1) AASHTO LRFD Bridge Design Specifications, 8th Ed. (2017)

Parameter Description	Parameter Symbol	Values	Reference
Socket Diameter	B (in)	66	
Method 1: Kulhawy et al 2005 (Rock w/o caving)			
Concrete Unconfined Compressive Strength	fc' (psi)	4,000	
Design Unconfined Compressive Strength	qur-c (psi)	4,000	Minimum of Rock or Concrete
Regression Coefficient	C	1	AASHTO 10.8.3.5.4b
Nominal Unit Side Resistance (Method 1)	qs1 (ksf)	34.9	AASHTO Eq. 10.8.3.5.4b-1
Method 2: O'Neill and Reese 1999, Brown et al 2010 (Temporary casing required for socket support during installation)			
Joint Modification Factor	a_E	0.575	AASHTO 10.8.3.5.4b, based on RQD
Nominal Unit Side Resistance (Method 2)	qs2 (ksf)	14.6	AASHTO Eq. 10.8.3.5.4b-2
Side Resistance Design Parameters			
Nominal Side Resistance	**qs (ksf)**	**24.8**	Average of Methods 1 and 2 (Conservative, sidewalls expected to stand in excavations)
Nominal Side Resistance	qs (psi)	172	
Load Testing Planned?	Y / N	N	
Resistance Factor, Compression, Strength	ϕ_{stat}	0.55	AASHTO Table 10.5.5.2.4-1, Kulhawy 2005
Resistance Factor, Tension, Strength	ϕ_{up}	0.40	AASHTO Table 10.5.5.2.4-1, Kulhawy 2006
Resistance Factor, Compression, Load Test	ϕ_{load}	0.70	AASHTO Table 10.5.5.2.4-1, Static Load Test
Resistance Factor, Tension, Load Test	ϕ_{upload}	0.60	AASHTO Table 10.5.5.2.4-1, Static Load Test
Factored Side Resistance, Compression	**qs,c (ksf)**	**13.6**	Assume no testing
Factored Side Resistance, Tension	**qs,t (ksf)**	**9.9**	Assume no testing
Factored Compression Side Resistance/Foot Socket Length	**Rs,c/ft (kip/ft)**	235	
Factored Compression Side Resistance/Foot Socket Length	**Rs,t/ft (kip/ft)**	171	

Total Factored Side Resistance (kips) - diff. shaft lengths		Compression	Tension
10' Shaft	Rs,c (kips)	2,354	1,712
15' Shaft	Rs,c (kips)	3,531	2,568
20' Shaft	Rs,c (kips)	4,709	3,424
25' Shaft	Rs,c (kips)	5,886	4,281

Madawaska International Bridge
Madawaska, ME - Edmundston, NB
09.0025984.03

Calculated by N. Williams Date: 7/21/2020
Checked by A.Blaisdell Date: 8/25/2020

Calculation: Drilled Shaft Tip Resistance in Rock

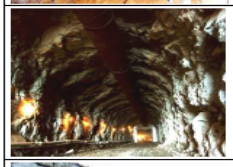
Note: Values imported from Bedrock Design Parameters

Parameter Description	Parameter Symbol	Values	Reference
Unconfined compressive strength of intact rock	q_u (psi)	5,000	Lab data
Nominal Shaft Tip Resistance, Intact Rock	$q_{p\ intact}$ (ksf)	1800	AASHTO Eq. 10.8.3.5.4C-1
Geological Strength Index	GSI	65	AASHTO FIG 10.4.6.4-1
Hoek - Brown 2002	D	0	Hoek - Brown 2002
Empirically determined rock mass parameter	s	0.020	AASHTO Eq. 10.4.6.4-2
Empirically determined rock mass parameter	a	0.502	AASHTO Eq. 10.4.6.4-3
Rock group constant	m_i	7	AASHTO TABLE 10.4.6.4-1
Empirically determined rock mass parameter	m_b	2.0	AASHTO Eq. 10.4.6.4-4
Vertical effective stress at the socket bearing elevation	$\sigma'_{v,b}$ (psf)	1629	Vertical effective stress, assume fully scoured to rock
	$\sigma'_{v,b}$ (psi)	11.3	
Fracturing coefficient	A	796	AASHTO Eq. 10.8.3.5.4C-3 (Turner and Ramey, 2010)
Nominal Shaft Tip Resistance, Jointed Rock Mass	$q_{p\ jointed}$ (ksf)	533.578	AASHTO Eq. 10.8.3.5.4C-2
Nominal Shaft Tip Resistance, Jointed Rock Mass	$q_{p\ jointed}$ (psi)	3705	
Ratio of Jointed Tip Resistance / Intact Tip Resistance	$q_{p\ jointed}$ / $q_{p\ intact}$	0.30	
Ratio of Jointed Tip Resistance / UCS	$q_{p\ jointed}$ / q_u	0.74	
Area of Pile Tip - Calculated from Diameter above	A_p (ft^2)	23.76	
Nominal Tip Resistance, Intact Rock	$R_{p,i}$ (kips)	42,765	
Nominal Tip Resistance, Jointed Rock Mass	$R_{p,j}$ (kips)	12,677	AASHTO Eq. 10.8.3.5-2
Resistance Factor	ϕ_{qp}	0.5	AASHTO TABLE 10.5.5.2.5-1
Factored Unit Tip Resistance, Intact Rock	$q_{p\ intact}$ (ksf)	900	
Factored Unit Tip Resistance, Jointed Rock Mass	$q_{p\ jointed}$ (ksf)	267	
Factored Tip Resistance, Intact Rock	$R_{R,i}$ (kips)	21,382	
Factored Tip Resistance, Jointed Rock Mass	$R_{R,j}$ (kips)	6,338	AASHTO Eq. 10.8.3.5-1

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

Method/Soil/Condition			Resistance Factor
Nominal Axial Compressive Resistance of Single-Drilled Shafts, φ_{stat}	Side resistance in clay	α-method (Brown et al., 2010)	0.45
	Tip resistance in clay	Total Stress (Brown et al., 2010)	0.40
	Side resistance in sand	β-method (Brown et al., 2010)	0.55
	Tip resistance in sand	Brown et al. (2010)	0.50
	Side resistance in cohesive IGMs	Brown et al. (2010)	0.60
	Tip resistance in cohesive IGMs	Brown et al. (2010)	0.55
	Side resistance in rock	Kulhawy et al. (2005) Brown et al. (2010)	0.55
	Side resistance in rock	Carter and Kulhawy (1988)	0.50
	Tip resistance in rock	Canadian Geotechnical Society (1985) Pressuremeter Method (Canadian Geotechnical Society, 1985) Brown et al. (2010)	0.50
Block Failure, φ_{b1}	Clay		0.55
Uplift Resistance of Single-Drilled Shafts, φ_{up}	Clay	α-method (Brown et al., 2010)	0.35
	Sand	β-method (Brown et al., 2010)	0.45
	Rock	Kulhawy et al. (2005) Brown et al. (2010)	0.40
Group Uplift Resistance, φ_{ug}	Sand and clay		0.45
Horizontal Geotechnical Resistance of Single Shaft or Shaft Group	All materials		1.0
Static Load Test (compression), φ_{load}	All Materials		0.70
Static Load Test (uplift), φ_{upload}	All Materials		0.60

Table 1: Guidelines for estimating disturbance factor *D* From Hoek et al., 200

Appearance of rock mass	Description of rock mass	Suggested value of *D*
	Excellent quality controlled blasting or excavation by Tunnel Boring Machine results in minimal disturbance to the confined rock mass surrounding a tunnel.	*D* = 0
	Mechanical or hand excavation in poor quality rock masses (no blasting) results in minimal disturbance to the surrounding rock mass. Where squeezing problems result in significant floor heave, disturbance can be severe unless a temporary invert, as shown in the photograph, is placed.	*D* = 0 *D* = 0.5 No invert
	Very poor quality blasting in a hard rock tunnel results in severe local damage, extending 2 or 3 m, in the surrounding rock mass.	*D* = 0.8
	Small scale blasting in civil engineering slopes results in modest rock mass damage, particularly if controlled blasting is used as shown on the left hand side of the photograph. However, stress relief results in some disturbance.	*D* = 0.7 Good blasting *D* = 1.0 Poor blasting
	Very large open pit mine slopes suffer significant disturbance due to heavy production blasting and also due to stress relief from overburden removal. In some softer rocks excavation can be carried out by ripping and dozing and the degree of damage to the slopes is less.	*D* = 1.0 Production blasting *D* = 0.7 Mechanical excavation

No Blasting, No Disturbance

Calculation: NCHRP Synthesis 360 p-y curves

References: 1) NCHRP Synthesis 360 - Rock-Socketed Shafts for Highway Structure Foundations.
2) Gabr 2002

0-10' deep

Parameter Description	Parameter Symbol	Design Values	Reference
Pile Socket Diameter	B (in)	66	
Depth to top of normal stress	(ft)	0	
Depth to bottom of normal stress	(ft)	10	
Moment of Inertia	$I_{xy}(in^4)$	931420	
Socket Stiffness ($E_{concrete}$)	Ec (ksi)	3605	
Effective Composite Socket Stiffness	$Ec*I_{xy}$ (kips-in^2)	3,357,766,502	
Coefficient of Lateral Subgrade Reaction	k_h (lb/in^3)	15,082	NCHRP Eq. 109
Lateral Subgrade Modulus	K_h (psi)	995,423	NCHRP Eq. 110
Depth of Limit Normal Stress	z (ft)	5	
Effective Overburden at Limit Stress Depth	$\gamma'*z$ (psi)	3.8	
Limit Normal Stress	p_L (psi)	740	NCHRP Eq. 113
Maximum Side Resistance (NCHRP)	τ_{max} (psi)	170	NCHRP Eq. 112
Nominal Side Resistance (AASHTO)	qs (psi)	101.4	AASHTO Eq. 10.8.3.5.4b-2, O'Neill and reese, 1999
Ultimate Lateral Resistance	p_{ult} (lb/in)	55,508	NCHRP Eq. 111, used in conjunction w/ AASHTO side resistance

10-20' deep

Parameter Description	Parameter Symbol	Design Values	Reference
Depth to top of normal stress	(ft)	10	
Depth to bottom of normal stress	(ft)	20	
Depth of Limit Normal Stress	z (ft)	15	
Effective Overburden at Limit Stress Depth	$\gamma'*z$ (psi)	11.3	
Limit Normal Stress	p_L (psi)	796	NCHRP Eq. 113
Maximum Side Resistance	τ_{max} (psi)	170	NCHRP Eq. 112
Nominal Side Resistance (AASHTO)	qs (psi)	101.4	AASHTO Eq. 10.8.3.5.4b-2, O'Neill and reese, 1999
Ultimate Lateral Resistance	p_{ult} (lb/in)	86,186	NCHRP Eq. 111, used in conjunction w/ AASHTO side resistance

Calculation: Reese 97 Weak Rock p-y curves

References: 1) Reese, 97, "Analysis of Laterally Loaded Piles in Weak Rock," ASCE JGGE.

Parameter Description	Parameter Symbol	Design Value, qu = 2ksi	Reference
Unconfined Compressive Strength	qu (psi)	**2000**	Maximum reasonable value used in Reese 1997 correlation
Calculated Strain Factor	krm,c	0.001250	Compression Strain at 50% of UCS
Design Strain Factor	krm	**0.00125**	Use krm closest to lab value
Rock Quality Designation	RQD (%)	**48**	
Correlation parameter	α_r	0.68	Reese 97
Intact Rock Modulus	Eir (ksi)	**1210**	
Diameter	b (in)	66	
Deflection at krm	y_{rm} (in)	0.083	Reese 97, Eq. 10
Depth of p-y curve	x_r (in)	**60**	
Ultimate resistance	p_{ur1} (lb/in)	168300	Reese 97, Eq. 3
Dimensionless Constant	kir	221	Reese 97, Eq. 6
Initial Modulus	Kir (ksi)	267587	Reese 97, Eq. 4
Deflection at end of linear segment of curve	y_A (in)	0.0000492	Reese 97, Eq. 11
Depth of p-y curve	x_r (in)	**180**	
Ultimate resistance	p_{ur1} (lb/in)	325380	Reese 97, Eq. 3
Dimensionless Constant	kir	464	Reese 97, Eq. 6
Initial Modulus	Kir (ksi)	560833	Reese 97, Eq. 4
Deflection at end of linear segment of curve	y_A (in)	0.0000442	Reese 97, Eq. 11

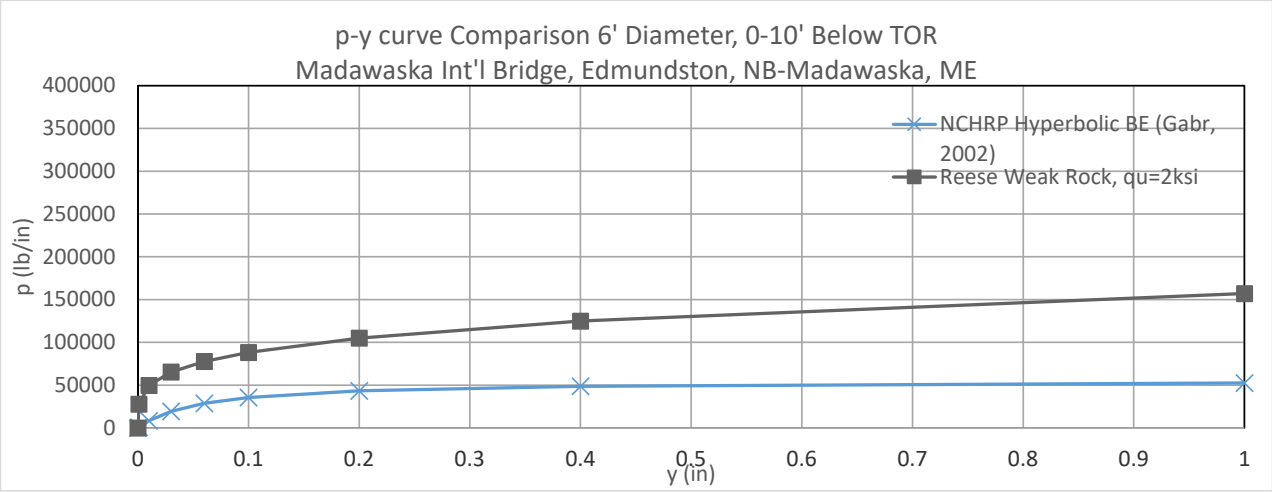
Notes:

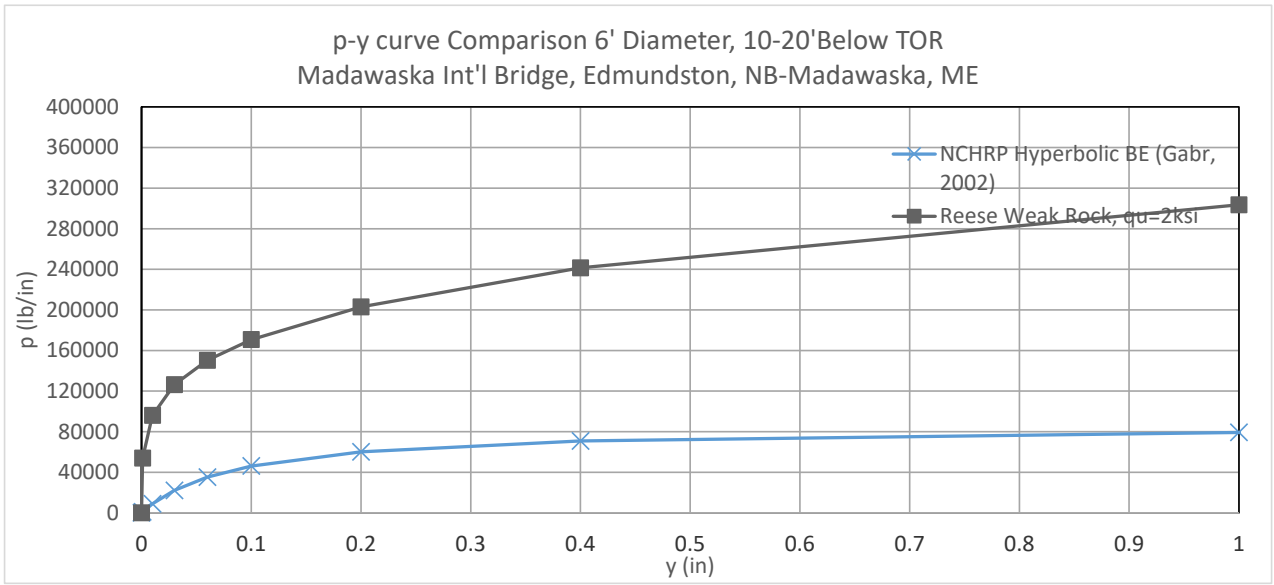
1. Yellow cell is user input, white is calculated.
2. Use design unconfined compressive strength of 2 ksi because Weak Rock p-y curve parameters were not developed to correlate to a higher strength.
3. Weak rock p-y curves are developed in this calculation to show plot comparison to NCHRP only, curves are calculated in Group using the values in bold above.

	Hyperbolic p-y curves			Weak Rock p-y curves	
	Design Values			2 ksi rock	
	y (in)	p (lb/in)		y (in)	p (lb/in)
0-10' BTR	0	0		0	0
	0.001	978		0.001	27,922
	0.01	8441		0.01	49,652
	0.03	19417		0.03	65,346
	0.06	28770		0.06	77,710
	0.1	35636		0.1	88,296
	0.2	43406		0.2	105,002
	0.4	48717		0.4	124,869
	1	52577		1	157,015
	1.5	53519		1.5	168,300
	2	54003		2	168,300

	Hyperbolic p-y curves			Weak Rock p-y curves	
	Design Values			2 ksi rock	
	y (in)	p (lb/in)		y (in)	p (lb/in)
10-20' BTR	0	0		0	0
	0.001	984		0.001	53,982
	0.01	8924		0.01	95,995
	0.03	22178		0.03	126,336
	0.06	35278		0.06	150,240
	0.1	46192		0.1	170,705
	0.2	60147		0.2	203,004
	0.4	70850		0.4	241,414
	1	79318		1	303,562
	1.5	81483		1.5	325,380
	2	82610		2	325,380

Calculation: p-y curves 5.5' diameter
Plotted p-y curves


p-y curve Comparison 6' Diameter, 0-10' Below TOR
Madawaska Int'l Bridge, Edmundston, NB-Madawaska, ME
p (lb/in)
y (in)
NCHRP Hyperbolic BE (Gabr, 2002)
Reese Weak Rock, qu=2ksi
400000
350000
300000
250000
200000
150000
100000
50000
0
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1


p-y curve Comparison 6' Diameter, 10-20'Below TOR
Madawaska Int'l Bridge, Edmundston, NB-Madawaska, ME
p (lb/in)
y (in)
NCHRP Hyperbolic BE (Gabr, 2002)
Reese Weak Rock, qu=2ksi
400000
360000
320000
280000
240000
200000
160000
120000
80000
40000
0
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1

Drilled Shaft Lateral Evaluations

Drilled Shaft Lateral Evaluations - Stiffness Matrices and Group Outputs

	Created: NVW	Date: 2020-08-03	Backchk'd:	Date:
	Checked: AH	Date: 2020-08-04	Updated:	Date:
Project: Madawaska Int'l Bridge	GZA job#: 09.0025984.03		Reviewed:	Date:

Madawaska Bridge Pier 1 Foundation Stiffness

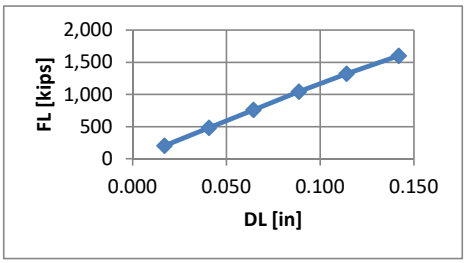
Description: Input parameters in blue cells provided by GZA based on Group analyses using NCHRP rock model.
Red text indicates calculations prepared by HNTB. Plots prepared by HNTB

Pier 1 Casing Thickness Before 1/8" Corrosion (in): 0.75 Conditions: Scoured to El. 461 (From scour report)

Axial load for analysis Pa = 3150 kips For F_L, F_T, M_L, M_T & M_V

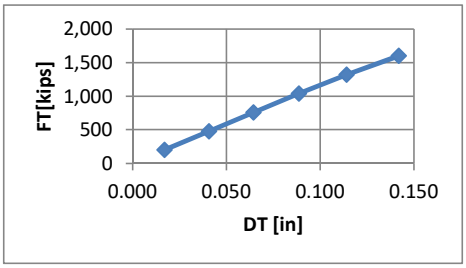
Longitudinal Force (X) (Z direction in Group)

F_L [kips]	δ_L [in]	$\Delta\delta_L$ [in]	θ_T [10^{-6} rad]	$\Delta\theta_T$ [10^{-6} rad]	$f_{FL,\delta L}$ [in/10^3 kips]	$f_{FL,\theta T}$ [10^{-6}rad/10^3 kips]
200	0.017	0.000	16.2	0		
480	0.041	0.024	39	23	0.085	82
760	0.064	0.048	62	46	0.085	82
1,040	0.089	0.072	85	69	0.085	82
1,320	0.114	0.097	106	90	0.087	81
1,600	0.142	0.125	126	110	0.089	79



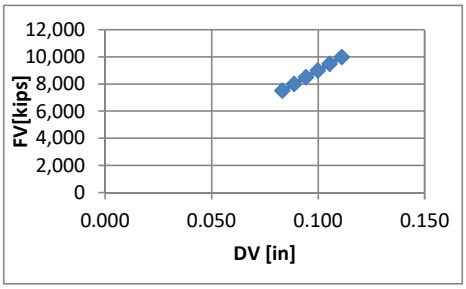
Transverse Force (Y)

F_T [kips]	δ_T [in]	$\Delta\delta_T$ [in]	θ_L [10^{-6} rad]	$\Delta\theta_L$ [10^{-6} rad]	$f_{FT,\delta T}$ [in/10^3 kips]	$f_{FT,\theta L}$ [10^{-6}rad/10^3 kips]
200	0.017	0.000	-16	0		
480	0.041	0.024	-39	-23	0.085	-82
760	0.064	0.048	-62	-46	0.085	-82
1,040	0.089	0.072	-85	-69	0.085	-82
1,320	0.114	0.097	-106	-90	0.087	-81
1,600	0.142	0.125	-126	-110	0.089	-79



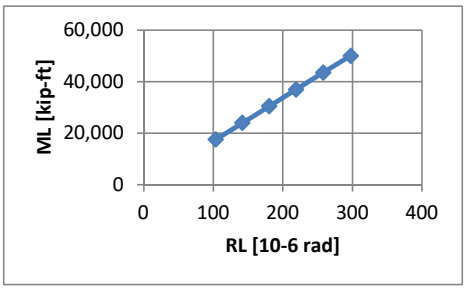
Vertical Force (z) (X Direction in Group)

F_V [kips]	δ_V [in]	$\Delta\delta_V$ [in]	$f_{FV,\delta V}$ [in/10^6 kips]
7,500	0.083	0.000	
8,000	0.089	0.006	11.181
8,500	0.094	0.011	11.181
9,000	0.100	0.017	11.181
9,500	0.105	0.022	11.181
10,000	0.111	0.028	11.181



Moment About Long Axis (X) (Z axis in Group)

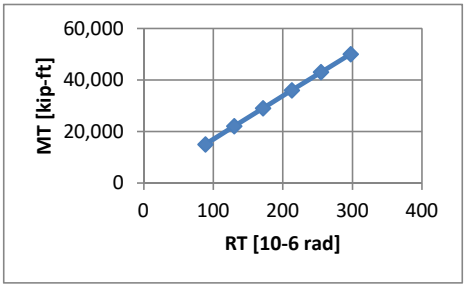
M_L [kip-ft]	δ_T [in]	$\Delta\delta_T$ [in]	θ_L [10^{-6} rad]	$\Delta\theta_L$ [10^{-6} rad]	$f_{ML,\delta T}$ in/10^6 kip-ft	$f_{ML,\theta L}$ [10^{-6} rad/10^6 kip-ft]
17,500	-0.017	0.000	103	0		
24,000	-0.024	-0.006	142	39	-0.987	5,926
30,500	-0.030	-0.013	180	77	-0.987	5,927
37,000	-0.036	-0.019	219	116	-0.987	5,927
43,500	-0.043	-0.026	258	154	-0.989	5,942
50,000	-0.049	-0.032	297	194	-0.994	5,969



	Created: NVW	Date: 2020-08-03	Backchk'd:	Date:
	Checked: AH	Date: 2020-08-04	Updated:	Date:
Project: Madawaska Int'l Bridge	GZA job#: 09.0025984.03		Reviewed:	Date:

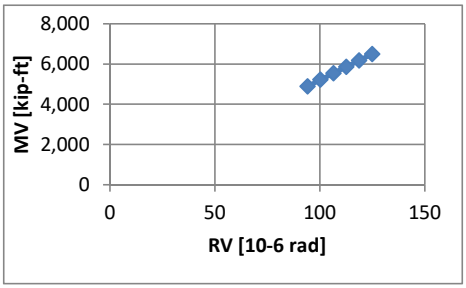
Moment About Trans Axis (Y)

M_T [kip-ft]	δ_L [in]	$\Delta\delta_T$ [in]	θ_T [10^{-6} rad]	$\Delta\theta_T$ [10^{-6} rad]	$f_{MT,\delta L}$ in/10^6 kip-ft	$f_{MT,\theta T}$ [10^{-6} rad/10^6 kip-ft]
15,000	0.015	0.000	89	0		
22,000	0.022	0.007	130	41	0.986	5,922
29,000	0.029	0.014	171	83	0.986	5,925
36,000	0.035	0.021	213	124	0.987	5,926
43,000	0.042	0.028	255	166	0.989	5,937
50,000	0.049	0.035	297	209	0.993	5,965



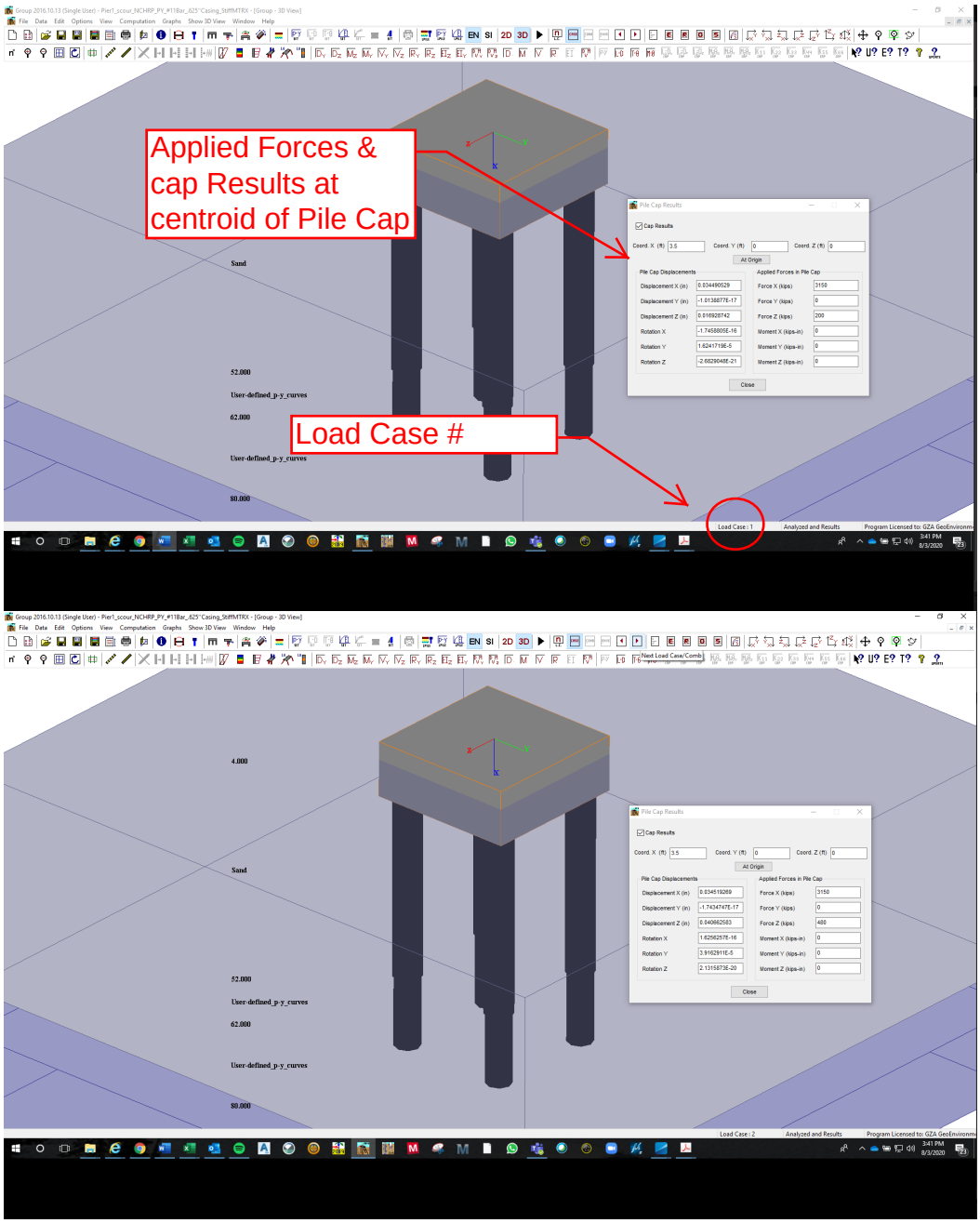
Moment About Vertical Axis (z) (X axis in Group)

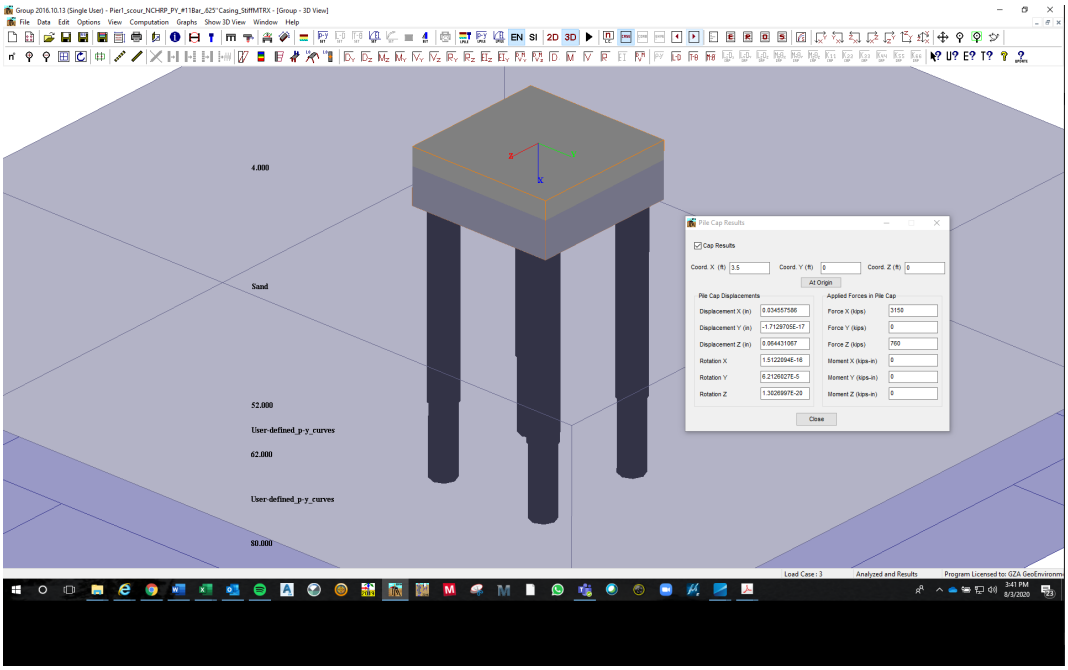
M_V [kip-ft]	θ_V [10^{-6} rad]	$\Delta\theta_V$ [10^{-6} rad]	$f_{MV,\theta V}$ [10^{-6} rad/10^6 kip-ft]
4,900	94	0	
5,220	100	6	19,214
5,540	106	12	19,215
5,860	113	18	19,215
6,180	119	25	19,215
6,500	125	31	19,215

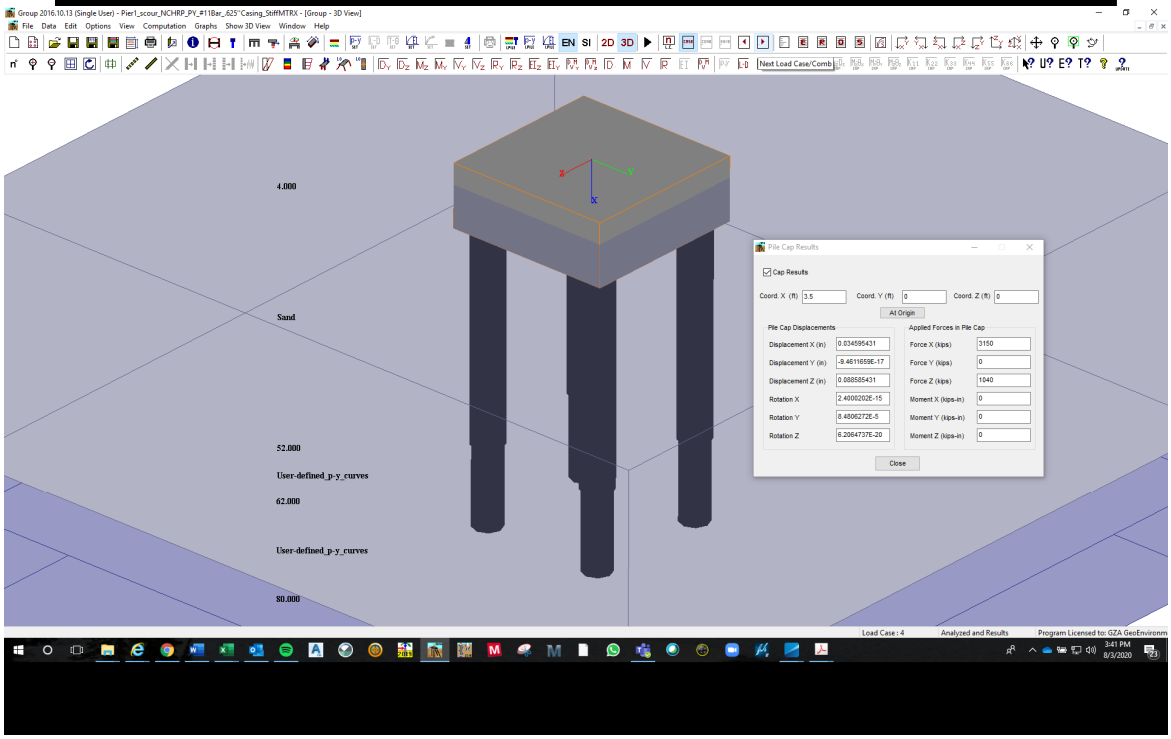


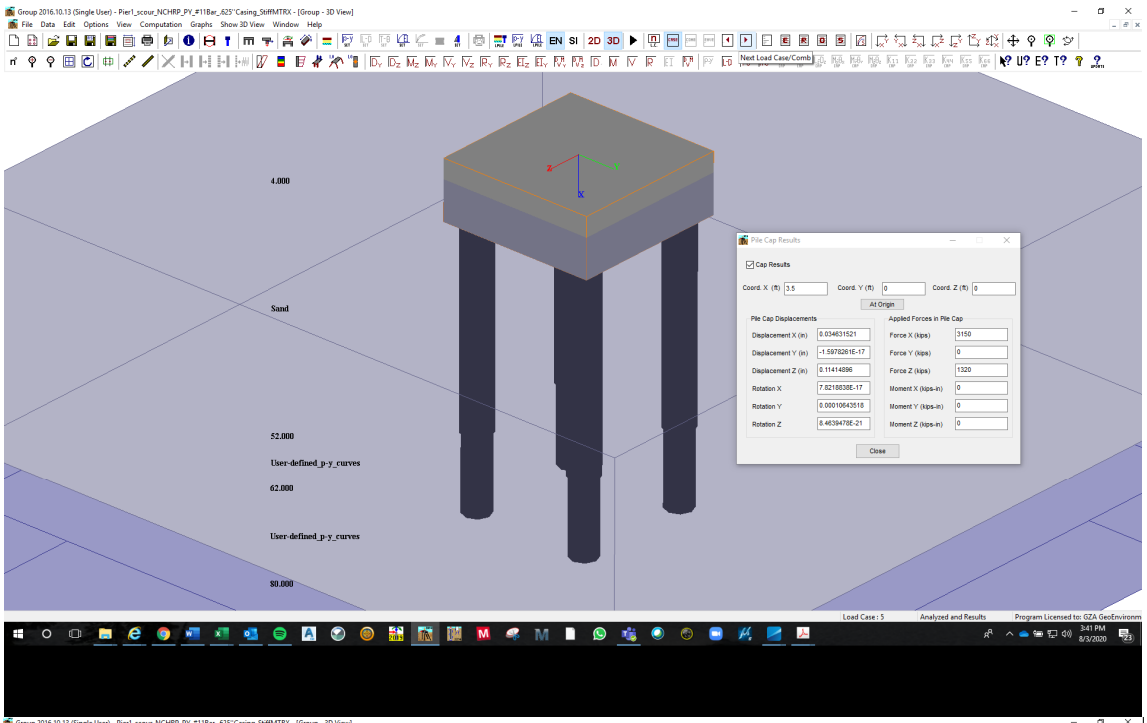
<u>Pier 1 Scour Condition w/NCHRP</u>deisgn parameters.

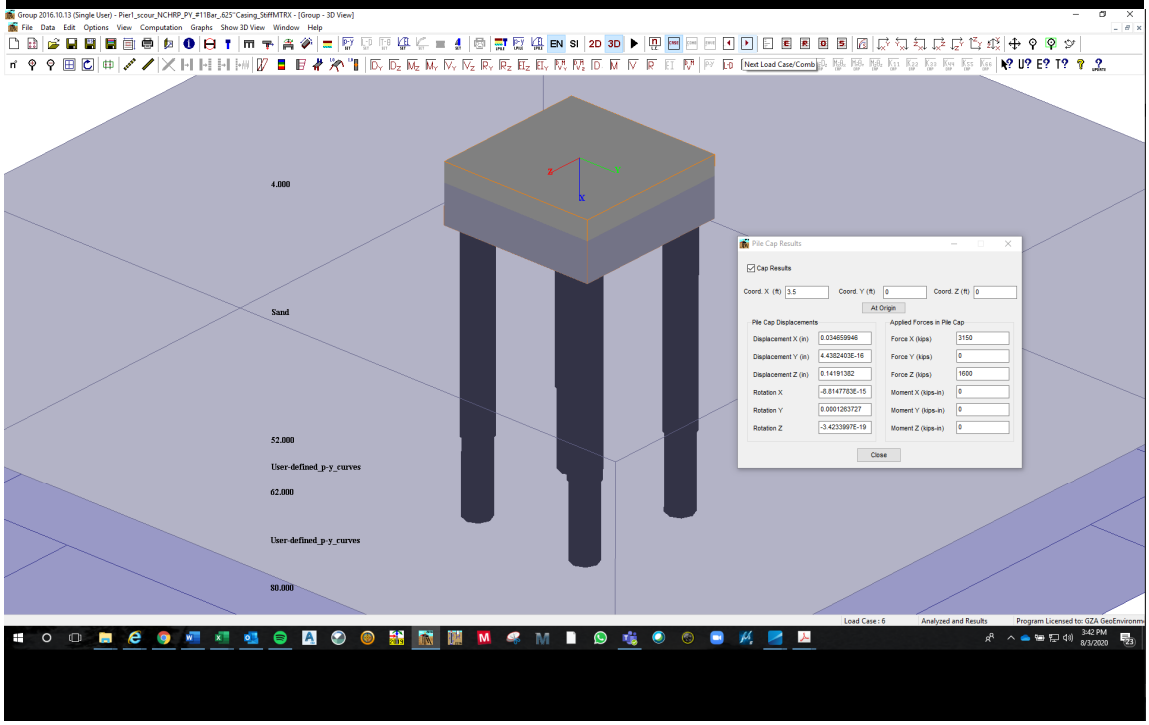
Note: Loads/moments were applied to the centroid of pile cap. Displacements/Rotations are taken at the centroid of the footing (x = 3.5', below origin)

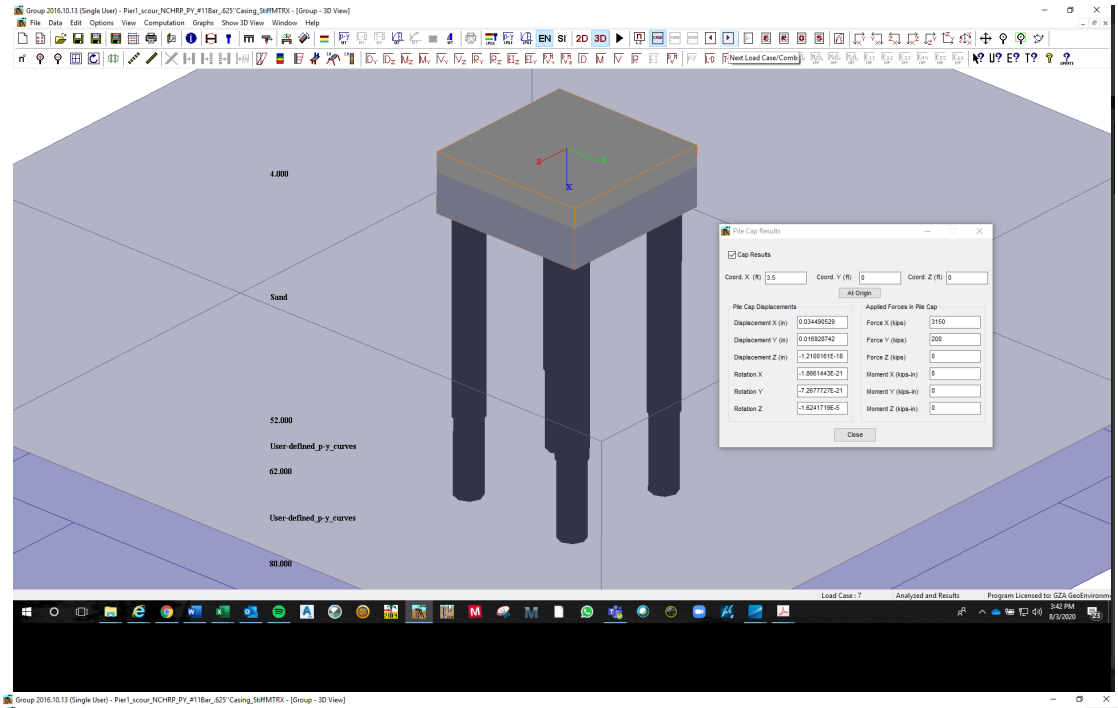


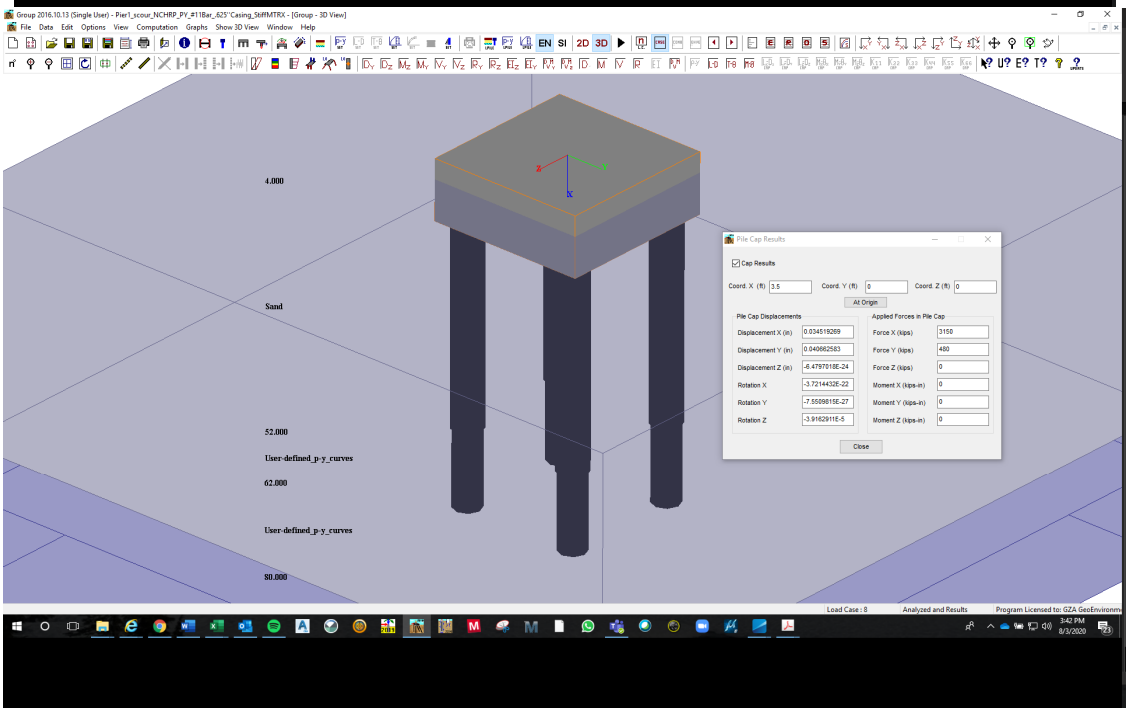

Group 2016.10.13 (Single User) - Pier1_scour_NCHRP_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
4.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034557586
Displacement Y (in) -1.7129705E-17
Displacement Z (in) 0.064431067
Rotation X 1.5122694E-16
Rotation Y 6.2126627E-5
Rotation Z 1.3626997E-20
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 760
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 3
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
3:41 PM
8/3/2020

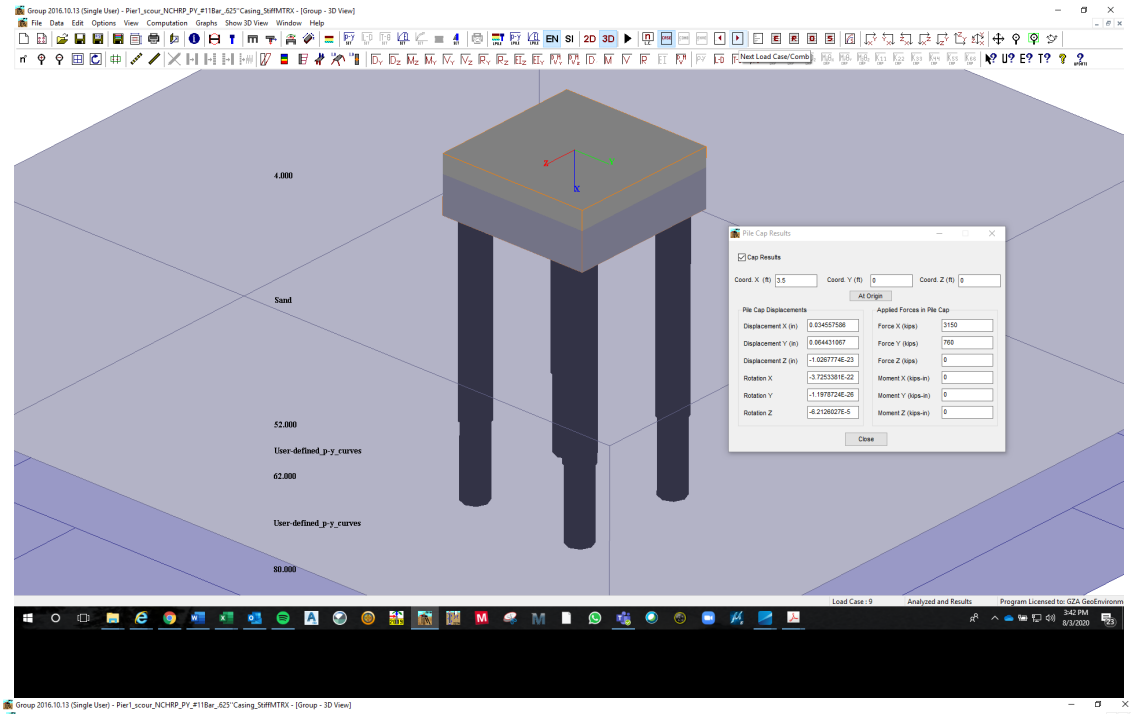

Group 2016.10.13 (Single User) - Pier1_scour_NCHRP_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
4.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034595431
Displacement Y (in) -9.46116659E-17
Displacement Z (in) 0.088585431
Rotation X 2.4000202E-15
Rotation Y 8.4806272E-5
Rotation Z 6.2064737E-20
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 1040
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 4
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
3:41 PM
8/3/2020

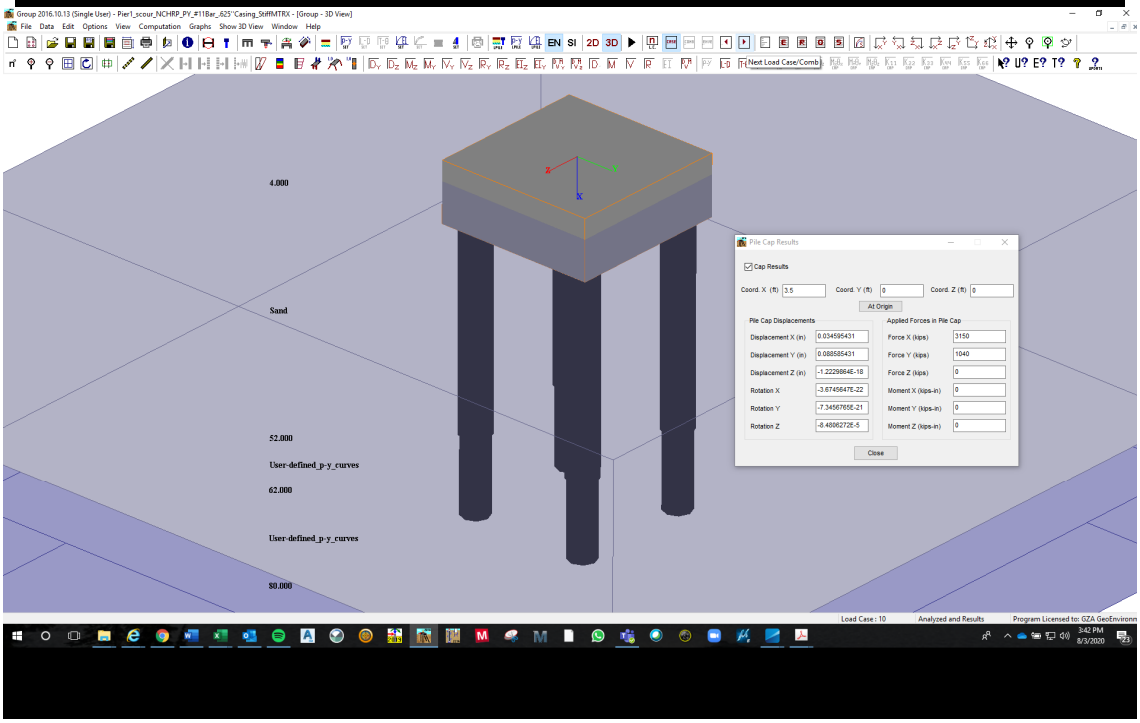

4.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034631521
Displacement Y (in) -1.5978261E-17
Displacement Z (in) 0.11414896
Rotation X 7.8218838E-17
Rotation Y 0.0001064351
Rotation Z 8.4639478E-21
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 1320
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close

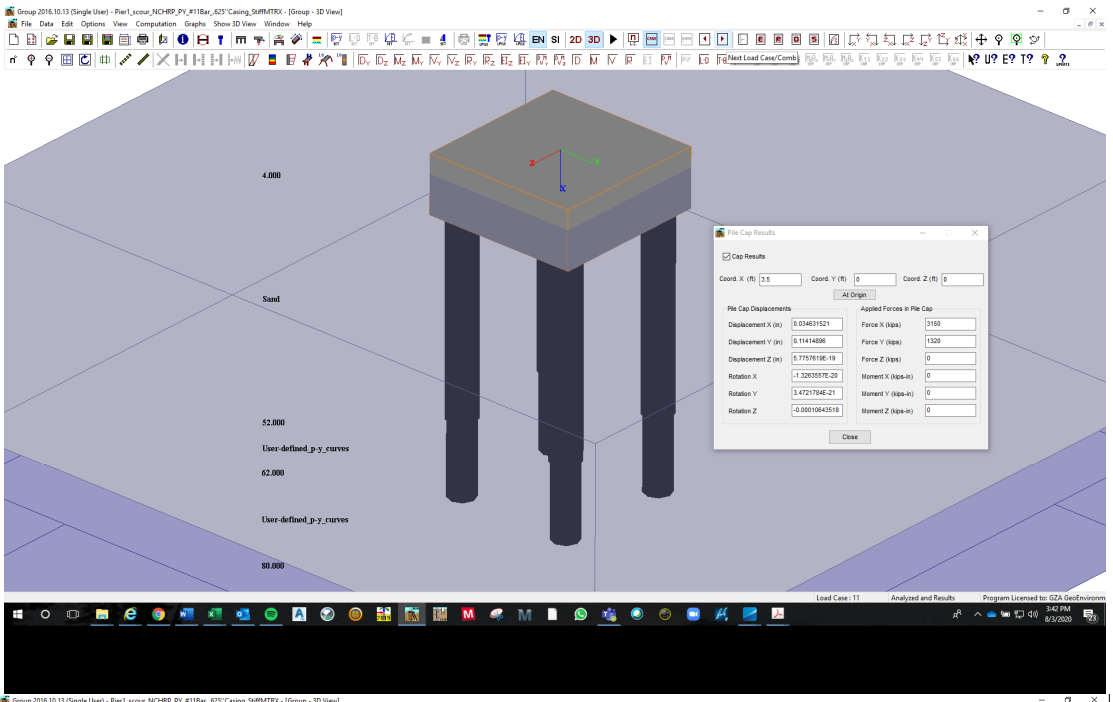

4.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034659946
Displacement Y (in) 4.4382403E-16
Displacement Z (in) 0.14191382
Rotation X -8.8147783E-15
Rotation Y 0.0001263727
Rotation Z -3.4233997E-19
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 1600
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close

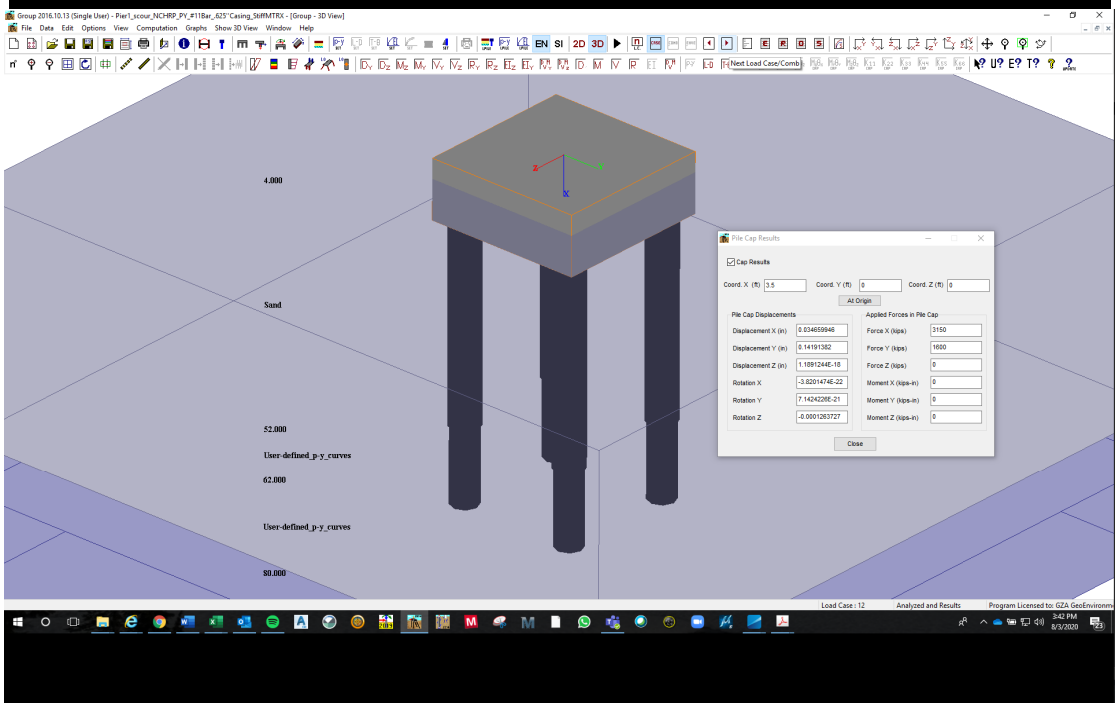

4.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034490529
Displacement Y (in) 0.016928742
Displacement Z (in) -1.21001616E-16
Rotation X -1.8661443E-21
Rotation Y -7.2677727E-21
Rotation Z -1.6241719E-5
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 200
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close

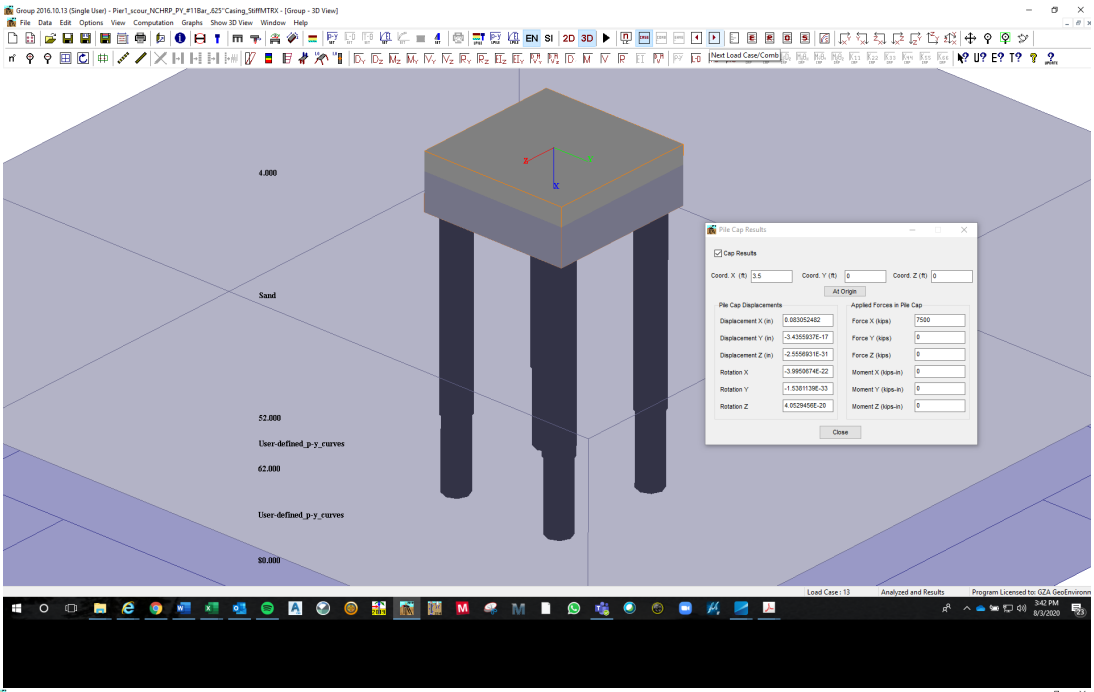

4.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034519269
Displacement Y (in) 0.040662583
Displacement Z (in) -6.47970618E-24
Rotation X -3.7214432E-22
Rotation Y -7.5509815E-27
Rotation Z -3.91629116-5
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 480
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close

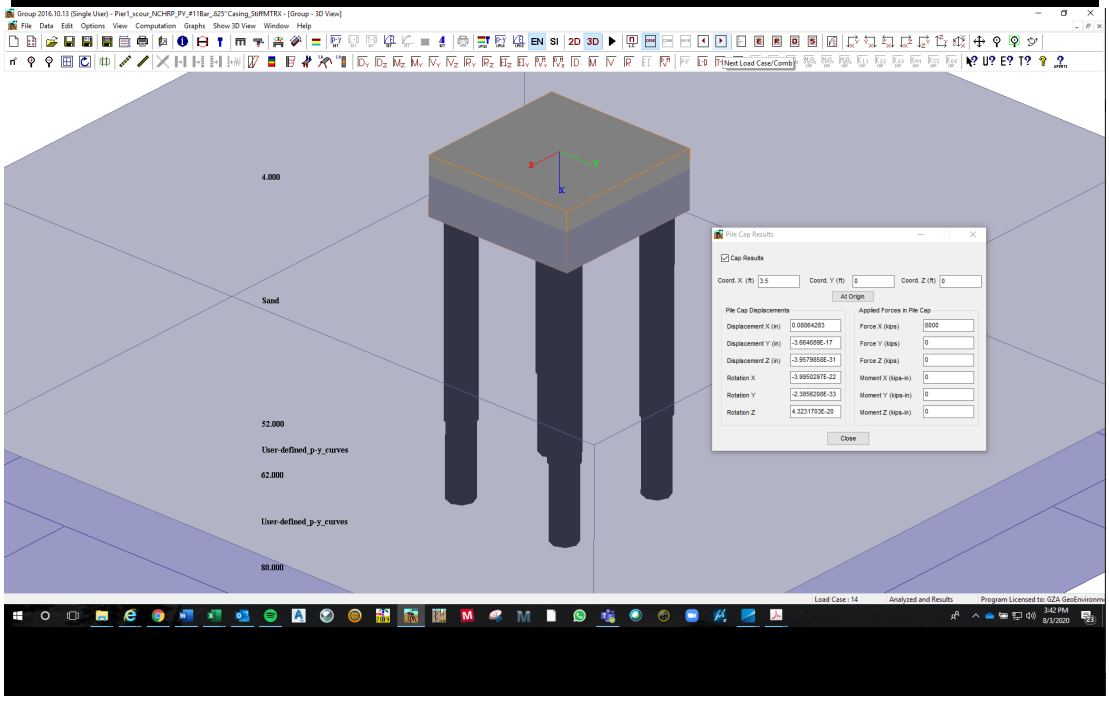

4.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034557586
Displacement Y (in) 0.064431067
Displacement Z (in) -1.0267774E-23
Rotation X -3.7253381E-22
Rotation Y -1.1978724E-26
Rotation Z -8.2126027E-5
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 760
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close

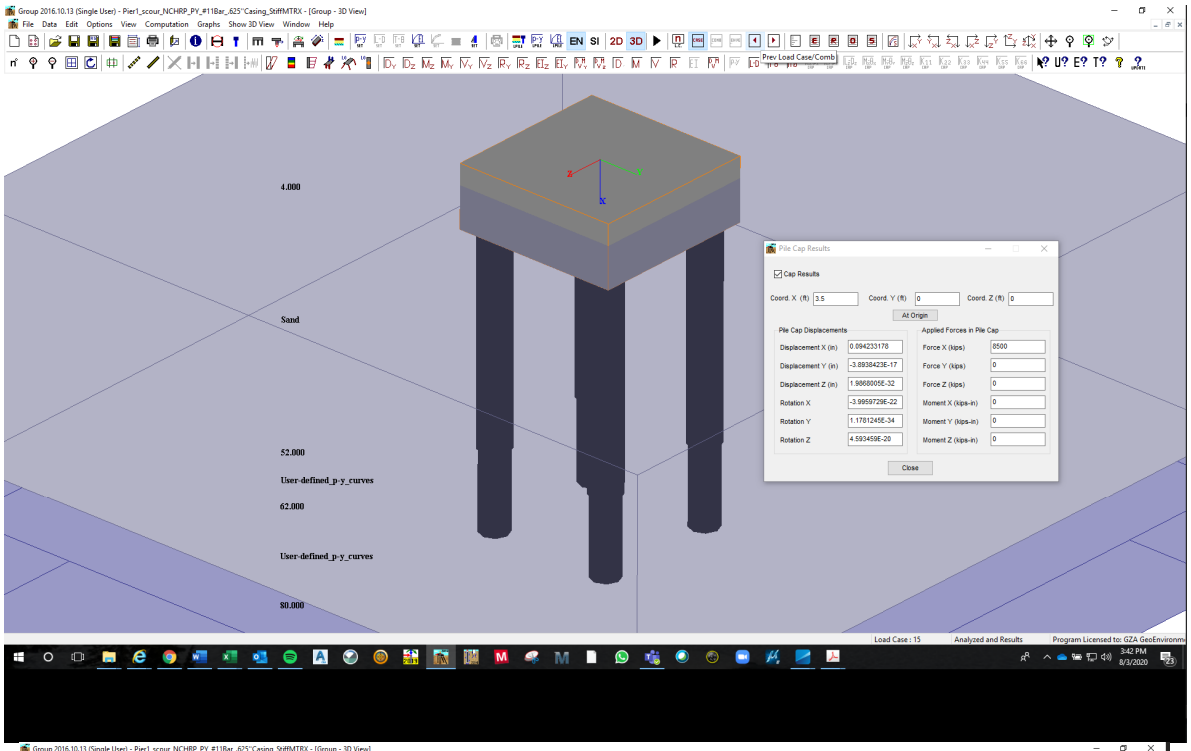

4.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034595431
Displacement Y (in) 0.088585431
Displacement Z (in) -1.2229864E-18
Rotation X -3.6745647E-22
Rotation Y -7.3456765E-21
Rotation Z -8.4606272E-5
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 1040
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close

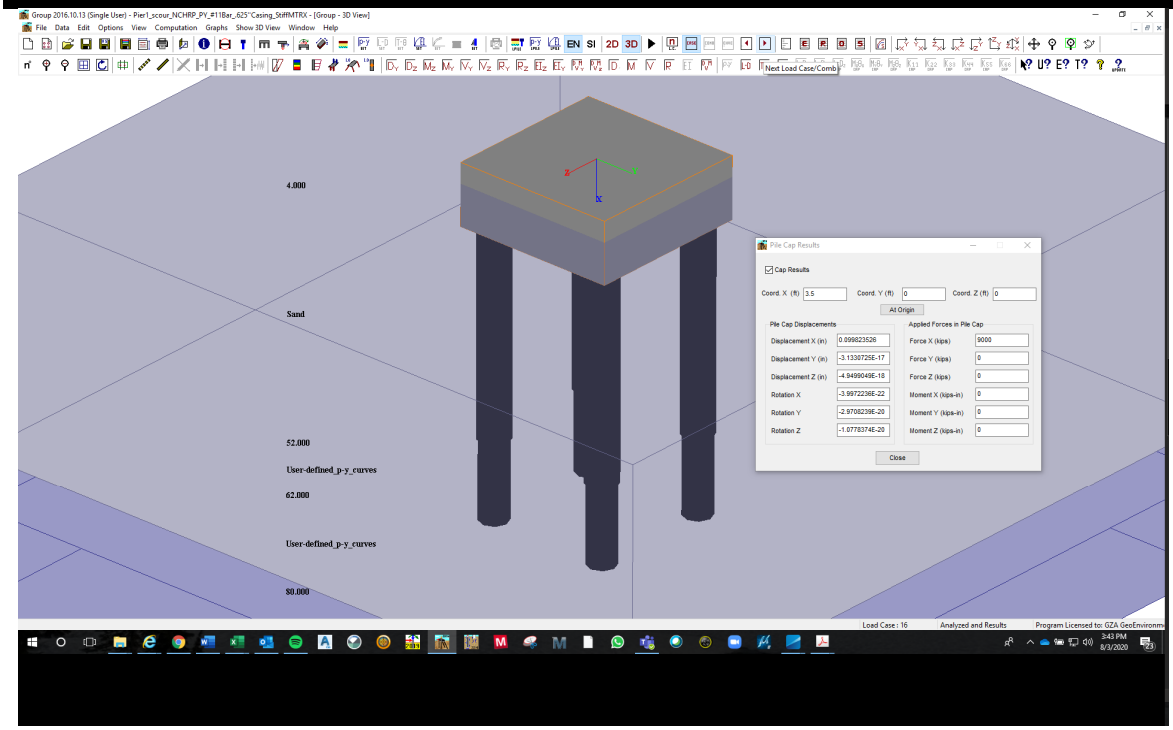

4.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034631521
Displacement Y (in) 0.11414896
Displacement Z (in) 5.7757619E-19
Rotation X -1.3263557E-20
Rotation Y 3.4721784E-21
Rotation Z -0.00010643518
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 1320
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close

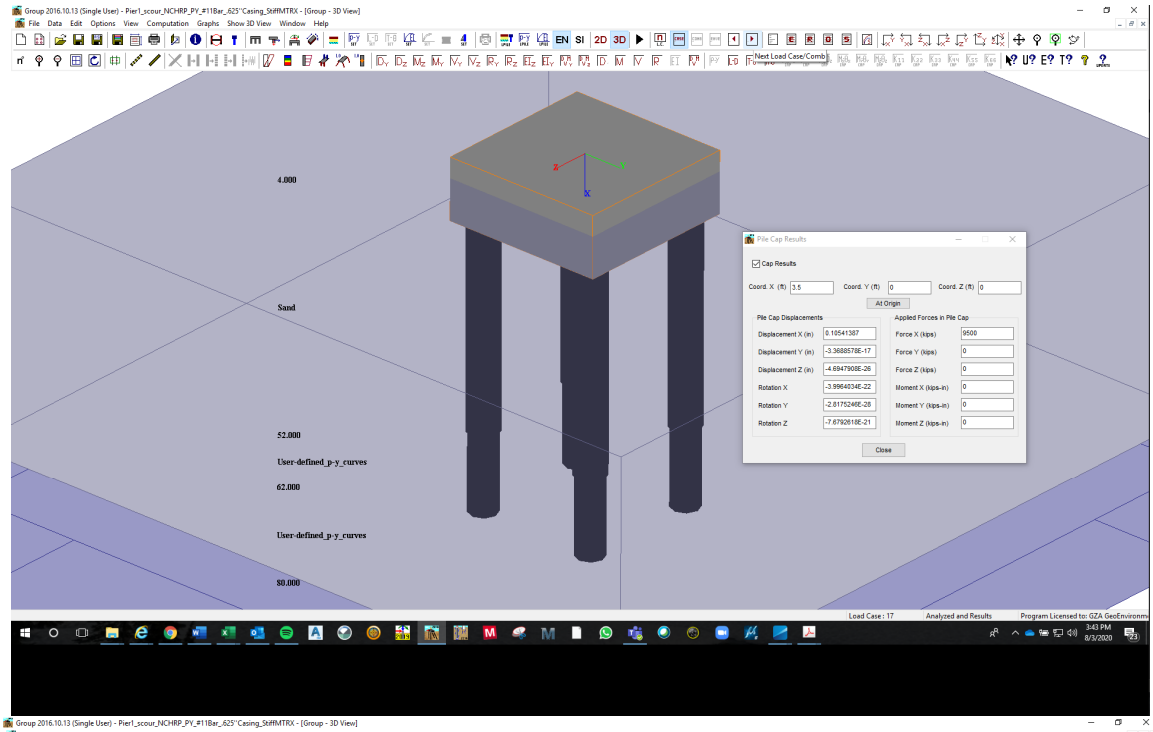

4.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034659946
Displacement Y (in) 0.14191382
Displacement Z (in) 1.1891244E-18
Rotation X -3.8201474E-22
Rotation Y 7.1424226E-21
Rotation Z -0.00012637127
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 1650
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close

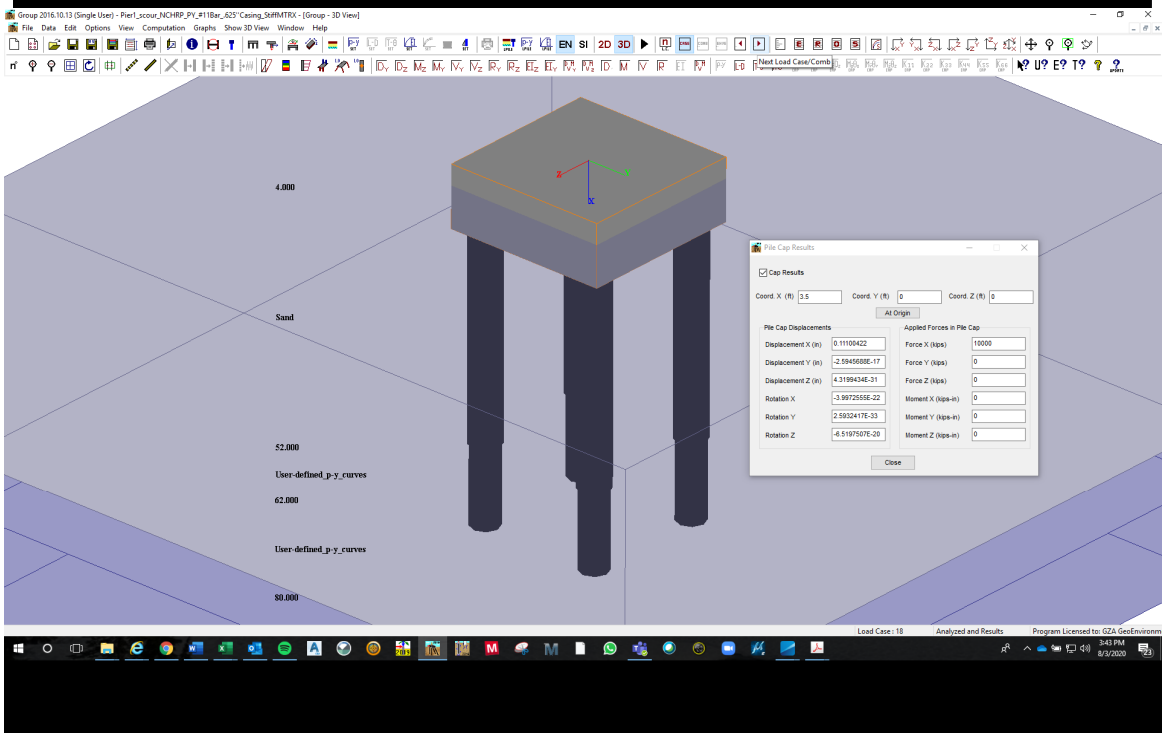

4.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.083052482
Displacement Y (in) -3.4355937E-17
Displacement Z (in) -2.5556931E-31
Rotation X -3.9950674E-22
Rotation Y -1.5301139E-33
Rotation Z 4.0529456E-20
Applied Forces in Pile Cap
Force X (kips) 7500
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 13
Analyzed and Results
Program Licensed to: GZA GeoEnvironm

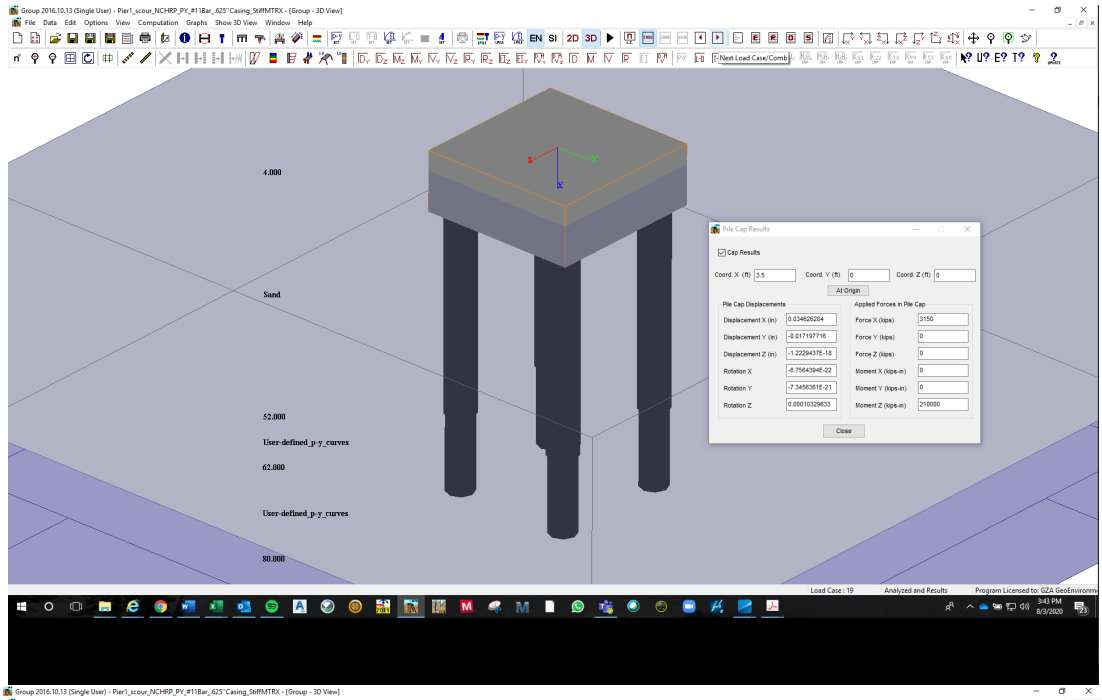

4.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.08064283
Displacement Y (in) -3.664689E-17
Displacement Z (in) -3.9579858E-31
Rotation X -3.9950297E-22
Rotation Y -2.3856208E-33
Rotation Z 4.3231703E-20
Applied Forces in Pile Cap
Force X (kips) 8000
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 14
Analyzed and Results
Program Licensed to: GZA GeoEnvironm

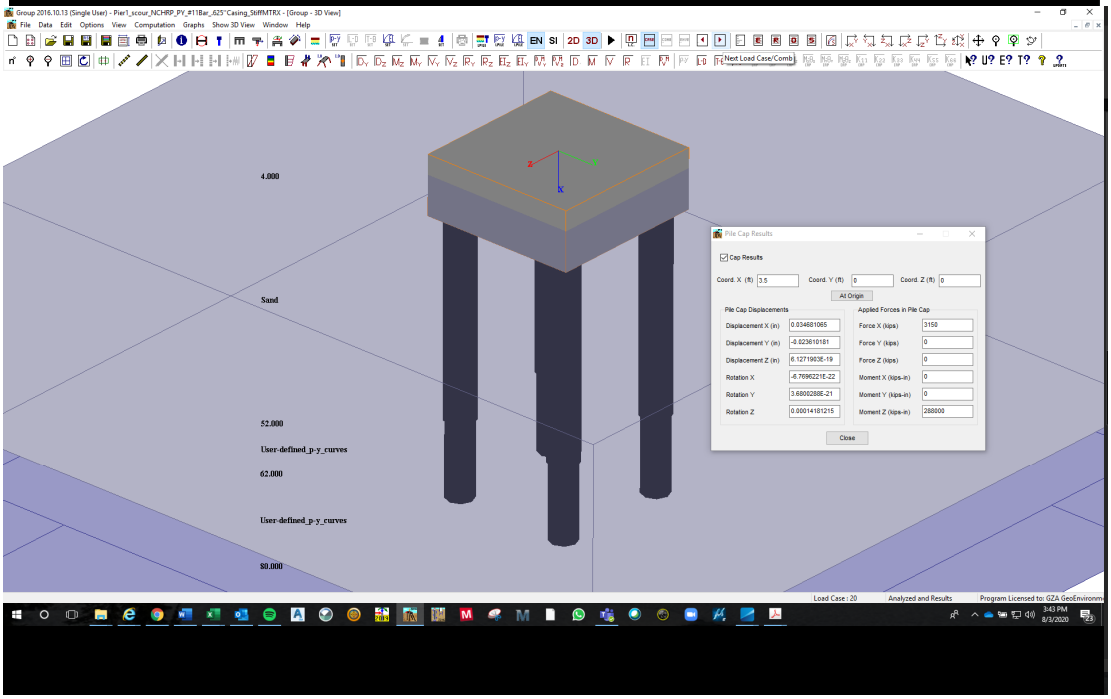

Group 2016.10.13 (Single User) - Pier1_scour_NCHRP_PY_#11Bar_.625"Casing_StiffMTRX - [Group - 3D View]
Prev Load Case/Comb
4.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.094233176
Displacement Y (in) -3.893842E-17
Displacement Z (in) 1.9868005E-32
Rotation X -3.9959729E-22
Rotation Y 1.1761245E-34
Rotation Z 4.593459E-20
Applied Forces in Pile Cap
Force X (kips) 8500
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 15
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
3:42 PM
8/3/2020

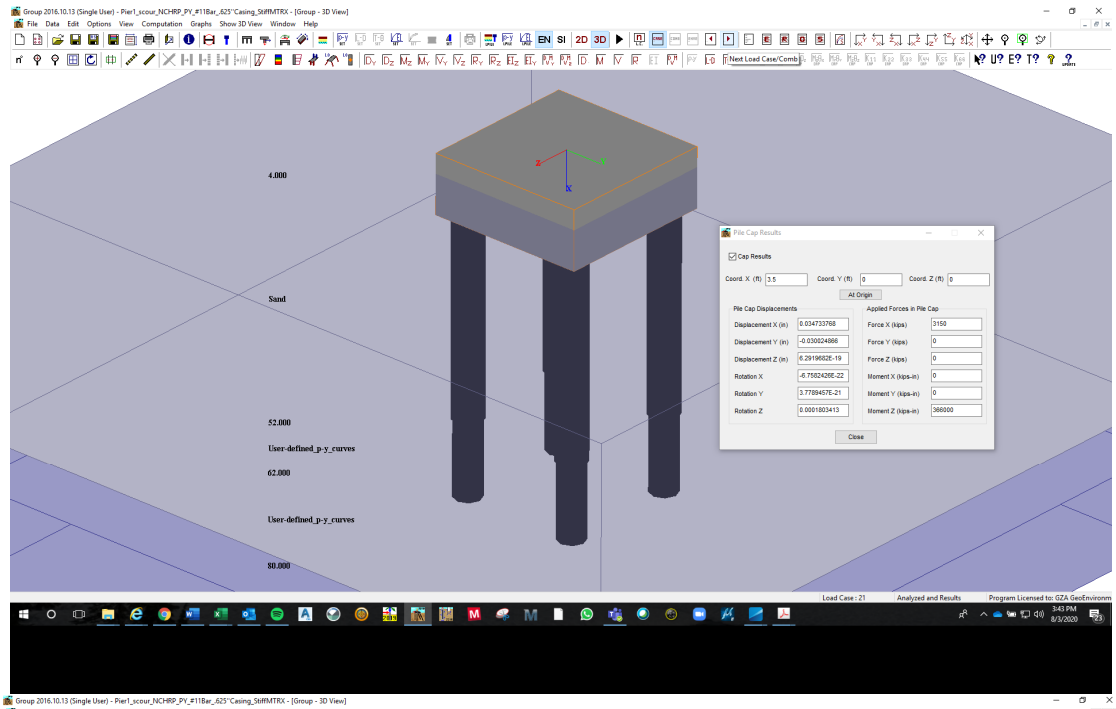

Group 2016.10.13 (Single User) - Pier1_scour_NCHRP_PY_#11Bar_.625"Casing_StiffMTRX - [Group - 3D View]
Next Load Case/Comb
4.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.099823626
Displacement Y (in) -3.1330725E-17
Displacement Z (in) -4.9499049E-18
Rotation X -3.9972236E-22
Rotation Y -2.9708239E-20
Rotation Z -1.0778374E-20
Applied Forces in Pile Cap
Force X (kips) 9000
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 16
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
3:43 PM
8/3/2020

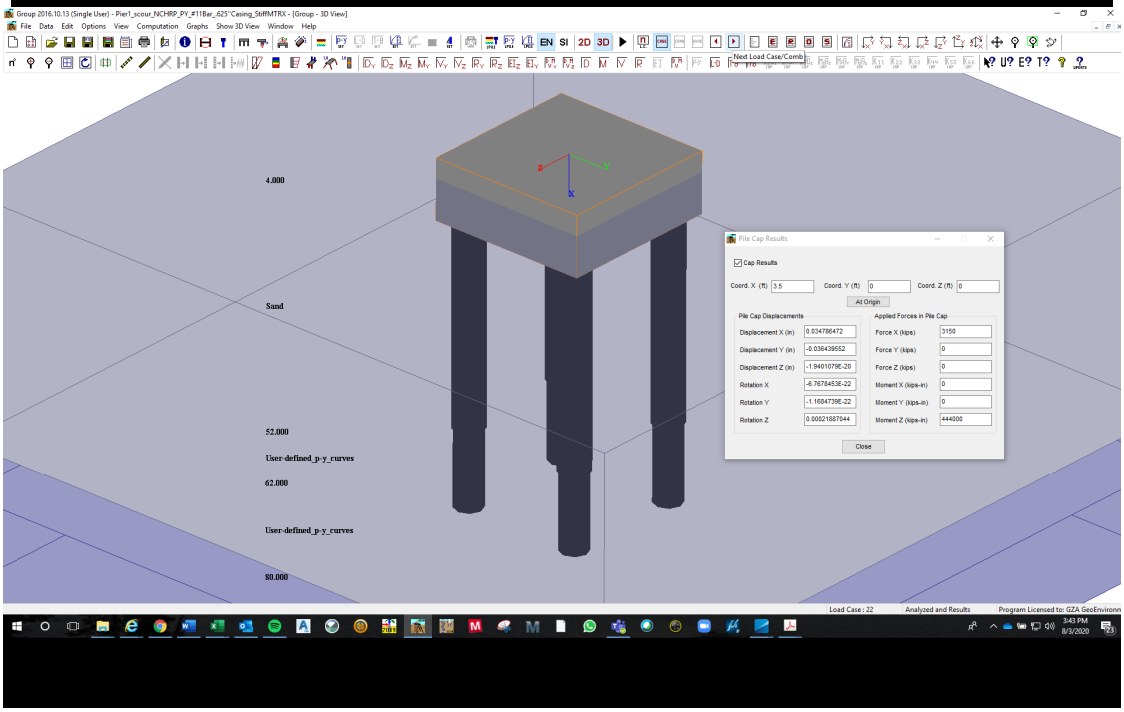

4.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.10541387
Displacement Y (in) -3.3688578E-17
Displacement Z (in) -4.6947908E-26
Rotation X -3.9864034E-22
Rotation Y -2.8175246E-28
Rotation Z -7.6792618E-21
Applied Forces in Pile Cap
Force X (kips) 9500
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close

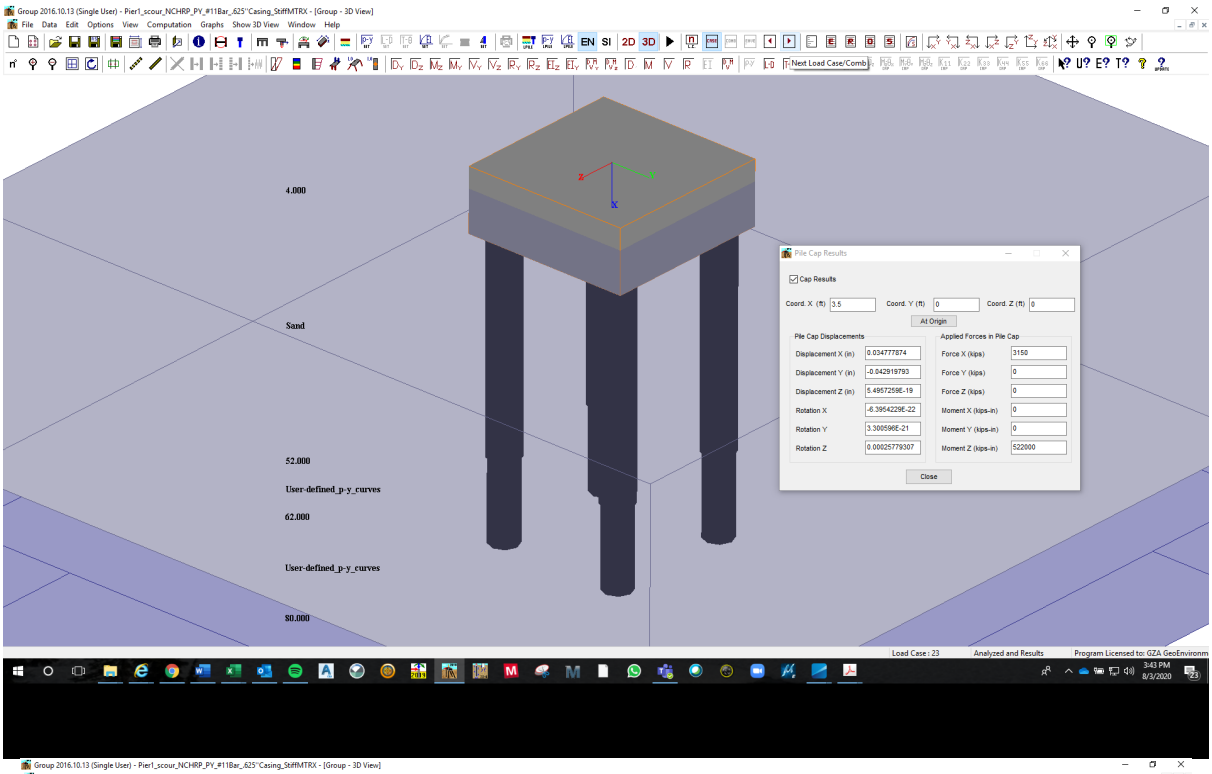

4.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.11100422
Displacement Y (in) -2.5945688E-17
Displacement Z (in) 4.3199434E-31
Rotation X -3.9972555E-22
Rotation Y 2.5932417E-33
Rotation Z -6.5197507E-20
Applied Forces in Pile Cap
Force X (kips) 10000
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close

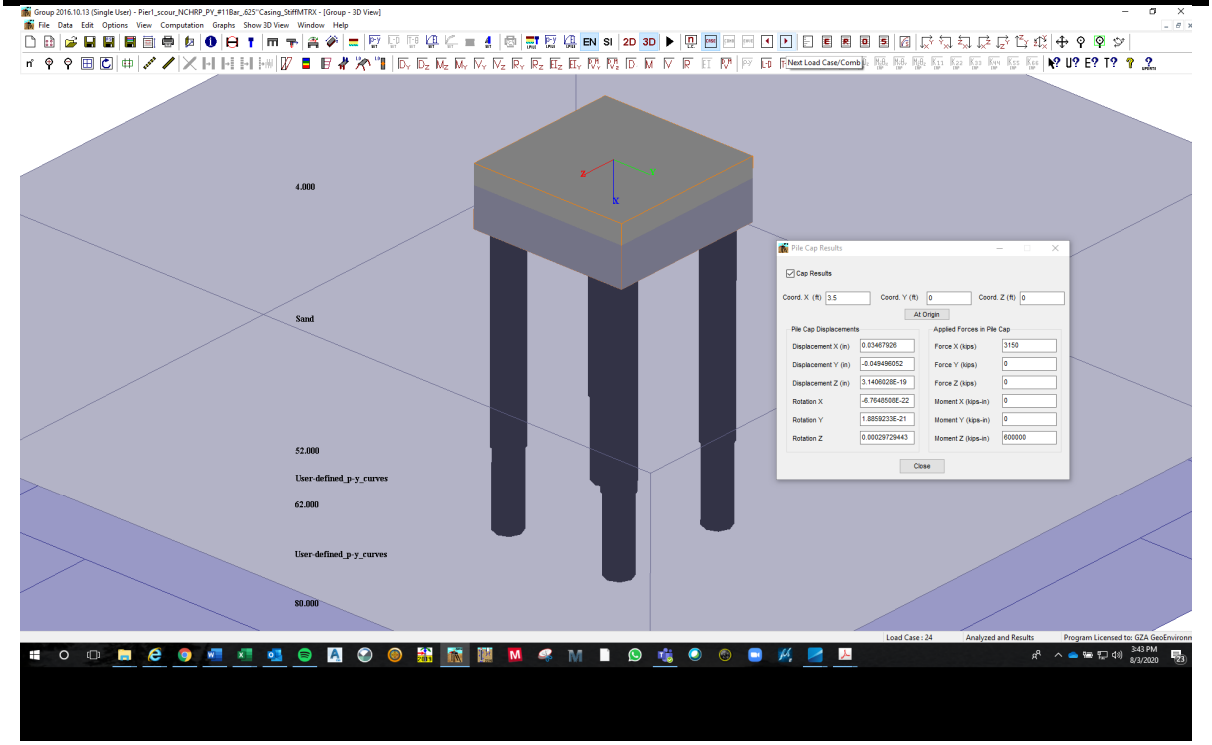

4.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034626284
Displacement Y (in) -9.017197716
Displacement Z (in) -1.2229437E-18
Rotation X -6.756439ØE-22
Rotation Y -7.345636 1E-21
Rotation Z 0.000103296 33
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 210000
Close

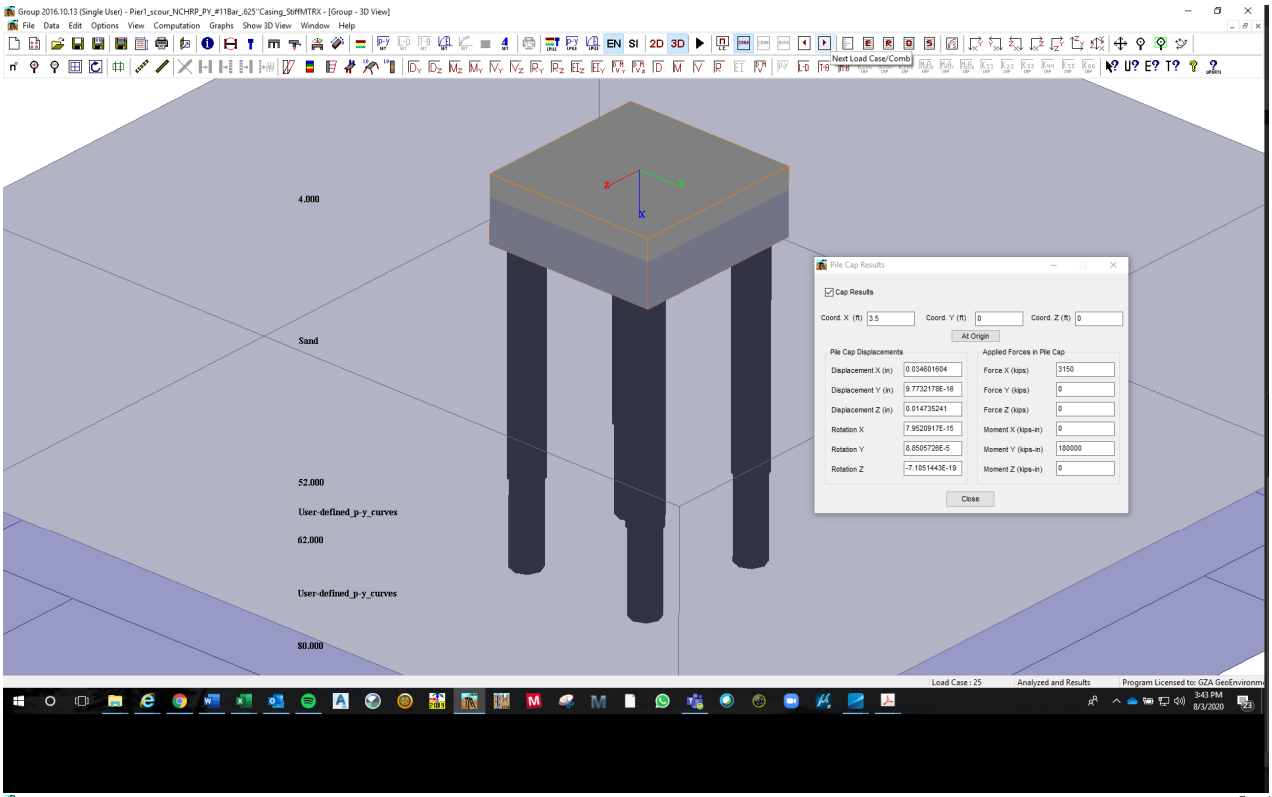

4.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034681065
Displacement Y (in) -9.023610181
Displacement Z (in) 6.1271903E-19
Rotation X -5.7696221E-22
Rotation Y 3.6800288E-21
Rotation Z 0.000141812 15
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 288000
Close

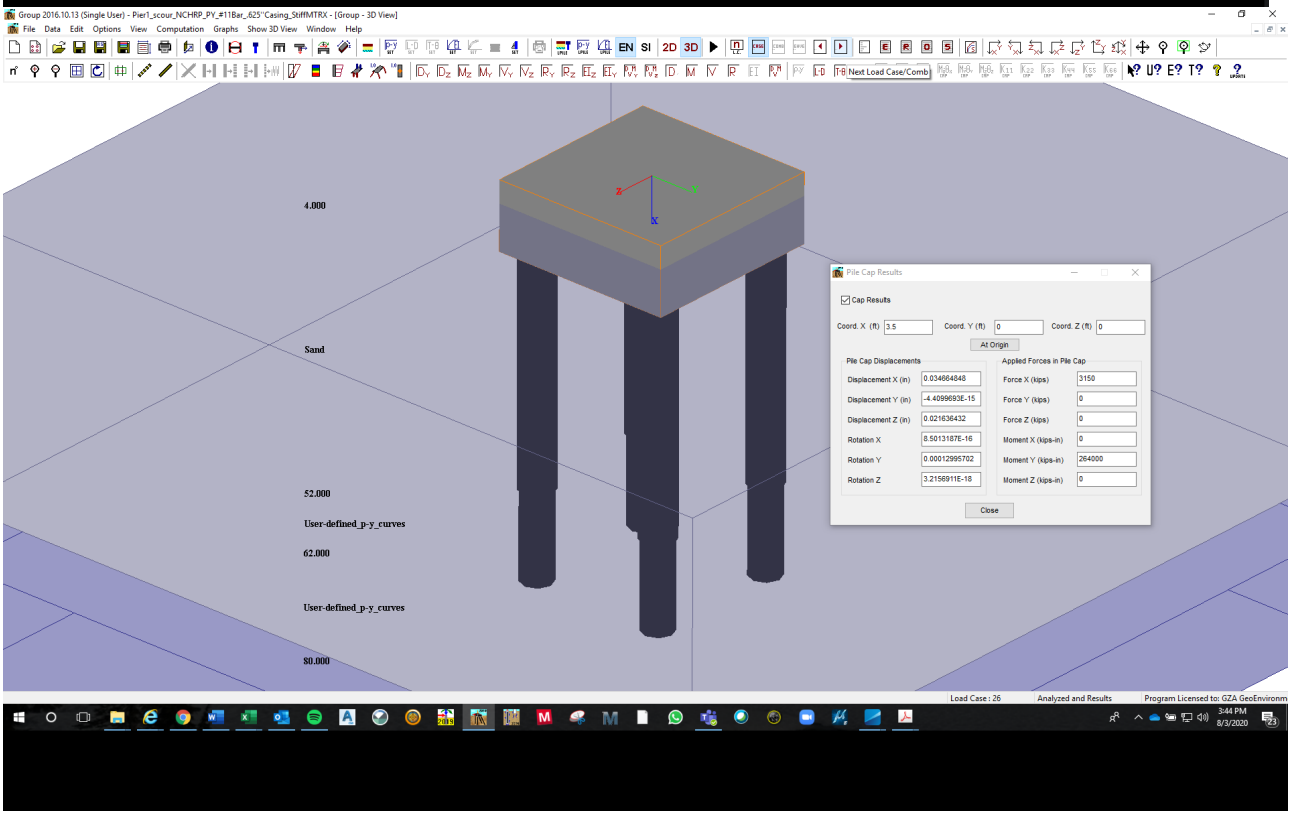

4.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034733768
Displacement Y (in) -0.030324886
Displacement Z (in) 6.2919682E-19
Rotation X -6.7562426E-22
Rotation Y 3.7789457E-21
Rotation Z 0.0001803413
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 366000
Close

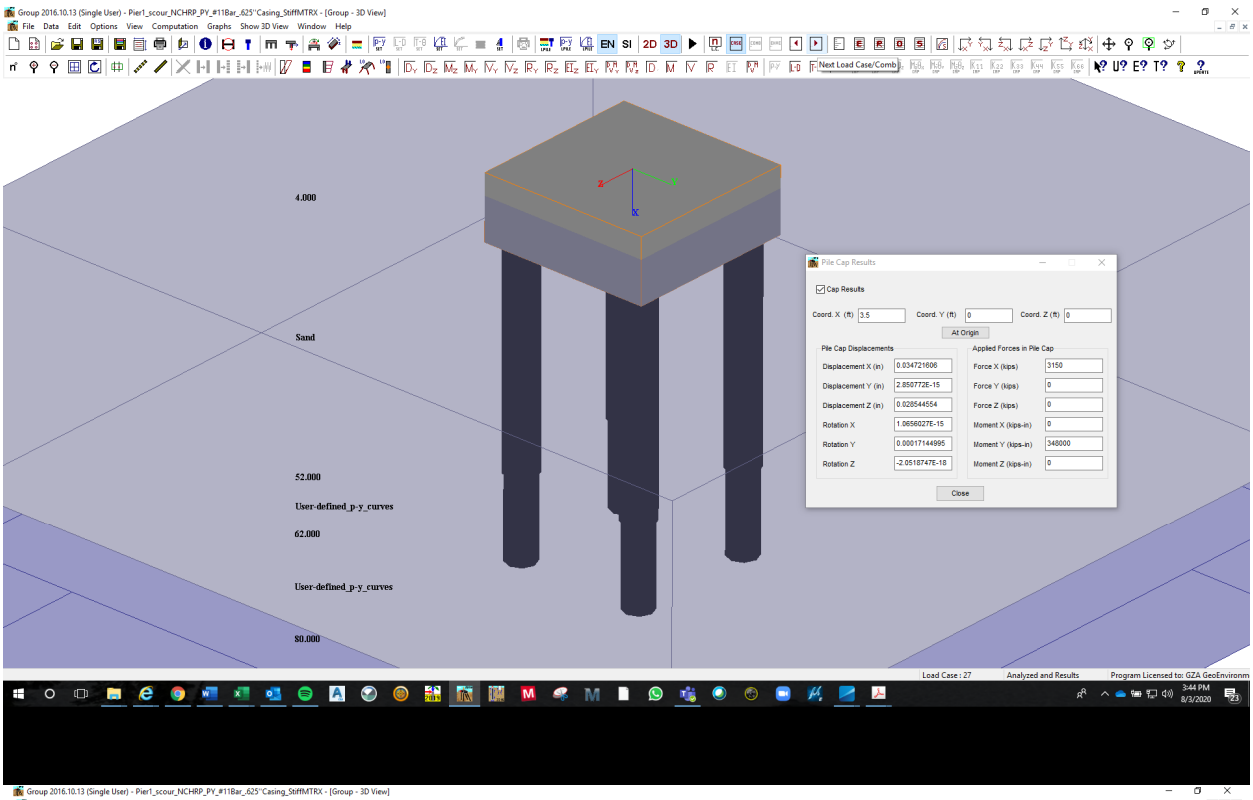

4.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034786472
Displacement Y (in) -0.036439552
Displacement Z (in) -1.9401079E-20
Rotation X -6.7678453E-22
Rotation Y -1.1684739E-22
Rotation Z 0.0002187044
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 444000
Close

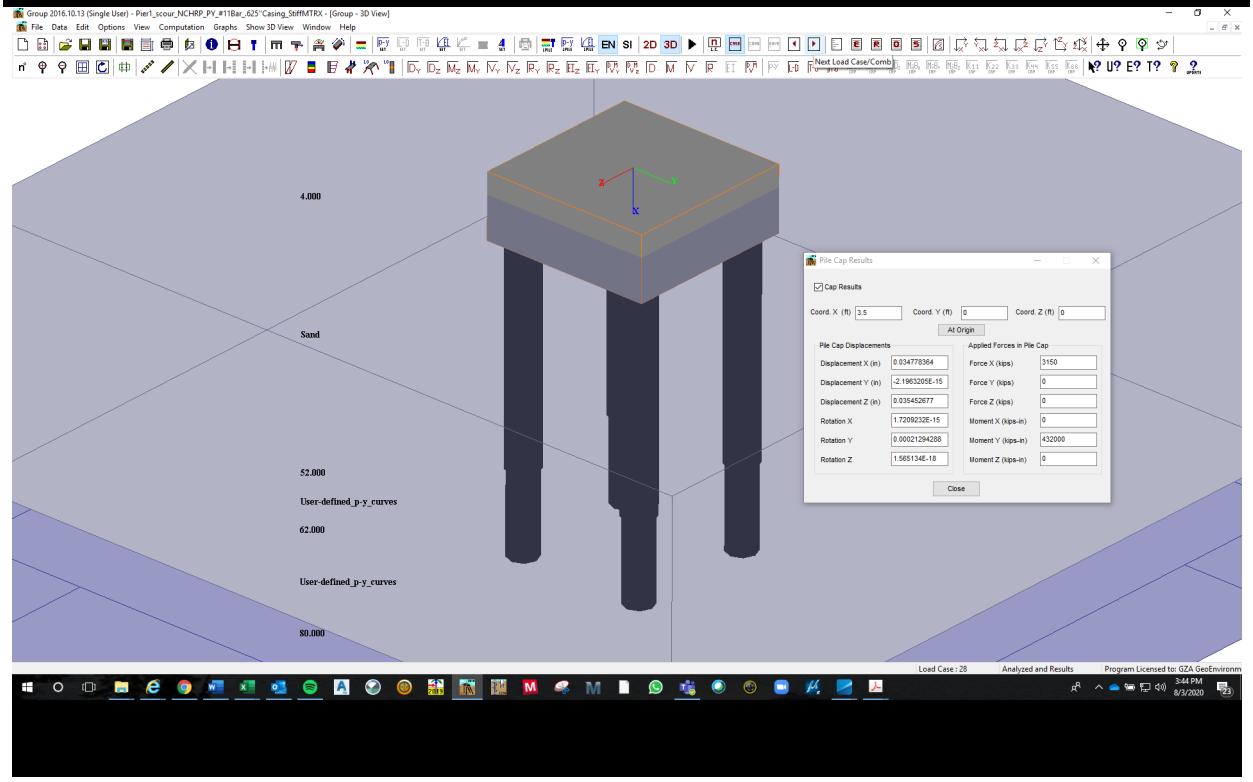

Group 2016.10.13 (Single User) - Pier1_scour_NCHRP_PV_#11Bar_.625"Casing_StiffMTRX - [Group - 3D View]
4.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034777874
Displacement Y (in) -0.042919793
Displacement Z (in) 5.4957259E-19
Rotation X -6.3954229E-22
Rotation Y 3.300596E-21
Rotation Z 0.00025779307
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 522000
Close
Load Case : 23
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
3:43 PM
8/3/2020

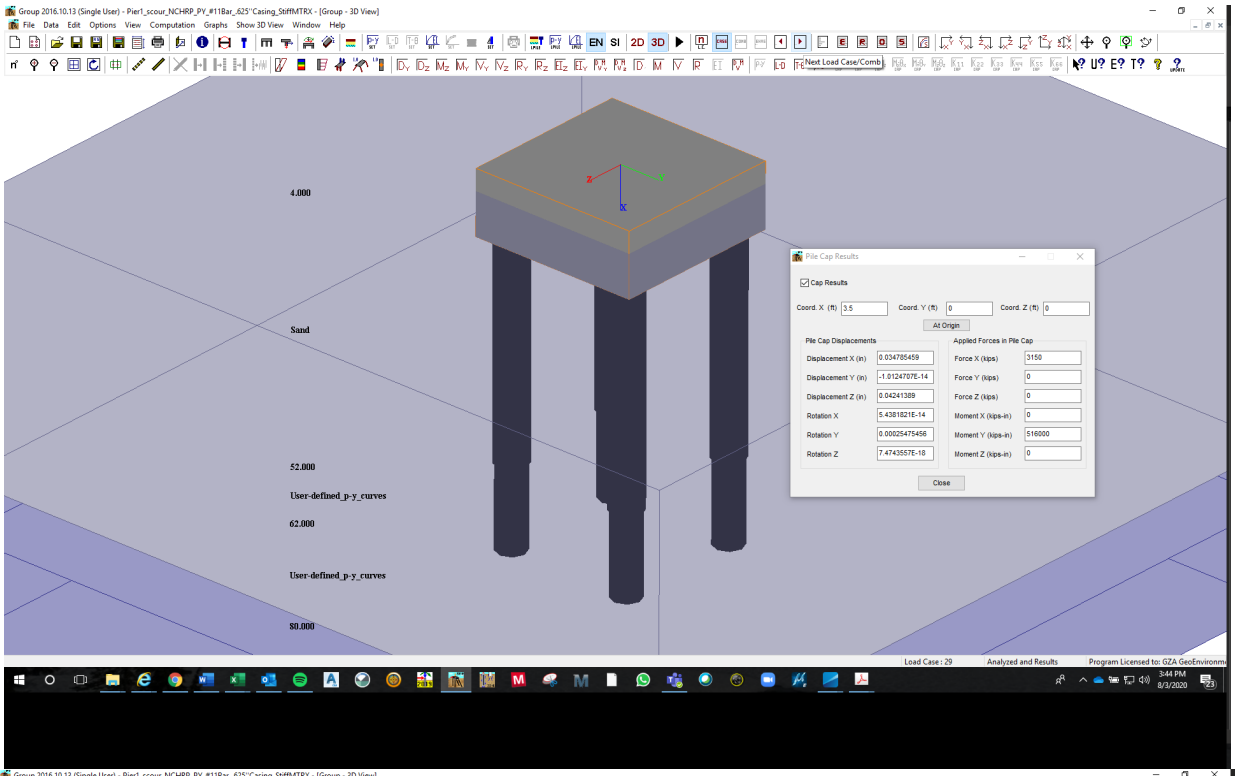

Group 2016.10.13 (Single User) - Pier1_scour_NCHRP_PV_#11Bar_.625"Casing_StiffMTRX - [Group - 3D View]
4.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.03467926
Displacement Y (in) -0.049496052
Displacement Z (in) 3.1406028E-19
Rotation X -6.7648508E-22
Rotation Y 1.8859233E-21
Rotation Z 0.00029729443
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 600000
Close
Load Case : 24
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
3:43 PM
8/3/2020

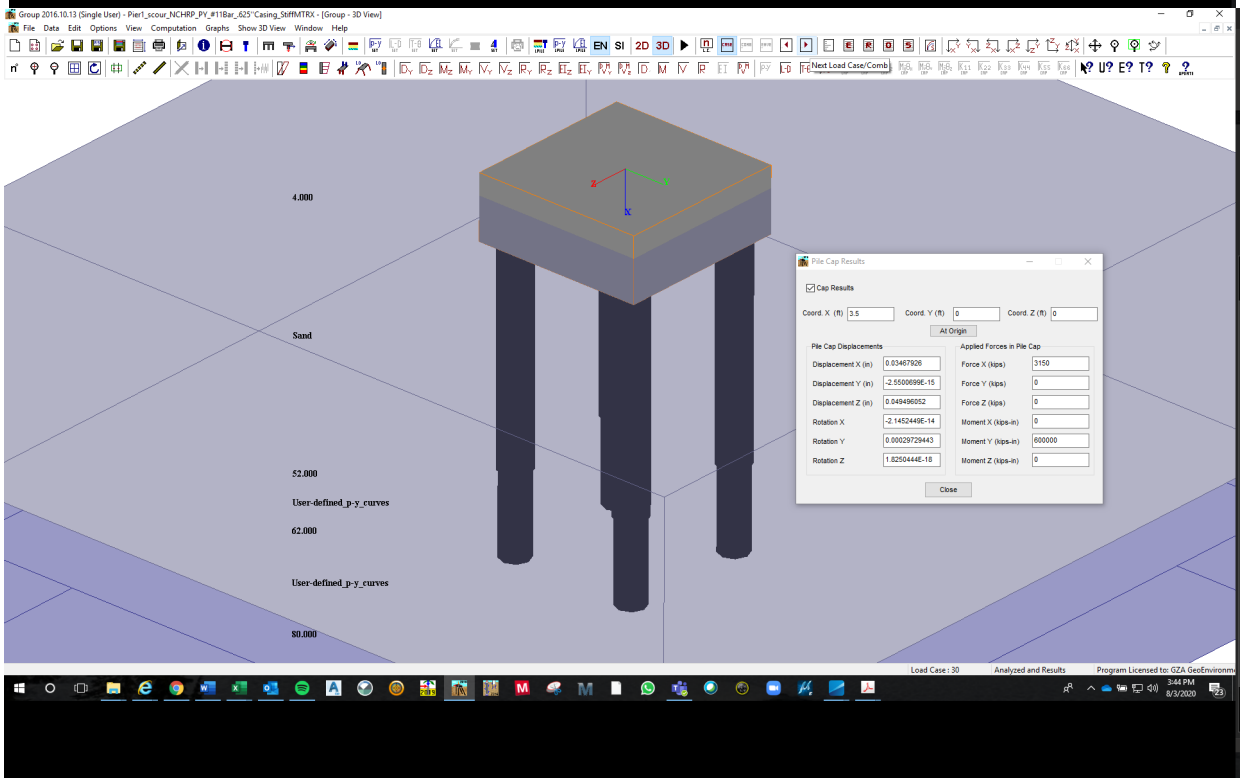

Group 2016.10.13 (Single User) - Pier1_scour_NCHRP_PY_#11Bar_.625"Casing_StiffMTRX - [Group - 3D View]
File Data Edit Options View Computation Graphs Show 3D View Window Help
Next Load Case/Comb
4.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034601604
Displacement Y (in) 9.7732178E-16
Displacement Z (in) 0.014735241
Rotation X 7.9520917E-15
Rotation Y 8.8505726E-5
Rotation Z -7.1051443E-19
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 180000
Moment Z (kips-in) 0
Close
Load Case : 25
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
3:43 PM
8/3/2020

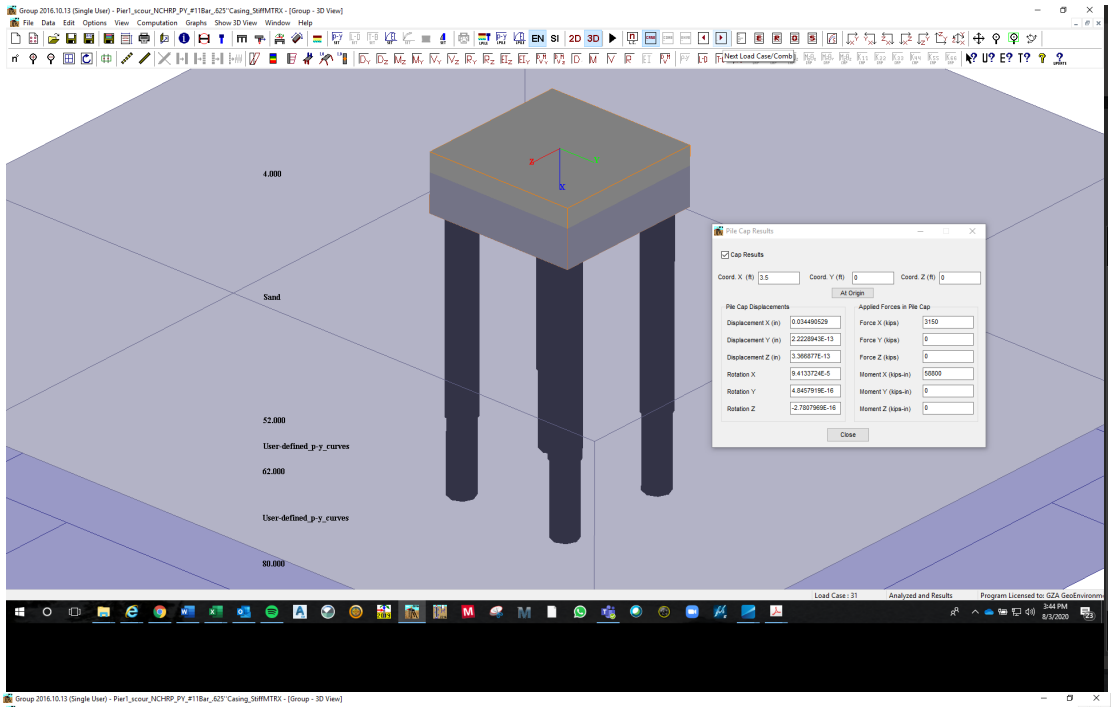

Group 2016.10.13 (Single User) - Pier1_scour_NCHRP_PY_#11Bar_.625"Casing_StiffMTRX - [Group - 3D View]
File Data Edit Options View Computation Graphs Show 3D View Window Help
Next Load Case/Comb
4.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034664848
Displacement Y (in) -4.4099693E-15
Displacement Z (in) 0.021636432
Rotation X 8.5013187E-16
Rotation Y 0.0001299570
Rotation Z 3.2156911E-18
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 264000
Moment Z (kips-in) 0
Close
Load Case : 26
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
3:44 PM
8/3/2020

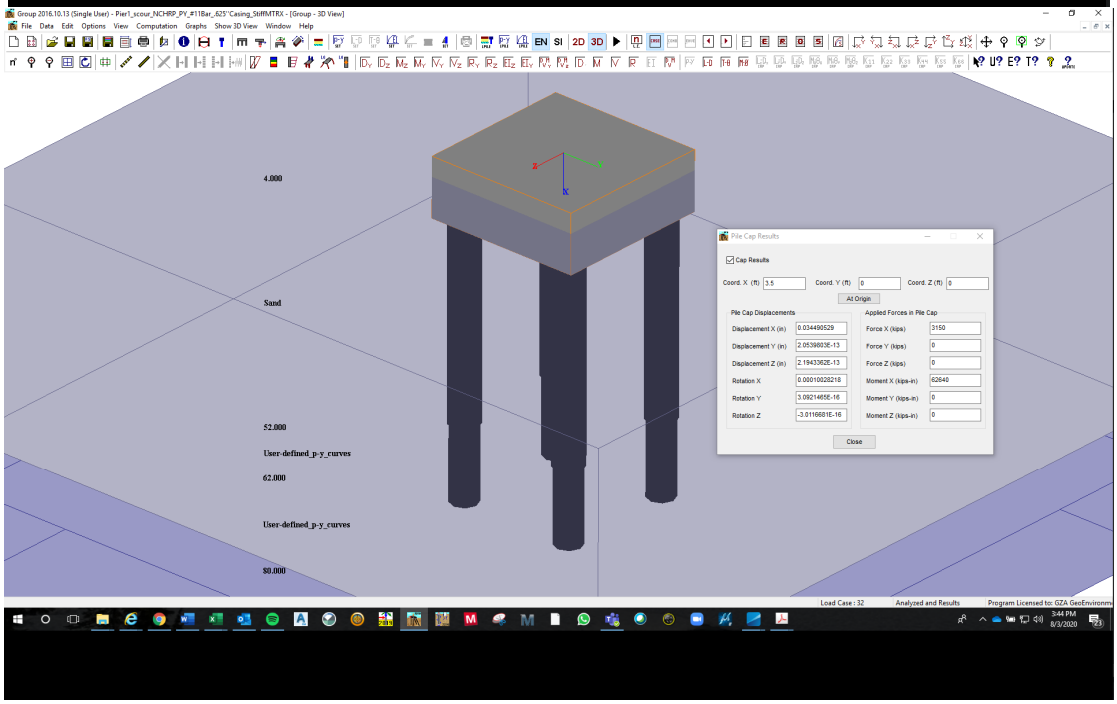

Group 2016.10.13 (Single User) - Pier1_scour_NCHRP_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
4.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034721606
Displacement Y (in) 2.850772E-15
Displacement Z (in) 0.028544554
Rotation X 1.0656027E-15
Rotation Y 0.00017144995
Rotation Z -2.0518747E-18
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 348000
Moment Z (kips-in) 0
Close
Load Case : 27
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
3:44 PM
8/3/2020

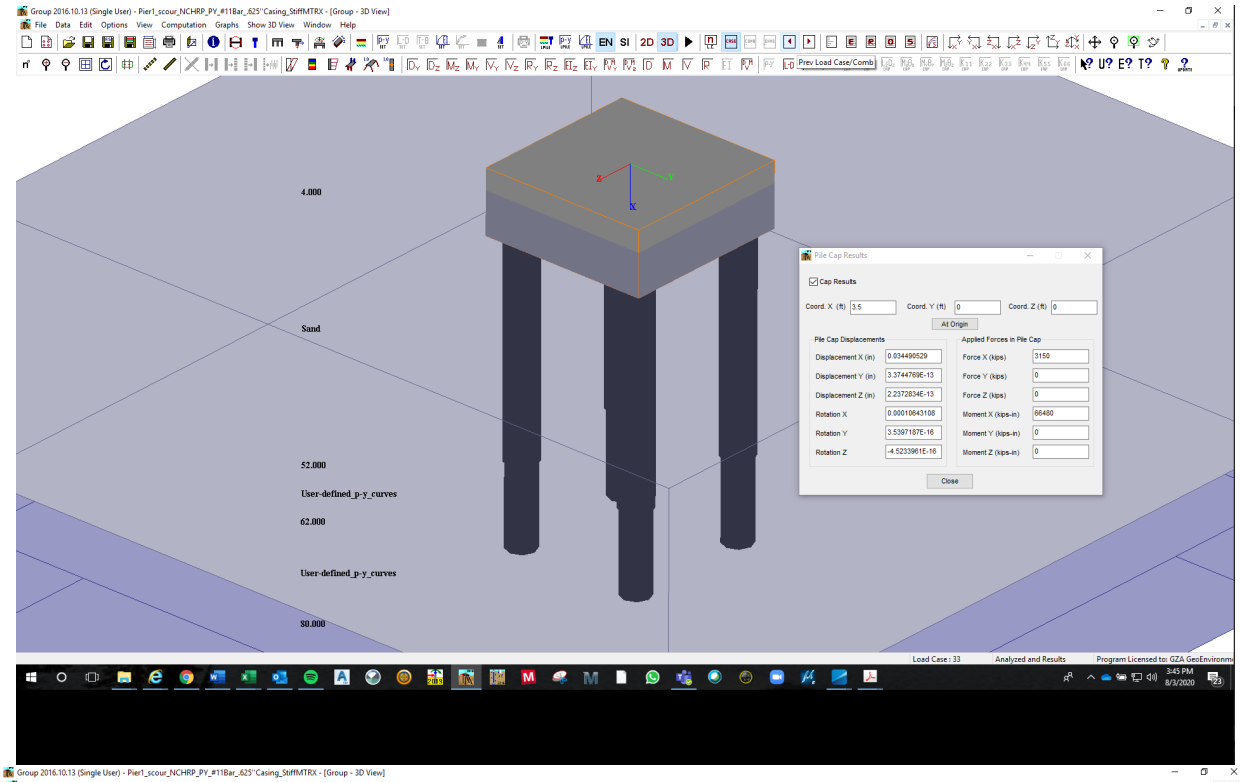

Group 2016.10.13 (Single User) - Pier1_scour_NCHRP_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
4.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034778364
Displacement Y (in) -2.1963205E-15
Displacement Z (in) 0.035452677
Rotation X 1.7209232E-15
Rotation Y 0.00021294288
Rotation Z 1.565134E-18
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 432000
Moment Z (kips-in) 0
Close
Load Case : 28
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
3:44 PM
8/3/2020

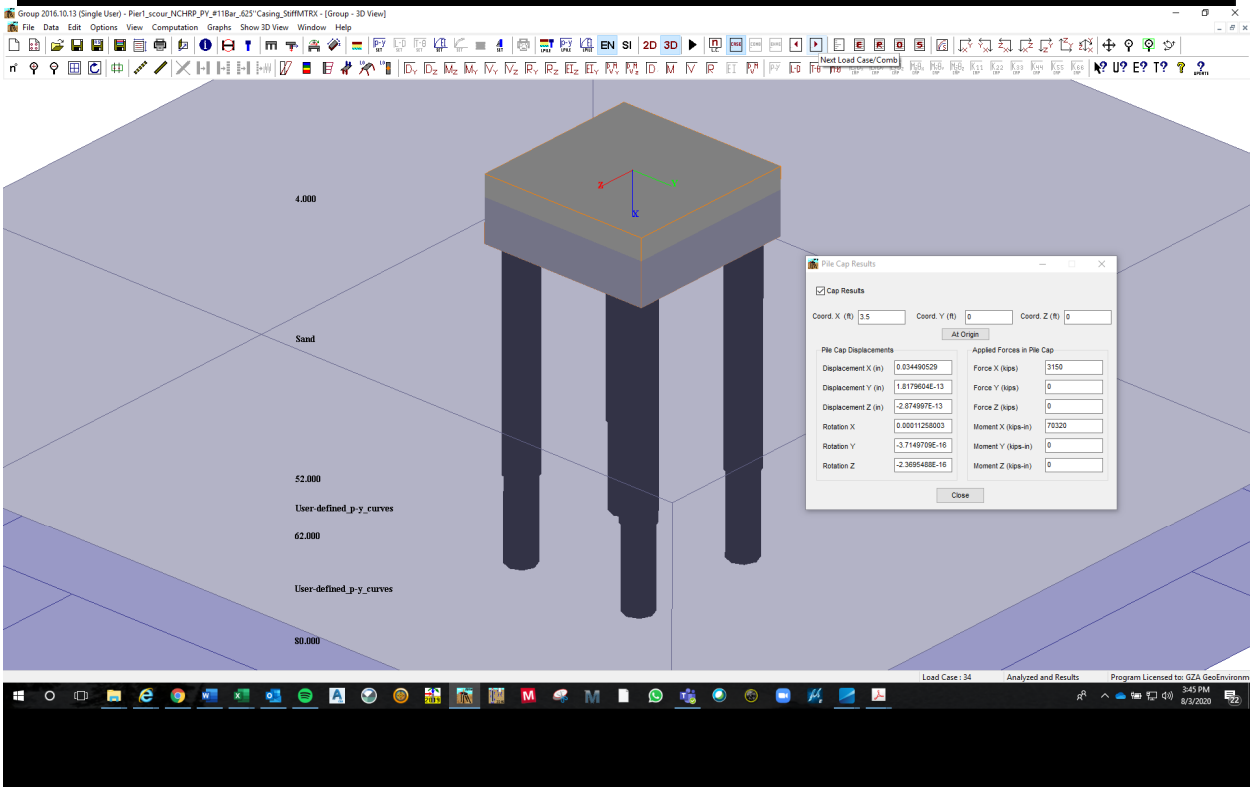

Group 2016.10.13 (Single User) - Pier1_scour_NCHRP_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
4.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034765459
Displacement Y (in) -1.0124707E-14
Displacement Z (in) 0.04241389
Rotation X 5.4381821E-14
Rotation Y 0.00025475456
Rotation Z 7.4743557E-18
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 516000
Moment Z (kips-in) 0
Close
Load Case : 29
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
3:44 PM
8/3/2020

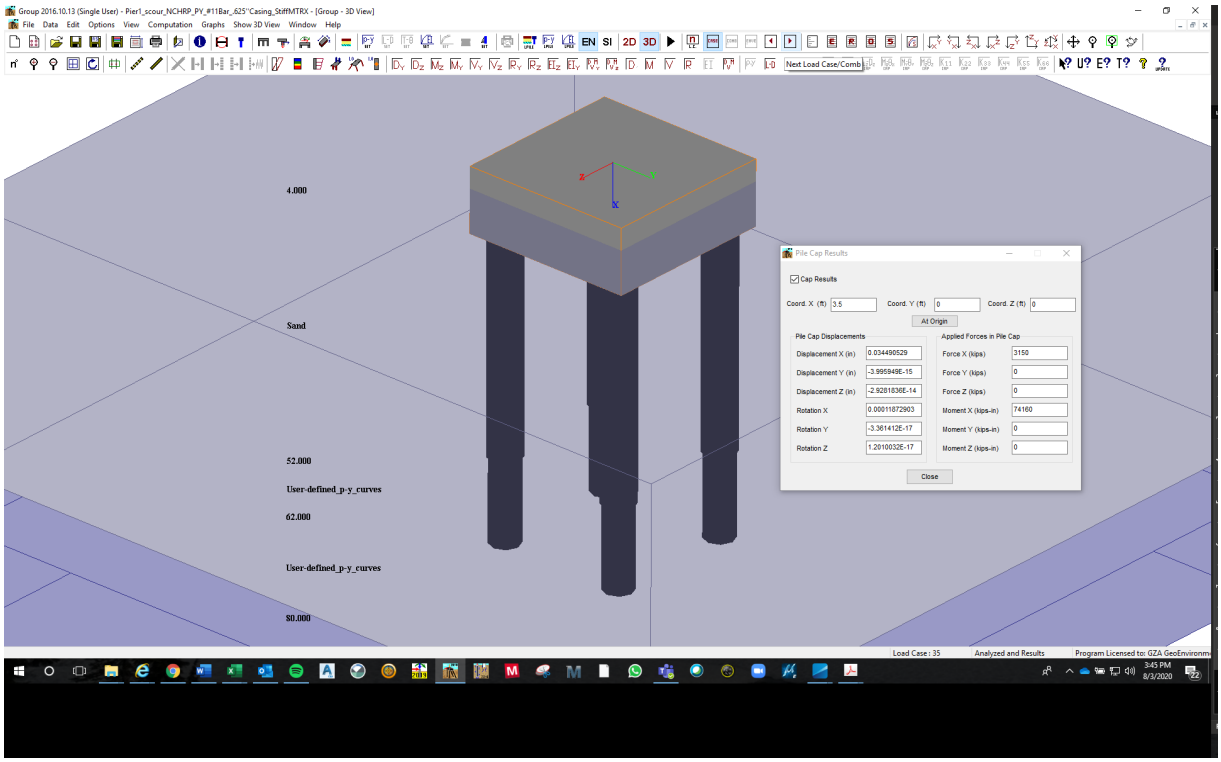

Group 2016.10.13 (Single User) - Pier1_scour_NCHRP_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
4.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.03467926
Displacement Y (in) -2.5500699E-15
Displacement Z (in) 0.049496052
Rotation X -2.1452449E-14
Rotation Y 0.00029729443
Rotation Z 1.8250444E-18
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 600000
Moment Z (kips-in) 0
Close
Load Case : 30
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
3:44 PM
8/3/2020

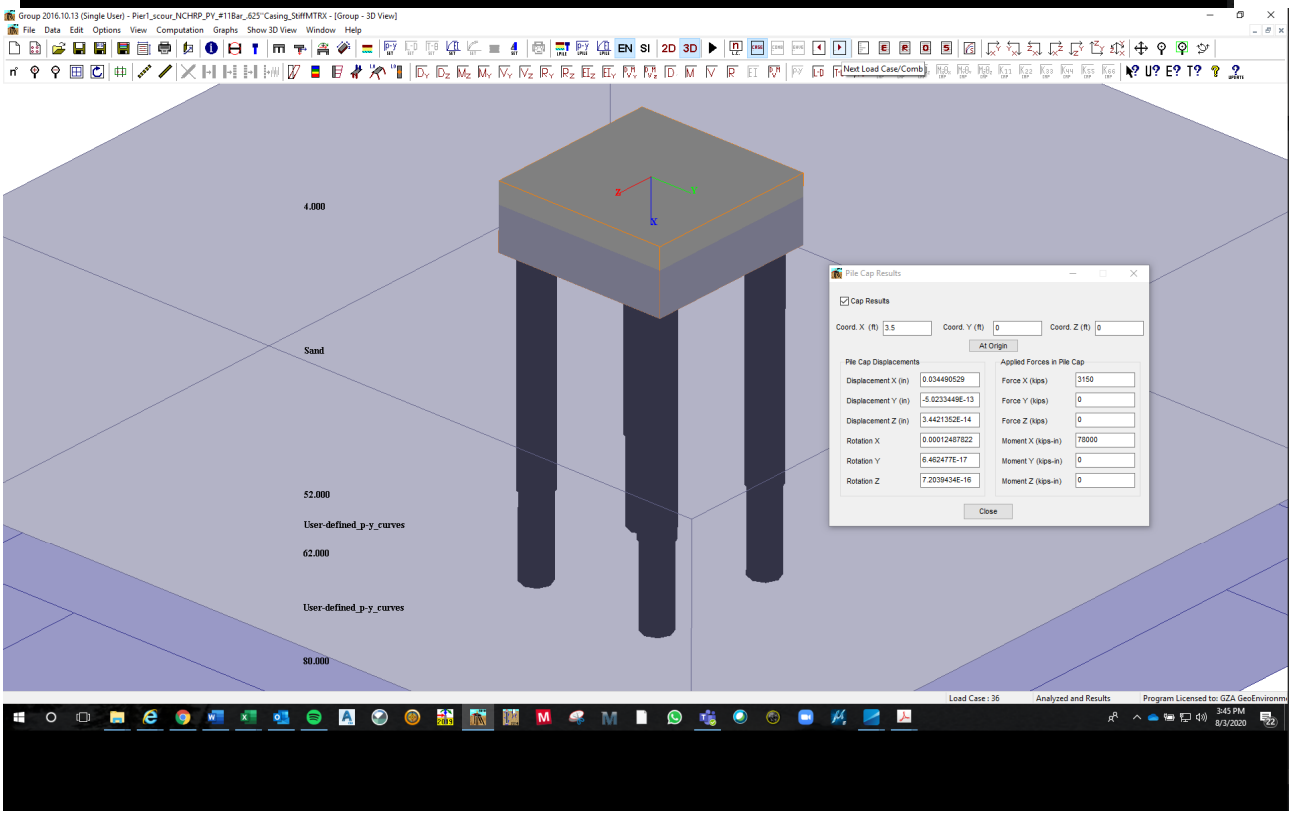

4.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034490529
Displacement Y (in) 2.2228943E-13
Displacement Z (in) 3.366877E-13
Rotation X 9.4133724E-5
Rotation Y 4.8457919E-16
Rotation Z -2.7807969E-16
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 58800
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close


4.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034490529
Displacement Y (in) 2.0539803E-13
Displacement Z (in) 2.1943362E-13
Rotation X 0.000100282818
Rotation Y 3.0921465E-16
Rotation Z -3.0116681E-16
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 62640
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close


Group 2016.10.13 (Single User) - Pier1_scour_NCHRP_PY_#11Bar_.625"Casing_StiffMTRX - [Group - 3D View]
4.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034490529
Displacement Y (in) 3.3744769E-13
Displacement Z (in) 2.2372834E-13
Rotation X 0.00010643108
Rotation Y 3.5397187E-16
Rotation Z -4.5233961E-16
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 66400
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 33
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
3:45 PM
8/3/2020


Group 2016.10.13 (Single User) - Pier1_scour_NCHRP_PY_#11Bar_.625"Casing_StiffMTRX - [Group - 3D View]
4.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034490529
Displacement Y (in) 1.8179604E-13
Displacement Z (in) -2.874997E-13
Rotation X 0.00011258003
Rotation Y -3.7149709E-16
Rotation Z -2.3695488E-16
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 70320
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 34
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
3:45 PM
8/3/2020


Group 2016.10.13 (Single User) - Pier1_scour_NCHRP_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
4.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034490529
Displacement Y (in) -3.995849E-15
Displacement Z (in) -2.9281836E-14
Rotation X 0.0001107290 3
Rotation Y -3.361412E-17
Rotation Z 1.2010032E-17
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 74160
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 35
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
3:45 PM
8/3/2020


Group 2016.10.13 (Single User) - Pier1_scour_NCHRP_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
4.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034490529
Displacement Y (in) -5.0233449E-13
Displacement Z (in) 3.4421352E-14
Rotation X 0.00012487822
Rotation Y 6.462477E-17
Rotation Z 7.2039434E-16
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 78000
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 36
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
3:45 PM
8/3/2020

	Created: NVW	Date: 2020-08-03	Backchk'd:	Date:
	Checked: AH	Date: 2020-08-04	Updated:	Date:
Project: Madawaska Int'l Bridge	GZA job#: 09.0025984.03		Reviewed:	Date:

Madawaska Bridge Pier 1 Foundation Stiffness

Description: Input parameters in blue cells provided by GZA based on Group analyses using Weak rock model.

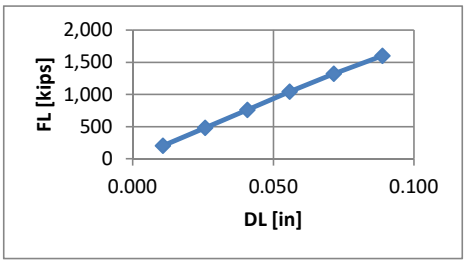
Red text indicates calculations prepared by HNTB. Plots prepared by HNTB

Pier 1 Casing Thickness Before 1/8" Corrosion (in): 0.75 Conditions: No Scour

Axial load for analysis Pa = 3150 kips For F_L, F_T, M_L, M_T & M_V

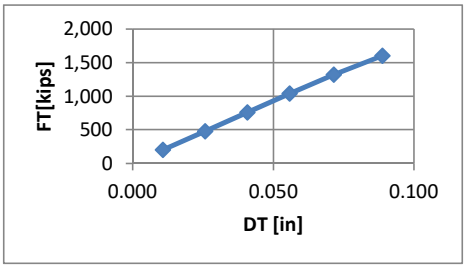
Longitudinal Force (X) (Z direction in Group)

F_L [kips]	δ_L [in]	$\Delta\delta_L$ [in]	θ_T [10^{-6} rad]	$\Delta\theta_T$ [10^{-6} rad]	$f_{FL,\delta L}$ [in/10^3 kips]	$f_{FL,\theta T}$ [10^{-6}rad/10^3 kips]
200	0.011	0.000	13.5	0		
480	0.026	0.015	33	19	0.054	68
760	0.041	0.030	52	38	0.054	68
1,040	0.056	0.045	71	57	0.054	68
1,320	0.072	0.061	90	76	0.054	68
1,600	0.089	0.078	108	95	0.056	68



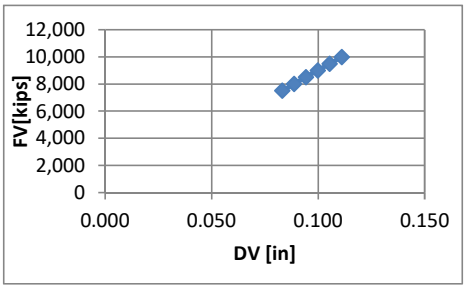
Transverse Force (Y)

F_T [kips]	δ_T [in]	$\Delta\delta_T$ [in]	θ_L [10^{-6} rad]	$\Delta\theta_L$ [10^{-6} rad]	$f_{FT,\delta T}$ [in/10^3 kips]	$f_{FT,\theta L}$ [10^{-6}rad/10^3 kips]
200	0.011	0.000	-14	0		
480	0.026	0.015	-33	-19	0.054	-68
760	0.041	0.030	-52	-38	0.054	-68
1,040	0.056	0.045	-71	-57	0.054	-68
1,320	0.072	0.061	-90	-76	0.054	-68
1,600	0.089	0.078	108	122	0.056	87



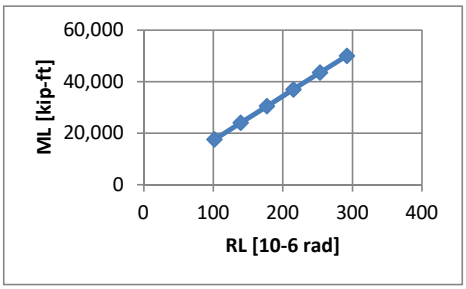
Vertical Force (z) (X Direction in Group)

F_V [kips]	δ_V [in]	$\Delta\delta_V$ [in]	$f_{FV,\delta V}$ [in/10^6 kips]
7,500	0.083	0.000	
8,000	0.089	0.006	11.181
8,500	0.094	0.011	11.181
9,000	0.100	0.017	11.181
9,500	0.105	0.022	11.181
10,000	0.111	0.028	11.181



Moment About Long Axis (X) (Z axis in Group)

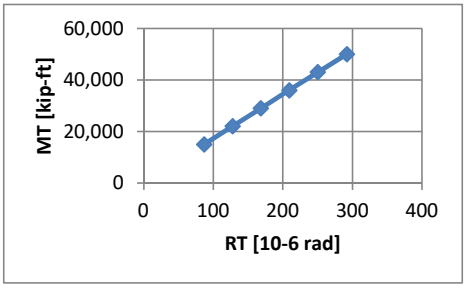
M_L [kip-ft]	δ_T [in]	$\Delta\delta_T$ [in]	θ_L [10^{-6} rad]	$\Delta\theta_L$ [10^{-6} rad]	$f_{ML,\delta T}$ in/10^6 kip-ft	$f_{ML,\theta L}$ [10^{-6} rad/10^6 kip-ft]
17,500	-0.014	0.000	101	0		
24,000	-0.020	-0.005	139	38	-0.822	5,820
30,500	-0.025	-0.011	177	76	-0.822	5,822
37,000	-0.030	-0.016	215	114	-0.822	5,822
43,500	-0.036	-0.021	253	152	-0.823	5,833
50,000	-0.041	-0.027	292	190	-0.827	5,860



	Created: NVW	Date: 2020-08-03	Backchk'd:	Date:
	Checked: AH	Date: 2020-08-04	Updated:	Date:
Project: Madawaska Int'l Bridge	GZA job#: 09.0025984.03		Reviewed:	Date:

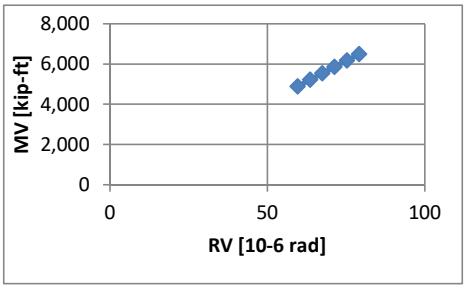
Moment About Trans Axis (Y)

M_T	δ_L	$\Delta\delta_T$	θ_T	$\Delta\theta_T$	$f_{MT,\delta L}$	$f_{MT,\theta T}$
[kip-ft]	[in]	[in]	[10^{-6} rad]	[10^{-6} rad]	in/10^6 kip-ft	[10^{-6} rad/10^6 kip-ft]
15,000	0.012	0.000	87	0		
22,000	0.018	0.006	128	41	0.821	5,817
29,000	0.024	0.012	168	81	0.822	5,820
36,000	0.030	0.017	209	122	0.822	5,821
43,000	0.035	0.023	250	163	0.823	5,829
50,000	0.041	0.029	292	205	0.827	5,857



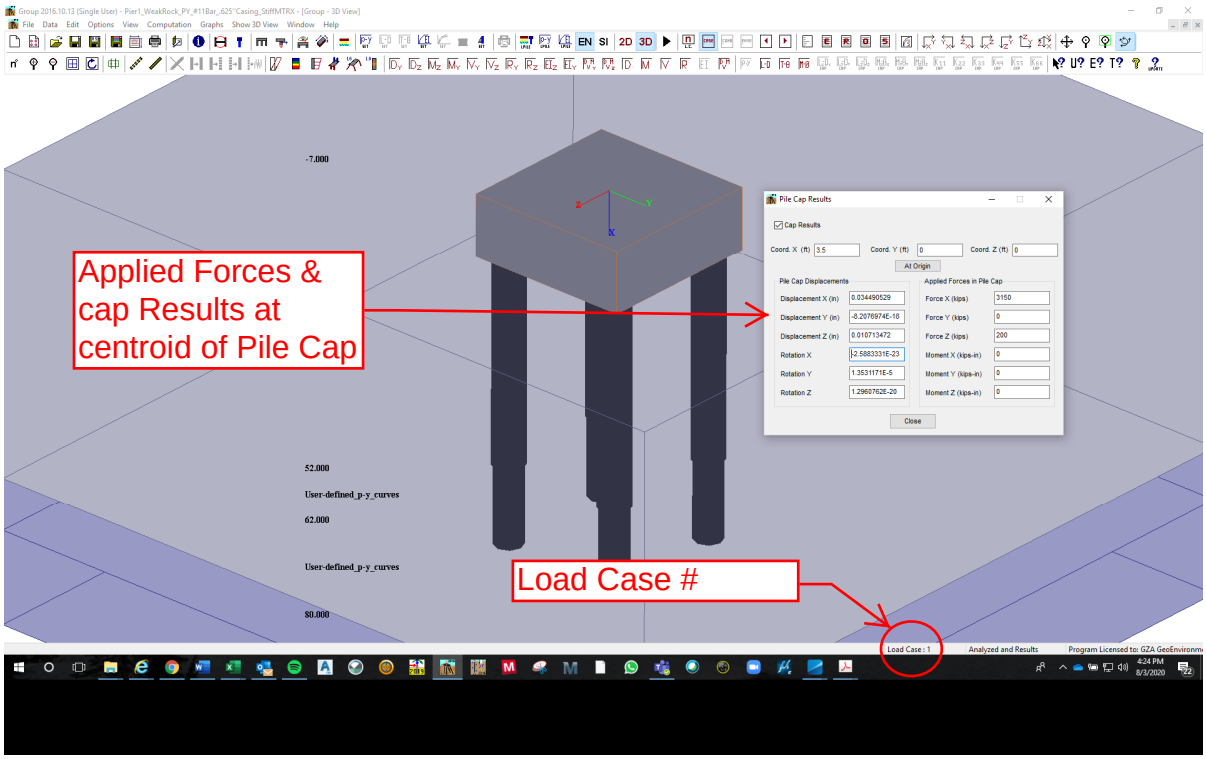
Moment About Vertical Axis (z) (X axis in Group)

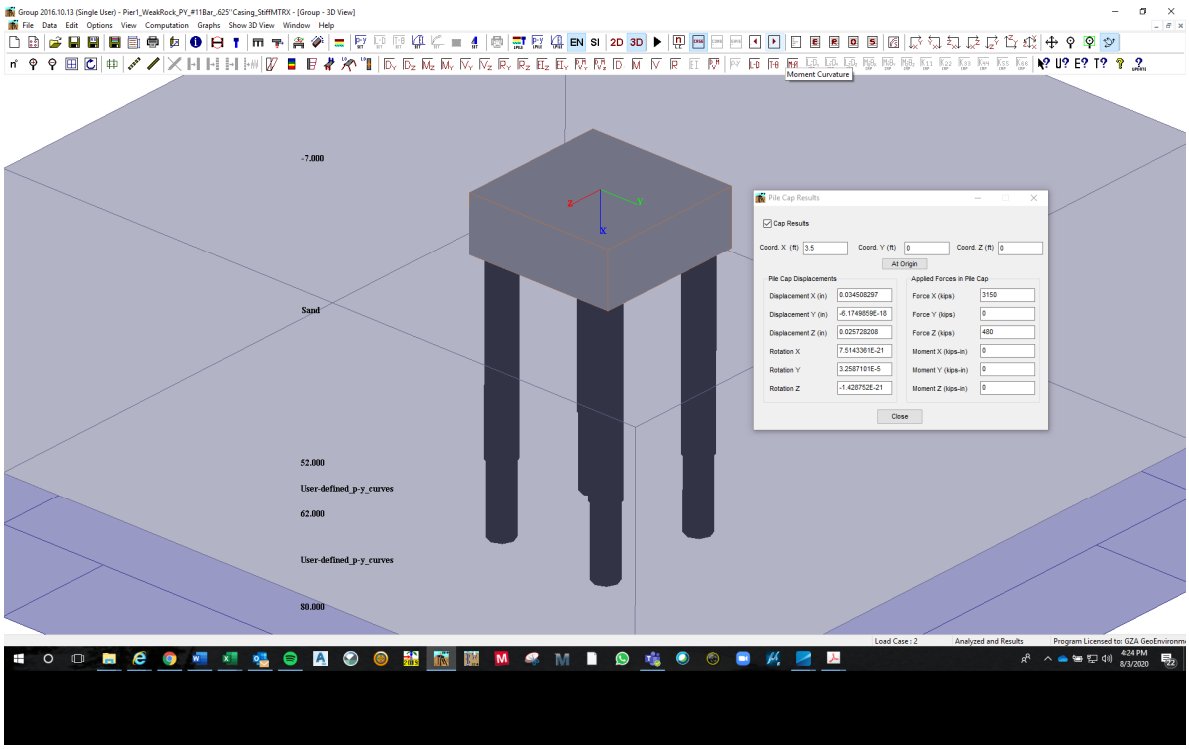
M_V	θ_V	$\Delta\theta_V$	$f_{MV,\theta V}$
[kip-ft]	[10^{-6} rad]	[10^{-6} rad]	[10^{-6} rad/10^6 kip-ft]
4,900	60	0	
5,220	64	4	12,173
5,540	67	8	12,173
5,860	71	12	12,173
6,180	75	16	12,173
6,500	79	19	12,173

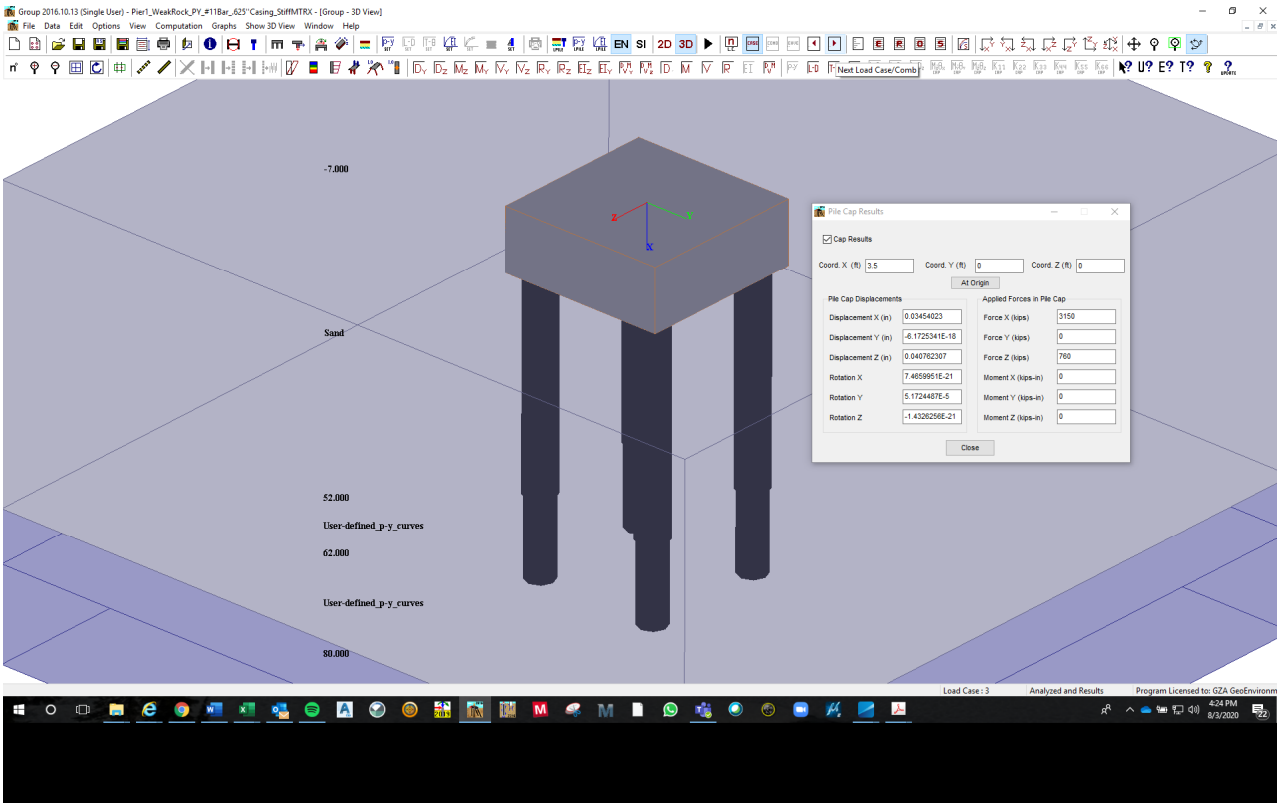


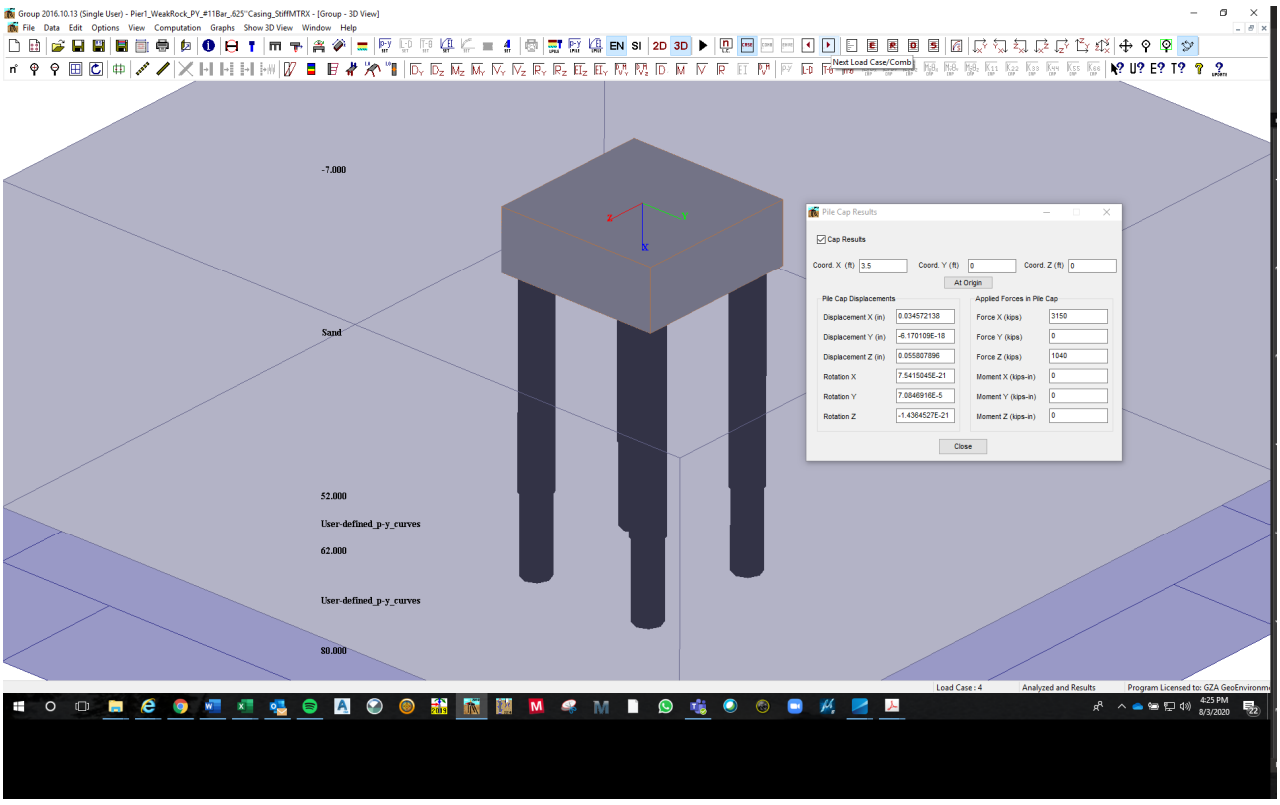
<u>Pier 1 No Scour w/Weak Rock</u> deisgn parameters.

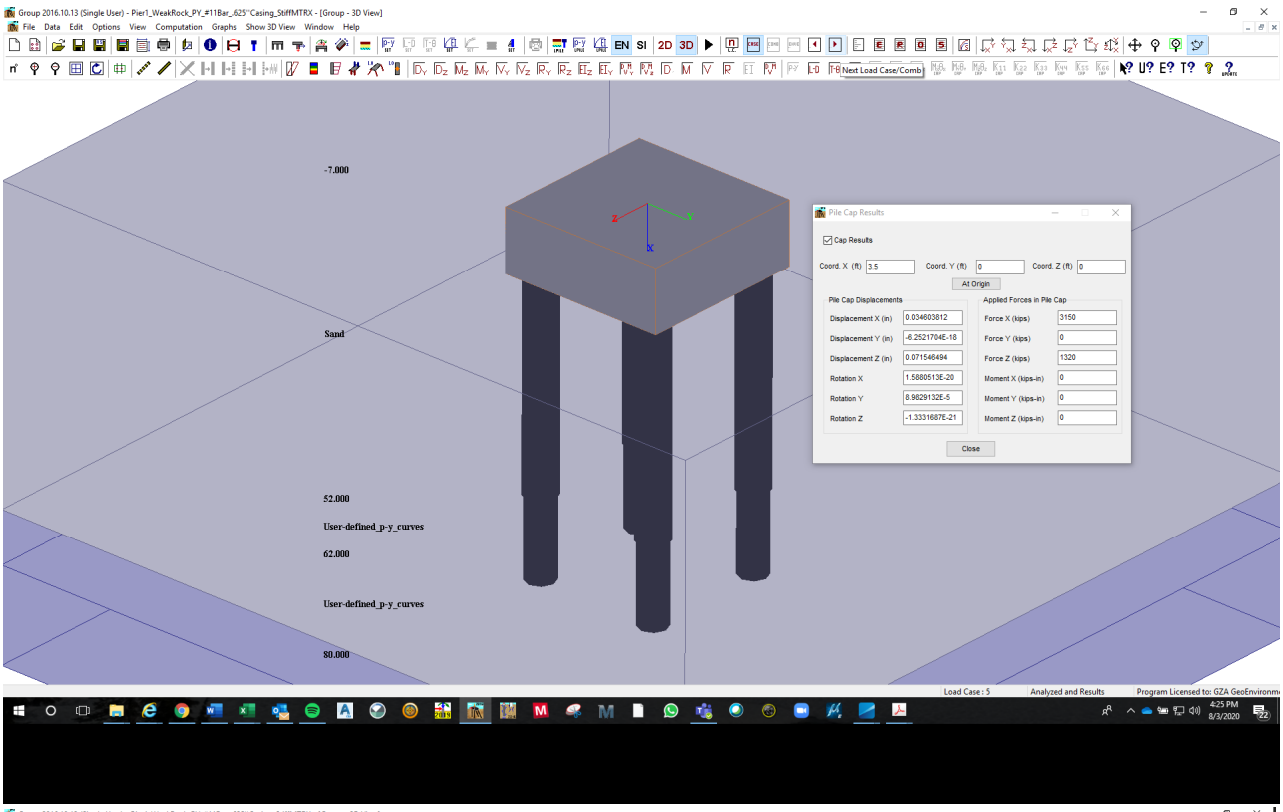
Note: Loads/moments were applied to the centroid of pile cap. Displacements/Rotations are taken at the centroid of the footing (x = 3.5', below origin)

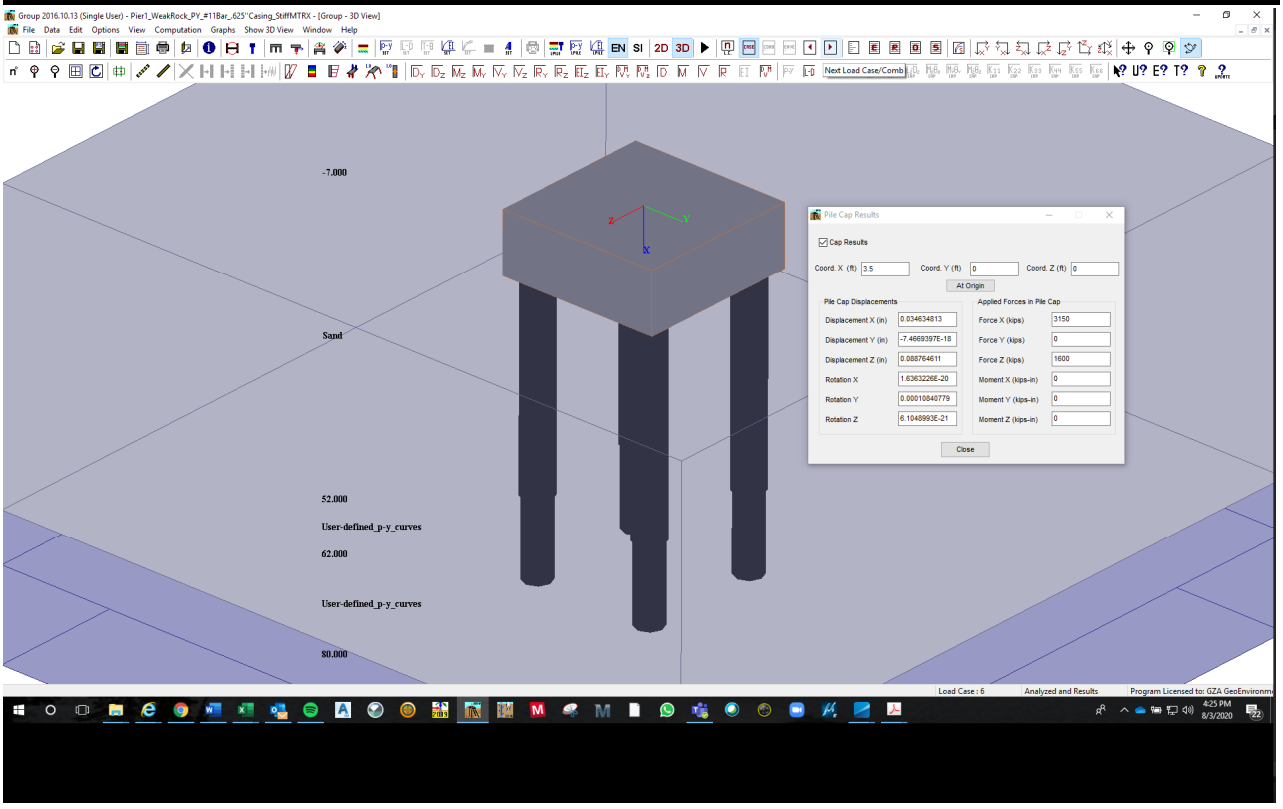


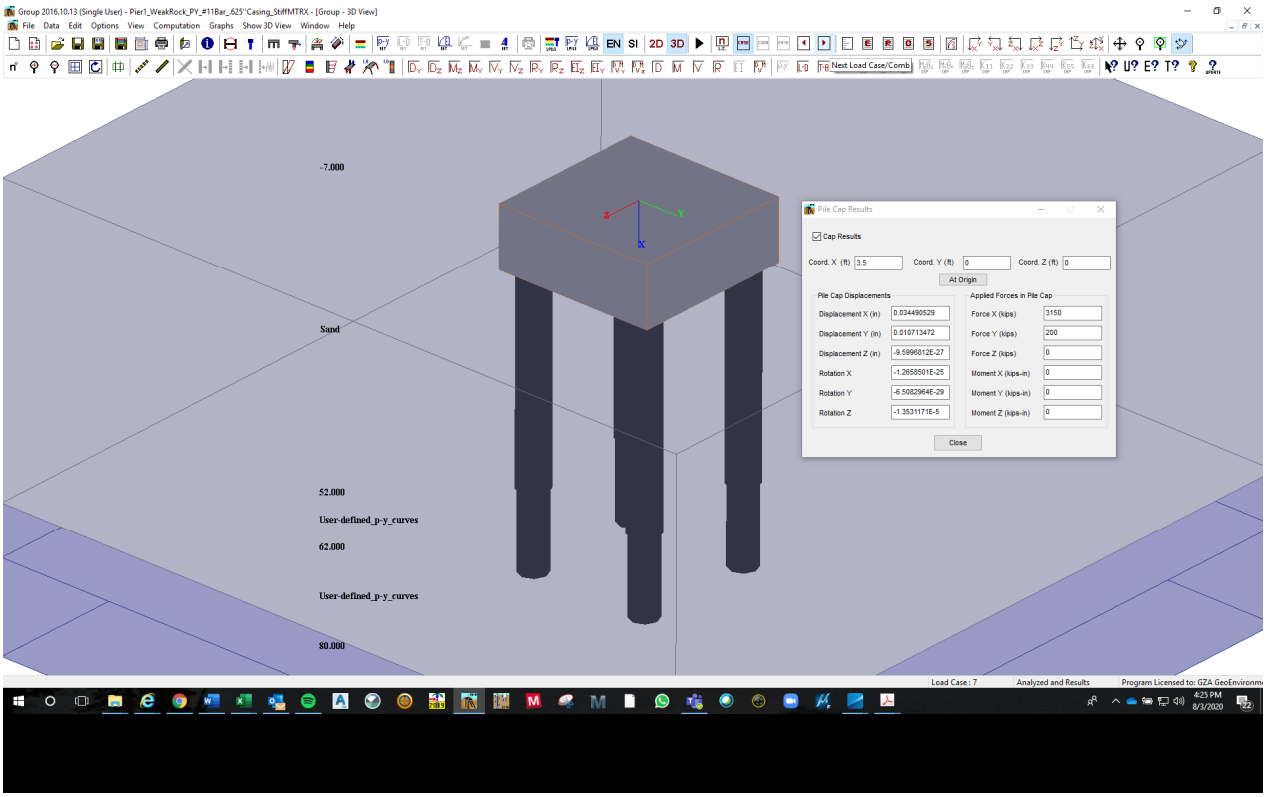


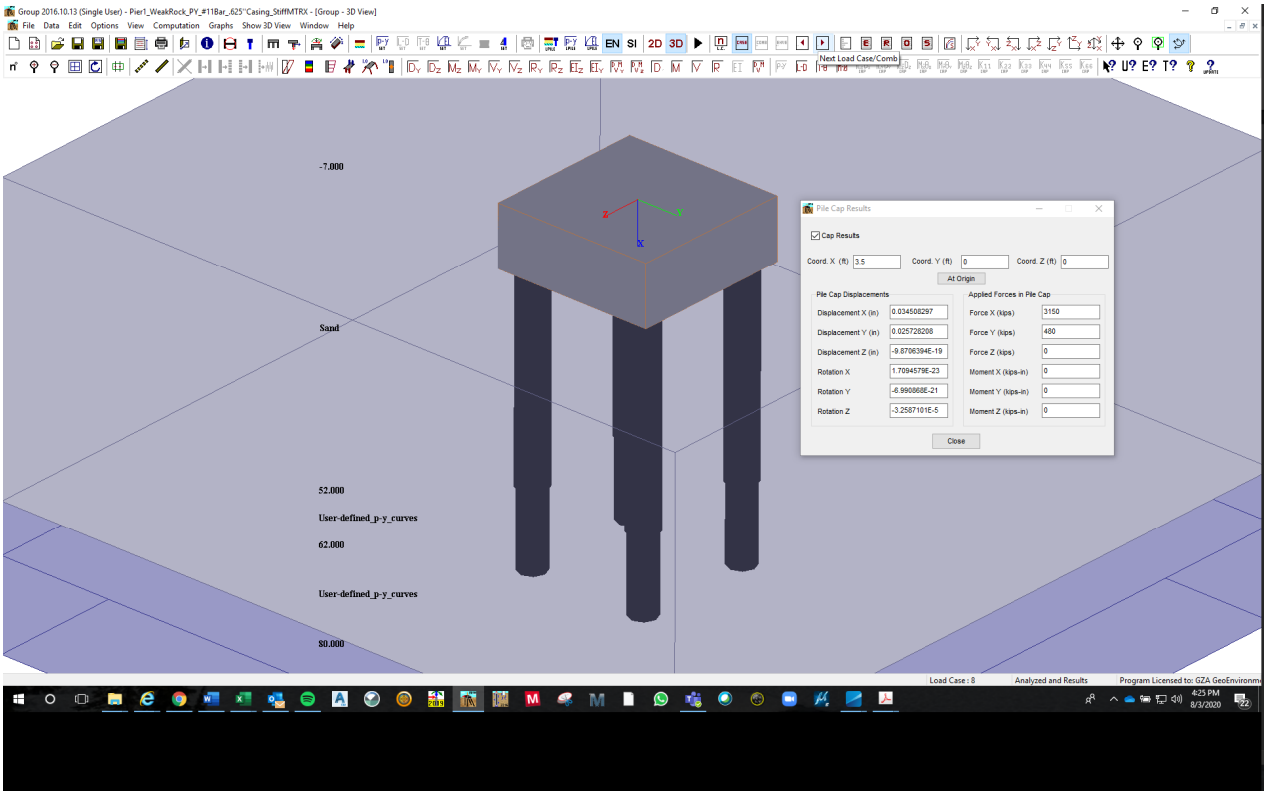

Group 2016.10.13 (Single User) - Pier1_WeakRock_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
-7.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.03454023
Displacement Y (in) -6.1725341E-18
Displacement Z (in) 0.040762307
Rotation X 7.4659951E-21
Rotation Y 5.1724487E-5
Rotation Z -1.4326256E-21
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 760
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 3
Analyzed and Results
Program Licensed to: GZA GeoEnvironm


Group 2016.10.13 (Single User) - Pier1_WeakRock_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
-7.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034572138
Displacement Y (in) -6.170109E-18
Displacement Z (in) 0.055807896
Rotation X 7.5415045E-21
Rotation Y 7.0846916E-5
Rotation Z -1.4364527E-21
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 1040
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 4
Analyzed and Results
Program Licensed to: GZA GeoEnvironm


Group 2016.10.13 (Single User) - Pier1_WeakRock_PY_#118ar_625"Casing_StiffMTRX - [Group - 3D View]
-7.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034603612
Displacement Y (in) -6.2521704E-18
Displacement Z (in) 0.071546494
Rotation X 1.5880513E-20
Rotation Y 8.9829132E-5
Rotation Z -1.3331687E-21
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 1320
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 5
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
4:25 PM
8/3/2020


Group 2016.10.13 (Single User) - Pier1_WeakRock_PY_#118ar_625"Casing_StiffMTRX - [Group - 3D View]
-7.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034634813
Displacement Y (in) -7.4669397E-18
Displacement Z (in) 0.088764611
Rotation X 1.6363226E-20
Rotation Y 0.00010840779
Rotation Z 6.1048993E-21
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 1600
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 6
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
4:25 PM
8/3/2020


Group 2016.10.13 (Single User) - Pier1_WeakRock_PY_#11Bar_.625"Casing_StiffMTRX - [Group - 3D View]
File Data Edit Options View Computation Graphs Show 3D View Window Help
Next Load Case/Comb
-7.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034490529
Displacement Y (in) 0.010713472
Displacement Z (in) -9.5996812E-27
Rotation X -1.2658501E-25
Rotation Y -6.5082964E-29
Rotation Z -1.3531171E-5
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 200
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 7
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
4:25 PM
8/3/2020


Group 2016.10.13 (Single User) - Pier1_WeakRock_PY_#11Bar_.625"Casing_StiffMTRX - [Group - 3D View]
File Data Edit Options View Computation Graphs Show 3D View Window Help
Next Load Case/Comb
-7.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034508297
Displacement Y (in) 0.025728208
Displacement Z (in) -9.870639E-19
Rotation X 1.7094579E-23
Rotation Y -6.990868E-21
Rotation Z -3.2587101E-5
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 480
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 8
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
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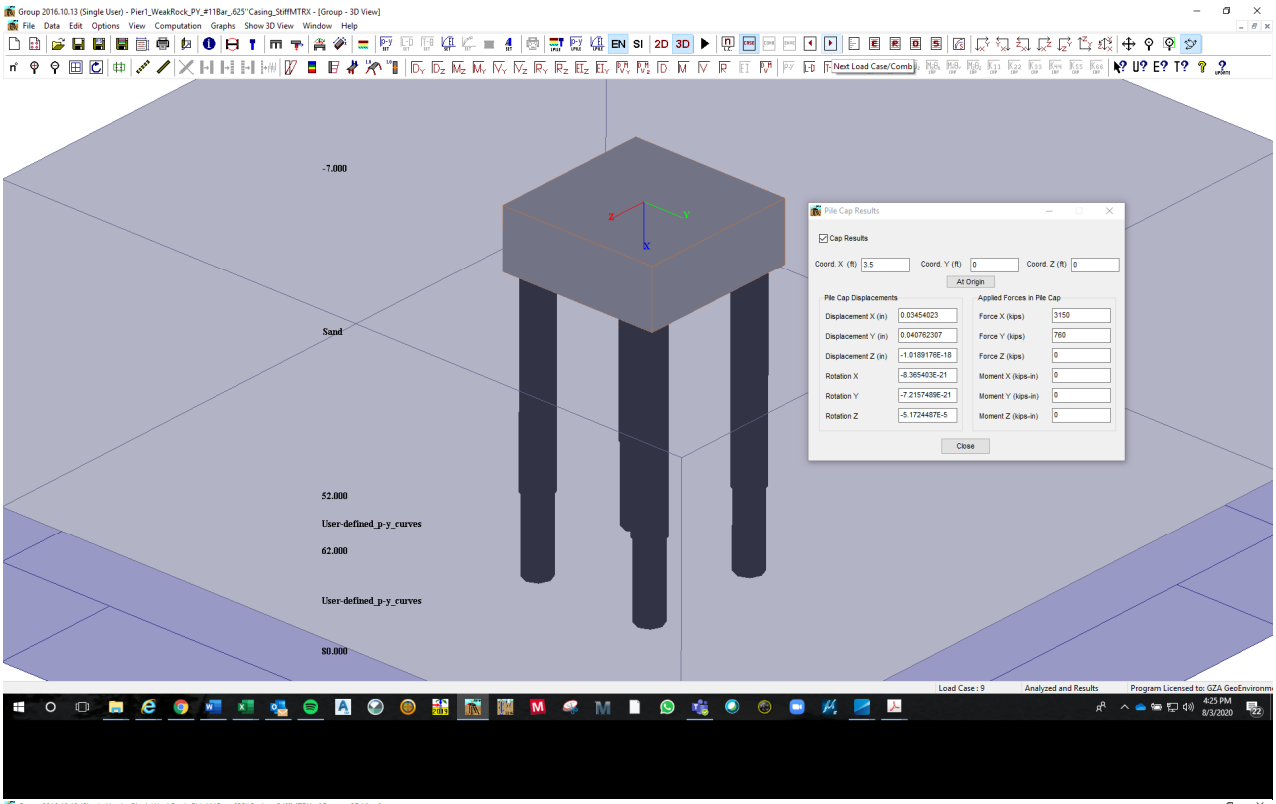
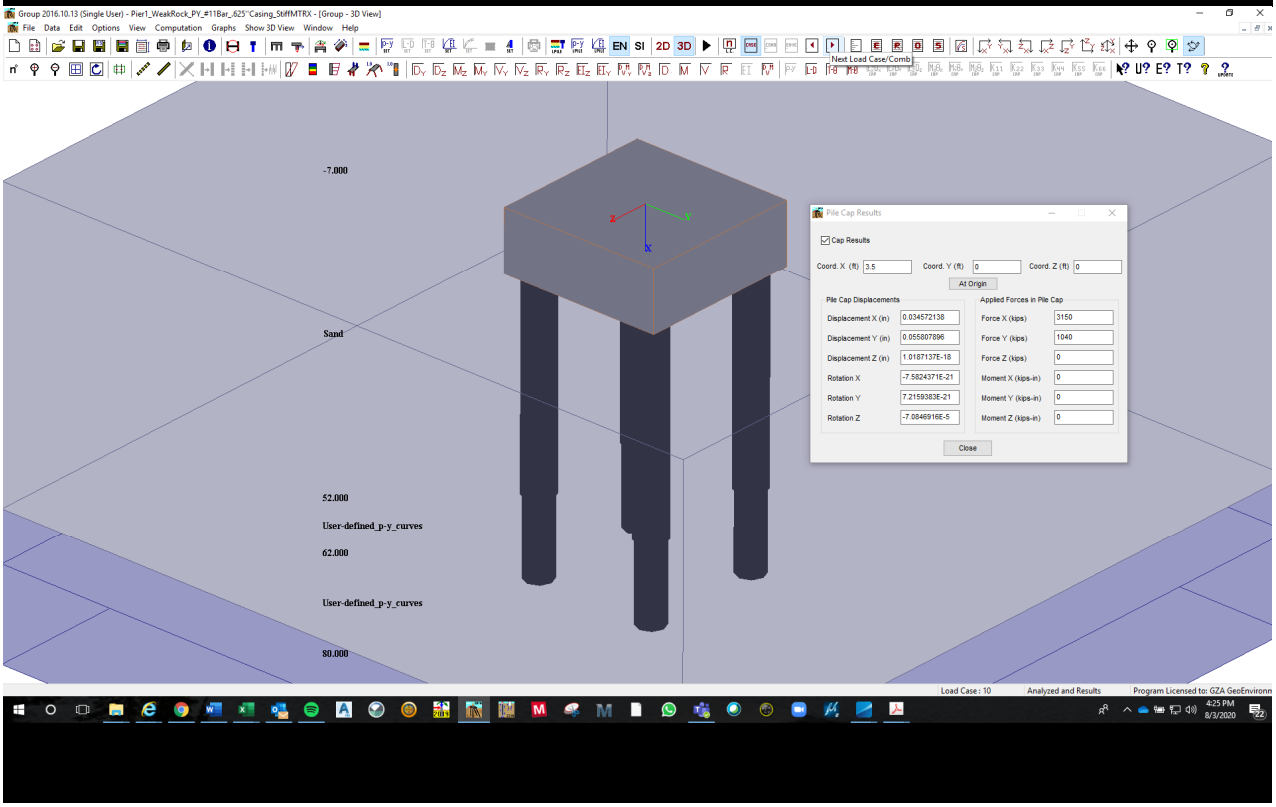
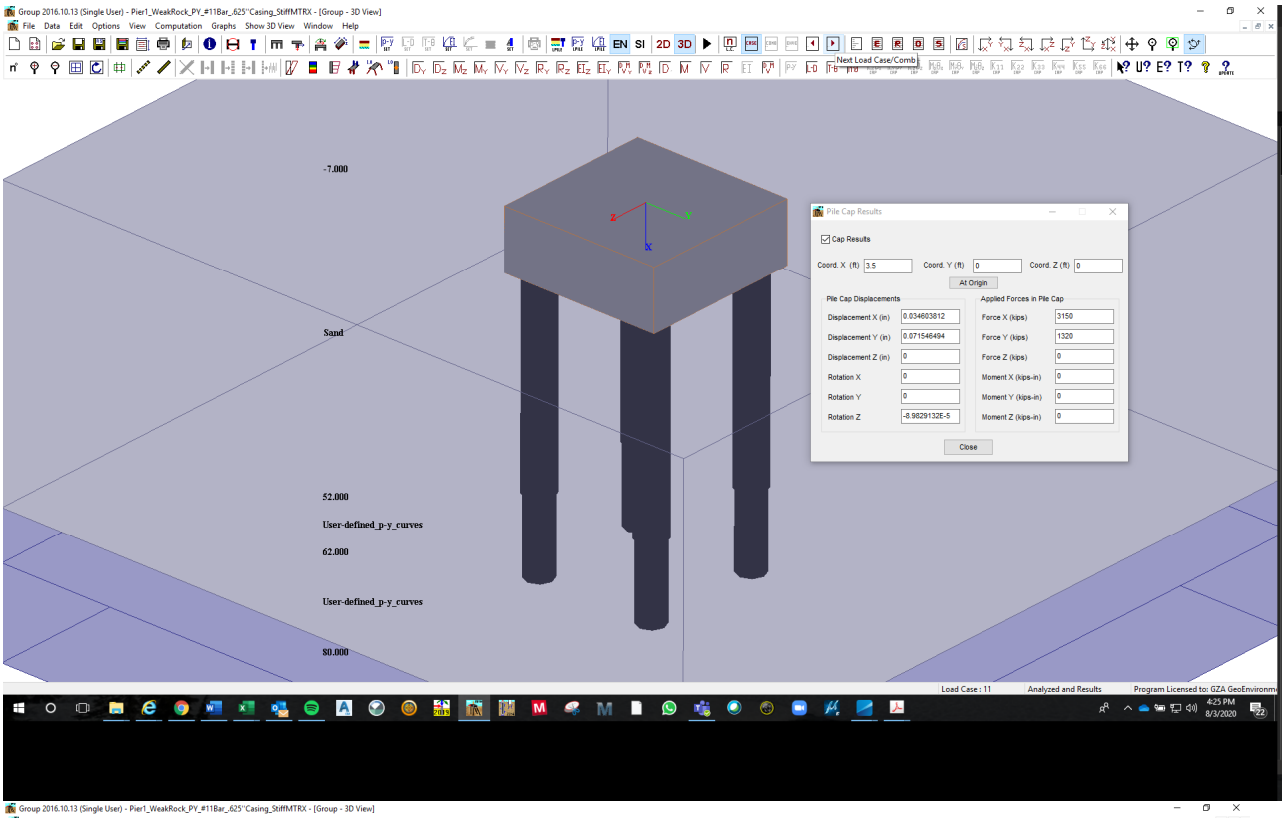
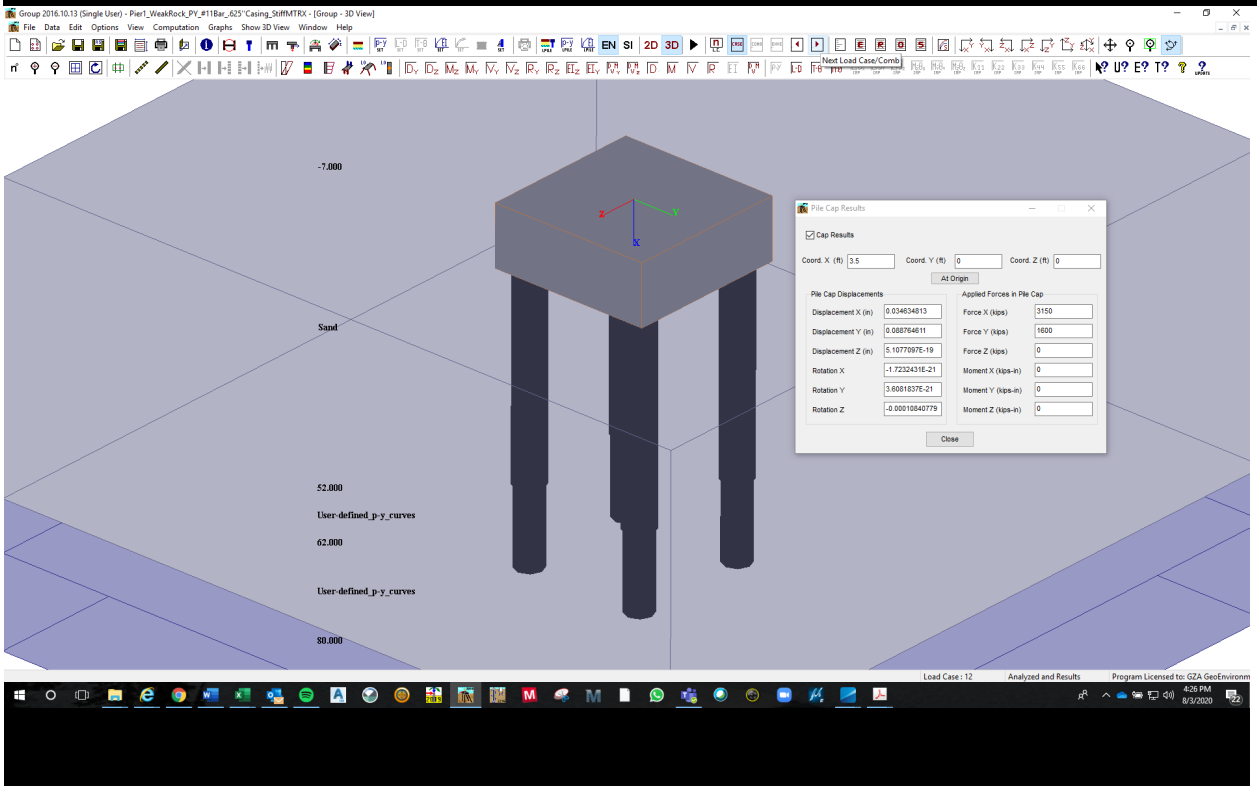
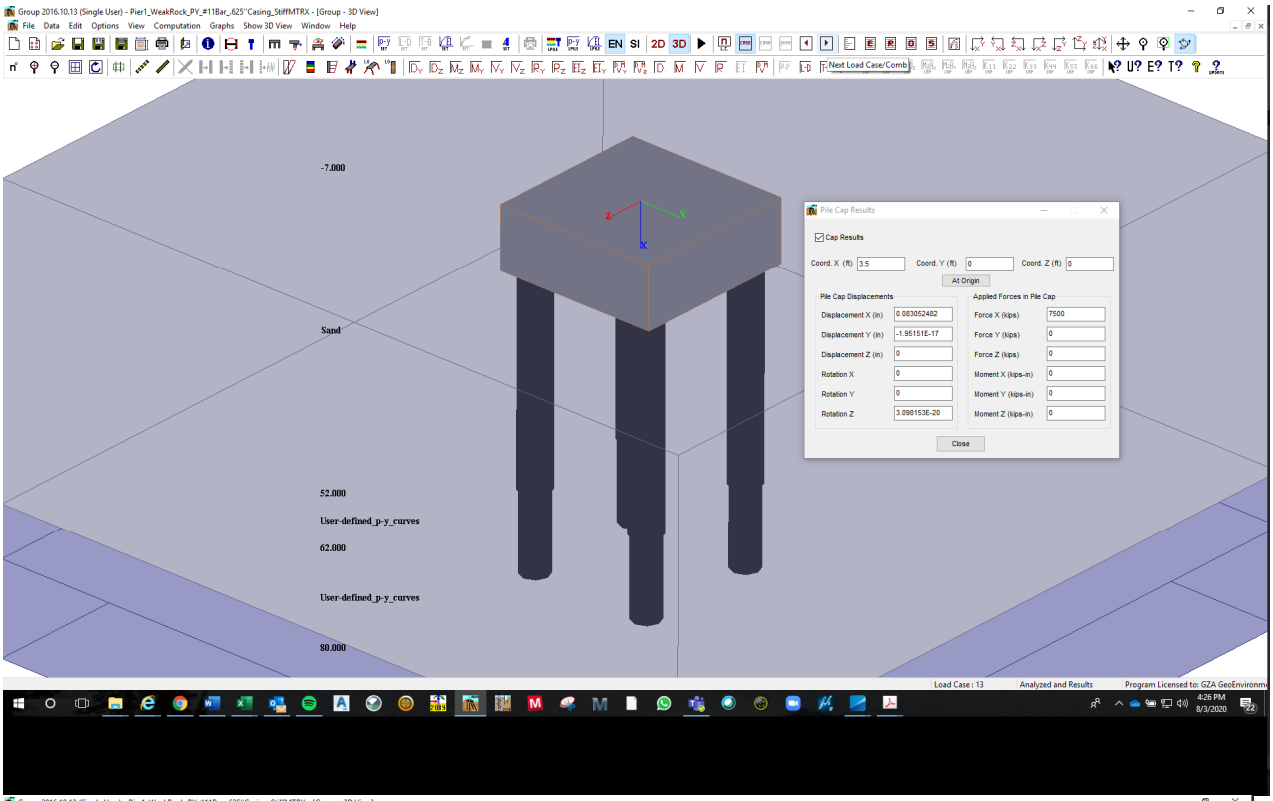
8/3/2020

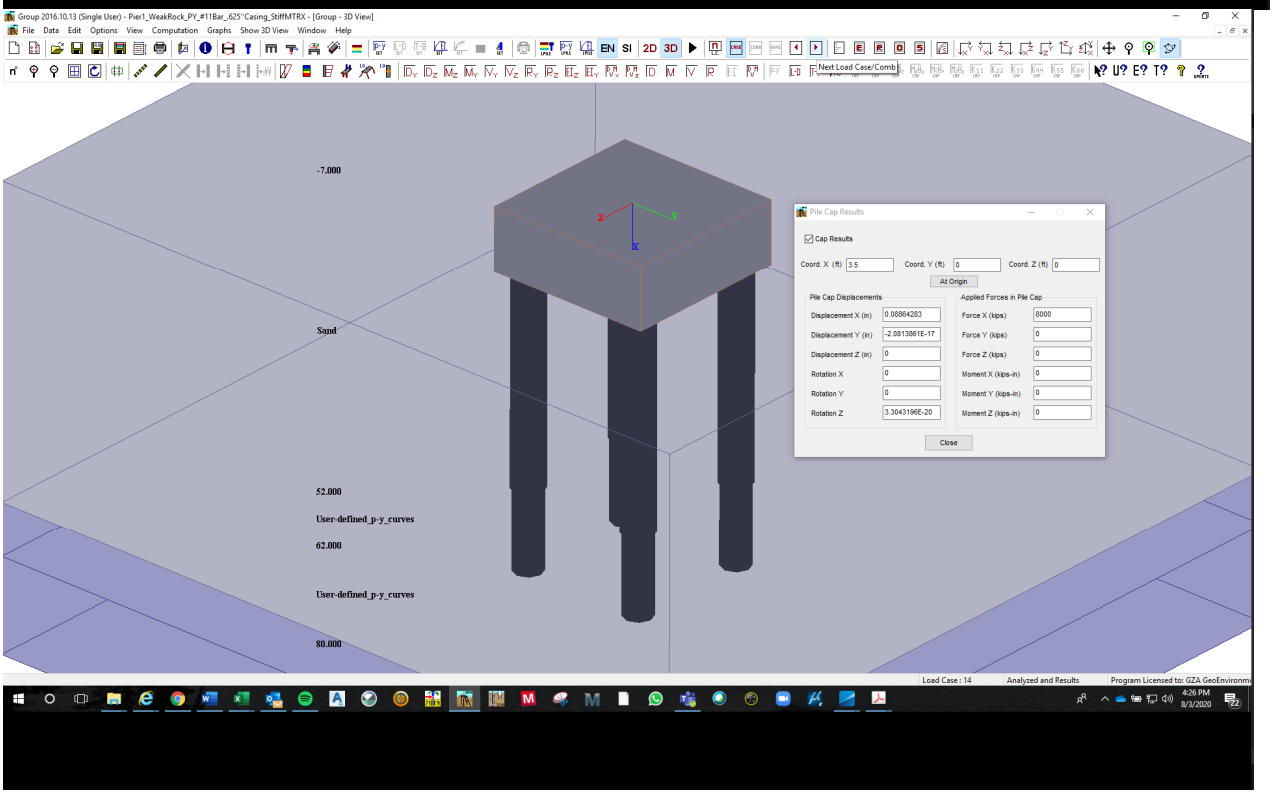

Group 2016.10.13 (Single User) - Pier1_WeakRock_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
-7.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.03454023
Displacement Y (in) 0.040762307
Displacement Z (in) -1.0189176E-18
Rotation X -8.365403E-21
Rotation Y -7.2157489E-21
Rotation Z -5.1724487E-5
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 760
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 9
Analyzed and Results

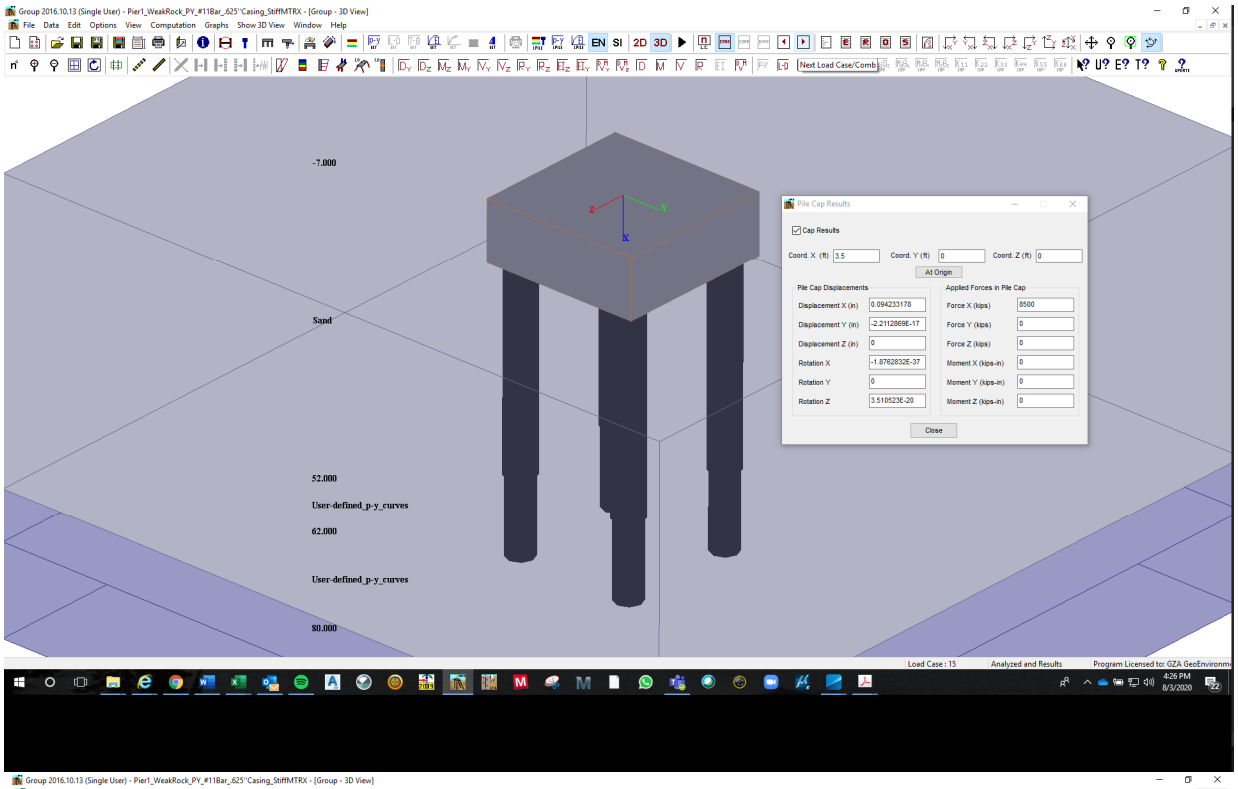

Group 2016.10.13 (Single User) - Pier1_WeakRock_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
-7.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034572138
Displacement Y (in) 0.055807896
Displacement Z (in) 1.0187137E-18
Rotation X -7.5824371E-21
Rotation Y 7.2159383E-21
Rotation Z -7.0846916E-5
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 1040
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 10
Analyzed and Results

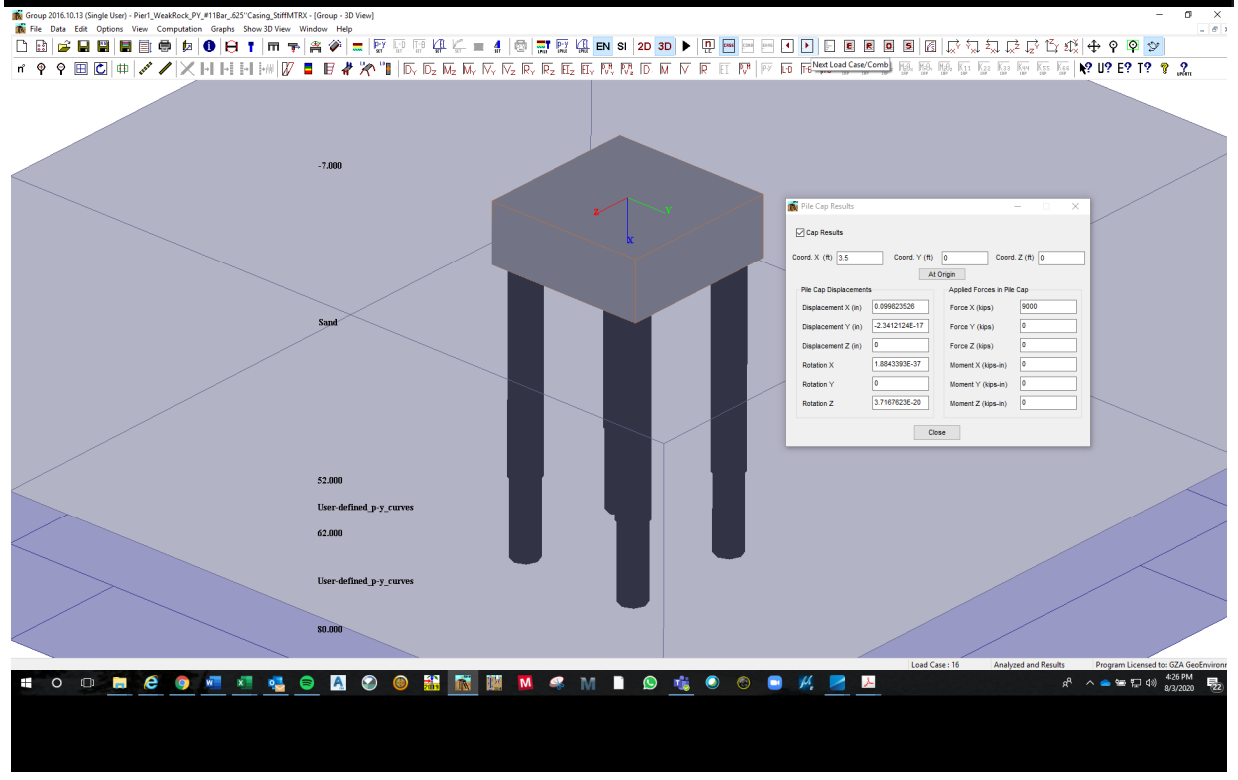

Group 2016.10.13 (Single User) - Pier1_WeakRock_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
-7.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034603812
Displacement Y (in) 0.071546494
Displacement Z (in) 0
Rotation X 0
Rotation Y 0
Rotation Z -8.9829132E-5
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 1320
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 11
Analyzed and Results
4:25 PM
8/3/2020

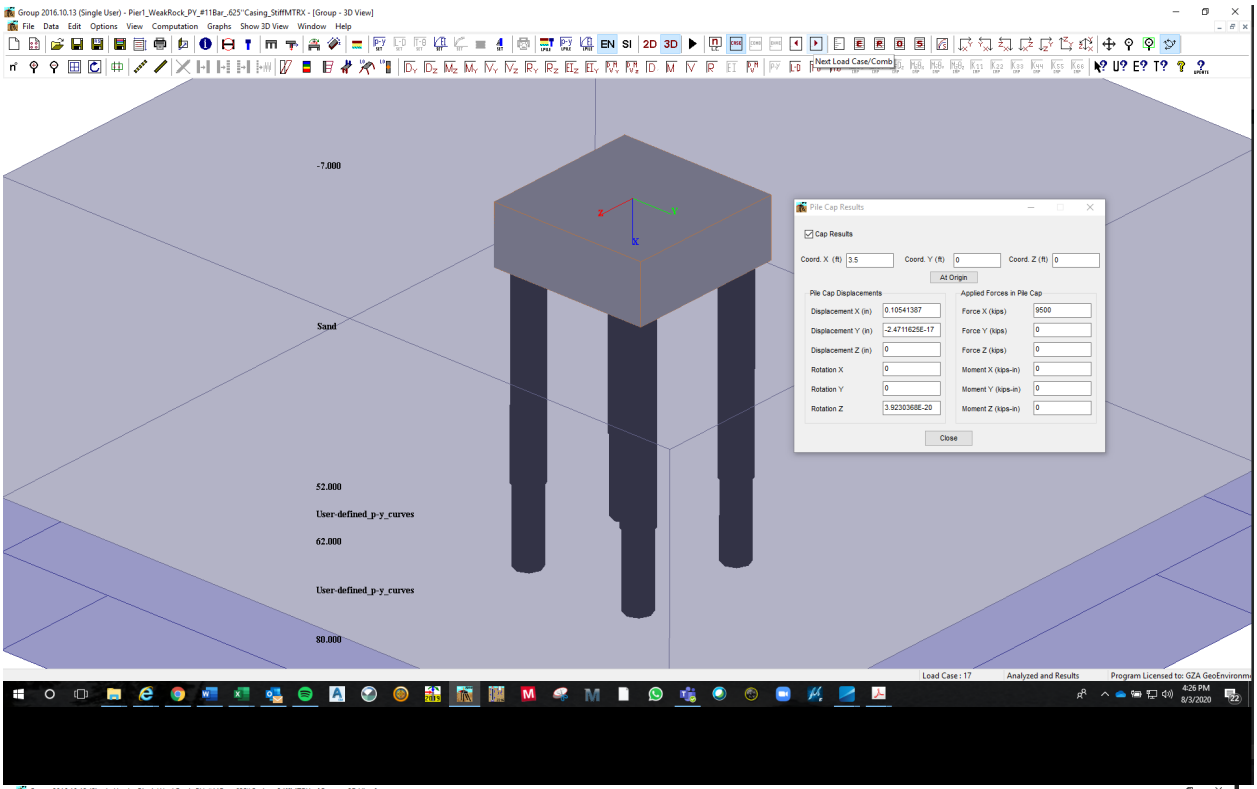

Group 2016.10.13 (Single User) - Pier1_WeakRock_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
-7.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034634813
Displacement Y (in) 0.088764611
Displacement Z (in) 5.1077097E-19
Rotation X -1.7232431E-21
Rotation Y 3.6081837E-21
Rotation Z -0.00010840779
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 1600
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 12
Analyzed and Results
4:26 PM
8/3/2020

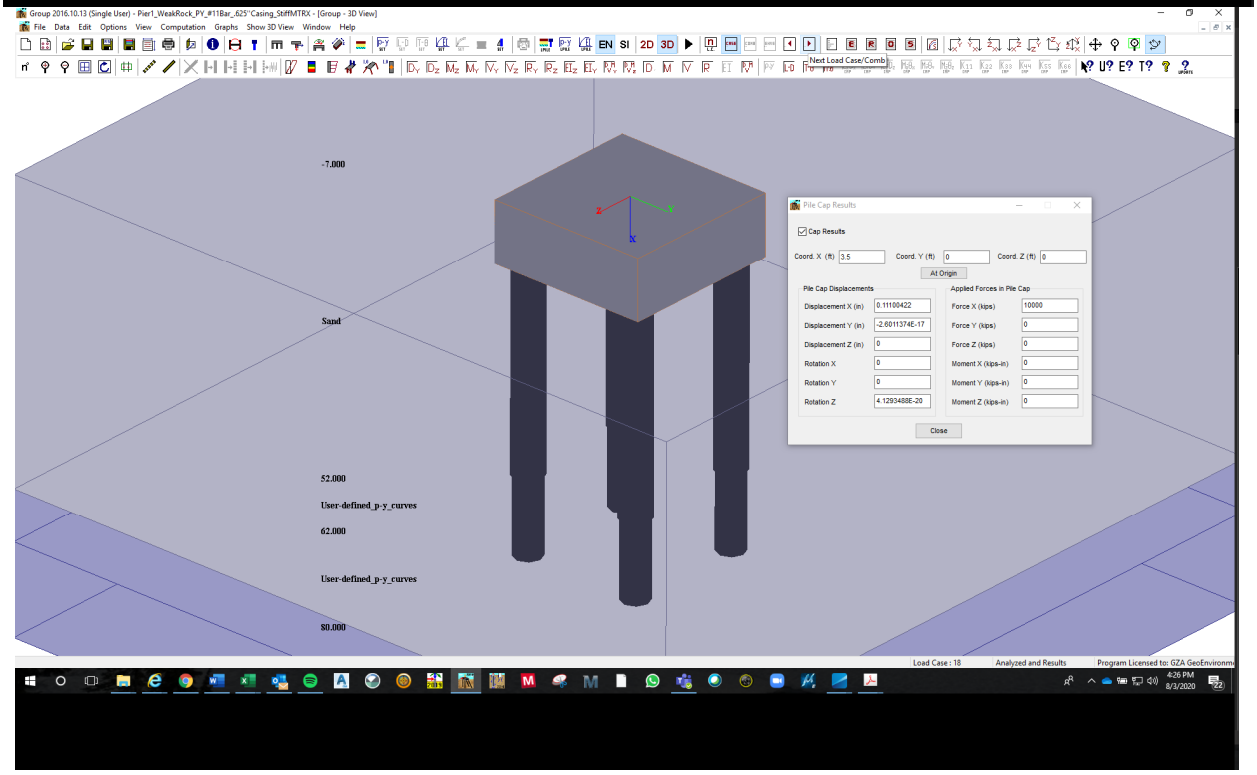

Group 2016.10.13 (Single User) - Pier1_WeakRock_PY_#11Bar_.625"Casing_StiffMTRX - [Group - 3D View]
-7.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.083052482
Displacement Y (in) -1.95151E-17
Displacement Z (in) 0
Rotation X 0
Rotation Y 0
Rotation Z 3.098153E-20
Applied Forces in Pile Cap
Force X (kips) 7500
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 13
Analyzed and Results

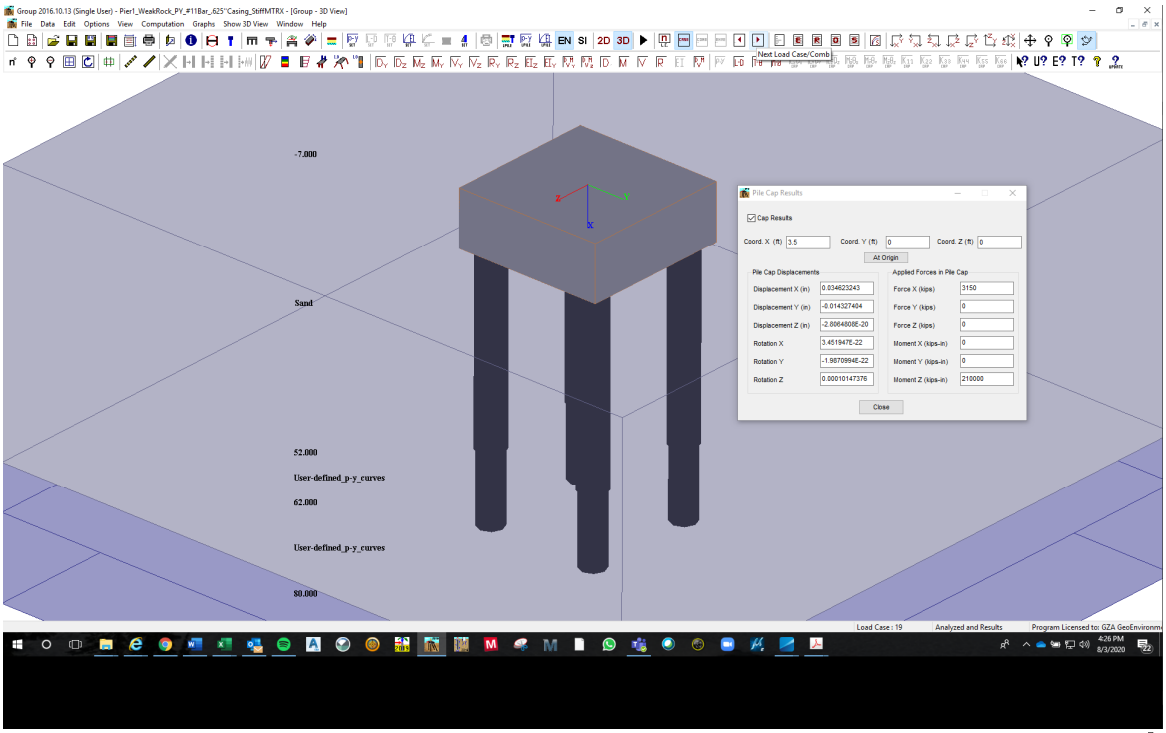

Group 2016.10.13 (Single User) - Pier1_WeakRock_PY_#11Bar_.625"Casing_StiffMTRX - [Group - 3D View]
-7.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.08864283
Displacement Y (in) -2.08138E-17
Displacement Z (in) 0
Rotation X 0
Rotation Y 0
Rotation Z 3.3043196E-20
Applied Forces in Pile Cap
Force X (kips) 8000
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 14
Analyzed and Results

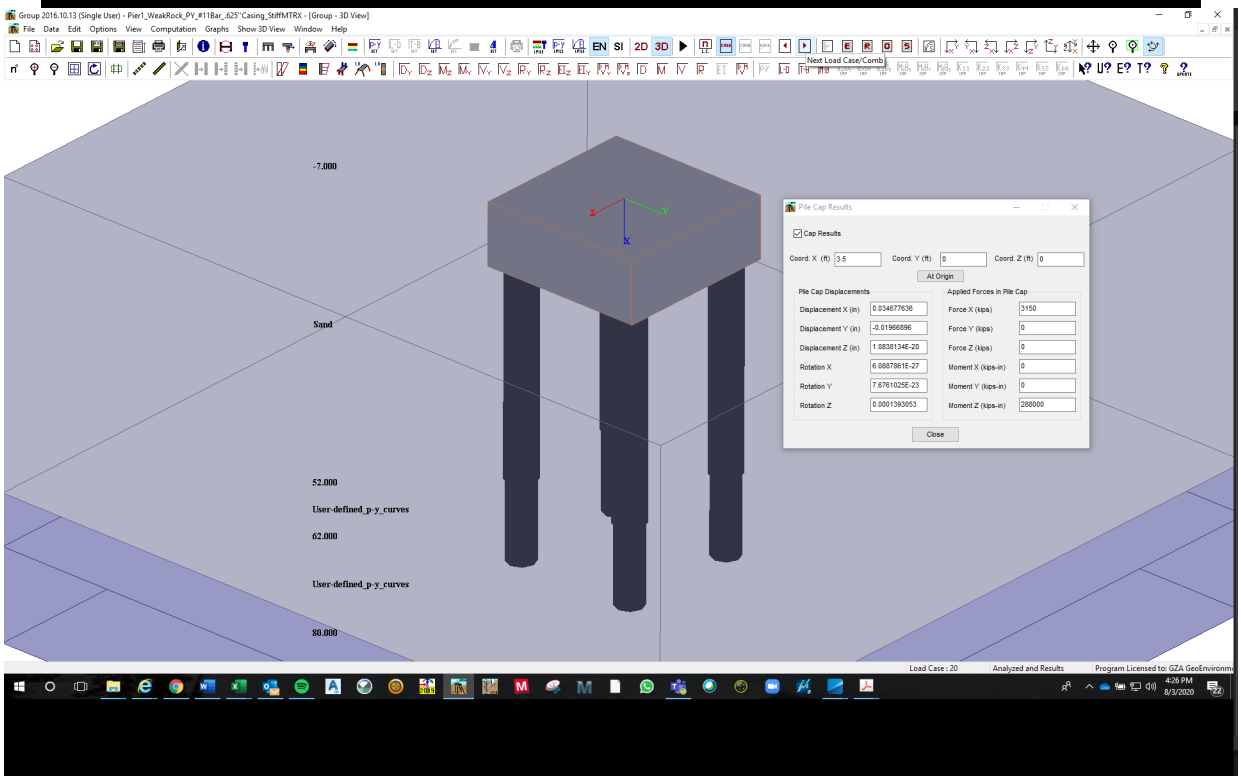

Group 2016.10.13 (Single User) - Pier1_WeakRock_PY_#11Bar_.625"Casing_StiffMTRX - [Group - 3D View]
File Data Edit Options View Computation Graphs Show 3D View Window Help
-7.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.094233178
Displacement Y (in) -2.2112869E-17
Displacement Z (in) 0
Rotation X -1.8782832E-37
Rotation Y 0
Rotation Z 3.510523E-20
Applied Forces in Pile Cap
Force X (kips) 8500
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 15
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
4:26 PM
8/3/2020

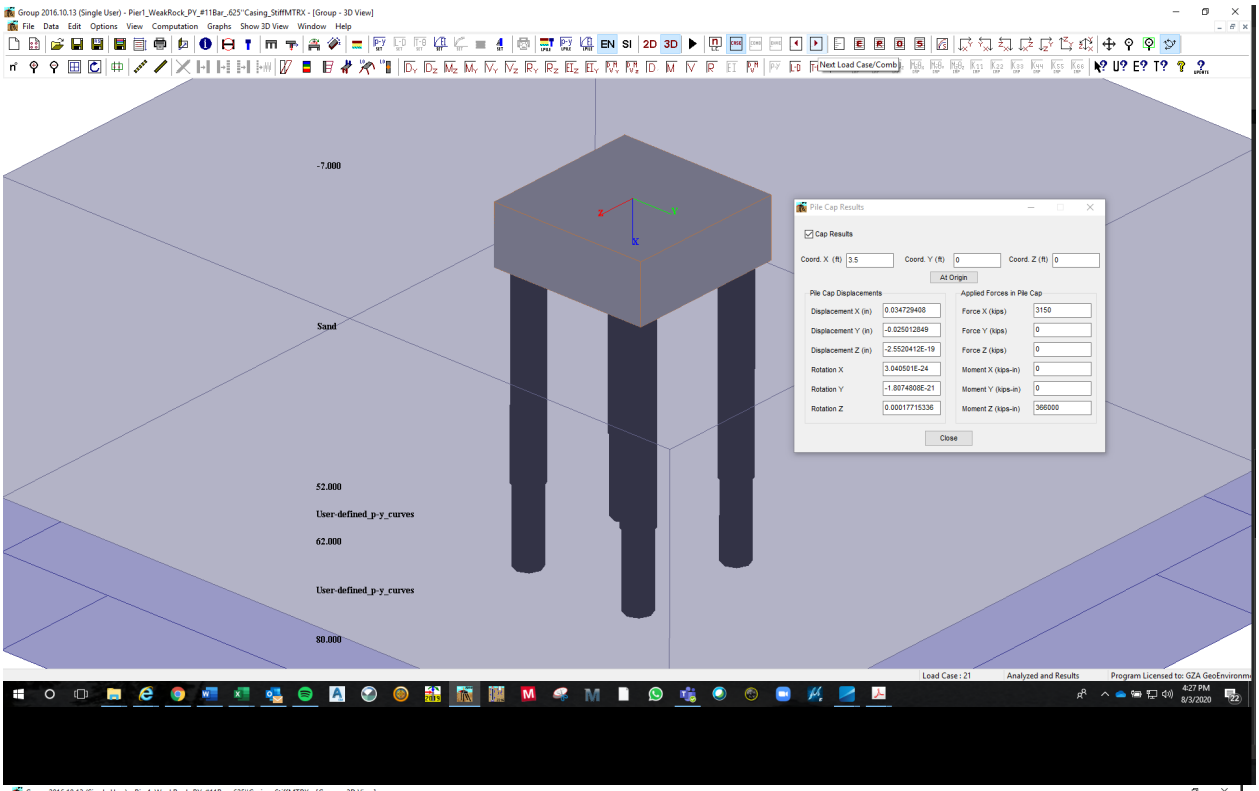

Group 2016.10.13 (Single User) - Pier1_WeakRock_PY_#11Bar_.625"Casing_StiffMTRX - [Group - 3D View]
File Data Edit Options View Computation Graphs Show 3D View Window Help
-7.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.099623526
Displacement Y (in) -2.3412124E-17
Displacement Z (in) 0
Rotation X 1.8843393E-37
Rotation Y 0
Rotation Z 3.7167623E-20
Applied Forces in Pile Cap
Force X (kips) 9000
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 16
Analyzed and Results
Program Licensed to: GZA GeoEnvironr
4:26 PM
8/3/2020

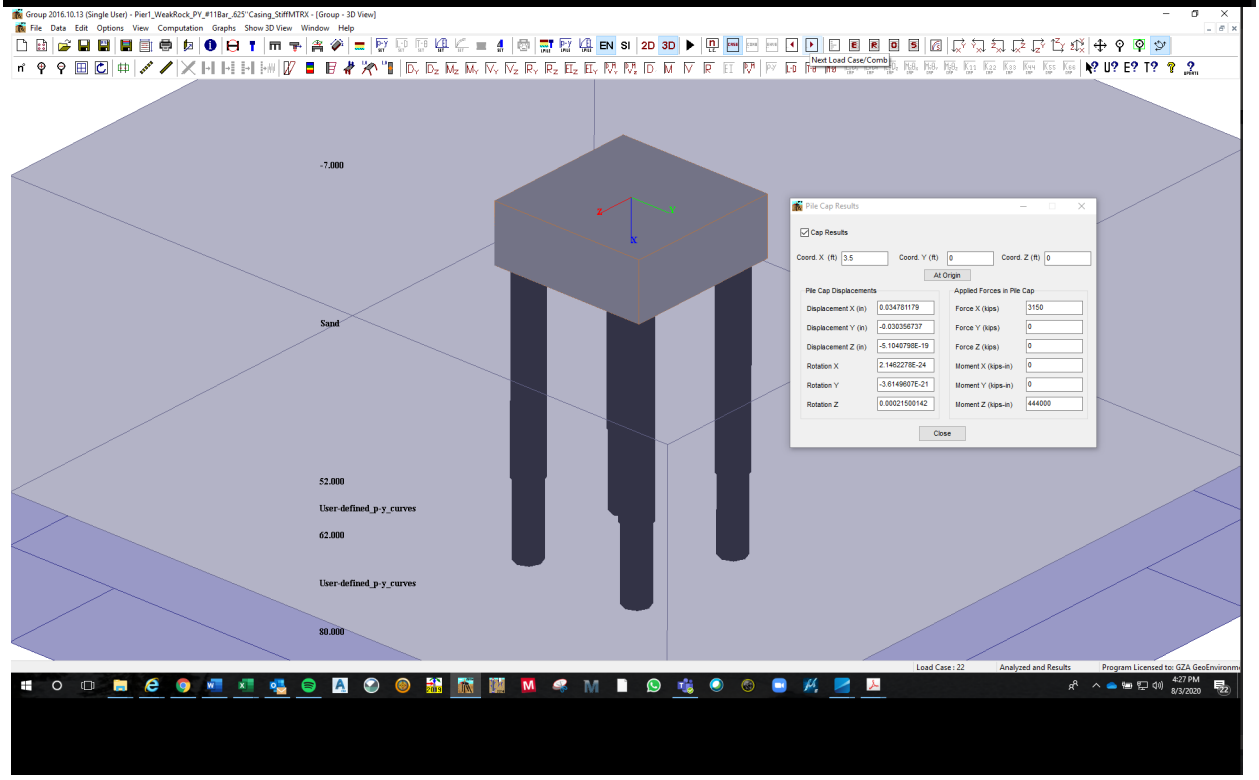

Group 2016.10.13 (Single User) - Pier1_WeakRock_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
-7.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.10541387
Displacement Y (in) -2.4711625E-17
Displacement Z (in) 0
Rotation X 0
Rotation Y 0
Rotation Z 3.9230368E-20
Applied Forces in Pile Cap
Force X (kips) 9500
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 17
Analyzed and Results

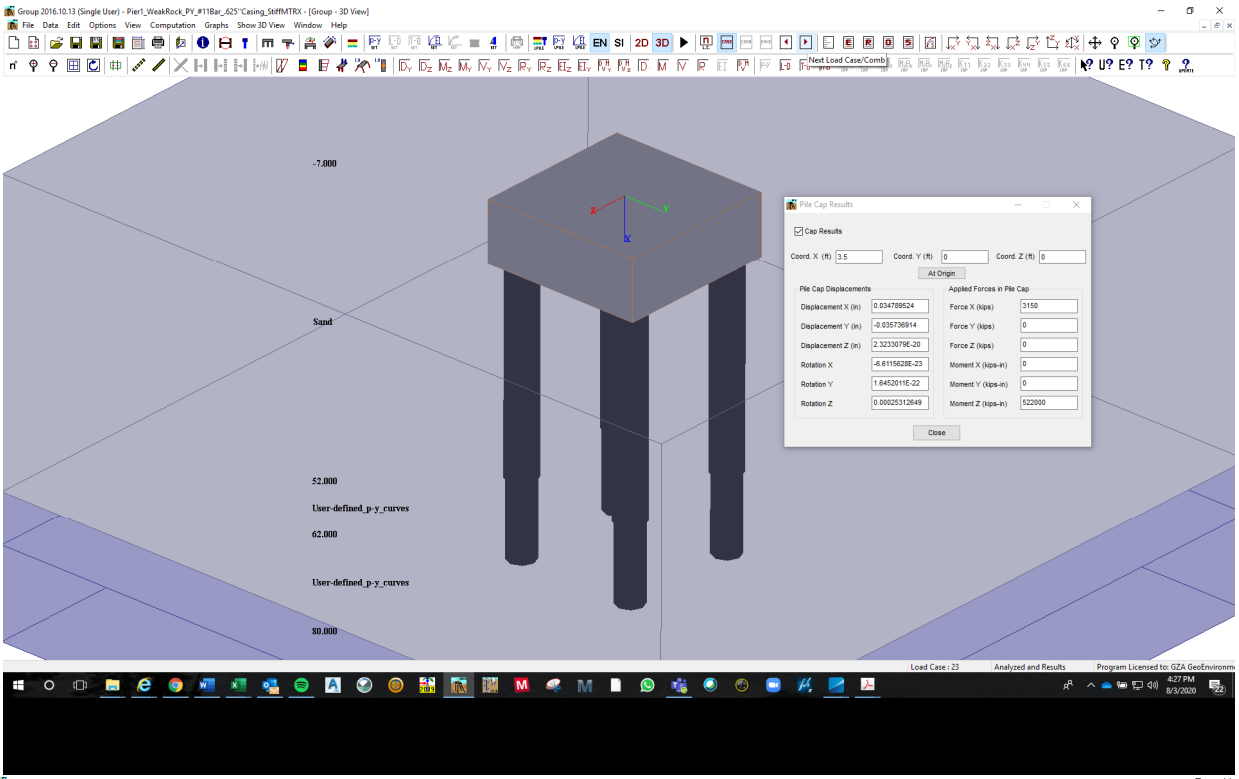

Group 2016.10.13 (Single User) - Pier1_WeakRock_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
-7.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.11100422
Displacement Y (in) -2.6011374E-17
Displacement Z (in) 0
Rotation X 0
Rotation Y 0
Rotation Z 4.1293488E-20
Applied Forces in Pile Cap
Force X (kips) 10000
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 18
Analyzed and Results

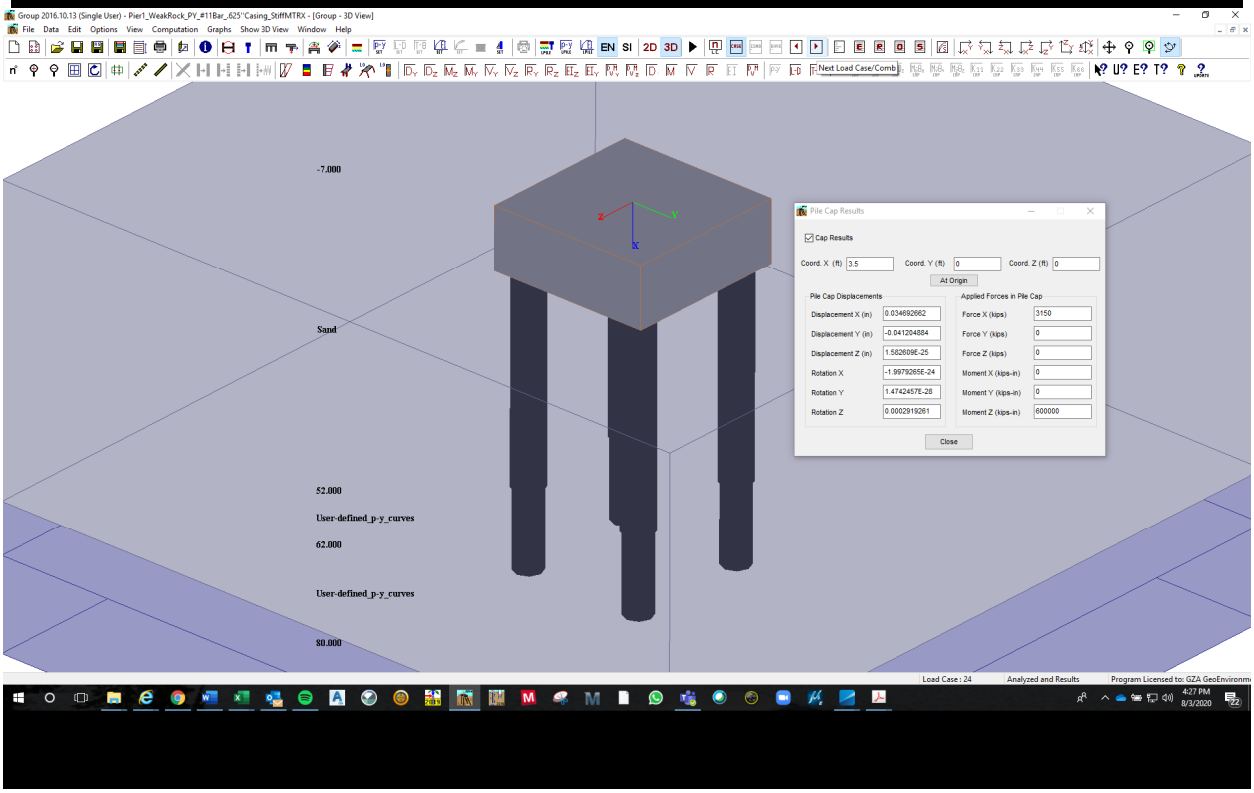

Group 2016.10.13 (Single User) - Pier1_WeakRock_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
-7.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034623243
Displacement Y (in) -0.014327404
Displacement Z (in) -2.8064808E-20
Rotation X 3.451947E-22
Rotation Y -1.9870994E-22
Rotation Z 0.00010147376
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 210000
Close
Load Case : 19
Analyzed and Results

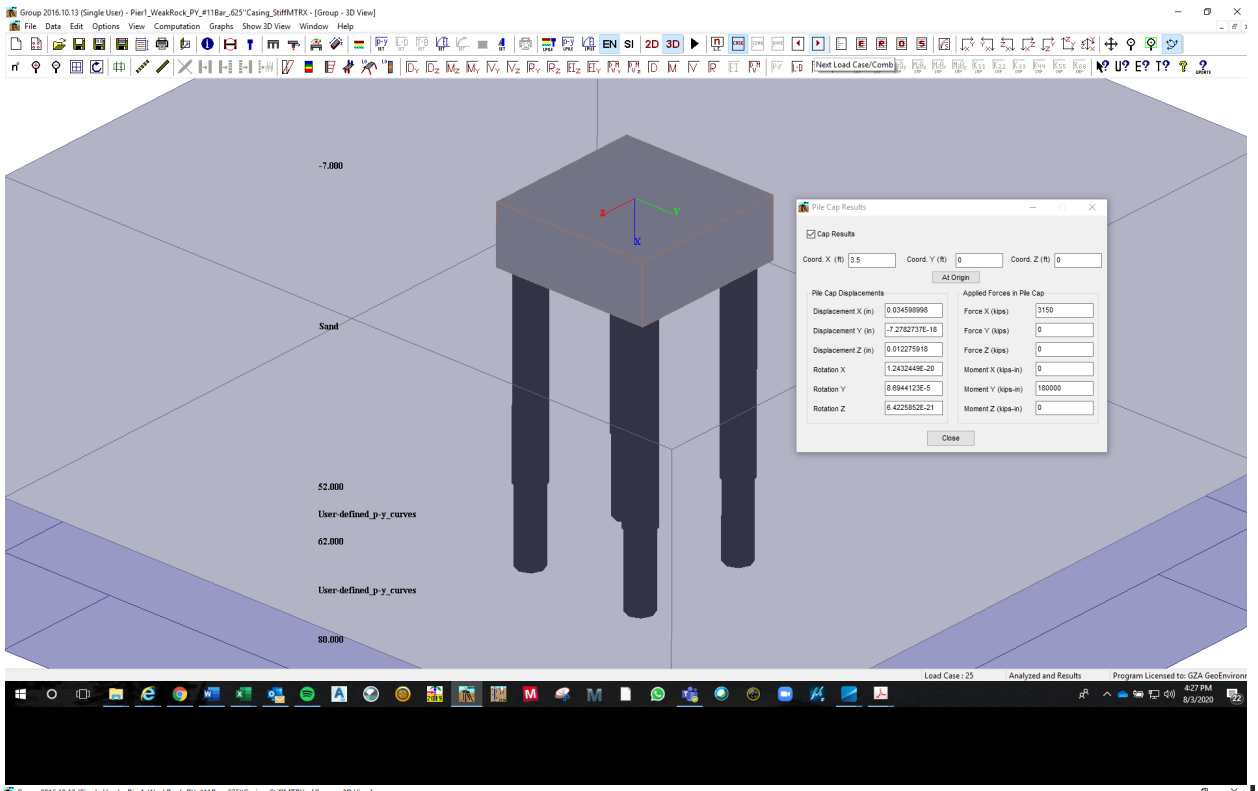

Group 2016.10.13 (Single User) - Pier1_WeakRock_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
-7.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034677636
Displacement Y (in) -0.01966896
Displacement Z (in) 1.0838134E-20
Rotation X 6.0887861E-27
Rotation Y 7.6761025E-23
Rotation Z 0.0001393053
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 288000
Close
Load Case : 20
Analyzed and Results

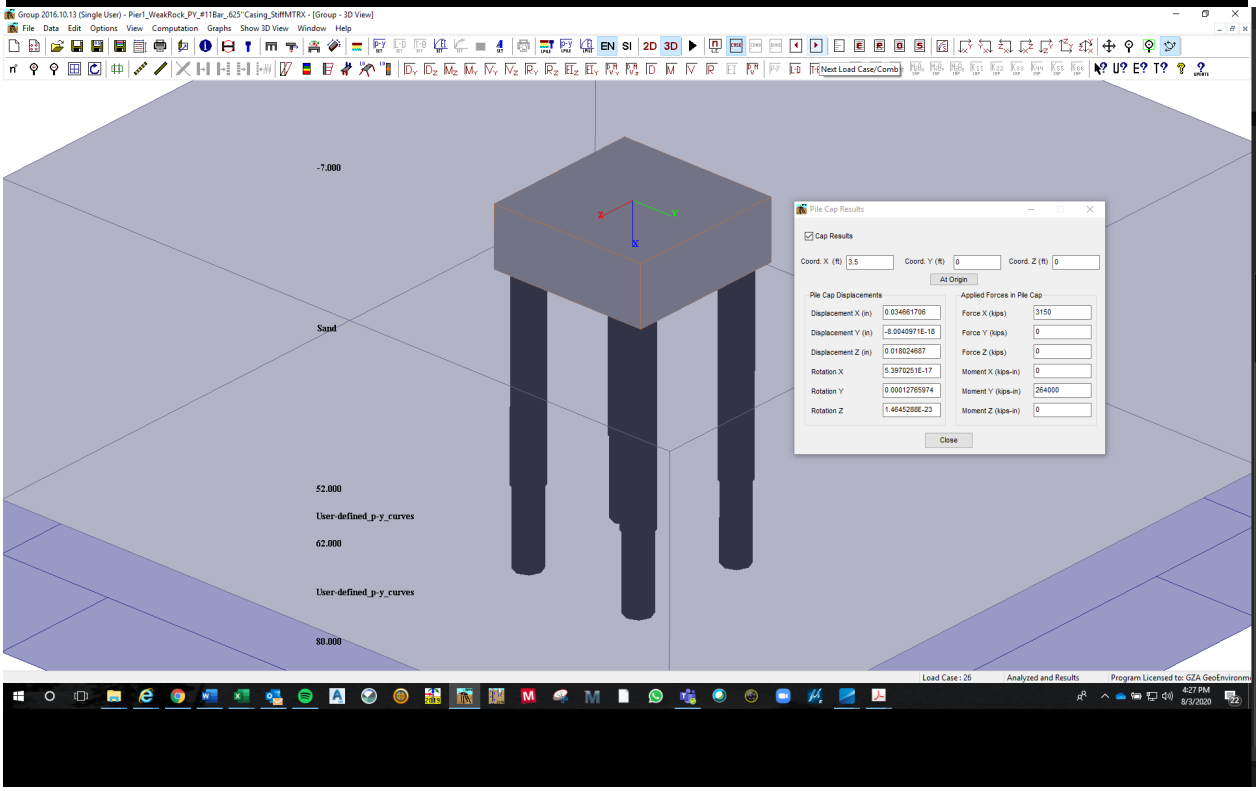

Group 2016.10.13 (Single User) - Pier1_WeakRock_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
-7.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034729408
Displacement Y (in) -0.025012849
Displacement Z (in) -2.5520412E-19
Rotation X 3.040501E-24
Rotation Y -1.8074808E-21
Rotation Z 0.00017715336
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 366000
Close
Load Case : 21
Analyzed and Results

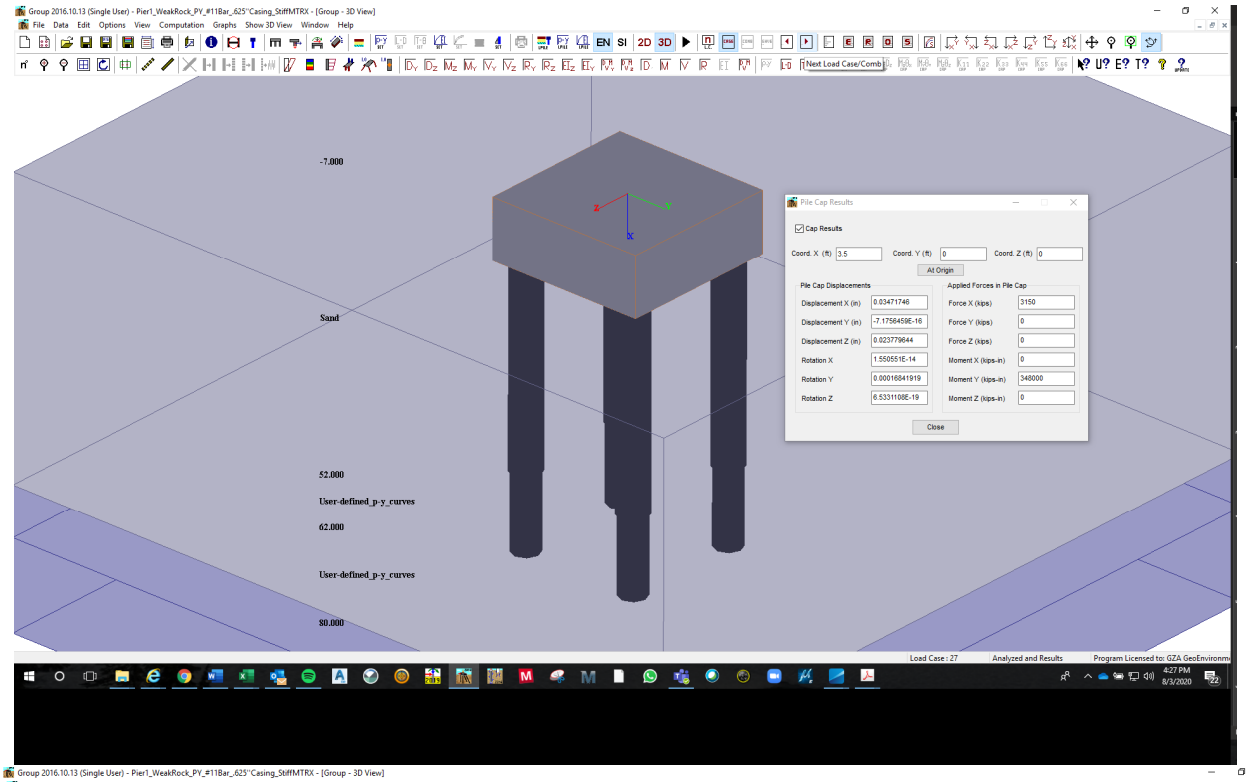

Group 2016.10.13 (Single User) - Pier1_WeakRock_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
-7.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034781179
Displacement Y (in) -0.030356737
Displacement Z (in) -5.1040798E-19
Rotation X 2.1462278E-24
Rotation Y -3.6149607E-21
Rotation Z 0.00021500142
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 444000
Close
Load Case : 22
Analyzed and Results

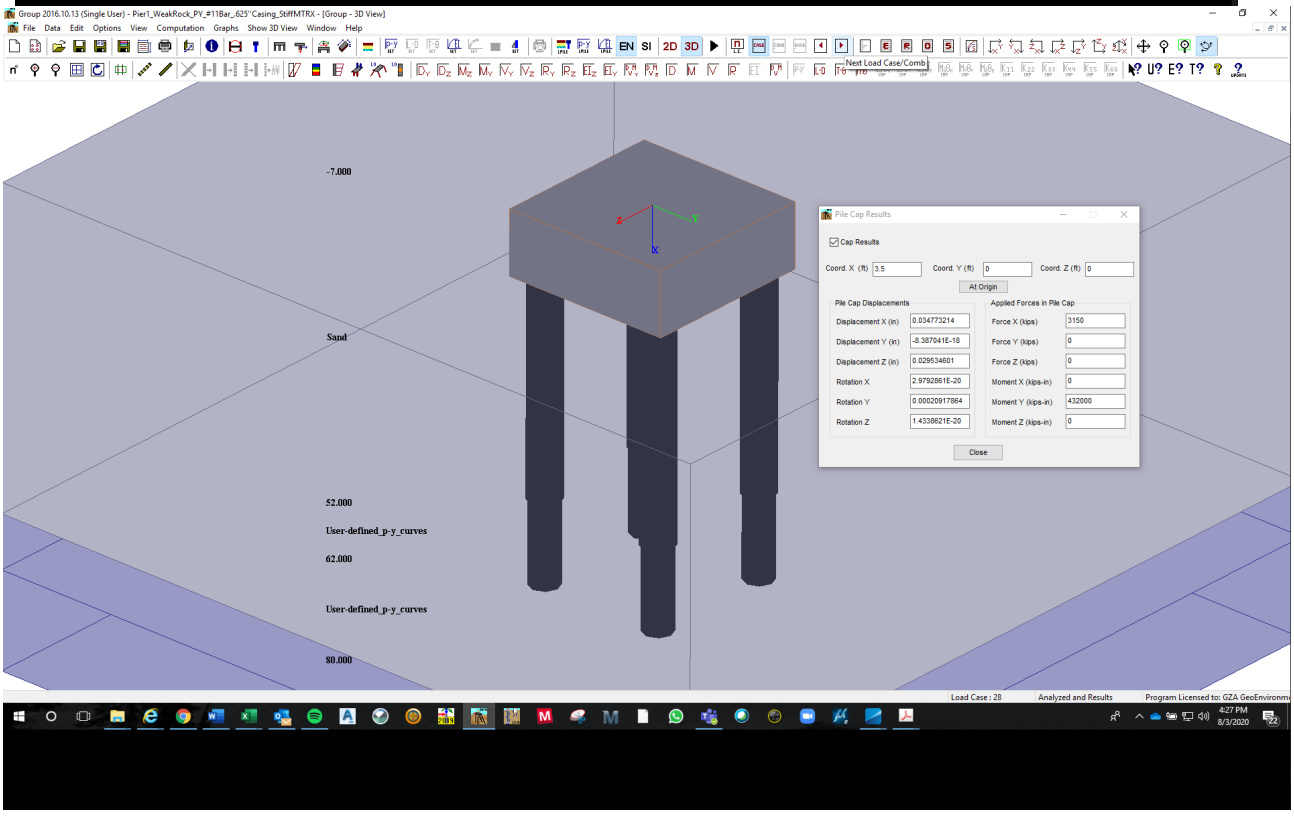

Group 2016.10.13 (Single User) - Pier1_WeakRock_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
-7.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034789524
Displacement Y (in) -0.035736914
Displacement Z (in) 2.3233079E-20
Rotation X -6.611562BE-23
Rotation Y 1.6452011E-22
Rotation Z 0.00025312649
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 522000
Close
Load Case : 23
Analyzed and Results
4:27 PM
8/3/2020

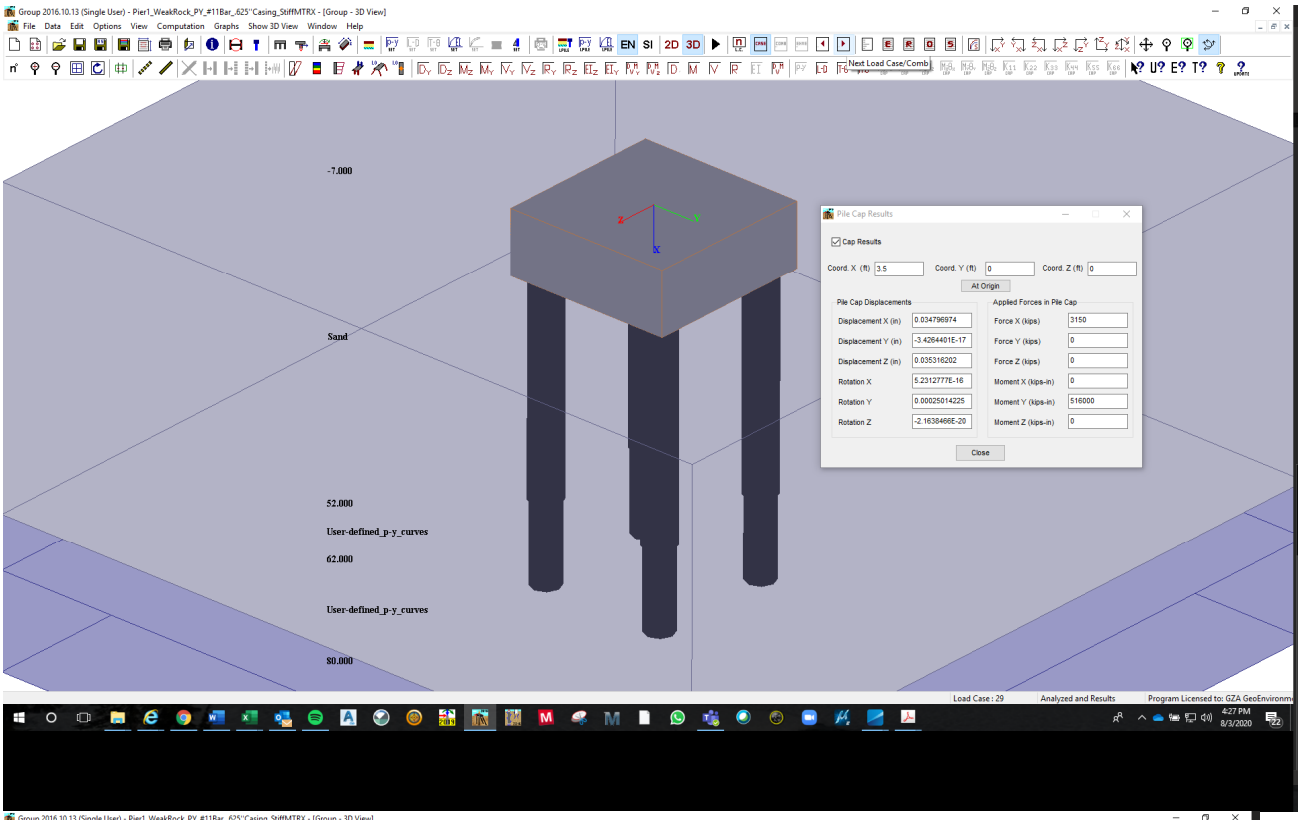

Group 2016.10.13 (Single User) - Pier1_WeakRock_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
-7.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034692662
Displacement Y (in) -0.041204884
Displacement Z (in) 1.582609E-25
Rotation X -1.9979265E-24
Rotation Y 1.4742457E-28
Rotation Z 0.0002919261
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 600000
Close
Load Case : 24
Analyzed and Results
4:27 PM
8/3/2020

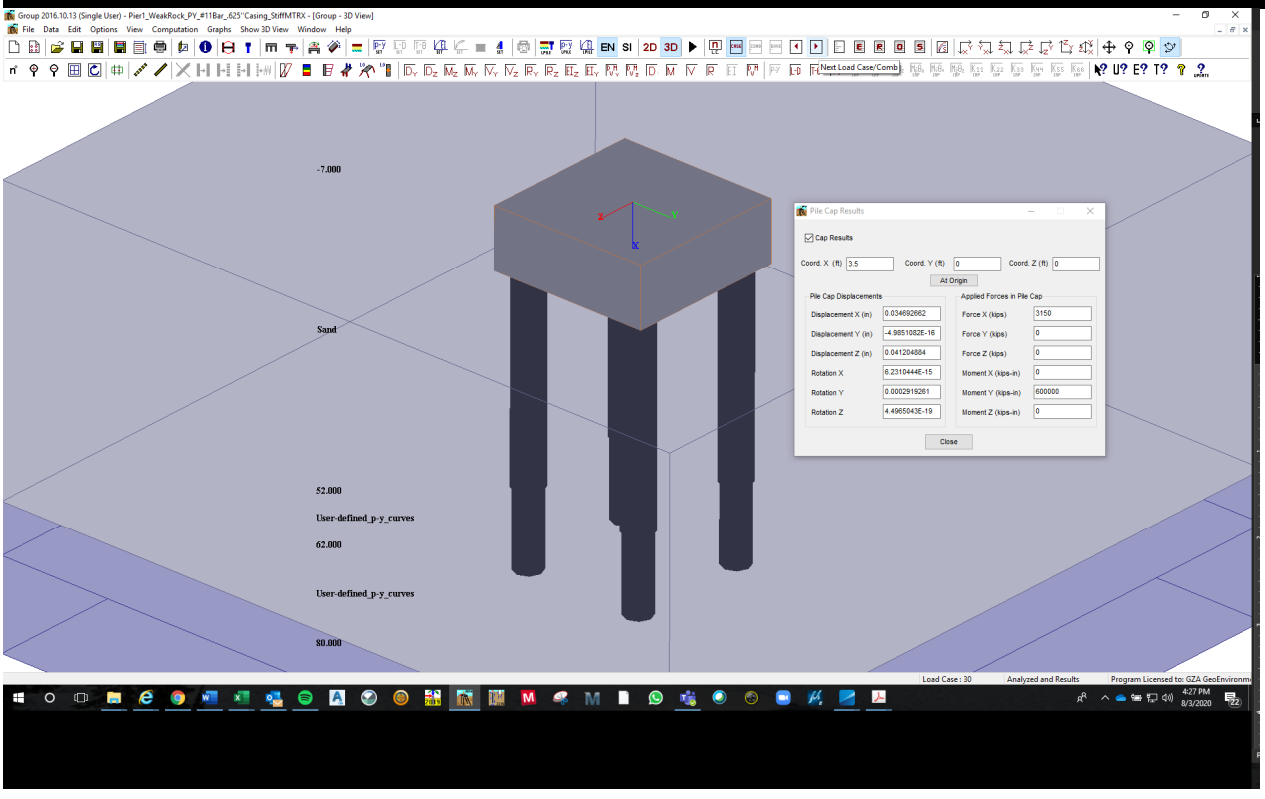

Group 2016.10.13 (Single User) - Pier1_WeakRock_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
-7.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034596998
Displacement Y (in) -7.2782737E-18
Displacement Z (in) 0.012275918
Rotation X 1.2432449E-20
Rotation Y 8.6944123E-5
Rotation Z 6.4225852E-21
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 180000
Moment Z (kips-in) 0
Close
Load Case : 25
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
4:27 PM
8/3/2020

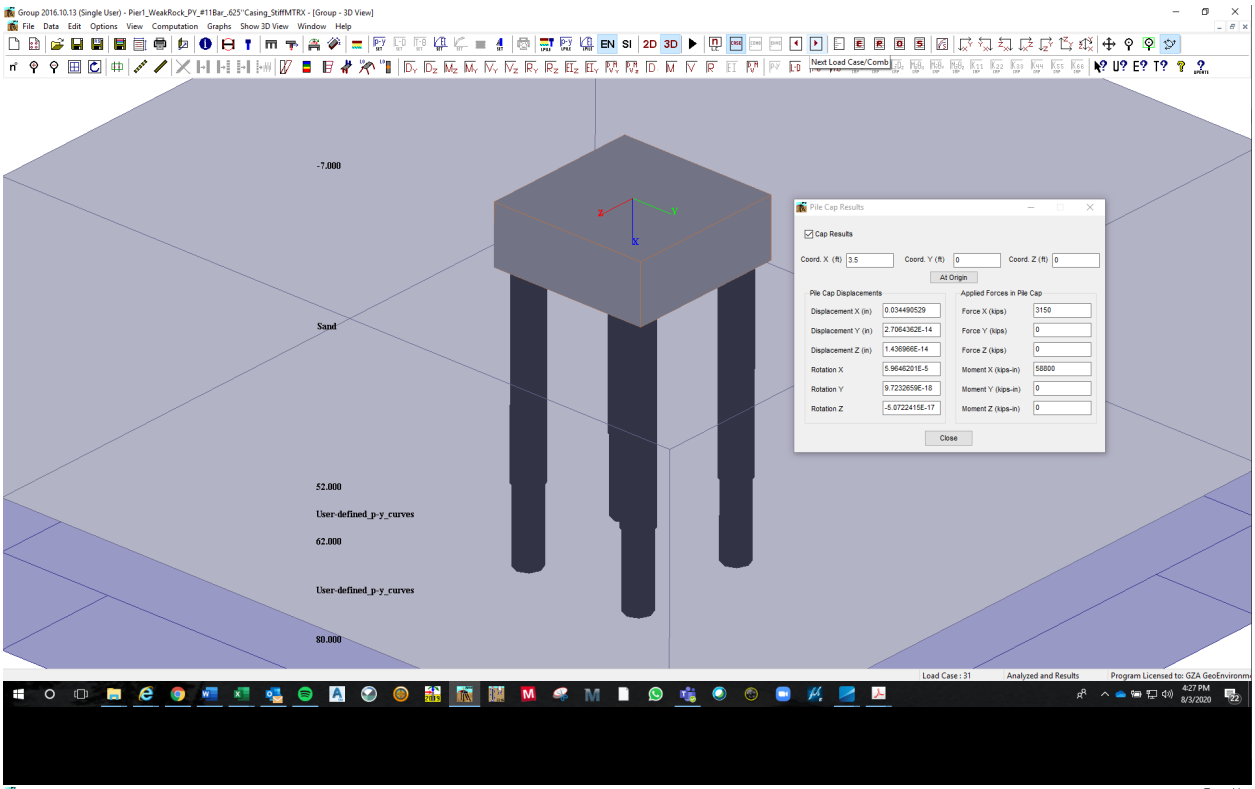

Group 2016.10.13 (Single User) - Pier1_WeakRock_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
-7.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034661706
Displacement Y (in) -8.0040971E-18
Displacement Z (in) 0.018024687
Rotation X 5.3970251E-17
Rotation Y 0.00012765974
Rotation Z 1.4645288E-23
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 264000
Moment Z (kips-in) 0
Close
Load Case : 26
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
4:27 PM
8/3/2020

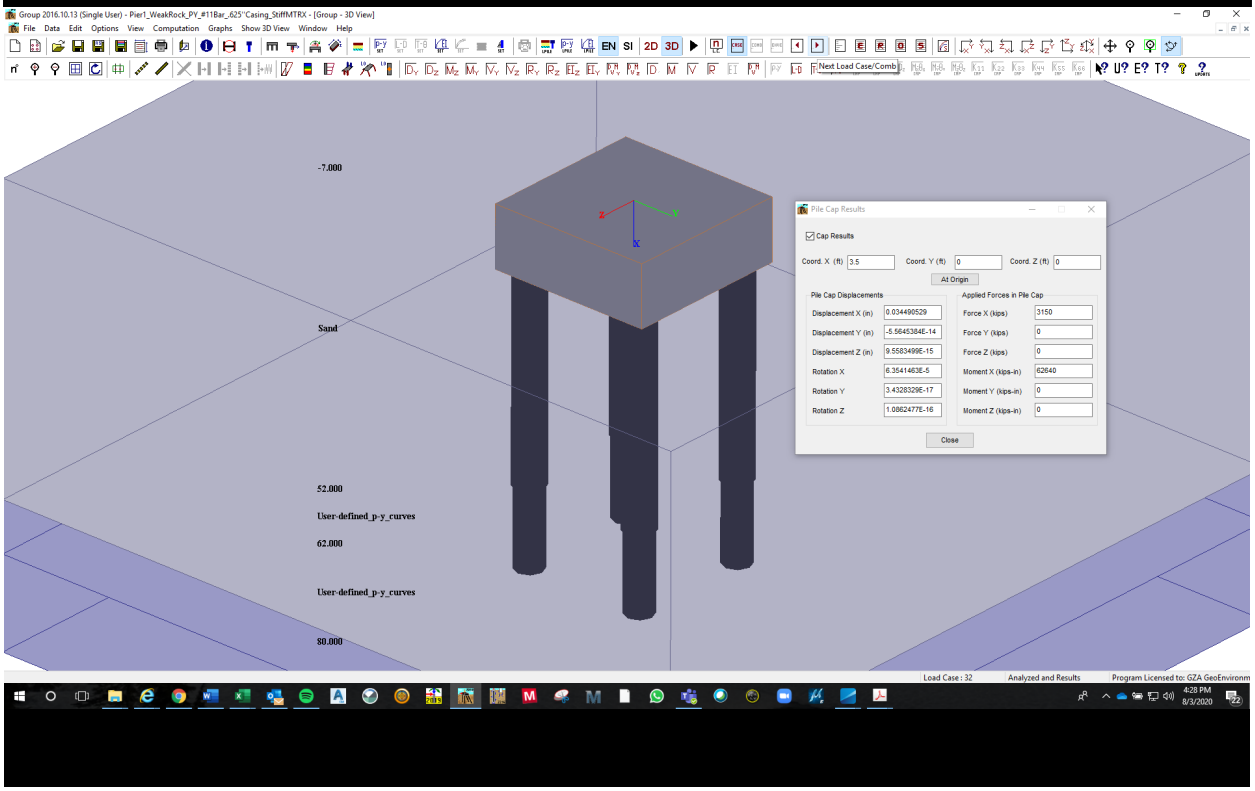

Group 2016.10.13 (Single User) - Pier1_WeakRock_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
-7.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.03471746
Displacement Y (in) -7.1756459E-16
Displacement Z (in) 0.023779644
Rotation X 1.550551E-14
Rotation Y 0.00016841919
Rotation Z 6.5331105E-19
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 348000
Moment Z (kips-in) 0
Close
Load Case : 27
Analyzed and Results
Program Licensed to: GZA GeoEnvironmi
4:27 PM
8/3/2020

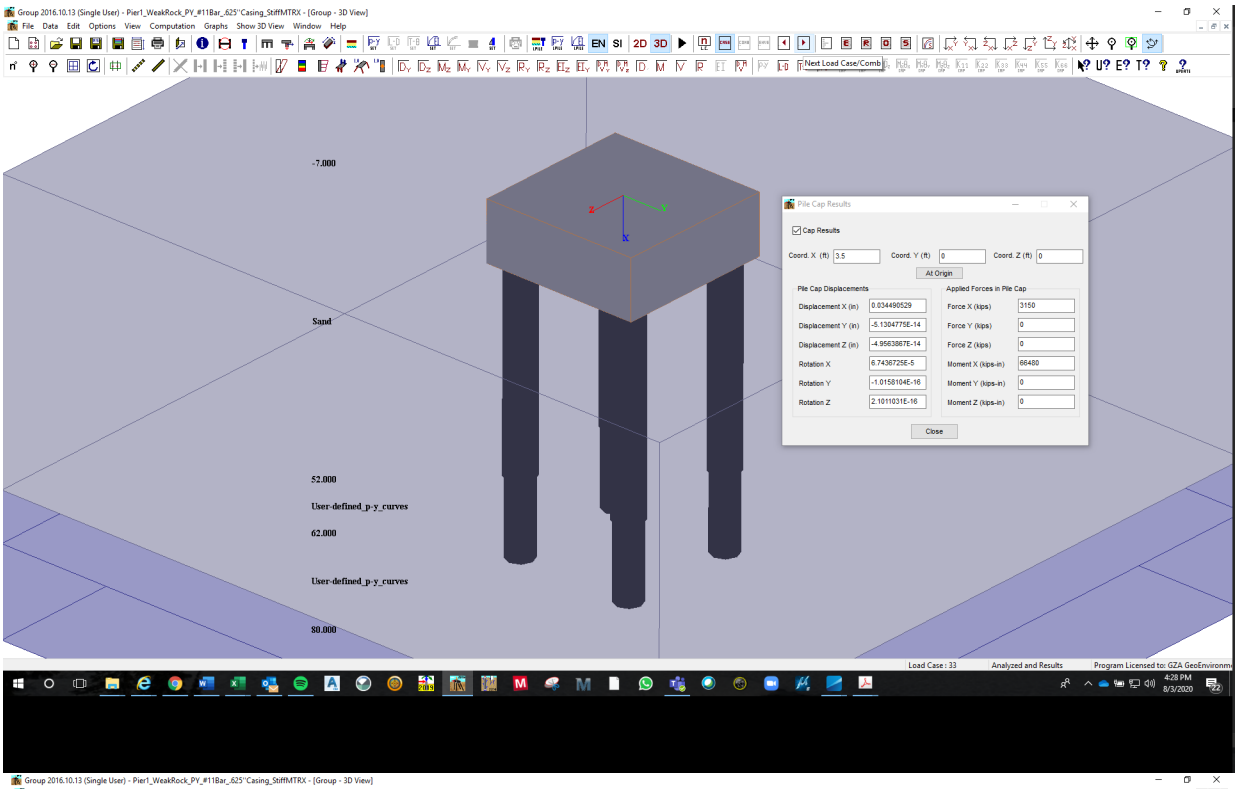

Group 2016.10.13 (Single User) - Pier1_WeakRock_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
-7.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034773214
Displacement Y (in) -8.387041E-18
Displacement Z (in) 0.029534601
Rotation X 2.9792861E-20
Rotation Y 0.00020917864
Rotation Z 1.4338621E-20
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 432000
Moment Z (kips-in) 0
Close
Load Case : 28
Analyzed and Results
Program Licensed to: GZA GeoEnvironmi
4:27 PM
8/3/2020

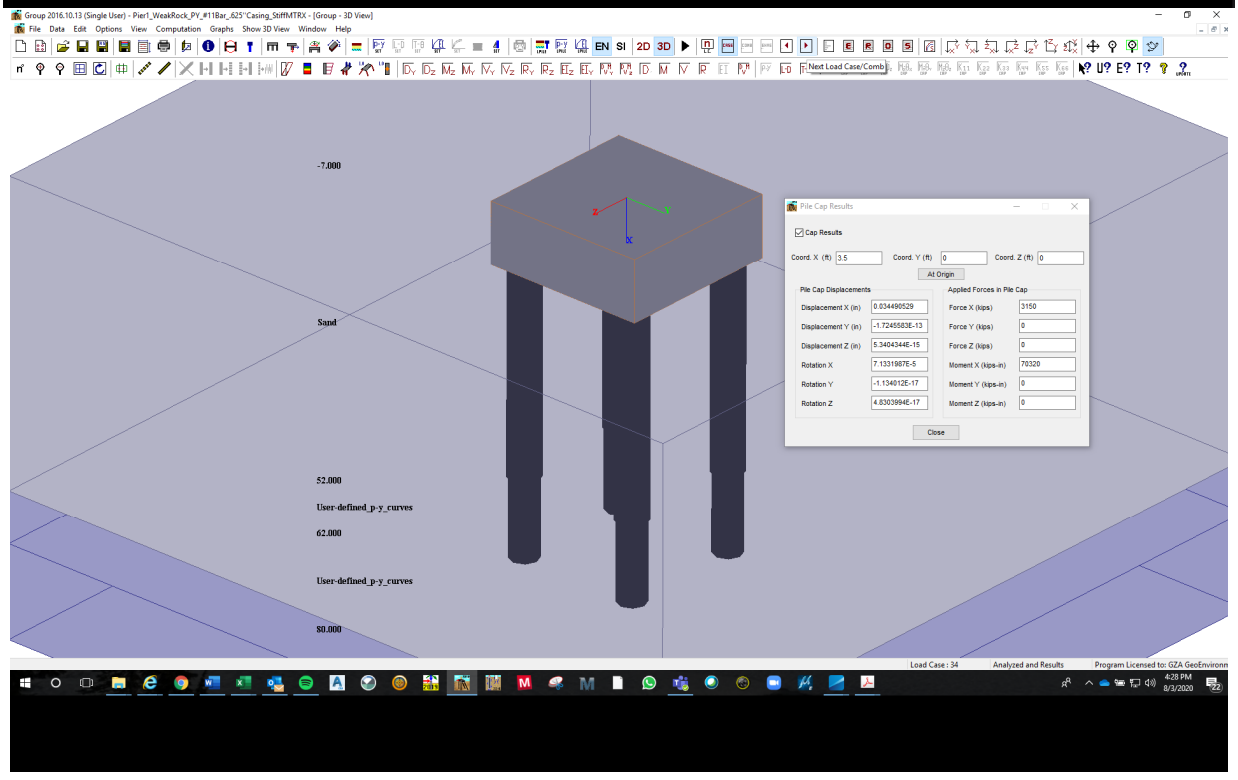

Group 2016.10.13 (Single User) - Pier1_WeakRock_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
-7.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034796974
Displacement Y (in) -3.4264401E-17
Displacement Z (in) 0.035316202
Rotation X 5.2312777E-16
Rotation Y 0.00025014225
Rotation Z -2.1638466E-20
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 516000
Moment Z (kips-in) 0
Close
Load Case : 29
Analyzed and Results

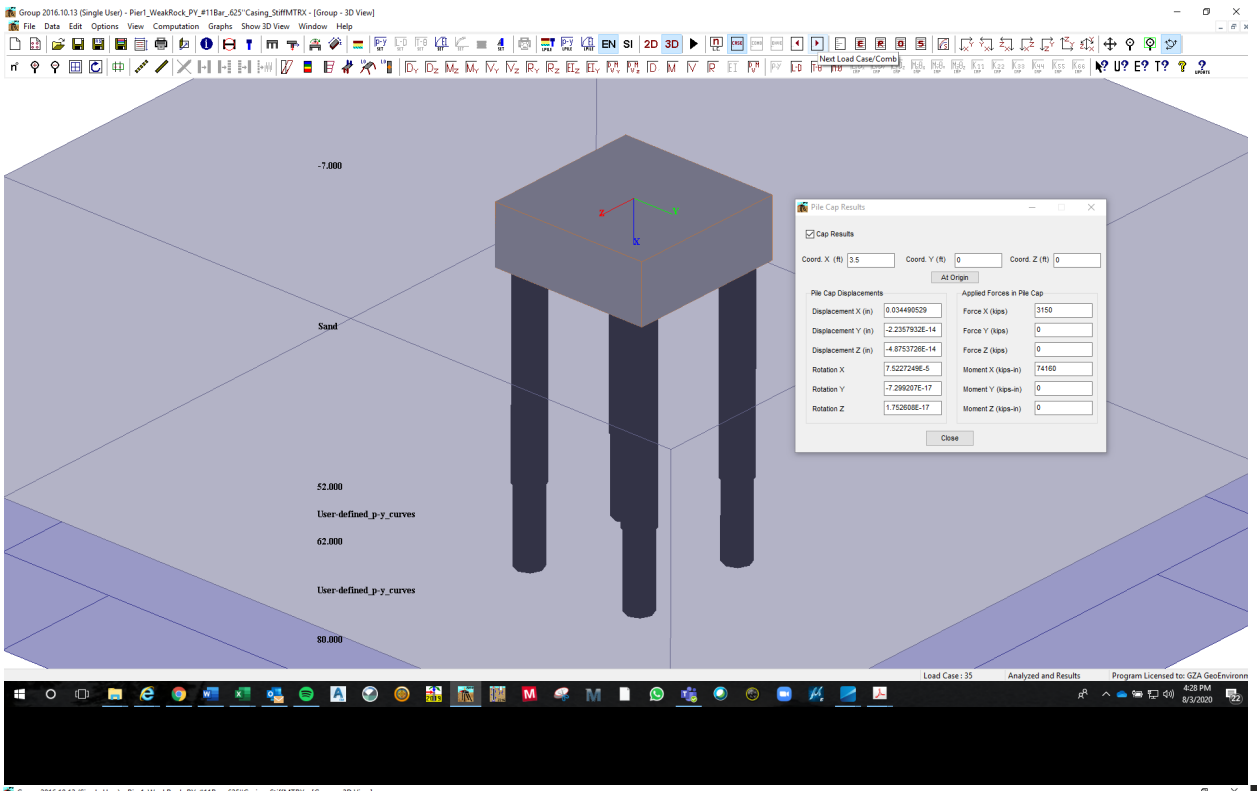

Group 2016.10.13 (Single User) - Pier1_WeakRock_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
-7.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034692662
Displacement Y (in) -4.9851082E-16
Displacement Z (in) 0.041204884
Rotation X 6.2310444E-15
Rotation Y 0.0002919261
Rotation Z 4.4965043E-19
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 600000
Moment Z (kips-in) 0
Close
Load Case : 30
Analyzed and Results

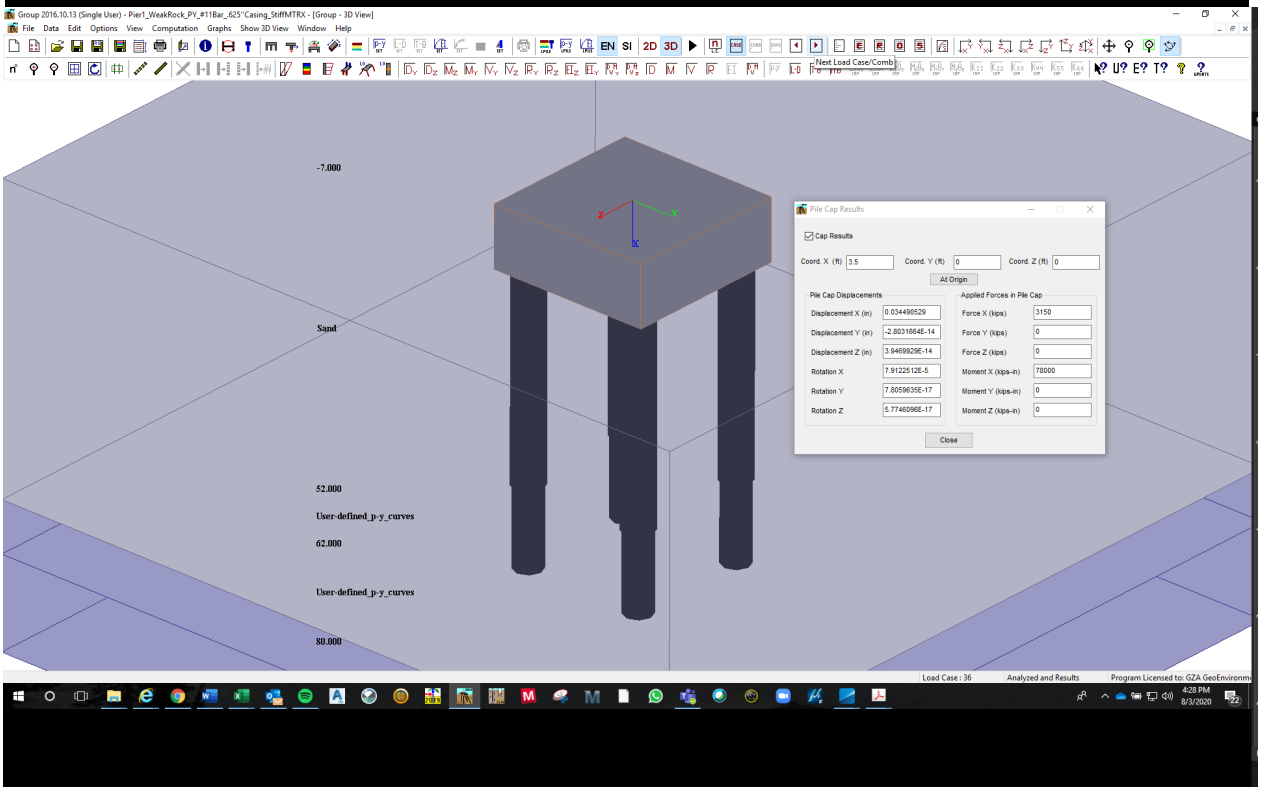

Group 2016.10.13 (Single User) - Pier1_WeakRock_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
-7.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034490529
Displacement Y (in) 2.7064362E-14
Displacement Z (in) 1.436966E-14
Rotation X 5.9646201E-5
Rotation Y 9.7232659E-18
Rotation Z -5.0722415E-17
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 58800
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 31
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
4:27 PM
8/3/2020


Group 2016.10.13 (Single User) - Pier1_WeakRock_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
-7.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034490529
Displacement Y (in) -5.5645384E-14
Displacement Z (in) 9.5503499E-15
Rotation X 6.3541463E-5
Rotation Y 3.4328329E-17
Rotation Z 1.0862477E-16
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 62640
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 32
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
4:28 PM
8/3/2020


-7.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034490529
Displacement Y (in) -5.1304775E-14
Displacement Z (in) -4.9563867E-14
Rotation X 6.7436725E-5
Rotation Y -1.0158104E-16
Rotation Z 2.1011031E-16
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 66480
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close


-7.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034490529
Displacement Y (in) -1.7245583E-13
Displacement Z (in) 5.3404344E-15
Rotation X 7.1331987E-5
Rotation Y -1.134012E-17
Rotation Z 4.8303994E-17
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 70320
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close


Group 2016.10.13 (Single User) - Pier1_WeakRock_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
File Data Edit Options View Computation Graphs Show 3D View Window Help
Next Load Case/Comb
-7.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034490529
Displacement Y (in) -2.2357932E-14
Displacement Z (in) -4.8753726E-14
Rotation X 7.5227249E-5
Rotation Y -7.299207E-17
Rotation Z 1.752608E-17
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 74160
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 35
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
4:28 PM
8/3/2020


Group 2016.10.13 (Single User) - Pier1_WeakRock_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
File Data Edit Options View Computation Graphs Show 3D View Window Help
Next Load Case/Comb
-7.000
Sand
52.000
User-defined_p-y_curves
62.000
User-defined_p-y_curves
80.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.034490529
Displacement Y (in) -2.8031664E-14
Displacement Z (in) 3.9469929E-14
Rotation X 7.9122512E-5
Rotation Y 7.8059635E-17
Rotation Z 5.7746096E-17
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 78000
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 36
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
4:28 PM
8/3/2020

	Created: NVW	Date: 2020-07-30	Backchk'd:	Date:
	Checked: AH	Date: 2020-07-31	Updated:	Date:
Project: Madawaska Int'l Bridge	GZA job#: 09.0025984.03		Reviewed:	Date:

Madawaska Bridge Pier 3 Foundation Stiffness

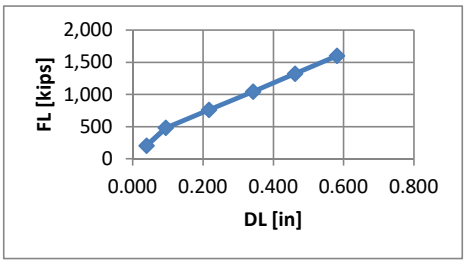
Description: Input parameters in blue cells provided by GZA based on Group analyses using NCHRP rock model.
Red text indicates calculations prepared by HNTB. Plots prepared by HNTB

Pier 3 Casing Thickness Before 1/8" Corrosion (in): 0.75 Conditions: Fully Scoured

Axial load for analysis Pa = 3150 kips For F_L, F_T, M_L, M_T & M_V

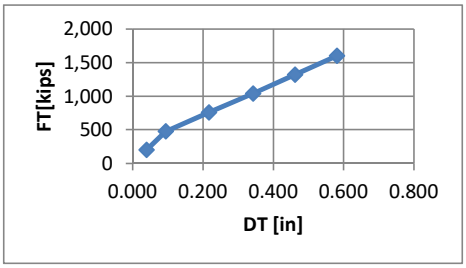
Longitudinal Force (X) (Z direction in Group)

F_L [kips]	δ_L [in]	$\Delta\delta_L$ [in]	θ_T [10^{-6} rad]	$\Delta\theta_T$ [10^{-6} rad]	$f_{FL,\delta L}$ [in/10^3 kips]	$f_{FL,\theta T}$ [10^{-6}rad/10^3 kips]
200	0.039	0.000	22.1	0		
480	0.094	0.055	53	31	0.198	111
760	0.216	0.178	91	69	0.317	123
1,040	0.342	0.303	125	103	0.361	123
1,320	0.462	0.423	159	137	0.377	122
1,600	0.581	0.542	193	171	0.387	122



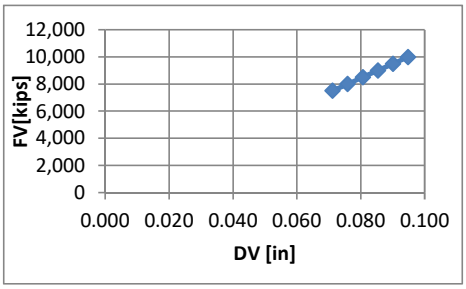
Transverse Force (Y)

F_T [kips]	δ_T [in]	$\Delta\delta_T$ [in]	θ_L [10^{-6} rad]	$\Delta\theta_L$ [10^{-6} rad]	$f_{FT,\delta T}$ [in/10^3 kips]	$f_{FT,\theta L}$ [10^{-6}rad/10^3 kips]
200	0.039	0.000	-22	0		
480	0.094	0.055	-53	-31	0.198	-110
760	0.216	0.178	-91	-69	0.317	-123
1,040	0.342	0.303	-125	-103	0.361	-122
1,320	0.462	0.423	-159	-137	0.377	-122
1,600	0.581	0.542	-193	-171	0.387	-122



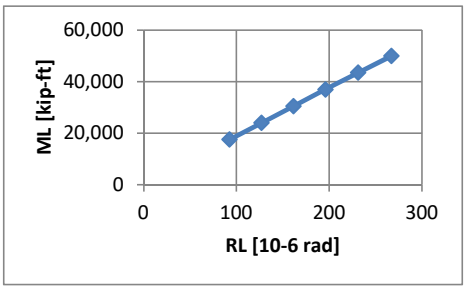
Vertical Force (z) (X Direction in Group)

F_V [kips]	δ_V [in]	$\Delta\delta_V$ [in]	$f_{FV,\delta V}$ [in/10^6 kips]
7,500	0.071	0.000	
8,000	0.076	0.005	9.482
8,500	0.081	0.009	9.482
9,000	0.085	0.014	9.482
9,500	0.090	0.019	9.482
10,000	0.095	0.024	9.482



Moment About Long Axis (X) (Z axis in Group)

M_L [kip-ft]	δ_T [in]	$\Delta\delta_T$ [in]	θ_L [10^{-6} rad]	$\Delta\theta_L$ [10^{-6} rad]	$f_{ML,\delta T}$ in/10^6 kip-ft	$f_{ML,\theta L}$ [10^{-6} rad/10^6 kip-ft]
17,500	-0.023	0.000	93	0		
24,000	-0.032	-0.009	127	34	-1.336	5,291
30,500	-0.041	-0.017	161	69	-1.338	5,293
37,000	-0.049	-0.026	196	103	-1.339	5,293
43,500	-0.058	-0.035	231	139	-1.349	5,330
50,000	-0.068	-0.044	267	174	-1.359	5,367



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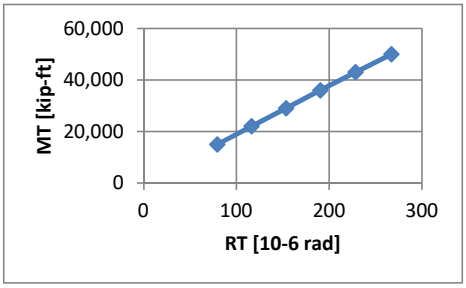
	Checked: AH	Date: 2020-07-31	Updated:	Date:
Project: Madawaska Int'l Bridge	GZA job#: 09.0025984.03		Reviewed:	Date:

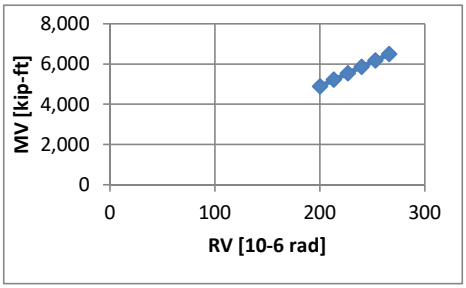
Moment About Trans Axis (Y)

M_T	δ_L	$\Delta\delta_T$	θ_T	$\Delta\theta_T$	$f_{MT,\delta L}$	$f_{MT,\theta T}$
[kip-ft]	[in]	[in]	[10^{-6} rad]	[10^{-6} rad]	in/10^6 kip-ft	[10^{-6} rad/10^6 kip-ft]
15,000	0.020	0.000	79	0		
22,000	0.029	0.009	116	37	1.335	5,289
29,000	0.039	0.019	153	74	1.337	5,292
36,000	0.048	0.028	190	111	1.339	5,293
43,000	0.058	0.038	228	149	1.347	5,323
50,000	0.068	0.048	267	188	1.357	5,362



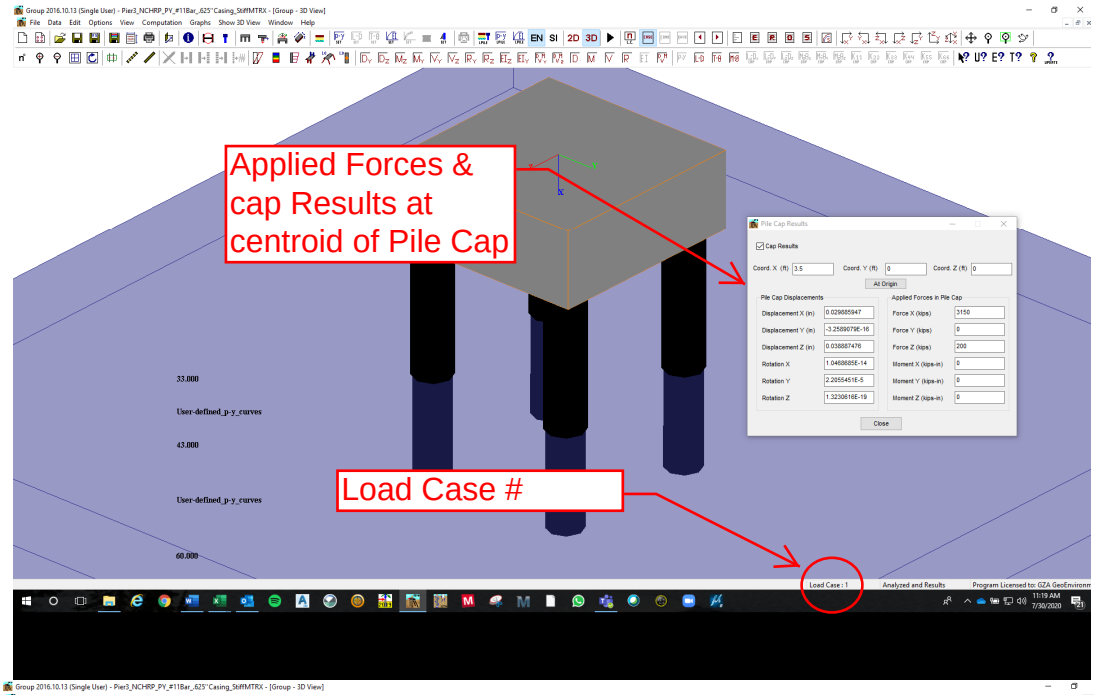
Moment About Vertical Axis (z) (X axis in Group)

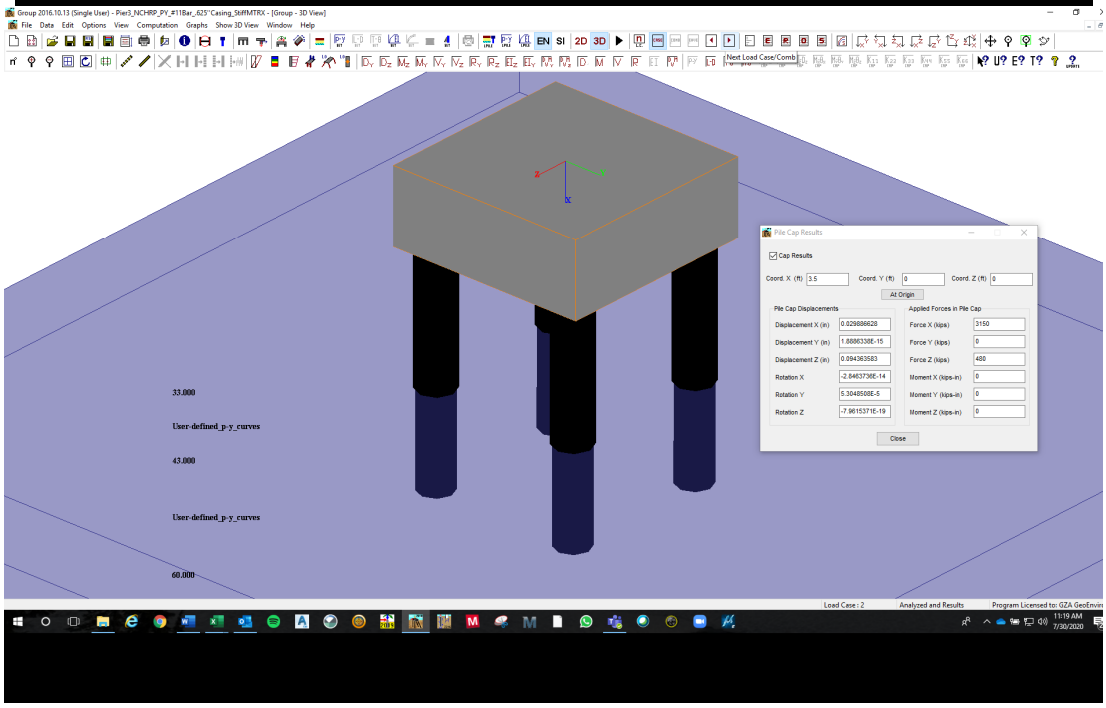
M_V	θ_V	$\Delta\theta_V$	$f_{MV,\theta V}$
[kip-ft]	[10^{-6} rad]	[10^{-6} rad]	[10^{-6} rad/10^6 kip-ft]
4,900	200	0	
5,220	213	13	41,103
5,540	227	26	41,102
5,860	240	39	41,114
6,180	253	53	41,121
6,500	266	66	41,129

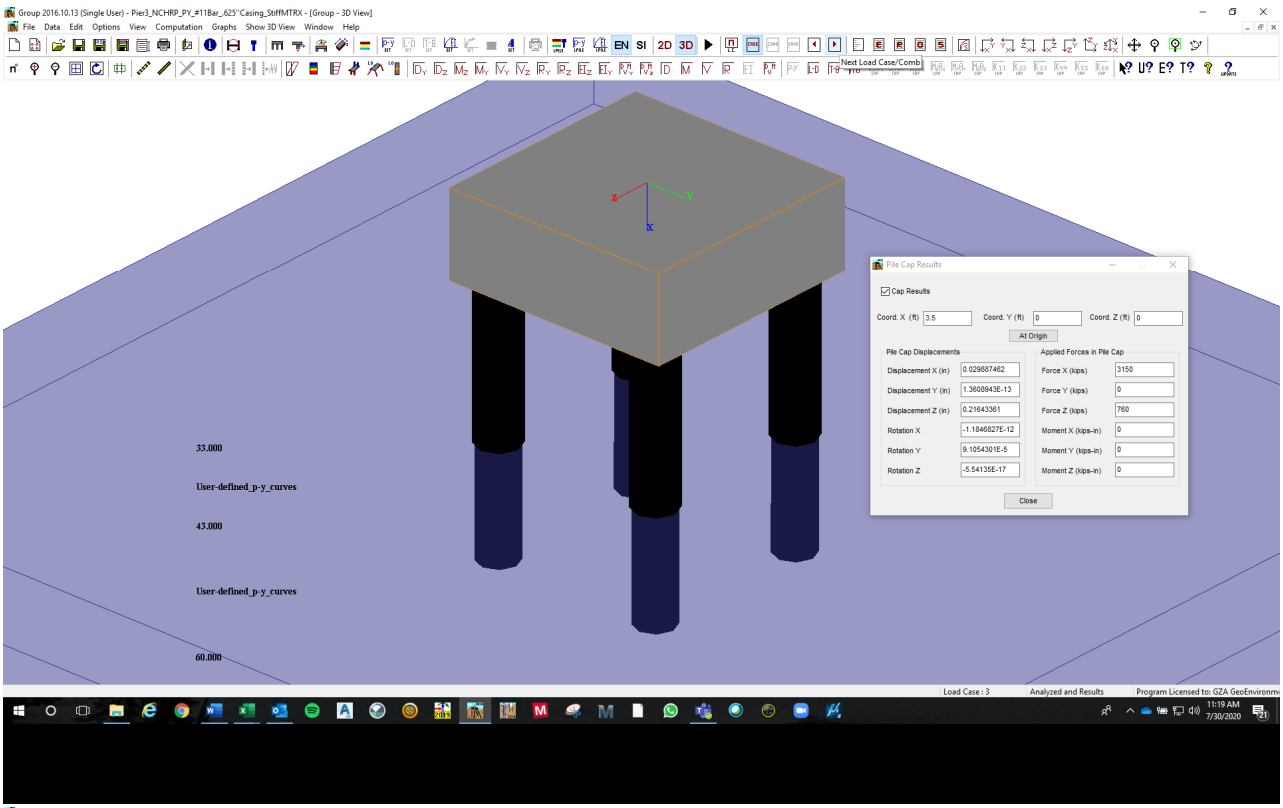


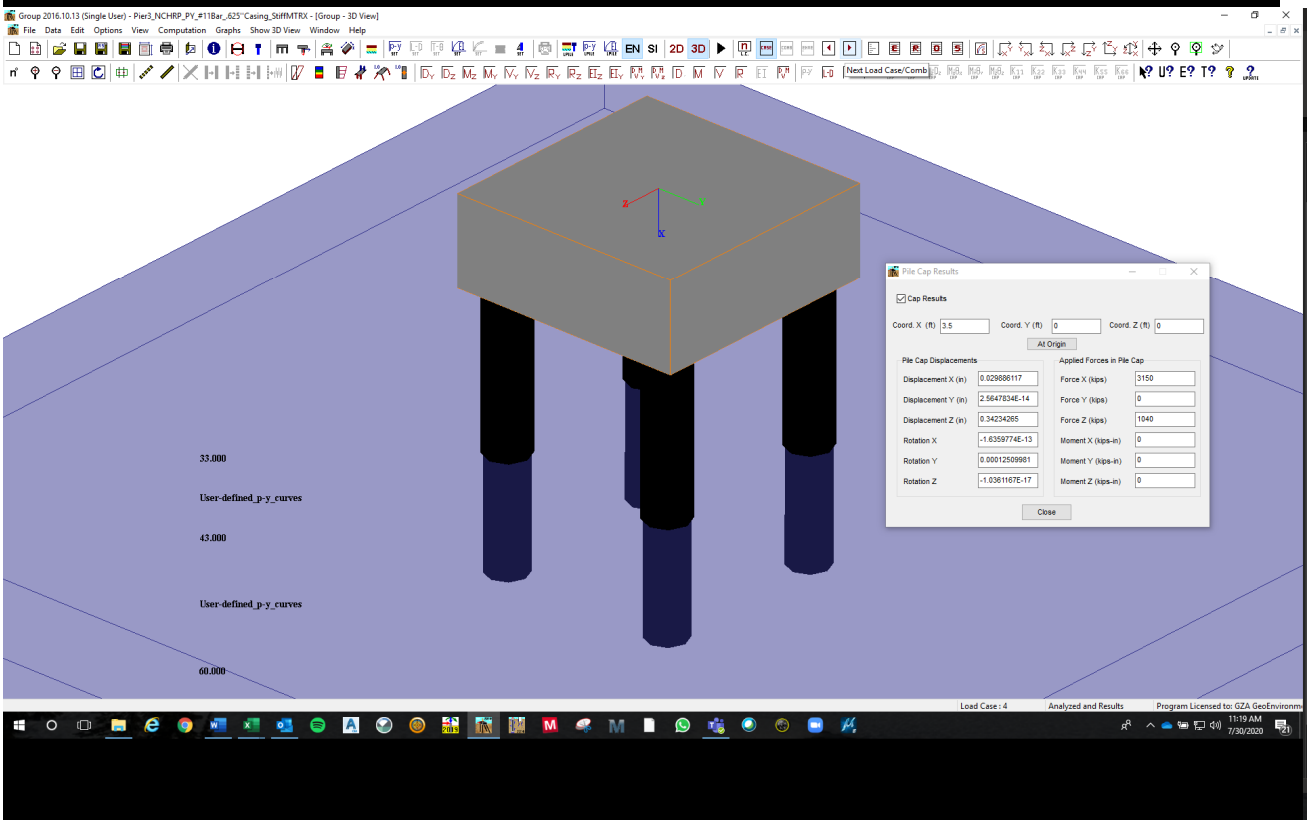
<u>Pier 3 Fully Scoured w/NCHRP</u>deisgn parameters.

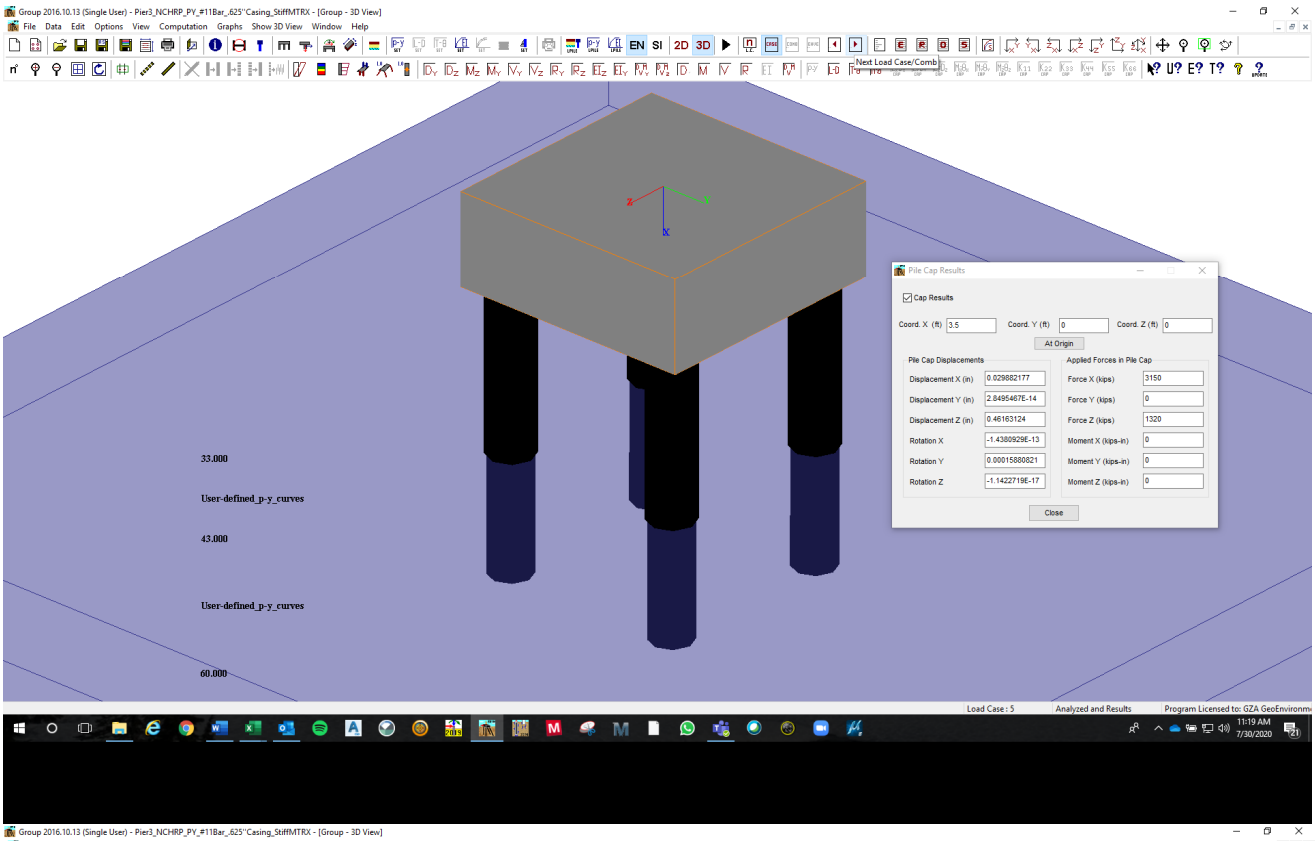
Note: Loads/moments were applied to the centroid of pile cap. Displacements/Rotations are taken at the centroid of the footing (x = 3.5', below origin) – so applied moment in load cases with






Group 2016.10.13 (Single User) - Pier3_NCHRP_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
File Data Edit Options View Computation Graphs Show 3D View Window Help
Next Load Case/Comb
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.029887482
Displacement Y (in) 1.3608943E-13
Displacement Z (in) 0.21643361
Rotation X -1.1846827E-12
Rotation Y 9.1054301E-5
Rotation Z -5.54135E-17
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 760
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Load Case : 3
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
11:19 AM
7/30/2020


Group 2016.10.13 (Single User) - Pier3_NCHRP_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
File Data Edit Options View Computation Graphs Show 3D View Window Help
Next Load Case/Comb
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.029886117
Displacement Y (in) 2.5647834E-14
Displacement Z (in) 0.34234265
Rotation X -1.6359774E-13
Rotation Y 0.00012509981
Rotation Z -1.0361167E-17
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 1040
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Load Case : 4
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
11:19 AM
7/30/2020


Group 2016.10.13 (Single User) - Pier3_NCHRP_PY_#11Bar_.625"Casing_StiffMTRX - [Group - 3D View]
File Data Edit Options View Computation Graphs Show 3D View Window Help
Next Load Case/Comb
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.029882177
Displacement Y (in) 2.8495467E-14
Displacement Z (in) 0.46163124
Rotation X -1.4380929E-13
Rotation Y 0.00015880821
Rotation Z -1.1422719E-17
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 1320
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 5
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
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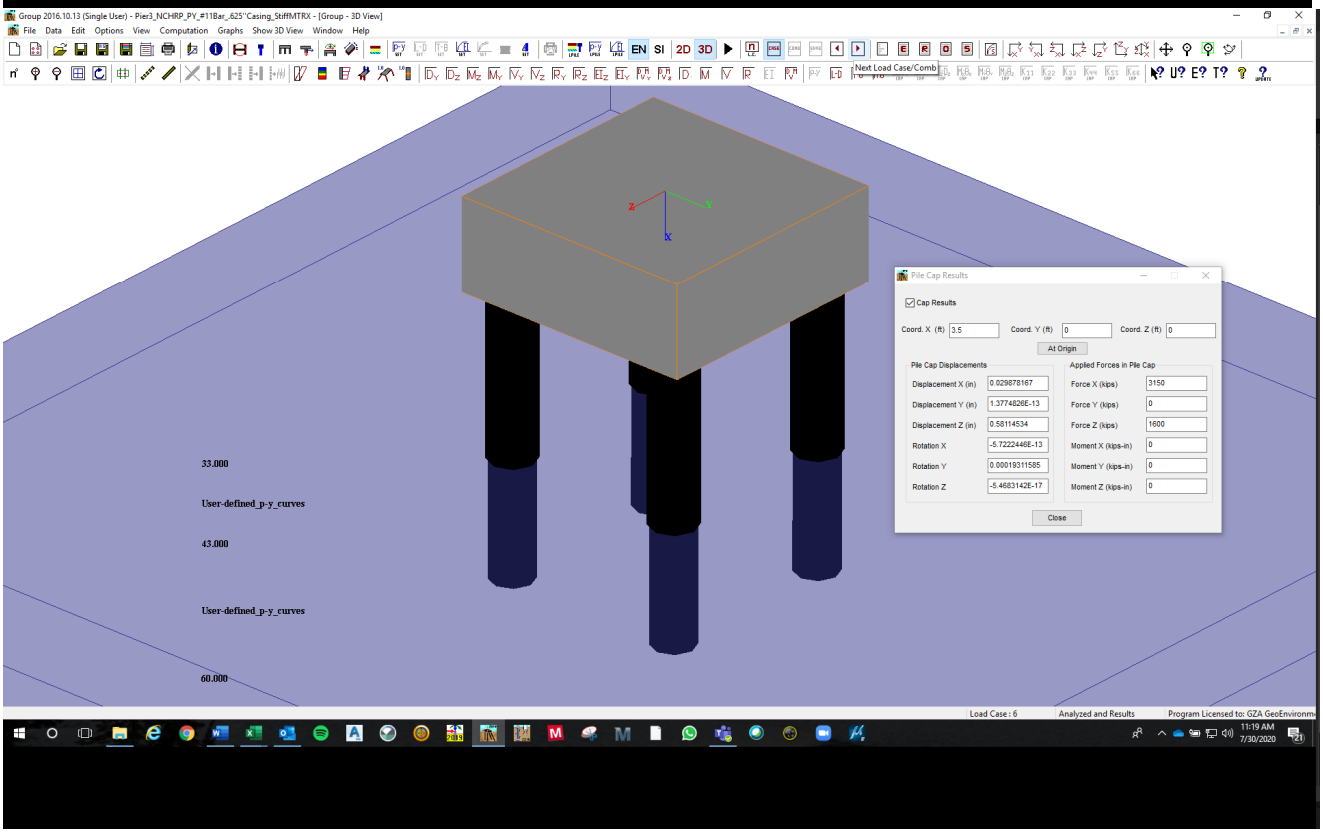
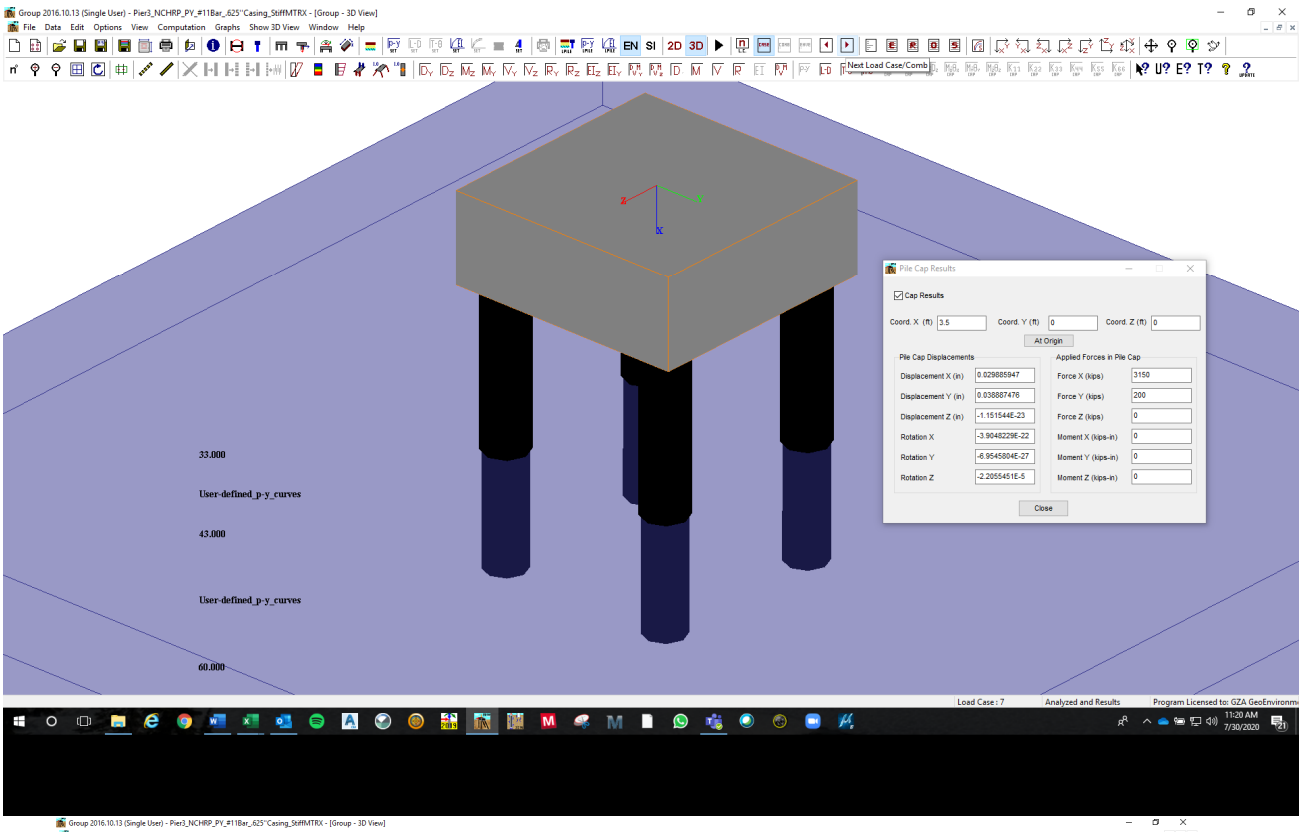
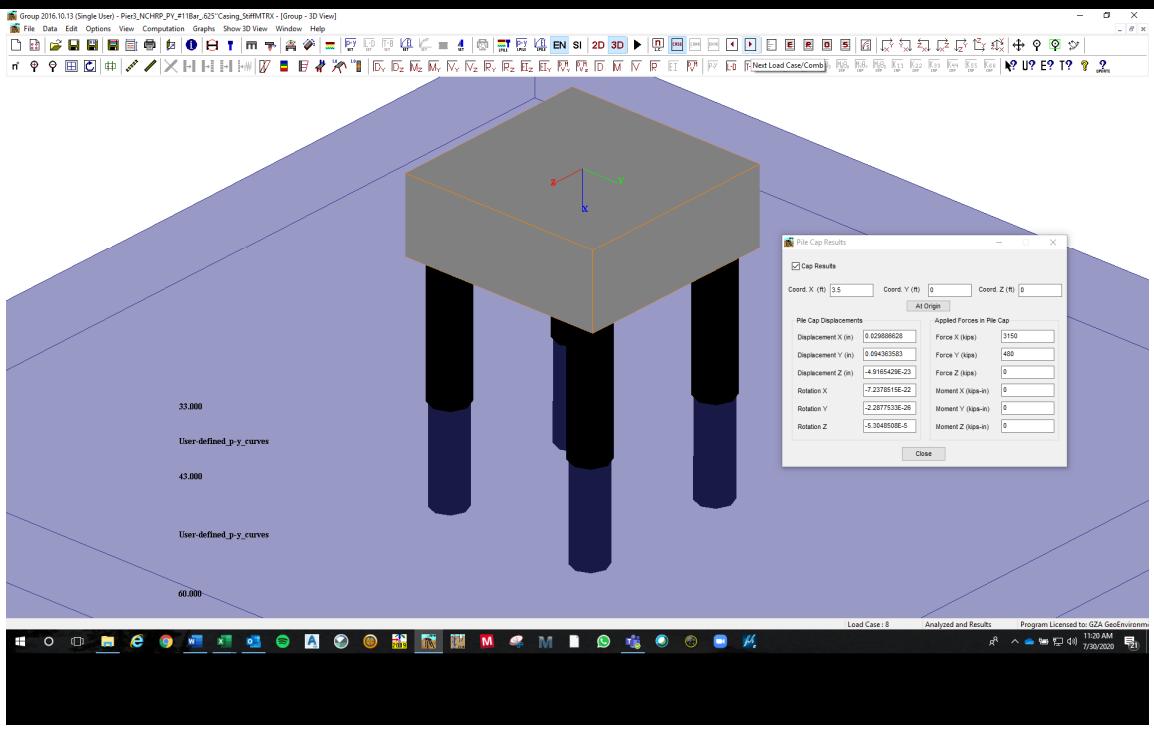
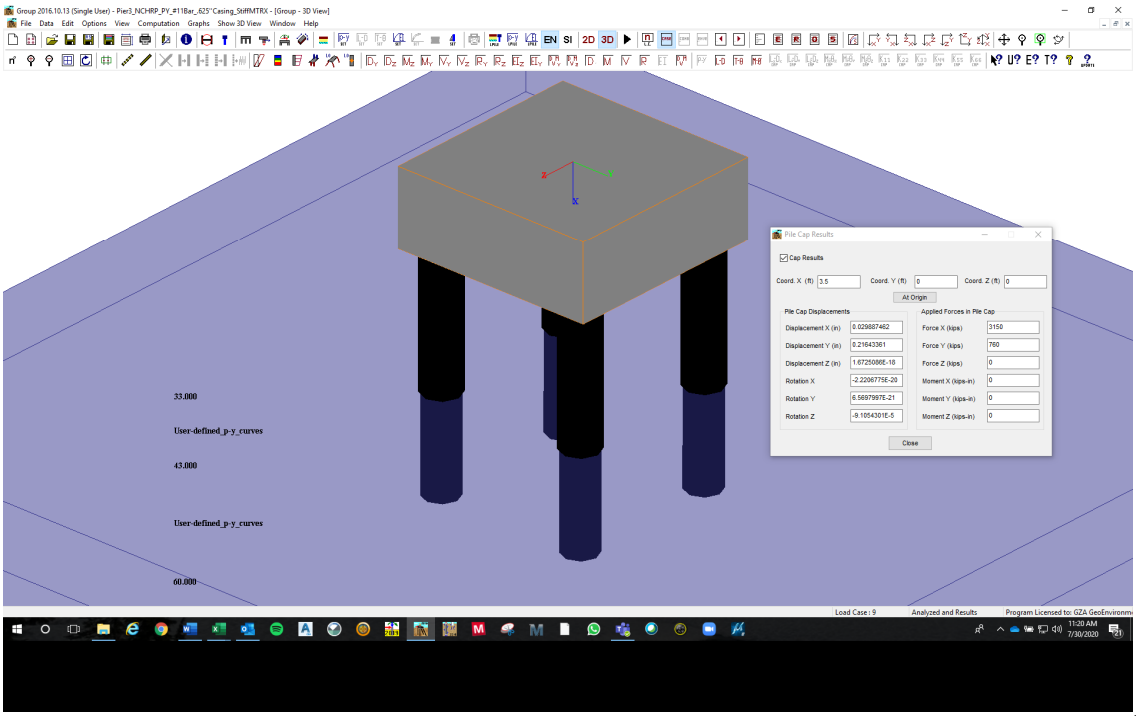
7/30/2020


Group 2016.10.13 (Single User) - Pier3_NCHRP_PY_#11Bar_.625"Casing_StiffMTRX - [Group - 3D View]
File Data Edit Options View Computation Graphs Show 3D View Window Help
Next Load Case/Comb
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.029878167
Displacement Y (in) 1.3774826E-13
Displacement Z (in) 0.58114534
Rotation X -5.7222446E-13
Rotation Y 0.00019311585
Rotation Z -5.4683142E-17
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 1600
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 6
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
11:19 AM
7/30/2020


Group 2016.10.13 (Single User) - Pier3_NCHRP_PY_#11Bar_.625"Casing_StiffMTRX - [Group - 3D View]
File Data Edit Options View Computation Graphs Show 3D View Window Help
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.029885947
Displacement Y (in) 0.038887476
Displacement Z (in) -1.151544E-23
Rotation X -3.9048229E-22
Rotation Y -6.9545804E-27
Rotation Z -2.2055451E-5
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 200
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Load Case : 7
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
11:20 AM
7/30/2020


Group 2016.10.13 (Single User) - Pier3_NCHRP_PY_#11Bar_.625"Casing_StiffMTRX - [Group - 3D View]
File Data Edit Options View Computation Graphs Show 3D View Window Help
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.029888628
Displacement Y (in) 0.094363583
Displacement Z (in) -4.9165429E-23
Rotation X -7.2378515E-22
Rotation Y -2.2877533E-26
Rotation Z -5.3048508E-5
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 480
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Load Case : 8
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
11:20 AM
7/30/2020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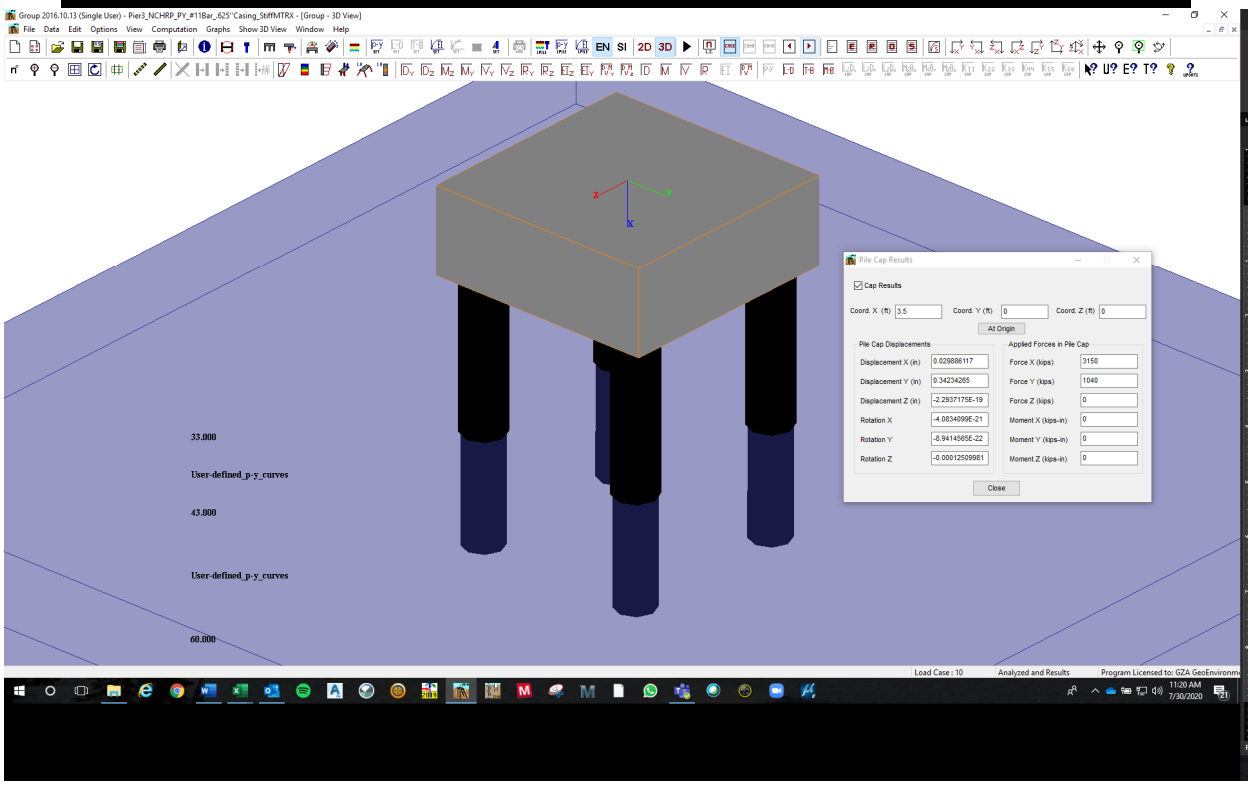
File Data Edit Options View Computation Graphs Show 3D View Window Help
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.029887462
Displacement Y (in) 0.21643361
Displacement Z (in) 1.6725086E-18
Rotation X -2.2206775E-20
Rotation Y 6.5697997E-21
Rotation Z -9.1054301E-5
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 760
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Load Case : 9
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
11:20 AM
7/30/2020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File Data Edit Options View Computation Graphs Show 3D View Window Help
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.029886117
Displacement Y (in) 0.34234265
Displacement Z (in) -2.2937175E-19
Rotation X -4.0834099E-21
Rotation Y -8.9414565E-22
Rotation Z -0.00012509981
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 1040
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Load Case : 10
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
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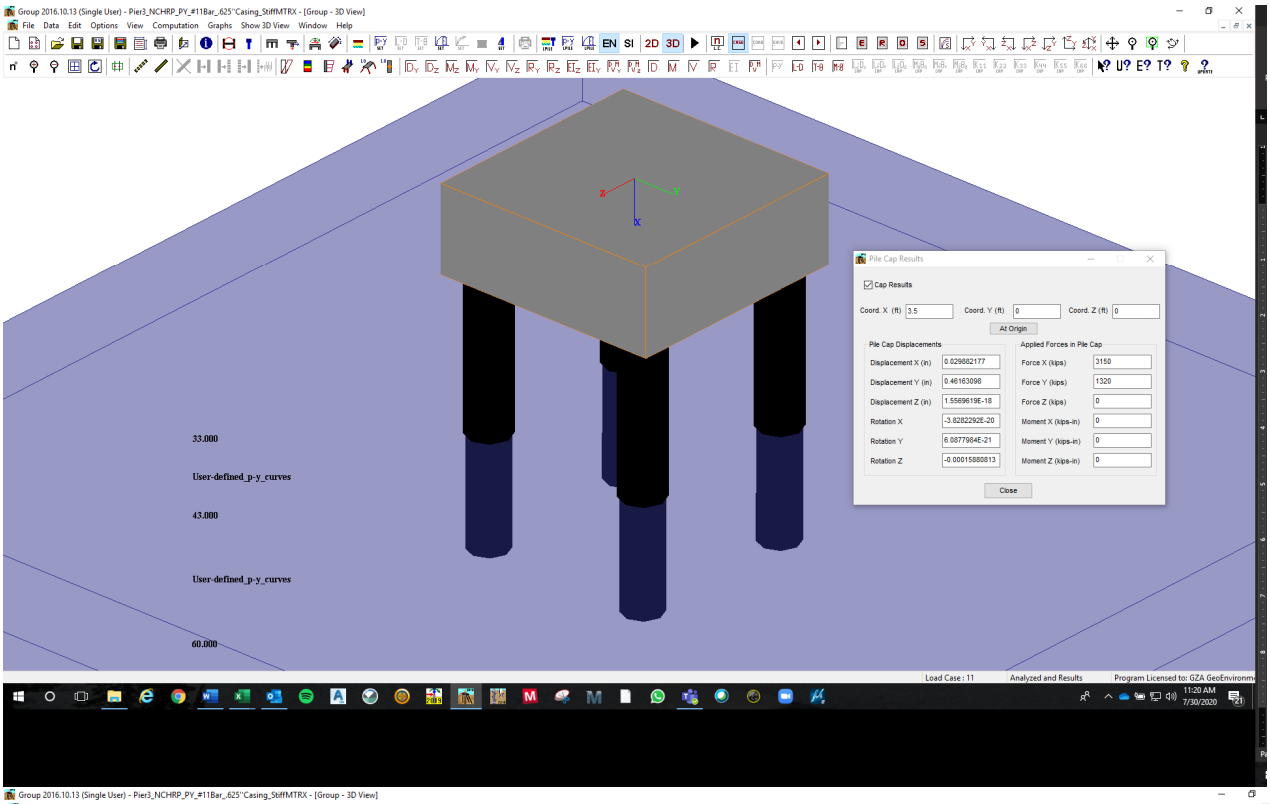
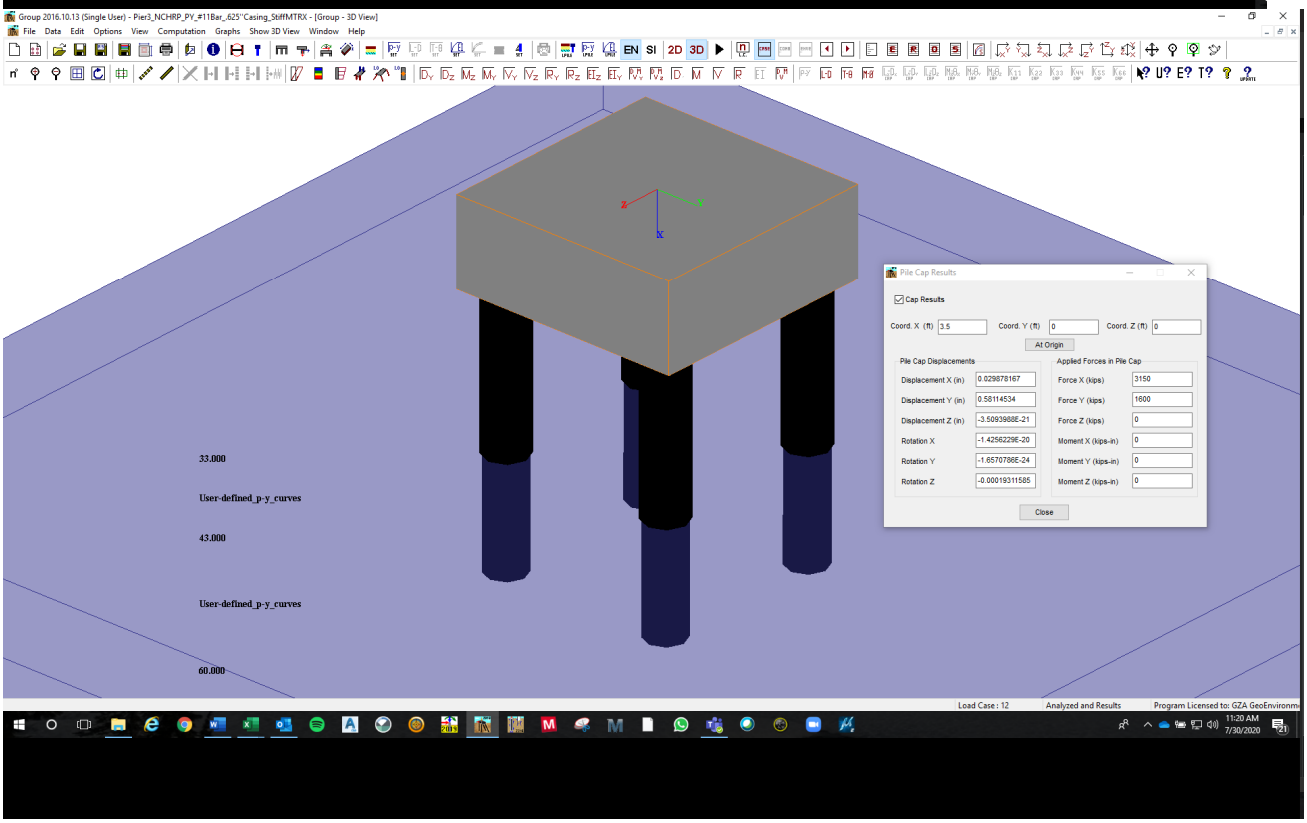
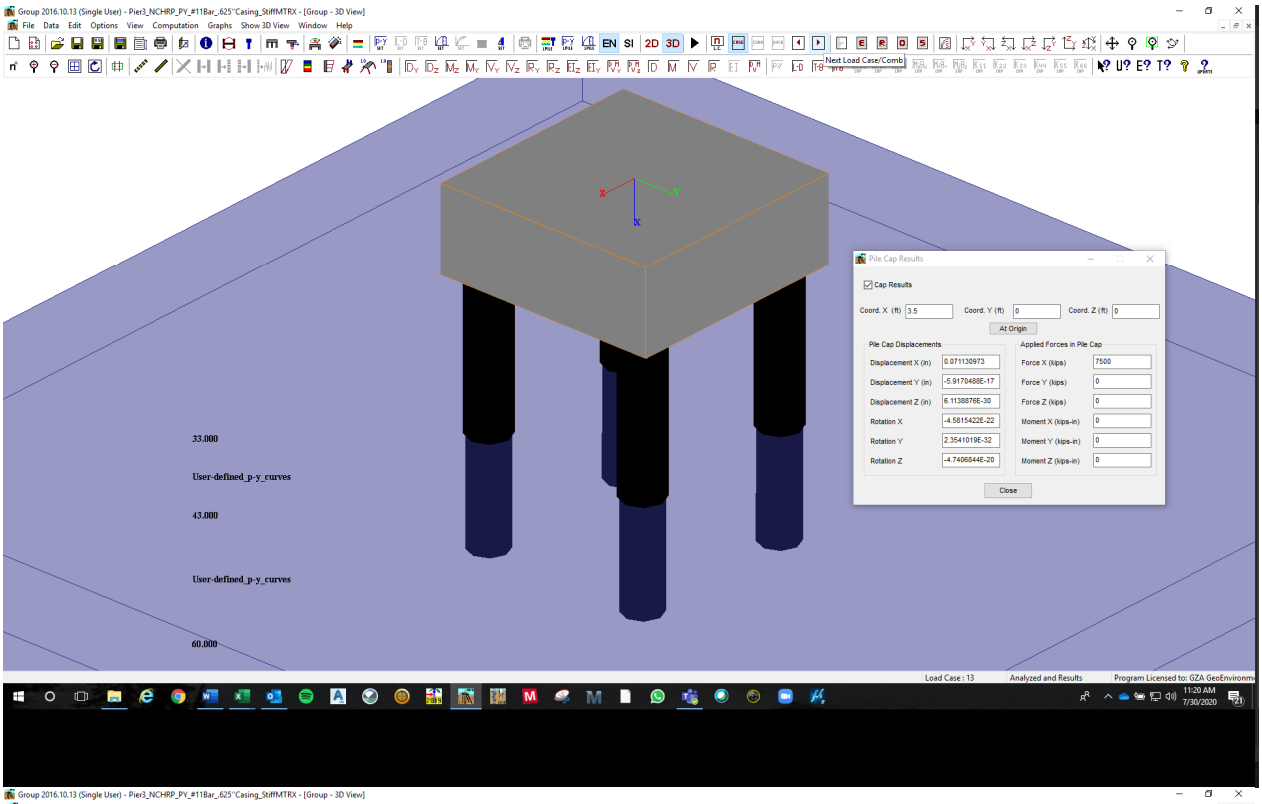
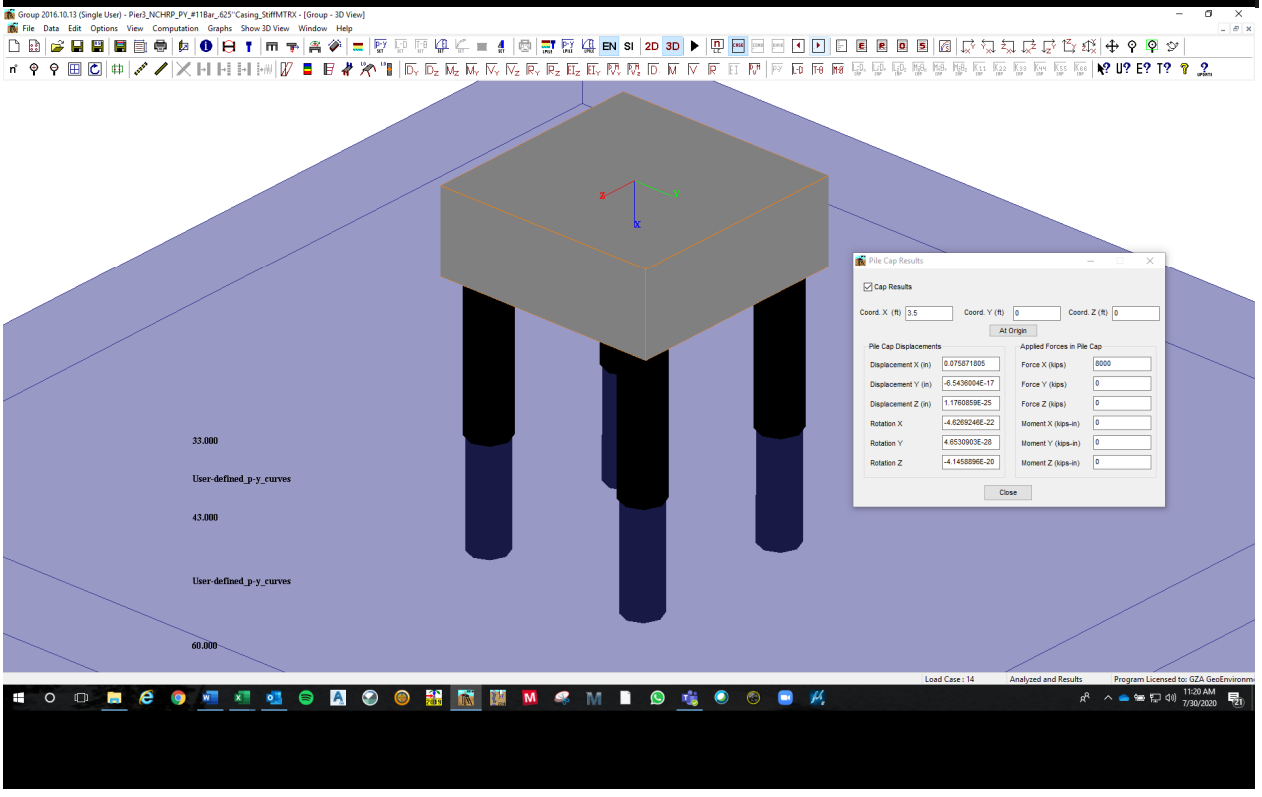
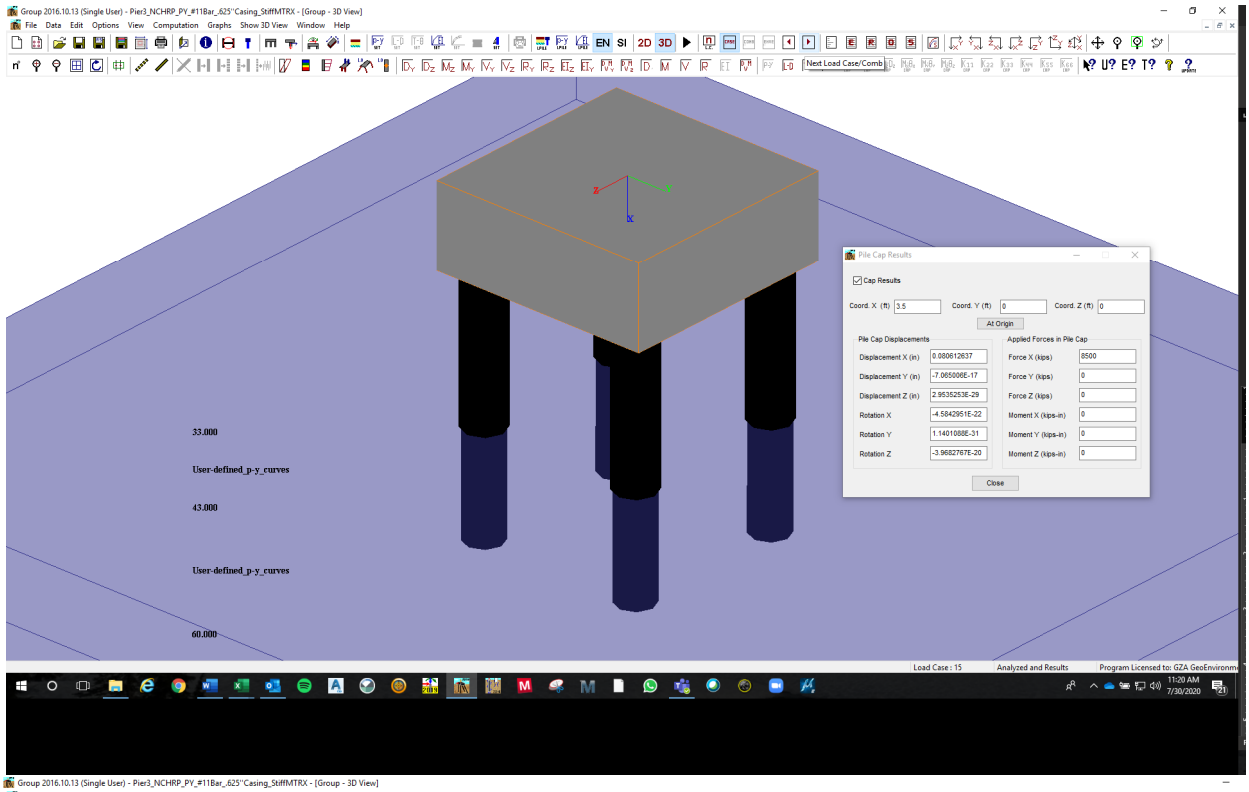
7/30/2020

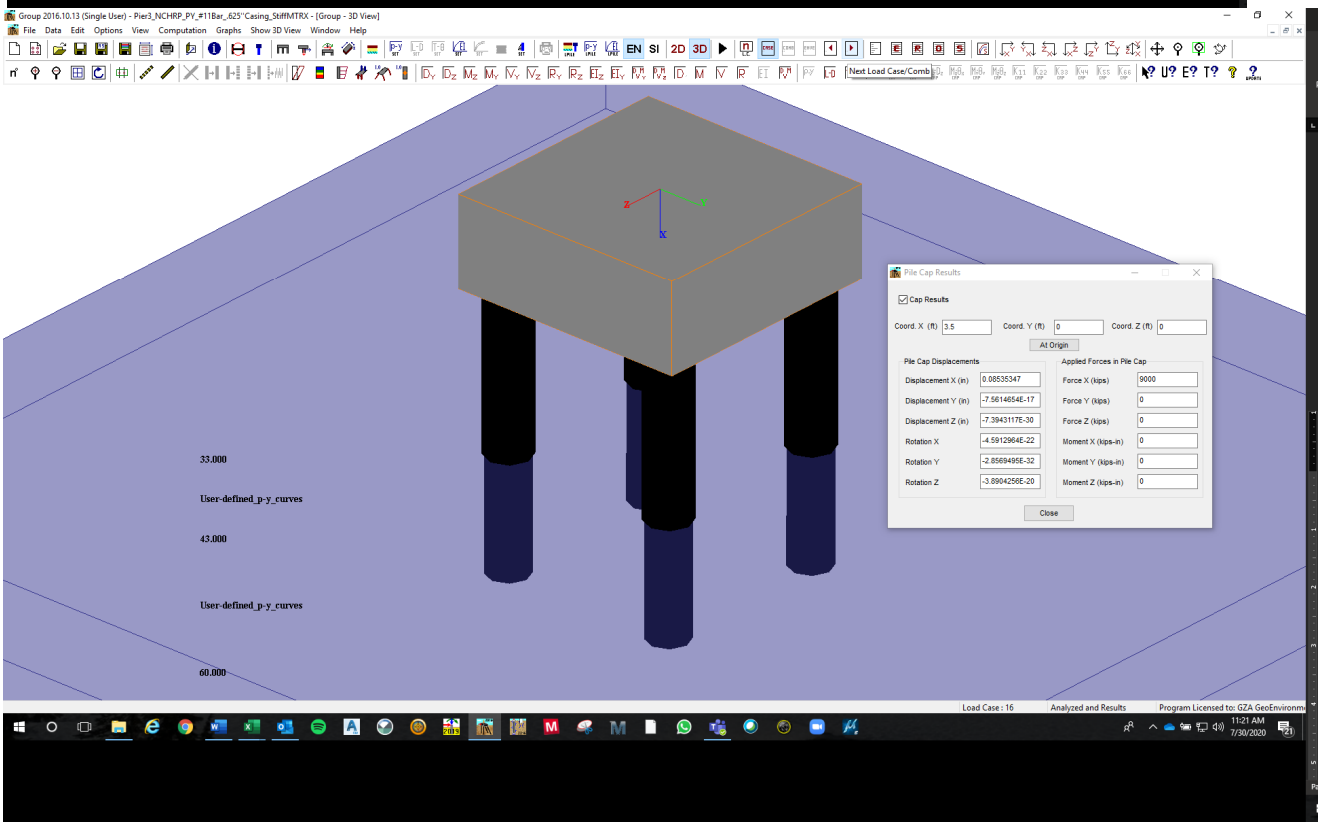

Group 2016.10.13 (Single User) - Pier3_NCHRP_PY_#11Bar_.625"Casing_StiffMTRX - [Group - 3D View]
File Data Edit Options View Computation Graphs Show 3D View Window Help
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.029882177
Displacement Y (in) 0.46163098
Displacement Z (in) 1.5569619E-18
Rotation X -3.8282292E-20
Rotation Y 6.0877984E-21
Rotation Z -0.00015880813
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 1320
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Load Case : 11
Analyzed and Results
11:20 AM
7/30/2020

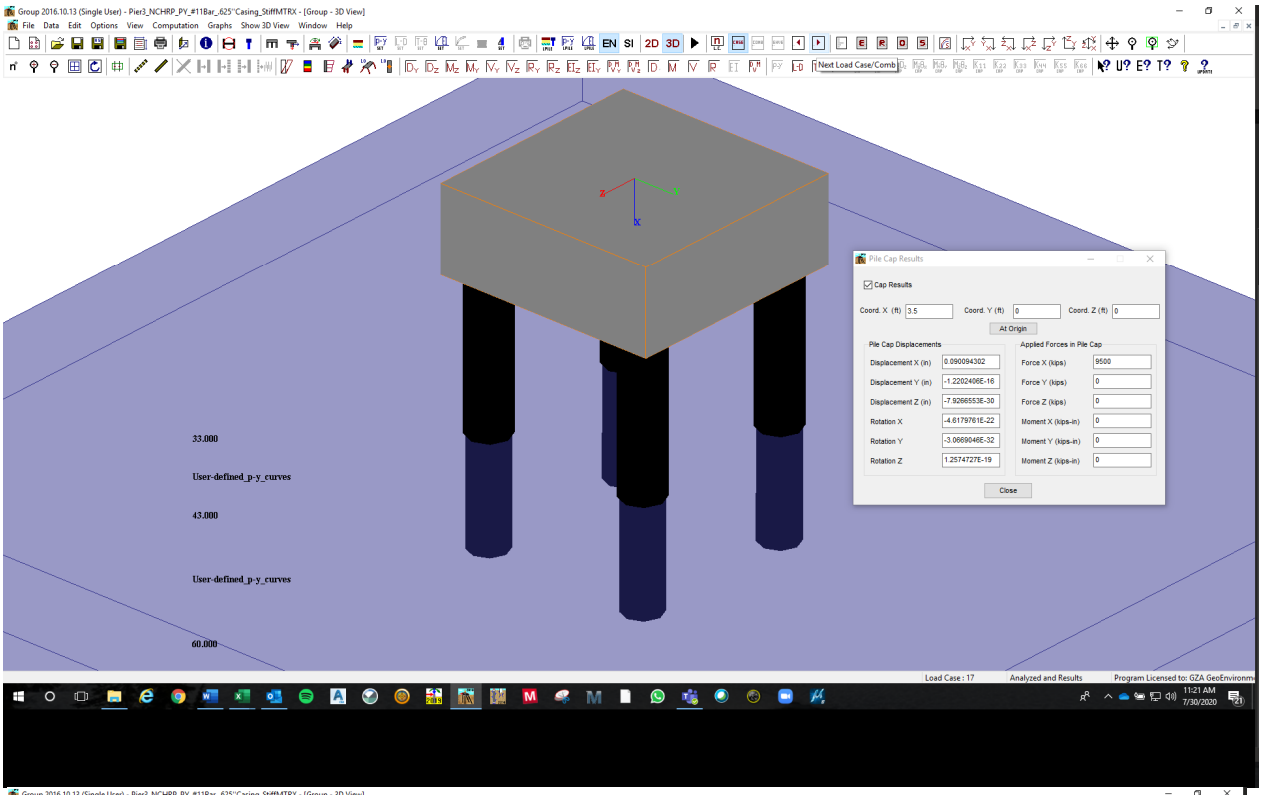

Group 2016.10.13 (Single User) - Pier3_NCHRP_PY_#11Bar_.625"Casing_StiffMTRX - [Group - 3D View]
File Data Edit Options View Computation Graphs Show 3D View Window Help
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.029878167
Displacement Y (in) 0.58114534
Displacement Z (in) -3.5093988E-21
Rotation X -1.4256229E-20
Rotation Y -1.6570786E-24
Rotation Z -0.00019311585
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 1600
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Load Case : 12
Analyzed and Results
11:20 AM
7/30/2020

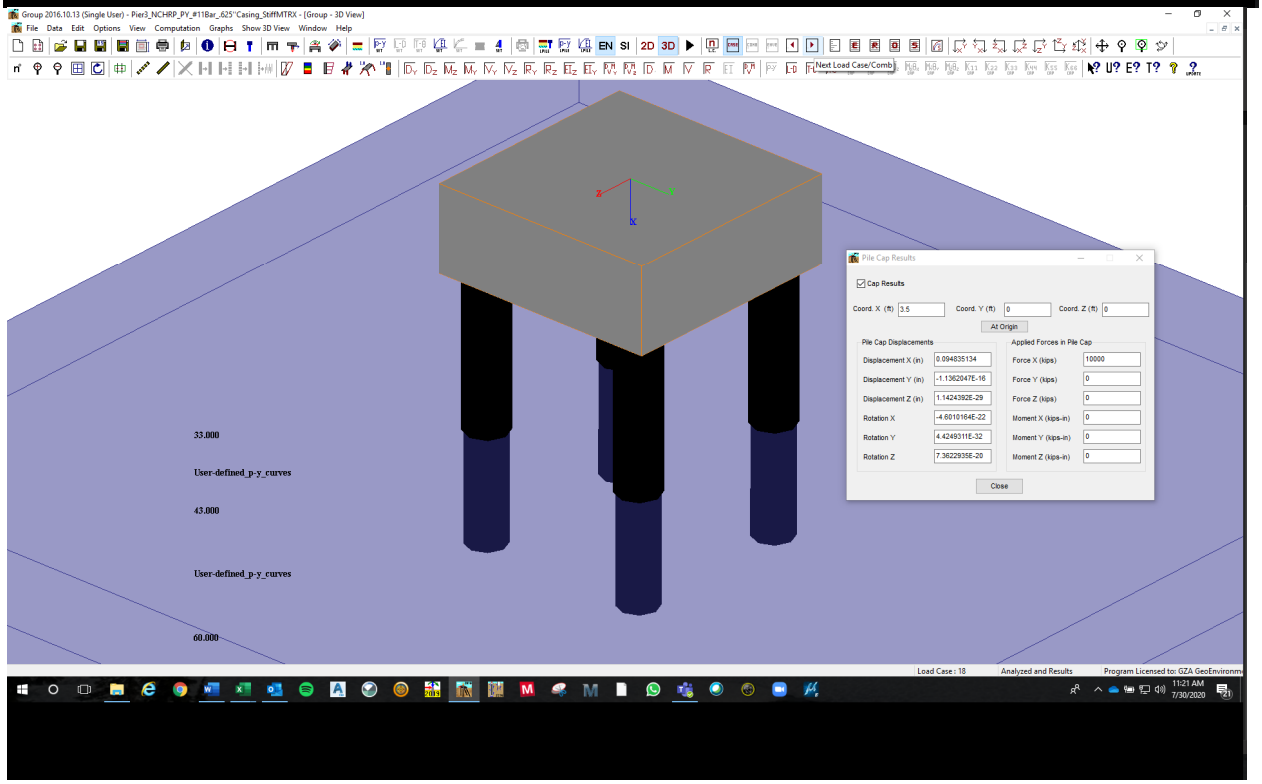

Group 2016.10.13 (Single User) - Pier3_NCHRP_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
File Data Edit Options View Computation Graphs Show 3D View Window Help
Next Load Case/Comb
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.071130973
Displacement Y (in) -5.9170488E-17
Displacement Z (in) 6.1138876E-30
Rotation X -4.5815422E-22
Rotation Y 2.3541019E-32
Rotation Z -4.7406844E-20
Applied Forces in Pile Cap
Force X (kips) 7500
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 13
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
11:20 AM
7/30/2020

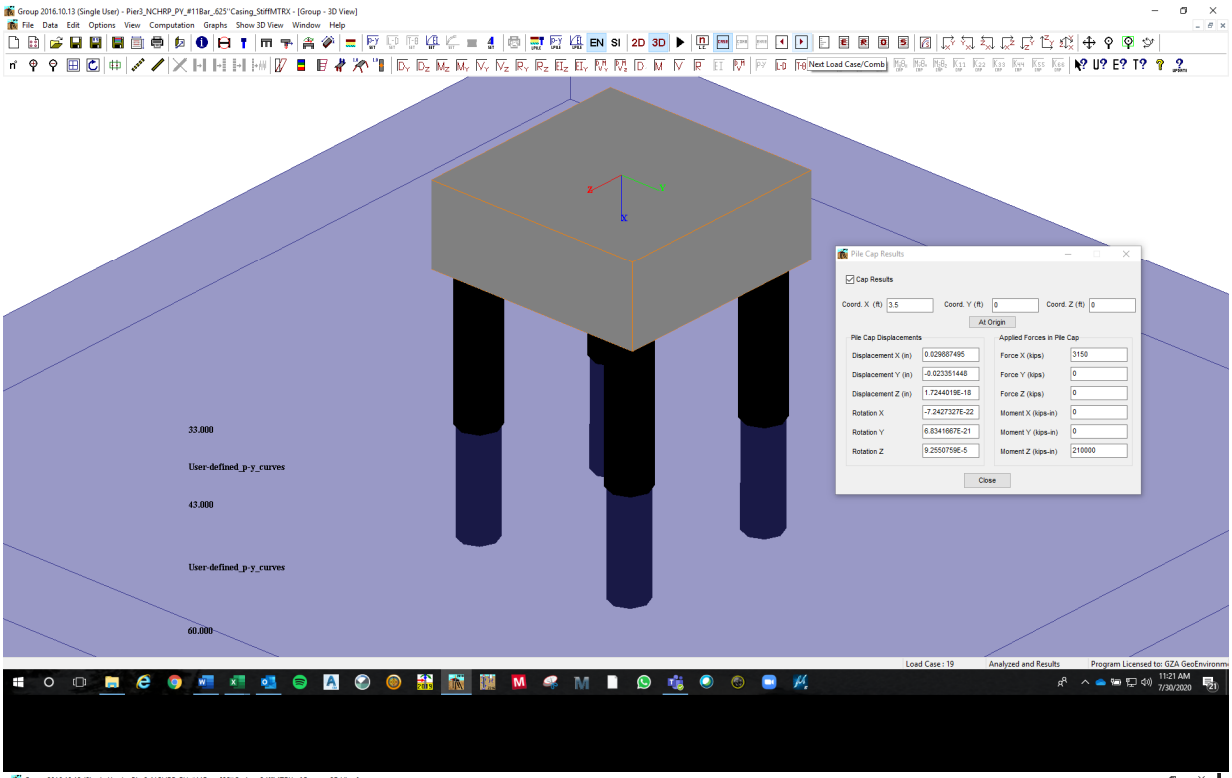

Group 2016.10.13 (Single User) - Pier3_NCHRP_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
File Data Edit Options View Computation Graphs Show 3D View Window Help
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.075871805
Displacement Y (in) -6.5436004E-17
Displacement Z (in) 1.1760859E-25
Rotation X -4.6269246E-22
Rotation Y 4.6530903E-28
Rotation Z -4.1458896E-20
Applied Forces in Pile Cap
Force X (kips) 8000
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 14
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
11:20 AM
7/30/2020

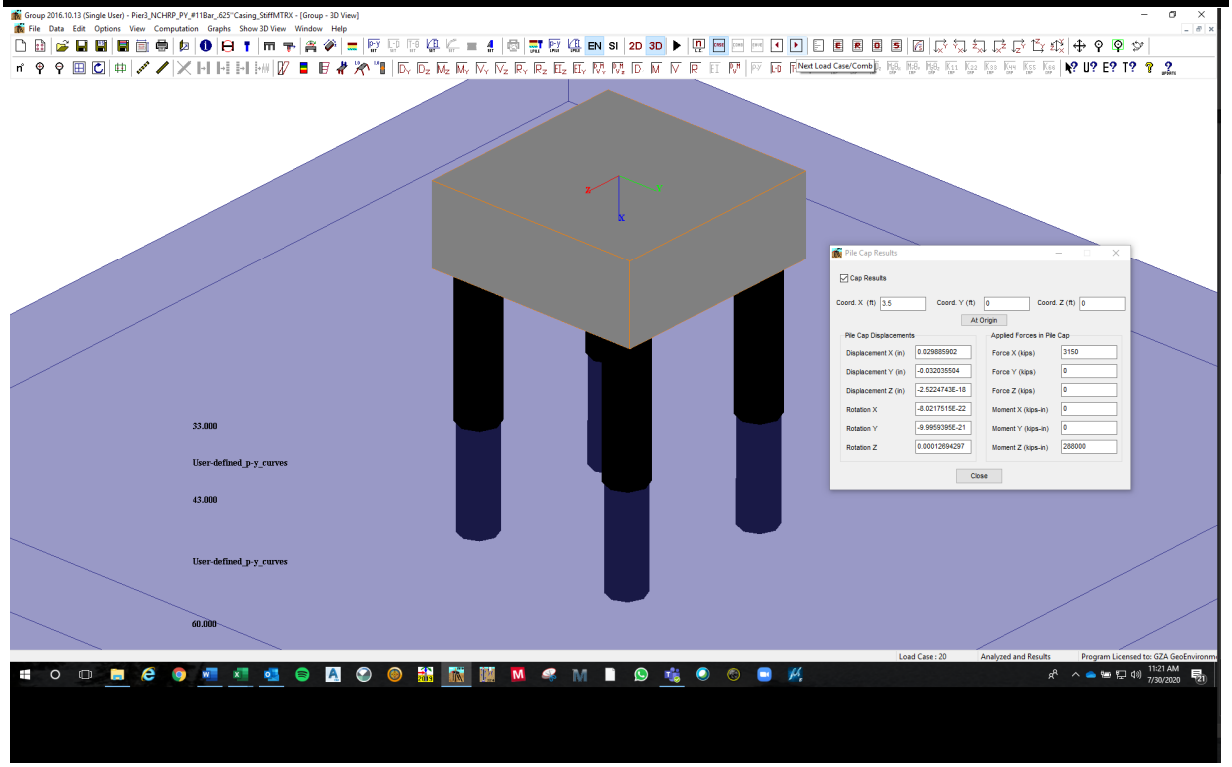

Group 2016.10.13 (Single User) - Pier3_NCHRP_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.080612637
Displacement Y (in) -7.065006E-17
Displacement Z (in) 2.9535253E-29
Rotation X -4.5842951E-22
Rotation Y 1.1401088E-31
Rotation Z -3.9682767E-20
Applied Forces in Pile Cap
Force X (kips) 8500
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Load Case : 15
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
11:20 AM
7/30/2020

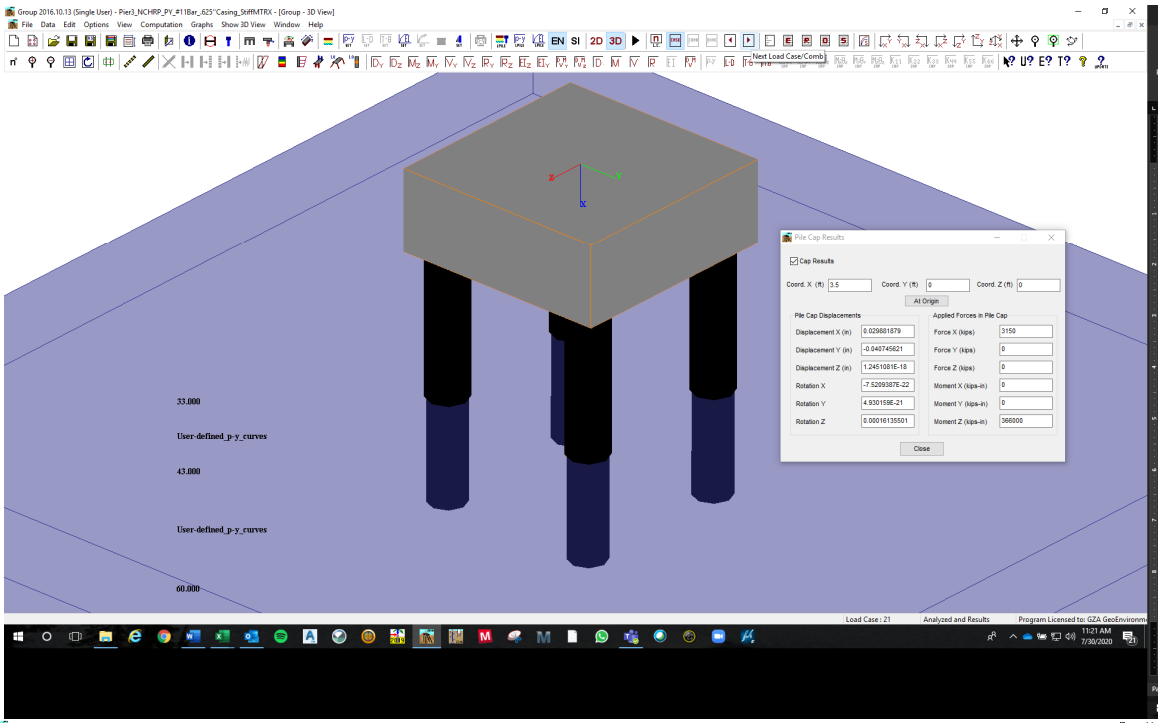

Group 2016.10.13 (Single User) - Pier3_NCHRP_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.08535347
Displacement Y (in) -7.5614654E-17
Displacement Z (in) -7.3943117E-30
Rotation X -4.5912964E-22
Rotation Y -2.8569495E-32
Rotation Z -3.8904256E-20
Applied Forces in Pile Cap
Force X (kips) 9000
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Load Case : 16
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
11:21 AM
7/30/2020

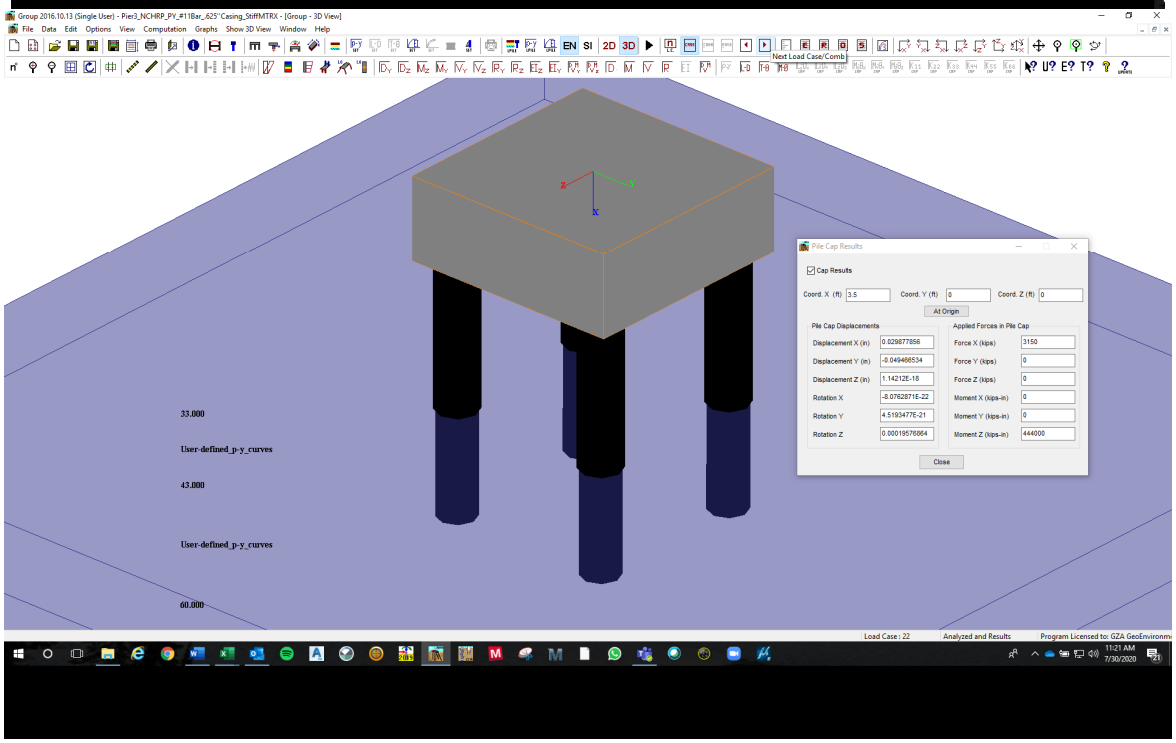

Group 2016.10.13 (Single User) - Pier3_NCHRP_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
File Data Edit Options View Computation Graphs Show 3D View Window Help
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.090094302
Displacement Y (in) -1.2202406E-16
Displacement Z (in) -7.9266553E-30
Rotation X -4.61797616-22
Rotation Y -3.0669046E-32
Rotation Z 1.2574727E-19
Applied Forces in Pile Cap
Force X (kips) 9500
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Load Case : 17
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
11:21 AM
7/30/2020

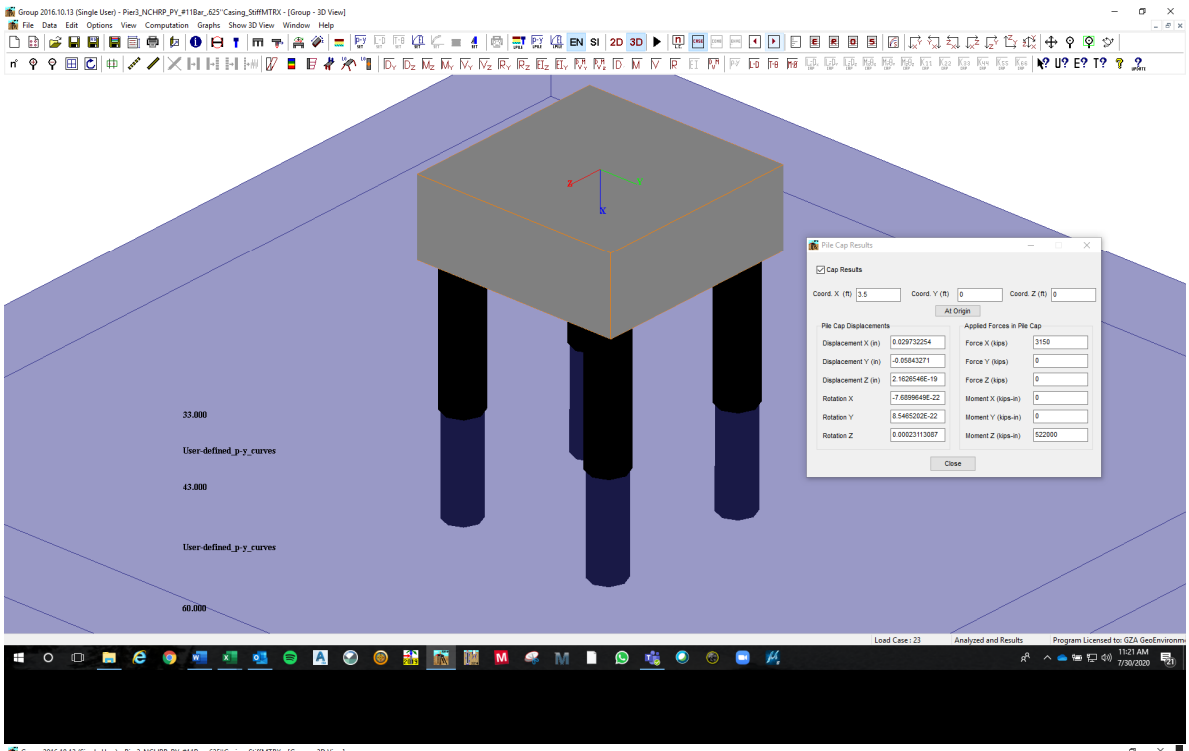

Group 2016.10.13 (Single User) - Pier3_NCHRP_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
File Data Edit Options View Computation Graphs Show 3D View Window Help
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.094835134
Displacement Y (in) -1.1362047E-16
Displacement Z (in) 1.1424392E-29
Rotation X -4.6010164E-22
Rotation Y 4.4249311E-32
Rotation Z 7.3622935E-20
Applied Forces in Pile Cap
Force X (kips) 10000
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Load Case : 18
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
11:21 AM
7/30/2020

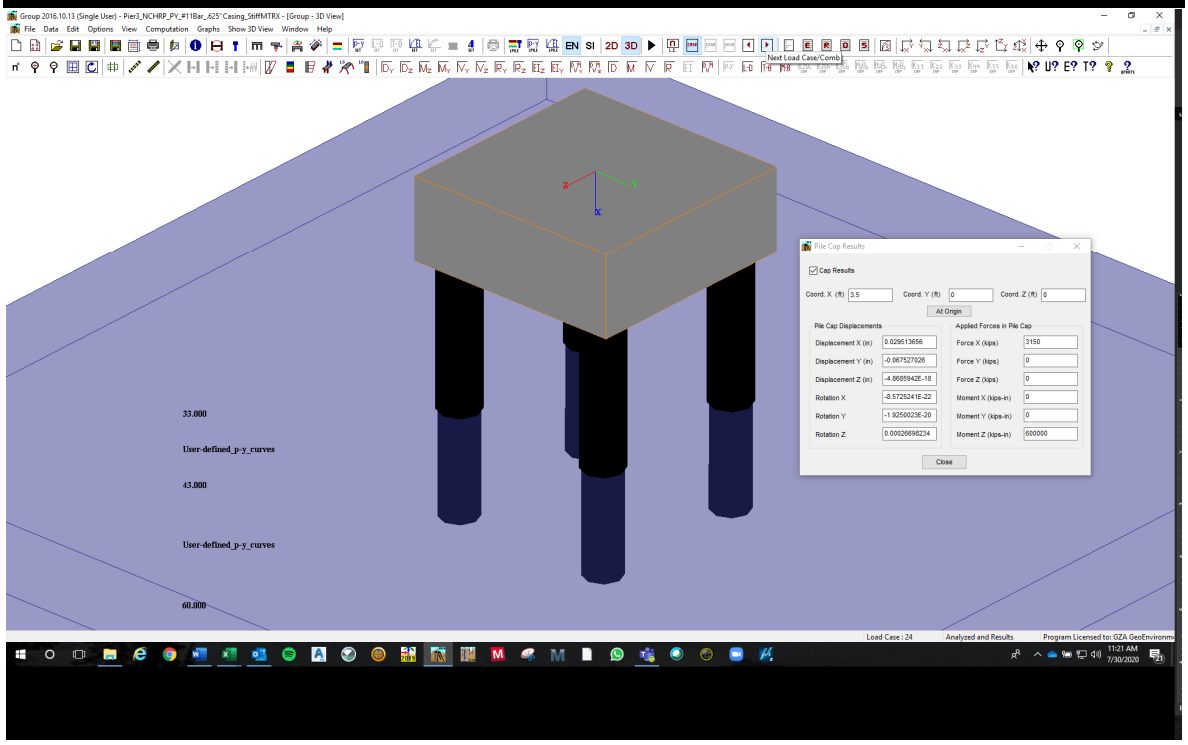

Group 2016.10.13 (Single User) - Pier3_NCHRP_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
File Data Edit Options View Computation Graphs Show 3D View Window Help
Next Load Case/Comb
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.029687495
Displacement Y (in) -0.023351448
Displacement Z (in) 1.7244019E-18
Rotation X -7.2427327E-22
Rotation Y 6.8341667E-21
Rotation Z 9.2550759E-5
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 210000
Close
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Load Case : 19
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
11:21 AM
7/30/2020

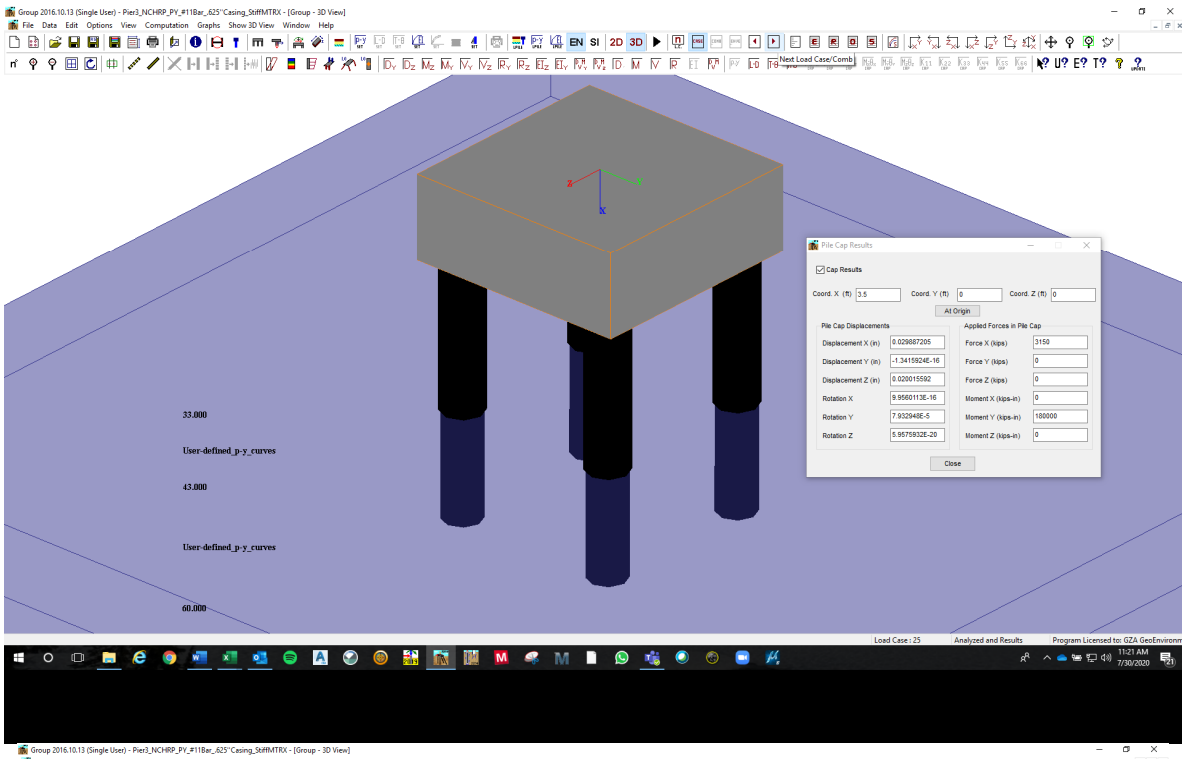

Group 2016.10.13 (Single User) - Pier3_NCHRP_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
File Data Edit Options View Computation Graphs Show 3D View Window Help
Next Load Case/Comb
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.029885902
Displacement Y (in) -0.032035504
Displacement Z (in) -2.5224743E-18
Rotation X -8.0217515E-22
Rotation Y -9.9959395E-21
Rotation Z 0.00012694297
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 280000
Close
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Load Case : 20
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
11:21 AM
7/30/2020

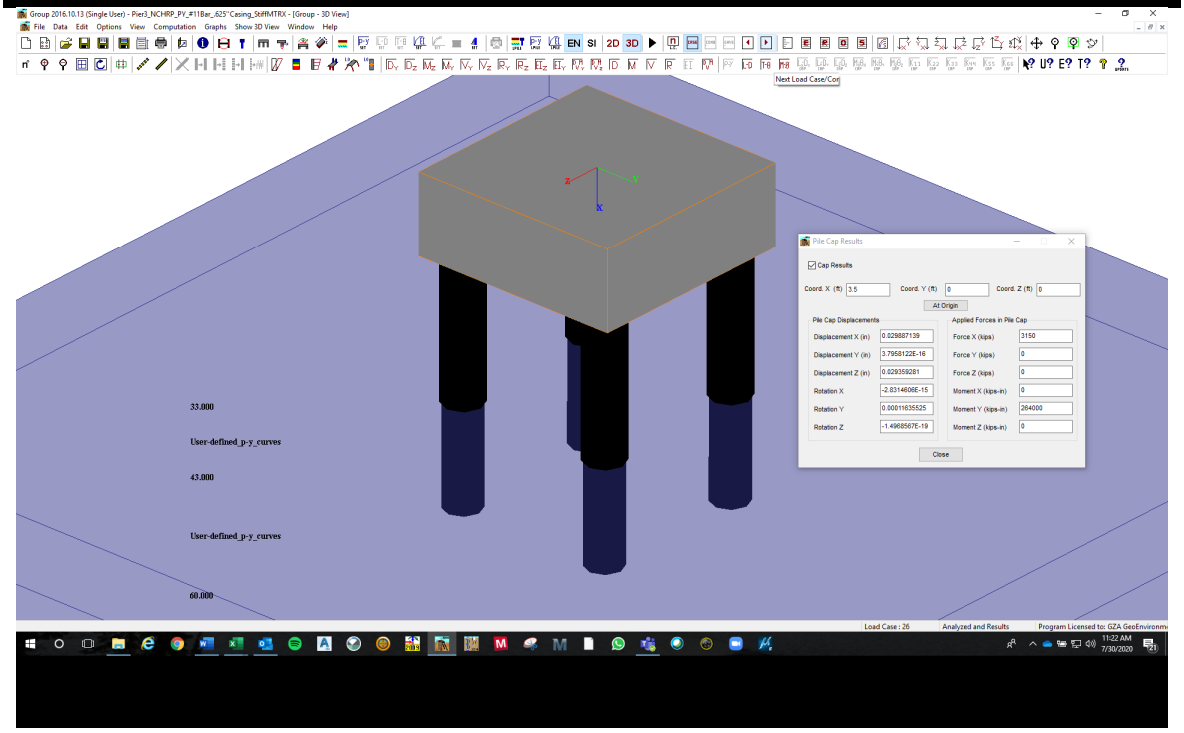

Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.029881879
Displacement Y (in) -0.049745621
Displacement Z (in) 1.2451081E-18
Rotation X -7.5209387E-22
Rotation Y 4.930159E-21
Rotation Z 0.0001613501
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 366000
Close
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000

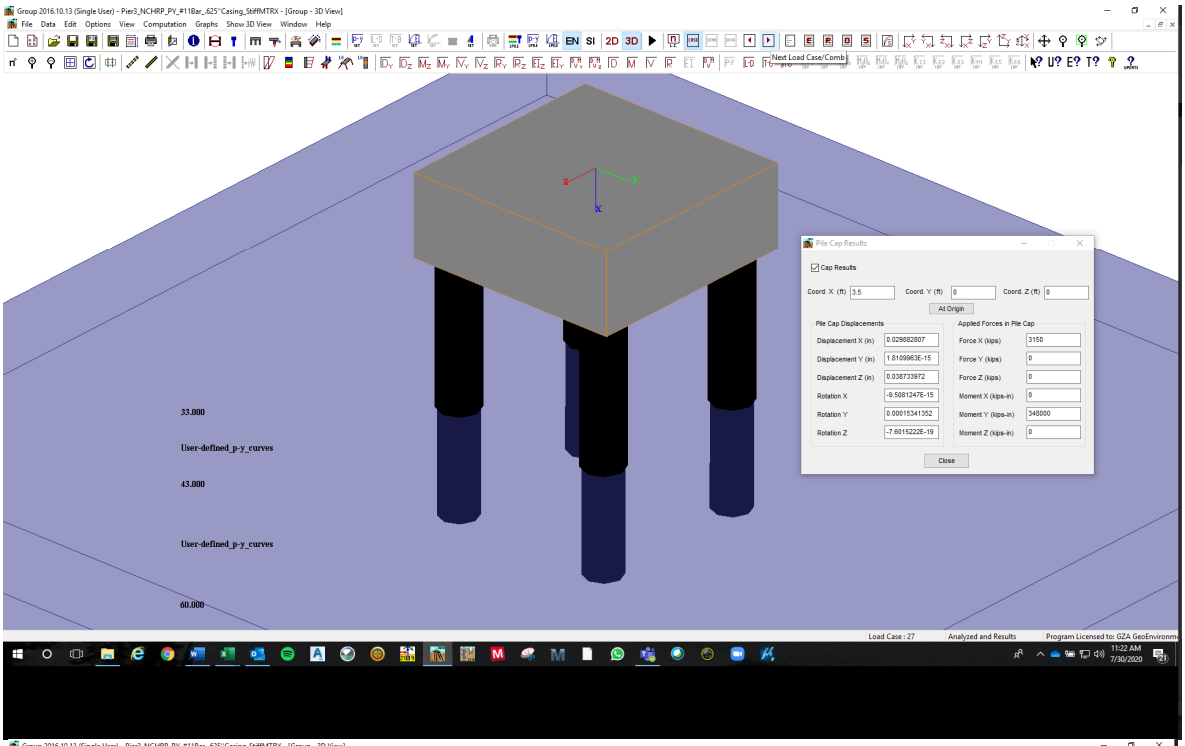

Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.029877856
Displacement Y (in) -0.049466534
Displacement Z (in) 1.14212E-18
Rotation X -8.0762871E-22
Rotation Y 4.5193477E-21
Rotation Z 0.0001957664
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 444000
Close
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000

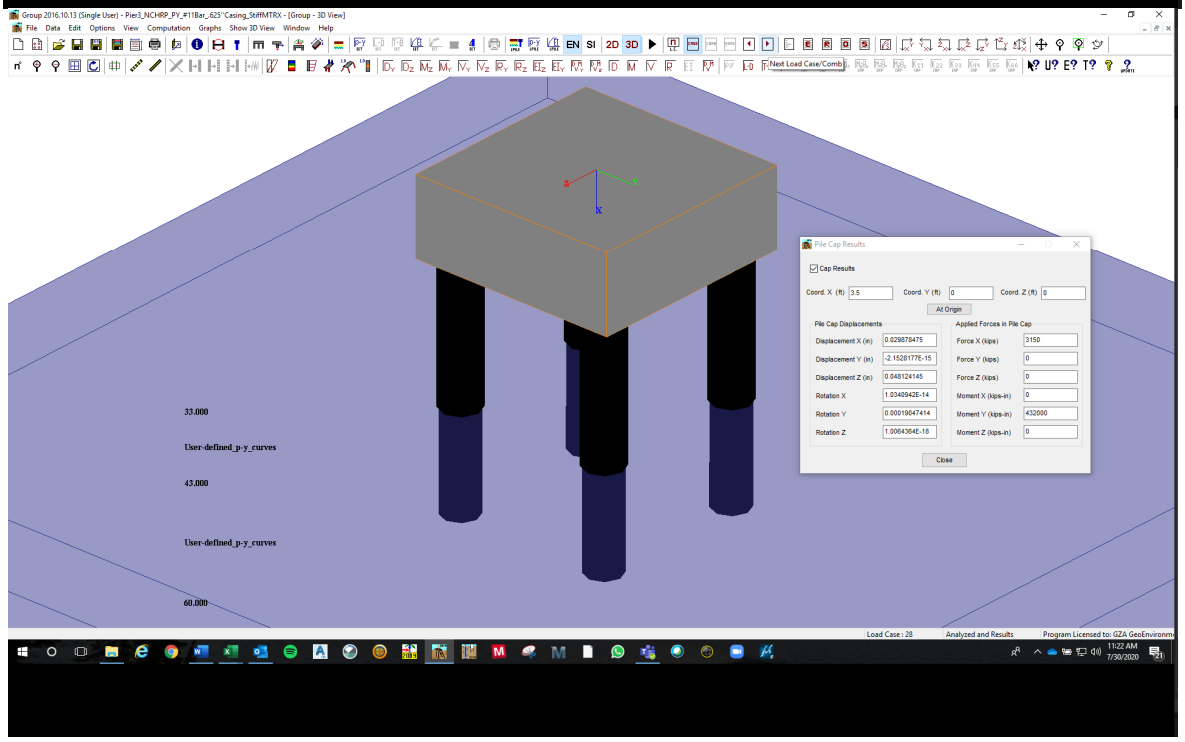

Group 2016.10.13 (Single User) - Pier3_NCHRP_PY_#11Bar_.625"Casing_StiffMTRX - [Group - 3D View]
File Data Edit Options View Computation Graphs Show 3D View Window Help
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.029732254
Displacement Y (in) -0.05843271
Displacement Z (in) 2.1626546E-19
Rotation X -7.6899649E-22
Rotation Y 8.5465202E-22
Rotation Z 0.00023113087
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 522000
Close
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Load Case : 23
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
11:21 AM
7/30/2020

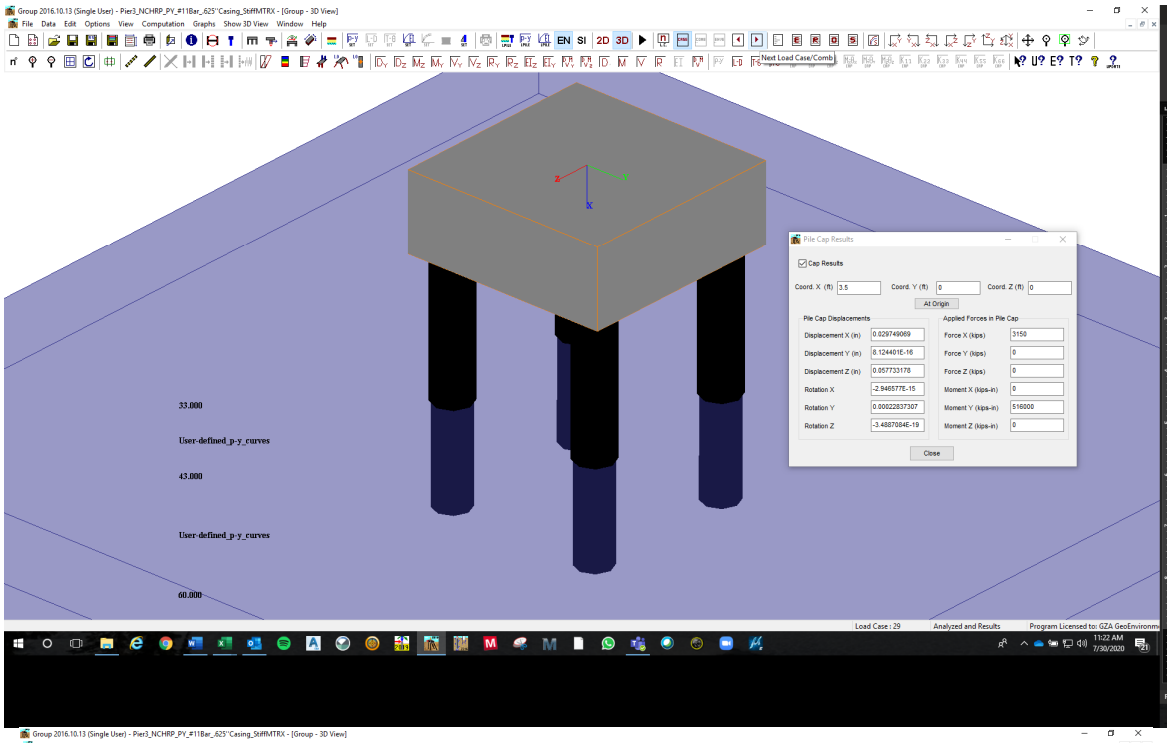

Group 2016.10.13 (Single User) - Pier3_NCHRP_PY_#11Bar_.625"Casing_StiffMTRX - [Group - 3D View]
File Data Edit Options View Computation Graphs Show 3D View Window Help
Next Load Case/Comb
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.029513656
Displacement Y (in) -0.067527026
Displacement Z (in) -4.8685942E-18
Rotation X -8.5725241E-22
Rotation Y -1.9250023E-20
Rotation Z 0.00026698234
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 600000
Close
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Load Case : 24
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
11:21 AM
7/30/2020

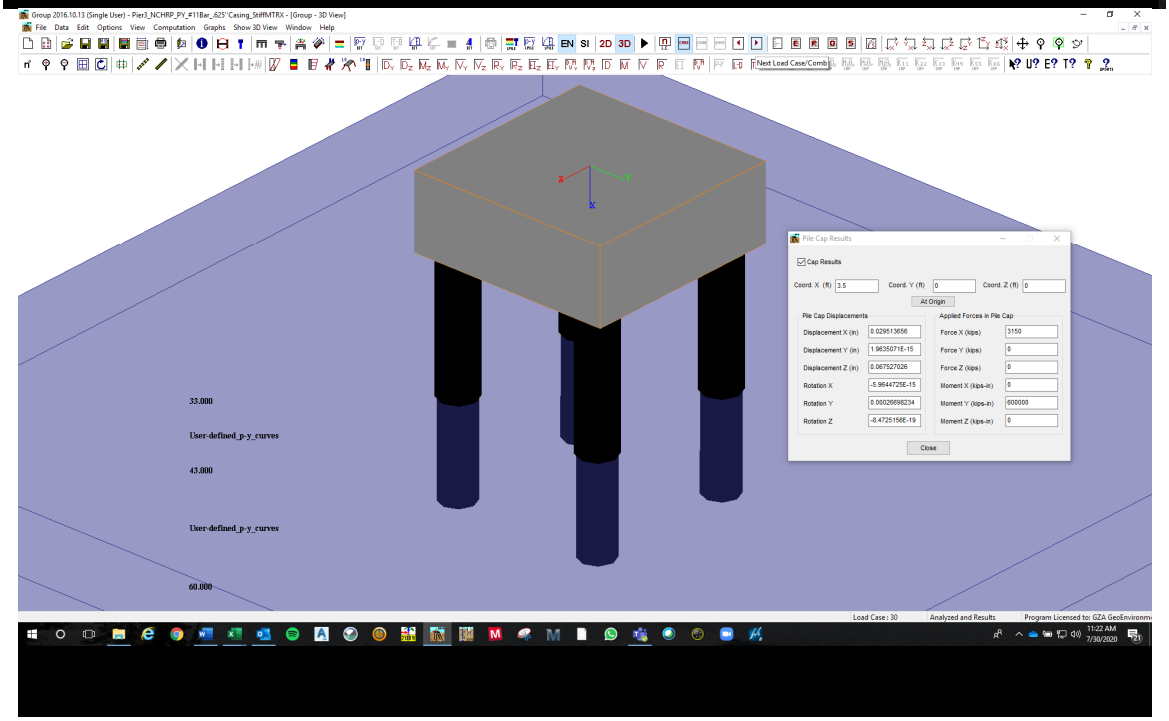

Group 2016.10.13 (Single User) - Pier3_NCHRP_PY_#11Bar_.625"Casing_StiffMTRX - [Group - 3D View]
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.029887205
Displacement Y (in) -1.3415924E-16
Displacement Z (in) 0.020015592
Rotation X 9.9560113E-16
Rotation Y 7.932949E-5
Rotation Z 5.9575932E-20
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 180000
Moment Z (kips-in) 0
Close
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Load Case : 25
Analyzed and Results
11:21 AM
7/30/2020

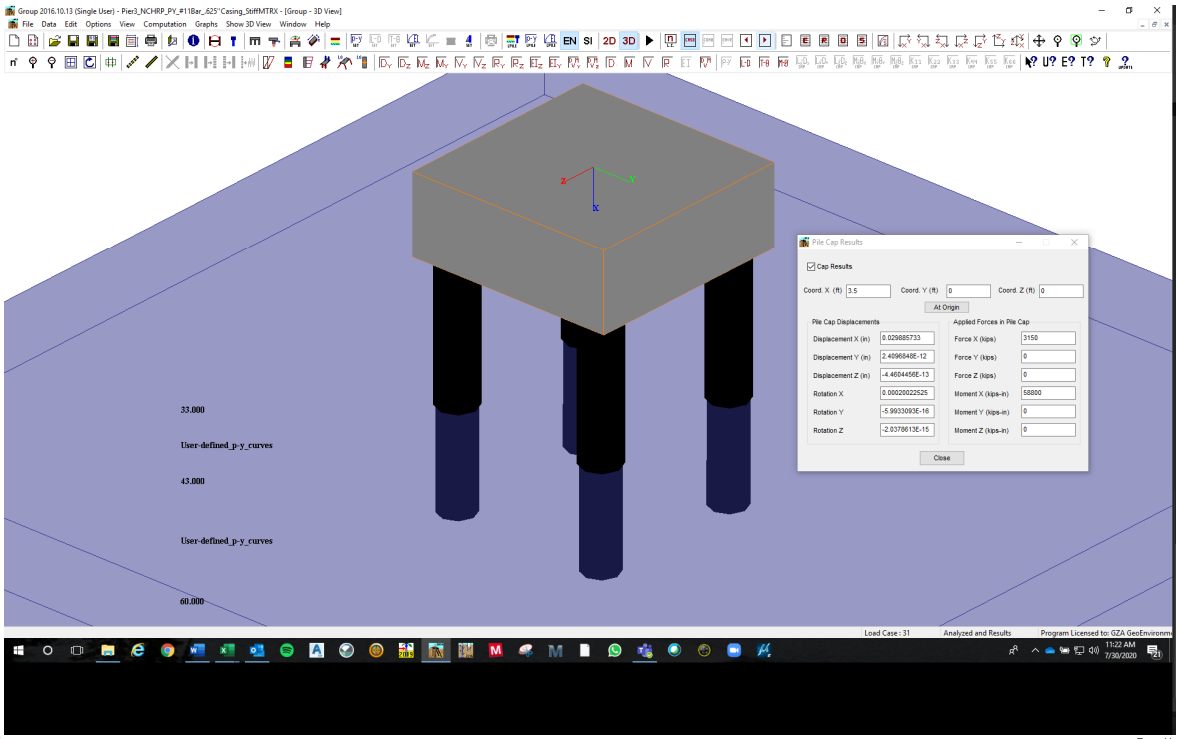

Group 2016.10.13 (Single User) - Pier3_NCHRP_PY_#11Bar_.625"Casing_StiffMTRX - [Group - 3D View]
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.029887139
Displacement Y (in) 3.7958122E-16
Displacement Z (in) 0.029359281
Rotation X -2.8314606E-15
Rotation Y 0.0001163525
Rotation Z -1.4968567E-19
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 364000
Moment Z (kips-in) 0
Close
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Load Case : 26
Analyzed and Results
11:22 AM
7/30/2020

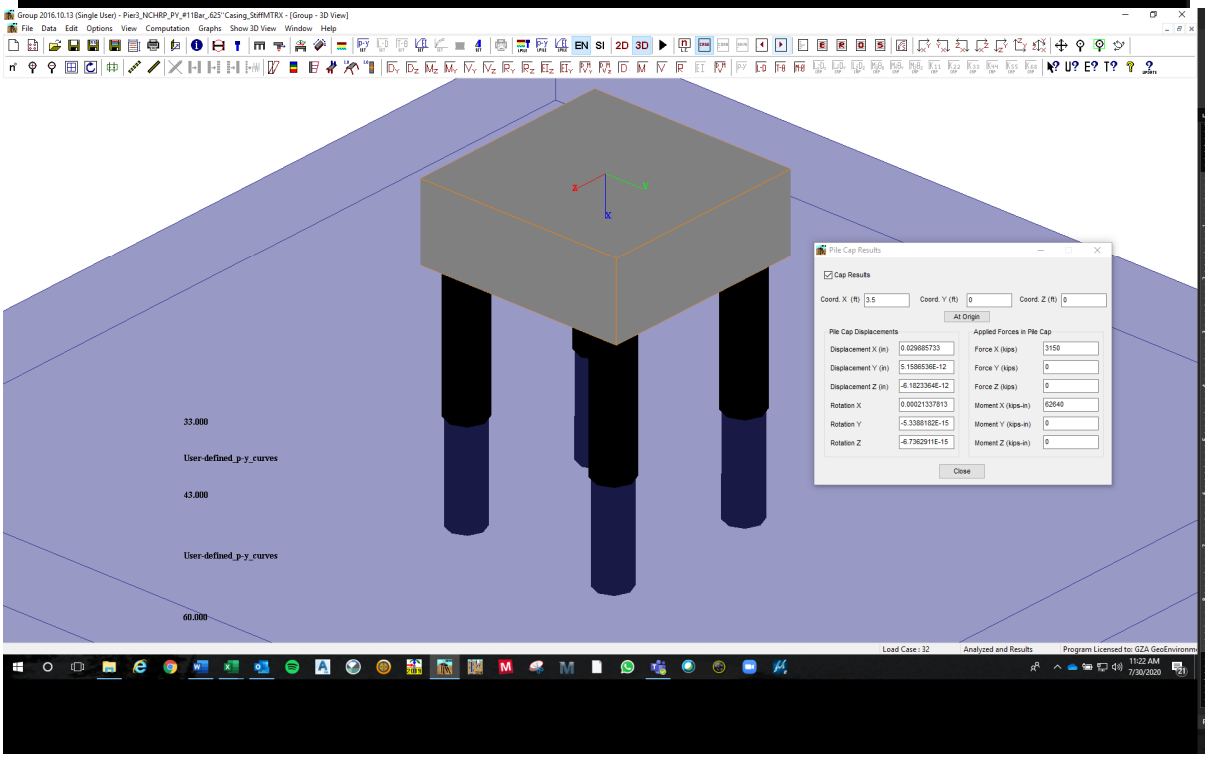

Group 2016.10.13 (Single User) - Pier3_NCHRP_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.029882807
Displacement Y (in) 1.8109963E-15
Displacement Z (in) 0.038733972
Rotation X -9.5081247E-15
Rotation Y 0.00015341352
Rotation Z -7.60152222E-19
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 348000
Moment Z (kips-in) 0
Close
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Load Case : 27
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
11:22 AM
7/30/2020

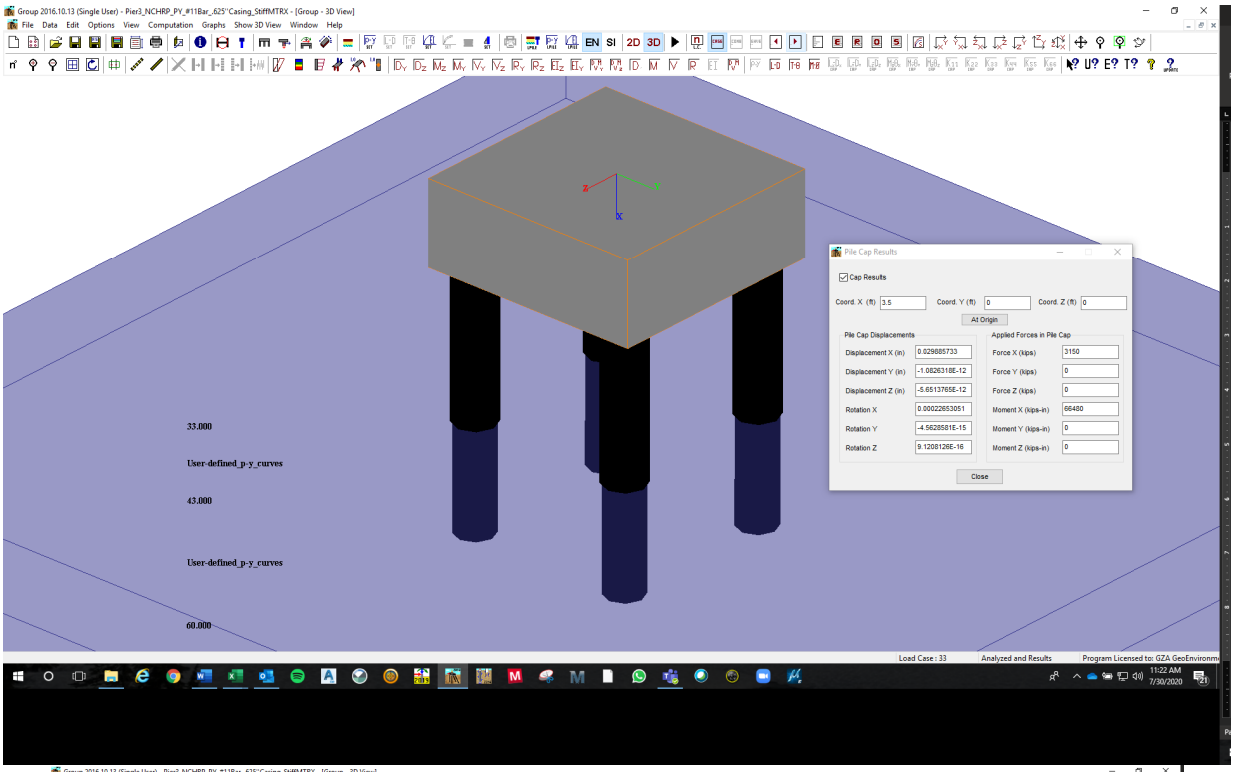

Group 2016.10.13 (Single User) - Pier3_NCHRP_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.029878475
Displacement Y (in) -2.1528177E-15
Displacement Z (in) 0.048124145
Rotation X 1.0340942E-14
Rotation Y 0.00019047414
Rotation Z 1.0064364E-16
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 432000
Moment Z (kips-in) 0
Close
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Load Case : 28
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
11:22 AM
7/30/2020

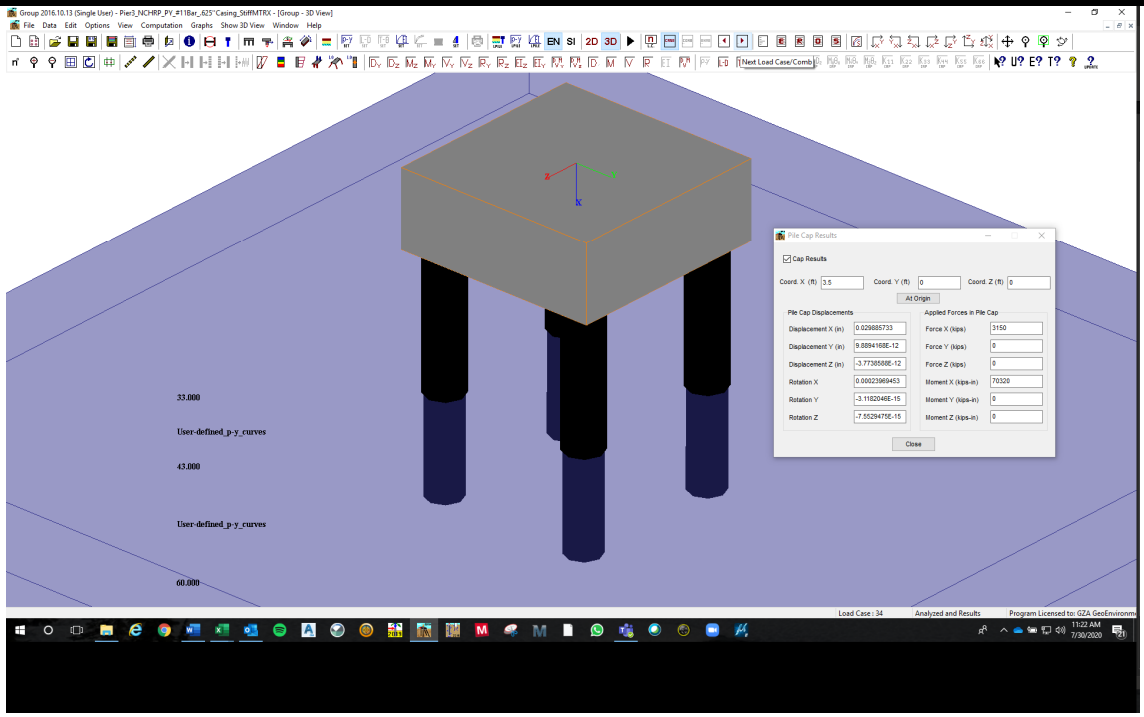

Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.029749069
Displacement Y (in) 8.124401E-16
Displacement Z (in) 0.05773178
Rotation X -2.946577E-15
Rotation Y 0.0002283730 7
Rotation Z -3.4887084E-19
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 516000
Moment Z (kips-in) 0
Close
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Load Case : 29
Analyzed and Results
11:22 AM
7/30/2020

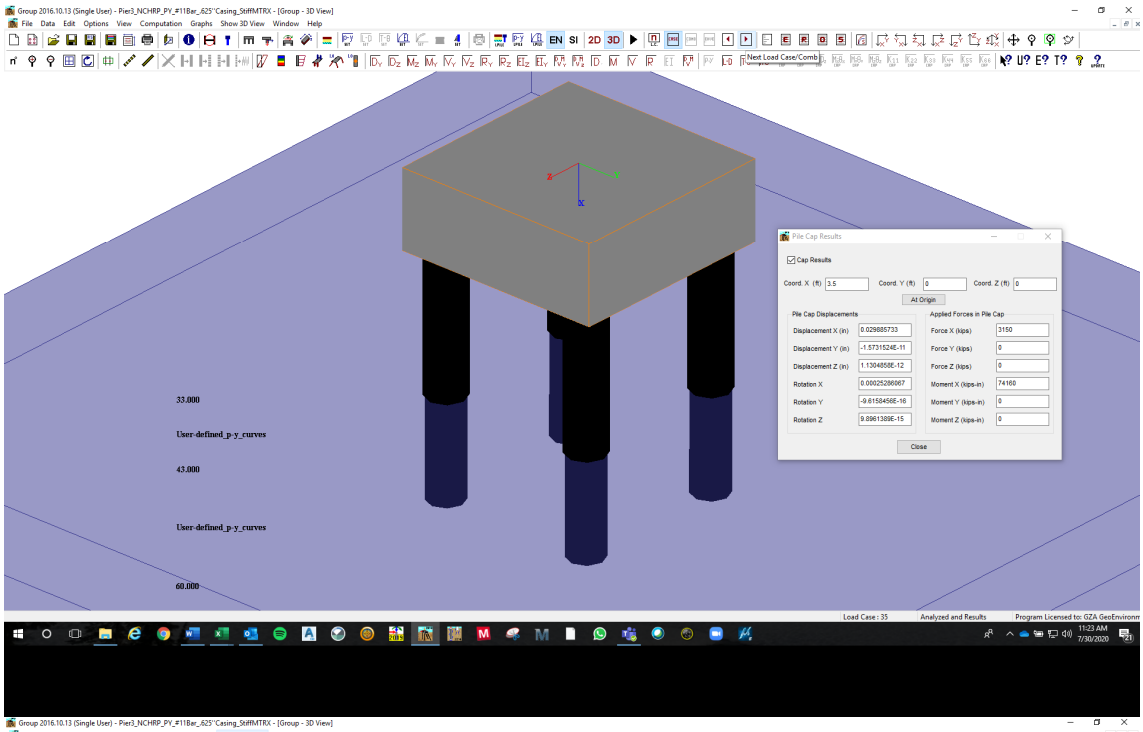

Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.029513656
Displacement Y (in) 1.963507 1E-15
Displacement Z (in) 0.057527026
Rotation X -5.96447 25E-15
Rotation Y 0.0002669823 4
Rotation Z -8.4725156E-19
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 600000
Moment Z (kips-in) 0
Close
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Load Case : 30
Analyzed and Results
11:22 AM
7/30/2020

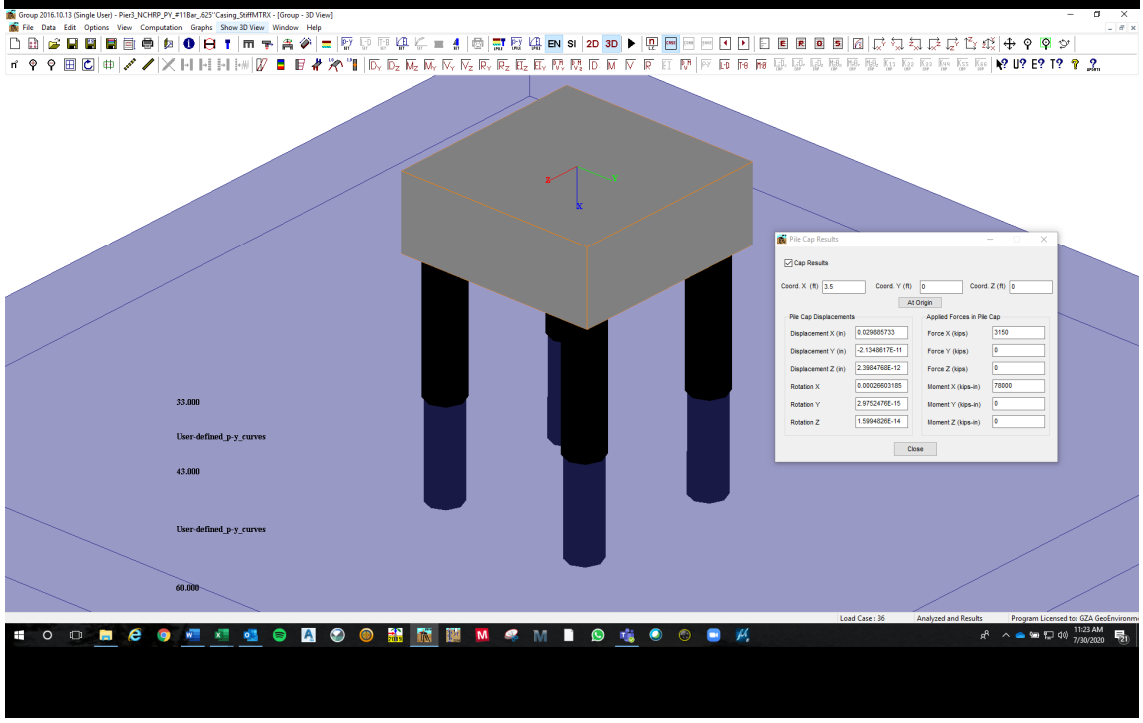

Group 2016.10.13 (Single User) - Pier3_NCHRP_PY_#11Bar_.625"Casing_StiffMTRX - [Group - 3D View]
File Data Edit Options View Computation Graphs Show 3D View Window Help
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.029885733
Displacement Y (in) 2.4096848E-12
Displacement Z (in) -4.4604456E-13
Rotation X 0.00020022525
Rotation Y -5.9933093E-16
Rotation Z -2.0378613E-15
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 58800
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Load Case : 31
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
11:22 AM
7/30/2020


Group 2016.10.13 (Single User) - Pier3_NCHRP_PY_#11Bar_.625"Casing_StiffMTRX - [Group - 3D View]
File Data Edit Options View Computation Graphs Show 3D View Window Help
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.029885733
Displacement Y (in) 5.1586536E-12
Displacement Z (in) -6.1823364E-12
Rotation X 0.00021337813
Rotation Y -5.3388182E-15
Rotation Z -6.7362911E-15
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 62640
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Load Case : 32
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
11:22 AM
7/30/2020


Group 2016.10.13 (Single User) - Pier3_NCHRP_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
File Data Edit Options View Computation Graphs Show 3D View Window Help
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.029885733
Displacement Y (in) -1.0826318E-12
Displacement Z (in) -5.6513765E-12
Rotation X 0.00022653051
Rotation Y -4.5628581E-15
Rotation Z 9.1208126E-16
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 66480
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Load Case : 33
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
11:22 AM
7/30/2020


Group 2016.10.13 (Single User) - Pier3_NCHRP_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
File Data Edit Options View Computation Graphs Show 3D View Window Help
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.029885733
Displacement Y (in) 9.8894168E-12
Displacement Z (in) -3.7736588E-12
Rotation X 0.00023969453
Rotation Y -3.1182046E-15
Rotation Z -7.5529475E-15
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 70320
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Load Case : 34
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
11:22 AM
7/30/2020


Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.029885733
Displacement Y (in) -1.5731524E-11
Displacement Z (in) 1.1304858E-12
Rotation X 0.00025286967
Rotation Y -9.6158456E-16
Rotation Z 9.8961389E-15
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 74160
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Load Case : 35
Analyzed and Results


Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.029885733
Displacement Y (in) -2.1349617E-11
Displacement Z (in) 2.3984768E-12
Rotation X 0.00026603185
Rotation Y 2.9752476E-15
Rotation Z 1.5994826E-14
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 78000
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Load Case : 36
Analyzed and Results

	Created: NVW	Date: 2020-07-30	Backchk'd:	Date:
	Checked: AH	Date: 2020-07-31	Updated:	Date:
Project: Madawaska Int'l Bridge	GZA job#: 09.0025984.03		Reviewed:	Date:

Madawaska Bridge Pier 3 Foundation Stiffness

Description: Input parameters in blue cells provided by GZA based on Group analyses using Weak rock model.

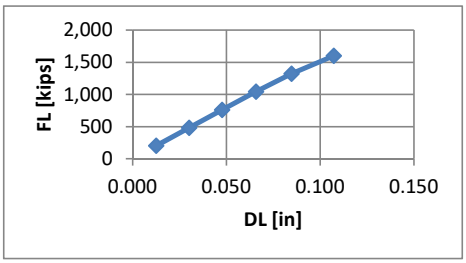
Red text indicates calculations prepared by HNTB. Plots prepared by HNTB

Pier 3 Casing Thickness Before 1/8" Corrosion (in): 0.75 Conditions: No Scour

Axial load for analysis Pa = 3150 kips For F_L, F_T, M_L, M_T & M_V

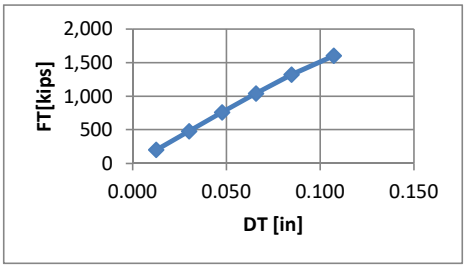
Longitudinal Force (X) (Z direction in Group)

F_L [kips]	δ_L [in]	$\Delta\delta_L$ [in]	θ_T [10^{-6} rad]	$\Delta\theta_T$ [10^{-6} rad]	$f_{FL,\delta L}$ [in/10^3 kips]	$f_{FL,\theta T}$ [10^{-6}rad/10^3 kips]
200	0.013	0.000	12.7	0		
480	0.030	0.018	31	18	0.063	64
760	0.048	0.035	48	36	0.063	64
1,040	0.066	0.053	66	53	0.063	63
1,320	0.085	0.072	83	70	0.064	63
1,600	0.107	0.095	98	86	0.068	61



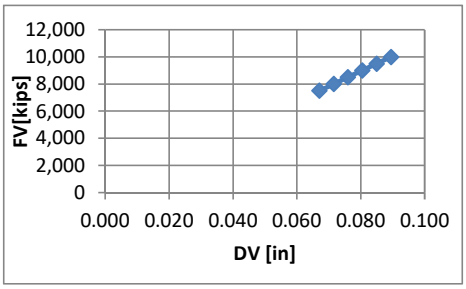
Transverse Force (Y)

F_T [kips]	δ_T [in]	$\Delta\delta_T$ [in]	θ_L [10^{-6} rad]	$\Delta\theta_L$ [10^{-6} rad]	$f_{FT,\delta T}$ [in/10^3 kips]	$f_{FT,\theta L}$ [10^{-6}rad/10^3 kips]
200	0.013	0.000	-13	0		
480	0.030	0.018	-31	-18	0.063	-64
760	0.048	0.035	-48	-36	0.063	-64
1,040	0.066	0.053	-66	-53	0.063	-63
1,320	0.085	0.072	-83	-70	0.064	-63
1,600	0.107	0.095	-98	-86	0.068	-61



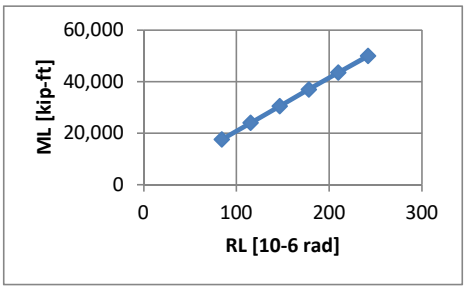
Vertical Force (z) (X Direction in Group)

F_V [kips]	δ_V [in]	$\Delta\delta_V$ [in]	$f_{FV,\delta V}$ [in/10^6 kips]
7,500	0.067	0.000	
8,000	0.072	0.004	8.962
8,500	0.076	0.009	8.962
9,000	0.080	0.013	8.962
9,500	0.085	0.018	8.962
10,000	0.089	0.022	8.962



Moment About Long Axis (X) (Z axis in Group)

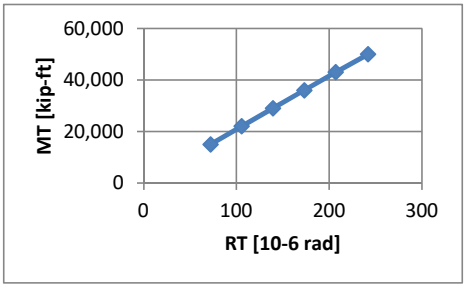
M_L [kip-ft]	δ_T [in]	$\Delta\delta_T$ [in]	θ_L [10^{-6} rad]	$\Delta\theta_L$ [10^{-6} rad]	$f_{ML,\delta T}$ in/10^6 kip-ft	$f_{ML,\theta L}$ [10^{-6} rad/10^6 kip-ft]
17,500	-0.013	0.000	84	0		
24,000	-0.018	-0.005	115	31	-0.765	4,805
30,500	-0.023	-0.010	147	62	-0.765	4,806
37,000	-0.028	-0.015	178	94	-0.765	4,807
43,500	-0.033	-0.020	210	125	-0.768	4,826
50,000	-0.038	-0.025	242	158	-0.773	4,857



	Created: NVW	Date: 2020-07-30	Backchk'd:	Date:
	Checked: AH	Date: 2020-07-31	Updated:	Date:
Project: Madawaska Int'l Bridge	GZA job#: 09.0025984.03		Reviewed:	Date:

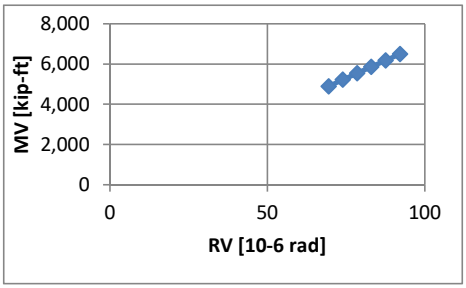
Moment About Trans Axis (Y)

M_T [kip-ft]	δ_L [in]	$\Delta\delta_T$ [in]	θ_T [10^{-6} rad]	$\Delta\theta_T$ [10^{-6} rad]	$f_{MT,\delta L}$ in/10^6 kip-ft	$f_{MT,\theta T}$ [10^{-6} rad/10^6 kip-ft]
15,000	0.011	0.000	72	0		
22,000	0.017	0.005	106	34	0.765	4,804
29,000	0.022	0.011	139	67	0.765	4,806
36,000	0.028	0.016	173	101	0.765	4,806
43,000	0.033	0.021	207	135	0.767	4,821
50,000	0.038	0.027	242	170	0.772	4,853



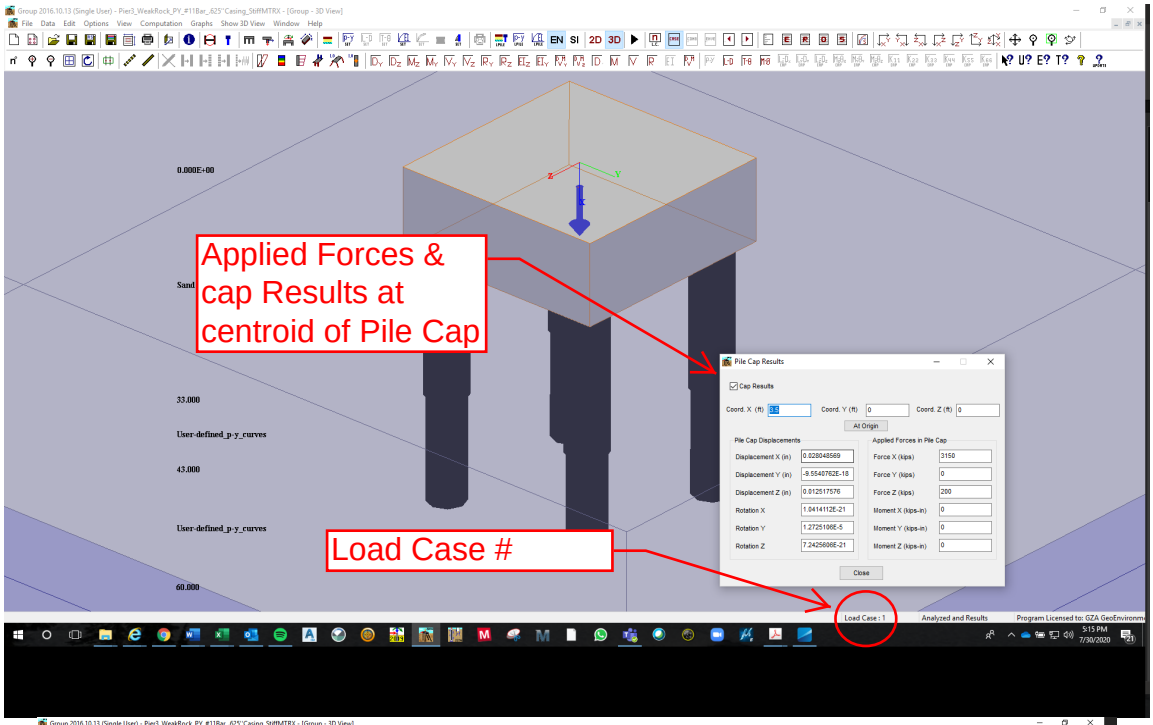
Moment About Vertical Axis (z) (X axis in Group)

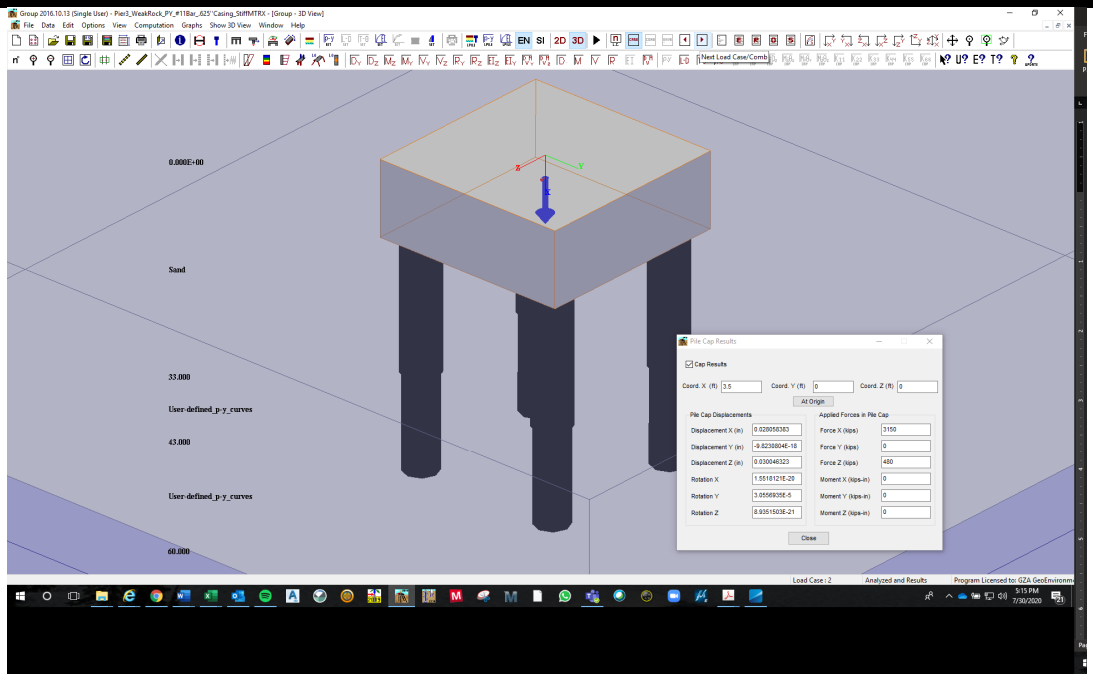
M_V [kip-ft]	θ_V [10^{-6} rad]	$\Delta\theta_V$ [10^{-6} rad]	$f_{MV,\theta V}$ [10^{-6} rad/10^6 kip-ft]
4,900	69	0	
5,220	74	5	14,164
5,540	78	9	14,164
5,860	83	14	14,164
6,180	88	18	14,164
6,500	92	23	14,164

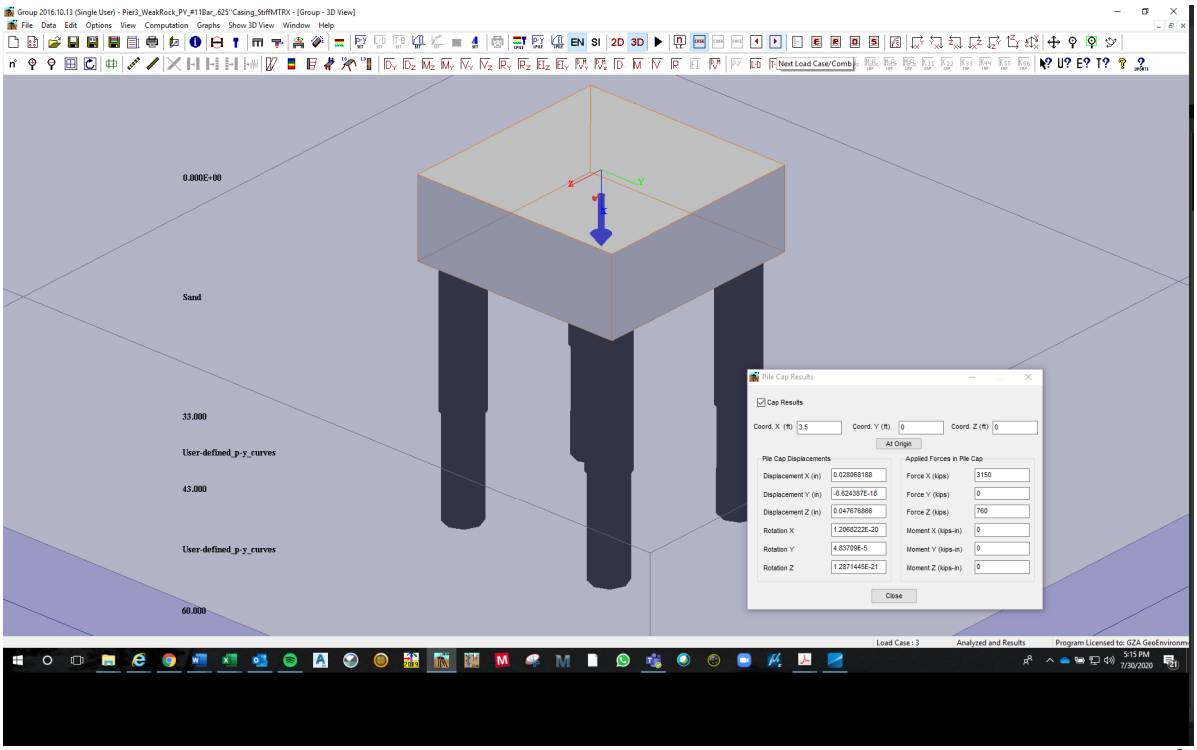


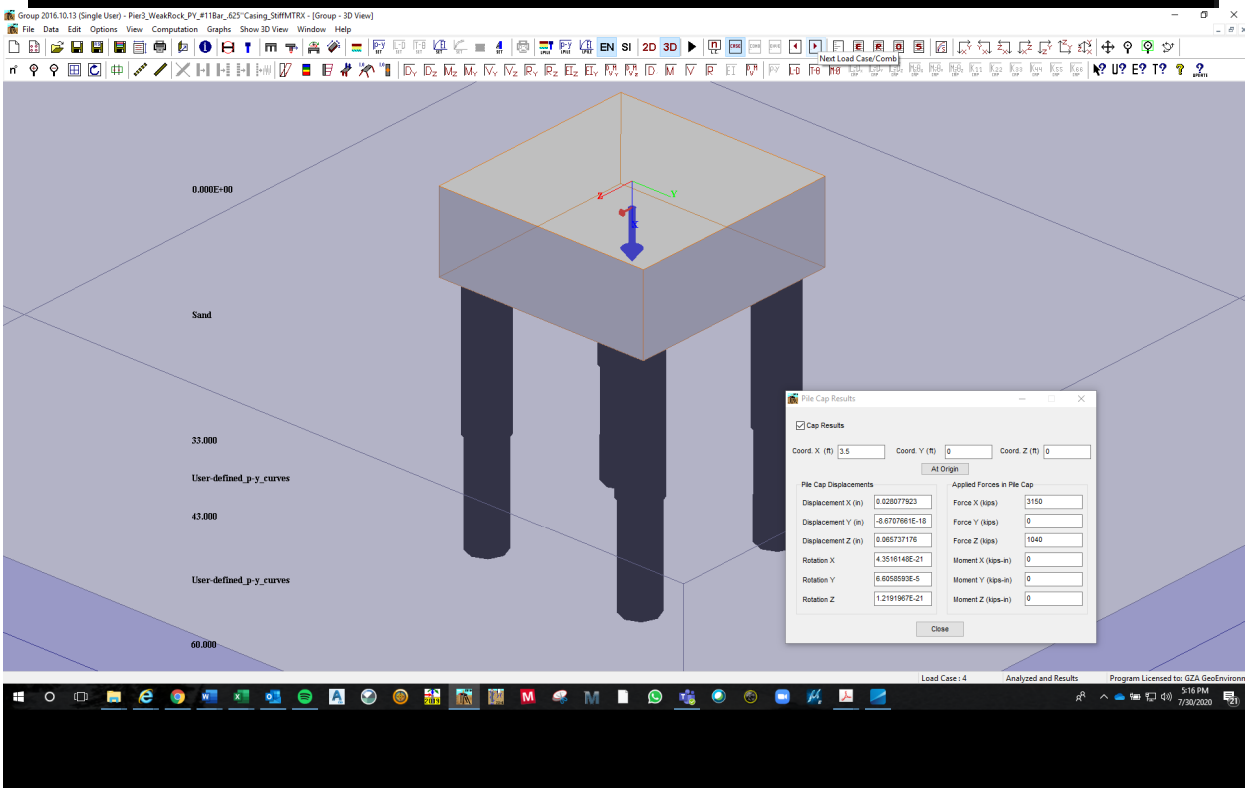
<u>Pier 3 No Scour w/Weak Rock</u> deisgn parameters.

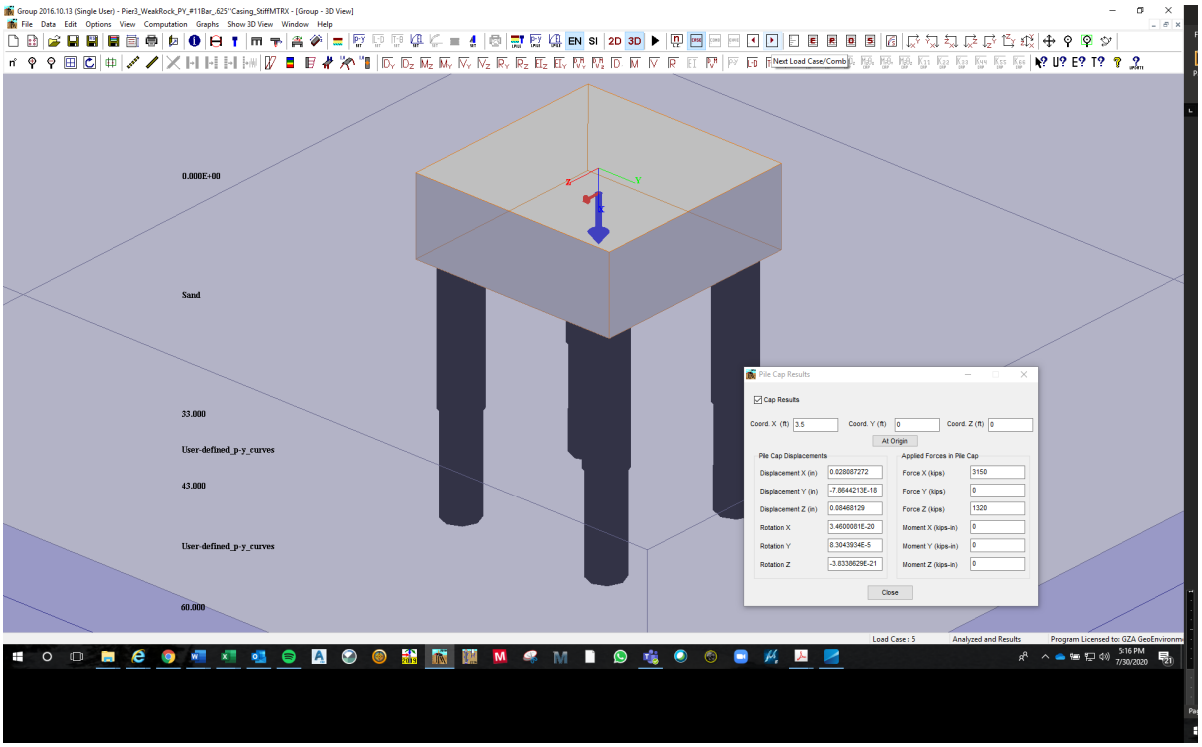
Note: Loads/moments were applied to the centroid of pile cap. Displacements/Rotations are taken at the centroid of the footing (x = 3.5', below origin)

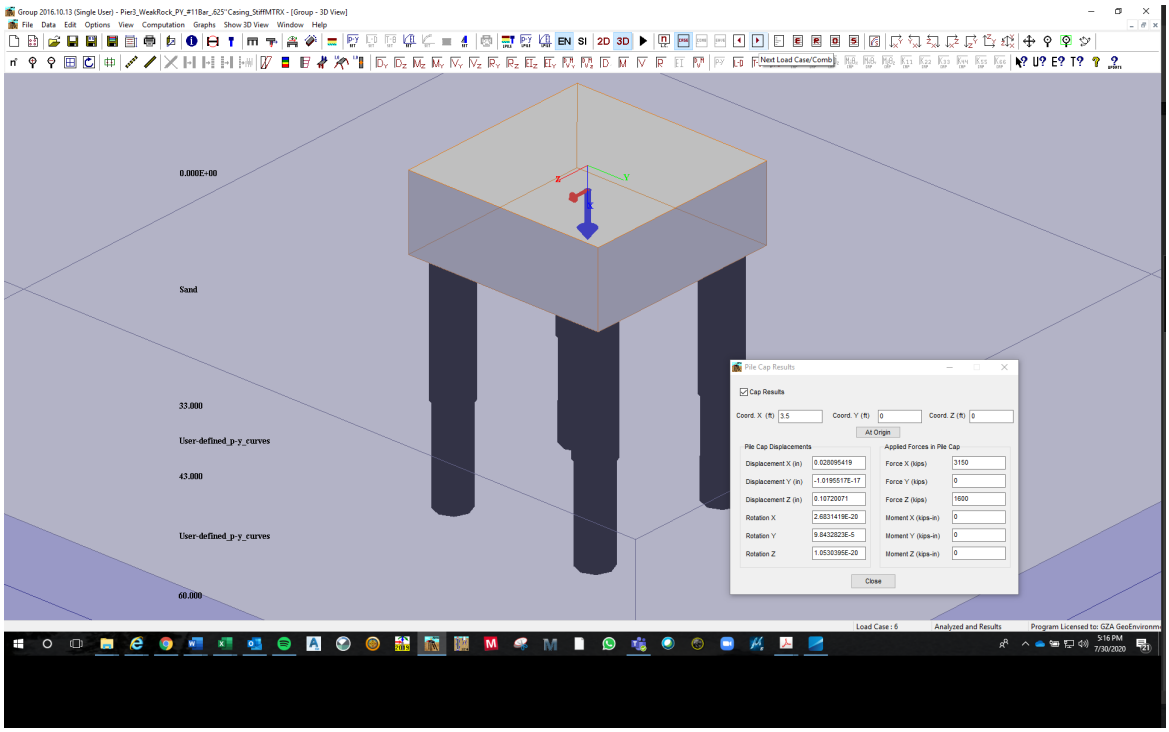


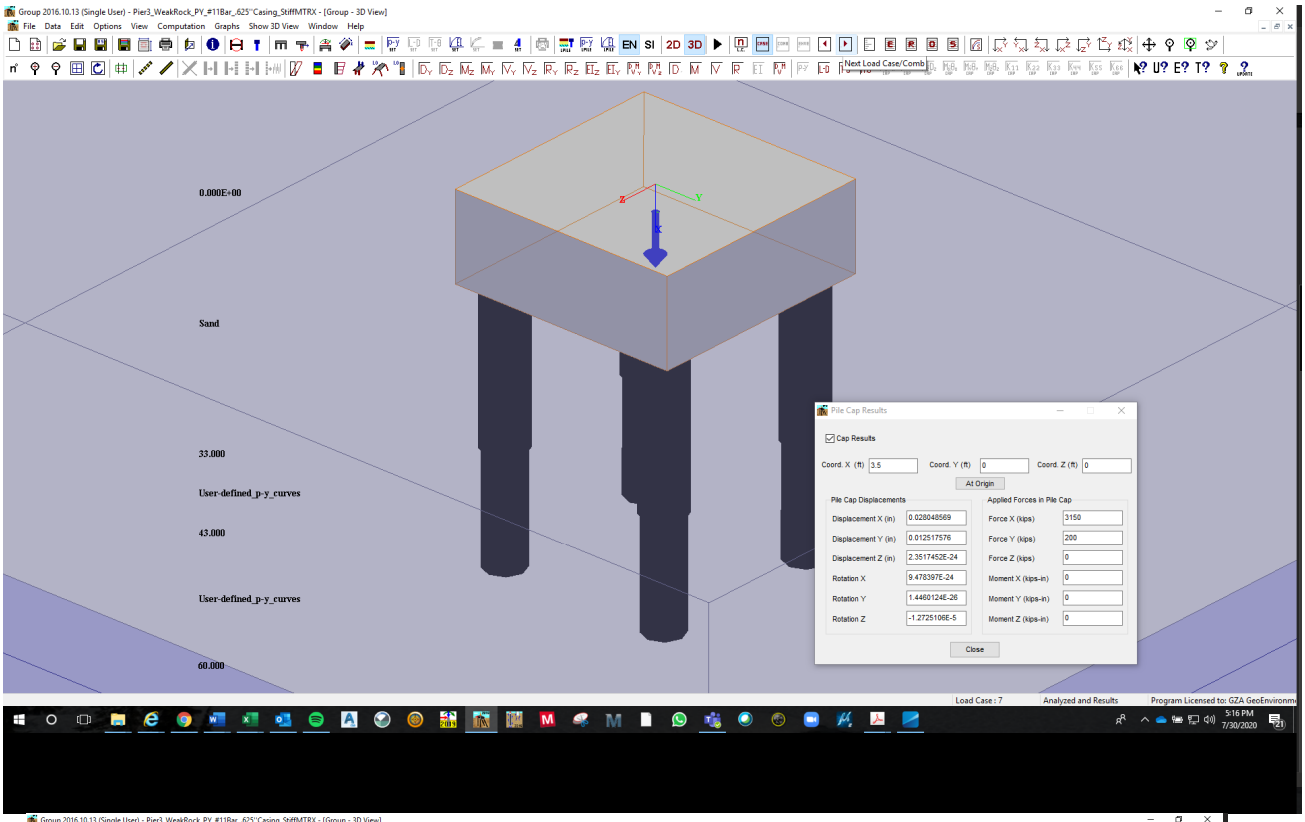


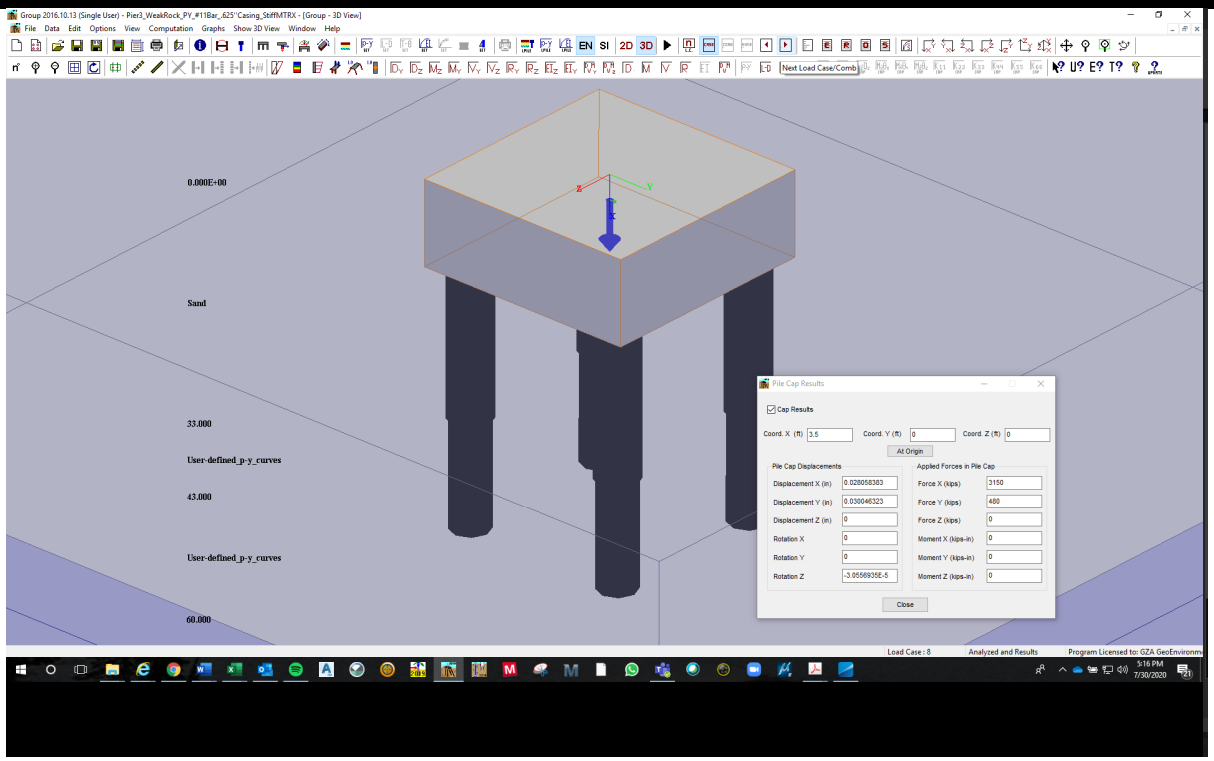

Group 2016.10.13 (Single User) - Pier3_WeakRock_PY_#11Bar_.625"Casing_StiffMTRX - [Group - 3D View]
0.000E+00
Sand
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.028868188
Displacement Y (in) -8.624367E-18
Displacement Z (in) 0.047676866
Rotation X 1.206822E-20
Rotation Y 4.83709E-5
Rotation Z 1.2871445E-21
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 760
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 3
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
5:15 PM
7/30/2020

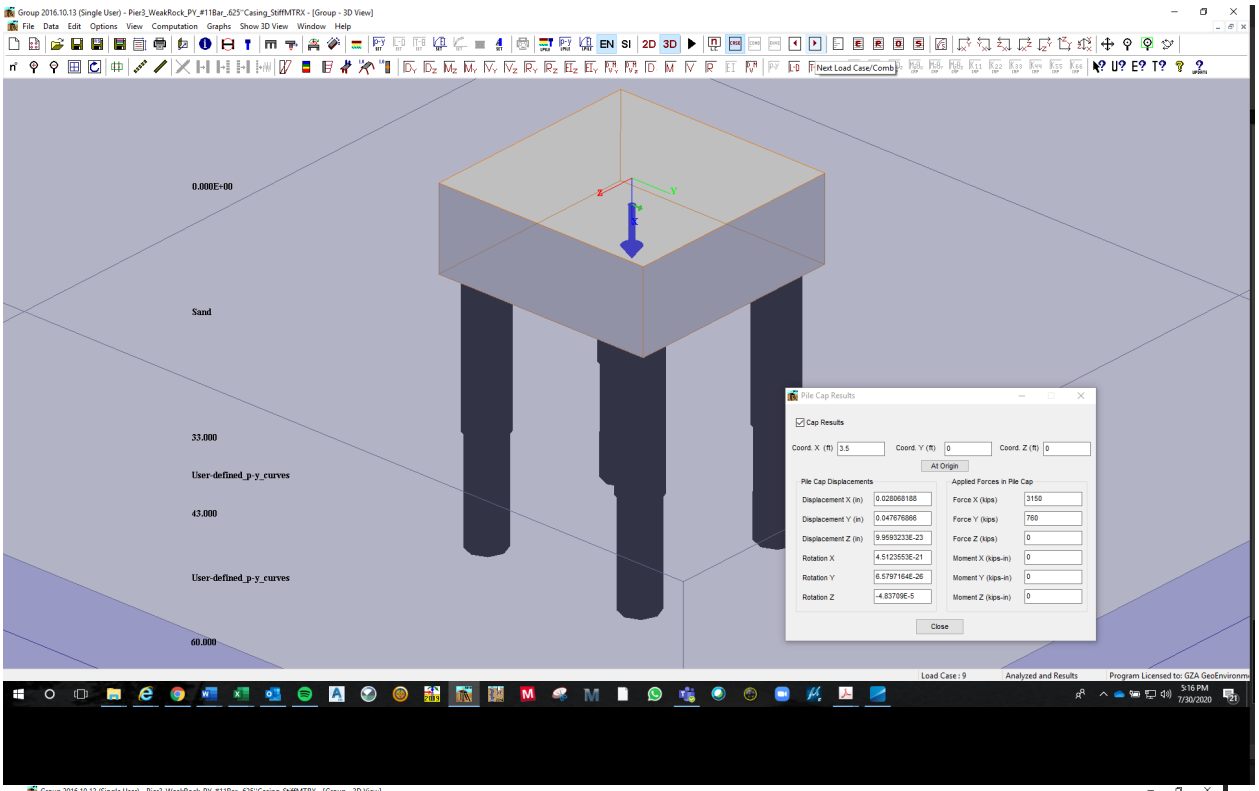

Group 2016.10.13 (Single User) - Pier3_WeakRock_PY_#11Bar_.625"Casing_StiffMTRX - [Group - 3D View]
0.000E+00
Sand
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.028077923
Displacement Y (in) -8.6707661E-18
Displacement Z (in) 0.065737176
Rotation X 4.3516148E-21
Rotation Y 6.6058593E-5
Rotation Z 1.2191967E-21
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 1040
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 4
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
5:16 PM
7/30/2020

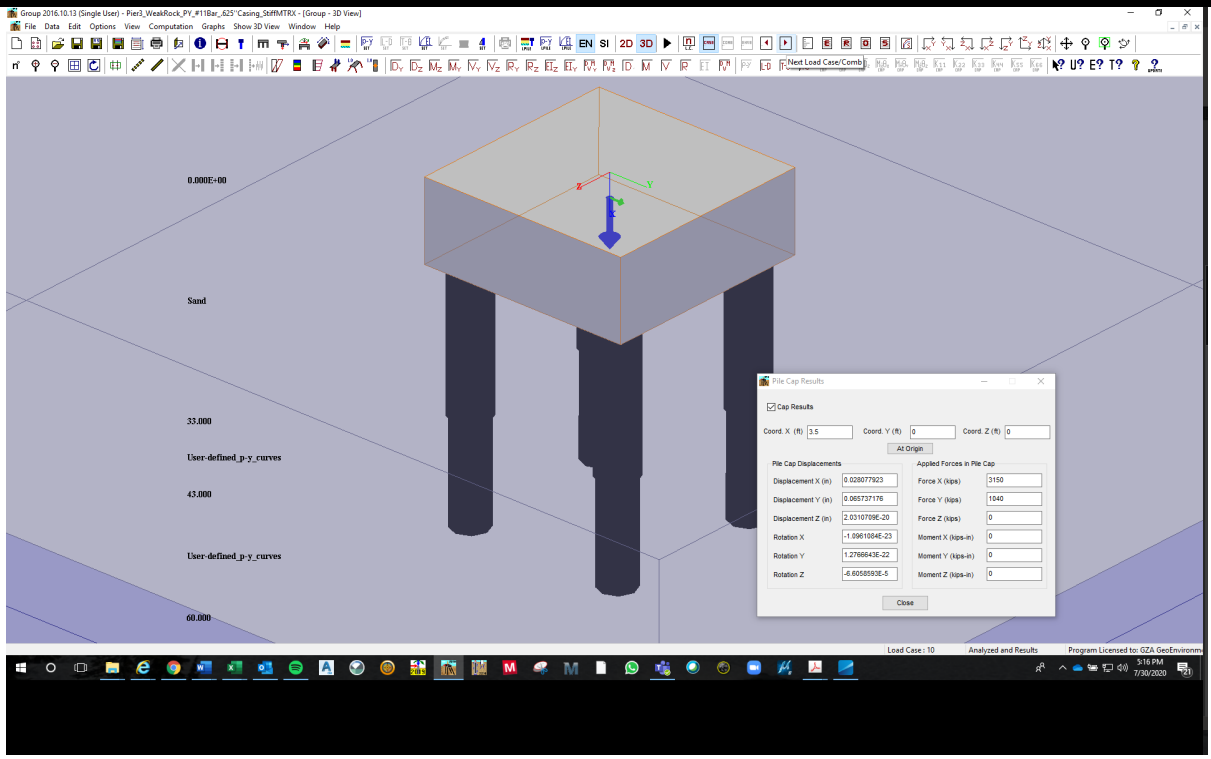

0.000E+00
Sand
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.028087272
Displacement Y (in) -7.8644213E-18
Displacement Z (in) 0.08468129
Rotation X 3.46000681E-20
Rotation Y 8.3043934E-5
Rotation Z -3.85386529E-21
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 1320
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 5
Analyzed and Results

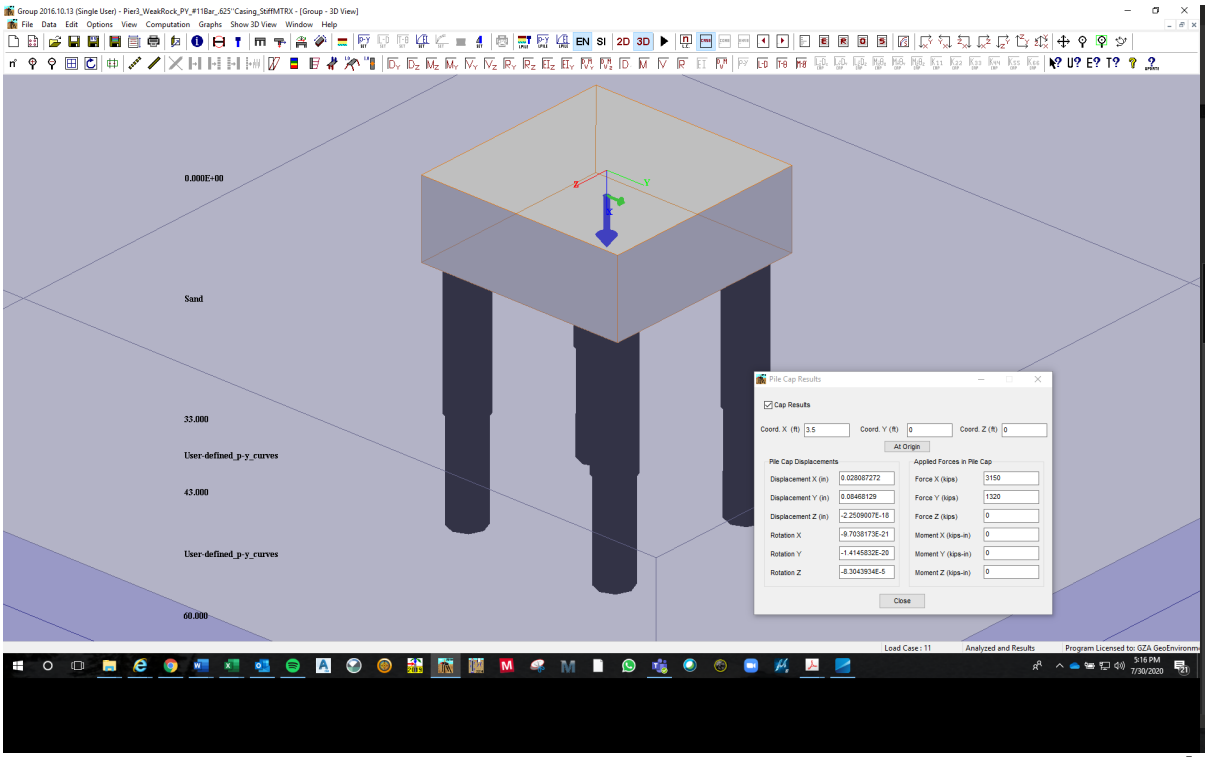

0.000E+00
Sand
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.028095419
Displacement Y (in) -1.01955175-17
Displacement Z (in) 0.10720071
Rotation X 2.68314195-20
Rotation Y 9.8432823E-5
Rotation Z 1.0530395E-20
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 1600
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 6
Analyzed and Results

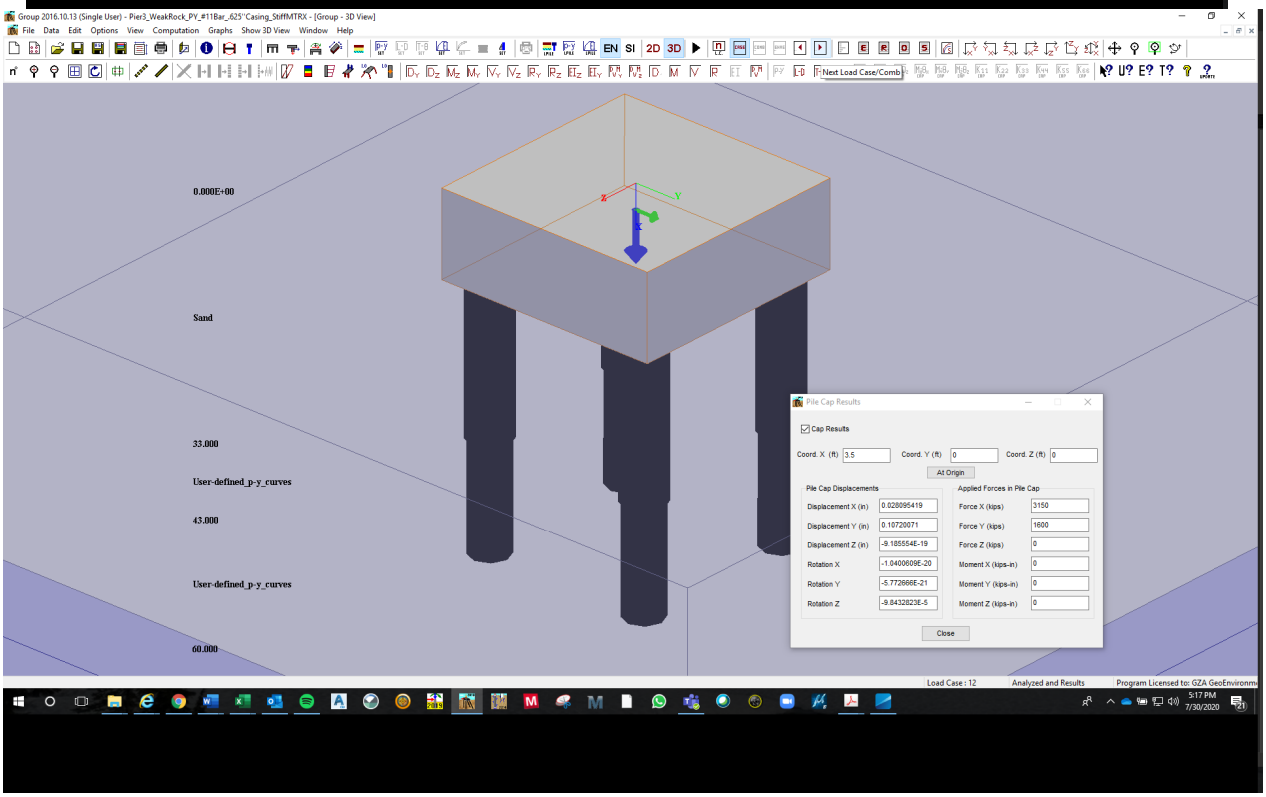

Group 2016.10.13 (Single User) - Pier3_WeakRock_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
0.000E+00
Sand
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.028048569
Displacement Y (in) 0.012517576
Displacement Z (in) 2.3517452E-24
Rotation X 9.478397E-24
Rotation Y 1.4460124E-26
Rotation Z -1.2725106E-5
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 200
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 7
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
5:16 PM
7/30/2020

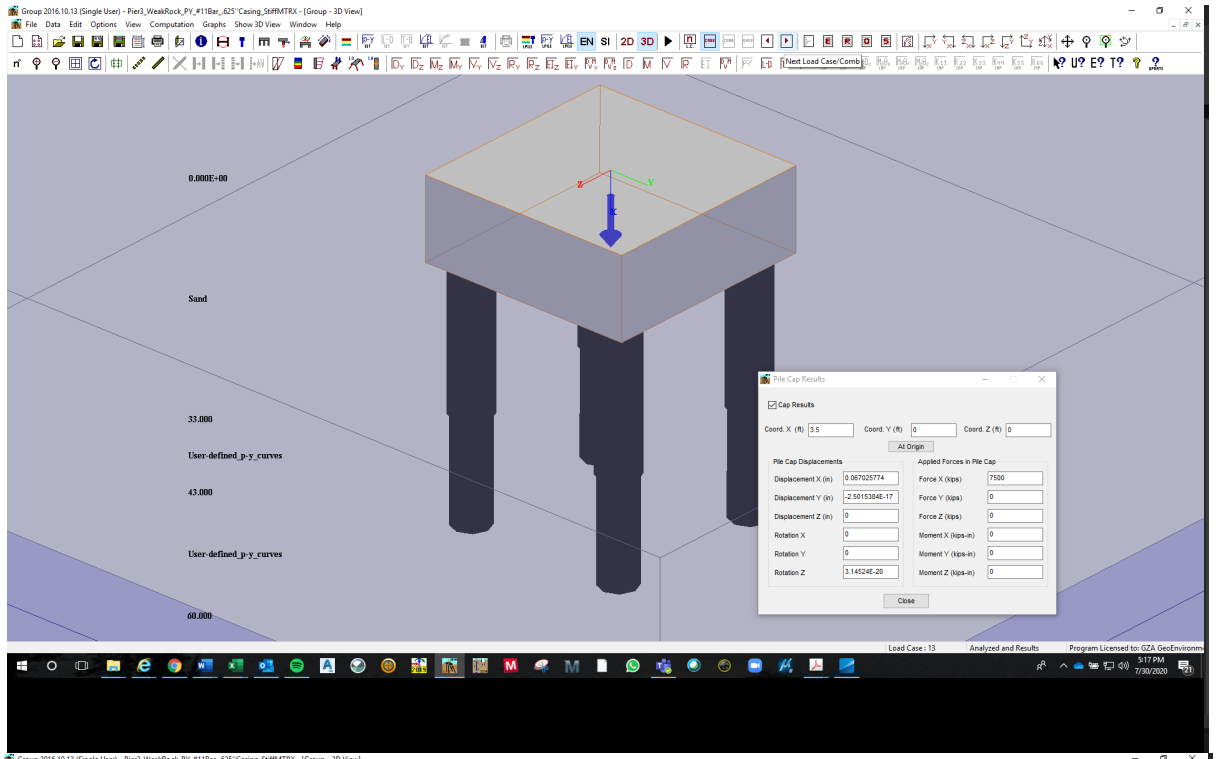

Group 2016.10.13 (Single User) - Pier3_WeakRock_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
0.000E+00
Sand
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.028058383
Displacement Y (in) 0.030046323
Displacement Z (in) 0
Rotation X 0
Rotation Y 0
Rotation Z -3.6566935E-5
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 480
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 8
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
5:16 PM
7/30/2020

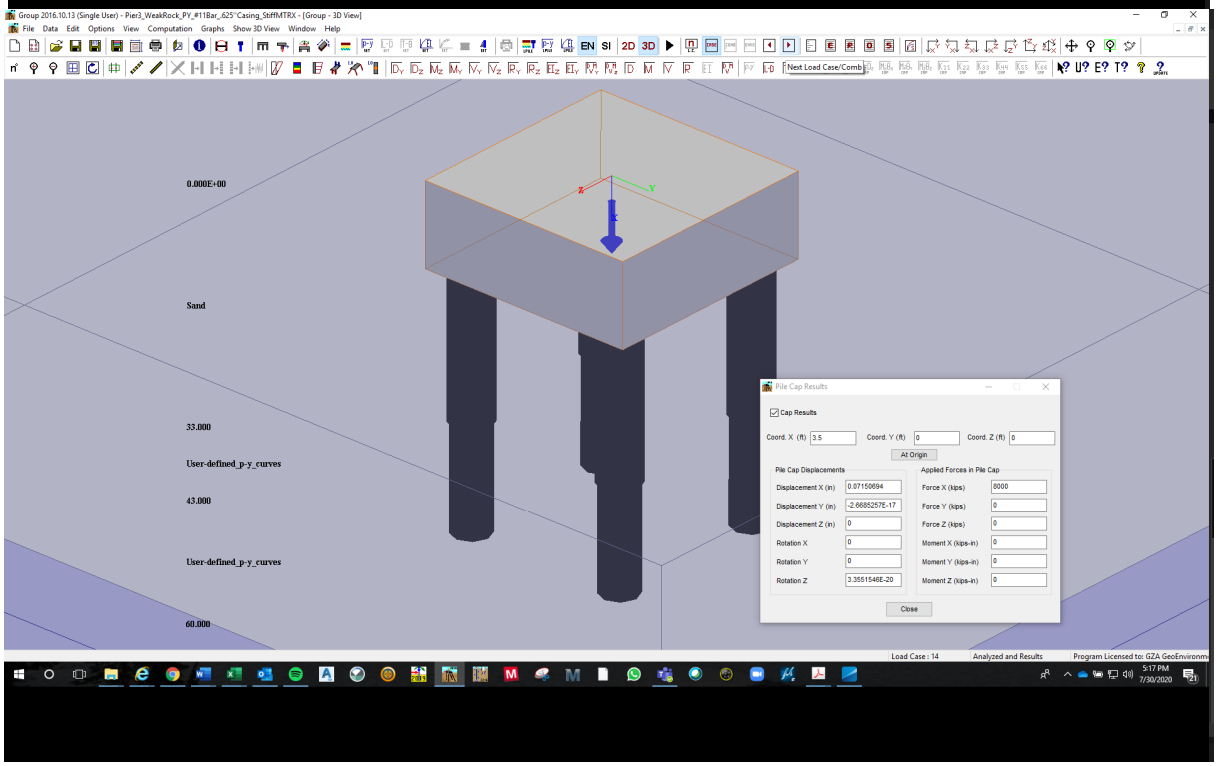

Group 2016.10.13 (Single User) - Pier3_WeakRock_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
0.000E+00
Sand
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.028868188
Displacement Y (in) 0.047676866
Displacement Z (in) 9.9593233E-23
Rotation X 4.5123553E-21
Rotation Y 6.5797164E-26
Rotation Z -4.83709E-5
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 760
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 9
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
5:16 PM
7/30/2020

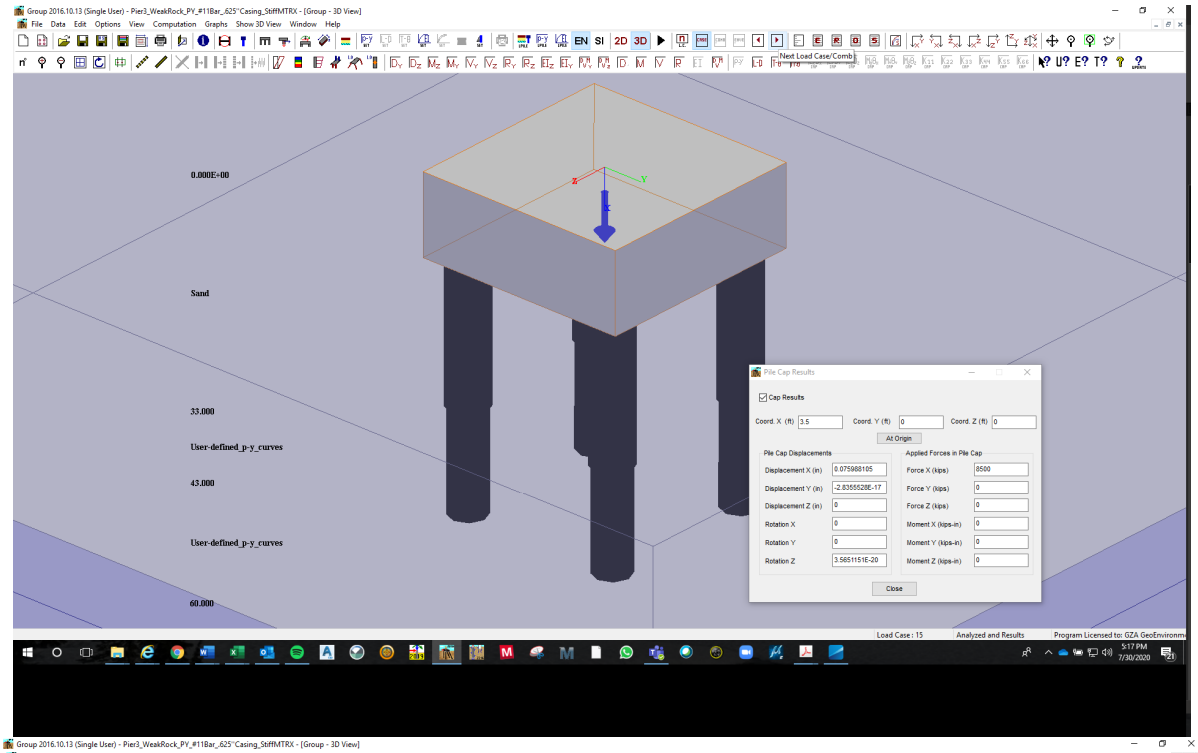

Group 2016.10.13 (Single User) - Pier3_WeakRock_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
0.000E+00
Sand
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.028077923
Displacement Y (in) 0.065737176
Displacement Z (in) 2.0310709E-20
Rotation X -1.0961084E-23
Rotation Y 1.2766643E-22
Rotation Z -6.6058593E-5
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 1040
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 10
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
5:16 PM
7/30/2020

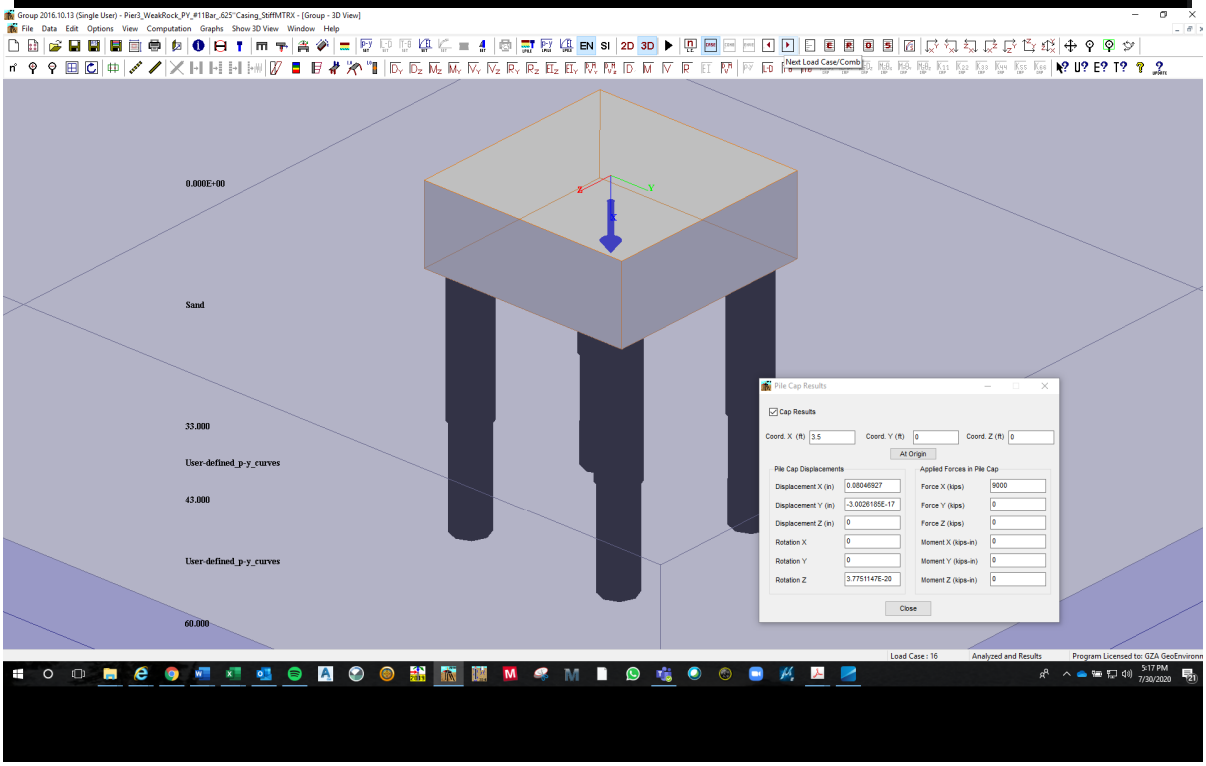

Group 2016.10.13 (Single User) - Pier3_WeakRock_PY_#11Bar_.625"Casing_StiffMTRX - [Group - 3D View]
0.000E+00
Sand
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.028087272
Displacement Y (in) 0.08468129
Displacement Z (in) -2.2509007E-18
Rotation X -9.7038173E-21
Rotation Y -1.4145832E-20
Rotation Z -8.3043934E-5
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 1320
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 11
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
5:16 PM
7/30/2020

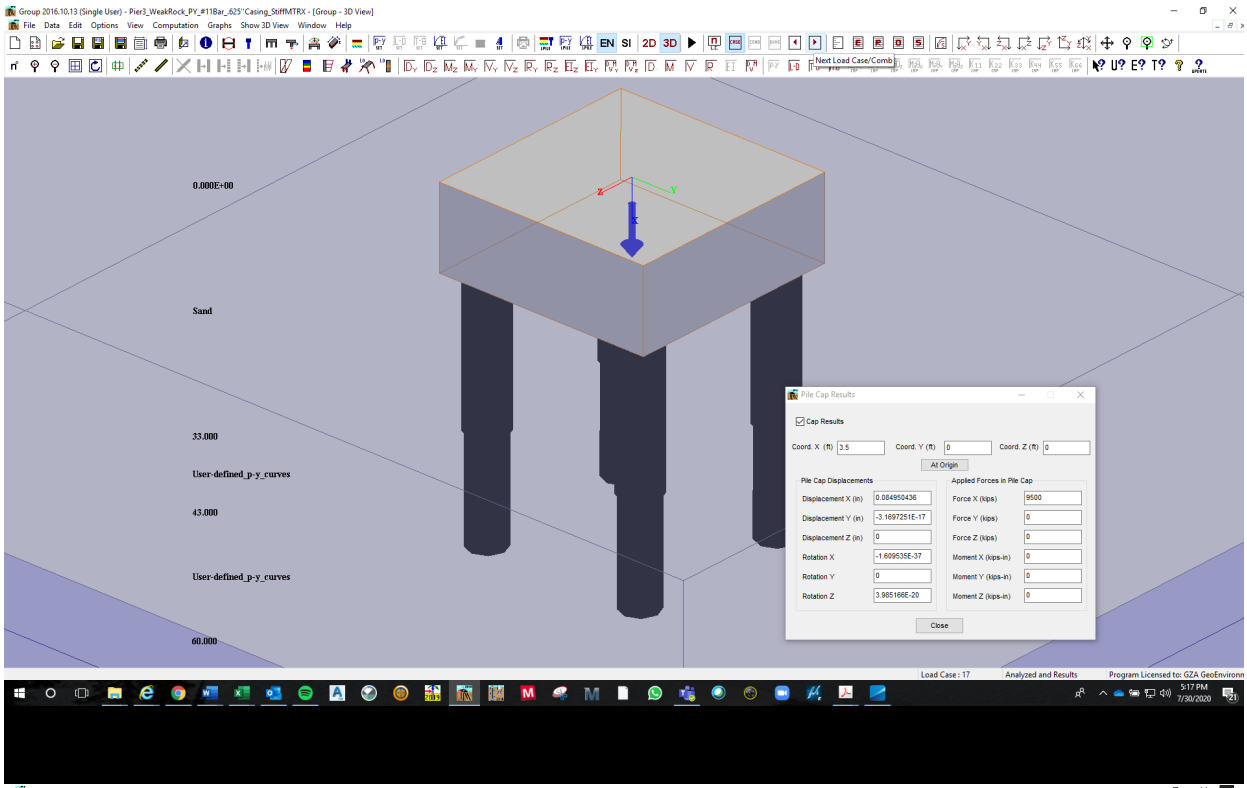

Group 2016.10.13 (Single User) - Pier3_WeakRock_PY_#11Bar_.625"Casing_StiffMTRX - [Group - 3D View]
0.000E+00
Sand
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.028095419
Displacement Y (in) 0.10720071
Displacement Z (in) -9.185554E-19
Rotation X -1.0400609E-20
Rotation Y -5.772666E-21
Rotation Z -9.8432823E-5
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 1600
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 12
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
5:17 PM
7/30/2020

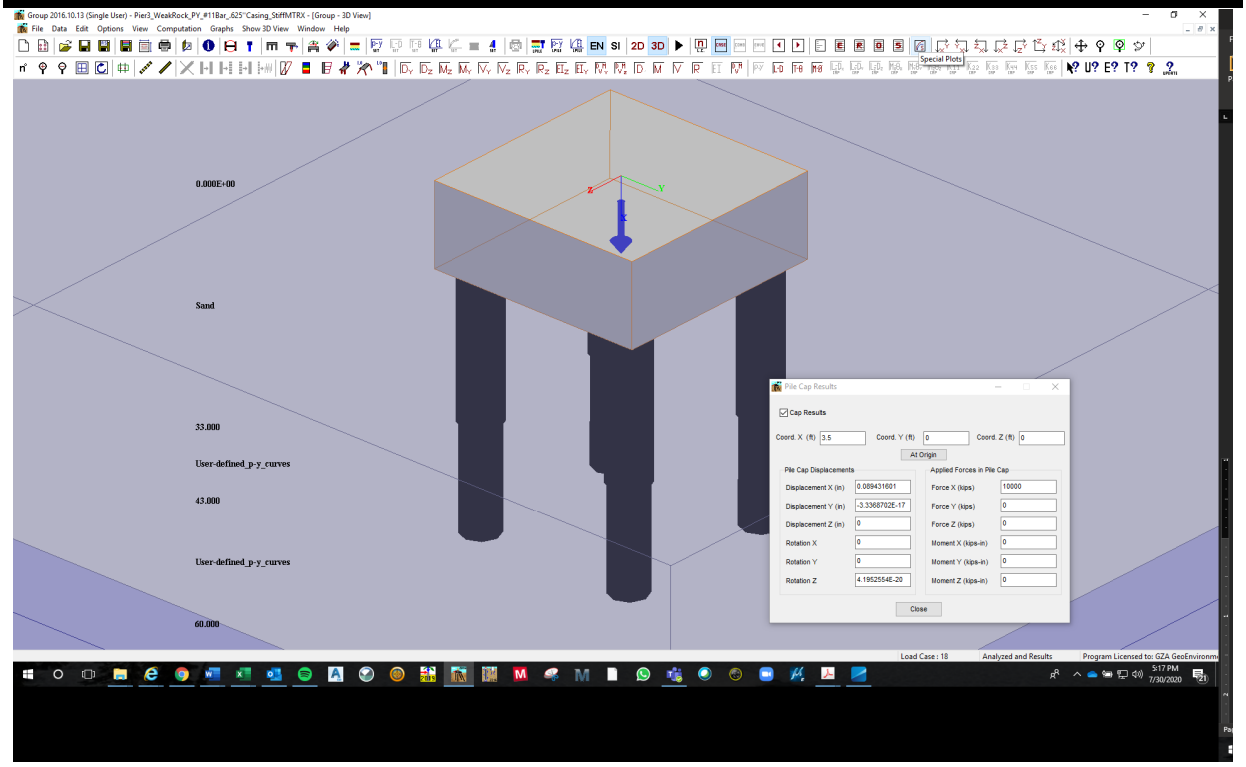

Group 2016.10.13 (Single User) - Pier3_WeakRock_PY_#11Bar_.625"Casing_StiffMTRX - [Group - 3D View]
0.000E+00
Sand
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.067025774
Displacement Y (in) -2.5015384E-17
Displacement Z (in) 0
Rotation X 0
Rotation Y 0
Rotation Z 3.14524E-20
Applied Forces in Pile Cap
Force X (kips) 7500
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 13
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
5:17 PM
7/30/2020

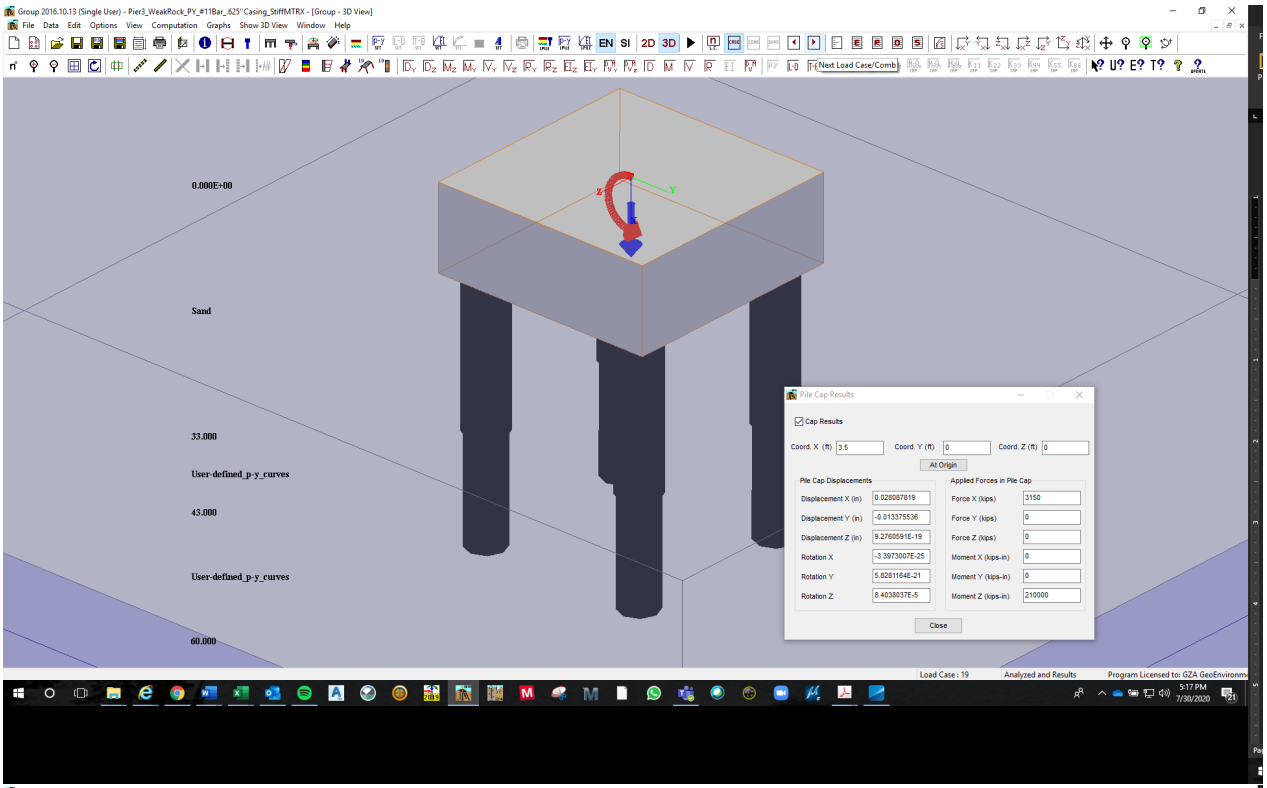

Group 2016.10.13 (Single User) - Pier3_WeakRock_PY_#11Bar_.625"Casing_StiffMTRX - [Group - 3D View]
0.000E+00
Sand
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.07150694
Displacement Y (in) -2.66852576-17
Displacement Z (in) 0
Rotation X 0
Rotation Y 0
Rotation Z 3.3551546E-20
Applied Forces in Pile Cap
Force X (kips) 8000
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 14
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
5:17 PM
7/30/2020

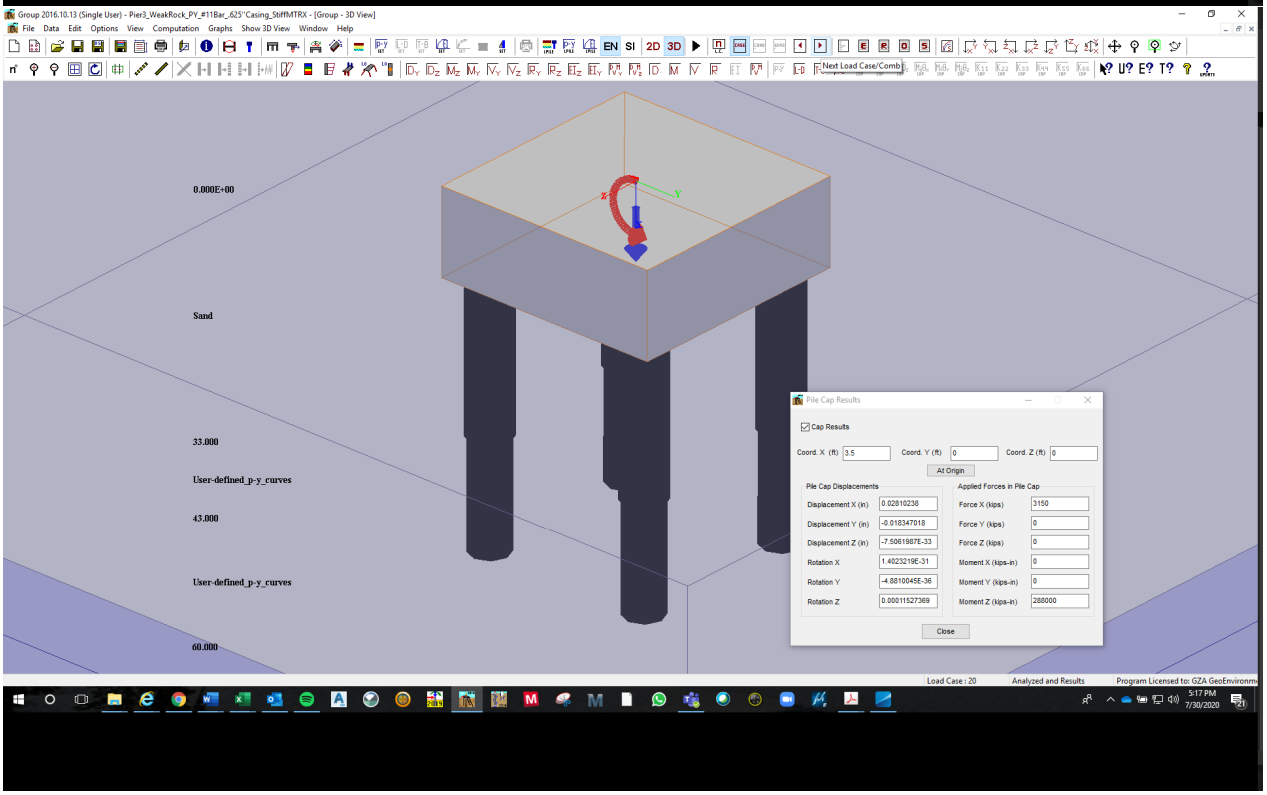

Group 2016.10.13 (Single User) - Pier3_WeakRock_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
0.000E+00
Sand
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.075988105
Displacement Y (in) -2.8355528E-17
Displacement Z (in) 0
Rotation X 0
Rotation Y 0
Rotation Z 3.56511515E-20
Applied Forces in Pile Cap
Force X (kips) 8500
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 15
Analyzed and Results
Program Licensed to: GZA GeoEnvironm

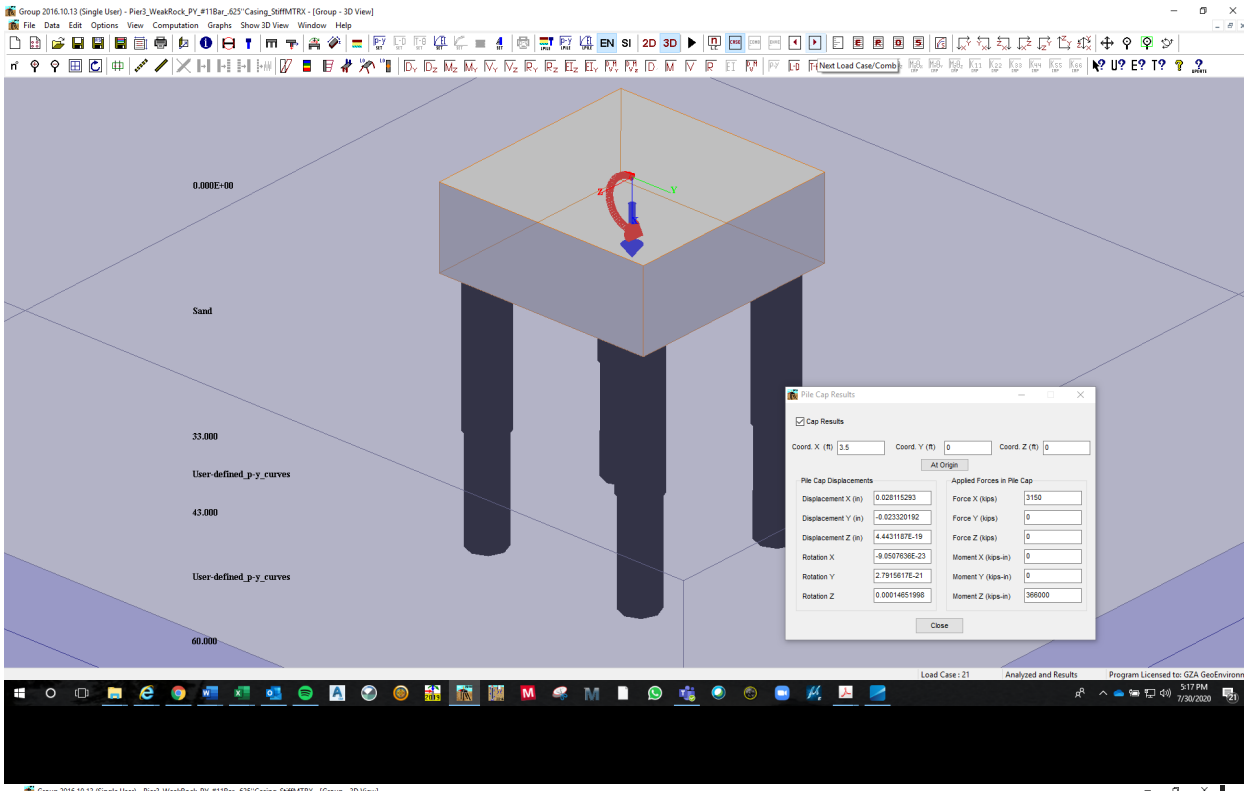

Group 2016.10.13 (Single User) - Pier3_WeakRock_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
0.000E+00
Sand
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.08046927
Displacement Y (in) -3.00261855E-17
Displacement Z (in) 0
Rotation X 0
Rotation Y 0
Rotation Z 3.77511147E-20
Applied Forces in Pile Cap
Force X (kips) 9000
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 16
Analyzed and Results
Program Licensed to: GZA GeoEnvironm

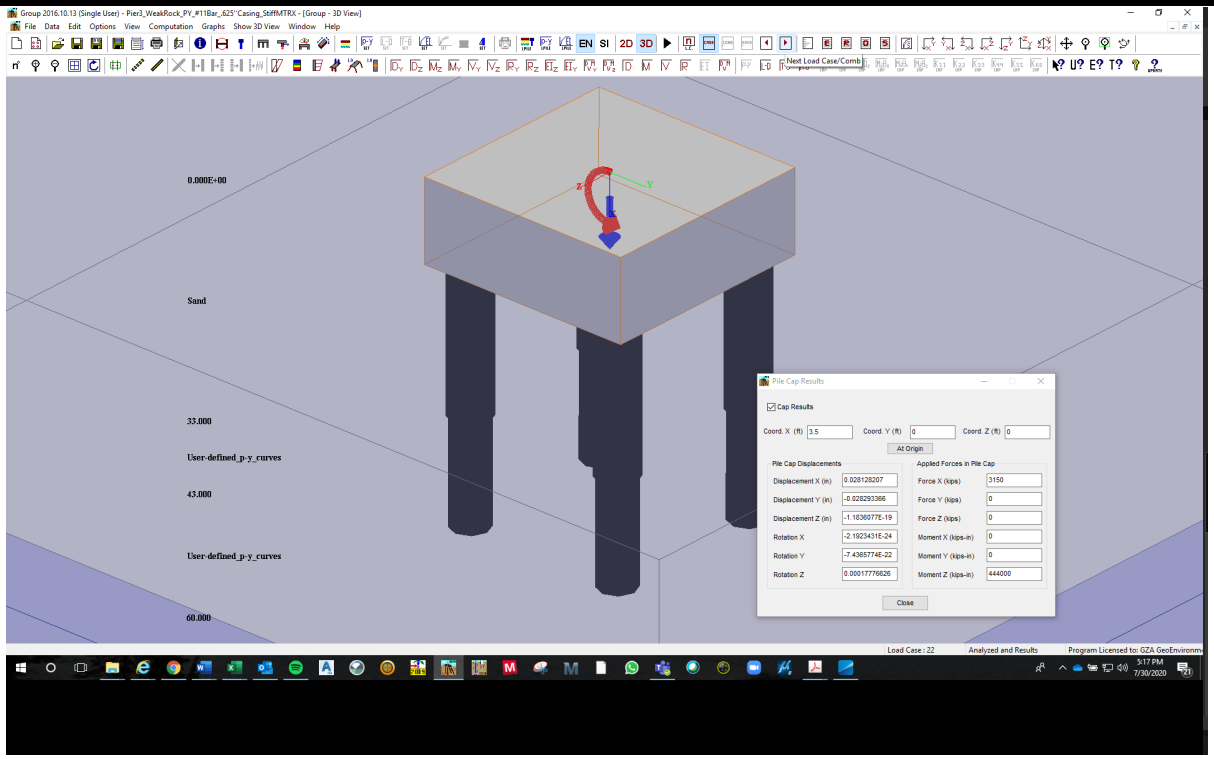

Group 2016.10.13 (Single User) - Pier3_WeakRock_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
File Data Edit Options View Computation Graphs Show 3D View Window Help
Next Load Case/Comb
0.000E+00
Sand
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.084950436
Displacement Y (in) -3.1697251E-17
Displacement Z (in) 0
Rotation X -1.609535E-37
Rotation Y 0
Rotation Z 3.985166E-20
Applied Forces in Pile Cap
Force X (kips) 9500
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 17
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
5:17 PM
7/30/2020

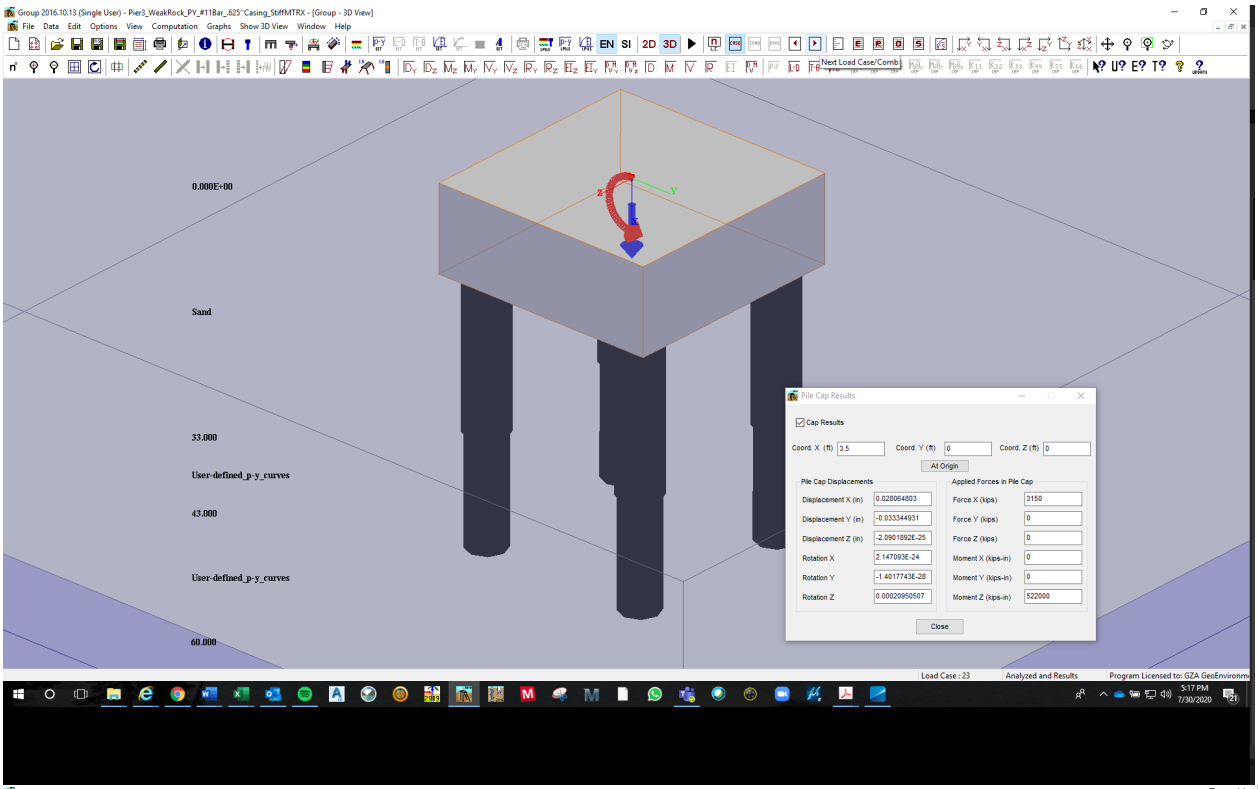

Group 2016.10.13 (Single User) - Pier3_WeakRock_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
File Data Edit Options View Computation Graphs Show 3D View Window Help
Special Plots
0.000E+00
Sand
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.089431601
Displacement Y (in) -3.3368702E-17
Displacement Z (in) 0
Rotation X 0
Rotation Y 0
Rotation Z 4.1952554E-20
Applied Forces in Pile Cap
Force X (kips) 10000
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 18
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
5:17 PM
7/30/2020

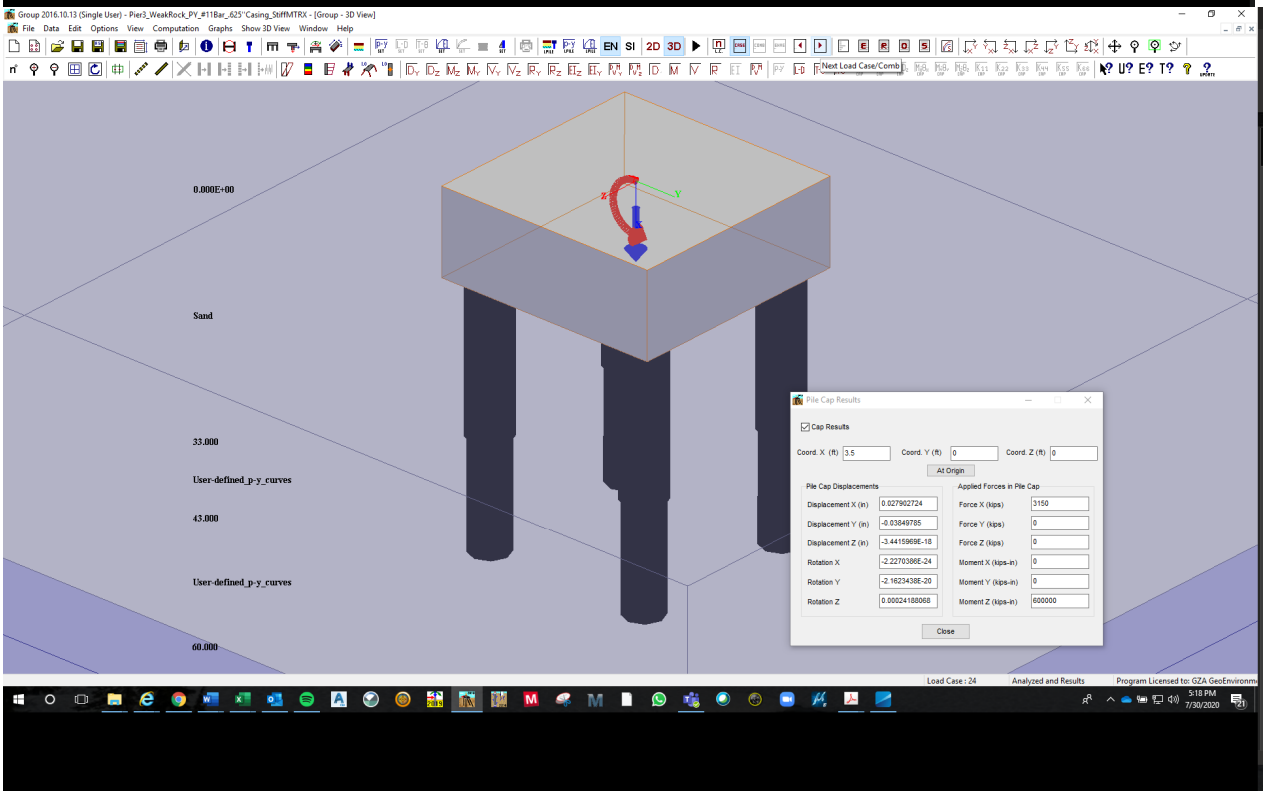

Group 2016.10.13 (Single User) - Pier3_WeakRock_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
0.000E+00
Sand
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.028087819
Displacement Y (in) -0.013375536
Displacement Z (in) 9.2760591E-19
Rotation X -3.3973007E-25
Rotation Y 5.8281164E-21
Rotation Z 8.4038037E-5
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 210000
Close
Load Case : 19
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
5:17 PM
7/30/2020

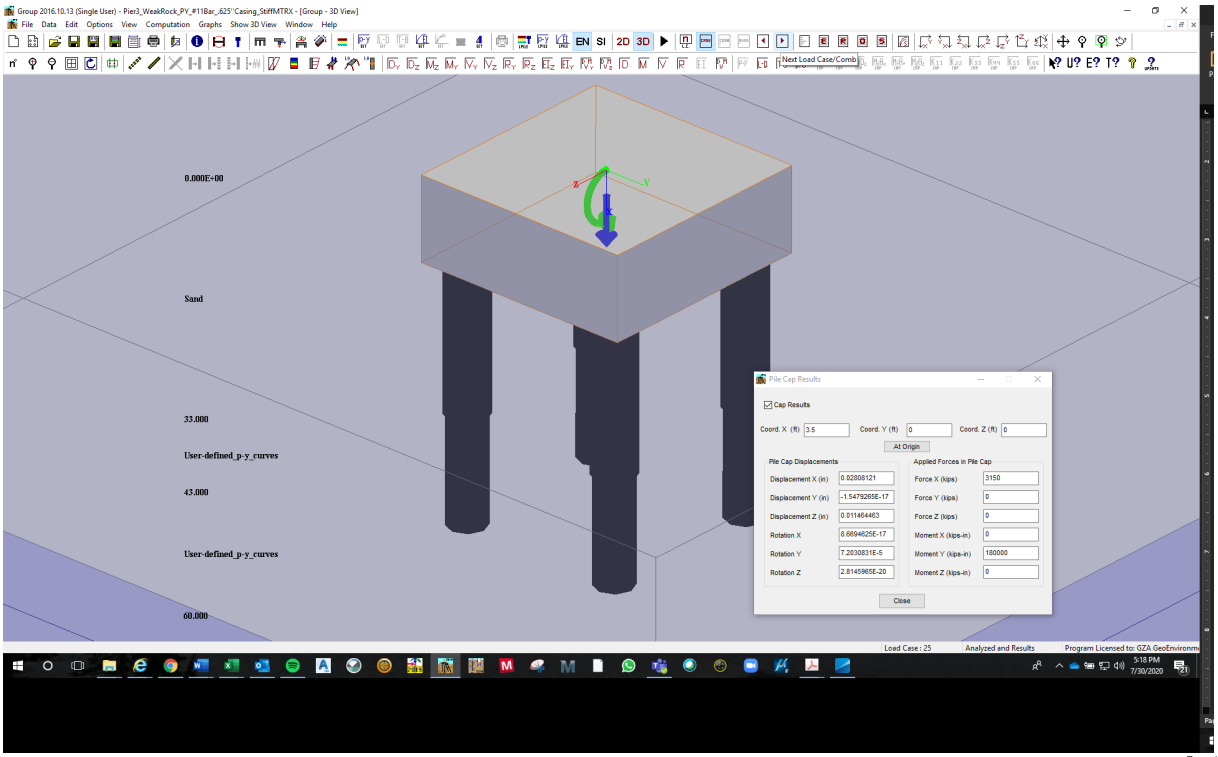

Group 2016.10.13 (Single User) - Pier3_WeakRock_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
0.000E+00
Sand
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.02810238
Displacement Y (in) -0.018347018
Displacement Z (in) -7.5061987E-33
Rotation X 1.4023219E-31
Rotation Y -4.8810045E-36
Rotation Z 0.0001527369
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 288000
Close
Load Case : 20
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
5:17 PM
7/30/2020

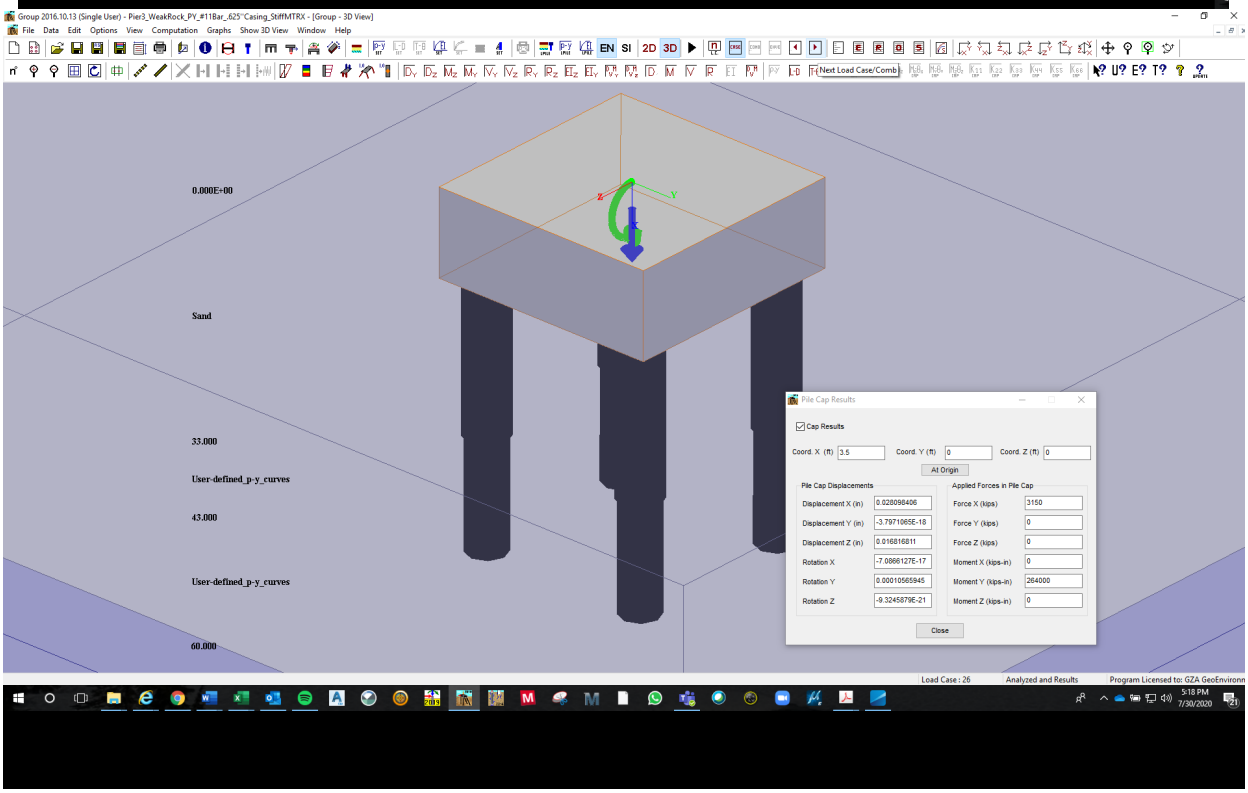

Group 2016.10.13 (Single User) - Pier3_WeakRock_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
0.000E+00
Sand
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.028115293
Displacement Y (in) -0.023320192
Displacement Z (in) 4.4431187E-19
Rotation X -9.0507636E-23
Rotation Y 2.7915617E-21
Rotation Z 0.00014651998
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 366000
Close
Load Case : 21
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
5:17 PM
7/30/2020

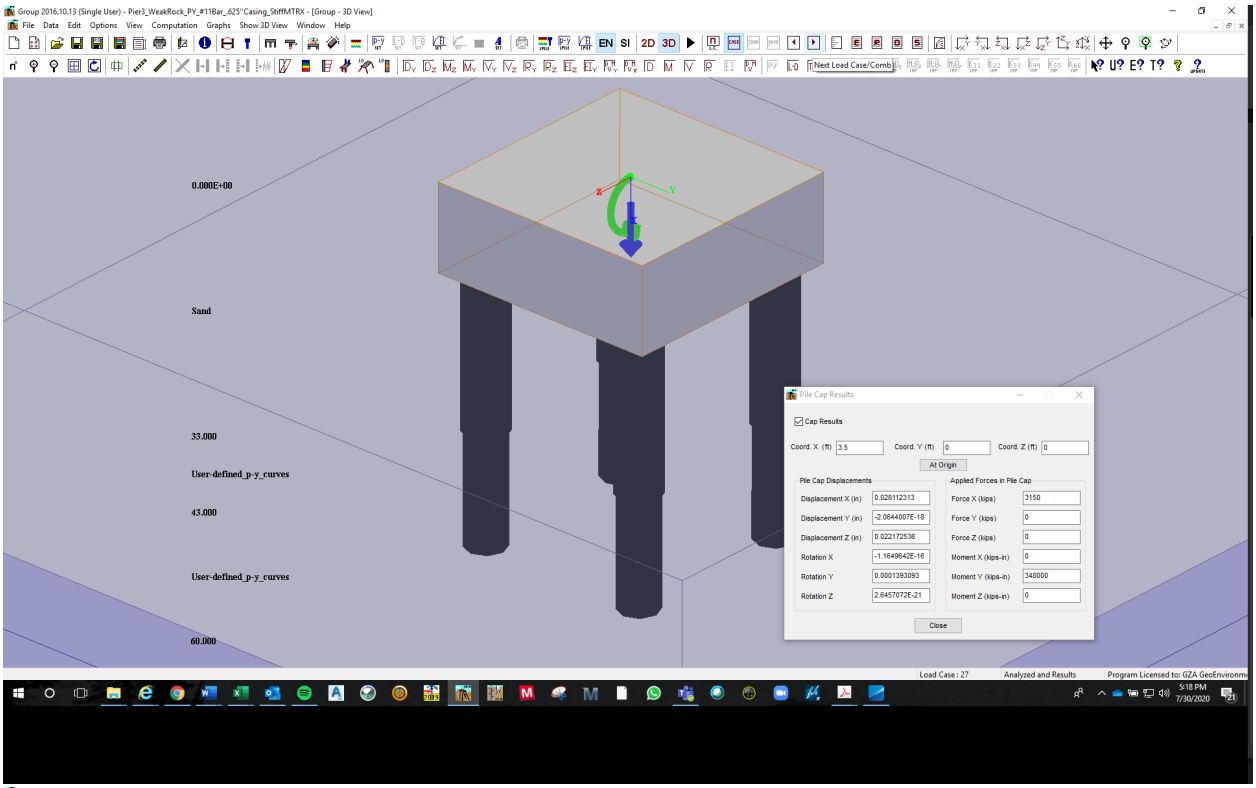

Group 2016.10.13 (Single User) - Pier3_WeakRock_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
0.000E+00
Sand
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.028128207
Displacement Y (in) -0.028293366
Displacement Z (in) -1.1836077E-19
Rotation X -2.1923431E-24
Rotation Y -7.4365774E-22
Rotation Z 0.00017776626
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 444000
Close
Load Case : 22
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
5:17 PM
7/30/2020

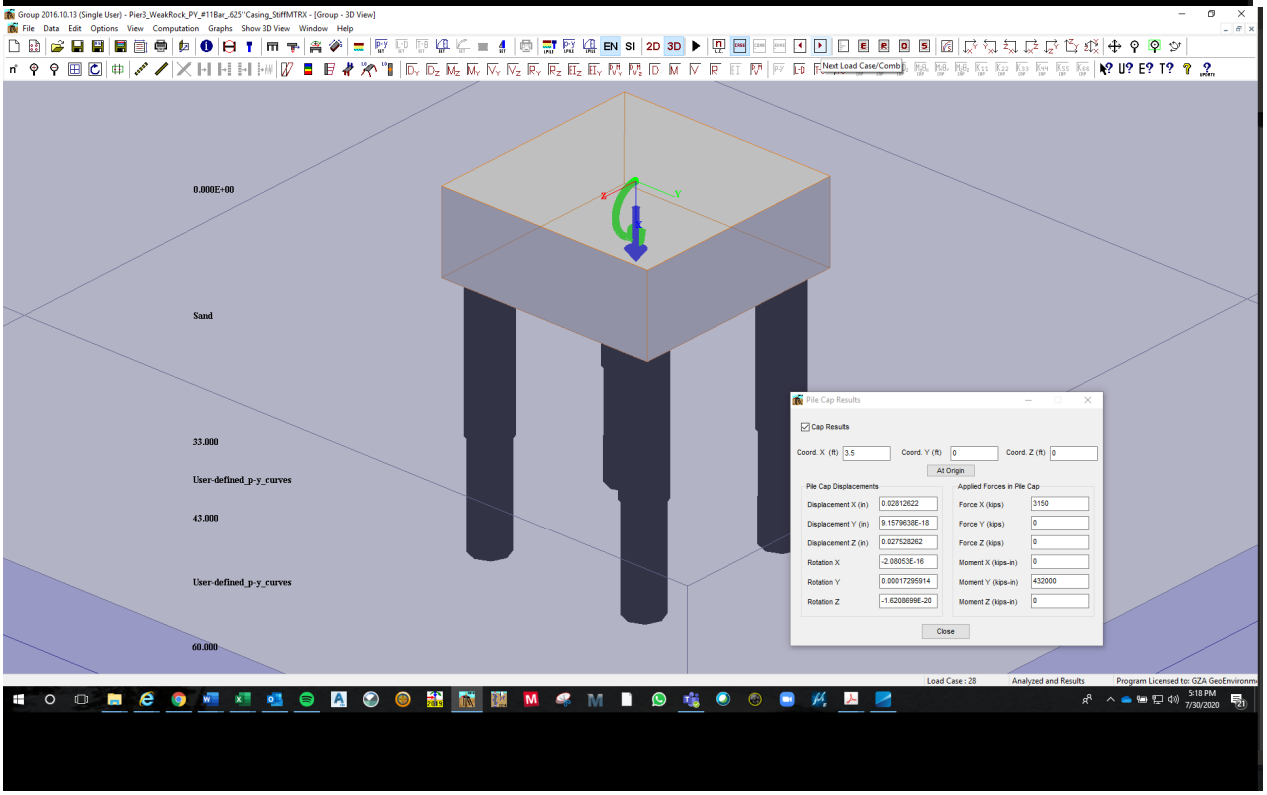

Group 2016.10.13 (Single User) - Pier3_WeakRock_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
0.000E+00
Sand
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.028064803
Displacement Y (in) -0.033344931
Displacement Z (in) -2.09018926-25
Rotation X 2.147093E-24
Rotation Y -1.40177436-28
Rotation Z 0.00020950507
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 522000
Close
Load Case : 23
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
5:17 PM
7/30/2020

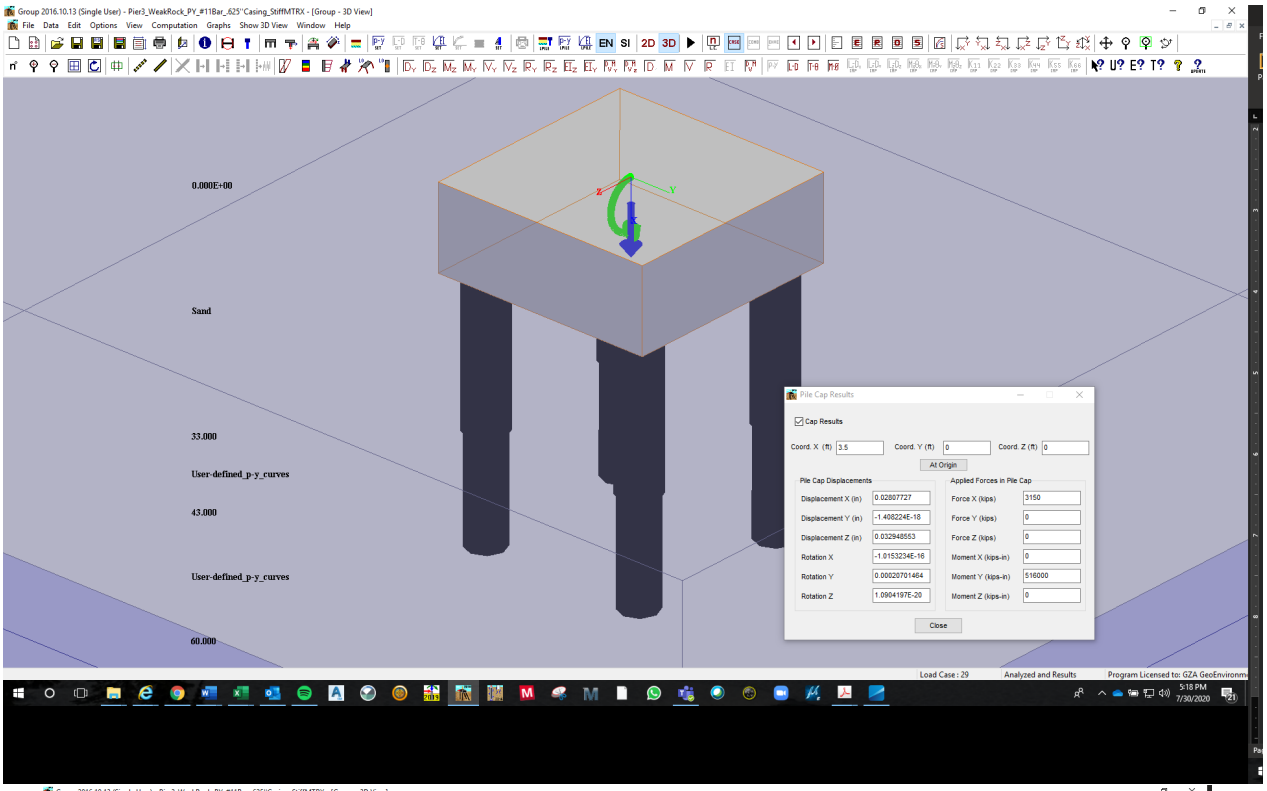

Group 2016.10.13 (Single User) - Pier3_WeakRock_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
0.000E+00
Sand
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.027902724
Displacement Y (in) -0.03849785
Displacement Z (in) -3.4415969E-18
Rotation X -2.2270386E-24
Rotation Y -2.1623438E-20
Rotation Z 0.00024188068
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 0
Moment Z (kips-in) 600000
Close
Load Case : 24
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
5:18 PM
7/30/2020

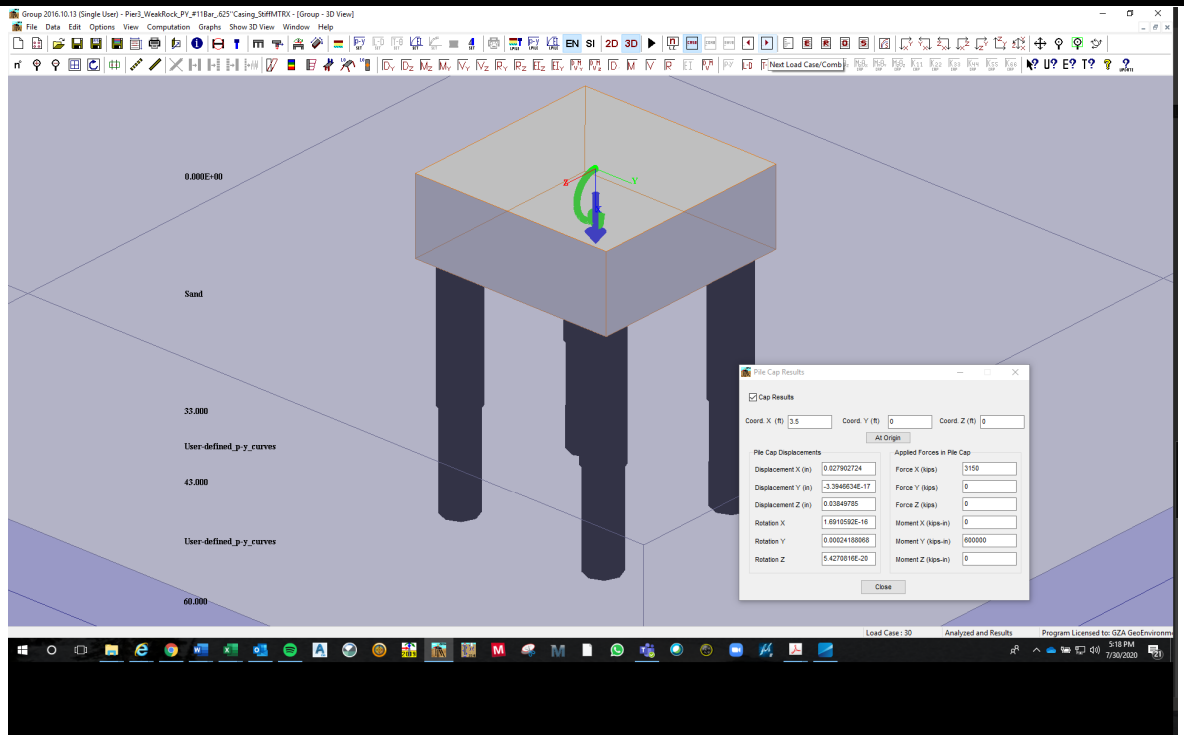

Group 2016.10.13 (Single User) - Pier3_WeakRock_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
0.000E+00
Sand
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.02808121
Displacement Y (in) -1.5479265E-17
Displacement Z (in) 0.011464463
Rotation X 8.6694625E-17
Rotation Y 7.2030831E-5
Rotation Z 2.8145965E-20
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 180000
Moment Z (kips-in) 0
Close
Load Case : 25
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
5:18 PM
7/30/2020

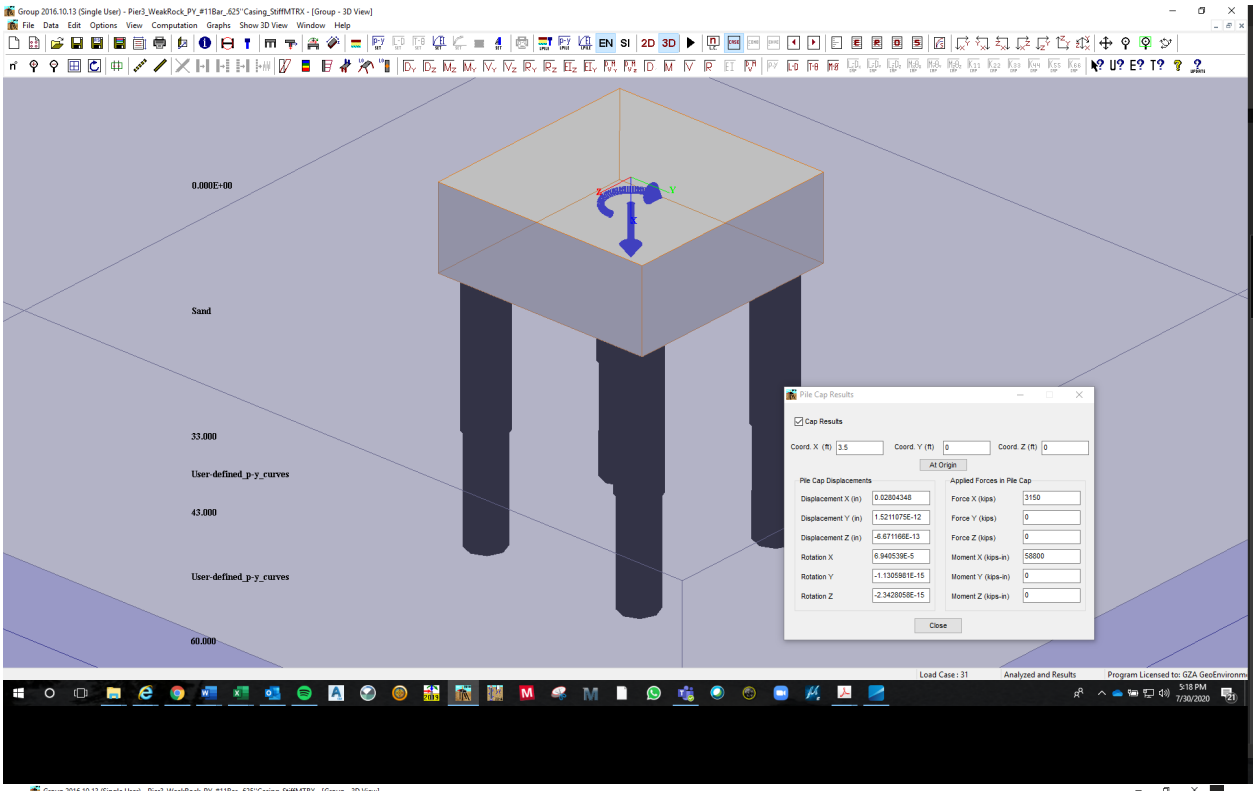

Group 2016.10.13 (Single User) - Pier3_WeakRock_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
0.000E+00
Sand
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.028098406
Displacement Y (in) -3.7971065E-18
Displacement Z (in) 0.016816811
Rotation X -7.0866127E-17
Rotation Y 0.00010565945
Rotation Z -9.3245879E-21
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 264000
Moment Z (kips-in) 0
Close
Load Case : 26
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
5:18 PM
7/30/2020

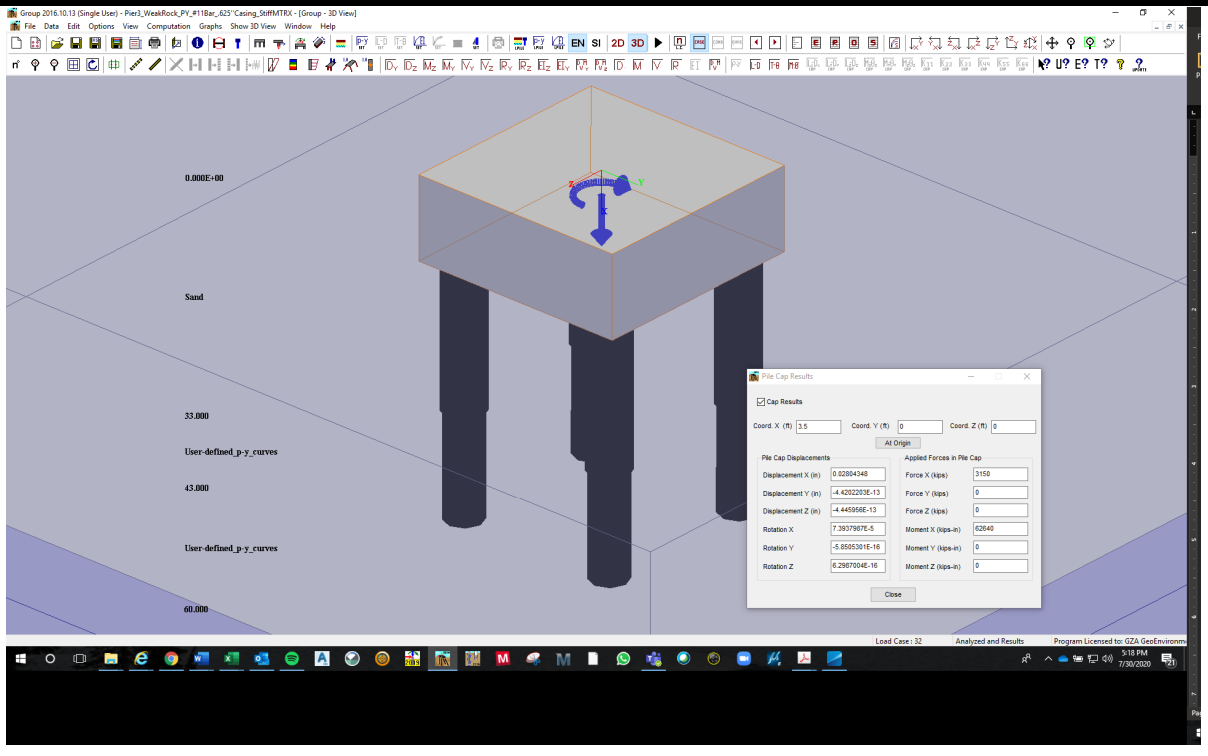

Group 2016.10.13 (Single User) - Pier3_WeakRock_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
0.000E+00
Sand
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.028112313
Displacement Y (in) -2.0644007E-18
Displacement Z (in) 0.022172536
Rotation X -1.1649642E-16
Rotation Y 0.0001393093
Rotation Z 2.6457072E-21
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 348000
Moment Z (kips-in) 0
Close
Load Case : 27
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
5:18 PM
7/30/2020

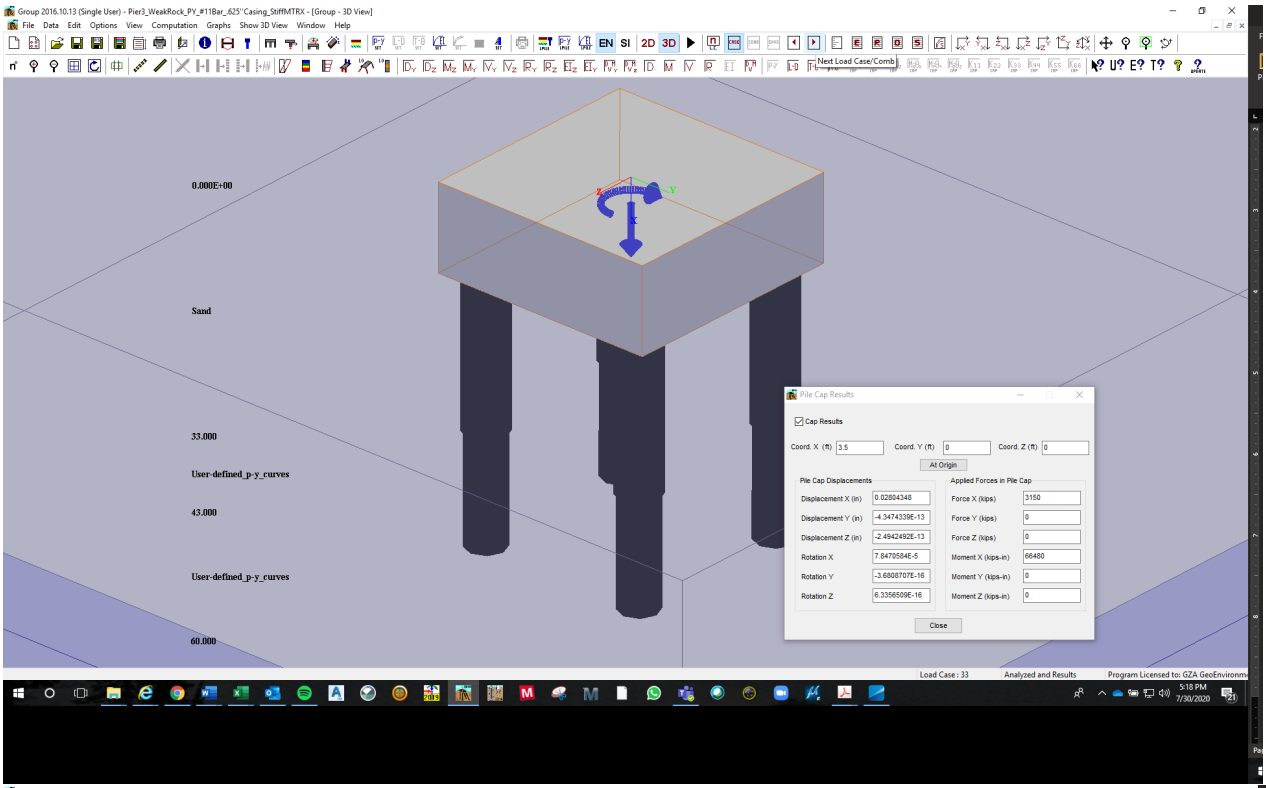

Group 2016.10.13 (Single User) - Pier3_WeakRock_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
0.000E+00
Sand
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.02812622
Displacement Y (in) 9.1579638E-18
Displacement Z (in) 0.027528262
Rotation X -2.08053E-16
Rotation Y 0.00017295914
Rotation Z -1.6208699E-20
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 432000
Moment Z (kips-in) 0
Close
Load Case : 28
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
5:18 PM
7/30/2020

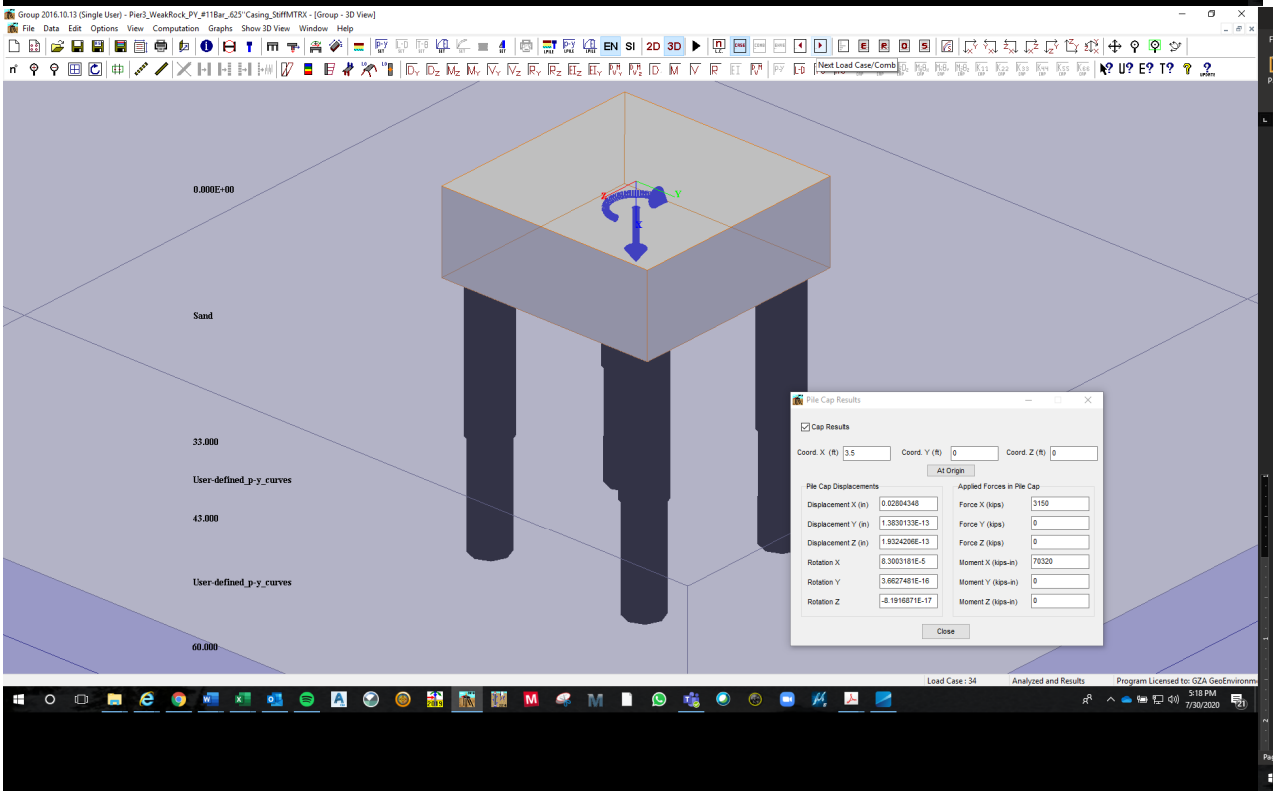

0.000E+00
Sand
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.02807727
Displacement Y (in) -1.468224E-18
Displacement Z (in) 0.03294853
Rotation X -1.0153234E-16
Rotation Y 0.00020701464
Rotation Z 1.0904197E-20
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 516000
Moment Z (kips-in) 0
Close
Load Case : 29
Analyzed and Results
Program Licensed to: GZA GeoEnvironm

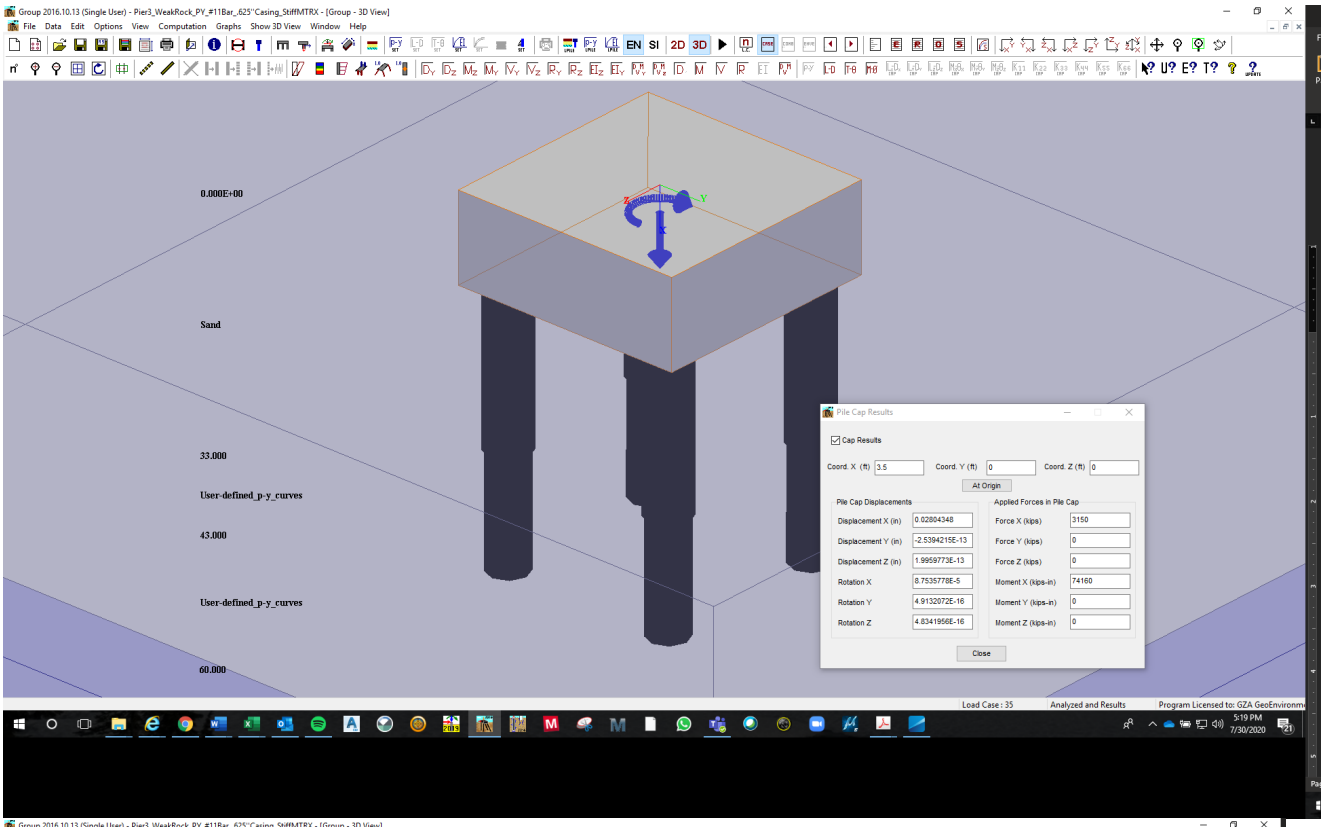

0.000E+00
Sand
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.027902724
Displacement Y (in) -3.3946634E-17
Displacement Z (in) 0.03849785
Rotation X 1.6910592E-16
Rotation Y 0.00024188068
Rotation Z 5.4270816E-20
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 0
Moment Y (kips-in) 600000
Moment Z (kips-in) 0
Close
Load Case : 30
Analyzed and Results
Program Licensed to: GZA GeoEnvironm

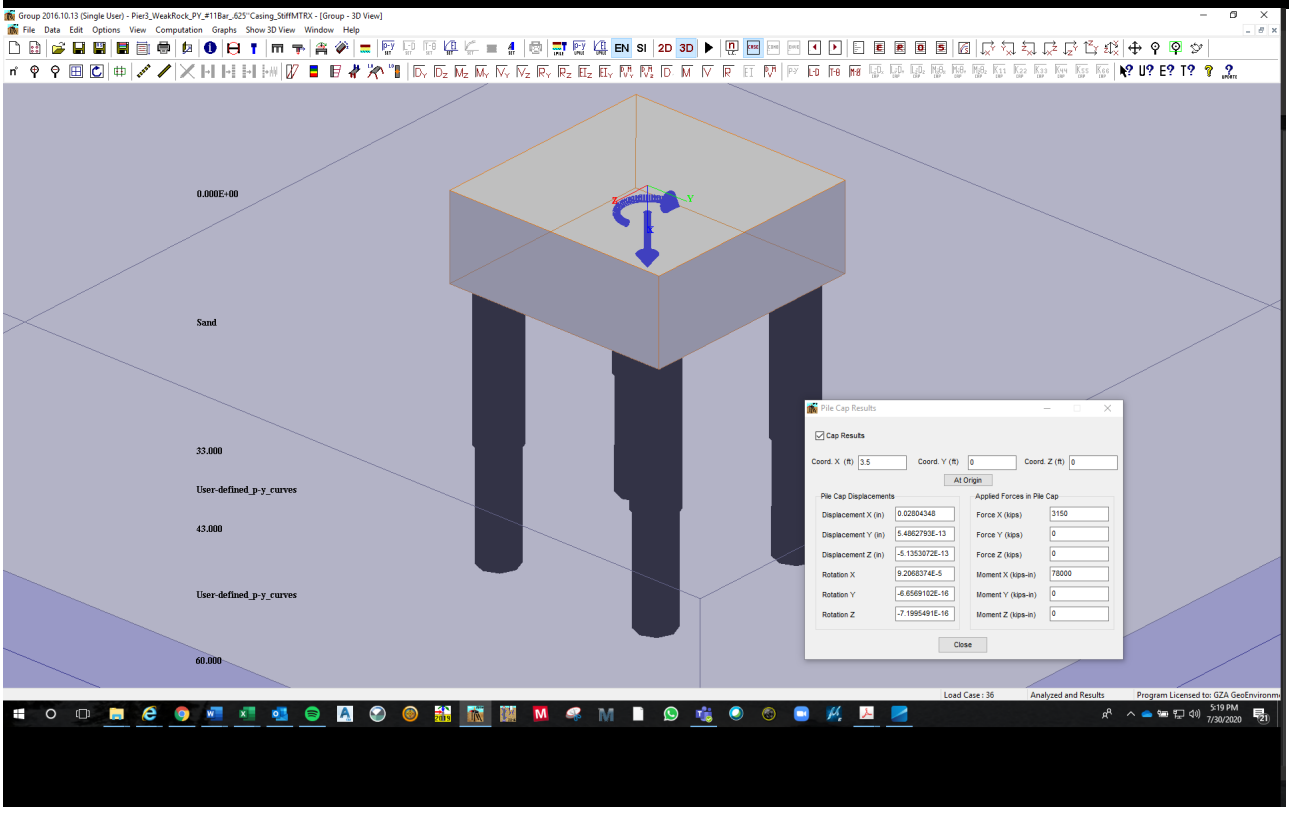

Group 2016.10.13 (Single User) - Pier3_WeakRock_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
0.000E+00
Sand
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.02804348
Displacement Y (in) 1.5211075E-12
Displacement Z (in) -6.671166E-13
Rotation X 6.940539E-5
Rotation Y -1.1305981E-15
Rotation Z -2.3428058E-15
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 58800
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 31
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
5:18 PM
7/30/2020


Group 2016.10.13 (Single User) - Pier3_WeakRock_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
0.000E+00
Sand
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.02804348
Displacement Y (in) -4.4202203E-13
Displacement Z (in) -4.445956E-13
Rotation X 7.3937987E-5
Rotation Y -5.8505301E-16
Rotation Z 6.2967004E-16
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 62640
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 32
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
5:18 PM
7/30/2020


Group 2016.10.13 (Single User) - Pier3_WeakRock_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
0.000E+00
Sand
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.02804348
Displacement Y (in) -4.3474339E-13
Displacement Z (in) -2.4942492E-13
Rotation X 7.8470584E-5
Rotation Y -3.6808707E-16
Rotation Z 6.3356509E-16
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 66480
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 33
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
5:18 PM
7/30/2020

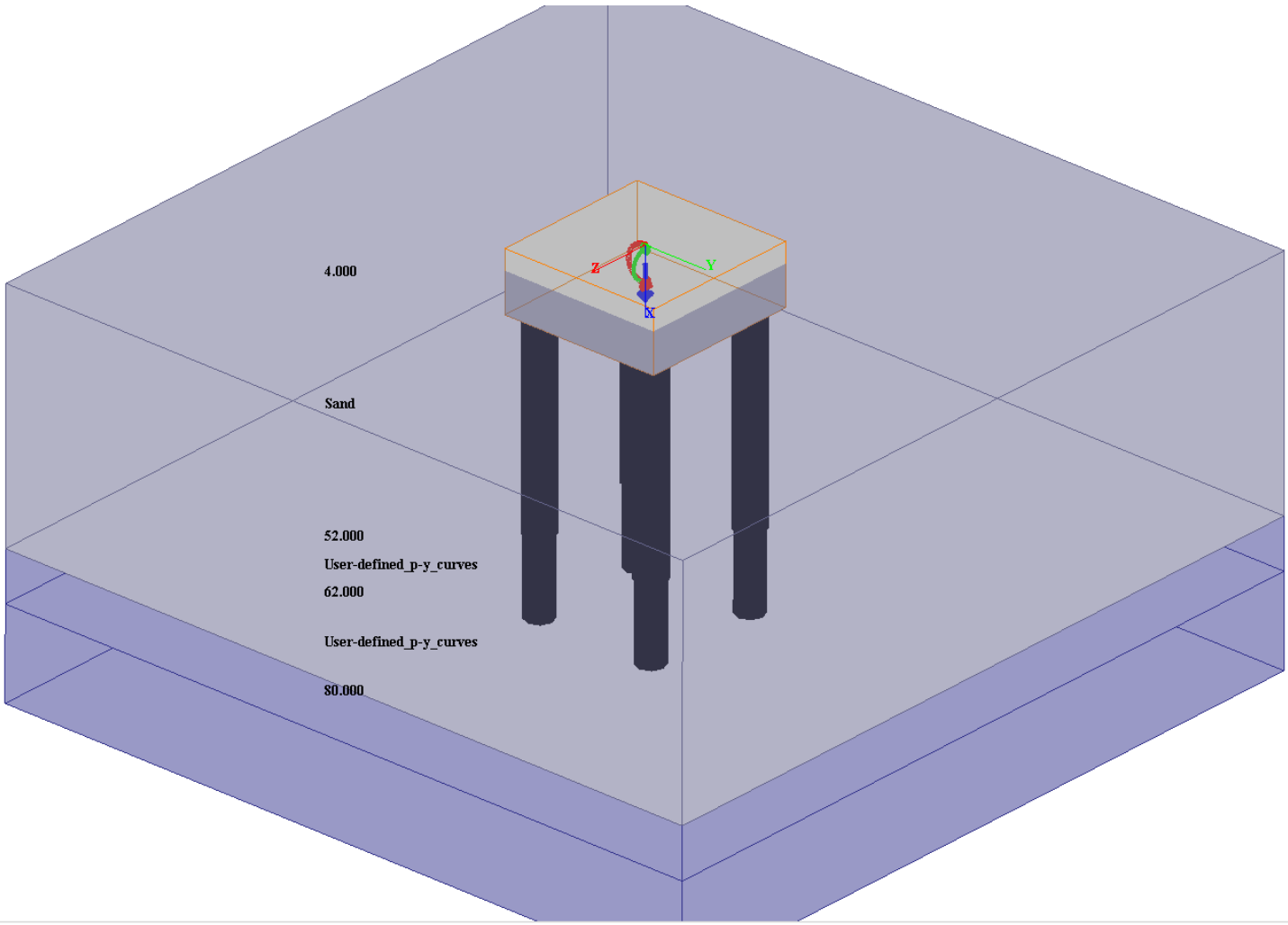

Group 2016.10.13 (Single User) - Pier3_WeakRock_PY_#11Bar_625"Casing_StiffMTRX - [Group - 3D View]
0.000E+00
Sand
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.02804348
Displacement Y (in) 1.3830133E-13
Displacement Z (in) 1.9324206E-13
Rotation X 8.3003181E-5
Rotation Y 3.6627481E-16
Rotation Z -8.1916871E-17
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 70320
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 34
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
5:18 PM
7/30/2020


Group 2016.10.13 (Single User) - Pier3_WeakRock_PY_#11Bar_.625"Casing_StiffMTRX - [Group - 3D View]
0.000E+00
Sand
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.02804348
Displacement Y (in) -2.5394215E-13
Displacement Z (in) 1.9959773E-13
Rotation X 8.7535778E-5
Rotation Y 4.9132072E-16
Rotation Z 4.8341956E-16
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 74160
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 35
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
5:19 PM
7/30/2020


Group 2016.10.13 (Single User) - Pier3_WeakRock_PY_#11Bar_.625"Casing_StiffMTRX - [Group - 3D View]
0.000E+00
Sand
33.000
User-defined_p-y_curves
43.000
User-defined_p-y_curves
60.000
Pile Cap Results
Cap Results
Coord. X (ft) 3.5
Coord. Y (ft) 0
Coord. Z (ft) 0
At Origin
Pile Cap Displacements
Displacement X (in) 0.02804348
Displacement Y (in) 5.4862793E-13
Displacement Z (in) -5.1353072E-13
Rotation X 9.2068374E-5
Rotation Y -6.6569102E-16
Rotation Z -7.1995491E-16
Applied Forces in Pile Cap
Force X (kips) 3150
Force Y (kips) 0
Force Z (kips) 0
Moment X (kips-in) 78000
Moment Y (kips-in) 0
Moment Z (kips-in) 0
Close
Load Case : 36
Analyzed and Results
Program Licensed to: GZA GeoEnvironm
5:19 PM
7/30/2020

Drilled Shaft Lateral Evaluations - Lower Bound Stiffness (NCHRP)

Pier 1
Reese NCHRP p-y parameters (Lower Bound - Controls)
Scoured to El. 461 (4' below the top of footing)
40 #11 Bar Reinforcement
Strength Condition: Load Cases 1 through 12
Service Condition: Load cases 13 through 24
0.75" thick casing reduced to 0.625" after 1/8" of corrosion



Pier 1 Loading Schedule provided by HNTB
on 8/21/2020
Converted to kip-in

	PIER	ID	Station	Output	Case	P	V2	V3	T	M2	M3
						Vertical, x-dir	horizontal, Fy	horizontal, Fz	Mx	My	Mz
	-	-	ft	-	-	kip	Kip	Kip	Kip-in	Kip-in	Kip-in
1	PileCap 1	5143	0	STRENGTH	Max P	6367	-59	-92	-2300	-117589	-80003
2	PileCap 1	5143	0	STRENGTH	Min P	11155	154	157	-3234	120132	129849
3	PileCap 1	5143	0	STRENGTH	Max V2	9409	333	-19	-7070	-46189	298826
4	PileCap 1	5143	0	STRENGTH	Min V2	6567	-241	88	2419	58108	-258360
5	PileCap 1	5143	0	STRENGTH	Max V3	9425	-20	328	1767	292831	-45491
6	PileCap 1	5143	0	STRENGTH	Min V3	6551	111	-259	-6418	-280912	85956
7	PileCap 1	5143	0	STRENGTH	Max T	6585	-29	321	2436	288898	-47621
8	PileCap 1	5143	0	STRENGTH	Min T	9391	121	-252	-7087	-276980	88086
9	PileCap 1	5143	0	STRENGTH	Max M2	9425	-20	328	1767	292831	-45491
10	PileCap 1	5143	0	STRENGTH	Min M2	6551	111	-259	-6418	-280912	85956
11	PileCap 1	5143	0	STRENGTH	Max M3	9409	333	-19	-7070	-46189	298826
12	PileCap 1	5143	0	STRENGTH	Min M3	6567	-241	88	2419	58108	-258360
13	PileCap 1	5143	0	SERVICE	Max P	7288	-78	-105	-1680	-129812	-102508
14	PileCap 1	5143	0	SERVICE	Min P	8612	187	162	-2571	155322	140416
15	PileCap 1	5143	0	SERVICE	Max V2	7941	279	82	-4723	88441	218542
16	PileCap 1	5143	0	SERVICE	Min V2	7885	-180	-23	64	-69107	-183158
17	PileCap 1	5143	0	SERVICE	Max V3	7778	71	279	-594	228045	68638
18	PileCap 1	5143	0	SERVICE	Min V3	7969	18	-218	-3237	-209619	-39280
19	PileCap 1	5143	0	SERVICE	Max T	7855	-135	-69	1568	-65737	-187382
20	PileCap 1	5143	0	SERVICE	Min T	7885	240	101	-5874	74807	213715
21	PileCap 1	5143	0	SERVICE	Max M2	7944	106	260	-351	240893	71916
22	PileCap 1	5143	0	SERVICE	Min M2	7786	-29	-179	-4187	-219756	-36730
23	PileCap 1	5143	0	SERVICE	Max M3	7972	261	106	-5389	89287	224832
24	PileCap 1	5143	0	SERVICE	Min M3	7742	-148	-59	1240	-64267	-191780

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

                GROUP for Windows, Version 2016.10.13

                 Serial Number : 364300562

                 Analysis of A Group of Piles
               Subjected to Axial and Lateral Loading

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                      All Rights Reserved

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


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

          Date:  August 31, 2020     Time:  10:18:32



            *****     COMPUTATION RESULTS     *****


Pier 1



            *****     LOAD CASES RESULTS      *****


LOAD CASE :     1
CASE NAME : Max P
LOAD TYPE : Dead, DL


* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *


       VERTICAL ,IN      HORIZONTAL Y,IN     HORIZONTAL Z,IN
          0.0658548         3.39898E-03          -0.0170479

     ANGLE ROT. X,RAD    ANGLE ROT. Y,RAD    ANGLE ROT. Z,RAD
       -2.78773E-06        -6.17905E-05        -3.32157E-05
```


* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1689.3	-16.638	-21.109	-31.777	-211.37	-3271.5
2	1916.0	-16.638	-24.877	-31.777	215.25	-3271.2
3	1494.2	-12.862	-24.891	-31.777	214.22	-2845.8
4	1267.5	-12.862	-21.123	-31.777	-212.40	-2846.1
MINIMUM	1267.5	-16.638	-24.891	-31.777	-212.40	-3271.5
Pile N.	4	1	3	1	4	1
MAXIMUM	1916.0	-12.862	-21.109	-31.777	215.25	-2845.8
Pile N.	2	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-1.6737E-03	-0.011456	-282.39	-1987.5	-16.657	-20.873	-0.065601	-0.1497	0.4009	4.5738E+09	4.5738E+09
x(FT)	11.400	0.0000	31.800	13.200	0.0000	0.0000	17.400	7.2000	0.0000	45.000	46.200
2	-1.6738E-03	-0.012259	-282.43	-2027.7	-16.657	-24.626	-0.065606	-0.1653	0.4547	4.5738E+09	4.5738E+09
x(FT)	11.400	0.0000	31.800	14.400	0.0000	0.0000	17.400	7.8000	0.0000	45.600	45.000
3	-1.1879E-03	-0.012259	-204.22	-2027.3	-13.024	-24.641	-0.051663	-0.1653	0.3546	4.5738E+09	4.5738E+09
x(FT)	13.800	0.0000	33.600	14.400	3.0000	0.0000	18.600	7.8000	0.0000	45.000	45.000
4	-1.1878E-03	-0.011456	-204.18	-1987.2	-13.023	-20.887	-0.051658	-0.1497	0.3008	4.5738E+09	4.5738E+09
x(FT)	13.800	0.0000	33.600	13.200	3.0000	0.0000	18.600	7.2000	0.0000	45.600	45.000
Min.	-1.6738E-03	-0.012259	-282.43	-2027.7	-16.657	-24.641	-0.065606	-0.1653	0.3008	4.5738E+09	4.5738E+09
Pile N.	2	2	2	2	1	3	2	3	4	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	2.0743E-04	3.7668E-04	3271.5	116.32	1.6359	8.0690	0.016751	0.1109	0.4938	8.8843E+09	8.8843E+09
x(FT)	0.0000	33.600	0.0000	47.400	44.400	25.200	48.600	45.000	45.000	0.0000	0.0000
2	2.0743E-04	3.7194E-04	3271.2	215.25	1.6365	8.3045	0.016758	0.1198	0.5600	8.8843E+09	8.8843E+09
x(FT)	0.0000	34.200	0.0000	0.0000	44.400	26.400	48.600	45.000	45.000	0.6000	0.0000
3	1.0103E-03	3.7147E-04	2845.8	214.22	1.2325	8.2979	0.012685	0.1198	0.4368	8.8843E+09	8.8843E+09
x(FT)	0.0000	34.200	0.0000	0.0000	45.600	26.400	49.800	45.000	45.000	0.0000	0.6000
4	1.0103E-03	3.7623E-04	2846.1	116.20	1.2320	8.0623	0.012680	0.1109	0.3705	8.8843E+09	8.8843E+09
x(FT)	0.0000	33.600	0.0000	47.400	45.600	25.200	49.800	45.000	45.000	1.2000	0.0000
Max.	1.0103E-03	3.7668E-04	3271.5	215.25	1.6365	8.3045	0.016758	0.1198	0.5600	8.8843E+09	8.8843E+09
Pile N.	3	1	1	2	2	2	2	2	2	1	1

LOAD CASE : 2
CASE NAME : Min P
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.11636	-1.58760E-03	0.0216807

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-3.92587E-06	6.77170E-05	4.96869E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2727.2	35.844	41.910	-44.750	-1895.4	6128.6
2	2388.1	35.846	36.611	-44.750	-1294.5	6129.4
3	2850.3	41.157	36.591	-44.750	-1295.7	6728.3
4	3189.4	41.153	41.888	-44.750	-1896.6	6727.6
MINIMUM	2388.1	35.844	36.591	-44.750	-1896.6	6128.6
Pile N.	2	1	3	1	4	1
MAXIMUM	3189.4	41.157	41.910	-44.750	-1294.5	6728.3
Pile N.	4	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-4.2580E-05	-4.1289E-04	-6128.6	-1895.4	-3.7147	-10.414	-0.041643	-0.1661	0.6472	4.5738E+09	4.5738E+09
x(FT)	46.800	36.000	0.0000	0.0000	42.000	28.200	46.800	45.000	0.0000	45.000	45.000
2	-4.2546E-05	-4.0783E-04	-6129.4	-1294.5	-3.7129	-9.8843	-0.041610	-0.1535	0.5667	4.5738E+09	4.5738E+09
x(FT)	46.800	35.400	0.0000	0.0000	42.000	27.600	46.800	45.000	0.0000	45.600	45.000
3	-5.2672E-05	-4.0841E-04	-6728.3	-1295.7	-4.3561	-9.8929	-0.051513	-0.1536	0.6764	4.5738E+09	4.5738E+09
x(FT)	46.200	35.400	0.0000	0.0000	41.400	27.600	46.200	45.000	0.0000	46.200	45.000
4	-5.2717E-05	-4.1349E-04	-6727.6	-1896.6	-4.3581	-10.423	-0.051557	-0.1663	0.7568	4.5738E+09	4.5738E+09
x(FT)	46.200	36.000	0.0000	0.0000	41.400	28.200	46.200	45.000	0.0000	46.200	45.600
Min.	-5.2717E-05	-4.1349E-04	-6728.3	-1896.6	-4.3581	-10.423	-0.051557	-0.1663	0.5667	4.5738E+09	4.5738E+09
Pile N.	4	4	3	4	4	4	4	4	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR	DISPL. z-DIR	MOMENT z-DIR	MOMENT y-DIR	SHEAR y-DIR	SHEAR z-DIR	SOIL REACT y-DIR	SOIL REACT z-DIR	TOTAL STRESS	FLEX. RIG. z-DIR	FLEX. RIG. y-DIR
1	4.1936E-03	0.016558	684.48	2486.8	35.833	41.580	0.1425	0.2438	0.7972	8.8843E+09	8.8843E+09
x(FT)	8.4000	0.0000	29.400	16.800	0.0000	0.0000	15.600	8.4000	45.000	0.6000	0.0000
2	4.1935E-03	0.015427	684.35	2376.9	35.835	36.301	0.1425	0.2208	0.6980	8.8843E+09	8.8843E+09
x(FT)	8.4000	0.0000	29.400	16.200	0.0000	0.0000	15.600	8.4000	45.000	0.0000	0.0000
3	5.1012E-03	0.015427	822.04	2377.4	41.126	36.281	0.1650	0.2208	0.8331	8.8843E+09	8.8843E+09
x(FT)	7.2000	0.0000	28.800	16.200	0.0000	0.0000	15.000	8.4000	45.000	0.6000	0.0000
4	5.1013E-03	0.016558	822.19	2487.4	41.123	41.558	0.1650	0.2438	0.9323	8.8843E+09	8.8843E+09
x(FT)	7.2000	0.0000	28.800	16.800	0.0000	0.0000	15.000	8.4000	45.000	0.0000	0.0000
Max.	5.1013E-03	0.016558	822.19	2487.4	41.126	41.580	0.1650	0.2438	0.9323	8.8843E+09	8.8843E+09
Pile N.	4	1	4	4	3	1	4	1	4	1	1

LOAD CASE : 3
CASE NAME : Max V2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0979454	-5.09380E-03	-5.54256E-03

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-8.56897E-06	-2.30303E-05	1.15904E-04

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2826.4	77.453	1.0550	-97.676	-1083.7	1.3598E+04
2	2035.3	77.464	-10.553	-97.676	225.14	1.3602E+04
3	1878.1	89.049	-10.556	-97.676	225.00	1.4909E+04
4	2669.2	89.034	1.0540	-97.676	-1083.9	1.4905E+04
MINIMUM	1878.1	77.453	-10.556	-97.676	-1083.9	1.3598E+04
Pile N.	3	1	3	1	4	1
MAXIMUM	2826.4	89.049	1.0550	-97.676	225.14	1.4909E+04
Pile N.	1	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-8.8615E-05	-2.3741E-03	-1.3598E+04	-1083.7	-7.9400	-0.4672	-0.086665	-0.022440	0.6707	4.5738E+09	4.5738E+09

x(FT)	47.400	0.0000	0.0000	0.0000	42.600	49.200	47.400	3.6000	0.0000	45.600	45.600
2	-8.8468E-05	-4.8420E-03	-1.3602E+04	-774.17	-7.9310	-10.455	-0.086522	-0.067022	0.4830	4.5738E+09	4.5738E+09
x(FT)	47.400	0.0000	0.0000	15.000	42.600	0.0000	47.400	7.8000	0.0000	45.000	45.000
3	-1.0912E-04	-4.8420E-03	-1.4909E+04	-774.12	-9.3033	-10.457	-0.1067	-0.067023	0.4457	4.5738E+09	4.5738E+09
x(FT)	46.800	0.0000	0.0000	15.000	42.000	0.0000	46.800	7.8000	0.0000	45.600	45.000
4	-1.0932E-04	-2.3741E-03	-1.4905E+04	-1083.9	-9.3133	-0.4671	-0.1069	-0.022441	0.6334	4.5738E+09	4.5738E+09
x(FT)	46.800	0.0000	0.0000	0.0000	42.000	49.200	46.800	3.6000	0.0000	45.600	45.000
Min.	-1.0932E-04	-4.8420E-03	-1.4909E+04	-1083.9	-9.3133	-10.457	-0.1069	-0.067023	0.4457	4.5738E+09	4.5738E+09
Pile N.	4	2	3	4	4	3	4	3	3	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	8.7737E-03	2.4367E-04	1442.6	47.824	77.452	3.7788	0.3069	0.020328	0.8261	8.8843E+09	8.8843E+09
x(FT)	9.0000	24.600	30.000	45.000	0.0000	15.000	15.600	45.000	45.000	3.0000	1.2000
2	8.7728E-03	1.3807E-04	1442.0	225.14	77.457	3.1928	0.3068	0.047698	0.5949	8.8843E+09	8.8843E+09
x(FT)	9.0000	34.800	30.000	0.0000	0.0000	27.000	15.600	45.000	45.000	3.0000	1.8000
3	0.010698	1.3801E-04	1734.5	225.00	88.997	3.1919	0.3553	0.047689	0.5490	8.8843E+09	8.8843E+09
x(FT)	7.8000	34.800	29.400	0.0000	0.0000	27.000	15.000	45.000	45.000	4.2000	0.6000
4	0.010699	2.4361E-04	1735.2	47.812	88.987	3.7780	0.3553	0.020327	0.7802	8.8843E+09	8.8843E+09
x(FT)	7.8000	24.600	29.400	45.000	0.0000	15.000	15.000	45.000	45.000	4.2000	0.6000
Max.	0.010699	2.4367E-04	1735.2	225.14	88.997	3.7788	0.3553	0.047698	0.8261	8.8843E+09	8.8843E+09
Pile N.	4	1	4	2	3	1	4	2	1	1	1

LOAD CASE : 4
CASE NAME : Min V2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0679646	7.57351E-03	0.0112933

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
2.93603E-06	3.36220E-05	-1.03604E-04

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1173.5	-58.264	20.023	33.467	-846.29	-1.0925E+04

2	1880.6	-58.261	23.983	33.467	-1295.9	-1.0922E+04
3	2110.0	-62.235	23.977	33.467	-1296.2	-1.1369E+04
4	1402.9	-62.240	20.018	33.467	-846.59	-1.1373E+04
MINIMUM	1173.5	-62.240	20.018	33.467	-1296.2	-1.1373E+04
Pile N.	1	4	4	1	3	4
MAXIMUM	2110.0	-58.261	23.983	33.467	-846.29	-1.0922E+04
Pile N.	3	2	2	1	1	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-6.1351E-03	-2.0310E-04	-1024.2	-846.29	-58.296	-5.0740	-0.2295	-0.080385	0.2785	4.5738E+09	4.5738E+09
x(FT)	10.200	36.000	31.200	0.0000	0.0000	28.200	16.200	45.000	0.0000	45.000	45.600
2	-6.1359E-03	-2.0861E-04	-1024.7	-1295.9	-58.297	-5.4989	-0.2296	-0.089837	0.4463	4.5738E+09	4.5738E+09
x(FT)	10.200	36.600	31.200	0.0000	0.0000	29.400	16.200	45.000	0.0000	45.000	45.000
3	-6.7358E-03	-2.0876E-04	-1118.6	-1296.2	-62.256	-5.5011	-0.2456	-0.089866	0.5007	4.5738E+09	4.5738E+09
x(FT)	9.6000	36.600	30.600	0.0000	0.0000	29.400	16.200	45.000	0.0000	45.600	45.000
4	-6.7350E-03	-2.0324E-04	-1118.1	-846.59	-62.258	-5.0762	-0.2456	-0.080410	0.3329	4.5738E+09	4.5738E+09
x(FT)	9.6000	36.000	30.600	0.0000	0.0000	28.200	16.200	45.000	0.0000	45.000	45.000
Min.	-6.7358E-03	-2.0876E-04	-1118.6	-1296.2	-62.258	-5.5011	-0.2456	-0.089866	0.2785	4.5738E+09	4.5738E+09
Pile N.	3	3	3	3	4	3	3	3	1	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	6.1897E-05	8.0463E-03	1.0925E+04	1216.2	5.8135	19.861	0.060535	0.1175	0.3430	8.8843E+09	8.8843E+09
x(FT)	48.000	0.0000	0.0000	16.800	43.800	0.0000	48.000	8.4000	45.000	0.0000	0.0000
2	6.1985E-05	8.8919E-03	1.0922E+04	1305.7	5.8198	23.806	0.060621	0.1347	0.5497	8.8843E+09	8.8843E+09
x(FT)	48.000	0.0000	0.0000	17.400	43.800	0.0000	48.000	8.4000	45.000	0.6000	0.0000
3	6.7751E-05	8.8919E-03	1.1369E+04	1305.8	6.2767	23.801	0.066261	0.1347	0.6168	8.8843E+09	8.8843E+09
x(FT)	48.000	0.0000	0.0000	17.400	43.200	0.0000	48.000	8.4000	45.000	0.6000	0.0000
4	6.7659E-05	8.0463E-03	1.1373E+04	1216.3	6.2700	19.856	0.066171	0.1175	0.4101	8.8843E+09	8.8843E+09
x(FT)	48.000	0.0000	0.0000	16.800	43.200	0.0000	48.000	8.4000	45.000	0.6000	0.6000
Max.	6.7751E-05	8.8919E-03	1.1373E+04	1305.8	6.2767	23.806	0.066261	0.1347	0.6168	8.8843E+09	8.8843E+09
Pile N.	3	2	4	3	3	2	3	2	3	1	1

LOAD CASE : 5
CASE NAME : Max V3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0981141	2.84708E-03	0.0491445

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
2.14450E-06	1.61079E-04	-1.98718E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1738.7	-3.5464	80.610	24.445	-2336.6	-1234.1
2	1874.4	-3.5470	83.501	24.445	-2665.3	-1234.0
3	2973.8	-6.4534	83.389	24.445	-2672.2	-1560.8
4	2838.1	-6.4532	80.500	24.445	-2343.6	-1561.0
MINIMUM	1738.7	-6.4534	80.500	24.445	-2672.2	-1561.0
Pile N.	1	3	4	1	3	4
MAXIMUM	2973.8	-3.5464	83.501	24.445	-2336.6	-1234.0
Pile N.	3	1	2	1	1	2

* EFFECTS FOR LATERALLY LOADED PILE *

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-3.3314E-04	-9.6474E-04	-58.501	-2336.6	-4.5109	-22.888	-0.018559	-0.3483	0.4126	4.5738E+09	4.5738E+09
x(FT)	19.800	35.400	39.000	0.0000	9.6000	27.600	23.400	45.000	0.0000	47.400	45.000
2	-3.3319E-04	-9.6688E-04	-58.510	-2665.3	-4.5114	-23.158	-0.018562	-0.3540	0.4448	4.5738E+09	4.5738E+09
x(FT)	19.800	35.400	39.000	0.0000	9.6000	27.600	23.400	45.000	0.0000	45.000	45.600
3	-5.7475E-04	-9.7011E-04	-99.688	-2672.2	-6.6844	-23.205	-0.026726	-0.3544	0.7057	4.5738E+09	4.5738E+09
x(FT)	15.000	35.400	34.800	0.0000	4.8000	27.600	19.800	45.000	0.0000	45.000	45.600
4	-5.7471E-04	-9.6790E-04	-99.675	-2343.6	-6.6841	-22.935	-0.026724	-0.3487	0.6735	4.5738E+09	4.5738E+09
x(FT)	15.000	35.400	34.800	0.0000	4.8000	27.600	19.800	45.000	0.0000	45.000	45.000
Min.	-5.7475E-04	-9.7011E-04	-99.688	-2672.2	-6.6844	-23.205	-0.026726	-0.3544	0.4126	4.5738E+09	4.5738E+09
Pile N.	3	3	3	3	3	3	3	3	1	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	1.4867E-03	0.035305	1234.1	5529.5	0.4734	79.897	0.011948	0.4974	0.5082	8.8843E+09	8.8843E+09

x(FT)	0.0000	0.0000	0.0000	15.600	47.400	0.0000	2.4000	7.8000	45.000	1.2000	1.8000
2	1.4867E-03	0.035923	1234.0	5581.3	0.4734	82.776	0.011948	0.5096	0.5479	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	0.0000	16.200	47.400	0.0000	2.4000	7.8000	45.000	0.0000	0.0000
3	8.6904E-04	0.035923	1560.8	5584.2	0.6368	82.665	6.5700E-03	0.5096	0.8692	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	0.0000	16.200	46.200	0.0000	50.400	7.8000	45.000	0.6000	0.6000
4	8.6904E-04	0.035305	1561.0	5532.4	0.6367	79.788	6.5694E-03	0.4973	0.8296	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	0.0000	15.600	46.200	0.0000	50.400	7.8000	45.000	0.0000	0.0000
Max.	1.4867E-03	0.035923	1561.0	5584.2	0.6368	82.776	0.011948	0.5096	0.8692	8.8843E+09	8.8843E+09
Pile N.	1	2	4	3	3	2	1	2	3	1	1

LOAD CASE : 6
CASE NAME : Min V2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0677958	-4.41761E-04	-0.0433718

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-7.76288E-06	-1.50461E-04	3.22326E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2261.2	22.488	-59.440	-88.488	401.33	3889.9
2	2041.2	22.489	-69.970	-88.488	1586.4	3890.2
3	1014.3	33.012	-70.063	-88.488	1580.4	5078.1
4	1234.3	33.010	-59.526	-88.488	395.21	5077.8
MINIMUM	1014.3	22.488	-70.063	-88.488	395.21	3889.9
Pile N.	3	1	3	1	4	1
MAXIMUM	2261.2	33.012	-59.440	-88.488	1586.4	5078.1
Pile N.	1	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-2.6185E-05	-0.029615	-3889.9	-4924.2	-2.3172	-58.834	-0.025609	-0.3978	0.5366	4.5738E+09	4.5738E+09
x(FT)	46.800	0.0000	0.0000	14.400	42.600	0.0000	46.800	7.8000	0.0000	46.200	45.600
2	-2.6171E-05	-0.031851	-3890.2	-5073.3	-2.3164	-69.324	-0.025595	-0.4422	0.4844	4.5738E+09	4.5738E+09
x(FT)	46.800	0.0000	0.0000	15.000	42.600	0.0000	46.800	7.8000	0.0000	45.000	45.600

3	-4.7365E-05	-0.031851	-5078.1	-5070.9	-3.5996	-69.416	-0.046323	-0.4422	0.2407	4.5738E+09	4.5738E+09
x(FT)	45.600	0.0000	0.0000	15.000	40.200	0.0000	45.600	7.8000	0.0000	46.200	45.000
4	-4.7392E-05	-0.029615	-5077.8	-4921.9	-3.6007	-58.920	-0.046350	-0.3978	0.2929	4.5738E+09	4.5738E+09
x(FT)	45.600	0.0000	0.0000	14.400	40.200	0.0000	45.600	7.8000	0.0000	45.600	45.000
Min.	-4.7392E-05	-0.031851	-5078.1	-5073.3	-3.6007	-69.416	-0.046350	-0.4422	0.2407	4.5738E+09	4.5738E+09
Pile N.	4	2	3	2	4	3	4	3	3	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	2.5929E-03	9.0760E-04	424.39	401.33	22.483	20.156	0.089247	0.2893	0.6609	8.8843E+09	8.8843E+09
x(FT)	8.4000	34.200	29.400	0.0000	0.0000	26.400	15.600	45.000	45.000	0.6000	0.6000
2	2.5929E-03	9.0193E-04	424.34	1586.4	22.484	20.943	0.089243	0.3140	0.5966	8.8843E+09	8.8843E+09
x(FT)	8.4000	34.800	29.400	0.0000	0.0000	27.000	15.600	45.000	45.000	0.0000	0.0000
3	4.4473E-03	8.9913E-04	702.25	1580.4	32.964	20.902	0.1342	0.3136	0.2965	8.8843E+09	8.8843E+09
x(FT)	6.0000	34.800	27.600	0.0000	0.0000	27.000	13.800	45.000	45.000	0.0000	0.0000
4	4.4473E-03	9.0486E-04	702.33	395.21	32.962	20.117	0.1342	0.2890	0.3608	8.8843E+09	8.8843E+09
x(FT)	6.0000	34.200	27.600	0.0000	0.0000	26.400	13.800	45.000	45.000	0.0000	0.0000
Max.	4.4473E-03	9.0760E-04	702.33	1586.4	32.964	20.943	0.1342	0.3140	0.6609	8.8843E+09	8.8843E+09
Pile N.	3	1	4	2	3	2	3	2	1	1	1

LOAD CASE : 7
CASE NAME : Max T
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0681545	2.43576E-03	0.0482897

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
2.95426E-06	1.58704E-04	-2.02154E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1035.7	-5.2482	78.309	33.675	-2164.5	-1441.4
2	1173.6	-5.2486	82.298	33.675	-2616.9	-1441.3
3	2256.8	-9.2516	82.189	33.675	-2623.6	-1891.9
4	2118.9	-9.2516	78.203	33.675	-2171.2	-1892.0
MINIMUM	1035.7	-9.2516	78.203	33.675	-2623.6	-1892.0

Pile N.	1	3	4	1	3	4
MAXIMUM	2256.8	-5.2482	82.298	33.675	-2164.5	-1441.3
Pile N.	3	1	2	1	1	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-4.6067E-04	-9.4781E-04	-80.309	-2164.5	-5.7262	-22.415	-0.023135	-0.3412	0.2458	4.5738E+09	4.5738E+09
x(FT)	16.800	35.400	36.600	0.0000	6.6000	27.600	21.000	45.000	0.0000	45.000	45.000
2	-4.6072E-04	-9.5046E-04	-80.321	-2616.9	-5.7266	-22.783	-0.023138	-0.3490	0.2785	4.5738E+09	4.5738E+09
x(FT)	16.800	35.400	36.600	0.0000	6.6000	27.600	21.000	45.000	0.0000	45.600	45.000
3	-9.0053E-04	-9.5360E-04	-153.07	-2623.6	-9.2770	-22.829	-0.036612	-0.3494	0.5355	4.5738E+09	4.5738E+09
x(FT)	12.000	35.400	32.400	0.0000	1.2000	27.600	17.400	45.000	0.0000	45.000	45.000
4	-9.0049E-04	-9.5100E-04	-153.06	-2171.2	-9.2769	-22.459	-0.036610	-0.3417	0.5028	4.5738E+09	4.5738E+09
x(FT)	12.000	34.800	32.400	0.0000	1.2000	27.600	17.400	45.000	0.0000	45.600	45.000
Min.	-9.0053E-04	-9.5360E-04	-153.07	-2623.6	-9.2770	-22.829	-0.036612	-0.3494	0.2458	4.5738E+09	4.5738E+09
Pile N.	3	3	3	3	3	3	3	3	1	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	1.1631E-03	0.034533	1441.4	5425.6	0.5608	77.610	8.5091E-03	0.4851	0.3027	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	0.0000	15.600	46.800	0.0000	1.2000	7.8000	45.000	0.0000	1.2000
2	1.1631E-03	0.035384	1441.3	5496.3	0.5607	81.583	8.5091E-03	0.5020	0.3431	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	0.0000	16.200	46.800	0.0000	1.2000	7.8000	45.000	0.0000	1.2000
3	3.1226E-04	0.035384	1891.9	5499.2	0.8996	81.476	9.1673E-03	0.5019	0.6597	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	0.0000	16.200	44.400	0.0000	49.200	7.8000	45.000	0.0000	0.0000
4	3.1226E-04	0.034533	1892.0	5428.4	0.8994	77.505	9.1645E-03	0.4850	0.6193	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	0.0000	15.600	44.400	0.0000	49.200	7.8000	45.000	0.0000	0.0000
Max.	1.1631E-03	0.035384	1892.0	5499.2	0.8996	81.583	9.1673E-03	0.5020	0.6597	8.8843E+09	8.8843E+09
Pile N.	1	2	4	3	3	2	3	2	3	1	1

LOAD CASE : 8
CASE NAME : Min T
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0977555	3.73773E-05	-0.0425540

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-8.57625E-06	-1.48130E-04	3.25058E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2964.2	24.439	-57.144	-97.759	250.41	4121.0
2	2742.3	24.441	-68.770	-97.759	1559.8	4121.3
3	1731.3	36.061	-68.860	-97.759	1553.9	5433.5
4	1953.2	36.059	-57.226	-97.759	244.48	5433.2
MINIMUM	1731.3	24.439	-68.860	-97.759	244.48	4121.0
Pile N.	3	1	3	1	4	1
MAXIMUM	2964.2	36.061	-57.144	-97.759	1559.8	5433.5
Pile N.	1	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-2.9694E-05	-0.028876	-4121.0	-4832.8	-2.5495	-56.553	-0.029041	-0.3860	0.7034	4.5738E+09	4.5738E+09
x(FT)	46.800	0.0000	0.0000	14.400	42.000	0.0000	46.800	7.2000	0.0000	45.600	45.000
2	-2.9679E-05	-0.031346	-4121.3	-4995.5	-2.5487	-68.135	-0.029026	-0.4351	0.6508	4.5738E+09	4.5738E+09
x(FT)	46.800	0.0000	0.0000	15.000	42.000	0.0000	46.800	7.8000	0.0000	45.000	46.800
3	-5.4042E-05	-0.031346	-5433.5	-4993.2	-3.9853	-68.224	-0.052853	-0.4351	0.4108	4.5738E+09	4.5738E+09
x(FT)	45.600	0.0000	0.0000	15.000	39.600	0.0000	45.600	7.8000	0.0000	45.600	45.000
4	-5.4072E-05	-0.028876	-5433.2	-4830.6	-3.9865	-56.635	-0.052882	-0.3861	0.4635	4.5738E+09	4.5738E+09
x(FT)	45.600	0.0000	0.0000	14.400	39.600	0.0000	45.600	7.2000	0.0000	45.000	45.600
Min.	-5.4072E-05	-0.031346	-5433.5	-4995.5	-3.9865	-68.224	-0.052882	-0.4351	0.4108	4.5738E+09	4.5738E+09
Pile N.	4	2	3	2	4	3	4	3	3	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	2.9089E-03	8.9655E-04	473.12	282.38	24.429	19.780	0.097402	0.2819	0.8664	8.8843E+09	8.8843E+09
x(FT)	7.8000	34.200	29.400	47.400	0.0000	25.800	15.000	45.000	45.000	0.0000	0.0000
2	2.9088E-03	8.8986E-04	473.07	1559.8	24.430	20.641	0.097399	0.3093	0.8016	8.8843E+09	8.8843E+09
x(FT)	7.8000	34.800	29.400	0.0000	0.0000	27.000	15.000	45.000	45.000	0.6000	0.0000
3	5.0037E-03	8.8714E-04	785.33	1553.9	36.004	20.602	0.1475	0.3089	0.5061	8.8843E+09	8.8843E+09
x(FT)	5.4000	34.800	27.600	0.0000	0.0000	27.000	13.800	45.000	45.000	0.0000	0.0000
4	5.0037E-03	8.9393E-04	785.41	281.64	36.002	19.741	0.1475	0.2816	0.5709	8.8843E+09	8.8843E+09
x(FT)	5.4000	34.200	27.600	47.400	0.0000	25.800	13.800	45.000	45.000	3.0000	0.6000

Max.	5.0037E-03	8.9655E-04	785.41	1559.8	36.004	20.641	0.1475	0.3093	0.8664	8.8843E+09	8.8843E+09
Pile N.	3	1	4	2	3	2	4	2	1	1	1

LOAD CASE : 9
CASE NAME : Max M2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0981141	2.84708E-03	0.0491445

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
2.14450E-06	1.61079E-04	-1.98718E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1738.7	-3.5464	80.610	24.445	-2336.6	-1234.1
2	1874.4	-3.5470	83.501	24.445	-2665.3	-1234.0
3	2973.8	-6.4534	83.389	24.445	-2672.2	-1560.8
4	2838.1	-6.4532	80.500	24.445	-2343.6	-1561.0
MINIMUM	1738.7	-6.4534	80.500	24.445	-2672.2	-1561.0
Pile N.	1	3	4	1	3	4
MAXIMUM	2973.8	-3.5464	83.501	24.445	-2336.6	-1234.0
Pile N.	3	1	2	1	1	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-3.3314E-04	-9.6474E-04	-58.501	-2336.6	-4.5109	-22.888	-0.018559	-0.3483	0.4126	4.5738E+09	4.5738E+09
x(FT)	19.800	35.400	39.000	0.0000	9.6000	27.600	23.400	45.000	0.0000	45.000	45.000
2	-3.3319E-04	-9.6688E-04	-58.510	-2665.3	-4.5114	-23.158	-0.018562	-0.3540	0.4448	4.5738E+09	4.5738E+09
x(FT)	19.800	35.400	39.000	0.0000	9.6000	27.600	23.400	45.000	0.0000	45.600	45.000
3	-5.7475E-04	-9.7011E-04	-99.688	-2672.2	-6.6844	-23.205	-0.026726	-0.3544	0.7057	4.5738E+09	4.5738E+09
x(FT)	15.000	35.400	34.800	0.0000	4.8000	27.600	19.800	45.000	0.0000	45.000	45.000
4	-5.7471E-04	-9.6790E-04	-99.675	-2343.6	-6.6841	-22.935	-0.026724	-0.3487	0.6735	4.5738E+09	4.5738E+09
x(FT)	15.000	35.400	34.800	0.0000	4.8000	27.600	19.800	45.000	0.0000	45.000	45.000
Min.	-5.7475E-04	-9.7011E-04	-99.688	-2672.2	-6.6844	-23.205	-0.026726	-0.3544	0.4126	4.5738E+09	4.5738E+09
Pile N.	3	3	3	3	3	3	3	3	1	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	1.4867E-03	0.035305	1234.1	5529.5	0.4734	79.897	0.011948	0.4974	0.5082	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	0.0000	15.600	47.400	0.0000	2.4000	7.8000	45.000	0.0000	2.4000
2	1.4867E-03	0.035923	1234.0	5581.3	0.4734	82.776	0.011948	0.5096	0.5479	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	0.0000	16.200	47.400	0.0000	2.4000	7.8000	45.000	0.6000	0.0000
3	8.6904E-04	0.035923	1560.8	5584.2	0.6368	82.665	6.5700E-03	0.5096	0.8692	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	0.0000	16.200	46.200	0.0000	50.400	7.8000	45.000	0.0000	0.6000
4	8.6904E-04	0.035305	1561.0	5532.4	0.6367	79.788	6.5694E-03	0.4973	0.8296	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	0.0000	15.600	46.200	0.0000	50.400	7.8000	45.000	0.0000	0.0000
Max.	1.4867E-03	0.035923	1561.0	5584.2	0.6368	82.776	0.011948	0.5096	0.8692	8.8843E+09	8.8843E+09
Pile N.	1	2	4	3	3	2	1	2	3	1	1

LOAD CASE : 10
CASE NAME : Min M2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0677958	-4.41761E-04	-0.0433718

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-7.76288E-06	-1.50461E-04	3.22326E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2261.2	22.488	-59.440	-88.488	401.33	3889.9
2	2041.2	22.489	-69.970	-88.488	1586.4	3890.2
3	1014.3	33.012	-70.063	-88.488	1580.4	5078.1
4	1234.3	33.010	-59.526	-88.488	395.21	5077.8
MINIMUM	1014.3	22.488	-70.063	-88.488	395.21	3889.9
Pile N.	3	1	3	1	4	1
MAXIMUM	2261.2	33.012	-59.440	-88.488	1586.4	5078.1
Pile N.	1	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-2.6185E-05	-0.029615	-3889.9	-4924.2	-2.3172	-58.834	-0.025609	-0.3978	0.5366	4.5738E+09	4.5738E+09
x(FT)	46.800	0.0000	0.0000	14.400	42.600	0.0000	46.800	7.8000	0.0000	45.600	45.000
2	-2.6171E-05	-0.031851	-3890.2	-5073.3	-2.3164	-69.324	-0.025595	-0.4422	0.4844	4.5738E+09	4.5738E+09
x(FT)	46.800	0.0000	0.0000	15.000	42.600	0.0000	46.800	7.8000	0.0000	45.600	45.000
3	-4.7365E-05	-0.031851	-5078.1	-5070.9	-3.5996	-69.416	-0.046323	-0.4422	0.2407	4.5738E+09	4.5738E+09
x(FT)	45.600	0.0000	0.0000	15.000	40.200	0.0000	45.600	7.8000	0.0000	45.000	45.000
4	-4.7392E-05	-0.029615	-5077.8	-4921.9	-3.6007	-58.920	-0.046350	-0.3978	0.2929	4.5738E+09	4.5738E+09
x(FT)	45.600	0.0000	0.0000	14.400	40.200	0.0000	45.600	7.8000	0.0000	45.000	45.000
Min.	-4.7392E-05	-0.031851	-5078.1	-5073.3	-3.6007	-69.416	-0.046350	-0.4422	0.2407	4.5738E+09	4.5738E+09
Pile N.	4	2	3	2	4	3	4	3	3	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	2.5929E-03	9.0760E-04	424.39	401.33	22.483	20.156	0.089247	0.2893	0.6609	8.8843E+09	8.8843E+09
x(FT)	8.4000	34.200	29.400	0.0000	0.0000	26.400	15.600	45.000	45.000	2.4000	0.0000
2	2.5929E-03	9.0193E-04	424.34	1586.4	22.484	20.943	0.089243	0.3140	0.5966	8.8843E+09	8.8843E+09
x(FT)	8.4000	34.800	29.400	0.0000	0.0000	27.000	15.600	45.000	45.000	0.0000	0.0000
3	4.4473E-03	8.9913E-04	702.25	1580.4	32.964	20.902	0.1342	0.3136	0.2965	8.8843E+09	8.8843E+09
x(FT)	6.0000	34.800	27.600	0.0000	0.0000	27.000	13.800	45.000	45.000	0.0000	0.0000
4	4.4473E-03	9.0486E-04	702.33	395.21	32.962	20.117	0.1342	0.2890	0.3608	8.8843E+09	8.8843E+09
x(FT)	6.0000	34.200	27.600	0.0000	0.0000	26.400	13.800	45.000	45.000	0.6000	0.0000
Max.	4.4473E-03	9.0760E-04	702.33	1586.4	32.964	20.943	0.1342	0.3140	0.6609	8.8843E+09	8.8843E+09
Pile N.	3	1	4	2	3	2	3	2	1	1	1

LOAD CASE : 11
CASE NAME : Max M3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0979454	-5.09380E-03	-5.54256E-03

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-8.56897E-06	-2.30303E-05	1.15904E-04

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2826.4	77.453	1.0550	-97.676	-1083.7	1.3598E+04
2	2035.3	77.464	-10.553	-97.676	225.14	1.3602E+04
3	1878.1	89.049	-10.556	-97.676	225.00	1.4909E+04
4	2669.2	89.034	1.0540	-97.676	-1083.9	1.4905E+04
MINIMUM	1878.1	77.453	-10.556	-97.676	-1083.9	1.3598E+04
Pile N.	3	1	3	1	4	1
MAXIMUM	2826.4	89.049	1.0550	-97.676	225.14	1.4909E+04
Pile N.	1	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-8.8615E-05	-2.3741E-03	-1.3598E+04	-1083.7	-7.9400	-0.4672	-0.086665	-0.022440	0.6707	4.5738E+09	4.5738E+09
x(FT)	47.400	0.0000	0.0000	0.0000	42.600	49.200	47.400	3.6000	0.0000	45.000	45.000
2	-8.8468E-05	-4.8420E-03	-1.3602E+04	-774.17	-7.9310	-10.455	-0.086522	-0.067022	0.4830	4.5738E+09	4.5738E+09
x(FT)	47.400	0.0000	0.0000	15.000	42.600	0.0000	47.400	7.8000	0.0000	45.000	45.600
3	-1.0912E-04	-4.8420E-03	-1.4909E+04	-774.12	-9.3033	-10.457	-0.1067	-0.067023	0.4457	4.5738E+09	4.5738E+09
x(FT)	46.800	0.0000	0.0000	15.000	42.000	0.0000	46.800	7.8000	0.0000	45.000	45.000
4	-1.0932E-04	-2.3741E-03	-1.4905E+04	-1083.9	-9.3133	-0.4671	-0.1069	-0.022441	0.6334	4.5738E+09	4.5738E+09
x(FT)	46.800	0.0000	0.0000	0.0000	42.000	49.200	46.800	3.6000	0.0000	45.000	45.000
Min.	-1.0932E-04	-4.8420E-03	-1.4909E+04	-1083.9	-9.3133	-10.457	-0.1069	-0.067023	0.4457	4.5738E+09	4.5738E+09
Pile N.	4	2	3	4	4	3	4	3	3	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	8.7737E-03	2.4367E-04	1442.6	47.824	77.452	3.7788	0.3069	0.020328	0.8261	8.8843E+09	8.8843E+09
x(FT)	9.0000	24.600	30.000	45.000	0.0000	15.000	15.600	45.000	45.000	3.6000	0.0000
2	8.7728E-03	1.3807E-04	1442.0	225.14	77.457	3.1928	0.3068	0.047698	0.5949	8.8843E+09	8.8843E+09
x(FT)	9.0000	34.800	30.000	0.0000	0.0000	27.000	15.600	45.000	45.000	4.2000	1.2000
3	0.010698	1.3801E-04	1734.5	225.00	88.997	3.1919	0.3553	0.047689	0.5490	8.8843E+09	8.8843E+09
x(FT)	7.8000	34.800	29.400	0.0000	0.0000	27.000	15.000	45.000	45.000	4.2000	0.0000
4	0.010699	2.4361E-04	1735.2	47.812	88.987	3.7780	0.3553	0.020327	0.7802	8.8843E+09	8.8843E+09
x(FT)	7.8000	24.600	29.400	45.000	0.0000	15.000	15.000	45.000	45.000	4.2000	0.0000
Max.	0.010699	2.4367E-04	1735.2	225.14	88.997	3.7788	0.3553	0.047698	0.8261	8.8843E+09	8.8843E+09
Pile N.	4	1	4	2	3	1	4	2	1	1	1

LOAD CASE : 12
CASE NAME : Min M3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0679646	7.57351E-03	0.0112933

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
2.93603E-06	3.36220E-05	-1.03604E-04

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1173.5	-58.264	20.023	33.467	-846.29	-1.0925E+04
2	1880.6	-58.261	23.983	33.467	-1295.9	-1.0922E+04
3	2110.0	-62.235	23.977	33.467	-1296.2	-1.1369E+04
4	1402.9	-62.240	20.018	33.467	-846.59	-1.1373E+04
MINIMUM	1173.5	-62.240	20.018	33.467	-1296.2	-1.1373E+04
Pile N.	1	4	4	1	3	4
MAXIMUM	2110.0	-58.261	23.983	33.467	-846.29	-1.0922E+04
Pile N.	3	2	2	1	1	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-6.1351E-03	-2.0310E-04	-1024.2	-846.29	-58.296	-5.0740	-0.2295	-0.080385	0.2785	4.5738E+09	4.5738E+09
x(FT)	10.200	36.000	31.200	0.0000	0.0000	28.200	16.200	45.000	0.0000	46.200	45.600
2	-6.1359E-03	-2.0861E-04	-1024.7	-1295.9	-58.297	-5.4989	-0.2296	-0.089837	0.4463	4.5738E+09	4.5738E+09
x(FT)	10.200	36.600	31.200	0.0000	0.0000	29.400	16.200	45.000	0.0000	45.000	45.000
3	-6.7358E-03	-2.0876E-04	-1118.6	-1296.2	-62.256	-5.5011	-0.2456	-0.089866	0.5007	4.5738E+09	4.5738E+09
x(FT)	9.6000	36.600	30.600	0.0000	0.0000	29.400	16.200	45.000	0.0000	45.000	47.400
4	-6.7350E-03	-2.0324E-04	-1118.1	-846.59	-62.258	-5.0762	-0.2456	-0.080410	0.3329	4.5738E+09	4.5738E+09
x(FT)	9.6000	36.000	30.600	0.0000	0.0000	28.200	16.200	45.000	0.0000	46.200	45.000
Min.	-6.7358E-03	-2.0876E-04	-1118.6	-1296.2	-62.258	-5.5011	-0.2456	-0.089866	0.2785	4.5738E+09	4.5738E+09
Pile N.	3	3	3	3	4	3	3	3	1	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL.	DISPL.	MOMENT	MOMENT	SHEAR	SHEAR	SOIL REACT	SOIL REACT	TOTAL	FLEX. RIG.	FLEX. RIG.

	y-DIR IN	z-DIR IN	z-DIR KIP-IN	y-DIR KIP-IN	y-DIR KIP	z-DIR KIP	y-DIR KIP/IN	z-DIR KIP/IN	STRESS KIP/IN**2	z-DIR KIP-IN**2	y-DIR KIP-IN**2
1	6.1897E-05	8.0463E-03	1.0925E+04	1216.2	5.8135	19.861	0.060535	0.1175	0.3430	8.8843E+09	8.8843E+09
x(FT)	48.000	0.0000	0.0000	16.800	43.800	0.0000	48.000	8.4000	45.000	1.8000	0.0000
2	6.1985E-05	8.8919E-03	1.0922E+04	1305.7	5.8198	23.806	0.060621	0.1347	0.5497	8.8843E+09	8.8843E+09
x(FT)	48.000	0.0000	0.0000	17.400	43.800	0.0000	48.000	8.4000	45.000	1.2000	0.6000
3	6.7751E-05	8.8919E-03	1.1369E+04	1305.8	6.2767	23.801	0.066261	0.1347	0.6168	8.8843E+09	8.8843E+09
x(FT)	48.000	0.0000	0.0000	17.400	43.200	0.0000	48.000	8.4000	45.000	1.2000	0.0000
4	6.7659E-05	8.0463E-03	1.1373E+04	1216.3	6.2700	19.856	0.066171	0.1175	0.4101	8.8843E+09	8.8843E+09
x(FT)	48.000	0.0000	0.0000	16.800	43.200	0.0000	48.000	8.4000	45.000	1.2000	0.6000
Max.	6.7751E-05	8.8919E-03	1.1373E+04	1305.8	6.2767	23.806	0.066261	0.1347	0.6168	8.8843E+09	8.8843E+09
Pile N.	3	2	4	3	3	2	3	2	3	1	1

LOAD CASE : 13
CASE NAME : Max P
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0755706	4.19330E-03	-0.0190541

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-2.03836E-06	-6.84659E-05	-4.23857E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1911.0	-20.880	-24.867	-23.235	-65.996	-4134.7
2	2200.3	-20.880	-27.616	-23.235	246.31	-4134.2
3	1733.0	-18.120	-27.634	-23.235	245.05	-3823.5
4	1443.7	-18.119	-24.884	-23.235	-67.266	-3824.0
MINIMUM	1443.7	-20.880	-27.634	-23.235	-67.266	-4134.7
Pile N.	4	1	3	1	4	1
MAXIMUM	2200.3	-18.119	-24.867	-23.235	246.31	-3823.5
Pile N.	2	4	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR	DISPL. z-DIR	MOMENT z-DIR	MOMENT y-DIR	SHEAR y-DIR	SHEAR z-DIR	SOIL REACT y-DIR	SOIL REACT z-DIR	TOTAL STRESS	FLEX. RIG. z-DIR	FLEX. RIG. y-DIR

	IN	IN	KIP-IN	KIP-IN	KIP	KIP	KIP/IN	KIP/IN	KIP/IN**2	KIP-IN**2	KIP-IN**2
1	-2.0875E-03	-0.013009	-352.70	-2216.1	-20.906	-24.599	-0.082385	-0.1719	0.4535	4.5738E+09	4.5738E+09
x(FT)	11.400	0.0000	31.800	13.800	0.0000	0.0000	17.400	7.2000	0.0000	46.200	45.000
2	-2.0876E-03	-0.013597	-352.77	-2247.8	-20.907	-27.338	-0.082392	-0.1834	0.5221	4.5738E+09	4.5738E+09
x(FT)	11.400	0.0000	31.800	14.400	0.0000	0.0000	17.400	7.8000	0.0000	46.200	45.000
3	-1.7237E-03	-0.013597	-294.31	-2247.3	-18.220	-27.356	-0.072047	-0.1834	0.4112	4.5738E+09	4.5738E+09
x(FT)	12.600	0.0000	33.000	14.400	1.8000	0.0000	18.000	7.8000	0.0000	45.000	45.000
4	-1.7235E-03	-0.013009	-294.25	-2215.6	-18.219	-24.616	-0.072039	-0.1719	0.3426	4.5738E+09	4.5738E+09
x(FT)	12.600	0.0000	33.000	13.800	1.8000	0.0000	18.000	7.2000	0.0000	45.000	45.600
Min.	-2.0876E-03	-0.013597	-352.77	-2247.8	-20.907	-27.356	-0.082392	-0.1834	0.3426	4.5738E+09	4.5738E+09
Pile N.	2	2	2	2	2	3	2	3	4	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	3.3937E-04	4.1498E-04	4134.7	129.54	2.0493	9.0290	0.020953	0.1264	0.5586	8.8843E+09	8.8843E+09
x(FT)	0.0000	33.600	0.0000	47.400	44.400	25.800	48.600	45.000	45.000	0.0000	1.8000
2	3.3937E-04	4.1241E-04	4134.2	246.31	2.0503	9.2110	0.020965	0.1330	0.6431	8.8843E+09	8.8843E+09
x(FT)	0.0000	34.200	0.0000	0.0000	44.400	26.400	48.600	45.000	45.000	0.0000	0.0000
3	9.2642E-04	4.1184E-04	3823.5	245.05	1.7430	9.2029	0.017853	0.1329	0.5065	8.8843E+09	8.8843E+09
x(FT)	0.0000	34.200	0.0000	0.0000	44.400	26.400	49.200	45.000	45.000	0.6000	0.6000
4	9.2642E-04	4.1440E-04	3824.0	129.38	1.7420	9.0210	0.017844	0.1263	0.4220	8.8843E+09	8.8843E+09
x(FT)	0.0000	33.600	0.0000	47.400	44.400	25.800	49.200	45.000	45.000	0.6000	0.0000
Max.	9.2642E-04	4.1498E-04	4134.7	246.31	2.0503	9.2110	0.020965	0.1330	0.6431	8.8843E+09	8.8843E+09
Pile N.	3	1	1	2	2	2	2	2	2	1	1

LOAD CASE : 14
CASE NAME : Min P
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0895377	-3.37028E-04	0.0252560

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-3.12351E-06	8.45656E-05	5.22430E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN

1	2042.7	44.637	42.621	-35.604	-1263.5	7229.2
2	1686.1	44.641	38.409	-35.604	-784.90	7230.0
3	2263.3	48.863	38.380	-35.604	-786.82	7706.0
4	2619.9	48.858	42.590	-35.604	-1265.4	7705.2
MINIMUM	1686.1	44.637	38.380	-35.604	-1265.4	7229.2
Pile N.	2	1	3	1	4	1
MAXIMUM	2619.9	48.863	42.621	-35.604	-784.90	7706.0
Pile N.	4	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-5.8026E-05	-5.0706E-04	-7229.2	-1263.5	-4.7400	-12.052	-0.056749	-0.1843	0.4847	4.5738E+09	4.5738E+09
x(FT)	46.200	35.400	0.0000	0.0000	41.400	27.600	46.200	45.000	0.0000	45.600	45.000
2	-5.7975E-05	-5.0651E-04	-7230.0	-784.90	-4.7377	-11.687	-0.056699	-0.1742	0.4001	4.5738E+09	4.5738E+09
x(FT)	46.200	34.800	0.0000	0.0000	41.400	27.000	46.200	45.000	0.0000	45.000	47.400
3	-6.6712E-05	-5.0739E-04	-7706.0	-786.82	-5.2643	-11.699	-0.065245	-0.1743	0.5371	4.5738E+09	4.5738E+09
x(FT)	45.600	34.800	0.0000	0.0000	40.800	27.000	45.600	45.000	0.0000	45.000	45.000
4	-6.6777E-05	-5.0793E-04	-7705.2	-1265.4	-5.2668	-12.065	-0.065308	-0.1844	0.6217	4.5738E+09	4.5738E+09
x(FT)	45.600	35.400	0.0000	0.0000	40.800	27.600	45.600	45.000	0.0000	45.000	45.000
Min.	-6.6777E-05	-5.0793E-04	-7706.0	-1265.4	-5.2668	-12.065	-0.065308	-0.1844	0.4001	4.5738E+09	4.5738E+09
Pile N.	4	4	3	4	4	4	4	4	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	5.6027E-03	0.018602	899.54	2908.9	44.597	42.245	0.1792	0.2625	0.5971	8.8843E+09	8.8843E+09
x(FT)	7.2000	0.0000	28.800	15.600	0.0000	0.0000	14.400	7.8000	45.000	0.0000	0.6000
2	5.6025E-03	0.017703	899.37	2836.8	44.600	38.049	0.1792	0.2446	0.4929	8.8843E+09	8.8843E+09
x(FT)	7.2000	0.0000	28.800	15.000	0.0000	0.0000	14.400	7.8000	45.000	0.6000	0.0000
3	6.3604E-03	0.017703	1013.1	2837.5	48.808	38.021	0.1975	0.2446	0.6615	8.8843E+09	8.8843E+09
x(FT)	6.6000	0.0000	28.200	15.000	0.0000	0.0000	14.400	7.8000	45.000	0.0000	0.0000
4	6.3605E-03	0.018602	1013.3	2909.7	48.804	42.215	0.1975	0.2624	0.7658	8.8843E+09	8.8843E+09
x(FT)	6.6000	0.0000	28.200	15.600	0.0000	0.0000	14.400	7.8000	45.000	0.0000	0.0000
Max.	6.3605E-03	0.018602	1013.3	2909.7	48.808	42.245	0.1975	0.2625	0.7658	8.8843E+09	8.8843E+09
Pile N.	4	1	4	4	3	1	3	1	4	1	1

LOAD CASE : 15
CASE NAME : Max V2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0824592	-1.33756E-03	0.0136887

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-5.72880E-06	4.74069E-05	8.21845E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2103.9	65.871	24.376	-65.302	-763.13	1.0881E+04
2	1543.0	65.879	16.633	-65.302	113.47	1.0883E+04
3	1866.6	73.631	16.625	-65.302	112.86	1.1758E+04
4	2427.5	73.619	24.366	-65.302	-763.73	1.1755E+04
MINIMUM	1543.0	65.871	16.625	-65.302	-763.73	1.0881E+04
Pile N.	2	1	3	1	4	1
MAXIMUM	2427.5	73.631	24.376	-65.302	113.47	1.1758E+04
Pile N.	4	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-8.2447E-05	-2.8457E-04	-1.0881E+04	-763.13	-6.9282	-6.8011	-0.080633	-0.1045	0.4993	4.5738E+09	4.5738E+09
x(FT)	46.200	35.400	0.0000	0.0000	41.400	27.600	46.200	45.000	0.0000	45.000	45.000
2	-8.2329E-05	-2.8810E-04	-1.0883E+04	-89.379	-6.9228	-6.2121	-0.080517	-0.086097	0.3661	4.5738E+09	4.5738E+09
x(FT)	46.200	33.600	0.0000	47.400	41.400	25.800	46.200	45.000	0.0000	45.000	46.200
3	-9.8177E-05	-2.8837E-04	-1.1758E+04	-89.452	-7.8750	-6.2158	-0.096017	-0.086129	0.4429	4.5738E+09	4.5738E+09
x(FT)	46.200	33.600	0.0000	47.400	40.800	25.800	46.200	45.000	0.0000	45.600	45.000
4	-9.8309E-05	-2.8485E-04	-1.1755E+04	-763.73	-7.8809	-6.8052	-0.096146	-0.1045	0.5760	4.5738E+09	4.5738E+09
x(FT)	46.200	35.400	0.0000	0.0000	40.800	27.600	46.200	45.000	0.0000	46.200	45.000
Min.	-9.8309E-05	-2.8837E-04	-1.1758E+04	-763.73	-7.8809	-6.8052	-0.096146	-0.1045	0.3661	4.5738E+09	4.5738E+09
Pile N.	4	3	3	4	4	4	4	4	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	8.0520E-03	0.010531	1300.9	1639.2	65.824	24.163	0.2635	0.1492	0.6150	8.8843E+09	8.8843E+09

x(FT)	7.8000	0.0000	28.800	15.600	0.0000	0.0000	15.000	7.8000	45.000	0.6000	1.2000
2	8.0516E-03	8.8816E-03	1300.5	1528.3	65.830	16.450	0.2635	0.1166	0.4510	8.8843E+09	8.8843E+09
x(FT)	7.8000	0.0000	28.800	13.800	0.0000	0.0000	15.000	7.2000	45.000	0.0000	0.6000
3	9.4161E-03	8.8816E-03	1505.8	1528.6	73.554	16.442	0.2967	0.1166	0.5456	8.8843E+09	8.8843E+09
x(FT)	7.2000	0.0000	28.200	13.800	0.0000	0.0000	14.400	7.2000	45.000	3.0000	0.0000
4	9.4164E-03	0.010531	1506.2	1639.5	73.545	24.154	0.2967	0.1492	0.7096	8.8843E+09	8.8843E+09
x(FT)	7.2000	0.0000	28.200	15.600	0.0000	0.0000	14.400	7.8000	45.000	1.8000	0.6000
Max.	9.4164E-03	0.010531	1506.2	1639.5	73.554	24.163	0.2967	0.1492	0.7096	8.8843E+09	8.8843E+09
Pile N.	4	1	4	4	3	1	4	1	4	1	1

LOAD CASE : 16
CASE NAME : Min V2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0818684	4.75203E-03	-7.92546E-03

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
7.46068E-08	-3.40617E-05	-7.27852E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1839.1	-44.950	-5.8024	0.8504	-774.37	-8126.6
2	2335.9	-44.947	-5.6943	0.8504	-785.09	-8125.1
3	2103.4	-45.050	-5.6976	0.8504	-785.41	-8137.2
4	1606.6	-45.053	-5.8057	0.8504	-774.69	-8138.8
MINIMUM	1606.6	-45.053	-5.8057	0.8504	-785.41	-8138.8
Pile N.	4	4	4	1	3	4
MAXIMUM	2335.9	-44.947	-5.6943	0.8504	-774.37	-8125.1
Pile N.	2	2	2	1	1	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-4.9222E-03	-5.0750E-03	-814.89	-1115.5	-44.960	-5.6947	-0.1775	-0.059178	0.4364	4.5738E+09	4.5738E+09
x(FT)	9.6000	0.0000	30.600	9.0000	0.0000	0.0000	16.200	6.0000	0.0000	45.000	45.600

2	-4.9226E-03	-5.0535E-03	-815.13	-1117.7	-44.959	-5.5869	-0.1775	-0.058788	0.5543	4.5738E+09	4.5738E+09
x(FT)	9.6000	0.0000	30.600	9.0000	0.0000	0.0000	16.200	6.0000	0.0000	45.600	45.000
3	-4.9381E-03	-5.0535E-03	-817.42	-1117.6	-45.060	-5.5902	-0.1779	-0.058790	0.4991	4.5738E+09	4.5738E+09
x(FT)	9.6000	0.0000	30.600	9.0000	0.0000	0.0000	16.200	6.0000	0.0000	45.000	46.200
4	-4.9377E-03	-5.0750E-03	-817.17	-1115.5	-45.061	-5.6981	-0.1779	-0.059179	0.3812	4.5738E+09	4.5738E+09
x(FT)	9.6000	0.0000	30.600	9.0000	0.0000	0.0000	16.200	6.0000	0.0000	45.000	46.200
Min.	-4.9381E-03	-5.0750E-03	-817.42	-1117.7	-45.061	-5.6981	-0.1779	-0.059179	0.3812	4.5738E+09	4.5738E+09
Pile N.	3	1	3	2	4	4	3	4	4	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	4.9473E-05	2.3255E-04	8126.6	63.582	4.5488	4.3700	0.048385	0.047396	0.5376	8.8843E+09	8.8843E+09
x(FT)	47.400	30.600	0.0000	46.200	43.200	22.200	47.400	45.000	45.000	0.6000	0.6000
2	4.9527E-05	2.3365E-04	8125.1	63.695	4.5521	4.3772	0.048438	0.047178	0.6828	8.8843E+09	8.8843E+09
x(FT)	47.400	30.600	0.0000	46.200	43.200	22.200	47.400	45.000	45.000	0.0000	1.2000
3	4.9667E-05	2.3351E-04	8137.2	63.662	4.5622	4.3754	0.048575	0.047169	0.6148	8.8843E+09	8.8843E+09
x(FT)	47.400	30.600	0.0000	46.200	43.200	22.200	47.400	45.000	45.000	0.0000	0.0000
4	4.9613E-05	2.3241E-04	8138.8	63.549	4.5589	4.3681	0.048522	0.047387	0.4696	8.8843E+09	8.8843E+09
x(FT)	47.400	30.600	0.0000	46.200	43.200	22.200	47.400	45.000	45.000	0.0000	3.0000
Max.	4.9667E-05	2.3365E-04	8138.8	63.695	4.5622	4.3772	0.048575	0.047396	0.6828	8.8843E+09	8.8843E+09
Pile N.	3	2	4	2	3	2	3	1	2	1	1

LOAD CASE : 17
CASE NAME : Max V3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0807397	-1.54164E-03	0.0398523

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-7.25649E-07	1.27142E-04	2.70186E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1602.8	17.260	70.270	-8.2716	-2592.0	3081.6
2	1418.4	17.260	69.302	-8.2716	-2480.2	3081.9
3	2286.2	18.240	69.230	-8.2716	-2484.5	3191.7
4	2470.6	18.240	70.198	-8.2716	-2596.3	3191.5

MINIMUM	1418.4	17.260	69.230	-8.2716	-2596.3	3081.6
Pile N.	2	1	3	1	4	1
MAXIMUM	2470.6	18.240	70.270	-8.2716	-2480.2	3191.7
Pile N.	4	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-1.9293E-05	-7.6464E-04	-3081.6	-2592.0	-1.7539	-18.666	-0.018869	-0.2914	0.3804	4.5738E+09	4.5738E+09
x(FT)	47.400	35.400	0.0000	0.0000	42.600	28.200	47.400	45.000	0.0000	45.000	46.800
2	-1.9285E-05	-7.6368E-04	-3081.9	-2480.2	-1.7535	-18.568	-0.018861	-0.2890	0.3366	4.5738E+09	4.5738E+09
x(FT)	47.400	35.400	0.0000	0.0000	42.600	27.600	47.400	45.000	0.0000	45.000	45.000
3	-2.0931E-05	-7.6574E-04	-3191.7	-2484.5	-1.8709	-18.599	-0.020470	-0.2893	0.5425	4.5738E+09	4.5738E+09
x(FT)	47.400	35.400	0.0000	0.0000	42.600	27.600	47.400	45.000	0.0000	45.000	46.200
4	-2.0939E-05	-7.6673E-04	-3191.5	-2596.3	-1.8714	-18.696	-0.020478	-0.2917	0.5863	4.5738E+09	4.5738E+09
x(FT)	47.400	35.400	0.0000	0.0000	42.600	28.200	47.400	45.000	0.0000	45.000	45.000
Min.	-2.0939E-05	-7.6673E-04	-3191.7	-2596.3	-1.8714	-18.696	-0.020478	-0.2917	0.3366	4.5738E+09	4.5738E+09
Pile N.	4	4	3	4	4	4	4	4	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	1.9161E-03	0.029277	316.32	4489.6	17.261	69.681	0.068206	0.4210	0.4685	8.8843E+09	8.8843E+09
x(FT)	9.0000	0.0000	30.000	16.200	0.0000	0.0000	15.600	8.4000	45.000	0.0000	0.0000
2	1.9161E-03	0.029068	316.29	4470.0	17.261	68.716	0.068204	0.4167	0.4146	8.8843E+09	8.8843E+09
x(FT)	9.0000	0.0000	30.000	16.200	0.0000	0.0000	15.600	8.4000	45.000	0.0000	0.0000
3	2.0743E-03	0.029068	340.67	4471.9	18.239	68.646	0.072283	0.4167	0.6682	8.8843E+09	8.8843E+09
x(FT)	9.0000	0.0000	30.000	16.200	0.0000	0.0000	15.600	8.4000	45.000	0.6000	0.0000
4	2.0743E-03	0.029277	340.70	4491.5	18.238	69.609	0.072286	0.4209	0.7221	8.8843E+09	8.8843E+09
x(FT)	9.0000	0.0000	30.000	16.200	0.0000	0.0000	15.600	8.4000	45.000	0.0000	0.0000
Max.	2.0743E-03	0.029277	340.70	4491.5	18.239	69.681	0.072286	0.4210	0.7221	8.8843E+09	8.8843E+09
Pile N.	3	1	4	4	3	1	4	1	4	1	1

LOAD CASE : 18
CASE NAME : Min V3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0827545	4.83701E-03	-0.0340392

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-3.92168E-06	-1.14078E-04	-1.97180E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2314.3	1.8417	-51.823	-44.703	1067.5	-618.72
2	2448.8	1.8408	-57.123	-44.703	1667.5	-618.62
3	1670.2	7.1580	-57.178	-44.703	1664.0	-19.877
4	1535.7	7.1595	-51.876	-44.703	1064.0	-19.982
MINIMUM	1535.7	1.8408	-57.178	-44.703	1064.0	-618.72
Pile N.	4	2	3	1	4	1
MAXIMUM	2448.8	7.1595	-51.823	-44.703	1667.5	-19.877
Pile N.	2	4	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-1.5010E-04	-0.023892	-37.478	-3828.7	-2.6432	-51.338	-0.023876	-0.3301	0.5492	4.5738E+09	4.5738E+09
x(FT)	28.800	0.0000	46.200	15.000	19.800	0.0000	45.000	7.8000	0.0000	45.000	45.000
2	-1.5015E-04	-0.025021	-37.488	-3918.9	-2.6438	-56.618	-0.023878	-0.3526	0.5811	4.5738E+09	4.5738E+09
x(FT)	28.800	0.0000	46.200	15.600	19.800	0.0000	45.000	7.8000	0.0000	46.800	45.000
3	-1.1944E-04	-0.025021	-37.282	-3917.4	-2.5988	-56.672	-0.036384	-0.3526	0.3963	4.5738E+09	4.5738E+09
x(FT)	33.600	0.0000	47.400	15.600	25.800	0.0000	45.000	7.8000	0.0000	45.600	45.000
4	-1.1939E-04	-0.023892	-37.269	-3827.3	-2.5981	-51.390	-0.036379	-0.3302	0.3644	4.5738E+09	4.5738E+09
x(FT)	33.600	0.0000	47.400	15.000	25.800	0.0000	45.000	7.8000	0.0000	47.400	46.200
Min.	-1.5015E-04	-0.025021	-37.488	-3918.9	-2.6438	-56.672	-0.036384	-0.3526	0.3644	4.5738E+09	4.5738E+09
Pile N.	2	2	2	2	2	3	3	3	4	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	2.6160E-03	6.8456E-04	693.19	1067.5	1.7851	15.788	0.028580	0.2353	0.6764	8.8843E+09	8.8843E+09
x(FT)	0.0000	34.800	6.0000	0.0000	0.0000	27.000	5.4000	45.000	45.000	0.0000	1.2000
2	2.6160E-03	6.8466E-04	693.18	1667.5	1.7841	16.239	0.028579	0.2479	0.7158	8.8843E+09	8.8843E+09
x(FT)	0.0000	35.400	6.0000	0.0000	0.0000	27.600	5.4000	45.000	45.000	0.6000	1.8000
3	3.7454E-03	6.8308E-04	638.10	1664.0	7.0811	16.215	0.049489	0.2477	0.4882	8.8843E+09	8.8843E+09

x(FT)	0.0000	35.400	13.800	0.0000	0.0000	27.600	7.2000	45.000	45.000	0.0000	0.0000
4	3.7454E-03	6.8297E-04	638.07	1064.0	7.0825	15.765	0.049490	0.2351	0.4489	8.8843E+09	8.8843E+09
x(FT)	0.0000	34.800	13.800	0.0000	0.0000	27.000	7.2000	45.000	45.000	0.0000	0.6000
Max.	3.7454E-03	6.8466E-04	693.19	1667.5	7.0825	16.239	0.049490	0.2479	0.7158	8.8843E+09	8.8843E+09
Pile N.	3	2	1	2	4	2	4	2	2	1	1

LOAD CASE : 19
CASE NAME : Max T
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0815519	8.17701E-03	-0.0107173

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
1.89541E-06	-3.58210E-05	-7.80314E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1819.7	-32.466	-18.536	21.605	588.79	-6938.0
2	2352.3	-32.468	-15.958	21.605	299.86	-6936.2
3	2107.8	-35.034	-15.963	21.605	299.52	-7226.7
4	1575.2	-35.032	-18.542	21.605	588.45	-7228.5
MINIMUM	1575.2	-35.034	-18.542	21.605	299.52	-7228.5
Pile N.	4	3	4	1	3	4
MAXIMUM	2352.3	-32.466	-15.958	21.605	588.79	-6936.2
Pile N.	2	1	2	1	1	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-3.0608E-03	-7.9813E-03	-524.00	-1240.5	-32.699	-18.375	-0.1294	-0.1132	0.4318	4.5738E+09	4.5738E+09
x(FT)	13.200	0.0000	33.000	16.200	2.4000	0.0000	18.000	7.8000	0.0000	45.000	45.600
2	-3.0615E-03	-7.4354E-03	-524.22	-1197.5	-32.701	-15.807	-0.1294	-0.1023	0.5582	4.5738E+09	4.5738E+09
x(FT)	13.200	0.0000	33.000	15.000	2.4000	0.0000	18.000	7.8000	0.0000	45.600	45.000
3	-3.3864E-03	-7.4354E-03	-576.57	-1197.4	-35.152	-15.812	-0.1388	-0.1023	0.5002	4.5738E+09	4.5738E+09
x(FT)	12.000	0.0000	32.400	15.000	1.8000	0.0000	18.000	7.8000	0.0000	45.000	45.000
4	-3.3859E-03	-7.9813E-03	-576.34	-1240.3	-35.151	-18.381	-0.1388	-0.1132	0.3738	4.5738E+09	4.5738E+09

x(FT)	12.000	0.0000	32.400	16.200	1.8000	0.0000	18.000	7.8000	0.0000	45.000	45.000
Min.	-3.3864E-03	-7.9813E-03	-576.57	-1240.5	-35.152	-18.381	-0.1388	-0.1132	0.3738	4.5738E+09	4.5738E+09
Pile N.	3	1	3	1	3	4	3	1	4	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	1.8953E-03	2.1490E-04	6938.0	588.79	3.1179	5.1463	0.031930	0.079161	0.5319	8.8843E+09	8.8843E+09
x(FT)	0.0000	35.400	0.0000	0.0000	45.000	27.600	49.200	45.000	45.000	0.0000	0.0000
2	1.8953E-03	2.1502E-04	6936.2	299.86	3.1208	4.9323	0.031962	0.073156	0.6876	8.8843E+09	8.8843E+09
x(FT)	0.0000	34.800	0.0000	0.0000	45.000	27.000	49.200	45.000	45.000	3.0000	0.6000
3	1.3494E-03	2.1486E-04	7226.7	299.52	3.3965	4.9300	0.034658	0.073134	0.6161	8.8843E+09	8.8843E+09
x(FT)	0.0000	34.800	0.0000	0.0000	44.400	27.000	49.200	45.000	45.000	0.0000	0.6000
4	1.3494E-03	2.1474E-04	7228.5	588.45	3.3933	5.1440	0.034626	0.079137	0.4604	8.8843E+09	8.8843E+09
x(FT)	0.0000	35.400	0.0000	0.0000	44.400	27.600	49.200	45.000	45.000	0.0000	0.0000
Max.	1.8953E-03	2.1502E-04	7228.5	588.79	3.3965	5.1463	0.034658	0.079161	0.6876	8.8843E+09	8.8843E+09
Pile N.	1	2	4	1	3	1	3	1	2	1	1

LOAD CASE : 20
CASE NAME : Min T
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0818684	-3.52318E-03	0.0137127

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-7.12176E-06	4.23954E-05	8.27527E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2109.0	55.177	30.068	-81.180	-1615.8	9698.3
2	1544.2	55.182	20.440	-81.180	-526.47	9700.3
3	1833.5	64.825	20.432	-81.180	-526.95	1.0788E+04
4	2398.3	64.816	30.059	-81.180	-1616.3	1.0786E+04
MINIMUM	1544.2	55.177	20.432	-81.180	-1616.3	9698.3
Pile N.	2	1	3	1	4	1
MAXIMUM	2398.3	64.825	30.068	-81.180	-526.47	1.0788E+04
Pile N.	4	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-6.2951E-05	-2.6296E-04	-9698.3	-1615.8	-5.6477	-6.9179	-0.061566	-0.1129	0.5005	4.5738E+09	4.5738E+09
x(FT)	47.400	36.600	0.0000	0.0000	42.600	28.800	47.400	45.000	0.0000	45.000	45.600
2	-6.2877E-05	-2.5365E-04	-9700.3	-526.47	-5.6431	-5.9535	-0.061493	-0.090109	0.3664	4.5738E+09	4.5738E+09
x(FT)	47.400	34.800	0.0000	0.0000	42.600	27.000	47.400	45.000	0.0000	45.000	45.600
3	-8.0158E-05	-2.5388E-04	-1.0788E+04	-526.95	-6.7903	-5.9568	-0.078394	-0.090141	0.4351	4.5738E+09	4.5738E+09
x(FT)	46.800	34.800	0.0000	0.0000	41.400	27.000	46.800	45.000	0.0000	45.600	45.000
4	-8.0258E-05	-2.6320E-04	-1.0786E+04	-1616.3	-6.7957	-6.9216	-0.078492	-0.1130	0.5691	4.5738E+09	4.5738E+09
x(FT)	46.800	36.600	0.0000	0.0000	41.400	28.800	46.800	45.000	0.0000	45.600	45.000
Min.	-8.0258E-05	-2.6320E-04	-1.0788E+04	-1616.3	-6.7957	-6.9216	-0.078492	-0.1130	0.3664	4.5738E+09	4.5738E+09
Pile N.	4	4	3	4	4	4	4	4	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	6.2418E-03	0.011177	1026.2	1642.7	55.173	29.847	0.2185	0.1691	0.6164	8.8843E+09	8.8843E+09
x(FT)	9.0000	0.0000	30.000	17.400	0.0000	0.0000	15.600	8.4000	45.000	0.6000	0.0000
2	6.2413E-03	9.1260E-03	1025.9	1441.6	55.176	20.255	0.2185	0.1276	0.4513	8.8843E+09	8.8843E+09
x(FT)	9.0000	0.0000	30.000	15.600	0.0000	0.0000	15.600	7.8000	45.000	0.0000	0.0000
3	7.8492E-03	9.1260E-03	1270.2	1441.8	64.782	20.247	0.2589	0.1276	0.5359	8.8843E+09	8.8843E+09
x(FT)	7.8000	0.0000	28.800	15.600	0.0000	0.0000	15.000	7.8000	45.000	0.0000	0.0000
4	7.8496E-03	0.011177	1270.6	1643.0	64.777	29.838	0.2589	0.1691	0.7010	8.8843E+09	8.8843E+09
x(FT)	7.8000	0.0000	28.800	17.400	0.0000	0.0000	15.000	8.4000	45.000	0.6000	1.8000
Max.	7.8496E-03	0.011177	1270.6	1643.0	64.782	29.847	0.2589	0.1691	0.7010	8.8843E+09	8.8843E+09
Pile N.	4	1	4	4	3	1	4	1	4	1	1

LOAD CASE : 21
CASE NAME : Max M2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0824908	5.16878E-04	0.0397567

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-4.32888E-07	1.31786E-04	2.60146E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1625.0	26.210	65.323	-4.9344	-1839.2	4049.4
2	1447.5	26.212	64.751	-4.9344	-1772.1	4049.6
3	2347.0	26.790	64.678	-4.9344	-1776.7	4114.7
4	2524.5	26.788	65.249	-4.9344	-1843.8	4114.5
MINIMUM	1447.5	26.210	64.678	-4.9344	-1843.8	4049.4
Pile N.	2	1	3	1	4	1
MAXIMUM	2524.5	26.790	65.323	-4.9344	-1772.1	4114.7
Pile N.	4	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-3.7334E-05	-7.8860E-04	-4049.4	-1839.2	-2.8536	-18.664	-0.036513	-0.2843	0.3856	4.5738E+09	4.5738E+09
x(FT)	45.600	35.400	0.0000	0.0000	40.200	27.600	45.600	45.000	0.0000	45.000	45.000
2	-3.7317E-05	-7.8807E-04	-4049.6	-1772.1	-2.8529	-18.605	-0.036496	-0.2829	0.3435	4.5738E+09	4.5738E+09
x(FT)	45.600	34.800	0.0000	0.0000	40.200	27.600	45.600	45.000	0.0000	45.000	45.000
3	-3.8712E-05	-7.9029E-04	-4114.7	-1776.7	-2.9302	-18.636	-0.037861	-0.2832	0.5569	4.5738E+09	4.5738E+09
x(FT)	45.600	34.800	0.0000	0.0000	40.200	27.600	45.600	45.000	0.0000	45.600	45.000
4	-3.8730E-05	-7.9070E-04	-4114.5	-1843.8	-2.9309	-18.695	-0.037878	-0.2847	0.5991	4.5738E+09	4.5738E+09
x(FT)	45.600	35.400	0.0000	0.0000	40.200	27.600	45.600	45.000	0.0000	45.000	45.000
Min.	-3.8730E-05	-7.9070E-04	-4114.7	-1843.8	-2.9309	-18.695	-0.037878	-0.2847	0.3435	4.5738E+09	4.5738E+09
Pile N.	4	4	3	4	4	4	4	4	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	3.5096E-03	0.028749	555.09	4512.6	26.174	64.741	0.1064	0.4042	0.4750	8.8843E+09	8.8843E+09
x(FT)	6.0000	0.0000	27.600	15.600	0.0000	0.0000	14.400	7.8000	45.000	0.0000	0.0000
2	3.5095E-03	0.028624	555.04	4502.0	26.175	64.171	0.1064	0.4018	0.4231	8.8843E+09	8.8843E+09
x(FT)	6.0000	0.0000	27.600	15.600	0.0000	0.0000	14.400	7.8000	45.000	2.4000	0.6000
3	3.6190E-03	0.028624	571.52	4503.9	26.753	64.099	0.1090	0.4017	0.6860	8.8843E+09	8.8843E+09
x(FT)	6.0000	0.0000	27.600	15.600	0.0000	0.0000	13.800	7.8000	45.000	0.0000	0.6000
4	3.6190E-03	0.028749	571.57	4514.5	26.752	64.668	0.1090	0.4042	0.7379	8.8843E+09	8.8843E+09
x(FT)	6.0000	0.0000	27.600	15.600	0.0000	0.0000	13.800	7.8000	45.000	0.0000	0.0000
Max.	3.6190E-03	0.028749	571.57	4514.5	26.753	64.741	0.1090	0.4042	0.7379	8.8843E+09	8.8843E+09

Pile N. 3 1 4 4 3 1 3 1 4 1 1

LOAD CASE : 22
CASE NAME : Min M2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0808240	1.43143E-03	-0.0323427

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-5.07367E-06	-1.15998E-04	-1.51111E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2290.8	-10.686	-41.294	-57.834	-201.82	-1839.7
2	2393.9	-10.685	-48.156	-57.834	574.06	-1839.6
3	1602.2	-3.8147	-48.208	-57.834	570.43	-1064.7
4	1499.1	-3.8145	-41.342	-57.834	-205.47	-1064.8
MINIMUM	1499.1	-10.686	-48.208	-57.834	-205.47	-1839.7
Pile N.	4	1	3	1	4	1
MAXIMUM	2393.9	-3.8145	-41.294	-57.834	574.06	-1064.7
Pile N.	2	4	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-1.2393E-03	-0.021868	-202.60	-3747.2	-10.683	-40.844	-0.042431	-0.2879	0.5436	4.5738E+09	4.5738E+09
x(FT)	8.4000	0.0000	29.400	13.800	0.0000	0.0000	15.600	7.2000	0.0000	46.200	45.000
2	-1.2393E-03	-0.023329	-202.61	-3826.1	-10.683	-47.680	-0.042432	-0.3165	0.5681	4.5738E+09	4.5738E+09
x(FT)	8.4000	0.0000	29.400	14.400	0.0000	0.0000	15.600	7.8000	0.0000	45.000	45.600
3	-3.3522E-04	-0.023329	-58.527	-3824.7	-4.1984	-47.732	-0.016987	-0.3166	0.3802	4.5738E+09	4.5738E+09
x(FT)	17.400	0.0000	36.600	14.400	7.2000	0.0000	21.600	7.8000	0.0000	45.000	45.000
4	-3.3519E-04	-0.021868	-58.520	-3745.9	-4.1981	-40.893	-0.016986	-0.2879	0.3557	4.5738E+09	4.5738E+09
x(FT)	17.400	0.0000	36.600	13.800	7.2000	0.0000	21.600	7.2000	0.0000	45.600	45.000
Min.	-1.2393E-03	-0.023329	-202.61	-3826.1	-10.683	-47.732	-0.042432	-0.3166	0.3557	4.5738E+09	4.5738E+09

Pile N. 1 2 2 2 1 3 2 3 4 1 1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	1.2539E-05	7.0532E-04	1839.7	219.36	1.1032	15.260	0.012263	0.2124	0.6696	8.8843E+09	8.8843E+09
x(FT)	46.800	33.600	0.0000	47.400	42.000	25.800	46.800	45.000	45.000	1.8000	0.6000
2	1.2542E-05	6.9788E-04	1839.6	574.06	1.1033	15.710	0.012266	0.2286	0.6997	8.8843E+09	8.8843E+09
x(FT)	46.800	34.200	0.0000	0.0000	42.000	26.400	46.800	45.000	45.000	1.8000	0.0000
3	8.9271E-04	6.9621E-04	1064.7	570.43	0.4134	15.686	6.5823E-03	0.2284	0.4683	8.8843E+09	8.8843E+09
x(FT)	0.0000	34.200	0.0000	0.0000	46.800	26.400	1.2000	45.000	45.000	0.0000	0.6000
4	8.9271E-04	7.0368E-04	1064.8	218.92	0.4133	15.237	6.5823E-03	0.2122	0.4382	8.8843E+09	8.8843E+09
x(FT)	0.0000	33.600	0.0000	47.400	46.800	25.800	1.2000	45.000	45.000	0.6000	0.0000
Max.	8.9271E-04	7.0532E-04	1839.7	574.06	1.1033	15.710	0.012266	0.2286	0.6997	8.8843E+09	8.8843E+09
Pile N.	3	1	1	2	2	2	2	2	2	1	1

LOAD CASE : 23
CASE NAME : Max M3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0827862	-3.13192E-03	0.0153857

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-6.53599E-06	4.95457E-05	8.64393E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2118.9	60.824	30.922	-74.503	-1412.3	1.0490E+04
2	1528.9	60.831	22.089	-74.503	-412.29	1.0492E+04
3	1867.1	69.678	22.079	-74.503	-412.95	1.1490E+04
4	2457.1	69.668	30.910	-74.503	-1413.0	1.1488E+04
MINIMUM	1528.9	60.824	22.079	-74.503	-1413.0	1.0490E+04
Pile N.	2	1	3	1	4	1
MAXIMUM	2457.1	69.678	30.922	-74.503	-412.29	1.1490E+04
Pile N.	4	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-7.1141E-05	-3.0179E-04	-1.0490E+04	-1412.3	-6.2730	-7.6345	-0.069576	-0.1220	0.5028	4.5738E+09	4.5738E+09
x(FT)	46.800	36.000	0.0000	0.0000	42.600	28.800	46.800	45.000	0.0000	45.000	45.000
2	-7.1042E-05	-2.9668E-04	-1.0492E+04	-412.29	-6.2679	-6.8110	-0.069479	-0.1011	0.3628	4.5738E+09	4.5738E+09
x(FT)	46.800	34.800	0.0000	0.0000	42.600	27.000	46.800	45.000	0.0000	45.000	45.000
3	-8.7463E-05	-2.9698E-04	-1.1490E+04	-412.95	-7.3323	-6.8153	-0.085539	-0.1011	0.4431	4.5738E+09	4.5738E+09
x(FT)	46.200	34.800	0.0000	0.0000	41.400	27.000	46.200	45.000	0.0000	45.000	45.000
4	-8.7594E-05	-3.0211E-04	-1.1488E+04	-1413.0	-7.3382	-7.6391	-0.085667	-0.1221	0.5831	4.5738E+09	4.5738E+09
x(FT)	46.200	36.000	0.0000	0.0000	41.400	28.800	46.200	45.000	0.0000	45.000	45.600
Min.	-8.7594E-05	-3.0211E-04	-1.1490E+04	-1413.0	-7.3382	-7.6391	-0.085667	-0.1221	0.3628	4.5738E+09	4.5738E+09
Pile N.	4	4	3	4	4	4	4	4	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	7.0390E-03	0.012165	1151.1	1824.1	60.808	30.679	0.2415	0.1794	0.6193	8.8843E+09	8.8843E+09
x(FT)	8.4000	0.0000	29.400	16.800	0.0000	0.0000	15.600	8.4000	45.000	0.6000	1.2000
2	7.0385E-03	0.010283	1150.7	1655.6	60.812	21.880	0.2414	0.1415	0.4469	8.8843E+09	8.8843E+09
x(FT)	8.4000	0.0000	29.400	15.000	0.0000	0.0000	15.600	7.8000	45.000	0.6000	0.0000
3	8.5362E-03	0.010283	1378.4	1655.8	69.626	21.870	0.2788	0.1415	0.5457	8.8843E+09	8.8843E+09
x(FT)	7.8000	0.0000	28.800	15.000	0.0000	0.0000	15.000	7.8000	45.000	0.6000	0.0000
4	8.5366E-03	0.012165	1378.8	1824.4	69.619	30.667	0.2788	0.1794	0.7182	8.8843E+09	8.8843E+09
x(FT)	7.8000	0.0000	28.800	16.800	0.0000	0.0000	15.000	8.4000	45.000	2.4000	0.0000
Max.	8.5366E-03	0.012165	1378.8	1824.4	69.626	30.679	0.2788	0.1794	0.7182	8.8843E+09	8.8843E+09
Pile N.	4	1	4	4	3	1	4	1	4	1	1

LOAD CASE : 24
CASE NAME : Min M3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0803599	7.70572E-03	-9.90709E-03

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
1.49827E-06	-3.44059E-05	-7.91491E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1782.8	-35.985	-15.767	17.079	335.55	-7382.1
2	2323.0	-35.986	-13.728	17.079	107.30	-7380.3
3	2088.2	-38.014	-13.732	17.079	106.98	-7610.1
4	1548.0	-38.014	-15.772	17.079	335.24	-7611.9
MINIMUM	1548.0	-38.014	-15.772	17.079	106.98	-7611.9
Pile N.	4	3	4	1	3	4
MAXIMUM	2323.0	-35.985	-13.728	17.079	335.55	-7380.3
Pile N.	2	1	2	1	1	2

* MINIMUM VALUES AND LOCATIONS *

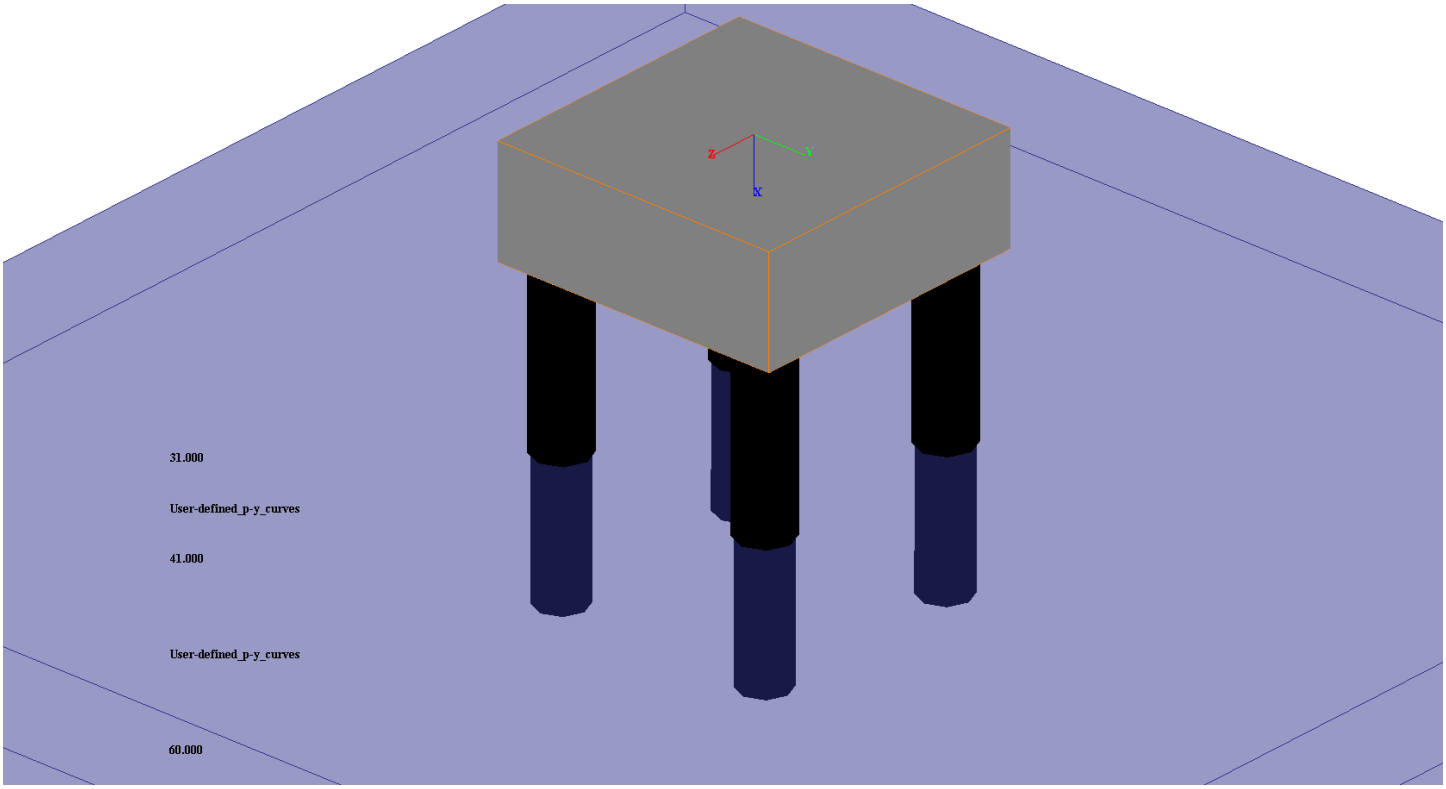
PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-3.4940E-03	-7.2327E-03	-594.14	-1156.4	-36.090	-15.621	-0.1424	-0.1001	0.4231	4.5738E+09	4.5738E+09
x(FT)	12.000	0.0000	32.400	15.000	1.2000	0.0000	17.400	7.8000	0.0000	46.800	45.000
2	-3.4946E-03	-6.8012E-03	-594.38	-1127.8	-36.091	-13.589	-0.1424	-0.091534	0.5513	4.5738E+09	4.5738E+09
x(FT)	12.000	0.0000	32.400	14.400	1.2000	0.0000	17.400	7.8000	0.0000	45.000	45.000
3	-3.7636E-03	-6.8012E-03	-637.27	-1127.7	-38.071	-13.593	-0.1501	-0.091537	0.4955	4.5738E+09	4.5738E+09
x(FT)	11.400	0.0000	31.800	14.400	1.2000	0.0000	17.400	7.8000	0.0000	45.000	45.000
4	-3.7630E-03	-7.2327E-03	-637.03	-1156.3	-38.071	-15.625	-0.1501	-0.1001	0.3673	4.5738E+09	4.5738E+09
x(FT)	11.400	0.0000	31.800	15.000	1.2000	0.0000	17.400	7.8000	0.0000	45.000	45.000
Min.	-3.7636E-03	-7.2327E-03	-637.27	-1156.4	-38.071	-15.625	-0.1501	-0.1001	0.3673	4.5738E+09	4.5738E+09
Pile N.	3	1	3	1	3	4	3	4	4	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	1.2730E-03	2.0612E-04	7382.1	335.55	3.4931	4.7673	0.035610	0.071227	0.5211	8.8843E+09	8.8843E+09
x(FT)	0.0000	34.800	0.0000	0.0000	44.400	27.000	49.200	45.000	45.000	0.0000	0.0000
2	1.2730E-03	2.0745E-04	7380.3	107.30	3.4964	4.6193	0.035644	0.066485	0.6790	8.8843E+09	8.8843E+09
x(FT)	0.0000	34.200	0.0000	0.0000	44.400	26.400	49.200	45.000	45.000	0.6000	0.0000
3	8.4145E-04	2.0731E-04	7610.1	106.98	3.7197	4.6173	0.037940	0.066467	0.6104	8.8843E+09	8.8843E+09

x(FT)	0.0000	34.200	0.0000	0.0000	44.400	26.400	48.600	45.000	45.000	0.0000	0.6000
4	8.4145E-04	2.0597E-04	7611.9	335.24	3.7163	4.7652	0.037900	0.071206	0.4525	8.8843E+09	8.8843E+09
x(FT)	0.0000	34.800	0.0000	0.0000	44.400	27.000	48.600	45.000	45.000	0.0000	0.0000
Max.	1.2730E-03	2.0745E-04	7611.9	335.55	3.7197	4.7673	0.037940	0.071227	0.6790	8.8843E+09	8.8843E+09
Pile N.	1	2	4	1	3	1	3	1	2	1	1

Pier 2
NCHRP p-y parameters (Lower Bound)
Scoured to Bedrock
40 #11 Bar Reinforcement
Strength Condition: Load Cases 1 through 12
Service Condition: Load cases 13 through 24
0.75" thick casing reduced to 0.625" after 1/8" of corrosion



Pier 2 Loading Schedule provided by HNTB on 8/21/2020
Converted to kip-in

	PIER	ID	Station	Output	Case	P	V2	V3	T	M2	M3
						Vertical, x-di	orizontal, F	orizontal, F	Mx	My	Mz
	-	-	ft	-	-	kip	Kip	Kip	Kip-in	Kip-in	Kip-in
1	PileCap 2	5144	0	STRENGTH	Max P	5763	1195	-273	-1658	-143458	210825
2	PileCap 2	5144	0	STRENGTH	Min P	10293	-1139	278	1331	113750	-178424
3	PileCap 2	5144	0	STRENGTH	Max V2	6046	1521	-286	-6047	-156480	548263
4	PileCap 2	5144	0	STRENGTH	Min V2	8649	-1464	292	5274	127713	-497226
5	PileCap 2	5144	0	STRENGTH	Max V3	6047	1185	425	-1950	241588	205535
6	PileCap 2	5144	0	STRENGTH	Min V3	8647	-1043	-371	-263	-222874	-58911
7	PileCap 2	5144	0	STRENGTH	Max T	9363	-1146	-300	15302	-170126	-179063
8	PileCap 2	5144	0	STRENGTH	Min T	6752	1214	303	-16062	138881	215402
9	PileCap 2	5144	0	STRENGTH	Max M2	6047	1185	425	-1950	241588	205535
10	PileCap 2	5144	0	STRENGTH	Min M2	9529	-1151	-355	2957	-224925	-183799
11	PileCap 2	5144	0	STRENGTH	Max M3	6046	1521	-286	-6047	-156480	548263
12	PileCap 2	5144	0	STRENGTH	Min M3	8649	-1464	292	5274	127713	-497226
13	PileCap 2	5144	0	SERVICE	Max P	6639	21	162	-2763	144752	16017
14	PileCap 2	5144	0	SERVICE	Min P	7976	36	-153	2148	-169928	19053
15	PileCap 2	5144	0	SERVICE	Max V2	7139	203	154	-5283	136119	161291
16	PileCap 2	5144	0	SERVICE	Min V2	7159	-143	-138	4925	-154843	-122577
17	PileCap 2	5144	0	SERVICE	Max V3	7316	43	219	-4395	196274	26705
18	PileCap 2	5144	0	SERVICE	Min V3	7340	42	-199	2642	-210749	28441
19	PileCap 2	5144	0	SERVICE	Max T	7244	-86	-143	11595	-160236	-107376
20	PileCap 2	5144	0	SERVICE	Min T	7237	150	152	-12475	134794	147138
21	PileCap 2	5144	0	SERVICE	Max M2	7316	43	219	-4395	196274	26705
22	PileCap 2	5144	0	SERVICE	Min M2	7340	42	-199	2642	-210749	28441
23	PileCap 2	5144	0	SERVICE	Max M3	7096	148	156	-5744	138584	190241
24	PileCap 2	5144	0	SERVICE	Min M3	7174	-94	-138	5075	-155657	-153586

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

                GROUP for Windows, Version 2016.10.13

                 Serial Number : 364300562

                  Analysis of A Group of Piles
                Subjected to Axial and Lateral Loading

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

          Date:  August 31, 2020     Time:  13:40:24



            *****     COMPUTATION RESULTS     *****


Pier 2



            *****     LOAD CASES RESULTS      *****


LOAD CASE :     1
CASE NAME : Strength MaxP
LOAD TYPE : Dead, DL


* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *


       VERTICAL ,IN      HORIZONTAL Y,IN     HORIZONTAL Z,IN
          0.0534956            0.31532         -0.0661467

     ANGLE ROT. X,RAD    ANGLE ROT. Y,RAD    ANGLE ROT. Z,RAD
       -5.84565E-06       -9.07164E-05       -4.19614E-05


  * PILE TOP REACTIONS *
```


PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1630.0	297.93	-66.805	-69.023	1.1681E+04	6.3469E+04
2	1955.7	297.57	-69.596	-69.023	1.2260E+04	6.3456E+04
3	1251.5	299.57	-69.697	-69.023	1.2258E+04	6.3752E+04
4	925.80	299.93	-66.902	-69.023	1.1679E+04	6.3766E+04
MINIMUM	925.80	297.57	-69.697	-69.023	1.1679E+04	6.3456E+04
Pile N.	4	2	3	1	4	2
MAXIMUM	1955.7	299.93	-66.805	-69.023	1.2260E+04	6.3766E+04
Pile N.	2	4	1	1	2	4

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-3.1087E-03	-0.057685	-6.3469E+04	-8158.2	-269.61	-66.601	-2.7660	-3.9705	0.3868	1.4301E+09	4.5568E+09
x(FT)	33.150	0.0000	0.0000	25.350	28.860	0.0000	34.320	24.180	0.0000	25.350	25.350
2	-3.1100E-03	-0.059368	-6.3456E+04	-8428.5	-269.68	-69.386	-2.7667	-4.1123	0.4641	1.4301E+09	4.5555E+09
x(FT)	33.150	0.0000	0.0000	25.350	28.860	0.0000	34.320	24.180	0.0000	25.350	25.350
3	-3.1240E-03	-0.059368	-6.3752E+04	-8423.9	-270.77	-69.484	-2.7781	-4.1036	0.2970	1.4292E+09	4.5555E+09
x(FT)	33.150	0.0000	0.0000	25.350	28.860	0.0000	34.320	24.180	0.0000	25.350	25.350
4	-3.1227E-03	-0.057685	-6.3766E+04	-8153.7	-270.70	-66.696	-2.7775	-3.9621	0.2197	1.4292E+09	4.5568E+09
x(FT)	33.150	0.0000	0.0000	25.350	28.860	0.0000	34.320	24.180	0.0000	25.350	25.350
Min.	-3.1240E-03	-0.059368	-6.3766E+04	-8428.5	-270.77	-69.484	-2.7781	-4.1123	0.2197	1.4292E+09	4.5555E+09
Pile N.	3	2	4	2	3	3	3	2	4	3	2

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.3110	1.0409E-03	2.4969E+04	1.1681E+04	297.61	81.480	20.600	0.9584	0.4764	8.8843E+09	8.8843E+09
x(FT)	0.0000	36.660	25.350	0.0000	0.0000	30.030	24.180	37.050	24.180	14.820	0.7800
2	0.3110	1.0781E-03	2.4968E+04	1.2260E+04	297.26	84.231	20.587	0.9928	0.5716	8.8843E+09	8.8843E+09
x(FT)	0.0000	36.660	25.350	0.0000	0.0000	30.030	24.180	37.050	24.180	15.210	1.5600
3	0.3126	1.0786E-03	2.5069E+04	1.2258E+04	299.24	84.158	20.659	0.9932	0.3658	8.8843E+09	8.8843E+09
x(FT)	0.0000	36.660	25.350	0.0000	0.0000	30.030	24.180	37.440	24.180	14.820	1.5600
4	0.3126	1.0413E-03	2.5070E+04	1.1679E+04	299.59	81.408	20.671	0.9588	0.2706	8.8843E+09	8.8843E+09
x(FT)	0.0000	36.660	25.350	0.0000	0.0000	30.030	24.180	37.050	24.180	15.210	1.1700
Max.	0.3126	1.0786E-03	2.5070E+04	1.2260E+04	299.59	84.231	20.671	0.9932	0.5716	8.8843E+09	8.8843E+09
Pile N.	3	3	4	2	4	2	4	3	2	1	1

LOAD CASE : 2
CASE NAME : Strength MinP
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0955136	-0.30087	0.0633606

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
5.93100E-06	7.84678E-05	5.02716E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2463.8	-284.22	68.082	70.030	-1.2206E+04	-6.0609E+04
2	2073.6	-284.59	71.043	70.030	-1.2795E+04	-6.0619E+04
3	2682.7	-285.28	70.916	70.030	-1.2791E+04	-6.0877E+04
4	3072.9	-284.91	67.959	70.030	-1.2202E+04	-6.0867E+04
MINIMUM	2073.6	-285.28	67.959	70.030	-1.2795E+04	-6.0877E+04
Pile N.	2	3	4	1	2	3
MAXIMUM	3072.9	-284.22	71.043	70.030	-1.2202E+04	-6.0609E+04
Pile N.	4	1	2	1	4	1

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-0.2958	-1.0291E-03	-2.3968E+04	-1.2206E+04	-283.93	-80.647	-19.962	-0.9487	0.5847	1.4394E+09	4.5572E+09
x(FT)	0.0000	36.660	25.350	0.0000	0.0000	30.030	24.180	37.050	0.0000	25.350	25.350
2	-0.2958	-1.0667E-03	-2.3962E+04	-1.2795E+04	-284.28	-83.405	-19.952	-0.9833	0.4921	1.4394E+09	4.5559E+09
x(FT)	0.0000	36.660	25.350	0.0000	0.0000	30.030	24.180	37.050	0.0000	25.350	25.740
3	-0.2975	-1.0672E-03	-2.4076E+04	-1.2791E+04	-284.99	-83.415	-20.017	-0.9837	0.6366	1.4383E+09	4.5559E+09
x(FT)	0.0000	36.660	25.350	0.0000	0.0000	30.030	24.180	37.050	0.0000	25.350	25.740
4	-0.2975	-1.0296E-03	-2.4083E+04	-1.2202E+04	-284.64	-80.656	-20.028	-0.9490	0.7292	1.4383E+09	4.5573E+09
x(FT)	0.0000	36.660	25.350	0.0000	0.0000	30.030	24.180	37.050	0.0000	25.350	25.740
Min.	-0.2975	-1.0672E-03	-2.4083E+04	-1.2795E+04	-284.99	-83.415	-20.028	-0.9837	0.4921	1.4383E+09	4.5559E+09
Pile N.	3	3	4	2	3	3	4	3	2	3	2

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	2.9450E-03	0.055915	6.0609E+04	8057.7	256.68	67.883	2.6435	4.0428	0.7202	8.8843E+09	8.8843E+09
x(FT)	33.540	0.0000	0.0000	25.350	28.860	0.0000	34.320	24.180	24.180	15.600	1.5600
2	2.9433E-03	0.057623	6.0619E+04	8333.1	256.47	70.835	2.6423	4.1901	0.6061	8.8843E+09	8.8843E+09
x(FT)	33.540	0.0000	0.0000	25.740	28.860	0.0000	34.320	24.180	24.180	15.210	2.7300
3	2.9633E-03	0.057623	6.0877E+04	8331.6	258.17	70.710	2.6572	4.1790	0.7841	8.8843E+09	8.8843E+09
x(FT)	33.540	0.0000	0.0000	25.740	28.860	0.0000	34.320	24.180	24.180	14.820	2.3400
4	2.9651E-03	0.055915	6.0867E+04	8056.1	258.38	67.762	2.6584	4.0320	0.8982	8.8843E+09	8.8843E+09
x(FT)	33.540	0.0000	0.0000	25.350	28.860	0.0000	34.320	24.180	24.180	14.820	1.5600
Max.	2.9651E-03	0.057623	6.0877E+04	8333.1	258.38	70.835	2.6584	4.1901	0.8982	8.8843E+09	8.8843E+09
Pile N.	4	2	3	2	4	2	4	2	4	1	1

LOAD CASE : 3
CASE NAME : Strength MaxV2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0561205	0.38823	-0.0709149

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-2.28440E-05	-9.78750E-05	6.94704E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2161.0	376.84	-65.938	-269.73	1.1463E+04	8.1688E+04
2	1621.7	377.47	-76.995	-269.73	1.3703E+04	8.1705E+04
3	862.00	383.70	-77.071	-269.73	1.3694E+04	8.2854E+04
4	1401.3	382.98	-65.996	-269.73	1.1454E+04	8.2829E+04
MINIMUM	862.00	376.84	-77.071	-269.73	1.1454E+04	8.1688E+04
Pile N.	3	1	3	1	4	1
MAXIMUM	2161.0	383.70	-65.938	-269.73	1.3703E+04	8.2854E+04
Pile N.	1	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-4.1334E-03	-0.059404	-8.1688E+04	-8187.8	-343.27	-65.722	-3.5724	-3.6570	0.5128	1.4098E+09	4.5566E+09
x(FT)	32.760	0.0000	0.0000	25.740	28.860	0.0000	32.760	24.180	0.0000	25.350	25.740
2	-4.1272E-03	-0.065983	-8.1705E+04	-9227.4	-342.76	-76.747	-3.5666	-4.1635	0.3848	1.4098E+09	4.5521E+09
x(FT)	32.760	0.0000	0.0000	25.740	28.860	0.0000	32.760	24.180	0.0000	25.350	25.740
3	-4.1869E-03	-0.065983	-8.2854E+04	-9216.9	-347.58	-76.819	-3.6170	-4.1433	0.2046	1.4094E+09	4.5522E+09
x(FT)	32.760	0.0000	0.0000	25.740	28.860	0.0000	32.760	24.180	0.0000	25.350	25.740
4	-4.2055E-03	-0.059404	-8.2829E+04	-8177.0	-348.33	-65.776	-3.6321	-3.6371	0.3325	1.4094E+09	4.5567E+09
x(FT)	32.760	0.0000	0.0000	25.740	28.860	0.0000	32.760	24.180	0.0000	25.350	25.740
Min.	-4.2055E-03	-0.065983	-8.2854E+04	-9227.4	-348.33	-76.819	-3.6321	-4.1635	0.2046	1.4094E+09	4.5521E+09
Pile N.	4	2	3	2	4	3	4	2	3	3	2

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.3909	1.0931E-03	3.0578E+04	1.1463E+04	376.55	81.842	24.406	1.0160	0.6317	8.8843E+09	8.8843E+09
x(FT)	0.3900	39.000	25.350	0.0000	0.0000	30.420	24.180	39.000	24.180	15.600	0.7800
2	0.3909	1.2507E-03	3.0560E+04	1.3703E+04	377.15	92.362	24.385	1.1601	0.4740	8.8843E+09	8.8843E+09
x(FT)	0.3900	39.000	25.350	0.0000	0.0000	30.420	24.180	39.000	24.180	15.600	3.1200
3	0.3975	1.2550E-03	3.0998E+04	1.3694E+04	383.34	92.247	24.670	1.1625	0.2520	8.8843E+09	8.8843E+09
x(FT)	0.3900	39.000	25.350	0.0000	0.0000	30.420	24.180	39.000	24.180	15.600	4.2900
4	0.3975	1.0968E-03	3.1001E+04	1.1454E+04	382.65	81.722	24.685	1.0193	0.4096	8.8843E+09	8.8843E+09
x(FT)	0.3900	39.000	25.350	0.0000	0.0000	30.420	24.180	39.000	24.180	15.600	0.7800
Max.	0.3975	1.2550E-03	3.1001E+04	1.3703E+04	383.34	92.362	24.685	1.1625	0.6317	8.8843E+09	8.8843E+09
Pile N.	3	3	4	2	3	2	4	3	1	1	1

LOAD CASE : 4
CASE NAME : Strength MinV2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0802647	-0.37586	0.0683775

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
2.22049E-05	8.61151E-05	-5.32195E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1621.5	-364.26	67.806	262.18	-1.2052E+04	-7.8684E+04
2	2034.6	-363.65	78.400	262.18	-1.4229E+04	-7.8655E+04
3	2703.0	-367.74	78.183	262.18	-1.4216E+04	-7.9697E+04
4	2289.9	-368.35	67.611	262.18	-1.2041E+04	-7.9726E+04
MINIMUM	1621.5	-368.35	67.611	262.18	-1.4229E+04	-7.9726E+04
Pile N.	1	4	4	1	2	4
MAXIMUM	2703.0	-363.65	78.400	262.18	-1.2041E+04	-7.8655E+04
Pile N.	3	2	2	1	4	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-0.3772	-1.0885E-03	-2.9617E+04	-1.2052E+04	-363.94	-81.373	-23.761	-1.0120	0.3848	1.4116E+09	4.5569E+09
x(FT)	0.3900	39.000	25.350	0.0000	0.0000	30.420	24.180	39.000	0.0000	25.350	25.740
2	-0.3772	-1.2402E-03	-2.9610E+04	-1.4229E+04	-363.35	-91.678	-23.732	-1.1508	0.4828	1.4117E+09	4.5524E+09
x(FT)	0.3900	39.000	25.350	0.0000	0.0000	30.420	24.180	39.000	0.0000	25.350	25.740
3	-0.3836	-1.2437E-03	-3.0029E+04	-1.4216E+04	-367.46	-91.627	-23.997	-1.1541	0.6414	1.4103E+09	4.5525E+09
x(FT)	0.3900	39.000	25.350	0.0000	0.0000	30.420	24.180	39.000	0.0000	25.350	25.740
4	-0.3836	-1.0916E-03	-3.0036E+04	-1.2041E+04	-368.06	-81.327	-24.024	-1.0149	0.5434	1.4103E+09	4.5569E+09
x(FT)	0.3900	39.000	25.350	0.0000	0.0000	30.420	24.180	39.000	0.0000	25.350	25.740
Min.	-0.3836	-1.2437E-03	-3.0036E+04	-1.4229E+04	-368.06	-91.678	-24.024	-1.1541	0.3848	1.4103E+09	4.5524E+09
Pile N.	3	3	4	2	4	2	4	3	1	3	2

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	3.9489E-03	0.057946	7.8684E+04	8132.5	330.62	67.589	3.4194	3.7097	0.4739	8.8843E+09	8.8843E+09
x(FT)	32.760	0.0000	0.0000	25.740	28.860	0.0000	32.760	24.180	24.180	15.990	1.1700
2	3.9500E-03	0.064341	7.8655E+04	9147.6	330.60	78.156	3.4196	4.2074	0.5947	8.8843E+09	8.8843E+09
x(FT)	32.760	0.0000	0.0000	25.740	28.860	0.0000	32.760	24.180	24.180	16.770	3.5100
3	4.0342E-03	0.064341	7.9697E+04	9138.1	336.33	77.940	3.4895	4.1826	0.7901	8.8843E+09	8.8843E+09
x(FT)	32.760	0.0000	0.0000	25.740	28.860	0.0000	32.760	24.180	24.180	15.600	3.5100
4	4.0328E-03	0.057946	7.9726E+04	8124.0	336.34	67.396	3.4890	3.6876	0.6693	8.8843E+09	8.8843E+09
x(FT)	32.760	0.0000	0.0000	25.740	28.860	0.0000	32.760	24.180	24.180	15.990	1.1700

Max.	4.0342E-03	0.064341	7.9726E+04	9147.6	336.34	78.156	3.4895	4.2074	0.7901	8.8843E+09	8.8843E+09
Pile N.	3	2	4	2	4	2	3	2	3	1	1

LOAD CASE : 5
CASE NAME : Strength MaxV3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0561298	0.31312	0.10568

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-9.21469E-06	1.49202E-04	-4.32645E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	764.75	295.99	108.67	-108.80	-1.8982E+04	6.2928E+04
2	1100.6	295.70	104.21	-108.80	-1.8083E+04	6.2923E+04
3	2258.7	296.51	103.84	-108.80	-1.8075E+04	6.3314E+04
4	1922.9	296.80	108.28	-108.80	-1.8973E+04	6.3319E+04
MINIMUM	764.75	295.70	103.84	-108.80	-1.8982E+04	6.2923E+04
Pile N.	1	2	3	1	1	2
MAXIMUM	2258.7	296.80	108.67	-108.80	-1.8075E+04	6.3319E+04
Pile N.	3	4	1	1	3	4

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-3.0666E-03	-1.6979E-03	-6.2928E+04	-1.8982E+04	-265.63	-131.87	-2.7373	-1.5569	0.1815	1.4325E+09	4.4481E+09
x(FT)	33.150	36.660	0.0000	0.0000	28.860	30.030	34.320	37.050	0.0000	25.350	25.350
2	-3.0692E-03	-1.6416E-03	-6.2923E+04	-1.8083E+04	-265.90	-127.86	-2.7385	-1.5053	0.2612	1.4324E+09	4.4665E+09
x(FT)	33.150	36.660	0.0000	0.0000	28.860	30.030	34.320	37.050	0.0000	25.350	25.350
3	-3.1028E-03	-1.6428E-03	-6.3314E+04	-1.8075E+04	-268.54	-127.90	-2.7623	-1.5063	0.5360	1.4307E+09	4.4667E+09

x(FT)	33.150	36.660	0.0000	0.0000	28.860	30.030	34.320	37.050	0.0000	25.350	25.350
4	-3.1003E-03	-1.6992E-03	-6.3319E+04	-1.8973E+04	-268.28	-131.91	-2.7611	-1.5579	0.4563	1.4308E+09	4.4483E+09
x(FT)	33.150	36.660	0.0000	0.0000	28.860	30.030	34.320	37.050	0.0000	25.350	25.350
Min.	-3.1028E-03	-1.6992E-03	-6.3319E+04	-1.8982E+04	-268.54	-131.91	-2.7623	-1.5579	0.1815	1.4307E+09	4.4481E+09
Pile N.	3	4	4	1	3	4	3	4	1	3	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.3082	0.094473	2.4708E+04	1.3219E+04	295.64	108.33	20.249	6.4298	0.2235	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	25.350	25.350	0.0000	0.0000	24.180	24.180	24.180	14.820	6.6300
2	0.3082	0.091819	2.4718E+04	1.2820E+04	295.36	103.89	20.272	6.2152	0.3217	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	25.350	25.350	0.0000	0.0000	24.180	24.180	24.180	14.820	6.2400
3	0.3108	0.091819	2.4898E+04	1.2816E+04	296.21	103.52	20.376	6.1928	0.6602	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	25.350	25.350	0.0000	0.0000	24.180	24.180	24.180	14.820	5.8500
4	0.3108	0.094473	2.4888E+04	1.3216E+04	296.49	107.95	20.353	6.4068	0.5621	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	25.350	25.350	0.0000	0.0000	24.180	24.180	15.600	6.2400	
Max.	0.3108	0.094473	2.4898E+04	1.3219E+04	296.49	108.33	20.376	6.4298	0.6602	8.8843E+09	8.8843E+09
Pile N.	3	1	3	1	4	1	3	1	3	1	1

LOAD CASE : 6
CASE NAME : Strength Minv3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0802462	-0.28118	-0.0931578

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-1.95777E-06	-1.35319E-04	9.19416E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	3043.8	-260.17	-92.057	-23.116	1.5916E+04	-5.5185E+04
2	2330.1	-260.81	-93.175	-23.116	1.6110E+04	-5.5202E+04
3	1279.7	-261.33	-93.444	-23.116	1.6113E+04	-5.5138E+04
4	1993.4	-260.70	-92.324	-23.116	1.5919E+04	-5.5121E+04

MINIMUM	1279.7	-261.33	-93.444	-23.116	1.5916E+04	-5.5202E+04
Pile N.	3	3	3	1	1	2
MAXIMUM	3043.8	-260.17	-92.057	-23.116	1.6113E+04	-5.5121E+04
Pile N.	1	1	1	1	3	4

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-0.2737	-0.081509	-2.2356E+04	-1.1502E+04	-259.89	-91.786	-18.720	-5.8461	0.7223	1.4503E+09	4.5376E+09
x(FT)	0.0000	0.0000	25.350	25.350	0.0000	0.0000	24.180	24.180	0.0000	25.350	25.350
2	-0.2737	-0.082073	-2.2349E+04	-1.1588E+04	-260.50	-92.899	-18.717	-5.8954	0.5529	1.4503E+09	4.5324E+09
x(FT)	0.0000	0.0000	25.350	25.350	0.0000	0.0000	24.180	24.180	0.0000	25.350	25.350
3	-0.2732	-0.082073	-2.2305E+04	-1.1587E+04	-261.00	-93.162	-18.699	-5.9020	0.3037	1.4506E+09	4.5325E+09
x(FT)	0.0000	0.0000	25.350	25.350	0.0000	0.0000	24.180	24.180	0.0000	25.350	25.350
4	-0.2732	-0.081509	-2.2312E+04	-1.1500E+04	-260.39	-92.048	-18.702	-5.8526	0.4730	1.4505E+09	4.5377E+09
x(FT)	0.0000	0.0000	25.350	25.350	0.0000	0.0000	24.180	24.180	0.0000	25.350	25.350
Min.	-0.2737	-0.082073	-2.2356E+04	-1.1588E+04	-261.00	-93.162	-18.720	-5.9020	0.3037	1.4503E+09	4.5324E+09
Pile N.	1	2	1	2	3	3	1	3	3	1	2

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	2.6984E-03	1.4431E-03	5.5185E+04	1.5916E+04	235.43	114.81	2.4477	1.3261	0.8897	8.8843E+09	8.8843E+09
x(FT)	33.540	36.270	0.0000	0.0000	28.860	30.030	34.320	36.270	24.180	14.820	5.0700
2	2.6957E-03	1.4550E-03	5.5202E+04	1.6110E+04	235.16	115.65	2.4461	1.3369	0.6811	8.8843E+09	8.8843E+09
x(FT)	33.540	36.270	0.0000	0.0000	28.860	30.030	34.320	36.270	24.180	14.040	4.6800
3	2.6866E-03	1.4546E-03	5.5138E+04	1.6113E+04	234.35	115.58	2.4396	1.3366	0.3740	8.8843E+09	8.8843E+09
x(FT)	33.540	36.270	0.0000	0.0000	28.860	30.030	34.320	36.270	24.180	14.430	5.0700
4	2.6892E-03	1.4427E-03	5.5121E+04	1.5919E+04	234.62	114.74	2.4412	1.3257	0.5827	8.8843E+09	8.8843E+09
x(FT)	33.540	36.270	0.0000	0.0000	28.860	30.030	34.320	36.270	24.180	14.040	4.6800
Max.	2.6984E-03	1.4550E-03	5.5202E+04	1.6113E+04	235.43	115.65	2.4477	1.3369	0.8897	8.8843E+09	8.8843E+09
Pile N.	1	2	2	3	1	2	1	2	1	1	1

LOAD CASE : 7
CASE NAME : Strength MaxT
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0868874	-0.30306	-0.0742866

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
6.02941E-05	-1.05115E-04	5.07148E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2945.6	-279.21	-89.684	711.92	1.6067E+04	-5.9638E+04
2	2551.9	-279.83	-60.387	711.92	1.0095E+04	-5.9678E+04
3	1735.9	-293.80	-60.330	711.92	1.0070E+04	-6.2516E+04
4	2129.6	-293.16	-89.599	711.92	1.6034E+04	-6.2475E+04
MINIMUM	1735.9	-293.80	-89.684	711.92	1.0070E+04	-6.2516E+04
Pile N.	3	3	1	1	3	3
MAXIMUM	2945.6	-279.21	-60.330	711.92	1.6067E+04	-5.9638E+04
Pile N.	1	1	3	1	1	1

THE PILE COORDINATE SYSTEM (LOCAL AXES)

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-0.2901	-0.074139	-2.3577E+04	-1.0656E+04	-278.93	-89.424	-19.604	-5.3582	0.6990	1.4432E+09	4.5474E+09
x(FT)	0.0000	0.0000	25.350	25.350	0.0000	0.0000	24.180	24.180	0.0000	25.350	25.350
2	-0.2901	-0.056775	-2.3608E+04	-7864.5	-279.54	-60.201	-19.751	-3.8622	0.6056	1.4429E+09	4.5582E+09
x(FT)	0.0000	0.0000	25.350	25.350	0.0000	0.0000	24.180	24.180	0.0000	25.350	25.350
3	-0.3075	-0.056775	-2.4718E+04	-7836.6	-293.49	-60.140	-20.442	-3.7642	0.4119	1.4323E+09	4.5584E+09
x(FT)	0.0000	0.0000	25.350	25.350	0.0000	0.0000	24.180	24.180	0.0000	25.350	25.350
4	-0.3075	-0.074139	-2.4687E+04	-1.0619E+04	-292.86	-89.333	-20.311	-5.2278	0.5053	1.4326E+09	4.5475E+09
x(FT)	0.0000	0.0000	25.350	25.740	0.0000	0.0000	24.180	24.180	0.0000	25.350	25.740
Min.	-0.3075	-0.074139	-2.4718E+04	-1.0656E+04	-293.49	-89.424	-20.442	-5.3582	0.4119	1.4323E+09	4.5474E+09
Pile N.	3	1	3	1	3	1	3	1	3	3	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL.	DISPL.	MOMENT	MOMENT	SHEAR	SHEAR	SOIL REACT	SOIL REACT	TOTAL	FLEX. RIG.	FLEX. RIG.

	y-DIR IN	z-DIR IN	z-DIR KIP-IN	y-DIR KIP-IN	y-DIR KIP	z-DIR KIP	y-DIR KIP/IN	z-DIR KIP/IN	STRESS KIP/IN**2	z-DIR KIP-IN**2	y-DIR KIP-IN**2
1	2.8871E-03	1.3622E-03	5.9638E+04	1.6067E+04	251.41	106.64	2.5979	1.2528	0.8610	8.8843E+09	8.8843E+09
x(FT)	33.540	36.660	0.0000	0.0000	28.860	30.030	34.320	37.050	24.180	14.430	4.6800
2	2.8876E-03	9.8092E-04	5.9678E+04	1.0095E+04	251.93	78.349	2.5993	0.9030	0.7459	8.8843E+09	8.8843E+09
x(FT)	33.540	36.270	0.0000	0.0000	28.860	30.030	34.320	36.270	24.180	14.430	0.3900
3	3.0668E-03	9.8408E-04	6.2516E+04	1.0070E+04	266.38	78.039	2.7338	0.9051	0.5074	8.8843E+09	8.8843E+09
x(FT)	33.150	36.270	0.0000	0.0000	28.860	30.030	34.320	36.660	24.180	14.820	0.0000
4	3.0649E-03	1.3675E-03	6.2475E+04	1.6034E+04	265.89	106.21	2.7329	1.2579	0.6225	8.8843E+09	8.8843E+09
x(FT)	33.150	36.660	0.0000	0.0000	28.860	30.030	34.320	37.440	24.180	14.820	4.6800
Max.	3.0668E-03	1.3675E-03	6.2516E+04	1.6067E+04	266.38	106.64	2.7338	1.2579	0.8610	8.8843E+09	8.8843E+09
Pile N.	3	4	3	1	3	1	3	4	1	1	1

LOAD CASE : 8
CASE NAME : Strength MinT
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0626691	0.32212	0.0710369

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-6.50587E-05	9.19412E-05	-4.21946E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1167.4	296.81	91.824	-768.18	-1.6719E+04	6.3163E+04
2	1494.9	296.76	60.090	-768.18	-1.0286E+04	6.3186E+04
3	2208.6	310.17	59.740	-768.18	-1.0254E+04	6.6207E+04
4	1881.1	310.26	91.346	-768.18	-1.6675E+04	6.6187E+04
MINIMUM	1167.4	296.76	59.740	-768.18	-1.6719E+04	6.3163E+04
Pile N.	1	2	3	1	1	1
MAXIMUM	2208.6	310.26	91.824	-768.18	-1.0254E+04	6.6207E+04
Pile N.	3	4	1	1	3	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-3.0841E-03	-1.3709E-03	-6.3163E+04	-1.6719E+04	-267.36	-105.56	-2.7492	-1.2639	0.2770	1.4314E+09	4.5477E+09
x(FT)	33.150	37.050	0.0000	0.0000	28.860	30.030	34.320	39.000	0.0000	25.350	25.740
2	-3.0905E-03	-9.5475E-04	-6.3186E+04	-1.0286E+04	-268.24	-75.253	-2.7522	-0.8790	0.3547	1.4311E+09	4.5600E+09
x(FT)	33.150	36.270	0.0000	0.0000	28.860	30.030	34.320	36.660	0.0000	25.350	25.350
3	-3.2979E-03	-9.5923E-04	-6.6207E+04	-1.0254E+04	-284.21	-74.998	-2.9043	-0.8828	0.5241	1.4248E+09	4.5602E+09
x(FT)	33.150	36.660	0.0000	0.0000	28.860	30.030	34.320	37.050	0.0000	25.350	25.350
4	-3.2925E-03	-1.3792E-03	-6.6187E+04	-1.6675E+04	-283.39	-105.25	-2.9019	-1.2759	0.4464	1.4250E+09	4.5478E+09
x(FT)	33.150	37.440	0.0000	0.0000	28.860	30.420	34.320	39.000	0.0000	25.350	25.740
Min.	-3.2979E-03	-1.3792E-03	-6.6207E+04	-1.6719E+04	-284.21	-105.56	-2.9043	-1.2759	0.2770	1.4248E+09	4.5477E+09
Pile N.	3	4	3	1	3	1	3	4	1	3	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.3092	0.072682	2.4819E+04	1.0552E+04	296.48	91.552	20.424	5.2266	0.3412	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	25.350	25.740	0.0000	0.0000	24.180	24.180	24.180	14.820	5.8500
2	0.3092	0.053945	2.4862E+04	7545.6	296.44	59.903	20.553	3.6503	0.4370	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	25.350	25.350	0.0000	0.0000	24.180	24.180	24.180	14.820	1.9500
3	0.3279	0.053945	2.6065E+04	7515.6	309.87	59.554	21.305	3.5610	0.6456	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	25.350	25.350	0.0000	0.0000	24.180	24.180	24.180	15.210	0.0000
4	0.3279	0.072682	2.6025E+04	1.0516E+04	309.95	91.074	21.190	5.1041	0.5498	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	25.350	25.740	0.0000	0.0000	24.180	24.180	24.180	14.820	5.4600
Max.	0.3279	0.072682	2.6065E+04	1.0552E+04	309.95	91.552	21.305	5.2266	0.6456	8.8843E+09	8.8843E+09
Pile N.	3	1	3	1	4	1	3	1	3	1	1

LOAD CASE : 9
CASE NAME : Strength MaxM2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0561298	0.31312	0.10568

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-9.21468E-06	1.49202E-04	-4.32645E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	764.75	295.99	108.67	-108.80	-1.8982E+04	6.2928E+04
2	1100.6	295.70	104.21	-108.80	-1.8083E+04	6.2923E+04
3	2258.7	296.51	103.84	-108.80	-1.8075E+04	6.3314E+04
4	1922.9	296.80	108.28	-108.80	-1.8973E+04	6.3319E+04
MINIMUM	764.75	295.70	103.84	-108.80	-1.8982E+04	6.2923E+04
Pile N.	1	2	3	1	1	2
MAXIMUM	2258.7	296.80	108.67	-108.80	-1.8075E+04	6.3319E+04
Pile N.	3	4	1	1	3	4

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-3.0666E-03	-1.6979E-03	-6.2928E+04	-1.8982E+04	-265.63	-131.87	-2.7373	-1.5569	0.1815	1.4325E+09	4.4481E+09
x(FT)	33.150	36.660	0.0000	0.0000	28.860	30.030	34.320	37.050	0.0000	25.350	25.350
2	-3.0692E-03	-1.6416E-03	-6.2923E+04	-1.8083E+04	-265.90	-127.86	-2.7385	-1.5053	0.2612	1.4324E+09	4.4665E+09
x(FT)	33.150	36.660	0.0000	0.0000	28.860	30.030	34.320	37.050	0.0000	25.350	25.350
3	-3.1028E-03	-1.6428E-03	-6.3314E+04	-1.8075E+04	-268.54	-127.90	-2.7623	-1.5063	0.5360	1.4307E+09	4.4667E+09
x(FT)	33.150	36.660	0.0000	0.0000	28.860	30.030	34.320	37.050	0.0000	25.350	25.350
4	-3.1003E-03	-1.6992E-03	-6.3319E+04	-1.8973E+04	-268.28	-131.91	-2.7611	-1.5579	0.4563	1.4308E+09	4.4483E+09
x(FT)	33.150	36.660	0.0000	0.0000	28.860	30.030	34.320	37.050	0.0000	25.350	25.350
Min.	-3.1028E-03	-1.6992E-03	-6.3319E+04	-1.8982E+04	-268.54	-131.91	-2.7623	-1.5579	0.1815	1.4307E+09	4.4481E+09
Pile N.	3	4	4	1	3	4	3	4	1	3	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.3082	0.094473	2.4708E+04	1.3219E+04	295.64	108.33	20.249	6.4298	0.2235	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	25.350	25.350	0.0000	0.0000	24.180	24.180	24.180	14.820	6.6300
2	0.3082	0.091819	2.4718E+04	1.2820E+04	295.36	103.89	20.272	6.2152	0.3217	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	25.350	25.350	0.0000	0.0000	24.180	24.180	24.180	14.820	5.8500
3	0.3108	0.091819	2.4898E+04	1.2816E+04	296.21	103.52	20.376	6.1928	0.6602	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	25.350	25.350	0.0000	0.0000	24.180	24.180	24.180	14.820	5.8500

4	0.3108	0.094473	2.4888E+04	1.3216E+04	296.49	107.95	20.353	6.4068	0.5621	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	25.350	25.350	0.0000	0.0000	24.180	24.180	24.180	14.820	7.0200
Max.	0.3108	0.094473	2.4898E+04	1.3219E+04	296.49	108.33	20.376	6.4298	0.6602	8.8843E+09	8.8843E+09
Pile N.	3	1	3	1	4	1	3	1	3	1	1

LOAD CASE : 10
CASE NAME : Strength MinM2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0884272	-0.30453	-0.0909151

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
1.07270E-05	-1.34592E-04	4.92318E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	3095.7	-285.84	-91.204	126.66	1.5795E+04	-6.1104E+04
2	2713.5	-286.27	-86.094	126.66	1.4737E+04	-6.1121E+04
3	1668.8	-289.66	-86.292	126.66	1.4732E+04	-6.1655E+04
4	2051.0	-289.23	-91.410	126.66	1.5790E+04	-6.1638E+04
MINIMUM	1668.8	-289.66	-91.410	126.66	1.4732E+04	-6.1655E+04
Pile N.	3	3	4	1	3	3
MAXIMUM	3095.7	-285.84	-86.094	126.66	1.5795E+04	-6.1104E+04
Pile N.	1	1	2	1	1	1

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-0.2989	-0.081154	-2.4139E+04	-1.1387E+04	-285.57	-90.930	-19.934	-5.5685	0.7346	1.4377E+09	4.5445E+09
x(FT)	0.0000	0.0000	25.350	25.350	0.0000	0.0000	24.180	24.180	0.0000	25.350	25.350
2	-0.2989	-0.078065	-2.4143E+04	-1.0893E+04	-285.98	-85.831	-19.965	-5.3092	0.6439	1.4377E+09	4.5468E+09
x(FT)	0.0000	0.0000	25.350	25.350	0.0000	0.0000	24.180	24.180	0.0000	25.350	25.350

3	-0.3019	-0.078065	-2.4333E+04	-1.0884E+04	-289.34	-86.025	-20.094	-5.2871	0.3960	1.4359E+09	4.5468E+09
x(FT)	0.0000	0.0000	25.350	25.350	0.0000	0.0000	24.180	24.180	0.0000	25.350	25.350
4	-0.3019	-0.081154	-2.4330E+04	-1.1378E+04	-288.93	-91.131	-20.064	-5.5455	0.4867	1.4359E+09	4.5450E+09
x(FT)	0.0000	0.0000	25.350	25.350	0.0000	0.0000	24.180	24.180	0.0000	25.350	25.350
Min.	-0.3019	-0.081154	-2.4333E+04	-1.1387E+04	-289.34	-91.131	-20.094	-5.5685	0.3960	1.4359E+09	4.5445E+09
Pile N.	3	1	3	1	3	4	3	1	3	3	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	2.9783E-03	1.4453E-03	6.1104E+04	1.5795E+04	258.94	113.68	2.6674	1.3272	0.9049	8.8843E+09	8.8843E+09
x(FT)	33.540	36.660	0.0000	0.0000	28.860	30.030	34.320	36.660	24.180	14.820	4.2900
2	2.9772E-03	1.3773E-03	6.1121E+04	1.4737E+04	258.92	108.65	2.6669	1.2648	0.7932	8.8843E+09	8.8843E+09
x(FT)	33.540	36.270	0.0000	0.0000	28.860	30.030	34.320	36.660	24.180	15.210	3.5100
3	3.0045E-03	1.3778E-03	6.1655E+04	1.4732E+04	261.14	108.51	2.6888	1.2654	0.4878	8.8843E+09	8.8843E+09
x(FT)	33.540	36.270	0.0000	0.0000	28.860	30.030	34.320	36.660	24.180	15.210	3.5100
4	3.0057E-03	1.4461E-03	6.1638E+04	1.5790E+04	261.17	113.53	2.6893	1.3277	0.5995	8.8843E+09	8.8843E+09
x(FT)	33.540	36.660	0.0000	0.0000	28.860	30.030	34.320	36.660	24.180	16.380	5.4600
Max.	3.0057E-03	1.4461E-03	6.1655E+04	1.5795E+04	261.17	113.68	2.6893	1.3277	0.9049	8.8843E+09	8.8843E+09
Pile N.	4	4	3	1	4	1	4	4	1	1	1

LOAD CASE : 11
CASE NAME : Strength MaxM3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0561205	0.38823	-0.0709149

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-2.28440E-05	-9.78750E-05	6.94704E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2161.0	376.84	-65.938	-269.73	1.1463E+04	8.1688E+04
2	1621.7	377.47	-76.995	-269.73	1.3703E+04	8.1705E+04
3	862.00	383.70	-77.071	-269.73	1.3694E+04	8.2854E+04

4	1401.3	382.98	-65.996	-269.73	1.1454E+04	8.2829E+04
MINIMUM	862.00	376.84	-77.071	-269.73	1.1454E+04	8.1688E+04
Pile N.	3	1	3	1	4	1
MAXIMUM	2161.0	383.70	-65.938	-269.73	1.3703E+04	8.2854E+04
Pile N.	1	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-4.1334E-03	-0.059404	-8.1688E+04	-8187.8	-343.27	-65.722	-3.5724	-3.6570	0.5128	1.4098E+09	4.5566E+09
x(FT)	32.760	0.0000	0.0000	25.740	28.860	0.0000	32.760	24.180	0.0000	25.350	25.740
2	-4.1272E-03	-0.065983	-8.1705E+04	-9227.4	-342.76	-76.747	-3.5666	-4.1635	0.3848	1.4098E+09	4.5521E+09
x(FT)	32.760	0.0000	0.0000	25.740	28.860	0.0000	32.760	24.180	0.0000	25.350	25.740
3	-4.1869E-03	-0.065983	-8.2854E+04	-9216.9	-347.58	-76.819	-3.6170	-4.1433	0.2046	1.4094E+09	4.5522E+09
x(FT)	32.760	0.0000	0.0000	25.740	28.860	0.0000	32.760	24.180	0.0000	25.350	25.740
4	-4.2055E-03	-0.059404	-8.2829E+04	-8177.0	-348.33	-65.776	-3.6321	-3.6371	0.3325	1.4094E+09	4.5567E+09
x(FT)	32.760	0.0000	0.0000	25.740	28.860	0.0000	32.760	24.180	0.0000	25.350	25.740
Min.	-4.2055E-03	-0.065983	-8.2854E+04	-9227.4	-348.33	-76.819	-3.6321	-4.1635	0.2046	1.4094E+09	4.5521E+09
Pile N.	4	2	3	2	4	3	4	2	3	3	2

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.3909	1.0931E-03	3.0578E+04	1.1463E+04	376.55	81.842	24.406	1.0160	0.6317	8.8843E+09	8.8843E+09
x(FT)	0.3900	39.000	25.350	0.0000	0.0000	30.420	24.180	39.000	24.180	15.600	1.5600
2	0.3909	1.2507E-03	3.0560E+04	1.3703E+04	377.15	92.362	24.385	1.1601	0.4740	8.8843E+09	8.8843E+09
x(FT)	0.3900	39.000	25.350	0.0000	0.0000	30.420	24.180	39.000	24.180	15.600	4.2900
3	0.3975	1.2550E-03	3.0998E+04	1.3694E+04	383.34	92.247	24.670	1.1625	0.2520	8.8843E+09	8.8843E+09
x(FT)	0.3900	39.000	25.350	0.0000	0.0000	30.420	24.180	39.000	24.180	15.600	3.1200
4	0.3975	1.0968E-03	3.1001E+04	1.1454E+04	382.65	81.722	24.685	1.0193	0.4096	8.8843E+09	8.8843E+09
x(FT)	0.3900	39.000	25.350	0.0000	0.0000	30.420	24.180	39.000	24.180	17.160	0.7800
Max.	0.3975	1.2550E-03	3.1001E+04	1.3703E+04	383.34	92.362	24.685	1.1625	0.6317	8.8843E+09	8.8843E+09
Pile N.	3	3	4	2	3	2	4	3	1	1	1

LOAD CASE : 12
CASE NAME : Strength MinM3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0802647	-0.37586	0.0683775

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
2.22049E-05	8.61151E-05	-5.32195E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1621.5	-364.26	67.806	262.18	-1.2052E+04	-7.8684E+04
2	2034.6	-363.65	78.400	262.18	-1.4229E+04	-7.8655E+04
3	2703.0	-367.74	78.183	262.18	-1.4216E+04	-7.9697E+04
4	2289.9	-368.35	67.611	262.18	-1.2041E+04	-7.9726E+04
MINIMUM	1621.5	-368.35	67.611	262.18	-1.4229E+04	-7.9726E+04
Pile N.	1	4	4	1	2	4
MAXIMUM	2703.0	-363.65	78.400	262.18	-1.2041E+04	-7.8655E+04
Pile N.	3	2	2	1	4	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-0.3772	-1.0885E-03	-2.9617E+04	-1.2052E+04	-363.94	-81.373	-23.761	-1.0120	0.3848	1.4116E+09	4.5569E+09
x(FT)	0.3900	39.000	25.350	0.0000	0.0000	30.420	24.180	39.000	0.0000	25.350	25.740
2	-0.3772	-1.2402E-03	-2.9610E+04	-1.4229E+04	-363.35	-91.678	-23.732	-1.1508	0.4828	1.4117E+09	4.5524E+09
x(FT)	0.3900	39.000	25.350	0.0000	0.0000	30.420	24.180	39.000	0.0000	25.350	25.740
3	-0.3836	-1.2437E-03	-3.0029E+04	-1.4216E+04	-367.46	-91.627	-23.997	-1.1541	0.6414	1.4103E+09	4.5525E+09
x(FT)	0.3900	39.000	25.350	0.0000	0.0000	30.420	24.180	39.000	0.0000	25.350	25.740
4	-0.3836	-1.0916E-03	-3.0036E+04	-1.2041E+04	-368.06	-81.327	-24.024	-1.0149	0.5434	1.4103E+09	4.5569E+09
x(FT)	0.3900	39.000	25.350	0.0000	0.0000	30.420	24.180	39.000	0.0000	25.350	25.740
Min.	-0.3836	-1.2437E-03	-3.0036E+04	-1.4229E+04	-368.06	-91.678	-24.024	-1.1541	0.3848	1.4103E+09	4.5524E+09
Pile N.	3	3	4	2	4	2	4	3	1	3	2

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	3.9489E-03	0.057946	7.8684E+04	8132.5	330.62	67.589	3.4194	3.7097	0.4739	8.8843E+09	8.8843E+09
x(FT)	32.760	0.0000	0.0000	25.740	28.860	0.0000	32.760	24.180	24.180	15.990	2.3400
2	3.9500E-03	0.064341	7.8655E+04	9147.6	330.60	78.156	3.4196	4.2074	0.5947	8.8843E+09	8.8843E+09
x(FT)	32.760	0.0000	0.0000	25.740	28.860	0.0000	32.760	24.180	24.180	15.990	3.5100
3	4.0342E-03	0.064341	7.9697E+04	9138.1	336.33	77.940	3.4895	4.1826	0.7901	8.8843E+09	8.8843E+09
x(FT)	32.760	0.0000	0.0000	25.740	28.860	0.0000	32.760	24.180	24.180	15.600	3.9000
4	4.0328E-03	0.057946	7.9726E+04	8124.0	336.34	67.396	3.4890	3.6876	0.6693	8.8843E+09	8.8843E+09
x(FT)	32.760	0.0000	0.0000	25.740	28.860	0.0000	32.760	24.180	24.180	15.600	1.5600
Max.	4.0342E-03	0.064341	7.9726E+04	9147.6	336.34	78.156	3.4895	4.2074	0.7901	8.8843E+09	8.8843E+09
Pile N.	3	2	4	2	4	2	3	2	3	1	1

LOAD CASE : 13
CASE NAME : Service MaxP
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0616209	1.60927E-03	0.0452522

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-8.10733E-06	7.92781E-05	4.71702E-06

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1370.4	3.1720	42.594	-95.727	-6831.3	732.38
2	1333.7	3.1744	38.482	-95.727	-6007.0	732.71
3	1949.1	7.3299	38.408	-95.727	-6006.4	1562.8
4	1985.8	7.3237	42.516	-95.727	-6830.6	1561.9
MINIMUM	1333.7	3.1720	38.408	-95.727	-6831.3	732.38
Pile N.	2	1	3	1	1	1
MAXIMUM	1985.8	7.3299	42.594	-95.727	-6006.4	1562.8
Pile N.	4	3	1	1	3	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-2.7196E-05	-6.3452E-04	-732.38	-6831.3	-2.2096	-57.331	-0.026761	-0.6244	0.3252	4.5738E+09	4.5737E+09
x(FT)	37.830	34.710	0.0000	0.0000	30.420	29.640	37.830	34.710	0.0000	25.740	24.960
2	-2.7130E-05	-5.8881E-04	-732.71	-6007.0	-2.2129	-53.359	-0.026696	-0.5794	0.3165	4.5738E+09	4.5738E+09
x(FT)	37.440	34.710	0.0000	0.0000	30.420	29.640	37.440	34.710	0.0000	24.180	24.180
3	-7.3153E-05	-5.8893E-04	-1562.8	-6006.4	-6.2843	-53.371	-0.071982	-0.5795	0.4625	4.5738E+09	4.5738E+09
x(FT)	35.880	34.710	0.0000	0.0000	30.030	29.640	35.880	34.710	0.0000	24.960	24.180
4	-7.3179E-05	-6.3465E-04	-1561.9	-6830.6	-6.2736	-57.345	-0.072009	-0.6245	0.4712	4.5738E+09	4.5737E+09
x(FT)	35.880	34.710	0.0000	0.0000	30.030	29.640	35.880	34.710	0.0000	24.960	24.960
Min.	-7.3179E-05	-6.3465E-04	-1562.8	-6831.3	-6.2843	-57.345	-0.072009	-0.6245	0.3165	4.5738E+09	4.5737E+09
Pile N.	4	4	3	1	3	4	4	4	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	9.8676E-04	0.039760	214.72	5727.8	3.1664	42.485	0.1621	3.4027	0.4006	8.8843E+09	8.8843E+09
x(FT)	5.4600	0.0000	26.130	24.960	0.0000	0.0000	24.180	24.180	24.180	1.1700	0.0000
2	9.8669E-04	0.037425	215.04	5335.5	3.1688	38.381	0.1624	3.1423	0.3898	8.8843E+09	8.8843E+09
x(FT)	5.4600	0.0000	26.130	24.960	0.0000	0.0000	24.180	24.180	24.180	0.3900	0.0000
3	3.2390E-03	0.037425	617.65	5335.4	7.3158	38.308	0.4284	3.1410	0.5697	8.8843E+09	8.8843E+09
x(FT)	2.3400	0.0000	25.740	24.960	0.0000	0.0000	24.180	24.180	24.180	0.0000	0.3900
4	3.2390E-03	0.039760	616.77	5727.8	7.3095	42.408	0.4278	3.4014	0.5804	8.8843E+09	8.8843E+09
x(FT)	2.3400	0.0000	25.740	24.960	0.0000	0.0000	24.180	24.180	24.180	0.0000	0.0000
Max.	3.2390E-03	0.039760	617.65	5727.8	7.3158	42.485	0.4284	3.4027	0.5804	8.8843E+09	8.8843E+09
Pile N.	3	1	3	1	3	1	3	1	4	1	1

LOAD CASE : 14
CASE NAME : Service MinP
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0740223	3.78929E-03	-0.0468270

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
6.31152E-06	-8.92072E-05	4.46223E-06

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2357.5	10.609	-39.804	74.523	6089.2	2213.7
2	2322.9	10.616	-36.608	74.523	5447.5	2214.7
3	1630.5	7.3901	-36.694	74.523	5447.9	1568.9
4	1665.1	7.3850	-39.894	74.523	6089.7	1568.2
MINIMUM	1630.5	7.3850	-39.894	74.523	5447.5	1568.2
Pile N.	3	4	4	1	2	4
MAXIMUM	2357.5	10.616	-36.608	74.523	6089.7	2214.7
Pile N.	1	2	2	1	4	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-1.1039E-04	-0.040242	-2213.7	-5678.6	-9.5557	-39.700	-0.1086	-3.3159	0.5594	4.5738E+09	4.5738E+09
x(FT)	35.880	0.0000	0.0000	24.960	30.030	0.0000	35.880	24.180	0.0000	24.180	24.960
2	-1.1037E-04	-0.038425	-2214.7	-5372.9	-9.5679	-36.510	-0.1086	-3.1132	0.5512	4.5738E+09	4.5738E+09
x(FT)	35.490	0.0000	0.0000	24.960	30.030	0.0000	35.490	24.180	0.0000	24.180	24.180
3	-7.4228E-05	-0.038425	-1568.9	-5373.3	-6.3883	-36.595	-0.073040	-3.1149	0.3869	4.5738E+09	4.5738E+09
x(FT)	35.880	0.0000	0.0000	24.960	30.030	0.0000	35.880	24.180	0.0000	24.570	24.180
4	-7.4251E-05	-0.040242	-1568.2	-5678.9	-6.3801	-39.788	-0.073063	-3.3175	0.3951	4.5738E+09	4.5738E+09
x(FT)	35.880	0.0000	0.0000	24.960	30.030	0.0000	35.880	24.180	0.0000	24.960	24.180
Min.	-1.1039E-04	-0.040242	-2214.7	-5678.9	-9.5679	-39.788	-0.1086	-3.3175	0.3869	4.5738E+09	4.5738E+09
Pile N.	1	1	2	4	2	4	1	4	3	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	5.1141E-03	6.2544E-04	940.80	6089.2	10.588	56.737	0.6404	0.6154	0.6891	8.8843E+09	8.8843E+09
x(FT)	1.5600	34.710	25.740	0.0000	0.0000	29.640	24.180	34.710	24.180	4.6800	0.0000
2	5.1140E-03	5.9007E-04	941.82	5447.5	10.595	53.639	0.6411	0.5806	0.6790	8.8843E+09	8.8843E+09
x(FT)	1.5600	34.320	25.740	0.0000	0.0000	29.640	24.180	34.320	24.180	0.0000	0.0000
3	3.3139E-03	5.8995E-04	628.15	5447.9	7.3757	53.628	0.4342	0.5805	0.4766	8.8843E+09	8.8843E+09

x(FT)	2.3400	34.320	25.740	0.0000	0.0000	29.640	24.180	34.320	24.180	0.0000	0.3900
4	3.3139E-03	6.2532E-04	627.45	6089.7	7.3705	56.725	0.4337	0.6153	0.4867	8.8843E+09	8.8843E+09
x(FT)	2.3400	34.710	25.740	0.0000	0.0000	29.640	24.180	34.710	24.180	0.0000	0.3900
Max.	5.1141E-03	6.2544E-04	941.82	6089.7	10.595	56.737	0.6411	0.6154	0.6891	8.8843E+09	8.8843E+09
Pile N.	1	1	2	4	2	1	2	1	1	1	1

LOAD CASE : 15
CASE NAME : Service MaxV2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0662587	0.0148352	0.0429181

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-1.55818E-05	7.47413E-05	4.83712E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1682.4	46.774	42.497	-183.98	-6921.7	1.0361E+04
2	1306.9	46.831	34.601	-183.98	-5334.0	1.0368E+04
3	1887.1	54.728	34.506	-183.98	-5329.3	1.1953E+04
4	2262.6	54.668	42.396	-183.98	-6917.1	1.1946E+04
MINIMUM	1306.9	46.774	34.506	-183.98	-6921.7	1.0361E+04
Pile N.	2	1	3	1	1	1
MAXIMUM	2262.6	54.728	42.497	-183.98	-5329.3	1.1953E+04
Pile N.	4	3	1	1	3	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-4.3698E-04	-6.2446E-04	-1.0361E+04	-6921.7	-36.471	-56.210	-0.4300	-0.6145	0.3992	4.5738E+09	4.5738E+09
x(FT)	36.660	34.710	0.0000	0.0000	30.420	29.640	36.660	34.710	0.0000	24.180	24.180
2	-4.3645E-04	-5.3636E-04	-1.0368E+04	-5334.0	-36.518	-48.522	-0.4295	-0.5278	0.3101	4.5738E+09	4.5738E+09
x(FT)	36.660	34.710	0.0000	0.0000	30.420	29.640	36.660	34.710	0.0000	24.180	24.180
3	-5.2537E-04	-5.3603E-04	-1.1953E+04	-5329.3	-44.220	-48.453	-0.5170	-0.5275	0.4478	4.5738E+09	4.5738E+09
x(FT)	36.270	34.710	0.0000	0.0000	30.420	29.640	36.270	34.710	0.0000	24.570	24.180
4	-5.2572E-04	-6.2418E-04	-1.1946E+04	-6917.1	-44.178	-56.149	-0.5173	-0.6142	0.5369	4.5738E+09	4.5738E+09
x(FT)	36.270	34.710	0.0000	0.0000	30.420	29.640	36.270	34.710	0.0000	24.180	24.180
Min.	-5.2572E-04	-6.2446E-04	-1.1953E+04	-6921.7	-44.220	-56.210	-0.5173	-0.6145	0.3101	4.5738E+09	4.5738E+09
Pile N.	4	1	3	1	3	1	4	1	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.017730	0.038884	3573.6	5623.5	46.686	42.387	2.5722	3.3555	0.4918	8.8843E+09	8.8843E+09
x(FT)	3.9000	0.0000	25.740	25.350	0.0000	0.0000	24.180	24.180	24.180	0.0000	0.3900
2	0.017729	0.034396	3578.4	4862.6	46.742	34.509	2.5761	2.8516	0.3820	8.8843E+09	8.8843E+09
x(FT)	3.9000	0.0000	25.740	24.960	0.0000	0.0000	24.180	24.180	24.180	0.3900	0.0000
3	0.022063	0.034396	4344.4	4857.6	54.623	34.414	3.0818	2.8469	0.5516	8.8843E+09	8.8843E+09
x(FT)	3.1200	0.0000	25.740	24.960	0.0000	0.0000	24.180	24.180	24.180	1.5600	0.0000
4	0.022063	0.038884	4340.0	5619.0	54.564	42.288	3.0781	3.3512	0.6613	8.8843E+09	8.8843E+09
x(FT)	3.1200	0.0000	25.740	25.350	0.0000	0.0000	24.180	24.180	24.180	1.9500	0.0000
Max.	0.022063	0.038884	4344.4	5623.5	54.623	42.387	3.0818	3.3555	0.6613	8.8843E+09	8.8843E+09
Pile N.	3	1	3	1	3	1	3	1	4	1	1

LOAD CASE : 16
CASE NAME : Service MinV2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0664442	-9.31743E-03	-0.0424385

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
1.43970E-05	-8.11367E-05	-3.79432E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1957.4	-32.049	-38.160	169.99	5922.4	-7198.8
2	2251.9	-32.071	-30.807	169.99	4456.2	-7202.5
3	1622.1	-39.449	-30.833	169.99	4450.8	-8674.4
4	1327.6	-39.430	-38.200	169.99	5917.9	-8670.8
MINIMUM	1327.6	-39.449	-38.200	169.99	4450.8	-8674.4
Pile N.	4	3	4	1	3	3
MAXIMUM	2251.9	-32.049	-30.807	169.99	5922.4	-7198.8
Pile N.	2	1	2	1	1	1

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-0.011392	-0.037696	-2358.1	-5346.0	-31.991	-38.060	-1.7230	-3.1384	0.4645	4.5738E+09	4.5738E+09
x(FT)	4.2900	0.0000	25.740	24.960	0.0000	0.0000	24.180	24.180	0.0000	24.960	24.570
2	-0.011392	-0.033550	-2363.3	-4646.2	-32.014	-30.723	-1.7269	-2.6734	0.5344	4.5738E+09	4.5738E+09
x(FT)	4.2900	0.0000	25.740	24.960	0.0000	0.0000	24.180	24.180	0.0000	24.180	25.740
3	-0.015364	-0.033550	-3073.3	-4639.9	-39.375	-30.748	-2.1963	-2.6696	0.3849	4.5738E+09	4.5738E+09
x(FT)	3.5100	0.0000	25.740	24.960	0.0000	0.0000	24.180	24.180	0.0000	24.960	24.180
4	-0.015365	-0.037696	-3068.0	-5340.4	-39.355	-38.098	-2.1923	-3.1356	0.3150	4.5738E+09	4.5738E+09
x(FT)	3.5100	0.0000	25.740	24.960	0.0000	0.0000	24.180	24.180	0.0000	24.180	25.350
Min.	-0.015365	-0.037696	-3073.3	-5346.0	-39.375	-38.098	-2.1963	-3.1384	0.3150	4.5738E+09	4.5738E+09
Pile N.	4	1	3	1	3	4	3	1	4	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	2.9045E-04	5.8996E-04	7198.8	5922.4	24.148	53.411	0.2858	0.5805	0.5721	8.8843E+09	8.8843E+09
x(FT)	36.660	34.710	0.0000	0.0000	30.420	29.640	36.660	34.710	24.180	0.3900	0.7800
2	2.9000E-04	5.0911E-04	7202.5	4456.2	24.200	46.318	0.2854	0.5010	0.6582	8.8843E+09	8.8843E+09
x(FT)	36.660	34.320	0.0000	0.0000	30.420	29.640	36.660	34.320	24.180	0.0000	0.7800
3	3.7181E-04	5.0836E-04	8674.4	4450.8	31.334	46.219	0.3659	0.5002	0.4741	8.8843E+09	8.8843E+09
x(FT)	36.270	34.320	0.0000	0.0000	30.030	29.640	36.270	34.320	24.180	1.9500	0.3900
4	3.7208E-04	5.8942E-04	8670.8	5917.9	31.272	53.313	0.3661	0.5800	0.3881	8.8843E+09	8.8843E+09
x(FT)	36.270	34.710	0.0000	0.0000	30.420	29.640	36.270	34.710	24.180	0.0000	0.3900
Max.	3.7208E-04	5.8996E-04	8674.4	5922.4	31.334	53.411	0.3661	0.5805	0.6582	8.8843E+09	8.8843E+09
Pile N.	4	1	3	1	3	1	4	1	2	1	1

LOAD CASE : 17
CASE NAME : Service MaxV3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0679004	4.05962E-03	0.0613981

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-1.29372E-05	1.07463E-04	7.02872E-06

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1439.2	7.4471	58.092	-152.76	-9349.7	1635.5
2	1384.6	7.4530	51.548	-152.76	-8036.1	1636.3
3	2218.8	14.056	51.413	-152.76	-8035.0	2957.8
4	2273.4	14.044	57.947	-152.76	-9348.5	2956.3
MINIMUM	1384.6	7.4471	51.413	-152.76	-9349.7	1635.5
Pile N.	2	1	3	1	1	1
MAXIMUM	2273.4	14.056	58.092	-152.76	-8035.0	2957.8
Pile N.	4	3	1	1	3	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-7.0756E-05	-8.6354E-04	-1635.5	-9349.7	-5.9278	-77.761	-0.069624	-0.8497	0.3415	4.5738E+09	4.5587E+09
x(FT)	36.660	34.710	0.0000	0.0000	30.420	29.640	36.660	34.710	0.0000	24.570	25.350
2	-7.0686E-05	-7.9116E-04	-1636.3	-8036.1	-5.9370	-71.481	-0.069555	-0.7785	0.3286	4.5738E+09	4.5623E+09
x(FT)	36.270	34.710	0.0000	0.0000	30.420	29.640	36.270	34.710	0.0000	24.570	24.960
3	-1.4464E-04	-7.9131E-04	-2957.8	-8035.0	-12.412	-71.496	-0.1423	-0.7786	0.5265	4.5738E+09	4.5624E+09
x(FT)	35.880	34.710	0.0000	0.0000	30.030	29.640	35.880	34.710	0.0000	24.570	24.960
4	-1.4467E-04	-8.6375E-04	-2956.3	-9348.5	-12.391	-77.784	-0.1424	-0.8499	0.5395	4.5738E+09	4.5587E+09
x(FT)	35.880	34.710	0.0000	0.0000	30.030	29.640	35.880	34.710	0.0000	24.960	25.350

Min.	-1.4467E-04	-8.6375E-04	-2957.8	-9349.7	-12.412	-77.784	-0.1424	-0.8499	0.3286	4.5738E+09	4.5587E+09
Pile N.	4	4	3	1	3	4	4	4	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	2.9301E-03	0.054234	581.75	7783.6	7.4328	57.940	0.4146	4.6245	0.4207	8.8843E+09	8.8843E+09
x(FT)	3.5100	0.0000	25.740	25.350	0.0000	0.0000	24.180	24.180	24.180	0.0000	4.6800
2	2.9300E-03	0.050508	582.56	7160.1	7.4387	51.411	0.4151	4.2086	0.4047	8.8843E+09	8.8843E+09
x(FT)	3.5100	0.0000	25.740	24.960	0.0000	0.0000	24.180	24.180	24.180	0.3900	0.0000
3	6.5895E-03	0.050508	1222.6	7159.7	14.028	51.278	0.8372	4.2063	0.6485	8.8843E+09	8.8843E+09
x(FT)	1.9500	0.0000	25.740	24.960	0.0000	0.0000	24.180	24.180	24.180	0.7800	0.3900
4	6.5896E-03	0.054234	1221.1	7783.5	14.016	57.798	0.8363	4.6222	0.6645	8.8843E+09	8.8843E+09
x(FT)	1.9500	0.0000	25.740	25.350	0.0000	0.0000	24.180	24.180	24.180	0.0000	0.0000
Max.	6.5896E-03	0.054234	1222.6	7783.6	14.028	57.940	0.8372	4.6245	0.6645	8.8843E+09	8.8843E+09
Pile N.	4	1	3	1	3	1	3	1	4	1	1

LOAD CASE : 18
CASE NAME : Service MinV3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0681231	3.67250E-03	-0.0597353

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
7.78224E-06	-1.11613E-04	7.88230E-06

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2298.8	12.480	-51.645	91.889	7997.7	2660.8
2	2237.6	12.487	-47.718	91.889	7207.5	2661.7
3	1371.2	8.5188	-47.852	91.889	7207.9	1866.9
4	1432.4	8.5139	-51.785	91.889	7998.2	1866.2
MINIMUM	1371.2	8.5139	-51.785	91.889	7207.5	1866.2
Pile N.	3	4	4	1	2	4
MAXIMUM	2298.8	12.487	-47.718	91.889	7998.2	2661.7
Pile N.	1	2	2	1	4	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-1.2544E-04	-0.051480	-2660.8	-7268.9	-10.706	-51.509	-0.1234	-4.2571	0.5455	4.5738E+09	4.5617E+09
x(FT)	35.880	0.0000	0.0000	24.960	30.030	0.0000	35.880	24.180	0.0000	24.180	24.960
2	-1.2542E-04	-0.049239	-2661.7	-6894.0	-10.719	-47.590	-0.1234	-4.0070	0.5310	4.5738E+09	4.5641E+09
x(FT)	35.880	0.0000	0.0000	24.960	30.030	0.0000	35.880	24.180	0.0000	24.960	24.960
3	-8.0992E-05	-0.049239	-1866.9	-6893.9	-6.8168	-47.722	-0.079696	-4.0091	0.3254	4.5738E+09	4.5641E+09
x(FT)	36.270	0.0000	0.0000	24.960	30.420	0.0000	36.270	24.180	0.0000	24.180	24.960
4	-8.1029E-05	-0.051480	-1866.2	-7268.7	-6.8096	-51.646	-0.079732	-4.2592	0.3399	4.5738E+09	4.5617E+09
x(FT)	36.270	0.0000	0.0000	24.960	30.420	0.0000	36.270	24.180	0.0000	24.180	24.960
Min.	-1.2544E-04	-0.051480	-2661.7	-7268.9	-10.719	-51.646	-0.1234	-4.2592	0.3254	4.5738E+09	4.5617E+09
Pile N.	1	1	2	1	2	4	1	4	3	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	5.5635E-03	8.0254E-04	1053.4	7997.7	12.456	72.557	0.7293	0.7897	0.6719	8.8843E+09	8.8843E+09
x(FT)	2.3400	34.710	25.740	0.0000	0.0000	29.640	24.180	34.710	24.180	0.0000	0.3900
2	5.5635E-03	7.5894E-04	1054.4	7207.5	12.463	68.772	0.7298	0.7468	0.6540	8.8843E+09	8.8843E+09
x(FT)	2.3400	34.710	25.740	0.0000	0.0000	29.640	24.180	34.710	24.180	0.0000	0.0000
3	3.3713E-03	7.5875E-04	669.02	7207.9	8.5024	68.750	0.4758	0.7466	0.4008	8.8843E+09	8.8843E+09
x(FT)	3.5100	34.710	25.740	0.0000	0.0000	29.640	24.180	34.710	24.180	0.0000	0.7800
4	3.3714E-03	8.0232E-04	668.38	7998.2	8.4975	72.530	0.4754	0.7895	0.4187	8.8843E+09	8.8843E+09
x(FT)	3.5100	34.710	25.740	0.0000	0.0000	29.640	24.180	34.710	24.180	0.7800	0.3900
Max.	5.5635E-03	8.0254E-04	1054.4	7998.2	12.463	72.557	0.7298	0.7897	0.6719	8.8843E+09	8.8843E+09
Pile N.	1	1	2	4	2	1	2	1	1	1	1

LOAD CASE : 19
CASE NAME : Service MaxT
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN

0.0672326	-1.47152E-03	-0.0439295

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
3.39477E-05	-8.39795E-05	-3.73323E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1992.0	-12.784	-44.377	400.84	7105.9	-3336.9
2	2281.8	-12.814	-27.104	400.84	3651.3	-3340.6
3	1630.0	-30.234	-27.106	400.84	3642.7	-6818.6
4	1340.2	-30.169	-44.414	400.84	7099.7	-6809.2
MINIMUM	1340.2	-30.234	-44.414	400.84	3642.7	-6818.6
Pile N.	4	3	4	1	3	3
MAXIMUM	2281.8	-12.784	-27.104	400.84	7105.9	-3336.9
Pile N.	2	1	2	1	1	1

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-1.9221E-03	-0.041764	-528.46	-6002.2	-12.766	-44.263	-0.4960	-3.5594	0.4727	4.5738E+09	4.5712E+09
x(FT)	10.920	0.0000	26.910	24.960	0.0000	0.0000	24.180	24.180	0.0000	24.570	24.960
2	-1.9196E-03	-0.031987	-531.80	-4355.3	-12.797	-27.028	-0.4997	-2.4688	0.5415	4.5738E+09	4.5738E+09
x(FT)	10.920	0.0000	26.910	24.960	0.0000	0.0000	24.180	24.180	0.0000	24.180	24.180
3	-0.010482	-0.031987	-2196.0	-4345.4	-30.180	-27.029	-1.6145	-2.4604	0.3868	4.5738E+09	4.5738E+09
x(FT)	4.6800	0.0000	25.740	24.960	0.0000	0.0000	24.180	24.180	0.0000	24.180	24.180
4	-0.010483	-0.041764	-2184.6	-5994.2	-30.113	-44.298	-1.6056	-3.5556	0.3180	4.5738E+09	4.5712E+09
x(FT)	4.6800	0.0000	25.740	24.960	0.0000	0.0000	24.180	24.180	0.0000	24.180	24.960
Min.	-0.010483	-0.041764	-2196.0	-6002.2	-30.180	-44.298	-1.6145	-3.5594	0.3180	4.5738E+09	4.5712E+09
Pile N.	4	1	3	1	3	4	3	1	4	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	2.8104E-04	6.6492E-04	3336.9	7105.9	5.6450	60.064	0.088168	0.6543	0.5823	8.8843E+09	8.8843E+09
x(FT)	0.0000	34.710	0.0000	0.0000	31.200	29.640	39.000	34.710	24.180	0.0000	0.3900
2	2.8104E-04	4.7473E-04	3340.6	3651.3	5.6669	43.418	0.086901	0.4671	0.6670	8.8843E+09	8.8843E+09
x(FT)	0.0000	34.320	0.0000	0.0000	31.200	29.250	39.000	34.320	24.180	0.0000	0.3900

3	2.6991E-04	4.7379E-04	6818.6	3642.7	22.500	43.260	0.2656	0.4662	0.4764	8.8843E+09	8.8843E+09
x(FT)	36.660	34.320	0.0000	0.0000	30.420	29.250	36.660	34.320	24.180	0.0000	0.0000
4	2.7113E-04	6.6417E-04	6809.2	7099.7	22.388	59.928	0.2668	0.6535	0.3917	8.8843E+09	8.8843E+09
x(FT)	37.050	34.710	0.0000	0.0000	30.420	29.640	37.050	34.710	24.180	1.1700	0.0000
Max.	2.8104E-04	6.6492E-04	6818.6	7105.9	22.500	60.064	0.2668	0.6543	0.6670	8.8843E+09	8.8843E+09
Pile N.	1	1	3	1	3	1	4	1	2	1	1

LOAD CASE : 20
CASE NAME : Service MinT
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0671677	7.51708E-03	0.0423864

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-3.66647E-05	7.39574E-05	4.77982E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1707.7	28.111	47.375	-432.92	-7911.4	6619.5
2	1336.7	28.196	28.770	-432.92	-4179.1	6630.9
3	1910.8	46.898	28.620	-432.92	-4166.3	1.0372E+04
4	2281.8	46.794	47.235	-432.92	-7901.7	1.0359E+04
MINIMUM	1336.7	28.111	28.620	-432.92	-7911.4	6619.5
Pile N.	2	1	3	1	1	1
MAXIMUM	2281.8	46.898	47.375	-432.92	-4166.3	1.0372E+04
Pile N.	4	3	1	1	3	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2

1	-2.3615E-04	-6.7714E-04	-6619.5	-7911.4	-18.461	-60.878	-0.2324	-0.6663	0.4052	4.5738E+09	4.5705E+09
x(FT)	39.000	34.710	0.0000	0.0000	30.420	29.640	39.000	34.710	0.0000	24.180	25.350
2	-2.3291E-04	-4.7064E-04	-6630.9	-4179.1	-18.562	-42.835	-0.2292	-0.4631	0.3172	4.5738E+09	4.5738E+09
x(FT)	39.000	34.320	0.0000	0.0000	30.420	29.640	39.000	34.320	0.0000	24.180	24.180
3	-4.3792E-04	-4.6927E-04	-1.0372E+04	-4166.3	-36.759	-42.644	-0.4309	-0.4618	0.4534	4.5738E+09	4.5738E+09
x(FT)	36.660	34.320	0.0000	0.0000	30.420	29.640	36.660	34.320	0.0000	24.180	25.350
4	-4.3911E-04	-6.7639E-04	-1.0359E+04	-7901.7	-36.636	-60.726	-0.4321	-0.6656	0.5415	4.5738E+09	4.5706E+09
x(FT)	36.660	34.710	0.0000	0.0000	30.420	29.640	36.660	34.710	0.0000	24.180	25.350
Min.	-4.3911E-04	-6.7714E-04	-1.0372E+04	-7911.4	-36.759	-60.878	-0.4321	-0.6663	0.3172	4.5738E+09	4.5705E+09
Pile N.	4	1	3	1	3	1	4	1	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	7.9624E-03	0.041454	1788.8	6082.1	28.063	47.256	1.3853	3.6615	0.4992	8.8843E+09	8.8843E+09
x(FT)	6.2400	0.0000	26.130	25.350	0.0000	0.0000	24.180	24.180	24.180	1.1700	0.7800
2	7.9596E-03	0.030894	1799.1	4295.4	28.148	28.691	1.3940	2.4808	0.3907	8.8843E+09	8.8843E+09
x(FT)	6.2400	0.0000	26.130	24.960	0.0000	0.0000	24.180	24.180	24.180	0.0000	0.0000
3	0.017859	0.030894	3601.7	4280.6	46.811	28.542	2.5889	2.4675	0.5585	8.8843E+09	8.8843E+09
x(FT)	3.9000	0.0000	25.740	24.960	0.0000	0.0000	24.180	24.180	24.180	0.0000	0.0000
4	0.017861	0.041454	3589.8	6072.1	46.708	47.117	2.5797	3.6538	0.6670	8.8843E+09	8.8843E+09
x(FT)	3.9000	0.0000	25.740	25.350	0.0000	0.0000	24.180	24.180	24.180	0.3900	0.3900
Max.	0.017861	0.041454	3601.7	6082.1	46.811	47.256	2.5889	3.6615	0.6670	8.8843E+09	8.8843E+09
Pile N.	4	1	3	1	3	1	3	1	4	1	1

LOAD CASE : 21
CASE NAME : Service MaxM2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0679004	4.05962E-03	0.0613981

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-1.29372E-05	1.07463E-04	7.02872E-06

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1439.2	7.4471	58.092	-152.76	-9349.7	1635.5
2	1384.6	7.4530	51.548	-152.76	-8036.1	1636.3
3	2218.8	14.056	51.413	-152.76	-8035.0	2957.8
4	2273.4	14.044	57.947	-152.76	-9348.5	2956.3
MINIMUM	1384.6	7.4471	51.413	-152.76	-9349.7	1635.5
Pile N.	2	1	3	1	1	1
MAXIMUM	2273.4	14.056	58.092	-152.76	-8035.0	2957.8
Pile N.	4	3	1	1	3	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-7.0756E-05	-8.6354E-04	-1635.5	-9349.7	-5.9278	-77.761	-0.069624	-0.8497	0.3415	4.5738E+09	4.5587E+09
x(FT)	36.660	34.710	0.0000	0.0000	30.420	29.640	36.660	34.710	0.0000	24.180	25.350
2	-7.0686E-05	-7.9116E-04	-1636.3	-8036.1	-5.9370	-71.481	-0.069555	-0.7785	0.3286	4.5738E+09	4.5623E+09
x(FT)	36.270	34.710	0.0000	0.0000	30.420	29.640	36.270	34.710	0.0000	24.960	24.960
3	-1.4464E-04	-7.9131E-04	-2957.8	-8035.0	-12.412	-71.496	-0.1423	-0.7786	0.5265	4.5738E+09	4.5624E+09
x(FT)	35.880	34.710	0.0000	0.0000	30.030	29.640	35.880	34.710	0.0000	24.570	24.960
4	-1.4467E-04	-8.6375E-04	-2956.3	-9348.5	-12.391	-77.784	-0.1424	-0.8499	0.5395	4.5738E+09	4.5587E+09
x(FT)	35.880	34.710	0.0000	0.0000	30.030	29.640	35.880	34.710	0.0000	24.180	25.350
Min.	-1.4467E-04	-8.6375E-04	-2957.8	-9349.7	-12.412	-77.784	-0.1424	-0.8499	0.3286	4.5738E+09	4.5587E+09
Pile N.	4	4	3	1	3	4	4	4	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	2.9301E-03	0.054234	581.75	7783.6	7.4328	57.940	0.4146	4.6245	0.4207	8.8843E+09	8.8843E+09
x(FT)	3.5100	0.0000	25.740	25.350	0.0000	0.0000	24.180	24.180	24.180	0.3900	0.0000
2	2.9300E-03	0.050508	582.56	7160.1	7.4387	51.411	0.4151	4.2086	0.4047	8.8843E+09	8.8843E+09
x(FT)	3.5100	0.0000	25.740	24.960	0.0000	0.0000	24.180	24.180	24.180	0.0000	0.7800
3	6.5895E-03	0.050508	1222.6	7159.7	14.028	51.278	0.8372	4.2063	0.6485	8.8843E+09	8.8843E+09
x(FT)	1.9500	0.0000	25.740	24.960	0.0000	0.0000	24.180	24.180	24.180	0.0000	0.7800
4	6.5896E-03	0.054234	1221.1	7783.5	14.016	57.798	0.8363	4.6222	0.6645	8.8843E+09	8.8843E+09
x(FT)	1.9500	0.0000	25.740	25.350	0.0000	0.0000	24.180	24.180	24.180	0.3900	0.0000
Max.	6.5896E-03	0.054234	1222.6	7783.6	14.028	57.940	0.8372	4.6245	0.6645	8.8843E+09	8.8843E+09
Pile N.	4	1	3	1	3	1	3	1	4	1	1

LOAD CASE : 22
CASE NAME : Service MinM2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0681231	3.67250E-03	-0.0597353

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
7.78224E-06	-1.11613E-04	7.88230E-06

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2298.8	12.480	-51.645	91.889	7997.7	2660.8
2	2237.6	12.487	-47.718	91.889	7207.5	2661.7
3	1371.2	8.5188	-47.852	91.889	7207.9	1866.9
4	1432.4	8.5139	-51.785	91.889	7998.2	1866.2
MINIMUM	1371.2	8.5139	-51.785	91.889	7207.5	1866.2
Pile N.	3	4	4	1	2	4
MAXIMUM	2298.8	12.487	-47.718	91.889	7998.2	2661.7
Pile N.	1	2	2	1	4	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-1.2544E-04	-0.051480	-2660.8	-7268.9	-10.706	-51.509	-0.1234	-4.2571	0.5455	4.5738E+09	4.5617E+09
x(FT)	35.880	0.0000	0.0000	24.960	30.030	0.0000	35.880	24.180	0.0000	24.180	24.960
2	-1.2542E-04	-0.049239	-2661.7	-6894.0	-10.719	-47.590	-0.1234	-4.0070	0.5310	4.5738E+09	4.5641E+09
x(FT)	35.880	0.0000	0.0000	24.960	30.030	0.0000	35.880	24.180	0.0000	24.180	24.960
3	-8.0992E-05	-0.049239	-1866.9	-6893.9	-6.8168	-47.722	-0.079696	-4.0091	0.3254	4.5738E+09	4.5641E+09
x(FT)	36.270	0.0000	0.0000	24.960	30.420	0.0000	36.270	24.180	0.0000	24.180	24.960
4	-8.1029E-05	-0.051480	-1866.2	-7268.7	-6.8096	-51.646	-0.079732	-4.2592	0.3399	4.5738E+09	4.5617E+09
x(FT)	36.270	0.0000	0.0000	24.960	30.420	0.0000	36.270	24.180	0.0000	24.180	24.960

Min.	-1.2544E-04	-0.051480	-2661.7	-7268.9	-10.719	-51.646	-0.1234	-4.2592	0.3254	4.5738E+09	4.5617E+09
Pile N.	1	1	2	1	2	4	1	4	3	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	5.5635E-03	8.0254E-04	1053.4	7997.7	12.456	72.557	0.7293	0.7897	0.6719	8.8843E+09	8.8843E+09
x(FT)	2.3400	34.710	25.740	0.0000	0.0000	29.640	24.180	34.710	24.180	0.0000	0.0000
2	5.5635E-03	7.5894E-04	1054.4	7207.5	12.463	68.772	0.7298	0.7468	0.6540	8.8843E+09	8.8843E+09
x(FT)	2.3400	34.710	25.740	0.0000	0.0000	29.640	24.180	34.710	24.180	1.1700	0.0000
3	3.3713E-03	7.5875E-04	669.02	7207.9	8.5024	68.750	0.4758	0.7466	0.4008	8.8843E+09	8.8843E+09
x(FT)	3.5100	34.710	25.740	0.0000	0.0000	29.640	24.180	34.710	24.180	0.7800	0.0000
4	3.3714E-03	8.0232E-04	668.38	7998.2	8.4975	72.530	0.4754	0.7895	0.4187	8.8843E+09	8.8843E+09
x(FT)	3.5100	34.710	25.740	0.0000	0.0000	29.640	24.180	34.710	24.180	0.0000	0.0000
Max.	5.5635E-03	8.0254E-04	1054.4	7998.2	12.463	72.557	0.7298	0.7897	0.6719	8.8843E+09	8.8843E+09
Pile N.	1	1	2	4	2	1	2	1	1	1	1

LOAD CASE : 23
CASE NAME : Service MaxM3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0658598	1.89179E-03	0.0435217

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-1.69179E-05	7.60053E-05	6.65908E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1737.5	32.665	43.326	-199.76	-7058.4	7923.3
2	1220.6	32.712	34.778	-199.76	-5336.1	7930.1
3	1810.5	41.341	34.676	-199.76	-5330.7	9655.6
4	2327.4	41.282	43.221	-199.76	-7053.5	9648.0

MINIMUM	1220.6	32.665	34.676	-199.76	-7058.4	7923.3
Pile N.	2	1	3	1	1	1
MAXIMUM	2327.4	41.341	43.326	-199.76	-5330.7	9655.6
Pile N.	4	3	1	1	3	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-2.6157E-04	-6.3647E-04	-7923.3	-7058.4	-19.443	-57.370	-0.2574	-0.6263	0.4123	4.5738E+09	4.5737E+09
x(FT)	39.000	34.710	0.0000	0.0000	30.810	29.640	39.000	34.710	0.0000	24.180	25.350
2	-2.6004E-04	-5.4080E-04	-7930.1	-5336.1	-19.473	-49.031	-0.2559	-0.5322	0.2896	4.5738E+09	4.5738E+09
x(FT)	39.000	34.710	0.0000	0.0000	30.810	29.640	39.000	34.710	0.0000	24.960	24.180
3	-3.4990E-04	-5.4050E-04	-9655.6	-5330.7	-27.857	-48.960	-0.3443	-0.5319	0.4296	4.5738E+09	4.5738E+09
x(FT)	39.000	34.710	0.0000	0.0000	30.420	29.640	39.000	34.710	0.0000	24.180	25.350
4	-3.5161E-04	-6.3616E-04	-9648.0	-7053.5	-27.806	-57.304	-0.3460	-0.6260	0.5523	4.5738E+09	4.5738E+09
x(FT)	39.000	34.710	0.0000	0.0000	30.420	29.640	39.000	34.710	0.0000	24.960	25.350
Min.	-3.5161E-04	-6.3647E-04	-9655.6	-7058.4	-27.857	-57.370	-0.3460	-0.6263	0.2896	4.5738E+09	4.5737E+09
Pile N.	4	1	3	1	3	1	4	1	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	7.8746E-03	0.039573	1870.1	5733.4	32.612	43.215	1.5153	3.4222	0.5079	8.8843E+09	8.8843E+09
x(FT)	7.8000	0.0000	26.130	25.350	0.0000	0.0000	24.180	24.180	24.180	0.0000	0.0000
2	7.8724E-03	0.034701	1874.7	4909.4	32.658	34.685	1.5191	2.8776	0.3568	8.8843E+09	8.8843E+09
x(FT)	7.8000	0.0000	26.130	24.960	0.0000	0.0000	24.180	24.180	24.180	0.7800	0.3900
3	0.012184	0.034701	2702.4	4903.5	41.270	34.584	2.0714	2.8720	0.5292	8.8843E+09	8.8843E+09
x(FT)	5.8500	0.0000	26.130	24.960	0.0000	0.0000	24.180	24.180	24.180	0.3900	1.5600
4	0.012186	0.039573	2697.3	5728.6	41.213	43.111	2.0673	3.4181	0.6803	8.8843E+09	8.8843E+09
x(FT)	5.8500	0.0000	26.130	25.350	0.0000	0.0000	24.180	24.180	24.180	0.0000	0.0000
Max.	0.012186	0.039573	2702.4	5733.4	41.270	43.215	2.0714	3.4222	0.6803	8.8843E+09	8.8843E+09
Pile N.	4	1	3	1	3	1	3	1	4	1	1

LOAD CASE : 24
CASE NAME : Service MinM3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0665833	2.83023E-03	-0.0425016

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
1.48293E-05	-8.14809E-05	-5.64208E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1890.8	-19.687	-38.268	175.10	5932.0	-5115.8
2	2328.7	-19.707	-30.692	175.10	4423.4	-5117.6
3	1696.2	-27.314	-30.724	175.10	4418.9	-6637.6
4	1258.3	-27.291	-38.316	175.10	5928.5	-6634.8
MINIMUM	1258.3	-27.314	-38.316	175.10	4418.9	-6637.6
Pile N.	4	3	4	1	3	3
MAXIMUM	2328.7	-19.687	-30.692	175.10	5932.0	-5115.8
Pile N.	2	1	2	1	1	1

* MINIMUM VALUES AND LOCATIONS *

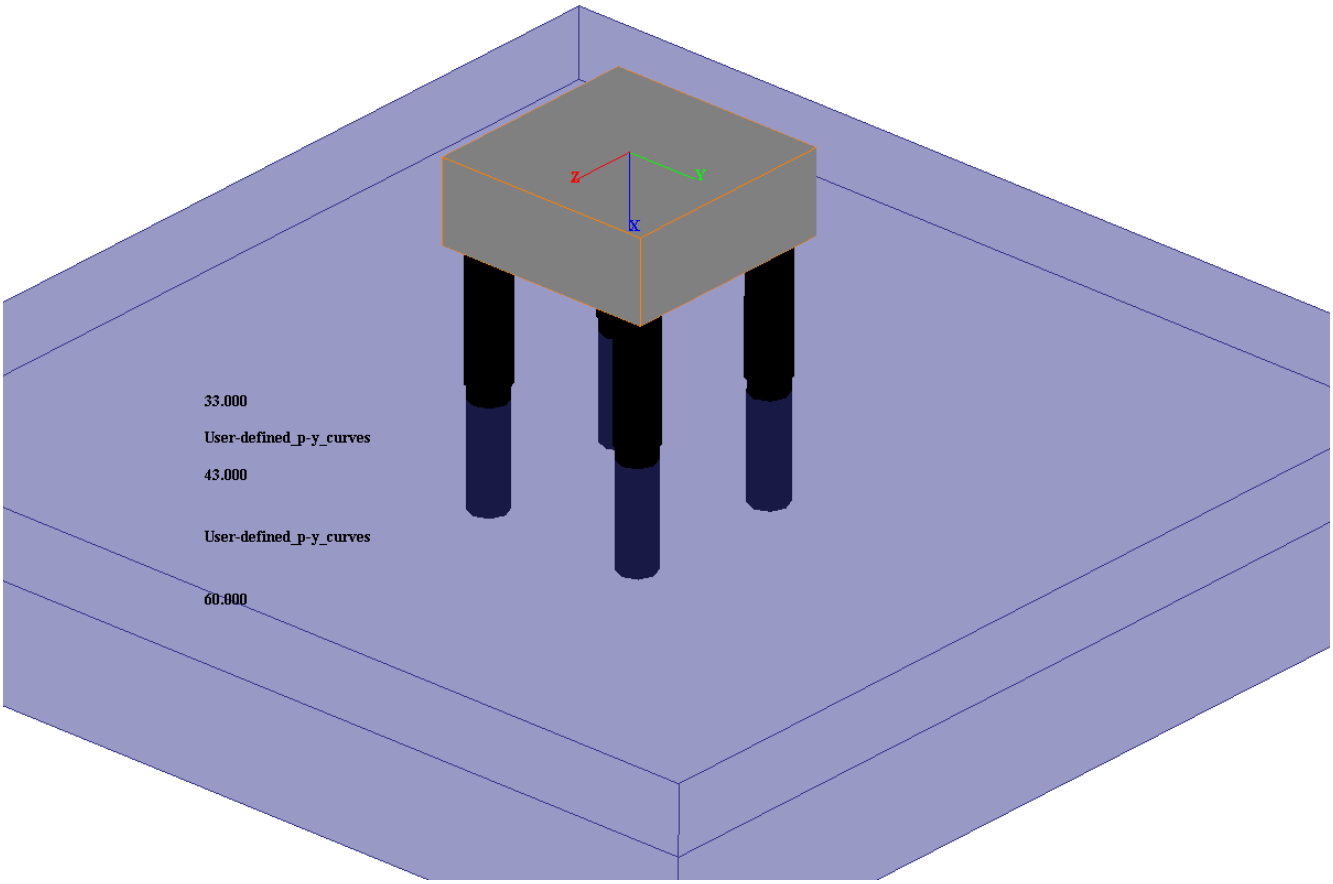
PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-3.0488E-03	-0.037793	-832.55	-5366.0	-19.660	-38.168	-0.7737	-3.1506	0.4487	4.5738E+09	4.5738E+09
x(FT)	10.920	0.0000	26.910	24.960	0.0000	0.0000	24.180	24.180	0.0000	24.180	24.180
2	-3.0472E-03	-0.033522	-835.13	-4647.1	-19.681	-30.609	-0.7764	-2.6740	0.5526	4.5738E+09	4.5738E+09
x(FT)	10.920	0.0000	26.910	24.960	0.0000	0.0000	24.180	24.180	0.0000	24.180	24.180
3	-6.4702E-03	-0.033522	-1552.2	-4641.8	-27.271	-30.640	-1.2629	-2.6708	0.4025	4.5738E+09	4.5738E+09
x(FT)	7.8000	0.0000	26.130	24.960	0.0000	0.0000	24.180	24.180	0.0000	24.570	24.570
4	-6.4715E-03	-0.037793	-1547.6	-5361.5	-27.247	-38.214	-1.2592	-3.1489	0.2986	4.5738E+09	4.5738E+09
x(FT)	7.8000	0.0000	26.130	24.960	0.0000	0.0000	24.180	24.180	0.0000	24.180	24.180
Min.	-6.4715E-03	-0.037793	-1552.2	-5366.0	-27.271	-38.214	-1.2629	-3.1506	0.2986	4.5738E+09	4.5738E+09
Pile N.	4	1	3	1	3	4	3	1	4	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	2.2630E-04	5.9176E-04	5115.8	5932.0	8.8708	53.640	0.1362	0.5823	0.5527	8.8843E+09	8.8843E+09

x(FT)	0.0000	34.710	0.0000	0.0000	31.200	29.640	39.000	34.710	24.180	0.7800	0.7800
2	2.2630E-04	5.0890E-04	5117.6	4423.4	8.8894	46.351	0.1353	0.5008	0.6807	8.8843E+09	8.8843E+09
x(FT)	0.0000	34.320	0.0000	0.0000	31.200	29.640	39.000	34.320	24.180	0.0000	0.0000
3	2.1508E-04	5.0832E-04	6637.6	4418.9	16.133	46.273	0.2116	0.5002	0.4958	8.8843E+09	8.8843E+09
x(FT)	39.000	34.320	0.0000	0.0000	30.810	29.640	39.000	34.320	24.180	0.0000	2.3400
4	2.1639E-04	5.9132E-04	6634.8	5928.5	16.095	53.562	0.2129	0.5819	0.3678	8.8843E+09	8.8843E+09
x(FT)	39.000	34.710	0.0000	0.0000	30.810	29.640	39.000	34.710	24.180	0.7800	0.3900
Max.	2.2630E-04	5.9176E-04	6637.6	5932.0	16.133	53.640	0.2129	0.5823	0.6807	8.8843E+09	8.8843E+09
Pile N.	1	1	3	1	3	1	4	1	2	1	1

Pier 3
NCHRP p-y parameters (Lower Bound)
Fully Scoured to Bedrock
40 #11 Bar Reinforcement
Strength Condition: Load Cases 1 through 12
Service Condition: Load cases 13 through 24
0.75" thick casing reduced to 0.625" after 1/8" of corrosion



Pier 3 Loading Schedule provided by HNTB
on 8/21/2020
Converted to kip-in

	PIER	ID	Station	Output	Case	P	V2	V3	T	M2	M3
						Vertical, x-di	orizontal, F	orizontal, F	Mx	My	Mz
	-	-	ft	-	-	kip	Kip	Kip	Kip-in	Kip-in	Kip-in
1	PileCap 3	5145	0	STRENGTH	Max P	5879	-1136	-184	-1025	-54123	-171116
2	PileCap 3	5145	0	STRENGTH	Min P	10505	48	47	-2372	28155	22169
3	PileCap 3	5145	0	STRENGTH	Max V2	8811	1576	139	432	-20647	606111
4	PileCap 3	5145	0	STRENGTH	Min V2	6159	-1494	-109	-3901	16376	-533056
5	PileCap 3	5145	0	STRENGTH	Max V3	6159	1193	374	-1640	184333	224630
6	PileCap 3	5145	0	STRENGTH	Min V3	8811	-1010	-287	-1037	-134955	-43434
7	PileCap 3	5145	0	STRENGTH	Max T	6878	-1128	-106	15400	19056	-176260
8	PileCap 3	5145	0	STRENGTH	Min T	9534	1220	136	-19224	-23436	233129
9	PileCap 3	5145	0	STRENGTH	Max M2	6159	1193	374	-1640	184333	224630
10	PileCap 3	5145	0	STRENGTH	Min M2	9697	-1118	-278	743	-142352	-178405
11	PileCap 3	5145	0	STRENGTH	Max M3	8811	1576	139	432	-20647	606111
12	PileCap 3	5145	0	STRENGTH	Min M3	6159	-1494	-109	-3901	16376	-533056
13	PileCap 3	5145	0	SERVICE	Max P	6768	34	-28	2248	-42637	28278
14	PileCap 3	5145	0	SERVICE	Min P	8127	48	59	-5985	39280	27346
15	PileCap 3	5145	0	SERVICE	Max V2	7277	237	73	-3916	52766	187521
16	PileCap 3	5145	0	SERVICE	Min V2	7292	-154	-50	-420	-63041	-128913
17	PileCap 3	5145	0	SERVICE	Max V3	7472	50	158	-6708	127414	39825
18	PileCap 3	5145	0	SERVICE	Min V3	7466	64	-111	3843	-115970	40944
19	PileCap 3	5145	0	SERVICE	Max T	7442	45	-41	13035	-54652	32193
20	PileCap 3	5145	0	SERVICE	Min T	7453	42	72	-16845	51765	25397
21	PileCap 3	5145	0	SERVICE	Max M2	7472	50	158	-6708	127414	39825
22	PileCap 3	5145	0	SERVICE	Min M2	7466	64	-111	3843	-115970	40943
23	PileCap 3	5145	0	SERVICE	Max M3	7235	184	71	-3220	50374	221774
24	PileCap 3	5145	0	SERVICE	Min M3	7316	-107	-49	-754	-62165	-164975

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

                GROUP for Windows, Version 2016.10.13

                 Serial Number : 364300562

                  Analysis of A Group of Piles
               Subjected to Axial and Lateral Loading

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                      All Rights Reserved

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


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

          Date:  August 31, 2020     Time:  13:54:04



            *****     COMPUTATION RESULTS     *****


Pier 3



            *****     LOAD CASES RESULTS      *****


LOAD CASE :     1
CASE NAME : Strength MaxP
LOAD TYPE : Dead, DL



* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *


       VERTICAL ,IN      HORIZONTAL Y,IN     HORIZONTAL Z,IN
          0.0557612           -0.36572         -0.0450468

     ANGLE ROT. X,RAD    ANGLE ROT. Y,RAD    ANGLE ROT. Z,RAD
       -5.18660E-06        -4.43650E-05         5.98534E-05
```



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   * PILE TOP REACTIONS *

  PILE GROUP   FOR. X,KIP   FOR. Y,KIP   FOR. Z,KIP MOM X,KIP-IN MOM Y,KIP-IN MOM Z,KIP-IN
  **********  ***********  ***********  ***********  ***********  ***********  ***********
      1           1865.4      -284.01      -44.869      -58.209       8564.8  -6.3667E+04
      2           1410.9      -284.53      -47.080      -58.209       9019.7  -6.3683E+04
      3           1074.1      -283.99      -47.132      -58.209       9022.0  -6.3484E+04
      4           1528.6      -283.47      -44.919      -58.209       8567.0  -6.3468E+04

  MINIMUM         1074.1      -284.53      -47.132      -58.209       8564.8  -6.3683E+04
  Pile N.           3            2            3            1            1            2
  MAXIMUM         1865.4      -283.47      -44.869      -58.209       9022.0  -6.3468E+04
  Pile N.           1            4            1            1            3            4



   * MINIMUM VALUES AND LOCATIONS *

  PILE     DISPL.      DISPL.      MOMENT      MOMENT       SHEAR       SHEAR    SOIL REACT  SOIL REACT     TOTAL    FLEX. RIG.  FLEX. RIG.
           y-DIR       z-DIR       z-DIR       y-DIR       y-DIR       z-DIR       y-DIR       z-DIR      STRESS       z-DIR       y-DIR
            IN          IN        KIP-IN      KIP-IN         KIP         KIP       KIP/IN      KIP/IN    KIP/IN**2   KIP-IN**2   KIP-IN**2
 ******  **********  **********  **********  **********  **********  **********  **********  **********  **********  **********  **********
     1     -0.3614   -0.040573 -2.6654E+04     -5491.5     -280.86     -43.545     -21.084     -2.6083      0.4427  1.4224E+09  4.5738E+09
  x(FT)      0.0000      0.0000      27.470      27.470      0.0000      0.0000      26.240      26.240      0.0000      27.470      26.240
     2     -0.3614   -0.042067 -2.6648E+04     -5714.8     -281.34     -45.696     -21.081     -2.7204      0.3348  1.4224E+09  4.5738E+09
  x(FT)      0.0000      0.0000      27.470      27.470      0.0000      0.0000      26.240      26.240      0.0000      27.470      26.650
     3     -0.3599   -0.042067 -2.6556E+04     -5716.1     -280.78     -45.748     -21.029     -2.7253      0.2549  1.4228E+09  4.5738E+09
  x(FT)      0.0000      0.0000      27.470      27.470      0.0000      0.0000      26.240      26.240      0.0000      27.470      26.650
     4     -0.3599   -0.040573 -2.6562E+04     -5492.7     -280.30     -43.595     -21.031     -2.6130      0.3627  1.4228E+09  4.5738E+09
  x(FT)      0.0000      0.0000      27.470      27.470      0.0000      0.0000      26.240      26.240      0.0000      27.470      26.240

    Min.     -0.3614   -0.042067 -2.6654E+04     -5716.1     -281.34     -45.748     -21.084     -2.7253      0.2549  1.4224E+09  4.5738E+09
 Pile N.        1           2           1           3           2           3           1           3           3           1           1

   * MAXIMUM VALUES AND LOCATIONS *

  PILE     DISPL.      DISPL.      MOMENT      MOMENT       SHEAR       SHEAR    SOIL REACT  SOIL REACT     TOTAL    FLEX. RIG.  FLEX. RIG.
           y-DIR       z-DIR       z-DIR       y-DIR       y-DIR       z-DIR       y-DIR       z-DIR      STRESS       z-DIR       y-DIR
            IN          IN        KIP-IN      KIP-IN         KIP         KIP       KIP/IN      KIP/IN    KIP/IN**2   KIP-IN**2   KIP-IN**2
 ******  **********  **********  **********  **********  **********  **********  **********  **********  **********  **********  **********
     1   3.3835E-03  6.7973E-04  6.3667E+04      8564.8      291.67      54.523      2.9675      0.6254      0.5453  8.8843E+09  8.8843E+09
  x(FT)      34.850      38.130      0.0000      0.0000      30.750      31.980      36.080      38.540      26.240      15.580      0.0000
     2   3.3803E-03  7.0848E-04  6.3683E+04      9019.7      291.42      56.741      2.9658      0.6519      0.4124  8.8843E+09  8.8843E+09
  x(FT)      34.850      38.130      0.0000      0.0000      30.750      31.980      36.080      38.540      26.240      16.810      0.0000
     3   3.3619E-03  7.0824E-04  6.3484E+04      9022.0      290.09      56.745      2.9528      0.6518      0.3139  8.8843E+09  8.8843E+09
  x(FT)      34.850      38.130      0.0000      0.0000      30.750      31.980      36.080      38.540      26.240      16.400      0.0000
     4   3.3650E-03  6.7950E-04  6.3468E+04      8567.0      290.33      54.527      2.9545      0.6252      0.4468  8.8843E+09  8.8843E+09
  x(FT)      34.850      38.130      0.0000      0.0000      30.750      31.980      36.080      38.540      26.240      15.580      1.2300
```

Max.	3.3835E-03	7.0848E-04	6.3683E+04	9022.0	291.67	56.745	2.9675	0.6519	0.5453	8.8843E+09	8.8843E+09
Pile N.	1	2	2	3	1	3	1	2	1	1	1

LOAD CASE : 2
CASE NAME : Strength MinP
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0996234	6.60449E-03	0.0129582

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-8.05356E-06	1.76017E-05	4.48086E-06

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2576.4	10.245	13.506	-90.385	-2456.6	2222.9
2	2542.4	10.262	10.017	-90.385	-1728.8	2225.3
3	2676.1	13.757	9.9951	-90.385	-1726.2	2954.2
4	2710.1	13.736	13.482	-90.385	-2453.7	2951.2
MINIMUM	2542.4	10.245	9.9951	-90.385	-2456.6	2222.9
Pile N.	2	1	3	1	1	1
MAXIMUM	2710.1	13.757	13.506	-90.385	-1726.2	2954.2
Pile N.	4	3	1	1	3	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-1.1276E-04	-1.9377E-04	-2222.9	-2456.6	-10.154	-17.808	-0.1110	-0.1907	0.6114	4.5738E+09	4.5738E+09
x(FT)	36.900	36.490	0.0000	0.0000	31.980	31.570	36.900	36.490	0.0000	26.240	26.650
2	-1.1276E-04	-1.5254E-04	-2225.3	-1728.8	-10.169	-14.062	-0.1109	-0.1501	0.6033	4.5738E+09	4.5738E+09
x(FT)	36.900	36.080	0.0000	0.0000	31.570	31.570	36.900	36.080	0.0000	26.650	26.240
3	-1.5429E-04	-1.5240E-04	-2954.2	-1726.2	-13.924	-14.044	-0.1518	-0.1500	0.6350	4.5738E+09	4.5738E+09

x(FT)	36.900	36.080	0.0000	0.0000	31.570	31.570	36.900	36.080	0.0000	26.240	26.240
4	-1.5428E-04	-1.9367E-04	-2951.2	-2453.7	-13.899	-17.784	-0.1518	-0.1906	0.6431	4.5738E+09	4.5738E+09
x(FT)	36.900	36.490	0.0000	0.0000	31.980	31.570	36.900	36.490	0.0000	26.650	26.650
Min.	-1.5429E-04	-1.9377E-04	-2954.2	-2456.6	-13.924	-17.808	-0.1518	-0.1907	0.6033	4.5738E+09	4.5738E+09
Pile N.	3	1	3	1	3	1	3	1	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	5.8622E-03	0.012639	1010.4	1782.5	10.045	13.197	0.6754	1.0854	0.7531	8.8843E+09	8.8843E+09
x(FT)	1.6400	0.0000	27.470	27.060	0.0000	0.0000	26.240	26.240	26.240	0.0000	0.0000
2	5.8622E-03	0.010320	1012.4	1411.5	10.064	9.7807	0.6866	0.8553	0.7431	8.8843E+09	8.8843E+09
x(FT)	1.6400	0.0000	27.470	27.060	0.0000	0.0000	26.240	26.240	26.240	0.0000	0.8200
3	8.1712E-03	0.010320	1386.2	1408.8	13.486	9.7577	0.9215	0.8430	0.7822	8.8843E+09	8.8843E+09
x(FT)	1.2300	0.0000	27.470	27.060	0.0000	0.0000	26.240	26.240	26.240	1.6400	0.0000
4	8.1713E-03	0.012639	1383.4	1779.2	13.464	13.171	0.9119	1.0763	0.7922	8.8843E+09	8.8843E+09
x(FT)	1.2300	0.0000	27.470	27.060	0.0000	0.0000	26.240	26.240	26.240	0.0000	0.0000
Max.	8.1713E-03	0.012639	1386.2	1782.5	13.486	13.197	0.9215	1.0854	0.7922	8.8843E+09	8.8843E+09
Pile N.	4	1	3	1	3	1	3	1	4	1	1

LOAD CASE : 3
CASE NAME : Strength MaxV2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0835614	0.49589	0.0264755

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
1.84130E-06	6.45891E-06	8.17531E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2488.6	393.70	34.352	20.665	-7153.3	9.0302E+04
2	1867.8	394.72	35.149	20.665	-7313.7	9.0342E+04
3	1916.9	394.30	35.148	20.665	-7313.9	9.0262E+04

4	2537.7	393.28	34.351	20.665	-7153.5	9.0222E+04
MINIMUM	1867.8	393.28	34.351	20.665	-7313.9	9.0222E+04
Pile N.	2	4	4	1	3	4
MAXIMUM	2537.7	394.72	35.149	20.665	-7153.3	9.0342E+04
Pile N.	4	2	2	1	1	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-5.1553E-03	-5.0823E-04	-9.0302E+04	-7153.3	-409.40	-36.867	-4.4229	-0.4770	0.5906	1.3989E+09	4.5738E+09
x(FT)	34.030	41.000	0.0000	0.0000	30.750	32.390	34.030	41.000	0.0000	27.470	26.650
2	-5.1475E-03	-5.1928E-04	-9.0342E+04	-7313.7	-408.95	-37.630	-4.4165	-0.4872	0.4432	1.3989E+09	4.5738E+09
x(FT)	34.030	41.000	0.0000	0.0000	30.750	32.390	34.030	41.000	0.0000	27.470	26.240
3	-5.1417E-03	-5.1916E-04	-9.0262E+04	-7313.9	-408.59	-37.634	-4.4116	-0.4871	0.4549	1.3990E+09	4.5738E+09
x(FT)	34.030	41.000	0.0000	0.0000	30.750	32.390	34.030	41.000	0.0000	27.470	26.240
4	-5.1494E-03	-5.0811E-04	-9.0222E+04	-7153.5	-409.04	-36.871	-4.4180	-0.4769	0.6022	1.3990E+09	4.5738E+09
x(FT)	34.030	41.000	0.0000	0.0000	30.750	32.390	34.030	41.000	0.0000	27.470	26.240
Min.	-5.1553E-03	-5.1928E-04	-9.0342E+04	-7313.9	-409.40	-37.634	-4.4229	-0.4872	0.4432	1.3989E+09	4.5738E+09
Pile N.	1	2	2	3	1	3	1	2	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.5032	0.025668	3.5827E+04	3673.8	390.37	33.324	26.978	1.6399	0.7274	8.8843E+09	8.8843E+09
x(FT)	0.4100	0.0000	27.470	27.880	0.0000	0.0000	26.240	26.240	26.240	17.630	0.0000
2	0.5032	0.026198	3.5817E+04	3750.8	391.32	34.098	26.983	1.6751	0.5460	8.8843E+09	8.8843E+09
x(FT)	0.4100	0.0000	27.470	27.880	0.0000	0.0000	26.240	26.240	26.240	16.810	1.6400
3	0.5027	0.026198	3.5786E+04	3751.2	390.91	34.097	26.962	1.6756	0.5603	8.8843E+09	8.8843E+09
x(FT)	0.4100	0.0000	27.470	27.880	0.0000	0.0000	26.240	26.240	26.240	17.220	0.0000
4	0.5027	0.025668	3.5797E+04	3674.1	389.96	33.322	26.957	1.6404	0.7418	8.8843E+09	8.8843E+09
x(FT)	0.4100	0.0000	27.470	27.880	0.0000	0.0000	26.240	26.240	26.240	16.810	0.0000
Max.	0.5032	0.026198	3.5827E+04	3751.2	391.32	34.098	26.983	1.6756	0.7418	8.8843E+09	8.8843E+09
Pile N.	1	2	1	3	2	2	2	3	4	1	1

LOAD CASE : 4
CASE NAME : Strength MinV2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0584161	-0.46872	-0.0206291

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-1.82487E-05	-4.96049E-06	-5.93838E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1333.1	-375.48	-23.515	-204.80	4870.1	-8.5505E+04
2	1784.1	-374.76	-30.965	-204.80	6450.2	-8.5475E+04
3	1746.4	-371.52	-30.988	-204.80	6453.5	-8.4714E+04
4	1295.4	-372.23	-23.532	-204.80	4872.6	-8.4744E+04
MINIMUM	1295.4	-375.48	-30.988	-204.80	4870.1	-8.5505E+04
Pile N.	4	1	3	1	1	1
MAXIMUM	1784.1	-371.52	-23.515	-204.80	6453.5	-8.4714E+04
Pile N.	2	3	1	1	3	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-0.4764	-0.017585	-3.4173E+04	-2521.6	-372.05	-22.820	-25.878	-1.1391	0.3164	1.4018E+09	4.5738E+09
x(FT)	0.4100	0.0000	27.470	27.880	0.0000	0.0000	26.240	26.240	0.0000	27.470	26.240
2	-0.4764	-0.022840	-3.4177E+04	-3295.7	-371.37	-30.055	-25.870	-1.4926	0.4234	1.4018E+09	4.5738E+09
x(FT)	0.4100	0.0000	27.470	27.880	0.0000	0.0000	26.240	26.240	0.0000	27.470	26.240
3	-0.4712	-0.022840	-3.3869E+04	-3298.8	-368.13	-30.080	-25.670	-1.4976	0.4144	1.4026E+09	4.5738E+09
x(FT)	0.4100	0.0000	27.470	27.880	0.0000	0.0000	26.240	26.240	0.0000	27.470	26.240
4	-0.4712	-0.017585	-3.3865E+04	-2524.0	-368.79	-22.839	-25.678	-1.1430	0.3074	1.4026E+09	4.5738E+09
x(FT)	0.4100	0.0000	27.470	27.880	0.0000	0.0000	26.240	26.240	0.0000	27.470	26.240
Min.	-0.4764	-0.022840	-3.4177E+04	-3298.8	-372.05	-30.080	-25.878	-1.4976	0.3074	1.4018E+09	4.5738E+09
Pile N.	1	2	2	3	1	3	1	3	4	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL.	DISPL.	MOMENT	MOMENT	SHEAR	SHEAR	SOIL REACT	SOIL REACT	TOTAL	FLEX. RIG.	FLEX. RIG.

	y-DIR IN	z-DIR IN	z-DIR KIP-IN	y-DIR KIP-IN	y-DIR KIP	z-DIR KIP	y-DIR KIP/IN	z-DIR KIP/IN	STRESS KIP/IN**2	z-DIR KIP-IN**2	y-DIR KIP-IN**2
1	4.7853E-03	3.4192E-04	8.5505E+04	4870.1	387.43	25.270	4.1155	0.3217	0.3897	8.8843E+09	8.8843E+09
x(FT)	34.440	41.000	0.0000	0.0000	30.750	32.390	34.440	41.000	26.240	16.810	0.8200
2	4.7893E-03	4.4862E-04	8.5475E+04	6450.2	387.66	33.047	4.1188	0.4218	0.5215	8.8843E+09	8.8843E+09
x(FT)	34.440	41.000	0.0000	0.0000	30.750	32.390	34.440	41.000	26.240	17.220	0.0000
3	4.7238E-03	4.4751E-04	8.4714E+04	6453.5	383.66	33.074	4.0644	0.4208	0.5105	8.8843E+09	8.8843E+09
x(FT)	34.440	41.000	0.0000	0.0000	30.750	32.390	34.440	41.000	26.240	16.810	0.4100
4	4.7199E-03	3.4107E-04	8.4744E+04	4872.6	383.43	25.290	4.0612	0.3210	0.3786	8.8843E+09	8.8843E+09
x(FT)	34.440	41.000	0.0000	0.0000	30.750	32.390	34.440	41.000	26.240	16.810	0.0000
Max.	4.7893E-03	4.4862E-04	8.5505E+04	6453.5	387.66	33.074	4.1188	0.4218	0.5215	8.8843E+09	8.8843E+09
Pile N.	2	2	1	3	2	3	2	2	2	1	1

LOAD CASE : 5
CASE NAME : Strength MaxV3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0584161	0.38384	0.10193

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-9.09114E-06	1.23060E-04	-4.27989E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	910.02	298.17	95.516	-102.03	-1.7667E+04	6.6866E+04
2	1235.0	297.81	91.761	-102.03	-1.6884E+04	6.6857E+04
3	2169.5	298.33	91.488	-102.03	-1.6877E+04	6.7196E+04
4	1844.5	298.70	95.235	-102.03	-1.7659E+04	6.7205E+04
MINIMUM	910.02	297.81	91.488	-102.03	-1.7667E+04	6.6857E+04
Pile N.	1	2	3	1	1	2
MAXIMUM	2169.5	298.70	95.516	-102.03	-1.6877E+04	6.7205E+04
Pile N.	3	4	1	1	3	4

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-3.5704E-03	-1.5124E-03	-6.6866E+04	-1.7667E+04	-304.57	-120.17	-3.1098	-1.3844	0.2160	1.4183E+09	4.5008E+09
x(FT)	34.850	38.130	0.0000	0.0000	30.750	31.980	36.080	38.540	0.0000	27.470	27.470
2	-3.5734E-03	-1.4634E-03	-6.6857E+04	-1.6884E+04	-304.84	-116.50	-3.1114	-1.3396	0.2931	1.4183E+09	4.5215E+09
x(FT)	34.850	38.130	0.0000	0.0000	30.750	31.980	36.080	38.540	0.0000	27.470	27.470
3	-3.6078E-03	-1.4642E-03	-6.7196E+04	-1.6877E+04	-307.35	-116.53	-3.1358	-1.3402	0.5148	1.4176E+09	4.5216E+09
x(FT)	34.850	38.130	0.0000	0.0000	30.750	31.980	36.080	38.540	0.0000	27.470	27.470
4	-3.6047E-03	-1.5132E-03	-6.7205E+04	-1.7659E+04	-307.08	-120.20	-3.1342	-1.3851	0.4377	1.4177E+09	4.5009E+09
x(FT)	34.850	38.130	0.0000	0.0000	30.750	31.980	36.080	38.540	0.0000	27.470	27.470
Min.	-3.6078E-03	-1.5132E-03	-6.7205E+04	-1.7667E+04	-307.35	-120.20	-3.1358	-1.3851	0.2160	1.4176E+09	4.5008E+09
Pile N.	3	4	4	1	3	4	3	4	1	3	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.3789	0.092906	2.7703E+04	1.2144E+04	294.89	92.583	21.594	5.5759	0.2660	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	27.470	27.470	0.0000	0.0000	26.240	26.240	26.240	16.810	7.3800
2	0.3789	0.090288	2.7712E+04	1.1773E+04	294.56	88.929	21.608	5.3913	0.3610	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	27.470	27.470	0.0000	0.0000	26.240	26.240	26.240	16.810	5.7400
3	0.3816	0.090288	2.7882E+04	1.1770E+04	295.15	88.660	21.699	5.3760	0.6341	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	27.470	27.470	0.0000	0.0000	26.240	26.240	26.240	15.990	5.7400
4	0.3816	0.092906	2.7873E+04	1.2141E+04	295.49	92.306	21.685	5.5601	0.5391	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	27.470	27.470	0.0000	0.0000	26.240	26.240	26.240	15.990	7.3800
Max.	0.3816	0.092906	2.7882E+04	1.2144E+04	295.49	92.583	21.699	5.5759	0.6341	8.8843E+09	8.8843E+09
Pile N.	3	1	3	1	4	1	3	1	3	1	1

LOAD CASE : 6
CASE NAME : Strength Minv3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0835614	-0.33005	-0.0768401

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-5.55913E-06	-9.15223E-05	1.02339E-04

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2938.8	-252.25	-70.445	-62.390	1.3041E+04	-5.6297E+04
2	2161.7	-253.03	-72.901	-62.390	1.3528E+04	-5.6319E+04
3	1466.7	-252.75	-73.057	-62.390	1.3532E+04	-5.6115E+04
4	2243.8	-251.97	-70.597	-62.390	1.3045E+04	-5.6094E+04
MINIMUM	1466.7	-253.03	-73.057	-62.390	1.3041E+04	-5.6319E+04
Pile N.	3	2	3	1	1	2
MAXIMUM	2938.8	-251.97	-70.445	-62.390	1.3532E+04	-5.6094E+04
Pile N.	1	4	1	1	3	4

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-0.3223	-0.068352	-2.4107E+04	-9064.1	-249.15	-68.364	-19.414	-4.4459	0.6974	1.4380E+09	4.5528E+09
x(FT)	0.0000	0.0000	27.060	27.470	0.0000	0.0000	26.240	26.240	0.0000	27.060	27.470
2	-0.3223	-0.069953	-2.4098E+04	-9302.1	-249.89	-70.755	-19.406	-4.5703	0.5130	1.4381E+09	4.5518E+09
x(FT)	0.0000	0.0000	27.060	27.470	0.0000	0.0000	26.240	26.240	0.0000	27.060	27.470
3	-0.3207	-0.069953	-2.3997E+04	-9303.2	-249.56	-70.907	-19.352	-4.5813	0.3481	1.4391E+09	4.5518E+09
x(FT)	0.0000	0.0000	27.060	27.470	0.0000	0.0000	26.240	26.240	0.0000	27.060	27.470
4	-0.3207	-0.068352	-2.4007E+04	-9065.2	-248.83	-68.513	-19.361	-4.4566	0.5324	1.4390E+09	4.5528E+09
x(FT)	0.0000	0.0000	27.060	27.470	0.0000	0.0000	26.240	26.240	0.0000	27.060	27.470
Min.	-0.3223	-0.069953	-2.4107E+04	-9303.2	-249.89	-70.907	-19.414	-4.5813	0.3481	1.4380E+09	4.5518E+09
Pile N.	1	2	1	3	2	3	1	3	3	1	2

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	2.9448E-03	1.1026E-03	5.6297E+04	1.3041E+04	258.06	89.903	2.6390	1.0135	0.8590	8.8843E+09	8.8843E+09
x(FT)	35.260	37.720	0.0000	0.0000	30.750	31.980	36.080	38.130	26.240	15.170	2.4600
2	2.9411E-03	1.1329E-03	5.6319E+04	1.3528E+04	257.71	92.246	2.6366	1.0414	0.6319	8.8843E+09	8.8843E+09
x(FT)	35.260	37.720	0.0000	0.0000	30.750	31.980	36.080	38.130	26.240	16.400	2.8700
3	2.9221E-03	1.1324E-03	5.6115E+04	1.3532E+04	256.17	92.225	2.6225	1.0411	0.4287	8.8843E+09	8.8843E+09
x(FT)	35.260	37.720	0.0000	0.0000	30.750	31.980	36.080	38.130	26.240	15.170	3.6900
4	2.9258E-03	1.1022E-03	5.6094E+04	1.3045E+04	256.52	89.882	2.6249	1.0132	0.6559	8.8843E+09	8.8843E+09
x(FT)	35.260	37.720	0.0000	0.0000	30.750	31.980	36.080	38.130	26.240	15.170	2.8700
Max.	2.9448E-03	1.1329E-03	5.6319E+04	1.3532E+04	258.06	92.246	2.6390	1.0414	0.8590	8.8843E+09	8.8843E+09
Pile N.	1	2	2	3	1	2	1	2	1	1	1

LOAD CASE : 7
CASE NAME : Strength MaxT
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0652334	-0.36187	-0.0193442

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
7.10339E-05	-3.40378E-06	5.66659E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1947.6	-275.31	-41.330	797.21	8633.7	-6.1733E+04
2	1517.3	-275.85	-11.738	797.21	2401.0	-6.1757E+04
3	1491.4	-288.72	-11.708	797.21	2396.2	-6.4674E+04
4	1921.7	-288.13	-41.224	797.21	8617.1	-6.4646E+04
MINIMUM	1491.4	-288.72	-41.330	797.21	2396.2	-6.4674E+04
Pile N.	3	3	1	1	3	3
MAXIMUM	1947.6	-275.31	-11.708	797.21	8633.7	-6.1733E+04
Pile N.	1	1	3	1	1	1

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-0.3469	-0.029287	-2.5797E+04	-4370.7	-272.14	-40.223	-20.603	-2.2106	0.4622	1.4259E+09	4.5738E+09
x(FT)	0.0000	0.0000	27.470	27.880	0.0000	0.0000	26.240	26.240	0.0000	27.470	26.240
2	-0.3469	-8.8294E-03	-2.5803E+04	-1284.3	-272.66	-11.417	-20.650	-0.6435	0.3600	1.4259E+09	4.5738E+09
x(FT)	0.0000	0.0000	27.470	27.470	0.0000	0.0000	26.240	26.240	0.0000	27.470	26.240
3	-0.3673	-8.8294E-03	-2.7035E+04	-1280.0	-285.54	-11.383	-21.369	-0.6275	0.3539	1.4209E+09	4.5738E+09

x(FT)	0.0000	0.0000	27.470	27.880	0.0000	0.0000	26.240	26.240	0.0000	27.470	27.060
4	-0.3673	-0.029287	-2.7027E+04	-4355.5	-284.98	-40.105	-21.330	-2.1567	0.4560	1.4209E+09	4.5738E+09
x(FT)	0.0000	0.0000	27.470	27.880	0.0000	0.0000	26.240	26.240	0.0000	27.470	26.240
Min.	-0.3673	-0.029287	-2.7035E+04	-4370.7	-285.54	-40.223	-21.369	-2.2106	0.3539	1.4209E+09	4.5738E+09
Pile N.	3	1	3	1	3	1	3	1	3	3	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	3.2259E-03	5.5484E-04	6.1733E+04	8633.7	280.25	43.756	2.8542	0.5142	0.5693	8.8843E+09	8.8843E+09
x(FT)	34.850	38.540	0.0000	0.0000	30.750	32.390	36.080	41.000	26.240	15.580	0.0000
2	3.2248E-03	1.6146E-04	6.1757E+04	2401.0	280.29	12.836	2.8535	0.1494	0.4435	8.8843E+09	8.8843E+09
x(FT)	34.850	38.540	0.0000	0.0000	30.750	32.390	36.080	38.950	26.240	15.580	0.0000
3	3.4501E-03	1.6216E-04	6.4674E+04	2396.2	296.72	12.796	3.0161	0.1505	0.4359	8.8843E+09	8.8843E+09
x(FT)	34.850	38.540	0.0000	0.0000	30.750	32.390	36.080	41.000	26.240	15.580	0.4100
4	3.4506E-03	5.5762E-04	6.4646E+04	8617.1	296.62	43.612	3.0168	0.5195	0.5617	8.8843E+09	8.8843E+09
x(FT)	34.850	38.950	0.0000	0.0000	30.750	32.390	36.080	41.000	26.240	15.580	0.0000
Max.	3.4506E-03	5.5762E-04	6.4674E+04	8633.7	296.72	43.756	3.0168	0.5195	0.5693	8.8843E+09	8.8843E+09
Pile N.	4	4	3	1	3	1	4	4	1	1	1

LOAD CASE : 8
CASE NAME : Strength MinT
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0904167	0.39538	0.0251012

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-8.88165E-05	4.84195E-06	-4.25422E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2203.6	297.07	52.470	-996.78	-1.0970E+04	6.6887E+04
2	2526.6	296.80	15.641	-996.78	-3203.7	6.6890E+04

3	2563.4	312.91	15.588	-996.78	-3195.7	7.0575E+04
4	2240.4	313.22	52.301	-996.78	-1.0944E+04	7.0575E+04
MINIMUM	2203.6	296.80	15.588	-996.78	-1.0970E+04	6.6887E+04
Pile N.	1	2	3	1	1	1
MAXIMUM	2563.4	313.22	52.470	-996.78	-3195.7	7.0575E+04
Pile N.	3	4	1	1	3	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-3.5901E-03	-7.1587E-04	-6.6887E+04	-1.0970E+04	-306.58	-55.606	-3.1231	-0.6681	0.5229	1.4180E+09	4.5738E+09
x(FT)	34.850	38.950	0.0000	0.0000	30.750	32.390	34.850	41.000	0.0000	27.470	26.240
2	-3.5956E-03	-2.1875E-04	-6.6890E+04	-3203.7	-307.17	-17.186	-3.1291	-0.2037	0.5996	1.4179E+09	4.5738E+09
x(FT)	34.850	38.540	0.0000	0.0000	30.750	32.390	34.850	41.000	0.0000	27.470	26.240
3	-3.8832E-03	-2.2013E-04	-7.0575E+04	-3195.7	-327.23	-17.118	-3.3671	-0.2063	0.6083	1.4125E+09	4.5738E+09
x(FT)	34.440	38.950	0.0000	0.0000	30.750	32.390	34.440	41.000	0.0000	27.470	26.650
4	-3.8772E-03	-7.2096E-04	-7.0575E+04	-1.0944E+04	-326.69	-55.394	-3.3612	-0.6760	0.5316	1.4125E+09	4.5738E+09
x(FT)	34.440	39.360	0.0000	0.0000	30.750	32.390	34.440	41.000	0.0000	27.470	26.240
Min.	-3.8832E-03	-7.2096E-04	-7.0575E+04	-1.0970E+04	-327.23	-55.606	-3.3671	-0.6760	0.5229	1.4125E+09	4.5738E+09
Pile N.	3	4	3	1	3	1	3	4	1	3	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.3790	0.037484	2.7786E+04	5552.5	293.93	51.031	21.786	2.7127	0.6441	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	27.470	27.880	0.0000	0.0000	26.240	26.240	26.240	16.810	0.0000
2	0.3790	0.011905	2.7808E+04	1718.3	293.68	15.202	21.839	0.8309	0.7385	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	27.470	27.880	0.0000	0.0000	26.240	26.240	26.240	16.400	0.0000
3	0.4046	0.011905	2.9368E+04	1711.1	309.78	15.144	22.755	0.8095	0.7493	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	27.470	27.880	0.0000	0.0000	26.240	26.240	26.240	15.990	0.0000
4	0.4046	0.037484	2.9347E+04	5529.5	310.06	50.845	22.709	2.6438	0.6549	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	27.470	27.880	0.0000	0.0000	26.240	26.240	26.240	15.990	0.0000
Max.	0.4046	0.037484	2.9368E+04	5552.5	310.06	51.031	22.755	2.7127	0.7493	8.8843E+09	8.8843E+09
Pile N.	3	1	3	1	4	1	3	1	3	1	1

LOAD CASE : 9
CASE NAME : Strength MaxM2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0584161	0.38384	0.10193

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-9.09114E-06	1.23060E-04	-4.27989E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	910.02	298.17	95.516	-102.03	-1.7667E+04	6.6866E+04
2	1235.0	297.81	91.761	-102.03	-1.6884E+04	6.6857E+04
3	2169.5	298.33	91.488	-102.03	-1.6877E+04	6.7196E+04
4	1844.5	298.70	95.235	-102.03	-1.7659E+04	6.7205E+04
MINIMUM	910.02	297.81	91.488	-102.03	-1.7667E+04	6.6857E+04
Pile N.	1	2	3	1	1	2
MAXIMUM	2169.5	298.70	95.516	-102.03	-1.6877E+04	6.7205E+04
Pile N.	3	4	1	1	3	4

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-3.5704E-03	-1.5124E-03	-6.6866E+04	-1.7667E+04	-304.57	-120.17	-3.1098	-1.3844	0.2160	1.4183E+09	4.5008E+09
x(FT)	34.850	38.130	0.0000	0.0000	30.750	31.980	36.080	38.540	0.0000	27.470	27.470
2	-3.5734E-03	-1.4634E-03	-6.6857E+04	-1.6884E+04	-304.84	-116.50	-3.1114	-1.3396	0.2931	1.4183E+09	4.5215E+09
x(FT)	34.850	38.130	0.0000	0.0000	30.750	31.980	36.080	38.540	0.0000	27.470	27.470
3	-3.6078E-03	-1.4642E-03	-6.7196E+04	-1.6877E+04	-307.35	-116.53	-3.1358	-1.3402	0.5148	1.4176E+09	4.5216E+09
x(FT)	34.850	38.130	0.0000	0.0000	30.750	31.980	36.080	38.540	0.0000	27.470	27.470
4	-3.6047E-03	-1.5132E-03	-6.7205E+04	-1.7659E+04	-307.08	-120.20	-3.1342	-1.3851	0.4377	1.4177E+09	4.5009E+09
x(FT)	34.850	38.130	0.0000	0.0000	30.750	31.980	36.080	38.540	0.0000	27.470	27.470
Min.	-3.6078E-03	-1.5132E-03	-6.7205E+04	-1.7667E+04	-307.35	-120.20	-3.1358	-1.3851	0.2160	1.4176E+09	4.5008E+09
Pile N.	3	4	4	1	3	4	3	4	1	3	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.3789	0.092906	2.7703E+04	1.2144E+04	294.89	92.583	21.594	5.5759	0.2660	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	27.470	27.470	0.0000	0.0000	26.240	26.240	26.240	17.220	6.1500
2	0.3789	0.090288	2.7712E+04	1.1773E+04	294.56	88.929	21.608	5.3913	0.3610	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	27.470	27.470	0.0000	0.0000	26.240	26.240	26.240	15.990	6.1500
3	0.3816	0.090288	2.7882E+04	1.1770E+04	295.15	88.660	21.699	5.3760	0.6341	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	27.470	27.470	0.0000	0.0000	26.240	26.240	26.240	15.990	6.1500
4	0.3816	0.092906	2.7873E+04	1.2141E+04	295.49	92.306	21.685	5.5601	0.5391	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	27.470	27.470	0.0000	0.0000	26.240	26.240	26.240	15.990	6.1500
Max.	0.3816	0.092906	2.7882E+04	1.2144E+04	295.49	92.583	21.699	5.5759	0.6341	8.8843E+09	8.8843E+09
Pile N.	3	1	3	1	4	1	3	1	3	1	1

LOAD CASE : 10
CASE NAME : Strength MinM2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0919622	-0.35895	-0.0762442

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
2.47952E-06	-9.38339E-05	5.48059E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2988.6	-278.63	-69.905	27.828	1.2903E+04	-6.2755E+04
2	2572.4	-279.11	-68.964	27.828	1.2688E+04	-6.2771E+04
3	1859.9	-280.37	-69.094	27.828	1.2688E+04	-6.2899E+04
4	2276.1	-279.89	-70.037	27.828	1.2903E+04	-6.2882E+04
MINIMUM	1859.9	-280.37	-70.037	27.828	1.2688E+04	-6.2899E+04
Pile N.	3	3	4	1	2	3
MAXIMUM	2988.6	-278.63	-68.964	27.828	1.2903E+04	-6.2755E+04
Pile N.	1	1	2	1	1	1

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-0.3540	-0.068719	-2.6211E+04	-9033.6	-275.53	-67.786	-20.727	-4.2409	0.7092	1.4242E+09	4.5529E+09
x(FT)	0.0000	0.0000	27.470	27.470	0.0000	0.0000	26.240	26.240	0.0000	27.470	27.470
2	-0.3540	-0.068005	-2.6208E+04	-8926.6	-275.98	-66.870	-20.734	-4.1883	0.6104	1.4242E+09	4.5533E+09
x(FT)	0.0000	0.0000	27.470	27.470	0.0000	0.0000	26.240	26.240	0.0000	27.470	27.470
3	-0.3547	-0.068005	-2.6244E+04	-8923.9	-277.19	-66.995	-20.764	-4.1855	0.4414	1.4241E+09	4.5533E+09
x(FT)	0.0000	0.0000	27.470	27.470	0.0000	0.0000	26.240	26.240	0.0000	27.470	27.470
4	-0.3547	-0.068719	-2.6247E+04	-9030.8	-276.73	-67.912	-20.758	-4.2381	0.5401	1.4241E+09	4.5529E+09
x(FT)	0.0000	0.0000	27.470	27.470	0.0000	0.0000	26.240	26.240	0.0000	27.470	27.470
Min.	-0.3547	-0.068719	-2.6247E+04	-9033.6	-277.19	-67.912	-20.764	-4.2409	0.4414	1.4241E+09	4.5529E+09
Pile N.	3	1	4	1	3	4	3	1	3	3	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	3.3084E-03	1.1092E-03	6.2755E+04	1.2903E+04	285.89	89.553	2.9131	1.0182	0.8736	8.8843E+09	8.8843E+09
x(FT)	34.850	38.130	0.0000	0.0000	30.750	31.980	36.080	38.130	26.240	15.580	2.4600
2	3.3060E-03	1.0953E-03	6.2771E+04	1.2688E+04	285.73	88.465	2.9118	1.0055	0.7519	8.8843E+09	8.8843E+09
x(FT)	34.850	38.130	0.0000	0.0000	30.750	31.980	36.080	38.130	26.240	15.990	2.8700
3	3.3093E-03	1.0953E-03	6.2899E+04	1.2688E+04	285.98	88.406	2.9151	1.0054	0.5436	8.8843E+09	8.8843E+09
x(FT)	34.850	38.130	0.0000	0.0000	30.750	31.980	36.080	38.130	26.240	16.400	2.0500
4	3.3117E-03	1.1091E-03	6.2882E+04	1.2903E+04	286.13	89.493	2.9164	1.0181	0.6653	8.8843E+09	8.8843E+09
x(FT)	34.850	38.130	0.0000	0.0000	30.750	31.980	36.080	38.130	26.240	15.580	2.4600
Max.	3.3117E-03	1.1092E-03	6.2899E+04	1.2903E+04	286.13	89.553	2.9164	1.0182	0.8736	8.8843E+09	8.8843E+09
Pile N.	4	1	3	1	4	1	4	1	1	1	1

LOAD CASE : 11
CASE NAME : Strength MaxM3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0835614	0.49589	0.0264755

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
1.84130E-06	6.45891E-06	8.17531E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2488.6	393.70	34.352	20.665	-7153.3	9.0302E+04
2	1867.8	394.72	35.149	20.665	-7313.7	9.0342E+04
3	1916.9	394.30	35.148	20.665	-7313.9	9.0262E+04
4	2537.7	393.28	34.351	20.665	-7153.5	9.0222E+04
MINIMUM	1867.8	393.28	34.351	20.665	-7313.9	9.0222E+04
Pile N.	2	4	4	1	3	4
MAXIMUM	2537.7	394.72	35.149	20.665	-7153.3	9.0342E+04
Pile N.	4	2	2	1	1	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-5.1553E-03	-5.0823E-04	-9.0302E+04	-7153.3	-409.40	-36.867	-4.4229	-0.4770	0.5906	1.3989E+09	4.5738E+09
x(FT)	34.030	41.000	0.0000	0.0000	30.750	32.390	34.030	41.000	0.0000	27.470	26.240
2	-5.1475E-03	-5.1928E-04	-9.0342E+04	-7313.7	-408.95	-37.630	-4.4165	-0.4872	0.4432	1.3989E+09	4.5738E+09
x(FT)	34.030	41.000	0.0000	0.0000	30.750	32.390	34.030	41.000	0.0000	27.470	26.650
3	-5.1417E-03	-5.1916E-04	-9.0262E+04	-7313.9	-408.59	-37.634	-4.4116	-0.4871	0.4549	1.3990E+09	4.5738E+09
x(FT)	34.030	41.000	0.0000	0.0000	30.750	32.390	34.030	41.000	0.0000	27.470	26.240
4	-5.1494E-03	-5.0811E-04	-9.0222E+04	-7153.5	-409.04	-36.871	-4.4180	-0.4769	0.6022	1.3990E+09	4.5738E+09
x(FT)	34.030	41.000	0.0000	0.0000	30.750	32.390	34.030	41.000	0.0000	27.470	26.240
Min.	-5.1553E-03	-5.1928E-04	-9.0342E+04	-7313.9	-409.40	-37.634	-4.4229	-0.4872	0.4432	1.3989E+09	4.5738E+09
Pile N.	1	2	2	3	1	3	1	2	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.5032	0.025668	3.5827E+04	3673.8	390.37	33.324	26.978	1.6399	0.7274	8.8843E+09	8.8843E+09
x(FT)	0.4100	0.0000	27.470	27.880	0.0000	0.0000	26.240	26.240	26.240	16.810	0.0000
2	0.5032	0.026198	3.5817E+04	3750.8	391.32	34.098	26.983	1.6751	0.5460	8.8843E+09	8.8843E+09
x(FT)	0.4100	0.0000	27.470	27.880	0.0000	0.0000	26.240	26.240	26.240	17.220	0.0000
3	0.5027	0.026198	3.5786E+04	3751.2	390.91	34.097	26.962	1.6756	0.5603	8.8843E+09	8.8843E+09

x(FT)	0.4100	0.0000	27.470	27.880	0.0000	0.0000	26.240	26.240	26.240	16.810	0.0000
4	0.5027	0.025668	3.5797E+04	3674.1	389.96	33.322	26.957	1.6404	0.7418	8.8843E+09	8.8843E+09
x(FT)	0.4100	0.0000	27.470	27.880	0.0000	0.0000	26.240	26.240	26.240	17.630	0.0000
Max.	0.5032	0.026198	3.5827E+04	3751.2	391.32	34.098	26.983	1.6756	0.7418	8.8843E+09	8.8843E+09
Pile N.	1	2	1	3	2	2	2	3	4	1	1

LOAD CASE : 12
CASE NAME : Strength MinM3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0584161	-0.46872	-0.0206291

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-1.82487E-05	-4.96049E-06	-5.93838E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1333.1	-375.48	-23.515	-204.80	4870.1	-8.5505E+04
2	1784.1	-374.76	-30.965	-204.80	6450.2	-8.5475E+04
3	1746.4	-371.52	-30.988	-204.80	6453.5	-8.4714E+04
4	1295.4	-372.23	-23.532	-204.80	4872.6	-8.4744E+04
MINIMUM	1295.4	-375.48	-30.988	-204.80	4870.1	-8.5505E+04
Pile N.	4	3	3	1	1	1
MAXIMUM	1784.1	-371.52	-23.515	-204.80	6453.5	-8.4714E+04
Pile N.	2	3	1	1	3	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-0.4764	-0.017585	-3.4173E+04	-2521.6	-372.05	-22.820	-25.878	-1.1391	0.3164	1.4018E+09	4.5738E+09
x(FT)	0.4100	0.0000	27.470	27.880	0.0000	0.0000	26.240	26.240	0.0000	27.470	26.650
2	-0.4764	-0.022840	-3.4177E+04	-3295.7	-371.37	-30.055	-25.870	-1.4926	0.4234	1.4018E+09	4.5738E+09

x(FT)	0.4100	0.0000	27.470	27.880	0.0000	0.0000	26.240	26.240	0.0000	27.470	26.240
3	-0.4712	-0.022840	-3.3869E+04	-3298.8	-368.13	-30.080	-25.670	-1.4976	0.4144	1.4026E+09	4.5738E+09
x(FT)	0.4100	0.0000	27.470	27.880	0.0000	0.0000	26.240	26.240	0.0000	27.470	26.240
4	-0.4712	-0.017585	-3.3865E+04	-2524.0	-368.79	-22.839	-25.678	-1.1430	0.3074	1.4026E+09	4.5738E+09
x(FT)	0.4100	0.0000	27.470	27.880	0.0000	0.0000	26.240	26.240	0.0000	27.470	26.240
Min.	-0.4764	-0.022840	-3.4177E+04	-3298.8	-372.05	-30.080	-25.878	-1.4976	0.3074	1.4018E+09	4.5738E+09
Pile N.	1	2	2	3	1	3	1	3	4	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	4.7853E-03	3.4192E-04	8.5505E+04	4870.1	387.43	25.270	4.1155	0.3217	0.3897	8.8843E+09	8.8843E+09
x(FT)	34.440	41.000	0.0000	0.0000	30.750	32.390	34.440	41.000	26.240	17.630	1.2300
2	4.7893E-03	4.4862E-04	8.5475E+04	6450.2	387.66	33.047	4.1188	0.4218	0.5215	8.8843E+09	8.8843E+09
x(FT)	34.440	41.000	0.0000	0.0000	30.750	32.390	34.440	41.000	26.240	16.810	0.0000
3	4.7238E-03	4.4751E-04	8.4714E+04	6453.5	383.66	33.074	4.0644	0.4208	0.5105	8.8843E+09	8.8843E+09
x(FT)	34.440	41.000	0.0000	0.0000	30.750	32.390	34.440	41.000	26.240	17.220	0.0000
4	4.7199E-03	3.4107E-04	8.4744E+04	4872.6	383.43	25.290	4.0612	0.3210	0.3786	8.8843E+09	8.8843E+09
x(FT)	34.440	41.000	0.0000	0.0000	30.750	32.390	34.440	41.000	26.240	17.630	0.0000
Max.	4.7893E-03	4.4862E-04	8.5505E+04	6453.5	387.66	33.074	4.1188	0.4218	0.5215	8.8843E+09	8.8843E+09
Pile N.	2	2	1	3	2	3	2	2	2	1	1

LOAD CASE : 13
CASE NAME : Service MaxP
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0641904	3.01844E-03	-0.0110498

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
7.57308E-06	-2.18798E-05	8.72466E-06

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN

1	1808.2	10.153	-8.6502	84.992	1353.0	2286.1
2	1741.9	10.160	-5.3419	84.992	665.10	2287.0
3	1575.8	6.8440	-5.3457	84.992	665.05	1598.2
4	1642.1	6.8433	-8.6622	84.992	1354.0	1598.2
MINIMUM	1575.8	6.8433	-8.6622	84.992	665.05	1598.2
Pile N.	3	4	4	1	3	3
MAXIMUM	1808.2	10.160	-5.3419	84.992	1354.0	2287.0
Pile N.	1	2	2	1	4	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-1.0328E-04	-0.010302	-2286.1	-1346.8	-9.2567	-8.4333	-0.1016	-0.7997	0.4291	4.5738E+09	4.5738E+09
x(FT)	36.900	0.0000	0.0000	27.060	31.980	0.0000	36.900	26.240	0.0000	26.240	26.240
2	-1.0327E-04	-8.1213E-03	-2287.0	-994.62	-9.2592	-5.1921	-0.1016	-0.5730	0.4134	4.5738E+09	4.5738E+09
x(FT)	36.900	0.0000	0.0000	26.650	31.980	0.0000	36.900	26.240	0.0000	26.240	26.650
3	-6.4391E-05	-8.1213E-03	-1598.2	-994.60	-5.7181	-5.1958	-0.063361	-0.5731	0.3739	4.5738E+09	4.5738E+09
x(FT)	37.310	0.0000	0.0000	26.650	31.980	0.0000	37.310	26.240	0.0000	26.240	26.240
4	-6.4394E-05	-0.010302	-1598.2	-1347.7	-5.7184	-8.4456	-0.063363	-0.8122	0.3897	4.5738E+09	4.5738E+09
x(FT)	37.310	0.0000	0.0000	27.060	31.980	0.0000	37.310	26.240	0.0000	26.650	26.240
Min.	-1.0328E-04	-0.010302	-2287.0	-1347.7	-9.2592	-8.4456	-0.1016	-0.8122	0.3739	4.5738E+09	4.5738E+09
Pile N.	1	1	2	4	2	4	1	4	3	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	4.9972E-03	1.4470E-04	918.88	1353.0	9.9653	13.394	0.6474	0.1424	0.5285	8.8843E+09	8.8843E+09
x(FT)	2.8700	36.080	27.470	0.0000	0.0000	31.160	26.240	36.080	26.240	0.0000	0.0000
2	4.9971E-03	1.0601E-04	919.39	665.10	9.9723	9.8808	0.6574	0.1043	0.5092	8.8843E+09	8.8843E+09
x(FT)	2.8700	35.670	27.470	0.0000	0.0000	31.160	26.240	36.080	26.240	0.0000	0.0000
3	2.8893E-03	1.0600E-04	565.32	665.05	6.7232	9.8799	0.4183	0.1042	0.4606	8.8843E+09	8.8843E+09
x(FT)	4.5100	35.670	27.470	0.0000	0.0000	31.160	26.240	36.080	26.240	0.0000	0.4100
4	2.8893E-03	1.4473E-04	565.33	1354.0	6.7226	13.401	0.4183	0.1424	0.4800	8.8843E+09	8.8843E+09
x(FT)	4.5100	36.080	27.470	0.0000	0.0000	31.160	26.240	36.080	26.240	0.8200	0.4100
Max.	4.9972E-03	1.4473E-04	919.39	1354.0	9.9723	13.401	0.6574	0.1424	0.5285	8.8843E+09	8.8843E+09
Pile N.	1	4	2	4	2	4	2	4	1	1	1

LOAD CASE : 14
CASE NAME : Service MinP

LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0770760	5.93854E-03	0.0167853

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-2.03300E-05	2.38265E-05	6.76466E-06

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1967.0	7.5705	19.169	-228.16	-3507.1	1712.3
2	1915.6	7.6038	10.382	-228.16	-1674.3	1717.1
3	2096.5	16.439	10.331	-228.16	-1667.7	3557.2
4	2147.9	16.386	19.117	-228.16	-3500.6	3549.4
MINIMUM	1915.6	7.5705	10.331	-228.16	-3507.1	1712.3
Pile N.	2	1	3	1	1	1
MAXIMUM	2147.9	16.439	19.169	-228.16	-1667.7	3557.2
Pile N.	4	3	1	1	3	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-7.7031E-05	-2.7264E-04	-1712.3	-3507.1	-6.8647	-24.995	-0.075799	-0.2683	0.4668	4.5738E+09	4.5738E+09
x(FT)	37.310	36.490	0.0000	0.0000	31.980	31.570	37.310	36.490	0.0000	26.240	26.240
2	-7.6959E-05	-1.6890E-04	-1717.1	-1674.3	-6.8931	-15.612	-0.075728	-0.1662	0.4546	4.5738E+09	4.5738E+09
x(FT)	36.900	36.080	0.0000	0.0000	31.980	31.160	36.900	36.080	0.0000	26.240	26.650
3	-1.8174E-04	-1.6852E-04	-3557.2	-1667.7	-16.353	-15.546	-0.1788	-0.1658	0.4975	4.5738E+09	4.5738E+09
x(FT)	36.900	36.080	0.0000	0.0000	31.980	31.570	36.900	36.080	0.0000	26.240	26.650
4	-1.8161E-04	-2.7231E-04	-3549.4	-3500.6	-16.293	-24.928	-0.1787	-0.2680	0.5097	4.5738E+09	4.5738E+09
x(FT)	36.900	36.490	0.0000	0.0000	31.980	31.570	36.900	36.490	0.0000	26.240	27.060
Min.	-1.8174E-04	-2.7264E-04	-3557.2	-3507.1	-16.353	-24.995	-0.1788	-0.2683	0.4546	4.5738E+09	4.5738E+09
Pile N.	3	1	3	1	3	1	3	1	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	3.7046E-03	0.017711	679.55	2499.8	7.4277	18.726	0.4636	1.5082	0.5749	8.8843E+09	8.8843E+09
x(FT)	3.2800	0.0000	27.470	27.060	0.0000	0.0000	26.240	26.240	26.240	0.0000	0.4100
2	3.7042E-03	0.011856	683.97	1569.5	7.4636	10.127	0.4816	0.9368	0.5599	8.8843E+09	8.8843E+09
x(FT)	3.2800	0.0000	27.470	27.060	0.0000	0.0000	26.240	26.240	26.240	0.0000	0.0000
3	9.4920E-03	0.011856	1626.9	1562.4	16.116	10.072	1.0787	0.9088	0.6128	8.8843E+09	8.8843E+09
x(FT)	1.6400	0.0000	27.470	27.060	0.0000	0.0000	26.240	26.240	26.240	0.0000	0.0000
4	9.4922E-03	0.017711	1618.6	2492.2	16.058	18.671	1.0611	1.4952	0.6278	8.8843E+09	8.8843E+09
x(FT)	1.6400	0.0000	27.470	27.060	0.0000	0.0000	26.240	26.240	26.240	0.0000	1.6400
Max.	9.4922E-03	0.017711	1626.9	2499.8	16.116	18.726	1.0787	1.5082	0.6278	8.8843E+09	8.8843E+09
Pile N.	4	1	3	1	3	1	3	1	4	1	1

LOAD CASE : 15
CASE NAME : Service MaxV2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0690166	0.0228381	0.0214469

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-1.34450E-05	3.13332E-05	5.65092E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1914.8	56.359	21.152	-150.89	-3778.9	1.2894E+04
2	1485.7	56.412	15.376	-150.89	-2569.7	1.2899E+04
3	1723.7	62.142	15.351	-150.89	-2567.5	1.4098E+04
4	2152.8	62.086	21.121	-150.89	-3776.2	1.4093E+04
MINIMUM	1485.7	56.359	15.351	-150.89	-3778.9	1.2894E+04
Pile N.	2	1	3	1	1	1
MAXIMUM	2152.8	62.142	21.152	-150.89	-2567.5	1.4098E+04
Pile N.	4	3	1	1	3	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-5.6794E-04	-3.1034E-04	-1.2894E+04	-3778.9	-49.666	-28.267	-0.5588	-0.3054	0.4544	4.5738E+09	4.5738E+09
x(FT)	37.720	36.490	0.0000	0.0000	31.980	31.570	37.720	36.490	0.0000	26.650	26.650
2	-5.6778E-04	-2.4190E-04	-1.2899E+04	-2569.7	-49.687	-22.129	-0.5587	-0.2380	0.3526	4.5738E+09	4.5738E+09
x(FT)	37.720	36.490	0.0000	0.0000	31.980	31.570	37.720	36.490	0.0000	26.240	26.650
3	-6.3633E-04	-2.4167E-04	-1.4098E+04	-2567.5	-55.756	-22.091	-0.6261	-0.2378	0.4090	4.5738E+09	4.5738E+09
x(FT)	37.720	36.490	0.0000	0.0000	31.980	31.570	37.720	36.490	0.0000	26.240	26.240
4	-6.3646E-04	-3.1005E-04	-1.4093E+04	-3776.2	-55.736	-28.220	-0.6263	-0.3051	0.5109	4.5738E+09	4.5738E+09
x(FT)	37.720	36.490	0.0000	0.0000	31.980	31.570	37.720	36.490	0.0000	26.650	26.240
Min.	-6.3646E-04	-3.1034E-04	-1.4098E+04	-3778.9	-55.756	-28.267	-0.6263	-0.3054	0.3526	4.5738E+09	4.5738E+09
Pile N.	4	1	3	1	3	1	4	1	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.026816	0.020751	4911.2	2838.3	55.253	20.626	3.3348	1.6701	0.5597	8.8843E+09	8.8843E+09
x(FT)	3.6900	0.0000	27.470	27.060	0.0000	0.0000	26.240	26.240	26.240	3.2800	0.4100
2	0.026815	0.016879	4913.6	2226.9	55.305	14.976	3.3376	1.2818	0.4343	8.8843E+09	8.8843E+09
x(FT)	3.6900	0.0000	27.470	27.060	0.0000	0.0000	26.240	26.240	26.240	2.8700	0.8200
3	0.030583	0.016879	5521.1	2224.4	60.906	14.950	3.7209	1.2794	0.5038	8.8843E+09	8.8843E+09
x(FT)	3.2800	0.0000	27.470	27.060	0.0000	0.0000	26.240	26.240	26.240	4.5100	1.6400
4	0.030583	0.020751	5519.0	2835.3	60.851	20.593	3.7186	1.6674	0.6292	8.8843E+09	8.8843E+09
x(FT)	3.2800	0.0000	27.470	27.060	0.0000	0.0000	26.240	26.240	26.240	4.1000	0.0000
Max.	0.030583	0.020751	5521.1	2838.3	60.906	20.626	3.7209	1.6701	0.6292	8.8843E+09	8.8843E+09
Pile N.	3	1	3	1	3	1	3	1	4	1	1

LOAD CASE : 16
CASE NAME : Service MinV2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0691588	-0.0138214	-0.0181555

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-1.46024E-06	-3.33174E-05	-3.98442E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1798.2	-38.816	-12.184	-16.388	1864.7	-8892.6
2	2100.8	-38.796	-12.802	-16.388	1996.3	-8891.0
3	1847.8	-38.184	-12.816	-16.388	1996.7	-8761.1
4	1545.2	-38.204	-12.198	-16.388	1865.0	-8762.7
MINIMUM	1545.2	-38.816	-12.816	-16.388	1864.7	-8892.6
Pile N.	4	1	3	1	1	1
MAXIMUM	2100.8	-38.184	-12.184	-16.388	1996.7	-8761.1
Pile N.	2	3	1	1	3	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-0.018223	-0.015147	-3373.4	-1934.4	-38.072	-11.856	-2.3003	-1.0898	0.4267	4.5738E+09	4.5738E+09
x(FT)	3.6900	0.0000	27.470	27.060	0.0000	0.0000	26.240	26.240	0.0000	26.240	26.240
2	-0.018223	-0.015567	-3373.3	-2001.2	-38.053	-12.461	-2.2997	-1.1320	0.4985	4.5738E+09	4.5738E+09
x(FT)	3.6900	0.0000	27.470	27.060	0.0000	0.0000	26.240	26.240	0.0000	26.240	26.240
3	-0.017816	-0.015567	-3306.7	-2001.6	-37.454	-12.474	-2.2582	-1.1327	0.4385	4.5738E+09	4.5738E+09
x(FT)	3.6900	0.0000	27.470	27.060	0.0000	0.0000	26.240	26.240	0.0000	26.650	26.240
4	-0.017816	-0.015147	-3306.9	-1934.8	-37.473	-11.869	-2.2588	-1.0904	0.3667	4.5738E+09	4.5738E+09
x(FT)	3.6900	0.0000	27.470	27.060	0.0000	0.0000	26.240	26.240	0.0000	26.240	26.650
Min.	-0.018223	-0.015567	-3373.4	-2001.6	-38.072	-12.474	-2.3003	-1.1327	0.3667	4.5738E+09	4.5738E+09
Pile N.	1	2	1	3	1	3	1	3	4	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	3.8785E-04	2.0860E-04	8892.6	1864.7	34.167	19.218	0.3816	0.2053	0.5256	8.8843E+09	8.8843E+09
x(FT)	37.310	36.080	0.0000	0.0000	31.980	31.570	37.310	36.080	26.240	0.0000	0.0000
2	3.8791E-04	2.1601E-04	8891.0	1996.3	34.171	19.893	0.3817	0.2125	0.6140	8.8843E+09	8.8843E+09
x(FT)	37.310	36.080	0.0000	0.0000	31.980	31.570	37.310	36.080	26.240	1.2300	0.0000
3	3.8037E-04	2.1603E-04	8761.1	1996.7	33.499	19.896	0.3743	0.2126	0.5401	8.8843E+09	8.8843E+09
x(FT)	37.310	36.080	0.0000	0.0000	31.980	31.570	37.310	36.080	26.240	1.2300	0.0000

4	3.8031E-04	2.0862E-04	8762.7	1865.0	33.495	19.221	0.3742	0.2053	0.4517	8.8843E+09	8.8843E+09
x(FT)	37.310	36.080	0.0000	0.0000	31.980	31.570	37.310	36.080	26.240	0.0000	0.0000
Max.	3.8791E-04	2.1603E-04	8892.6	1996.7	34.171	19.896	0.3817	0.2126	0.6140	8.8843E+09	8.8843E+09
Pile N.	2	3	1	3	2	3	2	3	2	1	1

LOAD CASE : 17
CASE NAME : Service MaxV3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0708655	4.77362E-03	0.0481018

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-2.29391E-05	7.36379E-05	1.20378E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1634.1	7.5451	44.455	-257.45	-7776.7	1816.2
2	1542.7	7.5572	34.634	-257.45	-5723.2	1818.0
3	2101.9	17.463	34.548	-257.45	-5719.5	3884.5
4	2193.3	17.435	44.364	-257.45	-7773.6	3880.3
MINIMUM	1542.7	7.5451	34.548	-257.45	-7776.7	1816.2
Pile N.	2	1	3	1	1	1
MAXIMUM	2193.3	17.463	44.455	-257.45	-5719.5	3884.5
Pile N.	4	3	1	1	3	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-6.8338E-05	-6.6721E-04	-1816.2	-7776.7	-5.8572	-60.897	-0.067244	-0.6565	0.3878	4.5738E+09	4.5702E+09

x(FT)	38.130	36.490	0.0000	0.0000	32.390	31.570	38.130	36.490	0.0000	26.240	27.060
2	-6.8232E-05	-5.5152E-04	-1818.0	-5723.2	-5.8761	-50.595	-0.067140	-0.5427	0.3661	4.5738E+09	4.5738E+09
x(FT)	38.130	36.490	0.0000	0.0000	32.390	31.570	38.130	36.490	0.0000	27.060	26.650
3	-1.8552E-04	-5.5130E-04	-3884.5	-5719.5	-16.433	-50.552	-0.1825	-0.5425	0.4988	4.5738E+09	4.5738E+09
x(FT)	37.310	36.490	0.0000	0.0000	31.980	31.570	37.310	36.490	0.0000	27.880	26.240
4	-1.8542E-04	-6.6707E-04	-3880.3	-7773.6	-16.376	-60.867	-0.1825	-0.6564	0.5205	4.5738E+09	4.5702E+09
x(FT)	37.310	36.490	0.0000	0.0000	31.980	31.570	37.310	36.490	0.0000	26.240	27.060
Min.	-1.8552E-04	-6.6721E-04	-3884.5	-7776.7	-16.433	-60.897	-0.1825	-0.6565	0.3661	4.5738E+09	4.5702E+09
Pile N.	3	1	3	1	3	1	3	1	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	2.8709E-03	0.045219	576.00	6113.9	7.4069	43.336	0.4102	3.5672	0.4776	8.8843E+09	8.8843E+09
x(FT)	5.7400	0.0000	27.880	27.060	0.0000	0.0000	26.240	26.240	26.240	0.0000	1.2300
2	2.8704E-03	0.038613	577.97	5083.4	7.4202	33.738	0.4118	2.9155	0.4509	8.8843E+09	8.8843E+09
x(FT)	5.7400	0.0000	27.880	27.060	0.0000	0.0000	26.240	26.240	26.240	0.0000	2.0500
3	9.2609E-03	0.038613	1627.8	5079.5	17.113	33.652	1.0780	2.9113	0.6144	8.8843E+09	8.8843E+09
x(FT)	2.4600	0.0000	27.470	27.060	0.0000	0.0000	26.240	26.240	26.240	0.8200	0.0000
4	9.2611E-03	0.045219	1623.1	6111.3	17.082	43.246	1.0742	3.5643	0.6411	8.8843E+09	8.8843E+09
x(FT)	2.4600	0.0000	27.470	27.060	0.0000	0.0000	26.240	26.240	26.240	0.0000	0.0000
Max.	9.2611E-03	0.045219	1627.8	6113.9	17.113	43.336	1.0780	3.5672	0.6411	8.8843E+09	8.8843E+09
Pile N.	4	1	3	1	3	1	3	1	4	1	1

LOAD CASE : 18
CASE NAME : Service MinV3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0708086	7.39203E-03	-0.0371851

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
1.31205E-05	-6.33920E-05	1.09885E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2148.9	18.819	-30.534	147.25	5088.3	4145.6
2	2065.5	18.845	-24.907	147.25	3911.3	4149.3
3	1584.1	13.175	-24.959	147.25	3912.7	2966.0
4	1667.5	13.160	-30.600	147.25	5091.3	2963.8
MINIMUM	1584.1	13.160	-30.600	147.25	3911.3	2963.8
Pile N.	3	4	4	1	2	4
MAXIMUM	2148.9	18.845	-24.907	147.25	5091.3	4149.3
Pile N.	1	2	2	1	4	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-2.0339E-04	-0.033749	-4145.6	-4459.9	-18.088	-29.750	-0.2001	-2.5638	0.5099	4.5738E+09	4.5738E+09
x(FT)	37.310	0.0000	0.0000	27.060	31.980	0.0000	37.310	26.240	0.0000	26.240	26.240
2	-2.0340E-04	-0.029971	-4149.3	-3867.0	-18.128	-24.248	-0.2001	-2.1902	0.4901	4.5738E+09	4.5738E+09
x(FT)	37.310	0.0000	0.0000	27.060	31.980	0.0000	37.310	26.240	0.0000	26.240	26.240
3	-1.3605E-04	-0.029971	-2966.0	-3868.5	-12.059	-24.299	-0.1339	-2.1938	0.3759	4.5738E+09	4.5738E+09
x(FT)	37.310	0.0000	0.0000	27.060	31.980	0.0000	37.310	26.240	0.0000	26.240	27.060
4	-1.3605E-04	-0.033749	-2963.8	-4463.2	-12.038	-29.816	-0.1339	-2.5679	0.3957	4.5738E+09	4.5738E+09
x(FT)	37.310	0.0000	0.0000	27.060	31.980	0.0000	37.310	26.240	0.0000	27.060	26.240
Min.	-2.0340E-04	-0.033749	-4149.3	-4463.2	-18.128	-29.816	-0.2001	-2.5679	0.3759	4.5738E+09	4.5738E+09
Pile N.	2	1	2	4	2	4	2	4	3	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.010338	4.8415E-04	1793.1	5088.3	18.440	44.418	1.1793	0.4764	0.6281	8.8843E+09	8.8843E+09
x(FT)	2.0500	36.490	27.470	0.0000	0.0000	31.570	26.240	36.490	26.240	0.4100	0.0000
2	0.010338	4.1758E-04	1797.2	3911.3	18.468	38.461	1.1838	0.4109	0.6037	8.8843E+09	8.8843E+09
x(FT)	2.0500	36.080	27.470	0.0000	0.0000	31.570	26.240	36.080	26.240	0.0000	0.4100
3	6.6159E-03	4.1762E-04	1193.1	3912.7	12.919	38.468	0.8013	0.4109	0.4630	8.8843E+09	8.8843E+09
x(FT)	2.8700	36.080	27.470	0.0000	0.0000	31.570	26.240	36.080	26.240	0.0000	0.0000
4	6.6160E-03	4.8430E-04	1190.8	5091.3	12.902	44.449	0.7983	0.4765	0.4874	8.8843E+09	8.8843E+09
x(FT)	2.8700	36.490	27.470	0.0000	0.0000	31.570	26.240	36.490	26.240	0.0000	0.0000
Max.	0.010338	4.8430E-04	1797.2	5091.3	18.468	44.449	1.1838	0.4765	0.6281	8.8843E+09	8.8843E+09
Pile N.	1	4	2	4	2	4	2	4	1	1	1

LOAD CASE : 19
CASE NAME : Service MaxT
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0705810	4.72284E-03	-0.0152343

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
4.41570E-05	-2.86197E-05	9.23166E-06

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2004.2	20.803	-19.792	495.57	3544.6	4519.9
2	1934.1	20.902	-0.6533	495.57	-443.51	4534.4
3	1716.8	1.6493	-0.6737	495.57	-441.29	529.97
4	1786.9	1.6461	-19.881	495.57	3556.3	529.46
MINIMUM	1716.8	1.6461	-19.881	495.57	-443.51	529.46
Pile N.	3	4	4	1	2	4
MAXIMUM	2004.2	20.902	-0.6533	495.57	3556.3	4534.4
Pile N.	1	2	2	1	4	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-2.2949E-04	-0.019189	-4519.9	-2653.3	-20.549	-19.317	-0.2258	-1.5731	0.4756	4.5738E+09	4.5738E+09
x(FT)	36.900	0.0000	0.0000	27.060	31.980	0.0000	36.900	26.240	0.0000	26.240	28.290
2	-2.2978E-04	-6.4717E-03	-4534.4	-639.15	-20.667	-0.5834	-0.2261	-0.2805	0.4590	4.5738E+09	4.5738E+09
x(FT)	36.900	0.0000	0.0000	26.240	31.980	12.300	36.900	26.240	0.0000	26.240	26.240
3	-8.6030E-04	-6.4717E-03	-529.97	-642.38	-0.2680	-0.6050	-7.1140E-03	-0.2944	0.4074	4.5738E+09	4.5738E+09
x(FT)	0.0000	0.0000	0.0000	26.240	35.670	25.830	41.000	26.240	0.0000	26.650	26.240
4	-8.6030E-04	-0.019189	-529.46	-2667.2	-0.2711	-19.412	-7.2367E-03	-1.5945	0.4240	4.5738E+09	4.5738E+09
x(FT)	0.0000	0.0000	0.0000	27.060	35.670	0.0000	41.000	26.240	0.0000	26.650	26.650

Min.	-8.6030E-04	-0.019189	-4534.4	-2667.2	-20.667	-19.412	-0.2261	-1.5945	0.4074	4.5738E+09	4.5738E+09
Pile N.	3	1	2	4	2	4	2	4	3	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.011943	2.8953E-04	2040.2	3544.6	20.384	26.510	1.3362	0.2849	0.5858	8.8843E+09	8.8843E+09
x(FT)	1.6400	36.490	27.470	0.0000	0.0000	31.570	26.240	36.490	26.240	0.0000	0.0000
2	0.011942	6.6429E-05	2055.8	6.4019E-13	20.491	6.2691	1.3669	0.064968	0.5653	8.8843E+09	8.8843E+09
x(FT)	1.6400	34.850	27.470	41.000	0.0000	30.340	26.240	34.850	26.240	0.0000	0.0000
3	5.9151E-05	6.6798E-05	21.128	-6.4019E-13	1.6340	6.3074	0.039592	0.065329	0.5018	8.8843E+09	8.8843E+09
x(FT)	20.910	34.850	31.160	41.000	0.0000	30.340	26.240	34.850	26.240	0.8200	0.0000
4	5.9816E-05	2.9019E-04	21.285	3556.3	1.6306	26.642	0.037431	0.2856	0.5223	8.8843E+09	8.8843E+09
x(FT)	20.910	36.490	31.160	0.0000	0.0000	31.570	26.240	36.490	26.240	0.0000	0.8200
Max.	0.011943	2.9019E-04	2055.8	3556.3	20.491	26.642	1.3669	0.2856	0.5858	8.8843E+09	8.8843E+09
Pile N.	1	4	2	4	2	4	2	4	1	1	1

LOAD CASE : 20
CASE NAME : Service MinT
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0706853	5.03408E-03	0.0210344

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-5.72245E-05	3.07707E-05	6.56272E-06

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1771.3	-1.9093	30.403	-642.23	-5709.2	-264.86
2	1721.5	-1.9356	5.6696	-642.23	-552.50	-268.67
3	1955.2	22.982	5.6056	-642.23	-544.27	4916.1
4	2005.0	22.862	30.322	-642.23	-5699.2	4898.0
MINIMUM	1721.5	-1.9356	5.6056	-642.23	-5709.2	-268.67
Pile N.	2	2	3	1	1	2

MAXIMUM	2005.0	22.982	30.403	-642.23	-544.27	4916.1
Pile N.	4	3	1	1	3	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-2.6550E-03	-4.1898E-04	-329.37	-5709.2	-1.8555	-38.206	-0.1818	-0.4123	0.4203	4.5738E+09	4.5738E+09
x(FT)	0.0000	36.490	27.060	0.0000	0.0000	31.570	26.240	36.490	0.0000	26.650	26.650
2	-2.6550E-03	-1.2787E-04	-333.73	-552.50	-1.8839	-11.939	-0.1959	-0.1254	0.4085	4.5738E+09	4.5738E+09
x(FT)	0.0000	35.670	27.060	0.0000	0.0000	31.160	26.240	36.080	0.0000	26.650	27.060
3	-2.5982E-04	-1.2706E-04	-4916.1	-544.27	-23.377	-11.848	-0.2557	-0.1249	0.4640	4.5738E+09	4.5738E+09
x(FT)	36.900	35.670	0.0000	0.0000	31.980	31.160	36.900	36.080	0.0000	27.880	26.650
4	-2.5923E-04	-4.1822E-04	-4898.0	-5699.2	-23.200	-38.070	-0.2551	-0.4115	0.4758	4.5738E+09	4.5738E+09
x(FT)	36.900	36.490	0.0000	0.0000	31.980	31.570	36.900	36.490	0.0000	26.240	26.240
Min.	-2.6550E-03	-4.1898E-04	-4916.1	-5709.2	-23.377	-38.206	-0.2557	-0.4123	0.4085	4.5738E+09	4.5738E+09
Pile N.	1	1	3	1	3	1	3	1	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	3.5383E-05	0.026690	264.86	3816.1	3.2694	29.697	0.034817	2.3025	0.5178	8.8843E+09	8.8843E+09
x(FT)	36.080	0.0000	0.0000	27.060	31.160	0.0000	36.080	26.240	26.240	0.8200	1.6400
2	3.5675E-05	0.010209	268.67	1205.3	3.3172	5.4960	0.035105	0.6730	0.5032	8.8843E+09	8.8843E+09
x(FT)	36.080	0.0000	0.0000	26.650	31.160	0.0000	36.080	26.240	26.240	0.0000	0.4100
3	0.013864	0.010209	2326.2	1194.8	22.519	5.4276	1.5185	0.6341	0.5715	8.8843E+09	8.8843E+09
x(FT)	0.8200	0.0000	27.470	26.650	0.0000	0.0000	26.240	26.240	26.240	0.0000	0.0000
4	0.013864	0.026690	2305.9	3804.5	22.388	29.611	1.4881	2.2899	0.5860	8.8843E+09	8.8843E+09
x(FT)	0.8200	0.0000	27.470	27.060	0.0000	0.0000	26.240	26.240	26.240	0.0000	0.8200
Max.	0.013864	0.026690	2326.2	3816.1	22.519	29.697	1.5185	2.3025	0.5860	8.8843E+09	8.8843E+09
Pile N.	3	1	3	1	3	1	3	1	4	1	1

LOAD CASE : 21
CASE NAME : Service MaxM2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0708655	4.77362E-03	0.0481018

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-2.29391E-05	7.36379E-05	1.20378E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1634.1	7.5451	44.455	-257.45	-7776.7	1816.2
2	1542.7	7.5572	34.634	-257.45	-5723.2	1818.0
3	2101.9	17.463	34.548	-257.45	-5719.5	3884.5
4	2193.3	17.435	44.364	-257.45	-7773.6	3880.3
MINIMUM	1542.7	7.5451	34.548	-257.45	-7776.7	1816.2
Pile N.	2	1	3	1	1	1
MAXIMUM	2193.3	17.463	44.455	-257.45	-5719.5	3884.5
Pile N.	4	3	1	1	3	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-6.8338E-05	-6.6721E-04	-1816.2	-7776.7	-5.8572	-60.897	-0.067244	-0.6565	0.3878	4.5738E+09	4.5702E+09
x(FT)	38.130	36.490	0.0000	0.0000	32.390	31.570	38.130	36.490	0.0000	26.650	27.060
2	-6.8232E-05	-5.5152E-04	-1818.0	-5723.2	-5.8761	-50.595	-0.067140	-0.5427	0.3661	4.5738E+09	4.5738E+09
x(FT)	38.130	36.490	0.0000	0.0000	32.390	31.570	38.130	36.490	0.0000	26.240	26.240
3	-1.8552E-04	-5.5130E-04	-3884.5	-5719.5	-16.433	-50.552	-0.1825	-0.5425	0.4988	4.5738E+09	4.5738E+09
x(FT)	37.310	36.490	0.0000	0.0000	31.980	31.570	37.310	36.490	0.0000	26.650	26.240
4	-1.8542E-04	-6.6707E-04	-3880.3	-7773.6	-16.376	-60.867	-0.1825	-0.6564	0.5205	4.5738E+09	4.5702E+09
x(FT)	37.310	36.490	0.0000	0.0000	31.980	31.570	37.310	36.490	0.0000	26.650	27.060
Min.	-1.8552E-04	-6.6721E-04	-3884.5	-7776.7	-16.433	-60.897	-0.1825	-0.6565	0.3661	4.5738E+09	4.5702E+09
Pile N.	3	1	3	1	3	1	3	1	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	2.8709E-03	0.045219	576.00	6113.9	7.4069	43.336	0.4102	3.5672	0.4776	8.8843E+09	8.8843E+09

x(FT)	5.7400	0.0000	27.880	27.060	0.0000	0.0000	26.240	26.240	26.240	0.0000	0.0000
2	2.8704E-03	0.038613	577.97	5083.4	7.4202	33.738	0.4118	2.9155	0.4509	8.8843E+09	8.8843E+09
x(FT)	5.7400	0.0000	27.880	27.060	0.0000	0.0000	26.240	26.240	26.240	0.8200	0.4100
3	9.2609E-03	0.038613	1627.8	5079.5	17.113	33.652	1.0780	2.9113	0.6144	8.8843E+09	8.8843E+09
x(FT)	2.4600	0.0000	27.470	27.060	0.0000	0.0000	26.240	26.240	26.240	0.8200	0.0000
4	9.2611E-03	0.045219	1623.1	6111.3	17.082	43.246	1.0742	3.5643	0.6411	8.8843E+09	8.8843E+09
x(FT)	2.4600	0.0000	27.470	27.060	0.0000	0.0000	26.240	26.240	26.240	0.0000	0.0000
Max.	9.2611E-03	0.045219	1627.8	6113.9	17.113	43.336	1.0780	3.5672	0.6411	8.8843E+09	8.8843E+09
Pile N.	4	1	3	1	3	1	3	1	4	1	1

LOAD CASE : 22
CASE NAME : Service MinM2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0708086	7.39216E-03	-0.0371851

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
1.31205E-05	-6.33920E-05	1.09880E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2148.9	18.819	-30.534	147.25	5088.3	4145.6
2	2065.5	18.845	-24.907	147.25	3911.3	4149.3
3	1584.1	13.175	-24.959	147.25	3912.7	2965.9
4	1667.5	13.160	-30.600	147.25	5091.3	2963.8
MINIMUM	1584.1	13.160	-30.600	147.25	3911.3	2963.8
Pile N.	3	4	4	1	2	4
MAXIMUM	2148.9	18.845	-24.907	147.25	5091.3	4149.3
Pile N.	1	2	2	1	4	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL.	DISPL.	MOMENT	MOMENT	SHEAR	SHEAR	SOIL REACT	SOIL REACT	TOTAL	FLEX. RIG.	FLEX. RIG.

	y-DIR IN	z-DIR IN	z-DIR KIP-IN	y-DIR KIP-IN	y-DIR KIP	z-DIR KIP	y-DIR KIP/IN	z-DIR KIP/IN	STRESS KIP/IN**2	z-DIR KIP-IN**2	y-DIR KIP-IN**2
1	-2.0339E-04	-0.033749	-4145.6	-4459.9	-18.088	-29.750	-0.2001	-2.5638	0.5099	4.5738E+09	4.5738E+09
x(FT)	37.310	0.0000	0.0000	27.060	31.980	0.0000	37.310	26.240	0.0000	26.650	26.650
2	-2.0340E-04	-0.029971	-4149.3	-3867.0	-18.128	-24.248	-0.2001	-2.1902	0.4901	4.5738E+09	4.5738E+09
x(FT)	37.310	0.0000	0.0000	27.060	31.980	0.0000	37.310	26.240	0.0000	26.240	26.240
3	-1.3605E-04	-0.029971	-2965.9	-3868.5	-12.059	-24.299	-0.1339	-2.1938	0.3759	4.5738E+09	4.5738E+09
x(FT)	37.310	0.0000	0.0000	27.060	31.980	0.0000	37.310	26.240	0.0000	26.240	26.650
4	-1.3605E-04	-0.033749	-2963.8	-4463.2	-12.038	-29.816	-0.1339	-2.5679	0.3957	4.5738E+09	4.5738E+09
x(FT)	37.310	0.0000	0.0000	27.060	31.980	0.0000	37.310	26.240	0.0000	26.650	26.650
Min.	-2.0340E-04	-0.033749	-4149.3	-4463.2	-18.128	-29.816	-0.2001	-2.5679	0.3759	4.5738E+09	4.5738E+09
Pile N.	2	1	2	4	2	4	2	4	3	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.010339	4.8415E-04	1793.1	5088.3	18.440	44.418	1.1793	0.4764	0.6281	8.8843E+09	8.8843E+09
x(FT)	2.0500	36.490	27.470	0.0000	0.0000	31.570	26.240	36.490	26.240	0.0000	0.8200
2	0.010338	4.1758E-04	1797.2	3911.3	18.468	38.461	1.1838	0.4109	0.6037	8.8843E+09	8.8843E+09
x(FT)	2.0500	36.080	27.470	0.0000	0.0000	31.570	26.240	36.080	26.240	0.0000	0.4100
3	6.6159E-03	4.1762E-04	1193.1	3912.7	12.919	38.468	0.8013	0.4109	0.4630	8.8843E+09	8.8843E+09
x(FT)	2.8700	36.080	27.470	0.0000	0.0000	31.570	26.240	36.080	26.240	0.0000	1.2300
4	6.6161E-03	4.8430E-04	1190.8	5091.3	12.902	44.449	0.7983	0.4765	0.4874	8.8843E+09	8.8843E+09
x(FT)	2.8700	36.490	27.470	0.0000	0.0000	31.570	26.240	36.490	26.240	1.6400	0.8200
Max.	0.010339	4.8430E-04	1797.2	5091.3	18.468	44.449	1.1838	0.4765	0.6281	8.8843E+09	8.8843E+09
Pile N.	1	4	2	4	2	4	2	4	1	1	1

LOAD CASE : 23
CASE NAME : Service MaxM3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0686183	7.72210E-03	0.0207005

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-1.10370E-05	3.00528E-05	7.74750E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1988.8	43.612	20.133	-123.87	-3590.3	1.0656E+04
2	1400.5	43.661	15.398	-123.87	-2596.8	1.0662E+04
3	1628.7	48.389	15.369	-123.87	-2594.0	1.1650E+04
4	2217.0	48.338	20.100	-123.87	-3587.1	1.1644E+04
MINIMUM	1400.5	43.612	15.369	-123.87	-3590.3	1.0656E+04
Pile N.	2	1	3	1	1	1
MAXIMUM	2217.0	48.389	20.133	-123.87	-2594.0	1.1650E+04
Pile N.	4	3	1	1	3	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-3.8090E-04	-2.9619E-04	-1.0656E+04	-3590.3	-32.529	-27.049	-0.3748	-0.2914	0.4719	4.5738E+09	4.5738E+09
x(FT)	38.130	36.490	0.0000	0.0000	32.390	31.570	38.130	36.490	0.0000	26.240	26.240
2	-3.8058E-04	-2.3984E-04	-1.0662E+04	-2596.8	-32.544	-21.987	-0.3745	-0.2360	0.3323	4.5738E+09	4.5738E+09
x(FT)	38.130	36.490	0.0000	0.0000	32.390	31.570	38.130	36.490	0.0000	26.650	26.240
3	-4.3657E-04	-2.3960E-04	-1.1650E+04	-2594.0	-37.535	-21.945	-0.4296	-0.2358	0.3865	4.5738E+09	4.5738E+09
x(FT)	38.130	36.490	0.0000	0.0000	32.390	31.570	38.130	36.490	0.0000	26.650	26.240
4	-4.3686E-04	-2.9592E-04	-1.1644E+04	-3587.1	-37.523	-27.002	-0.4299	-0.2912	0.5261	4.5738E+09	4.5738E+09
x(FT)	38.130	36.490	0.0000	0.0000	32.390	31.570	38.130	36.490	0.0000	27.060	26.240
Min.	-4.3686E-04	-2.9619E-04	-1.1650E+04	-3590.3	-37.535	-27.049	-0.4299	-0.2914	0.3323	4.5738E+09	4.5738E+09
Pile N.	4	1	3	1	3	1	4	1	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.015413	0.019765	3191.5	2711.2	42.839	19.639	2.3197	1.5982	0.5813	8.8843E+09	8.8843E+09
x(FT)	6.1500	0.0000	27.880	27.060	0.0000	0.0000	26.240	26.240	26.240	1.2300	0.0000
2	0.015412	0.016587	3194.4	2208.2	42.888	15.007	2.3236	1.2790	0.4094	8.8843E+09	8.8843E+09
x(FT)	6.1500	0.0000	27.880	27.060	0.0000	0.0000	26.240	26.240	26.240	2.0500	0.4100
3	0.018334	0.016587	3692.2	2204.8	47.511	14.976	2.6391	1.2752	0.4761	8.8843E+09	8.8843E+09
x(FT)	5.7400	0.0000	27.880	27.060	0.0000	0.0000	26.240	26.240	26.240	1.6400	0.0000
4	0.018335	0.019765	3689.8	2707.6	47.460	19.604	2.6358	1.5944	0.6480	8.8843E+09	8.8843E+09
x(FT)	5.7400	0.0000	27.880	27.060	0.0000	0.0000	26.240	26.240	26.240	2.0500	0.0000

Max.	0.018335	0.019765	3692.2	2711.2	47.511	19.639	2.6391	1.5982	0.6480	8.8843E+09	8.8843E+09
Pile N.	4	1	3	1	3	1	3	1	4	1	1

LOAD CASE : 24
CASE NAME : Service MinM3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0693863	2.79402E-04	-0.0177980

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-2.57417E-06	-3.28145E-05	-6.09421E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1722.2	-27.320	-11.701	-28.890	1769.6	-6918.9
2	2185.0	-27.303	-12.795	-28.890	2002.0	-6916.1
3	1935.8	-26.180	-12.799	-28.890	2000.8	-6682.7
4	1473.0	-26.197	-11.705	-28.890	1768.6	-6685.6
MINIMUM	1473.0	-27.320	-12.799	-28.890	1768.6	-6918.9
Pile N.	4	1	3	1	4	1
MAXIMUM	2185.0	-26.180	-11.701	-28.890	2002.0	-6682.7
Pile N.	2	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

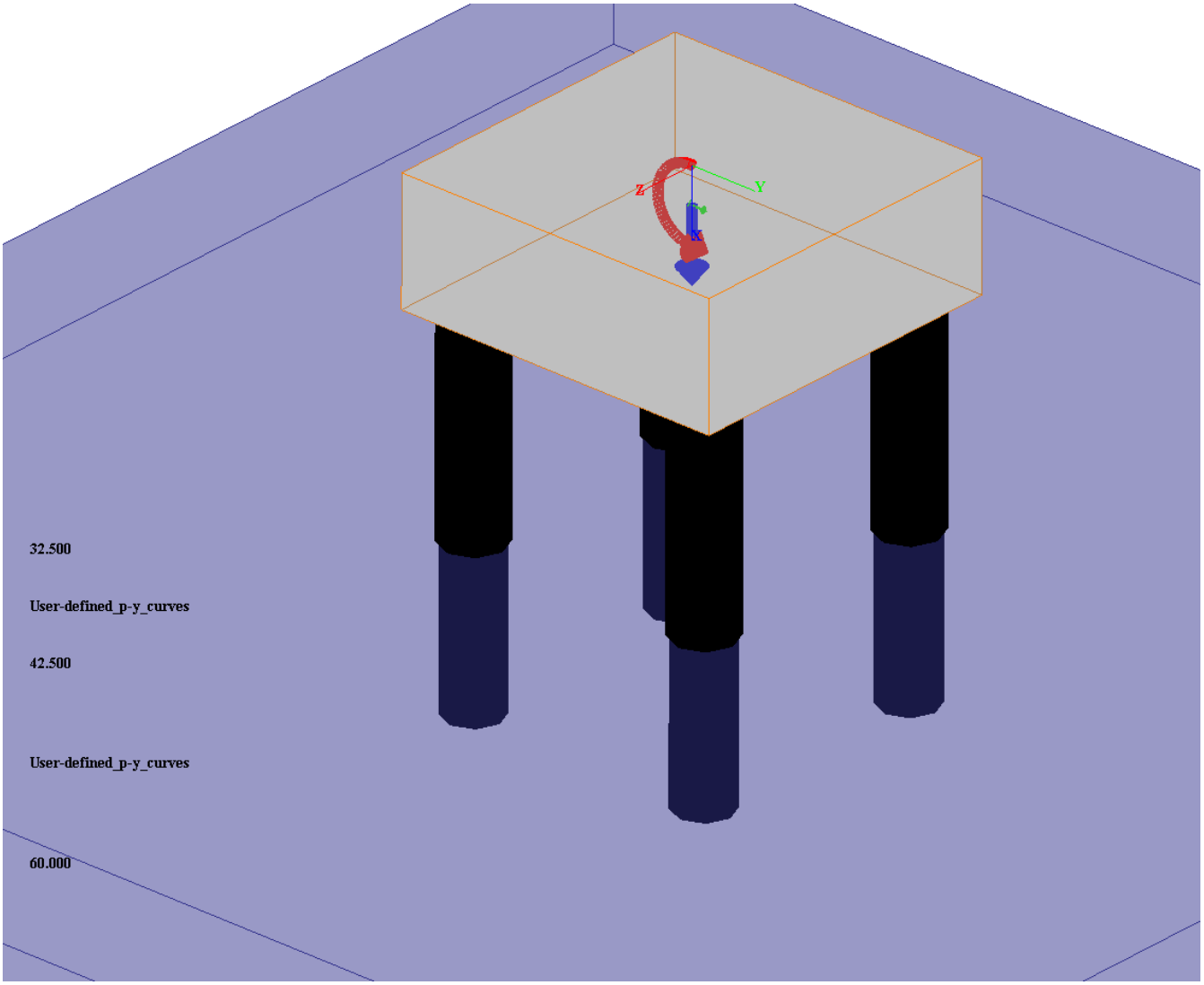
PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-7.9146E-03	-0.014671	-1778.5	-1878.6	-26.875	-11.392	-1.3710	-1.0664	0.4087	4.5738E+09	4.5738E+09
x(FT)	8.2000	0.0000	27.880	27.060	0.0000	0.0000	26.240	26.240	0.0000	27.880	26.650
2	-7.9155E-03	-0.015412	-1777.9	-1996.7	-26.859	-12.463	-1.3689	-1.1409	0.5185	4.5738E+09	4.5738E+09
x(FT)	8.2000	0.0000	27.880	27.060	0.0000	0.0000	26.240	26.240	0.0000	26.240	26.650
3	-7.2818E-03	-0.015412	-1657.8	-1995.2	-25.758	-12.466	-1.2916	-1.1402	0.4594	4.5738E+09	4.5738E+09
x(FT)	8.2000	0.0000	27.880	27.060	0.0000	0.0000	26.240	26.240	0.0000	26.240	26.240
4	-7.2809E-03	-0.014671	-1658.6	-1877.4	-25.774	-11.395	-1.2935	-1.0658	0.3496	4.5738E+09	4.5738E+09

x(FT)	8.2000	0.0000	27.880	27.060	0.0000	0.0000	26.240	26.240	0.0000	26.240	26.240
Min.	-7.9155E-03	-0.015412	-1778.5	-1996.7	-26.875	-12.466	-1.3710	-1.1409	0.3496	4.5738E+09	4.5738E+09
Pile N.	2	2	1	2	1	3	1	2	4	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	2.1583E-04	2.0223E-04	6918.9	1769.6	18.217	18.674	0.2124	0.1990	0.5034	8.8843E+09	8.8843E+09
x(FT)	38.540	36.080	0.0000	0.0000	32.390	31.160	38.540	36.080	26.240	0.0000	0.4100
2	2.1599E-04	2.1533E-04	6916.1	2002.0	18.219	19.861	0.2125	0.2119	0.6387	8.8843E+09	8.8843E+09
x(FT)	38.540	36.080	0.0000	0.0000	32.390	31.570	38.540	36.080	26.240	0.0000	1.2300
3	2.0344E-04	2.1517E-04	6682.7	2000.8	17.021	19.843	0.2002	0.2117	0.5658	8.8843E+09	8.8843E+09
x(FT)	38.950	36.080	0.0000	0.0000	32.390	31.570	38.950	36.080	26.240	0.8200	0.4100
4	2.0324E-04	2.0211E-04	6685.6	1768.6	17.022	18.657	0.2000	0.1989	0.4306	8.8843E+09	8.8843E+09
x(FT)	38.950	36.080	0.0000	0.0000	32.390	31.160	38.950	36.080	26.240	0.0000	0.4100
Max.	2.1599E-04	2.1533E-04	6918.9	2002.0	18.219	19.861	0.2125	0.2119	0.6387	8.8843E+09	8.8843E+09
Pile N.	2	2	1	2	2	2	2	2	2	1	1

Pier 4
NCHRP p-y parameters (Lower Bound)
Scoured to bedrock
40 #11 Bar Reinforcement
Strength Condition: Load Cases 1 through 12
Service Condition: Load cases 13 through 24
0.75" thick casing reduced to 0.625" after 1/8" of corrosion



Pier 4 Loading Schedule provided by HNTB on 8/21/2020
Converted to kip-in

	PIER	ID	Station	Output	Case	P	V2	V3	T	M2	M3
						Vertical, x-di	orizontal, F	orizontal, F	Mx	My	Mz
	-	-	ft	-	-	kip	Kip	Kip	Kip-in	Kip-in	Kip-in
1	PileCap 4	5146	0	STRENGTH	Max P	5714	1263	240	274	68054	246105
2	PileCap 4	5146	0	STRENGTH	Min P	10213	-1165	-185	1132	-49202	-198169
3	PileCap 4	5146	0	STRENGTH	Max V2	8555	1594	268	11556	92665	569919
4	PileCap 4	5146	0	STRENGTH	Min V2	5992	-1512	-213	-7298	-75066	-502188
5	PileCap 4	5146	0	STRENGTH	Max V3	8562	1262	412	1962	208907	253449
6	PileCap 4	5146	0	STRENGTH	Min V3	5985	-1086	-295	4791	-134481	-88953
7	PileCap 4	5146	0	STRENGTH	Max T	9300	1266	-204	19547	-66962	237517
8	PileCap 4	5146	0	STRENGTH	Min T	6689	-1168	259	-15959	85245	-181615
9	PileCap 4	5146	0	STRENGTH	Max M2	8562	1262	412	1962	208907	253449
10	PileCap 4	5146	0	STRENGTH	Min M2	6844	-1186	-279	4099	-134659	-213255
11	PileCap 4	5146	0	STRENGTH	Max M3	8555	1594	268	11556	92665	569919
12	PileCap 4	5146	0	STRENGTH	Min M3	5992	-1512	-213	-7298	-75066	-502188
13	PileCap 4	5146	0	SERVICE	Max P	6579	37	81	6574	57778	27109
14	PileCap 4	5146	0	SERVICE	Min P	7912	57	-28	-5095	-41566	24646
15	PileCap 4	5146	0	SERVICE	Max V2	7066	223	-33	-231	-45989	164190
16	PileCap 4	5146	0	SERVICE	Min V2	7106	-136	85	2601	61725	-107335
17	PileCap 4	5146	0	SERVICE	Max V3	7282	52	184	7078	147125	43123
18	PileCap 4	5146	0	SERVICE	Min V3	7256	61	-114	-2656	-115031	33905
19	PileCap 4	5146	0	SERVICE	Max T	7183	168	97	20070	72029	153680
20	PileCap 4	5146	0	SERVICE	Min T	7173	-76	-44	-17051	-56143	-96000
21	PileCap 4	5146	0	SERVICE	Max M2	7282	52	184	7078	147125	43123
22	PileCap 4	5146	0	SERVICE	Min M2	7256	61	-114	-2656	-115031	33905
23	PileCap 4	5146	0	SERVICE	Max M3	7029	167	-32	843	-44672	197719
24	PileCap 4	5146	0	SERVICE	Min M3	7179	-85	81	2254	57570	-142129

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

                GROUP for Windows, Version 2016.10.13

                 Serial Number : 364300562

                  Analysis of A Group of Piles
                Subjected to Axial and Lateral Loading

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


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

          Date:  August 31, 2020     Time:  14:10:22



            *****     COMPUTATION RESULTS     *****


Pier 4



            *****     LOAD CASES RESULTS      *****


LOAD CASE :     1
CASE NAME : Strength MaxP
LOAD TYPE : Dead, DL




* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *


       VERTICAL ,IN      HORIZONTAL Y,IN     HORIZONTAL Z,IN
          0.0539759            0.38601          0.0568699

     ANGLE ROT. X,RAD    ANGLE ROT. Y,RAD    ANGLE ROT. Z,RAD
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        5.98953E-07        5.66488E-05       -3.97996E-05



   * PILE TOP REACTIONS *

 PILE GROUP   FOR. X,KIP   FOR. Y,KIP   FOR. Z,KIP MOM X,KIP-IN MOM Y,KIP-IN MOM Z,KIP-IN
 **********  ***********  ***********  ***********  ***********  ***********  ***********
     1           1060.7       316.26       59.926       6.8220  -1.1547E+04   7.0148E+04
     2           1364.2       315.89       60.138       6.8220  -1.1601E+04   7.0135E+04
     3           1796.3       315.24       60.073       6.8220  -1.1600E+04   7.0091E+04
     4           1492.8       315.61       59.863       6.8220  -1.1546E+04   7.0104E+04

  MINIMUM         1060.7       315.24       59.863       6.8220  -1.1601E+04   7.0091E+04
  Pile N.          1            3            4            1            2            3
  MAXIMUM         1796.3       316.26       60.138       6.8220  -1.1546E+04   7.0148E+04
  Pile N.          3            1            2            1            4            1



   * MINIMUM VALUES AND LOCATIONS *

 PILE     DISPL.      DISPL.      MOMENT      MOMENT       SHEAR       SHEAR    SOIL REACT  SOIL REACT     TOTAL    FLEX. RIG.  FLEX. RIG.
          y-DIR       z-DIR       z-DIR       y-DIR       y-DIR       z-DIR       y-DIR       z-DIR     STRESS       z-DIR       y-DIR
           IN          IN        KIP-IN      KIP-IN         KIP         KIP       KIP/IN      KIP/IN   KIP/IN**2   KIP-IN**2   KIP-IN**2
******  **********  **********  **********  **********  **********  **********  **********  **********  **********  **********  **********
    1  -3.7286E-03 -9.0375E-04 -7.0148E+04 -1.1547E+04     -315.55     -71.629     -3.2369     -0.8301      0.2517  1.4152E+09  4.5620E+09
 x(FT)      34.020      37.665      0.0000      0.0000      29.970      31.590      34.020      38.070      0.0000      26.730      26.730
    2  -3.7307E-03 -9.0724E-04 -7.0135E+04 -1.1601E+04     -315.70     -71.907     -3.2387     -0.8333      0.3237  1.4152E+09  4.5619E+09
 x(FT)      34.020      37.665      0.0000      0.0000      29.970      31.590      34.020      38.070      0.0000      26.730      26.730
    3  -3.7317E-03 -9.0728E-04 -7.0091E+04 -1.1600E+04     -315.78     -71.930     -3.2395     -0.8333      0.4263  1.4152E+09  4.5619E+09
 x(FT)      34.020      37.665      0.0000      0.0000      29.970      31.590      34.020      38.070      0.0000      26.730      26.730
    4  -3.7296E-03 -9.0379E-04 -7.0104E+04 -1.1546E+04     -315.63     -71.652     -3.2377     -0.8301      0.3542  1.4152E+09  4.5620E+09
 x(FT)      34.020      37.665      0.0000      0.0000      29.970      31.590      34.020      38.070      0.0000      26.730      26.730

   Min. -3.7317E-03 -9.0728E-04 -7.0148E+04 -1.1601E+04     -315.78     -71.930     -3.2395     -0.8333      0.2517  1.4152E+09  4.5619E+09
Pile N.       3           3           1           2           3           3           3           3           1           1           2

   * MAXIMUM VALUES AND LOCATIONS *

 PILE     DISPL.      DISPL.      MOMENT      MOMENT       SHEAR       SHEAR    SOIL REACT  SOIL REACT     TOTAL    FLEX. RIG.  FLEX. RIG.
          y-DIR       z-DIR       z-DIR       y-DIR       y-DIR       z-DIR       y-DIR       z-DIR     STRESS       z-DIR       y-DIR
           IN          IN        KIP-IN      KIP-IN         KIP         KIP       KIP/IN      KIP/IN   KIP/IN**2   KIP-IN**2   KIP-IN**2
******  **********  **********  **********  **********  **********  **********  **********  **********  **********  **********  **********
    1      0.3827    0.052025  2.8565E+04      7204.1      315.97      59.743      22.444      3.3505      0.3100  8.8843E+09  8.8843E+09
 x(FT)      0.0000      0.0000      26.730      26.730      0.0000      0.0000      25.515      25.515      25.515      15.795      1.6200
    2      0.3827    0.052198  2.8568E+04      7230.8      315.61      59.954      22.442      3.3631      0.3988  8.8843E+09  8.8843E+09
 x(FT)      0.0000      0.0000      26.730      26.730      0.0000      0.0000      25.515      25.515      25.515      15.795      0.8100
    3      0.3826    0.052198  2.8563E+04      7231.8      314.98      59.891      22.432      3.3634      0.5251  8.8843E+09  8.8843E+09
 x(FT)      0.0000      0.0000      26.730      26.730      0.0000      0.0000      25.515      25.515      25.515      15.795      0.8100
    4      0.3826    0.052025  2.8559E+04      7205.1      315.34      59.680      22.435      3.3508      0.4363  8.8843E+09  8.8843E+09
```

x(FT)	0.0000	0.0000	26.730	26.730	0.0000	0.0000	25.515	25.515	25.515	15.795	1.2150
Max.	0.3827	0.052198	2.8568E+04	7231.8	315.97	59.954	22.444	3.3634	0.5251	8.8843E+09	8.8843E+09
Pile N.	1	2	2	3	1	2	1	3	3	1	1

LOAD CASE : 2
CASE NAME : Strength MinP
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0964493	-0.35459	-0.0433054

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
4.62417E-06	-4.22410E-05	5.00472E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2905.2	-290.41	-47.213	52.669	9163.7	-6.4678E+04
2	2523.5	-290.85	-45.261	52.669	8741.7	-6.4694E+04
3	2201.3	-292.09	-45.286	52.669	8740.7	-6.4905E+04
4	2583.0	-291.65	-47.240	52.669	9162.8	-6.4889E+04
MINIMUM	2201.3	-292.09	-47.240	52.669	8740.7	-6.4905E+04
Pile N.	3	3	4	1	3	3
MAXIMUM	2905.2	-290.41	-45.261	52.669	9163.7	-6.4678E+04
Pile N.	1	1	2	1	1	1

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-0.3497	-0.040423	-2.6500E+04	-5668.1	-290.18	-47.077	-21.183	-2.7258	0.6894	1.4230E+09	4.5738E+09
x(FT)	0.0000	0.0000	26.730	26.730	0.0000	0.0000	25.515	25.515	0.0000	26.730	25.515
2	-0.3497	-0.039091	-2.6498E+04	-5462.6	-290.61	-45.128	-21.190	-2.6225	0.5988	1.4230E+09	4.5738E+09
x(FT)	0.0000	0.0000	26.730	26.730	0.0000	0.0000	25.515	25.515	0.0000	26.730	25.515

3	-0.3510	-0.039091	-2.6576E+04	-5460.6	-291.84	-45.153	-21.242	-2.6185	0.5224	1.4227E+09	4.5738E+09
x(FT)	0.0000	0.0000	26.730	26.730	0.0000	0.0000	25.515	25.515	0.0000	26.730	25.515
4	-0.3510	-0.040423	-2.6578E+04	-5666.0	-291.42	-47.102	-21.235	-2.7216	0.6129	1.4227E+09	4.5738E+09
x(FT)	0.0000	0.0000	26.730	26.730	0.0000	0.0000	25.515	25.515	0.0000	26.730	25.920
Min.	-0.3510	-0.040423	-2.6578E+04	-5668.1	-291.84	-47.102	-21.242	-2.7258	0.5224	1.4227E+09	4.5738E+09
Pile N.	3	1	4	1	3	4	3	1	3	3	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	3.3593E-03	7.0199E-04	6.4678E+04	9163.7	289.44	56.370	2.9314	0.6461	0.8492	8.8843E+09	8.8843E+09
x(FT)	34.020	37.260	0.0000	0.0000	29.970	31.590	34.020	37.665	25.515	15.390	0.0000
2	3.3572E-03	6.7561E-04	6.4694E+04	8741.7	289.30	54.295	2.9298	0.6218	0.7376	8.8843E+09	8.8843E+09
x(FT)	34.020	37.260	0.0000	0.0000	29.970	31.590	34.020	37.665	25.515	16.605	0.8100
3	3.3700E-03	6.7568E-04	6.4905E+04	8740.7	290.22	54.270	2.9404	0.6218	0.6434	8.8843E+09	8.8843E+09
x(FT)	34.020	37.260	0.0000	0.0000	29.970	31.590	34.020	37.665	25.515	15.390	0.0000
4	3.3722E-03	7.0206E-04	6.4889E+04	9162.8	290.36	56.344	2.9421	0.6461	0.7550	8.8843E+09	8.8843E+09
x(FT)	34.020	37.260	0.0000	0.0000	29.970	31.590	34.020	37.665	25.515	16.200	0.0000
Max.	3.3722E-03	7.0206E-04	6.4905E+04	9163.7	290.36	56.370	2.9421	0.6461	0.8492	8.8843E+09	8.8843E+09
Pile N.	4	4	3	1	4	1	4	4	1	1	1

LOAD CASE : 3
CASE NAME : Strength MaxV2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0807967	0.47672	0.0666570

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
5.05684E-05	7.07850E-05	6.52121E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2117.5	403.55	56.291	575.97	-1.0609E+04	9.1068E+04
2	1620.2	404.20	77.665	575.97	-1.5151E+04	9.1082E+04

3	2160.0	393.44	77.715	575.97	-1.5171E+04	8.8798E+04
4	2657.3	392.82	56.328	575.97	-1.0625E+04	8.8786E+04
MINIMUM	1620.2	392.82	56.291	575.97	-1.5171E+04	8.8786E+04
Pile N.	2	4	1	1	3	4
MAXIMUM	2657.3	404.20	77.715	575.97	-1.0609E+04	9.1082E+04
Pile N.	4	2	3	1	1	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-5.0899E-03	-9.2047E-04	-9.1068E+04	-1.0609E+04	-405.69	-70.392	-4.3672	-0.8572	0.5025	1.3991E+09	4.5628E+09
x(FT)	33.615	38.475	0.0000	0.0000	30.375	31.590	33.615	40.500	0.0000	26.730	27.135
2	-5.0790E-03	-1.2248E-03	-9.1082E+04	-1.5151E+04	-405.02	-92.070	-4.3575	-1.1417	0.3845	1.3992E+09	4.5520E+09
x(FT)	33.615	40.095	0.0000	0.0000	30.375	31.590	33.615	40.500	0.0000	26.730	27.135
3	-4.9215E-03	-1.2191E-03	-8.8798E+04	-1.5171E+04	-394.37	-92.308	-4.2275	-1.1346	0.5126	1.4004E+09	4.5519E+09
x(FT)	33.615	39.285	0.0000	0.0000	30.375	31.590	33.615	40.500	0.0000	26.730	27.135
4	-4.9325E-03	-9.1753E-04	-8.8786E+04	-1.0625E+04	-395.05	-70.578	-4.2373	-0.8516	0.6306	1.4003E+09	4.5627E+09
x(FT)	33.615	38.475	0.0000	0.0000	30.375	31.590	33.615	40.500	0.0000	26.730	27.135
Min.	-5.0899E-03	-1.2248E-03	-9.1082E+04	-1.5171E+04	-405.69	-92.308	-4.3672	-1.1417	0.3845	1.3991E+09	4.5519E+09
Pile N.	1	2	2	3	1	3	1	2	2	1	3

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.4896	0.053429	3.5614E+04	7081.1	403.30	56.102	27.091	3.0285	0.6189	8.8843E+09	8.8843E+09
x(FT)	0.4050	0.0000	26.730	27.135	0.0000	0.0000	25.515	25.515	25.515	16.605	0.0000
2	0.4896	0.067993	3.5586E+04	9251.5	403.92	77.412	27.063	4.0223	0.4736	8.8843E+09	8.8843E+09
x(FT)	0.4050	0.0000	26.730	27.135	0.0000	0.0000	25.515	25.515	25.515	16.605	4.4550
3	0.4750	0.067993	3.4713E+04	9273.6	393.19	77.466	26.493	4.0568	0.6314	8.8843E+09	8.8843E+09
x(FT)	0.4050	0.0000	26.730	27.135	0.0000	0.0000	25.515	25.515	25.515	17.010	4.4550
4	0.4750	0.053429	3.4742E+04	7098.1	392.60	56.142	26.522	3.0547	0.7767	8.8843E+09	8.8843E+09
x(FT)	0.4050	0.0000	26.730	27.135	0.0000	0.0000	25.515	25.515	25.515	17.415	0.0000
Max.	0.4896	0.067993	3.5614E+04	9273.6	403.92	77.466	27.091	4.0568	0.7767	8.8843E+09	8.8843E+09
Pile N.	1	2	1	3	2	3	1	3	4	1	1

LOAD CASE : 4
CASE NAME : Strength MinV2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0566004	-0.45123	-0.0528837

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-3.33461E-05	-5.68148E-05	-4.50860E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1542.7	-381.27	-46.133	-379.81	8683.9	-8.5658E+04
2	1886.6	-380.68	-60.229	-379.81	1.1694E+04	-8.5628E+04
3	1453.3	-374.66	-60.378	-379.81	1.1707E+04	-8.4162E+04
4	1109.4	-375.38	-46.261	-379.81	8694.8	-8.4206E+04
MINIMUM	1109.4	-381.27	-60.378	-379.81	8683.9	-8.5658E+04
Pile N.	4	1	3	1	1	1
MAXIMUM	1886.6	-374.66	-46.133	-379.81	1.1707E+04	-8.4162E+04
Pile N.	2	3	1	1	3	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-0.4598	-0.043309	-3.3739E+04	-5782.9	-381.00	-45.980	-25.853	-2.5117	0.3661	1.4029E+09	4.5732E+09
x(FT)	0.4050	0.0000	26.730	27.135	0.0000	0.0000	25.515	25.515	0.0000	26.730	27.135
2	-0.4598	-0.052913	-3.3731E+04	-7227.7	-380.43	-60.036	-25.831	-3.1812	0.4477	1.4030E+09	4.5619E+09
x(FT)	0.4050	0.0000	26.730	27.135	0.0000	0.0000	25.515	25.515	0.0000	26.730	27.135
3	-0.4502	-0.052913	-3.3116E+04	-7237.9	-374.39	-60.184	-25.453	-3.2008	0.3449	1.4048E+09	4.5618E+09
x(FT)	0.4050	0.0000	26.730	27.135	0.0000	0.0000	25.515	25.515	0.0000	26.730	27.135
4	-0.4502	-0.043309	-3.3154E+04	-5792.3	-375.09	-46.108	-25.472	-2.5285	0.2633	1.4046E+09	4.5731E+09
x(FT)	0.4050	0.0000	26.730	27.135	0.0000	0.0000	25.515	25.515	0.0000	26.730	27.135
Min.	-0.4598	-0.052913	-3.3739E+04	-7237.9	-381.00	-60.184	-25.853	-3.2008	0.2633	1.4029E+09	4.5618E+09
Pile N.	1	2	1	3	1	3	1	3	4	1	3

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL.	DISPL.	MOMENT	MOMENT	SHEAR	SHEAR	SOIL REACT	SOIL REACT	TOTAL	FLEX. RIG.	FLEX. RIG.

	y-DIR IN	z-DIR IN	z-DIR KIP-IN	y-DIR KIP-IN	y-DIR KIP	z-DIR KIP	y-DIR KIP/IN	z-DIR KIP/IN	STRESS KIP/IN**2	z-DIR KIP-IN**2	y-DIR KIP-IN**2
1	4.7178E-03	7.4190E-04	8.5658E+04	8683.9	381.52	57.478	4.0592	0.6880	0.4509	8.8843E+09	8.8843E+09
x(FT)	33.615	38.070	0.0000	0.0000	30.375	31.590	33.615	40.500	25.515	16.605	0.0000
2	4.7181E-03	9.3870E-04	8.5628E+04	1.1694E+04	381.49	71.943	4.0591	0.8740	0.5514	8.8843E+09	8.8843E+09
x(FT)	33.615	38.475	0.0000	0.0000	30.375	31.590	33.615	40.500	25.515	17.415	2.0250
3	4.6251E-03	9.3632E-04	8.4162E+04	1.1707E+04	374.18	72.018	3.9814	0.8713	0.4248	8.8843E+09	8.8843E+09
x(FT)	33.615	38.475	0.0000	0.0000	30.375	31.590	33.615	40.500	25.515	16.605	1.6200
4	4.5893E-03	7.4041E-04	8.4206E+04	8694.8	373.60	57.558	3.9524	0.6849	0.3243	8.8843E+09	8.8843E+09
x(FT)	33.615	38.070	0.0000	0.0000	30.375	31.590	33.615	40.500	25.515	16.200	0.4050
Max.	4.7181E-03	9.3870E-04	8.5658E+04	1.1707E+04	381.52	72.018	4.0592	0.8740	0.5514	8.8843E+09	8.8843E+09
Pile N.	2	2	1	3	1	3	1	2	2	1	1

LOAD CASE : 5
CASE NAME : Strength MaxV3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0808628	0.38667	0.11032

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
7.31635E-06	1.37893E-04	-3.67717E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1474.5	317.04	101.65	83.332	-1.8839E+04	7.0492E+04
2	1754.9	316.66	104.61	83.332	-1.9491E+04	7.0476E+04
3	2806.5	313.96	104.35	83.332	-1.9494E+04	7.0114E+04
4	2526.1	314.34	101.39	83.332	-1.8841E+04	7.0130E+04
MINIMUM	1474.5	313.96	101.39	83.332	-1.9494E+04	7.0114E+04
Pile N.	1	3	4	1	3	3
MAXIMUM	2806.5	317.04	104.61	83.332	-1.8839E+04	7.0492E+04
Pile N.	3	1	2	1	1	1

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-3.7465E-03	-1.6197E-03	-7.0492E+04	-1.8839E+04	-316.19	-128.52	-3.2468	-1.4802	0.3499	1.4150E+09	4.4590E+09
x(FT)	34.020	37.665	0.0000	0.0000	29.970	31.590	34.020	37.665	0.0000	26.730	26.730
2	-3.7476E-03	-1.6600E-03	-7.0476E+04	-1.9491E+04	-316.23	-131.56	-3.2474	-1.5167	0.4164	1.4150E+09	4.4454E+09
x(FT)	34.020	37.665	0.0000	0.0000	29.970	31.590	34.020	38.070	0.0000	26.730	26.730
3	-3.7307E-03	-1.6596E-03	-7.0114E+04	-1.9494E+04	-315.07	-131.70	-3.2333	-1.5165	0.6660	1.4154E+09	4.4450E+09
x(FT)	34.020	37.665	0.0000	0.0000	29.970	31.590	34.020	37.665	0.0000	26.730	26.730
4	-3.7296E-03	-1.6193E-03	-7.0130E+04	-1.8841E+04	-315.03	-128.65	-3.2327	-1.4800	0.5994	1.4154E+09	4.4586E+09
x(FT)	34.020	37.665	0.0000	0.0000	29.970	31.590	34.020	37.665	0.0000	26.730	26.730
Min.	-3.7476E-03	-1.6600E-03	-7.0492E+04	-1.9494E+04	-316.23	-131.70	-3.2474	-1.5167	0.3499	1.4150E+09	4.4450E+09
Pile N.	2	2	1	3	2	3	2	2	1	1	3

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.3846	0.097679	2.8635E+04	1.2981E+04	316.76	101.33	22.346	5.9065	0.4310	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	26.730	26.730	0.0000	0.0000	25.515	25.515	25.515	16.200	6.4800
2	0.3846	0.099786	2.8633E+04	1.3283E+04	316.39	104.28	22.331	6.0565	0.5130	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	26.730	26.730	0.0000	0.0000	25.515	25.515	25.515	16.605	7.2900
3	0.3825	0.099786	2.8516E+04	1.3291E+04	313.73	104.02	22.241	6.0667	0.8203	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	26.730	26.730	0.0000	0.0000	25.515	25.515	25.515	16.605	6.8850
4	0.3825	0.097679	2.8518E+04	1.2989E+04	314.10	101.08	22.256	5.9165	0.7384	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	26.730	26.730	0.0000	0.0000	25.515	25.515	25.515	15.795	6.8850
Max.	0.3846	0.099786	2.8635E+04	1.3291E+04	316.76	104.28	22.346	6.0667	0.8203	8.8843E+09	8.8843E+09
Pile N.	1	2	1	3	1	2	1	3	3	1	1

LOAD CASE : 6
CASE NAME : Strength Minv3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0565343	-0.33559	-0.0760703

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD

2.05196E-05 -9.18869E-05 8.91974E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2186.8	-268.78	-78.069	233.72	1.4677E+04	-5.9352E+04
2	1506.5	-269.55	-69.359	233.72	1.2808E+04	-5.9381E+04
3	805.72	-274.23	-69.429	233.72	1.2801E+04	-6.0279E+04
4	1486.0	-273.45	-78.144	233.72	1.4669E+04	-6.0248E+04
MINIMUM	805.72	-274.23	-78.144	233.72	1.2801E+04	-6.0279E+04
Pile N.	3	3	4	1	3	3
MAXIMUM	2186.8	-268.78	-69.359	233.72	1.4677E+04	-5.9352E+04
Pile N.	1	1	2	1	1	1

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-0.3251	-0.071307	-2.4785E+04	-9782.5	-268.52	-77.839	-19.972	-4.7702	0.5189	1.4317E+09	4.5501E+09
x(FT)	0.0000	0.0000	26.730	26.730	0.0000	0.0000	25.515	25.515	0.0000	26.730	26.730
2	-0.3251	-0.065397	-2.4789E+04	-8876.1	-269.26	-69.149	-20.020	-4.3052	0.3575	1.4317E+09	4.5535E+09
x(FT)	0.0000	0.0000	26.730	26.730	0.0000	0.0000	25.515	25.515	0.0000	26.730	26.730
3	-0.3311	-0.065397	-2.5146E+04	-8865.8	-273.93	-69.216	-20.239	-4.2718	0.1912	1.4288E+09	4.5536E+09
x(FT)	0.0000	0.0000	26.730	26.730	0.0000	0.0000	25.515	25.515	0.0000	26.730	26.730
4	-0.3311	-0.071307	-2.5142E+04	-9770.9	-273.16	-77.910	-20.194	-4.7339	0.3526	1.4288E+09	4.5502E+09
x(FT)	0.0000	0.0000	26.730	26.730	0.0000	0.0000	25.515	25.515	0.0000	26.730	26.730
Min.	-0.3311	-0.071307	-2.5146E+04	-9782.5	-273.93	-77.910	-20.239	-4.7702	0.1912	1.4288E+09	4.5501E+09
Pile N.	3	1	3	1	3	4	3	1	3	3	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	3.0567E-03	1.1959E-03	5.9352E+04	1.4677E+04	266.28	96.913	2.6901	1.0983	0.6392	8.8843E+09	8.8843E+09
x(FT)	34.425	37.260	0.0000	0.0000	29.970	31.590	35.640	37.260	25.515	14.985	4.4550
2	3.0545E-03	1.0795E-03	5.9381E+04	1.2808E+04	266.21	87.803	2.6890	0.9921	0.4404	8.8843E+09	8.8843E+09
x(FT)	34.425	37.260	0.0000	0.0000	29.970	31.185	35.640	37.260	25.515	14.985	3.6450
3	3.1115E-03	1.0801E-03	6.0279E+04	1.2801E+04	270.66	87.684	2.7312	0.9922	0.2355	8.8843E+09	8.8843E+09
x(FT)	34.425	37.260	0.0000	0.0000	29.970	31.590	35.640	37.260	25.515	14.985	2.8350
4	3.1137E-03	1.1966E-03	6.0248E+04	1.4669E+04	270.72	96.775	2.7323	1.0984	0.4344	8.8843E+09	8.8843E+09
x(FT)	34.425	37.260	0.0000	0.0000	29.970	31.590	35.640	37.260	25.515	14.985	4.4550

Max.	3.1137E-03	1.1966E-03	6.0279E+04	1.4677E+04	270.72	96.913	2.7323	1.0984	0.6392	8.8843E+09	8.8843E+09
Pile N.	4	4	3	1	4	1	4	4	1	1	1

LOAD CASE : 7
CASE NAME : Strength MaxT
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0878300	0.39010	-0.0496363

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
8.74692E-05	-5.21989E-05	-4.43769E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2354.8	324.84	-69.608	996.26	1.3740E+04	7.2342E+04
2	2693.3	324.64	-32.135	996.26	5792.4	7.2355E+04
3	2295.2	308.16	-32.310	996.26	5811.5	6.8566E+04
4	1956.7	308.36	-69.947	996.26	1.3779E+04	6.8554E+04
MINIMUM	1956.7	308.16	-69.947	996.26	5792.4	6.8554E+04
Pile N.	4	3	4	1	2	4
MAXIMUM	2693.3	324.84	-32.135	996.26	1.3779E+04	7.2355E+04
Pile N.	2	1	2	1	4	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-3.9236E-03	-0.057847	-7.2342E+04	-8130.1	-328.90	-69.400	-3.3984	-3.7681	0.5588	1.4119E+09	4.5569E+09
x(FT)	34.020	0.0000	0.0000	27.135	29.970	0.0000	34.020	25.515	0.0000	26.730	27.135
2	-3.9311E-03	-0.032656	-7.2355E+04	-4298.3	-329.75	-32.031	-3.4066	-1.9142	0.6391	1.4117E+09	4.5738E+09
x(FT)	34.020	0.0000	0.0000	26.730	29.970	0.0000	34.020	25.515	0.0000	26.730	25.515
3	-3.6293E-03	-0.032656	-6.8566E+04	-4317.2	-308.95	-32.206	-3.1559	-1.9645	0.5446	1.4172E+09	4.5738E+09
x(FT)	34.020	0.0000	0.0000	26.730	29.970	0.0000	34.020	25.515	0.0000	26.730	26.325

4	-3.6222E-03	-0.057847	-6.8554E+04	-8163.2	-308.14	-69.742	-3.1478	-3.8633	0.4643	1.4173E+09	4.5567E+09
x(FT)	34.020	0.0000	0.0000	27.135	29.970	0.0000	34.020	25.515	0.0000	26.730	27.135
Min.	-3.9311E-03	-0.057847	-7.2355E+04	-8163.2	-329.75	-69.742	-3.4066	-3.8633	0.4643	1.4117E+09	4.5567E+09
Pile N.	2	1	2	4	2	4	2	4	4	2	4

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.3990	1.0337E-03	2.9550E+04	1.3740E+04	324.61	80.993	23.012	0.9501	0.6883	8.8843E+09	8.8843E+09
x(FT)	0.0000	38.070	26.730	0.0000	0.0000	31.590	25.515	38.880	25.515	15.795	3.2400
2	0.3990	5.3002E-04	2.9587E+04	5792.4	324.41	42.531	23.084	0.4859	0.7872	8.8843E+09	8.8843E+09
x(FT)	0.0000	37.260	26.730	0.0000	0.0000	31.590	25.515	37.665	25.515	16.200	0.4050
3	0.3738	5.2828E-04	2.8021E+04	5811.5	307.92	42.679	22.138	0.4847	0.6709	8.8843E+09	8.8843E+09
x(FT)	0.0000	37.260	26.730	0.0000	0.0000	31.590	25.515	37.665	25.515	17.010	0.0000
4	0.3738	1.0286E-03	2.7987E+04	1.3779E+04	308.10	81.297	22.050	0.9452	0.5719	8.8843E+09	8.8843E+09
x(FT)	0.0000	37.665	26.730	0.0000	0.0000	31.590	25.515	38.070	25.515	16.605	4.0500
Max.	0.3990	1.0337E-03	2.9587E+04	1.3779E+04	324.61	81.297	23.084	0.9501	0.7872	8.8843E+09	8.8843E+09
Pile N.	1	1	2	4	1	4	2	1	2	1	1

LOAD CASE : 8
CASE NAME : Strength MinT
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0631805	-0.35671	0.0627358

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-7.03103E-05	6.62940E-05	5.74977E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1638.7	-298.70	79.751	-800.82	-1.5555E+04	-6.6211E+04
2	1200.2	-299.42	49.603	-800.82	-9159.1	-6.6255E+04
3	1705.8	-285.30	49.722	-800.82	-9184.2	-6.3215E+04

4	2144.3	-284.58	79.924	-800.82	-1.5591E+04	-6.3170E+04
MINIMUM	1200.2	-299.42	49.603	-800.82	-1.5591E+04	-6.6255E+04
Pile N.	2	2	2	1	4	2
MAXIMUM	2144.3	-284.58	79.924	-800.82	-9159.1	-6.3170E+04
Pile N.	4	4	4	1	2	4

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-0.3620	-1.1812E-03	-2.7178E+04	-1.5555E+04	-298.42	-93.795	-21.509	-1.0845	0.3889	1.4203E+09	4.5514E+09
x(FT)	0.0000	37.665	26.730	0.0000	0.0000	31.590	25.515	38.070	0.0000	26.730	26.730
2	-0.3620	-7.7992E-04	-2.7205E+04	-9159.1	-299.13	-62.835	-21.609	-0.7162	0.2848	1.4202E+09	4.5681E+09
x(FT)	0.0000	37.260	26.730	0.0000	0.0000	31.590	25.515	37.665	0.0000	26.730	26.730
3	-0.3417	-7.7779E-04	-2.5965E+04	-9184.2	-285.03	-63.076	-20.845	-0.7148	0.4048	1.4252E+09	4.5679E+09
x(FT)	0.0000	37.260	26.730	0.0000	0.0000	31.590	25.515	37.260	0.0000	26.730	26.730
4	-0.3417	-1.1770E-03	-2.5934E+04	-1.5591E+04	-284.32	-94.162	-20.734	-1.0813	0.5088	1.4253E+09	4.5512E+09
x(FT)	0.0000	37.665	26.730	0.0000	0.0000	31.590	25.515	37.665	0.0000	26.730	26.730
Min.	-0.3620	-1.1812E-03	-2.7205E+04	-1.5591E+04	-299.13	-94.162	-21.609	-1.0845	0.2848	1.4202E+09	4.5512E+09
Pile N.	1	1	2	4	2	4	2	1	2	2	4

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	3.4752E-03	0.067292	6.6211E+04	9430.9	297.52	79.515	3.0245	4.4940	0.4790	8.8843E+09	8.8843E+09
x(FT)	34.020	0.0000	0.0000	26.730	29.970	0.0000	34.020	25.515	25.515	15.795	4.8600
2	3.4781E-03	0.047042	6.6255E+04	6346.8	298.00	49.448	3.0294	2.9565	0.3508	8.8843E+09	8.8843E+09
x(FT)	34.020	0.0000	0.0000	26.730	29.970	0.0000	34.020	25.515	25.515	15.795	0.4050
3	3.2571E-03	0.047042	6.3215E+04	6373.8	282.01	49.570	2.8460	3.0278	0.4986	8.8843E+09	8.8843E+09
x(FT)	34.425	0.0000	0.0000	26.730	29.970	0.0000	34.020	25.515	25.515	15.390	0.0000
4	3.2549E-03	0.067292	6.3170E+04	9470.1	281.46	79.693	2.8408	4.5987	0.6268	8.8843E+09	8.8843E+09
x(FT)	34.425	0.0000	0.0000	26.730	29.970	0.0000	34.425	25.515	25.515	15.795	5.2650
Max.	3.4781E-03	0.067292	6.6255E+04	9470.1	298.00	79.693	3.0294	4.5987	0.6268	8.8843E+09	8.8843E+09
Pile N.	2	1	2	4	2	4	2	4	4	1	1

LOAD CASE : 9
CASE NAME : Strength MaxM2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0808628	0.38667	0.11032

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
7.31636E-06	1.37893E-04	-3.67717E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1474.5	317.04	101.65	83.332	-1.8839E+04	7.0492E+04
2	1754.9	316.66	104.61	83.332	-1.9491E+04	7.0476E+04
3	2806.5	313.96	104.35	83.332	-1.9494E+04	7.0114E+04
4	2526.1	314.34	101.39	83.332	-1.8841E+04	7.0130E+04
MINIMUM	1474.5	313.96	101.39	83.332	-1.9494E+04	7.0114E+04
Pile N.	1	3	4	1	3	3
MAXIMUM	2806.5	317.04	104.61	83.332	-1.8839E+04	7.0492E+04
Pile N.	3	1	2	1	1	1

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-3.7465E-03	-1.6197E-03	-7.0492E+04	-1.8839E+04	-316.19	-128.52	-3.2468	-1.4802	0.3499	1.4150E+09	4.4590E+09
x(FT)	34.020	37.665	0.0000	0.0000	29.970	31.590	34.020	37.665	0.0000	26.730	26.730
2	-3.7476E-03	-1.6600E-03	-7.0476E+04	-1.9491E+04	-316.23	-131.56	-3.2474	-1.5167	0.4164	1.4150E+09	4.4454E+09
x(FT)	34.020	37.665	0.0000	0.0000	29.970	31.590	34.020	38.070	0.0000	26.730	26.730
3	-3.7307E-03	-1.6596E-03	-7.0114E+04	-1.9494E+04	-315.07	-131.70	-3.2333	-1.5165	0.6660	1.4154E+09	4.4450E+09
x(FT)	34.020	37.665	0.0000	0.0000	29.970	31.590	34.020	37.665	0.0000	26.730	26.730
4	-3.7296E-03	-1.6193E-03	-7.0130E+04	-1.8841E+04	-315.03	-128.65	-3.2327	-1.4800	0.5994	1.4154E+09	4.4586E+09
x(FT)	34.020	37.665	0.0000	0.0000	29.970	31.590	34.020	37.665	0.0000	26.730	26.730
Min.	-3.7476E-03	-1.6600E-03	-7.0492E+04	-1.9494E+04	-316.23	-131.70	-3.2474	-1.5167	0.3499	1.4150E+09	4.4450E+09
Pile N.	2	2	1	3	2	3	2	2	1	1	3

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2

1	0.3846	0.097679	2.8635E+04	1.2981E+04	316.76	101.33	22.346	5.9065	0.4310	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	26.730	26.730	0.0000	0.0000	25.515	25.515	25.515	15.795	6.4800
2	0.3846	0.099786	2.8633E+04	1.3283E+04	316.39	104.28	22.331	6.0565	0.5130	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	26.730	26.730	0.0000	0.0000	25.515	25.515	25.515	17.415	6.8850
3	0.3825	0.099786	2.8516E+04	1.3291E+04	313.73	104.02	22.241	6.0667	0.8203	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	26.730	26.730	0.0000	0.0000	25.515	25.515	25.515	17.010	6.8850
4	0.3825	0.097679	2.8518E+04	1.2989E+04	314.10	101.08	22.256	5.9165	0.7384	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	26.730	26.730	0.0000	0.0000	25.515	25.515	25.515	17.010	7.2900
Max.	0.3846	0.099786	2.8635E+04	1.3291E+04	316.76	104.28	22.346	6.0667	0.8203	8.8843E+09	8.8843E+09
Pile N.	1	2	1	3	1	2	1	3	3	1	1

LOAD CASE : 10
CASE NAME : Strength MinM2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0646438	-0.35992	-0.0732094

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
1.73126E-05	-9.02501E-05	4.55051E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2228.7	-294.21	-73.396	197.19	1.3754E+04	-6.5452E+04
2	1881.6	-294.66	-66.034	197.19	1.2180E+04	-6.5473E+04
3	1193.3	-298.79	-66.101	197.19	1.2174E+04	-6.6244E+04
4	1540.4	-298.34	-73.469	197.19	1.3747E+04	-6.6223E+04
MINIMUM	1193.3	-298.79	-73.469	197.19	1.2174E+04	-6.6244E+04
Pile N.	3	3	4	1	3	3
MAXIMUM	2228.7	-294.21	-66.034	197.19	1.3754E+04	-6.5452E+04
Pile N.	1	1	2	1	1	1

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL.	DISPL.	MOMENT	MOMENT	SHEAR	SHEAR	SOIL REACT	SOIL REACT	TOTAL	FLEX. RIG.	FLEX. RIG.

	y-DIR IN	z-DIR IN	z-DIR KIP-IN	y-DIR KIP-IN	y-DIR KIP	z-DIR KIP	y-DIR KIP/IN	z-DIR KIP/IN	STRESS KIP/IN**2	z-DIR KIP-IN**2	y-DIR KIP-IN**2
1	-0.3536	-0.068121	-2.6717E+04	-9257.1	-293.96	-73.174	-21.252	-4.3541	0.5289	1.4221E+09	4.5520E+09
x(FT)	0.0000	0.0000	26.730	26.730	0.0000	0.0000	25.515	25.515	0.0000	26.730	26.730
2	-0.3536	-0.063135	-2.6723E+04	-8497.5	-294.40	-65.830	-21.281	-3.9743	0.4465	1.4221E+09	4.5552E+09
x(FT)	0.0000	0.0000	26.730	26.730	0.0000	0.0000	25.515	25.515	0.0000	26.730	26.730
3	-0.3586	-0.063135	-2.7025E+04	-8488.0	-298.50	-65.894	-21.474	-3.9525	0.2832	1.4209E+09	4.5552E+09
x(FT)	0.0000	0.0000	26.730	26.730	0.0000	0.0000	25.515	25.515	0.0000	26.730	26.730
4	-0.3586	-0.068121	-2.7020E+04	-9246.8	-298.06	-73.243	-21.445	-4.3305	0.3655	1.4209E+09	4.5521E+09
x(FT)	0.0000	0.0000	26.730	26.730	0.0000	0.0000	25.515	25.515	0.0000	26.730	26.730
Min.	-0.3586	-0.068121	-2.7025E+04	-9257.1	-298.50	-73.243	-21.474	-4.3541	0.2832	1.4209E+09	4.5520E+09
Pile N.	3	1	3	1	3	4	3	1	3	3	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	3.3965E-03	1.1419E-03	6.5452E+04	1.3754E+04	291.82	91.750	2.9592	1.0475	0.6514	8.8843E+09	8.8843E+09
x(FT)	34.020	37.260	0.0000	0.0000	29.970	31.590	34.020	37.665	25.515	15.795	3.2400
2	3.3959E-03	1.0435E-03	6.5473E+04	1.2180E+04	291.85	84.122	2.9595	0.9571	0.5500	8.8843E+09	8.8843E+09
x(FT)	34.020	37.260	0.0000	0.0000	29.970	31.590	34.020	37.665	25.515	15.390	1.6200
3	3.4464E-03	1.0440E-03	6.6244E+04	1.2174E+04	295.52	84.014	3.0014	0.9576	0.3488	8.8843E+09	8.8843E+09
x(FT)	34.020	37.260	0.0000	0.0000	29.970	31.590	34.020	37.665	25.515	15.390	2.0250
4	3.4471E-03	1.1424E-03	6.6223E+04	1.3747E+04	295.50	91.630	3.0012	1.0480	0.4502	8.8843E+09	8.8843E+09
x(FT)	34.020	37.260	0.0000	0.0000	29.970	31.590	34.020	37.665	25.515	15.390	3.2400
Max.	3.4471E-03	1.1424E-03	6.6244E+04	1.3754E+04	295.52	91.750	3.0014	1.0480	0.6514	8.8843E+09	8.8843E+09
Pile N.	4	4	3	1	3	1	3	4	1	1	1

LOAD CASE : 11
CASE NAME : Strength MaxM3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0807967	0.47672	0.0666570

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
5.05684E-05	7.07850E-05	6.52121E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2117.5	403.55	56.291	575.97	-1.0609E+04	9.1068E+04
2	1620.2	404.20	77.665	575.97	-1.5151E+04	9.1082E+04
3	2160.0	393.44	77.715	575.97	-1.5171E+04	8.8798E+04
4	2657.3	392.82	56.328	575.97	-1.0625E+04	8.8786E+04
MINIMUM	1620.2	392.82	56.291	575.97	-1.5171E+04	8.8786E+04
Pile N.	2	4	1	1	3	4
MAXIMUM	2657.3	404.20	77.715	575.97	-1.0609E+04	9.1082E+04
Pile N.	4	2	3	1	1	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-5.0899E-03	-9.2047E-04	-9.1068E+04	-1.0609E+04	-405.69	-70.392	-4.3672	-0.8572	0.5025	1.3991E+09	4.5628E+09
x(FT)	33.615	38.475	0.0000	0.0000	30.375	31.590	33.615	40.500	0.0000	26.730	27.135
2	-5.0790E-03	-1.2248E-03	-9.1082E+04	-1.5151E+04	-405.02	-92.070	-4.3575	-1.1417	0.3845	1.3992E+09	4.5520E+09
x(FT)	33.615	40.095	0.0000	0.0000	30.375	31.590	33.615	40.500	0.0000	26.730	27.135
3	-4.9215E-03	-1.2191E-03	-8.8798E+04	-1.5171E+04	-394.37	-92.308	-4.2275	-1.1346	0.5126	1.4004E+09	4.5519E+09
x(FT)	33.615	39.285	0.0000	0.0000	30.375	31.590	33.615	40.500	0.0000	26.730	27.135
4	-4.9325E-03	-9.1753E-04	-8.8786E+04	-1.0625E+04	-395.05	-70.578	-4.2373	-0.8516	0.6306	1.4003E+09	4.5627E+09
x(FT)	33.615	38.475	0.0000	0.0000	30.375	31.590	33.615	40.500	0.0000	26.730	27.135
Min.	-5.0899E-03	-1.2248E-03	-9.1082E+04	-1.5171E+04	-405.69	-92.308	-4.3672	-1.1417	0.3845	1.3991E+09	4.5519E+09
Pile N.	1	2	2	3	1	3	1	2	2	1	3

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.4896	0.053429	3.5614E+04	7081.1	403.30	56.102	27.091	3.0285	0.6189	8.8843E+09	8.8843E+09
x(FT)	0.4050	0.0000	26.730	27.135	0.0000	0.0000	25.515	25.515	25.515	17.415	0.0000
2	0.4896	0.067993	3.5586E+04	9251.5	403.92	77.412	27.063	4.0223	0.4736	8.8843E+09	8.8843E+09
x(FT)	0.4050	0.0000	26.730	27.135	0.0000	0.0000	25.515	25.515	25.515	17.820	5.2650
3	0.4750	0.067993	3.4713E+04	9273.6	393.19	77.466	26.493	4.0568	0.6314	8.8843E+09	8.8843E+09
x(FT)	0.4050	0.0000	26.730	27.135	0.0000	0.0000	25.515	25.515	25.515	17.010	4.4550
4	0.4750	0.053429	3.4742E+04	7098.1	392.60	56.142	26.522	3.0547	0.7767	8.8843E+09	8.8843E+09
x(FT)	0.4050	0.0000	26.730	27.135	0.0000	0.0000	25.515	25.515	25.515	17.010	1.2150
Max.	0.4896	0.067993	3.5614E+04	9273.6	403.92	77.466	27.091	4.0568	0.7767	8.8843E+09	8.8843E+09
Pile N.	1	2	1	3	2	3	1	3	4	1	1

LOAD CASE : 12
CASE NAME : Strength MinM3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0566004	-0.45123	-0.0528837

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-3.33461E-05	-5.68148E-05	-4.50860E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1542.7	-381.27	-46.133	-379.81	8683.9	-8.5658E+04
2	1886.6	-380.68	-60.229	-379.81	1.1694E+04	-8.5628E+04
3	1453.3	-374.66	-60.378	-379.81	1.1707E+04	-8.4162E+04
4	1109.4	-375.38	-46.261	-379.81	8694.8	-8.4206E+04
MINIMUM	1109.4	-381.27	-60.378	-379.81	8683.9	-8.5658E+04
Pile N.	4	1	3	1	1	1
MAXIMUM	1886.6	-374.66	-46.133	-379.81	1.1707E+04	-8.4162E+04
Pile N.	2	3	1	1	3	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-0.4598	-0.043309	-3.3739E+04	-5782.9	-381.00	-45.980	-25.853	-2.5117	0.3661	1.4029E+09	4.5732E+09
x(FT)	0.4050	0.0000	26.730	27.135	0.0000	0.0000	25.515	25.515	0.0000	26.730	27.135
2	-0.4598	-0.052913	-3.3731E+04	-7227.7	-380.43	-60.036	-25.831	-3.1812	0.4477	1.4030E+09	4.5619E+09
x(FT)	0.4050	0.0000	26.730	27.135	0.0000	0.0000	25.515	25.515	0.0000	26.730	27.135
3	-0.4502	-0.052913	-3.3116E+04	-7237.9	-374.39	-60.184	-25.453	-3.2008	0.3449	1.4048E+09	4.5618E+09
x(FT)	0.4050	0.0000	26.730	27.135	0.0000	0.0000	25.515	25.515	0.0000	26.730	27.135
4	-0.4502	-0.043309	-3.3154E+04	-5792.3	-375.09	-46.108	-25.472	-2.5285	0.2633	1.4046E+09	4.5731E+09
x(FT)	0.4050	0.0000	26.730	27.135	0.0000	0.0000	25.515	25.515	0.0000	26.730	27.135

Min.	-0.4598	-0.052913	-3.3739E+04	-7237.9	-381.00	-60.184	-25.853	-3.2008	0.2633	1.4029E+09	4.5618E+09
Pile N.	1	2	1	3	1	3	1	3	4	1	3

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	4.7178E-03	7.4190E-04	8.5658E+04	8683.9	381.52	57.478	4.0592	0.6880	0.4509	8.8843E+09	8.8843E+09
x(FT)	33.615	38.070	0.0000	0.0000	30.375	31.590	33.615	40.500	25.515	16.605	0.0000
2	4.7181E-03	9.3870E-04	8.5628E+04	1.1694E+04	381.49	71.943	4.0591	0.8740	0.5514	8.8843E+09	8.8843E+09
x(FT)	33.615	38.475	0.0000	0.0000	30.375	31.590	33.615	40.500	25.515	18.630	2.0250
3	4.6251E-03	9.3632E-04	8.4162E+04	1.1707E+04	374.18	72.018	3.9814	0.8713	0.4248	8.8843E+09	8.8843E+09
x(FT)	33.615	38.475	0.0000	0.0000	30.375	31.590	33.615	40.500	25.515	16.605	1.2150
4	4.5893E-03	7.4041E-04	8.4206E+04	8694.8	373.60	57.558	3.9524	0.6849	0.3243	8.8843E+09	8.8843E+09
x(FT)	33.615	38.070	0.0000	0.0000	30.375	31.590	33.615	40.500	25.515	17.010	0.0000
Max.	4.7181E-03	9.3870E-04	8.5658E+04	1.1707E+04	381.52	72.018	4.0592	0.8740	0.5514	8.8843E+09	8.8843E+09
Pile N.	2	2	1	3	1	3	1	2	2	1	1

LOAD CASE : 13
CASE NAME : Service MaxP
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0621421	3.55260E-03	0.0227862

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
2.14389E-05	3.42416E-05	7.84910E-06

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1544.1	14.160	15.399	244.19	-2497.8	3095.9
2	1484.2	14.107	25.076	244.19	-4512.2	3088.6
3	1745.4	4.3576	25.092	244.19	-4516.6	1063.9
4	1805.3	4.3756	15.433	244.19	-2504.0	1066.4

MINIMUM	1484.2	4.3576	15.399	244.19	-4516.6	1063.9
Pile N.	2	3	1	1	3	3
MAXIMUM	1805.3	14.160	25.092	244.19	-2497.8	3095.9
Pile N.	4	1	3	1	1	1

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-1.4907E-04	-2.4651E-04	-3095.9	-2497.8	-13.385	-22.772	-0.1467	-0.2426	0.3664	4.5738E+09	4.5738E+09
x(FT)	36.450	35.640	0.0000	0.0000	31.185	30.780	36.450	35.640	0.0000	25.920	25.515
2	-1.4901E-04	-3.5831E-04	-3088.6	-4512.2	-13.313	-32.827	-0.1466	-0.3526	0.3522	4.5738E+09	4.5738E+09
x(FT)	36.450	35.640	0.0000	0.0000	31.185	30.780	36.450	35.640	0.0000	25.515	25.515
3	-3.6253E-05	-3.5875E-04	-1063.9	-4516.6	-3.1146	-32.895	-0.035673	-0.3530	0.4142	4.5738E+09	4.5738E+09
x(FT)	37.260	35.640	0.0000	0.0000	31.590	30.780	37.260	35.640	0.0000	25.515	25.515
4	-3.6108E-05	-2.4689E-04	-1066.4	-2504.0	-3.1298	-22.839	-0.035531	-0.2429	0.4284	4.5738E+09	4.5738E+09
x(FT)	37.260	35.640	0.0000	0.0000	31.590	30.780	37.260	35.640	0.0000	26.325	25.515
Min.	-1.4907E-04	-3.5875E-04	-3095.9	-4516.6	-13.385	-32.895	-0.1467	-0.3530	0.3522	4.5738E+09	4.5738E+09
Pile N.	1	3	1	3	1	3	1	3	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	7.3906E-03	0.016823	1328.7	2287.5	14.133	15.361	0.8970	1.3365	0.4513	8.8843E+09	8.8843E+09
x(FT)	2.0250	0.0000	26.730	26.325	0.0000	0.0000	25.515	25.515	25.515	0.4050	0.4050
2	7.3908E-03	0.022997	1320.5	3287.2	14.080	25.017	0.8840	1.9731	0.4338	8.8843E+09	8.8843E+09
x(FT)	2.0250	0.0000	26.730	26.325	0.0000	0.0000	25.515	25.515	25.515	0.0000	0.4050
3	1.4112E-03	0.022997	305.43	3292.9	4.3504	25.033	0.2284	1.9797	0.5102	8.8843E+09	8.8843E+09
x(FT)	6.4800	0.0000	27.135	26.325	0.0000	0.0000	25.515	25.515	25.515	0.4050	0.0000
4	1.4105E-03	0.016823	307.68	2295.0	4.3686	15.395	0.2336	1.3519	0.5277	8.8843E+09	8.8843E+09
x(FT)	6.4800	0.0000	27.135	26.325	0.0000	0.0000	25.515	25.515	25.515	0.4050	0.8100
Max.	7.3908E-03	0.022997	1328.7	3292.9	14.133	25.033	0.8970	1.9797	0.5277	8.8843E+09	8.8843E+09
Pile N.	2	2	1	3	1	3	1	3	4	1	1

LOAD CASE : 14
CASE NAME : Service MinP
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0747264	7.62748E-03	-0.0106180

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-1.65258E-05	-2.13144E-05	4.58261E-06

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2076.8	10.496	-3.2331	-188.23	236.87	2266.5
2	2041.8	10.477	-10.796	-188.23	1804.8	2264.0
3	1879.2	17.994	-10.754	-188.23	1798.4	3825.3
4	1914.2	18.033	-3.2170	-188.23	234.29	3830.6
MINIMUM	1879.2	10.477	-10.796	-188.23	234.29	2264.0
Pile N.	3	2	2	1	4	2
MAXIMUM	2076.8	18.033	-3.2170	-188.23	1804.8	3830.6
Pile N.	1	4	4	1	2	4

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-1.1230E-04	-6.4479E-03	-2266.5	-768.07	-10.155	-3.2225	-0.1105	-0.4216	0.4928	4.5738E+09	4.5738E+09
x(FT)	36.045	0.0000	0.0000	25.920	31.185	0.0000	36.045	25.515	0.0000	25.515	26.325
2	-1.1229E-04	-0.011207	-2264.0	-1554.8	-10.142	-10.771	-0.1105	-0.9363	0.4845	4.5738E+09	4.5738E+09
x(FT)	36.045	0.0000	0.0000	26.325	31.185	0.0000	36.045	25.515	0.0000	27.540	25.515
3	-1.9972E-04	-0.011207	-3825.3	-1547.4	-18.041	-10.728	-0.1965	-0.9153	0.4459	4.5738E+09	4.5738E+09
x(FT)	36.045	0.0000	0.0000	26.325	31.185	0.0000	36.045	25.515	0.0000	25.515	25.515
4	-1.9983E-04	-6.4479E-03	-3830.6	-764.99	-18.078	-3.2062	-0.1966	-0.4051	0.4542	4.5738E+09	4.5738E+09
x(FT)	36.045	0.0000	0.0000	25.920	31.185	0.0000	36.045	25.515	0.0000	25.920	25.515
Min.	-1.9983E-04	-0.011207	-3830.6	-1554.8	-18.078	-10.771	-0.1966	-0.9363	0.4459	4.5738E+09	4.5738E+09
Pile N.	4	2	4	2	4	2	4	2	3	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR	DISPL. z-DIR	MOMENT z-DIR	MOMENT y-DIR	SHEAR y-DIR	SHEAR z-DIR	SOIL REACT y-DIR	SOIL REACT z-DIR	TOTAL STRESS	FLEX. RIG. z-DIR	FLEX. RIG. y-DIR

	Y-DIR IN	Z-DIR IN	Y-DIR KIP-IN	Z-DIR KIP-IN	Y-DIR KIP	Z-DIR KIP	Y-DIR KIP/IN	Z-DIR KIP/IN	STRESS KIP/IN**2	Z-DIR KIP-IN**2	Y-DIR KIP-IN**2
1	5.6749E-03	8.1094E-05	1011.1	236.87	10.477	7.5939	0.7116	0.079310	0.6070	8.8843E+09	8.8843E+09
x(FT)	1.6200	34.830	26.730	0.0000	0.0000	30.375	25.515	34.830	25.515	0.4050	0.4050
2	5.6750E-03	1.6736E-04	1009.3	1804.8	10.458	15.478	0.6901	0.1647	0.5968	8.8843E+09	8.8843E+09
x(FT)	1.6200	35.640	26.730	0.0000	0.0000	30.780	25.515	35.640	25.515	0.0000	0.0000
3	0.010417	1.6704E-04	1795.5	1798.4	17.959	15.419	1.1903	0.1644	0.5493	8.8843E+09	8.8843E+09
x(FT)	0.8100	35.640	26.730	0.0000	0.0000	30.780	25.515	35.640	25.515	0.0000	0.8100
4	0.010417	8.0853E-05	1800.8	234.29	17.998	7.5681	1.2063	0.079074	0.5595	8.8843E+09	8.8843E+09
x(FT)	0.8100	34.830	26.730	0.0000	0.0000	30.375	25.515	34.830	25.515	0.4050	0.0000
Max.	0.010417	1.6736E-04	1800.8	1804.8	17.998	15.478	1.2063	0.1647	0.6070	8.8843E+09	8.8843E+09
Pile N.	3	2	4	2	4	2	4	2	1	1	1

LOAD CASE : 15
CASE NAME : Service MaxV2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0667396	0.0215754	-0.0122168

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-7.33561E-07	-2.38182E-05	4.76103E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2038.9	55.563	-8.0765	-8.3552	1200.8	1.2527E+04
2	1675.8	55.593	-8.4188	-8.3552	1269.7	1.2529E+04
3	1494.1	55.937	-8.4235	-8.3552	1269.6	1.2598E+04
4	1857.2	55.907	-8.0811	-8.3552	1200.7	1.2596E+04
MINIMUM	1494.1	55.563	-8.4235	-8.3552	1200.7	1.2527E+04
Pile N.	3	1	3	1	4	1
MAXIMUM	2038.9	55.937	-8.0765	-8.3552	1269.7	1.2598E+04
Pile N.	1	3	1	1	2	3

THE PILE COORDINATE SYSTEM (LOCAL AXES)

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. Y-DIR IN	DISPL. Z-DIR IN	MOMENT Z-DIR KIP-IN	MOMENT Y-DIR KIP-IN	SHEAR Y-DIR KIP	SHEAR Z-DIR KIP	SOIL REACT Y-DIR KIP/IN	SOIL REACT Z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. Z-DIR KIP-IN**2	FLEX. RIG. Y-DIR KIP-IN**2
1	-5.5912E-04	-0.010110	-1.2527E+04	-1312.4	-49.163	-8.0543	-0.5502	-0.7377	0.4838	4.5738E+09	4.5738E+09
x(FT)	36.855	0.0000	0.0000	26.325	31.590	0.0000	36.855	25.515	0.0000	25.515	25.515
2	-5.5902E-04	-0.010322	-1.2529E+04	-1346.7	-49.149	-8.3957	-0.5501	-0.7600	0.3977	4.5738E+09	4.5738E+09
x(FT)	36.855	0.0000	0.0000	26.325	31.590	0.0000	36.855	25.515	0.0000	25.515	25.515
3	-5.6282E-04	-0.010322	-1.2598E+04	-1346.6	-49.482	-8.4004	-0.5538	-0.7599	0.3545	4.5738E+09	4.5738E+09
x(FT)	36.855	0.0000	0.0000	26.325	31.590	0.0000	36.855	25.515	0.0000	25.515	25.515
4	-5.6291E-04	-0.010110	-1.2596E+04	-1312.3	-49.496	-8.0588	-0.5539	-0.7376	0.4407	4.5738E+09	4.5738E+09
x(FT)	36.855	0.0000	0.0000	26.325	31.590	0.0000	36.855	25.515	0.0000	25.515	25.515
Min.	-5.6291E-04	-0.010322	-1.2598E+04	-1346.7	-49.496	-8.4004	-0.5539	-0.7600	0.3545	4.5738E+09	4.5738E+09
Pile N.	4	2	3	2	4	3	4	2	3	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. Y-DIR IN	DISPL. Z-DIR IN	MOMENT Z-DIR KIP-IN	MOMENT Y-DIR KIP-IN	SHEAR Y-DIR KIP	SHEAR Z-DIR KIP	SOIL REACT Y-DIR KIP/IN	SOIL REACT Z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. Z-DIR KIP-IN**2	FLEX. RIG. Y-DIR KIP-IN**2
1	0.026314	1.4110E-04	4872.0	1200.8	55.457	13.003	3.3245	0.1388	0.5960	8.8843E+09	8.8843E+09
x(FT)	3.2400	35.640	27.135	0.0000	0.0000	30.780	25.515	35.640	25.515	2.4300	0.0000
2	0.026314	1.4490E-04	4871.5	1269.7	55.486	13.344	3.3245	0.1426	0.4898	8.8843E+09	8.8843E+09
x(FT)	3.2400	35.640	27.135	0.0000	0.0000	30.780	25.515	35.640	25.515	2.8350	0.8100
3	0.026519	1.4488E-04	4905.2	1269.6	55.829	13.341	3.3464	0.1426	0.4367	8.8843E+09	8.8843E+09
x(FT)	3.2400	35.640	27.135	0.0000	0.0000	30.780	25.515	35.640	25.515	2.8350	0.4050
4	0.026520	1.4108E-04	4905.7	1200.7	55.800	13.000	3.3463	0.1388	0.5429	8.8843E+09	8.8843E+09
x(FT)	3.2400	35.640	27.135	0.0000	0.0000	30.780	25.515	35.640	25.515	2.4300	0.0000
Max.	0.026520	1.4490E-04	4905.7	1269.7	55.829	13.344	3.3464	0.1426	0.5960	8.8843E+09	8.8843E+09
Pile N.	4	2	4	2	3	2	3	2	1	1	1

LOAD CASE : 16
CASE NAME : Service MinV2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0671173	-0.0121738	0.0241363

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
8.54523E-06	3.64303E-05	-3.22074E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1514.8	-32.099	19.347	97.329	-3280.6	-7321.5
2	1760.4	-32.065	23.192	97.329	-4084.0	-7317.5
3	2038.2	-35.901	23.152	97.329	-4080.8	-8118.9
4	1792.6	-35.935	19.309	97.329	-3277.5	-8122.7
MINIMUM	1514.8	-35.935	19.309	97.329	-4084.0	-8122.7
Pile N.	1	4	1	2	4	
MAXIMUM	2038.2	-32.065	23.192	97.329	-3277.5	-7317.5
Pile N.	3	2	2	1	4	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-0.014319	-2.9654E-04	-2728.2	-3280.6	-32.039	-27.238	-1.8874	-0.2918	0.3594	4.5738E+09	4.5738E+09
x(FT)	3.6450	35.640	27.135	0.0000	0.0000	30.780	25.515	35.640	0.0000	25.920	26.325
2	-0.014319	-3.4110E-04	-2725.0	-4084.0	-32.006	-31.248	-1.8834	-0.3357	0.4177	4.5738E+09	4.5738E+09
x(FT)	3.6450	35.640	27.135	0.0000	0.0000	30.780	25.515	35.640	0.0000	25.515	26.325
3	-0.016710	-3.4081E-04	-3124.1	-4080.8	-35.834	-31.203	-2.1395	-0.3354	0.4837	4.5738E+09	4.5738E+09
x(FT)	3.2400	35.640	27.135	0.0000	0.0000	30.780	25.515	35.640	0.0000	26.325	25.515
4	-0.016710	-2.9626E-04	-3127.0	-3277.5	-35.868	-27.195	-2.1430	-0.2915	0.4254	4.5738E+09	4.5738E+09
x(FT)	3.2400	35.640	27.135	0.0000	0.0000	30.780	25.515	35.640	0.0000	25.515	26.325
Min.	-0.016710	-3.4110E-04	-3127.0	-4084.0	-35.868	-31.248	-2.1430	-0.3357	0.3594	4.5738E+09	4.5738E+09
Pile N.	3	2	4	2	4	2	4	2	1	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	3.1293E-04	0.019846	7321.5	2734.3	27.576	19.299	0.3079	1.6019	0.4428	8.8843E+09	8.8843E+09
x(FT)	36.855	0.0000	0.0000	26.325	31.185	0.0000	36.855	25.515	25.515	0.0000	0.0000
2	3.1300E-04	0.022307	7317.5	3133.7	27.542	23.136	0.3080	1.8583	0.5146	8.8843E+09	8.8843E+09
x(FT)	36.855	0.0000	0.0000	26.325	31.185	0.0000	36.855	25.515	25.515	0.0000	0.4050
3	3.5791E-04	0.022307	8118.9	3130.1	31.562	23.096	0.3522	1.8546	0.5958	8.8843E+09	8.8843E+09
x(FT)	36.855	0.0000	0.0000	26.325	31.185	0.0000	36.855	25.515	25.515	0.8100	0.0000
4	3.5785E-04	0.019846	8122.7	2730.8	31.595	19.261	0.3521	1.5979	0.5240	8.8843E+09	8.8843E+09
x(FT)	36.855	0.0000	0.0000	26.325	31.185	0.0000	36.855	25.515	25.515	0.0000	0.4050

Max.	3.5791E-04	0.022307	8122.7	3133.7	31.595	23.136	0.3522	1.8583	0.5958	8.8843E+09	8.8843E+09
Pile N.	3	2	4	2	4	2	3	2	3	1	1

LOAD CASE : 17
CASE NAME : Service MaxV3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0687788	4.41340E-03	0.0541257

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
2.32153E-05	8.48201E-05	1.32252E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1547.5	18.262	40.829	264.42	-6776.2	4066.5
2	1446.6	18.240	51.241	264.42	-8947.2	4063.1
3	2093.5	7.7443	51.161	264.42	-8948.8	1879.6
4	2194.4	7.7542	40.769	264.42	-6779.2	1881.0
MINIMUM	1446.6	7.7443	40.769	264.42	-8948.8	1879.6
Pile N.	2	3	4	1	3	3
MAXIMUM	2194.4	18.262	51.241	264.42	-6776.2	4066.5
Pile N.	4	1	2	1	1	1

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-1.8800E-04	-6.4111E-04	-4066.5	-6776.2	-16.597	-58.788	-0.1850	-0.6309	0.3672	4.5738E+09	4.5719E+09
x(FT)	36.855	35.640	0.0000	0.0000	31.185	30.780	36.855	35.640	0.0000	26.325	26.325
2	-1.8795E-04	-7.6049E-04	-4063.1	-8947.2	-16.538	-69.411	-0.1849	-0.7483	0.3433	4.5738E+09	4.5635E+09
x(FT)	36.855	36.045	0.0000	0.0000	31.185	30.780	36.855	36.045	0.0000	25.920	26.325
3	-6.6652E-05	-7.6092E-04	-1879.6	-8948.8	-5.6535	-69.485	-0.065586	-0.7487	0.4968	4.5738E+09	4.5635E+09

x(FT)	37.665	36.045	0.0000	0.0000	31.590	30.780	37.665	36.045	0.0000	25.515	26.325
4	-6.6551E-05	-6.4176E-04	-1881.0	-6779.2	-5.6738	-58.876	-0.065486	-0.6315	0.5207	4.5738E+09	4.5719E+09
x(FT)	37.665	35.640	0.0000	0.0000	31.590	30.780	37.665	35.640	0.0000	25.920	26.325
Min.	-1.8800E-04	-7.6092E-04	-4066.5	-8948.8	-16.597	-69.485	-0.1850	-0.7487	0.3433	4.5738E+09	4.5635E+09
Pile N.	1	3	1	3	1	3	1	3	2	1	2

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	9.0666E-03	0.043658	1645.3	5917.0	18.226	40.723	1.1095	3.4242	0.4523	8.8843E+09	8.8843E+09
x(FT)	2.4300	0.0000	27.135	26.325	0.0000	0.0000	25.515	25.515	25.515	0.0000	0.0000
2	9.0668E-03	0.050344	1641.3	6985.3	18.203	51.112	1.1066	4.1129	0.4228	8.8843E+09	8.8843E+09
x(FT)	2.4300	0.0000	27.135	26.325	0.0000	0.0000	25.515	25.515	25.515	0.4050	1.2150
3	2.6391E-03	0.050344	554.64	6988.7	7.7310	51.034	0.4076	4.1135	0.6119	8.8843E+09	8.8843E+09
x(FT)	6.0750	0.0000	27.135	26.325	0.0000	0.0000	25.515	25.515	25.515	0.8100	1.2150
4	2.6387E-03	0.043658	556.37	5921.3	7.7410	40.665	0.4088	3.4256	0.6414	8.8843E+09	8.8843E+09
x(FT)	6.0750	0.0000	27.135	26.325	0.0000	0.0000	25.515	25.515	25.515	0.4050	0.0000
Max.	9.0668E-03	0.050344	1645.3	6988.7	18.226	51.112	1.1095	4.1135	0.6414	8.8843E+09	8.8843E+09
Pile N.	2	2	1	3	1	2	1	3	4	1	1

LOAD CASE : 18
CASE NAME : Service MinV3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0685334	7.28553E-03	-0.0365067

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-8.66337E-06	-6.30194E-05	8.19446E-06

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2085.6	13.285	-26.531	-98.674	4244.4	2928.1

2	2023.1	13.279	-30.442	-98.674	5058.4	2927.1
3	1542.4	17.215	-30.473	-98.674	5056.4	3743.9
4	1604.9	17.221	-26.554	-98.674	4241.8	3745.0
MINIMUM	1542.4	13.279	-30.473	-98.674	4241.8	2927.1
Pile N.	3	2	3	1	4	2
MAXIMUM	2085.6	17.221	-26.531	-98.674	5058.4	3745.0
Pile N.	1	4	1	1	2	4

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-1.3918E-04	-0.029966	-2928.1	-4015.5	-12.398	-26.463	-0.1369	-2.3061	0.4949	4.5738E+09	4.5738E+09
x(FT)	36.450	0.0000	0.0000	26.325	31.185	0.0000	36.450	25.515	0.0000	25.515	25.515
2	-1.3916E-04	-0.032461	-2927.1	-4419.7	-12.385	-30.366	-0.1369	-2.5640	0.4801	4.5738E+09	4.5738E+09
x(FT)	36.450	0.0000	0.0000	26.325	31.185	0.0000	36.450	25.515	0.0000	26.325	25.920
3	-1.8481E-04	-0.032461	-3743.9	-4416.9	-16.488	-30.396	-0.1819	-2.5622	0.3660	4.5738E+09	4.5738E+09
x(FT)	36.450	0.0000	0.0000	26.325	31.185	0.0000	36.450	25.515	0.0000	25.515	25.515
4	-1.8484E-04	-0.029966	-3745.0	-4012.1	-16.501	-26.485	-0.1819	-2.3035	0.3809	4.5738E+09	4.5738E+09
x(FT)	36.450	0.0000	0.0000	26.325	31.185	0.0000	36.450	25.515	0.0000	26.325	25.515
Min.	-1.8484E-04	-0.032461	-3745.0	-4419.7	-16.501	-30.396	-0.1819	-2.5640	0.3660	4.5738E+09	4.5738E+09
Pile N.	4	2	4	2	4	3	4	2	3	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	6.8316E-03	4.3359E-04	1228.6	4244.4	13.260	39.945	0.8240	0.4266	0.6096	8.8843E+09	8.8843E+09
x(FT)	2.0250	35.640	26.730	0.0000	0.0000	30.780	25.515	35.640	25.515	0.0000	0.0000
2	6.8316E-03	4.7874E-04	1227.3	5058.4	13.253	44.005	0.8220	0.4711	0.5913	8.8843E+09	8.8843E+09
x(FT)	2.0250	35.640	26.730	0.0000	0.0000	30.780	25.515	35.640	25.515	0.0000	1.2150
3	9.3033E-03	4.7840E-04	1636.5	5056.4	17.181	43.958	1.0845	0.4707	0.4508	8.8843E+09	8.8843E+09
x(FT)	1.6200	35.640	26.730	0.0000	0.0000	30.780	25.515	35.640	25.515	1.2150	0.4050
4	9.3033E-03	4.3323E-04	1637.7	4241.8	17.187	39.894	1.0866	0.4263	0.4691	8.8843E+09	8.8843E+09
x(FT)	1.6200	35.640	26.730	0.0000	0.0000	30.780	25.515	35.640	25.515	0.0000	0.4050
Max.	9.3033E-03	4.7874E-04	1637.7	5058.4	17.187	44.005	1.0866	0.4711	0.6096	8.8843E+09	8.8843E+09
Pile N.	3	2	4	2	4	2	4	2	1	1	1

LOAD CASE : 19
CASE NAME : Service MaxT
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0678442	0.0123942	0.0277945

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
6.57561E-05	4.22789E-05	4.90372E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1821.5	56.835	9.3601	748.95	-1093.8	1.2819E+04
2	1447.5	56.766	39.047	748.95	-7270.5	1.2806E+04
3	1770.0	27.130	39.138	748.95	-7287.7	6635.7
4	2144.0	27.269	9.4555	748.95	-1109.2	6655.1
MINIMUM	1447.5	27.130	9.3601	748.95	-7287.7	6635.7
Pile N.	2	3	1	1	3	3
MAXIMUM	2144.0	56.835	39.138	748.95	-1093.8	1.2819E+04
Pile N.	4	1	3	1	1	1

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-5.7123E-04	-1.9311E-04	-1.2819E+04	-1093.8	-50.191	-17.889	-0.5621	-0.1898	0.4322	4.5738E+09	4.5738E+09
x(FT)	36.855	35.235	0.0000	0.0000	31.590	30.780	36.855	35.640	0.0000	25.515	25.515
2	-5.7092E-04	-5.3587E-04	-1.2806E+04	-7270.5	-49.986	-48.580	-0.5618	-0.5273	0.3435	4.5738E+09	4.5738E+09
x(FT)	36.855	36.045	0.0000	0.0000	31.590	31.185	36.855	36.045	0.0000	25.515	25.515
3	-2.2802E-04	-5.3769E-04	-6635.7	-7287.7	-19.327	-48.886	-0.2244	-0.5291	0.4200	4.5738E+09	4.5738E+09
x(FT)	37.665	36.045	0.0000	0.0000	31.590	30.780	37.665	36.045	0.0000	27.135	26.325
4	-2.2664E-04	-1.9524E-04	-6655.1	-1109.2	-19.518	-18.154	-0.2230	-0.1913	0.5088	4.5738E+09	4.5738E+09
x(FT)	37.260	35.235	0.0000	0.0000	31.590	30.375	37.260	35.640	0.0000	25.920	25.515
Min.	-5.7123E-04	-5.3769E-04	-1.2819E+04	-7287.7	-50.191	-48.886	-0.5621	-0.5291	0.3435	4.5738E+09	4.5738E+09
Pile N.	1	3	1	3	1	3	1	3	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.026859	0.014774	4974.3	1812.6	56.726	9.3309	3.3952	0.9754	0.5324	8.8843E+09	8.8843E+09
x(FT)	3.2400	0.0000	27.135	26.325	0.0000	0.0000	25.515	25.515	25.515	2.8350	0.0000
2	0.026860	0.033712	4958.1	4881.4	56.655	38.953	3.3821	2.9517	0.4231	8.8843E+09	8.8843E+09
x(FT)	3.2400	0.0000	27.135	26.730	0.0000	0.0000	25.515	25.515	25.515	2.8350	0.4050
3	8.8368E-03	0.033712	1893.1	4902.0	27.084	39.046	1.4085	2.9666	0.5174	8.8843E+09	8.8843E+09
x(FT)	6.4800	0.0000	27.135	26.730	0.0000	0.0000	25.515	25.515	25.515	0.0000	0.0000
4	8.8314E-03	0.014774	1914.8	1830.8	27.225	9.4275	1.4376	0.9978	0.6267	8.8843E+09	8.8843E+09
x(FT)	6.4800	0.0000	27.135	26.325	0.0000	0.0000	25.515	25.515	25.515	0.0000	0.0000
Max.	0.026860	0.033712	4974.3	4902.0	56.726	39.046	3.3952	2.9666	0.6267	8.8843E+09	8.8843E+09
Pile N.	2	2	1	3	1	3	1	3	4	1	1

LOAD CASE : 20
CASE NAME : Service MinT
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0677498	-2.15409E-03	-0.0155750

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-5.54949E-05	-2.94768E-05	-3.38185E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1776.7	-31.672	1.6144	-632.08	-932.58	-7259.9
2	2034.6	-31.544	-23.545	-632.08	4301.1	-7243.0
3	1809.8	-6.3828	-23.665	-632.08	4315.9	-2010.4
4	1551.9	-6.4015	1.5959	-632.08	-930.72	-2013.5
MINIMUM	1551.9	-31.672	-23.665	-632.08	-932.58	-7259.9
Pile N.	4	1	3	1	1	1
MAXIMUM	2034.6	-6.3828	1.6144	-632.08	4315.9	-2010.4
Pile N.	2	3	1	1	3	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-0.013733	-5.1077E-03	-2658.4	-932.58	-31.615	2.5556E-03	-1.8617	-0.1383	0.4216	4.5738E+09	4.5738E+09
x(FT)	3.6450	0.0000	27.135	0.0000	0.0000	40.500	25.515	25.515	0.0000	25.515	25.515
2	-0.013734	-0.021090	-2642.3	-3033.8	-31.487	-23.490	-1.8366	-1.8261	0.4828	4.5738E+09	4.5738E+09
x(FT)	3.6450	0.0000	27.135	26.325	0.0000	0.0000	25.515	25.515	0.0000	26.325	25.920
3	-2.4547E-04	-0.021090	-87.257	-3051.3	-6.3771	-23.611	-0.1480	-1.8484	0.4295	4.5738E+09	4.5738E+09
x(FT)	20.250	0.0000	30.375	26.325	0.0000	0.0000	25.515	25.515	0.0000	25.515	25.515
4	-2.4182E-04	-5.1077E-03	-86.477	-930.72	-6.3959	2.4484E-03	-0.1578	-0.1478	0.3683	4.5738E+09	4.5738E+09
x(FT)	20.250	0.0000	30.375	0.0000	0.0000	40.500	25.515	25.515	0.0000	25.515	25.515
Min.	-0.013734	-0.021090	-2658.4	-3051.3	-31.615	-23.611	-1.8617	-1.8484	0.3683	4.5738E+09	4.5738E+09
Pile N.	2	2	1	3	1	3	1	3	4	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	3.0384E-04	4.6801E-05	7259.9	0.0000	26.884	4.4357	0.2990	0.045771	0.5193	8.8843E+09	8.8843E+09
x(FT)	36.855	33.210	0.0000	40.500	31.185	28.755	36.855	33.210	25.515	0.0000	0.0000
2	3.0417E-04	3.3148E-04	7243.0	4301.1	26.726	30.302	0.2993	0.3262	0.5947	8.8843E+09	8.8843E+09
x(FT)	36.855	35.640	0.0000	0.0000	31.590	30.780	36.855	35.640	25.515	0.4050	0.0000
3	2.9964E-03	3.3273E-04	2010.4	4315.9	1.0954	30.501	0.029114	0.3274	0.5290	8.8843E+09	8.8843E+09
x(FT)	0.0000	35.640	0.0000	0.0000	34.830	30.780	40.500	35.640	25.515	0.4050	0.0000
4	2.9964E-03	4.7332E-05	2013.5	3.2805E-13	1.0794	4.4877	0.028399	0.046291	0.4536	8.8843E+09	8.8843E+09
x(FT)	0.0000	33.210	0.0000	40.500	34.830	28.755	40.500	33.210	25.515	0.8100	0.0000
Max.	2.9964E-03	3.3273E-04	7259.9	4315.9	26.884	30.501	0.2993	0.3274	0.5947	8.8843E+09	8.8843E+09
Pile N.	3	3	1	3	1	3	2	3	2	1	1

LOAD CASE : 21
CASE NAME : Service MaxM2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0687788	4.41340E-03	0.0541257

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
2.32153E-05	8.48201E-05	1.32252E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1547.5	18.262	40.829	264.42	-6776.2	4066.5
2	1446.6	18.240	51.241	264.42	-8947.2	4063.1
3	2093.5	7.7443	51.161	264.42	-8948.8	1879.6
4	2194.4	7.7542	40.769	264.42	-6779.2	1881.0
MINIMUM	1446.6	7.7443	40.769	264.42	-8948.8	1879.6
Pile N.	2	3	4	1	3	3
MAXIMUM	2194.4	18.262	51.241	264.42	-6776.2	4066.5
Pile N.	4	1	2	1	1	1

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-1.8800E-04	-6.4111E-04	-4066.5	-6776.2	-16.597	-58.788	-0.1850	-0.6309	0.3672	4.5738E+09	4.5719E+09
x(FT)	36.855	35.640	0.0000	0.0000	31.185	30.780	36.855	35.640	0.0000	25.515	26.325
2	-1.8795E-04	-7.6049E-04	-4063.1	-8947.2	-16.538	-69.411	-0.1849	-0.7483	0.3433	4.5738E+09	4.5635E+09
x(FT)	36.855	36.045	0.0000	0.0000	31.185	30.780	36.855	36.045	0.0000	26.325	26.325
3	-6.6652E-05	-7.6092E-04	-1879.6	-8948.8	-5.6535	-69.485	-0.065586	-0.7487	0.4968	4.5738E+09	4.5635E+09
x(FT)	37.665	36.045	0.0000	0.0000	31.590	30.780	37.665	36.045	0.0000	25.515	26.325
4	-6.6551E-05	-6.4176E-04	-1881.0	-6779.2	-5.6738	-58.876	-0.065486	-0.6315	0.5207	4.5738E+09	4.5719E+09
x(FT)	37.665	35.640	0.0000	0.0000	31.590	30.780	37.665	35.640	0.0000	25.515	26.325
Min.	-1.8800E-04	-7.6092E-04	-4066.5	-8948.8	-16.597	-69.485	-0.1850	-0.7487	0.3433	4.5738E+09	4.5635E+09
Pile N.	1	3	1	3	1	3	1	3	2	1	2

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	9.0666E-03	0.043658	1645.3	5917.0	18.226	40.723	1.1095	3.4242	0.4523	8.8843E+09	8.8843E+09
x(FT)	2.4300	0.0000	27.135	26.325	0.0000	0.0000	25.515	25.515	25.515	0.0000	0.8100
2	9.0668E-03	0.050344	1641.3	6985.3	18.203	51.112	1.1066	4.1129	0.4228	8.8843E+09	8.8843E+09
x(FT)	2.4300	0.0000	27.135	26.325	0.0000	0.0000	25.515	25.515	25.515	0.0000	1.2150
3	2.6391E-03	0.050344	554.64	6988.7	7.7310	51.034	0.4076	4.1135	0.6119	8.8843E+09	8.8843E+09
x(FT)	6.0750	0.0000	27.135	26.325	0.0000	0.0000	25.515	25.515	25.515	0.0000	1.6200
4	2.6387E-03	0.043658	556.37	5921.3	7.7410	40.665	0.4088	3.4256	0.6414	8.8843E+09	8.8843E+09

x(FT)	6.0750	0.0000	27.135	26.325	0.0000	0.0000	25.515	25.515	25.515	0.0000	0.0000
Max.	9.0668E-03	0.050344	1645.3	6988.7	18.226	51.112	1.1095	4.1135	0.6414	8.8843E+09	8.8843E+09
Pile N.	2	2	1	3	1	2	1	3	4	1	1

LOAD CASE : 22
CASE NAME : Service MinM2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0685334	7.28553E-03	-0.0365067

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-8.66337E-06	-6.30194E-05	8.19446E-06

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2085.6	13.285	-26.531	-98.674	4244.4	2928.1
2	2023.1	13.279	-30.442	-98.674	5058.4	2927.1
3	1542.4	17.215	-30.473	-98.674	5056.4	3743.9
4	1604.9	17.221	-26.554	-98.674	4241.8	3745.0
MINIMUM	1542.4	13.279	-30.473	-98.674	4241.8	2927.1
Pile N.	3	2	3	1	4	2
MAXIMUM	2085.6	17.221	-26.531	-98.674	5058.4	3745.0
Pile N.	1	4	1	1	2	4

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-1.3918E-04	-0.029966	-2928.1	-4015.5	-12.398	-26.463	-0.1369	-2.3061	0.4949	4.5738E+09	4.5738E+09
x(FT)	36.450	0.0000	0.0000	26.325	31.185	0.0000	36.450	25.515	0.0000	25.920	26.325

2	-1.3916E-04	-0.032461	-2927.1	-4419.7	-12.385	-30.366	-0.1369	-2.5640	0.4801	4.5738E+09	4.5738E+09
x(FT)	36.450	0.0000	0.0000	26.325	31.185	0.0000	36.450	25.515	0.0000	25.920	25.515
3	-1.8481E-04	-0.032461	-3743.9	-4416.9	-16.488	-30.396	-0.1819	-2.5622	0.3660	4.5738E+09	4.5738E+09
x(FT)	36.450	0.0000	0.0000	26.325	31.185	0.0000	36.450	25.515	0.0000	25.515	27.135
4	-1.8484E-04	-0.029966	-3745.0	-4012.1	-16.501	-26.485	-0.1819	-2.3035	0.3809	4.5738E+09	4.5738E+09
x(FT)	36.450	0.0000	0.0000	26.325	31.185	0.0000	36.450	25.515	0.0000	25.515	25.920
Min.	-1.8484E-04	-0.032461	-3745.0	-4419.7	-16.501	-30.396	-0.1819	-2.5640	0.3660	4.5738E+09	4.5738E+09
Pile N.	4	2	4	2	4	3	4	2	3	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	6.8316E-03	4.3359E-04	1228.6	4244.4	13.260	39.945	0.8240	0.4266	0.6096	8.8843E+09	8.8843E+09
x(FT)	2.0250	35.640	26.730	0.0000	0.0000	30.780	25.515	35.640	25.515	0.0000	0.8100
2	6.8316E-03	4.7874E-04	1227.3	5058.4	13.253	44.005	0.8220	0.4711	0.5913	8.8843E+09	8.8843E+09
x(FT)	2.0250	35.640	26.730	0.0000	0.0000	30.780	25.515	35.640	25.515	0.0000	0.0000
3	9.3033E-03	4.7840E-04	1636.5	5056.4	17.181	43.958	1.0845	0.4707	0.4508	8.8843E+09	8.8843E+09
x(FT)	1.6200	35.640	26.730	0.0000	0.0000	30.780	25.515	35.640	25.515	0.0000	0.0000
4	9.3033E-03	4.3323E-04	1637.7	4241.8	17.187	39.894	1.0866	0.4263	0.4691	8.8843E+09	8.8843E+09
x(FT)	1.6200	35.640	26.730	0.0000	0.0000	30.780	25.515	35.640	25.515	0.0000	0.4050
Max.	9.3033E-03	4.7874E-04	1637.7	5058.4	17.187	44.005	1.0866	0.4711	0.6096	8.8843E+09	8.8843E+09
Pile N.	3	2	4	2	4	2	4	2	1	1	1

LOAD CASE : 23
CASE NAME : Service MaxM3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0663903	6.46186E-03	-0.0118279

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
2.78001E-06	-2.31250E-05	6.84986E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN

1	2106.6	42.356	-8.6184	31.664	1325.1	1.0191E+04
2	1584.2	42.385	-7.3723	31.664	1062.9	1.0194E+04
3	1407.9	41.143	-7.3812	31.664	1063.4	9934.4
4	1930.3	41.116	-8.6282	31.664	1325.8	9931.1
MINIMUM	1407.9	41.116	-8.6282	31.664	1062.9	9931.1
Pile N.	3	4	4	1	2	4
MAXIMUM	2106.6	42.385	-7.3723	31.664	1325.8	1.0194E+04
Pile N.	1	2	2	1	4	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-3.6742E-04	-0.010286	-1.0191E+04	-1357.6	-31.698	-8.5957	-0.3615	-0.7730	0.4999	4.5738E+09	4.5738E+09
x(FT)	37.260	0.0000	0.0000	26.325	31.590	0.0000	37.260	25.515	0.0000	25.515	25.515
2	-3.6730E-04	-9.4851E-03	-1.0194E+04	-1226.7	-31.690	-7.3520	-0.3614	-0.6886	0.3759	4.5738E+09	4.5738E+09
x(FT)	37.260	0.0000	0.0000	26.325	31.590	0.0000	37.260	25.515	0.0000	25.515	25.515
3	-3.5274E-04	-9.4851E-03	-9934.4	-1227.3	-30.388	-7.3609	-0.3471	-0.6895	0.3341	4.5738E+09	4.5738E+09
x(FT)	37.260	0.0000	0.0000	26.325	31.590	0.0000	37.260	25.515	0.0000	25.515	25.515
4	-3.5286E-04	-0.010286	-9931.1	-1358.3	-30.396	-8.6055	-0.3472	-0.7740	0.4581	4.5738E+09	4.5738E+09
x(FT)	37.260	0.0000	0.0000	26.325	31.590	0.0000	37.260	25.515	0.0000	25.515	25.515
Min.	-3.6742E-04	-0.010286	-1.0194E+04	-1358.3	-31.698	-8.6055	-0.3615	-0.7740	0.3341	4.5738E+09	4.5738E+09
Pile N.	1	1	2	4	1	4	1	4	3	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.014870	1.4617E-04	3113.9	1325.1	42.284	13.489	2.2796	0.1438	0.6158	8.8843E+09	8.8843E+09
x(FT)	5.6700	35.640	27.135	0.0000	0.0000	30.780	25.515	35.640	25.515	0.0000	0.0000
2	0.014869	1.3156E-04	3114.1	1062.9	42.312	12.170	2.2805	0.1295	0.4631	8.8843E+09	8.8843E+09
x(FT)	5.6700	35.640	27.135	0.0000	0.0000	30.780	25.515	35.640	25.515	0.0000	0.0000
3	0.014134	1.3160E-04	2984.7	1063.4	41.073	12.177	2.1982	0.1295	0.4115	8.8843E+09	8.8843E+09
x(FT)	6.0750	35.640	27.135	0.0000	0.0000	30.780	25.515	35.640	25.515	0.8100	0.0000
4	0.014135	1.4621E-04	2984.6	1325.8	41.046	13.497	2.1972	0.1439	0.5642	8.8843E+09	8.8843E+09
x(FT)	6.0750	35.640	27.135	0.0000	0.0000	30.780	25.515	35.640	25.515	0.0000	0.0000
Max.	0.014870	1.4621E-04	3114.1	1325.8	42.312	13.497	2.2805	0.1439	0.6158	8.8843E+09	8.8843E+09
Pile N.	1	4	2	4	2	4	2	4	1	1	1

LOAD CASE : 24
CASE NAME : Service MinM3

LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0678064	2.05690E-03	0.0227833

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
7.37784E-06	3.41569E-05	-5.30882E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1462.1	-19.588	18.613	84.033	-3167.7	-5142.4
2	1866.9	-19.564	21.914	84.033	-3860.3	-5138.4
3	2127.4	-22.917	21.898	84.033	-3860.1	-5834.8
4	1722.6	-22.931	18.575	84.033	-3164.3	-5837.1
MINIMUM	1462.1	-22.931	18.575	84.033	-3860.3	-5837.1
Pile N.	1	4	4	1	2	4
MAXIMUM	2127.4	-19.564	21.914	84.033	-3164.3	-5138.4
Pile N.	3	2	2	1	4	2

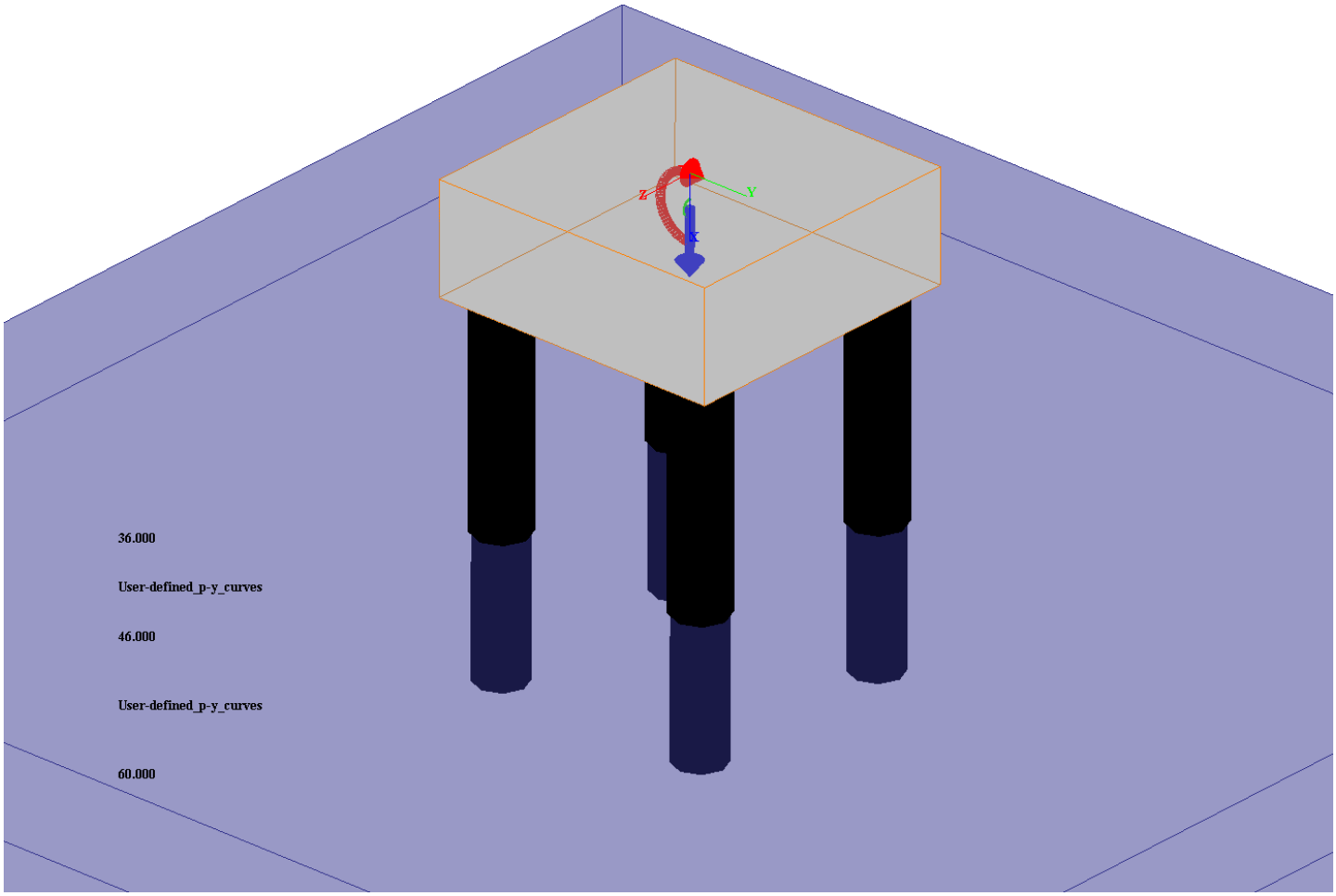
* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-4.1745E-03	-2.8345E-04	-1047.0	-3167.7	-19.560	-26.096	-0.8810	-0.2789	0.3469	4.5738E+09	4.5738E+09
x(FT)	9.7200	35.640	27.540	0.0000	0.0000	30.780	25.515	35.640	0.0000	25.515	25.515
2	-4.1764E-03	-3.2196E-04	-1044.9	-3860.3	-19.536	-29.558	-0.8767	-0.3168	0.4430	4.5738E+09	4.5738E+09
x(FT)	9.7200	35.640	27.540	0.0000	0.0000	30.780	25.515	35.640	0.0000	25.920	25.515
3	-5.9163E-03	-3.2201E-04	-1389.3	-3860.1	-22.882	-29.564	-1.1025	-0.3169	0.5048	4.5738E+09	4.5738E+09
x(FT)	8.5050	35.640	27.540	0.0000	0.0000	30.780	25.515	35.640	0.0000	25.515	25.515
4	-5.9155E-03	-2.8323E-04	-1389.7	-3164.3	-22.895	-26.058	-1.1053	-0.2787	0.4088	4.5738E+09	4.5738E+09
x(FT)	8.5050	35.640	27.540	0.0000	0.0000	30.780	25.515	35.640	0.0000	25.515	25.515
Min.	-5.9163E-03	-3.2201E-04	-1389.7	-3860.3	-22.895	-29.564	-1.1053	-0.3169	0.3469	4.5738E+09	4.5738E+09
Pile N.	3	3	4	2	4	3	4	3	1	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	1.3728E-04	0.018852	5142.4	2617.7	10.827	18.568	0.1351	1.5476	0.4274	8.8843E+09	8.8843E+09
x(FT)	40.500	0.0000	0.0000	26.325	31.995	0.0000	40.500	25.515	25.515	1.2150	0.4050
2	1.3810E-04	0.020976	5138.4	2961.4	10.817	21.863	0.1359	1.7659	0.5457	8.8843E+09	8.8843E+09
x(FT)	40.500	0.0000	0.0000	26.325	31.995	0.0000	40.500	25.515	25.515	0.0000	0.4050
3	1.7219E-04	0.020976	5834.8	2961.5	14.259	21.846	0.1694	1.7643	0.6218	8.8843E+09	8.8843E+09
x(FT)	38.475	0.0000	0.0000	26.325	31.995	0.0000	38.475	25.515	25.515	0.8100	0.4050
4	1.7201E-04	0.018852	5837.1	2613.8	14.258	18.530	0.1693	1.5421	0.5035	8.8843E+09	8.8843E+09
x(FT)	38.475	0.0000	0.0000	26.325	31.995	0.0000	38.475	25.515	25.515	0.4050	0.0000
Max.	1.7219E-04	0.020976	5837.1	2961.5	14.259	21.863	0.1694	1.7659	0.6218	8.8843E+09	8.8843E+09
Pile N.	3	2	4	3	3	2	3	2	3	1	1

Pier 5
NCHRP p-y parameters (Lower Bound)
Scoured to Bedrock
40 #11 Bar Reinforcement
Strength Condition: Load Cases 1 through 12
Service Condition: Load cases 13 through 24
0.75" thick casing reduced to 0.625" after 1/8" of corrosion



Pier 5 Loading Schedule provided by HNTB on 8/21/2020
Converted to kip-in

	PIER	ID	Station	Output	Case	P	V2	V3	T	M2	M3
						Vertical, x-di	orizontal, F	orizontal, F	Mx	My	Mz
	-	-	ft	-	-	kip	Kip	Kip	Kip-in	Kip-in	Kip-in
1	PileCap 5	5147	0	STRENGTH	Max P	6149	-542	217	-1655	109083	-65139
2	PileCap 5	5147	0	STRENGTH	Min P	10792	-3	-146	-2055	-135135	8917
3	PileCap 5	5147	0	STRENGTH	Max V2	9113	878	216	2817	108085	355109
4	PileCap 5	5147	0	STRENGTH	Min V2	6341	-826	-224	-5438	-142771	-310729
5	PileCap 5	5147	0	STRENGTH	Max V3	6329	633	345	-233	202393	145024
6	PileCap 5	5147	0	STRENGTH	Min V3	9125	-508	-304	-1203	-196146	-33265
7	PileCap 5	5147	0	STRENGTH	Max T	6357	878	223	3513	113814	349915
8	PileCap 5	5147	0	STRENGTH	Min T	9812	-115	-165	-6144	-151078	-116139
9	PileCap 5	5147	0	STRENGTH	Max M2	6329	633	345	-233	202393	145024
10	PileCap 5	5147	0	STRENGTH	Min M2	9973	-584	-289	-3770	-196777	-85654
11	PileCap 5	5147	0	STRENGTH	Max M3	9113	878	216	2817	108085	355109
12	PileCap 5	5147	0	STRENGTH	Min M3	6341	-826	-224	-5438	-142771	-310729
13	PileCap 5	5147	0	SERVICE	Max P	7048	63	155	55	115122	57074
14	PileCap 5	5147	0	SERVICE	Min P	8303	-17	-172	-3329	-156558	-20770
15	PileCap 5	5147	0	SERVICE	Max V2	7471	223	166	1736	123965	154231
16	PileCap 5	5147	0	SERVICE	Min V2	7546	-169	-174	-4707	-158461	-117077
17	PileCap 5	5147	0	SERVICE	Max V3	7725	84	232	729	175471	66914
18	PileCap 5	5147	0	SERVICE	Min V3	7694	-10	-226	-3543	-198078	-7624
19	PileCap 5	5147	0	SERVICE	Max T	7445	150	173	3287	129577	163364
20	PileCap 5	5147	0	SERVICE	Min T	7762	-111	-178	-6357	-161929	-117682
21	PileCap 5	5147	0	SERVICE	Max M2	7725	84	232	729	175471	66914
22	PileCap 5	5147	0	SERVICE	Min M2	7694	-10	-226	-3543	-198078	-7624
23	PileCap 5	5147	0	SERVICE	Max M3	7607	159	158	2214	117668	174674
24	PileCap 5	5147	0	SERVICE	Min M3	7518	-111	-162	-5569	-148543	-138736

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

                GROUP for Windows, Version 2016.10.13

                 Serial Number : 364300562

                  Analysis of A Group of Piles
                Subjected to Axial and Lateral Loading

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                      All Rights Reserved

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

          Date:  August 31, 2020     Time:  14:30:15



            *****     COMPUTATION RESULTS     *****


Pier 5



            *****     LOAD CASES RESULTS      *****


LOAD CASE :     1
CASE NAME : Strength MaxP
LOAD TYPE : Dead, DL



* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *


       VERTICAL ,IN      HORIZONTAL Y,IN     HORIZONTAL Z,IN
          0.0614304           -0.15657          0.0722243

     ANGLE ROT. X,RAD    ANGLE ROT. Y,RAD    ANGLE ROT. Z,RAD
       -9.60963E-06         7.83074E-05         4.24430E-05
```


* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1408.0	-136.05	55.835	-101.88	-1.1463E+04	-3.2796E+04
2	1102.0	-136.20	52.750	-101.88	-1.0737E+04	-3.2802E+04
3	1666.5	-134.95	52.667	-101.88	-1.0738E+04	-3.2456E+04
4	1972.5	-134.80	55.748	-101.88	-1.1464E+04	-3.2450E+04
MINIMUM	1102.0	-136.20	52.667	-101.88	-1.1464E+04	-3.2802E+04
Pile N.	2	2	3	1	4	2
MAXIMUM	1972.5	-134.80	55.835	-101.88	-1.0737E+04	-3.2450E+04
Pile N.	4	4	1	1	2	4

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-0.1544	-9.3725E-04	-1.5331E+04	-1.1463E+04	-135.72	-81.219	-9.9642	-0.8744	0.3341	1.7153E+09	4.5563E+09
x(FT)	0.0000	39.600	29.920	0.0000	0.0000	34.320	29.040	39.600	0.0000	30.360	29.920
2	-0.1544	-8.9204E-04	-1.5332E+04	-1.0737E+04	-135.87	-77.425	-9.9801	-0.8327	0.2615	1.7150E+09	4.5582E+09
x(FT)	0.0000	39.600	29.920	0.0000	0.0000	34.320	29.040	39.600	0.0000	30.360	29.920
3	-0.1516	-8.9232E-04	-1.5315E+04	-1.0738E+04	-134.62	-77.473	-9.8826	-0.8329	0.3955	1.7389E+09	4.5582E+09
x(FT)	0.0000	39.600	29.920	0.0000	0.0000	34.320	29.040	39.600	0.0000	30.360	29.920
4	-0.1516	-9.3755E-04	-1.5314E+04	-1.1464E+04	-134.48	-81.269	-9.8663	-0.8746	0.4681	1.7395E+09	4.5563E+09
x(FT)	0.0000	39.600	29.920	0.0000	0.0000	34.320	29.040	39.600	0.0000	30.360	29.920
Min.	-0.1544	-9.3755E-04	-1.5332E+04	-1.1464E+04	-135.87	-81.269	-9.9801	-0.8746	0.2615	1.7150E+09	4.5563E+09
Pile N.	1	4	2	4	2	4	2	4	2	2	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	1.7576E-03	0.067030	3.2796E+04	8256.4	151.50	55.659	1.6397	4.3204	0.4115	8.8843E+09	8.8843E+09
x(FT)	39.600	0.0000	0.0000	29.920	34.760	0.0000	39.600	29.040	29.040	13.640	0.8800
2	1.7560E-03	0.064263	3.2802E+04	7873.0	151.49	52.582	1.6392	4.1133	0.3221	8.8843E+09	8.8843E+09
x(FT)	39.600	0.0000	0.0000	29.920	34.760	0.0000	39.600	29.040	29.040	13.640	0.8800
3	1.7554E-03	0.064263	3.2456E+04	7876.0	151.38	52.502	1.6385	4.1217	0.4871	8.8843E+09	8.8843E+09
x(FT)	39.600	0.0000	0.0000	29.920	34.760	0.0000	39.600	29.040	29.040	14.080	0.4400
4	1.7570E-03	0.067030	3.2450E+04	8259.5	151.39	55.575	1.6390	4.3290	0.5766	8.8843E+09	8.8843E+09
x(FT)	39.600	0.0000	0.0000	29.920	34.760	0.0000	39.600	29.040	29.040	13.200	0.8800

Max.	1.7576E-03	0.067030	3.2802E+04	8259.5	151.50	55.659	1.6397	4.3290	0.5766	8.8843E+09	8.8843E+09
Pile N.	1	1	2	4	1	1	1	4	4	1	1

LOAD CASE : 2
CASE NAME : Strength MinP
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.10780	-2.07654E-03	-0.0572354

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-8.81793E-06	-8.13780E-05	4.52926E-06

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	3007.7	-2.2156	-35.008	-93.487	6590.8	-428.41
2	2975.0	-2.2143	-37.913	-93.487	7262.0	-428.17
3	2388.3	0.7148	-37.994	-93.487	7262.6	247.49
4	2421.0	0.7150	-35.085	-93.487	6591.2	247.51
MINIMUM	2388.3	-2.2156	-37.994	-93.487	6590.8	-428.41
Pile N.	3	1	3	1	1	1
MAXIMUM	3007.7	0.7150	-35.008	-93.487	7262.6	247.51
Pile N.	1	4	1	1	3	4

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-2.9659E-03	-0.049130	-357.05	-5820.2	-2.2092	-34.905	-0.1998	-3.2312	0.7137	4.5738E+09	4.5729E+09
x(FT)	0.0000	0.0000	29.920	29.920	0.0000	0.0000	29.040	29.040	0.0000	29.040	29.920
2	-2.9659E-03	-0.051669	-356.74	-6177.3	-2.2079	-37.803	-0.1996	-3.4460	0.7060	4.5738E+09	4.5696E+09
x(FT)	0.0000	0.0000	29.920	29.920	0.0000	0.0000	29.040	29.040	0.0000	29.040	29.920
3	-4.2630E-04	-0.051669	-247.49	-6177.0	-0.1674	-37.882	-3.7085E-03	-3.4471	0.5667	4.5738E+09	4.5696E+09
x(FT)	0.0000	0.0000	0.0000	29.920	37.400	0.0000	44.000	29.040	0.0000	29.040	29.920
4	-4.2630E-04	-0.049130	-247.51	-5819.9	-0.1674	-34.981	-3.6974E-03	-3.2324	0.5745	4.5738E+09	4.5729E+09

x(FT)	0.0000	0.0000	0.0000	29.920	37.400	0.0000	44.000	29.040	0.0000	29.040	29.920
Min.	-2.9659E-03	-0.051669	-357.05	-6177.3	-2.2092	-37.882	-0.1998	-3.4471	0.5667	4.5738E+09	4.5696E+09
Pile N.	1	2	1	2	1	3	1	3	3	1	2

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	3.8464E-05	6.2583E-04	428.41	6590.8	3.5446	57.744	0.037848	0.6158	0.8791	8.8843E+09	8.8843E+09
x(FT)	39.160	39.160	0.0000	0.0000	34.320	34.320	39.160	39.160	29.040	0.4400	0.4400
2	3.8432E-05	6.6502E-04	428.17	7262.0	3.5399	61.282	0.037817	0.6544	0.8696	8.8843E+09	8.8843E+09
x(FT)	39.160	39.160	0.0000	0.0000	34.320	34.320	39.160	39.160	29.040	0.8800	1.3200
3	4.2705E-05	6.6485E-04	14.353	7262.6	0.7141	61.262	0.019358	0.6542	0.6981	8.8843E+09	8.8843E+09
x(FT)	21.560	39.160	33.000	0.0000	0.0000	34.320	29.040	39.160	29.040	0.0000	0.4400
4	4.2659E-05	6.2567E-04	14.364	6591.2	0.7143	57.726	0.019373	0.6157	0.7076	8.8843E+09	8.8843E+09
x(FT)	21.560	39.160	33.000	0.0000	0.0000	34.320	29.040	39.160	29.040	0.0000	0.4400
Max.	4.2705E-05	6.6502E-04	428.41	7262.6	3.5446	61.282	0.037848	0.6544	0.8791	8.8843E+09	8.8843E+09
Pile N.	3	2	1	3	1	2	1	2	1	1	1

LOAD CASE : 3
CASE NAME : Strength MaxV2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0910303	0.31510	0.0729655

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
1.50737E-05	7.79359E-05	4.74319E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2168.3	220.68	51.587	159.81	-1.0601E+04	5.5201E+04
2	1826.3	220.98	56.491	159.81	-1.1731E+04	5.5212E+04
3	2388.2	218.32	56.411	159.81	-1.1733E+04	5.4671E+04
4	2730.2	218.02	51.512	159.81	-1.0603E+04	5.4661E+04

MINIMUM	1826.3	218.02	51.512	159.81	-1.1733E+04	5.4661E+04
Pile N.	2	4	4	1	3	4
MAXIMUM	2730.2	220.98	56.491	159.81	-1.0601E+04	5.5212E+04
Pile N.	4	2	2	1	1	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-2.7657E-03	-9.0603E-04	-5.5201E+04	-1.0601E+04	-243.87	-75.738	-2.4531	-0.8339	0.5145	1.4459E+09	4.5592E+09
x(FT)	37.840	40.040	0.0000	0.0000	33.440	34.760	39.160	40.040	0.0000	29.920	29.920
2	-2.7639E-03	-9.7772E-04	-5.5212E+04	-1.1731E+04	-243.66	-81.576	-2.4521	-0.8996	0.4334	1.4459E+09	4.5562E+09
x(FT)	37.840	40.040	0.0000	0.0000	33.440	34.760	39.160	40.040	0.0000	29.920	29.920
3	-2.7267E-03	-9.7766E-04	-5.4671E+04	-1.1733E+04	-240.64	-81.651	-2.4261	-0.8998	0.5667	1.4472E+09	4.5562E+09
x(FT)	37.840	40.040	0.0000	0.0000	33.440	34.760	39.160	40.040	0.0000	29.920	29.920
4	-2.7285E-03	-9.0597E-04	-5.4661E+04	-1.0603E+04	-240.86	-75.807	-2.4271	-0.8342	0.6479	1.4472E+09	4.5592E+09
x(FT)	37.840	40.040	0.0000	0.0000	33.440	34.760	39.160	40.040	0.0000	29.920	29.920
Min.	-2.7657E-03	-9.7772E-04	-5.5212E+04	-1.1733E+04	-243.87	-81.651	-2.4531	-0.8998	0.4334	1.4459E+09	4.5562E+09
Pile N.	1	2	2	3	1	3	1	3	2	1	2

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.3214	0.064248	2.3118E+04	7683.4	220.41	51.408	18.209	3.7075	0.6338	8.8843E+09	8.8843E+09
x(FT)	0.4400	0.0000	29.920	29.920	0.0000	0.0000	29.040	29.040	29.040	17.160	0.4400
2	0.3214	0.068590	2.3110E+04	8270.8	220.70	56.296	18.206	4.0106	0.5338	8.8843E+09	8.8843E+09
x(FT)	0.4400	0.0000	29.920	29.920	0.0000	0.0000	29.040	29.040	29.040	16.720	1.3200
3	0.3170	0.068590	2.2873E+04	8276.0	218.05	56.218	17.981	4.0152	0.6981	8.8843E+09	8.8843E+09
x(FT)	0.4400	0.0000	29.920	29.920	0.0000	0.0000	29.040	29.040	29.040	17.160	1.3200
4	0.3170	0.064248	2.2881E+04	7688.2	217.77	51.335	17.983	3.7118	0.7980	8.8843E+09	8.8843E+09
x(FT)	0.4400	0.0000	29.920	29.920	0.0000	0.0000	29.040	29.040	29.040	16.720	0.4400
Max.	0.3214	0.068590	2.3118E+04	8276.0	220.70	56.296	18.209	4.0152	0.7980	8.8843E+09	8.8843E+09
Pile N.	1	2	1	3	2	2	1	3	4	1	1

LOAD CASE : 4
CASE NAME : Strength MinV2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0633478	-0.29160	-0.0799498

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-3.21490E-05	-9.50305E-05	-3.36477E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1806.5	-208.55	-50.760	-340.84	1.0076E+04	-5.2075E+04
2	2049.1	-208.29	-61.058	-340.84	1.2486E+04	-5.2060E+04
3	1364.0	-204.45	-61.252	-340.84	1.2496E+04	-5.1011E+04
4	1121.4	-204.71	-50.930	-340.84	1.0085E+04	-5.1026E+04
MINIMUM	1121.4	-208.55	-61.252	-340.84	1.0076E+04	-5.2075E+04
Pile N.	4	1	3	1	1	1
MAXIMUM	2049.1	-204.45	-50.760	-340.84	1.2496E+04	-5.1011E+04
Pile N.	2	3	1	1	3	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-0.2991	-0.067338	-2.1835E+04	-7889.5	-208.26	-50.580	-17.003	-3.7812	0.4287	1.4536E+09	4.5581E+09
x(FT)	0.4400	0.0000	29.920	29.920	0.0000	0.0000	29.040	29.040	0.0000	29.920	29.920
2	-0.2991	-0.076597	-2.1826E+04	-9146.1	-208.01	-60.847	-16.989	-4.4301	0.4863	1.4537E+09	4.5524E+09
x(FT)	0.4400	0.0000	29.920	29.920	0.0000	0.0000	29.040	29.040	0.0000	29.920	29.920
3	-0.2898	-0.076597	-2.1327E+04	-9155.7	-204.15	-61.040	-16.528	-4.4462	0.3237	1.4595E+09	4.5524E+09
x(FT)	0.4400	0.0000	29.920	29.920	0.0000	0.0000	29.040	29.040	0.0000	29.920	29.920
4	-0.2898	-0.067338	-2.1337E+04	-7898.0	-204.40	-50.749	-16.543	-3.7954	0.2661	1.4593E+09	4.5581E+09
x(FT)	0.4400	0.0000	29.920	29.920	0.0000	0.0000	29.040	29.040	0.0000	29.920	29.920
Min.	-0.2991	-0.076597	-2.1835E+04	-9155.7	-208.26	-61.040	-17.003	-4.4462	0.2661	1.4536E+09	4.5524E+09
Pile N.	1	2	1	3	1	3	1	3	4	1	2

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2

1	2.5631E-03	9.2124E-04	5.2075E+04	1.0076E+04	226.63	77.605	2.3077	0.8496	0.5280	8.8843E+09	8.8843E+09
x(FT)	38.280	40.040	0.0000	0.0000	33.440	34.760	39.160	40.040	29.040	16.720	0.0000
2	2.5641E-03	1.0744E-03	5.2060E+04	1.2486E+04	226.49	90.130	2.3075	0.9898	0.5989	8.8843E+09	8.8843E+09
x(FT)	38.280	40.040	0.0000	0.0000	33.440	34.760	39.160	40.040	29.040	17.600	3.0800
3	2.4879E-03	1.0733E-03	5.1011E+04	1.2496E+04	219.68	90.196	2.2518	0.9896	0.3987	8.8843E+09	8.8843E+09
x(FT)	38.280	40.040	0.0000	0.0000	33.880	34.760	39.160	40.040	29.040	17.600	2.6400
4	2.4871E-03	9.2029E-04	5.1026E+04	1.0085E+04	219.79	77.665	2.2520	0.8494	0.3278	8.8843E+09	8.8843E+09
x(FT)	38.280	40.040	0.0000	0.0000	33.880	34.760	39.160	40.040	29.040	16.280	0.0000
Max.	2.5641E-03	1.0744E-03	5.2075E+04	1.2496E+04	226.63	90.196	2.3077	0.9898	0.5989	8.8843E+09	8.8843E+09
Pile N.	2	2	1	3	1	3	1	2	2	1	1

LOAD CASE : 5
CASE NAME : Strength MaxV3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0632279	0.20418	0.12022

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-2.28720E-06	1.38171E-04	-1.84572E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1017.6	158.43	86.775	-24.249	-1.7591E+04	3.9164E+04
2	1150.7	158.36	86.017	-24.249	-1.7421E+04	3.9162E+04
3	2146.9	158.07	85.726	-24.249	-1.7417E+04	3.9218E+04
4	2013.8	158.14	86.482	-24.249	-1.7587E+04	3.9219E+04
MINIMUM	1017.6	158.07	85.726	-24.249	-1.7591E+04	3.9162E+04
Pile N.	1	3	3	1	1	2
MAXIMUM	2146.9	158.43	86.775	-24.249	-1.7417E+04	3.9219E+04
Pile N.	3	1	1	1	3	4

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-1.9268E-03	-1.5049E-03	-3.9164E+04	-1.7591E+04	-166.97	-128.14	-1.7799	-1.3902	0.2415	1.5683E+09	4.4566E+09
x(FT)	39.600	39.600	0.0000	0.0000	34.320	34.760	39.600	40.040	0.0000	29.920	29.920
2	-1.9267E-03	-1.4946E-03	-3.9162E+04	-1.7421E+04	-167.00	-127.30	-1.7800	-1.3808	0.2731	1.5682E+09	4.4605E+09
x(FT)	39.600	39.600	0.0000	0.0000	34.320	34.760	39.600	39.600	0.0000	29.920	29.920
3	-1.9307E-03	-1.4954E-03	-3.9218E+04	-1.7417E+04	-167.45	-127.37	-1.7837	-1.3814	0.5094	1.5663E+09	4.4604E+09
x(FT)	39.160	39.600	0.0000	0.0000	34.320	34.760	39.160	39.600	0.0000	29.920	29.920
4	-1.9307E-03	-1.5056E-03	-3.9219E+04	-1.7587E+04	-167.41	-128.21	-1.7835	-1.3907	0.4779	1.5664E+09	4.4565E+09
x(FT)	39.160	39.600	0.0000	0.0000	34.320	34.760	39.160	39.600	0.0000	29.920	29.920
Min.	-1.9307E-03	-1.5056E-03	-3.9219E+04	-1.7591E+04	-167.45	-128.21	-1.7837	-1.3907	0.2415	1.5663E+09	4.4565E+09
Pile N.	3	4	4	1	3	4	3	4	1	3	4

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.2023	0.1089	1.6832E+04	1.3033E+04	158.09	86.485	11.937	6.5271	0.2974	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	29.920	29.920	0.0000	0.0000	29.040	29.040	29.040	14.960	6.6000
2	0.2023	0.1083	1.6833E+04	1.2948E+04	158.03	85.729	11.940	6.4808	0.3363	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	29.920	29.920	0.0000	0.0000	29.040	29.040	29.040	14.960	6.6000
3	0.2030	0.1083	1.6865E+04	1.2949E+04	157.76	85.444	11.965	6.4758	0.6275	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	29.920	29.920	0.0000	0.0000	29.040	29.040	29.040	14.960	6.1600
4	0.2030	0.1089	1.6864E+04	1.3034E+04	157.83	86.198	11.963	6.5221	0.5886	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	29.920	29.920	0.0000	0.0000	29.040	29.040	14.960	6.6000	
Max.	0.2030	0.1089	1.6865E+04	1.3034E+04	158.09	86.485	11.965	6.5271	0.6275	8.8843E+09	8.8843E+09
Pile N.	3	1	3	4	1	1	3	1	3	1	1

LOAD CASE : 6
CASE NAME : Strength Minv3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0911502	-0.12993	-0.10796

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD

-6.05570E-06 -1.29972E-04 4.92004E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2927.1	-127.58	-74.856	-64.202	1.5010E+04	-2.8707E+04
2	2572.4	-127.68	-76.877	-64.202	1.5463E+04	-2.8708E+04
3	1635.4	-126.42	-77.146	-64.202	1.5470E+04	-2.8337E+04
4	1990.1	-126.32	-75.120	-64.202	1.5017E+04	-2.8337E+04
MINIMUM	1635.4	-127.68	-77.146	-64.202	1.5010E+04	-2.8708E+04
Pile N.	3	2	3	1	1	2
MAXIMUM	2927.1	-126.32	-74.856	-64.202	1.5470E+04	-2.8337E+04
Pile N.	1	4	1	1	3	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-0.1267	-0.096172	-1.6566E+04	-1.1554E+04	-127.23	-74.619	-9.1408	-6.0025	0.6946	4.2405E+09	4.5355E+09
x(FT)	0.0000	0.0000	29.920	29.920	0.0000	0.0000	29.040	29.040	0.0000	29.920	29.920
2	-0.1267	-0.097916	-1.6561E+04	-1.1786E+04	-127.33	-76.633	-9.1288	-6.1278	0.6104	4.2425E+09	4.5219E+09
x(FT)	0.0000	0.0000	29.920	29.920	0.0000	0.0000	29.040	29.040	0.0000	29.920	29.920
3	-0.1249	-0.097916	-1.6374E+04	-1.1789E+04	-126.06	-76.898	-9.0310	-6.1429	0.3881	4.3161E+09	4.5217E+09
x(FT)	0.0000	0.0000	29.920	29.920	0.0000	0.0000	29.040	29.040	0.0000	29.920	29.920
4	-0.1249	-0.096172	-1.6380E+04	-1.1556E+04	-125.96	-74.879	-9.0434	-6.0175	0.4722	4.3140E+09	4.5354E+09
x(FT)	0.0000	0.0000	29.920	29.920	0.0000	0.0000	29.040	29.040	0.0000	29.920	29.920
Min.	-0.1267	-0.097916	-1.6566E+04	-1.1789E+04	-127.33	-76.898	-9.1408	-6.1429	0.3881	4.2405E+09	4.5217E+09
Pile N.	1	2	1	3	2	3	1	3	3	1	3

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	1.9214E-03	1.3185E-03	2.8707E+04	1.5010E+04	163.70	113.53	1.7789	1.2208	0.8556	8.8843E+09	8.8843E+09
x(FT)	40.040	39.600	0.0000	0.0000	34.760	34.320	40.040	39.600	29.040	11.880	5.2800
2	1.9220E-03	1.3463E-03	2.8708E+04	1.5463E+04	163.64	115.81	1.7789	1.2461	0.7519	8.8843E+09	8.8843E+09
x(FT)	40.040	39.600	0.0000	0.0000	34.760	34.320	40.040	39.600	29.040	11.880	5.2800
3	1.8983E-03	1.3452E-03	2.8337E+04	1.5470E+04	161.71	115.78	1.7578	1.2457	0.4780	8.8843E+09	8.8843E+09
x(FT)	40.040	39.600	0.0000	0.0000	34.760	34.320	40.040	39.600	29.040	11.440	5.2800

4	1.8978E-03	1.3175E-03	2.8337E+04	1.5017E+04	161.78	113.51	1.7579	1.2203	0.5817	8.8843E+09	8.8843E+09
x(FT)	40.040	39.600	0.0000	0.0000	34.760	34.320	40.040	39.600	29.040	11.440	5.2800
Max.	1.9220E-03	1.3463E-03	2.8708E+04	1.5470E+04	163.70	115.81	1.7789	1.2461	0.8556	8.8843E+09	8.8843E+09
Pile N.	2	2	2	3	1	2	1	2	1	1	1

LOAD CASE : 7
CASE NAME : Strength MaxT
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0635076	0.31455	0.0755344

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
1.89714E-05	8.14472E-05	4.52139E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1458.6	220.98	52.708	201.13	-1.0772E+04	5.5122E+04
2	1132.7	221.26	58.871	201.13	-1.2194E+04	5.5131E+04
3	1719.9	218.01	58.789	201.13	-1.2197E+04	5.4456E+04
4	2045.8	217.74	52.632	201.13	-1.0775E+04	5.4447E+04
MINIMUM	1132.7	217.74	52.632	201.13	-1.2197E+04	5.4447E+04
Pile N.	2	4	4	1	3	4
MAXIMUM	2045.8	221.26	58.871	201.13	-1.0772E+04	5.5131E+04
Pile N.	4	2	2	1	1	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-2.7594E-03	-9.2707E-04	-5.5122E+04	-1.0772E+04	-243.34	-77.500	-2.4492	-0.8533	0.3461	1.4460E+09	4.5582E+09
x(FT)	37.840	40.040	0.0000	0.0000	33.440	34.760	39.160	40.040	0.0000	29.920	29.920

2	-2.7576E-03	-1.0173E-03	-5.5131E+04	-1.2194E+04	-243.10	-84.846	-2.4482	-0.9358	0.2688	1.4461E+09	4.5547E+09
x(FT)	37.840	40.040	0.0000	0.0000	33.440	34.760	39.160	40.040	0.0000	29.920	29.920
3	-2.7102E-03	-1.0172E-03	-5.4456E+04	-1.2197E+04	-239.26	-84.937	-2.4152	-0.9361	0.4081	1.4477E+09	4.5546E+09
x(FT)	37.840	40.040	0.0000	0.0000	33.440	34.760	39.160	40.040	0.0000	29.920	29.920
4	-2.7120E-03	-9.2694E-04	-5.4447E+04	-1.0775E+04	-239.49	-77.583	-2.4162	-0.8535	0.4855	1.4477E+09	4.5582E+09
x(FT)	37.840	40.040	0.0000	0.0000	33.440	34.760	39.160	40.040	0.0000	29.920	29.920
Min.	-2.7594E-03	-1.0173E-03	-5.5131E+04	-1.2197E+04	-243.34	-84.937	-2.4492	-0.9361	0.2688	1.4460E+09	4.5546E+09
Pile N.	1	2	2	3	1	3	1	3	2	1	3

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.3212	0.065961	2.3091E+04	7866.5	220.69	52.522	18.191	3.7932	0.4264	8.8843E+09	8.8843E+09
x(FT)	0.4400	0.0000	29.920	29.920	0.0000	0.0000	29.040	29.040	29.040	16.720	0.0000
2	0.3212	0.071425	2.3083E+04	8605.5	220.96	58.666	18.187	4.1745	0.3311	8.8843E+09	8.8843E+09
x(FT)	0.4400	0.0000	29.920	29.920	0.0000	0.0000	29.040	29.040	29.040	18.480	1.7600
3	0.3157	0.071425	2.2784E+04	8612.1	217.73	58.586	17.904	4.1807	0.5027	8.8843E+09	8.8843E+09
x(FT)	0.4400	0.0000	29.920	29.920	0.0000	0.0000	29.040	29.040	29.040	17.600	1.7600
4	0.3157	0.065961	2.2792E+04	7872.5	217.47	52.449	17.908	3.7989	0.5980	8.8843E+09	8.8843E+09
x(FT)	0.4400	0.0000	29.920	29.920	0.0000	0.0000	29.040	29.040	29.040	16.720	0.0000
Max.	0.3212	0.071425	2.3091E+04	8612.1	220.96	58.666	18.191	4.1807	0.5980	8.8843E+09	8.8843E+09
Pile N.	1	2	1	3	2	2	1	3	4	1	1

LOAD CASE : 8
CASE NAME : Strength MinT
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0980109	-0.0125116	-0.0645045

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-2.64808E-05	-9.12045E-05	-3.94523E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2639.6	-33.147	-36.848	-280.75	6831.6	-8361.4
2	2924.0	-33.102	-45.528	-280.75	8848.6	-8355.7
3	2266.4	-24.358	-45.657	-280.75	8853.1	-6334.1
4	1982.0	-24.393	-36.967	-280.75	6836.2	-6338.8
MINIMUM	1982.0	-33.147	-45.657	-280.75	6831.6	-8361.4
Pile N.	4	1	3	1	1	1
MAXIMUM	2924.0	-24.358	-36.848	-280.75	8853.1	-6334.1
Pile N.	2	3	1	1	3	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-0.020517	-0.053030	-3397.4	-6213.4	-33.074	-36.736	-2.1770	-3.4330	0.6264	4.5738E+09	4.5693E+09
x(FT)	3.9600	0.0000	30.360	29.920	0.0000	0.0000	29.040	29.040	0.0000	29.040	29.920
2	-0.020517	-0.060657	-3392.4	-7287.4	-33.030	-45.395	-2.1735	-4.0805	0.6939	4.5738E+09	4.5616E+09
x(FT)	3.9600	0.0000	30.360	29.920	0.0000	0.0000	29.040	29.040	0.0000	29.480	29.920
3	-0.013196	-0.060657	-2309.5	-7291.3	-24.306	-45.522	-1.5196	-4.0846	0.5378	4.5738E+09	4.5615E+09
x(FT)	5.2800	0.0000	30.360	29.920	0.0000	0.0000	29.040	29.040	0.0000	29.040	29.920
4	-0.013195	-0.053030	-2313.8	-6218.5	-24.340	-36.854	-1.5228	-3.4385	0.4703	4.5738E+09	4.5693E+09
x(FT)	5.2800	0.0000	30.360	29.920	0.0000	0.0000	29.040	29.040	0.0000	29.480	29.920
Min.	-0.020517	-0.060657	-3397.4	-7291.3	-33.074	-45.522	-2.1770	-4.0846	0.4703	4.5738E+09	4.5615E+09
Pile N.	1	2	1	3	1	3	1	3	4	1	3

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	3.8148E-04	6.6741E-04	8361.4	6831.6	34.099	61.512	0.3754	0.6567	0.7715	8.8843E+09	8.8843E+09
x(FT)	40.040	39.160	0.0000	0.0000	34.760	34.320	40.040	39.160	29.040	0.0000	0.8800
2	3.8131E-04	7.8511E-04	8355.7	8848.6	34.026	72.149	0.3752	0.7725	0.8547	8.8843E+09	8.8843E+09
x(FT)	40.040	39.160	0.0000	0.0000	34.760	34.320	40.040	39.160	29.040	2.2000	0.0000
3	2.6226E-04	7.8546E-04	6334.1	8853.1	23.228	72.205	0.2581	0.7729	0.6625	8.8843E+09	8.8843E+09
x(FT)	40.040	39.160	0.0000	0.0000	34.760	34.320	40.040	39.160	29.040	0.4400	0.4400
4	2.6237E-04	6.6780E-04	6338.8	6836.2	23.285	61.576	0.2582	0.6571	0.5793	8.8843E+09	8.8843E+09
x(FT)	40.040	39.160	0.0000	0.0000	34.760	34.320	40.040	39.160	29.040	0.0000	0.4400
Max.	3.8148E-04	7.8546E-04	8361.4	8853.1	34.099	72.205	0.3754	0.7729	0.8547	8.8843E+09	8.8843E+09
Pile N.	1	3	1	3	1	3	1	3	2	1	1

LOAD CASE : 9
CASE NAME : Strength MaxM2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0632279	0.20418	0.12022

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-2.28720E-06	1.38171E-04	-1.84572E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1017.6	158.43	86.775	-24.249	-1.7591E+04	3.9164E+04
2	1150.7	158.36	86.017	-24.249	-1.7421E+04	3.9162E+04
3	2146.9	158.07	85.726	-24.249	-1.7417E+04	3.9218E+04
4	2013.8	158.14	86.482	-24.249	-1.7587E+04	3.9219E+04
MINIMUM	1017.6	158.07	85.726	-24.249	-1.7591E+04	3.9162E+04
Pile N.	1	3	3	1	1	2
MAXIMUM	2146.9	158.43	86.775	-24.249	-1.7417E+04	3.9219E+04
Pile N.	3	1	1	1	3	4

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-1.9268E-03	-1.5049E-03	-3.9164E+04	-1.7591E+04	-166.97	-128.14	-1.7799	-1.3902	0.2415	1.5683E+09	4.4566E+09
x(FT)	39.600	39.600	0.0000	0.0000	34.320	34.760	39.600	40.040	0.0000	29.920	29.920
2	-1.9267E-03	-1.4946E-03	-3.9162E+04	-1.7421E+04	-167.00	-127.30	-1.7800	-1.3808	0.2731	1.5682E+09	4.4605E+09
x(FT)	39.600	39.600	0.0000	0.0000	34.320	34.760	39.600	39.600	0.0000	29.920	29.920
3	-1.9307E-03	-1.4954E-03	-3.9218E+04	-1.7417E+04	-167.45	-127.37	-1.7837	-1.3814	0.5094	1.5663E+09	4.4604E+09
x(FT)	39.160	39.600	0.0000	0.0000	34.320	34.760	39.160	39.600	0.0000	29.920	29.920
4	-1.9307E-03	-1.5056E-03	-3.9219E+04	-1.7587E+04	-167.41	-128.21	-1.7835	-1.3907	0.4779	1.5664E+09	4.4565E+09
x(FT)	39.160	39.600	0.0000	0.0000	34.320	34.760	39.160	39.600	0.0000	29.920	29.920
Min.	-1.9307E-03	-1.5056E-03	-3.9219E+04	-1.7591E+04	-167.45	-128.21	-1.7837	-1.3907	0.2415	1.5663E+09	4.4565E+09

Pile N.	3	4	4	1	3	4	3	4	1	3	4

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.2023	0.1089	1.6832E+04	1.3033E+04	158.09	86.485	11.937	6.5271	0.2974	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	29.920	29.920	0.0000	0.0000	29.040	29.040	29.040	14.960	6.6000
2	0.2023	0.1083	1.6833E+04	1.2948E+04	158.03	85.729	11.940	6.4808	0.3363	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	29.920	29.920	0.0000	0.0000	29.040	29.040	29.040	18.920	6.1600
3	0.2030	0.1083	1.6865E+04	1.2949E+04	157.76	85.444	11.965	6.4758	0.6275	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	29.920	29.920	0.0000	0.0000	29.040	29.040	29.040	16.280	6.1600
4	0.2030	0.1089	1.6864E+04	1.3034E+04	157.83	86.198	11.963	6.5221	0.5886	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	29.920	29.920	0.0000	0.0000	29.040	29.040	29.040	17.160	6.6000
Max.	0.2030	0.1089	1.6865E+04	1.3034E+04	158.09	86.485	11.965	6.5271	0.6275	8.8843E+09	8.8843E+09
Pile N.	3	1	3	4	1	1	3	1	3	1	1

LOAD CASE : 10
CASE NAME : Strength MinM2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0996187	-0.18335	-0.10441

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-2.29228E-05	-1.28414E-04	3.96821E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	3099.2	-147.08	-68.390	-243.03	1.3567E+04	-3.6251E+04
2	2813.1	-147.18	-75.833	-243.03	1.5286E+04	-3.6250E+04
3	1887.3	-144.92	-76.119	-243.03	1.5296E+04	-3.5509E+04
4	2173.4	-144.82	-68.657	-243.03	1.3576E+04	-3.5512E+04
MINIMUM	1887.3	-147.18	-76.119	-243.03	1.3567E+04	-3.6251E+04
Pile N.	3	2	3	1	1	1
MAXIMUM	3099.2	-144.82	-68.390	-243.03	1.5296E+04	-3.5509E+04
Pile N.	1	4	1	1	3	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-0.1833	-0.090325	-1.6085E+04	-1.0729E+04	-146.79	-68.169	-11.025	-5.3862	0.7354	1.6106E+09	4.5472E+09
x(FT)	0.0000	0.0000	29.920	29.920	0.0000	0.0000	29.040	29.040	0.0000	30.360	29.920
2	-0.1833	-0.096927	-1.6076E+04	-1.1629E+04	-146.88	-75.589	-10.993	-5.8607	0.6675	1.6114E+09	4.5297E+09
x(FT)	0.0000	0.0000	29.920	29.920	0.0000	0.0000	29.040	29.040	0.0000	30.360	29.920
3	-0.1767	-0.096927	-1.5852E+04	-1.1636E+04	-144.60	-75.871	-10.716	-5.8896	0.4479	1.6335E+09	4.5293E+09
x(FT)	0.0000	0.0000	29.920	29.920	0.0000	0.0000	29.040	29.040	0.0000	30.360	29.920
4	-0.1767	-0.090325	-1.5861E+04	-1.0736E+04	-144.51	-68.432	-10.750	-5.4142	0.5157	1.6328E+09	4.5472E+09
x(FT)	0.0000	0.0000	29.920	29.920	0.0000	0.0000	29.040	29.040	0.0000	30.360	29.920
Min.	-0.1833	-0.096927	-1.6085E+04	-1.1636E+04	-146.88	-75.871	-11.025	-5.8896	0.4479	1.6106E+09	4.5293E+09
Pile N.	1	2	1	3	2	3	1	3	3	1	3

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	1.8418E-03	1.2247E-03	3.6251E+04	1.3567E+04	159.26	105.54	1.7095	1.1367	0.9059	8.8843E+09	8.8843E+09
x(FT)	39.600	39.600	0.0000	0.0000	34.320	34.320	39.600	39.600	29.040	14.520	3.0800
2	1.8445E-03	1.3324E-03	3.6250E+04	1.5286E+04	159.11	114.40	1.7096	1.2350	0.8223	8.8843E+09	8.8843E+09
x(FT)	39.600	39.600	0.0000	0.0000	34.320	34.320	39.600	39.600	29.040	14.520	4.8400
3	1.8220E-03	1.3314E-03	3.5509E+04	1.5296E+04	156.72	114.40	1.6893	1.2344	0.5516	8.8843E+09	8.8843E+09
x(FT)	39.600	39.600	0.0000	0.0000	34.320	34.320	39.600	39.600	29.040	14.080	4.8400
4	1.8192E-03	1.2237E-03	3.5512E+04	1.3576E+04	156.86	105.54	1.6891	1.1362	0.6353	8.8843E+09	8.8843E+09
x(FT)	39.600	39.600	0.0000	0.0000	34.320	34.320	39.600	39.600	29.040	14.960	3.0800
Max.	1.8445E-03	1.3324E-03	3.6251E+04	1.5296E+04	159.26	114.40	1.7096	1.2350	0.9059	8.8843E+09	8.8843E+09
Pile N.	2	2	1	3	1	2	2	2	1	1	1

LOAD CASE : 11
CASE NAME : Strength MaxM3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0910303	0.31510	0.0729655

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
1.50737E-05	7.79359E-05	4.74319E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2168.3	220.68	51.587	159.81	-1.0601E+04	5.5201E+04
2	1826.3	220.98	56.491	159.81	-1.1731E+04	5.5212E+04
3	2388.2	218.32	56.411	159.81	-1.1733E+04	5.4671E+04
4	2730.2	218.02	51.512	159.81	-1.0603E+04	5.4661E+04
MINIMUM	1826.3	218.02	51.512	159.81	-1.1733E+04	5.4661E+04
Pile N.	2	4	4	1	3	4
MAXIMUM	2730.2	220.98	56.491	159.81	-1.0601E+04	5.5212E+04
Pile N.	4	2	2	1	1	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-2.7657E-03	-9.0603E-04	-5.5201E+04	-1.0601E+04	-243.87	-75.738	-2.4531	-0.8339	0.5145	1.4459E+09	4.5592E+09
x(FT)	37.840	40.040	0.0000	0.0000	33.440	34.760	39.160	40.040	0.0000	29.920	29.920
2	-2.7639E-03	-9.7772E-04	-5.5212E+04	-1.1731E+04	-243.66	-81.576	-2.4521	-0.8996	0.4334	1.4459E+09	4.5562E+09
x(FT)	37.840	40.040	0.0000	0.0000	33.440	34.760	39.160	40.040	0.0000	29.920	29.920
3	-2.7267E-03	-9.7766E-04	-5.4671E+04	-1.1733E+04	-240.64	-81.651	-2.4261	-0.8998	0.5667	1.4472E+09	4.5562E+09
x(FT)	37.840	40.040	0.0000	0.0000	33.440	34.760	39.160	40.040	0.0000	29.920	29.920
4	-2.7285E-03	-9.0597E-04	-5.4661E+04	-1.0603E+04	-240.86	-75.807	-2.4271	-0.8342	0.6479	1.4472E+09	4.5592E+09
x(FT)	37.840	40.040	0.0000	0.0000	33.440	34.760	39.160	40.040	0.0000	29.920	29.920
Min.	-2.7657E-03	-9.7772E-04	-5.5212E+04	-1.1733E+04	-243.87	-81.651	-2.4531	-0.8998	0.4334	1.4459E+09	4.5562E+09
Pile N.	1	2	2	3	1	3	1	3	2	1	2

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.3214	0.064248	2.3118E+04	7683.4	220.41	51.408	18.209	3.7075	0.6338	8.8843E+09	8.8843E+09
x(FT)	0.4400	0.0000	29.920	29.920	0.0000	0.0000	29.040	29.040	29.040	17.160	0.0000
2	0.3214	0.068590	2.3110E+04	8270.8	220.70	56.296	18.206	4.0106	0.5338	8.8843E+09	8.8843E+09
x(FT)	0.4400	0.0000	29.920	29.920	0.0000	0.0000	29.040	29.040	29.040	16.720	2.2000
3	0.3170	0.068590	2.2873E+04	8276.0	218.05	56.218	17.981	4.0152	0.6981	8.8843E+09	8.8843E+09

x(FT)	0.4400	0.0000	29.920	29.920	0.0000	0.0000	29.040	29.040	29.040	17.160	1.3200
4	0.3170	0.064248	2.2881E+04	7688.2	217.77	51.335	17.983	3.7118	0.7980	8.8843E+09	8.8843E+09
x(FT)	0.4400	0.0000	29.920	29.920	0.0000	0.0000	29.040	29.040	29.040	16.720	1.3200
Max.	0.3214	0.068590	2.3118E+04	8276.0	220.70	56.296	18.209	4.0152	0.7980	8.8843E+09	8.8843E+09
Pile N.	1	2	1	3	2	2	1	3	4	1	1

LOAD CASE : 12
CASE NAME : Strength MinM3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0633478	-0.29160	-0.0799498

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-3.21490E-05	-9.50305E-05	-3.36477E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1806.5	-208.55	-50.760	-340.84	1.0076E+04	-5.2075E+04
2	2049.1	-208.29	-61.058	-340.84	1.2486E+04	-5.2060E+04
3	1364.0	-204.45	-61.252	-340.84	1.2496E+04	-5.1011E+04
4	1121.4	-204.71	-50.930	-340.84	1.0085E+04	-5.1026E+04
MINIMUM	1121.4	-208.55	-61.252	-340.84	1.0076E+04	-5.2075E+04
Pile N.	4	1	3	1	1	1
MAXIMUM	2049.1	-204.45	-50.760	-340.84	1.2496E+04	-5.1011E+04
Pile N.	2	3	1	1	3	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-0.2991	-0.067338	-2.1835E+04	-7889.5	-208.26	-50.580	-17.003	-3.7812	0.4287	1.4536E+09	4.5581E+09
x(FT)	0.4400	0.0000	29.920	29.920	0.0000	0.0000	29.040	29.040	0.0000	29.920	29.920

2	-0.2991	-0.076597	-2.1826E+04	-9146.1	-208.01	-60.847	-16.989	-4.4301	0.4863	1.4537E+09	4.5524E+09
x(FT)	0.4400	0.0000	29.920	29.920	0.0000	0.0000	29.040	29.040	0.0000	29.920	29.920
3	-0.2898	-0.076597	-2.1327E+04	-9155.7	-204.15	-61.040	-16.528	-4.4462	0.3237	1.4595E+09	4.5524E+09
x(FT)	0.4400	0.0000	29.920	29.920	0.0000	0.0000	29.040	29.040	0.0000	29.920	29.920
4	-0.2898	-0.067338	-2.1337E+04	-7898.0	-204.40	-50.749	-16.543	-3.7954	0.2661	1.4593E+09	4.5581E+09
x(FT)	0.4400	0.0000	29.920	29.920	0.0000	0.0000	29.040	29.040	0.0000	29.920	29.920
Min.	-0.2991	-0.076597	-2.1835E+04	-9155.7	-208.26	-61.040	-17.003	-4.4462	0.2661	1.4536E+09	4.5524E+09
Pile N.	1	2	1	3	1	3	1	3	4	1	2

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	2.5631E-03	9.2124E-04	5.2075E+04	1.0076E+04	226.63	77.605	2.3077	0.8496	0.5280	8.8843E+09	8.8843E+09
x(FT)	38.280	40.040	0.0000	0.0000	33.440	34.760	39.160	40.040	29.040	16.720	0.0000
2	2.5641E-03	1.0744E-03	5.2060E+04	1.2486E+04	226.49	90.130	2.3075	0.9898	0.5989	8.8843E+09	8.8843E+09
x(FT)	38.280	40.040	0.0000	0.0000	33.440	34.760	39.160	40.040	29.040	16.720	2.6400
3	2.4879E-03	1.0733E-03	5.1011E+04	1.2496E+04	219.68	90.196	2.2518	0.9896	0.3987	8.8843E+09	8.8843E+09
x(FT)	38.280	40.040	0.0000	0.0000	33.880	34.760	39.160	40.040	29.040	16.280	2.2000
4	2.4871E-03	9.2029E-04	5.1026E+04	1.0085E+04	219.79	77.665	2.2520	0.8494	0.3278	8.8843E+09	8.8843E+09
x(FT)	38.280	40.040	0.0000	0.0000	33.880	34.760	39.160	40.040	29.040	16.720	3.5200
Max.	2.5641E-03	1.0744E-03	5.2075E+04	1.2496E+04	226.63	90.196	2.3077	0.9898	0.5989	8.8843E+09	8.8843E+09
Pile N.	2	2	1	3	1	3	1	2	2	1	1

LOAD CASE : 13
CASE NAME : Service MaxP
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0704082	7.77686E-03	0.0565153

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
1.95214E-07	7.31604E-05	1.85746E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN

1	1565.2	15.788	38.744	2.0696	-7562.4	3972.8
2	1431.3	15.792	38.826	2.0696	-7577.5	3973.1
3	1958.8	15.712	38.756	2.0696	-7576.9	3957.0
4	2092.7	15.708	38.674	2.0696	-7561.9	3956.8
MINIMUM	1431.3	15.708	38.674	2.0696	-7577.5	3956.8
Pile N.	2	4	4	1	2	4
MAXIMUM	2092.7	15.792	38.826	2.0696	-7561.9	3973.1
Pile N.	4	2	2	1	4	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-1.8144E-04	-6.5802E-04	-3972.8	-7562.4	-16.246	-60.535	-0.1785	-0.6475	0.3714	4.5738E+09	4.5703E+09
x(FT)	40.040	39.160	0.0000	0.0000	34.760	34.320	40.040	39.160	0.0000	29.480	29.920
2	-1.8142E-04	-6.5885E-04	-3973.1	-7577.5	-16.244	-60.608	-0.1785	-0.6483	0.3397	4.5738E+09	4.5702E+09
x(FT)	40.040	39.160	0.0000	0.0000	34.760	34.320	40.040	39.160	0.0000	29.040	29.920
3	-1.8059E-04	-6.5902E-04	-3957.0	-7576.9	-16.171	-60.629	-0.1777	-0.6485	0.4648	4.5738E+09	4.5702E+09
x(FT)	40.040	39.160	0.0000	0.0000	34.760	34.320	40.040	39.160	0.0000	29.920	29.920
4	-1.8061E-04	-6.5820E-04	-3956.8	-7561.9	-16.173	-60.556	-0.1777	-0.6477	0.4966	4.5738E+09	4.5702E+09
x(FT)	40.040	39.160	0.0000	0.0000	34.760	34.320	40.040	39.160	0.0000	29.040	29.920
Min.	-1.8144E-04	-6.5902E-04	-3973.1	-7577.5	-16.246	-60.629	-0.1785	-0.6485	0.3397	4.5738E+09	4.5702E+09
Pile N.	1	3	2	2	1	3	1	3	2	1	2

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	9.7743E-03	0.050342	1618.8	6105.0	15.752	38.630	1.0374	3.4339	0.4575	8.8843E+09	8.8843E+09
x(FT)	3.9600	0.0000	30.360	29.920	0.0000	0.0000	29.040	29.040	29.040	1.3200	1.7600
2	9.7743E-03	0.050398	1618.7	6112.8	15.756	38.712	1.0374	3.4389	0.4184	8.8843E+09	8.8843E+09
x(FT)	3.9600	0.0000	30.360	29.920	0.0000	0.0000	29.040	29.040	29.040	1.3200	0.0000
3	9.7199E-03	0.050398	1610.9	6113.3	15.677	38.643	1.0324	3.4380	0.5725	8.8843E+09	8.8843E+09
x(FT)	3.9600	0.0000	30.360	29.920	0.0000	0.0000	29.040	29.040	29.040	0.4400	0.0000
4	9.7199E-03	0.050342	1611.0	6105.5	15.673	38.561	1.0324	3.4330	0.6117	8.8843E+09	8.8843E+09
x(FT)	3.9600	0.0000	30.360	29.920	0.0000	0.0000	29.040	29.040	29.040	0.0000	0.0000
Max.	9.7743E-03	0.050398	1618.8	6113.3	15.756	38.712	1.0374	3.4389	0.6117	8.8843E+09	8.8843E+09
Pile N.	1	2	1	3	2	2	1	2	4	1	1

LOAD CASE : 14
CASE NAME : Service MinP

LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0829413	-1.31917E-03	-0.0670207

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-1.42990E-05	-9.46130E-05	-7.50797E-06

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2389.8	-6.6281	-40.596	-151.60	7623.6	-1664.2
2	2443.9	-6.6234	-45.295	-151.60	8711.9	-1663.5
3	1761.7	-1.8738	-45.407	-151.60	8712.9	-569.23
4	1707.6	-1.8747	-40.702	-151.60	7624.4	-569.39
MINIMUM	1707.6	-6.6281	-45.407	-151.60	7623.6	-1664.2
Pile N.	4	1	3	1	1	1
MAXIMUM	2443.9	-1.8738	-40.596	-151.60	8712.9	-569.23
Pile N.	2	3	1	1	3	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-4.1681E-03	-0.057014	-685.94	-6735.7	-6.6134	-40.475	-0.4381	-3.7375	0.5671	4.5738E+09	4.5652E+09
x(FT)	3.5200	0.0000	30.360	29.920	0.0000	0.0000	29.040	29.040	0.0000	29.480	29.920
2	-4.1682E-03	-0.061132	-685.17	-7314.0	-6.6086	-45.161	-0.4375	-4.0857	0.5799	4.5738E+09	4.5614E+09
x(FT)	3.5200	0.0000	30.360	29.920	0.0000	0.0000	29.040	29.040	0.0000	29.040	29.920
3	-4.1487E-04	-0.061132	-101.43	-7313.7	-1.8707	-45.271	-0.083382	-4.0874	0.4181	4.5738E+09	4.5614E+09
x(FT)	13.200	0.0000	31.240	29.920	0.0000	0.0000	29.040	29.040	0.0000	29.040	29.920
4	-4.1473E-04	-0.057014	-101.57	-6735.7	-1.8716	-40.578	-0.083477	-3.7392	0.4052	4.5738E+09	4.5652E+09
x(FT)	13.200	0.0000	31.240	29.920	0.0000	0.0000	29.040	29.040	0.0000	29.040	29.920
Min.	-4.1682E-03	-0.061132	-685.94	-7314.0	-6.6134	-45.271	-0.4381	-4.0874	0.4052	4.5738E+09	4.5614E+09
Pile N.	2	2	1	2	1	3	1	3	4	1	2

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	7.6853E-05	7.2413E-04	1664.2	7623.6	6.8846	66.738	0.075623	0.7126	0.6985	8.8843E+09	8.8843E+09
x(FT)	40.040	39.160	0.0000	0.0000	34.760	34.320	40.040	39.160	29.040	0.0000	0.0000
2	7.6833E-05	7.8758E-04	1663.5	8711.9	6.8746	72.466	0.075604	0.7750	0.7143	8.8843E+09	8.8843E+09
x(FT)	40.040	39.160	0.0000	0.0000	34.760	34.320	40.040	39.160	29.040	0.0000	0.0000
3	1.0922E-04	7.8737E-04	569.23	8712.9	1.0515	72.442	0.013620	0.7748	0.5150	8.8843E+09	8.8843E+09
x(FT)	0.0000	39.160	0.0000	0.0000	35.640	34.320	44.000	39.160	29.040	0.8800	0.0000
4	1.0922E-04	7.2396E-04	569.39	7624.4	1.0526	66.719	0.013569	0.7124	0.4991	8.8843E+09	8.8843E+09
x(FT)	0.0000	39.160	0.0000	0.0000	35.640	34.320	44.000	39.160	29.040	0.0000	0.4400
Max.	1.0922E-04	7.8758E-04	1664.2	8712.9	6.8846	72.466	0.075623	0.7750	0.7143	8.8843E+09	8.8843E+09
Pile N.	3	2	1	3	1	2	1	2	2	1	1

LOAD CASE : 15
CASE NAME : Service MaxV2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0746325	0.0346815	0.0607708

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
7.33073E-06	7.86917E-05	4.34963E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1740.9	56.976	40.302	77.720	-7834.7	1.3917E+04
2	1427.3	57.005	42.772	77.720	-8394.3	1.3918E+04
3	1994.6	54.524	42.696	77.720	-8394.7	1.3357E+04
4	2308.2	54.496	40.230	77.720	-7835.2	1.3356E+04
MINIMUM	1427.3	54.496	40.230	77.720	-8394.7	1.3356E+04
Pile N.	2	4	4	1	3	4
MAXIMUM	2308.2	57.005	42.772	77.720	-7834.7	1.3918E+04
Pile N.	4	2	2	1	1	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-6.9611E-04	-6.8816E-04	-1.3917E+04	-7834.7	-62.434	-63.157	-0.6850	-0.6772	0.4131	4.5691E+09	4.5679E+09
x(FT)	40.040	39.160	0.0000	0.0000	34.760	34.320	40.040	39.160	0.0000	30.360	29.920
2	-6.9594E-04	-7.2063E-04	-1.3918E+04	-8394.3	-62.396	-66.088	-0.6847	-0.7091	0.3387	4.5691E+09	4.5656E+09
x(FT)	40.040	39.160	0.0000	0.0000	34.760	34.320	40.040	39.160	0.0000	30.360	29.920
3	-6.6344E-04	-7.2104E-04	-1.3357E+04	-8394.7	-59.477	-66.143	-0.6528	-0.7095	0.4733	4.5717E+09	4.5656E+09
x(FT)	40.040	39.160	0.0000	0.0000	34.760	34.320	40.040	39.160	0.0000	30.360	29.920
4	-6.6360E-04	-6.8854E-04	-1.3356E+04	-7835.2	-59.512	-63.207	-0.6530	-0.6775	0.5477	4.5717E+09	4.5679E+09
x(FT)	40.040	39.160	0.0000	0.0000	34.760	34.320	40.040	39.160	0.0000	30.360	29.920
Min.	-6.9611E-04	-7.2104E-04	-1.3918E+04	-8394.7	-62.434	-66.143	-0.6850	-0.7095	0.3387	4.5691E+09	4.5656E+09
Pile N.	1	3	2	3	1	3	1	3	2	1	2

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.040014	0.053105	6248.2	6390.3	56.839	40.181	3.9143	3.5845	0.5089	8.8843E+09	8.8843E+09
x(FT)	2.6400	0.0000	30.360	29.920	0.0000	0.0000	29.040	29.040	29.040	4.4000	1.3200
2	0.040014	0.055216	6246.4	6687.8	56.867	42.643	3.9138	3.7651	0.4172	8.8843E+09	8.8843E+09
x(FT)	2.6400	0.0000	30.360	29.920	0.0000	0.0000	29.040	29.040	29.040	7.4800	0.0000
3	0.037934	0.055216	5950.3	6689.7	54.394	42.569	3.7335	3.7649	0.5830	8.8843E+09	8.8843E+09
x(FT)	2.6400	0.0000	30.360	29.920	0.0000	0.0000	29.040	29.040	29.040	3.5200	0.0000
4	0.037934	0.053105	5952.1	6392.2	54.369	40.110	3.7342	3.5844	0.6747	8.8843E+09	8.8843E+09
x(FT)	2.6400	0.0000	30.360	29.920	0.0000	0.0000	29.040	29.040	29.040	3.5200	0.4400
Max.	0.040014	0.055216	6248.2	6689.7	56.867	42.643	3.9143	3.7651	0.6747	8.8843E+09	8.8843E+09
Pile N.	1	2	1	3	2	2	1	2	4	1	1

LOAD CASE : 16
CASE NAME : Service MinV2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0753815	-0.0262285	-0.0678630

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-2.03246E-05	-9.57513E-05	-3.30534E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2112.5	-45.610	-40.101	-215.48	7486.0	-1.1113E+04
2	2350.8	-45.568	-46.770	-215.48	9034.9	-1.1109E+04
3	1660.5	-38.892	-46.904	-215.48	9038.7	-9560.1
4	1422.2	-38.931	-40.226	-215.48	7489.8	-9564.5
MINIMUM	1422.2	-45.610	-46.904	-215.48	7486.0	-1.1113E+04
Pile N.	4	1	3	1	1	1
MAXIMUM	2350.8	-38.892	-40.101	-215.48	9038.7	-9560.1
Pile N.	2	3	1	1	3	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-0.032383	-0.056893	-5038.7	-6682.9	-45.502	-39.978	-3.1490	-3.7013	0.5013	4.5738E+09	4.5656E+09
x(FT)	2.2000	0.0000	30.360	29.920	0.0000	0.0000	29.040	29.040	0.0000	29.480	29.920
2	-0.032384	-0.062747	-5035.2	-7507.6	-45.460	-46.630	-3.1462	-4.1988	0.5578	4.5738E+09	4.5603E+09
x(FT)	2.2000	0.0000	30.360	29.920	0.0000	0.0000	29.040	29.040	0.0000	29.040	29.920
3	-0.026608	-0.062747	-4205.9	-7510.6	-38.799	-46.762	-2.6460	-4.2027	0.3940	4.5738E+09	4.5602E+09
x(FT)	2.6400	0.0000	30.360	29.920	0.0000	0.0000	29.040	29.040	0.0000	29.040	29.920
4	-0.026608	-0.056893	-4209.5	-6686.6	-38.838	-40.101	-2.6487	-3.7054	0.3375	4.5738E+09	4.5656E+09
x(FT)	2.6400	0.0000	30.360	29.920	0.0000	0.0000	29.040	29.040	0.0000	29.040	29.920
Min.	-0.032384	-0.062747	-5038.7	-7510.6	-45.502	-46.762	-3.1490	-4.2027	0.3375	4.5738E+09	4.5602E+09
Pile N.	2	2	1	3	1	3	1	3	4	1	3

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	5.6069E-04	7.1786E-04	1.1113E+04	7486.0	50.379	66.055	0.5517	0.7064	0.6175	8.8843E+09	8.8843E+09
x(FT)	40.040	39.160	0.0000	0.0000	34.760	34.320	40.040	39.160	29.040	0.8800	0.0000
2	5.6059E-04	8.0823E-04	1.1109E+04	9034.9	50.330	74.226	0.5516	0.7953	0.6871	8.8843E+09	8.8843E+09
x(FT)	40.040	39.160	0.0000	0.0000	34.760	34.320	40.040	39.160	29.040	0.0000	0.8800
3	4.6925E-04	8.0844E-04	9560.1	9038.7	42.066	74.264	0.4617	0.7955	0.4854	8.8843E+09	8.8843E+09
x(FT)	40.040	39.160	0.0000	0.0000	34.760	34.320	40.040	39.160	29.040	0.4400	0.0000

4	4.6936E-04	7.1817E-04	9564.5	7489.8	42.118	66.105	0.4618	0.7067	0.4157	8.8843E+09	8.8843E+09
x(FT)	40.040	39.160	0.0000	0.0000	34.760	34.320	40.040	39.160	29.040	0.0000	0.0000
Max.	5.6069E-04	8.0844E-04	1.1113E+04	9038.7	50.379	74.264	0.5517	0.7955	0.6871	8.8843E+09	8.8843E+09
Pile N.	1	3	1	3	1	3	1	3	2	1	1

LOAD CASE : 17
CASE NAME : Service MaxV3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0771691	0.0117678	0.0853096

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
3.05523E-06	1.11026E-04	2.04848E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1604.9	21.521	57.562	32.391	-1.1214E+04	5330.6
2	1457.2	21.525	58.598	32.391	-1.1447E+04	5330.7
3	2257.6	20.479	58.437	32.391	-1.1446E+04	5095.0
4	2405.3	20.475	57.403	32.391	-1.1213E+04	5094.9
MINIMUM	1457.2	20.475	57.403	32.391	-1.1447E+04	5094.9
Pile N.	2	4	4	1	2	4
MAXIMUM	2405.3	21.525	58.598	32.391	-1.1213E+04	5330.7
Pile N.	4	2	2	1	4	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-2.5598E-04	-9.7972E-04	-5330.6	-1.1214E+04	-22.890	-89.909	-0.2518	-0.9628	0.3808	4.5738E+09	4.5527E+09

x(FT)	40.040	39.160	0.0000	0.0000	34.760	34.320	40.040	39.160	0.0000	29.040	29.920
2	-2.5602E-04	-9.9343E-04	-5330.7	-1.1447E+04	-22.882	-91.115	-0.2515	-0.9749	0.3458	4.5738E+09	4.5522E+09
x(FT)	40.040	39.160	0.0000	0.0000	34.760	34.320	40.040	39.160	0.0000	29.040	29.920
3	-2.4238E-04	-9.9380E-04	-5095.0	-1.1446E+04	-21.653	-91.169	-0.2382	-0.9756	0.5357	4.5738E+09	4.5522E+09
x(FT)	40.040	39.160	0.0000	0.0000	34.760	34.320	40.040	39.160	0.0000	29.040	29.920
4	-2.4234E-04	-9.8009E-04	-5094.9	-1.1213E+04	-21.660	-89.962	-0.2385	-0.9635	0.5708	4.5738E+09	4.5527E+09
x(FT)	40.040	39.160	0.0000	0.0000	34.760	34.320	40.040	39.160	0.0000	29.480	29.920
Min.	-2.5602E-04	-9.9380E-04	-5330.7	-1.1447E+04	-22.890	-91.169	-0.2518	-0.9756	0.3458	4.5738E+09	4.5522E+09
Pile N.	2	3	2	2	1	3	1	3	2	1	2

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.014296	0.075543	2288.0	9093.7	21.470	57.389	1.4469	5.1070	0.4691	8.8843E+09	8.8843E+09
x(FT)	3.0800	0.0000	30.360	29.920	0.0000	0.0000	29.040	29.040	29.040	0.0000	0.8800
2	0.014296	0.076423	2287.6	9216.8	21.474	58.422	1.4468	5.1820	0.4259	8.8843E+09	8.8843E+09
x(FT)	3.0800	0.0000	30.360	29.920	0.0000	0.0000	29.040	29.040	29.040	0.0000	1.3200
3	0.013433	0.076423	2163.3	9218.2	20.432	58.264	1.3712	5.1802	0.6599	8.8843E+09	8.8843E+09
x(FT)	3.0800	0.0000	30.360	29.920	0.0000	0.0000	29.040	29.040	29.040	0.0000	0.8800
4	0.013433	0.075543	2163.7	9095.1	20.428	57.233	1.3713	5.1052	0.7031	8.8843E+09	8.8843E+09
x(FT)	3.0800	0.0000	30.360	29.920	0.0000	0.0000	29.040	29.040	29.040	0.8800	0.8800
Max.	0.014296	0.076423	2288.0	9218.2	21.474	58.422	1.4469	5.1820	0.7031	8.8843E+09	8.8843E+09
Pile N.	1	2	1	3	2	2	1	2	4	1	1

LOAD CASE : 18
CASE NAME : Service MinV3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0768595	-1.45304E-03	-0.0870599

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-1.52243E-05	-1.20779E-04	-2.27873E-06

* PILE TOP REACTIONS *

PILE	GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1		2350.7	-5.0272	-53.910	-161.41	1.0224E+04	-1200.4
2		2367.1	-5.0248	-58.913	-161.41	1.1382E+04	-1200.0
3		1496.3	0.025906	-59.096	-161.41	1.1384E+04	-35.997
4		1479.9	0.026032	-54.082	-161.41	1.0225E+04	-35.982
MINIMUM		1479.9	-5.0272	-59.096	-161.41	1.0224E+04	-1200.4
Pile N.		4	1	3	1	1	1
MAXIMUM		2367.1	0.026032	-53.910	-161.41	1.1384E+04	-35.982
Pile N.		2	4	1	1	3	4

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-3.8562E-03	-0.074722	-579.76	-8842.1	-5.0151	-53.747	-0.3573	-4.9180	0.5578	4.5738E+09	4.5537E+09
x(FT)	1.3200	0.0000	30.360	29.920	0.0000	0.0000	29.040	29.040	0.0000	29.040	29.920
2	-3.8562E-03	-0.079107	-579.33	-9456.5	-5.0126	-58.737	-0.3570	-5.2896	0.5617	4.5738E+09	4.5513E+09
x(FT)	1.3200	0.0000	30.360	29.920	0.0000	0.0000	29.040	29.040	0.0000	29.040	29.920
3	-4.6891E-06	-0.079107	6.9483E-14	-9455.6	-0.4422	-58.916	-4.5859E-03	-5.2921	0.3551	4.5738E+09	4.5513E+09
x(FT)	37.840	0.0000	44.000	29.920	33.440	0.0000	37.840	29.040	0.0000	29.040	29.920
4	-4.6931E-06	-0.074722	0.0000	-8841.3	-0.4427	-53.916	-4.5898E-03	-4.9203	0.3512	4.5738E+09	4.5537E+09
x(FT)	37.840	0.0000	44.000	29.920	33.440	0.0000	37.840	29.040	0.0000	29.040	29.920
Min.	-3.8562E-03	-0.079107	-579.76	-9456.5	-5.0151	-58.916	-0.3573	-5.2921	0.3512	4.5738E+09	4.5513E+09
Pile N.	1	2	1	2	1	3	1	3	4	1	2

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	6.4278E-05	9.5092E-04	1200.4	1.0224E+04	5.7914	87.456	0.063249	0.9357	0.6871	8.8843E+09	8.8843E+09
x(FT)	39.600	39.160	0.0000	0.0000	34.760	34.320	39.600	39.160	29.040	0.0000	0.0000
2	6.4259E-05	1.0185E-03	1200.0	1.1382E+04	5.7845	93.517	0.063122	1.0002	0.6919	8.8843E+09	8.8843E+09
x(FT)	39.600	39.160	0.0000	0.0000	34.760	34.320	39.600	39.160	29.040	0.0000	0.4400
3	5.4784E-04	1.0180E-03	45.615	1.1384E+04	0.025344	93.469	0.018892	1.0000	0.4374	8.8843E+09	8.8843E+09
x(FT)	0.0000	39.160	29.040	0.0000	28.600	34.320	29.040	39.160	29.040	0.4400	0.4400
4	5.4784E-04	9.5055E-04	45.636	1.0225E+04	0.025471	87.413	0.018911	0.9353	0.4326	8.8843E+09	8.8843E+09
x(FT)	0.0000	39.160	29.040	0.0000	0.8800	34.320	29.040	39.160	29.040	0.8800	0.0000
Max.	5.4784E-04	1.0185E-03	1200.4	1.1384E+04	5.7914	93.517	0.063249	1.0002	0.6919	8.8843E+09	8.8843E+09
Pile N.	3	2	1	3	1	2	1	2	2	1	1

LOAD CASE : 19

CASE NAME : Service MaxT
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0743729	0.0145553	0.0633430

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
1.39850E-05	8.21820E-05	5.69948E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1770.5	39.831	40.946	148.27	-7916.0	1.0216E+04
2	1359.5	39.844	45.629	148.27	-8982.5	1.0216E+04
3	1952.0	35.167	45.550	148.27	-8983.8	9143.8
4	2363.0	35.158	40.876	148.27	-7917.8	9143.9
MINIMUM	1359.5	35.158	40.876	148.27	-8983.8	9143.8
Pile N.	2	4	4	1	3	3
MAXIMUM	2363.0	39.844	45.629	148.27	-7916.0	1.0216E+04
Pile N.	4	2	2	1	1	1

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-4.4112E-04	-7.0392E-04	-1.0216E+04	-7916.0	-39.190	-64.692	-0.4341	-0.6927	0.4201	4.5738E+09	4.5667E+09
x(FT)	40.040	39.160	0.0000	0.0000	34.760	34.320	40.040	39.160	0.0000	29.920	29.920
2	-4.4090E-04	-7.6584E-04	-1.0216E+04	-8982.5	-39.135	-70.283	-0.4338	-0.7536	0.3226	4.5738E+09	4.5627E+09
x(FT)	40.040	39.160	0.0000	0.0000	34.760	34.320	40.040	39.160	0.0000	29.480	29.920
3	-3.7829E-04	-7.6642E-04	-9143.8	-8983.8	-33.474	-70.359	-0.3722	-0.7542	0.4632	4.5738E+09	4.5627E+09
x(FT)	40.040	39.160	0.0000	0.0000	34.760	34.320	40.040	39.160	0.0000	29.040	29.920
4	-3.7850E-04	-7.0451E-04	-9143.9	-7917.8	-33.527	-64.771	-0.3724	-0.6932	0.5607	4.5738E+09	4.5667E+09
x(FT)	40.040	39.160	0.0000	0.0000	34.760	34.320	40.040	39.160	0.0000	29.040	29.920
Min.	-4.4112E-04	-7.6642E-04	-1.0216E+04	-8983.8	-39.190	-70.359	-0.4341	-0.7542	0.3226	4.5738E+09	4.5627E+09
Pile N.	1	3	1	3	1	3	1	3	2	1	2

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.022872	0.054426	3903.6	6537.1	39.743	40.823	2.5395	3.6620	0.5175	8.8843E+09	8.8843E+09
x(FT)	4.8400	0.0000	30.360	29.920	0.0000	0.0000	29.040	29.040	29.040	0.0000	0.4400
2	0.022872	0.058454	3900.4	7103.7	39.754	45.492	2.5378	4.0053	0.3974	8.8843E+09	8.8843E+09
x(FT)	4.8400	0.0000	30.360	29.920	0.0000	0.0000	29.040	29.040	29.040	0.0000	0.0000
3	0.019040	0.058454	3330.3	7107.0	35.090	45.416	2.1926	4.0059	0.5706	8.8843E+09	8.8843E+09
x(FT)	5.2800	0.0000	30.360	29.920	0.0000	0.0000	29.040	29.040	29.040	1.3200	0.0000
4	0.019040	0.054426	3333.5	6540.6	35.083	40.755	2.1943	3.6628	0.6907	8.8843E+09	8.8843E+09
x(FT)	5.2800	0.0000	30.360	29.920	0.0000	0.0000	29.040	29.040	29.040	1.3200	3.0800
Max.	0.022872	0.058454	3903.6	7107.0	39.754	45.492	2.5395	4.0059	0.6907	8.8843E+09	8.8843E+09
Pile N.	1	2	1	3	2	2	1	3	4	1	1

LOAD CASE : 20
CASE NAME : Service MinT
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0775386	-0.0112448	-0.0693742

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-2.73809E-05	-9.78704E-05	-4.06821E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2146.7	-32.300	-39.942	-290.29	7408.6	-8185.1
2	2440.0	-32.258	-48.920	-290.29	9493.9	-8179.7
3	1734.3	-23.205	-49.063	-290.29	9498.1	-6089.1
4	1441.0	-23.236	-40.075	-290.29	7413.1	-6093.6
MINIMUM	1441.0	-32.300	-49.063	-290.29	7408.6	-8185.1
Pile N.	4	1	3	1	1	1
MAXIMUM	2440.0	-23.205	-39.942	-290.29	9498.1	-6089.1
Pile N.	2	3	1	1	3	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-0.019562	-0.057210	-3266.7	-6705.7	-32.228	-39.820	-2.1021	-3.7081	0.5094	4.5738E+09	4.5655E+09
x(FT)	3.9600	0.0000	30.360	29.920	0.0000	0.0000	29.040	29.040	0.0000	29.040	29.920
2	-0.019562	-0.065096	-3262.0	-7814.9	-32.186	-48.775	-2.0989	-4.3773	0.5790	4.5738E+09	4.5585E+09
x(FT)	3.9600	0.0000	30.360	29.920	0.0000	0.0000	29.040	29.040	0.0000	29.040	29.920
3	-0.012036	-0.065096	-2142.5	-7818.3	-23.155	-48.916	-1.4228	-4.3813	0.4116	4.5738E+09	4.5585E+09
x(FT)	5.7200	0.0000	30.360	29.920	0.0000	0.0000	29.040	29.040	0.0000	29.040	29.920
4	-0.012035	-0.057210	-2146.3	-6710.3	-23.186	-39.951	-1.4254	-3.7130	0.3420	4.5738E+09	4.5654E+09
x(FT)	5.7200	0.0000	30.360	29.920	0.0000	0.0000	29.040	29.040	0.0000	29.040	29.920
Min.	-0.019562	-0.065096	-3266.7	-7818.3	-32.228	-48.916	-2.1021	-4.3813	0.3420	4.5738E+09	4.5585E+09
Pile N.	1	2	1	3	1	3	1	3	4	1	2

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	3.6749E-04	7.2022E-04	8185.1	7408.6	32.783	66.348	0.3616	0.7087	0.6275	8.8843E+09	8.8843E+09
x(FT)	40.040	39.160	0.0000	0.0000	34.760	34.320	40.040	39.160	29.040	0.0000	1.7600
2	3.6734E-04	8.4173E-04	8179.7	9493.9	32.715	77.326	0.3615	0.8283	0.7132	8.8843E+09	8.8843E+09
x(FT)	40.040	39.160	0.0000	0.0000	34.760	34.320	40.040	39.160	29.040	0.0000	0.4400
3	2.4427E-04	8.4200E-04	6089.1	9498.1	21.554	77.370	0.2404	0.8285	0.5069	8.8843E+09	8.8843E+09
x(FT)	40.040	39.160	0.0000	0.0000	34.760	34.320	40.040	39.160	29.040	0.0000	0.0000
4	2.4439E-04	7.2060E-04	6093.6	7413.1	21.609	66.410	0.2405	0.7091	0.4212	8.8843E+09	8.8843E+09
x(FT)	40.040	39.160	0.0000	0.0000	34.760	34.320	40.040	39.160	29.040	0.0000	0.8800
Max.	3.6749E-04	8.4200E-04	8185.1	9498.1	32.783	77.370	0.3616	0.8285	0.7132	8.8843E+09	8.8843E+09
Pile N.	1	3	1	3	1	3	1	3	2	1	1

LOAD CASE : 21
CASE NAME : Service MaxM2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0771691	0.0117678	0.0853096

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
3.05523E-06	1.11026E-04	2.04848E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1604.9	21.521	57.562	32.391	-1.1214E+04	5330.6
2	1457.2	21.525	58.598	32.391	-1.1447E+04	5330.7
3	2257.6	20.479	58.437	32.391	-1.1446E+04	5095.0
4	2405.3	20.475	57.403	32.391	-1.1213E+04	5094.9
MINIMUM	1457.2	20.475	57.403	32.391	-1.1447E+04	5094.9
Pile N.	2	4	4	1	2	4
MAXIMUM	2405.3	21.525	58.598	32.391	-1.1213E+04	5330.7
Pile N.	4	2	2	1	4	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-2.5598E-04	-9.7972E-04	-5330.6	-1.1214E+04	-22.890	-89.909	-0.2518	-0.9628	0.3808	4.5738E+09	4.5527E+09
x(FT)	40.040	39.160	0.0000	0.0000	34.760	34.320	40.040	39.160	0.0000	29.040	29.920
2	-2.5602E-04	-9.9343E-04	-5330.7	-1.1447E+04	-22.882	-91.115	-0.2515	-0.9749	0.3458	4.5738E+09	4.5522E+09
x(FT)	40.040	39.160	0.0000	0.0000	34.760	34.320	40.040	39.160	0.0000	29.040	29.920
3	-2.4238E-04	-9.9380E-04	-5095.0	-1.1446E+04	-21.653	-91.169	-0.2382	-0.9756	0.5357	4.5738E+09	4.5522E+09
x(FT)	40.040	39.160	0.0000	0.0000	34.760	34.320	40.040	39.160	0.0000	29.920	29.920
4	-2.4234E-04	-9.8009E-04	-5094.9	-1.1213E+04	-21.660	-89.962	-0.2385	-0.9635	0.5708	4.5738E+09	4.5527E+09
x(FT)	40.040	39.160	0.0000	0.0000	34.760	34.320	40.040	39.160	0.0000	29.040	29.920
Min.	-2.5602E-04	-9.9380E-04	-5330.7	-1.1447E+04	-22.890	-91.169	-0.2518	-0.9756	0.3458	4.5738E+09	4.5522E+09
Pile N.	2	3	2	2	1	3	1	3	2	1	2

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.014296	0.075543	2288.0	9093.7	21.470	57.389	1.4469	5.1070	0.4691	8.8843E+09	8.8843E+09
x(FT)	3.0800	0.0000	30.360	29.920	0.0000	0.0000	29.040	29.040	29.040	0.8800	0.4400
2	0.014296	0.076423	2287.6	9216.8	21.474	58.422	1.4468	5.1820	0.4259	8.8843E+09	8.8843E+09
x(FT)	3.0800	0.0000	30.360	29.920	0.0000	0.0000	29.040	29.040	29.040	1.3200	0.8800
3	0.013433	0.076423	2163.3	9218.2	20.432	58.264	1.3712	5.1802	0.6599	8.8843E+09	8.8843E+09
x(FT)	3.0800	0.0000	30.360	29.920	0.0000	0.0000	29.040	29.040	29.040	0.4400	0.8800
4	0.013433	0.075543	2163.7	9095.1	20.428	57.233	1.3713	5.1052	0.7031	8.8843E+09	8.8843E+09

x(FT)	3.0800	0.0000	30.360	29.920	0.0000	0.0000	29.040	29.040	29.040	0.4400	0.4400
Max.	0.014296	0.076423	2288.0	9218.2	21.474	58.422	1.4469	5.1820	0.7031	8.8843E+09	8.8843E+09
Pile N.	1	2	1	3	2	2	1	2	4	1	1

LOAD CASE : 22
CASE NAME : Service MinM2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0768595	-1.45304E-03	-0.0870599

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-1.52243E-05	-1.20779E-04	-2.27873E-06

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2350.7	-5.0272	-53.910	-161.41	1.0224E+04	-1200.4
2	2367.1	-5.0248	-58.913	-161.41	1.1382E+04	-1200.0
3	1496.3	0.025906	-59.096	-161.41	1.1384E+04	-35.997
4	1479.9	0.026032	-54.082	-161.41	1.0225E+04	-35.982
MINIMUM	1479.9	-5.0272	-59.096	-161.41	1.0224E+04	-1200.4
Pile N.	4	1	3	1	1	1
MAXIMUM	2367.1	0.026032	-59.910	-161.41	1.1384E+04	-35.982
Pile N.	2	4	1	1	3	4

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-3.8562E-03	-0.074722	-579.76	-8842.1	-5.0151	-53.747	-0.3573	-4.9180	0.5578	4.5738E+09	4.5537E+09
x(FT)	1.3200	0.0000	30.360	29.920	0.0000	0.0000	29.040	29.040	0.0000	29.480	29.920
2	-3.8562E-03	-0.079107	-579.33	-9456.5	-5.0126	-58.737	-0.3570	-5.2896	0.5617	4.5738E+09	4.5513E+09
x(FT)	1.3200	0.0000	30.360	29.920	0.0000	0.0000	29.040	29.040	0.0000	29.920	29.920

3	-4.6891E-06	-0.079107	0.0000	-9455.6	-0.4422	-58.916	-4.5859E-03	-5.2921	0.3551	4.5738E+09	4.5513E+09
x(FT)	37.840	0.0000	44.000	29.920	33.440	0.0000	37.840	29.040	0.0000	30.360	29.920
4	-4.6931E-06	-0.074722	0.0000	-8841.3	-0.4427	-53.916	-4.5898E-03	-4.9203	0.3512	4.5738E+09	4.5537E+09
x(FT)	37.840	0.0000	44.000	29.920	33.440	0.0000	37.840	29.040	0.0000	29.040	29.920
Min.	-3.8562E-03	-0.079107	-579.76	-9456.5	-5.0151	-58.916	-0.3573	-5.2921	0.3512	4.5738E+09	4.5513E+09
Pile N.	1	2	1	2	1	3	1	3	4	1	2

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	6.4278E-05	9.5092E-04	1200.4	1.0224E+04	5.7914	87.456	0.063249	0.9357	0.6871	8.8843E+09	8.8843E+09
x(FT)	39.600	39.160	0.0000	0.0000	34.760	34.320	39.600	39.160	29.040	0.4400	0.0000
2	6.4259E-05	1.0185E-03	1200.0	1.1382E+04	5.7845	93.517	0.063122	1.0002	0.6919	8.8843E+09	8.8843E+09
x(FT)	39.600	39.160	0.0000	0.0000	34.760	34.320	39.600	39.160	29.040	0.0000	0.8800
3	5.4784E-04	1.0180E-03	45.615	1.1384E+04	0.025344	93.469	0.018892	1.0000	0.4374	8.8843E+09	8.8843E+09
x(FT)	0.0000	39.160	29.040	0.0000	0.8800	34.320	29.040	39.160	29.040	0.0000	1.3200
4	5.4784E-04	9.5055E-04	45.636	1.0225E+04	0.025471	87.413	0.018911	0.9353	0.4326	8.8843E+09	8.8843E+09
x(FT)	0.0000	39.160	29.040	0.0000	3.5200	34.320	29.040	39.160	29.040	0.0000	0.0000
Max.	5.4784E-04	1.0185E-03	1200.4	1.1384E+04	5.7914	93.517	0.063249	1.0002	0.6919	8.8843E+09	8.8843E+09
Pile N.	3	2	1	3	1	2	1	2	2	1	1

LOAD CASE : 23
CASE NAME : Service MaxM3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0759907	0.0152016	0.0577382

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
9.38206E-06	7.47416E-05	6.11165E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1852.6	41.313	37.950	99.468	-7363.9	1.0633E+04

2	1412.0	41.332	41.113	99.468	-8080.0	1.0634E+04
3	1950.9	38.185	41.048	99.468	-8080.9	9913.7
4	2391.5	38.169	37.890	99.468	-7365.1	9912.9
MINIMUM	1412.0	38.169	37.890	99.468	-8080.9	9912.9
Pile N.	2	4	4	1	3	4
MAXIMUM	2391.5	41.332	41.113	99.468	-7363.9	1.0634E+04
Pile N.	4	2	2	1	1	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-4.5415E-04	-6.5016E-04	-1.0633E+04	-7363.9	-40.330	-59.755	-0.4469	-0.6398	0.4396	4.5738E+09	4.5709E+09
x(FT)	40.040	39.160	0.0000	0.0000	34.760	34.320	40.040	39.160	0.0000	29.040	29.920
2	-4.5395E-04	-6.9173E-04	-1.0634E+04	-8080.0	-40.286	-63.509	-0.4467	-0.6807	0.3351	4.5738E+09	4.5677E+09
x(FT)	40.040	39.160	0.0000	0.0000	34.760	34.320	40.040	39.160	0.0000	29.480	29.920
3	-4.1200E-04	-6.9218E-04	-9913.7	-8080.9	-36.495	-63.568	-0.4054	-0.6811	0.4629	4.5738E+09	4.5676E+09
x(FT)	40.040	39.160	0.0000	0.0000	34.760	34.320	40.040	39.160	0.0000	30.360	29.920
4	-4.1219E-04	-6.5061E-04	-9912.9	-7365.1	-36.539	-59.815	-0.4056	-0.6402	0.5675	4.5738E+09	4.5709E+09
x(FT)	40.040	39.160	0.0000	0.0000	34.760	34.320	40.040	39.160	0.0000	29.040	29.920
Min.	-4.5415E-04	-6.9218E-04	-1.0634E+04	-8080.9	-40.330	-63.568	-0.4469	-0.6811	0.3351	4.5738E+09	4.5676E+09
Pile N.	1	3	2	3	1	3	1	3	2	1	3

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.023367	0.050109	4015.1	6035.9	41.222	37.837	2.6203	3.3853	0.5415	8.8843E+09	8.8843E+09
x(FT)	4.8400	0.0000	30.360	29.920	0.0000	0.0000	29.040	29.040	29.040	0.0000	1.7600
2	0.023367	0.052811	4012.6	6416.6	41.240	40.990	2.6190	3.6160	0.4127	8.8843E+09	8.8843E+09
x(FT)	4.8400	0.0000	30.360	29.920	0.0000	0.0000	29.040	29.040	29.040	0.4400	0.8800
3	0.020797	0.052811	3630.4	6419.1	38.102	40.927	2.3874	3.6164	0.5702	8.8843E+09	8.8843E+09
x(FT)	5.2800	0.0000	30.360	29.920	0.0000	0.0000	29.040	29.040	29.040	1.3200	0.0000
4	0.020797	0.050109	3632.9	6038.5	38.088	37.778	2.3887	3.3858	0.6990	8.8843E+09	8.8843E+09
x(FT)	5.2800	0.0000	30.360	29.920	0.0000	0.0000	29.040	29.040	29.040	2.2000	0.0000
Max.	0.023367	0.052811	4015.1	6419.1	41.240	40.990	2.6203	3.6164	0.6990	8.8843E+09	8.8843E+09
Pile N.	1	2	1	3	2	2	1	3	4	1	1

LOAD CASE : 24
CASE NAME : Service MinM3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0751019	-8.14707E-03	-0.0632665

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-2.39859E-05	-8.96075E-05	-5.04782E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2020.6	-31.742	-36.511	-254.30	6762.9	-8234.0
2	2384.5	-31.699	-44.370	-254.30	8590.2	-8228.4
3	1738.4	-23.763	-44.493	-254.30	8594.3	-6396.8
4	1374.5	-23.795	-36.625	-254.30	6767.1	-6401.5
MINIMUM	1374.5	-31.742	-44.493	-254.30	6762.9	-8234.0
Pile N.	4	1	3	1	1	1
MAXIMUM	2384.5	-23.763	-36.511	-254.30	8594.3	-6396.8
Pile N.	2	3	1	1	3	3

* MINIMUM VALUES AND LOCATIONS *

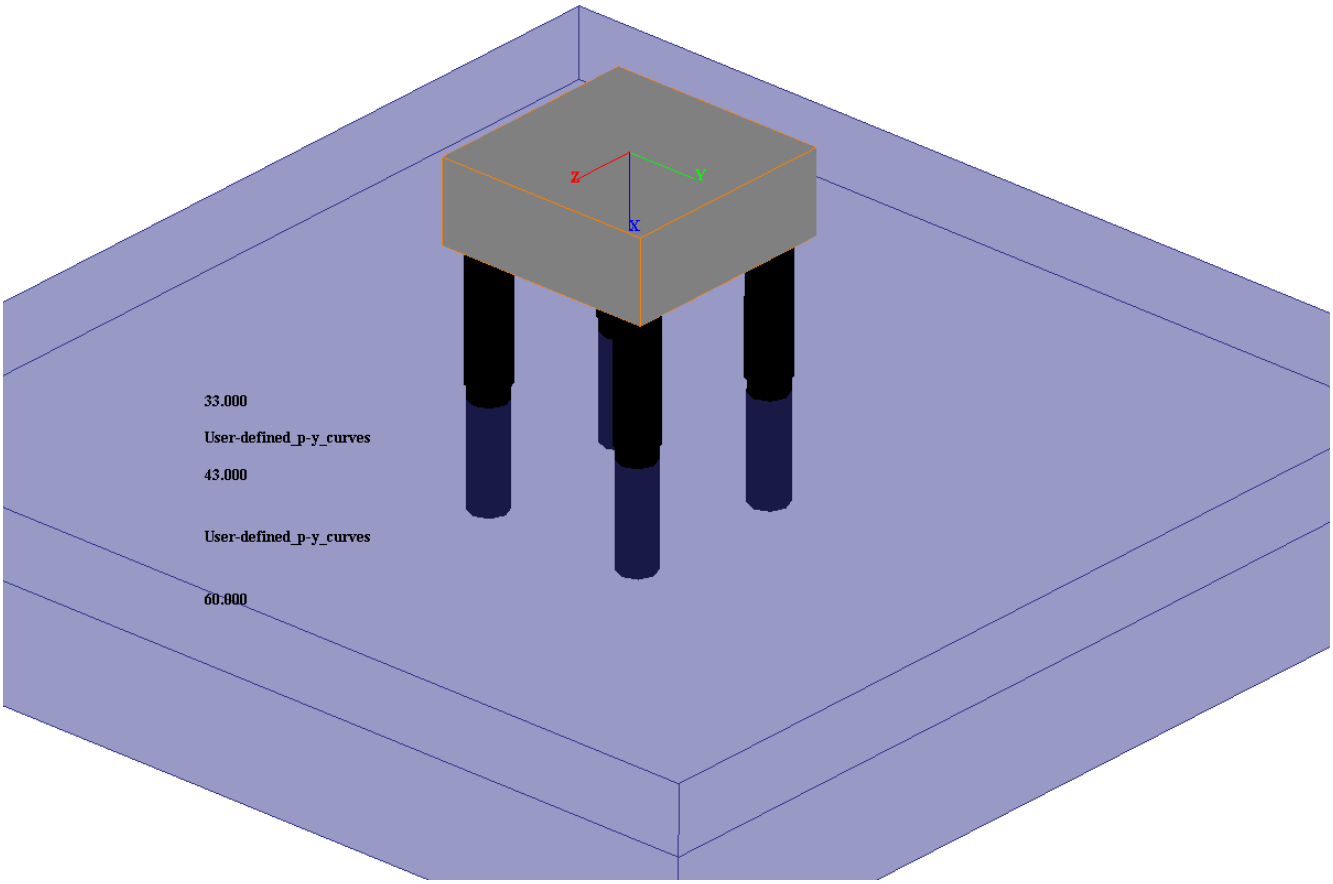
PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-0.017329	-0.052286	-3025.6	-6132.8	-31.674	-36.400	-1.9879	-3.3919	0.4795	4.5738E+09	4.5700E+09
x(FT)	5.2800	0.0000	30.360	29.920	0.0000	0.0000	29.040	29.040	0.0000	29.480	29.920
2	-0.017330	-0.059193	-3021.2	-7105.5	-31.631	-44.239	-1.9846	-3.9779	0.5658	4.5738E+09	4.5627E+09
x(FT)	5.2800	0.0000	30.360	29.920	0.0000	0.0000	29.040	29.040	0.0000	29.040	29.920
3	-0.010895	-0.059193	-2039.9	-7109.1	-23.714	-44.360	-1.3918	-3.9816	0.4125	4.5738E+09	4.5627E+09
x(FT)	7.0400	0.0000	30.360	29.920	0.0000	0.0000	29.040	29.040	0.0000	29.040	29.920
4	-0.010893	-0.052286	-2043.6	-6137.2	-23.746	-36.512	-1.3946	-3.3968	0.3262	4.5738E+09	4.5700E+09
x(FT)	7.0400	0.0000	30.360	29.920	0.0000	0.0000	29.040	29.040	0.0000	30.360	29.920
Min.	-0.017330	-0.059193	-3025.6	-7109.1	-31.674	-44.360	-1.9879	-3.9816	0.3262	4.5738E+09	4.5627E+09
Pile N.	2	2	1	3	1	3	1	3	4	1	2

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	3.4300E-04	6.5865E-04	8234.0	6762.9	30.436	60.708	0.3375	0.6481	0.5906	8.8843E+09	8.8843E+09
x(FT)	40.040	39.160	0.0000	0.0000	34.760	34.320	40.040	39.160	29.040	0.0000	1.7600
2	3.4289E-04	7.6531E-04	8228.4	8590.2	30.376	70.348	0.3374	0.7531	0.6970	8.8843E+09	8.8843E+09
x(FT)	40.040	39.160	0.0000	0.0000	34.760	34.320	40.040	39.160	29.040	0.0000	0.4400
3	2.3562E-04	7.6562E-04	6396.8	8594.3	20.591	70.398	0.2319	0.7534	0.5081	8.8843E+09	8.8843E+09
x(FT)	40.480	39.160	0.0000	0.0000	34.760	34.320	40.480	39.160	29.040	0.4400	0.8800
4	2.3553E-04	6.5899E-04	6401.5	6767.1	20.637	60.764	0.2318	0.6484	0.4018	8.8843E+09	8.8843E+09
x(FT)	40.480	39.160	0.0000	0.0000	34.760	34.320	40.480	39.160	29.040	0.4400	0.4400
Max.	3.4300E-04	7.6562E-04	8234.0	8594.3	30.436	70.398	0.3375	0.7534	0.6970	8.8843E+09	8.8843E+09
Pile N.	1	3	1	3	1	3	1	3	2	1	1

Drilled Shaft Lateral Evaluations - Upper Bound Stiffness (Weak Rock)

Pier 1
Weak Rock p-y parameters (Upper Bound)
No Scour Condition
40 #11 Bar Reinforcement
Strength Condition: Load Cases 1 through 12
Service Condition: Load cases 13 through 24
0.75" thick casing reduced to 0.625" after 1/8" of corrosion



Pier 1 Loading Schedule provided by HNTB on 8/14/2020
Converted to kip-in

,000	PIER	ID	Station	Output	Case	P	V2	V3	T	M2	M3
						Vertical, x-dir	horizontal, Fy	horizontal, Fz	Mx	My	Mz
	-	-	ft	-	-	kip	Kip	Kip	Kip-in	Kip-in	Kip-in
1	PileCap 1	5143	0	STRENGTH	Max P	6368	-63	-87	-2149	-112802	-84172
2	PileCap 1	5143	0	STRENGTH	Min P	11155	154	157	-3240	120223	129929
3	PileCap 1	5143	0	STRENGTH	Max V2	9409	328	-15	-6920	-42020	293598
4	PileCap 1	5143	0	STRENGTH	Min V2	6568	-236	84	2264	54012	-253222
5	PileCap 1	5143	0	STRENGTH	Max V3	9425	-15	323	1611	287925	-41080
6	PileCap 1	5143	0	STRENGTH	Min V3	6551	107	-254	-6267	-275933	81456
7	PileCap 1	5143	0	STRENGTH	Max T	6585	-25	316	2281	283987	-43239
8	PileCap 1	5143	0	STRENGTH	Min T	9391	117	-247	-6937	-271995	83615
9	PileCap 1	5143	0	STRENGTH	Max M2	9425	-15	323	1611	287925	-41080
10	PileCap 1	5143	0	STRENGTH	Min M2	6551	107	-254	-6267	-275933	81456
11	PileCap 1	5143	0	STRENGTH	Max M3	9409	328	-15	-6920	-42020	293598
12	PileCap 1	5143	0	STRENGTH	Min M3	6568	-236	84	2264	54012	-253222
13	PileCap 1	5143	0	SERVICE	Max P	7288	-78	-105	-1687	-129805	-102648
14	PileCap 1	5143	0	SERVICE	Min P	8612	187	162	-2566	155406	140405
15	PileCap 1	5143	0	SERVICE	Max V2	7941	279	82	-4726	88441	218610
16	PileCap 1	5143	0	SERVICE	Min V2	7885	-180	-23	63	-69006	-183339
17	PileCap 1	5143	0	SERVICE	Max V3	7778	71	279	-582	228257	68557
18	PileCap 1	5143	0	SERVICE	Min V3	7971	18	-218	-3250	-209610	-39233
19	PileCap 1	5143	0	SERVICE	Max T	7855	-135	-69	1569	-65693	-187553
20	PileCap 1	5143	0	SERVICE	Min T	7885	240	102	-5877	74872	213767
21	PileCap 1	5143	0	SERVICE	Max M2	7946	106	260	-340	241065	71833
22	PileCap 1	5143	0	SERVICE	Min M2	7787	-29	-179	-4202	-219810	-36811
23	PileCap 1	5143	0	SERVICE	Max M3	7971	261	106	-5390	89300	224873
24	PileCap 1	5143	0	SERVICE	Min M3	7740	-148	-59	1234	-64045	-191983

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

                GROUP for Windows, Version 2016.10.13

                 Serial Number : 364300562

                  Analysis of A Group of Piles
               Subjected to Axial and Lateral Loading

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                     All Rights Reserved

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


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

          Date:  August 24, 2020     Time:  19:13:41



            *****     COMPUTATION RESULTS     *****


Pier 1



            *****     LOAD CASES RESULTS      *****


LOAD CASE :     1
CASE NAME : Max P
LOAD TYPE : Dead, DL



* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *


       VERTICAL ,IN      HORIZONTAL Y,IN     HORIZONTAL Z,IN
          0.0658653        3.93935E-03         -0.0133076

     ANGLE ROT. X,RAD    ANGLE ROT. Y,RAD    ANGLE ROT. Z,RAD
       -1.78008E-06       -5.75004E-05        -3.49159E-05
```

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   * PILE TOP REACTIONS *

 PILE GROUP   FOR. X,KIP   FOR. Y,KIP   FOR. Z,KIP MOM X,KIP-IN MOM Y,KIP-IN MOM Z,KIP-IN
 **********  ***********  ***********  ***********  ***********  ***********  ***********
     1           1669.1      -17.543      -19.956      -21.432      -1024.7      -3390.5
     2           1907.4      -17.543      -23.534      -21.432      -689.59      -3390.2
     3           1514.9      -13.958      -23.544      -21.432      -690.44      -3056.2
     4           1276.6      -13.957      -19.966      -21.432      -1025.5      -3056.5

  MINIMUM        1276.6      -17.543      -23.544      -21.432      -1025.5      -3390.5
  Pile N.           4            1            3            1            4            1
  MAXIMUM        1907.4      -13.957      -19.956      -21.432      -689.59      -3056.2
  Pile N.           2            4            1            1            2            3


   T
   * MINIMUM VALUES AND LOCATIONS *

  PILE     DISPL.      DISPL.      MOMENT      MOMENT       SHEAR       SHEAR    SOIL REACT  SOIL REACT     TOTAL    FLEX. RIG.  FLEX. RIG.
           y-DIR       z-DIR       z-DIR       y-DIR       y-DIR       z-DIR       y-DIR       z-DIR     STRESS      z-DIR       y-DIR
            IN          IN        KIP-IN      KIP-IN         KIP         KIP       KIP/IN      KIP/IN  KIP/IN**2   KIP-IN**2   KIP-IN**2
******  **********  **********  **********  **********  **********  **********  **********  **********  **********  **********  **********
    1  -1.2937E-03 -8.2213E-03     -247.73     -2051.8     -17.772     -19.215   -0.072837     -0.2066      0.3961  4.5738E+09  4.5738E+09
 x(FT)      12.000      0.0000      31.200      9.0000      1.8000      0.0000      15.600      0.6000      0.0000      45.000      45.000
    2  -1.2938E-03 -8.7339E-03     -247.77     -2030.4     -17.772     -22.747   -0.072843     -0.2202      0.4526  4.5738E+09  4.5738E+09
 x(FT)      12.000      0.0000      31.200      10.200      1.8000      0.0000      15.600      1.2000      0.0000      47.400      46.200
    3  -1.0193E-03 -8.7339E-03     -198.12     -2030.2     -14.690     -22.758   -0.069823     -0.2202      0.3595  4.5738E+09  4.5738E+09
 x(FT)      13.800      0.0000      32.400      10.200      3.6000      0.0000      45.000      1.2000      0.0000      45.000      45.000
    4  -1.0192E-03 -8.2213E-03     -198.08     -2051.6     -14.689     -19.225   -0.069865     -0.2066      0.3029  4.5738E+09  4.5738E+09
 x(FT)      13.800      0.0000      32.400      9.0000      3.6000      0.0000      45.000      0.6000      0.0000      45.000      48.000

   Min. -1.2938E-03 -8.7339E-03     -247.77     -2051.8     -17.772     -22.758   -0.072843     -0.2202      0.3029  4.5738E+09  4.5738E+09
Pile N.       2           2           2           1           1           3           2           2           4           1           1

   * MAXIMUM VALUES AND LOCATIONS *

  PILE     DISPL.      DISPL.      MOMENT      MOMENT       SHEAR       SHEAR    SOIL REACT  SOIL REACT     TOTAL    FLEX. RIG.  FLEX. RIG.
           y-DIR       z-DIR       z-DIR       y-DIR       y-DIR       z-DIR       y-DIR       z-DIR     STRESS      z-DIR       y-DIR
            IN          IN        KIP-IN      KIP-IN         KIP         KIP       KIP/IN      KIP/IN  KIP/IN**2   KIP-IN**2   KIP-IN**2
******  **********  **********  **********  **********  **********  **********  **********  **********  **********  **********  **********
    1   7.5008E-04  3.9081E-04      3390.5      208.59      1.7819      8.6120    0.040674      0.5067      0.4879  8.8843E+09  8.8843E+09
 x(FT)      0.0000      28.800      0.0000      45.000      45.600      20.400      47.400      45.000      45.000      0.0000      1.8000
    2   7.5008E-04  3.7577E-04      3390.2      216.31      1.7820      8.5834    0.040676      0.5395      0.5575  8.8843E+09  8.8843E+09
 x(FT)      0.0000      29.400      0.0000      45.000      45.600      21.600      47.400      45.000      45.000      1.2000      0.6000
    3   1.2627E-03  3.7542E-04      3056.2      216.19      1.7825      8.5779    0.040794      0.5393      0.4428  8.8843E+09  8.8843E+09
 x(FT)      0.0000      29.400      0.0000      45.000      46.200      21.600      48.000      45.000      45.000      1.2000      0.6000
    4   1.2627E-03  3.9046E-04      3056.5      208.48      1.7825      8.6064    0.040793      0.5065      0.3731  8.8843E+09  8.8843E+09
 x(FT)      0.0000      28.800      0.0000      45.000      46.200      20.400      48.000      45.000      45.000      0.6000      0.6000

   Max.  1.2627E-03  3.9081E-04      3390.5      216.31      1.7825      8.6120    0.040794      0.5395      0.5575  8.8843E+09  8.8843E+09
Pile N.       3           1           1           2           3           1           3           2           2           1           1
```

LOAD CASE : 2
CASE NAME : Min P
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.11636	-3.42315E-03	0.0172018

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-2.68662E-06	6.53111E-05	5.03554E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2737.7	35.797	41.956	-32.347	-642.82	5867.6
2	2394.0	35.797	36.560	-32.347	-137.05	5868.3
3	2839.8	41.204	36.545	-32.347	-138.14	6372.3
4	3183.5	41.202	41.939	-32.347	-643.91	6371.6
MINIMUM	2394.0	35.797	36.545	-32.347	-643.91	5867.6
Pile N.	2	1	3	1	4	1
MAXIMUM	3183.5	41.204	41.956	-32.347	-137.05	6372.3
Pile N.	4	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-2.5754E-06	-3.9455E-04	-5867.6	-642.82	-3.1561	-10.240	-0.071911	-0.7527	0.6496	4.5738E+09	4.5738E+09
x(FT)	46.200	31.800	0.0000	0.0000	44.400	24.000	46.200	45.000	0.0000	45.000	45.000
2	-2.5733E-06	-4.0145E-04	-5868.3	-266.93	-3.1546	-9.9801	-0.071852	-0.7030	0.5681	4.5738E+09	4.5738E+09
x(FT)	46.200	31.200	0.0000	45.000	44.400	23.400	46.200	45.000	0.0000	45.000	46.200
3	-3.4623E-06	-4.0190E-04	-6372.3	-267.12	-3.6516	-9.9875	-0.096674	-0.7033	0.6739	4.5738E+09	4.5738E+09
x(FT)	45.600	30.600	0.0000	45.000	43.200	23.400	45.600	45.000	0.0000	45.000	45.000
4	-3.4669E-06	-3.9500E-04	-6371.6	-643.91	-3.6532	-10.248	-0.096804	-0.7531	0.7554	4.5738E+09	4.5738E+09
x(FT)	45.600	31.800	0.0000	0.0000	43.200	24.000	45.600	45.000	0.0000	45.000	45.000
Min.	-3.4669E-06	-4.0190E-04	-6372.3	-643.91	-3.6532	-10.248	-0.096804	-0.7531	0.5681	4.5738E+09	4.5738E+09
Pile N.	4	3	3	4	4	4	4	4	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	2.8251E-03	0.012102	527.15	2373.2	35.763	40.867	0.1445	0.3119	0.8002	8.8843E+09	8.8843E+09
x(FT)	9.6000	0.0000	28.800	13.200	0.0000	0.0000	13.800	2.4000	45.000	0.6000	0.0000
2	2.8249E-03	0.011329	527.04	2327.5	35.763	35.541	0.1445	0.2895	0.6998	8.8843E+09	8.8843E+09
x(FT)	9.6000	0.0000	28.800	12.000	0.0000	0.0000	13.800	1.8000	45.000	0.0000	0.0000
3	3.3831E-03	0.011329	624.40	2327.8	41.101	35.525	0.1665	0.2895	0.8301	8.8843E+09	8.8843E+09
x(FT)	8.4000	0.0000	28.200	12.000	0.0000	0.0000	12.600	1.8000	45.000	0.0000	1.2000
4	3.3832E-03	0.012102	624.51	2373.6	41.100	40.850	0.1665	0.3119	0.9305	8.8843E+09	8.8843E+09
x(FT)	8.4000	0.0000	28.200	13.200	0.0000	0.0000	12.600	2.4000	45.000	0.6000	1.2000
Max.	3.3832E-03	0.012102	624.51	2373.6	41.101	40.867	0.1665	0.3119	0.9305	8.8843E+09	8.8843E+09
Pile N.	4	1	4	4	3	1	3	1	4	1	1

LOAD CASE : 3
CASE NAME : Max V2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0979454	-8.66922E-03	-4.14296E-03

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-5.73242E-06	-2.03340E-05	1.15037E-04

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2814.2	76.237	2.0231	-69.018	-1208.4	1.2886E+04
2	2029.1	76.239	-9.5220	-69.018	-131.67	1.2889E+04
3	1890.3	87.765	-9.5234	-69.018	-131.78	1.3964E+04
4	2675.4	87.759	2.0224	-69.018	-1208.5	1.3961E+04
MINIMUM	1890.3	76.237	-9.5234	-69.018	-1208.5	1.2886E+04
Pile N.	3	1	3	1	4	1
MAXIMUM	2814.2	87.765	2.0231	-69.018	-131.67	1.3964E+04
Pile N.	1	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-5.3573E-06	-1.6094E-03	-1.2886E+04	-1208.4	-6.7055	-1.2192	-0.1496	-0.040365	0.6678	4.5738E+09	4.5738E+09
x(FT)	46.800	0.0000	0.0000	0.0000	44.400	46.800	46.800	0.0000	0.0000	45.000	45.600
2	-5.3533E-06	-3.2604E-03	-1.2889E+04	-716.83	-6.6979	-9.2285	-0.1495	-0.082599	0.4815	4.5738E+09	4.5738E+09
x(FT)	46.800	0.0000	0.0000	10.800	44.400	0.0000	46.800	1.2000	0.0000	45.000	45.000
3	-6.5755E-06	-3.2604E-03	-1.3964E+04	-716.80	-7.7476	-9.2298	-0.1836	-0.082599	0.4486	4.5738E+09	4.5738E+09
x(FT)	46.200	0.0000	0.0000	10.800	43.800	0.0000	46.200	1.2000	0.0000	46.200	45.000
4	-6.5872E-06	-1.6094E-03	-1.3961E+04	-1208.5	-7.7557	-1.2191	-0.1839	-0.040365	0.6349	4.5738E+09	4.5738E+09
x(FT)	46.200	0.0000	0.0000	0.0000	43.800	46.800	46.200	0.0000	0.0000	45.000	46.200
Min.	-6.5872E-06	-3.2604E-03	-1.3964E+04	-1208.5	-7.7557	-9.2298	-0.1839	-0.082599	0.4486	4.5738E+09	4.5738E+09
Pile N.	4	2	3	4	4	3	4	2	3	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	5.9102E-03	2.7751E-04	1109.7	60.595	76.232	4.7136	0.3085	0.096395	0.8226	8.8843E+09	8.8843E+09
x(FT)	10.200	19.800	29.400	39.600	0.0000	10.800	13.800	45.000	45.000	3.0000	0.6000
2	5.9093E-03	1.2909E-04	1109.2	79.074	76.229	3.0497	0.3084	0.2018	0.5931	8.8843E+09	8.8843E+09
x(FT)	10.200	30.000	29.400	45.000	0.0000	22.200	13.800	45.000	45.000	2.4000	1.8000
3	7.0613E-03	1.2904E-04	1309.9	79.057	87.606	3.0490	0.3542	0.2017	0.5525	8.8843E+09	8.8843E+09
x(FT)	9.0000	30.000	28.800	45.000	0.0000	22.200	13.200	45.000	45.000	3.0000	0.0000
4	7.0621E-03	2.7746E-04	1310.5	60.584	87.605	4.7131	0.3543	0.096395	0.7820	8.8843E+09	8.8843E+09
x(FT)	9.0000	19.800	28.800	39.600	0.0000	10.800	13.200	45.000	45.000	3.0000	0.0000
Max.	7.0621E-03	2.7751E-04	1310.5	79.074	87.606	4.7136	0.3543	0.2018	0.8226	8.8843E+09	8.8843E+09
Pile N.	4	1	4	2	3	1	4	2	1	1	1

LOAD CASE : 4
CASE NAME : Min V2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0679752	9.67489E-03	8.35517E-03

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
1.87697E-06	3.01776E-05	-1.02138E-04

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1190.5	-57.109	19.118	22.599	-267.79	-1.0461E+04
2	1887.6	-57.111	22.886	22.599	-621.34	-1.0458E+04
3	2093.5	-60.891	22.882	22.599	-621.58	-1.0810E+04
4	1396.4	-60.890	19.115	22.599	-268.02	-1.0813E+04
MINIMUM	1190.5	-60.891	19.115	22.599	-621.58	-1.0813E+04
Pile N.	1	3	4	1	3	4
MAXIMUM	2093.5	-57.109	22.886	22.599	-267.79	-1.0458E+04
Pile N.	3	1	2	1	1	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-4.2736E-03	-1.8189E-04	-812.18	-267.79	-57.355	-4.7039	-0.2338	-0.3445	0.2825	4.5738E+09	4.5738E+09
x(FT)	11.400	31.200	30.600	0.0000	1.2000	24.000	15.000	45.000	0.0000	45.000	45.600
2	-4.2744E-03	-1.7967E-04	-812.56	-621.34	-57.357	-4.9336	-0.2338	-0.3793	0.4479	4.5738E+09	4.5738E+09
x(FT)	11.400	32.400	30.600	0.0000	1.2000	25.200	15.000	45.000	0.0000	45.600	45.000
3	-4.6126E-03	-1.7977E-04	-872.52	-621.58	-60.972	-4.9352	-0.2478	-0.3794	0.4968	4.5738E+09	4.5738E+09
x(FT)	10.800	32.400	30.000	0.0000	0.6000	25.200	14.400	45.000	0.0000	46.200	45.000
4	-4.6119E-03	-1.8199E-04	-872.13	-268.02	-60.971	-4.7056	-0.2478	-0.3446	0.3314	4.5738E+09	4.5738E+09
x(FT)	10.800	31.200	30.000	0.0000	0.6000	24.000	14.400	45.000	0.0000	45.600	45.000
Min.	-4.6126E-03	-1.8199E-04	-872.52	-621.58	-60.972	-4.9352	-0.2478	-0.3794	0.2825	4.5738E+09	4.5738E+09
Pile N.	3	4	3	3	3	3	3	3	1	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	1.3656E-03	5.5500E-03	1.0461E+04	1092.9	5.2369	18.619	0.1199	0.1429	0.3480	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	0.0000	13.200	45.600	0.0000	47.400	2.4000	45.000	0.6000	0.6000
2	1.3656E-03	6.0905E-03	1.0458E+04	1136.6	5.2372	22.337	0.1199	0.1589	0.5517	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	0.0000	13.800	45.600	0.0000	47.400	2.4000	45.000	0.0000	0.6000
3	8.2499E-04	6.0905E-03	1.0810E+04	1136.7	5.4051	22.334	0.1231	0.1589	0.6119	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	0.0000	13.800	45.000	0.0000	46.800	2.4000	45.000	0.6000	0.0000
4	8.2499E-04	5.5500E-03	1.0813E+04	1093.0	5.4015	18.615	0.1230	0.1429	0.4082	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	0.0000	13.200	45.000	0.0000	46.800	2.4000	45.000	0.0000	0.6000
Max.	1.3656E-03	6.0905E-03	1.0813E+04	1136.7	5.4051	22.337	0.1231	0.1589	0.6119	8.8843E+09	8.8843E+09

Pile N. 1 2 4 3 3 2 3 2 3 1 1

LOAD CASE : 5
CASE NAME : Max V3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0981141	2.66064E-03	0.0387063

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
1.33545E-06	1.53092E-04	-1.80257E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1772.3	-2.4038	79.452	16.079	270.16	-1129.4
2	1895.3	-2.4043	82.131	16.079	18.463	-1129.3
3	2940.2	-5.0961	82.048	16.079	12.440	-1379.5
4	2817.2	-5.0958	79.370	16.079	264.13	-1379.6
MINIMUM	1772.3	-5.0961	79.370	16.079	12.440	-1379.6
Pile N.	1	3	4	1	3	4
MAXIMUM	2940.2	-2.4038	82.131	16.079	270.16	-1129.3
Pile N.	3	1	2	1	1	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-2.6728E-04	-9.5251E-04	-56.567	-611.63	-4.4508	-23.149	-0.079840	-1.5893	0.4206	4.5738E+09	4.5738E+09
x(FT)	19.200	30.600	38.400	45.000	9.6000	22.800	45.000	45.000	0.0000	45.000	45.000
2	-2.6732E-04	-9.4722E-04	-56.576	-617.49	-4.4513	-23.238	-0.079839	-1.6140	0.4498	4.5738E+09	4.5738E+09
x(FT)	19.200	30.600	38.400	45.000	9.6000	22.800	45.000	45.000	0.0000	45.600	45.600
3	-3.9238E-04	-9.4976E-04	-77.999	-618.51	-6.0076	-23.279	-0.055241	-1.6158	0.6977	4.5738E+09	4.5738E+09
x(FT)	15.600	30.600	34.800	45.000	6.0000	22.800	45.000	45.000	0.0000	45.000	45.000
4	-3.9235E-04	-9.5500E-04	-77.989	-612.63	-6.0073	-23.189	-0.055247	-1.5910	0.6685	4.5738E+09	4.5738E+09
x(FT)	15.600	30.600	34.800	45.000	6.0000	22.800	45.000	45.000	0.0000	45.000	45.000
Min.	-3.9238E-04	-9.5500E-04	-77.999	-618.51	-6.0076	-23.279	-0.079840	-1.6158	0.4206	4.5738E+09	4.5738E+09

Pile N. 3 4 3 3 3 3 1 3 1 1 1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	1.3388E-03	0.025654	1129.4	5419.2	1.0575	77.142	0.033577	0.6528	0.5180	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	0.0000	12.000	46.200	0.0000	0.0000	1.8000	45.000	0.0000	0.0000
2	1.3388E-03	0.026039	1129.3	5434.5	1.0576	79.787	0.033577	0.6638	0.5540	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	0.0000	12.000	46.200	0.0000	0.0000	1.8000	45.000	0.0000	1.2000
3	9.5418E-04	0.026039	1379.5	5436.4	0.9811	79.703	0.023931	0.6638	0.8594	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	0.0000	12.000	46.200	0.0000	0.0000	1.8000	45.000	0.6000	0.0000
4	9.5418E-04	0.025654	1379.6	5421.0	0.9810	77.060	0.023931	0.6528	0.8235	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	0.0000	12.000	46.200	0.0000	0.0000	1.8000	45.000	0.6000	1.8000
Max.	1.3388E-03	0.026039	1379.6	5436.4	1.0576	79.787	0.033577	0.6638	0.8594	8.8843E+09	8.8843E+09
Pile N.	1	2	4	3	2	2	1	2	3	1	1

LOAD CASE : 6
CASE NAME : Min V2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0677958	-1.65665E-03	-0.0344820

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-5.18348E-06	-1.43229E-04	3.09141E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2232.0	21.529	-58.241	-62.409	-1749.4	3561.1
2	2021.0	21.530	-68.691	-62.409	-776.35	3561.3
3	1043.5	31.971	-68.761	-62.409	-781.64	4536.7
4	1254.5	31.970	-58.306	-62.409	-1754.7	4536.5
MINIMUM	1043.5	21.529	-68.761	-62.409	-1754.7	3561.1
Pile N.	3	1	3	1	4	1
MAXIMUM	2232.0	31.971	-58.241	-62.409	-776.35	4536.7
Pile N.	1	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-1.5267E-06	-0.021704	-3561.1	-5059.2	-1.8954	-56.286	-0.042627	-0.5470	0.5297	4.5738E+09	4.5738E+09
x(FT)	46.200	0.0000	0.0000	10.200	44.400	0.0000	46.200	1.2000	0.0000	45.600	45.000
2	-1.5259E-06	-0.023197	-3561.3	-5053.0	-1.8949	-66.603	-0.042605	-0.5882	0.4796	4.5738E+09	4.5738E+09
x(FT)	46.200	0.0000	0.0000	11.400	44.400	0.0000	46.200	1.2000	0.0000	45.600	45.000
3	-4.8176E-06	-0.023197	-4536.7	-5051.5	-2.8598	-66.673	-0.1168	-0.5882	0.2476	4.5738E+09	4.5738E+09
x(FT)	43.800	0.0000	0.0000	11.400	41.400	0.0000	45.000	1.2000	0.0000	45.000	45.000
4	-4.8255E-06	-0.021704	-4536.5	-5058.0	-2.8605	-56.352	-0.1169	-0.5470	0.2977	4.5738E+09	4.5738E+09
x(FT)	43.800	0.0000	0.0000	10.200	41.400	0.0000	45.000	1.2000	0.0000	47.400	45.000
Min.	-4.8255E-06	-0.023197	-4536.7	-5059.2	-2.8605	-66.673	-0.1169	-0.5882	0.2476	4.5738E+09	4.5738E+09
Pile N.	4	2	3	1	4	3	4	2	3	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	1.6901E-03	9.3810E-04	315.81	538.31	21.514	21.390	0.086959	1.3409	0.6524	8.8843E+09	8.8843E+09
x(FT)	9.6000	29.400	29.400	45.000	0.0000	21.600	13.800	45.000	45.000	0.0000	0.6000
2	1.6901E-03	9.0461E-04	315.77	560.44	21.514	21.513	0.086955	1.4359	0.5907	8.8843E+09	8.8843E+09
x(FT)	9.6000	30.000	29.400	45.000	0.0000	22.200	13.800	45.000	45.000	0.0000	0.6000
3	2.8199E-03	9.0239E-04	510.50	559.60	31.819	21.477	0.1305	1.4345	0.3050	8.8843E+09	8.8843E+09
x(FT)	7.2000	30.000	27.000	45.000	0.0000	22.200	11.400	45.000	45.000	0.0000	0.0000
4	2.8199E-03	9.3593E-04	510.55	537.55	31.819	21.356	0.1305	1.3397	0.3667	8.8843E+09	8.8843E+09
x(FT)	7.2000	29.400	27.000	45.000	0.0000	21.600	11.400	45.000	45.000	0.0000	0.0000
Max.	2.8199E-03	9.3810E-04	510.55	560.44	31.819	21.513	0.1305	1.4359	0.6524	8.8843E+09	8.8843E+09
Pile N.	3	1	4	2	3	2	3	2	1	1	1

LOAD CASE : 7
CASE NAME : Max T
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0681545	2.36843E-03	0.0380450

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
1.88993E-06	1.50820E-04	-1.83962E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1068.8	-4.3457	77.142	22.755	380.77	-1329.9
2	1194.3	-4.3461	80.938	22.755	24.852	-1329.8
3	2223.7	-8.1542	80.857	22.755	19.008	-1684.3
4	2098.2	-8.1540	77.062	22.755	374.92	-1684.4
MINIMUM	1068.8	-8.1542	77.062	22.755	19.008	-1684.4
Pile N.	1	3	4	1	3	4
MAXIMUM	2223.7	-4.3457	80.938	22.755	380.77	-1329.8
Pile N.	3	1	2	1	1	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-3.5497E-04	-9.3919E-04	-71.361	-599.36	-5.5763	-22.742	-0.064222	-1.5537	0.2536	4.5738E+09	4.5738E+09
x(FT)	16.800	30.600	35.400	45.000	7.2000	22.800	45.000	45.000	0.0000	45.000	45.000
2	-3.5501E-04	-9.3154E-04	-71.371	-607.58	-5.5766	-22.865	-0.064217	-1.5886	0.2834	4.5738E+09	4.5738E+09
x(FT)	16.800	30.600	35.400	45.000	7.2000	22.800	45.000	45.000	0.0000	45.000	45.000
3	-5.9559E-04	-9.3401E-04	-115.06	-608.58	-8.4079	-22.905	-0.034666	-1.5904	0.5277	4.5738E+09	4.5738E+09
x(FT)	12.600	30.600	31.800	45.000	3.0000	22.800	16.200	45.000	0.0000	45.000	45.000
4	-5.9556E-04	-9.4159E-04	-115.05	-600.33	-8.4078	-22.781	-0.034665	-1.5554	0.4979	4.5738E+09	4.5738E+09
x(FT)	12.600	30.600	31.800	45.000	3.0000	22.800	16.200	45.000	0.0000	46.200	45.000
Min.	-5.9559E-04	-9.4159E-04	-115.06	-608.58	-8.4079	-22.905	-0.064222	-1.5904	0.2536	4.5738E+09	4.5738E+09
Pile N.	3	4	3	3	3	3	1	3	1	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	1.0953E-03	0.025104	1329.9	5333.2	1.0247	74.882	0.027470	0.6382	0.3124	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	0.0000	11.400	46.200	0.0000	0.0000	1.8000	45.000	0.6000	0.6000
2	1.0953E-03	0.025648	1329.8	5352.5	1.0248	78.629	0.027470	0.6539	0.3491	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	0.0000	12.000	46.200	0.0000	0.0000	1.8000	45.000	0.0000	0.0000
3	5.5100E-04	0.025648	1684.3	5354.3	0.9344	78.548	0.021268	0.6538	0.6500	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	0.0000	12.000	45.600	0.0000	47.400	1.8000	45.000	0.0000	1.2000
4	5.5100E-04	0.025104	1684.4	5334.9	0.9344	74.802	0.021267	0.6382	0.6133	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	0.0000	11.400	45.600	0.0000	47.400	1.8000	45.000	0.0000	0.0000
Max.	1.0953E-03	0.025648	1684.4	5354.3	1.0248	78.629	0.027470	0.6539	0.6500	8.8843E+09	8.8843E+09
Pile N.	1	2	4	3	2	2	1	2	3	1	1

LOAD CASE : 8
CASE NAME : Min T
LOAD TYPE : Dead, DL

* TABLE L * COMPUTATION ON PILE CAP

* EQUIVALENT CONCENTRATED LOAD AT ORIGIN *

VERT. LOAD,KIPS	HOR. LOAD Y,KIPS	HOR. LOAD Z,KIPS
9391.00	117.000	-247.000

MOMENT X ,KIP-IN	MOMENT Y,KIP-IN	MOMENT Z,KIP-IN
83615.0	-2.61621E+05	-2023.00

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2793.0	98.935	-131.40	833.64	5206.2	8711.7
2	2864.8	98.931	7.9604	833.64	-7806.1	8711.7
3	1902.5	-40.432	7.9256	833.64	-7811.4	-4301.5
4	1830.7	-40.433	-131.49	833.64	5201.2	-4301.5
MINIMUM	1830.7	-40.433	-131.49	833.64	-7811.4	-4301.5
Pile N.	4	4	4	1	3	3
MAXIMUM	2864.8	98.935	7.9604	833.64	5206.2	8711.7
Pile N.	2	1	2	1	1	1

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-2.0498E-04	-0.031958	-8711.7	-5677.2	-11.439	-128.52	-0.9642	-0.8494	0.6628	4.5738E+09	4.5738E+09
x(FT)	37.200	0.0000	0.0000	15.000	31.800	0.0000	45.000	3.0000	0.0000	45.600	45.000
2	-2.0504E-04	-0.012017	-8711.7	-7806.1	-11.440	-8.7234	-0.9644	-0.3014	0.6798	4.5738E+09	4.5738E+09
x(FT)	37.200	0.0000	0.0000	0.0000	31.800	46.800	45.000	0.0000	0.0000	45.000	45.000
3	-4.9232E-03	-0.012017	-828.55	-7811.4	-40.002	-8.7167	-0.1817	-0.3014	0.4515	4.5738E+09	4.5738E+09
x(FT)	1.8000	0.0000	22.800	0.0000	0.0000	46.800	8.4000	0.0000	0.0000	45.000	46.200
4	-4.9232E-03	-0.031958	-828.53	-5675.0	-40.003	-128.62	-0.1817	-0.8494	0.4344	4.5738E+09	4.5738E+09
x(FT)	1.8000	0.0000	22.800	15.000	0.0000	0.0000	8.4000	3.0000	0.0000	45.000	45.000
Min.	-4.9232E-03	-0.031958	-8711.7	-7811.4	-40.003	-128.62	-0.9644	-0.8494	0.4344	4.5738E+09	4.5738E+09
Pile N.	3	1	1	3	4	4	2	4	4	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.015138	8.4110E-04	2437.9	5206.2	97.578	24.888	0.4844	1.9978	0.8164	8.8843E+09	8.8843E+09
x(FT)	0.0000	33.000	21.000	0.0000	0.0000	25.800	6.6000	45.000	45.000	0.6000	1.2000
2	0.015138	1.7379E-03	2438.0	401.95	97.575	30.252	0.4844	0.7232	0.8374	8.8843E+09	8.8843E+09
x(FT)	0.0000	21.000	21.000	41.400	0.0000	12.000	6.6000	45.000	45.000	0.6000	0.0000
3	4.3710E-05	1.7358E-03	4301.5	401.49	4.0834	30.223	0.3097	0.7231	0.5561	8.8843E+09	8.8843E+09
x(FT)	39.000	21.000	0.0000	41.400	34.800	12.000	45.000	45.000	0.6000	0.0000	
4	4.3695E-05	8.3874E-04	4301.5	5201.2	4.0831	24.848	0.3096	1.9953	0.5351	8.8843E+09	8.8843E+09
x(FT)	39.000	33.000	0.0000	0.0000	34.800	25.800	45.000	45.000	45.000	1.2000	0.6000
Max.	0.015138	1.7379E-03	4301.5	5206.2	97.578	30.252	0.4844	1.9978	0.8374	8.8843E+09	8.8843E+09
Pile N.	1	2	3	1	1	2	1	1	2	1	1

LOAD CASE : 9
CASE NAME : Max M2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0981141	2.66064E-03	0.0387063

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
1.33545E-06	1.53092E-04	-1.80257E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1772.3	-2.4038	79.452	16.079	270.16	-1129.4
2	1895.3	-2.4043	82.131	16.079	18.463	-1129.3
3	2940.2	-5.0961	82.048	16.079	12.440	-1379.5
4	2817.2	-5.0958	79.370	16.079	264.13	-1379.6
MINIMUM	1772.3	-5.0961	79.370	16.079	12.440	-1379.6
Pile N.	1	3	4	1	3	4
MAXIMUM	2940.2	-2.4038	82.131	16.079	270.16	-1129.3
Pile N.	3	1	2	1	1	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-2.6728E-04	-9.5251E-04	-56.567	-611.63	-4.4508	-23.149	-0.079840	-1.5893	0.4206	4.5738E+09	4.5738E+09
x(FT)	19.200	30.600	38.400	45.000	9.6000	22.800	45.000	45.000	0.0000	45.600	45.000
2	-2.6732E-04	-9.4722E-04	-56.576	-617.49	-4.4513	-23.238	-0.079839	-1.6140	0.4498	4.5738E+09	4.5738E+09
x(FT)	19.200	30.600	38.400	45.000	9.6000	22.800	45.000	45.000	0.0000	45.000	45.600
3	-3.9238E-04	-9.4976E-04	-77.999	-618.51	-6.0076	-23.279	-0.055241	-1.6158	0.6977	4.5738E+09	4.5738E+09
x(FT)	15.600	30.600	34.800	45.000	6.0000	22.800	45.000	45.000	0.0000	45.600	45.000
4	-3.9235E-04	-9.5500E-04	-77.989	-612.63	-6.0073	-23.189	-0.055247	-1.5910	0.6685	4.5738E+09	4.5738E+09
x(FT)	15.600	30.600	34.800	45.000	6.0000	22.800	45.000	45.000	0.0000	45.000	45.000
Min.	-3.9238E-04	-9.5500E-04	-77.999	-618.51	-6.0076	-23.279	-0.079840	-1.6158	0.4206	4.5738E+09	4.5738E+09
Pile N.	3	4	3	3	3	3	1	3	1	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	1.3388E-03	0.025654	1129.4	5419.2	1.0575	77.142	0.033577	0.6528	0.5180	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	0.0000	12.000	46.200	0.0000	0.0000	1.8000	45.000	0.0000	0.0000
2	1.3388E-03	0.026039	1129.3	5434.5	1.0576	79.787	0.033577	0.6638	0.5540	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	0.0000	12.000	46.200	0.0000	0.0000	1.8000	45.000	0.0000	1.2000
3	9.5418E-04	0.026039	1379.5	5436.4	0.9811	79.703	0.023931	0.6638	0.8594	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	0.0000	12.000	46.200	0.0000	0.0000	1.8000	45.000	0.6000	0.0000
4	9.5418E-04	0.025654	1379.6	5421.0	0.9810	77.060	0.023931	0.6528	0.8235	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	0.0000	12.000	46.200	0.0000	0.0000	1.8000	45.000	0.0000	1.8000
Max.	1.3388E-03	0.026039	1379.6	5436.4	1.0576	79.787	0.033577	0.6638	0.8594	8.8843E+09	8.8843E+09
Pile N.	1	2	4	3	2	2	1	2	3	1	1

LOAD CASE : 10
CASE NAME : Min M2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0677958	-1.65665E-03	-0.0344820

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-5.18348E-06	-1.43229E-04	3.09141E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2232.0	21.529	-58.241	-62.409	-1749.4	3561.1
2	2021.0	21.530	-68.691	-62.409	-776.35	3561.3
3	1043.5	31.971	-68.761	-62.409	-781.64	4536.7
4	1254.5	31.970	-58.306	-62.409	-1754.7	4536.5
MINIMUM	1043.5	21.529	-68.761	-62.409	-1754.7	3561.1
Pile N.	3	1	3	1	4	1
MAXIMUM	2232.0	31.971	-58.241	-62.409	-776.35	4536.7
Pile N.	1	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-1.5267E-06	-0.021704	-3561.1	-5059.2	-1.8954	-56.286	-0.042627	-0.5470	0.5297	4.5738E+09	4.5738E+09
x(FT)	46.200	0.0000	0.0000	10.200	44.400	0.0000	46.200	1.2000	0.0000	45.000	45.600
2	-1.5259E-06	-0.023197	-3561.3	-5053.0	-1.8949	-66.603	-0.042605	-0.5882	0.4796	4.5738E+09	4.5738E+09
x(FT)	46.200	0.0000	0.0000	11.400	44.400	0.0000	46.200	1.2000	0.0000	45.000	45.000
3	-4.8176E-06	-0.023197	-4536.7	-5051.5	-2.8598	-66.673	-0.1168	-0.5882	0.2476	4.5738E+09	4.5738E+09
x(FT)	43.800	0.0000	0.0000	11.400	41.400	0.0000	45.000	1.2000	0.0000	45.000	46.200
4	-4.8255E-06	-0.021704	-4536.5	-5058.0	-2.8605	-56.352	-0.1169	-0.5470	0.2977	4.5738E+09	4.5738E+09
x(FT)	43.800	0.0000	0.0000	10.200	41.400	0.0000	45.000	1.2000	0.0000	45.000	45.000
Min.	-4.8255E-06	-0.023197	-4536.7	-5059.2	-2.8605	-66.673	-0.1169	-0.5882	0.2476	4.5738E+09	4.5738E+09
Pile N.	4	2	3	1	4	3	4	2	3	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	1.6901E-03	9.3810E-04	315.81	538.31	21.514	21.390	0.086959	1.3409	0.6524	8.8843E+09	8.8843E+09
x(FT)	9.6000	29.400	29.400	45.000	0.0000	21.600	13.800	45.000	45.000	0.0000	1.2000
2	1.6901E-03	9.0461E-04	315.77	560.44	21.514	21.513	0.086955	1.4359	0.5907	8.8843E+09	8.8843E+09
x(FT)	9.6000	30.000	29.400	45.000	0.0000	22.200	13.800	45.000	45.000	0.0000	1.8000
3	2.8199E-03	9.0239E-04	510.50	559.60	31.819	21.477	0.1305	1.4345	0.3050	8.8843E+09	8.8843E+09
x(FT)	7.2000	30.000	27.000	45.000	0.0000	22.200	11.400	45.000	45.000	0.0000	0.0000
4	2.8199E-03	9.3593E-04	510.55	537.55	31.819	21.356	0.1305	1.3397	0.3667	8.8843E+09	8.8843E+09
x(FT)	7.2000	29.400	27.000	45.000	0.0000	21.600	11.400	45.000	45.000	0.0000	0.0000
Max.	2.8199E-03	9.3810E-04	510.55	560.44	31.819	21.513	0.1305	1.4359	0.6524	8.8843E+09	8.8843E+09
Pile N.	3	1	4	2	3	2	3	2	1	1	1

LOAD CASE : 11
CASE NAME : Max M3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0979454	-8.66922E-03	-4.14296E-03

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-5.73242E-06	-2.03340E-05	1.15037E-04

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2814.2	76.237	2.0231	-69.018	-1208.4	1.2886E+04
2	2029.1	76.239	-9.5220	-69.018	-131.67	1.2889E+04
3	1890.3	87.765	-9.5234	-69.018	-131.78	1.3964E+04
4	2675.4	87.759	2.0224	-69.018	-1208.5	1.3961E+04
MINIMUM	1890.3	76.237	-9.5234	-69.018	-1208.5	1.2886E+04
Pile N.	3	1	3	1	4	1
MAXIMUM	2814.2	87.765	2.0231	-69.018	-131.67	1.3964E+04
Pile N.	1	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-5.3573E-06	-1.6094E-03	-1.2886E+04	-1208.4	-6.7055	-1.2192	-0.1496	-0.040365	0.6678	4.5738E+09	4.5738E+09
x(FT)	46.800	0.0000	0.0000	0.0000	44.400	46.800	46.800	0.0000	0.0000	45.600	45.600
2	-5.3533E-06	-3.2604E-03	-1.2889E+04	-716.83	-6.6979	-9.2285	-0.1495	-0.082599	0.4815	4.5738E+09	4.5738E+09
x(FT)	46.800	0.0000	0.0000	10.800	44.400	0.0000	46.800	1.2000	0.0000	45.600	45.000
3	-6.5755E-06	-3.2604E-03	-1.3964E+04	-716.80	-7.7476	-9.2298	-0.1836	-0.082599	0.4486	4.5738E+09	4.5738E+09
x(FT)	46.200	0.0000	0.0000	10.800	43.800	0.0000	46.200	1.2000	0.0000	45.600	46.800
4	-6.5872E-06	-1.6094E-03	-1.3961E+04	-1208.5	-7.7557	-1.2191	-0.1839	-0.040365	0.6349	4.5738E+09	4.5738E+09
x(FT)	46.200	0.0000	0.0000	0.0000	43.800	46.800	46.200	0.0000	0.0000	46.800	45.000
Min.	-6.5872E-06	-3.2604E-03	-1.3964E+04	-1208.5	-7.7557	-9.2298	-0.1839	-0.082599	0.4486	4.5738E+09	4.5738E+09

Pile N.	4	2	3	4	4	3	4	2	3	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	5.9102E-03	2.7751E-04	1109.7	60.595	76.232	4.7136	0.3085	0.096395	0.8226	8.8843E+09	8.8843E+09
x(FT)	10.200	19.800	29.400	39.600	0.0000	10.800	13.800	45.000	45.000	2.4000	0.6000
2	5.9093E-03	1.2909E-04	1109.2	79.074	76.229	3.0497	0.3084	0.2018	0.5931	8.8843E+09	8.8843E+09
x(FT)	10.200	30.000	29.400	45.000	0.0000	22.200	13.800	45.000	45.000	2.4000	0.0000
3	7.0613E-03	1.2904E-04	1309.9	79.057	87.606	3.0490	0.3542	0.2017	0.5525	8.8843E+09	8.8843E+09
x(FT)	9.0000	30.000	28.800	45.000	0.0000	22.200	13.200	45.000	45.000	4.8000	0.0000
4	7.0621E-03	2.7746E-04	1310.5	60.584	87.605	4.7131	0.3543	0.096395	0.7820	8.8843E+09	8.8843E+09
x(FT)	9.0000	19.800	28.800	39.600	0.0000	10.800	13.200	45.000	45.000	3.0000	1.8000
Max.	7.0621E-03	2.7751E-04	1310.5	79.074	87.606	4.7136	0.3543	0.2018	0.8226	8.8843E+09	8.8843E+09
Pile N.	4	1	4	2	3	1	4	2	1	1	1

LOAD CASE : 12
CASE NAME : Min M3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0679752	9.67489E-03	8.35517E-03

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
1.87697E-06	3.01776E-05	-1.02138E-04

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1190.5	-57.109	19.118	22.599	-267.79	-1.0461E+04
2	1887.6	-57.111	22.886	22.599	-621.34	-1.0458E+04
3	2093.5	-60.891	22.882	22.599	-621.58	-1.0810E+04
4	1396.4	-60.890	19.115	22.599	-268.02	-1.0813E+04
MINIMUM	1190.5	-60.891	19.115	22.599	-621.58	-1.0813E+04
Pile N.	1	3	4	1	3	4
MAXIMUM	2093.5	-57.109	22.886	22.599	-267.79	-1.0458E+04
Pile N.	3	1	2	1	1	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-4.2736E-03	-1.8189E-04	-812.18	-267.79	-57.355	-4.7039	-0.2338	-0.3445	0.2825	4.5738E+09	4.5738E+09
x(FT)	11.400	31.200	30.600	0.0000	1.2000	24.000	15.000	45.000	0.0000	45.000	45.600
2	-4.2744E-03	-1.7967E-04	-812.56	-621.34	-57.357	-4.9336	-0.2338	-0.3793	0.4479	4.5738E+09	4.5738E+09
x(FT)	11.400	32.400	30.600	0.0000	1.2000	25.200	15.000	45.000	0.0000	45.000	45.000
3	-4.6126E-03	-1.7977E-04	-872.52	-621.58	-60.972	-4.9352	-0.2478	-0.3794	0.4968	4.5738E+09	4.5738E+09
x(FT)	10.800	32.400	30.000	0.0000	0.6000	25.200	14.400	45.000	0.0000	45.000	45.000
4	-4.6119E-03	-1.8199E-04	-872.13	-268.02	-60.971	-4.7056	-0.2478	-0.3446	0.3314	4.5738E+09	4.5738E+09
x(FT)	10.800	31.200	30.000	0.0000	0.6000	24.000	14.400	45.000	0.0000	46.200	45.000
Min.	-4.6126E-03	-1.8199E-04	-872.52	-621.58	-60.972	-4.9352	-0.2478	-0.3794	0.2825	4.5738E+09	4.5738E+09
Pile N.	3	4	3	3	3	3	3	3	1	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	1.3656E-03	5.5500E-03	1.0461E+04	1092.9	5.2369	18.619	0.1199	0.1429	0.3480	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	0.0000	13.200	45.600	0.0000	47.400	2.4000	45.000	1.2000	0.0000
2	1.3656E-03	6.0905E-03	1.0458E+04	1136.6	5.2372	22.337	0.1199	0.1589	0.5517	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	0.0000	13.800	45.600	0.0000	47.400	2.4000	45.000	0.0000	1.2000
3	8.2499E-04	6.0905E-03	1.0810E+04	1136.7	5.4051	22.334	0.1231	0.1589	0.6119	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	0.0000	13.800	45.000	0.0000	46.800	2.4000	45.000	0.0000	0.6000
4	8.2499E-04	5.5500E-03	1.0813E+04	1093.0	5.4015	18.615	0.1230	0.1429	0.4082	8.8843E+09	8.8843E+09
x(FT)	0.0000	0.0000	0.0000	13.200	45.000	0.0000	46.800	2.4000	45.000	0.0000	0.0000
Max.	1.3656E-03	6.0905E-03	1.0813E+04	1136.7	5.4051	22.337	0.1231	0.1589	0.6119	8.8843E+09	8.8843E+09
Pile N.	1	2	4	3	3	2	3	2	3	1	1

LOAD CASE : 13
CASE NAME : Max P
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0755706	4.74945E-03	-0.0155438

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-1.39834E-06	-6.64751E-05	-4.25078E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1903.8	-20.908	-24.840	-16.836	-1018.2	-4085.4
2	2193.9	-20.909	-27.646	-16.836	-754.67	-4084.9
3	1740.2	-18.092	-27.660	-16.836	-755.81	-3822.9
4	1450.1	-18.091	-24.853	-16.836	-1019.4	-3823.4
MINIMUM	1450.1	-20.909	-27.660	-16.836	-1019.4	-4085.4
Pile N.	4	2	3	1	4	1
MAXIMUM	2193.9	-18.091	-24.840	-16.836	-754.67	-3822.9
Pile N.	2	4	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-1.5385E-03	-9.7585E-03	-295.04	-2358.5	-21.234	-23.961	-0.087114	-0.2455	0.4518	4.5738E+09	4.5738E+09
x(FT)	12.000	0.0000	31.200	9.6000	2.4000	0.0000	15.600	0.6000	0.0000	45.000	45.600
2	-1.5386E-03	-0.010161	-295.11	-2346.1	-21.235	-26.731	-0.087123	-0.2563	0.5206	4.5738E+09	4.5738E+09
x(FT)	12.000	0.0000	31.200	10.200	2.4000	0.0000	15.600	1.2000	0.0000	45.000	45.000
3	-1.3207E-03	-0.010161	-255.63	-2345.8	-18.790	-26.745	-0.077600	-0.2563	0.4129	4.5738E+09	4.5738E+09
x(FT)	13.200	0.0000	32.400	10.200	3.6000	0.0000	16.800	1.2000	0.0000	45.000	45.600
4	-1.3205E-03	-9.7585E-03	-255.57	-2358.3	-18.789	-23.975	-0.077591	-0.2455	0.3441	4.5738E+09	4.5738E+09
x(FT)	13.200	0.0000	32.400	9.6000	3.6000	0.0000	16.800	0.6000	0.0000	46.200	45.000
Min.	-1.5386E-03	-0.010161	-295.11	-2358.5	-21.235	-26.745	-0.087123	-0.2563	0.3441	4.5738E+09	4.5738E+09
Pile N.	2	2	2	1	2	3	2	2	4	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	9.7744E-04	4.4361E-04	4085.4	245.02	2.1676	9.9334	0.049452	0.6021	0.5565	8.8843E+09	8.8843E+09
x(FT)	0.0000	28.800	0.0000	45.000	45.600	21.000	47.400	45.000	45.000	0.0000	1.2000
2	9.7744E-04	4.3304E-04	4084.9	251.14	2.1678	9.9305	0.049456	0.6279	0.6413	8.8843E+09	8.8843E+09
x(FT)	0.0000	29.400	0.0000	45.000	45.600	21.600	47.400	45.000	45.000	0.0000	1.8000
3	1.3802E-03	4.3257E-04	3822.9	250.97	2.1556	9.9230	0.049020	0.6277	0.5087	8.8843E+09	8.8843E+09
x(FT)	0.0000	29.400	0.0000	45.000	45.600	21.600	47.400	45.000	45.000	0.6000	0.0000
4	1.3802E-03	4.4314E-04	3823.4	244.86	2.1554	9.9260	0.049014	0.6018	0.4239	8.8843E+09	8.8843E+09
x(FT)	0.0000	28.800	0.0000	45.000	45.600	21.000	47.400	45.000	45.000	0.6000	1.2000

Max.	1.3802E-03	4.4361E-04	4085.4	251.14	2.1678	9.9334	0.049456	0.6279	0.6413	8.8843E+09	8.8843E+09
Pile N.	3	1	1	2	2	1	2	2	2	1	1

LOAD CASE : 14
CASE NAME : Min P
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0895377	-2.73486E-03	0.0203119

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-2.12892E-06	8.18572E-05	5.31273E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2055.0	44.608	42.647	-25.632	127.07	6830.4
2	1692.4	44.610	38.376	-25.632	528.30	6831.2
3	2251.0	48.893	38.353	-25.632	526.58	7230.1
4	2613.6	48.890	42.624	-25.632	125.34	7229.4
MINIMUM	1692.4	44.608	38.353	-25.632	125.34	6830.4
Pile N.	2	1	3	1	4	1
MAXIMUM	2613.6	48.893	42.647	-25.632	528.30	7230.1
Pile N.	4	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-3.8784E-06	-5.0929E-04	-6830.4	-327.56	-3.9532	-12.389	-0.1083	-0.8516	0.4876	4.5738E+09	4.5738E+09
x(FT)	45.600	30.600	0.0000	45.000	43.200	22.800	45.600	45.000	0.0000	45.000	45.600
2	-3.8731E-06	-5.1914E-04	-6831.2	-318.22	-3.9514	-12.271	-0.1081	-0.8122	0.4016	4.5738E+09	4.5738E+09
x(FT)	45.600	30.000	0.0000	45.000	43.200	22.200	45.600	45.000	0.0000	47.400	47.400
3	-5.2479E-06	-5.1986E-04	-7230.1	-318.49	-4.3518	-12.282	-0.1465	-0.8127	0.5342	4.5738E+09	4.5738E+09
x(FT)	45.000	30.000	0.0000	45.000	42.600	22.200	45.000	45.000	0.0000	45.600	45.000
4	-5.2577E-06	-5.1001E-04	-7229.4	-327.84	-4.3537	-12.401	-0.1468	-0.8521	0.6202	4.5738E+09	4.5738E+09
x(FT)	45.000	30.600	0.0000	45.000	42.600	22.800	45.000	45.000	0.0000	45.000	45.600
Min.	-5.2577E-06	-5.1986E-04	-7230.1	-327.84	-4.3537	-12.401	-0.1468	-0.8521	0.4016	4.5738E+09	4.5738E+09

Pile N.	4	3	3	4	4	4	4	4	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	3.6900E-03	0.013742	679.39	2898.9	44.483	41.410	0.1803	0.3498	0.6007	8.8843E+09	8.8843E+09
x(FT)	8.4000	0.0000	28.200	12.000	0.0000	0.0000	12.600	1.8000	45.000	0.6000	1.2000
2	3.6898E-03	0.013129	679.26	2885.4	44.484	37.194	0.1803	0.3326	0.4947	8.8843E+09	8.8843E+09
x(FT)	8.4000	0.0000	28.200	10.800	0.0000	0.0000	12.600	1.2000	45.000	0.0000	0.0000
3	4.1596E-03	0.013129	760.29	2885.8	48.713	37.171	0.1983	0.3326	0.6580	8.8843E+09	8.8843E+09
x(FT)	7.8000	0.0000	27.600	10.800	0.0000	0.0000	12.000	1.2000	45.000	0.0000	0.0000
4	4.1597E-03	0.013742	760.43	2899.4	48.712	41.386	0.1983	0.3498	0.7640	8.8843E+09	8.8843E+09
x(FT)	7.8000	0.0000	27.600	12.000	0.0000	0.0000	12.000	1.8000	45.000	1.8000	1.2000
Max.	4.1597E-03	0.013742	760.43	2899.4	48.713	41.410	0.1983	0.3498	0.7640	8.8843E+09	8.8843E+09
Pile N.	4	1	4	4	3	1	4	1	4	1	1

LOAD CASE : 15
CASE NAME : Max V2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0824592	-4.82778E-03	0.0110812

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-3.91627E-06	4.59466E-05	8.34779E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2113.3	65.807	24.440	-47.152	24.241	1.0332E+04
2	1543.6	65.810	16.567	-47.152	761.27	1.0334E+04
3	1857.2	73.694	16.561	-47.152	760.72	1.1069E+04
4	2426.9	73.689	24.432	-47.152	23.699	1.1067E+04
MINIMUM	1543.6	65.807	16.561	-47.152	23.699	1.0332E+04
Pile N.	2	1	3	1	4	1
MAXIMUM	2426.9	73.694	24.440	-47.152	761.27	1.1069E+04
Pile N.	4	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-5.1998E-06	-2.8487E-04	-1.0332E+04	-184.95	-5.8181	-6.9704	-0.1452	-0.4827	0.5015	4.5738E+09	4.5738E+09
x(FT)	45.600	30.600	0.0000	45.000	43.800	22.800	45.600	45.000	0.0000	45.600	45.000
2	-5.1874E-06	-3.0925E-04	-1.0334E+04	-167.97	-5.8138	-6.8670	-0.1448	-0.4104	0.3663	4.5738E+09	4.5738E+09
x(FT)	45.600	28.800	0.0000	45.000	43.800	21.000	45.600	45.000	0.0000	45.000	45.600
3	-7.2049E-06	-3.0948E-04	-1.1069E+04	-168.04	-6.5432	-6.8704	-0.2012	-0.4106	0.4407	4.5738E+09	4.5738E+09
x(FT)	45.000	28.800	0.0000	45.000	42.600	21.000	45.000	45.000	0.0000	45.000	45.000
4	-7.2279E-06	-2.8509E-04	-1.1067E+04	-185.04	-6.5478	-6.9741	-0.2018	-0.4828	0.5759	4.5738E+09	4.5738E+09
x(FT)	45.000	30.600	0.0000	45.000	42.600	22.800	45.000	45.000	0.0000	45.000	45.000
Min.	-7.2279E-06	-3.0948E-04	-1.1069E+04	-185.04	-6.5478	-6.9741	-0.2018	-0.4828	0.3663	4.5738E+09	4.5738E+09
Pile N.	4	3	3	4	4	4	4	4	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	5.3415E-03	7.7857E-03	988.49	1630.0	65.666	23.739	0.2656	0.1984	0.6177	8.8843E+09	8.8843E+09
x(FT)	9.0000	0.0000	28.200	12.000	0.0000	0.0000	13.200	1.8000	45.000	1.2000	0.6000
2	5.3411E-03	6.6578E-03	988.19	1634.0	65.667	15.967	0.2656	0.1674	0.4512	8.8843E+09	8.8843E+09
x(FT)	9.0000	0.0000	28.200	9.6000	0.0000	0.0000	13.200	0.6000	45.000	0.0000	0.0000
3	6.1881E-03	6.6578E-03	1134.4	1634.1	73.451	15.961	0.2984	0.1674	0.5428	8.8843E+09	8.8843E+09
x(FT)	7.8000	0.0000	27.600	9.6000	0.0000	0.0000	12.600	0.6000	45.000	0.0000	0.0000
4	6.1884E-03	7.7857E-03	1134.7	1630.2	73.448	23.731	0.2984	0.1984	0.7094	8.8843E+09	8.8843E+09
x(FT)	7.8000	0.0000	27.600	12.000	0.0000	0.0000	12.600	1.8000	45.000	0.0000	0.6000
Max.	6.1884E-03	7.7857E-03	1134.7	1634.1	73.451	23.739	0.2984	0.1984	0.7094	8.8843E+09	8.8843E+09
Pile N.	4	1	4	3	3	1	4	1	4	1	1

LOAD CASE : 16
CASE NAME : Min V2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0818684	6.57762E-03	-6.72646E-03

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
5.07565E-08	-3.32894E-05	-7.33821E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1834.4	-44.949	-5.8027	0.6111	-1129.5	-7879.5
2	2335.3	-44.949	-5.6946	0.6111	-1138.5	-7878.0
3	2108.1	-45.051	-5.6973	0.6111	-1138.7	-7888.2
4	1607.2	-45.051	-5.8055	0.6111	-1129.8	-7889.7
MINIMUM	1607.2	-45.051	-5.8055	0.6111	-1138.7	-7889.7
Pile N.	4	3	4	1	3	4
MAXIMUM	2335.3	-44.949	-5.6946	0.6111	-1129.5	-7878.0
Pile N.	2	1	2	1	1	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-3.4220E-03	-3.9375E-03	-646.28	-1311.7	-44.989	-5.4478	-0.1826	-0.098751	0.4353	4.5738E+09	4.5738E+09
x(FT)	10.800	0.0000	30.000	5.4000	0.0000	0.0000	14.400	0.0000	0.0000	45.600	45.000
2	-3.4224E-03	-3.9228E-03	-646.48	-1315.4	-44.991	-5.3408	-0.1826	-0.098385	0.5542	4.5738E+09	4.5738E+09
x(FT)	10.800	0.0000	30.000	5.4000	0.0000	0.0000	14.400	0.0000	0.0000	45.600	46.200
3	-3.4315E-03	-3.9228E-03	-648.05	-1315.4	-45.091	-5.3436	-0.1830	-0.098385	0.5002	4.5738E+09	4.5738E+09
x(FT)	10.200	0.0000	30.000	5.4000	0.0000	0.0000	14.400	0.0000	0.0000	45.000	45.600
4	-3.4312E-03	-3.9375E-03	-647.84	-1311.7	-45.090	-5.4507	-0.1830	-0.098751	0.3814	4.5738E+09	4.5738E+09
x(FT)	10.200	0.0000	30.000	5.4000	0.0000	0.0000	14.400	0.0000	0.0000	45.000	45.000
Min.	-3.4315E-03	-3.9375E-03	-648.05	-1315.4	-45.091	-5.4507	-0.1830	-0.098751	0.3814	4.5738E+09	4.5738E+09
Pile N.	3	1	3	2	3	4	3	1	4	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	4.2083E-04	2.6914E-04	7879.5	108.52	3.9522	5.3611	0.090133	0.2409	0.5362	8.8843E+09	8.8843E+09
x(FT)	0.0000	25.800	0.0000	45.000	45.000	17.400	46.800	45.000	45.000	0.0000	0.0000
2	4.2083E-04	2.7056E-04	7878.0	108.37	3.9540	5.3771	0.090178	0.2401	0.6826	8.8843E+09	8.8843E+09
x(FT)	0.0000	25.800	0.0000	45.000	45.000	17.400	46.800	45.000	45.000	1.8000	0.6000
3	4.0621E-04	2.7044E-04	7888.2	108.34	3.9591	5.3753	0.090302	0.2400	0.6162	8.8843E+09	8.8843E+09
x(FT)	0.0000	25.800	0.0000	45.000	45.000	17.400	46.800	45.000	45.000	0.0000	0.6000
4	4.0621E-04	2.6902E-04	7889.7	108.50	3.9573	5.3593	0.090256	0.2409	0.4698	8.8843E+09	8.8843E+09
x(FT)	0.0000	25.800	0.0000	45.000	45.000	17.400	46.800	45.000	45.000	1.2000	1.2000
Max.	4.2083E-04	2.7056E-04	7889.7	108.52	3.9591	5.3771	0.090302	0.2409	0.6826	8.8843E+09	8.8843E+09

Pile N.	1	2	4	1	3	2	3	1	2	1	1

LOAD CASE : 17
CASE NAME : Max V3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0807397	-2.28667E-03	0.0317543

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-4.84809E-07	1.22791E-04	2.72095E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1618.3	17.262	70.260	-5.8371	-391.47	2977.4
2	1432.6	17.262	69.296	-5.8371	-299.49	2977.6
3	2270.7	18.238	69.241	-5.8371	-303.36	3067.9
4	2456.4	18.238	70.204	-5.8371	-395.34	3067.7
MINIMUM	1432.6	17.262	69.241	-5.8371	-395.34	2977.4
Pile N.	2	1	3	1	4	1
MAXIMUM	2456.4	18.238	70.260	-5.8371	-299.49	3067.9
Pile N.	4	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-7.0881E-05	-7.5128E-04	-2977.4	-504.36	-1.5131	-18.802	-0.034254	-1.3340	0.3840	4.5738E+09	4.5738E+09
x(FT)	0.0000	31.200	0.0000	45.000	44.400	23.400	46.800	45.000	0.0000	45.000	45.000
2	-7.0881E-05	-7.5227E-04	-2977.6	-502.13	-1.5126	-18.755	-0.034248	-1.3248	0.3400	4.5738E+09	4.5738E+09
x(FT)	0.0000	31.200	0.0000	45.000	44.400	23.400	46.800	45.000	0.0000	45.000	45.000
3	-1.2770E-06	-7.5385E-04	-3067.9	-502.81	-1.6035	-18.781	-0.035656	-1.3260	0.5388	4.5738E+09	4.5738E+09
x(FT)	46.800	31.200	0.0000	45.000	44.400	23.400	46.800	45.000	0.0000	45.600	45.600
4	-1.2772E-06	-7.5287E-04	-3067.7	-505.05	-1.6039	-18.828	-0.035662	-1.3352	0.5829	4.5738E+09	4.5738E+09
x(FT)	46.800	31.200	0.0000	45.000	44.400	23.400	46.800	45.000	0.0000	45.000	46.200
Min.	-7.0881E-05	-7.5385E-04	-3067.9	-505.05	-1.6039	-18.828	-0.035662	-1.3352	0.3400	4.5738E+09	4.5738E+09
Pile N.	1	3	3	4	4	4	4	4	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	1.3248E-03	0.021510	249.27	4384.4	17.269	68.323	0.069951	0.5504	0.4730	8.8843E+09	8.8843E+09
x(FT)	10.200	0.0000	30.000	12.600	0.0000	0.0000	14.400	1.8000	45.000	0.0000	0.6000
2	1.3248E-03	0.021370	249.24	4377.4	17.269	67.372	0.069947	0.5464	0.4188	8.8843E+09	8.8843E+09
x(FT)	10.200	0.0000	30.000	12.000	0.0000	0.0000	14.400	1.8000	45.000	0.0000	0.0000
3	1.4175E-03	0.021370	265.88	4378.5	18.233	67.317	0.073753	0.5464	0.6637	8.8843E+09	8.8843E+09
x(FT)	9.6000	0.0000	29.400	12.000	0.0000	0.0000	13.800	1.8000	45.000	0.6000	0.0000
4	1.4175E-03	0.021510	265.91	4385.7	18.234	68.268	0.073756	0.5504	0.7180	8.8843E+09	8.8843E+09
x(FT)	9.6000	0.0000	29.400	12.600	0.0000	0.0000	13.800	1.8000	45.000	0.0000	0.0000
Max.	1.4175E-03	0.021510	265.91	4385.7	18.234	68.323	0.073756	0.5504	0.7180	8.8843E+09	8.8843E+09
Pile N.	3	1	4	4	4	1	4	1	4	1	1

LOAD CASE : 18
CASE NAME : Min V3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0827756	4.05487E-03	-0.0273711

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-2.69111E-06	-1.10374E-04	-1.92341E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2303.8	1.7885	-51.774	-32.401	-703.96	-798.02
2	2435.0	1.7877	-57.184	-32.401	-197.64	-797.92
3	1681.7	7.2113	-57.227	-32.401	-200.77	-292.70
4	1550.5	7.2125	-51.815	-32.401	-707.10	-292.80
MINIMUM	1550.5	1.7877	-57.227	-32.401	-707.10	-798.02
Pile N.	4	2	3	1	4	1

MAXIMUM	2435.0	7.2125	-51.774	-32.401	-197.64	-292.70
Pile N.	2	4	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-1.7585E-04	-0.017712	-59.398	-3891.2	-3.3398	-50.179	-0.1250	-0.4488	0.5467	4.5738E+09	4.5738E+09
x(FT)	24.600	0.0000	45.000	10.800	15.600	0.0000	45.000	1.2000	0.0000	45.000	45.000
2	-1.7589E-04	-0.018487	-59.406	-3907.5	-3.3404	-55.520	-0.1250	-0.4704	0.5778	4.5738E+09	4.5738E+09
x(FT)	24.600	0.0000	45.000	12.000	15.600	0.0000	45.000	1.8000	0.0000	45.600	46.200
3	-1.2818E-04	-0.018487	-70.920	-3906.6	-2.8729	-55.562	-0.1744	-0.4704	0.3991	4.5738E+09	4.5738E+09
x(FT)	28.800	0.0000	45.000	12.000	21.000	0.0000	45.000	1.8000	0.0000	45.000	45.000
4	-1.2814E-04	-0.017712	-70.907	-3890.5	-2.8723	-50.220	-0.1744	-0.4488	0.3679	4.5738E+09	4.5738E+09
x(FT)	28.800	0.0000	45.000	10.800	21.000	0.0000	45.000	1.2000	0.0000	45.000	45.000
Min.	-1.7589E-04	-0.018487	-70.920	-3907.5	-3.3404	-55.562	-0.1744	-0.4704	0.3679	4.5738E+09	4.5738E+09
Pile N.	2	2	3	2	2	3	3	3	4	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	2.0517E-03	7.0088E-04	831.56	429.62	1.6034	16.564	0.051456	1.0964	0.6734	8.8843E+09	8.8843E+09
x(FT)	0.0000	30.000	3.0000	45.000	0.0000	22.200	0.0000	45.000	45.000	3.0000	3.0000
2	2.0517E-03	6.8799E-04	831.51	441.29	1.6025	16.706	0.051456	1.1461	0.7117	8.8843E+09	8.8843E+09
x(FT)	0.0000	30.600	3.0000	45.000	0.0000	22.800	0.0000	45.000	45.000	0.0000	0.0000
3	2.8267E-03	6.8669E-04	682.25	440.77	6.9568	16.685	0.071121	1.1451	0.4916	8.8843E+09	8.8843E+09
x(FT)	0.0000	30.600	9.6000	45.000	0.0000	22.800	0.6000	45.000	45.000	0.0000	0.0000
4	2.8267E-03	6.9957E-04	682.23	429.13	6.9579	16.543	0.071121	1.0956	0.4532	8.8843E+09	8.8843E+09
x(FT)	0.0000	30.000	9.6000	45.000	0.0000	22.200	0.6000	45.000	45.000	0.6000	0.0000
Max.	2.8267E-03	7.0088E-04	831.56	441.29	6.9579	16.706	0.071121	1.1461	0.7117	8.8843E+09	8.8843E+09
Pile N.	3	1	1	2	4	2	3	2	2	1	1

LOAD CASE : 19
CASE NAME : Max T
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0815519	9.03041E-03	-8.60986E-03

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
1.29714E-06	-3.46339E-05	-7.81386E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1815.3	-32.443	-18.558	15.618	-6.4800	-6951.0
2	2348.6	-32.447	-15.938	15.618	-249.57	-6949.4
3	2112.2	-35.057	-15.942	15.618	-249.88	-7193.9
4	1578.9	-35.053	-18.563	15.618	-6.7882	-7195.5
MINIMUM	1578.9	-35.057	-18.563	15.618	-249.88	-7195.5
Pile N.	4	3	4	1	3	4
MAXIMUM	2348.6	-32.443	-15.938	15.618	-6.4800	-6949.4
Pile N.	2	1	2	1	1	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-2.3681E-03	-5.8874E-03	-459.26	-1229.3	-33.869	-18.028	-0.1451	-0.1501	0.4308	4.5738E+09	4.5738E+09
x(FT)	13.200	0.0000	32.400	12.000	3.6000	0.0000	45.000	1.8000	0.0000	45.000	45.600
2	-2.3686E-03	-5.5138E-03	-459.46	-1221.0	-33.873	-15.441	-0.1449	-0.1396	0.5573	4.5738E+09	4.5738E+09
x(FT)	13.200	0.0000	32.400	10.800	3.6000	0.0000	45.000	1.2000	0.0000	45.600	45.600
3	-2.5624E-03	-5.5138E-03	-494.56	-1221.0	-36.074	-15.445	-0.1487	-0.1396	0.5012	4.5738E+09	4.5738E+09
x(FT)	12.600	0.0000	31.800	10.800	3.0000	0.0000	16.200	1.2000	0.0000	45.600	45.000
4	-2.5619E-03	-5.8874E-03	-494.36	-1229.2	-36.070	-18.033	-0.1486	-0.1501	0.3747	4.5738E+09	4.5738E+09
x(FT)	12.600	0.0000	31.800	12.000	3.0000	0.0000	16.200	1.8000	0.0000	45.000	45.000
Min.	-2.5624E-03	-5.8874E-03	-494.56	-1229.3	-36.074	-18.033	-0.1487	-0.1501	0.3747	4.5738E+09	4.5738E+09
Pile N.	3	1	3	1	3	4	3	1	4	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	2.6536E-03	2.1429E-04	6951.0	139.63	3.9592	5.2556	0.090547	0.3649	0.5306	8.8843E+09	8.8843E+09
x(FT)	0.0000	30.600	0.0000	45.000	45.600	22.800	48.000	45.000	45.000	0.0000	0.0000
2	2.6536E-03	2.2083E-04	6949.4	134.16	3.9601	5.1919	0.090548	0.3412	0.6865	8.8843E+09	8.8843E+09
x(FT)	0.0000	30.000	0.0000	45.000	45.600	22.200	48.000	45.000	45.000	1.8000	0.0000
3	2.2800E-03	2.2071E-04	7193.9	134.11	3.9706	5.1899	0.090397	0.3412	0.6174	8.8843E+09	8.8843E+09

x(FT)	0.0000	30.000	0.0000	45.000	45.600	22.200	47.400	45.000	45.000	0.0000	1.2000
4	2.2800E-03	2.1416E-04	7195.5	139.57	3.9699	5.2535	0.090378	0.3648	0.4615	8.8843E+09	8.8843E+09
x(FT)	0.0000	30.600	0.0000	45.000	45.600	22.800	47.400	45.000	45.000	0.6000	1.8000
Max.	2.6536E-03	2.2083E-04	7195.5	139.63	3.9706	5.2556	0.090548	0.3649	0.6865	8.8843E+09	8.8843E+09
Pile N.	1	2	4	1	3	1	2	1	2	1	1

LOAD CASE : 20
CASE NAME : Min T
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0818684	-6.25809E-03	0.0109072

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-4.86892E-06	4.09327E-05	8.36789E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2117.1	55.099	30.398	-58.622	-783.63	9342.9
2	1546.0	55.099	20.608	-58.622	132.33	9344.7
3	1825.4	64.903	20.602	-58.622	131.89	1.0259E+04
4	2396.5	64.899	30.391	-58.622	-784.06	1.0257E+04
MINIMUM	1546.0	55.099	20.602	-58.622	-784.06	9342.9
Pile N.	2	1	3	1	4	1
MAXIMUM	2396.5	64.903	30.398	-58.622	132.33	1.0259E+04
Pile N.	4	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-3.8765E-06	-2.4400E-04	-9342.9	-783.63	-4.8401	-6.6522	-0.1082	-0.5088	0.5024	4.5738E+09	4.5738E+09
x(FT)	46.800	32.400	0.0000	0.0000	44.400	24.600	46.800	45.000	0.0000	45.000	45.000
2	-3.8744E-06	-2.5586E-04	-9344.7	-162.11	-4.8360	-6.1670	-0.1082	-0.4190	0.3669	4.5738E+09	4.5738E+09
x(FT)	46.800	30.600	0.0000	45.000	44.400	22.800	46.800	45.000	0.0000	45.000	45.000
3	-4.9836E-06	-2.5604E-04	-1.0259E+04	-162.18	-5.7324	-6.1699	-0.1391	-0.4191	0.4332	4.5738E+09	4.5738E+09
x(FT)	45.600	30.600	0.0000	45.000	43.800	22.800	45.600	45.000	0.0000	45.600	46.200
4	-4.9958E-06	-2.4418E-04	-1.0257E+04	-784.06	-5.7367	-6.6554	-0.1395	-0.5089	0.5687	4.5738E+09	4.5738E+09
x(FT)	45.600	32.400	0.0000	0.0000	43.800	24.600	45.600	45.000	0.0000	45.000	45.000
Min.	-4.9958E-06	-2.5604E-04	-1.0259E+04	-784.06	-5.7367	-6.6554	-0.1395	-0.5089	0.3669	4.5738E+09	4.5738E+09
Pile N.	4	3	3	4	4	4	4	4	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	4.2646E-03	8.1700E-03	800.77	1533.9	55.097	29.663	0.2229	0.2129	0.6188	8.8843E+09	8.8843E+09
x(FT)	10.200	0.0000	29.400	13.800	0.0000	0.0000	13.800	2.4000	45.000	0.6000	0.0000
2	4.2641E-03	6.7677E-03	800.50	1446.7	55.095	19.999	0.2229	0.1719	0.4519	8.8843E+09	8.8843E+09
x(FT)	10.200	0.0000	29.400	11.400	0.0000	0.0000	13.800	1.2000	45.000	0.6000	0.0000
3	5.2448E-03	6.7677E-03	971.54	1446.8	64.774	19.993	0.2620	0.1719	0.5335	8.8843E+09	8.8843E+09
x(FT)	9.0000	0.0000	28.800	11.400	0.0000	0.0000	13.200	1.2000	45.000	0.0000	0.6000
4	5.2452E-03	8.1700E-03	971.85	1534.0	64.773	29.656	0.2620	0.2129	0.7005	8.8843E+09	8.8843E+09
x(FT)	9.0000	0.0000	28.800	13.800	0.0000	0.0000	13.200	2.4000	45.000	0.6000	2.4000
Max.	5.2452E-03	8.1700E-03	971.85	1534.0	64.774	29.663	0.2620	0.2129	0.7005	8.8843E+09	8.8843E+09
Pile N.	4	1	4	4	3	1	4	1	4	1	1

LOAD CASE : 21
CASE NAME : Max M2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0825119	-9.15440E-04	0.0319134

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-2.85213E-07	1.27517E-04	2.65351E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1641.9	26.214	65.310	-3.4340	307.59	3779.1
2	1460.8	26.215	64.747	-3.4340	362.06	3779.3
3	2331.1	26.786	64.691	-3.4340	357.88	3832.0

4	2512.2	26.785	65.253	-3.4340	303.40	3831.8
MINIMUM	1460.8	26.214	64.691	-3.4340	303.40	3779.1
Pile N.	2	1	3	1	4	1
MAXIMUM	2512.2	26.786	65.310	-3.4340	362.06	3832.0
Pile N.	4	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-3.4064E-06	-7.9495E-04	-3779.1	-507.47	-2.3402	-19.250	-0.089306	-1.3156	0.3896	4.5738E+09	4.5738E+09
x(FT)	44.400	30.600	0.0000	45.000	41.400	22.800	45.000	45.000	0.0000	46.200	47.400
2	-3.4024E-06	-7.9579E-04	-3779.3	-506.11	-2.3397	-19.226	-0.089232	-1.3101	0.3466	4.5738E+09	4.5738E+09
x(FT)	44.400	30.600	0.0000	45.000	41.400	22.800	45.000	45.000	0.0000	45.000	45.600
3	-3.7728E-06	-7.9750E-04	-3832.0	-506.79	-2.3967	-19.254	-0.094832	-1.3113	0.5532	4.5738E+09	4.5738E+09
x(FT)	43.800	30.600	0.0000	45.000	41.400	22.800	45.000	45.000	0.0000	45.000	45.000
4	-3.7785E-06	-7.9667E-04	-3831.8	-508.16	-2.3972	-19.278	-0.094908	-1.3168	0.5961	4.5738E+09	4.5738E+09
x(FT)	43.800	30.600	0.0000	45.000	41.400	22.800	45.000	45.000	0.0000	45.600	45.000
Min.	-3.7785E-06	-7.9750E-04	-3832.0	-508.16	-2.3972	-19.278	-0.094908	-1.3168	0.3466	4.5738E+09	4.5738E+09
Pile N.	4	3	3	4	4	4	4	4	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	2.2799E-03	0.021243	414.06	4510.3	26.101	63.397	0.1067	0.5401	0.4799	8.8843E+09	8.8843E+09
x(FT)	7.2000	0.0000	27.000	11.400	0.0000	0.0000	12.000	1.8000	45.000	0.0000	0.6000
2	2.2799E-03	0.021161	414.02	4508.4	26.101	62.842	0.1067	0.5378	0.4270	8.8843E+09	8.8843E+09
x(FT)	7.2000	0.0000	27.000	11.400	0.0000	0.0000	12.000	1.8000	45.000	0.6000	1.2000
3	2.3460E-03	0.021161	425.57	4509.6	26.666	62.785	0.1092	0.5377	0.6814	8.8843E+09	8.8843E+09
x(FT)	7.2000	0.0000	27.000	11.400	0.0000	0.0000	12.000	1.8000	45.000	0.6000	0.0000
4	2.3460E-03	0.021243	425.61	4511.5	26.665	63.340	0.1092	0.5401	0.7343	8.8843E+09	8.8843E+09
x(FT)	7.2000	0.0000	27.000	11.400	0.0000	0.0000	12.000	1.8000	45.000	0.0000	0.6000
Max.	2.3460E-03	0.021243	425.61	4511.5	26.666	63.397	0.1092	0.5401	0.7343	8.8843E+09	8.8843E+09
Pile N.	3	1	4	4	3	1	4	1	4	1	1

LOAD CASE : 22
CASE NAME : Min M2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0808346	1.65502E-03	-0.0263788

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-3.47990E-06	-1.12645E-04	-1.51797E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2279.4	-10.754	-41.230	-41.898	-1802.5	-1765.6
2	2383.0	-10.754	-48.230	-41.898	-1148.0	-1765.5
3	1614.1	-3.7465	-48.271	-41.898	-1151.3	-1111.9
4	1510.5	-3.7462	-41.269	-41.898	-1805.8	-1112.0
MINIMUM	1510.5	-10.754	-48.271	-41.898	-1805.8	-1765.6
Pile N.	4	1	3	1	4	1
MAXIMUM	2383.0	-3.7462	-41.230	-41.898	-1148.0	-1111.9
Pile N.	2	4	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-8.4786E-04	-0.016416	-158.20	-4002.4	-10.744	-39.751	-0.043413	-0.4128	0.5409	4.5738E+09	4.5738E+09
x(FT)	9.6000	0.0000	28.800	9.6000	0.0000	0.0000	13.800	0.6000	0.0000	45.000	45.000
2	-8.4787E-04	-0.017418	-158.21	-3971.4	-10.744	-46.661	-0.043414	-0.4398	0.5655	4.5738E+09	4.5738E+09
x(FT)	9.6000	0.0000	28.800	10.200	0.0000	0.0000	13.800	1.2000	0.0000	45.000	45.600
3	-3.0101E-04	-0.017418	-60.375	-3970.7	-4.7016	-46.703	-0.051523	-0.4398	0.3830	4.5738E+09	4.5738E+09
x(FT)	16.800	0.0000	35.400	10.200	7.2000	0.0000	45.000	1.2000	0.0000	45.000	45.000
4	-3.0099E-04	-0.016416	-60.369	-4001.8	-4.7014	-39.790	-0.051527	-0.4128	0.3584	4.5738E+09	4.5738E+09
x(FT)	16.800	0.0000	35.400	9.6000	7.2000	0.0000	45.000	0.6000	0.0000	45.000	45.600
Min.	-8.4787E-04	-0.017418	-158.21	-4002.4	-10.744	-46.703	-0.051527	-0.4398	0.3584	4.5738E+09	4.5738E+09
Pile N.	2	2	2	1	1	3	4	2	4	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	7.7111E-07	7.5638E-04	1765.6	413.61	0.9474	16.850	0.021531	1.0129	0.6663	8.8843E+09	8.8843E+09
x(FT)	46.200	28.800	0.0000	45.000	44.400	21.000	46.200	45.000	45.000	0.6000	0.0000
2	7.7130E-07	7.2891E-04	1765.5	428.66	0.9475	16.841	0.021536	1.0770	0.6965	8.8843E+09	8.8843E+09

x(FT)	46.200	29.400	0.0000	45.000	44.400	21.600	46.200	45.000	45.000	0.0000	0.6000
3	8.8103E-04	7.2754E-04	1111.9	428.17	0.8412	16.820	0.022096	1.0762	0.4718	8.8843E+09	8.8843E+09
x(FT)	0.0000	29.400	0.0000	45.000	46.200	21.600	0.0000	45.000	45.000	0.6000	0.0000
4	8.8103E-04	7.5503E-04	1112.0	413.17	0.8412	16.829	0.022096	1.0122	0.4415	8.8843E+09	8.8843E+09
x(FT)	0.0000	28.800	0.0000	45.000	46.200	21.000	0.0000	45.000	45.000	0.0000	0.6000
Max.	8.8103E-04	7.5638E-04	1765.6	428.66	0.9475	16.850	0.022096	1.0770	0.6965	8.8843E+09	8.8843E+09
Pile N.	3	1	1	2	2	1	3	2	2	1	1

LOAD CASE : 23
CASE NAME : Max M3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0827756	-6.18363E-03	0.0122758

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-4.46640E-06	4.78426E-05	8.74934E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2128.1	60.754	30.993	-53.776	-492.44	1.0062E+04
2	1530.9	60.755	22.015	-53.776	348.07	1.0064E+04
3	1857.4	69.747	22.007	-53.776	347.48	1.0903E+04
4	2454.6	69.744	30.984	-53.776	-493.02	1.0900E+04
MINIMUM	1530.9	60.754	22.007	-53.776	-493.02	1.0062E+04
Pile N.	2	1	3	1	4	1
MAXIMUM	2454.6	69.747	30.993	-53.776	348.07	1.0903E+04
Pile N.	4	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-4.2986E-06	-2.8838E-04	-1.0062E+04	-492.44	-5.3473	-7.5065	-0.1200	-0.5532	0.5050	4.5738E+09	4.5738E+09
x(FT)	46.200	31.800	0.0000	0.0000	44.400	24.000	46.200	45.000	0.0000	45.000	45.000
2	-4.2924E-06	-3.0450E-04	-1.0064E+04	-185.05	-5.3428	-7.1619	-0.1198	-0.4708	0.3633	4.5738E+09	4.5738E+09

x(FT)	46.200	30.000	0.0000	45.000	44.400	22.200	46.200	45.000	0.0000	45.000	45.000
3	-5.6057E-06	-3.0474E-04	-1.0903E+04	-185.15	-6.1668	-7.1658	-0.1565	-0.4710	0.4408	4.5738E+09	4.5738E+09
x(FT)	45.600	30.000	0.0000	45.000	43.800	22.200	45.600	45.000	0.0000	45.000	45.000
4	-5.6194E-06	-2.8863E-04	-1.0900E+04	-493.02	-6.1715	-7.5106	-0.1569	-0.5534	0.5825	4.5738E+09	4.5738E+09
x(FT)	45.600	31.800	0.0000	0.0000	43.800	24.000	45.600	45.000	0.0000	45.600	45.000
Min.	-5.6194E-06	-3.0474E-04	-1.0903E+04	-493.02	-6.1715	-7.5106	-0.1569	-0.5534	0.3633	4.5738E+09	4.5738E+09
Pile N.	4	3	3	4	4	4	4	4	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	4.7657E-03	8.9002E-03	890.71	1740.5	60.711	30.192	0.2454	0.2295	0.6220	8.8843E+09	8.8843E+09
x(FT)	9.6000	0.0000	29.400	13.200	0.0000	0.0000	13.800	2.4000	45.000	0.6000	1.2000
2	4.7652E-03	7.6139E-03	890.39	1686.3	60.711	21.330	0.2454	0.1928	0.4475	8.8843E+09	8.8843E+09
x(FT)	9.6000	0.0000	29.400	10.800	0.0000	0.0000	13.800	1.2000	45.000	0.6000	0.0000
3	5.6796E-03	7.6139E-03	1050.2	1686.5	69.589	21.322	0.2815	0.1928	0.5429	8.8843E+09	8.8843E+09
x(FT)	8.4000	0.0000	28.200	10.800	0.0000	0.0000	13.200	1.2000	45.000	1.2000	0.0000
4	5.6800E-03	8.9002E-03	1050.5	1740.8	69.587	30.183	0.2816	0.2295	0.7175	8.8843E+09	8.8843E+09
x(FT)	8.4000	0.0000	28.200	13.200	0.0000	0.0000	13.200	2.4000	45.000	0.6000	0.0000
Max.	5.6800E-03	8.9002E-03	1050.5	1740.8	69.589	30.192	0.2816	0.2295	0.7175	8.8843E+09	8.8843E+09
Pile N.	4	1	4	4	3	1	4	1	4	1	1

LOAD CASE : 24
CASE NAME : Min M3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0803388	8.78409E-03	-8.00646E-03

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
1.01986E-06	-3.32484E-05	-7.93710E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1777.6	-35.972	-15.779	12.279	-196.43	-7342.4
2	2319.3	-35.976	-13.717	12.279	-387.43	-7340.8
3	2092.4	-38.027	-13.721	12.279	-387.71	-7533.1
4	1550.7	-38.025	-15.783	12.279	-196.72	-7534.8

MINIMUM	1550.7	-38.027	-15.783	12.279	-387.71	-7534.8
Pile N.	4	3	4	1	3	4
MAXIMUM	2319.3	-35.972	-13.717	12.279	-196.43	-7340.8
Pile N.	2	1	2	1	1	2

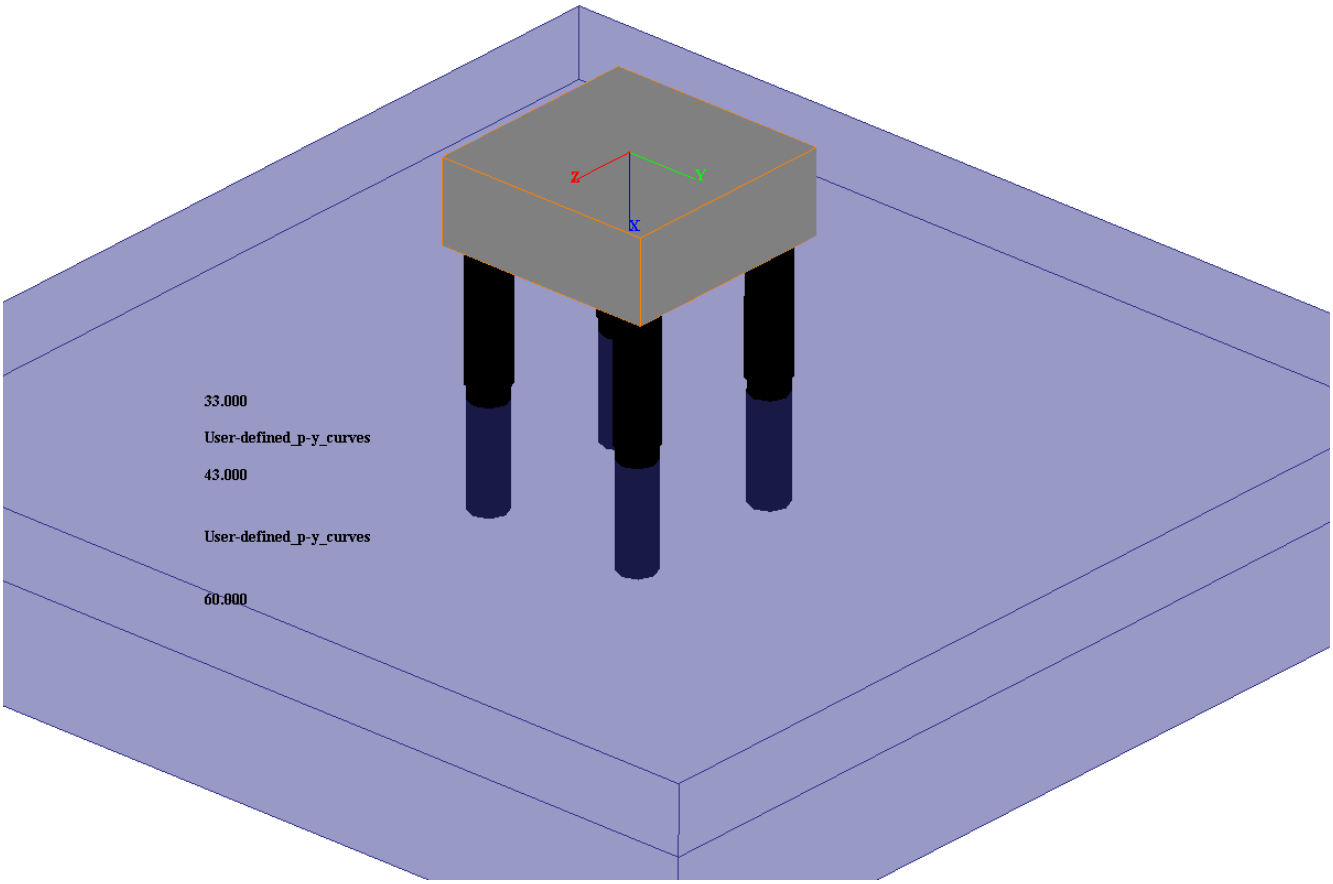
* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-2.6307E-03	-5.3605E-03	-507.30	-1172.4	-36.953	-15.297	-0.1522	-0.1359	0.4218	4.5738E+09	4.5738E+09
x(FT)	12.600	0.0000	31.800	11.400	3.0000	0.0000	16.200	1.2000	0.0000	45.000	45.000
2	-2.6313E-03	-5.0667E-03	-507.51	-1173.8	-36.956	-13.261	-0.1522	-0.1278	0.5504	4.5738E+09	4.5738E+09
x(FT)	12.600	0.0000	31.800	10.200	3.0000	0.0000	16.200	1.2000	0.0000	45.000	45.000
3	-2.7901E-03	-5.0667E-03	-536.11	-1173.7	-38.751	-13.264	-0.1591	-0.1278	0.4965	4.5738E+09	4.5738E+09
x(FT)	12.600	0.0000	31.200	10.200	2.4000	0.0000	15.600	1.2000	0.0000	45.600	45.000
4	-2.7896E-03	-5.3605E-03	-535.89	-1172.3	-38.749	-15.300	-0.1591	-0.1359	0.3680	4.5738E+09	4.5738E+09
x(FT)	12.600	0.0000	31.200	11.400	2.4000	0.0000	15.600	1.2000	0.0000	45.000	45.000
Min.	-2.7901E-03	-5.3605E-03	-536.11	-1173.8	-38.751	-15.300	-0.1591	-0.1359	0.3680	4.5738E+09	4.5738E+09
Pile N.	3	1	3	2	3	4	3	1	4	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	2.2638E-03	2.1035E-04	7342.4	129.68	4.0343	4.9885	0.091867	0.3317	0.5196	8.8843E+09	8.8843E+09
x(FT)	0.0000	30.000	0.0000	45.000	45.600	22.200	47.400	45.000	45.000	0.0000	0.6000
2	2.2638E-03	2.1706E-04	7340.8	125.40	4.0350	4.9672	0.091885	0.3131	0.6779	8.8843E+09	8.8843E+09
x(FT)	0.0000	29.400	0.0000	45.000	45.600	21.600	47.400	45.000	45.000	3.6000	1.8000
3	1.9701E-03	2.1695E-04	7533.1	125.36	4.0433	4.9654	0.092189	0.3130	0.6116	8.8843E+09	8.8843E+09
x(FT)	0.0000	29.400	0.0000	45.000	45.600	21.600	47.400	45.000	45.000	0.0000	0.0000
4	1.9701E-03	2.1023E-04	7534.8	129.64	4.0427	4.9866	0.092173	0.3316	0.4533	8.8843E+09	8.8843E+09
x(FT)	0.0000	30.000	0.0000	45.000	45.600	22.200	47.400	45.000	45.000	0.6000	0.0000
Max.	2.2638E-03	2.1706E-04	7534.8	129.68	4.0433	4.9885	0.092189	0.3317	0.6779	8.8843E+09	8.8843E+09
Pile N.	1	2	4	1	3	1	3	1	2	1	1

Pier 2
Weak Rock p-y parameters (Upper Bound)
No Scour Condition
40 #11 Bar Reinforcement
Strength Condition: Load Cases 1 through 12
Service Condition: Load cases 13 through 24
0.75" thick casing reduced to 0.625" after 1/8" of corrosion



Pier 2 Loading Schedule provided by HNTB
on 8/14/2020
Converted to kip-in

,000	PIER	ID	Station	Output	Case	P	V2	V3	T	M2	M3
						Vertical, x-di	orizontal, F	orizontal, F	Mx	My	Mz
Load case	-	-	ft	-	-	kip	Kip	Kip	Kip-in	Kip-in	Kip-in
1	PileCap 2	5144	0	STRENGTH	Max P	5763	1199	-277	-1144	-147560	215144
2	PileCap 2	5144	0	STRENGTH	Min P	10293	-1143	282	828	117714	-182652
3	PileCap 2	5144	0	STRENGTH	Max V2	6046	1526	-291	-5642	-160811	552729
4	PileCap 2	5144	0	STRENGTH	Min V2	8649	-1469	296	4857	131910	-501656
5	PileCap 2	5144	0	STRENGTH	Max V3	6047	1189	430	-1452	246756	209954
6	PileCap 2	5144	0	STRENGTH	Min V3	8647	-1047	-376	-810	-227676	-63315
7	PileCap 2	5144	0	STRENGTH	Max T	9363	-1150	-304	15308	-174175	-183736
8	PileCap 2	5144	0	STRENGTH	Min T	6752	1219	307	-16075	142745	220310
9	PileCap 2	5144	0	STRENGTH	Max M2	6047	1189	430	-1452	246756	209954
10	PileCap 2	5144	0	STRENGTH	Min M2	9528	-1155	-360	2512	-229853	-188239
11	PileCap 2	5144	0	STRENGTH	Max M3	6046	1526	-291	-5642	-160811	552729
12	PileCap 2	5144	0	STRENGTH	Min M3	8649	-1469	296	4857	131910	-501656
13	PileCap 2	5144	0	SERVICE	Max P	6639	21	165	-2808	147615	15989
14	PileCap 2	5144	0	SERVICE	Min P	7976	36	-156	2197	-172857	19170
15	PileCap 2	5144	0	SERVICE	Max V2	7140	204	156	-5423	138795	162088
16	PileCap 2	5144	0	SERVICE	Min V2	7159	-144	-140	5072	-157562	-123231
17	PileCap 2	5144	0	SERVICE	Max V3	7316	43	222	-4500	199845	27024
18	PileCap 2	5144	0	SERVICE	Min V3	7340	42	-202	2712	-214307	28448
19	PileCap 2	5144	0	SERVICE	Max T	7244	-86	-146	11970	-163022	-107504
20	PileCap 2	5144	0	SERVICE	Min T	7237	151	155	-12858	137496	147434
21	PileCap 2	5144	0	SERVICE	Max M2	7316	43	222	-4500	199845	27024
22	PileCap 2	5144	0	SERVICE	Min M2	7340	42	-202	2712	-214307	28449
23	PileCap 2	5144	0	SERVICE	Max M3	7096	149	159	-5899	141332	190226
24	PileCap 2	5144	0	SERVICE	Min M3	7173	-94	-141	5231	-158322	-153532

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                GROUP for Windows, Version 2016.10.13

                 Serial Number : 364300562

                  Analysis of A Group of Piles
                Subjected to Axial and Lateral Loading

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                    Time and Date of Analysis
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          Date:  September 03, 2020     Time:  13:50:42



            *****     COMPUTATION RESULTS     *****


Pier 2 Weak Rock



            *****     LOAD CASES RESULTS      *****


LOAD CASE :     1
CASE NAME : Strength MaxP
LOAD TYPE : Dead, DL


* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *


       VERTICAL ,IN      HORIZONTAL Y,IN     HORIZONTAL Z,IN
          0.0488323          0.0452644         -0.0244896

     ANGLE ROT. X,RAD    ANGLE ROT. Y,RAD    ANGLE ROT. Z,RAD
       -1.06717E-06        -7.15991E-05         1.52792E-05
```


* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1808.0	298.85	-68.257	-16.641	3677.7	3.1817E+04
2	1678.8	298.86	-70.209	-16.641	3882.1	3.1817E+04
3	1073.5	300.65	-70.243	-16.641	3880.7	3.1977E+04
4	1202.7	300.64	-68.291	-16.641	3676.3	3.1977E+04
MINIMUM	1073.5	298.85	-70.243	-16.641	3676.3	3.1817E+04
Pile N.	3	1	3	1	4	1
MAXIMUM	1808.0	300.65	-68.257	-16.641	3882.1	3.1977E+04
Pile N.	1	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-2.3588E-04	-0.018322	-3.1817E+04	-3289.8	-291.25	-67.571	-6.5863	-5.7352	0.4290	4.4622E+09	4.5738E+09
x(FT)	28.080	0.0000	0.0000	19.500	26.130	0.0000	28.080	24.180	0.0000	24.180	24.180
2	-2.3586E-04	-0.018629	-3.1817E+04	-3353.6	-291.22	-69.511	-6.5858	-5.9066	0.3984	4.4623E+09	4.5738E+09
x(FT)	28.080	0.0000	0.0000	19.890	26.130	0.0000	28.080	24.180	0.0000	24.180	24.960
3	-2.3712E-04	-0.018629	-3.1977E+04	-3352.5	-292.76	-69.545	-6.6208	-5.8789	0.2547	4.4591E+09	4.5738E+09
x(FT)	28.080	0.0000	0.0000	19.890	26.130	0.0000	28.080	24.180	0.0000	24.180	24.180
4	-2.3713E-04	-0.018322	-3.1977E+04	-3288.8	-292.78	-67.604	-6.6212	-5.7083	0.2854	4.4590E+09	4.5738E+09
x(FT)	28.080	0.0000	0.0000	19.500	26.130	0.0000	28.080	24.180	0.0000	24.180	24.180
Min.	-2.3713E-04	-0.018629	-3.1977E+04	-3353.6	-292.78	-69.545	-6.6212	-5.9066	0.2547	4.4590E+09	4.5738E+09
Pile N.	4	2	3	2	4	3	4	2	3	4	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.046420	5.8027E-05	1.2993E+04	3677.7	297.12	71.096	27.339	1.6202	0.5285	8.9130E+09	8.9130E+09
x(FT)	0.3900	27.690	24.180	0.0000	0.0000	25.740	24.180	27.690	24.180	9.3600	1.9500
2	0.046420	5.9562E-05	1.2992E+04	3882.1	297.14	72.963	27.308	1.6631	0.4907	8.9130E+09	8.9130E+09
x(FT)	0.3900	27.690	24.180	0.0000	0.0000	25.740	24.180	27.690	24.180	13.260	3.5100
3	0.046726	5.9537E-05	1.3061E+04	3880.7	298.91	72.927	27.324	1.6624	0.3138	8.9130E+09	8.9130E+09
x(FT)	0.3900	27.690	24.180	0.0000	0.0000	25.740	24.180	27.690	24.180	9.7500	7.0200
4	0.046726	5.8003E-05	1.3062E+04	3676.3	298.89	71.062	27.355	1.6196	0.3515	8.9130E+09	8.9130E+09
x(FT)	0.3900	27.690	24.180	0.0000	0.0000	25.740	24.180	27.690	24.180	10.920	3.9000
Max.	0.046726	5.9562E-05	1.3062E+04	3882.1	298.91	72.963	27.355	1.6631	0.5285	8.9130E+09	8.9130E+09
Pile N.	3	2	4	2	3	2	4	2	1	1	1

LOAD CASE : 2
CASE NAME : Strength MinP
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0874162	-0.0445711	0.0226008

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
7.94290E-07	6.05463E-05	-5.82601E-06

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2292.7	-285.13	69.795	12.386	-4384.8	-3.0050E+04
2	2342.0	-285.11	71.239	12.386	-4537.2	-3.0049E+04
3	2853.8	-286.37	71.205	12.386	-4537.4	-3.0182E+04
4	2804.5	-286.39	69.761	12.386	-4385.0	-3.0182E+04
MINIMUM	2292.7	-286.39	69.761	12.386	-4537.4	-3.0182E+04
Pile N.	1	4	4	1	3	3
MAXIMUM	2853.8	-285.11	71.239	12.386	-4384.8	-3.0049E+04
Pile N.	3	2	2	1	1	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-0.044946	-5.8857E-05	-1.2461E+04	-4384.8	-283.45	-72.073	-27.131	-1.6434	0.5441	4.4880E+09	4.5738E+09
x(FT)	0.0000	27.690	24.180	0.0000	0.0000	25.740	24.180	27.690	0.0000	24.180	24.180
2	-0.044946	-6.0003E-05	-1.2460E+04	-4537.2	-283.44	-73.468	-27.104	-1.6754	0.5557	4.4881E+09	4.5738E+09
x(FT)	0.0000	27.690	24.180	0.0000	0.0000	25.740	24.180	27.690	0.0000	24.180	24.570
3	-0.045175	-5.9979E-05	-1.2515E+04	-4537.4	-284.70	-73.435	-27.124	-1.6747	0.6772	4.4853E+09	4.5738E+09
x(FT)	0.0000	27.690	24.180	0.0000	0.0000	25.740	24.180	27.690	0.0000	24.180	24.180
4	-0.045175	-5.8834E-05	-1.2516E+04	-4385.0	-284.71	-72.041	-27.150	-1.6428	0.6655	4.4853E+09	4.5738E+09
x(FT)	0.0000	27.690	24.180	0.0000	0.0000	25.740	24.180	27.690	0.0000	24.180	24.180
Min.	-0.045175	-6.0003E-05	-1.2516E+04	-4537.4	-284.71	-73.468	-27.150	-1.6754	0.5441	4.4853E+09	4.5738E+09
Pile N.	3	2	4	3	4	2	4	2	1	3	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	2.2630E-04	0.017401	3.0050E+04	3220.6	279.20	69.144	6.3188	6.2013	0.6702	8.9130E+09	8.9130E+09
x(FT)	27.690	0.0000	0.0000	22.230	26.130	0.0000	27.690	24.180	24.180	12.870	10.530
2	2.2628E-04	0.017629	3.0049E+04	3278.0	279.19	70.580	6.3182	6.3329	0.6845	8.9130E+09	8.9130E+09
x(FT)	27.690	0.0000	0.0000	22.620	26.130	0.0000	27.690	24.180	24.180	12.870	1.5600
3	2.2727E-04	0.017629	3.0182E+04	3277.3	280.44	70.546	6.3457	6.3070	0.8341	8.9130E+09	8.9130E+09
x(FT)	27.690	0.0000	0.0000	22.620	26.130	0.0000	27.690	24.180	24.180	17.550	0.0000
4	2.2729E-04	0.017401	3.0182E+04	3219.9	280.45	69.111	6.3463	6.1758	0.8197	8.9130E+09	8.9130E+09
x(FT)	27.690	0.0000	0.0000	22.230	26.130	0.0000	27.690	24.180	24.180	7.8000	3.5100
Max.	2.2729E-04	0.017629	3.0182E+04	3278.0	280.45	70.580	6.3463	6.3329	0.8341	8.9130E+09	8.9130E+09
Pile N.	4	2	3	2	4	2	4	2	3	1	1

LOAD CASE : 3
CASE NAME : Strength MaxV2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0512581	0.0429052	-0.0261595

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-5.65990E-06	-7.73179E-05	1.30329E-04

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2389.6	377.40	-67.564	-88.256	3327.3	4.2453E+04
2	1287.9	377.59	-77.915	-88.256	4406.6	4.2458E+04
3	632.50	385.61	-77.936	-88.256	4402.6	4.3090E+04
4	1736.0	385.41	-67.585	-88.256	3323.6	4.3085E+04
MINIMUM	632.50	377.40	-77.936	-88.256	3323.6	4.2453E+04
Pile N.	3	1	3	1	4	1
MAXIMUM	2389.6	385.61	-67.564	-88.256	4406.6	4.3090E+04
Pile N.	1	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-2.9058E-04	-0.018850	-4.2453E+04	-3342.3	-357.49	-66.859	-8.1134	-4.6166	0.5671	4.3510E+09	4.5738E+09
x(FT)	28.080	0.0000	0.0000	18.330	26.130	0.0000	28.080	24.180	0.0000	24.180	24.180
2	-2.9037E-04	-0.020480	-4.2458E+04	-3662.0	-357.20	-77.148	-8.1078	-5.3702	0.3056	4.3513E+09	4.5738E+09
x(FT)	28.080	0.0000	0.0000	19.890	26.130	0.0000	28.080	24.180	0.0000	24.180	24.180
3	-2.9586E-04	-0.020480	-4.3090E+04	-3657.4	-363.84	-77.168	-8.2609	-5.2865	0.1501	4.3424E+09	4.5738E+09
x(FT)	28.080	0.0000	0.0000	19.890	26.130	0.0000	28.080	24.180	0.0000	24.180	24.180
4	-2.9606E-04	-0.018850	-4.3085E+04	-3338.8	-364.12	-66.879	-8.2665	-4.5444	0.4119	4.3422E+09	4.5738E+09
x(FT)	28.080	0.0000	0.0000	18.330	26.130	0.0000	28.080	24.180	0.0000	24.180	24.180
Min.	-2.9606E-04	-0.020480	-4.3090E+04	-3662.0	-364.12	-77.168	-8.2665	-5.3702	0.1501	4.3422E+09	4.5738E+09
Pile N.	4	2	3	2	4	3	4	2	3	4	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.054179	5.6507E-05	1.5956E+04	3327.3	375.45	69.162	28.576	1.5778	0.6985	8.9130E+09	8.9130E+09
x(FT)	1.5600	27.690	24.180	0.0000	0.0000	26.130	24.180	27.690	24.180	17.550	0.0000
2	0.054179	6.4381E-05	1.5947E+04	4406.6	375.62	79.028	28.473	1.7976	0.3765	8.9130E+09	8.9130E+09
x(FT)	1.5600	27.690	24.180	0.0000	0.0000	26.130	24.180	27.690	24.180	14.040	4.2900
3	0.055783	6.4159E-05	1.6255E+04	4402.6	383.56	78.846	28.590	1.7914	0.1849	8.9130E+09	8.9130E+09
x(FT)	1.5600	27.690	24.180	0.0000	0.0000	26.130	24.180	27.690	24.180	15.600	2.3400
4	0.055783	5.6317E-05	1.6263E+04	3323.6	383.38	69.007	28.691	1.5725	0.5074	8.9130E+09	8.9130E+09
x(FT)	1.5600	27.690	24.180	0.0000	0.0000	26.130	24.180	27.690	24.180	18.720	4.2900
Max.	0.055783	6.4381E-05	1.6263E+04	4406.6	383.56	79.028	28.691	1.7976	0.6985	8.9130E+09	8.9130E+09
Pile N.	3	2	4	2	3	2	4	2	1	1	1

LOAD CASE : 4
CASE NAME : Strength MinV2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0734136	-0.0427699	0.0243522

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
4.97909E-06	6.67186E-05	-1.13249E-04

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1401.6	-363.95	69.536	77.640	-4046.2	-4.0792E+04
2	2358.9	-363.75	78.521	77.640	-4999.2	-4.0784E+04
3	2922.9	-370.55	78.461	77.640	-4997.2	-4.1333E+04
4	1965.6	-370.76	69.481	77.640	-4044.5	-4.1341E+04
MINIMUM	1401.6	-370.76	69.481	77.640	-4999.2	-4.1341E+04
Pile N.	1	4	4	1	2	4
MAXIMUM	2922.9	-363.75	78.521	77.640	-4044.5	-4.0784E+04
Pile N.	3	2	2	1	4	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-0.052464	-5.7717E-05	-1.5451E+04	-4046.2	-362.03	-70.723	-28.314	-1.6116	0.3326	4.3662E+09	4.5738E+09
x(FT)	1.5600	27.690	24.180	0.0000	0.0000	26.130	24.180	27.690	0.0000	24.180	24.180
2	-0.052464	-6.4689E-05	-1.5444E+04	-4999.2	-361.85	-79.426	-28.212	-1.8062	0.5598	4.3664E+09	4.5738E+09
x(FT)	1.5600	27.690	24.180	0.0000	0.0000	26.130	24.180	27.690	0.0000	24.180	24.960
3	-0.053873	-6.4483E-05	-1.5715E+04	-4997.2	-368.61	-79.250	-28.329	-1.8005	0.6936	4.3581E+09	4.5738E+09
x(FT)	1.5600	27.690	24.180	0.0000	0.0000	26.130	24.180	27.690	0.0000	24.180	24.180
4	-0.053873	-5.7534E-05	-1.5722E+04	-4044.5	-368.80	-70.566	-28.427	-1.6065	0.4664	4.3579E+09	4.5738E+09
x(FT)	1.5600	27.690	24.180	0.0000	0.0000	26.130	24.180	27.690	0.0000	24.180	24.180
Min.	-0.053873	-6.4689E-05	-1.5722E+04	-4999.2	-368.80	-79.426	-28.427	-1.8062	0.3326	4.3579E+09	4.5738E+09
Pile N.	3	2	4	2	4	2	4	2	1	4	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	2.8144E-04	0.018031	4.0792E+04	3244.4	346.50	68.861	7.8584	4.9632	0.4097	8.9130E+09	8.9130E+09
x(FT)	28.080	0.0000	0.0000	20.280	26.130	0.0000	28.080	24.180	24.180	9.7500	8.1900
2	2.8133E-04	0.019465	4.0784E+04	3574.1	346.33	77.794	7.8552	5.6387	0.6895	8.9130E+09	8.9130E+09
x(FT)	28.080	0.0000	0.0000	21.840	26.130	0.0000	28.080	24.180	24.180	8.1900	8.5800
3	2.8620E-04	0.019465	4.1333E+04	3569.6	352.24	77.734	7.9914	5.5581	0.8544	8.9130E+09	8.9130E+09
x(FT)	28.080	0.0000	0.0000	21.840	26.130	0.0000	28.080	24.180	24.180	9.3600	2.7300
4	2.8631E-04	0.018031	4.1341E+04	3241.3	352.40	68.807	7.9944	4.8914	0.5745	8.9130E+09	8.9130E+09
x(FT)	28.080	0.0000	0.0000	20.280	26.130	0.0000	28.080	24.180	24.180	8.1900	1.9500

Max.	2.8631E-04	0.019465	4.1341E+04	3574.1	352.40	77.794	7.9944	5.6387	0.8544	8.9130E+09	8.9130E+09
Pile N.	4	2	4	2	4	2	4	2	3	1	1

LOAD CASE : 5
CASE NAME : Strength MaxV3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0512512	0.0450968	0.0392940

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-1.42029E-06	1.17873E-04	1.38189E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1072.0	296.16	108.84	-22.147	-5673.1	3.1481E+04
2	955.14	296.18	106.27	-22.147	-5400.7	3.1482E+04
3	1951.5	298.34	106.16	-22.147	-5402.5	3.1705E+04
4	2068.4	298.32	108.73	-22.147	-5674.8	3.1704E+04
MINIMUM	955.14	296.16	106.16	-22.147	-5674.8	3.1481E+04
Pile N.	2	1	3	1	4	1
MAXIMUM	2068.4	298.34	108.84	-22.147	-5400.7	3.1705E+04
Pile N.	4	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-2.3354E-04	-9.2536E-05	-3.1481E+04	-5673.1	-288.29	-113.37	-6.5208	-2.5838	0.2544	4.4686E+09	4.5738E+09
x(FT)	28.080	27.690	0.0000	0.0000	26.130	25.740	28.080	27.690	0.0000	24.180	24.180
2	-2.3356E-04	-9.0509E-05	-3.1482E+04	-5400.7	-288.33	-110.91	-6.5215	-2.5272	0.2266	4.4685E+09	4.5738E+09

x(FT)	28.080	27.690	0.0000	0.0000	26.130	25.740	28.080	27.690	0.0000	24.180	24.570
3	-2.3533E-04	-9.0452E-05	-3.1705E+04	-5402.5	-290.49	-110.83	-6.5708	-2.5256	0.4631	4.4640E+09	4.5738E+09
x(FT)	28.080	27.690	0.0000	0.0000	26.130	25.740	28.080	27.690	0.0000	24.180	24.960
4	-2.3530E-04	-9.2479E-05	-3.1704E+04	-5674.8	-290.45	-113.29	-6.5701	-2.5822	0.4908	4.4641E+09	4.5738E+09
x(FT)	28.080	27.690	0.0000	0.0000	26.130	25.740	28.080	27.690	0.0000	24.180	24.180
Min.	-2.3533E-04	-9.2536E-05	-3.1705E+04	-5674.8	-290.49	-113.37	-6.5708	-2.5838	0.2266	4.4640E+09	4.5738E+09
Pile N.	3	1	3	4	3	1	3	1	2	3	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.046073	0.029597	1.2860E+04	5296.6	294.43	107.73	26.559	8.9402	0.3133	8.9130E+09	8.9130E+09
x(FT)	0.3900	0.0000	24.180	19.110	0.0000	0.0000	24.180	24.180	24.180	17.160	8.1900
2	0.046073	0.029188	1.2862E+04	5216.2	294.46	105.17	26.619	8.7282	0.2792	8.9130E+09	8.9130E+09
x(FT)	0.3900	0.0000	24.180	18.720	0.0000	0.0000	24.180	24.180	24.180	15.600	2.7300
3	0.046481	0.029188	1.2957E+04	5216.6	296.61	105.07	26.657	8.6696	0.5704	8.9130E+09	8.9130E+09
x(FT)	0.3900	0.0000	24.180	18.720	0.0000	0.0000	24.180	24.180	24.180	8.9700	5.4600
4	0.046481	0.029597	1.2955E+04	5296.9	296.59	107.62	26.598	8.8806	0.6046	8.9130E+09	8.9130E+09
x(FT)	0.3900	0.0000	24.180	19.110	0.0000	0.0000	24.180	24.180	24.180	13.260	0.3900
Max.	0.046481	0.029597	1.2957E+04	5296.9	296.61	107.73	26.657	8.9402	0.6046	8.9130E+09	8.9130E+09
Pile N.	3	1	3	4	3	1	3	1	4	1	1

LOAD CASE : 6
CASE NAME : Strength Minv3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0733965	-0.0479976	-0.0352110

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-7.76400E-07	-1.07611E-04	3.44472E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN

1	2762.2	-262.33	-93.237	-12.107	4555.5	-2.5870E+04
2	2471.0	-262.37	-94.677	-12.107	4703.7	-2.5870E+04
3	1561.3	-261.17	-94.763	-12.107	4702.1	-2.5732E+04
4	1852.5	-261.13	-93.323	-12.107	4553.9	-2.5733E+04
MINIMUM	1561.3	-262.37	-94.763	-12.107	4553.9	-2.5870E+04
Pile N.	3	2	3	1	4	1
MAXIMUM	2762.2	-261.13	-93.237	-12.107	4703.7	-2.5732E+04
Pile N.	1	4	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-0.045216	-0.026060	-1.1595E+04	-4665.4	-260.65	-92.262	-25.469	-8.3346	0.6555	4.5422E+09	4.5738E+09
x(FT)	0.0000	0.0000	24.180	18.330	0.0000	0.0000	24.180	24.180	0.0000	24.180	25.740
2	-0.045216	-0.026283	-1.1594E+04	-4707.5	-260.69	-93.693	-25.434	-8.4629	0.5864	4.5422E+09	4.5738E+09
x(FT)	0.0000	0.0000	24.180	18.720	0.0000	0.0000	24.180	24.180	0.0000	24.180	24.180
3	-0.044992	-0.026283	-1.1539E+04	-4707.0	-259.49	-93.778	-25.418	-8.5046	0.3705	4.5452E+09	4.5738E+09
x(FT)	0.0000	0.0000	24.180	18.720	0.0000	0.0000	24.180	24.180	0.0000	24.180	24.180
4	-0.044992	-0.026060	-1.1540E+04	-4664.8	-259.45	-92.346	-25.453	-8.3758	0.4396	4.5451E+09	4.5738E+09
x(FT)	0.0000	0.0000	24.180	18.330	0.0000	0.0000	24.180	24.180	0.0000	24.180	24.180
Min.	-0.045216	-0.026283	-1.1595E+04	-4707.5	-260.69	-93.778	-25.469	-8.5046	0.3705	4.5422E+09	4.5738E+09
Pile N.	1	2	1	2	2	3	1	3	3	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	2.1114E-04	8.0327E-05	2.5870E+04	4555.5	259.60	98.575	5.8956	2.2429	0.8074	8.9130E+09	8.9130E+09
x(FT)	27.690	27.690	0.0000	0.0000	26.130	25.740	27.690	27.690	24.180	10.530	4.6800
2	2.1111E-04	8.1448E-05	2.5870E+04	4703.7	259.57	99.939	5.8945	2.2742	0.7223	8.9130E+09	8.9130E+09
x(FT)	27.690	27.690	0.0000	0.0000	26.130	25.740	27.690	27.690	24.180	12.480	0.0000
3	2.1010E-04	8.1490E-05	2.5732E+04	4702.1	258.31	99.994	5.8665	2.2754	0.4564	8.9130E+09	8.9130E+09
x(FT)	27.690	27.690	0.0000	0.0000	26.130	25.740	27.690	27.690	24.180	7.0200	14.820
4	2.1014E-04	8.0368E-05	2.5733E+04	4553.9	258.33	98.630	5.8676	2.2440	0.5415	8.9130E+09	8.9130E+09
x(FT)	27.690	27.690	0.0000	0.0000	26.130	25.740	27.690	27.690	24.180	7.8000	1.9500
Max.	2.1114E-04	8.1490E-05	2.5870E+04	4703.7	259.60	99.994	5.8956	2.2754	0.8074	8.9130E+09	8.9130E+09
Pile N.	1	3	1	2	1	3	1	3	1	1	1

LOAD CASE : 7
CASE NAME : Strength MaxT

LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0794950	-0.0448799	-0.0277645

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
1.42813E-05	-8.32413E-05	-5.88443E-06

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2667.7	-275.45	-89.018	222.69	5301.8	-2.9085E+04
2	2717.5	-275.51	-62.996	222.69	2562.4	-2.9093E+04
3	2013.8	-299.55	-62.987	222.69	2554.8	-3.1469E+04
4	1964.0	-299.50	-89.000	222.69	5292.0	-3.1463E+04
MINIMUM	1964.0	-299.55	-89.018	222.69	2554.8	-3.1469E+04
Pile N.	4	3	1	1	3	3
MAXIMUM	2717.5	-275.45	-62.987	222.69	5301.8	-2.9085E+04
Pile N.	2	1	3	1	1	1

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-0.043318	-0.022829	-1.2057E+04	-4168.8	-273.84	-88.164	-26.617	-7.9818	0.6330	4.5092E+09	4.5738E+09
x(FT)	0.0000	0.0000	24.180	21.060	0.0000	0.0000	24.180	24.180	0.0000	24.180	24.180
2	-0.043318	-0.018716	-1.2076E+04	-3354.1	-273.90	-62.295	-27.138	-5.5730	0.6449	4.5083E+09	4.5738E+09
x(FT)	0.0000	0.0000	24.180	17.160	0.0000	0.0000	24.180	24.180	0.0000	24.180	24.180
3	-0.047431	-0.018716	-1.3048E+04	-3347.3	-297.78	-62.285	-27.448	-5.1917	0.4779	4.4597E+09	4.5738E+09
x(FT)	0.0000	0.0000	24.180	17.160	0.0000	0.0000	24.180	24.180	0.0000	24.180	24.180
4	-0.047431	-0.022829	-1.3032E+04	-4155.0	-297.73	-88.145	-27.000	-7.4569	0.4661	4.4603E+09	4.5738E+09
x(FT)	0.0000	0.0000	24.180	20.670	0.0000	0.0000	24.180	24.180	0.0000	24.180	24.180
Min.	-0.047431	-0.022829	-1.3048E+04	-4168.8	-297.78	-88.164	-27.448	-7.9818	0.4661	4.4597E+09	4.5738E+09
Pile N.	3	1	3	1	3	1	3	1	4	3	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	2.1905E-04	7.5515E-05	2.9085E+04	5301.8	270.12	92.529	6.1164	2.1085	0.7798	8.9130E+09	8.9130E+09
x(FT)	27.690	27.690	0.0000	0.0000	26.130	25.740	27.690	27.690	24.180	19.500	0.0000
2	2.1953E-04	5.4867E-05	2.9093E+04	2562.4	270.49	67.401	6.1296	1.5320	0.7943	8.9130E+09	8.9130E+09
x(FT)	27.690	27.690	0.0000	0.0000	26.130	25.740	27.690	27.690	24.180	6.2400	4.2900
3	2.3681E-04	5.4521E-05	3.1469E+04	2554.8	292.45	66.913	6.6121	1.5223	0.5886	8.9130E+09	8.9130E+09
x(FT)	28.080	27.690	0.0000	0.0000	26.130	25.740	28.080	27.690	24.180	7.0200	5.4600
4	2.3660E-04	7.5035E-05	3.1463E+04	5292.0	292.13	91.855	6.6062	2.0951	0.5741	8.9130E+09	8.9130E+09
x(FT)	28.080	27.690	0.0000	0.0000	26.130	25.740	28.080	27.690	24.180	10.140	0.7800
Max.	2.3681E-04	7.5515E-05	3.1469E+04	5301.8	292.45	92.529	6.6121	2.1085	0.7943	8.9130E+09	8.9130E+09
Pile N.	3	1	3	1	3	1	3	1	2	1	1

LOAD CASE : 8
CASE NAME : Strength MinT
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0572560	0.0460785	0.0256522

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-1.55588E-05	7.14506E-05	1.62609E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1454.7	292.65	90.971	-242.61	-6072.2	3.1254E+04
2	1317.3	292.73	62.630	-242.61	-3089.2	3.1262E+04
3	1921.3	316.85	62.545	-242.61	-3084.3	3.3507E+04
4	2058.7	316.77	90.854	-242.61	-6064.6	3.3501E+04
MINIMUM	1317.3	292.65	62.545	-242.61	-6072.2	3.1254E+04
Pile N.	2	1	3	1	1	1

MAXIMUM	2058.7	316.85	90.971	-242.61	-3084.3	3.3507E+04
Pile N.	4	3	1	1	3	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-2.3099E-04	-7.6002E-05	-3.1254E+04	-6072.2	-285.20	-92.968	-6.4497	-2.1221	0.3452	4.4751E+09	4.5738E+09
x(FT)	28.080	27.690	0.0000	0.0000	26.130	25.740	28.080	27.690	0.0000	24.180	24.960
2	-2.3123E-04	-5.3629E-05	-3.1262E+04	-3089.2	-285.56	-65.763	-6.4563	-1.4974	0.3126	4.4743E+09	4.5738E+09
x(FT)	28.080	27.690	0.0000	0.0000	26.130	25.740	28.080	27.690	0.0000	24.180	24.180
3	-2.4943E-04	-5.3300E-05	-3.3507E+04	-3084.3	-307.84	-65.302	-6.9646	-1.4882	0.4559	4.4295E+09	4.5738E+09
x(FT)	28.080	27.690	0.0000	0.0000	26.130	25.740	28.080	27.690	0.0000	24.180	24.570
4	-2.4921E-04	-7.5528E-05	-3.3501E+04	-6064.6	-307.52	-92.365	-6.9586	-2.1089	0.4885	4.4304E+09	4.5738E+09
x(FT)	28.080	27.690	0.0000	0.0000	26.130	26.130	28.080	27.690	0.0000	24.180	24.570
Min.	-2.4943E-04	-7.6002E-05	-3.3507E+04	-6072.2	-307.84	-92.968	-6.9646	-2.1221	0.3126	4.4295E+09	4.5738E+09
Pile N.	3	1	3	1	3	1	3	1	2	3	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.045236	0.021891	1.2724E+04	4150.6	290.96	90.151	26.831	7.8244	0.4252	8.9130E+09	8.9130E+09
x(FT)	0.3900	0.0000	24.180	24.180	0.0000	0.0000	24.180	24.180	24.180	8.1900	0.7800
2	0.045236	0.017410	1.2742E+04	3111.3	291.04	61.977	27.349	5.3289	0.3850	8.9130E+09	8.9130E+09
x(FT)	0.3900	0.0000	24.180	18.720	0.0000	0.0000	24.180	24.180	24.180	7.4100	5.8500
3	0.049707	0.017410	1.3728E+04	3105.2	315.00	61.893	27.588	4.9707	0.5616	8.9130E+09	8.9130E+09
x(FT)	0.3900	0.0000	24.180	18.330	0.0000	0.0000	24.180	24.180	24.180	10.140	14.430
4	0.049707	0.021891	1.3711E+04	4131.6	314.93	90.035	27.095	7.3068	0.6018	8.9130E+09	8.9130E+09
x(FT)	0.3900	0.0000	24.180	24.180	0.0000	0.0000	24.180	24.180	24.180	7.0200	5.0700
Max.	0.049707	0.021891	1.3728E+04	4150.6	315.00	90.151	27.588	7.8244	0.6018	8.9130E+09	8.9130E+09
Pile N.	3	1	3	1	3	1	3	1	4	1	1

LOAD CASE : 9
CASE NAME : Strength MaxM2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0512512	0.0450968	0.0392940

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-1.42029E-06	1.17873E-04	1.38189E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1072.0	296.16	108.84	-22.147	-5673.1	3.1481E+04
2	955.14	296.18	106.27	-22.147	-5400.7	3.1482E+04
3	1951.5	298.34	106.16	-22.147	-5402.5	3.1705E+04
4	2068.4	298.32	108.73	-22.147	-5674.8	3.1704E+04
MINIMUM	955.14	296.16	106.16	-22.147	-5674.8	3.1481E+04
Pile N.	2	1	3	1	4	1
MAXIMUM	2068.4	298.34	108.84	-22.147	-5400.7	3.1705E+04
Pile N.	4	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-2.3354E-04	-9.2536E-05	-3.1481E+04	-5673.1	-288.29	-113.37	-6.5208	-2.5838	0.2544	4.4686E+09	4.5738E+09
x(FT)	28.080	27.690	0.0000	0.0000	26.130	25.740	28.080	27.690	0.0000	24.180	24.180
2	-2.3356E-04	-9.0509E-05	-3.1482E+04	-5400.7	-288.33	-110.91	-6.5215	-2.5272	0.2266	4.4685E+09	4.5738E+09
x(FT)	28.080	27.690	0.0000	0.0000	26.130	25.740	28.080	27.690	0.0000	24.180	24.180
3	-2.3533E-04	-9.0452E-05	-3.1705E+04	-5402.5	-290.49	-110.83	-6.5708	-2.5256	0.4631	4.4640E+09	4.5738E+09
x(FT)	28.080	27.690	0.0000	0.0000	26.130	25.740	28.080	27.690	0.0000	24.180	24.180
4	-2.3530E-04	-9.2479E-05	-3.1704E+04	-5674.8	-290.45	-113.29	-6.5701	-2.5822	0.4908	4.4641E+09	4.5738E+09
x(FT)	28.080	27.690	0.0000	0.0000	26.130	25.740	28.080	27.690	0.0000	24.180	24.570
Min.	-2.3533E-04	-9.2536E-05	-3.1705E+04	-5674.8	-290.49	-113.37	-6.5708	-2.5838	0.2266	4.4640E+09	4.5738E+09
Pile N.	3	1	3	4	3	1	3	1	2	3	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.046073	0.029597	1.2860E+04	5296.6	294.43	107.73	26.559	8.9402	0.3133	8.9130E+09	8.9130E+09
x(FT)	0.3900	0.0000	24.180	19.110	0.0000	0.0000	24.180	24.180	24.180	9.7500	1.1700

2	0.046073	0.029188	1.2862E+04	5216.2	294.46	105.17	26.619	8.7282	0.2792	8.9130E+09	8.9130E+09
x(FT)	0.3900	0.0000	24.180	18.720	0.0000	0.0000	24.180	24.180	24.180	6.6300	3.1200
3	0.046481	0.029188	1.2957E+04	5216.6	296.61	105.07	26.657	8.6696	0.5704	8.9130E+09	8.9130E+09
x(FT)	0.3900	0.0000	24.180	18.720	0.0000	0.0000	24.180	24.180	24.180	9.3600	0.7800
4	0.046481	0.029597	1.2955E+04	5296.9	296.59	107.62	26.598	8.8806	0.6046	8.9130E+09	8.9130E+09
x(FT)	0.3900	0.0000	24.180	19.110	0.0000	0.0000	24.180	24.180	24.180	8.9700	3.9000
Max.	0.046481	0.029597	1.2957E+04	5296.9	296.61	107.73	26.657	8.9402	0.6046	8.9130E+09	8.9130E+09
Pile N.	3	1	3	4	3	1	3	1	4	1	1

LOAD CASE : 10
CASE NAME : Strength MinM2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0809004	-0.0448134	-0.0345795

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
2.31028E-06	-1.07546E-04	-7.31659E-06

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2805.6	-286.74	-92.072	36.025	4435.8	-3.0286E+04
2	2867.5	-286.75	-87.861	36.025	3993.2	-3.0287E+04
3	1958.4	-290.76	-87.927	36.025	3989.6	-3.0672E+04
4	1896.5	-290.75	-92.140	36.025	4432.2	-3.0671E+04
MINIMUM	1896.5	-290.76	-92.140	36.025	3989.6	-3.0672E+04
Pile N.	4	3	4	1	3	3
MAXIMUM	2867.5	-286.74	-87.861	36.025	4435.8	-3.0286E+04
Pile N.	2	1	2	1	1	1

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR	DISPL. z-DIR	MOMENT z-DIR	MOMENT y-DIR	SHEAR y-DIR	SHEAR z-DIR	SOIL REACT y-DIR	SOIL REACT z-DIR	TOTAL STRESS	FLEX. RIG. z-DIR	FLEX. RIG. y-DIR

	IN	IN	KIP-IN	KIP-IN	KIP	KIP	KIP/IN	KIP/IN	KIP/IN**2	KIP-IN**2	KIP-IN**2
1	-0.045095	-0.025878	-1.2516E+04	-4624.1	-285.07	-91.104	-26.773	-7.8253	0.6658	4.4854E+09	4.5738E+09
x(FT)	0.0000	0.0000	24.180	18.330	0.0000	0.0000	24.180	24.180	0.0000	24.180	24.960
2	-0.045095	-0.025213	-1.2519E+04	-4503.6	-285.07	-86.917	-26.862	-7.4568	0.6804	4.4853E+09	4.5738E+09
x(FT)	0.0000	0.0000	24.180	17.940	0.0000	0.0000	24.180	24.180	0.0000	24.180	24.570
3	-0.045761	-0.025213	-1.2675E+04	-4500.8	-289.05	-86.982	-26.921	-7.3778	0.4647	4.4775E+09	4.5738E+09
x(FT)	0.0000	0.0000	24.180	17.940	0.0000	0.0000	24.180	24.180	0.0000	24.180	24.180
4	-0.045761	-0.025878	-1.2672E+04	-4621.3	-289.05	-91.170	-26.834	-7.7430	0.4500	4.4776E+09	4.5738E+09
x(FT)	0.0000	0.0000	24.180	18.330	0.0000	0.0000	24.180	24.180	0.0000	24.180	24.960
Min.	-0.045761	-0.025878	-1.2675E+04	-4624.1	-289.05	-91.170	-26.921	-7.8253	0.4500	4.4775E+09	4.5738E+09
Pile N.	3	1	3	1	3	4	3	1	4	3	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	2.2715E-04	7.9073E-05	3.0286E+04	4435.8	280.49	96.980	6.3426	2.2079	0.8201	8.9130E+09	8.9130E+09
x(FT)	27.690	27.690	0.0000	0.0000	26.130	25.740	27.690	27.690	24.180	13.260	2.3400
2	2.2724E-04	7.5752E-05	3.0287E+04	3993.2	280.55	92.942	6.3449	2.1152	0.8381	8.9130E+09	8.9130E+09
x(FT)	27.690	27.690	0.0000	0.0000	26.130	25.740	27.690	27.690	24.180	8.9700	1.5600
3	2.3001E-04	7.5684E-05	3.0672E+04	3989.6	284.07	92.843	6.4224	2.1132	0.5724	8.9130E+09	8.9130E+09
x(FT)	28.080	27.690	0.0000	0.0000	26.130	25.740	28.080	27.690	24.180	8.5800	6.2400
4	2.2997E-04	7.9001E-05	3.0671E+04	4432.2	284.01	96.877	6.4212	2.2059	0.5543	8.9130E+09	8.9130E+09
x(FT)	28.080	27.690	0.0000	0.0000	26.130	25.740	28.080	27.690	24.180	9.7500	8.1900
Max.	2.3001E-04	7.9073E-05	3.0672E+04	4435.8	284.07	96.980	6.4224	2.2079	0.8381	8.9130E+09	8.9130E+09
Pile N.	3	1	3	1	3	1	3	1	2	1	1

LOAD CASE : 11
CASE NAME : Strength MaxM3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0512581	0.0429052	-0.0261595

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-5.65990E-06	-7.73179E-05	1.30329E-04

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2389.6	377.40	-67.564	-88.256	3327.3	4.2453E+04
2	1287.9	377.59	-77.915	-88.256	4406.6	4.2458E+04
3	632.50	385.61	-77.936	-88.256	4402.6	4.3090E+04
4	1736.0	385.41	-67.585	-88.256	3323.6	4.3085E+04
MINIMUM	632.50	377.40	-77.936	-88.256	3323.6	4.2453E+04
Pile N.	3	1	3	1	4	1
MAXIMUM	2389.6	385.61	-67.564	-88.256	4406.6	4.3090E+04
Pile N.	1	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-2.9058E-04	-0.018850	-4.2453E+04	-3342.3	-357.49	-66.859	-8.1134	-4.6166	0.5671	4.3510E+09	4.5738E+09
x(FT)	28.080	0.0000	0.0000	18.330	26.130	0.0000	28.080	24.180	0.0000	24.180	24.180
2	-2.9037E-04	-0.020480	-4.2458E+04	-3662.0	-357.20	-77.148	-8.1078	-5.3702	0.3056	4.3513E+09	4.5738E+09
x(FT)	28.080	0.0000	0.0000	19.890	26.130	0.0000	28.080	24.180	0.0000	24.180	24.180
3	-2.9586E-04	-0.020480	-4.3090E+04	-3657.4	-363.84	-77.168	-8.2609	-5.2865	0.1501	4.3424E+09	4.5738E+09
x(FT)	28.080	0.0000	0.0000	19.890	26.130	0.0000	28.080	24.180	0.0000	24.180	24.180
4	-2.9606E-04	-0.018850	-4.3085E+04	-3338.8	-364.12	-66.879	-8.2665	-4.5444	0.4119	4.3422E+09	4.5738E+09
x(FT)	28.080	0.0000	0.0000	18.330	26.130	0.0000	28.080	24.180	0.0000	24.180	24.180
Min.	-2.9606E-04	-0.020480	-4.3090E+04	-3662.0	-364.12	-77.168	-8.2665	-5.3702	0.1501	4.3422E+09	4.5738E+09
Pile N.	4	2	3	2	4	3	4	2	3	4	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.054179	5.6507E-05	1.5956E+04	3327.3	375.45	69.162	28.576	1.5778	0.6985	8.9130E+09	8.9130E+09
x(FT)	1.5600	27.690	24.180	0.0000	0.0000	26.130	24.180	27.690	24.180	18.720	2.7300
2	0.054179	6.4381E-05	1.5947E+04	4406.6	375.62	79.028	28.473	1.7976	0.3765	8.9130E+09	8.9130E+09
x(FT)	1.5600	27.690	24.180	0.0000	0.0000	26.130	24.180	27.690	24.180	10.530	3.9000
3	0.055783	6.4159E-05	1.6255E+04	4402.6	383.56	78.846	28.590	1.7914	0.1849	8.9130E+09	8.9130E+09
x(FT)	1.5600	27.690	24.180	0.0000	0.0000	26.130	24.180	27.690	24.180	9.7500	0.0000
4	0.055783	5.6317E-05	1.6263E+04	3323.6	383.38	69.007	28.691	1.5725	0.5074	8.9130E+09	8.9130E+09
x(FT)	1.5600	27.690	24.180	0.0000	0.0000	26.130	24.180	27.690	24.180	14.820	3.1200
Max.	0.055783	6.4381E-05	1.6263E+04	4406.6	383.56	79.028	28.691	1.7976	0.6985	8.9130E+09	8.9130E+09
Pile N.	3	2	4	2	3	2	4	2	1	1	1

LOAD CASE : 12
CASE NAME : Strength MinM3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0734136	-0.0427699	0.0243522

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
4.97909E-06	6.67186E-05	-1.13249E-04

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1401.6	-363.95	69.536	77.640	-4046.2	-4.0792E+04
2	2358.9	-363.75	78.521	77.640	-4999.2	-4.0784E+04
3	2922.9	-370.55	78.461	77.640	-4997.2	-4.1333E+04
4	1965.6	-370.76	69.481	77.640	-4044.5	-4.1341E+04
MINIMUM	1401.6	-370.76	69.481	77.640	-4999.2	-4.1341E+04
Pile N.	1	4	4	1	2	4
MAXIMUM	2922.9	-363.75	78.521	77.640	-4044.5	-4.0784E+04
Pile N.	3	2	2	1	4	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-0.052464	-5.7717E-05	-1.5451E+04	-4046.2	-362.03	-70.723	-28.314	-1.6116	0.3326	4.3662E+09	4.5738E+09
x(FT)	1.5600	27.690	24.180	0.0000	0.0000	26.130	24.180	27.690	0.0000	24.180	24.180
2	-0.052464	-6.4689E-05	-1.5444E+04	-4999.2	-361.85	-79.426	-28.212	-1.8062	0.5598	4.3664E+09	4.5738E+09
x(FT)	1.5600	27.690	24.180	0.0000	0.0000	26.130	24.180	27.690	0.0000	24.180	24.180
3	-0.053873	-6.4483E-05	-1.5715E+04	-4997.2	-368.61	-79.250	-28.329	-1.8005	0.6936	4.3581E+09	4.5738E+09
x(FT)	1.5600	27.690	24.180	0.0000	0.0000	26.130	24.180	27.690	0.0000	24.180	24.180

4	-0.053873	-5.7534E-05	-1.5722E+04	-4044.5	-368.80	-70.566	-28.427	-1.6065	0.4664	4.3579E+09	4.5738E+09
x(FT)	1.5600	27.690	24.180	0.0000	0.0000	26.130	24.180	27.690	0.0000	24.180	24.180
Min.	-0.053873	-6.4689E-05	-1.5722E+04	-4999.2	-368.80	-79.426	-28.427	-1.8062	0.3326	4.3579E+09	4.5738E+09
Pile N.	3	2	4	2	4	2	4	2	1	4	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	2.8144E-04	0.018031	4.0792E+04	3244.4	346.50	68.861	7.8584	4.9632	0.4097	8.9130E+09	8.9130E+09
x(FT)	28.080	0.0000	0.0000	20.280	26.130	0.0000	28.080	24.180	24.180	17.160	1.9500
2	2.8133E-04	0.019465	4.0784E+04	3574.1	346.33	77.794	7.8552	5.6387	0.6895	8.9130E+09	8.9130E+09
x(FT)	28.080	0.0000	0.0000	21.840	26.130	0.0000	28.080	24.180	24.180	8.1900	2.7300
3	2.8620E-04	0.019465	4.1333E+04	3569.6	352.24	77.734	7.9914	5.5581	0.8544	8.9130E+09	8.9130E+09
x(FT)	28.080	0.0000	0.0000	21.840	26.130	0.0000	28.080	24.180	24.180	12.090	1.1700
4	2.8631E-04	0.018031	4.1341E+04	3241.3	352.40	68.807	7.9944	4.8914	0.5745	8.9130E+09	8.9130E+09
x(FT)	28.080	0.0000	0.0000	20.280	26.130	0.0000	28.080	24.180	24.180	8.1900	15.600
Max.	2.8631E-04	0.019465	4.1341E+04	3574.1	352.40	77.794	7.9944	5.6387	0.8544	8.9130E+09	8.9130E+09
Pile N.	4	2	4	2	4	2	4	2	3	1	1

LOAD CASE : 13
CASE NAME : Service MaxP
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0562936	-9.96262E-05	0.0188762

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-2.52149E-06	6.53548E-05	4.90280E-06

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1404.2	2.9488	43.563	-39.318	-1382.8	550.53
2	1362.8	2.9488	38.961	-39.318	-898.20	550.54

3	1915.3	7.5513	38.937	-39.318	-899.11	1034.9
4	1956.7	7.5512	43.538	-39.318	-1383.7	1034.9
MINIMUM	1362.8	2.9488	38.937	-39.318	-1383.7	550.53
Pile N.	2	1	3	1	4	1
MAXIMUM	1956.7	7.5513	43.563	-39.318	-898.20	1034.9
Pile N.	4	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-5.0885E-05	-3.8472E-05	-550.53	-1382.8	-2.6572	-47.335	-0.060527	-1.0742	0.3332	4.5738E+09	4.5738E+09
x(FT)	0.0000	27.690	0.0000	0.0000	26.130	25.740	28.080	27.690	0.0000	24.570	24.570
2	-5.0885E-05	-3.4783E-05	-550.54	-898.20	-2.6572	-42.837	-0.060526	-0.9712	0.3234	4.5738E+09	4.5738E+09
x(FT)	0.0000	27.690	0.0000	0.0000	26.130	25.740	28.080	27.690	0.0000	24.570	24.570
3	-5.8384E-06	-3.4779E-05	-1034.9	-899.11	-7.1962	-42.832	-0.1630	-0.9711	0.4545	4.5738E+09	4.5738E+09
x(FT)	28.080	27.690	0.0000	0.0000	26.130	25.740	28.080	27.690	0.0000	24.180	24.570
4	-5.8385E-06	-3.8468E-05	-1034.9	-1383.7	-7.1963	-47.330	-0.1630	-1.0741	0.4643	4.5738E+09	4.5738E+09
x(FT)	28.080	27.690	0.0000	0.0000	26.130	25.740	28.080	27.690	0.0000	24.180	24.960
Min.	-5.0885E-05	-3.8472E-05	-1034.9	-1383.7	-7.1963	-47.335	-0.1630	-1.0742	0.3234	4.5738E+09	4.5738E+09
Pile N.	1	1	3	4	4	1	3	1	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	1.8737E-04	0.013750	117.97	2491.8	2.9532	43.048	0.3426	3.9655	0.4104	8.9130E+09	8.9130E+09
x(FT)	9.3600	0.0000	24.180	15.990	0.7800	0.0000	24.180	24.180	24.180	4.2900	3.9000
2	1.8737E-04	0.013023	117.97	2399.6	2.9532	38.473	0.3426	3.4916	0.3983	8.9130E+09	8.9130E+09
x(FT)	9.3600	0.0000	24.180	15.210	0.7800	0.0000	24.180	24.180	24.180	9.3600	4.2900
3	7.9251E-04	0.013023	320.75	2400.1	7.5263	38.449	0.8165	3.4898	0.5598	8.9130E+09	8.9130E+09
x(FT)	4.2900	0.0000	24.180	15.210	0.0000	0.0000	24.180	24.180	24.180	11.700	2.7300
4	7.9251E-04	0.013750	320.75	2492.3	7.5262	43.022	0.8165	3.9636	0.5719	8.9130E+09	8.9130E+09
x(FT)	4.2900	0.0000	24.180	15.990	0.0000	0.0000	24.180	24.180	24.180	3.9000	3.9000
Max.	7.9251E-04	0.013750	320.75	2492.3	7.5263	43.048	0.8165	3.9655	0.5719	8.9130E+09	8.9130E+09
Pile N.	3	1	3	4	3	1	3	1	4	1	1

LOAD CASE : 14
CASE NAME : Service MinP
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0676814	4.22194E-04	-0.0202452

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
1.97376E-06	-7.44506E-05	5.27235E-06

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2331.0	10.800	-40.785	30.777	651.21	1395.1
2	2286.4	10.800	-37.185	30.777	271.88	1395.1
3	1657.0	7.1999	-37.214	30.777	270.64	1016.0
4	1701.6	7.1997	-40.815	30.777	649.99	1016.0
MINIMUM	1657.0	7.1997	-40.815	30.777	270.64	1016.0
Pile N.	3	4	4	1	3	3
MAXIMUM	2331.0	10.800	-37.185	30.777	651.21	1395.1
Pile N.	1	1	2	1	1	1

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-8.4173E-06	-0.014276	-1395.1	-2675.8	-10.383	-40.250	-0.2350	-3.6082	0.5531	4.5738E+09	4.5738E+09
x(FT)	28.080	0.0000	0.0000	14.430	26.130	0.0000	28.080	24.180	0.0000	24.570	24.570
2	-8.4173E-06	-0.013707	-1395.1	-2627.5	-10.383	-36.671	-0.2350	-3.2374	0.5426	4.5738E+09	4.5738E+09
x(FT)	28.080	0.0000	0.0000	13.650	26.130	0.0000	28.080	24.180	0.0000	24.180	24.570
3	-5.5435E-06	-0.013707	-1016.0	-2626.8	-6.8298	-36.699	-0.1548	-3.2397	0.3932	4.5738E+09	4.5738E+09
x(FT)	28.080	0.0000	0.0000	13.650	26.130	0.0000	28.080	24.180	0.0000	24.570	24.570
4	-5.5436E-06	-0.014276	-1016.0	-2675.1	-6.8299	-40.279	-0.1548	-3.6106	0.4038	4.5738E+09	4.5738E+09
x(FT)	28.080	0.0000	0.0000	14.430	26.130	0.0000	28.080	24.180	0.0000	24.180	24.180
Min.	-8.4173E-06	-0.014276	-1395.1	-2675.8	-10.383	-40.279	-0.2350	-3.6106	0.3932	4.5738E+09	4.5738E+09
Pile N.	1	1	1	1	1	4	1	4	3	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL.	DISPL.	MOMENT	MOMENT	SHEAR	SHEAR	SOIL REACT	SOIL REACT	TOTAL	FLEX. RIG.	FLEX. RIG.

	y-DIR IN	z-DIR IN	z-DIR KIP-IN	y-DIR KIP-IN	y-DIR KIP	z-DIR KIP	y-DIR KIP/IN	z-DIR KIP/IN	STRESS KIP/IN**2	z-DIR KIP-IN**2	y-DIR KIP-IN**2
1	1.2472E-03	3.6768E-05	463.07	651.21	10.758	45.318	1.1541	1.0266	0.6813	8.9130E+09	8.9130E+09
x(FT)	3.1200	27.690	24.180	0.0000	0.0000	25.740	24.180	27.690	24.180	0.3900	2.3400
2	1.2472E-03	3.3881E-05	463.07	271.88	10.758	41.797	1.1542	0.9460	0.6683	8.9130E+09	8.9130E+09
x(FT)	3.1200	27.690	24.180	0.0000	0.0000	25.740	24.180	27.690	24.180	1.5600	0.7800
3	7.2031E-04	3.3886E-05	304.33	270.64	7.1783	41.804	0.7832	0.9462	0.4844	8.9130E+09	8.9130E+09
x(FT)	4.6800	27.690	24.180	0.0000	0.0000	25.740	24.180	27.690	24.180	0.0000	5.4600
4	7.2031E-04	3.6774E-05	304.33	649.99	7.1782	45.324	0.7832	1.0268	0.4974	8.9130E+09	8.9130E+09
x(FT)	4.6800	27.690	24.180	0.0000	0.0000	25.740	24.180	27.690	24.180	0.0000	11.310
Max.	1.2472E-03	3.6774E-05	463.07	651.21	10.758	45.324	1.1542	1.0268	0.6813	8.9130E+09	8.9130E+09
Pile N.	1	4	1	1	1	4	2	4	1	1	1

LOAD CASE : 15
CASE NAME : Service MaxV2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0605608	-1.45491E-03	0.0177925

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-4.87514E-06	6.14991E-05	5.02001E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1737.2	46.551	43.452	-76.019	-1562.1	7358.2
2	1312.9	46.556	34.569	-76.019	-624.63	7359.2
3	1832.8	55.450	34.549	-76.019	-625.45	8294.8
4	2257.1	55.443	43.429	-76.019	-1562.8	8293.8
MINIMUM	1312.9	46.551	34.549	-76.019	-1562.8	7358.2
Pile N.	2	1	3	1	4	1
MAXIMUM	2257.1	55.450	43.452	-76.019	-624.63	8294.8
Pile N.	4	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-3.5242E-05	-3.8183E-05	-7358.2	-1562.1	-43.341	-46.957	-0.9840	-1.0661	0.4123	4.5738E+09	4.5738E+09
x(FT)	28.080	27.690	0.0000	0.0000	26.130	25.740	28.080	27.690	0.0000	24.570	24.570
2	-3.5238E-05	-3.1052E-05	-7359.2	-624.63	-43.335	-38.263	-0.9839	-0.8670	0.3115	4.5738E+09	4.5738E+09
x(FT)	28.080	27.690	0.0000	0.0000	26.130	25.740	28.080	27.690	0.0000	24.180	24.180
3	-4.2339E-05	-3.1048E-05	-8294.8	-625.45	-52.117	-38.259	-1.1822	-0.8669	0.4349	4.5738E+09	4.5738E+09
x(FT)	28.080	27.690	0.0000	0.0000	26.130	25.740	28.080	27.690	0.0000	24.180	24.180
4	-4.2344E-05	-3.8179E-05	-8293.8	-1562.8	-52.122	-46.953	-1.1823	-1.0660	0.5356	4.5738E+09	4.5738E+09
x(FT)	28.080	27.690	0.0000	0.0000	26.130	25.740	28.080	27.690	0.0000	24.570	24.570
Min.	-4.2344E-05	-3.8183E-05	-8294.8	-1562.8	-52.122	-46.957	-1.1823	-1.0661	0.3115	4.5738E+09	4.5738E+09
Pile N.	4	1	3	4	4	1	4	1	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	3.8675E-03	0.013329	1928.7	2401.2	46.476	42.953	5.1923	3.9851	0.5078	8.9130E+09	8.9130E+09
x(FT)	6.6300	0.0000	24.180	16.380	0.0000	0.0000	24.180	24.180	24.180	13.260	1.9500
2	3.8674E-03	0.011925	1928.5	2222.1	46.480	34.122	5.1922	3.0701	0.3837	8.9130E+09	8.9130E+09
x(FT)	6.6300	0.0000	24.180	14.430	0.0000	0.0000	24.180	24.180	24.180	3.5100	12.480
3	5.0430E-03	0.011925	2320.7	2222.6	55.322	34.101	6.1087	3.0685	0.5357	8.9130E+09	8.9130E+09
x(FT)	5.8500	0.0000	24.180	14.430	0.0000	0.0000	24.180	24.180	24.180	6.6300	12.480
4	5.0431E-03	0.013329	2320.9	2401.7	55.316	42.930	6.1087	3.9834	0.6597	8.9130E+09	8.9130E+09
x(FT)	5.8500	0.0000	24.180	16.380	0.0000	0.0000	24.180	24.180	24.180	7.8000	1.9500
Max.	5.0431E-03	0.013329	2320.9	2401.7	55.322	42.953	6.1087	3.9851	0.6597	8.9130E+09	8.9130E+09
Pile N.	4	1	4	4	3	1	3	1	4	1	1

LOAD CASE : 16
CASE NAME : Service MinV2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN

0.0607226 1.66153E-03 -0.0183421

ANGLE ROT. X,RAD ANGLE ROT. Y,RAD ANGLE ROT. Z,RAD
4.54872E-06 -6.77380E-05 -3.87870E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1912.1	-31.847	-39.146	70.929	804.38	-5251.4
2	2240.0	-31.845	-30.830	70.929	-69.054	-5250.9
3	1667.4	-40.152	-30.853	70.929	-70.099	-6125.8
4	1339.5	-40.156	-39.171	70.929	803.39	-6126.4
MINIMUM	1339.5	-40.156	-39.171	70.929	-70.099	-6126.4
Pile N.	4	4	4	1	3	4
MAXIMUM	2240.0	-31.845	-30.830	70.929	804.38	-5250.9
Pile N.	2	2	2	1	1	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-2.4694E-03	-0.013307	-1308.7	-2466.5	-31.813	-38.647	-3.5877	-3.4923	0.4537	4.5738E+09	4.5738E+09
x(FT)	7.4100	0.0000	24.180	14.820	0.0000	0.0000	24.180	24.180	0.0000	24.180	24.180
2	-2.4695E-03	-0.011997	-1308.8	-2360.9	-31.812	-30.380	-3.5878	-2.6363	0.5315	4.5738E+09	4.5738E+09
x(FT)	7.4100	0.0000	24.180	12.870	0.0000	0.0000	24.180	24.180	0.0000	24.960	24.570
3	-3.5352E-03	-0.011997	-1674.4	-2360.3	-40.070	-30.402	-4.4426	-2.6381	0.3957	4.5738E+09	4.5738E+09
x(FT)	6.2400	0.0000	24.180	12.870	0.0000	0.0000	24.180	24.180	0.0000	24.180	24.180
4	-3.5352E-03	-0.013307	-1674.4	-2466.0	-40.073	-38.672	-4.4426	-3.4943	0.3179	4.5738E+09	4.5738E+09
x(FT)	6.2400	0.0000	24.180	14.820	0.0000	0.0000	24.180	24.180	0.0000	24.180	24.180
Min.	-3.5352E-03	-0.013307	-1674.4	-2466.5	-40.073	-38.672	-4.4426	-3.4943	0.3179	4.5738E+09	4.5738E+09
Pile N.	3	1	3	1	4	4	3	4	4	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	2.3946E-05	3.5076E-05	5251.4	804.38	29.427	43.210	0.6686	0.9794	0.5589	8.9130E+09	8.9130E+09
x(FT)	28.080	27.690	0.0000	0.0000	26.130	25.740	28.080	27.690	24.180	1.1700	8.5800
2	2.3949E-05	2.8417E-05	5250.9	67.568	29.430	35.092	0.6687	0.7935	0.6547	8.9130E+09	8.9130E+09
x(FT)	28.080	27.690	0.0000	31.200	26.130	25.740	28.080	27.690	24.180	1.9500	2.7300

3	3.0565E-05	2.8422E-05	6125.8	67.576	37.611	35.097	0.8534	0.7936	0.4874	8.9130E+09	8.9130E+09
x(FT)	28.080	27.690	0.0000	31.200	26.130	25.740	28.080	27.690	24.180	3.1200	0.3900
4	3.0563E-05	3.5080E-05	6126.4	803.39	37.608	43.215	0.8534	0.9795	0.3915	8.9130E+09	8.9130E+09
x(FT)	28.080	27.690	0.0000	0.0000	26.130	25.740	28.080	27.690	24.180	3.1200	5.0700
Max.	3.0565E-05	3.5080E-05	6126.4	804.38	37.611	43.215	0.8534	0.9795	0.6547	8.9130E+09	8.9130E+09
Pile N.	3	4	4	1	3	4	3	4	2	1	1

LOAD CASE : 17
CASE NAME : Service MaxV3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN HORIZONTAL Y,IN HORIZONTAL Z,IN
0.0620599 2.07329E-04 0.0254880

ANGLE ROT. X,RAD ANGLE ROT. Y,RAD ANGLE ROT. Z,RAD
-4.04187E-06 8.84039E-05 7.86628E-06

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1488.6	7.0622	59.210	-63.026	-1901.0	1128.6
2	1422.1	7.0623	51.835	-63.026	-1124.2	1128.6
3	2169.4	14.438	51.791	-63.026	-1125.9	1905.0
4	2235.9	14.438	59.164	-63.026	-1902.6	1905.0
MINIMUM	1422.1	7.0622	51.791	-63.026	-1902.6	1128.6
Pile N.	2	1	3	1	4	1
MAXIMUM	2235.9	14.438	59.210	-63.026	-1124.2	1905.0
Pile N.	4	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-5.3365E-06	-5.2270E-05	-1128.6	-1901.0	-6.5615	-64.310	-0.1490	-1.4595	0.3532	4.5738E+09	4.5738E+09

x(FT)	28.080	27.690	0.0000	0.0000	26.130	25.740	28.080	27.690	0.0000	24.180	24.180	
2	-5.3364E-06	-4.6357E-05	-1128.6	-1124.2	-6.5614	-57.100	-0.1490	-1.2944	0.3375	4.5738E+09	4.5738E+09	
x(FT)	28.080	27.690	0.0000	0.0000	26.130	25.740	28.080	27.690	0.0000	24.570	24.570	
3	-1.1221E-05	-4.6349E-05	-1905.0	-1125.9	-13.838	-57.091	-0.3133	-1.2942	0.5148	4.5738E+09	4.5738E+09	
x(FT)	28.080	27.690	0.0000	0.0000	26.130	25.740	28.080	27.690	0.0000	24.180	24.180	
4	-1.1221E-05	-5.2263E-05	-1905.0	-1902.6	-13.838	-64.302	-0.3133	-1.4593	0.5306	4.5738E+09	4.5738E+09	
x(FT)	28.080	27.690	0.0000	0.0000	26.130	25.740	28.080	27.690	0.0000	24.570	24.180	
Min.	-1.1221E-05	-5.2270E-05	-1905.0	-1902.6	-13.838	-64.310	-0.3133	-1.4595	0.3375	4.5738E+09	4.5738E+09	
Pile N.	3	1	3	4	3	1	3	1	2	1	1	

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	5.7625E-04	0.018644	291.95	3376.9	7.0518	58.511	0.7897	5.3933	0.4351	8.9130E+09	8.9130E+09
x(FT)	7.0200	0.0000	24.180	15.990	0.0000	0.0000	24.180	24.180	24.180	3.1200	0.0000
2	5.7624E-04	0.017480	291.95	3230.5	7.0518	51.179	0.7896	4.6338	0.4157	8.9130E+09	8.9130E+09
x(FT)	7.0200	0.0000	24.180	14.820	0.0000	0.0000	24.180	24.180	24.180	0.3900	4.6800
3	1.6114E-03	0.017480	617.01	3231.5	14.384	51.136	1.5493	4.6304	0.6341	8.9130E+09	8.9130E+09
x(FT)	3.5100	0.0000	24.180	14.820	0.0000	0.0000	24.180	24.180	24.180	4.2900	17.940
4	1.6114E-03	0.018644	617.01	3377.9	14.384	58.465	1.5493	5.3898	0.6535	8.9130E+09	8.9130E+09
x(FT)	3.5100	0.0000	24.180	15.990	0.0000	0.0000	24.180	24.180	24.180	3.5100	9.3600
Max.	1.6114E-03	0.018644	617.01	3377.9	14.384	58.511	1.5493	5.3933	0.6535	8.9130E+09	8.9130E+09
Pile N.	3	1	3	4	3	1	3	1	4	1	1

LOAD CASE : 18
CASE NAME : Service MinV3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0622643	5.47784E-05	-0.0255279

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
2.43663E-06	-9.27823E-05	8.46367E-06

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2262.9	12.722	-52.698	37.995	1007.9	1753.7
2	2191.4	12.723	-48.256	37.995	539.54	1753.7
3	1407.1	8.2775	-48.301	37.995	537.63	1285.8
4	1478.6	8.2773	-52.745	37.995	1006.0	1285.8
MINIMUM	1407.1	8.2773	-52.745	37.995	537.63	1285.8
Pile N.	3	4	4	1	3	3
MAXIMUM	2262.9	12.723	-48.256	37.995	1007.9	1753.7
Pile N.	1	2	2	1	1	1

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-9.8309E-06	-0.018085	-1753.7	-3363.8	-12.116	-52.020	-0.2745	-4.6892	0.5370	4.5738E+09	4.5738E+09
x(FT)	28.080	0.0000	0.0000	14.820	26.130	0.0000	28.080	24.180	0.0000	25.350	24.180
2	-9.8308E-06	-0.017383	-1753.7	-3298.0	-12.116	-47.603	-0.2745	-4.2316	0.5200	4.5738E+09	4.5738E+09
x(FT)	28.080	0.0000	0.0000	14.040	26.130	0.0000	28.080	24.180	0.0000	24.180	24.180
3	-6.2827E-06	-0.017383	-1285.8	-3296.9	-7.7287	-47.648	-0.1754	-4.2351	0.3339	4.5738E+09	4.5738E+09
x(FT)	28.080	0.0000	0.0000	14.040	26.130	0.0000	28.080	24.180	0.0000	24.570	24.180
4	-6.2828E-06	-0.018085	-1285.8	-3362.7	-7.7289	-52.067	-0.1754	-4.6928	0.3509	4.5738E+09	4.5738E+09
x(FT)	28.080	0.0000	0.0000	14.820	26.130	0.0000	28.080	24.180	0.0000	24.960	24.180
Min.	-9.8309E-06	-0.018085	-1753.7	-3363.8	-12.116	-52.067	-0.2745	-4.6928	0.3339	4.5738E+09	4.5738E+09
Pile N.	1	1	1	1	1	4	1	4	3	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	1.3231E-03	4.7319E-05	540.00	1007.9	12.681	58.302	1.3775	1.3212	0.6614	8.9130E+09	8.9130E+09
x(FT)	4.2900	27.690	24.180	0.0000	0.0000	25.740	24.180	27.690	24.180	4.6800	17.550
2	1.3231E-03	4.3754E-05	539.99	539.54	12.682	53.956	1.3775	1.2217	0.6405	8.9130E+09	8.9130E+09
x(FT)	4.2900	27.690	24.180	0.0000	0.0000	25.740	24.180	27.690	24.180	5.4600	0.3900
3	7.0740E-04	4.3763E-05	344.01	537.63	8.2622	53.966	0.9195	1.2219	0.4113	8.9130E+09	8.9130E+09
x(FT)	6.2400	27.690	24.180	0.0000	0.0000	25.740	24.180	27.690	24.180	1.9500	11.700
4	7.0741E-04	4.7327E-05	344.02	1006.0	8.2620	58.312	0.9195	1.3215	0.4322	8.9130E+09	8.9130E+09
x(FT)	6.2400	27.690	24.180	0.0000	0.0000	25.740	24.180	27.690	24.180	2.7300	12.870
Max.	1.3231E-03	4.7327E-05	540.00	1007.9	12.682	58.312	1.3775	1.3215	0.6614	8.9130E+09	8.9130E+09
Pile N.	1	4	1	1	2	4	1	4	1	1	1

LOAD CASE : 19
CASE NAME : Service MaxT
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0614466	3.43228E-03	-0.0190353

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
1.07430E-05	-7.01497E-05	-3.60554E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1955.1	-11.693	-46.298	167.52	1439.4	-2996.1
2	2259.9	-11.695	-26.677	167.52	-624.24	-2995.7
3	1666.9	-31.305	-26.699	167.52	-625.40	-5060.8
4	1362.1	-31.307	-46.327	167.52	1438.4	-5061.3
MINIMUM	1362.1	-31.307	-46.327	167.52	-625.40	-5061.3
Pile N.	4	4	4	1	3	4
MAXIMUM	2259.9	-11.693	-26.677	167.52	1439.4	-2995.7
Pile N.	2	1	2	1	1	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-4.6965E-04	-0.014690	-441.31	-2665.7	-13.079	-45.747	-1.4908	-4.2096	0.4639	4.5738E+09	4.5738E+09
x(FT)	13.650	0.0000	24.570	15.990	7.0200	0.0000	24.180	24.180	0.0000	24.180	24.180
2	-4.6976E-04	-0.011596	-441.40	-2421.7	-13.080	-26.241	-1.4910	-2.1894	0.5363	4.5738E+09	4.5738E+09
x(FT)	13.650	0.0000	24.570	11.700	7.0200	0.0000	24.180	24.180	0.0000	24.180	24.180
3	-2.5069E-03	-0.011596	-1291.4	-2421.1	-31.263	-26.264	-3.5099	-2.1913	0.3956	4.5738E+09	4.5738E+09
x(FT)	7.0200	0.0000	24.180	11.700	0.0000	0.0000	24.180	24.180	0.0000	24.180	24.180
4	-2.5068E-03	-0.014690	-1291.3	-2665.1	-31.265	-45.776	-3.5098	-4.2118	0.3232	4.5738E+09	4.5738E+09

x(FT)	7.0200	0.0000	24.180	15.990	0.0000	0.0000	24.180	24.180	0.0000	24.180	25.350	
Min.	-2.5069E-03	-0.014690	-1291.4	-2665.7	-31.265	-45.776	-3.5099	-4.2118	0.3232	4.5738E+09	4.5738E+09	
Pile N.	3	1	3	1	4	4	3	4	4	1	1	

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	1.9506E-03	4.0942E-05	2996.1	1439.4	9.8954	50.378	0.2240	1.1432	0.5715	8.9130E+09	8.9130E+09
x(FT)	0.0000	27.690	0.0000	0.0000	26.520	25.740	28.470	27.690	24.180	5.4600	2.7300
2	1.9506E-03	2.5444E-05	2995.7	60.256	9.8978	31.208	0.2240	0.7104	0.6606	8.9130E+09	8.9130E+09
x(FT)	0.0000	27.300	0.0000	31.200	26.520	25.740	28.470	27.300	24.180	4.2900	9.7500
3	2.3613E-05	2.5447E-05	5060.8	60.265	29.028	31.214	0.6593	0.7105	0.4872	8.9130E+09	8.9130E+09
x(FT)	28.080	27.300	0.0000	31.200	26.130	25.740	28.080	27.300	24.180	0.7800	2.7300
4	2.3611E-05	4.0946E-05	5061.3	1438.4	29.025	50.383	0.6593	1.1433	0.3981	8.9130E+09	8.9130E+09
x(FT)	28.080	27.690	0.0000	0.0000	26.130	25.740	28.080	27.690	24.180	3.1200	4.2900	
Max.	1.9506E-03	4.0946E-05	5061.3	1439.4	29.028	50.383	0.6593	1.1433	0.6606	8.9130E+09	8.9130E+09	
Pile N.	1	4	4	1	3	4	3	4	2	1	1	

LOAD CASE : 20
CASE NAME : Service MinT
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0613870	-3.05230E-03	0.0176493

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-1.15491E-05	6.09496E-05	4.75961E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1752.8	27.210	49.295	-180.09	-2204.1	5194.9
2	1350.5	27.211	28.226	-180.09	15.773	5195.6
3	1865.7	48.292	28.208	-180.09	14.929	7413.9

4	2268.0	48.287	49.271	-180.09	-2204.8	7413.0
MINIMUM	1350.5	27.210	28.208	-180.09	-2204.8	5194.9
Pile N.	2	1	3	1	4	1
MAXIMUM	2268.0	48.292	49.295	-180.09	15.773	7413.9
Pile N.	4	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-7.1729E-04	-4.2836E-05	-5194.9	-2204.1	-24.404	-52.628	-0.5562	-1.1961	0.4159	4.5738E+09	4.5738E+09
x(FT)	0.0000	27.690	0.0000	0.0000	26.130	25.740	28.080	27.690	0.0000	24.180	24.180
2	-7.1729E-04	-2.5940E-05	-5195.6	-61.648	-24.400	-32.027	-0.5561	-0.7243	0.3205	4.5738E+09	4.5738E+09
x(FT)	0.0000	27.690	0.0000	31.200	26.130	25.740	28.080	27.690	0.0000	24.570	24.180
3	-3.6730E-05	-2.5936E-05	-7413.9	-61.642	-45.193	-32.022	-1.0256	-0.7242	0.4427	4.5738E+09	4.5738E+09
x(FT)	28.080	27.690	0.0000	31.200	26.130	25.740	28.080	27.690	0.0000	24.960	24.180
4	-3.6734E-05	-4.2833E-05	-7413.0	-2204.8	-45.197	-52.624	-1.0257	-1.1960	0.5382	4.5738E+09	4.5738E+09
x(FT)	28.080	27.690	0.0000	0.0000	26.130	25.740	28.080	27.690	0.0000	24.180	24.570
Min.	-7.1729E-04	-4.2836E-05	-7413.9	-2204.8	-45.197	-52.628	-1.0257	-1.1961	0.3205	4.5738E+09	4.5738E+09
Pile N.	1	1	3	4	4	1	4	1	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	1.6696E-03	0.014193	1084.4	2541.5	27.306	48.763	3.1802	4.5911	0.5123	8.9130E+09	8.9130E+09
x(FT)	9.7500	0.0000	24.570	17.940	1.5600	0.0000	24.180	24.180	24.180	5.0700	0.0000
2	1.6694E-03	0.010866	1084.3	2127.0	27.307	27.818	3.1799	2.4214	0.3947	8.9130E+09	8.9130E+09
x(FT)	9.7500	0.0000	24.570	13.260	1.5600	0.0000	24.180	24.180	24.180	1.1700	9.3600
3	4.2092E-03	0.010866	2011.8	2127.4	48.197	27.800	5.3510	2.4199	0.5453	8.9130E+09	8.9130E+09
x(FT)	6.2400	0.0000	24.180	13.260	0.0000	0.0000	24.180	24.180	24.180	12.480	12.090
4	4.2093E-03	0.014193	2011.9	2541.9	48.192	48.739	5.3511	4.5893	0.6629	8.9130E+09	8.9130E+09
x(FT)	6.2400	0.0000	24.180	17.940	0.0000	0.0000	24.180	24.180	24.180	2.7300	9.3600
Max.	4.2093E-03	0.014193	2011.9	2541.9	48.197	48.763	5.3511	4.5911	0.6629	8.9130E+09	8.9130E+09
Pile N.	4	1	4	4	3	1	4	1	4	1	1

LOAD CASE : 21
CASE NAME : Service MaxM2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0620599	2.07329E-04	0.0254880
ANGLE ROT. X,RAD	**ANGLE ROT. Y,RAD**	**ANGLE ROT. Z,RAD**
-4.04187E-06	8.84039E-05	7.86628E-06

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1488.6	7.0622	59.210	-63.026	-1901.0	1128.6
2	1422.1	7.0623	51.835	-63.026	-1124.2	1128.6
3	2169.4	14.438	51.791	-63.026	-1125.9	1905.0
4	2235.9	14.438	59.164	-63.026	-1902.6	1905.0
MINIMUM	1422.1	7.0622	51.791	-63.026	-1902.6	1128.6
Pile N.	2	1	3	1	4	1
MAXIMUM	2235.9	14.438	59.210	-63.026	-1124.2	1905.0
Pile N.	4	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-5.3365E-06	-5.2270E-05	-1128.6	-1901.0	-6.5615	-64.310	-0.1490	-1.4595	0.3532	4.5738E+09	4.5738E+09
x(FT)	28.080	27.690	0.0000	0.0000	26.130	25.740	28.080	27.690	0.0000	24.180	24.180
2	-5.3364E-06	-4.6357E-05	-1128.6	-1124.2	-6.5614	-57.100	-0.1490	-1.2944	0.3375	4.5738E+09	4.5738E+09
x(FT)	28.080	27.690	0.0000	0.0000	26.130	25.740	28.080	27.690	0.0000	24.180	24.570
3	-1.1221E-05	-4.6349E-05	-1905.0	-1125.9	-13.838	-57.091	-0.3133	-1.2942	0.5148	4.5738E+09	4.5738E+09
x(FT)	28.080	27.690	0.0000	0.0000	26.130	25.740	28.080	27.690	0.0000	24.180	24.180
4	-1.1221E-05	-5.2263E-05	-1905.0	-1902.6	-13.838	-64.302	-0.3133	-1.4593	0.5306	4.5738E+09	4.5738E+09
x(FT)	28.080	27.690	0.0000	0.0000	26.130	25.740	28.080	27.690	0.0000	24.180	24.180
Min.	-1.1221E-05	-5.2270E-05	-1905.0	-1902.6	-13.838	-64.310	-0.3133	-1.4595	0.3375	4.5738E+09	4.5738E+09
Pile N.	3	1	3	4	3	1	3	1	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL.	DISPL.	MOMENT	MOMENT	SHEAR	SHEAR	SOIL REACT	SOIL REACT	TOTAL	FLEX. RIG.	FLEX. RIG.

	y-DIR IN	z-DIR IN	z-DIR KIP-IN	y-DIR KIP-IN	y-DIR KIP	z-DIR KIP	y-DIR KIP/IN	z-DIR KIP/IN	STRESS KIP/IN**2	z-DIR KIP-IN**2	y-DIR KIP-IN**2
1	5.7625E-04	0.018644	291.95	3376.9	7.0518	58.511	0.7897	5.3933	0.4351	8.9130E+09	8.9130E+09
x(FT)	7.0200	0.0000	24.180	15.990	0.0000	0.0000	24.180	24.180	24.180	1.9500	7.0200
2	5.7624E-04	0.017480	291.95	3230.5	7.0518	51.179	0.7896	4.6338	0.4157	8.9130E+09	8.9130E+09
x(FT)	7.0200	0.0000	24.180	14.820	0.0000	0.0000	24.180	24.180	24.180	3.5100	0.0000
3	1.6114E-03	0.017480	617.01	3231.5	14.384	51.136	1.5493	4.6304	0.6341	8.9130E+09	8.9130E+09
x(FT)	3.5100	0.0000	24.180	14.820	0.0000	0.0000	24.180	24.180	24.180	4.2900	4.2900
4	1.6114E-03	0.018644	617.01	3377.9	14.384	58.465	1.5493	5.3898	0.6535	8.9130E+09	8.9130E+09
x(FT)	3.5100	0.0000	24.180	15.990	0.0000	0.0000	24.180	24.180	24.180	4.6800	5.0700
Max.	1.6114E-03	0.018644	617.01	3377.9	14.384	58.511	1.5493	5.3933	0.6535	8.9130E+09	8.9130E+09
Pile N.	3	1	3	4	3	1	3	1	4	1	1

LOAD CASE : 22
CASE NAME : Service MinM2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0622643	5.47065E-05	-0.0255279

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
2.43663E-06	-9.27823E-05	8.46405E-06

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2262.9	12.722	-52.698	37.995	1007.9	1753.7
2	2191.4	12.723	-48.256	37.995	539.54	1753.7
3	1407.1	8.2775	-48.301	37.995	537.63	1285.8
4	1478.6	8.2773	-52.745	37.995	1006.0	1285.8
MINIMUM	1407.1	8.2773	-52.745	37.995	537.63	1285.8
Pile N.	3	4	4	1	3	3
MAXIMUM	2262.9	12.723	-48.256	37.995	1007.9	1753.7
Pile N.	1	2	2	1	1	1

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-9.8309E-06	-0.018085	-1753.7	-3363.8	-12.116	-52.020	-0.2745	-4.6892	0.5370	4.5738E+09	4.5738E+09
x(FT)	28.080	0.0000	0.0000	14.820	26.130	0.0000	28.080	24.180	0.0000	24.180	24.180
2	-9.8308E-06	-0.017383	-1753.7	-3298.0	-12.116	-47.603	-0.2745	-4.2316	0.5200	4.5738E+09	4.5738E+09
x(FT)	28.080	0.0000	0.0000	14.040	26.130	0.0000	28.080	24.180	0.0000	24.570	24.180
3	-6.2827E-06	-0.017383	-1285.8	-3296.9	-7.7287	-47.648	-0.1754	-4.2351	0.3339	4.5738E+09	4.5738E+09
x(FT)	28.080	0.0000	0.0000	14.040	26.130	0.0000	28.080	24.180	0.0000	24.960	24.180
4	-6.2828E-06	-0.018085	-1285.8	-3362.7	-7.7289	-52.067	-0.1754	-4.6928	0.3509	4.5738E+09	4.5738E+09
x(FT)	28.080	0.0000	0.0000	14.820	26.130	0.0000	28.080	24.180	0.0000	24.180	24.180
Min.	-9.8309E-06	-0.018085	-1753.7	-3363.8	-12.116	-52.067	-0.2745	-4.6928	0.3339	4.5738E+09	4.5738E+09
Pile N.	1	1	1	1	1	4	1	4	3	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	1.3230E-03	4.7319E-05	540.00	1007.9	12.681	58.302	1.3775	1.3212	0.6614	8.9130E+09	8.9130E+09
x(FT)	4.2900	27.690	24.180	0.0000	0.0000	25.740	24.180	27.690	24.180	0.0000	0.3900
2	1.3230E-03	4.3754E-05	539.99	539.54	12.682	53.956	1.3775	1.2217	0.6405	8.9130E+09	8.9130E+09
x(FT)	4.2900	27.690	24.180	0.0000	0.0000	25.740	24.180	27.690	24.180	7.8000	3.1200
3	7.0739E-04	4.3763E-05	344.01	537.63	8.2622	53.966	0.9195	1.2219	0.4113	8.9130E+09	8.9130E+09
x(FT)	6.2400	27.690	24.180	0.0000	0.0000	25.740	24.180	27.690	24.180	14.040	2.3400
4	7.0739E-04	4.7327E-05	344.02	1006.0	8.2620	58.312	0.9195	1.3215	0.4322	8.9130E+09	8.9130E+09
x(FT)	6.2400	27.690	24.180	0.0000	0.0000	25.740	24.180	27.690	24.180	4.2900	5.4600
Max.	1.3230E-03	4.7327E-05	540.00	1007.9	12.682	58.312	1.3775	1.3215	0.6614	8.9130E+09	8.9130E+09
Pile N.	1	4	1	1	2	4	1	4	1	1	1

LOAD CASE : 23
CASE NAME : Service MaxM3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0601860	-6.23152E-03	0.0181251

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-5.30217E-06	6.26315E-05	6.39763E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1779.7	32.411	44.590	-82.678	-1626.6	6544.4
2	1238.9	32.410	34.933	-82.678	-606.93	6545.7
3	1768.3	42.090	34.911	-82.678	-607.79	7563.2
4	2309.1	42.088	44.566	-82.678	-1627.4	7561.9
MINIMUM	1238.9	32.410	34.911	-82.678	-1627.4	6544.4
Pile N.	2	2	3	1	4	1
MAXIMUM	2309.1	42.090	44.590	-82.678	-606.93	7563.2
Pile N.	4	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-1.6210E-03	-3.9157E-05	-6544.4	-1626.6	-28.698	-48.153	-0.6549	-1.0934	0.4223	4.5738E+09	4.5738E+09
x(FT)	0.0000	27.690	0.0000	0.0000	26.130	25.740	28.080	27.690	0.0000	24.180	24.180
2	-1.6210E-03	-3.1403E-05	-6545.7	-606.93	-28.690	-38.698	-0.6547	-0.8768	0.2940	4.5738E+09	4.5738E+09
x(FT)	0.0000	27.690	0.0000	0.0000	26.130	25.740	28.080	27.690	0.0000	24.180	24.180
3	-9.3996E-05	-3.1399E-05	-7563.2	-607.79	-38.241	-38.694	-0.8704	-0.8767	0.4196	4.5738E+09	4.5738E+09
x(FT)	0.0000	27.690	0.0000	0.0000	26.130	25.740	28.080	27.690	0.0000	24.180	24.180
4	-9.3996E-05	-3.9154E-05	-7561.9	-1627.4	-38.250	-48.149	-0.8706	-1.0933	0.5480	4.5738E+09	4.5738E+09
x(FT)	0.0000	27.690	0.0000	0.0000	26.130	25.740	28.080	27.690	0.0000	24.180	24.570
Min.	-1.6210E-03	-3.9157E-05	-7563.2	-1627.4	-38.250	-48.153	-0.8706	-1.0934	0.2940	4.5738E+09	4.5738E+09
Pile N.	1	1	3	4	4	1	4	1	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	1.8244E-03	0.013628	1280.2	2453.7	32.818	44.079	3.8459	4.0933	0.5202	8.9130E+09	8.9130E+09
x(FT)	10.530	0.0000	24.570	16.770	2.3400	0.0000	24.180	24.180	24.180	0.0000	21.060
2	1.8241E-03	0.012101	1279.9	2258.8	32.817	34.479	3.8453	3.0984	0.3621	8.9130E+09	8.9130E+09
x(FT)	10.530	0.0000	24.570	14.430	2.3400	0.0000	24.180	24.180	24.180	1.9500	8.1900
3	2.8407E-03	0.012101	1698.7	2259.3	42.096	34.457	4.8426	3.0967	0.5169	8.9130E+09	8.9130E+09
x(FT)	8.9700	0.0000	24.180	14.430	0.0000	0.0000	24.180	24.180	24.180	3.9000	0.0000

4	2.8410E-03	0.013628	1699.0	2454.1	42.095	44.055	4.8430	4.0915	0.6750	8.9130E+09	8.9130E+09
x(FT)	8.9700	0.0000	24.180	16.770	0.0000	0.0000	24.180	24.180	24.180	7.0200	3.9000
Max.	2.8410E-03	0.013628	1699.0	2454.1	42.096	44.079	4.8430	4.0933	0.6750	8.9130E+09	8.9130E+09
Pile N.	4	1	4	4	3	1	4	1	4	1	1

LOAD CASE : 24
CASE NAME : Service MinM3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0608419	6.34362E-03	-0.0184468

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
4.69189E-06	-6.80829E-05	-5.31058E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1856.6	-19.217	-39.529	73.162	827.47	-4623.1
2	2305.5	-19.220	-30.947	73.162	-73.261	-4622.2
3	1729.9	-27.782	-30.969	73.162	-74.317	-5524.9
4	1281.0	-27.781	-39.555	73.162	826.47	-5525.8
MINIMUM	1281.0	-27.782	-39.555	73.162	-74.317	-5525.8
Pile N.	4	3	4	1	3	4
MAXIMUM	2305.5	-19.217	-30.947	73.162	827.47	-4622.2
Pile N.	2	1	2	1	1	2

* MINIMUM VALUES AND LOCATIONS *

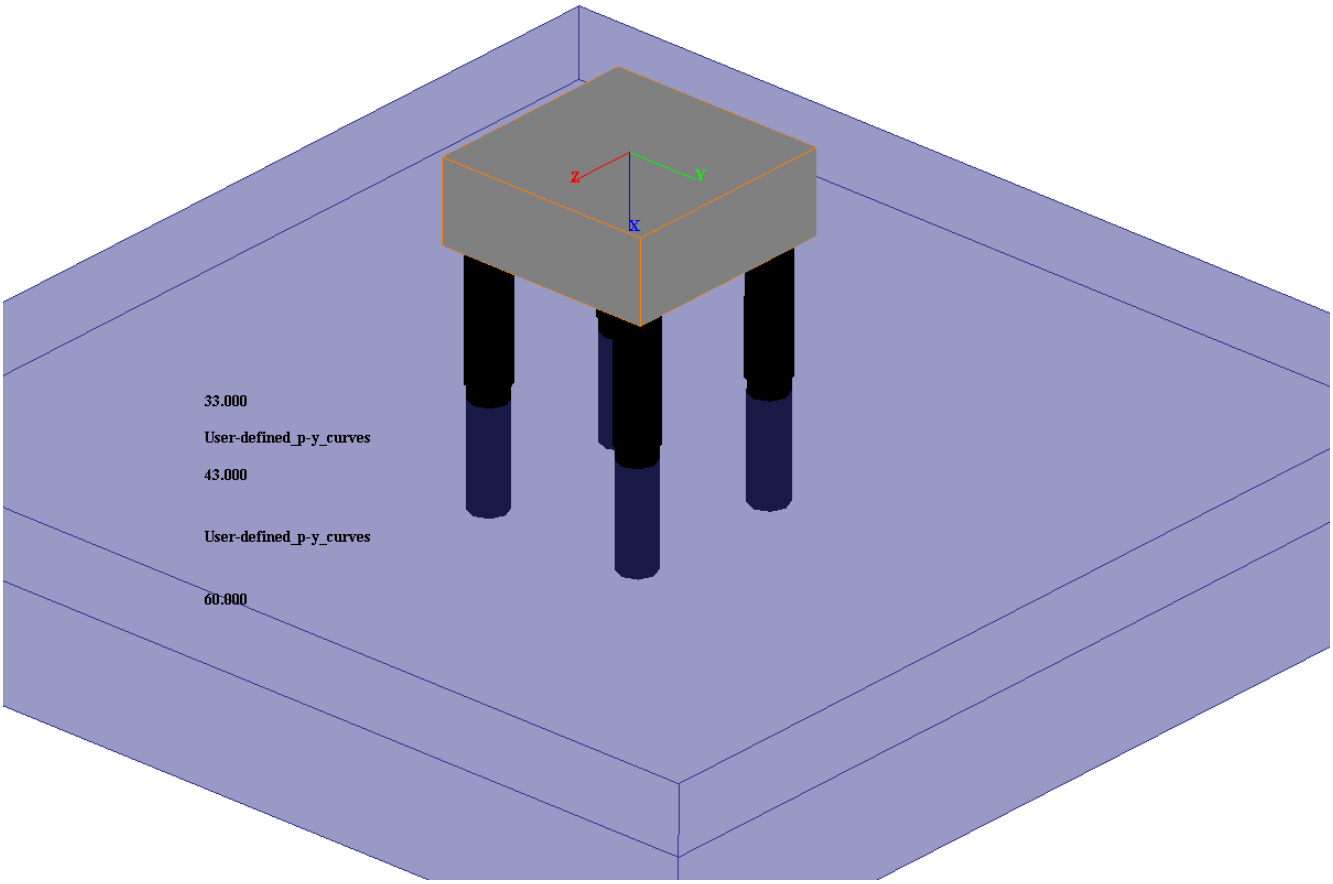
PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-8.3982E-04	-0.013403	-734.98	-2482.1	-20.746	-39.026	-2.4010	-3.5289	0.4406	4.5738E+09	4.5738E+09
x(FT)	12.870	0.0000	24.570	14.820	5.8500	0.0000	24.180	24.180	0.0000	24.570	24.180

2	-8.4005E-04	-0.012052	-735.18	-2372.7	-20.748	-30.494	-2.4015	-2.6456	0.5471	4.5738E+09	4.5738E+09
x(FT)	12.870	0.0000	24.570	12.870	5.8500	0.0000	24.180	24.180	0.0000	24.570	24.180
3	-1.6000E-03	-0.012052	-1100.0	-2372.1	-28.048	-30.517	-3.2828	-2.6475	0.4105	4.5738E+09	4.5738E+09
x(FT)	10.530	0.0000	24.570	12.870	2.3400	0.0000	24.180	24.180	0.0000	24.180	24.180
4	-1.5997E-03	-0.013403	-1099.9	-2481.5	-28.047	-39.052	-3.2824	-3.5309	0.3040	4.5738E+09	4.5738E+09
x(FT)	10.530	0.0000	24.570	14.820	2.3400	0.0000	24.180	24.180	0.0000	24.960	24.180
Min.	-1.6000E-03	-0.013403	-1100.0	-2482.1	-28.048	-39.052	-3.2828	-3.5309	0.3040	4.5738E+09	4.5738E+09
Pile N.	3	1	3	1	3	4	3	4	4	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
******	**********	**********	**********	**********	**********	**********	**********	**********	**********	**********	**********
1	2.5584E-03	3.5400E-05	4623.1	827.47	16.463	43.608	0.3725	0.9884	0.5427	8.9130E+09	8.9130E+09
x(FT)	0.0000	27.690	0.0000	0.0000	26.520	25.740	28.080	27.690	24.180	6.2400	8.5800
2	2.5584E-03	2.8531E-05	4622.2	67.841	16.468	35.233	0.3726	0.7966	0.6739	8.9130E+09	8.9130E+09
x(FT)	0.0000	27.690	0.0000	31.200	26.520	25.740	28.080	27.690	24.180	0.7800	2.7300
3	1.2071E-03	2.8536E-05	5524.9	67.849	24.687	35.238	0.5631	0.7968	0.5057	8.9130E+09	8.9130E+09
x(FT)	0.0000	27.690	0.0000	31.200	26.130	25.740	28.080	27.690	24.180	11.310	2.3400
4	1.2071E-03	3.5404E-05	5525.8	826.47	24.681	43.613	0.5630	0.9886	0.3744	8.9130E+09	8.9130E+09
x(FT)	0.0000	27.690	0.0000	0.0000	26.130	25.740	28.080	27.690	24.180	1.1700	1.1700
Max.	2.5584E-03	3.5404E-05	5525.8	827.47	24.687	43.613	0.5631	0.9886	0.6739	8.9130E+09	8.9130E+09
Pile N.	1	4	4	1	3	4	3	4	2	1	1

Pier 3
Weak Rock p-y parameters (Upper Bound)
No Scour Condition
40 #11 Bar Reinforcement
Strength Condition: Load Cases 1 through 12
Service Condition: Load cases 13 through 24
0.75" thick casing reduced to 0.625" after 1/8" of corrosion



Pier 3 Loading Schedule provided by HNTB on 8/14/2020
Converted to kip-in

,000	PIER	ID	Station	Output	Case	P	V2	V3	T	M2	M3
						Vertical, x-dir	horizontal, Fy	horizontal, Fz	Mx	My	Mz
	-	-	ft	-	-	kip	Kip	Kip	Kip-in	Kip-in	Kip-in
1	PileCap 3	5145	0	STRENGTH	Max P	5879	-1136	-186	-1154	-56436	-171297
2	PileCap 3	5145	0	STRENGTH	Min P	10505	49	48	-2456	29167	22408
3	PileCap 3	5145	0	STRENGTH	Max V2	8811	1576	139	622	-19776	605978
4	PileCap 3	5145	0	STRENGTH	Min V2	6159	-1494	-109	-4195	15860	-532927
5	PileCap 3	5145	0	STRENGTH	Max V3	6159	1193	379	-1570	189120	224559
6	PileCap 3	5145	0	STRENGTH	Min V3	8811	-1010	-291	-1170	-138645	-43384
7	PileCap 3	5145	0	STRENGTH	Max T	6878	-1128	-106	15899	18517	-176201
8	PileCap 3	5145	0	STRENGTH	Min T	9534	1220	136	-19841	-22550	233222
9	PileCap 3	5145	0	STRENGTH	Max M2	6159	1193	379	-1570	189120	224559
10	PileCap 3	5145	0	STRENGTH	Min M2	9695	-1118	-282	686	-146333	-178151
11	PileCap 3	5145	0	STRENGTH	Max M3	8811	1576	139	622	-19776	605978
12	PileCap 3	5145	0	STRENGTH	Min M3	6159	-1494	-109	-4195	15860	-532927
13	PileCap 3	5145	0	SERVICE	Max P	6768	34	-29	2312	-43478	28124
14	PileCap 3	5145	0	SERVICE	Min P	8127	49	60	-6154	40521	27473
15	PileCap 3	5145	0	SERVICE	Max V2	7277	238	75	-3997	54175	188379
16	PileCap 3	5145	0	SERVICE	Min V2	7291	-155	-51	-474	-64197	-129741
17	PileCap 3	5145	0	SERVICE	Max V3	7472	50	161	-6899	130154	39830
18	PileCap 3	5145	0	SERVICE	Min V3	7465	64	-113	3968	-118140	41068
19	PileCap 3	5145	0	SERVICE	Max T	7442	45	-42	13519	-55699	32156
20	PileCap 3	5145	0	SERVICE	Min T	7453	42	74	-17444	53185	25517
21	PileCap 3	5145	0	SERVICE	Max M2	7472	50	161	-6899	130154	39830
22	PileCap 3	5145	0	SERVICE	Min M2	7465	64	-113	3968	-118140	41068
23	PileCap 3	5145	0	SERVICE	Max M3	7232	185	72	-3300	51470	221857
24	PileCap 3	5145	0	SERVICE	Min M3	7313	-107	-50	-822	-63507	-165109

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

                GROUP for Windows, Version 2016.10.13

                 Serial Number : 364300562

                  Analysis of A Group of Piles
                Subjected to Axial and Lateral Loading

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

          Date:  August 31, 2020     Time:  14:38:04



            *****     COMPUTATION RESULTS     *****


Pier 3



            *****     LOAD CASES RESULTS      *****


LOAD CASE :     1
CASE NAME : Strength MaxP
LOAD TYPE : Dead, DL


* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *


       VERTICAL ,IN      HORIZONTAL Y,IN     HORIZONTAL Z,IN
          0.0505363         -0.0465069         -0.0136822

     ANGLE ROT. X,RAD    ANGLE ROT. Y,RAD    ANGLE ROT. Z,RAD
       -1.11457E-06       -3.22451E-05       -2.43728E-06
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* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1593.8	-284.91	-45.516	-16.882	3158.2	-2.9528E+04
2	1614.1	-284.91	-47.474	-16.882	3362.0	-2.9528E+04
3	1345.7	-283.09	-47.484	-16.882	3361.8	-2.9344E+04
4	1325.4	-283.09	-45.526	-16.882	3158.1	-2.9344E+04
MINIMUM	1325.4	-284.91	-47.484	-16.882	3158.1	-2.9528E+04
Pile N.	4	1	3	1	4	1
MAXIMUM	1614.1	-283.09	-45.516	-16.882	3362.0	-2.9344E+04
Pile N.	2	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-0.046872	-0.010813	-1.0579E+04	-1805.1	-283.07	-45.091	-23.262	-3.2806	0.3782	4.5476E+09	4.5738E+09
x(FT)	0.0000	0.0000	26.240	20.090	0.0000	0.0000	26.240	26.240	0.0000	26.240	26.240
2	-0.046872	-0.011134	-1.0579E+04	-1864.5	-283.07	-47.036	-23.262	-3.4407	0.3830	4.5476E+09	4.5738E+09
x(FT)	0.0000	0.0000	26.240	20.500	0.0000	0.0000	26.240	26.240	0.0000	26.240	27.060
3	-0.046551	-0.011134	-1.0511E+04	-1864.4	-281.26	-47.046	-23.115	-3.4414	0.3193	4.5478E+09	4.5738E+09
x(FT)	0.0000	0.0000	26.240	20.500	0.0000	0.0000	26.240	26.240	0.0000	26.240	26.240
4	-0.046551	-0.010813	-1.0511E+04	-1805.0	-281.27	-45.100	-23.115	-3.2813	0.3145	4.5478E+09	4.5738E+09
x(FT)	0.0000	0.0000	26.240	20.090	0.0000	0.0000	26.240	26.240	0.0000	26.240	26.650
Min.	-0.046872	-0.011134	-1.0579E+04	-1864.5	-283.07	-47.046	-23.262	-3.4414	0.3145	4.5476E+09	4.5738E+09
Pile N.	1	2	1	2	1	3	1	3	4	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	1.9338E-04	3.0577E-05	2.9528E+04	3158.2	237.59	37.788	5.3996	0.8538	0.4659	8.9130E+09	8.9130E+09
x(FT)	29.930	29.520	0.0000	0.0000	27.880	27.880	29.930	29.520	26.240	6.1500	11.890
2	1.9338E-04	3.1885E-05	2.9528E+04	3362.0	237.59	39.423	5.3996	0.8903	0.4718	8.9130E+09	8.9130E+09
x(FT)	29.930	29.520	0.0000	0.0000	27.880	27.880	29.930	29.520	26.240	7.7900	10.660
3	1.9212E-04	3.1886E-05	2.9344E+04	3361.8	236.04	39.425	5.3645	0.8903	0.3933	8.9130E+09	8.9130E+09
x(FT)	29.930	29.520	0.0000	0.0000	27.880	27.880	29.930	29.520	26.240	10.660	2.8700
4	1.9212E-04	3.0578E-05	2.9344E+04	3158.1	236.04	37.790	5.3645	0.8538	0.3874	8.9130E+09	8.9130E+09
x(FT)	29.930	29.520	0.0000	0.0000	27.880	27.880	29.930	29.520	26.240	12.300	8.6100
Max.	1.9338E-04	3.1886E-05	2.9528E+04	3362.0	237.59	39.425	5.3996	0.8903	0.4718	8.9130E+09	8.9130E+09

Pile N. 1 3 1 2 1 3 1 3 2 1 1

LOAD CASE : 2
CASE NAME : Strength MinP
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0905567	9.02309E-04	4.59247E-03

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-2.29092E-06	1.39570E-05	5.88392E-06

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2592.7	10.238	14.012	-34.699	-776.94	1352.4
2	2543.7	10.239	9.9891	-34.699	-358.27	1352.4
3	2659.8	14.262	9.9880	-34.699	-358.32	1771.0
4	2708.8	14.261	14.011	-34.699	-776.98	1771.0
MINIMUM	2543.7	10.238	9.9880	-34.699	-776.98	1352.4
Pile N.	2	1	3	1	4	1
MAXIMUM	2708.8	14.262	14.012	-34.699	-358.27	1771.0
Pile N.	4	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-7.0404E-06	-9.4408E-06	-1352.4	-776.94	-8.5879	-11.615	-0.1966	-0.2636	0.6152	4.5738E+09	4.5738E+09
x(FT)	29.930	29.520	0.0000	0.0000	27.880	27.880	29.930	29.520	0.0000	26.650	26.650
2	-7.0403E-06	-6.7512E-06	-1352.4	-358.27	-8.5879	-8.2547	-0.1966	-0.1885	0.6036	4.5738E+09	4.5738E+09
x(FT)	29.930	29.520	0.0000	0.0000	27.880	27.880	29.930	29.520	0.0000	26.240	26.240
3	-9.7761E-06	-6.7510E-06	-1771.0	-358.32	-11.948	-8.2544	-0.2730	-0.1885	0.6312	4.5738E+09	4.5738E+09
x(FT)	29.930	29.520	0.0000	0.0000	27.880	27.880	29.930	29.520	0.0000	26.650	26.240
4	-9.7762E-06	-9.4407E-06	-1771.0	-776.98	-11.949	-11.615	-0.2730	-0.2636	0.6428	4.5738E+09	4.5738E+09

x(FT)	29.930	29.520	0.0000	0.0000	27.880	27.880	29.930	29.520	0.0000	26.240	26.240
Min.	-9.7762E-06	-9.4408E-06	-1771.0	-776.98	-11.949	-11.615	-0.2730	-0.2636	0.6036	4.5738E+09	4.5738E+09
Pile N.	4	1	3	4	4	1	3	1	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	1.1945E-03	3.7500E-03	385.69	623.42	10.197	13.865	0.9178	0.9549	0.7578	8.9130E+09	8.9130E+09
x(FT)	4.1000	0.0000	26.240	18.040	0.0000	0.0000	26.240	26.240	26.240	9.8400	9.0200
2	1.1945E-03	3.0902E-03	385.69	533.40	10.197	9.8675	0.9179	0.6259	0.7435	8.9130E+09	8.9130E+09
x(FT)	4.1000	0.0000	26.240	15.580	0.0000	0.0000	26.240	26.240	26.240	10.250	4.1000
3	1.8217E-03	3.0902E-03	535.36	533.43	14.195	9.8664	1.2469	0.6258	0.7775	8.9130E+09	8.9130E+09
x(FT)	2.8700	0.0000	26.240	15.580	0.0000	0.0000	26.240	26.240	26.240	2.8700	3.6900
4	1.8217E-03	3.7500E-03	535.36	623.45	14.194	13.863	1.2469	0.9548	0.7918	8.9130E+09	8.9130E+09
x(FT)	2.8700	0.0000	26.240	18.040	0.0000	0.0000	26.240	26.240	26.240	4.1000	5.7400
Max.	1.8217E-03	3.7500E-03	535.36	623.45	14.195	13.865	1.2469	0.9549	0.7918	8.9130E+09	8.9130E+09
Pile N.	3	1	3	4	3	1	3	1	4	1	1

LOAD CASE : 3
CASE NAME : Strength MaxV2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0759016	0.0441195	5.74282E-03

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
6.35968E-07	1.99310E-07	1.51374E-04

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2831.8	395.07	34.180	9.6325	-3545.7	4.4239E+04
2	1572.0	395.32	35.320	9.6325	-3662.1	4.4248E+04
3	1573.7	394.43	35.320	9.6325	-3662.2	4.4177E+04
4	2833.5	394.18	34.180	9.6325	-3545.7	4.4169E+04

MINIMUM	1572.0	394.18	34.180	9.6325	-3662.2	4.4169E+04
Pile N.	2	4	1	1	3	4
MAXIMUM	2833.5	395.32	35.320	9.6325	-3545.7	4.4248E+04
Pile N.	4	2	2	1	1	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-2.6462E-04	-2.2951E-05	-4.4239E+04	-3545.7	-322.87	-28.056	-7.3887	-0.6408	0.6720	4.4003E+09	4.5738E+09
x(FT)	29.930	29.930	0.0000	0.0000	27.880	27.880	29.930	29.930	0.0000	26.240	26.240
2	-2.6458E-04	-2.3698E-05	-4.4248E+04	-3662.1	-322.81	-28.968	-7.3876	-0.6617	0.3730	4.4003E+09	4.5738E+09
x(FT)	29.930	29.930	0.0000	0.0000	27.880	27.880	29.930	29.930	0.0000	26.240	26.240
3	-2.6404E-04	-2.3701E-05	-4.4177E+04	-3662.2	-322.16	-28.973	-7.3725	-0.6618	0.3734	4.4014E+09	4.5738E+09
x(FT)	29.930	29.930	0.0000	0.0000	27.880	27.880	29.930	29.930	0.0000	26.240	26.240
4	-2.6408E-04	-2.2954E-05	-4.4169E+04	-3545.7	-322.22	-28.061	-7.3735	-0.6409	0.6724	4.4013E+09	4.5738E+09
x(FT)	29.930	29.930	0.0000	0.0000	27.880	27.880	29.930	29.930	0.0000	26.240	26.650
Min.	-2.6462E-04	-2.3701E-05	-4.4248E+04	-3662.2	-322.87	-28.973	-7.3887	-0.6618	0.3730	4.4003E+09	4.5738E+09
Pile N.	1	3	2	3	1	3	1	3	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.058395	5.6345E-03	1.4486E+04	1256.8	392.88	33.960	27.905	2.3531	0.8277	8.9130E+09	8.9130E+09
x(FT)	1.6400	0.0000	26.240	26.240	0.0000	0.0000	26.240	26.240	26.240	9.0200	0.0000
2	0.058394	5.8177E-03	1.4486E+04	1297.9	393.10	35.092	27.899	2.4297	0.4595	8.9130E+09	8.9130E+09
x(FT)	1.6400	0.0000	26.240	26.240	0.0000	0.0000	26.240	26.240	26.240	9.0200	0.4100
3	0.058214	5.8177E-03	1.4456E+04	1298.0	392.22	35.092	27.890	2.4337	0.4600	8.9130E+09	8.9130E+09
x(FT)	1.6400	0.0000	26.240	26.240	0.0000	0.0000	26.240	26.240	26.240	14.350	9.8400
4	0.058215	5.6345E-03	1.4456E+04	1256.9	392.00	33.960	27.896	2.3570	0.8282	8.9130E+09	8.9130E+09
x(FT)	1.6400	0.0000	26.240	26.240	0.0000	0.0000	26.240	26.240	26.240	9.0200	3.2800
Max.	0.058395	5.8177E-03	1.4486E+04	1298.0	393.10	35.092	27.905	2.4337	0.8282	8.9130E+09	8.9130E+09
Pile N.	1	2	1	3	2	2	1	3	4	1	1

LOAD CASE : 4
CASE NAME : Strength MinV2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0529586	-0.0436704	-4.47440E-03

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-4.37194E-06	-1.96995E-08	-1.26576E-04

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1013.1	-376.59	-23.420	-66.219	2433.3	-4.1935E+04
2	2066.6	-376.39	-31.078	-66.219	3230.9	-4.1929E+04
3	2066.4	-370.41	-31.081	-66.219	3231.3	-4.1459E+04
4	1012.9	-370.60	-23.422	-66.219	2433.6	-4.1465E+04
MINIMUM	1012.9	-376.59	-31.081	-66.219	2433.3	-4.1935E+04
Pile N.	4	1	3	1	1	1
MAXIMUM	2066.6	-370.41	-23.420	-66.219	3231.3	-4.1459E+04
Pile N.	2	3	1	1	3	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-0.056025	-3.8432E-03	-1.3850E+04	-862.98	-374.44	-23.268	-27.783	-1.6884	0.2404	4.4238E+09	4.5738E+09
x(FT)	1.6400	0.0000	26.240	26.240	0.0000	0.0000	26.240	26.240	0.0000	26.240	26.650
2	-0.056025	-5.1023E-03	-1.3848E+04	-1145.7	-374.26	-30.878	-27.750	-2.2390	0.4904	4.4238E+09	4.5738E+09
x(FT)	1.6400	0.0000	26.240	26.240	0.0000	0.0000	26.240	26.240	0.0000	26.240	27.060
3	-0.054790	-5.1023E-03	-1.3647E+04	-1146.7	-368.33	-30.881	-27.688	-2.2660	0.4904	4.4319E+09	4.5738E+09
x(FT)	1.6400	0.0000	26.240	26.240	0.0000	0.0000	26.240	26.240	0.0000	26.240	26.240
4	-0.054790	-3.8432E-03	-1.3649E+04	-863.73	-368.50	-23.271	-27.722	-1.7088	0.2404	4.4319E+09	4.5738E+09
x(FT)	1.6400	0.0000	26.240	26.240	0.0000	0.0000	26.240	26.240	0.0000	26.240	26.240
Min.	-0.056025	-5.1023E-03	-1.3850E+04	-1146.7	-374.44	-30.881	-27.783	-2.2660	0.2404	4.4238E+09	4.5738E+09
Pile N.	1	2	1	3	1	3	1	3	4	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	2.5298E-04	1.5760E-05	4.1935E+04	2433.3	309.08	19.287	7.0636	0.4400	0.2961	8.9130E+09	8.9130E+09

x(FT)	29.930	29.930	0.0000	0.0000	27.880	27.880	29.930	29.930	26.240	11.480	0.4100
2	2.5298E-04	2.0925E-05	4.1929E+04	3230.9	309.08	25.608	7.0637	0.5843	0.6040	8.9130E+09	8.9130E+09
x(FT)	29.930	29.930	0.0000	0.0000	27.880	27.880	29.930	29.930	26.240	8.2000	0.0000
3	2.4930E-04	2.0945E-05	4.1459E+04	3231.3	304.65	25.641	6.9611	0.5848	0.6040	8.9130E+09	8.9130E+09
x(FT)	29.930	29.930	0.0000	0.0000	27.880	27.880	29.930	29.930	26.240	8.6100	0.0000
4	2.4930E-04	1.5775E-05	4.1465E+04	2433.6	304.64	19.312	6.9610	0.4405	0.2961	8.9130E+09	8.9130E+09
x(FT)	29.930	29.930	0.0000	0.0000	27.880	27.880	29.930	29.930	26.240	12.710	6.1500
Max.	2.5298E-04	2.0945E-05	4.1935E+04	3231.3	309.08	25.641	7.0637	0.5848	0.6040	8.9130E+09	8.9130E+09
Pile N.	1	3	1	3	1	3	2	3	2	1	1

LOAD CASE : 5
CASE NAME : Strength MaxV3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0529586	0.0458044	0.0332560

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-1.56092E-06	9.42981E-05	1.99844E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1230.5	297.04	96.147	-23.642	-5388.1	3.1517E+04
2	1064.2	297.07	93.417	-23.642	-5102.4	3.1518E+04
3	1849.0	299.46	93.354	-23.642	-5104.2	3.1759E+04
4	2015.3	299.43	96.082	-23.642	-5389.9	3.1758E+04
MINIMUM	1064.2	297.04	93.354	-23.642	-5389.9	3.1517E+04
Pile N.	2	1	3	1	4	1
MAXIMUM	2015.3	299.46	96.147	-23.642	-5102.4	3.1759E+04
Pile N.	4	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-2.0177E-04	-6.4712E-05	-3.1517E+04	-5388.1	-247.74	-79.639	-5.6339	-1.8069	0.2920	4.5466E+09	4.5738E+09
x(FT)	29.930	29.520	0.0000	0.0000	27.880	27.880	29.930	29.520	0.0000	26.240	26.240
2	-2.0177E-04	-6.2881E-05	-3.1518E+04	-5102.4	-247.74	-77.353	-5.6338	-1.7558	0.2525	4.5466E+09	4.5738E+09
x(FT)	29.930	29.520	0.0000	0.0000	27.880	27.880	29.930	29.520	0.0000	26.240	26.240
3	-2.0348E-04	-6.2873E-05	-3.1759E+04	-5104.2	-249.85	-77.338	-5.6816	-1.7555	0.4388	4.5463E+09	4.5738E+09
x(FT)	29.930	29.520	0.0000	0.0000	27.880	27.880	29.930	29.520	0.0000	26.240	26.240
4	-2.0348E-04	-6.4703E-05	-3.1758E+04	-5389.9	-249.85	-79.625	-5.6816	-1.8066	0.4782	4.5463E+09	4.5738E+09
x(FT)	29.930	29.520	0.0000	0.0000	27.880	27.880	29.930	29.520	0.0000	26.240	26.240
Min.	-2.0348E-04	-6.4712E-05	-3.1759E+04	-5389.9	-249.85	-79.639	-5.6816	-1.8069	0.2525	4.5463E+09	4.5738E+09
Pile N.	3	1	3	4	3	1	3	1	2	3	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.047308	0.025560	1.1039E+04	4244.3	295.18	95.141	24.459	6.5715	0.3597	8.9130E+09	8.9130E+09
x(FT)	0.4100	0.0000	26.240	18.040	0.0000	0.0000	26.240	26.240	26.240	14.350	11.480
2	0.047308	0.025110	1.1039E+04	4174.6	295.21	92.428	24.460	6.3482	0.3111	8.9130E+09	8.9130E+09
x(FT)	0.4100	0.0000	26.240	18.040	0.0000	0.0000	26.240	26.240	26.240	13.940	0.0000
3	0.047756	0.025110	1.1132E+04	4175.9	297.59	92.366	24.654	6.3434	0.5404	8.9130E+09	8.9130E+09
x(FT)	0.4100	0.0000	26.240	18.040	0.0000	0.0000	26.240	26.240	26.240	15.580	9.0200
4	0.047756	0.025560	1.1132E+04	4245.6	297.57	95.077	24.653	6.5666	0.5891	8.9130E+09	8.9130E+09
x(FT)	0.4100	0.0000	26.240	18.040	0.0000	0.0000	26.240	26.240	26.240	9.4300	1.6400
Max.	0.047756	0.025560	1.1132E+04	4245.6	297.59	95.141	24.654	6.5715	0.5891	8.9130E+09	8.9130E+09
Pile N.	3	1	3	4	3	1	3	1	4	1	1

LOAD CASE : 6
CASE NAME : Strength Minv3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0759016	-0.0490129	-0.0250666

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-1.11990E-06	-6.98795E-05	4.01047E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2660.4	-253.39	-71.738	-16.962	4055.2	-2.4371E+04
2	2326.7	-253.45	-73.726	-16.962	4259.2	-2.4371E+04
3	1745.1	-251.61	-73.762	-16.962	4258.3	-2.4174E+04
4	2078.8	-251.55	-71.774	-16.962	4054.2	-2.4174E+04
MINIMUM	1745.1	-253.45	-73.762	-16.962	4054.2	-2.4371E+04
Pile N.	3	2	3	1	4	1
MAXIMUM	2660.4	-251.55	-71.738	-16.962	4259.2	-2.4174E+04
Pile N.	1	4	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-0.045805	-0.019035	-9383.6	-3161.6	-251.60	-70.990	-20.157	-4.9103	0.6313	4.5515E+09	4.5738E+09
x(FT)	0.0000	0.0000	26.240	18.040	0.0000	0.0000	26.240	26.240	0.0000	26.240	26.650
2	-0.045805	-0.019358	-9384.0	-3212.1	-251.65	-72.965	-20.161	-5.0727	0.5521	4.5515E+09	4.5738E+09
x(FT)	0.0000	0.0000	26.240	18.450	0.0000	0.0000	26.240	26.240	0.0000	26.240	26.240
3	-0.045483	-0.019358	-9313.3	-3211.4	-249.82	-73.001	-20.009	-5.0755	0.4141	4.5518E+09	4.5738E+09
x(FT)	0.0000	0.0000	26.240	18.450	0.0000	0.0000	26.240	26.240	0.0000	26.240	26.240
4	-0.045483	-0.019035	-9312.9	-3160.9	-249.77	-71.025	-20.006	-4.9130	0.4933	4.5518E+09	4.5738E+09
x(FT)	0.0000	0.0000	26.240	18.040	0.0000	0.0000	26.240	26.240	0.0000	26.240	26.650
Min.	-0.045805	-0.019358	-9384.0	-3212.1	-251.65	-73.001	-20.161	-5.0755	0.4141	4.5515E+09	4.5738E+09
Pile N.	1	2	2	2	2	3	2	3	3	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	1.7160E-04	4.8328E-05	2.4371E+04	4055.2	211.22	59.478	4.7914	1.3494	0.7776	8.9130E+09	8.9130E+09
x(FT)	29.930	29.520	0.0000	0.0000	27.880	27.880	29.930	29.520	26.240	14.760	3.2800
2	1.7160E-04	4.9646E-05	2.4371E+04	4259.2	211.22	61.125	4.7914	1.3862	0.6801	8.9130E+09	8.9130E+09
x(FT)	29.930	29.520	0.0000	0.0000	27.880	27.880	29.930	29.520	26.240	9.8400	0.4100
3	1.7030E-04	4.9650E-05	2.4174E+04	4258.3	209.62	61.133	4.7550	1.3863	0.5101	8.9130E+09	8.9130E+09
x(FT)	29.930	29.520	0.0000	0.0000	27.880	27.880	29.930	29.520	26.240	12.300	8.2000
4	1.7030E-04	4.8333E-05	2.4174E+04	4054.2	209.62	59.486	4.7550	1.3495	0.6076	8.9130E+09	8.9130E+09
x(FT)	29.930	29.520	0.0000	0.0000	27.880	27.880	29.930	29.520	26.240	6.5600	11.480

Max.	1.7160E-04	4.9650E-05	2.4371E+04	4259.2	211.22	61.133	4.7914	1.3863	0.7776	8.9130E+09	8.9130E+09
Pile N.	1	3	1	2	1	3	1	3	1	1	1

LOAD CASE : 7
CASE NAME : Strength MaxT
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0591788	-0.0457463	-4.12279E-03

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
1.51911E-05	1.17283E-06	-4.77489E-06

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1694.7	-269.35	-39.847	230.09	4201.6	-2.8088E+04
2	1734.5	-269.34	-13.153	230.09	1425.3	-2.8088E+04
3	1744.3	-294.65	-13.153	230.09	1425.3	-3.0602E+04
4	1704.5	-294.66	-39.847	230.09	4201.6	-3.0602E+04
MINIMUM	1694.7	-294.66	-39.847	230.09	1425.3	-3.0602E+04
Pile N.	1	4	1	1	2	3
MAXIMUM	1744.3	-269.34	-13.153	230.09	4201.6	-2.8088E+04
Pile N.	3	2	2	1	1	1

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-0.043960	-6.4089E-03	-1.0006E+04	-1482.5	-267.62	-39.596	-22.039	-3.2743	0.4022	4.5494E+09	4.5738E+09
x(FT)	0.0000	0.4100	26.240	26.240	0.0000	0.0000	26.240	26.240	0.0000	26.240	26.240
2	-0.043960	-2.0378E-03	-1.0006E+04	-490.02	-267.62	-13.073	-22.039	-1.0916	0.4116	4.5494E+09	4.5738E+09

x(FT)	0.0000	0.8200	26.240	26.240	0.0000	0.0000	26.240	26.240	0.0000	26.240	27.060
3	-0.048335	-2.0378E-03	-1.0942E+04	-490.02	-292.76	-13.073	-24.076	-1.0916	0.4139	4.5466E+09	4.5738E+09
x(FT)	0.0000	0.8200	26.240	26.240	0.0000	0.0000	26.240	26.240	0.0000	26.240	26.240
4	-0.048335	-6.4089E-03	-1.0942E+04	-1482.5	-292.77	-39.596	-24.077	-3.2743	0.4045	4.5466E+09	4.5738E+09
x(FT)	0.0000	0.4100	26.240	26.240	0.0000	0.0000	26.240	26.240	0.0000	26.240	26.240
Min.	-0.048335	-6.4089E-03	-1.0942E+04	-1482.5	-292.77	-39.596	-24.077	-3.2743	0.4022	4.5466E+09	4.5738E+09
Pile N.	3	1	3	1	4	1	4	1	1	3	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	1.8289E-04	2.7094E-05	2.8088E+04	4201.6	224.66	33.269	5.1066	0.7565	0.4954	8.9130E+09	8.9130E+09
x(FT)	29.930	29.930	0.0000	0.0000	27.880	27.880	29.930	29.930	26.240	16.400	4.5100
2	1.8289E-04	8.9541E-06	2.8088E+04	1425.3	224.66	10.987	5.1066	0.2500	0.5070	8.9130E+09	8.9130E+09
x(FT)	29.930	29.930	0.0000	0.0000	27.880	27.880	29.930	29.930	26.240	9.0200	2.0500
3	2.0002E-04	8.9541E-06	3.0602E+04	1425.3	245.74	10.987	5.5851	0.2500	0.5098	8.9130E+09	8.9130E+09
x(FT)	29.930	29.930	0.0000	0.0000	27.880	27.880	29.930	29.930	26.240	6.9700	7.3800
4	2.0002E-04	2.7094E-05	3.0602E+04	4201.6	245.74	33.269	5.5851	0.7565	0.4982	8.9130E+09	8.9130E+09
x(FT)	29.930	29.930	0.0000	0.0000	27.880	27.880	29.930	29.930	26.240	13.120	0.0000
Max.	2.0002E-04	2.7094E-05	3.0602E+04	4201.6	245.74	33.269	5.5851	0.7565	0.5098	8.9130E+09	8.9130E+09
Pile N.	3	1	3	1	3	1	3	1	3	1	1

LOAD CASE : 8
CASE NAME : Strength MinT
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0821564	0.0468420	5.37978E-03

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-1.97493E-05	-1.03713E-06	2.20125E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN

1	2479.4	289.96	51.343	-299.13	-5392.6	3.0935E+04
2	2296.2	289.99	16.657	-299.13	-1783.5	3.0935E+04
3	2287.6	320.04	16.657	-299.13	-1783.5	3.3675E+04
4	2470.8	320.01	51.343	-299.13	-5392.6	3.3675E+04
MINIMUM	2287.6	289.96	16.657	-299.13	-5392.6	3.0935E+04
Pile N.	3	1	2	1	1	1
MAXIMUM	2479.4	320.04	51.343	-299.13	-1783.5	3.3675E+04
Pile N.	1	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-1.9715E-04	-3.4920E-05	-3.0935E+04	-5392.6	-242.04	-42.885	-5.5048	-0.9750	0.5884	4.5471E+09	4.5738E+09
x(FT)	29.930	29.930	0.0000	0.0000	27.880	27.880	29.930	29.930	0.0000	26.240	26.240
2	-1.9715E-04	-1.1337E-05	-3.0935E+04	-1783.5	-242.04	-13.915	-5.5047	-0.3165	0.5449	4.5470E+09	4.5738E+09
x(FT)	29.930	29.930	0.0000	0.0000	27.880	27.880	29.930	29.930	0.0000	26.240	26.240
3	-2.1732E-04	-1.1337E-05	-3.3675E+04	-1783.5	-266.91	-13.915	-6.0680	-0.3165	0.5428	4.5134E+09	4.5738E+09
x(FT)	29.930	29.930	0.0000	0.0000	27.880	27.880	29.930	29.930	0.0000	26.240	26.240
4	-2.1732E-04	-3.4920E-05	-3.3675E+04	-5392.6	-266.91	-42.884	-6.0681	-0.9750	0.5863	4.5134E+09	4.5738E+09
x(FT)	29.930	29.930	0.0000	0.0000	27.880	27.880	29.930	29.930	0.0000	26.240	26.650
Min.	-2.1732E-04	-3.4920E-05	-3.3675E+04	-5392.6	-266.91	-42.885	-6.0681	-0.9750	0.5428	4.5134E+09	4.5738E+09
Pile N.	3	1	3	1	3	1	4	1	3	3	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.045908	8.3108E-03	1.0785E+04	1910.6	288.17	51.018	23.923	4.2130	0.7247	8.9130E+09	8.9130E+09
x(FT)	0.4100	0.0000	26.240	26.240	0.0000	0.0000	26.240	26.240	26.240	7.7900	6.1500
2	0.045908	2.6257E-03	1.0786E+04	620.34	288.20	16.554	23.924	1.3763	0.6712	8.9130E+09	8.9130E+09
x(FT)	0.4100	0.4100	26.240	26.240	0.0000	0.0000	26.240	26.240	26.240	12.300	4.9200
3	0.051581	2.6257E-03	1.1887E+04	620.34	318.03	16.554	26.261	1.3763	0.6686	8.9130E+09	8.9130E+09
x(FT)	0.4100	0.4100	26.240	26.240	0.0000	0.0000	26.240	26.240	26.240	17.630	9.0200
4	0.051581	8.3108E-03	1.1887E+04	1910.6	318.01	51.019	26.259	4.2130	0.7222	8.9130E+09	8.9130E+09
x(FT)	0.4100	0.0000	26.240	26.240	0.0000	0.0000	26.240	26.240	26.240	8.6100	6.9700
Max.	0.051581	8.3108E-03	1.1887E+04	1910.6	318.03	51.019	26.261	4.2130	0.7247	8.9130E+09	8.9130E+09
Pile N.	3	1	3	1	3	4	3	1	1	1	1

LOAD CASE : 9

CASE NAME : Strength MaxM2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0529586	0.0458044	0.0332560

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-1.56092E-06	9.42981E-05	1.99844E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1230.5	297.04	96.147	-23.642	-5388.1	3.1517E+04
2	1064.2	297.07	93.417	-23.642	-5102.4	3.1518E+04
3	1849.0	299.46	93.354	-23.642	-5104.2	3.1759E+04
4	2015.3	299.43	96.082	-23.642	-5389.9	3.1758E+04
MINIMUM	1064.2	297.04	93.354	-23.642	-5389.9	3.1517E+04
Pile N.	2	1	3	1	4	1
MAXIMUM	2015.3	299.46	96.147	-23.642	-5102.4	3.1759E+04
Pile N.	4	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-2.0177E-04	-6.4712E-05	-3.1517E+04	-5388.1	-247.74	-79.639	-5.6339	-1.8069	0.2920	4.5466E+09	4.5738E+09
x(FT)	29.930	29.520	0.0000	0.0000	27.880	27.880	29.930	29.520	0.0000	26.240	26.650
2	-2.0177E-04	-6.2881E-05	-3.1518E+04	-5102.4	-247.74	-77.353	-5.6338	-1.7558	0.2525	4.5466E+09	4.5738E+09
x(FT)	29.930	29.520	0.0000	0.0000	27.880	27.880	29.930	29.520	0.0000	26.240	26.650
3	-2.0348E-04	-6.2873E-05	-3.1759E+04	-5104.2	-249.85	-77.338	-5.6816	-1.7555	0.4388	4.5463E+09	4.5738E+09
x(FT)	29.930	29.520	0.0000	0.0000	27.880	27.880	29.930	29.520	0.0000	26.240	26.240
4	-2.0348E-04	-6.4703E-05	-3.1758E+04	-5389.9	-249.85	-79.625	-5.6816	-1.8066	0.4782	4.5463E+09	4.5738E+09
x(FT)	29.930	29.520	0.0000	0.0000	27.880	27.880	29.930	29.520	0.0000	26.240	26.650
Min.	-2.0348E-04	-6.4712E-05	-3.1759E+04	-5389.9	-249.85	-79.639	-5.6816	-1.8069	0.2525	4.5463E+09	4.5738E+09
Pile N.	3	1	3	4	3	1	3	1	2	3	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.047308	0.025560	1.1039E+04	4244.3	295.18	95.141	24.459	6.5715	0.3597	8.9130E+09	8.9130E+09
x(FT)	0.4100	0.0000	26.240	18.040	0.0000	0.0000	26.240	26.240	26.240	12.710	1.6400
2	0.047308	0.025110	1.1039E+04	4174.6	295.21	92.428	24.460	6.3482	0.3111	8.9130E+09	8.9130E+09
x(FT)	0.4100	0.0000	26.240	18.040	0.0000	0.0000	26.240	26.240	26.240	11.480	20.090
3	0.047756	0.025110	1.1132E+04	4175.9	297.59	92.366	24.654	6.3434	0.5404	8.9130E+09	8.9130E+09
x(FT)	0.4100	0.0000	26.240	18.040	0.0000	0.0000	26.240	26.240	26.240	7.3800	3.2800
4	0.047756	0.025560	1.1132E+04	4245.6	297.57	95.077	24.653	6.5666	0.5891	8.9130E+09	8.9130E+09
x(FT)	0.4100	0.0000	26.240	18.040	0.0000	0.0000	26.240	26.240	26.240	7.3800	3.6900
Max.	0.047756	0.025560	1.1132E+04	4245.6	297.59	95.141	24.654	6.5715	0.5891	8.9130E+09	8.9130E+09
Pile N.	3	1	3	4	3	1	3	1	4	1	1

LOAD CASE : 10
CASE NAME : Strength MinM2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0835492	-0.0450911	-0.0251628

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
6.28861E-07	-7.23412E-05	-6.05691E-06

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2699.6	-278.93	-71.035	9.5249	3862.2	-2.9117E+04
2	2750.0	-278.93	-69.928	9.5249	3747.4	-2.9116E+04
3	2147.9	-280.07	-69.965	9.5249	3746.3	-2.9222E+04
4	2097.5	-280.07	-71.072	9.5249	3861.2	-2.9222E+04
MINIMUM	2097.5	-280.07	-71.072	9.5249	3746.3	-2.9222E+04
Pile N.	4	3	4	1	3	3
MAXIMUM	2750.0	-278.93	-69.928	9.5249	3862.2	-2.9116E+04
Pile N.	2	1	2	1	1	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-0.045509	-0.019177	-1.0366E+04	-3191.2	-277.16	-70.282	-22.832	-4.8191	0.6406	4.5482E+09	4.5738E+09
x(FT)	0.0000	0.0000	26.240	18.040	0.0000	0.0000	26.240	26.240	0.0000	26.240	27.470
2	-0.045509	-0.018996	-1.0366E+04	-3164.1	-277.15	-69.181	-22.832	-4.7286	0.6526	4.5482E+09	4.5738E+09
x(FT)	0.0000	0.0000	26.240	17.630	0.0000	0.0000	26.240	26.240	0.0000	26.240	26.240
3	-0.045690	-0.018996	-1.0405E+04	-3163.3	-278.28	-69.218	-22.922	-4.7314	0.5097	4.5481E+09	4.5738E+09
x(FT)	0.0000	0.0000	26.240	17.630	0.0000	0.0000	26.240	26.240	0.0000	26.240	26.240
4	-0.045690	-0.019177	-1.0406E+04	-3190.5	-278.29	-70.318	-22.922	-4.8220	0.4977	4.5481E+09	4.5738E+09
x(FT)	0.0000	0.0000	26.240	18.040	0.0000	0.0000	26.240	26.240	0.0000	26.240	26.240
Min.	-0.045690	-0.019177	-1.0406E+04	-3191.2	-278.29	-70.318	-22.922	-4.8220	0.4977	4.5481E+09	4.5738E+09
Pile N.	3	1	4	1	4	4	3	4	4	3	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	1.8950E-04	4.7873E-05	2.9117E+04	3862.2	232.79	58.877	5.2913	1.3367	0.7891	8.9130E+09	8.9130E+09
x(FT)	29.930	29.520	0.0000	0.0000	27.880	27.880	29.930	29.520	26.240	10.660	2.8700
2	1.8950E-04	4.7134E-05	2.9116E+04	3747.4	232.79	57.954	5.2913	1.3161	0.8038	8.9130E+09	8.9130E+09
x(FT)	29.930	29.520	0.0000	0.0000	27.880	27.880	29.930	29.520	26.240	9.4300	14.350
3	1.9021E-04	4.7139E-05	2.9222E+04	3746.3	233.65	57.962	5.3111	1.3162	0.6278	8.9130E+09	8.9130E+09
x(FT)	29.930	29.520	0.0000	0.0000	27.880	27.880	29.930	29.520	26.240	11.890	3.2800
4	1.9021E-04	4.7878E-05	2.9222E+04	3861.2	233.65	58.885	5.3111	1.3368	0.6131	8.9130E+09	8.9130E+09
x(FT)	29.930	29.520	0.0000	0.0000	27.880	27.880	29.930	29.520	26.240	11.070	6.5600
Max.	1.9021E-04	4.7878E-05	2.9222E+04	3862.2	233.65	58.885	5.3111	1.3368	0.8038	8.9130E+09	8.9130E+09
Pile N.	3	4	3	1	3	4	3	4	2	1	1

LOAD CASE : 11
CASE NAME : Strength MaxM3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0759016	0.0439407	5.74276E-03

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
6.35938E-07	1.99325E-07	1.51518E-04

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2832.4	394.32	34.180	9.6321	-3545.7	4.4184E+04
2	1571.4	394.57	35.320	9.6321	-3662.1	4.4193E+04
3	1573.1	393.68	35.320	9.6321	-3662.2	4.4122E+04
4	2834.1	393.43	34.180	9.6321	-3545.8	4.4114E+04
MINIMUM	1571.4	393.43	34.180	9.6321	-3662.2	4.4114E+04
Pile N.	2	4	1	1	3	4
MAXIMUM	2834.1	394.57	35.320	9.6321	-3545.7	4.4193E+04
Pile N.	4	2	2	1	1	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-2.6416E-04	-2.2953E-05	-4.4184E+04	-3545.7	-322.32	-28.059	-7.3759	-0.6409	0.6721	4.4012E+09	4.5738E+09
x(FT)	29.930	29.930	0.0000	0.0000	27.880	27.880	29.930	29.930	0.0000	26.240	26.240
2	-2.6412E-04	-2.3701E-05	-4.4193E+04	-3662.1	-322.26	-28.972	-7.3748	-0.6618	0.3729	4.4012E+09	4.5738E+09
x(FT)	29.930	29.930	0.0000	0.0000	27.880	27.880	29.930	29.930	0.0000	26.240	26.240
3	-2.6358E-04	-2.3703E-05	-4.4122E+04	-3662.2	-321.60	-28.977	-7.3597	-0.6619	0.3733	4.4023E+09	4.5738E+09
x(FT)	29.930	29.930	0.0000	0.0000	27.880	27.880	29.930	29.930	0.0000	26.240	27.060
4	-2.6362E-04	-2.2956E-05	-4.4114E+04	-3545.8	-321.67	-28.064	-7.3608	-0.6410	0.6725	4.4022E+09	4.5738E+09
x(FT)	29.930	29.930	0.0000	0.0000	27.880	27.880	29.930	29.930	0.0000	26.240	26.240
Min.	-2.6416E-04	-2.3703E-05	-4.4193E+04	-3662.2	-322.32	-28.977	-7.3759	-0.6619	0.3729	4.4012E+09	4.5738E+09
Pile N.	1	3	2	3	1	3	1	3	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.058233	5.6344E-03	1.4461E+04	1256.9	392.13	33.960	27.897	2.3563	0.8279	8.9130E+09	8.9130E+09
x(FT)	1.6400	0.0000	26.240	26.240	0.0000	0.0000	26.240	26.240	26.240	17.630	18.860
2	0.058233	5.8176E-03	1.4461E+04	1298.0	392.36	35.092	27.891	2.4330	0.4593	8.9130E+09	8.9130E+09
x(FT)	1.6400	0.0000	26.240	26.240	0.0000	0.0000	26.240	26.240	26.240	9.8400	4.1000
3	0.058053	5.8176E-03	1.4431E+04	1298.2	391.48	35.092	27.882	2.4371	0.4598	8.9130E+09	8.9130E+09
x(FT)	1.6400	0.0000	26.240	26.240	0.0000	0.0000	26.240	26.240	26.240	9.8400	0.8200
4	0.058053	5.6344E-03	1.4431E+04	1257.0	391.26	33.960	27.888	2.3603	0.8284	8.9130E+09	8.9130E+09

x(FT)	1.6400	0.0000	26.240	26.240	0.0000	0.0000	26.240	26.240	26.240	9.4300	3.2800
Max.	0.058233	5.8176E-03	1.4461E+04	1298.2	392.36	35.092	27.897	2.4371	0.8284	8.9130E+09	8.9130E+09
Pile N.	1	2	1	3	2	2	1	3	4	1	1

LOAD CASE : 12
CASE NAME : Strength MinM3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0529586	-0.0436704	-4.47440E-03

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-4.37194E-06	-1.96995E-08	-1.26576E-04

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1013.1	-376.59	-23.420	-66.219	2433.3	-4.1935E+04
2	2066.6	-376.39	-31.078	-66.219	3230.9	-4.1929E+04
3	2066.4	-370.41	-31.081	-66.219	3231.3	-4.1459E+04
4	1012.9	-370.60	-23.422	-66.219	2433.6	-4.1465E+04
MINIMUM	1012.9	-376.59	-31.081	-66.219	2433.3	-4.1935E+04
Pile N.	4	1	3	1	1	1
MAXIMUM	2066.6	-370.41	-23.420	-66.219	3231.3	-4.1459E+04
Pile N.	2	3	1	1	3	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-0.056025	-3.8432E-03	-1.3850E+04	-862.98	-374.44	-23.268	-27.783	-1.6884	0.2404	4.4238E+09	4.5738E+09
x(FT)	1.6400	0.0000	26.240	26.240	0.0000	0.0000	26.240	26.240	0.0000	26.240	26.240
2	-0.056025	-5.1023E-03	-1.3848E+04	-1145.7	-374.26	-30.878	-27.750	-2.2390	0.4904	4.4238E+09	4.5738E+09
x(FT)	1.6400	0.0000	26.240	26.240	0.0000	0.0000	26.240	26.240	0.0000	26.240	27.060
3	-0.054790	-5.1023E-03	-1.3647E+04	-1146.7	-368.33	-30.881	-27.688	-2.2660	0.4904	4.4319E+09	4.5738E+09

x(FT)	1.6400	0.0000	26.240	26.240	0.0000	0.0000	26.240	26.240	0.0000	26.240	26.240
4	-0.054790	-3.8432E-03	-1.3649E+04	-863.73	-368.50	-23.271	-27.722	-1.7088	0.2404	4.4319E+09	4.5738E+09
x(FT)	1.6400	0.0000	26.240	26.240	0.0000	0.0000	26.240	26.240	0.0000	26.240	26.240
Min.	-0.056025	-5.1023E-03	-1.3850E+04	-1146.7	-374.44	-30.881	-27.783	-2.2660	0.2404	4.4238E+09	4.5738E+09
Pile N.	1	2	1	3	1	3	1	3	4	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	2.5298E-04	1.5760E-05	4.1935E+04	2433.3	309.08	19.287	7.0636	0.4400	0.2961	8.9130E+09	8.9130E+09
x(FT)	29.930	29.930	0.0000	0.0000	27.880	27.880	29.930	29.930	26.240	8.2000	9.4300
2	2.5298E-04	2.0925E-05	4.1929E+04	3230.9	309.08	25.608	7.0637	0.5843	0.6040	8.9130E+09	8.9130E+09
x(FT)	29.930	29.930	0.0000	0.0000	27.880	27.880	29.930	29.930	26.240	15.580	1.2300
3	2.4930E-04	2.0945E-05	4.1459E+04	3231.3	304.65	25.641	6.9611	0.5848	0.6040	8.9130E+09	8.9130E+09
x(FT)	29.930	29.930	0.0000	0.0000	27.880	27.880	29.930	29.930	26.240	14.350	3.6900
4	2.4930E-04	1.5775E-05	4.1465E+04	2433.6	304.64	19.312	6.9610	0.4405	0.2961	8.9130E+09	8.9130E+09
x(FT)	29.930	29.930	0.0000	0.0000	27.880	27.880	29.930	29.930	26.240	13.940	9.4300
Max.	2.5298E-04	2.0945E-05	4.1935E+04	3231.3	309.08	25.641	7.0637	0.5848	0.6040	8.9130E+09	8.9130E+09
Pile N.	1	3	1	3	1	3	2	3	2	1	1

LOAD CASE : 13
CASE NAME : Service MaxP
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0582272	-2.86544E-04	-4.64861E-03

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
2.15552E-06	-1.84053E-05	8.93405E-06

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1805.8	10.394	-9.1427	32.648	51.923	1517.4

2	1731.4	10.394	-5.3559	32.648	-342.06	1517.5
3	1578.2	6.6064	-5.3572	32.648	-342.15	1123.6
4	1652.6	6.6063	-9.1443	32.648	51.840	1123.6
MINIMUM	1578.2	6.6063	-9.1443	32.648	-342.15	1123.6
Pile N.	3	4	4	1	3	3
MAXIMUM	1805.8	10.394	-5.3559	32.648	51.923	1517.5
Pile N.	1	1	2	1	1	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-7.1839E-06	-3.4130E-03	-1517.4	-645.83	-8.7830	-9.0082	-0.2006	-0.4958	0.4285	4.5738E+09	4.5738E+09
x(FT)	29.930	0.0000	0.0000	13.120	28.290	0.0000	29.930	26.240	0.0000	27.880	26.240
2	-7.1837E-06	-2.7922E-03	-1517.5	-646.52	-8.7828	-5.2457	-0.2006	-0.1861	0.4109	4.5738E+09	4.5738E+09
x(FT)	29.930	0.0000	0.0000	9.8400	28.290	0.0000	29.930	26.240	0.0000	27.060	26.650
3	-4.6095E-06	-2.7922E-03	-1123.6	-646.48	-5.6643	-5.2470	-0.1287	-0.1863	0.3745	4.5738E+09	4.5738E+09
x(FT)	29.930	0.0000	0.0000	9.8400	28.290	0.0000	29.930	26.240	0.0000	26.240	26.240
4	-4.6097E-06	-3.4130E-03	-1123.6	-645.79	-5.6644	-9.0098	-0.1287	-0.4959	0.3922	4.5738E+09	4.5738E+09
x(FT)	29.930	0.0000	0.0000	13.120	28.290	0.0000	29.930	26.240	0.0000	26.240	27.060
Min.	-7.1839E-06	-3.4130E-03	-1517.5	-646.52	-8.7830	-9.0098	-0.2006	-0.4959	0.3745	4.5738E+09	4.5738E+09
Pile N.	1	1	2	2	1	4	1	4	3	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	1.0472E-03	6.2056E-06	393.85	51.923	10.364	7.6242	0.9721	0.1733	0.5278	8.9130E+09	8.9130E+09
x(FT)	5.7400	29.520	26.240	0.0000	0.0000	27.470	26.240	29.520	26.240	10.250	2.0500
2	1.0472E-03	3.8151E-06	393.84	9.0110	10.364	4.6807	0.9721	0.1065	0.5061	8.9130E+09	8.9130E+09
x(FT)	5.7400	29.110	26.240	32.800	0.0000	27.060	26.240	29.110	26.240	24.190	6.5600
3	5.3694E-04	3.8154E-06	253.01	9.0116	6.6006	4.6809	0.6624	0.1065	0.4613	8.9130E+09	8.9130E+09
x(FT)	8.2000	29.110	26.240	32.800	0.0000	27.060	26.240	29.110	26.240	4.1000	3.6900
4	5.3695E-04	6.2060E-06	253.01	51.840	6.6006	7.6246	0.6624	0.1733	0.4830	8.9130E+09	8.9130E+09
x(FT)	8.2000	29.520	26.240	0.0000	0.0000	27.470	26.240	29.520	26.240	6.5600	3.2800
Max.	1.0472E-03	6.2060E-06	393.85	51.923	10.364	7.6246	0.9721	0.1733	0.5278	8.9130E+09	8.9130E+09
Pile N.	1	4	1	1	1	4	2	4	1	1	1

LOAD CASE : 14
CASE NAME : Service MinP
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0699842	5.34411E-04	6.03360E-03

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-5.73821E-06	1.90117E-05	7.83802E-06

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1985.3	7.2097	20.042	-86.912	-1156.3	1132.7
2	1920.0	7.2098	9.9607	-86.912	-107.59	1132.7
3	2078.2	17.291	9.9589	-86.912	-107.67	2181.3
4	2143.5	17.290	20.039	-86.912	-1156.4	2181.3
MINIMUM	1920.0	7.2097	9.9589	-86.912	-1156.4	1132.7
Pile N.	2	1	3	1	4	1
MAXIMUM	2143.5	17.291	20.042	-86.912	-107.59	2181.3
Pile N.	4	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-5.0058E-06	-1.3493E-05	-1132.7	-1156.3	-6.1345	-16.612	-0.1398	-0.3767	0.4711	4.5738E+09	4.5738E+09
x(FT)	29.930	29.520	0.0000	0.0000	28.290	27.880	29.930	29.520	0.0000	27.470	26.240
2	-5.0057E-06	-6.7559E-06	-1132.7	-107.59	-6.1344	-8.2853	-0.1398	-0.1886	0.4556	4.5738E+09	4.5738E+09
x(FT)	29.930	29.520	0.0000	0.0000	28.290	27.470	29.930	29.520	0.0000	26.650	26.650
3	-1.1858E-05	-6.7555E-06	-2181.3	-107.67	-14.486	-8.2849	-0.3311	-0.1886	0.4932	4.5738E+09	4.5738E+09
x(FT)	29.930	29.520	0.0000	0.0000	27.880	27.470	29.930	29.520	0.0000	27.470	26.650
4	-1.1858E-05	-1.3492E-05	-2181.3	-1156.4	-14.486	-16.612	-0.3311	-0.3767	0.5086	4.5738E+09	4.5738E+09
x(FT)	29.930	29.520	0.0000	0.0000	27.880	27.880	29.930	29.520	0.0000	26.650	26.240
Min.	-1.1858E-05	-1.3493E-05	-2181.3	-1156.4	-14.486	-16.612	-0.3311	-0.3767	0.4556	4.5738E+09	4.5738E+09
Pile N.	3	1	3	4	3	1	3	1	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	6.5396E-04	5.2629E-03	274.58	873.19	7.1957	19.835	0.6968	1.3787	0.5803	8.9130E+09	8.9130E+09
x(FT)	6.9700	0.0000	26.240	18.450	0.0000	0.0000	26.240	26.240	26.240	4.9200	4.1000
2	6.5396E-04	3.6103E-03	274.57	672.06	7.1958	9.8185	0.6968	0.5544	0.5612	8.9130E+09	8.9130E+09
x(FT)	6.9700	0.0000	26.240	13.530	0.0000	0.0000	26.240	26.240	26.240	5.3300	5.7400
3	2.1570E-03	3.6103E-03	649.47	672.10	17.212	9.8167	1.5212	0.5542	0.6075	8.9130E+09	8.9130E+09
x(FT)	3.2800	0.0000	26.240	13.530	0.0000	0.0000	26.240	26.240	26.240	6.1500	0.0000
4	2.1570E-03	5.2629E-03	649.47	873.24	17.211	19.832	1.5211	1.3785	0.6265	8.9130E+09	8.9130E+09
x(FT)	3.2800	0.0000	26.240	18.450	0.0000	0.0000	26.240	26.240	26.240	19.680	2.0500
Max.	2.1570E-03	5.2629E-03	649.47	873.24	17.212	19.835	1.5212	1.3787	0.6265	8.9130E+09	8.9130E+09
Pile N.	3	1	3	4	3	1	3	1	4	1	1

LOAD CASE : 15
CASE NAME : Service MaxV2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0626307	-1.38991E-03	7.79687E-03

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-3.72953E-06	2.51231E-05	5.92639E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1961.3	56.222	22.024	-56.488	-1064.0	8742.3
2	1468.1	56.229	15.480	-56.488	-382.09	8743.6
3	1677.2	62.779	15.476	-56.488	-382.24	9424.6
4	2170.4	62.770	22.020	-56.488	-1064.2	9423.3
MINIMUM	1468.1	56.222	15.476	-56.488	-1064.2	8742.3
Pile N.	2	1	3	1	4	1
MAXIMUM	2170.4	62.779	22.024	-56.488	-382.09	9424.6
Pile N.	4	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-3.9010E-05	-1.4849E-05	-8742.3	-1064.0	-47.790	-18.229	-1.0892	-0.4146	0.4654	4.5738E+09	4.5738E+09
x(FT)	29.930	29.520	0.0000	0.0000	28.290	27.880	29.930	29.520	0.0000	26.240	26.650
2	-3.9005E-05	-1.0472E-05	-8743.6	-382.09	-47.784	-12.779	-1.0891	-0.2924	0.3484	4.5738E+09	4.5738E+09
x(FT)	29.930	29.520	0.0000	0.0000	28.290	27.470	29.930	29.520	0.0000	26.240	26.650
3	-4.3460E-05	-1.0472E-05	-9424.6	-382.24	-53.182	-12.778	-1.2135	-0.2924	0.3980	4.5738E+09	4.5738E+09
x(FT)	29.930	29.520	0.0000	0.0000	28.290	27.470	29.930	29.520	0.0000	26.650	26.240
4	-4.3466E-05	-1.4849E-05	-9423.3	-1064.2	-53.187	-18.228	-1.2137	-0.4146	0.5150	4.5738E+09	4.5738E+09
x(FT)	29.930	29.520	0.0000	0.0000	28.290	27.880	29.930	29.520	0.0000	26.650	26.240
Min.	-4.3466E-05	-1.4849E-05	-9424.6	-1064.2	-53.187	-18.229	-1.2137	-0.4146	0.3484	4.5738E+09	4.5738E+09
Pile N.	4	1	3	4	4	1	4	1	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	5.1744E-03	6.2236E-03	2139.6	1044.3	56.105	21.779	5.4083	1.4572	0.5733	8.9130E+09	8.9130E+09
x(FT)	6.5600	0.0000	26.240	17.220	0.0000	0.0000	26.240	26.240	26.240	9.0200	4.5100
2	5.1742E-03	5.1495E-03	2139.4	917.27	56.111	15.277	5.4082	0.9221	0.4291	8.9130E+09	8.9130E+09
x(FT)	6.5600	0.0000	26.240	14.760	0.0000	0.0000	26.240	26.240	26.240	5.3300	3.6900
3	6.0761E-03	5.1495E-03	2383.2	917.36	62.620	15.273	5.9441	0.9218	0.4902	8.9130E+09	8.9130E+09
x(FT)	6.1500	0.0000	26.240	14.760	0.0000	0.0000	26.240	26.240	26.240	9.0200	2.0500
4	6.0763E-03	6.2236E-03	2383.3	1044.4	62.612	21.775	5.9440	1.4569	0.6344	8.9130E+09	8.9130E+09
x(FT)	6.1500	0.0000	26.240	17.220	0.0000	0.0000	26.240	26.240	26.240	0.4100	0.8200
Max.	6.0763E-03	6.2236E-03	2383.3	1044.4	62.620	21.779	5.9441	1.4572	0.6344	8.9130E+09	8.9130E+09
Pile N.	4	1	4	4	3	1	3	1	4	1	1

LOAD CASE : 16
CASE NAME : Service MinV2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN

0.0627518 1.41706E-03 -7.28608E-03

ANGLE ROT. X,RAD ANGLE ROT. Y,RAD ANGLE ROT. Z,RAD
-4.43911E-07 -2.76374E-05 -4.13186E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1765.8	-39.141	-12.361	-6.7236	-64.387	-6089.3
2	2109.7	-39.137	-13.136	-6.7236	17.024	-6088.7
3	1879.7	-38.359	-13.139	-6.7236	16.835	-6008.0
4	1535.8	-38.363	-12.364	-6.7236	-64.578	-6008.6
MINIMUM	1535.8	-39.141	-13.139	-6.7236	-64.578	-6089.3
Pile N.	4	1	3	1	4	1
MAXIMUM	2109.7	-38.359	-12.361	-6.7236	17.024	-6008.0
Pile N.	2	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-3.5995E-03	-4.9006E-03	-1489.5	-960.20	-39.059	-12.168	-3.7658	-0.6326	0.4190	4.5738E+09	4.5738E+09
x(FT)	6.5600	0.0000	26.240	12.710	0.0000	0.0000	26.240	26.240	0.0000	26.240	26.240
2	-3.5996E-03	-5.0285E-03	-1489.6	-965.15	-39.056	-12.937	-3.7658	-0.6960	0.5006	4.5738E+09	4.5738E+09
x(FT)	6.5600	0.0000	26.240	13.120	0.0000	0.0000	26.240	26.240	0.0000	26.240	26.240
3	-3.4943E-03	-5.0285E-03	-1460.5	-965.06	-38.283	-12.941	-3.7020	-0.6963	0.4461	4.5738E+09	4.5738E+09
x(FT)	6.9700	0.0000	26.240	13.120	0.0000	0.0000	26.240	26.240	0.0000	26.240	26.240
4	-3.4942E-03	-4.9006E-03	-1460.4	-960.11	-38.286	-12.171	-3.7020	-0.6329	0.3644	4.5738E+09	4.5738E+09
x(FT)	6.9700	0.0000	26.240	12.710	0.0000	0.0000	26.240	26.240	0.0000	26.240	26.240
Min.	-3.5996E-03	-5.0285E-03	-1489.6	-965.15	-39.059	-12.941	-3.7658	-0.6963	0.3644	4.5738E+09	4.5738E+09
Pile N.	2	2	2	2	1	3	1	3	4	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	2.7156E-05	8.4043E-06	6089.3	19.891	33.269	10.365	0.7583	0.2347	0.5161	8.9130E+09	8.9130E+09
x(FT)	29.930	29.520	0.0000	33.210	28.290	27.470	29.930	29.520	26.240	0.8200	3.6900
2	2.7159E-05	8.9241E-06	6088.7	21.112	33.272	10.982	0.7583	0.2492	0.6167	8.9130E+09	8.9130E+09
x(FT)	29.930	29.520	0.0000	33.210	28.290	27.470	29.930	29.520	26.240	7.7900	10.660
3	2.6627E-05	8.9250E-06	6008.0	21.114	32.627	10.982	0.7435	0.2492	0.5494	8.9130E+09	8.9130E+09

x(FT)	29.930	29.520	0.0000	33.210	28.290	27.470	29.930	29.520	26.240	13.530	2.4600
4	2.6624E-05	8.4052E-06	6008.6	19.893	32.625	10.366	0.7434	0.2347	0.4489	8.9130E+09	8.9130E+09
x(FT)	29.930	29.520	0.0000	33.210	28.290	27.470	29.930	29.520	26.240	0.8200	11.890
Max.	2.7159E-05	8.9250E-06	6089.3	21.114	33.272	10.982	0.7583	0.2492	0.6167	8.9130E+09	8.9130E+09
Pile N.	2	3	1	3	2	2	2	3	2	1	1

LOAD CASE : 17
CASE NAME : Service MaxV3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN HORIZONTAL Y,IN HORIZONTAL Z,IN
0.0643176 -3.10297E-04 0.0177427

ANGLE ROT. X,RAD ANGLE ROT. Y,RAD ANGLE ROT. Z,RAD
-6.43340E-06 5.92774E-05 1.25485E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1673.5	6.8490	45.910	-97.442	-1879.0	1325.4
2	1569.1	6.8490	34.609	-97.442	-703.01	1325.4
3	2062.5	18.151	34.591	-97.442	-703.85	2500.9
4	2166.9	18.151	45.889	-97.442	-1879.7	2500.8
MINIMUM	1569.1	6.8490	34.591	-97.442	-1879.7	1325.4
Pile N.	2	1	3	1	4	1
MAXIMUM	2166.9	18.151	45.910	-97.442	-703.01	2500.9
Pile N.	4	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-1.8263E-04	-3.0984E-05	-1325.4	-1879.0	-5.9557	-37.949	-0.1347	-0.8651	0.3971	4.5738E+09	4.5738E+09
x(FT)	0.0000	29.520	0.0000	0.0000	28.290	27.880	29.930	29.520	0.0000	26.240	26.240
2	-1.8263E-04	-2.3432E-05	-1325.4	-703.01	-5.9554	-28.638	-0.1347	-0.6543	0.3724	4.5738E+09	4.5738E+09
x(FT)	0.0000	29.520	0.0000	0.0000	28.290	27.470	29.930	29.520	0.0000	26.240	26.240

3	-1.2507E-05	-2.3429E-05	-2500.9	-703.85	-15.263	-28.634	-0.3492	-0.6542	0.4894	4.5738E+09	4.5738E+09
x(FT)	29.930	29.520	0.0000	0.0000	28.290	27.470	29.930	29.520	0.0000	26.240	27.060
4	-1.2507E-05	-3.0981E-05	-2500.8	-1879.7	-15.264	-37.943	-0.3492	-0.8650	0.5142	4.5738E+09	4.5738E+09
x(FT)	29.930	29.520	0.0000	0.0000	28.290	27.880	29.930	29.520	0.0000	26.240	26.650
Min.	-1.8263E-04	-3.0984E-05	-2500.9	-1879.7	-15.264	-37.949	-0.3492	-0.8651	0.3724	4.5738E+09	4.5738E+09
Pile N.	1	1	3	4	4	1	3	1	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	4.7153E-04	0.013690	265.02	2332.1	6.8726	45.372	0.7317	2.9431	0.4892	8.9130E+09	8.9130E+09
x(FT)	10.250	0.0000	26.240	16.400	1.2300	0.0000	26.240	26.240	26.240	0.8200	2.4600
2	4.7152E-04	0.011837	265.01	2137.3	6.8726	34.143	0.7317	2.0190	0.4586	8.9130E+09	8.9130E+09
x(FT)	10.250	0.0000	26.240	14.350	1.2300	0.0000	26.240	26.240	26.240	1.6400	2.4600
3	1.9904E-03	0.011837	685.37	2137.8	18.087	34.125	1.6560	2.0175	0.6028	8.9130E+09	8.9130E+09
x(FT)	4.5100	0.0000	26.240	14.350	0.0000	0.0000	26.240	26.240	26.240	2.4600	0.4100
4	1.9904E-03	0.013690	685.38	2332.6	18.086	45.350	1.6560	2.9414	0.6334	8.9130E+09	8.9130E+09
x(FT)	4.5100	0.0000	26.240	16.400	0.0000	0.0000	26.240	26.240	26.240	7.3800	10.250
Max.	1.9904E-03	0.013690	685.38	2332.6	18.087	45.372	1.6560	2.9431	0.6334	8.9130E+09	8.9130E+09
Pile N.	3	1	4	4	3	1	3	1	4	1	1

LOAD CASE : 18
CASE NAME : Service MinV3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0642571	3.21796E-04	-0.0143960

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
3.70078E-06	-5.19391E-05	1.22376E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2133.3	19.250	-31.492	56.053	740.18	2600.0
2	2031.5	19.250	-24.994	56.053	63.704	2600.0
3	1599.2	12.750	-25.007	56.053	63.038	1923.9

4	1701.0	12.750	-31.507	56.053	739.55	1923.9
MINIMUM	1599.2	12.750	-31.507	56.053	63.038	1923.9
Pile N.	3	3	4	1	3	3
MAXIMUM	2133.3	19.250	-24.994	56.053	740.18	2600.0
Pile N.	1	1	2	1	1	1

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-1.3249E-05	-0.010566	-2600.0	-1889.6	-16.161	-31.076	-0.3700	-1.8645	0.5062	4.5738E+09	4.5738E+09
x(FT)	29.930	0.0000	0.0000	14.760	28.290	0.0000	29.930	26.240	0.0000	27.060	26.650
2	-1.3249E-05	-9.5002E-03	-2600.0	-1816.2	-16.160	-24.620	-0.3699	-1.3331	0.4821	4.5738E+09	4.5738E+09
x(FT)	29.930	0.0000	0.0000	13.120	28.290	0.0000	29.930	26.240	0.0000	26.240	27.060
3	-8.8289E-06	-9.5002E-03	-1923.9	-1815.9	-10.806	-24.632	-0.2465	-1.3342	0.3795	4.5738E+09	4.5738E+09
x(FT)	29.930	0.0000	0.0000	13.120	28.290	0.0000	29.930	26.240	0.0000	26.240	26.240
4	-8.8292E-06	-0.010566	-1923.9	-1889.2	-10.806	-31.091	-0.2465	-1.8657	0.4037	4.5738E+09	4.5738E+09
x(FT)	29.930	0.0000	0.0000	14.760	28.290	0.0000	29.930	26.240	0.0000	27.060	26.240
Min.	-1.3249E-05	-0.010566	-2600.0	-1889.6	-16.161	-31.091	-0.3700	-1.8657	0.3795	4.5738E+09	4.5738E+09
Pile N.	1	1	1	1	1	4	1	4	3	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	2.1731E-03	2.1320E-05	725.98	740.18	19.177	26.028	1.7416	0.5953	0.6236	8.9130E+09	8.9130E+09
x(FT)	4.1000	29.520	26.240	0.0000	0.0000	27.470	26.240	29.520	26.240	2.0500	0.4100
2	2.1731E-03	1.6976E-05	725.97	63.704	19.177	20.881	1.7416	0.4740	0.5938	8.9130E+09	8.9130E+09
x(FT)	4.1000	29.520	26.240	0.0000	0.0000	27.470	26.240	29.520	26.240	4.5100	0.0000
3	1.2249E-03	1.6979E-05	484.16	63.038	12.719	20.884	1.2100	0.4741	0.4674	8.9130E+09	8.9130E+09
x(FT)	6.1500	29.520	26.240	0.0000	0.0000	27.470	26.240	29.520	26.240	0.0000	6.1500
4	1.2249E-03	2.1323E-05	484.17	739.55	12.718	26.031	1.2100	0.5954	0.4972	8.9130E+09	8.9130E+09
x(FT)	6.1500	29.520	26.240	0.0000	0.0000	27.470	26.240	29.520	26.240	3.2800	0.8200
Max.	2.1731E-03	2.1323E-05	725.98	740.18	19.177	26.031	1.7416	0.5954	0.6236	8.9130E+09	8.9130E+09
Pile N.	1	4	1	1	1	4	1	4	1	1	1

LOAD CASE : 19
CASE NAME : Service MaxT
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0640581	-1.15791E-05	-6.20577E-03

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
1.26040E-05	-2.38524E-05	9.86983E-06

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2000.8	22.322	-21.570	190.90	1079.0	2803.9
2	1918.7	22.323	0.5730	190.90	-1224.5	2804.0
3	1720.2	0.1774	0.5716	190.90	-1224.7	500.60
4	1802.3	0.1776	-21.574	190.90	1078.9	500.57
MINIMUM	1720.2	0.1774	-21.574	190.90	-1224.7	500.57
Pile N.	3	3	4	1	3	4
MAXIMUM	2000.8	22.323	0.5730	190.90	1079.0	2804.0
Pile N.	1	2	2	1	1	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-1.5305E-05	-6.0171E-03	-2803.9	-1006.9	-18.699	-21.334	-0.4273	-1.4375	0.4748	4.5738E+09	4.5738E+09
x(FT)	29.930	0.0000	0.0000	17.220	27.880	0.0000	29.930	26.240	0.0000	27.060	26.650
2	-1.5305E-05	-2.3872E-03	-2804.0	-1224.5	-18.698	-1.4636	-0.4273	-0.038496	0.4553	4.5738E+09	4.5738E+09
x(FT)	29.930	0.0000	0.0000	0.0000	27.880	29.520	29.930	0.8200	0.0000	26.240	26.240
3	-9.9748E-04	-2.3872E-03	-500.60	-1224.7	-0.5690	-1.4627	-0.016102	-0.038496	0.4082	4.5738E+09	4.5738E+09
x(FT)	0.0000	0.0000	0.0000	0.0000	29.520	29.520	0.8200	0.8200	0.0000	26.240	26.240
4	-9.9748E-04	-6.0171E-03	-500.57	-1006.8	-0.5692	-21.337	-0.016102	-1.4378	0.4277	4.5738E+09	4.5738E+09
x(FT)	0.0000	0.0000	0.0000	17.220	29.520	0.0000	0.8200	26.240	0.0000	26.650	26.240
Min.	-9.9748E-04	-6.0171E-03	-2804.0	-1224.7	-18.699	-21.337	-0.4273	-1.4378	0.4082	4.5738E+09	4.5738E+09
Pile N.	3	1	2	3	1	4	1	4	3	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL.	DISPL.	MOMENT	MOMENT	SHEAR	SHEAR	SOIL REACT	SOIL REACT	TOTAL	FLEX. RIG.	FLEX. RIG.

	y-DIR IN	z-DIR IN	z-DIR KIP-IN	y-DIR KIP-IN	y-DIR KIP	z-DIR KIP	y-DIR KIP/IN	z-DIR KIP/IN	STRESS KIP/IN**2	z-DIR KIP-IN**2	y-DIR KIP-IN**2
1	2.8022E-03	1.4540E-05	838.23	1079.0	22.219	17.859	1.9604	0.4060	0.5848	8.9130E+09	8.9130E+09
x(FT)	2.8700	29.520	26.240	0.0000	0.0000	27.880	26.240	29.520	26.240	4.1000	1.6400
2	2.8022E-03	3.8611E-05	838.23	65.617	22.220	5.0232	1.9604	0.3732	0.5608	8.9130E+09	8.9130E+09
x(FT)	2.8700	21.730	26.240	27.470	0.0000	17.630	26.240	26.240	26.240	0.8200	18.040
3	1.4714E-05	3.8582E-05	25.423	65.575	2.0656	5.0222	0.1495	0.3731	0.5028	8.9130E+09	8.9130E+09
x(FT)	21.730	21.730	27.470	27.470	18.040	17.630	26.240	26.240	26.240	4.5100	6.5600
4	1.4718E-05	1.4540E-05	25.430	1078.9	2.0658	17.860	0.1496	0.4060	0.5268	8.9130E+09	8.9130E+09
x(FT)	21.730	29.520	27.470	0.0000	18.040	27.880	26.240	29.520	26.240	2.8700	6.1500
Max.	2.8022E-03	3.8611E-05	838.23	1079.0	22.220	17.860	1.9604	0.4060	0.5848	8.9130E+09	8.9130E+09
Pile N.	1	2	1	1	2	4	1	4	1	1	1

LOAD CASE : 20
CASE NAME : Service MinT
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0641533	3.15283E-04	7.67362E-03

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-1.62632E-05	2.46851E-05	7.47769E-06

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1791.6	-3.7870	32.790	-246.33	-2204.7	-28.630
2	1729.4	-3.7873	4.2140	-246.33	767.59	-28.616
3	1934.9	24.788	4.2120	-246.33	767.42	2943.5
4	1997.1	24.787	32.784	-246.33	-2204.8	2943.5
MINIMUM	1729.4	-3.7873	4.2120	-246.33	-2204.8	-28.630
Pile N.	2	2	3	1	4	1
MAXIMUM	1997.1	24.788	32.790	-246.33	767.59	2943.5
Pile N.	4	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-1.3985E-03	-2.2038E-05	-263.01	-2204.7	-3.7319	-27.217	-0.2074	-0.6153	0.4251	4.5738E+09	4.5738E+09
x(FT)	0.0000	29.520	13.530	0.0000	0.0000	27.880	26.240	29.520	0.0000	26.240	26.240
2	-1.3985E-03	-3.7811E-06	-263.00	-8.9049	-3.7322	-4.6564	-0.2074	-0.1056	0.4104	4.5738E+09	4.5738E+09
x(FT)	0.0000	28.290	13.530	31.980	0.0000	26.240	26.240	28.290	0.0000	26.240	26.240
3	-1.6948E-05	-3.7815E-06	-2943.5	-8.9061	-20.741	-4.6574	-0.4732	-0.1056	0.4591	4.5738E+09	4.5738E+09
x(FT)	29.930	28.290	0.0000	31.980	27.880	26.240	29.930	28.290	0.0000	26.240	26.240
4	-1.6948E-05	-2.2038E-05	-2943.5	-2204.8	-20.741	-27.216	-0.4732	-0.6153	0.4739	4.5738E+09	4.5738E+09
x(FT)	29.930	29.520	0.0000	0.0000	27.880	27.880	29.930	29.520	0.0000	26.240	26.240
Min.	-1.3985E-03	-2.2038E-05	-2943.5	-2204.8	-20.741	-27.217	-0.4732	-0.6153	0.4104	4.5738E+09	4.5738E+09
Pile N.	1	1	3	4	3	1	3	1	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	2.5696E-06	7.9420E-03	28.630	1321.3	3.1549	32.477	0.071750	2.3435	0.5237	8.9130E+09	8.9130E+09
x(FT)	29.520	0.0000	0.0000	19.680	27.470	0.0000	29.520	26.240	26.240	3.2800	1.2300
2	2.5697E-06	3.2582E-03	28.616	934.07	3.1550	4.0854	0.071751	0.055406	0.5055	8.9130E+09	8.9130E+09
x(FT)	29.520	0.0000	0.0000	6.5600	27.470	0.0000	29.520	2.4600	26.240	3.2800	1.2300
3	3.3759E-03	3.2582E-03	927.91	934.08	24.659	4.0833	2.1292	0.055406	0.5655	8.9130E+09	8.9130E+09
x(FT)	2.0500	0.0000	26.240	6.5600	0.0000	0.0000	26.240	2.4600	26.240	6.1500	6.1500
4	3.3759E-03	7.9420E-03	927.91	1321.4	24.658	32.472	2.1292	2.3431	0.5837	8.9130E+09	8.9130E+09
x(FT)	2.0500	0.0000	26.240	19.680	0.0000	0.0000	26.240	26.240	26.240	4.1000	9.0200
Max.	3.3759E-03	7.9420E-03	927.91	1321.4	24.659	32.477	2.1292	2.3435	0.5837	8.9130E+09	8.9130E+09
Pile N.	3	1	3	4	3	1	3	1	4	1	1

LOAD CASE : 21
CASE NAME : Service MaxM2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0643176	-3.10297E-04	0.0177427

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-6.43340E-06	5.92774E-05	1.25485E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1673.5	6.8490	45.910	-97.442	-1879.0	1325.4
2	1569.1	6.8490	34.609	-97.442	-703.01	1325.4
3	2062.5	18.151	34.591	-97.442	-703.85	2500.9
4	2166.9	18.151	45.889	-97.442	-1879.7	2500.8
MINIMUM	1569.1	6.8490	34.591	-97.442	-1879.7	1325.4
Pile N.	2	1	3	1	4	1
MAXIMUM	2166.9	18.151	45.910	-97.442	-703.01	2500.9
Pile N.	4	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-1.8263E-04	-3.0984E-05	-1325.4	-1879.0	-5.9557	-37.949	-0.1347	-0.8651	0.3971	4.5738E+09	4.5738E+09
x(FT)	0.0000	29.520	0.0000	0.0000	28.290	27.880	29.930	29.520	0.0000	27.060	26.240
2	-1.8263E-04	-2.3432E-05	-1325.4	-703.01	-5.9554	-28.638	-0.1347	-0.6543	0.3724	4.5738E+09	4.5738E+09
x(FT)	0.0000	29.520	0.0000	0.0000	28.290	27.470	29.930	29.520	0.0000	26.240	26.240
3	-1.2507E-05	-2.3429E-05	-2500.9	-703.85	-15.263	-28.634	-0.3492	-0.6542	0.4894	4.5738E+09	4.5738E+09
x(FT)	29.930	29.520	0.0000	0.0000	28.290	27.470	29.930	29.520	0.0000	26.240	26.650
4	-1.2507E-05	-3.0981E-05	-2500.8	-1879.7	-15.264	-37.943	-0.3492	-0.8650	0.5142	4.5738E+09	4.5738E+09
x(FT)	29.930	29.520	0.0000	0.0000	28.290	27.880	29.930	29.520	0.0000	27.880	26.240
Min.	-1.8263E-04	-3.0984E-05	-2500.9	-1879.7	-15.264	-37.949	-0.3492	-0.8651	0.3724	4.5738E+09	4.5738E+09
Pile N.	1	1	3	4	4	1	3	1	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	4.7153E-04	0.013690	265.02	2332.1	6.8726	45.372	0.7317	2.9431	0.4892	8.9130E+09	8.9130E+09
x(FT)	10.250	0.0000	26.240	16.400	1.2300	0.0000	26.240	26.240	26.240	2.8700	4.5100
2	4.7152E-04	0.011837	265.01	2137.3	6.8726	34.143	0.7317	2.0190	0.4586	8.9130E+09	8.9130E+09

x(FT)	10.250	0.0000	26.240	14.350	1.2300	0.0000	26.240	26.240	26.240	2.0500	9.0200
3	1.9904E-03	0.011837	685.37	2137.8	18.087	34.125	1.6560	2.0175	0.6028	8.9130E+09	8.9130E+09
x(FT)	4.5100	0.0000	26.240	14.350	0.0000	0.0000	26.240	26.240	26.240	0.8200	0.4100
4	1.9904E-03	0.013690	685.38	2332.6	18.086	45.350	1.6560	2.9414	0.6334	8.9130E+09	8.9130E+09
x(FT)	4.5100	0.0000	26.240	16.400	0.0000	0.0000	26.240	26.240	26.240	0.4100	0.4100
Max.	1.9904E-03	0.013690	685.38	2332.6	18.087	45.372	1.6560	2.9431	0.6334	8.9130E+09	8.9130E+09
Pile N.	3	1	4	4	3	1	3	1	4	1	1

LOAD CASE : 22
CASE NAME : Service MinM2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0642571	3.21796E-04	-0.0143960

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
3.70078E-06	-5.19391E-05	1.22376E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2133.3	19.250	-31.492	56.053	740.18	2600.0
2	2031.5	19.250	-24.994	56.053	63.704	2600.0
3	1599.2	12.750	-25.007	56.053	63.038	1923.9
4	1701.0	12.750	-31.507	56.053	739.55	1923.9
MINIMUM	1599.2	12.750	-31.507	56.053	63.038	1923.9
Pile N.	3	3	4	1	3	3
MAXIMUM	2133.3	19.250	-24.994	56.053	740.18	2600.0
Pile N.	1	1	2	1	1	1

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2

1	-1.3249E-05	-0.010566	-2600.0	-1889.6	-16.161	-31.076	-0.3700	-1.8645	0.5062	4.5738E+09	4.5738E+09
x(FT)	29.930	0.0000	0.0000	14.760	28.290	0.0000	29.930	26.240	0.0000	27.470	26.240
2	-1.3249E-05	-9.5002E-03	-2600.0	-1816.2	-16.160	-24.620	-0.3699	-1.3331	0.4821	4.5738E+09	4.5738E+09
x(FT)	29.930	0.0000	0.0000	13.120	28.290	0.0000	29.930	26.240	0.0000	27.060	26.240
3	-8.8289E-06	-9.5002E-03	-1923.9	-1815.9	-10.806	-24.632	-0.2465	-1.3342	0.3795	4.5738E+09	4.5738E+09
x(FT)	29.930	0.0000	0.0000	13.120	28.290	0.0000	29.930	26.240	0.0000	26.240	27.880
4	-8.8292E-06	-0.010566	-1923.9	-1889.2	-10.806	-31.091	-0.2465	-1.8657	0.4037	4.5738E+09	4.5738E+09
x(FT)	29.930	0.0000	0.0000	14.760	28.290	0.0000	29.930	26.240	0.0000	27.060	26.240
Min.	-1.3249E-05	-0.010566	-2600.0	-1889.6	-16.161	-31.091	-0.3700	-1.8657	0.3795	4.5738E+09	4.5738E+09
Pile N.	1	1	1	1	1	4	1	4	3	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	2.1731E-03	2.1320E-05	725.98	740.18	19.177	26.028	1.7416	0.5953	0.6236	8.9130E+09	8.9130E+09
x(FT)	4.1000	29.520	26.240	0.0000	0.0000	27.470	26.240	29.520	26.240	1.6400	11.070
2	2.1731E-03	1.6976E-05	725.97	63.704	19.177	20.881	1.7416	0.4740	0.5938	8.9130E+09	8.9130E+09
x(FT)	4.1000	29.520	26.240	0.0000	0.0000	27.470	26.240	29.520	26.240	0.0000	3.2800
3	1.2249E-03	1.6979E-05	484.16	63.038	12.719	20.884	1.2100	0.4741	0.4674	8.9130E+09	8.9130E+09
x(FT)	6.1500	29.520	26.240	0.0000	0.0000	27.470	26.240	29.520	26.240	12.710	8.6100
4	1.2249E-03	2.1323E-05	484.17	739.55	12.718	26.031	1.2100	0.5954	0.4972	8.9130E+09	8.9130E+09
x(FT)	6.1500	29.520	26.240	0.0000	0.0000	27.470	26.240	29.520	26.240	6.5600	3.6900
Max.	2.1731E-03	2.1323E-05	725.98	740.18	19.177	26.031	1.7416	0.5954	0.6236	8.9130E+09	8.9130E+09
Pile N.	1	4	1	1	1	4	1	4	1	1	1

LOAD CASE : 23
CASE NAME : Service MaxM3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0622414	-6.55109E-03	7.44595E-03

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-3.07954E-06	2.39106E-05	7.51637E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2021.3	43.544	20.702	-46.644	-985.86	8199.9
2	1395.7	43.546	15.301	-46.644	-422.65	8201.8
3	1594.7	48.957	15.298	-46.644	-422.78	8764.0
4	2220.3	48.953	20.698	-46.644	-985.98	8762.1
MINIMUM	1395.7	43.544	15.298	-46.644	-985.98	8199.9
Pile N.	2	1	3	1	4	1
MAXIMUM	2220.3	48.957	20.702	-46.644	-422.65	8764.0
Pile N.	4	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-6.8080E-04	-1.3960E-05	-8199.9	-985.86	-37.754	-17.133	-0.8547	-0.3898	0.4797	4.5738E+09	4.5738E+09
x(FT)	0.0000	29.520	0.0000	0.0000	28.290	27.880	29.930	29.520	0.0000	26.240	26.650
2	-6.8080E-04	-1.0347E-05	-8201.8	-422.65	-37.744	-12.619	-0.8544	-0.2889	0.3312	4.5738E+09	4.5738E+09
x(FT)	0.0000	29.520	0.0000	0.0000	28.290	27.880	29.930	29.520	0.0000	26.240	26.240
3	-3.4280E-05	-1.0346E-05	-8764.0	-422.78	-42.202	-12.618	-0.9572	-0.2889	0.3784	4.5738E+09	4.5738E+09
x(FT)	29.930	29.520	0.0000	0.0000	28.290	27.880	29.930	29.520	0.0000	26.240	26.650
4	-3.4289E-05	-1.3959E-05	-8762.1	-985.98	-42.213	-17.132	-0.9574	-0.3898	0.5269	4.5738E+09	4.5738E+09
x(FT)	29.930	29.520	0.0000	0.0000	28.290	27.880	29.930	29.520	0.0000	26.240	26.650
Min.	-6.8080E-04	-1.3960E-05	-8764.0	-985.98	-42.213	-17.133	-0.9574	-0.3898	0.3312	4.5738E+09	4.5738E+09
Pile N.	1	1	3	4	4	1	4	1	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	3.0999E-03	5.8809E-03	1681.4	987.97	43.596	20.471	4.5892	1.3657	0.5908	8.9130E+09	8.9130E+09
x(FT)	9.8400	0.0000	26.240	17.220	0.8200	0.0000	26.240	26.240	26.240	1.6400	12.300
2	3.0994E-03	4.9940E-03	1681.0	881.57	43.597	15.105	4.5886	0.9241	0.4080	8.9130E+09	8.9130E+09
x(FT)	9.8400	0.0000	26.240	15.170	0.8200	0.0000	26.240	26.240	26.240	0.4100	10.250
3	3.7176E-03	4.9940E-03	1882.3	881.65	48.951	15.102	5.0313	0.9238	0.4661	8.9130E+09	8.9130E+09
x(FT)	9.0200	0.0000	26.240	15.170	0.0000	0.0000	26.240	26.240	26.240	6.1500	13.530
4	3.7180E-03	5.8809E-03	1882.7	988.05	48.949	20.467	5.0318	1.3654	0.6490	8.9130E+09	8.9130E+09
x(FT)	9.0200	0.0000	26.240	17.220	0.0000	0.0000	26.240	26.240	26.240	2.4600	0.0000
Max.	3.7180E-03	5.8809E-03	1882.7	988.05	48.951	20.471	5.0318	1.3657	0.6490	8.9130E+09	8.9130E+09
Pile N.	4	1	4	4	3	1	4	1	4	1	1

LOAD CASE : 24
CASE NAME : Service MinM3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0629421	6.45749E-03	-7.18449E-03

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-7.68155E-07	-2.73149E-05	-5.76659E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1702.0	-27.425	-11.827	-11.635	-104.31	-5669.4
2	2181.9	-27.425	-13.169	-11.635	36.470	-5668.4
3	1954.5	-26.075	-13.173	-11.635	36.286	-5528.5
4	1474.6	-26.074	-11.830	-11.635	-104.49	-5529.6
MINIMUM	1474.6	-27.425	-13.173	-11.635	-104.49	-5669.4
Pile N.	4	1	3	1	4	1
MAXIMUM	2181.9	-26.074	-11.827	-11.635	36.470	-5528.5
Pile N.	2	4	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

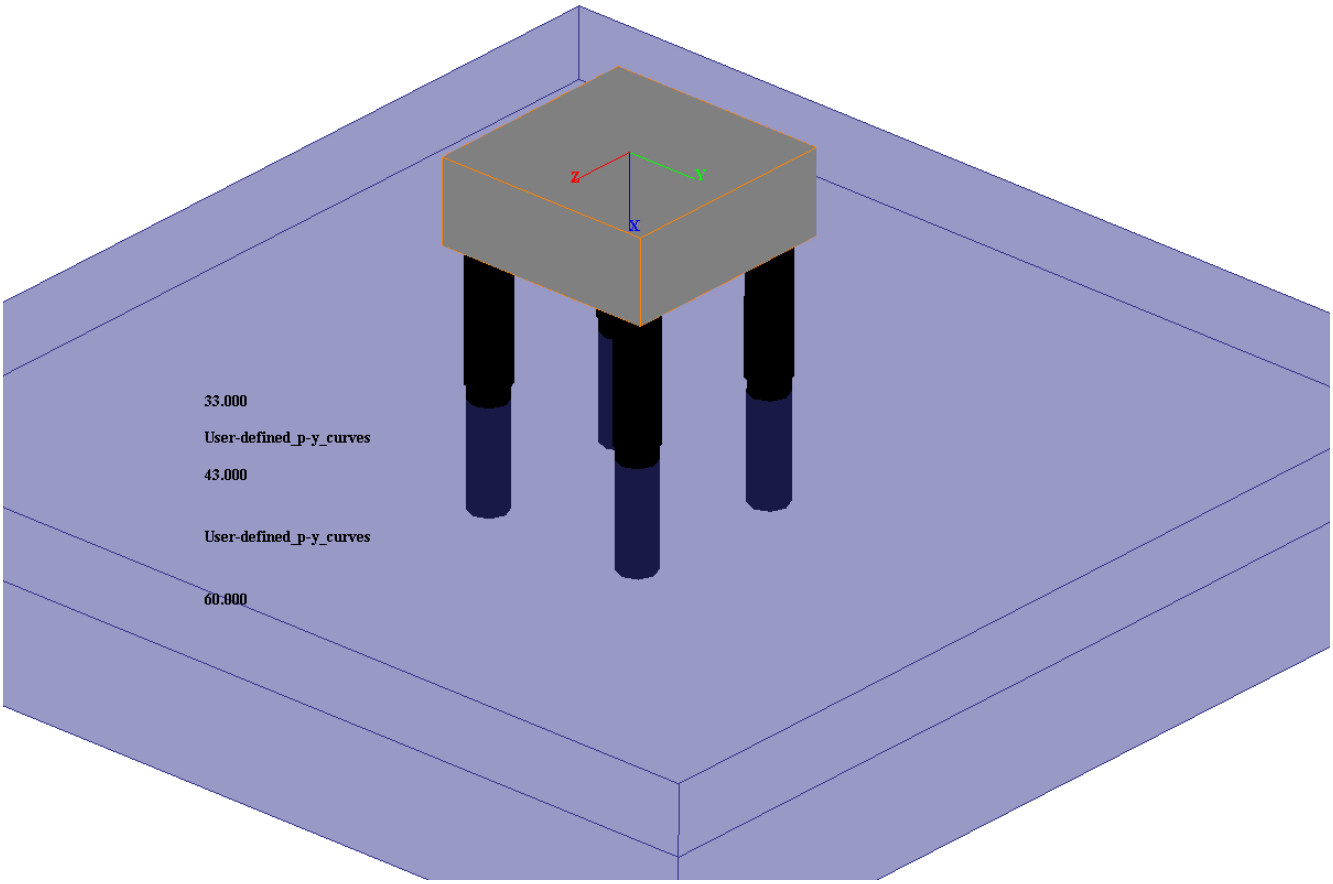
PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-1.7475E-03	-4.7794E-03	-1067.4	-947.39	-27.814	-11.639	-3.0314	-0.5934	0.4039	4.5738E+09	4.5738E+09
x(FT)	11.070	0.0000	26.240	12.300	2.4600	0.0000	26.240	26.240	0.0000	26.650	26.240
2	-1.7478E-03	-5.0007E-03	-1067.6	-955.45	-27.815	-12.972	-3.0319	-0.7031	0.5178	4.5738E+09	4.5738E+09
x(FT)	11.070	0.0000	26.240	13.120	2.4600	0.0000	26.240	26.240	0.0000	26.650	26.240
3	-1.6154E-03	-5.0007E-03	-1017.3	-955.35	-26.606	-12.976	-2.9213	-0.7034	0.4638	4.5738E+09	4.5738E+09
x(FT)	11.480	0.0000	26.240	13.120	2.8700	0.0000	26.240	26.240	0.0000	26.240	26.240
4	-1.6151E-03	-4.7794E-03	-1017.1	-947.30	-26.605	-11.642	-2.9208	-0.5937	0.3499	4.5738E+09	4.5738E+09
x(FT)	11.480	0.0000	26.240	12.300	2.8700	0.0000	26.240	26.240	0.0000	26.240	26.650
Min.	-1.7478E-03	-5.0007E-03	-1067.6	-955.45	-27.815	-12.976	-3.0319	-0.7034	0.3499	4.5738E+09	4.5738E+09

Pile N. 2 2 2 2 2 3 2 3 4 1 1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	1.5029E-03	8.0455E-06	5669.4	19.047	24.036	9.9355	0.5424	0.2246	0.4975	8.9130E+09	8.9130E+09
x(FT)	0.0000	29.520	0.0000	33.210	28.290	27.470	30.340	29.520	26.240	8.2000	1.6400
2	1.5029E-03	8.9455E-06	5668.4	36.470	24.042	11.002	0.5425	0.2498	0.6378	8.9130E+09	8.9130E+09
x(FT)	0.0000	29.520	0.0000	0.0000	28.290	27.470	30.340	29.520	26.240	3.6900	4.1000
3	1.7242E-03	8.9464E-06	5528.5	36.286	22.928	11.003	0.5178	0.2498	0.5713	8.9130E+09	8.9130E+09
x(FT)	0.0000	29.520	0.0000	0.0000	28.290	27.470	30.340	29.520	26.240	20.910	2.0500
4	1.7242E-03	8.0464E-06	5529.6	19.049	22.922	9.9364	0.5177	0.2247	0.4310	8.9130E+09	8.9130E+09
x(FT)	0.0000	29.520	0.0000	33.210	28.290	27.470	30.340	29.520	26.240	4.1000	0.4100
Max.	1.7242E-03	8.9464E-06	5669.4	36.470	24.042	11.003	0.5425	0.2498	0.6378	8.9130E+09	8.9130E+09
Pile N.	3	3	1	2	2	3	2	3	2	1	1

Pier 4
Weak Rock p-y parameters (Upper Bound)
No Scour Condition
40 #11 Bar Reinforcement
Strength Condition: Load Cases 1 through 12
Service Condition: Load cases 13 through 24
0.75" thick casing reduced to 0.625" after 1/8" of corrosion



Pier 4 Loading Schedule provided by HNTB on 8/14/2020
Converted to kip-in

,000	PIER	ID	Station	Output	Case	P	V2	V3	T	M2	M3
						Vertical, x-di	orizontal, F	orizontal, F	Mx	My	Mz
Load case	-	-	ft	-	-	kip	Kip	Kip	Kip-in	Kip-in	Kip-in
1	PileCap 4	5146	0	STRENGTH	Max P	5714	1265	244	-228	71425	248851
2	PileCap 4	5146	0	STRENGTH	Min P	10213	-1167	-188	1663	-51625	-200861
3	PileCap 4	5146	0	STRENGTH	Max V2	8555	1597	272	11484	96427	572699
4	PileCap 4	5146	0	STRENGTH	Min V2	5992	-1514	-216	-7070	-77908	-504947
5	PileCap 4	5146	0	STRENGTH	Max V3	8561	1265	419	1556	214767	256238
6	PileCap 4	5146	0	STRENGTH	Min V3	5985	-1089	-300	5447	-138518	-91774
7	PileCap 4	5146	0	STRENGTH	Max T	9300	1269	-208	19831	-70259	240669
8	PileCap 4	5146	0	STRENGTH	Min T	6689	-1170	264	-16116	89475	-184517
9	PileCap 4	5146	0	STRENGTH	Max M2	8561	1265	419	1556	214767	256238
10	PileCap 4	5146	0	STRENGTH	Min M2	6845	-1188	-284	4744	-138837	-216134
11	PileCap 4	5146	0	STRENGTH	Max M3	8555	1597	272	11484	96427	572699
12	PileCap 4	5146	0	STRENGTH	Min M3	5992	-1514	-216	-7070	-77908	-504947
13	PileCap 4	5146	0	SERVICE	Max P	6579	37	83	6755	59441	27003
14	PileCap 4	5146	0	SERVICE	Min P	7912	57	-29	-5235	-42349	24771
15	PileCap 4	5146	0	SERVICE	Max V2	7066	224	-34	-194	-46849	165197
16	PileCap 4	5146	0	SERVICE	Min V2	7106	-136	87	2650	63439	-108257
17	PileCap 4	5146	0	SERVICE	Max V3	7281	52	187	7291	150471	43110
18	PileCap 4	5146	0	SERVICE	Min V3	7257	61	-116	-2705	-117234	33958
19	PileCap 4	5146	0	SERVICE	Max T	7182	168	99	20798	73890	153648
20	PileCap 4	5146	0	SERVICE	Min T	7174	-76	-45	-17669	-57135	-95820
21	PileCap 4	5146	0	SERVICE	Max M2	7281	52	187	7291	150471	43110
22	PileCap 4	5146	0	SERVICE	Min M2	7257	61	-116	-2705	-117234	33958
23	PileCap 4	5146	0	SERVICE	Max M3	7027	168	-33	913	-45684	197845
24	PileCap 4	5146	0	SERVICE	Min M3	7175	-85	83	2259	59445	-142251

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

                GROUP for Windows, Version 2016.10.13

                 Serial Number : 364300562

                  Analysis of A Group of Piles
               Subjected to Axial and Lateral Loading

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

          Date:  September 03, 2020     Time:  14:16:44



            *****     COMPUTATION RESULTS     *****


Pier 4 Weak Rock



            *****     LOAD CASES RESULTS      *****


LOAD CASE :     1
CASE NAME : Strength MaxP
LOAD TYPE : Dead, DL




* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *


       VERTICAL ,IN      HORIZONTAL Y,IN     HORIZONTAL Z,IN
          0.0489652          0.0477937          0.0176509

     ANGLE ROT. X,RAD    ANGLE ROT. Y,RAD    ANGLE ROT. Z,RAD
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       -2.51002E-07        4.11898E-05        2.54931E-05



  * PILE TOP REACTIONS *

 PILE GROUP   FOR. X,KIP   FOR. Y,KIP   FOR. Z,KIP MOM X,KIP-IN MOM Y,KIP-IN MOM Z,KIP-IN
 **********  ***********  ***********  ***********  ***********  ***********  ***********
     1           1362.9       316.08       61.226      -3.8223      -4377.9   3.3582E+04
     2           1150.0       316.12       60.791      -3.8223      -4331.2   3.3583E+04
     3           1494.1       316.42       60.774      -3.8223      -4331.4   3.3613E+04
     4           1707.0       316.38       61.209      -3.8223      -4378.1   3.3613E+04

  MINIMUM         1150.0       316.08       60.774      -3.8223      -4378.1   3.3582E+04
  Pile N.          2            1            3           1            4            1
  MAXIMUM         1707.0       316.42       61.226      -3.8223      -4331.2   3.3613E+04
  Pile N.          4            3            1           1            2            3



  * MINIMUM VALUES AND LOCATIONS *

 PILE     DISPL.      DISPL.      MOMENT      MOMENT       SHEAR       SHEAR    SOIL REACT  SOIL REACT     TOTAL    FLEX. RIG.  FLEX. RIG.
          y-DIR       z-DIR       z-DIR       y-DIR       y-DIR       z-DIR       y-DIR       z-DIR     STRESS       z-DIR       y-DIR
            IN          IN        KIP-IN      KIP-IN         KIP         KIP       KIP/IN      KIP/IN   KIP/IN**2   KIP-IN**2   KIP-IN**2
******  **********  **********  **********  **********  **********  **********  **********  **********  **********  **********  **********
    1  -2.2782E-04 -4.4563E-05 -3.3582E+04     -4377.9      -278.49      -54.889     -6.3613     -1.2443      0.3234  4.4855E+09  4.5738E+09
 x(FT)      29.160      29.160      0.0000      0.0000      27.135      27.135      29.160      29.160      0.0000      25.515      25.920
    2  -2.2782E-04 -4.4242E-05 -3.3583E+04     -4331.2      -278.49      -54.497     -6.3613     -1.2353      0.2729  4.4854E+09  4.5738E+09
 x(FT)      29.160      29.160      0.0000      0.0000      27.135      27.135      29.160      29.160      0.0000      25.515      26.325
    3  -2.2807E-04 -4.4237E-05 -3.3613E+04     -4331.4      -278.79      -54.490     -6.3682     -1.2352      0.3545  4.4848E+09  4.5738E+09
 x(FT)      29.160      29.160      0.0000      0.0000      27.135      27.135      29.160      29.160      0.0000      25.515      25.515
    4  -2.2807E-04 -4.4558E-05 -3.3613E+04     -4378.1      -278.79      -54.882     -6.3682     -1.2441      0.4051  4.4848E+09  4.5738E+09
 x(FT)      29.160      29.160      0.0000      0.0000      27.135      27.135      29.160      29.160      0.0000      25.515      25.920

   Min. -2.2807E-04 -4.4563E-05 -3.3613E+04     -4378.1      -278.79      -54.889     -6.3682     -1.2443      0.2729  4.4848E+09  4.5738E+09
Pile N.       3           1           3           4           3           1           3           1           2           3           1

  * MAXIMUM VALUES AND LOCATIONS *

 PILE     DISPL.      DISPL.      MOMENT      MOMENT       SHEAR       SHEAR    SOIL REACT  SOIL REACT     TOTAL    FLEX. RIG.  FLEX. RIG.
          y-DIR       z-DIR       z-DIR       y-DIR       y-DIR       z-DIR       y-DIR       z-DIR     STRESS       z-DIR       y-DIR
            IN          IN        KIP-IN      KIP-IN         KIP         KIP       KIP/IN      KIP/IN   KIP/IN**2   KIP-IN**2   KIP-IN**2
******  **********  **********  **********  **********  **********  **********  **********  **********  **********  **********  **********
    1     0.049963    0.014227  1.2461E+04      2483.1      314.15      60.673      27.261      4.7857      0.3984  8.9130E+09  8.9130E+09
 x(FT)      0.4050      0.0000      25.515      21.870      0.0000      0.0000      25.515      25.515      25.515      10.935      3.2400
    2     0.049963    0.014155  1.2461E+04      2467.8      314.18      60.239      27.266      4.7486      0.3361  8.9130E+09  8.9130E+09
 x(FT)      0.4050      0.0000      25.515      21.465      0.0000      0.0000      25.515      25.515      25.515      8.1000      7.2900
    3     0.050035    0.014155  1.2474E+04      2467.8      314.48      60.223      27.269      4.7435      0.4367  8.9130E+09  8.9130E+09
 x(FT)      0.4050      0.0000      25.515      21.465      0.0000      0.0000      25.515      25.515      25.515      7.2900      1.2150
    4     0.050035    0.014227  1.2474E+04      2483.1      314.45      60.656      27.263      4.7805      0.4990  8.9130E+09  8.9130E+09
```

x(FT)	0.4050	0.0000	25.515	21.870	0.0000	0.0000	25.515	25.515	25.515	10.125	2.8350
Max.	0.050035	0.014227	1.2474E+04	2483.1	314.48	60.673	27.269	4.7857	0.4990	8.9130E+09	8.9130E+09
Pile N.	3	1	3	1	3	1	3	1	4	1	1

LOAD CASE : 2
CASE NAME : Strength MinP
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0877440	-0.0456240	-0.0133584

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
1.57598E-06	-3.04346E-05	-1.19430E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2630.5	-290.44	-48.397	23.999	3570.4	-3.0651E+04
2	2730.2	-290.42	-45.594	23.999	3278.0	-3.0651E+04
3	2476.0	-293.06	-45.603	23.999	3277.8	-3.0906E+04
4	2376.3	-293.08	-48.406	23.999	3570.3	-3.0907E+04
MINIMUM	2376.3	-293.08	-48.406	23.999	3277.8	-3.0907E+04
Pile N.	4	4	4	1	3	4
MAXIMUM	2730.2	-290.42	-45.594	23.999	3570.4	-3.0651E+04
Pile N.	2	2	2	1	1	1

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-0.046413	-0.011029	-1.1504E+04	-1949.1	-288.65	-47.969	-25.949	-3.9483	0.6242	4.5445E+09	4.5738E+09
x(FT)	0.4050	0.0000	25.515	22.275	0.0000	0.0000	25.515	25.515	0.0000	25.515	25.920

2	-0.046413	-0.010575	-1.1504E+04	-1851.7	-288.63	-45.184	-25.948	-3.6987	0.6479	4.5444E+09	4.5738E+09
x(FT)	0.4050	0.0000	25.515	21.870	0.0000	0.0000	25.515	25.515	0.0000	25.515	25.920
3	-0.046867	-0.010575	-1.1607E+04	-1851.7	-291.25	-45.193	-26.176	-3.6993	0.5876	4.5392E+09	4.5738E+09
x(FT)	0.4050	0.0000	25.515	21.870	0.0000	0.0000	25.515	25.515	0.0000	25.515	25.920
4	-0.046867	-0.011029	-1.1607E+04	-1949.0	-291.27	-47.978	-26.177	-3.9489	0.5639	4.5393E+09	4.5738E+09
x(FT)	0.4050	0.0000	25.515	22.275	0.0000	0.0000	25.515	25.515	0.0000	25.515	25.920
Min.	-0.046867	-0.011029	-1.1607E+04	-1949.1	-291.27	-47.978	-26.177	-3.9489	0.5639	4.5392E+09	4.5738E+09
Pile N.	3	1	3	1	4	4	4	4	4	3	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	2.1046E-04	3.5335E-05	3.0651E+04	3570.4	257.57	43.542	5.8766	0.9866	0.7689	8.9130E+09	8.9130E+09
x(FT)	29.160	29.160	0.0000	0.0000	27.135	27.135	29.160	29.160	25.515	11.745	1.2150
2	2.1046E-04	3.3304E-05	3.0651E+04	3278.0	257.57	41.056	5.8766	0.9299	0.7980	8.9130E+09	8.9130E+09
x(FT)	29.160	29.160	0.0000	0.0000	27.135	27.135	29.160	29.160	25.515	19.440	2.4300
3	2.1233E-04	3.3305E-05	3.0906E+04	3277.8	259.86	41.057	5.9287	0.9299	0.7237	8.9130E+09	8.9130E+09
x(FT)	29.160	29.160	0.0000	0.0000	27.135	27.135	29.160	29.160	25.515	21.870	15.795
4	2.1233E-04	3.5336E-05	3.0907E+04	3570.3	259.86	43.543	5.9286	0.9867	0.6946	8.9130E+09	8.9130E+09
x(FT)	29.160	29.160	0.0000	0.0000	27.135	27.135	29.160	29.160	25.515	7.2900	15.390
Max.	2.1233E-04	3.5336E-05	3.0907E+04	3570.4	259.86	43.543	5.9287	0.9867	0.7980	8.9130E+09	8.9130E+09
Pile N.	3	4	4	1	3	4	3	4	2	1	1

LOAD CASE : 3
CASE NAME : Strength MaxV2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0734530	0.0468917	0.0209196

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
1.17453E-05	5.23796E-05	1.36715E-04

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2491.0	407.40	57.566	178.86	-3452.9	4.4839E+04
2	1349.0	407.62	78.439	178.86	-5624.4	4.4845E+04
3	1786.5	391.10	78.434	178.86	-5627.5	4.3523E+04
4	2928.5	390.88	57.560	178.86	-3455.3	4.3518E+04
MINIMUM	1349.0	390.88	57.560	178.86	-5627.5	4.3518E+04
Pile N.	2	4	4	1	3	4
MAXIMUM	2928.5	407.62	78.439	178.86	-3452.9	4.4845E+04
Pile N.	4	2	2	1	1	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-2.8727E-04	-4.1438E-05	-4.4839E+04	-3452.9	-351.85	-50.936	-8.0213	-1.1570	0.5911	4.3571E+09	4.5738E+09
x(FT)	29.160	29.160	0.0000	0.0000	27.540	27.135	29.160	29.160	0.0000	25.515	25.920
2	-2.8709E-04	-5.6221E-05	-4.4845E+04	-5624.4	-351.70	-68.900	-8.0160	-1.5698	0.3201	4.3574E+09	4.5738E+09
x(FT)	29.160	29.160	0.0000	0.0000	27.540	27.135	29.160	29.160	0.0000	25.515	25.515
3	-2.7633E-04	-5.6355E-05	-4.3523E+04	-5627.5	-338.37	-69.113	-7.7158	-1.5735	0.4239	4.3753E+09	4.5738E+09
x(FT)	29.160	29.160	0.0000	0.0000	27.540	27.135	29.160	29.160	0.0000	25.515	25.515
4	-2.7652E-04	-4.1531E-05	-4.3518E+04	-3455.3	-338.52	-51.085	-7.7209	-1.1596	0.6949	4.3751E+09	4.5738E+09
x(FT)	29.160	29.160	0.0000	0.0000	27.540	27.135	29.160	29.160	0.0000	25.515	25.515
Min.	-2.8727E-04	-5.6355E-05	-4.4845E+04	-5627.5	-351.85	-69.113	-8.0213	-1.5735	0.3201	4.3571E+09	4.5738E+09
Pile N.	1	3	2	3	1	3	1	3	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.061223	0.014828	1.5741E+04	2504.7	405.10	56.990	28.464	3.4858	0.7281	8.9130E+09	8.9130E+09
x(FT)	1.6200	0.0000	25.515	19.035	0.0000	0.0000	25.515	25.515	25.515	8.5050	2.0250
2	0.061223	0.018211	1.5735E+04	3151.6	405.30	77.731	28.259	4.8875	0.3943	8.9130E+09	8.9130E+09
x(FT)	1.6200	0.0000	25.515	21.465	0.0000	0.0000	25.515	25.515	25.515	10.125	11.340
3	0.057898	0.018211	1.5144E+04	3156.1	388.92	77.727	28.181	5.0617	0.5222	8.9130E+09	8.9130E+09
x(FT)	1.6200	0.0000	25.515	21.465	0.0000	0.0000	25.515	25.515	25.515	12.150	3.6450
4	0.057898	0.014828	1.5151E+04	2507.3	388.73	56.984	28.373	3.6082	0.8560	8.9130E+09	8.9130E+09
x(FT)	1.6200	0.0000	25.515	19.035	0.0000	0.0000	25.515	25.515	25.515	9.3150	1.6200
Max.	0.061223	0.018211	1.5741E+04	3156.1	405.30	77.731	28.464	5.0617	0.8560	8.9130E+09	8.9130E+09
Pile N.	1	2	1	3	2	2	1	3	4	1	1

LOAD CASE : 4
CASE NAME : Strength MinV2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0513614	-0.0462603	-0.0167010

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-7.31136E-06	-4.21042E-05	-1.14037E-04

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1197.6	-383.64	-47.526	-111.34	2900.3	-4.2162E+04
2	2150.1	-383.44	-60.449	-111.34	4254.6	-4.2155E+04
3	1798.4	-373.36	-60.476	-111.34	4255.6	-4.1347E+04
4	845.86	-373.56	-47.548	-111.34	2901.0	-4.1353E+04
MINIMUM	845.86	-383.64	-60.476	-111.34	2900.3	-4.2162E+04
Pile N.	4	1	3	1	1	1
MAXIMUM	2150.1	-373.36	-47.526	-111.34	4255.6	-4.1347E+04
Pile N.	2	3	1	1	3	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-0.057760	-0.012111	-1.4886E+04	-2049.4	-381.44	-47.055	-28.355	-3.0565	0.2842	4.3837E+09	4.5738E+09
x(FT)	1.2150	0.0000	25.515	19.440	0.0000	0.0000	25.515	25.515	0.0000	25.515	25.515
2	-0.057760	-0.014217	-1.4882E+04	-2453.4	-381.26	-59.897	-28.253	-3.9873	0.5102	4.3838E+09	4.5738E+09
x(FT)	1.2150	0.0000	25.515	21.060	0.0000	0.0000	25.515	25.515	0.0000	25.515	26.730
3	-0.055676	-0.014217	-1.4516E+04	-2455.1	-371.26	-59.923	-28.151	-4.0728	0.4268	4.3965E+09	4.5738E+09
x(FT)	1.2150	0.0000	25.515	21.060	0.0000	0.0000	25.515	25.515	0.0000	25.515	26.325
4	-0.055676	-0.012111	-1.4520E+04	-2050.4	-371.43	-47.077	-28.258	-3.1228	0.2007	4.3963E+09	4.5738E+09
x(FT)	1.2150	0.0000	25.515	19.440	0.0000	0.0000	25.515	25.515	0.0000	25.515	25.515
Min.	-0.057760	-0.014217	-1.4886E+04	-2455.1	-381.44	-59.923	-28.355	-4.0728	0.2007	4.3837E+09	4.5738E+09

Pile N. 1 2 1 3 1 3 1 3 4 1 1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	2.7170E-04	3.4288E-05	4.2162E+04	2900.3	332.35	42.181	7.5864	0.9574	0.3500	8.9130E+09	8.9130E+09
x(FT)	29.160	29.160	0.0000	0.0000	27.540	27.135	29.160	29.160	25.515	16.605	0.8100
2	2.7166E-04	4.3529E-05	4.2155E+04	4254.6	332.31	53.431	7.5852	1.2154	0.6285	8.9130E+09	8.9130E+09
x(FT)	29.160	29.160	0.0000	0.0000	27.540	27.135	29.160	29.160	25.515	8.1000	4.0500
3	2.6497E-04	4.3597E-05	4.1347E+04	4255.6	324.05	53.537	7.3985	1.2173	0.5257	8.9130E+09	8.9130E+09
x(FT)	29.160	29.160	0.0000	0.0000	27.540	27.135	29.160	29.160	25.515	15.795	12.555
4	2.6502E-04	3.4341E-05	4.1353E+04	2901.0	324.09	42.264	7.3998	0.9589	0.2472	8.9130E+09	8.9130E+09
x(FT)	29.160	29.160	0.0000	0.0000	27.540	27.135	29.160	29.160	25.515	11.340	0.4050
Max.	2.7170E-04	4.3597E-05	4.2162E+04	4255.6	332.35	53.537	7.5864	1.2173	0.6285	8.9130E+09	8.9130E+09
Pile N.	1	3	1	3	1	3	1	3	2	1	1

LOAD CASE : 5
CASE NAME : Strength MaxV3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0735047	0.0473378	0.0369992

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
1.52881E-06	1.06153E-04	2.83608E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1815.3	317.40	103.42	23.281	-5610.0	3.3815E+04
2	1578.4	317.44	106.16	23.281	-5892.7	3.3815E+04
3	2465.2	315.09	106.08	23.281	-5895.6	3.3625E+04
4	2702.1	315.06	103.35	23.281	-5612.9	3.3625E+04
MINIMUM	1578.4	315.06	103.35	23.281	-5895.6	3.3625E+04

Pile N.	2	4	4	1	3	3
MAXIMUM	2702.1	317.44	106.16	23.281	-5610.0	3.3815E+04
Pile N.	4	2	2	1	1	1

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-2.2833E-04	-7.5434E-05	-3.3815E+04	-5610.0	-278.89	-93.214	-6.3754	-2.1063	0.4308	4.4842E+09	4.5738E+09
x(FT)	29.160	29.160	0.0000	0.0000	27.135	27.135	29.160	29.160	0.0000	25.515	25.515
2	-2.2829E-04	-7.7384E-05	-3.3815E+04	-5892.7	-278.82	-95.591	-6.3742	-2.1607	0.3746	4.4843E+09	4.5738E+09
x(FT)	29.160	29.160	0.0000	0.0000	27.135	27.135	29.160	29.160	0.0000	25.515	26.730
3	-2.2685E-04	-7.7406E-05	-3.3625E+04	-5895.6	-277.11	-95.633	-6.3341	-2.1613	0.5850	4.4885E+09	4.5738E+09
x(FT)	29.160	29.160	0.0000	0.0000	27.135	27.135	29.160	29.160	0.0000	25.515	26.325
4	-2.2690E-04	-7.5455E-05	-3.3625E+04	-5612.9	-277.18	-93.254	-6.3354	-2.1069	0.6412	4.4884E+09	4.5738E+09
x(FT)	29.160	29.160	0.0000	0.0000	27.135	27.135	29.160	29.160	0.0000	25.515	25.920
Min.	-2.2833E-04	-7.7406E-05	-3.3815E+04	-5895.6	-278.89	-95.633	-6.3754	-2.1613	0.3746	4.4842E+09	4.5738E+09
Pile N.	1	3	1	3	1	3	1	3	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.050017	0.027862	1.2492E+04	4725.5	315.47	102.34	26.689	7.4646	0.5306	8.9130E+09	8.9130E+09
x(FT)	0.4050	0.0000	25.515	18.225	0.0000	0.0000	25.515	25.515	25.515	10.935	8.5050
2	0.050017	0.028302	1.2490E+04	4797.4	315.51	105.05	26.638	7.6780	0.4614	8.9130E+09	8.9130E+09
x(FT)	0.4050	0.0000	25.515	18.630	0.0000	0.0000	25.515	25.515	25.515	12.150	3.6450
3	0.049578	0.028302	1.2410E+04	4799.6	313.19	104.98	26.617	7.7184	0.7206	8.9130E+09	8.9130E+09
x(FT)	0.4050	0.0000	25.515	18.225	0.0000	0.0000	25.515	25.515	25.515	10.530	8.9100
4	0.049578	0.027862	1.2412E+04	4727.7	313.16	102.26	26.668	7.5040	0.7898	8.9130E+09	8.9130E+09
x(FT)	0.4050	0.0000	25.515	18.225	0.0000	0.0000	25.515	25.515	25.515	6.8850	2.8350
Max.	0.050017	0.028302	1.2492E+04	4799.6	315.51	105.05	26.689	7.7184	0.7898	8.9130E+09	8.9130E+09
Pile N.	1	2	1	3	2	2	1	3	4	1	1

LOAD CASE : 6
CASE NAME : Strength Minv3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0513011	-0.0492193	-0.0253712

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
5.09477E-06	-7.01342E-05	2.58518E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1897.1	-267.83	-79.500	77.584	4874.9	-2.6617E+04
2	1681.2	-267.87	-70.462	77.584	3929.1	-2.6617E+04
3	1095.4	-276.67	-70.498	77.584	3928.1	-2.7498E+04
4	1311.3	-276.63	-79.540	77.584	4874.0	-2.7497E+04
MINIMUM	1095.4	-276.67	-79.540	77.584	3928.1	-2.7498E+04
Pile N.	3	3	4	1	3	3
MAXIMUM	1897.1	-267.83	-70.462	77.584	4874.9	-2.6617E+04
Pile N.	1	1	2	1	1	1

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-0.046314	-0.020214	-1.0614E+04	-3442.7	-266.04	-78.714	-23.523	-6.2442	0.4502	4.5476E+09	4.5738E+09
x(FT)	0.0000	0.0000	25.515	19.440	0.0000	0.0000	25.515	25.515	0.0000	25.515	25.515
2	-0.046314	-0.018746	-1.0614E+04	-3183.4	-266.07	-69.733	-23.525	-5.4388	0.3990	4.5476E+09	4.5738E+09
x(FT)	0.0000	0.0000	25.515	18.630	0.0000	0.0000	25.515	25.515	0.0000	25.515	25.515
3	-0.047781	-0.018746	-1.0959E+04	-3182.8	-274.81	-69.768	-24.299	-5.4414	0.2599	4.5467E+09	4.5738E+09
x(FT)	0.0000	0.0000	25.515	18.630	0.0000	0.0000	25.515	25.515	0.0000	25.515	25.920
4	-0.047781	-0.020214	-1.0958E+04	-3442.1	-274.77	-78.753	-24.297	-6.2470	0.3112	4.5467E+09	4.5738E+09
x(FT)	0.0000	0.0000	25.515	19.440	0.0000	0.0000	25.515	25.515	0.0000	25.515	25.920
Min.	-0.047781	-0.020214	-1.0959E+04	-3442.7	-274.81	-78.753	-24.299	-6.2470	0.2599	4.5467E+09	4.5738E+09
Pile N.	3	1	3	1	3	4	3	4	3	3	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	1.9425E-04	5.8163E-05	2.6617E+04	4874.9	238.04	71.864	5.4239	1.6240	0.5545	8.9130E+09	8.9130E+09
x(FT)	29.160	29.160	0.0000	0.0000	27.135	27.135	29.160	29.160	25.515	11.745	1.2150
2	1.9425E-04	5.1601E-05	2.6617E+04	3929.1	238.04	63.831	5.4239	1.4408	0.4914	8.9130E+09	8.9130E+09
x(FT)	29.160	29.160	0.0000	0.0000	27.135	27.135	29.160	29.160	25.515	7.2900	2.8350
3	2.0055E-04	5.1607E-05	2.7498E+04	3928.1	245.76	63.838	5.5997	1.4410	0.3202	8.9130E+09	8.9130E+09
x(FT)	29.160	29.160	0.0000	0.0000	27.135	27.135	29.160	29.160	25.515	21.465	3.6450
4	2.0055E-04	5.8169E-05	2.7497E+04	4874.0	245.76	71.870	5.5998	1.6242	0.3833	8.9130E+09	8.9130E+09
x(FT)	29.160	29.160	0.0000	0.0000	27.135	27.135	29.160	29.160	25.515	8.5050	2.4300
Max.	2.0055E-04	5.8169E-05	2.7498E+04	4874.9	245.76	71.870	5.5998	1.6242	0.5545	8.9130E+09	8.9130E+09
Pile N.	3	4	3	1	3	4	4	4	1	1	1

LOAD CASE : 7
CASE NAME : Strength MaxT
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0798744	0.0486572	-0.0157332

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
1.99904E-05	-3.87224E-05	2.21343E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2579.2	331.79	-69.706	304.41	5390.8	3.4805E+04
2	2394.3	331.86	-34.243	304.41	1685.1	3.4809E+04
3	2070.8	302.69	-34.274	304.41	1687.5	3.2254E+04
4	2255.7	302.66	-69.776	304.41	5397.3	3.2253E+04
MINIMUM	2070.8	302.66	-69.776	304.41	1685.1	3.2253E+04
Pile N.	3	4	4	1	2	4
MAXIMUM	2579.2	331.86	-34.243	304.41	5397.3	3.4809E+04
Pile N.	1	2	2	1	4	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-2.3831E-04	-0.015359	-3.4805E+04	-2764.9	-291.07	-69.111	-6.6541	-5.3076	0.6120	4.4571E+09	4.5738E+09
x(FT)	29.160	0.0000	0.0000	23.895	27.135	0.0000	29.160	25.515	0.0000	25.515	25.515
2	-2.3857E-04	-9.6019E-03	-3.4809E+04	-1634.6	-291.48	-33.870	-6.6613	-2.4197	0.5682	4.4566E+09	4.5738E+09
x(FT)	29.160	0.0000	0.0000	17.415	27.135	0.0000	29.160	25.515	0.0000	25.515	25.515
3	-2.1909E-04	-9.6019E-03	-3.2254E+04	-1636.7	-268.06	-33.901	-6.1173	-2.5906	0.4914	4.5110E+09	4.5738E+09
x(FT)	29.160	0.0000	0.0000	17.415	27.135	0.0000	29.160	25.515	0.0000	25.515	25.515
4	-2.1904E-04	-0.015359	-3.2253E+04	-2778.6	-267.99	-69.179	-6.1161	-5.7391	0.5353	4.5117E+09	4.5738E+09
x(FT)	29.160	0.0000	0.0000	24.300	27.135	0.0000	29.160	25.515	0.0000	25.515	25.920
Min.	-2.3857E-04	-0.015359	-3.4809E+04	-2778.6	-291.48	-69.179	-6.6613	-5.7391	0.4914	4.4566E+09	4.5738E+09
Pile N.	2	1	2	4	2	4	2	4	3	2	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.053437	5.0549E-05	1.3036E+04	5390.8	329.74	62.119	27.283	1.4114	0.7539	8.9130E+09	8.9130E+09
x(FT)	0.4050	29.160	25.515	0.0000	0.0000	27.135	25.515	29.160	25.515	8.5050	4.0500
2	0.053437	2.5006E-05	1.3048E+04	1685.1	329.80	30.932	27.629	0.6982	0.6998	8.9130E+09	8.9130E+09
x(FT)	0.4050	29.160	25.515	0.0000	0.0000	27.135	25.515	29.160	25.515	9.7200	0.0000
3	0.047693	2.5216E-05	1.1978E+04	1687.5	300.85	31.143	27.104	0.7041	0.6053	8.9130E+09	8.9130E+09
x(FT)	0.4050	28.755	25.515	0.0000	0.0000	27.135	25.515	28.755	25.515	9.3150	8.9100
4	0.047693	5.0884E-05	1.1975E+04	5397.3	300.82	62.649	27.033	1.4208	0.6593	8.9130E+09	8.9130E+09
x(FT)	0.4050	29.160	25.515	0.0000	0.0000	27.135	25.515	29.160	25.515	9.3150	14.985
Max.	0.053437	5.0884E-05	1.3048E+04	5397.3	329.80	62.649	27.629	1.4208	0.7539	8.9130E+09	8.9130E+09
Pile N.	1	4	2	4	2	4	2	4	1	1	1

LOAD CASE : 8
CASE NAME : Strength MinT
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0573692	-0.0469358	0.0199814

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-1.53416E-05	4.92568E-05	-5.50272E-06

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1443.5	-305.21	79.625	-233.62	-5905.1	-3.1784E+04
2	1489.5	-305.25	52.376	-233.62	-3059.9	-3.1788E+04
3	1901.0	-279.77	52.369	-233.62	-3061.8	-2.9283E+04
4	1855.0	-279.77	79.629	-233.62	-5909.0	-2.9284E+04
MINIMUM	1443.5	-305.25	52.369	-233.62	-5909.0	-3.1788E+04
Pile N.	1	2	3	1	4	2
MAXIMUM	1901.0	-279.77	79.629	-233.62	-3059.9	-2.9283E+04
Pile N.	3	3	4	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-0.049607	-5.7926E-05	-1.2046E+04	-5905.1	-303.29	-71.308	-26.194	-1.6174	0.3426	4.5162E+09	4.5738E+09
x(FT)	0.0000	29.160	25.515	0.0000	0.0000	27.135	25.515	29.160	0.0000	25.515	25.515
2	-0.049607	-3.8266E-05	-1.2059E+04	-3059.9	-303.32	-47.284	-26.539	-1.0685	0.3535	4.5159E+09	4.5738E+09
x(FT)	0.0000	29.160	25.515	0.0000	0.0000	27.135	25.515	29.160	0.0000	25.515	25.920
3	-0.045189	-3.8336E-05	-1.1080E+04	-3061.8	-278.02	-47.395	-24.934	-1.0704	0.4511	4.5465E+09	4.5738E+09
x(FT)	0.0000	29.160	25.515	0.0000	0.0000	27.135	25.515	29.160	0.0000	25.515	25.515
4	-0.045189	-5.8103E-05	-1.1080E+04	-5909.0	-278.02	-71.590	-24.935	-1.6224	0.4402	4.5465E+09	4.5738E+09
x(FT)	0.0000	29.160	25.515	0.0000	0.0000	27.135	25.515	29.160	0.0000	25.515	25.515
Min.	-0.049607	-5.8103E-05	-1.2059E+04	-5909.0	-303.32	-71.590	-26.539	-1.6224	0.3426	4.5159E+09	4.5738E+09
Pile N.	1	4	2	4	2	4	2	4	1	2	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	2.2028E-04	0.018053	3.1784E+04	3192.5	269.39	78.923	6.1507	6.2753	0.4219	8.9130E+09	8.9130E+09
x(FT)	29.160	0.0000	0.0000	22.680	27.135	0.0000	29.160	25.515	25.515	8.1000	24.705
2	2.2055E-04	0.013635	3.1788E+04	2315.0	269.82	51.846	6.1581	3.9848	0.4354	8.9130E+09	8.9130E+09
x(FT)	29.160	0.0000	0.0000	19.035	27.135	0.0000	29.160	25.515	25.515	8.1000	2.0250

3	2.0268E-04	0.013635	2.9283E+04	2317.0	248.09	51.839	5.6593	4.0767	0.5556	8.9130E+09	8.9130E+09
x(FT)	29.160	0.0000	0.0000	19.035	27.135	0.0000	29.160	25.515	25.515	6.4800	9.3150
4	2.0268E-04	0.018053	2.9284E+04	3199.0	248.09	78.927	5.6593	6.5051	0.5422	8.9130E+09	8.9130E+09
x(FT)	29.160	0.0000	0.0000	22.680	27.135	0.0000	29.160	25.515	25.515	11.340	11.745
Max.	2.2055E-04	0.018053	3.1788E+04	3199.0	269.82	78.927	6.1581	6.5051	0.5556	8.9130E+09	8.9130E+09
Pile N.	2	1	2	4	2	4	2	4	3	1	1

LOAD CASE : 9
CASE NAME : Strength MaxM2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0735047	0.0473378	0.0369992

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
1.52881E-06	1.06153E-04	2.83608E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1815.3	317.40	103.42	23.281	-5610.0	3.3815E+04
2	1578.4	317.44	106.16	23.281	-5892.7	3.3815E+04
3	2465.2	315.09	106.08	23.281	-5895.6	3.3625E+04
4	2702.1	315.06	103.35	23.281	-5612.9	3.3625E+04
MINIMUM	1578.4	315.06	103.35	23.281	-5895.6	3.3625E+04
Pile N.	2	4	4	1	3	3
MAXIMUM	2702.1	317.44	106.16	23.281	-5610.0	3.3815E+04
Pile N.	4	2	2	1	1	1

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2

1	-2.2833E-04	-7.5434E-05	-3.3815E+04	-5610.0	-278.89	-93.214	-6.3754	-2.1063	0.4308	4.4842E+09	4.5738E+09
x(FT)	29.160	29.160	0.0000	0.0000	27.135	27.135	29.160	29.160	0.0000	25.515	25.920
2	-2.2829E-04	-7.7384E-05	-3.3815E+04	-5892.7	-278.82	-95.591	-6.3742	-2.1607	0.3746	4.4843E+09	4.5738E+09
x(FT)	29.160	29.160	0.0000	0.0000	27.135	27.135	29.160	29.160	0.0000	25.515	25.515
3	-2.2685E-04	-7.7406E-05	-3.3625E+04	-5895.6	-277.11	-95.633	-6.3341	-2.1613	0.5850	4.4885E+09	4.5738E+09
x(FT)	29.160	29.160	0.0000	0.0000	27.135	27.135	29.160	29.160	0.0000	25.515	25.515
4	-2.2690E-04	-7.5455E-05	-3.3625E+04	-5612.9	-277.18	-93.254	-6.3354	-2.1069	0.6412	4.4884E+09	4.5738E+09
x(FT)	29.160	29.160	0.0000	0.0000	27.135	27.135	29.160	29.160	0.0000	25.515	26.325
Min.	-2.2833E-04	-7.7406E-05	-3.3815E+04	-5895.6	-278.89	-95.633	-6.3754	-2.1613	0.3746	4.4842E+09	4.5738E+09
Pile N.	1	3	1	3	1	3	1	3	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.050017	0.027862	1.2492E+04	4725.5	315.47	102.34	26.689	7.4646	0.5306	8.9130E+09	8.9130E+09
x(FT)	0.4050	0.0000	25.515	18.225	0.0000	0.0000	25.515	25.515	25.515	7.2900	2.0250
2	0.050017	0.028302	1.2490E+04	4797.4	315.51	105.05	26.638	7.6780	0.4614	8.9130E+09	8.9130E+09
x(FT)	0.4050	0.0000	25.515	18.630	0.0000	0.0000	25.515	25.515	25.515	21.465	9.7200
3	0.049578	0.028302	1.2410E+04	4799.6	313.19	104.98	26.617	7.7184	0.7206	8.9130E+09	8.9130E+09
x(FT)	0.4050	0.0000	25.515	18.225	0.0000	0.0000	25.515	25.515	25.515	10.125	1.2150
4	0.049578	0.027862	1.2412E+04	4727.7	313.16	102.26	26.668	7.5040	0.7898	8.9130E+09	8.9130E+09
x(FT)	0.4050	0.0000	25.515	18.225	0.0000	0.0000	25.515	25.515	25.515	10.125	2.8350
Max.	0.050017	0.028302	1.2492E+04	4799.6	315.51	105.05	26.689	7.7184	0.7898	8.9130E+09	8.9130E+09
Pile N.	1	2	1	3	2	2	1	3	4	1	1

LOAD CASE : 10
CASE NAME : Strength MinM2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0587138	-0.0456580	-0.0245806

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
4.53408E-06	-6.93584E-05	-1.67311E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1931.1	-293.28	-75.019	69.045	4444.9	-3.1138E+04
2	2070.8	-293.27	-66.959	69.045	3604.1	-3.1139E+04
3	1491.4	-300.72	-66.980	69.045	3601.5	-3.1856E+04
4	1351.7	-300.73	-75.042	69.045	4442.2	-3.1855E+04
MINIMUM	1351.7	-300.73	-75.042	69.045	3601.5	-3.1856E+04
Pile N.	4	4	4	1	3	3
MAXIMUM	2070.8	-293.27	-66.959	69.045	4444.9	-3.1138E+04
Pile N.	2	2	2	1	1	1

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-0.046445	-0.019407	-1.1604E+04	-3298.7	-291.48	-74.264	-26.024	-5.8049	0.4582	4.5406E+09	4.5738E+09
x(FT)	0.4050	0.0000	25.515	19.035	0.0000	0.0000	25.515	25.515	0.0000	25.515	25.515
2	-0.046445	-0.018102	-1.1608E+04	-3075.4	-291.47	-66.255	-26.135	-5.1146	0.4914	4.5405E+09	4.5738E+09
x(FT)	0.4050	0.0000	25.515	18.225	0.0000	0.0000	25.515	25.515	0.0000	25.515	26.325
3	-0.047749	-0.018102	-1.1879E+04	-3073.1	-298.87	-66.276	-26.229	-5.0119	0.3539	4.5260E+09	4.5738E+09
x(FT)	0.4050	0.0000	25.515	18.225	0.0000	0.0000	25.515	25.515	0.0000	25.515	25.515
4	-0.047749	-0.019407	-1.1876E+04	-3296.0	-298.88	-74.286	-26.123	-5.6892	0.3207	4.5261E+09	4.5738E+09
x(FT)	0.4050	0.0000	25.515	19.035	0.0000	0.0000	25.515	25.515	0.0000	25.515	25.920
Min.	-0.047749	-0.019407	-1.1879E+04	-3298.7	-298.88	-74.286	-26.229	-5.8049	0.3207	4.5260E+09	4.5738E+09
Pile N.	3	1	3	1	4	4	3	1	4	3	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	2.1224E-04	5.4874E-05	3.1138E+04	4444.9	259.64	67.817	5.9260	1.5322	0.5644	8.9130E+09	8.9130E+09
x(FT)	29.160	29.160	0.0000	0.0000	27.135	27.135	29.160	29.160	25.515	6.8850	10.935
2	2.1232E-04	4.9065E-05	3.1139E+04	3604.1	259.77	60.700	5.9285	1.3700	0.6053	8.9130E+09	8.9130E+09
x(FT)	29.160	28.755	0.0000	0.0000	27.135	27.135	29.160	28.755	25.515	6.8850	11.340
3	2.1722E-04	4.8977E-05	3.1856E+04	3601.5	265.63	60.577	6.0653	1.3675	0.4359	8.9130E+09	8.9130E+09
x(FT)	29.160	29.160	0.0000	0.0000	27.135	27.135	29.160	29.160	25.515	10.530	0.4050
4	2.1714E-04	5.4788E-05	3.1855E+04	4442.2	265.49	67.678	6.0629	1.5298	0.3951	8.9130E+09	8.9130E+09
x(FT)	29.160	29.160	0.0000	0.0000	27.135	27.135	29.160	29.160	25.515	14.985	0.0000
Max.	2.1722E-04	5.4874E-05	3.1856E+04	4444.9	265.63	67.817	6.0653	1.5322	0.6053	8.9130E+09	8.9130E+09
Pile N.	3	1	3	1	3	1	3	1	2	1	1

LOAD CASE : 11
CASE NAME : Strength MaxM3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0734530	0.0468917	0.0209196

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
1.17453E-05	5.23796E-05	1.36715E-04

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2491.0	407.40	57.566	178.86	-3452.9	4.4839E+04
2	1349.0	407.62	78.439	178.86	-5624.4	4.4845E+04
3	1786.5	391.10	78.434	178.86	-5627.5	4.3523E+04
4	2928.5	390.88	57.560	178.86	-3455.3	4.3518E+04
MINIMUM	1349.0	390.88	57.560	178.86	-5627.5	4.3518E+04
Pile N.	2	4	4	1	3	4
MAXIMUM	2928.5	407.62	78.439	178.86	-3452.9	4.4845E+04
Pile N.	4	2	2	1	1	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-2.8727E-04	-4.1438E-05	-4.4839E+04	-3452.9	-351.85	-50.936	-8.0213	-1.1570	0.5911	4.3571E+09	4.5738E+09
x(FT)	29.160	29.160	0.0000	0.0000	27.540	27.135	29.160	29.160	0.0000	25.515	25.920
2	-2.8709E-04	-5.6221E-05	-4.4845E+04	-5624.4	-351.70	-68.900	-8.0160	-1.5698	0.3201	4.3574E+09	4.5738E+09
x(FT)	29.160	29.160	0.0000	0.0000	27.540	27.135	29.160	29.160	0.0000	25.515	25.515
3	-2.7633E-04	-5.6355E-05	-4.3523E+04	-5627.5	-338.37	-69.113	-7.7158	-1.5735	0.4239	4.3753E+09	4.5738E+09
x(FT)	29.160	29.160	0.0000	0.0000	27.540	27.135	29.160	29.160	0.0000	25.515	25.920
4	-2.7652E-04	-4.1531E-05	-4.3518E+04	-3455.3	-338.52	-51.085	-7.7209	-1.1596	0.6949	4.3751E+09	4.5738E+09

x(FT)	29.160	29.160	0.0000	0.0000	27.540	27.135	29.160	29.160	0.0000	25.515	25.920
Min.	-2.8727E-04	-5.6355E-05	-4.4845E+04	-5627.5	-351.85	-69.113	-8.0213	-1.5735	0.3201	4.3571E+09	4.5738E+09
Pile N.	1	3	2	3	1	3	1	3	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.061223	0.014828	1.5741E+04	2504.7	405.10	56.990	28.464	3.4858	0.7281	8.9130E+09	8.9130E+09
x(FT)	1.6200	0.0000	25.515	19.035	0.0000	0.0000	25.515	25.515	25.515	16.200	23.490
2	0.061223	0.018211	1.5735E+04	3151.6	405.30	77.731	28.259	4.8875	0.3943	8.9130E+09	8.9130E+09
x(FT)	1.6200	0.0000	25.515	21.465	0.0000	0.0000	25.515	25.515	25.515	11.745	2.8350
3	0.057898	0.018211	1.5144E+04	3156.1	388.92	77.727	28.181	5.0617	0.5222	8.9130E+09	8.9130E+09
x(FT)	1.6200	0.0000	25.515	21.465	0.0000	0.0000	25.515	25.515	25.515	9.3150	4.4550
4	0.057898	0.014828	1.5151E+04	2507.3	388.73	56.984	28.373	3.6082	0.8560	8.9130E+09	8.9130E+09
x(FT)	1.6200	0.0000	25.515	19.035	0.0000	0.0000	25.515	25.515	25.515	11.340	2.8350
Max.	0.061223	0.018211	1.5741E+04	3156.1	405.30	77.731	28.464	5.0617	0.8560	8.9130E+09	8.9130E+09
Pile N.	1	2	1	3	2	2	1	3	4	1	1

LOAD CASE : 12
CASE NAME : Strength MinM3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0513614	-0.0462603	-0.0167010

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-7.31136E-06	-4.21042E-05	-1.14037E-04

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1197.6	-383.64	-47.526	-111.34	2900.3	-4.2162E+04
2	2150.1	-383.44	-60.449	-111.34	4254.6	-4.2155E+04

3	1798.4	-373.36	-60.476	-111.34	4255.6	-4.1347E+04
4	845.86	-373.56	-47.548	-111.34	2901.0	-4.1353E+04
MINIMUM	845.86	-383.64	-60.476	-111.34	2900.3	-4.2162E+04
Pile N.	4	1	3	1	1	1
MAXIMUM	2150.1	-373.36	-47.526	-111.34	4255.6	-4.1347E+04
Pile N.	2	3	1	1	3	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-0.057760	-0.012111	-1.4886E+04	-2049.4	-381.44	-47.055	-28.355	-3.0565	0.2842	4.3837E+09	4.5738E+09
x(FT)	1.2150	0.0000	25.515	19.440	0.0000	0.0000	25.515	25.515	0.0000	25.515	25.515
2	-0.057760	-0.014217	-1.4882E+04	-2453.4	-381.26	-59.897	-28.253	-3.9873	0.5102	4.3838E+09	4.5738E+09
x(FT)	1.2150	0.0000	25.515	21.060	0.0000	0.0000	25.515	25.515	0.0000	25.515	25.515
3	-0.055676	-0.014217	-1.4516E+04	-2455.1	-371.26	-59.923	-28.151	-4.0728	0.4268	4.3965E+09	4.5738E+09
x(FT)	1.2150	0.0000	25.515	21.060	0.0000	0.0000	25.515	25.515	0.0000	25.515	25.515
4	-0.055676	-0.012111	-1.4520E+04	-2050.4	-371.43	-47.077	-28.258	-3.1228	0.2007	4.3963E+09	4.5738E+09
x(FT)	1.2150	0.0000	25.515	19.440	0.0000	0.0000	25.515	25.515	0.0000	25.515	25.515
Min.	-0.057760	-0.014217	-1.4886E+04	-2455.1	-381.44	-59.923	-28.355	-4.0728	0.2007	4.3837E+09	4.5738E+09
Pile N.	1	2	1	3	1	3	1	3	4	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	2.7170E-04	3.4288E-05	4.2162E+04	2900.3	332.35	42.181	7.5864	0.9574	0.3500	8.9130E+09	8.9130E+09
x(FT)	29.160	29.160	0.0000	0.0000	27.540	27.135	29.160	29.160	25.515	13.365	8.9100
2	2.7166E-04	4.3529E-05	4.2155E+04	4254.6	332.31	53.431	7.5852	1.2154	0.6285	8.9130E+09	8.9130E+09
x(FT)	29.160	29.160	0.0000	0.0000	27.540	27.135	29.160	29.160	25.515	8.1000	0.0000
3	2.6497E-04	4.3597E-05	4.1347E+04	4255.6	324.05	53.537	7.3985	1.2173	0.5257	8.9130E+09	8.9130E+09
x(FT)	29.160	29.160	0.0000	0.0000	27.540	27.135	29.160	29.160	25.515	10.125	10.530
4	2.6502E-04	3.4341E-05	4.1353E+04	2901.0	324.09	42.264	7.3998	0.9589	0.2472	8.9130E+09	8.9130E+09
x(FT)	29.160	29.160	0.0000	0.0000	27.540	27.135	29.160	29.160	25.515	16.200	9.7200
Max.	2.7170E-04	4.3597E-05	4.2162E+04	4255.6	332.35	53.537	7.5864	1.2173	0.6285	8.9130E+09	8.9130E+09
Pile N.	1	3	1	3	1	3	1	3	2	1	1

LOAD CASE : 13
CASE NAME : Service MaxP
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0564210	-6.44717E-05	8.54966E-03

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
6.22859E-06	2.75221E-05	8.29730E-06

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1564.5	14.784	15.217	94.849	-242.90	1950.0
2	1495.1	14.784	26.287	94.849	-1398.9	1950.0
3	1725.0	3.7158	26.282	94.849	-1399.0	793.95
4	1794.4	3.7158	15.213	94.849	-243.08	793.93
MINIMUM	1495.1	3.7158	15.213	94.849	-1399.0	793.93
Pile N.	2	3	4	1	3	4
MAXIMUM	1794.4	14.784	26.287	94.849	-242.90	1950.0
Pile N.	4	1	2	1	1	1

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-1.0659E-05	-1.1469E-05	-1950.0	-242.90	-13.040	-14.013	-0.2976	-0.3202	0.3712	4.5738E+09	4.5738E+09
x(FT)	29.160	28.755	0.0000	0.0000	27.540	27.135	29.160	28.755	0.0000	26.730	25.515
2	-1.0659E-05	-1.9273E-05	-1950.0	-1398.9	-13.040	-23.836	-0.2976	-0.5381	0.3548	4.5738E+09	4.5738E+09
x(FT)	29.160	28.755	0.0000	0.0000	27.540	27.135	29.160	28.755	0.0000	25.515	25.920
3	-2.6442E-04	-1.9272E-05	-793.95	-1399.0	-3.2889	-23.835	-0.074642	-0.5381	0.4093	4.5738E+09	4.5738E+09
x(FT)	0.0000	28.755	0.0000	0.0000	27.540	27.135	29.565	28.755	0.0000	26.325	25.515
4	-2.6442E-04	-1.1468E-05	-793.93	-243.08	-3.2890	-14.012	-0.074645	-0.3202	0.4258	4.5738E+09	4.5738E+09
x(FT)	0.0000	28.755	0.0000	0.0000	27.540	27.135	29.565	28.755	0.0000	25.920	25.920
Min.	-2.6442E-04	-1.9273E-05	-1950.0	-1399.0	-13.040	-23.836	-0.2976	-0.5381	0.3548	4.5738E+09	4.5738E+09
Pile N.	3	2	1	3	1	2	1	2	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	1.7054E-03	5.3409E-03	584.44	982.84	14.725	15.009	1.4161	1.0267	0.4573	8.9130E+09	8.9130E+09
x(FT)	3.6450	0.0000	25.515	14.175	0.0000	0.0000	25.515	25.515	25.515	0.4050	20.655
2	1.7054E-03	7.1347E-03	584.44	1212.3	14.725	26.010	1.4162	2.0128	0.4370	8.9130E+09	8.9130E+09
x(FT)	3.6450	0.0000	25.515	18.225	0.0000	0.0000	25.515	25.515	25.515	0.0000	3.2400
3	2.1655E-04	7.1347E-03	145.83	1212.4	3.8046	26.004	0.4302	2.0124	0.5042	8.9130E+09	8.9130E+09
x(FT)	11.340	0.0000	25.920	18.225	3.2400	0.0000	25.515	25.515	25.515	6.4800	12.960
4	2.1655E-04	5.3409E-03	145.83	982.94	3.8046	15.005	0.4302	1.0263	0.5245	8.9130E+09	8.9130E+09
x(FT)	11.340	0.0000	25.920	14.175	3.2400	0.0000	25.515	25.515	25.515	12.150	9.3150
Max.	1.7054E-03	7.1347E-03	584.44	1212.4	14.725	26.010	1.4162	2.0128	0.5245	8.9130E+09	8.9130E+09
Pile N.	1	2	1	3	1	2	2	2	4	1	1

LOAD CASE : 14
CASE NAME : Service MinP
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0679107	1.12018E-03	-4.55122E-03

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-4.82795E-06	-1.79126E-05	6.31323E-06

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2079.2	9.9608	-2.9606	-73.520	-566.44	1349.2
2	2026.4	9.9610	-11.538	-73.520	329.53	1349.2
3	1876.8	18.539	-11.540	-73.520	329.46	2245.3
4	1929.6	18.539	-2.9616	-73.520	-566.52	2245.3
MINIMUM	1876.8	9.9608	-11.540	-73.520	-566.52	1349.2
Pile N.	3	1	3	1	4	1
MAXIMUM	2079.2	18.539	-2.9606	-73.520	329.53	2245.3
Pile N.	1	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-7.1787E-06	-2.3513E-03	-1349.2	-680.84	-8.7897	-2.8688	-0.2004	-0.049627	0.4934	4.5738E+09	4.5738E+09
x(FT)	29.160	0.0000	0.0000	6.4800	27.540	0.0000	29.160	25.515	0.0000	25.515	25.920
2	-7.1787E-06	-3.7418E-03	-1349.2	-664.44	-8.7896	-11.392	-0.2004	-0.8138	0.4809	4.5738E+09	4.5738E+09
x(FT)	29.160	0.0000	0.0000	15.390	27.540	0.0000	29.160	25.515	0.0000	25.515	25.515
3	-1.3399E-05	-3.7418E-03	-2245.3	-664.40	-16.348	-11.394	-0.3741	-0.8139	0.4454	4.5738E+09	4.5738E+09
x(FT)	29.160	0.0000	0.0000	15.390	27.540	0.0000	29.160	25.515	0.0000	25.515	25.515
4	-1.3399E-05	-2.3513E-03	-2245.3	-680.83	-16.348	-2.8699	-0.3741	-0.049728	0.4579	4.5738E+09	4.5738E+09
x(FT)	29.160	0.0000	0.0000	6.4800	27.540	0.0000	29.160	25.515	0.0000	25.515	25.920
Min.	-1.3399E-05	-3.7418E-03	-2245.3	-680.84	-16.348	-11.394	-0.3741	-0.8139	0.4454	4.5738E+09	4.5738E+09
Pile N.	3	2	3	1	3	3	3	3	3	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	1.1040E-03	2.9396E-06	393.72	6.9414	9.9240	3.6301	0.9629	0.082079	0.6077	8.9130E+09	8.9130E+09
x(FT)	4.0500	27.945	25.515	31.590	0.0000	25.920	25.515	27.945	25.515	1.2150	0.4050
2	1.1040E-03	8.6194E-06	393.72	329.53	9.9242	10.574	0.9629	0.2407	0.5923	8.9130E+09	8.9130E+09
x(FT)	4.0500	28.755	25.515	0.0000	0.0000	27.135	25.515	28.755	25.515	0.4050	23.085
3	2.4309E-03	8.6196E-06	733.84	329.46	18.449	10.574	1.7271	0.2407	0.5486	8.9130E+09	8.9130E+09
x(FT)	2.4300	28.755	25.515	0.0000	0.0000	27.135	25.515	28.755	25.515	4.8600	5.2650
4	2.4309E-03	2.9396E-06	733.84	6.9412	18.448	3.6300	1.7271	0.082080	0.5640	8.9130E+09	8.9130E+09
x(FT)	2.4300	27.945	25.515	31.590	0.0000	25.920	25.515	27.945	25.515	21.060	0.8100
Max.	2.4309E-03	8.6196E-06	733.84	329.53	18.449	10.574	1.7271	0.2407	0.6077	8.9130E+09	8.9130E+09
Pile N.	3	3	3	2	3	2	3	3	1	1	1

LOAD CASE : 15
CASE NAME : Service MaxV2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0606187	-5.14153E-04	-5.13247E-03

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-1.76944E-07	-1.99235E-05	5.08931E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2062.3	55.838	-8.3396	-2.6945	-102.84	8321.4
2	1637.2	55.845	-8.6586	-2.6945	-70.248	8322.3
3	1470.7	56.162	-8.6604	-2.6945	-70.345	8355.6
4	1895.8	56.155	-8.3414	-2.6945	-102.94	8354.6
MINIMUM	1470.7	55.838	-8.6604	-2.6945	-102.94	8321.4
Pile N.	3	1	3	1	4	1
MAXIMUM	2062.3	56.162	-8.3396	-2.6945	-70.248	8355.6
Pile N.	1	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-4.0129E-05	-3.4334E-03	-8321.4	-689.50	-49.300	-8.2058	-1.1205	-0.5048	0.4894	4.5738E+09	4.5738E+09
x(FT)	29.160	0.0000	0.0000	12.150	27.540	0.0000	29.160	25.515	0.0000	25.515	25.515
2	-4.0125E-05	-3.4844E-03	-8322.3	-690.48	-49.295	-8.5228	-1.1204	-0.5332	0.3885	4.5738E+09	4.5738E+09
x(FT)	29.160	0.0000	0.0000	12.555	27.540	0.0000	29.160	25.515	0.0000	25.920	25.515
3	-4.0351E-05	-3.4844E-03	-8355.6	-690.43	-49.570	-8.5247	-1.1267	-0.5334	0.3490	4.5738E+09	4.5738E+09
x(FT)	29.160	0.0000	0.0000	12.555	27.540	0.0000	29.160	25.515	0.0000	25.515	25.515
4	-4.0356E-05	-3.4334E-03	-8354.6	-689.45	-49.575	-8.2076	-1.1268	-0.5050	0.4499	4.5738E+09	4.5738E+09
x(FT)	29.160	0.0000	0.0000	12.150	27.540	0.0000	29.160	25.515	0.0000	25.515	25.920
Min.	-4.0356E-05	-3.4844E-03	-8355.6	-690.48	-49.575	-8.5247	-1.1268	-0.5334	0.3490	4.5738E+09	4.5738E+09
Pile N.	4	2	3	2	4	3	4	3	3	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	5.3561E-03	6.4178E-06	2203.9	15.165	55.695	7.8781	5.5831	0.1792	0.6028	8.9130E+09	8.9130E+09
x(FT)	6.0750	28.755	25.515	32.400	0.0000	26.730	25.515	28.755	25.515	4.8600	2.4300
2	5.3560E-03	6.6405E-06	2203.8	15.682	55.701	8.1417	5.5831	0.1854	0.4785	8.9130E+09	8.9130E+09

x(FT)	6.0750	28.755	25.515	32.400	0.0000	26.730	25.515	28.755	25.515	14.985	8.9100
3	5.3999E-03	6.6409E-06	2216.2	15.683	56.016	8.1421	5.6111	0.1854	0.4299	8.9130E+09	8.9130E+09
x(FT)	5.6700	28.755	25.515	32.400	0.0000	26.730	25.515	28.755	25.515	6.4800	12.150
4	5.4000E-03	6.4182E-06	2216.3	15.165	56.010	7.8785	5.6111	0.1792	0.5542	8.9130E+09	8.9130E+09
x(FT)	5.6700	28.755	25.515	32.400	0.0000	26.730	25.515	28.755	25.515	7.6950	8.9100
Max.	5.4000E-03	6.6409E-06	2216.3	15.683	56.016	8.1421	5.6111	0.1854	0.6028	8.9130E+09	8.9130E+09
Pile N.	4	3	4	3	3	3	3	3	1	1	1

LOAD CASE : 16
CASE NAME : Service MinV2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0609635	8.88700E-04	9.04442E-03

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
2.44608E-06	2.92848E-05	-3.39588E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1512.4	-31.829	19.582	37.249	-612.41	-4985.7
2	1796.0	-31.827	23.923	37.249	-1066.6	-4985.3
3	2040.6	-36.170	23.917	37.249	-1066.8	-5438.9
4	1757.0	-36.173	19.577	37.249	-612.60	-5439.3
MINIMUM	1512.4	-36.173	19.577	37.249	-1066.8	-5439.3
Pile N.	1	4	4	1	3	4
MAXIMUM	2040.6	-31.827	23.923	37.249	-612.41	-4985.3
Pile N.	3	2	2	1	1	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR	DISPL. z-DIR	MOMENT z-DIR	MOMENT y-DIR	SHEAR y-DIR	SHEAR z-DIR	SOIL REACT y-DIR	SOIL REACT z-DIR	TOTAL STRESS	FLEX. RIG. z-DIR	FLEX. RIG. y-DIR

	IN	IN	KIP-IN	KIP-IN	KIP	KIP	KIP/IN	KIP/IN	KIP/IN**2	KIP-IN**2	KIP-IN**2
1	-2.8336E-03	-1.4593E-05	-1255.0	-612.41	-31.767	-17.919	-3.2412	-0.4075	0.3589	4.5738E+09	4.5738E+09
x(FT)	6.8850	28.755	25.515	0.0000	0.0000	27.135	25.515	28.755	0.0000	25.515	25.515
2	-2.8337E-03	-1.7657E-05	-1255.1	-1066.6	-31.765	-21.775	-3.2412	-0.4930	0.4262	4.5738E+09	4.5738E+09
x(FT)	6.8850	28.755	25.515	0.0000	0.0000	27.135	25.515	28.755	0.0000	25.920	25.515
3	-3.4240E-03	-1.7656E-05	-1427.4	-1066.8	-36.082	-21.773	-3.6284	-0.4930	0.4842	4.5738E+09	4.5738E+09
x(FT)	6.0750	28.755	25.515	0.0000	0.0000	27.135	25.515	28.755	0.0000	25.515	25.920
4	-3.4239E-03	-1.4592E-05	-1427.4	-612.60	-36.085	-17.917	-3.6284	-0.4074	0.4169	4.5738E+09	4.5738E+09
x(FT)	6.0750	28.755	25.515	0.0000	0.0000	27.135	25.515	28.755	0.0000	25.920	25.515
Min.	-3.4240E-03	-1.7657E-05	-1427.4	-1066.8	-36.085	-21.775	-3.6284	-0.4930	0.3589	4.5738E+09	4.5738E+09
Pile N.	3	2	3	3	4	2	3	2	1	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR	DISPL. z-DIR	MOMENT z-DIR	MOMENT y-DIR	SHEAR y-DIR	SHEAR z-DIR	SOIL REACT y-DIR	SOIL REACT z-DIR	TOTAL STRESS	FLEX. RIG. z-DIR	FLEX. RIG. y-DIR
	IN	IN	KIP-IN	KIP-IN	KIP	KIP	KIP/IN	KIP/IN	KIP/IN**2	KIP-IN**2	KIP-IN**2
1	2.2832E-05	6.2323E-03	4985.7	1098.7	28.103	19.340	0.6375	1.3944	0.4420	8.9130E+09	8.9130E+09
x(FT)	29.160	0.0000	0.0000	15.390	27.540	0.0000	29.160	25.515	25.515	6.4800	6.0750
2	2.2834E-05	6.9367E-03	4985.3	1189.5	28.105	23.653	0.6376	1.7812	0.5250	8.9130E+09	8.9130E+09
x(FT)	29.160	0.0000	0.0000	17.010	27.540	0.0000	29.160	25.515	25.515	10.935	6.0750
3	2.5987E-05	6.9367E-03	5438.9	1189.6	31.937	23.647	0.7256	1.7807	0.5965	8.9130E+09	8.9130E+09
x(FT)	29.160	0.0000	0.0000	17.010	27.540	0.0000	29.160	25.515	25.515	1.2150	0.8100
4	2.5985E-05	6.2323E-03	5439.3	1098.9	31.935	19.335	0.7256	1.3940	0.5136	8.9130E+09	8.9130E+09
x(FT)	29.160	0.0000	0.0000	15.390	27.540	0.0000	29.160	25.515	25.515	0.0000	3.6450
Max.	2.5987E-05	6.9367E-03	5439.3	1189.6	31.937	23.653	0.7256	1.7812	0.5965	8.9130E+09	8.9130E+09
Pile N.	3	2	4	3	3	2	3	2	3	1	1

LOAD CASE : 17
CASE NAME : Service MaxV3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0624718	-4.64404E-04	0.0204631

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
6.72211E-06	6.83713E-05	1.36447E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1591.7	18.972	40.788	102.36	-915.32	2649.0
2	1477.7	18.973	52.739	102.36	-2162.7	2649.1
3	2048.8	7.0273	52.710	102.36	-2163.7	1401.2
4	2162.8	7.0273	40.763	102.36	-916.39	1401.2
MINIMUM	1477.7	7.0273	40.763	102.36	-2163.7	1401.2
Pile N.	2	3	4	1	3	3
MAXIMUM	2162.8	18.973	52.739	102.36	-915.32	2649.1
Pile N.	4	2	2	1	1	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-1.3658E-05	-3.0596E-05	-2649.0	-915.32	-16.740	-37.461	-0.3814	-0.8543	0.3777	4.5738E+09	4.5738E+09
x(FT)	29.160	28.755	0.0000	0.0000	27.540	27.135	29.160	28.755	0.0000	26.325	25.920
2	-1.3657E-05	-3.9019E-05	-2649.1	-2162.7	-16.740	-48.063	-0.3813	-1.0895	0.3507	4.5738E+09	4.5738E+09
x(FT)	29.160	28.755	0.0000	0.0000	27.540	27.135	29.160	28.755	0.0000	25.920	25.920
3	-2.8623E-04	-3.9015E-05	-1401.2	-2163.7	-6.2173	-48.056	-0.1408	-1.0894	0.4862	4.5738E+09	4.5738E+09
x(FT)	0.0000	28.755	0.0000	0.0000	27.540	27.135	29.565	28.755	0.0000	25.515	25.515
4	-2.8623E-04	-3.0592E-05	-1401.2	-916.39	-6.2176	-37.454	-0.1408	-0.8542	0.5132	4.5738E+09	4.5738E+09
x(FT)	0.0000	28.755	0.0000	0.0000	27.540	27.135	29.565	28.755	0.0000	26.325	25.515
Min.	-2.8623E-04	-3.9019E-05	-2649.1	-2163.7	-16.740	-48.063	-0.3814	-1.0895	0.3507	4.5738E+09	4.5738E+09
Pile N.	3	2	2	3	1	2	1	2	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	2.0081E-03	0.013752	749.42	2483.2	18.909	40.253	1.8532	2.8163	0.4652	8.9130E+09	8.9130E+09
x(FT)	4.8600	0.0000	25.515	14.580	0.0000	0.0000	25.515	25.515	25.515	1.2150	8.9100
2	2.0081E-03	0.015688	749.41	2706.3	18.909	52.128	1.8532	3.8809	0.4319	8.9130E+09	8.9130E+09
x(FT)	4.8600	0.0000	25.515	16.605	0.0000	0.0000	25.515	25.515	25.515	16.605	0.8100
3	4.4647E-04	0.015688	275.89	2706.9	7.0844	52.099	0.7892	3.8786	0.5989	8.9130E+09	8.9130E+09
x(FT)	10.530	0.0000	25.515	16.605	2.0250	0.0000	25.515	25.515	25.515	6.0750	0.8100
4	4.4648E-04	0.013752	275.90	2483.8	7.0844	40.228	0.7892	2.8143	0.6322	8.9130E+09	8.9130E+09
x(FT)	10.530	0.0000	25.515	14.580	2.0250	0.0000	25.515	25.515	25.515	0.0000	4.8600
Max.	2.0081E-03	0.015688	749.42	2706.9	18.909	52.128	1.8532	3.8809	0.6322	8.9130E+09	8.9130E+09
Pile N.	1	2	1	3	1	2	1	2	4	1	1

LOAD CASE : 18
CASE NAME : Service MinV3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0622650	6.58957E-04	-0.0144247

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-2.49330E-06	-5.15972E-05	9.61973E-06

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2069.9	13.034	-26.777	-37.968	274.79	1831.9
2	1989.6	13.034	-31.209	-37.968	737.39	1831.9
3	1558.6	17.467	-31.223	-37.968	736.79	2294.9
4	1638.9	17.466	-26.790	-37.968	274.16	2294.8
MINIMUM	1558.6	13.034	-31.223	-37.968	274.16	1831.9
Pile N.	3	1	3	1	4	1
MAXIMUM	2069.9	17.467	-26.777	-37.968	737.39	2294.9
Pile N.	1	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-9.3834E-06	-9.7315E-03	-1831.9	-1822.5	-11.504	-26.398	-0.2620	-1.7688	0.4912	4.5738E+09	4.5738E+09
x(FT)	29.160	0.0000	0.0000	13.770	27.540	0.0000	29.160	25.515	0.0000	25.920	25.515
2	-9.3832E-06	-0.010450	-1831.9	-1880.8	-11.503	-30.802	-0.2620	-2.1636	0.4721	4.5738E+09	4.5738E+09
x(FT)	29.160	0.0000	0.0000	14.580	27.540	0.0000	29.160	25.515	0.0000	27.135	25.515
3	-1.2595E-05	-0.010450	-2294.9	-1880.4	-15.406	-30.817	-0.3517	-2.1648	0.3699	4.5738E+09	4.5738E+09
x(FT)	29.160	0.0000	0.0000	14.580	27.540	0.0000	29.160	25.515	0.0000	25.515	25.515

4	-1.2595E-05	-9.7315E-03	-2294.8	-1822.2	-15.406	-26.411	-0.3517	-1.7699	0.3889	4.5738E+09	4.5738E+09
x(FT)	29.160	0.0000	0.0000	13.770	27.540	0.0000	29.160	25.515	0.0000	25.515	25.515
Min.	-1.2595E-05	-0.010450	-2294.9	-1880.8	-15.406	-30.817	-0.3517	-2.1648	0.3699	4.5738E+09	4.5738E+09
Pile N.	3	2	3	2	3	3	4	3	3	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	1.3663E-03	2.0274E-05	514.90	274.79	12.991	24.729	1.2762	0.5661	0.6050	8.9130E+09	8.9130E+09
x(FT)	4.8600	28.755	25.515	0.0000	0.0000	26.730	25.515	28.755	25.515	7.6950	9.7200
2	1.3663E-03	2.3398E-05	514.89	737.39	12.991	28.658	1.2762	0.6533	0.5815	8.9130E+09	8.9130E+09
x(FT)	4.8600	28.755	25.515	0.0000	0.0000	27.135	25.515	28.755	25.515	4.8600	2.0250
3	2.0269E-03	2.3401E-05	690.53	736.79	17.396	28.662	1.6709	0.6534	0.4556	8.9130E+09	8.9130E+09
x(FT)	3.6450	28.755	25.515	0.0000	0.0000	27.135	25.515	28.755	25.515	10.530	0.4050
4	2.0269E-03	2.0276E-05	690.53	274.16	17.395	24.732	1.6709	0.5662	0.4790	8.9130E+09	8.9130E+09
x(FT)	3.6450	28.755	25.515	0.0000	0.0000	26.730	25.515	28.755	25.515	8.9100	11.745
Max.	2.0269E-03	2.3401E-05	690.53	737.39	17.396	28.662	1.6709	0.6534	0.6050	8.9130E+09	8.9130E+09
Pile N.	3	3	3	2	3	3	3	3	1	1	1

LOAD CASE : 19
CASE NAME : Service MaxT
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0616185	-2.54110E-03	0.0104148

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
1.91771E-05	3.39777E-05	4.96064E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1860.8	59.034	7.7104	292.03	856.20	8592.4
2	1446.4	59.042	41.797	292.03	-2702.6	8593.4
3	1730.2	24.962	41.787	292.03	-2702.8	5033.6
4	2144.6	24.962	7.7062	292.03	855.90	5032.8

MINIMUM	1446.4	24.962	7.7062	292.03	-2702.8	5032.8
Pile N.	2	3	4	1	3	4
MAXIMUM	2144.6	59.042	41.797	292.03	856.20	8593.4
Pile N.	4	2	2	1	1	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-4.2452E-05	-6.6335E-06	-8592.4	-15.680	-52.109	-8.1767	-1.1853	-0.1852	0.4416	4.5738E+09	4.5738E+09
x(FT)	29.160	28.350	0.0000	31.995	27.540	26.325	29.160	28.350	0.0000	25.515	25.920
2	-4.2448E-05	-3.0549E-05	-8593.4	-2702.6	-52.104	-37.717	-1.1852	-0.8530	0.3432	4.5738E+09	4.5738E+09
x(FT)	29.160	29.160	0.0000	0.0000	27.540	27.135	29.160	29.160	0.0000	25.515	26.325
3	-1.1357E-03	-3.0547E-05	-5033.6	-2702.8	-22.083	-37.715	-0.5002	-0.8529	0.4106	4.5738E+09	4.5738E+09
x(FT)	0.0000	29.160	0.0000	0.0000	27.540	27.135	29.565	29.160	0.0000	25.920	25.920
4	-1.1357E-03	-6.6327E-06	-5032.8	-15.679	-22.088	-8.1761	-0.5003	-0.1852	0.5089	4.5738E+09	4.5738E+09
x(FT)	0.0000	28.350	0.0000	31.995	27.540	26.325	29.565	28.350	0.0000	25.515	25.515
Min.	-1.1357E-03	-3.0549E-05	-8593.4	-2702.8	-52.109	-37.717	-1.1853	-0.8530	0.3432	4.5738E+09	4.5738E+09
Pile N.	3	2	2	3	1	2	1	2	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	5.8675E-03	4.7992E-03	2330.7	1229.3	58.866	7.5232	5.8521	0.2807	0.5439	8.9130E+09	8.9130E+09
x(FT)	5.6700	0.0000	25.515	8.1000	0.0000	0.0000	25.515	25.515	25.515	13.770	6.8850
2	5.8674E-03	0.010322	2330.6	1766.8	58.872	41.395	5.8523	3.3172	0.4228	8.9130E+09	8.9130E+09
x(FT)	5.6700	0.0000	25.515	20.250	0.0000	0.0000	25.515	25.515	25.515	0.0000	3.2400
3	1.5630E-03	0.010322	979.65	1766.9	25.212	41.385	2.8166	3.3165	0.5057	8.9130E+09	8.9130E+09
x(FT)	10.530	0.0000	25.515	20.250	2.4300	0.0000	25.515	25.515	25.515	6.0750	0.0000
4	1.5632E-03	4.7992E-03	979.82	1229.3	25.212	7.5189	2.8170	0.2804	0.6269	8.9130E+09	8.9130E+09
x(FT)	10.530	0.0000	25.515	8.1000	2.4300	0.0000	25.515	25.515	25.515	2.4300	2.8350
Max.	5.8675E-03	0.010322	2330.7	1766.9	58.872	41.395	5.8523	3.3172	0.6269	8.9130E+09	8.9130E+09
Pile N.	1	2	1	3	2	2	2	2	4	1	1

LOAD CASE : 20
CASE NAME : Service MinT
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0615496	3.05551E-03	-6.44039E-03

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-1.62959E-05	-2.44971E-05	-3.25557E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1759.8	-33.478	3.2257	-248.15	-1535.1	-5089.1
2	2031.8	-33.476	-25.723	-248.15	1489.5	-5088.7
3	1827.2	-4.5241	-25.727	-248.15	1489.3	-2064.7
4	1555.2	-4.5221	3.2246	-248.15	-1535.2	-2065.0
MINIMUM	1555.2	-33.478	-25.727	-248.15	-1535.2	-5089.1
Pile N.	4	1	3	1	4	1
MAXIMUM	2031.8	-4.5221	3.2257	-248.15	1489.5	-2064.7
Pile N.	2	4	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-3.1171E-03	-2.0360E-03	-1320.8	-1535.1	-33.401	-3.0821	-3.3715	-0.070418	0.4176	4.5738E+09	4.5738E+09
x(FT)	6.0750	0.0000	25.515	0.0000	0.0000	27.945	25.515	29.970	0.0000	26.325	25.515
2	-3.1171E-03	-6.7292E-03	-1320.8	-1143.2	-33.398	-25.461	-3.3715	-1.9988	0.4821	4.5738E+09	4.5738E+09
x(FT)	6.0750	0.0000	25.515	19.035	0.0000	0.0000	25.515	25.515	0.0000	25.515	25.515
3	-1.4889E-04	-6.7292E-03	-191.71	-1143.1	-8.1540	-25.466	-0.7922	-1.9992	0.4336	4.5738E+09	4.5738E+09
x(FT)	18.225	0.0000	26.325	19.035	12.960	0.0000	25.515	25.515	0.0000	25.515	25.920
4	-1.4882E-04	-2.0360E-03	-191.63	-1535.2	-8.1523	-3.0809	-0.7919	-0.070394	0.3690	4.5738E+09	4.5738E+09
x(FT)	18.225	0.0000	26.325	0.0000	12.960	27.945	25.515	29.970	0.0000	25.515	25.515
Min.	-3.1171E-03	-6.7292E-03	-1320.8	-1535.2	-33.401	-25.466	-3.3715	-1.9992	0.3690	4.5738E+09	4.5738E+09
Pile N.	1	2	1	4	1	3	1	3	4	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL.	DISPL.	MOMENT	MOMENT	SHEAR	SHEAR	SOIL REACT	SOIL REACT	TOTAL	FLEX. RIG.	FLEX. RIG.

	y-DIR IN	z-DIR IN	z-DIR KIP-IN	y-DIR KIP-IN	y-DIR KIP	z-DIR KIP	y-DIR KIP/IN	z-DIR KIP/IN	STRESS KIP/IN**2	z-DIR KIP-IN**2	y-DIR KIP-IN**2
1	2.4041E-05	1.0486E-04	5089.1	137.99	29.557	6.0626	0.6713	0.5802	0.5144	8.9130E+09	8.9130E+09
x(FT)	29.160	18.225	0.0000	26.325	27.540	12.960	29.160	25.515	25.515	5.6700	2.4300
2	2.4043E-05	1.8834E-05	5088.7	1489.5	29.559	23.287	0.6713	0.5259	0.5939	8.9130E+09	8.9130E+09
x(FT)	29.160	29.160	0.0000	0.0000	27.540	27.135	29.160	29.160	25.515	6.4800	3.2400
3	2.6674E-03	1.8834E-05	2064.7	1489.3	4.2937	23.288	0.097916	0.5259	0.5341	8.9130E+09	8.9130E+09
x(FT)	0.0000	29.160	0.0000	0.0000	27.945	27.135	29.970	29.160	25.515	2.4300	1.2150
4	2.6674E-03	1.0482E-04	2065.0	137.95	4.2917	6.0616	0.097873	0.5800	0.4546	8.9130E+09	8.9130E+09
x(FT)	0.0000	18.225	0.0000	26.325	27.945	12.960	29.970	25.515	25.515	10.530	1.2150
Max.	2.6674E-03	1.0486E-04	5089.1	1489.5	29.559	23.288	0.6713	0.5802	0.5939	8.9130E+09	8.9130E+09
Pile N.	3	1	1	2	2	3	2	1	2	1	1

LOAD CASE : 21
CASE NAME : Service MaxM2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0624718	-4.64404E-04	0.0204631

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
6.72211E-06	6.83713E-05	1.36447E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1591.7	18.972	40.788	102.36	-915.32	2649.0
2	1477.7	18.973	52.739	102.36	-2162.7	2649.1
3	2048.8	7.0273	52.710	102.36	-2163.7	1401.2
4	2162.8	7.0273	40.763	102.36	-916.39	1401.2
MINIMUM	1477.7	7.0273	40.763	102.36	-2163.7	1401.2
Pile N.	2	3	4	1	3	3
MAXIMUM	2162.8	18.973	52.739	102.36	-915.32	2649.1
Pile N.	4	2	2	1	1	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-1.3658E-05	-3.0596E-05	-2649.0	-915.32	-16.740	-37.461	-0.3814	-0.8543	0.3777	4.5738E+09	4.5738E+09
x(FT)	29.160	28.755	0.0000	0.0000	27.540	27.135	29.160	28.755	0.0000	25.920	25.920
2	-1.3657E-05	-3.9019E-05	-2649.1	-2162.7	-16.740	-48.063	-0.3813	-1.0895	0.3507	4.5738E+09	4.5738E+09
x(FT)	29.160	28.755	0.0000	0.0000	27.540	27.135	29.160	28.755	0.0000	26.325	25.920
3	-2.8623E-04	-3.9015E-05	-1401.2	-2163.7	-6.2173	-48.056	-0.1408	-1.0894	0.4862	4.5738E+09	4.5738E+09
x(FT)	0.0000	28.755	0.0000	0.0000	27.540	27.135	29.565	28.755	0.0000	25.515	25.920
4	-2.8623E-04	-3.0592E-05	-1401.2	-916.39	-6.2176	-37.454	-0.1408	-0.8542	0.5132	4.5738E+09	4.5738E+09
x(FT)	0.0000	28.755	0.0000	0.0000	27.540	27.135	29.565	28.755	0.0000	25.515	25.515
Min.	-2.8623E-04	-3.9019E-05	-2649.1	-2163.7	-16.740	-48.063	-0.3814	-1.0895	0.3507	4.5738E+09	4.5738E+09
Pile N.	3	2	2	3	1	2	1	2	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	2.0081E-03	0.013752	749.42	2483.2	18.909	40.253	1.8532	2.8163	0.4652	8.9130E+09	8.9130E+09
x(FT)	4.8600	0.0000	25.515	14.580	0.0000	0.0000	25.515	25.515	25.515	8.1000	2.8350
2	2.0081E-03	0.015688	749.41	2706.3	18.909	52.128	1.8532	3.8809	0.4319	8.9130E+09	8.9130E+09
x(FT)	4.8600	0.0000	25.515	16.605	0.0000	0.0000	25.515	25.515	25.515	4.8600	3.2400
3	4.4647E-04	0.015688	275.89	2706.9	7.0844	52.099	0.7892	3.8786	0.5989	8.9130E+09	8.9130E+09
x(FT)	10.530	0.0000	25.515	16.605	2.0250	0.0000	25.515	25.515	25.515	3.6450	4.0500
4	4.4648E-04	0.013752	275.90	2483.8	7.0844	40.228	0.7892	2.8143	0.6322	8.9130E+09	8.9130E+09
x(FT)	10.530	0.0000	25.515	14.580	2.0250	0.0000	25.515	25.515	25.515	10.530	4.4550
Max.	2.0081E-03	0.015688	749.42	2706.9	18.909	52.128	1.8532	3.8809	0.6322	8.9130E+09	8.9130E+09
Pile N.	1	2	1	3	1	2	1	2	4	1	1

LOAD CASE : 22
CASE NAME : Service MinM2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0622650	6.58957E-04	-0.0144247

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-2.49330E-06	-5.15972E-05	9.61973E-06

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2069.9	13.034	-26.777	-37.968	274.79	1831.9
2	1989.6	13.034	-31.209	-37.968	737.39	1831.9
3	1558.6	17.467	-31.223	-37.968	736.79	2294.9
4	1638.9	17.466	-26.790	-37.968	274.16	2294.8
MINIMUM	1558.6	13.034	-31.223	-37.968	274.16	1831.9
Pile N.	3	1	3	1	4	1
MAXIMUM	2069.9	17.467	-26.777	-37.968	737.39	2294.9
Pile N.	1	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-9.3834E-06	-9.7315E-03	-1831.9	-1822.5	-11.504	-26.398	-0.2620	-1.7688	0.4912	4.5738E+09	4.5738E+09
x(FT)	29.160	0.0000	0.0000	13.770	27.540	0.0000	29.160	25.515	0.0000	25.515	25.920
2	-9.3832E-06	-0.010450	-1831.9	-1880.8	-11.503	-30.802	-0.2620	-2.1636	0.4721	4.5738E+09	4.5738E+09
x(FT)	29.160	0.0000	0.0000	14.580	27.540	0.0000	29.160	25.515	0.0000	25.515	25.515
3	-1.2595E-05	-0.010450	-2294.9	-1880.4	-15.406	-30.817	-0.3517	-2.1648	0.3699	4.5738E+09	4.5738E+09
x(FT)	29.160	0.0000	0.0000	14.580	27.540	0.0000	29.160	25.515	0.0000	25.515	25.515
4	-1.2595E-05	-9.7315E-03	-2294.8	-1822.2	-15.406	-26.411	-0.3517	-1.7699	0.3889	4.5738E+09	4.5738E+09
x(FT)	29.160	0.0000	0.0000	13.770	27.540	0.0000	29.160	25.515	0.0000	25.515	25.515
Min.	-1.2595E-05	-0.010450	-2294.9	-1880.8	-15.406	-30.817	-0.3517	-2.1648	0.3699	4.5738E+09	4.5738E+09
Pile N.	3	2	3	2	3	3	4	3	3	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	1.3663E-03	2.0274E-05	514.90	274.79	12.991	24.729	1.2762	0.5661	0.6050	8.9130E+09	8.9130E+09
x(FT)	4.8600	28.755	25.515	0.0000	0.0000	26.730	25.515	28.755	25.515	9.3150	1.6200
2	1.3663E-03	2.3398E-05	514.89	737.39	12.991	28.658	1.2762	0.6533	0.5815	8.9130E+09	8.9130E+09
x(FT)	4.8600	28.755	25.515	0.0000	0.0000	27.135	25.515	28.755	25.515	8.5050	3.6450
3	2.0269E-03	2.3401E-05	690.53	736.79	17.396	28.662	1.6709	0.6534	0.4556	8.9130E+09	8.9130E+09
x(FT)	3.6450	28.755	25.515	0.0000	0.0000	27.135	25.515	28.755	25.515	0.4050	2.4300

4	2.0269E-03	2.0276E-05	690.53	274.16	17.395	24.732	1.6709	0.5662	0.4790	8.9130E+09	8.9130E+09
x(FT)	3.6450	28.755	25.515	0.0000	0.0000	26.730	25.515	28.755	25.515	0.4050	20.655
Max.	2.0269E-03	2.3401E-05	690.53	737.39	17.396	28.662	1.6709	0.6534	0.6050	8.9130E+09	8.9130E+09
Pile N.	3	3	3	2	3	3	3	3	1	1	1

LOAD CASE : 23
CASE NAME : Service MaxM3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0602825	-5.74273E-03	-4.99695E-03

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
8.43708E-07	-1.94194E-05	6.65961E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2116.0	42.748	-8.9957	12.848	-9.5572	7721.5
2	1559.7	42.750	-7.5026	12.848	-166.46	7723.0
3	1397.5	41.252	-7.5042	12.848	-166.55	7566.8
4	1953.8	41.250	-8.9975	12.848	-9.6479	7565.3
MINIMUM	1397.5	41.250	-8.9975	12.848	-166.55	7565.3
Pile N.	3	4	4	1	3	4
MAXIMUM	2116.0	42.750	-7.5026	12.848	-9.5572	7723.0
Pile N.	1	2	2	1	1	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-3.0556E-05	-3.4872E-03	-7721.5	-676.39	-37.793	-8.8598	-0.8532	-0.5693	0.5021	4.5738E+09	4.5738E+09
x(FT)	29.565	0.0000	0.0000	12.960	27.540	0.0000	29.565	25.515	0.0000	25.515	25.515

2	-3.0549E-05	-3.2442E-03	-7723.0	-670.80	-37.784	-7.3761	-0.8530	-0.4363	0.3701	4.5738E+09	4.5738E+09
x(FT)	29.565	0.0000	0.0000	11.745	27.540	0.0000	29.565	25.515	0.0000	25.515	25.515
3	-2.7016E-04	-3.2442E-03	-7566.8	-670.75	-36.461	-7.3778	-0.8235	-0.4364	0.3316	4.5738E+09	4.5738E+09
x(FT)	0.0000	0.0000	0.0000	11.745	27.540	0.0000	29.565	25.515	0.0000	25.515	25.515
4	-2.7016E-04	-3.4872E-03	-7565.3	-676.34	-36.469	-8.8616	-0.8237	-0.5694	0.4636	4.5738E+09	4.5738E+09
x(FT)	0.0000	0.0000	0.0000	12.960	27.540	0.0000	29.565	25.515	0.0000	25.515	26.325
Min.	-2.7016E-04	-3.4872E-03	-7723.0	-676.39	-37.793	-8.8616	-0.8532	-0.5694	0.3316	4.5738E+09	4.5738E+09
Pile N.	3	1	2	1	1	4	1	4	3	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	3.0995E-03	6.8673E-06	1681.7	16.203	42.752	8.4035	4.6046	0.1918	0.6185	8.9130E+09	8.9130E+09
x(FT)	8.9100	28.755	25.515	32.400	0.0000	26.730	25.515	28.755	25.515	10.125	2.8350
2	3.0991E-03	5.8115E-06	1681.4	13.749	42.753	7.1529	4.6042	0.1623	0.4559	8.9130E+09	8.9130E+09
x(FT)	8.9100	28.755	25.515	32.400	0.0000	26.730	25.515	28.755	25.515	5.2650	1.2150
3	2.9287E-03	5.8119E-06	1621.9	13.749	41.263	7.1533	4.4705	0.1623	0.4085	8.9130E+09	8.9130E+09
x(FT)	9.3150	28.755	25.515	32.400	0.0000	26.730	25.515	28.755	25.515	1.2150	10.935
4	2.9291E-03	6.8677E-06	1622.1	16.204	41.263	8.4039	4.4710	0.1918	0.5711	8.9130E+09	8.9130E+09
x(FT)	9.3150	28.755	25.515	32.400	0.0000	26.730	25.515	28.755	25.515	6.0750	3.2400
Max.	3.0995E-03	6.8677E-06	1681.7	16.204	42.753	8.4039	4.6046	0.1918	0.6185	8.9130E+09	8.9130E+09
Pile N.	1	4	1	4	2	4	1	4	1	1	1

LOAD CASE : 24
CASE NAME : Service MinM3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0615582	5.95919E-03	8.55062E-03

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
2.08536E-06	2.75243E-05	-4.98979E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1470.4	-19.396	18.904	31.756	-627.56	-4467.1
2	1887.2	-19.398	22.601	31.756	-1014.9	-4466.3
3	2117.1	-23.103	22.596	31.756	-1015.0	-4852.9
4	1700.3	-23.103	18.899	31.756	-627.72	-4853.7
MINIMUM	1470.4	-23.103	18.899	31.756	-1015.0	-4853.7
Pile N.	1	3	4	1	3	4
MAXIMUM	2117.1	-19.396	22.601	31.756	-627.56	-4466.3
Pile N.	3	1	2	1	1	2

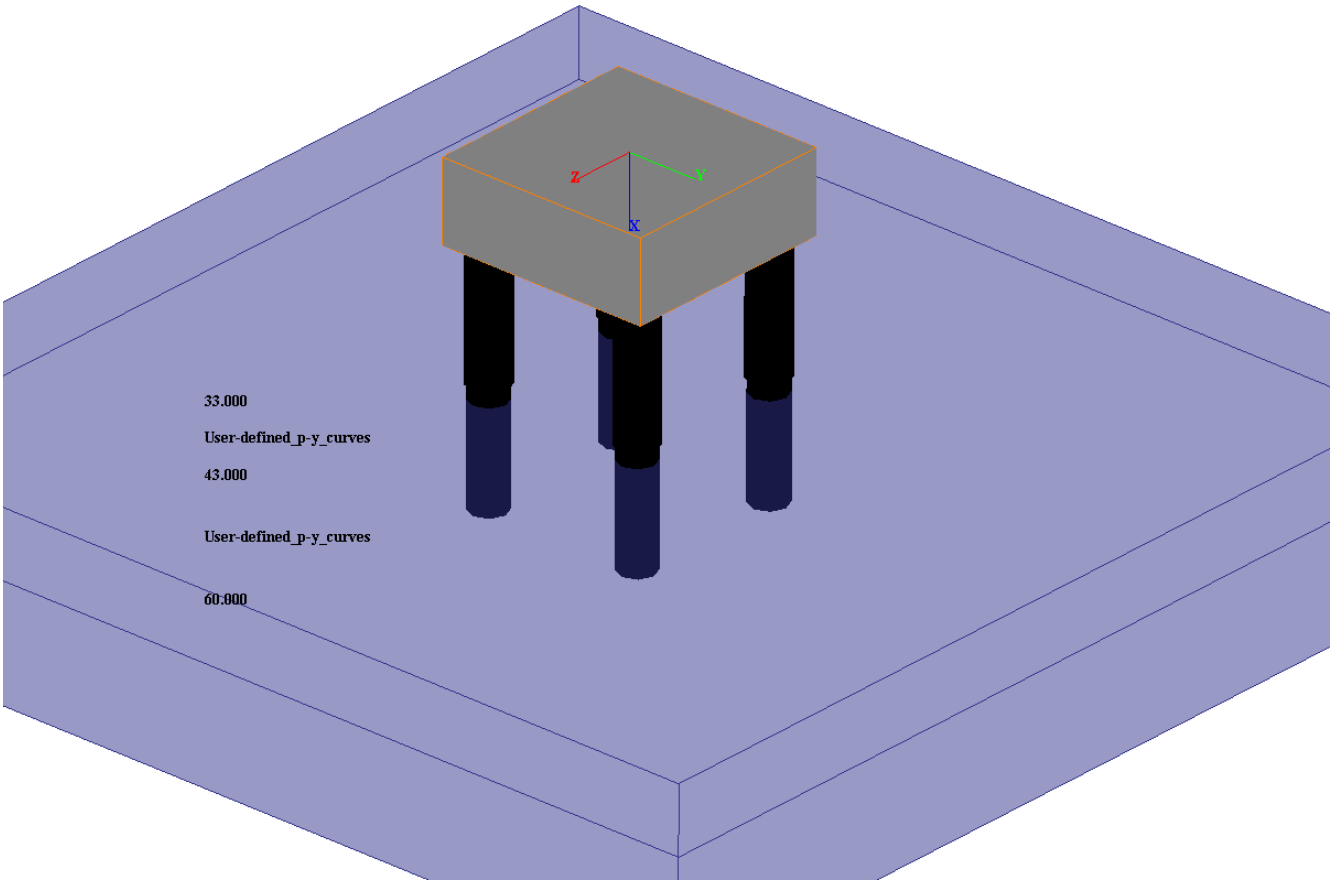
* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-1.0362E-03	-1.4067E-05	-764.59	-627.56	-20.383	-17.283	-2.3241	-0.3928	0.3489	4.5738E+09	4.5738E+09
x(FT)	12.555	28.755	25.920	0.0000	4.4550	27.135	25.515	28.755	0.0000	25.515	25.515
2	-1.0364E-03	-1.6679E-05	-764.77	-1014.9	-20.385	-20.570	-2.3246	-0.4657	0.4478	4.5738E+09	4.5738E+09
x(FT)	12.555	28.755	25.920	0.0000	4.4550	27.135	25.515	28.755	0.0000	25.515	26.325
3	-1.3747E-03	-1.6678E-05	-906.03	-1015.0	-23.546	-20.569	-2.6548	-0.4657	0.5024	4.5738E+09	4.5738E+09
x(FT)	11.340	28.755	25.515	0.0000	2.8350	27.135	25.515	28.755	0.0000	26.325	25.920
4	-1.3745E-03	-1.4066E-05	-905.86	-627.72	-23.546	-17.282	-2.6545	-0.3928	0.4035	4.5738E+09	4.5738E+09
x(FT)	11.340	28.755	25.515	0.0000	2.8350	27.135	25.515	28.755	0.0000	26.325	25.920
Min.	-1.3747E-03	-1.6679E-05	-906.03	-1015.0	-23.546	-20.570	-2.6548	-0.4657	0.3489	4.5738E+09	4.5738E+09
Pile N.	3	2	3	3	3	2	3	2	1	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	2.0681E-03	5.9383E-03	4467.1	1041.9	17.178	18.673	0.3909	1.3550	0.4298	8.9130E+09	8.9130E+09
x(FT)	0.0000	0.0000	0.0000	15.795	27.540	0.0000	29.565	25.515	25.515	0.0000	4.4550
2	2.0681E-03	6.5389E-03	4466.3	1120.8	17.182	22.346	0.3910	1.6845	0.5516	8.9130E+09	8.9130E+09
x(FT)	0.0000	0.0000	0.0000	17.010	27.540	0.0000	29.565	25.515	25.515	14.985	0.8100
3	1.4675E-03	6.5389E-03	4852.9	1120.9	20.450	22.342	0.4638	1.6841	0.6188	8.9130E+09	8.9130E+09
x(FT)	0.0000	0.0000	0.0000	17.010	27.540	0.0000	29.565	25.515	25.515	12.150	0.4050
4	1.4675E-03	5.9383E-03	4853.7	1042.0	20.445	18.668	0.4637	1.3547	0.4970	8.9130E+09	8.9130E+09
x(FT)	0.0000	0.0000	0.0000	15.795	27.540	0.0000	29.565	25.515	25.515	4.0500	0.0000
Max.	2.0681E-03	6.5389E-03	4853.7	1120.9	20.450	22.346	0.4638	1.6845	0.6188	8.9130E+09	8.9130E+09
Pile N.	1	2	4	3	3	2	3	2	3	1	1

Pier 5
Weak Rock p-y parameters (Upper Bound)
No Scour Condition
40 #11 Bar Reinforcement
Strength Condition: Load Cases 1 through 12
Service Condition: Load cases 13 through 24
0.75" thick casing reduced to 0.625" after 1/8" of corrosion



Pier 5 Loading Schedule provided by HNTB on 8/14/2020
Converted to kip-in

,000	PIER	ID	Station	Output	Case	P	V2	V3	T	M2	M3
						Vertical, x-di	orizontal, F	orizontal, F	Mx	My	Mz
Load case	-	-	ft	-	-	kip	Kip	Kip	Kip-in	Kip-in	Kip-in
1	PileCap 5	5147	0	STRENGTH	Max P	6150	-542	220	-1476	111544	-65651
2	PileCap 5	5147	0	STRENGTH	Min P	10792	-4	-149	-2069	-137434	8705
3	PileCap 5	5147	0	STRENGTH	Max V2	9113	879	218	2620	110156	356468
4	PileCap 5	5147	0	STRENGTH	Min V2	6341	-827	-227	-5264	-145148	-312021
5	PileCap 5	5147	0	STRENGTH	Max V3	6330	633	349	-437	205695	145420
6	PileCap 5	5147	0	STRENGTH	Min V3	9125	-508	-308	-1017	-199327	-33363
7	PileCap 5	5147	0	STRENGTH	Max T	6357	879	225	3321	115976	351322
8	PileCap 5	5147	0	STRENGTH	Min T	9811	-115	-168	-6194	-153578	-116815
9	PileCap 5	5147	0	STRENGTH	Max M2	6330	633	349	-437	205695	145420
10	PileCap 5	5147	0	STRENGTH	Min M2	9973	-584	-293	-3604	-200036	-86323
11	PileCap 5	5147	0	STRENGTH	Max M3	9113	879	218	2620	110156	356468
12	PileCap 5	5147	0	STRENGTH	Min M3	6341	-827	-227	-5264	-145148	-312021
13	PileCap 5	5147	0	SERVICE	Max P	7049	63	158	44	117308	57042
14	PileCap 5	5147	0	SERVICE	Min P	8303	-17	-175	-3342	-159149	-20713
15	PileCap 5	5147	0	SERVICE	Max V2	7470	225	169	1736	126312	155697
16	PileCap 5	5147	0	SERVICE	Min V2	7546	-170	-177	-4734	-161115	-118442
17	PileCap 5	5147	0	SERVICE	Max V3	7725	84	236	724	178563	67135
18	PileCap 5	5147	0	SERVICE	Min V3	7693	-10	-230	-3567	-201336	-7762
19	PileCap 5	5147	0	SERVICE	Max T	7445	150	176	3305	132042	163680
20	PileCap 5	5147	0	SERVICE	Min T	7762	-112	-182	-6401	-164666	-118132
21	PileCap 5	5147	0	SERVICE	Max M2	7725	84	236	724	178563	67136
22	PileCap 5	5147	0	SERVICE	Min M2	7693	-10	-230	-3567	-201336	-7762
23	PileCap 5	5147	0	SERVICE	Max M3	7607	160	161	2221	119850	175047
24	PileCap 5	5147	0	SERVICE	Min M3	7507	-113	-165	-5608	-151090	-139135

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

                GROUP for Windows, Version 2016.10.13

                 Serial Number : 364300562

                  Analysis of A Group of Piles
               Subjected to Axial and Lateral Loading

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                     All Rights Reserved

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

          Date:  September 03, 2020     Time:  15:25:56



            *****     COMPUTATION RESULTS     *****


Pier 5 Weak Rock



            *****     LOAD CASES RESULTS      *****


LOAD CASE :     1
CASE NAME : Strength MaxP
LOAD TYPE : Dead, DL


* TABLE L *   COMPUTATION ON PILE CAP


* EQUIVALENT CONCENTRATED LOAD AT ORIGIN *


      VERT. LOAD,KIPS    HOR. LOAD Y,KIPS   HOR. LOAD Z,KIPS
            6150.00           -542.000           220.000

     MOMENT X ,KIP-IN    MOMENT Y,KIP-IN    MOMENT Z,KIP-IN
           -1476.00        1.02304E+05          -88415.0
```

```
   * PILE TOP REACTIONS *

 PILE GROUP   FOR. X,KIP   FOR. Y,KIP   FOR. Z,KIP MOM X,KIP-IN MOM Y,KIP-IN MOM Z,KIP-IN
 **********  ***********  ***********  ***********  ***********  ***********  ***********
     1           1328.2      -136.72       56.213      -20.193      -2976.5  -1.3762E+04
     2           1287.7      -136.72       53.808      -20.193      -2729.7  -1.3762E+04
     3           1746.8      -134.28       53.787      -20.193      -2730.5  -1.3516E+04
     4           1787.3      -134.28       56.192      -20.193      -2977.2  -1.3516E+04

  MINIMUM        1287.7      -136.72       53.787      -20.193      -2977.2  -1.3762E+04
  Pile N.             2            1            3            1            4           1
  MAXIMUM        1787.3      -134.28       56.213      -20.193      -2729.7  -1.3516E+04
  Pile N.             4            3            1            1            2           3


   * MINIMUM VALUES AND LOCATIONS *

  PILE     DISPL.      DISPL.      MOMENT      MOMENT       SHEAR       SHEAR    SOIL REACT  SOIL REACT     TOTAL    FLEX. RIG.  FLEX. RIG.
           y-DIR       z-DIR       z-DIR       y-DIR       y-DIR       z-DIR       y-DIR       z-DIR     STRESS      z-DIR       y-DIR
            IN          IN        KIP-IN      KIP-IN         KIP         KIP       KIP/IN      KIP/IN   KIP/IN**2   KIP-IN**2   KIP-IN**2
******  **********  **********  **********  **********  **********  **********  **********  **********  **********  **********  **********
    1   -0.023507 -2.5572E-05     -3951.2     -2976.5     -135.73     -31.465     -7.4464     -0.7140      0.3152  4.5738E+09  4.5738E+09
 x(FT)      0.0000      32.120      24.200      0.0000      0.0000      30.360      29.040      32.120      0.0000      29.040      29.040
    2   -0.023507 -2.4380E-05     -3951.2     -2729.7     -135.73     -29.983     -7.4466     -0.6807      0.3056  4.5738E+09  4.5738E+09
 x(FT)      0.0000      32.120      24.200      0.0000      0.0000      30.360      29.040      32.120      0.0000      29.040      29.040
    3   -0.023103 -2.4375E-05     -3882.6     -2730.5     -133.31     -29.977     -7.3118     -0.6806      0.4145  4.5738E+09  4.5738E+09
 x(FT)      0.0000      32.120      24.200      0.0000      0.0000      30.360      29.040      32.120      0.0000      30.360      29.480
    4   -0.023103 -2.5568E-05     -3882.7     -2977.2     -133.31     -31.459     -7.3116     -0.7139      0.4241  4.5738E+09  4.5738E+09
 x(FT)      0.0000      32.120      24.200      0.0000      0.0000      30.360      29.040      32.120      0.0000      29.920      29.040

   Min.  -0.023507 -2.5572E-05     -3951.2     -2977.2     -135.73     -31.465     -7.4466     -0.7140      0.3056  4.5738E+09  4.5738E+09
Pile N.        1           1           1           4           1           1           2           1           2           1           1


   * MAXIMUM VALUES AND LOCATIONS *

  PILE     DISPL.      DISPL.      MOMENT      MOMENT       SHEAR       SHEAR    SOIL REACT  SOIL REACT     TOTAL    FLEX. RIG.  FLEX. RIG.
           y-DIR       z-DIR       z-DIR       y-DIR       y-DIR       z-DIR       y-DIR       z-DIR     STRESS      z-DIR       y-DIR
            IN          IN        KIP-IN      KIP-IN         KIP         KIP       KIP/IN      KIP/IN   KIP/IN**2   KIP-IN**2   KIP-IN**2
******  **********  **********  **********  **********  **********  **********  **********  **********  **********  **********  **********
    1   6.9514E-05    0.015332  1.3762E+04      2471.3      85.099      55.566      1.9410      2.0825      0.3882  8.9130E+09  8.9130E+09
 x(FT)      32.560      0.0000      0.0000      17.160      30.800      0.0000      32.560      29.040      29.040      4.8400      13.640
    2   6.9515E-05    0.014927  1.3762E+04      2420.9      85.100      53.177      1.9410      1.9499      0.3764  8.9130E+09  8.9130E+09
 x(FT)      32.560      0.0000      0.0000      16.720      30.800      0.0000      32.560      29.040      29.040      18.480      8.8000
    3   6.8283E-05    0.014927  1.3516E+04      2421.5      83.591      53.157      1.9066      1.9482      0.5106  8.9130E+09  8.9130E+09
 x(FT)      32.560      0.0000      0.0000      16.720      30.800      0.0000      32.560      29.040      29.040      9.6800      5.2800
    4   6.8283E-05    0.015332  1.3516E+04      2471.8      83.590      55.545      1.9066      2.0807      0.5224  8.9130E+09  8.9130E+09
 x(FT)      32.560      0.0000      0.0000      17.160      30.800      0.0000      32.560      29.040      29.040      7.4800      1.3200

   Max.  6.9515E-05    0.015332  1.3762E+04      2471.8      85.100      55.566      1.9410      2.0825      0.5224  8.9130E+09  8.9130E+09
Pile N.        2           1           1           4           2           1           1           1           4           1           1
```

LOAD CASE : 2
CASE NAME : Strength MinP
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0967394	-8.61759E-04	-0.0181425

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-1.98278E-06	-6.36616E-05	3.71760E-06

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2967.5	-2.6966	-35.543	-28.487	563.92	-96.612
2	2937.7	-2.6966	-38.938	-28.487	911.85	-96.608
3	2428.5	0.6966	-38.958	-28.487	910.81	251.46
4	2458.3	0.6966	-35.562	-28.487	562.86	251.45
MINIMUM	2428.5	-2.6966	-38.958	-28.487	562.86	-96.612
Pile N.	3	1	3	1	4	1
MAXIMUM	2967.5	0.6966	-35.543	-28.487	911.85	251.46
Pile N.	1	4	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-8.3500E-04	-0.012509	-142.13	-2282.5	-2.6614	-35.015	-0.082699	-0.8301	0.7042	4.5738E+09	4.5738E+09
x(FT)	0.0000	0.0000	15.400	13.640	0.0000	0.0000	29.040	29.040	0.0000	29.040	29.040
2	-8.3500E-04	-0.013080	-142.13	-2324.2	-2.6614	-38.386	-0.082705	-1.0172	0.6971	4.5738E+09	4.5738E+09
x(FT)	0.0000	0.0000	15.400	14.520	0.0000	0.0000	29.040	29.040	0.0000	29.480	30.360
3	-2.6396E-04	-0.013080	-251.46	-2323.7	-0.7543	-38.405	-0.017150	-1.0189	0.5763	4.5738E+09	4.5738E+09
x(FT)	0.0000	0.0000	0.0000	14.520	31.240	0.0000	33.000	29.040	0.0000	29.480	30.360
4	-2.6396E-04	-0.012509	-251.45	-2281.9	-0.7543	-35.034	-0.017150	-0.8317	0.5834	4.5738E+09	4.5738E+09
x(FT)	0.0000	0.0000	0.0000	13.640	31.240	0.0000	33.000	29.040	0.0000	29.040	29.040
Min.	-8.3500E-04	-0.013080	-251.46	-2324.2	-2.6614	-38.405	-0.082705	-1.0189	0.5763	4.5738E+09	4.5738E+09
Pile N.	1	2	3	2	1	3	2	3	3	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	1.1895E-06	1.5096E-05	96.612	563.92	1.4574	18.612	0.033213	0.4215	0.8674	8.9130E+09	8.9130E+09
x(FT)	32.120	32.120	0.0000	0.0000	30.360	29.920	32.120	32.120	29.040	3.5200	3.9600
2	1.1895E-06	1.6779E-05	96.608	911.85	1.4574	20.493	0.033213	0.4685	0.8587	8.9130E+09	8.9130E+09
x(FT)	32.120	32.120	0.0000	0.0000	30.360	30.360	32.120	32.120	29.040	12.760	3.9600
3	4.1431E-05	1.6785E-05	33.563	910.81	0.9723	20.500	0.1043	0.4687	0.7098	8.9130E+09	8.9130E+09
x(FT)	17.160	32.120	29.480	0.0000	9.6800	30.360	29.040	32.120	29.040	5.2800	4.8400
4	4.1432E-05	1.5102E-05	33.564	562.86	0.9723	18.616	0.1043	0.4217	0.7185	8.9130E+09	8.9130E+09
x(FT)	17.160	32.120	29.480	0.0000	9.6800	29.920	29.040	32.120	29.040	8.3600	7.0400
Max.	4.1432E-05	1.6785E-05	96.612	911.85	1.4574	20.500	0.1043	0.4687	0.8674	8.9130E+09	8.9130E+09
Pile N.	4	3	1	2	1	3	3	3	1	1	1

LOAD CASE : 3
CASE NAME : Strength MaxV2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0816248	0.0200335	0.0197480

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
2.54358E-06	5.67271E-05	9.20858E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2419.7	221.82	52.316	36.544	-2616.1	2.7062E+04
2	1683.1	221.88	56.705	36.544	-3061.3	2.7066E+04
3	2136.8	217.68	56.684	36.544	-3062.1	2.6655E+04
4	2873.4	217.62	52.296	36.544	-2616.9	2.6651E+04
MINIMUM	1683.1	217.62	52.296	36.544	-3062.1	2.6651E+04
Pile N.	2	4	4	1	3	4
MAXIMUM	2873.4	221.88	56.705	36.544	-2616.1	2.7066E+04
Pile N.	4	2	2	1	1	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2

1	-1.1882E-04	-2.3681E-05	-2.7062E+04	-2616.1	-145.83	-29.116	-3.3176	-0.6612	0.5742	4.5670E+09	4.5738E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	0.0000	29.040	29.040
2	-1.1881E-04	-2.5847E-05	-2.7066E+04	-3061.3	-145.83	-31.810	-3.3174	-0.7217	0.3994	4.5670E+09	4.5738E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	0.0000	29.040	29.480
3	-1.1671E-04	-2.5842E-05	-2.6655E+04	-3062.1	-143.26	-31.804	-3.2589	-0.7216	0.5071	4.5679E+09	4.5738E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	0.0000	29.040	29.920
4	-1.1672E-04	-2.3677E-05	-2.6651E+04	-2616.9	-143.26	-29.110	-3.2590	-0.6611	0.6818	4.5679E+09	4.5738E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	0.0000	29.040	29.040
Min.	-1.1882E-04	-2.5847E-05	-2.7066E+04	-3062.1	-145.83	-31.810	-3.3176	-0.7217	0.3994	4.5670E+09	4.5738E+09
Pile N.	1	2	2	3	1	2	1	2	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.029594	0.014617	6484.0	2377.5	220.64	51.700	13.806	1.8781	0.7073	8.9130E+09	8.9130E+09
x(FT)	2.6400	0.0000	29.040	16.720	0.0000	0.0000	29.040	29.040	29.040	11.880	1.3200
2	0.029594	0.015349	6484.4	2468.0	220.70	56.057	13.810	2.1209	0.4920	8.9130E+09	8.9130E+09
x(FT)	2.6400	0.0000	29.040	17.160	0.0000	0.0000	29.040	29.040	29.040	14.520	2.2000
3	0.028895	0.015349	6370.3	2468.5	216.54	56.036	13.585	2.1192	0.6246	8.9130E+09	8.9130E+09
x(FT)	3.0800	0.0000	29.040	17.160	0.0000	0.0000	29.040	29.040	29.040	7.4800	3.9600
4	0.028895	0.014617	6370.0	2378.0	216.48	51.680	13.581	1.8765	0.8399	8.9130E+09	8.9130E+09
x(FT)	3.0800	0.0000	29.040	16.720	0.0000	0.0000	29.040	29.040	29.040	7.0400	3.0800
Max.	0.029594	0.015349	6484.4	2468.5	220.70	56.057	13.810	2.1209	0.8399	8.9130E+09	8.9130E+09
Pile N.	1	2	2	3	2	2	2	2	4	1	1

LOAD CASE : 4
CASE NAME : Strength MinV2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0566709	-0.0204831	-0.0228300

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-5.13585E-06	-7.12524E-05	-7.71913E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1561.5	-211.02	-52.354	-73.788	1910.3	-2.5297E+04
2	2178.9	-210.97	-61.117	-73.788	2813.1	-2.5294E+04
3	1609.0	-202.48	-61.148	-73.788	2811.9	-2.4444E+04
4	991.62	-202.53	-52.381	-73.788	1909.1	-2.4446E+04
MINIMUM	991.62	-211.02	-61.148	-73.788	1909.1	-2.5297E+04
Pile N.	4	1	3	1	4	1
MAXIMUM	2178.9	-202.48	-52.354	-73.788	2813.1	-2.4444E+04
Pile N.	2	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-0.028816	-0.016105	-6132.9	-2732.3	-209.86	-51.674	-12.973	-1.6239	0.3705	4.5699E+09	4.5738E+09
x(FT)	2.6400	0.0000	29.040	15.400	0.0000	0.0000	29.040	29.040	0.0000	29.040	29.040
2	-0.028816	-0.017584	-6132.6	-2893.8	-209.81	-60.376	-12.969	-2.1061	0.5171	4.5699E+09	4.5738E+09
x(FT)	2.6400	0.0000	29.040	16.280	0.0000	0.0000	29.040	29.040	0.0000	29.040	29.040
3	-0.027391	-0.017584	-5898.2	-2893.0	-201.38	-60.406	-12.510	-2.1086	0.3818	4.5720E+09	4.5738E+09
x(FT)	2.6400	0.0000	29.040	16.280	0.0000	0.0000	29.040	29.040	0.0000	29.040	29.040
4	-0.027391	-0.016105	-5898.4	-2731.6	-201.43	-51.701	-12.513	-1.6262	0.2353	4.5720E+09	4.5738E+09
x(FT)	2.6400	0.0000	29.040	15.400	0.0000	0.0000	29.040	29.040	0.0000	29.040	29.040
Min.	-0.028816	-0.017584	-6132.9	-2893.8	-209.86	-60.406	-12.973	-2.1086	0.2353	4.5699E+09	4.5738E+09
Pile N.	1	2	1	2	1	3	1	3	4	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	1.1243E-04	2.3113E-05	2.5297E+04	1910.3	137.97	28.327	3.1393	0.6454	0.4564	8.9130E+09	8.9130E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	29.040	13.200	7.0400
2	1.1244E-04	2.7464E-05	2.5294E+04	2813.1	137.97	33.736	3.1394	0.7669	0.6369	8.9130E+09	8.9130E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	29.040	7.0400	2.2000
3	1.0810E-04	2.7471E-05	2.4444E+04	2811.9	132.67	33.746	3.0185	0.7671	0.4703	8.9130E+09	8.9130E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	29.040	10.120	5.2800
4	1.0810E-04	2.3120E-05	2.4446E+04	1909.1	132.66	28.336	3.0184	0.6456	0.2898	8.9130E+09	8.9130E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	29.040	13.200	4.8400
Max.	1.1244E-04	2.7471E-05	2.5297E+04	2813.1	137.97	33.746	3.1394	0.7671	0.6369	8.9130E+09	8.9130E+09
Pile N.	2	3	1	2	1	3	2	3	2	1	1

LOAD CASE : 5
CASE NAME : Strength MaxV3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0565719	0.0225901	0.0337956

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-4.40567E-07	1.02554E-04	2.16188E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1258.8	157.90	87.652	-6.3297	-4006.6	1.7221E+04
2	1085.9	157.91	86.910	-6.3297	-3928.8	1.7222E+04
3	1906.2	158.60	86.848	-6.3297	-3931.3	1.7297E+04
4	2079.1	158.59	87.589	-6.3297	-4009.2	1.7297E+04
MINIMUM	1085.9	157.90	86.848	-6.3297	-4009.2	1.7221E+04
Pile N.	2	1	3	1	4	1
MAXIMUM	2079.1	158.60	87.652	-6.3297	-3928.8	1.7297E+04
Pile N.	4	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-8.1962E-05	-3.9355E-05	-1.7221E+04	-4006.6	-100.44	-48.341	-2.2885	-1.0989	0.2987	4.5738E+09	4.5738E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	0.0000	29.040	29.040
2	-8.1963E-05	-3.8984E-05	-1.7222E+04	-3928.8	-100.45	-47.881	-2.2886	-1.0885	0.2577	4.5738E+09	4.5738E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	0.0000	29.040	29.040
3	-8.2344E-05	-3.8970E-05	-1.7297E+04	-3931.3	-100.91	-47.861	-2.2992	-1.0881	0.4523	4.5738E+09	4.5738E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	0.0000	29.920	29.040
4	-8.2344E-05	-3.9341E-05	-1.7297E+04	-4009.2	-100.91	-48.322	-2.2992	-1.0985	0.4934	4.5738E+09	4.5738E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	0.0000	29.040	29.040
Min.	-8.2344E-05	-3.9355E-05	-1.7297E+04	-4009.2	-100.91	-48.341	-2.2992	-1.0989	0.2577	4.5738E+09	4.5738E+09
Pile N.	3	1	3	4	3	1	3	1	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.024465	0.025245	4469.8	4155.9	156.87	86.586	9.0847	3.0159	0.3679	8.9130E+09	8.9130E+09
x(FT)	0.8800	0.0000	27.280	16.280	0.0000	0.0000	29.040	29.040	29.040	14.520	0.0000
2	0.024465	0.025118	4469.8	4141.0	156.89	85.850	9.0856	2.9754	0.3174	8.9130E+09	8.9130E+09
x(FT)	0.8800	0.0000	27.280	16.280	0.0000	0.0000	29.040	29.040	29.040	7.4800	10.560
3	0.024592	0.025118	4491.1	4142.6	157.57	85.788	9.1229	2.9703	0.5572	8.9130E+09	8.9130E+09
x(FT)	0.8800	0.0000	27.280	16.280	0.0000	0.0000	29.040	29.040	29.040	10.120	1.3200
4	0.024592	0.025245	4491.2	4157.5	157.56	86.524	9.1220	3.0108	0.6077	8.9130E+09	8.9130E+09
x(FT)	0.8800	0.0000	27.280	16.280	0.0000	0.0000	29.040	29.040	29.040	6.1600	4.4000
Max.	0.024592	0.025245	4491.2	4157.5	157.57	86.586	9.1229	3.0159	0.6077	8.9130E+09	8.9130E+09
Pile N.	3	1	4	4	3	1	3	1	4	1	1

LOAD CASE : 6
CASE NAME : Strength Minv3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0817328	-0.0243547	-0.0311645

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-9.88024E-07	-9.76438E-05	1.60374E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2735.9	-127.81	-76.123	-14.195	3078.4	-1.2329E+04
2	2607.6	-127.82	-77.823	-14.195	3251.4	-1.2329E+04
3	1826.6	-126.19	-77.877	-14.195	3249.0	-1.2156E+04
4	1954.9	-126.18	-76.177	-14.195	3076.0	-1.2156E+04
MINIMUM	1826.6	-127.82	-77.877	-14.195	3076.0	-1.2329E+04
Pile N.	3	2	3	1	4	1
MAXIMUM	2735.9	-126.18	-76.123	-14.195	3251.4	-1.2156E+04
Pile N.	1	4	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-0.023150	-0.022820	-3781.0	-3824.5	-126.84	-75.161	-6.7601	-2.4645	0.6492	4.5738E+09	4.5738E+09
x(FT)	0.0000	0.0000	23.320	15.840	0.0000	0.0000	29.040	29.040	0.0000	29.040	29.480
2	-0.023150	-0.023105	-3780.8	-3854.8	-126.85	-76.849	-6.7607	-2.5584	0.6188	4.5738E+09	4.5738E+09
x(FT)	0.0000	0.0000	23.320	15.840	0.0000	0.0000	29.040	29.040	0.0000	29.480	29.040
3	-0.022865	-0.023105	-3731.8	-3853.3	-125.23	-76.902	-6.6715	-2.5629	0.4335	4.5738E+09	4.5738E+09

x(FT)	0.0000	0.0000	23.320	15.840	0.0000	0.0000	29.040	29.040	0.0000	29.040	29.480
4	-0.022865	-0.022820	-3731.9	-3823.0	-125.22	-75.213	-6.6709	-2.4689	0.4639	4.5738E+09	4.5738E+09
x(FT)	0.0000	0.0000	23.320	15.840	0.0000	0.0000	29.040	29.040	0.0000	29.040	29.040
Min.	-0.023150	-0.023105	-3781.0	-3854.8	-126.85	-76.902	-6.7607	-2.5629	0.4335	4.5738E+09	4.5738E+09
Pile N.	1	2	1	2	2	3	2	3	3	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	6.4333E-05	3.3864E-05	1.2329E+04	3078.4	78.709	41.539	1.7963	0.9456	0.7997	8.9130E+09	8.9130E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	29.040	7.9200	11.000
2	6.4335E-05	3.4705E-05	1.2329E+04	3251.4	78.711	42.585	1.7964	0.9690	0.7622	8.9130E+09	8.9130E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	29.040	9.2400	27.280
3	6.3478E-05	3.4718E-05	1.2156E+04	3249.0	77.664	42.602	1.7724	0.9694	0.5339	8.9130E+09	8.9130E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	29.040	18.480	7.9200
4	6.3477E-05	3.3877E-05	1.2156E+04	3076.0	77.662	41.557	1.7724	0.9459	0.5714	8.9130E+09	8.9130E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	29.040	14.520	18.480
Max.	6.4335E-05	3.4718E-05	1.2329E+04	3251.4	78.711	42.602	1.7964	0.9694	0.7997	8.9130E+09	8.9130E+09
Pile N.	2	3	1	2	2	3	2	3	1	1	1

LOAD CASE : 7
CASE NAME : Strength MaxT
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0568149	0.0203993	0.0205458

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
3.22452E-06	5.94555E-05	9.00234E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1711.5	222.38	53.482	46.327	-2599.0	2.7020E+04
2	991.48	222.45	59.040	46.327	-3163.7	2.7023E+04
3	1467.0	217.12	59.017	46.327	-3164.5	2.6500E+04
4	2187.0	217.05	53.461	46.327	-2599.8	2.6497E+04
MINIMUM	991.48	217.05	53.461	46.327	-3164.5	2.6497E+04
Pile N.	2	4	4	1	3	4
MAXIMUM	2187.0	222.45	59.040	46.327	-2599.0	2.7023E+04
Pile N.	4	2	2	1	1	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-1.1894E-04	-2.4142E-05	-2.7020E+04	-2599.0	-145.98	-29.675	-3.3211	-0.6741	0.4061	4.5670E+09	4.5738E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	0.0000	29.040	29.040
2	-1.1894E-04	-2.6886E-05	-2.7023E+04	-3163.7	-145.97	-33.088	-3.3209	-0.7507	0.2353	4.5670E+09	4.5738E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	0.0000	29.040	29.040
3	-1.1627E-04	-2.6881E-05	-2.6500E+04	-3164.5	-142.71	-33.081	-3.2465	-0.7506	0.3481	4.5681E+09	4.5738E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	0.0000	29.040	30.360
4	-1.1627E-04	-2.4138E-05	-2.6497E+04	-2599.8	-142.71	-29.668	-3.2466	-0.6740	0.5190	4.5681E+09	4.5738E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	0.0000	29.040	29.920
Min.	-1.1894E-04	-2.6886E-05	-2.7023E+04	-3164.5	-145.98	-33.088	-3.3211	-0.7507	0.2353	4.5670E+09	4.5738E+09
Pile N.	1	2	2	3	1	2	1	2	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.029823	0.015087	6490.7	2462.8	221.19	52.846	13.802	1.8949	0.5003	8.9130E+09	8.9130E+09
x(FT)	2.6400	0.0000	29.040	16.720	0.0000	0.0000	29.040	29.040	29.040	8.3600	6.1600
2	0.029823	0.016016	6491.0	2576.7	221.25	58.364	13.806	2.2022	0.2898	8.9130E+09	8.9130E+09
x(FT)	2.6400	0.0000	29.040	17.160	0.0000	0.0000	29.040	29.040	29.040	10.120	7.4800
3	0.028929	0.016016	6346.1	2577.3	215.96	58.341	13.520	2.2003	0.4288	8.9130E+09	8.9130E+09
x(FT)	2.6400	0.0000	29.040	17.160	0.0000	0.0000	29.040	29.040	29.040	10.560	0.4400
4	0.028929	0.015087	6345.7	2463.4	215.90	52.824	13.516	1.8931	0.6393	8.9130E+09	8.9130E+09
x(FT)	2.6400	0.0000	29.040	16.720	0.0000	0.0000	29.040	29.040	29.040	7.0400	3.0800
Max.	0.029823	0.016016	6491.0	2577.3	221.25	58.364	13.806	2.2022	0.6393	8.9130E+09	8.9130E+09
Pile N.	1	2	2	3	2	2	2	2	4	1	1

LOAD CASE : 8
CASE NAME : Strength MinT
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0879083	2.64740E-03	-0.0203507

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-5.93986E-06	-7.12238E-05	-4.01234E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2577.1	-33.834	-36.911	-85.339	335.72	-5411.7
2	2898.0	-33.832	-47.065	-85.339	1379.0	-5411.2
3	2328.4	-23.667	-47.091	-85.339	1377.7	-4369.6
4	2007.5	-23.667	-36.934	-85.339	334.38	-4370.2
MINIMUM	2007.5	-33.834	-47.091	-85.339	334.38	-5411.7
Pile N.	4	1	3	1	4	1
MAXIMUM	2898.0	-23.667	-36.911	-85.339	1379.0	-4369.6
Pile N.	2	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-3.1760E-03	-0.013513	-1088.4	-2524.1	-33.771	-36.340	-2.5761	-0.7719	0.6116	4.5738E+09	4.5738E+09
x(FT)	7.4800	0.0000	29.040	13.200	0.0000	0.0000	29.040	29.040	0.0000	29.040	29.920
2	-3.1761E-03	-0.015223	-1088.5	-2649.8	-33.769	-46.422	-2.5761	-1.3311	0.6877	4.5738E+09	4.5738E+09
x(FT)	7.4800	0.0000	29.040	14.960	0.0000	0.0000	29.040	29.040	0.0000	29.040	29.040
3	-1.8994E-03	-0.015223	-806.38	-2649.1	-23.674	-46.448	-2.0156	-1.3333	0.5525	4.5738E+09	4.5738E+09
x(FT)	9.6800	0.0000	29.040	14.960	0.0000	0.0000	29.040	29.040	0.0000	29.040	29.040
4	-1.8992E-03	-0.013513	-806.30	-2523.5	-23.674	-36.363	-2.0155	-0.7739	0.4764	4.5738E+09	4.5738E+09
x(FT)	9.6800	0.0000	29.040	13.200	0.0000	0.0000	29.040	29.040	0.0000	29.040	29.040
Min.	-3.1761E-03	-0.015223	-1088.5	-2649.8	-33.771	-46.448	-2.5761	-1.3333	0.4764	4.5738E+09	4.5738E+09
Pile N.	2	2	2	2	1	3	1	3	4	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	1.9757E-05	1.5620E-05	5411.7	335.72	24.347	19.243	0.5516	0.4361	0.7533	8.9130E+09	8.9130E+09
x(FT)	32.560	31.680	0.0000	0.0000	30.800	29.920	32.560	31.680	29.040	6.1600	9.2400
2	1.9759E-05	2.0508E-05	5411.2	1379.0	24.349	25.086	0.5517	0.5726	0.8471	8.9130E+09	8.9130E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	29.040	0.8800	7.9200
3	1.3238E-04	2.0515E-05	4369.6	1377.7	17.983	25.095	0.4071	0.5728	0.6806	8.9130E+09	8.9130E+09
x(FT)	0.0000	32.120	0.0000	0.0000	30.800	30.360	33.000	32.120	29.040	6.6000	3.0800
4	1.3238E-04	1.5623E-05	4370.2	334.38	17.980	19.248	0.4070	0.4362	0.5868	8.9130E+09	8.9130E+09
x(FT)	0.0000	31.680	0.0000	0.0000	30.800	29.920	33.000	31.680	29.040	14.080	5.7200
Max.	1.3238E-04	2.0515E-05	5411.7	1379.0	24.349	25.095	0.5517	0.5728	0.8471	8.9130E+09	8.9130E+09
Pile N.	3	3	1	2	2	3	2	3	2	1	1

LOAD CASE : 9
CASE NAME : Strength MaxM2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0565719	0.0225901	0.0337956

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-4.40567E-07	1.02554E-04	2.16188E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1258.8	157.90	87.652	-6.3297	-4006.6	1.7221E+04
2	1085.9	157.91	86.910	-6.3297	-3928.8	1.7222E+04
3	1906.2	158.60	86.848	-6.3297	-3931.3	1.7297E+04
4	2079.1	158.59	87.589	-6.3297	-4009.2	1.7297E+04
MINIMUM	1085.9	157.90	86.848	-6.3297	-4009.2	1.7221E+04
Pile N.	2	1	3	1	4	1
MAXIMUM	2079.1	158.60	87.652	-6.3297	-3928.8	1.7297E+04
Pile N.	4	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-8.1962E-05	-3.9355E-05	-1.7221E+04	-4006.6	-100.44	-48.341	-2.2885	-1.0989	0.2987	4.5738E+09	4.5738E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	0.0000	30.360	29.040
2	-8.1963E-05	-3.8984E-05	-1.7222E+04	-3928.8	-100.45	-47.881	-2.2886	-1.0885	0.2577	4.5738E+09	4.5738E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	0.0000	29.040	29.920
3	-8.2344E-05	-3.8970E-05	-1.7297E+04	-3931.3	-100.91	-47.861	-2.2992	-1.0881	0.4523	4.5738E+09	4.5738E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	0.0000	29.480	29.040
4	-8.2344E-05	-3.9341E-05	-1.7297E+04	-4009.2	-100.91	-48.322	-2.2992	-1.0985	0.4934	4.5738E+09	4.5738E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	0.0000	29.920	29.480
Min.	-8.2344E-05	-3.9355E-05	-1.7297E+04	-4009.2	-100.91	-48.341	-2.2992	-1.0989	0.2577	4.5738E+09	4.5738E+09
Pile N.	3	1	3	4	3	1	3	1	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.024465	0.025245	4469.8	4155.9	156.87	86.586	9.0847	3.0159	0.3679	8.9130E+09	8.9130E+09
x(FT)	0.8800	0.0000	27.280	16.280	0.0000	0.0000	29.040	29.040	29.040	7.0400	0.0000
2	0.024465	0.025118	4469.8	4141.0	156.89	85.850	9.0856	2.9754	0.3174	8.9130E+09	8.9130E+09
x(FT)	0.8800	0.0000	27.280	16.280	0.0000	0.0000	29.040	29.040	29.040	18.920	0.4400
3	0.024592	0.025118	4491.1	4142.6	157.57	85.788	9.1229	2.9703	0.5572	8.9130E+09	8.9130E+09
x(FT)	0.8800	0.0000	27.280	16.280	0.0000	0.0000	29.040	29.040	29.040	21.120	7.9200
4	0.024592	0.025245	4491.2	4157.5	157.56	86.524	9.1220	3.0108	0.6077	8.9130E+09	8.9130E+09
x(FT)	0.8800	0.0000	27.280	16.280	0.0000	0.0000	29.040	29.040	29.040	24.640	0.4400
Max.	0.024592	0.025245	4491.2	4157.5	157.57	86.586	9.1229	3.0159	0.6077	8.9130E+09	8.9130E+09
Pile N.	3	1	4	4	3	1	3	1	4	1	1

LOAD CASE : 10
CASE NAME : Strength MinM2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0893667	-0.0244229	-0.0304278

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-3.47304E-06	-9.70630E-05	-7.73923E-07

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2878.3	-148.94	-70.252	-49.898	2505.9	-1.5307E+04
2	2884.5	-148.94	-76.196	-49.898	3115.5	-1.5307E+04
3	2108.2	-143.06	-76.249	-49.898	3113.1	-1.4700E+04
4	2102.0	-143.06	-70.303	-49.898	2503.5	-1.4700E+04
MINIMUM	2102.0	-148.94	-76.249	-49.898	2503.5	-1.5307E+04
Pile N.	4	1	3	1	4	1
MAXIMUM	2884.5	-143.06	-70.252	-49.898	3115.5	-1.4700E+04
Pile N.	2	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-0.024988	-0.021774	-4273.7	-3708.1	-147.89	-69.334	-8.2213	-2.1509	0.6830	4.5738E+09	4.5738E+09
x(FT)	0.0000	0.0000	24.640	15.400	0.0000	0.0000	29.040	29.040	0.0000	29.040	29.920
2	-0.024988	-0.022775	-4273.7	-3811.7	-147.89	-75.236	-8.2212	-2.4785	0.6845	4.5738E+09	4.5738E+09
x(FT)	0.0000	0.0000	24.640	15.840	0.0000	0.0000	29.040	29.040	0.0000	29.480	29.040
3	-0.023988	-0.022775	-4102.5	-3810.2	-142.05	-75.288	-7.8984	-2.4829	0.5003	4.5738E+09	4.5738E+09
x(FT)	0.0000	0.0000	24.640	15.840	0.0000	0.0000	29.040	29.040	0.0000	29.040	29.480
4	-0.023988	-0.021774	-4102.5	-3706.7	-142.05	-69.384	-7.8985	-2.1552	0.4988	4.5738E+09	4.5738E+09
x(FT)	0.0000	0.0000	24.640	15.400	0.0000	0.0000	29.040	29.040	0.0000	30.360	29.040
Min.	-0.024988	-0.022775	-4273.7	-3811.7	-147.89	-75.288	-8.2213	-2.4829	0.4988	4.5738E+09	4.5738E+09
Pile N.	1	2	1	2	1	3	1	3	4	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	7.6165E-05	3.0979E-05	1.5307E+04	2505.9	93.261	37.955	2.1267	0.8650	0.8413	8.9130E+09	8.9130E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	29.040	14.520	0.4400
2	7.6165E-05	3.3926E-05	1.5307E+04	3115.5	93.261	41.619	2.1267	0.9473	0.8431	8.9130E+09	8.9130E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	29.040	3.9600	2.6400
3	7.3137E-05	3.3939E-05	1.4700E+04	3113.1	89.556	41.637	2.0421	0.9476	0.6162	8.9130E+09	8.9130E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	29.040	14.960	4.8400
4	7.3137E-05	3.0992E-05	1.4700E+04	2503.5	89.556	37.972	2.0421	0.8653	0.6144	8.9130E+09	8.9130E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	29.040	2.2000	7.9200
Max.	7.6165E-05	3.3939E-05	1.5307E+04	3115.5	93.261	41.637	2.1267	0.9476	0.8431	8.9130E+09	8.9130E+09
Pile N.	1	3	1	2	1	3	1	3	2	1	1

LOAD CASE : 11
CASE NAME : Strength MaxM3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0816248	0.0200335	0.0197480

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
2.54358E-06	5.67271E-05	9.20858E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2419.7	221.82	52.316	36.544	-2616.1	2.7062E+04
2	1683.1	221.88	56.705	36.544	-3061.3	2.7066E+04
3	2136.8	217.68	56.684	36.544	-3062.1	2.6655E+04
4	2873.4	217.62	52.296	36.544	-2616.9	2.6651E+04
MINIMUM	1683.1	217.62	52.296	36.544	-3062.1	2.6651E+04
Pile N.	2	4	4	1	3	4
MAXIMUM	2873.4	221.88	56.705	36.544	-2616.1	2.7066E+04
Pile N.	4	2	2	1	1	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-1.1882E-04	-2.3681E-05	-2.7062E+04	-2616.1	-145.83	-29.116	-3.3176	-0.6612	0.5742	4.5670E+09	4.5738E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	0.0000	29.040	29.920
2	-1.1881E-04	-2.5847E-05	-2.7066E+04	-3061.3	-145.83	-31.810	-3.3174	-0.7217	0.3994	4.5670E+09	4.5738E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	0.0000	29.040	29.040
3	-1.1671E-04	-2.5842E-05	-2.6655E+04	-3062.1	-143.26	-31.804	-3.2589	-0.7216	0.5071	4.5679E+09	4.5738E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	0.0000	29.040	29.040
4	-1.1672E-04	-2.3677E-05	-2.6651E+04	-2616.9	-143.26	-29.110	-3.2590	-0.6611	0.6818	4.5679E+09	4.5738E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	0.0000	29.040	29.040
Min.	-1.1882E-04	-2.5847E-05	-2.7066E+04	-3062.1	-145.83	-31.810	-3.3176	-0.7217	0.3994	4.5670E+09	4.5738E+09
Pile N.	1	2	2	3	1	2	1	2	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	0.029594	0.014617	6484.0	2377.5	220.64	51.700	13.806	1.8781	0.7073	8.9130E+09	8.9130E+09
x(FT)	2.6400	0.0000	29.040	16.720	0.0000	0.0000	29.040	29.040	7.9200	2.2000	
2	0.029594	0.015349	6484.4	2468.0	220.70	56.057	13.810	2.1209	0.4920	8.9130E+09	8.9130E+09
x(FT)	2.6400	0.0000	29.040	17.160	0.0000	0.0000	29.040	29.040	18.920	11.440	
3	0.028895	0.015349	6370.3	2468.5	216.54	56.036	13.585	2.1192	0.6246	8.9130E+09	8.9130E+09
x(FT)	3.0800	0.0000	29.040	17.160	0.0000	0.0000	29.040	29.040	14.960	2.6400	
4	0.028895	0.014617	6370.0	2378.0	216.48	51.680	13.581	1.8765	0.8399	8.9130E+09	8.9130E+09
x(FT)	3.0800	0.0000	29.040	16.720	0.0000	0.0000	29.040	29.040	7.4800	21.120	
Max.	0.029594	0.015349	6484.4	2468.5	220.70	56.057	13.810	2.1209	0.8399	8.9130E+09	8.9130E+09
Pile N.	1	2	2	3	2	2	2	2	4	1	1

LOAD CASE : 12
CASE NAME : Strength MinM3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0566709	-0.0204831	-0.0228300

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-5.13585E-06	-7.12524E-05	-7.71913E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1561.5	-211.02	-52.354	-73.788	1910.3	-2.5297E+04
2	2178.9	-210.97	-61.117	-73.788	2813.1	-2.5294E+04
3	1609.0	-202.48	-61.148	-73.788	2811.9	-2.4444E+04
4	991.62	-202.53	-52.381	-73.788	1909.1	-2.4446E+04
MINIMUM	991.62	-211.02	-61.148	-73.788	1909.1	-2.5297E+04
Pile N.	4	1	3	1	4	1
MAXIMUM	2178.9	-202.48	-52.354	-73.788	2813.1	-2.4444E+04
Pile N.	2	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-0.028816	-0.016105	-6132.9	-2732.3	-209.86	-51.674	-12.973	-1.6239	0.3705	4.5699E+09	4.5738E+09
x(FT)	2.6400	0.0000	29.040	15.400	0.0000	0.0000	29.040	29.040	0.0000	29.040	29.040
2	-0.028816	-0.017584	-6132.6	-2893.8	-209.81	-60.376	-12.969	-2.1061	0.5171	4.5699E+09	4.5738E+09
x(FT)	2.6400	0.0000	29.040	16.280	0.0000	0.0000	29.040	29.040	0.0000	29.040	29.480
3	-0.027391	-0.017584	-5898.2	-2893.0	-201.38	-60.406	-12.510	-2.1086	0.3818	4.5720E+09	4.5738E+09
x(FT)	2.6400	0.0000	29.040	16.280	0.0000	0.0000	29.040	29.040	0.0000	29.040	29.480
4	-0.027391	-0.016105	-5898.4	-2731.6	-201.43	-51.701	-12.513	-1.6262	0.2353	4.5720E+09	4.5738E+09
x(FT)	2.6400	0.0000	29.040	15.400	0.0000	0.0000	29.040	29.040	0.0000	29.040	29.480
Min.	-0.028816	-0.017584	-6132.9	-2893.8	-209.86	-60.406	-12.973	-2.1086	0.2353	4.5699E+09	4.5738E+09
Pile N.	1	2	1	2	1	3	1	3	4	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	1.1243E-04	2.3113E-05	2.5297E+04	1910.3	137.97	28.327	3.1393	0.6454	0.4564	8.9130E+09	8.9130E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	29.040	6.6000	0.0000
2	1.1244E-04	2.7464E-05	2.5294E+04	2813.1	137.97	33.736	3.1394	0.7669	0.6369	8.9130E+09	8.9130E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	29.040	24.640	10.120
3	1.0810E-04	2.7471E-05	2.4444E+04	2811.9	132.67	33.746	3.0185	0.7671	0.4703	8.9130E+09	8.9130E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	29.040	7.9200	0.4400
4	1.0810E-04	2.3120E-05	2.4446E+04	1909.1	132.66	28.336	3.0184	0.6456	0.2898	8.9130E+09	8.9130E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	29.040	13.640	1.7600
Max.	1.1244E-04	2.7471E-05	2.5297E+04	2813.1	137.97	33.746	3.1394	0.7671	0.6369	8.9130E+09	8.9130E+09
Pile N.	2	3	1	2	1	3	2	3	2	1	1

LOAD CASE : 13
CASE NAME : Service MaxP
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0630444	-9.31351E-04	0.0171074

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
4.01896E-08	5.61144E-05	1.91960E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1614.6	15.785	39.471	0.5774	-1324.4	2548.4
2	1461.1	15.785	39.546	0.5774	-1331.2	2548.5
3	1909.9	15.715	39.529	0.5774	-1332.0	2541.1
4	2063.4	15.715	39.454	0.5774	-1325.2	2540.9
MINIMUM	1461.1	15.715	39.454	0.5774	-1332.0	2540.9
Pile N.	2	3	4	1	3	4
MAXIMUM	2063.4	15.785	39.546	0.5774	-1324.4	2548.5
Pile N.	4	1	2	1	1	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-9.2420E-06	-1.7332E-05	-2548.4	-1324.4	-11.391	-21.225	-0.2581	-0.4839	0.3831	4.5738E+09	4.5738E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	0.0000	29.040	29.040
2	-9.2416E-06	-1.7367E-05	-2548.5	-1331.2	-11.391	-21.269	-0.2580	-0.4849	0.3467	4.5738E+09	4.5738E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	0.0000	29.040	29.040
3	-9.2078E-06	-1.7363E-05	-2541.1	-1332.0	-11.349	-21.264	-0.2571	-0.4848	0.4532	4.5738E+09	4.5738E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	0.0000	29.040	29.040
4	-9.2082E-06	-1.7327E-05	-2540.9	-1325.2	-11.350	-21.219	-0.2571	-0.4838	0.4896	4.5738E+09	4.5738E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	0.0000	29.040	29.040
Min.	-9.2420E-06	-1.7367E-05	-2548.5	-1332.0	-11.391	-21.269	-0.2581	-0.4849	0.3467	4.5738E+09	4.5738E+09
Pile N.	1	2	2	3	1	2	1	2	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	1.4649E-03	0.012388	509.40	2122.5	15.756	38.948	1.2101	1.1818	0.4719	8.9130E+09	8.9130E+09
x(FT)	7.9200	0.0000	29.040	15.400	0.0000	0.0000	29.040	29.040	29.040	1.7600	16.720
2	1.4648E-03	0.012400	509.38	2123.5	15.757	39.022	1.2101	1.1861	0.4271	8.9130E+09	8.9130E+09
x(FT)	7.9200	0.0000	29.040	15.400	0.0000	0.0000	29.040	29.040	29.040	0.8800	7.9200
3	1.4559E-03	0.012400	507.52	2124.0	15.687	39.005	1.2063	1.1847	0.5583	8.9130E+09	8.9130E+09
x(FT)	7.9200	0.0000	29.040	15.400	0.0000	0.0000	29.040	29.040	29.040	14.080	5.7200
4	1.4559E-03	0.012388	507.53	2123.0	15.687	38.932	1.2063	1.1804	0.6031	8.9130E+09	8.9130E+09
x(FT)	7.9200	0.0000	29.040	15.400	0.0000	0.0000	29.040	29.040	29.040	1.3200	6.1600
Max.	1.4649E-03	0.012400	509.40	2124.0	15.757	39.022	1.2101	1.1861	0.6031	8.9130E+09	8.9130E+09
Pile N.	1	2	1	3	2	2	1	2	4	1	1

LOAD CASE : 14
CASE NAME : Service MinP
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0743331	6.48577E-04	-0.0211331

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-3.20261E-06	-7.38556E-05	-7.31051E-06

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2341.9	-6.9919	-40.997	-46.013	625.57	-1070.9
2	2400.3	-6.9918	-46.477	-46.013	1187.8	-1070.9
3	1809.6	-1.5081	-46.504	-46.013	1186.4	-508.92
4	1751.2	-1.5081	-41.022	-46.013	624.15	-508.93
MINIMUM	1751.2	-6.9919	-46.504	-46.013	624.15	-1070.9
Pile N.	4	1	3	1	4	1
MAXIMUM	2400.3	-1.5081	-40.997	-46.013	1187.8	-508.92
Pile N.	2	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-6.9158E-04	-0.014468	-221.24	-2644.5	-6.9744	-40.386	-0.5150	-0.9507	0.5557	4.5738E+09	4.5738E+09
x(FT)	6.6000	0.0000	29.040	13.640	0.0000	0.0000	29.040	29.040	0.0000	29.040	29.040
2	-6.9158E-04	-0.015390	-221.24	-2713.3	-6.9743	-45.827	-0.5150	-1.2527	0.5696	4.5738E+09	4.5738E+09
x(FT)	6.6000	0.0000	29.040	14.520	0.0000	0.0000	29.040	29.040	0.0000	29.040	29.040
3	-8.9821E-05	-0.015390	-69.581	-2712.5	-1.9896	-45.854	-0.2126	-1.2550	0.4294	4.5738E+09	4.5738E+09
x(FT)	16.280	0.0000	29.480	14.520	8.8000	0.0000	29.040	29.040	0.0000	29.040	29.040
4	-8.9815E-05	-0.014468	-69.577	-2643.7	-1.9895	-40.411	-0.2126	-0.9529	0.4155	4.5738E+09	4.5738E+09
x(FT)	16.280	0.0000	29.480	13.640	8.8000	0.0000	29.040	29.040	0.0000	29.040	29.040
Min.	-6.9158E-04	-0.015390	-221.24	-2713.3	-6.9744	-45.854	-0.5150	-1.2550	0.4155	4.5738E+09	4.5738E+09
Pile N.	1	2	1	2	1	3	1	3	4	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	4.0220E-06	1.7390E-05	1070.9	625.57	4.9532	21.452	0.1123	0.4856	0.6845	8.9130E+09	8.9130E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	29.920	32.560	32.120	29.040	2.2000	3.0800
2	4.0220E-06	2.0107E-05	1070.9	1187.8	4.9532	24.572	0.1123	0.5614	0.7016	8.9130E+09	8.9130E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	29.040	8.3600	14.080
3	4.9567E-04	2.0115E-05	508.92	1186.4	1.5652	24.582	0.035613	0.5616	0.5290	8.9130E+09	8.9130E+09
x(FT)	0.0000	32.120	0.0000	0.0000	31.240	30.360	33.000	32.120	29.040	10.120	16.720
4	4.9567E-04	1.7398E-05	508.93	624.15	1.5651	21.458	0.035611	0.4858	0.5119	8.9130E+09	8.9130E+09
x(FT)	0.0000	32.120	0.0000	0.0000	31.240	29.920	33.000	32.120	29.040	2.6400	4.4000
Max.	4.9567E-04	2.0115E-05	1070.9	1187.8	4.9532	24.582	0.1123	0.5616	0.7016	8.9130E+09	8.9130E+09
Pile N.	3	3	1	2	1	3	1	3	2	1	1

LOAD CASE : 15
CASE NAME : Service MaxV2

LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0668343	2.60280E-04	0.0183618

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
1.65649E-06	6.03572E-05	4.93273E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1823.4	57.669	40.833	23.799	-1259.6	8301.5
2	1428.9	57.676	43.686	23.799	-1549.6	8302.4
3	1911.6	54.831	43.666	23.799	-1550.5	8010.5
4	2306.1	54.825	40.814	23.799	-1260.5	8009.6
MINIMUM	1428.9	54.825	40.814	23.799	-1550.5	8009.6
Pile N.	2	4	4	1	3	4
MAXIMUM	2306.1	57.676	43.686	23.799	-1259.6	8302.4
Pile N.	4	2	2	1	1	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-3.2491E-05	-1.7840E-05	-8301.5	-1259.6	-39.976	-21.832	-0.9072	-0.4981	0.4327	4.5738E+09	4.5738E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	0.0000	29.040	29.480
2	-3.2488E-05	-1.9250E-05	-8302.4	-1549.6	-39.973	-23.586	-0.9071	-0.5375	0.3391	4.5738E+09	4.5738E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	0.0000	29.040	29.040
3	-3.1042E-05	-1.9245E-05	-8010.5	-1550.5	-38.202	-23.579	-0.8668	-0.5374	0.4536	4.5738E+09	4.5738E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	0.0000	29.040	29.040
4	-3.1045E-05	-1.7835E-05	-8009.6	-1260.5	-38.205	-21.826	-0.8668	-0.4980	0.5472	4.5738E+09	4.5738E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	0.0000	31.680	29.040
Min.	-3.2491E-05	-1.9250E-05	-8302.4	-1550.5	-39.976	-23.586	-0.9072	-0.5375	0.3391	4.5738E+09	4.5738E+09
Pile N.	1	2	2	3	1	2	1	2	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR	DISPL. z-DIR	MOMENT z-DIR	MOMENT y-DIR	SHEAR y-DIR	SHEAR z-DIR	SOIL REACT y-DIR	SOIL REACT z-DIR	TOTAL STRESS	FLEX. RIG. z-DIR	FLEX. RIG. y-DIR

	IN	IN	KIP-IN	KIP-IN	KIP	KIP	KIP/IN	KIP/IN	KIP/IN**2	KIP-IN**2	KIP-IN**2
1	6.1704E-03	0.013053	1783.4	2258.2	57.475	40.282	4.0527	1.1815	0.5330	8.9130E+09	8.9130E+09
x(FT)	5.7200	0.0000	29.040	14.960	0.0000	0.0000	29.040	29.040	29.040	5.7200	2.6400
2	6.1702E-03	0.013530	1783.3	2303.2	57.481	43.115	4.0529	1.3393	0.4177	8.9130E+09	8.9130E+09
x(FT)	5.7200	0.0000	29.040	15.400	0.0000	0.0000	29.040	29.040	29.040	5.7200	11.440
3	5.7551E-03	0.013530	1704.7	2303.8	54.657	43.095	3.8963	1.3376	0.5587	8.9130E+09	8.9130E+09
x(FT)	6.1600	0.0000	29.040	15.400	0.0000	0.0000	29.040	29.040	29.040	4.8400	0.8800
4	5.7553E-03	0.013053	1704.8	2258.7	54.652	40.263	3.8961	1.1799	0.6741	8.9130E+09	8.9130E+09
x(FT)	6.1600	0.0000	29.040	14.960	0.0000	0.0000	29.040	29.040	29.040	3.0800	3.5200
Max.	6.1704E-03	0.013530	1783.4	2303.8	57.481	43.115	4.0529	1.3393	0.6741	8.9130E+09	8.9130E+09
Pile N.	1	2	1	3	2	2	2	2	4	1	1

LOAD CASE : 16
CASE NAME : Service MinV2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0675185	-1.36780E-04	-0.0213838

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-4.54082E-06	-7.47565E-05	-3.75914E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2035.1	-46.387	-40.356	-65.239	514.15	-6576.2
2	2335.8	-46.382	-48.117	-65.239	1311.9	-6575.7
3	1737.9	-38.614	-48.145	-65.239	1310.4	-5779.7
4	1437.2	-38.617	-40.382	-65.239	512.68	-5780.2
MINIMUM	1437.2	-46.387	-48.145	-65.239	512.68	-6576.2
Pile N.	4	1	3	1	4	1
MAXIMUM	2335.8	-38.614	-40.356	-65.239	1311.9	-5779.7
Pile N.	2	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-5.0620E-03	-0.014450	-1426.8	-2664.4	-46.222	-39.746	-3.2229	-0.8999	0.4829	4.5738E+09	4.5738E+09
x(FT)	5.2800	0.0000	29.040	13.640	0.0000	0.0000	29.040	29.040	0.0000	29.920	29.040
2	-5.0621E-03	-0.015758	-1426.8	-2760.9	-46.218	-47.452	-3.2228	-1.3272	0.5543	4.5738E+09	4.5738E+09
x(FT)	5.2800	0.0000	29.040	14.520	0.0000	0.0000	29.040	29.040	0.0000	29.040	29.040
3	-3.9298E-03	-0.015758	-1211.1	-2760.2	-38.504	-47.480	-2.7944	-1.3296	0.4124	4.5738E+09	4.5738E+09
x(FT)	6.6000	0.0000	29.040	14.520	0.0000	0.0000	29.040	29.040	0.0000	29.040	29.040
4	-3.9298E-03	-0.014450	-1211.1	-2663.7	-38.507	-39.771	-2.7945	-0.9021	0.3411	4.5738E+09	4.5738E+09
x(FT)	6.6000	0.0000	29.040	13.640	0.0000	0.0000	29.040	29.040	0.0000	29.040	29.920
Min.	-5.0621E-03	-0.015758	-1426.8	-2760.9	-46.222	-47.480	-3.2229	-1.3296	0.3411	4.5738E+09	4.5738E+09
Pile N.	2	2	1	2	1	3	1	3	4	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	2.6009E-05	1.7086E-05	6576.2	514.15	31.993	21.080	0.7262	0.4771	0.5949	8.9130E+09	8.9130E+09
x(FT)	32.560	31.680	0.0000	0.0000	30.800	29.920	32.560	31.680	29.040	0.0000	1.7600
2	2.6010E-05	2.0884E-05	6575.7	1311.9	31.995	25.533	0.7263	0.5831	0.6827	8.9130E+09	8.9130E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	29.040	3.5200	0.8800
3	2.2034E-05	2.0892E-05	5779.7	1310.4	27.127	25.543	0.6152	0.5833	0.5080	8.9130E+09	8.9130E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	29.040	1.3200	2.6400
4	2.2033E-05	1.7089E-05	5780.2	512.68	27.125	21.086	0.6152	0.4772	0.4201	8.9130E+09	8.9130E+09
x(FT)	32.560	31.680	0.0000	0.0000	30.800	29.920	32.560	31.680	29.040	2.2000	12.760
Max.	2.6010E-05	2.0892E-05	6576.2	1311.9	31.995	25.543	0.7263	0.5833	0.6827	8.9130E+09	8.9130E+09
Pile N.	2	3	1	2	2	3	2	3	2	1	1

LOAD CASE : 17
CASE NAME : Service MaxV3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0691298	-5.75510E-04	0.0258045

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
6.89905E-07	8.51575E-05	2.20227E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1678.8	21.592	58.423	9.9120	-1859.1	3280.5
2	1502.6	21.593	59.615	9.9120	-1979.7	3280.7
3	2183.7	20.408	59.576	9.9120	-1981.6	3158.9
4	2359.9	20.407	58.385	9.9120	-1860.9	3158.7
MINIMUM	1502.6	20.407	58.385	9.9120	-1981.6	3158.7
Pile N.	2	4	4	1	3	4
MAXIMUM	2359.9	21.593	59.615	9.9120	-1859.1	3280.7
Pile N.	4	2	2	1	1	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-1.2382E-05	-2.5571E-05	-3280.5	-1859.1	-15.248	-31.301	-0.3457	-0.7140	0.3984	4.5738E+09	4.5738E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	0.0000	29.040	29.480
2	-1.2382E-05	-2.6159E-05	-3280.7	-1979.7	-15.247	-32.033	-0.3457	-0.7304	0.3566	4.5738E+09	4.5738E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	0.0000	29.040	29.480
3	-1.1780E-05	-2.6149E-05	-3158.9	-1981.6	-14.510	-32.020	-0.3289	-0.7301	0.5182	4.5738E+09	4.5738E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	0.0000	29.040	29.040
4	-1.1781E-05	-2.5561E-05	-3158.7	-1860.9	-14.511	-31.288	-0.3290	-0.7137	0.5600	4.5738E+09	4.5738E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	0.0000	29.480	29.920
Min.	-1.2382E-05	-2.6159E-05	-3280.7	-1981.6	-15.248	-32.033	-0.3457	-0.7304	0.3566	4.5738E+09	4.5738E+09
Pile N.	1	2	2	3	1	2	1	2	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	2.1572E-03	0.018552	680.98	3198.1	21.535	57.640	1.5803	1.7120	0.4907	8.9130E+09	8.9130E+09
x(FT)	6.6000	0.0000	29.040	14.960	0.0000	0.0000	29.040	29.040	8.8000	6.6000	
2	2.1572E-03	0.018751	680.96	3216.1	21.536	58.823	1.5803	1.7780	0.4392	8.9130E+09	8.9130E+09
x(FT)	6.6000	0.0000	29.040	15.400	0.0000	0.0000	29.040	29.040	2.2000	3.5200	
3	1.9928E-03	0.018751	648.27	3217.1	20.360	58.785	1.5151	1.7748	0.6383	8.9130E+09	8.9130E+09
x(FT)	7.0400	0.0000	29.040	15.400	0.0000	0.0000	29.040	29.040	29.040	17.160	14.960
4	1.9929E-03	0.018552	648.28	3199.1	20.359	57.602	1.5151	1.7088	0.6898	8.9130E+09	8.9130E+09
x(FT)	7.0400	0.0000	29.040	14.960	0.0000	0.0000	29.040	29.040	29.040	2.6400	3.9600
Max.	2.1572E-03	0.018751	680.98	3217.1	21.536	58.823	1.5803	1.7780	0.6898	8.9130E+09	8.9130E+09
Pile N.	1	2	1	3	2	2	1	2	4	1	1

LOAD CASE : 18
CASE NAME : Service MinV3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0688418	5.11996E-05	-0.0271881

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-3.41761E-06	-9.39293E-05	-2.52946E-06

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2288.8	-5.4261	-54.553	-49.102	1042.6	-678.77
2	2309.0	-5.4260	-60.403	-49.102	1642.5	-678.77
3	1557.7	0.4260	-60.448	-49.102	1640.3	-78.988
4	1537.5	0.4260	-54.595	-49.102	1040.3	-78.990
MINIMUM	1537.5	-5.4261	-60.448	-49.102	1040.3	-678.77
Pile N.	4	1	3	1	4	1
MAXIMUM	2309.0	0.4260	-54.553	-49.102	1642.5	-78.988
Pile N.	2	4	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-6.9980E-04	-0.018806	-159.92	-3391.3	-5.3988	-53.759	-0.3439	-1.3423	0.5431	4.5738E+09	4.5738E+09
x(FT)	3.0800	0.0000	29.040	14.080	0.0000	0.0000	29.040	29.040	0.0000	30.360	29.040
2	-6.9980E-04	-0.019790	-159.92	-3468.2	-5.3987	-59.568	-0.3439	-1.6647	0.5479	4.5738E+09	4.5738E+09
x(FT)	3.0800	0.0000	29.040	14.520	0.0000	0.0000	29.040	29.040	0.0000	29.480	29.480
3	-1.0235E-06	-0.019790	-2.1888	-3467.0	-0.4473	-59.612	-0.021317	-1.6685	0.3696	4.5738E+09	4.5738E+09
x(FT)	27.280	0.0000	31.680	14.520	24.640	0.0000	29.040	29.040	0.0000	29.040	29.920
4	-1.0233E-06	-0.018806	-2.1885	-3390.1	-0.4473	-53.801	-0.021315	-1.3459	0.3649	4.5738E+09	4.5738E+09
x(FT)	27.280	0.0000	31.680	14.080	24.640	0.0000	29.040	29.040	0.0000	29.040	29.040
Min.	-6.9980E-04	-0.019790	-159.92	-3468.2	-5.3988	-59.612	-0.3439	-1.6685	0.3649	4.5738E+09	4.5738E+09
Pile N.	1	2	1	2	1	3	1	3	4	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	2.9279E-06	2.3313E-05	678.77	1042.6	3.5950	28.614	0.081754	0.6509	0.6690	8.9130E+09	8.9130E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	29.920	32.560	32.120	29.040	14.520	7.9200
2	2.9279E-06	2.6213E-05	678.77	1642.5	3.5950	32.047	0.081754	0.7319	0.6749	8.9130E+09	8.9130E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	29.040	10.120	1.7600
3	3.3086E-04	2.6225E-05	95.758	1640.3	0.4120	32.063	5.6135E-03	0.7322	0.4553	8.9130E+09	8.9130E+09
x(FT)	0.0000	32.120	6.6000	0.0000	0.0000	30.360	2.6400	32.120	29.040	18.920	23.760
4	3.3086E-04	2.3325E-05	95.758	1040.3	0.4121	28.622	5.6135E-03	0.6513	0.4494	8.9130E+09	8.9130E+09
x(FT)	0.0000	32.120	6.6000	0.0000	0.0000	29.920	2.6400	32.120	29.040	3.9600	11.000
Max.	3.3086E-04	2.6225E-05	678.77	1642.5	3.5950	32.063	0.081754	0.7322	0.6749	8.9130E+09	8.9130E+09
Pile N.	3	3	1	2	1	3	1	3	2	1	1

LOAD CASE : 19
CASE NAME : Service MaxT
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0666092	-4.29847E-03	0.0191595

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
3.16026E-06	6.30566E-05	5.68634E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1836.5	40.206	41.295	45.404	-1176.1	6876.9
2	1381.7	40.208	46.726	45.404	-1729.9	6878.0
3	1886.0	34.794	46.705	45.404	-1730.9	6322.1
4	2340.8	34.792	41.274	45.404	-1177.1	6321.0
MINIMUM	1381.7	34.792	41.274	45.404	-1730.9	6321.0
Pile N.	2	4	4	1	3	4
MAXIMUM	2340.8	40.208	46.726	45.404	-1176.1	6878.0
Pile N.	4	2	2	1	1	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-2.4033E-05	-1.7962E-05	-6876.9	-1176.1	-29.648	-21.968	-0.6710	-0.5015	0.4358	4.5738E+09	4.5738E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	0.0000	29.920	29.480
2	-2.4028E-05	-2.0648E-05	-6878.0	-1729.9	-29.644	-25.310	-0.6709	-0.5766	0.3279	4.5738E+09	4.5738E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	0.0000	29.040	29.480
3	-2.1273E-05	-2.0643E-05	-6322.1	-1730.9	-26.264	-25.302	-0.5940	-0.5764	0.4476	4.5738E+09	4.5738E+09
x(FT)	33.000	32.120	0.0000	0.0000	30.800	30.360	33.000	32.120	0.0000	29.920	29.040
4	-2.1277E-05	-1.7957E-05	-6321.0	-1177.1	-26.269	-21.961	-0.5941	-0.5014	0.5555	4.5738E+09	4.5738E+09
x(FT)	33.000	32.120	0.0000	0.0000	30.800	30.360	33.000	32.120	0.0000	29.040	29.920
Min.	-2.4033E-05	-2.0648E-05	-6878.0	-1730.9	-29.648	-25.310	-0.6710	-0.5766	0.3279	4.5738E+09	4.5738E+09
Pile N.	1	2	2	3	1	2	1	2	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	3.4947E-03	0.013408	1327.4	2338.4	40.169	40.729	3.2236	1.1591	0.5368	8.9130E+09	8.9130E+09
x(FT)	8.8000	0.0000	29.040	14.960	0.0000	0.0000	29.040	29.040	29.040	2.6400	0.0000
2	3.4945E-03	0.014318	1327.3	2424.3	40.170	46.122	3.2235	1.4591	0.4039	8.9130E+09	8.9130E+09
x(FT)	8.8000	0.0000	29.040	15.400	0.0000	0.0000	29.040	29.040	29.040	0.0000	3.9600
3	2.8381E-03	0.014318	1177.4	2424.9	34.795	46.100	2.9253	1.4573	0.5513	8.9130E+09	8.9130E+09
x(FT)	9.6800	0.0000	29.040	15.400	0.0000	0.0000	29.040	29.040	29.040	4.8400	0.8800
4	2.8384E-03	0.013408	1177.5	2339.0	34.794	40.708	2.9255	1.1574	0.6842	8.9130E+09	8.9130E+09
x(FT)	9.6800	0.0000	29.040	14.960	0.0000	0.0000	29.040	29.040	29.040	10.560	3.9600
Max.	3.4947E-03	0.014318	1327.4	2424.9	40.170	46.122	3.2236	1.4591	0.6842	8.9130E+09	8.9130E+09
Pile N.	1	2	1	3	2	2	1	2	4	1	1

LOAD CASE : 20
CASE NAME : Service MinT
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0694629	2.90442E-03	-0.0219137

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD

-6.13693E-06 -7.64684E-05 -4.08233E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2083.0	-33.255	-40.240	-88.171	419.62	-5386.7
2	2409.6	-33.252	-50.732	-88.171	1497.6	-5386.1
3	1798.0	-22.746	-50.762	-88.171	1496.1	-4310.1
4	1471.4	-22.747	-40.266	-88.171	418.08	-4310.6
MINIMUM	1471.4	-33.255	-50.762	-88.171	418.08	-5386.7
Pile N.	4	1	3	1	4	1
MAXIMUM	2409.6	-22.746	-40.240	-88.171	1497.6	-4310.1
Pile N.	2	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-3.0746E-03	-0.014607	-1074.8	-2714.8	-33.197	-39.623	-2.5564	-0.8630	0.4943	4.5738E+09	4.5738E+09
x(FT)	7.9200	0.0000	29.040	13.640	0.0000	0.0000	29.040	29.040	0.0000	29.480	29.040
2	-3.0747E-03	-0.016374	-1074.8	-2846.9	-33.196	-50.041	-2.5564	-1.4409	0.5718	4.5738E+09	4.5738E+09
x(FT)	7.9200	0.0000	29.040	14.960	0.0000	0.0000	29.040	29.040	0.0000	29.040	29.040
3	-1.7809E-03	-0.016374	-783.33	-2846.1	-22.772	-50.071	-1.9770	-1.4435	0.4266	4.5738E+09	4.5738E+09
x(FT)	10.120	0.0000	29.040	14.960	0.8800	0.0000	29.040	29.040	0.0000	29.040	29.480
4	-1.7808E-03	-0.014607	-783.24	-2714.0	-22.772	-39.649	-1.9769	-0.8653	0.3492	4.5738E+09	4.5738E+09
x(FT)	10.120	0.0000	29.040	13.640	0.8800	0.0000	29.040	29.040	0.0000	29.920	29.480
Min.	-3.0747E-03	-0.016374	-1074.8	-2846.9	-33.197	-50.071	-2.5564	-1.4435	0.3492	4.5738E+09	4.5738E+09
Pile N.	2	2	1	2	1	3	1	3	4	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	1.9499E-05	1.7028E-05	5386.7	419.62	24.034	20.990	0.5444	0.4755	0.6089	8.9130E+09	8.9130E+09
x(FT)	32.560	31.680	0.0000	0.0000	30.800	29.920	32.560	31.680	29.040	0.8800	7.4800
2	1.9501E-05	2.2113E-05	5386.1	1497.6	24.036	27.051	0.5445	0.6174	0.7043	8.9130E+09	8.9130E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	29.040	11.000	15.840
3	3.5898E-04	2.2121E-05	4310.1	1496.1	17.458	27.062	0.3957	0.6177	0.5255	8.9130E+09	8.9130E+09
x(FT)	0.0000	32.120	0.0000	0.0000	30.800	30.360	33.000	32.120	29.040	8.3600	2.2000
4	3.5898E-04	1.7032E-05	4310.6	418.08	17.455	20.996	0.3957	0.4756	0.4301	8.9130E+09	8.9130E+09
x(FT)	0.0000	31.680	0.0000	0.0000	30.800	29.920	33.000	31.680	29.040	0.0000	3.9600

Max.	3.5898E-04	2.2121E-05	5386.7	1497.6	24.036	27.062	0.5445	0.6177	0.7043	8.9130E+09	8.9130E+09
Pile N.	3	3	1	2	2	3	2	3	2	1	1

LOAD CASE : 21
CASE NAME : Service MaxM2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0691298	-5.75584E-04	0.0258045

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
6.89905E-07	8.51575E-05	2.20231E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1678.8	21.592	58.423	9.9120	-1859.1	3280.5
2	1502.6	21.593	59.615	9.9120	-1979.7	3280.7
3	2183.7	20.408	59.576	9.9120	-1981.6	3158.9
4	2359.9	20.407	58.385	9.9120	-1860.9	3158.8
MINIMUM	1502.6	20.407	58.385	9.9120	-1981.6	3158.8
Pile N.	2	4	4	1	3	4
MAXIMUM	2359.9	21.593	59.615	9.9120	-1859.1	3280.7
Pile N.	4	2	2	1	1	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-1.2382E-05	-2.5571E-05	-3280.5	-1859.1	-15.248	-31.301	-0.3457	-0.7140	0.3984	4.5738E+09	4.5738E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	0.0000	29.480	29.040
2	-1.2382E-05	-2.6159E-05	-3280.7	-1979.7	-15.247	-32.033	-0.3457	-0.7304	0.3566	4.5738E+09	4.5738E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	0.0000	29.040	29.040
3	-1.1780E-05	-2.6149E-05	-3158.9	-1981.6	-14.510	-32.020	-0.3289	-0.7301	0.5182	4.5738E+09	4.5738E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	0.0000	30.360	29.480
4	-1.1781E-05	-2.5561E-05	-3158.8	-1860.9	-14.511	-31.288	-0.3290	-0.7137	0.5600	4.5738E+09	4.5738E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	0.0000	29.040	29.040
Min.	-1.2382E-05	-2.6159E-05	-3280.7	-1981.6	-15.248	-32.033	-0.3457	-0.7304	0.3566	4.5738E+09	4.5738E+09

Pile N. 1 2 2 3 1 2 1 2 2 1 1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	2.1572E-03	0.018552	680.98	3198.1	21.535	57.640	1.5803	1.7120	0.4907	8.9130E+09	8.9130E+09
x(FT)	6.6000	0.0000	29.040	14.960	0.0000	0.0000	29.040	29.040	29.040	0.0000	9.6800
2	2.1572E-03	0.018751	680.96	3216.1	21.536	58.823	1.5803	1.7780	0.4392	8.9130E+09	8.9130E+09
x(FT)	6.6000	0.0000	29.040	15.400	0.0000	0.0000	29.040	29.040	29.040	0.0000	0.4400
3	1.9928E-03	0.018751	648.27	3217.1	20.360	58.785	1.5152	1.7748	0.6383	8.9130E+09	8.9130E+09
x(FT)	7.0400	0.0000	29.040	15.400	0.0000	0.0000	29.040	29.040	29.040	12.320	12.320
4	1.9929E-03	0.018552	648.29	3199.1	20.359	57.602	1.5151	1.7088	0.6898	8.9130E+09	8.9130E+09
x(FT)	7.0400	0.0000	29.040	14.960	0.0000	0.0000	29.040	29.040	29.040	8.8000	19.800
Max.	2.1572E-03	0.018751	680.98	3217.1	21.536	58.823	1.5803	1.7780	0.6898	8.9130E+09	8.9130E+09
Pile N.	1	2	1	3	2	2	1	2	4	1	1

LOAD CASE : 22
CASE NAME : Service MinM2
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN
0.0688418	5.11996E-05	-0.0271881

ANGLE ROT. X,RAD	ANGLE ROT. Y,RAD	ANGLE ROT. Z,RAD
-3.41761E-06	-9.39293E-05	-2.52946E-06

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	2288.8	-5.4261	-54.553	-49.102	1042.6	-678.77
2	2309.0	-5.4260	-60.403	-49.102	1642.5	-678.77
3	1557.7	0.4260	-60.448	-49.102	1640.3	-78.988
4	1537.5	0.4260	-54.595	-49.102	1040.3	-78.990
MINIMUM	1537.5	-5.4261	-60.448	-49.102	1040.3	-678.77
Pile N.	4	1	3	1	4	1
MAXIMUM	2309.0	0.4260	-54.553	-49.102	1642.5	-78.988
Pile N.	2	4	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-6.9980E-04	-0.018806	-159.92	-3391.3	-5.3988	-53.759	-0.3439	-1.3423	0.5431	4.5738E+09	4.5738E+09
x(FT)	3.0800	0.0000	29.040	14.080	0.0000	0.0000	29.040	29.040	0.0000	29.040	29.040
2	-6.9980E-04	-0.019790	-159.92	-3468.2	-5.3987	-59.568	-0.3439	-1.6647	0.5479	4.5738E+09	4.5738E+09
x(FT)	3.0800	0.0000	29.040	14.520	0.0000	0.0000	29.040	29.040	0.0000	29.040	29.920
3	-1.0235E-06	-0.019790	-2.1888	-3467.0	-0.4473	-59.612	-0.021317	-1.6685	0.3696	4.5738E+09	4.5738E+09
x(FT)	27.280	0.0000	31.680	14.520	24.640	0.0000	29.040	29.040	0.0000	31.240	29.480
4	-1.0233E-06	-0.018806	-2.1885	-3390.1	-0.4473	-53.801	-0.021315	-1.3459	0.3649	4.5738E+09	4.5738E+09
x(FT)	27.280	0.0000	31.680	14.080	24.640	0.0000	29.040	29.040	0.0000	29.480	29.040
Min.	-6.9980E-04	-0.019790	-159.92	-3468.2	-5.3988	-59.612	-0.3439	-1.6685	0.3649	4.5738E+09	4.5738E+09
Pile N.	1	2	1	2	1	3	1	3	4	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	2.9279E-06	2.3313E-05	678.77	1042.6	3.5950	28.614	0.081754	0.6509	0.6690	8.9130E+09	8.9130E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	29.920	32.560	32.120	29.040	2.2000	1.7600
2	2.9279E-06	2.6213E-05	678.77	1642.5	3.5950	32.047	0.081754	0.7319	0.6749	8.9130E+09	8.9130E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	29.040	1.3200	3.5200
3	3.3086E-04	2.6225E-05	95.758	1640.3	0.4120	32.063	5.6135E-03	0.7322	0.4553	8.9130E+09	8.9130E+09
x(FT)	0.0000	32.120	6.6000	0.0000	0.0000	30.360	2.6400	32.120	29.040	3.0800	15.400
4	3.3086E-04	2.3325E-05	95.758	1040.3	0.4121	28.622	5.6135E-03	0.6513	0.4494	8.9130E+09	8.9130E+09
x(FT)	0.0000	32.120	6.6000	0.0000	0.0000	29.920	2.6400	32.120	29.040	6.1600	4.4000
Max.	3.3086E-04	2.6225E-05	678.77	1642.5	3.5950	32.063	0.081754	0.7322	0.6749	8.9130E+09	8.9130E+09
Pile N.	3	3	1	2	1	3	1	3	2	1	1

LOAD CASE : 23
CASE NAME : Service MaxM3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN	HORIZONTAL Y,IN	HORIZONTAL Z,IN

0.0680676 -4.61898E-03 0.0174568

ANGLE ROT. X,RAD ANGLE ROT. Y,RAD ANGLE ROT. Z,RAD
2.12202E-06 5.73071E-05 6.08366E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1915.9	41.817	38.432	30.488	-1161.8	7234.4
2	1429.3	41.819	42.085	30.488	-1533.4	7235.7
3	1887.6	38.183	42.067	30.488	-1534.2	6862.0
4	2374.2	38.181	38.415	30.488	-1162.7	6860.8
MINIMUM	1429.3	38.181	38.415	30.488	-1534.2	6860.8
Pile N.	2	4	4	1	3	4
MAXIMUM	2374.2	41.819	42.085	30.488	-1161.8	7235.7
Pile N.	4	2	2	1	1	2

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-2.5101E-05	-1.6772E-05	-7234.4	-1161.8	-30.972	-20.522	-0.7009	-0.4683	0.4546	4.5738E+09	4.5738E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	0.0000	29.920	29.040
2	-2.5096E-05	-1.8578E-05	-7235.7	-1533.4	-30.966	-22.768	-0.7007	-0.5187	0.3392	4.5738E+09	4.5738E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	0.0000	29.040	29.040
3	-2.3244E-05	-1.8573E-05	-6862.0	-1534.2	-28.698	-22.762	-0.6490	-0.5186	0.4479	4.5738E+09	4.5738E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	0.0000	29.480	29.040
4	-2.3249E-05	-1.6768E-05	-6860.8	-1162.7	-28.704	-20.516	-0.6492	-0.4682	0.5634	4.5738E+09	4.5738E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	0.0000	29.480	29.480
Min.	-2.5101E-05	-1.8578E-05	-7235.7	-1534.2	-30.972	-22.768	-0.7009	-0.5187	0.3392	4.5738E+09	4.5738E+09
Pile N.	1	2	2	3	1	2	1	2	2	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	3.5902E-03	0.012337	1387.0	2139.1	41.785	37.911	3.3828	1.1031	0.5600	8.9130E+09	8.9130E+09
x(FT)	8.8000	0.0000	29.040	14.960	0.0000	0.0000	29.040	29.040	29.040	12.760	6.1600
2	3.5900E-03	0.012949	1386.8	2197.0	41.787	41.538	3.3827	1.3050	0.4178	8.9130E+09	8.9130E+09
x(FT)	8.8000	0.0000	29.040	15.400	0.0000	0.0000	29.040	29.040	29.040	19.360	6.6000
3	3.1485E-03	0.012949	1286.2	2197.4	38.177	41.521	3.1825	1.3035	0.5517	8.9130E+09	8.9130E+09
x(FT)	9.6800	0.0000	29.040	15.400	0.0000	0.0000	29.040	29.040	29.040	18.040	7.0400
4	3.1489E-03	0.012337	1286.4	2139.5	38.177	37.895	3.1827	1.1017	0.6940	8.9130E+09	8.9130E+09
x(FT)	9.6800	0.0000	29.040	14.960	0.0000	0.0000	29.040	29.040	29.040	7.9200	3.5200
Max.	3.5902E-03	0.012949	1387.0	2197.4	41.787	41.538	3.3828	1.3050	0.6940	8.9130E+09	8.9130E+09
Pile N.	1	2	1	3	2	2	1	2	4	1	1

LOAD CASE : 24
CASE NAME : Service MinM3
LOAD TYPE : Dead, DL

* DISPLACEMENT OF GROUPED PILE FOUNDATION AT ORIGIN *

VERTICAL ,IN HORIZONTAL Y,IN HORIZONTAL Z,IN
0.0671674 4.42012E-03 -0.0200011

ANGLE ROT. X,RAD ANGLE ROT. Y,RAD ANGLE ROT. Z,RAD
-5.37707E-06 -7.00478E-05 -4.91755E-05

* PILE TOP REACTIONS *

PILE GROUP	FOR. X,KIP	FOR. Y,KIP	FOR. Z,KIP	MOM X,KIP-IN	MOM Y,KIP-IN	MOM Z,KIP-IN
1	1960.2	-32.855	-36.643	-77.254	361.26	-5750.6
2	2353.5	-32.853	-45.833	-77.254	1305.9	-5749.8
3	1793.3	-23.646	-45.858	-77.254	1304.7	-4807.2
4	1400.0	-23.646	-36.665	-77.254	359.97	-4808.0
MINIMUM	1400.0	-32.855	-45.858	-77.254	359.97	-5750.6
Pile N.	4	1	3	1	4	1
MAXIMUM	2353.5	-23.646	-36.643	-77.254	1305.9	-4807.2
Pile N.	2	3	1	1	2	3

* MINIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	-2.7850E-03	-0.013343	-1094.9	-2484.4	-32.836	-36.079	-2.6823	-0.7787	0.4652	4.5738E+09	4.5738E+09
x(FT)	9.2400	0.0000	29.040	13.640	0.0000	0.0000	29.040	29.040	0.0000	29.040	29.040
2	-2.7852E-03	-0.014891	-1095.0	-2598.0	-32.835	-45.205	-2.6824	-1.2848	0.5585	4.5738E+09	4.5738E+09
x(FT)	9.2400	0.0000	29.040	14.960	0.0000	0.0000	29.040	29.040	0.0000	29.040	29.040

3	-1.7403E-03	-0.014891	-839.52	-2597.3	-23.864	-45.230	-2.1746	-1.2869	0.4255	4.5738E+09	4.5738E+09
x(FT)	11.440	0.0000	29.040	14.960	2.2000	0.0000	29.040	29.040	0.0000	29.480	29.480
4	-1.7401E-03	-0.013343	-839.38	-2483.8	-23.864	-36.102	-2.1744	-0.7806	0.3322	4.5738E+09	4.5738E+09
x(FT)	11.440	0.0000	29.040	13.200	2.2000	0.0000	29.040	29.040	0.0000	29.040	29.040
Min.	-2.7852E-03	-0.014891	-1095.0	-2598.0	-32.836	-45.230	-2.6824	-1.2869	0.3322	4.5738E+09	4.5738E+09
Pile N.	2	2	2	2	1	3	2	3	4	1	1

* MAXIMUM VALUES AND LOCATIONS *

PILE	DISPL. y-DIR IN	DISPL. z-DIR IN	MOMENT z-DIR KIP-IN	MOMENT y-DIR KIP-IN	SHEAR y-DIR KIP	SHEAR z-DIR KIP	SOIL REACT y-DIR KIP/IN	SOIL REACT z-DIR KIP/IN	TOTAL STRESS KIP/IN**2	FLEX. RIG. z-DIR KIP-IN**2	FLEX. RIG. y-DIR KIP-IN**2
1	1.9806E-05	1.5503E-05	5750.6	361.26	24.443	19.105	0.5530	0.4329	0.5730	8.9130E+09	8.9130E+09
x(FT)	32.560	31.680	0.0000	0.0000	30.800	29.920	32.560	31.680	29.040	17.160	0.4400
2	1.9809E-05	1.9939E-05	5749.8	1305.9	24.447	24.385	0.5531	0.5567	0.6879	8.9130E+09	8.9130E+09
x(FT)	32.560	32.120	0.0000	0.0000	30.800	30.360	32.560	32.120	29.040	0.0000	4.8400
3	1.0637E-03	1.9946E-05	4807.2	1304.7	18.682	24.394	0.4251	0.5569	0.5242	8.9130E+09	8.9130E+09
x(FT)	0.0000	32.120	0.0000	0.0000	30.800	30.360	33.000	32.120	29.040	1.7600	11.000
4	1.0637E-03	1.5506E-05	4808.0	359.97	18.678	19.110	0.4250	0.4330	0.4092	8.9130E+09	8.9130E+09
x(FT)	0.0000	31.680	0.0000	0.0000	30.800	29.920	33.000	31.680	29.040	0.8800	17.160
Max.	1.0637E-03	1.9946E-05	5750.6	1305.9	24.447	24.394	0.5531	0.5569	0.6879	8.9130E+09	8.9130E+09
Pile N.	3	3	1	2	2	3	2	3	2	1	1

Footings Bearing on Rock

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Engineers and Scientists

Madawaska Int'l Bridge, Madawaska, ME - Edmundston, NB
JOB: 09.0025984.03
SUBJECT: Bearing Resistance of river pier spread footings on Bedrock
SHEET: 1 OF 10
CALCULATED BY: NVW 08.17.2020
CHECKED BY: ARB
REVIEWED BY: CLS

Objective

Assess nominal and factored bearing resistance of a foundation on rock based on support on SLATE from river pier borings BB-MSJR-204 through -208 (-207 not drilled).

Methodology

Use data from test borings and evaluate the nominal bearing resistance as follows:

1. Bedrock Properties From Test Borings
2. Calculation Of Rock Mass Rating
3. Determine Rock Property Constants s and m
4. Calculate Nominal Bearing Resistance of Bedrock q_n

References

1. American Association of State Highway and Transportation Officials, AASHTO LRFD Bridge Design Specifications: Customary U.S. Units, 6th edition, 2012. (AASHTO LRFD).

Note: AASHTO 8th Edition is now in effect, but the coefficients used in the bedrock bearing evaluations are based on RMR per LRFD 6th Edition rather than GSI per LRFD 8th Edition, as the RMR-based values are considered conservative.

2. Wyllie, Duncan C., "Foundations on Rock", Second edition, 1992.

1. Rock Properties

Bedrock properties were obtained from rock core specimens and logs completed at the location of the river piers for the Madawaska Int'l Bridge in Madawaska, ME - Edmundston, NB.

Bedrock Quality

Boring	Depth to Rock (ft)	Depth (ft) Below Top of Rock			Rec (%)	RQD %	Corr. Spacing (in)			Corr. Aperture (in)			Elev. (ft)	
		Top		Bottom									Top	Bottom
BB-MSJR-204	85.7	0.4	-	5.7	101%	0%	<0.75	-	8	0.02	-	0.1	414.8	409.5
BB-MSJR-204	85.7	5.7	-	9.4	99%	8%	0.75	-	8	0.01	-	0.02	409.5	405.8
BB-MSJR-204	85.7	9.4	-	14.4	100%	80%	2.5	-	24	0.01	-	0.4	405.8	400.8
BB-MSJR-205	29.2	0.8	-	5.8	100%	47%	0.75	-	8	0.004	-	0.01	411.3	406.3
BB-MSJR-205	29.2	5.8	-	10.8	100%	73%	0.75	-	24	0.004	-	0.01	406.3	401.3
BB-MSJR-205	29.2	10.8	-	15.8	100%	60%	0.75	-	24	0.004	-	0.02	401.3	396.3
BB-MSJR-205	29.2	15.8	-	20.8	100%	60%	2.5	-	8	0.004	-	0.02	396.3	391.3
BB-MSJR-206	30.7	0.1	-	3.8	99%	50%	0.75	-	8	0.01	-	0.1	410.2	406.5
BB-MSJR-206	30.7	3.8	-	8.7	100%	80%	2.5	-	24	0.004	-	0.01	406.5	401.6
BB-MSJR-206	30.7	8.7	-	13.7	100%	53%	0.75	-	24	0.004	-	0.02	401.6	396.6
BB-MSJR-206	30.7	13.7	-	18.7	100%	77%	2.5	-	24	0.004	-	0.02	396.6	391.6
BB-MSJR-208	35.1	0.0	-	5.0	83%	30%	<0.75	-	8	0.004	-	0.1	406.8	401.8
BB-MSJR-208	35.1	5.0	-	10.0	100%	22%	<0.75	-	8	0.01	-	0.1	401.8	396.8
BB-MSJR-208	35.1	10.0	-	15.0	100%	40%	<0.75	-	8	0.01	-	0.02	396.8	391.8

RQD weighted average within 15' of Top of Rock = 48% used for representative RQD of bedrock in river pier borings (also see bedrock properties calculation).

2. Calculation of Rock Mass Rating (RMR)

From AASHTO LRFD 6th Ed. Table 10.4.6.4-1, determine the RMR.

Parameter 1- Uniaxial Compressive Strength

$\sigma_{u.r} := 5.0ksi$ Design unconfined compressive strength of rock (see bedrock properties calculation).

$\sigma_{u.r} = 720 \cdot ksf$

From AASHTO LRFD Table 10.4.6.4-1

Relative Rating $RR_1 := 4$ for $\sigma_{u.r}$= 520 to 1080 ksf

Parameter 2- Drill Core Quality

Representative RQD: 48%

Because the average is at the limits of two ranges for RMR calculation, interpolate between the 25-50% value (RR=8) and 50-75% value (RR=13).

From AASHTO LRFD Table 10.4.6.4-1

Relative Rating $RR_2 := 10$

Parameter 3- Spacing of Joints

From Boring Logs & Subsurface Table, generally very close to moderately spaced = 2cm to 60 cm ~ .75 in to 2 feet

From AASHTO LRFD Table 10.4.6.4-1

Relative Rating

$RR_3 := 10$

Parameter 4- Condition of Joints

From boring logs, hard joint walls and slghtly rough surface, with joint separation less than 0.05 in.

From AASHTO LRFD Table 10.4.6.4-1

Relative Rating $RR_4 := 20$

Parameter 5- Ground Water Conditions

Moist only - interstitial water

From AASHTO LRFD Table 10.4.6.4-1

Relative Rating $RR_5 := 7$

Parameter 6-Adjustment for joint orientation

The joint sets are generally high angle to vertical, and the joints beneath the footings will not daylight to provide preferenctial bearing slip surface planes. Therefore the joint orientation is considered Favorable.

From AASHTO LRFD Table 10.4.6.4-2

Relative Rating $RR_6 := -2$

Total RMR Rating

$$RMR := RR_1 + RR_2 + RR_3 + RR_4 + RR_5 + RR_6$$

$$RMR = 49$$

From AASHTO LRFD Table 10.4.6.4-3 RMR= 41 to 60 is indicative of Fair Rock Quality

3. Determine Rock Property Constants s and m

Use AASHTO LRFD 6th Ed. Table 10.4.6.4-4 to develop empirircal rock property constants

Slate is categorized as rock type B, Lithified argrillaceous rock (Mudstone, Siltstone, Shale and Slate), RMR=49, using s and m values interpolated from the logarithmic trend of plotted values from AASHTO Table 10.4.6.4-4 (plots on sheet 8).

$m := 0.26$

$s := 0.00021$

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4. Calculate Nominal and Factored Bearing Resistance of Bedrock q_n and q_R

From Wyllie "Foundations on Rock"

Eq. 5.4 Pg.138

$$q_n := C_{f1} \cdot \sqrt{s} \cdot \sigma_{u.r} \cdot \left[1 + \sqrt{m \cdot \left(s - \frac{1}{2}\right)} + 1\right]$$

Where

$C_{f1} := 1.25$ From Wyllie Table 5.4 Pg. 138 Correction factor for foundation shape for rectangular foundation:

For L/B>6, use factor C_{f1}=1.0,

For L/B=2, use factor C_{f1}=1.12,

For L/B=1, use factor C_{f1}=1.25 therefore, 1.25 was used for square piers

$s = 0.00021$

$m = 0.26$

$\sigma_{u.r} = 5 \cdot ksi$

Nominal Bearing Resistance

$$q_n := C_{f1} \cdot \sqrt{s} \cdot \sigma_{u.r} \cdot \left[1 + \sqrt{m \cdot \left(s - \frac{1}{2}\right)} + 1\right]$$

$q_n = 69.8 \cdot ksf$ Say 70 ksf

Factored Bearing Resistance

Bearing Resistance Factor is specified in Table 10.5.5.2.2-1

$\phi_b := 0.45$ Footing on rock

$q_R := \phi_b \cdot q_n$

$q_R = 31.4 \cdot ksf$ Say 31 ksf

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Engineers and Scientists

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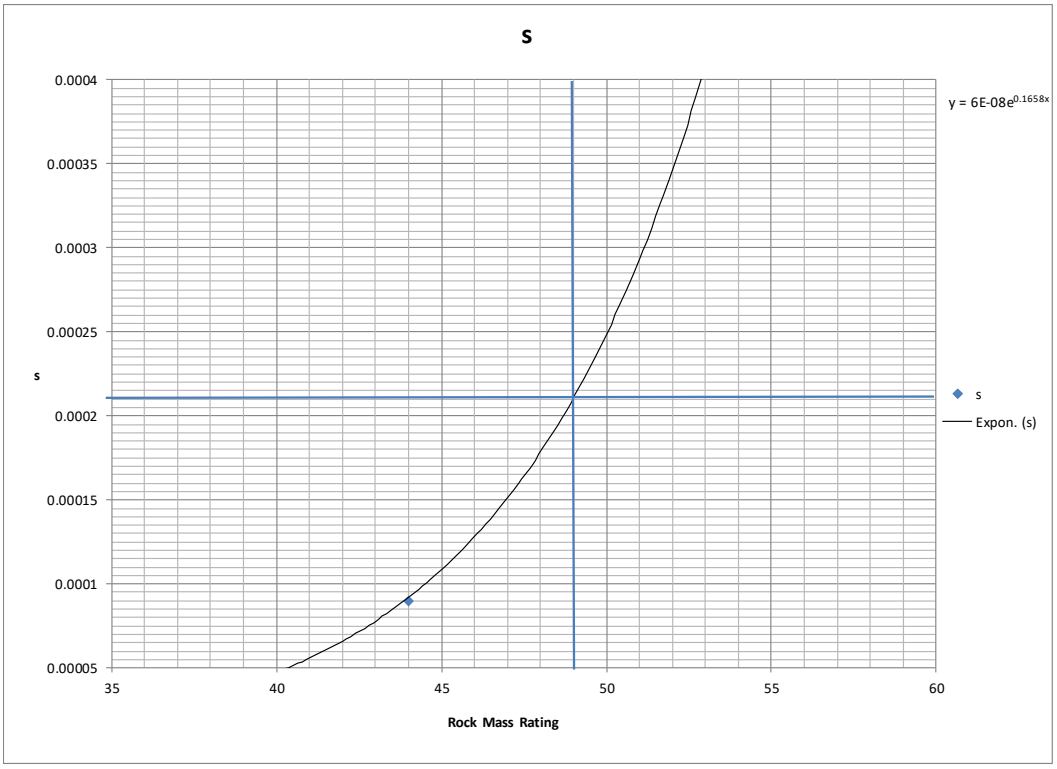
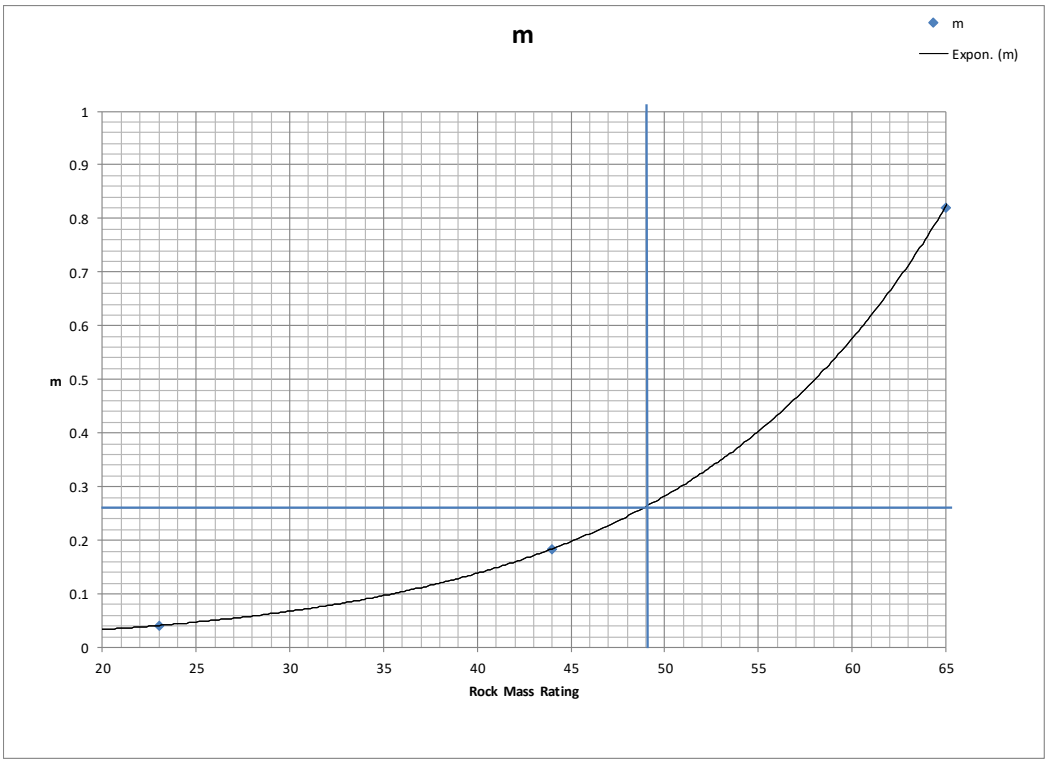
JOB: 09.0025984.03
SUBJECT: Bearing Resistance of river pier spread footings on Bedrock
SHEET: 5 OF 10
CALCULATED BY: NVW 08.17.2020
CHECKED BY: ARB
REVIEWED BY: CLS





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JOB: 09.0025984.03
SUBJECT: Bearing Resistance of river pier spread footings on Bedrock
SHEET: 6 OF 10
CALCULATED BY: NVW 08.17.2020
CHECKED BY: ARB
REVIEWED BY: CLS

Reference:I:\Mathcad\units.xmcd

Table 10.4.6.4-1 Geomechanics Classification of Rock Masses.

Parameter			Ranges of Values						
1	Strength of intact rock material	Point load strength index	>175 ksf	85–175 ksf	45–85 ksf	20–45 ksf	For this low range, uniaxial compressive test is preferred		
		Uniaxial compressive strength	>4320 ksf	2160–4320 ksf	1080–2160 ksf	520–1080 ksf	215–520 ksf	70–215 ksf	20–70 ksf
	Relative Rating		15	12	7	4	2	1	0
2	Drill core quality RQD		90% to 100%	75% to 90%		50% to 75%	25% to 50%		<25%
	Relative Rating		20	17		13	8		3
3	Spacing of joints		>10 ft.	3–10 ft.		1–3 ft.	2 in.–1 ft.		<2 in.
	Relative Rating		30	25		20	10		5
4	Condition of joints		• Very rough surfaces • Not continuous • No separation • Hard joint wall rock	• Slightly rough surfaces • Separation <0.05 in. • Hard joint wall rock		• Slightly rough surfaces • Separation <0.05 in. • Soft joint wall rock	• Slicken-sided surfaces or • Gouge <0.2 in. thick or • Joints open 0.05–0.2 in. • Continuous joints		• Soft gouge >0.2 in. thick or • Joints open >0.2 in. • Continuous joints
	Relative Rating		25	20		12	6		0
5	Ground water conditions (use one of the three evaluation criteria as appropriate to the method of exploration)	Inflow per 30 ft. tunnel length	None	<400 gal./hr.		400–2000 gal./hr.			>2000 gal./hr.
		Ratio = joint water pressure/ major principal stress	0	0.0–0.2		0.2–0.5			>0.5
		General Conditions	Completely Dry	Moist only (interstitial water)		Water under moderate pressure			Severe water problems
	Relative Rating		10	7		4			0

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SHEET: 7 OF 10
CALCULATED BY: NVW 08.17.2020
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Table 10.4.6.4-2 Geomechanics Rating Adjustment for Joint Orientations.

Strike and Dip Orientations of Joints		Very Favorable	Favorable	Fair	Unfavorable	Very Unfavorable
Ratings	Tunnels	0	–2	–5	–10	–12
	Foundations	0	–2	–7	–15	–25
	Slopes	0	–5	–25	–50	–60

Table 10.4.6.4-3 Geomechanics Rock Mass Classes Determined From Total Ratings.

RMR Rating	100–81	80–61	60–41	40–21	<20
Class No.	I	II	III	IV	V
Description	Very good rock	Good rock	Fair rock	Poor rock	Very poor rock

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JOB: 09.0025984.03
SUBJECT: Bearing Resistance of river pier spread footings on Bedrock
SHEET: 8 OF 10
CALCULATED BY: NVW 08.17.2020
CHECKED BY: ARB
REVIEWED BY: CLS

Table 10.4.6.4-4 Approximate relationship between rock-mass quality and material constants used in defining nonlinear strength (*Hoek and Brown, 1988*)

Rock Quality	Constants	Rock Type A = Carbonate rocks with well developed crystal cleavage—*dolomite, limestone and marble* B = Lithified argrillaceous rocks—*mudstone, siltstone, shale and slate (normal to cleavage)* C = Arenaceous rocks with strong crystals and poorly developed crystal cleavage—*sandstone and quartzite* D = Fine grained polyminerallic igneous crystalline rocks—*andesite, dolerite, diabase and rhyolite* E = Coarse grained polyminerallic igneous & metamorphic crystalline rocks—*amphibolite, gabbro gneiss, granite, norite, quartz-diorite*				
		A	B	C	D	E
INTACT ROCK SAMPLES Laboratory size specimens free from discontinuities CSIR rating: *RMR* = 100	*m* *s*	7.00 1.00	10.00 1.00	15.00 1.00	17.00 1.00	25.00 1.00
VERY GOOD QUALITY ROCK MASS Tightly interlocking undisturbed rock with unweathered joints at 3–10 ft. CSIR rating: *RMR* = 85	*m* *s*	2.40 0.082	3.43 0.082	5.14 0.082	5.82 0.082	8.567 0.082
GOOD QUALITY ROCK MASS Fresh to slightly weathered rock, slightly disturbed with joints at 3–10 ft. CSIR rating: *RMR* = 65	*m* *s*	0.575 0.00293	0.821 0.00293	1.231 0.00293	1.395 0.00293	2.052 0.00293
FAIR QUALITY ROCK MASS Several sets of moderately weathered joints spaced at 1–3 ft. CSIR rating: *RMR* = 44	*m* *s*	0.128 0.00009	0.183 0.00009	0.275 0.00009	0.311 0.00009	0.458 0.00009
POOR QUALITY ROCK MASS Numerous weathered joints at 2 to 12 in.; some gouge. Clean compacted waste rock. CSIR rating: *RMR* = 23	*m* *s*	0.029 3×10^{-6}	0.041 3×10^{-6}	0.061 3×10^{-6}	0.069 3×10^{-6}	0.102 3×10^{-6}
VERY POOR QUALITY ROCK MASS Numerous heavily weathered joints spaced <2 in. with gouge. Waste rock with fines. CSIR rating: *RMR* = 3	*m* *s*	0.007 1×10^{-7}	0.010 1×10^{-7}	0.015 1×10^{-7}	0.017 1×10^{-7}	0.025 1×10^{-7}

Micropile FBPier Parameters

Table 2 - FBPier Input Parameters, Abutment 2
Madawaska International Bridge Replacement
PIN 21736.00
Madawaska, ME - Edmundston, NB

Project:	Madawaska, ME - Edmundston, NB International Bridge	Computed: NVW	Date: 7/23/2020
Subject:	FB-Pier Parameters	Checked: ARB	Date: 7/23/2020
Task:	2	Page:	of:
Job #:	09.0025984.03	No:	

Abutment 2

Pile Section **11-7/8" ODx0.543" Micropile**
Water Elevation: **482** ft

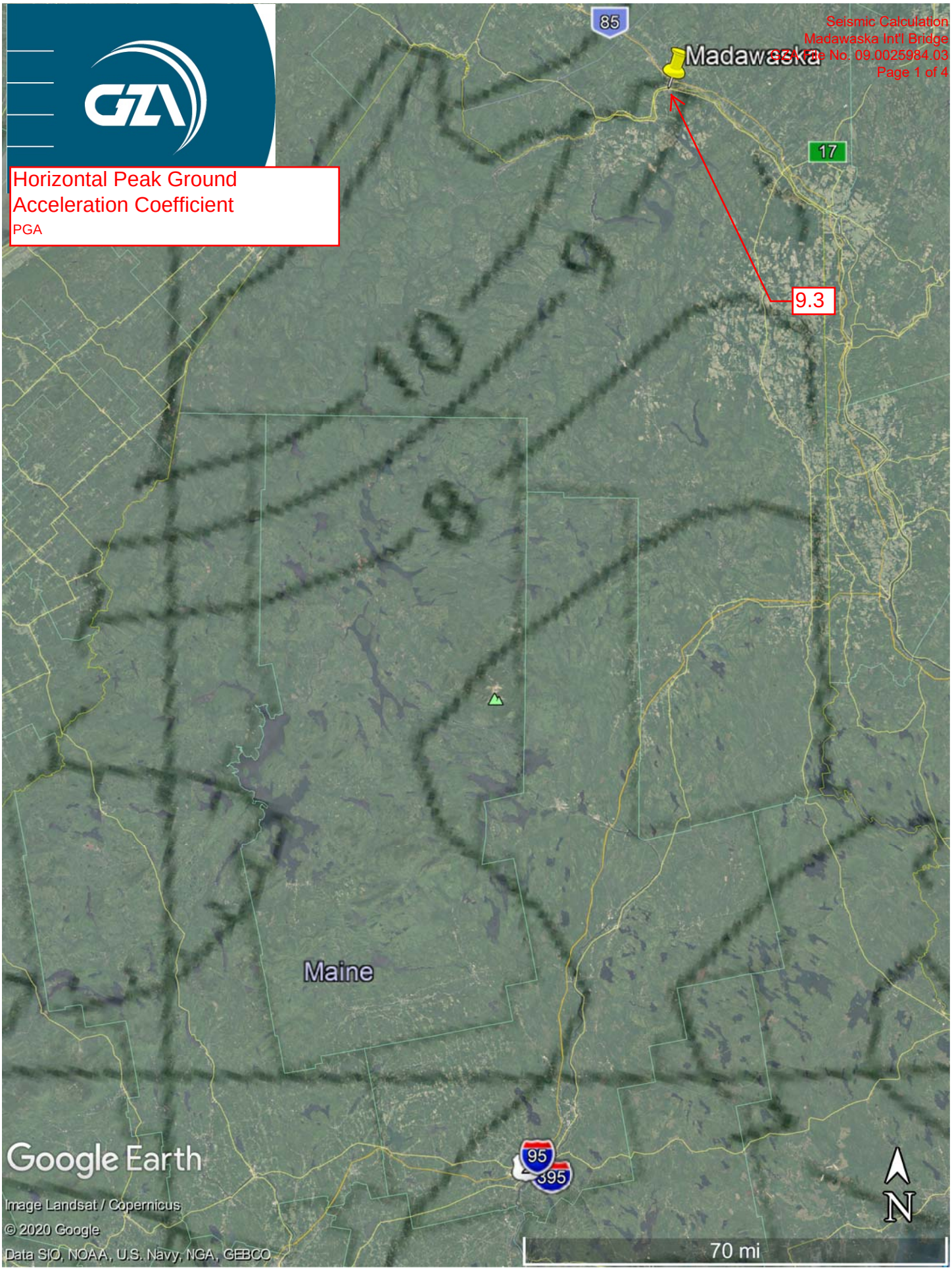
Stratum	Design Stratum Thickness (ft)	Approx. Elevation (ft)	Lateral Model								Axial[2]					Torsional	Tip Model		
			Effective Unit Weight (pcf)	Internal Friction Angle (Φ)[3]	P-Y Model	Subgrade Modulus (pci)[3]	Coefficient of Lateral Earth Pressure, K[2,4]	Strain Factor @ 50% of UCS (krm)	Rock Quality Designation (%)	Unconfined Compressive Strength (psi)	T-Z Model	Poisson's Ratio, ν	Young's Modulus, E (ksi)	Shear Modulus, G (ksi)[2,4]	Ultimate Unit Skin Friction[4] (psf)	Torsional Shear Stress[4] (psf)	Tip Soil Model	Ultimate End Bearing[4] (ksi)	Undrained Shear Strength (psi)
ABUTMENT 2 - AVERAGE SOIL DEPTH (MICROPILE SOCKETED IN ROCK)																			
Fill	9	482 to 473	125	31	Sand (Reese)	65	0.48	--	--	--	Drilled Shaft Sand	0.30	1.8	0.69	--	102			
Glacial Till	8	473 to 465	68	38	Sand (Reese)	120	0.38	--	--	--	Drilled Shaft Sand	0.40	11.1	2.67	--	251			
Bedrock		465 to --	109		Weak Rock	-	--	0.00125	48	2000	Drilled Shaft Limestone (McVay)	0.27	1210	476	24800	24800	Drilled Shaft Clay	3.7	1000

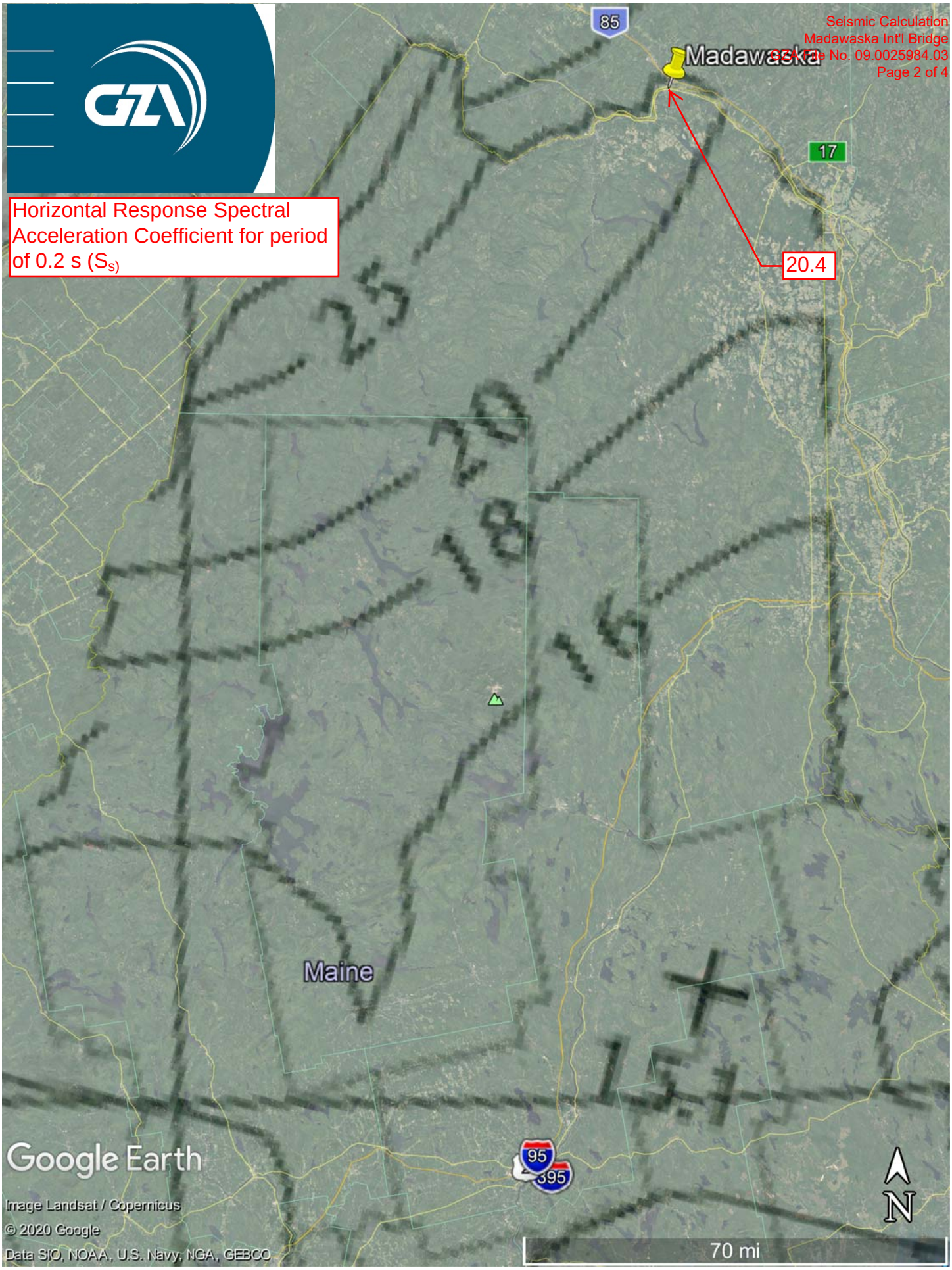
Notes.

1. Elevations are in feet and reference the North American Vertical Datum of 1988 (NAVD 88).
2. Lateral, axial and torsional model parameters for soil interpolated or calculated from default inputs and equations from BSI "Parameters of Soil Models for Studying Soil-Pile Interaction Analysis Using FB-MultiPier", dated May 2011.
3. Calculated internal friction and lateral subgrade modulus based on conditions encountered at borings BB-MSJR-209 through -214 and borings BB-MSJR-301 and -302 in Edmundston, within stratum.
4. Equations:

Subgrade Modulus: Calculated based on internal friction angles based on Figure 3-34 presented in the 2016 LPile technical manual
Coefficient of Lateral Earth Pressure: $K = 1 - \sin(\varphi)$
Young's Modulus, Sand (BSI FBPier Parameters, May 2011): $E = \alpha * p_a * N_{60}$
Shear Modulus, Sand (BSI FBPier Parameters, May 2011): $G(ksi) = E/(2 * (1 + v))$, maximum shear modulus for FBPier is 2.67
Torsional Shear Stress, Sand: (using Ultimate Skin Friction equation for steel piles in sand, DM7.2-193): $\tau = K * \sigma_v' * \tan(\frac{2}{3} * \varphi)$.
Ultimate End Bearing was taken as the nominal shaft tip resistance (Jointed Rock Mass). See Bedrock Shaft Design Parameters

Seismic Design


Horizontal Peak Ground Acceleration Coefficient
PGA
85
Madawaska
17
9.3
10
9
8
Maine
95
395
Google Earth
Image Landsat / Copernicus
© 2020 Google
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
N
70 mi


Horizontal Response Spectral Acceleration Coefficient for period of 0.2 s (S_s)
Madawaska
20.4
85
17
Maine
95
395
Google Earth
Image Landsat / Copernicus
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Data SIO, NOAA, U.S. Navy, NGA, GEBCO
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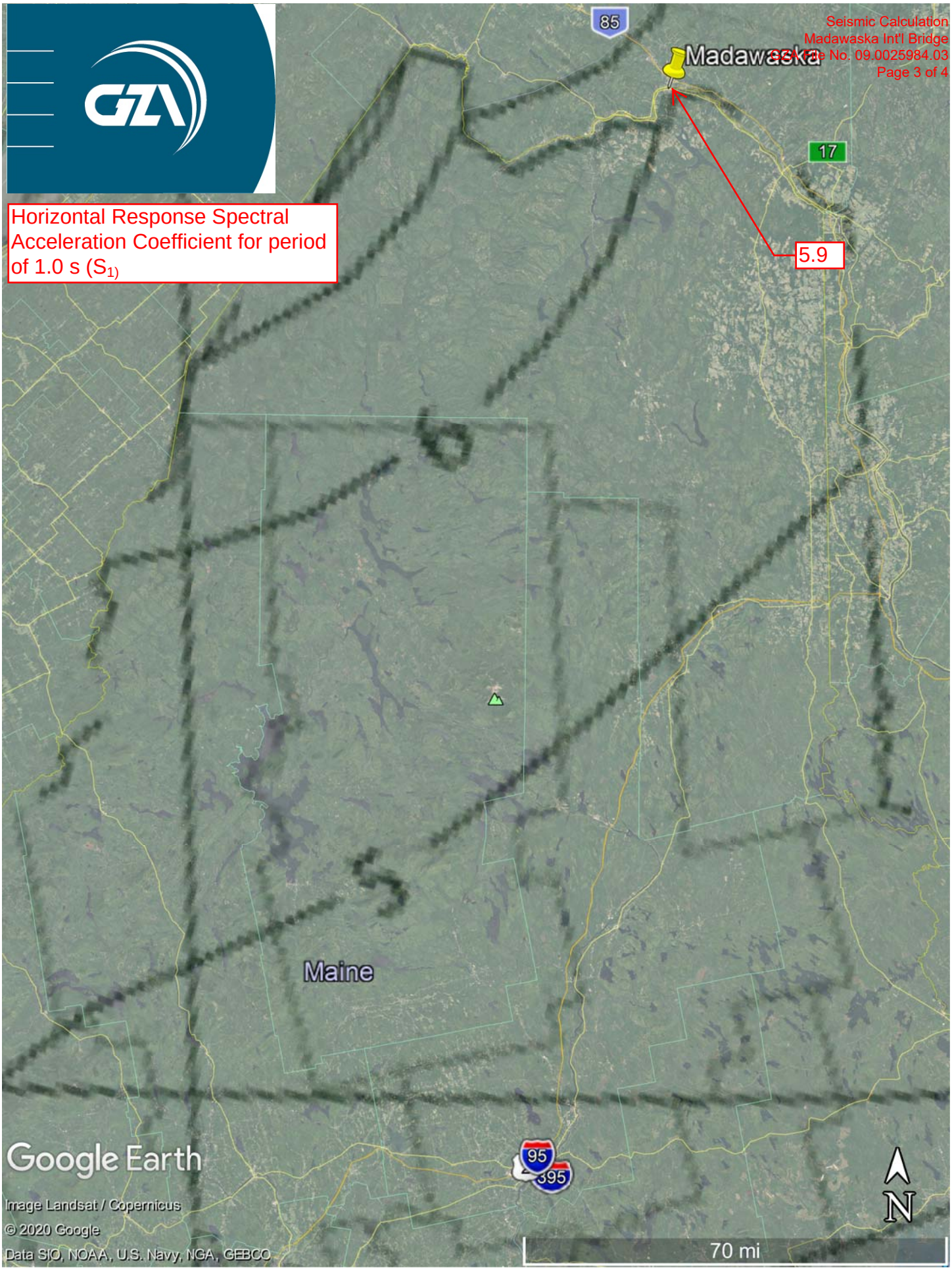
Horizontal Response Spectral Acceleration Coefficient for period of 1.0 s ($S_{1)}$
5.9
Madawaska
85
17
Maine
95
395
Google Earth
Image Landsat / Copernicus
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Data SIO, NOAA, U.S. Navy, NGA, GEBCO
70 mi
N

Madawaska Seismic Interpolation for Coefficients		
Seismic Parameter	**Interpolated Value from Maps[1]**	**Design Parameter**
Horizontal Peak ground Acceleration Coefficient	9.3	$PGA = .093$
Horizontal Response Spectral Acceleration Coefficient for Period of 0.2s	20.4	$S_s = 0.204$
Horizontal Response Spectral Acceleration Coefficient for Period of 1.0s	5.9	$S_1 = .059$

Notes: 1. AASHTO Figures 3.10.2.1-1,-2, and -3 were overlaid within the Google Earth software. Coefficients were interpolated between lines on these figures as presented in pages 1 through 3 of this calculation.

For Class C, values of F_{PGA} and F_a = 1.2, and F_v = 1.7

Therefore:

$$A_s = F_{PGA} \times PGA = 1.2 \times 0.093 = 0.112\ g$$

$$S_{DS} = F_a \times S_s = 1.2 \times 0.204 = 0.245\ g$$

$$S_{D1} = F_v \times S_1 = 1.7 \times 0.059 = 0.100\ g$$

Summary:

SITE CLASS C SEISMIC DESIGN PARAMETERS	
Parameter	**Design Value**
Fpga	1.2
Fa	1.2
Fv	1.7
As (Period = 0.0 sec)	0.112 g
SDs (Period = 0.2 sec)	0.245 g
SD1 (Period = 1.0 sec)	0.100 g

Lateral Earth Pressure

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Engineers and Scientists

JOB: 09.0025984.03 Madawaska International Bridge
SUBJECT: Lateral Earth Pressures
SHEET: 1 OF 6
CALCULATED BY A. Blaisdell 4/7/20
CHECKED BY N. Williams/C. Snow

Subject:

Evaluate lateral earth pressure coefficients for Abutments and buried portions of Piers

References:

1. MaineDOT Bridge Design Guide, Chapter 3
2. AASHTO LRFD Bridge Design Specifications, 8th Edition (2017)
3. U.S. Army Corps of Engineers Engineer Manual 1110-2-2502, Retaining and Flood Walls

Input Parameters, All Walls:

$\phi := 32deg$ Effective angle of internal friction of backfill material *(Granular borrow, Soil Type 4, BDG Table 3-3)*

$\delta_f := 19.5deg$ Average value, precast concrete against clean sand/silty sand-gravel mixture *(AASHTO LRFD Table 3.11.5.3-1)*

Case 1: Abutment A (Madawaska) and Retaining Walls

Assume long heeled walls per AASHTO Figure C3.11.5.3-1. Use Rankine active earth pressure coefficient.

$\beta := 0deg$ Angle of backfill to the horizontal (level backfill)

Rankine Active Earth Pressure Coefficient

$$K_{ar} := \cos(\beta)\cdot\frac{\left[\cos(\beta) - \sqrt{(\cos(\beta))^2 - (\cos(\phi))^2}\right]}{\left[\cos(\beta) + \sqrt{(\cos(\beta))^2 - (\cos(\phi))^2}\right]}$$

$K_{ar} = 0.31$

Note - Need increased Ka if there will be sloping backfill behind wingwalls, consult GZA if so.

Case 2: Pier 1, Buried Pier Wall in 2H:1V Slope

Assume lateral earth pressure is not adequate to create sufficient lateral deflection to allow active earth pressure to develop. Therefore, use at-rest earth pressure, including a 2H:1V backfill slope. Use equation from EM 1110-2-2502

$\beta_{p1} := \operatorname{atan}\left(\frac{1}{2}\right) = 27\cdot deg$ Angle of backfill to the horizontal, 2H:1V slope

$K_o := 1 - \sin(\phi) = 0.47$ At-rest Earth Pressure Coefficient, Level Ground

$$K_{o\beta 1} := K_o \cdot \left(1 + \sin\left(\beta_{p1}\right)\right)$$ $K_{o\beta 1} = 0.68$

At-rest Earth Pressure Coefficient, 2H:1V backslope. Apply to portion of pier that could have differential soil height from back to front (consider scour as appropriate).

Case 3: Pier 5, Buried Pier Wall in 6H:1V Slope

Assume lateral earth pressure is not adequate to create sufficient lateral deflection to allow active earth pressure to develop. Therefore, use at-rest earth pressure, including an approximate 6H:1V backfill slope. Use equation from EM 1110-2-2502

$$\beta_{p2} := \operatorname{atan}\left(\frac{1}{6}\right) = 9 \cdot \text{deg}$$ Angle of backfill to the horizontal, 2H:1V slope

$$K_{o\beta 2} := K_o \cdot \left(1 + \sin\left(\beta_{p2}\right)\right)$$ $K_{o\beta 2} = 0.55$

At-rest Earth Pressure Coefficient, 6H:1V backslope. Apply to portion of pier that could have differential soil height from back to front (consider scour as appropriate).

Case 4: Abutment B (Edmundston) and Retaining Walls

If abutment deflection/rotation is adequate to achieve active condition (ratio of movement of top of wall to height of wall, Δ/H=0.015 or greater), assume short heeled walls per AASHTO Figure C3.11.5.3-1, level backfill. Use Coulomb active earth pressure coefficient.

$\beta := 0\text{deg}$ Angle of backfill to the horizontal

$\theta := 90\text{deg}$ Angle of backface of wall to the horizontal (confirmed in 60% drawings)

Coloumb Active Earth Pressure Coefficient (Short-Heeled Wall)

$$\Gamma := \left[1 + \sqrt{\left[\frac{\sin\left(\phi + \delta_f\right) \cdot (\sin(\phi - \beta))}{\sin\left(\theta - \delta_f\right) \cdot \sin(\theta + \beta)}\right]}\right]^2 = 2.77$$

$$K_{ac} := \frac{(\sin(\theta + \phi))^2}{\Gamma \cdot \left[(\sin(\theta))^2 \cdot \sin\left(\theta - \delta_f\right)\right]}$$ $K_{ac} = 0.28$

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SUBJECT: Lateral Earth Pressures
SHEET: 3 OF 6
CALCULATED BY A. Blaisdell 4/7/20
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If abutment deflection/rotation is inadequate to achieve active, use at-rest earth pressure.

$K_o = 0.47$

Dynamic Earth Pressure :

Input Parameters:

$A_s := 0.112$ Peak ground acceleration, g's for Site Class

$d := 1$ Lateral wall displacement, inches

Horizontal pseudo-static acceleration, g's, Yielding wall (AASHTO Eq. A11.5.1-1), applicable only at lateral wall displacement of 1 inch or greater.

$$k_{hy} := 0.74 \cdot A_s \cdot \left(\frac{A_s}{d}\right)^{0.25} = 0.05$$

$k_{hny} := A_s$

$k_h := k_{hny}$ If wall does not yield more than 1 inch during earthquake, kh is equal to the maximum peak ground acceleration. If wall does yield, use khy above.

$k_v := 0$ Vertical pseudo-static acceleration, g's

$\theta_v := \theta - 90deg = 0$ Angle of backwall to vertical

Dynamic Active Earth Pressure:

$$\psi := \operatorname{atan}\left[\frac{k_h}{(1 - k_v)}\right] = 6.4 \cdot deg$$ Angle of Thrust

Dynamic Active Earth Pressure Coefficient:

$$K_{AE} := \frac{\cos(\phi - \theta_v - \psi)^2}{\cos(\psi)\cos(\theta_v)^2 \cdot \cos(\delta_f + \theta_v + \psi) \cdot \left(1 + \sqrt{\frac{\sin(\delta_f + \phi)\sin(\phi - \beta - \psi)}{\cos(\delta_f + \theta_v + \psi)\cos(\beta - \theta_v)}}\right)^2}$$

$K_{AE} = 0.35$

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SHEET: 4 OF 6
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Angle of Active Failure Surface:

$$C_{1E} := \sqrt{\tan(\phi - \psi - \beta)\left(\tan(\phi - \psi - \beta) + \cot\left(\phi - \psi - \theta_v\right)\right)\left(1 + \tan\left(\delta_f + \psi + \theta_v\right)\cot\left(\phi - \psi - \theta_v\right)\right)} = 1.57$$

$$C_{2E} := 1 + \left[\tan\left(\delta_f + \psi + \theta_v\right)\left(\tan(\phi - \psi - \beta) + \cot\left(\phi - \psi - \theta_v\right)\right)\right] = 2.25$$

$$\alpha_{AE} := \phi - \psi + \operatorname{atan}\left(\frac{-\tan(\phi - \psi - \beta) + C_{1E}}{C_{2E}}\right) = 52 \cdot \deg$$

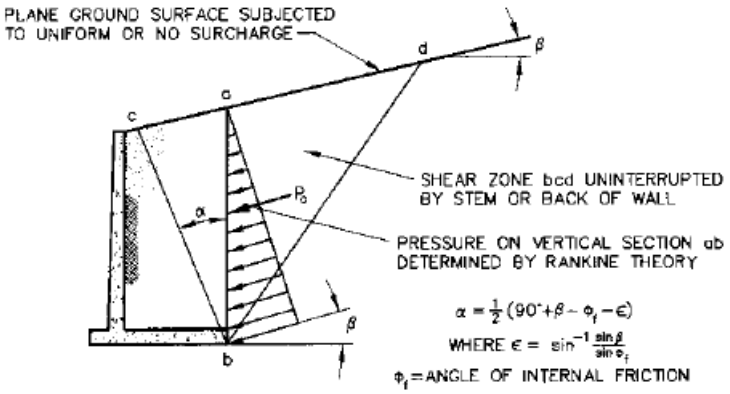
Dynamic Active Earth Pressure Coefficient Increment:

$$\Delta K_{AE} := K_{AE} - K_{ac}$$

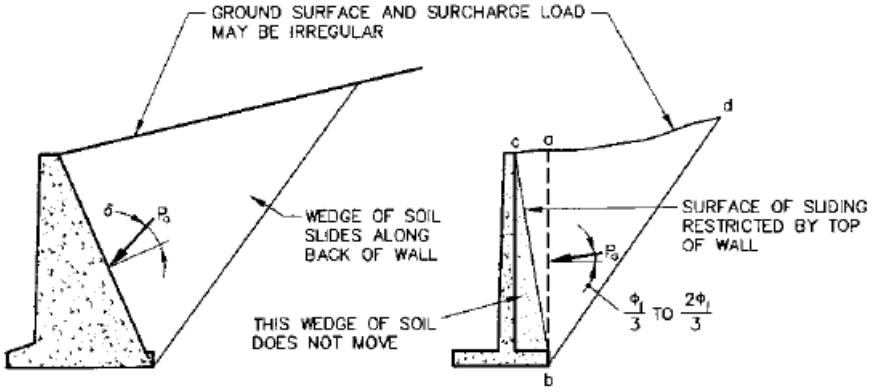
$\Delta K_{AE} = 0.07$

Application of Dynamic Active Earth Pressure Increment:

Static active earth pressure resultant located H/3 above bottom of excavation per standard theory.
Dynamic active earth pressure increment located at 0.6xH above bottom of excavation.



(a)



(b)

Figure C3.11.5.3-1—Application of (a) Rankine and (b) Coulomb Earth Pressure Theories in Retaining Wall Design

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SHEET: 6 OF 6
CALCULATED BY A. Blaisdell 4/7/20
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This is shown in Figure 3-5, a and b. If the resultant falls outside the middle one-third of the base, i.e., e is greater than B/6 , as shown in Figure 3-5c, the pressure distribution is triangular with a maximum pressure equal to

$$q'_{max} = \frac{4}{3}\left(\frac{N'}{B - 2e}\right) \qquad [3\text{-}2]$$

The base will be in compression over a distance b from the toe computed as

$$b = \frac{3}{2}(B - 2e) \qquad [3\text{-}3]$$

Refer to Appendix N for example computations.

3-10. At-Rest Earth Pressure Equations.

a. Horizontal Backfill. For the special case of a horizontal backfill surface and a normally consolidated backfill (no compaction or other prestress effects) the at-rest pressure coefficient K_o can be estimated from Jaky's (1944) equation

$$K_o = 1 - \sin \phi' \qquad [3\text{-}4]$$

and the lateral earth pressure computed by

$$p_o = \gamma' K_o z$$

where

ϕ' = drained internal friction angle

γ' = effective unit weight (moist or saturated above water table, submerged or buoyant below water table)

z = depth below surface of backfill along a vertical plane

b. Sloping Backfills. For normally consolidated sloping backfills, results of experiments to measure K_o are quite variable. The following equation proposed by the Danish Code (Danish Geotechnical Institute 1978) is recommended:

$$K_{o\beta} = K_o (1 + \sin \beta) \qquad [3\text{-}5]$$

EM 1110-2-2502
29 Sep 89

Substituting Equation 3-4 in 3-5 gives:

$$K_{o\beta} = (1 - \sin \phi')(1 + \sin \beta) \qquad [3\text{-}6]$$

and the lateral earth pressure computed by

$$p_o = \gamma' K_{o\beta} z$$

where β is the slope angle from the horizontal. β is positive for a soil layer that slopes upward and away from the structure. Values for K_o and $K_{o\beta}$ are given in Appendix E.

Frost Depth

March 2014

Frost Depth

Location of Bridge

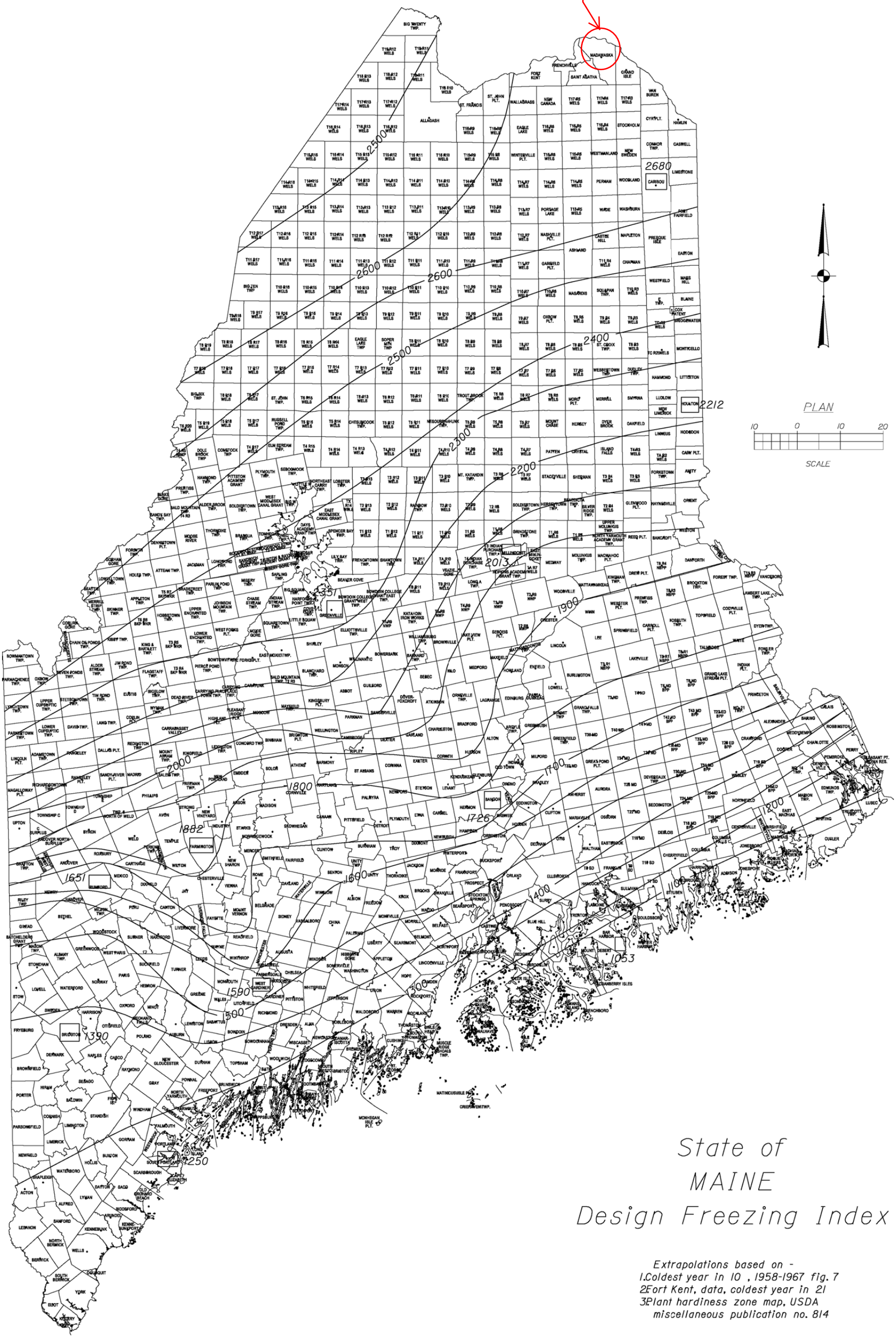

Figure 5-1 Maine Design Freezing Index Map

State of
MAINE
Design Freezing Index

Extrapolations based on -
1.Coldest year in 10 , 1958-1967 fig. 7
2.Fort Kent, data, coldest year in 21
3.Plant hardiness zone map, USDA
miscellaneous publication no. 814

Madawaska/Edmundston Frost Depths

5.2 General

5.2.1 Frost

Any foundation placed on seasonally frozen soils must be embedded below the depth of frost penetration to provide adequate frost protection and to minimize the potential for freeze/thaw movements. Fine-grained soils with low cohesion tend to be most frost susceptible. Soils containing a high percentage of particles smaller than the No. 200 sieve also tend to promote frost penetration.

In order to estimate the depth of frost penetration at a site, Table 5-1 has been developed using the Modified Berggren equation and Figure 5-1 Maine Design Freezing Index Map. The use of Table 5-1 assumes site specific, uniform soil conditions where the Geotechnical Designer has evaluated subsurface conditions. Coarse-grained soils are defined as soils with sand as the major constituent. Fine-grained soils are those having silt and/or clay as the major constituent. If the make-up of the soil is not easily discerned, consult the Geotechnical Designer for assistance. In the event that specific site soil conditions vary, the depth of frost penetration should be calculated by the Geotechnical Designer.

Table 5-1 Depth of Frost Penetration

Design Freezing Index	Frost Penetration (in)					
	Coarse Grained			Fine Grained		
	w=10%	w=20%	w=30%	w=10%	w=20%	w=30%
1000	66.3	55.0	47.5	47.1	40.7	36.9
1100	69.8	57.8	49.8	49.6	42.7	38.7
1200	73.1	60.4	52.0	51.9	44.7	40.5
1300	76.3	63.0	54.3	54.2	46.6	42.2
1400	79.2	65.5	56.4	56.3	48.5	43.9
1500	82.1	67.9	58.4	58.3	50.2	45.4
1600	84.8	70.2	60.3	60.2	51.9	46.9
1700	87.5	72.4	62.2	62.2	53.5	48.4
1800	90.1	74.5	64.0	64.0	55.1	49.8
1900	92.6	76.6	65.7	65.8	56.7	51.1
2000	95.1	78.7	67.5	67.6	58.2	52.5
2100	97.6	80.7	69.2	69.3	59.7	53.8
2200	100.0	82.6	70.8	71.0	61.1	55.1
2300	102.3	84.5	72.4	72.7	62.5	56.4
2400	104.6	86.4	74.0	74.3	63.9	57.6
2500	106.9	88.2	75.6	75.9	65.2	58.8
2600	109.1	89.9	77.1	77.5	66.5	60.0

Note: Testing and descriptions typically showed Fine to Coarse Sand with some Silt, so the average of fine-grained and coarse grained was used for Frost depth = 7.78'. We recommend 8' for frost.

MC results show 10% or less for the most part, and recorded GW levels were at 10' deep or lower

Notes: 1. w = water content
2. Where the Freezing Index and/or water content is between the presented values, linear interpretation may be used to determine the frost penetration.

Foundation Insulation

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SUBJECT: Mad. Int'l Bridge Geofoam Insulation
SHEET: 1
CALCULATED BY: N. Williams, 11/17/20
CHECKED BY: A. Blaisdell, 11/17/20

OBJECTIVE

Four inches of geofoam will be placed beneath the foundation of the Edmundston Abutment (abutment 2 and abutment 2 wingwalls) of the proposed International Bridge to provide frost protection where the foundation bearing level is embedded less than the design frost embedment (8.0 feet).
Select suitable geofoam material and assess 1) performance under imposed loading based on engineering properties, and 2) ability to limit frost penetration based on insulation properties and geometry.

REFERENCES

1. Horvath (1995), "Geofoam Geosynthetic." (attached Sheets 4-8)
2. Transportation Research Board (2004), "National Cooperative Highway Research Program, NCHRP Report 529, Guideline and Recommended Standard for Geofoam Applications in Highway Embankments." (attached Sheets 9-13)
3. ASTM (2007), "ASTM D6817-07, Standard Specification for Rigid Cellular Polystyrene Geofoam." (attached Sheets 14 and 15)
4. Phukan (1985), "Frozen Ground Engineering." (attached Sheet 16)
5. Initial height of concrete placement below construction joint provided by HNTB

PROCEDURE AND ASSUMPTIONS

1. Geofoam will consist of expanded polystyrene (EPS).
2. Initial Tangent Young's modulus (Eti) and elastic limit stress (σe) will be considered based on references 1, 2 and 3 above.
3. Geofoam selection will be based on unit weight and correlated Eti based on design considerations provided in reference 2 and the initial height of concrete placement provided by HNTB.
4. Insulation properties will be compared to existing soil using thermal properties from references 1 and 4 above.

LOAD BEARING CHARACTERISTICS OF EPS

Research on EPS geofoam summarized by Horvath (95) indicates the initial stress-strain behavior under compression loading is essentially linear (elastic) up to a strain of 1%. The stress at 1% strain is defined as the "Elastic Limit Stress", and the modulus of the stress-strain curve in this portion is defined as the "Initial Tangent Young's Modulus".

Several studies have shown a direct correlation between EPS density and Eti. Horvath developed an average equation relating the two variables based on the trend of the available studies (Eq. 4.2 in Horvath (95)):

$Eti = 0.45 \rho - 3$, where Eti is measured in MPa and ρ is EPS density in kg/m^3.

Section 5.5 in NCHRP 529 provides guidance for designing EPS geofoam for load bearing. The recommendation provided in Section 5.5.2.6 states that the elastic limit stress must be greater than the total stress multiplied by a safety factor of 1.2 (Eq. 38):

$\sigma e \geq \sigma t^{*} FS$, where σe is the elastic limit stress (stress at 1% strain), σt is the total imposed stress and FS is the safety factor.

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FOUNDATION LOADING

GZA considered the bearing pressure on the EPS geofoam assuming a maximum bearing pressure equal to the weight of 5' of concrete (750 psf) that will be placed below the first construction joint. Once the concrete is cured, the loads will be transferred from the abutment to the drilled micropiles, and not to the geofoam, so no further analysis is needed for the compression of the foam after the initial 5 foot concrete placement.

EPS GRADE SELECTION

GZA reviewed reference 3 to obtain unit weights and calculated the elastic limit stress reduced by a safety factor of 1.2 (i.e, σe/1.2) using Horvath's equation for comparison to the initial concrete pressure listed above. The results are summarized in the following table:

ASTM D6817-07	Minimum Density		Eti	Eti	σe	σe / 1.2	Acceptable?
EPS Grade	(pcf)	(kg/m^3)	(MPa)	(ksf)	(ksf)	(ksf)	
EPS29	1.8	28.8	10.0	208	2.08	1.73	σe / 1.2 ≥ σt for abutments and wingwall, Yes.

INSULATION PROPERTIES OF EPS

The thickness of the geofoam was initially proportioned based on a rule-of-thumb correlation that 1 inch of styrofoam insulation provides comparable frost protection to 1 foot of soil. A more detailed comparison was conducted to evaluate the acceptability of the selected EPS thickness. GZA reviewed Fig. 3.23 of reference 4 to assess the coefficient of thermal conductivity (K) of frozen soil and reference 1 (pg. 62-65) to assess K for EPS geofoam. Use the following K values from references for assessment:

Soil: K = 18.0 BTU/(ft^2)(hr)(°F)/in. (For frozen coarse-grained soil (Granular Borrow), w=10%, dry density=115 pcf)

EPS: K = 0.41 BTU/(ft^2)(hr)(°F)/in. (highest recommended value for condition where significant water absorption may occur, increases k so conservative for comparison)

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INSULATION PROPERTIES OF EPS (cont.)

The thermal resistance (R) is equal to the thickness of the material divided by the thermal conductivity:

R = **x** (Thickness in inches) / **K** (units above)

The thermal resistance of 4 inches of EPS geofoam is compared to existing on-site soil in the table below:

Material	**K** [BTU/ (ft^2)(hr)(°F)/in]	**Thickness, x** (in)	**R** [(ft^2)(hr) (°F)/ BTU]
Soil	18	96	5.3
EPS	0.41	4	9.8

Thermal resistance of 4" of EPS geofoam alone is more than what is required by the Design Frost Depth. Geofoam will be embedded approximately 2.5 feet below grade, which will add to the R-value.

GEOFOAM GEOMETRY AND FROST PATH

Sheet 17 of this calculation shows the proposed geofoam details. Geofoam will be placed over the leveling sand, and extend 1' beyond the sides of the footing, and an additional 5.6' beyond at a 2H:1V downward inclination, to increase the effective frost penetration path to at least 8.0 feet.

Based on the planned detail, the shortest frost path is from the exterior grade at the edge of the geofoam in front of the abutment. As illustrated, this frost path distance is longer than 8'. All other frost paths extend through the EPS, which provides greater frost protection than 8' of soil alone.

CONCLUSIONS

1. Based on Horvath's modulus correlation and the NCHRP 529 design methodology, EPS29 geofoam (minimum density = 1.8 pcf) in accordance with ASTM D6817-07 is suitable to use underneath the Abutment 2 pile caps and Abutment 2 Wingwall pile caps.

2. Because the strain of the 4 inch layer will be limited to the elastic range (less than 1%), compression of the geofoam will be negligable (strain-based calculated value of 0.04 inches or less).

3. The thermal resistance (R-value) provided by 4 inches of EPS geofoam subject to a high moisture content condition is greater than that provided by the design 8.0-foot frost embedment depth.

4. The proposed details provide suitable protection from frost penetration around the edges of the geofoam.

GEOFOAM

GEOSYNTHETIC

(REFERENCE 1)

A Monograph
by

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using the Figure 4.1 orientation), similar to small-strain behavior of soil. Consequently, some judgement was involved when interpreting the data to fit a straight line through the initial portion of the test data. Again, there are parallels with experiences in soil testing. This suggests that the issue of whether the initial portion of the EPS stress-strain curve is linear at all and, if so, to what strain level will not be resolved until precise deformation measurements, probably by instrumenting the EPS specimen directly, are made.

Nevertheless, based on presently available data and for practical purposes, it appears to be reasonable and sufficiently accurate in practice to assume that the initial stress-strain behavior is linear up to a strain of 1%. The author has termed the stress that defines the limit of this initial linear region the "elastic limit stress." This is because the majority of evidence suggests that EPS behavior in this initial loading zone is elastic in addition to linear. Consequently, the slope of the initial linear-elastic portion of the stress-strain curve is defined as the initial tangent Young's modulus, E_i.

This turns out to be a very useful parameter in geofoam design and has been the focus of some research. E_i exhibits approximately linear correlation with EPS density, at least over a range in densities achievable with block molding. Figure 4.2 shows results from five separate studies:

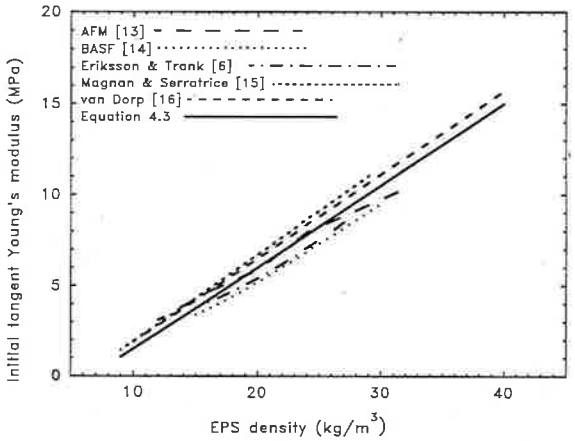

Figure 4.2 Correlation between density and initial tangent Young's modulus for block-molded EPS.

1. The curve labeled "AFM" represents data tabulated in [13].

2. The curve labeled "BASF" represents the mean of data tabulated in [14]. Maximum variations in E_i of $\pm$1.8 MPa (38 ksf) from the mean values were indicated, independent of density.

3. The curve labeled "Eriksson & Tränk" is the following empirical relationship for the average

of data on a plot of log E_i versus density in [6]

$$E_{t_i} = 0.0097\,\rho^2 - 0.014\,\rho + 1.8 \qquad (4.1)$$

where E_i has units of MPa and
ρ = EPS density in kg/m³.

For a given density, the maximum variation of E_i from this average curve was found to be approximately $\pm$0.5 MPa (10 ksf) at low densities, increasing to $\pm$1.0 MPa (21 ksf) at higher densities. These researchers assumed the elastic range extended to 2% strain, not 1%. In the author's opinion, this is too large a strain range and, consequently, produces values for E_i that are somewhat too low. This is consistent with what is shown in Figure 4.2.

4. The curve labeled "Magnan & Serratrice" is the following empirical relationship for the mean of data on an arithmetic plot of E_i versus density in [15]

$$E_{t_i} = 0.479\,\rho - 2.875 \qquad (4.2)$$

Notation and units are the same as Equation 4.1. A variation in E_i of approximately $\pm$1.5 MPa (31 ksf) about the mean was shown, independent of density. Of note is that these results were based on using triaxial-type specimens and strain rates much lower than typical.

5. The line labeled "van Dorp" is the median of the range of data scaled from a plot in [16]. The maximum variation of E_i from this median line is approximately $\pm$0.5 MPa (10 ksf) at low densities, increasing to $\pm$1.0 MPa (21 ksf) at higher densities.

Considering that the results shown in Figure 4.2 represent EPS block manufactured independently in several countries over a period of many years and that there was no standardization of specimen shape and size, strain rate, or definition of elastic limit the agreement between results is remarkable. The following simple linear equation provides a reasonable fit through all the data in Figure 4.2

$$E_{t_i} = 0.45\,\rho - 3 \qquad (4.3)$$

Notation and units are the same as Equation 4.1. A plot of Equation 4.3 is also shown in Figure 4.2.

The most extensive study of the effect of temperature on E_i was reported in [12]. Only temperatures lower than standard lab conditions were studied (as low as -13.9°C (+7.0°F)). Evaluation of the results is complicated by the conservative interpretation of the elastic range by this researcher as discussed previously. However, it appears that E_i is either unchanged or slightly larger in magnitude under lower temperatures.

Referring again to Figure 4.1, the second zone of stress-strain behavior involves yielding.

4.2.3.4 Flexure. Testing a beam-shaped specimen of EPS in flexure turns out to be an easier method for testing the tensile strength of EPS and, indirectly, quality. This is because the flexural test can be set up to create a maximum bending moment and, therefore, maximum tension in the extreme bottom fiber of the beam, at the center of the beam (another test variation creates zero moment/maximum shear at the center of the beam).

There is an ASTM standard (C 203) test method for flexural testing that is applicable to EPS. A beam-type specimen on the order of 6 inches (150 mm) wide and 10 inches (250 mm) long is subjected to a transverse load placed at the center of the beam. The test method allows for some variation in strain rates and other test parameters, but the loading is definitely rapid in nature. The flexural strength is defined as the calculated maximum fiber stress at the time of rupture of the specimen.

The range in measured flexural strength as a function of EPS density is shown in Figure 4.11 using data from [14]. Again, no details concerning actual specimen dimensions and strain rates used in these particular are known. Note the good agreement with results from tensile testing which supports the statement made at the beginning of this section. No long-term test data are known to exist for the flexure mode of loading.

4.2.3.5 Shear.

4.2.3.5.1 Introduction. There are two modes of shear behavior of interest:

- shear strength internally within a specimen of EPS and
- shear resistance (sliding friction) between blocks of EPS.

4.2.3.5.2 Internal. Currently, ASTM standards (C 273) only address internal shear strength. The test method involves placing a specimen between two stiff, flat plates. This test is actually oriented toward testing the core of structural "sandwiches" or composites as the test is under the jurisdiction of Committee F-7 (Aerospace Industry Methods). Specimen dimensions are not given explicitly, as it is apparently intended that a portion of the actual sandwich or composite would be tested. Only dimensions of specimen width and length relative to the specimen thickness are given. The loading rate is not specified, but a relatively rapid strain rate of 0.5% per minute is suggested. Shear strength is defined as the maximum stress in shear that can be supported, whether or not rupture of the core material, i.e., the part being tested, occurs.

Values of shear strength determined for EPS using this method are shown in Figure 4.11 using data from [14]. Specimen dimensions and testing strain rate are unknown. As can be seen in this figure, the shear and compressive strengths are close in magnitude. Consequently, shear-strength testing of EPS is not performed routinely as compressive strength values are assumed to provide an adequate assessment of shear strength.

4.2.3.5.3 External. Numerous researchers have studied the mechanism of sliding friction between EPS blocks. Reported values for the coefficient of friction fall in a range between 0.5 and 0.7, although most agree that the value is independent of EPS density and normal stress. The most detailed study was reported in [11] and this indicated a coefficient of approximately 0.64. In general, details concerning the surface of the EPS (as molded, cut with

a hot wire, or cut with a saw) as well as specimen dimensions, loading rate, and/or other test variables are not given in the published literature and could explain the range in reported values.

These coefficients of friction are equivalent to friction angles ranging between 27° and 35° (32° for the results in [11]). While these may be considered to be relatively large and comparable to friction angles encountered in many types of soil-structure interaction problems, it should be kept in mind that the normal stresses acting between blocks of EPS in most geofoam applications are usually relatively small by design. Therefore, the shear stress between blocks would also be small. This is why mechanical connectors such as barbed connector plates (Figure 3.7) are often used to enhance the shear resistance between blocks.

Because there is no standard connector plate design, no general statement can be made concerning the resistance provided by a connector plate. Design professionals should request this information from the plate supplier on a given project. Suppliers of connector plates will generally provide data for tests performed at a relatively rapid loading rate. While these data may be appropriate for evaluating the behavior of the plates when subjected to transient or short-duration loading, the data would not be appropriate for sustained loads. For behavior of the connector plates under sustained loads, long-term load test data should be requested specifically from the supplier.

No data are available for the shear resistance provided by pieces of steel reinforcing bars as used in some countries, most notably the U.K.

4.2.4 Thermal Properties

EPS is a very efficient thermal insulator because of the relatively large volume of gas-filled voids that are contained within the cellular polyhedra. For example, EPS with a density of 20 kg/m^3 (1.25 pcf) contains approximately 98% voids by volume. In any material, it is primarily the gas-filled voids contained within the material that provide thermal insulation, not the solid portion of the material. From a relative perspective, dry EPS is one to two orders of magnitude more efficient than soil as a thermal insulator.

All indications are that block-molded EPS is isotropic with respect to its thermal properties. In applications involving heat flow, the most, and usually only, important thermal property of EPS is its thermal conductivity. This defines how rapidly heat can flow through the EPS. The basic engineering parameter defining thermal conductivity is called the coefficient of thermal conductivity, k. This parameter is both conceptually and theoretically analogous to the coefficient of permeability for fluid flow in soil. This means the smaller the coefficient of thermal conductivity, the more efficient a material is as a thermal insulator.

The coefficient of thermal conductivity of dry EPS varies with density and temperature as shown in Figure 4.12. It is important to note that these values of k are constant with time. This is because air rapidly replaces any pentane blowing agent still in the EPS after molding. As a result, the coefficient of thermal conductivity measured in a lab test reflects the air-filled cells.

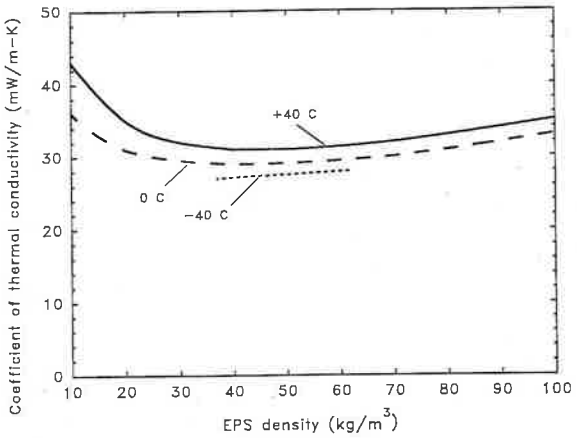

Figure 4.12 Coefficient of thermal conductivity, *k*, for dry, block-molded EPS [22,23].

This is not a trivial statement. Other types of plastic foam, XPS in particular, retain their blowing agent for a much longer period of time after manufacture. Because these blowing agents tend to be more efficient thermal insulators than air, XPS and other foams lose some of their thermal-insulative capability with time as the blowing agent outgasses and is replaced with air.

Manufacturers of plastic foams other than EPS tend to test and report values of thermal conductivity for material that has been recently manufactured. Obviously, this results in an optimistic evaluation of the thermal conductivity of these foams. For geofoam applications involving thermal conductivity, design professionals should always request information from manufacturers concerning the long-term thermal conductivity of the geofoam material being considered. This is particularly important as blowing agents are being changed from the CFC of the past which was a very efficient thermal insulator[18].

Although the coefficient of thermal conductivity would be used in any rigorous geothermal analysis, it is more common in the U.S.A. in some applications such as building construction to use a material's "R-value." The R-value is defined as the reciprocal of the coefficient of thermal conductivity, but only when this coefficient is expressed in imperial units of BTU-inch/ft^2-hr-°F. Thus the R-value is a measure of thermal resistivity per inch thickness of material. Consequently the larger the R-value, the greater the thermal insulative effect. The R/inch of dry EPS ranges from 3 to 5 which is comparable to other types of thermal insulation.

[18]This is a major reason why CFC was the refrigerant of choice in air conditioners and refrigerators.

Perhaps the most important technical issue, and contentious marketing issue, concerning the thermal conductivity of foam materials in general is water absorption and how it may, or may not, be exacerbated by freeze-thaw cycles. This is an important design consideration because the coefficient of thermal conductivity of any foam will increase in magnitude with increasing water content. This reduction in thermal efficiency should be accounted for in design.

Despite some claims to the contrary, all foam materials will collect and hold liquid water to some degree. Polystyrene is inherently hydrophobic (not all plastic foams are) and the closed-cell structure of EPS prevents the absorption of liquid water into each cellular polyhedron although water vapor can enter. In addition, the structure of EPS allows water, in either the vapor or liquid phase, to enter the small voids between the fused polyhedra.

In the past, there has been a tendency to reduce the water-absorption issue to simple, absolute terms depending on whether an optimistic or pessimistic assessment of the water-absorption tendency of EPS was sought for marketing purposes. However, both laboratory testing and field observations indicate that the relative volume of accumulated water is a very complex function of many factors:

- bead size, EPS density, and confining stress at the time of molding (which affect the relative volume of inter-polyhedra voids),
- thickness of the EPS,
- orientation of the pieces of EPS in the ground (vertical versus horizontal),
- the phase of water (vapor or liquid) available on the surface of the EPS,
- when only water vapor is available, the thermal gradient across the EPS (a thermal gradient drives water vapor into the EPS where it can then condense),
- when liquid water is available, both the pore pressure and hydraulic gradient across the EPS,
- time, and
- temperature.

In addition, the process of water absorption in EPS is largely reversible which is not true of all foam materials. Long-term field observations indicate that, after a relatively rapid (few weeks to months) period of water absorption, there are seasonal fluctuations in the water content of EPS geofoam similar to those observed in the vadose zone of soil. This explains why measured water contents of EPS versus time often appear to be erratic as measurements may only be taken annually or every few years and not at the same time of year. In all likelihood, the water content is varying seasonally within the EPS, much as it does in soil above the ground water table. Again, depending on the marketing intent of the person or organization using these data, it is not uncommon to see the plot of EPS water content versus time truncated at an early stage implying that water absorption continues to increase at a rapid rate forever. Often, such a plot is compared to other types of foam which may increase in water content more gradually but monotonically and irreversibly.

Because of the large number of variables controlling water absorption, and the often

contentious business-political climate surrounding the topic, it is perhaps not surprising that there is no ASTM standard method for determining a design value for water absorption although Committee C-16 has a task group studying this issue. Thus the best insight into water absorption is to look at actual in-situ behavior. In evaluating the subsequent discussion, it should be noted that the water content of foams is expressed on a relative volume basis, not relative weight as is used for soils.

In geofoam installations above ground water, the water content of EPS can increase in two ways:

1. By diffusion of water vapor driven by a thermal gradient into the EPS followed by condensation of the vapor into liquid water.

2. By liquid water that percolates through the ground. This can occur particularly in installations where the EPS pieces are oriented horizontally and overlain by soil so that water can accumulate on the top surface of the EPS.

Where the first mechanism occurs, both laboratory and field tests indicate that the uptake of water in such cases, even for relatively thin specimens and after a period of several years, is less than 1% by volume [22]. This causes an increase of about 5% in the coefficient of thermal conductivity [22]. However, a more-conservative allowance for a long-term water content in the EPS is required by some European design standards. For example, [24] addresses building construction applications where the insulation is placed vertically and positive drainage is provided so only water vapor is present. In this case, design values of water contents between 3% and 5% by volume are used. For the EPS densities considered in [24], 15 kg/m^3 (0.94 pcf) to 30 kg/m^3 (1.9 pcf), the recommended value of the coefficient of thermal conductivity is 40 mW/m-K (0.28 BTU-in/ft^2-hr-°F). This represents an R value of 3.6/inch.

On the other hand, where the insulation is placed horizontally or close to it, e.g., beneath pavements or railway tracks, the second mechanism of accumulated liquid water (ponding) can occur. Grading and providing drainage can minimize the amount of liquid water that comes into contact with the geofoam. In addition, a geomembrane could be used to protect the top of the insulation. Long-term observations in Finland of residential installations where a geomembrane was used indicate that this is very successful in practically eliminating water absorption by the EPS.

However, reality is that such positive measures are rarely implemented fully in actual designs and installations. Therefore, a greater allowance for water absorption is generally made in design. For example, in Germany design values of water contents of 10% to 15% by volume are recommended [25]. For the EPS densities considered in this reference, 30 kg/m^3 (1.9 pcf) to 60 kg/m^3 (3.7 pcf), the value of the coefficient of thermal conductivity recommended is 50 mW/m-K (0.35 BTU-in/ft^2-hr-°F) to 60 mW/m-K (0.41 BTU-in/ft^2-hr-°F). Thus, on the high end, the design value of the coefficient of thermal conductivity is approximately twice the dry value. This is supported by a test road installation in Norway that was constructed in 1966 [26]. This showed a relatively rapid increase in water content in the EPS and then an oscillation of water content between 10% and 18% with time until the limit of the observation period reported (1984).

The importance of providing proper drainage for thermal insulation below ground, and the penalty for not doing so, is apparent when field data for insulated railway tracks in Norway are reviewed [27]. Although insulated railways also use insulation in horizontal panels, railway subgrades tend to be much better drained than pavements. After 12 years in service, EPS

insulation had a water content of approximately 3%. The EPS had actually reached this value after about two years and then exhibited subsequent fluctuations, generally small in magnitude, as is typical.

These observations and design guidelines are also supported by field studies reported in [28]. Installations of vertically and horizontally aligned panels of EPS (as well as other geofoam materials) were made adjacent to two buildings, one in Canada (Sarnia, Ontario) and the other in the U.S.A. (Granville, Ohio). This appears to have been an intentionally severe installation as there is no indication that any attempt was made to provide positive drainage adjacent to the geofoam as would be considered good practice. The longest observations reported were for a period of 18 months.

In installations where the geofoam is submerged, liquid water can enter the inter-polyhedra voids directly. In general, geofoam is not used for thermal insulation in a submerged environment. Therefore, the only observation of actual installations involving long-term submersion of EPS geofoam were for applications where a function other than thermal insulation, usually lightweight fill, was the primary reason for using the geofoam. These installations involved full-size blocks that were subjected to relatively small heads of water under little or no thermal gradient for several years [29]. The maximum water content of the EPS in such cases was approximately 9% by volume.

In any of the references describing actual field behavior of EPS as thermal insulation, there was no indication that freeze-thaw cycles caused any degradation or physical change in the EPS.

Of less importance in thermal insulation applications is the heat capacity which can be expressed either on a mass or volumetric basis. Heat capacity is the quantity of heat gained or lost by a quantity (mass or volume as appropriate) of material with a temperature change of one degree. Data in [23] indicate that the specific (mass) heat capacity of dry EPS is independent of density and temperature, and has a magnitude of 1210 J/kg-K.

Another thermal-related parameter that is sometimes of interest is the coefficient of thermal expansion. Data in [23] indicate that it is independent of EPS density with an average value of 6x10^{-5} per K.

4.2.5 Durability

Considered here are the external factors that may affect the stability and/or performance of EPS. This is an important concern with any geosynthetic product in the relatively harsh environment of long-term burial in the ground. This is reflected in the significant attention devoted to geosynthetic durability in recent years.

In g…aterial in geofoam applications. In addition, it …npared to many other geosynthetic products. T… use that dates back to the 1960s.

EPS …eriorate, or change chemically when exposed to …ue to living organisms or animals. However, in certain climates burrowing insects such as termites and carpenter ants have been found to penetrate EPS (and other plastic foams as well) for nesting purposes or to attack wood that may be on one side of the foam. This has been noted primarily for thermal insulation in residential construction.

Within the past few years, a inorganic mineral additive to EPS was developed in the U.S.A. by AFM Corporation. This additive is intended to provide a passive deterrent to insect infestations and has been approved for use by the appropriate regulatory agencies in the U.S.A.

Discussion of thermal conductivity of EPS in high water conditions

NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

NCHRP REPORT 529

Guideline and Recommended Standard for Geofoam Applications in Highway Embankments

(REFERENCE 2)

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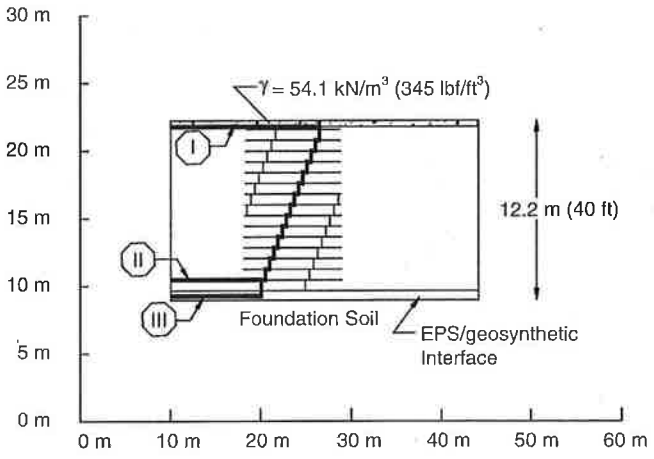

Figure 38. Typical cross section used in seismic internal slope stability analyses for vertical embankments with the three applicable failure modes.

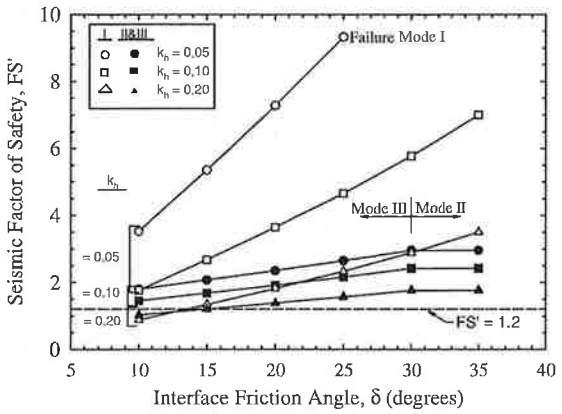

Figure 39. Design chart for internal seismic stability of EPS vertical embankments.

(690 lbs/ft²) corresponds to the sum of the design values of pavement surcharge (21.5 kN/m² [450 lbs/ft²]) and traffic surcharge (11.5 kN/m² [240 lbs/ft²]) used previously for external bearing capacity and static slope stability of trapezoidal embankments. The surcharge in Figure 6 had to be replaced by an equivalent soil layer for the seismic slope stability analysis because a seismic coefficient cannot be applied to a surcharge in limit equilibrium stability analyses.

Figure 7 also presents the three failure modes considered in the internal seismic stability analyses for vertical geofoam embankments. These failure modes are similar to the three failure modes analyzed in the seismic internal slope stability analysis of trapezoidal embankments, and a description of each is included in Section 5.4.1.1.

Slope stability analyses were conducted on a range of vertical embankment geometries to investigate the effect of embankment height (3.1 m [10 ft] to 12.2 m [40 ft]) and roadway width (11 m [36 ft], 23 m [76 ft], and 34 m [112 ft]) on internal seismic slope stability. The results of these analyses were used to develop design charts to facilitate internal design of roadway embankments with vertical walls that use geofoam. Three seismic coefficients—low (0.01), medium (0.10), and high (0.20)—were used for each roadway embankment.

5.4.2.2 Design Chart. The internal seismic stability design chart for vertical embankments in Figure 39 presents the seismic factor of safety for each seismic coefficient as a function of interface friction angle. This chart provides estimates of seismic internal factors of safety for vertical embankments with any of the geometries considered during this study—i.e., embankment heights of 3.1 m (10 ft) to 12.2 m (40 ft) and roadway widths of 11 m, 23 m, and 34 m (36, 76, and 112 ft)—even though the chart is based on a roadway width of 11 m (36 ft) and an embankment height from 3.1 m (10 ft).

It can be seen that an EPS embankment will exhibit a suitable seismic factor of safety if the minimum interface friction angle exceeds approximately 15 degrees, which is similar for trapezoidal embankments (see Figure 7). However, an important aspect of Figure 39 is that it can be used to develop the most cost-effective internal stability design by selecting the lowest interface friction angle for each interface that results in a seismic factor of safety of greater than 1.2. For example, a lightweight geotextile can be selected for the EPS/foundation interface because the interface only needs to exhibit a friction angle greater than 15 degrees. More importantly, the EPS/EPS interface within the EPS also only needs to exhibit a friction angle greater than 15 degrees, which suggests that mechanical connectors are not required between EPS blocks for internal seismic stability because the interface friction angle for an EPS/EPS interface is approximately 30 degrees. In summary, as with trapezoidal embankments, it appears that internal seismic stability will be controlled by the shear resistance of the pavement system/EPS interface.

5.5 Load Bearing

5.5.1 Introduction

The primary internal stability issue for EPS-block geofoam embankments is the load bearing of the EPS-geofoam mass. A load-bearing capacity analysis consists of selecting an EPS type with adequate properties to support the overlying pavement system and traffic loads without excessive EPS compression that could lead to excessive settlement of the pavement surface. The design approach used herein is an explicit deformation-based design methodology. It is based on the elastic limit stress, σ_e, to evaluate the load bearing of EPS.

Table 8 provides the minimum recommended values of elastic limit stress for various EPS densities. The use of the elastic limit stress values indicated in Table 8 is slightly conservative because the elastic limit stress of the block as a whole is somewhat greater than these minimums, but this conservatism is not unreasonable and will ensure that no part of a block (where the density might be somewhat lower than the overall average) becomes overstressed.

TABLE 8 Minimum allowable values of elastic limit stress and initial tangent Young's modulus for the proposed AASHTO EPS material designations

Material Designation	Dry Density of Each Block as a Whole, kg/m^3 (lbf/ft^3)	Dry Density of a Test Specimen, kg/m^3 (lbf/ft^3)	Elastic Limit Stress, kPa (lbs/in^2)	Initial Tangent Young's Modulus, MPa (lbs/in^2)
EPS40	16 (1.0)	15 (0.90)	40 (5.8)	4 (580)
EPS50	20 (1.25)	18 (1.15)	50 (7.2)	5 (725)
EPS70	24 (1.5)	22 (1.35)	70 (10.1)	7 (1015)
EPS100	32 (2.0)	29 (1.80)	100 (14.5)	10 (1450)

5.5.2 Design Procedure

The procedure for evaluating the load-bearing capacity of EPS as part of internal stability is outlined in the following thirteen steps:

1. Estimate the traffic loads.
2. Add impact allowance to the traffic loads.
3. Estimate traffic stresses at the top of EPS blocks.
4. Estimate gravity stresses at the top of EPS blocks.
5. Calculate total stresses at the top of EPS blocks.
6. Determine the minimum required elastic limit stress for EPS under the pavement system.
7. Select the appropriate EPS block to satisfy the required EPS elastic limit stress for underneath the pavement system, e.g., EPS50, EPS70, or EPS100.
8. Select the preliminary pavement system type and determine whether a separation layer is required.
9. Estimate traffic stresses at various depths within the EPS blocks.
10. Estimate gravity stresses at various depths within the EPS blocks.
11. Calculate total stresses at various depths within the EPS blocks.
12. Determine the minimum required elastic limit stress at various depths.
13. Select the appropriate EPS block to satisfy the required EPS elastic limit stress at various depths in the embankment.

The basic procedure for designing against load-bearing failure is to calculate the maximum vertical stresses at various levels within the EPS mass (typically the pavement system/EPS interface is most critical) and select the EPS that exhibits an elastic limit stress that is greater than the calculated or required elastic limit stress at the depth being considered. The load-bearing design procedure can be divided into two parts. Part 1 consists of Steps 1 through 8 and focuses on the determination of the traffic and gravity load stresses applied by the pavement system to the top of the EPS blocks and selection of the type of EPS that should be used directly beneath the pavement system (see steps above). Part 2 consists of Steps 9 through 13 and focuses on the determination of the traffic and gravity load stresses applied at various depths within the EPS blocks and selection of the appropriate EPS for use at these various depths within the embankment. Each of the design steps are subsequently described.

5.5.2.1 Step 1: Estimate the Traffic Loads. Figure 40 shows the wheel configuration of a typical semitrailer truck with a tandem axle with dual tires at the rear. Trucks with a tridem axle, each spaced at 122 to 137 cm (48 to 54 in.) apart, and dual tires also exist. The largest live or traffic load expected on the roadway above the embankment should be used for design. The magnitude and vehicle tire configuration that will provide the largest live load is typically not known during the preliminary design phase. Therefore, the AASHTO standard classes of highway loading (*12*) can be used for preliminary load-bearing analyses.

5.5.2.2 Step 2: Add Impact Allowance to the Traffic Loads. Allowance for impact forces from dynamic, vibratory, and impact effects of traffic is generally only considered where these forces act across the width of the embankment or adjacent to a bridge abutment. An impact coefficient of 0.3 is recommended for design of EPS-block geofoam (*15*). Equation 31 can be used to include the impact allowance to the live

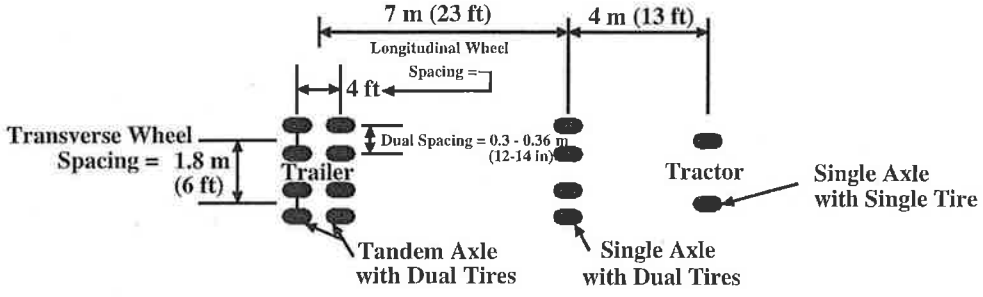

Figure 40. Wheel configuration of a typical semitrailer truck (14).

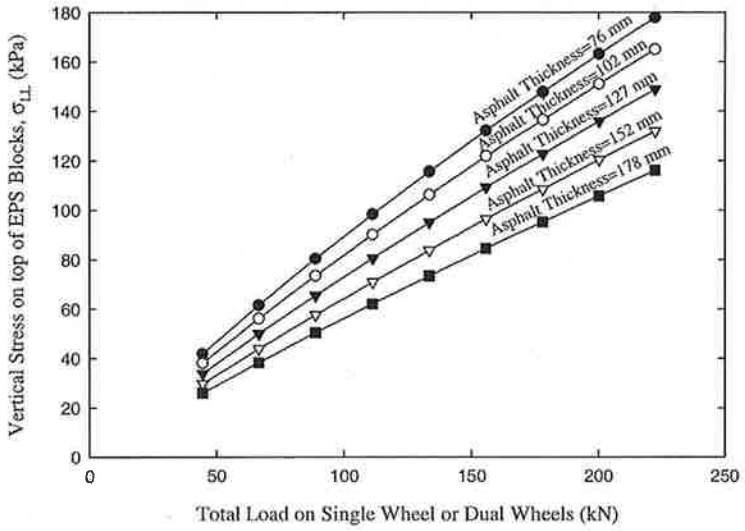

Figure 41. Vertical stress on top of the EPS blocks, σ_{LL}, due to traffic loads on top of a 610-mm (24-in.) asphalt concrete pavement system.

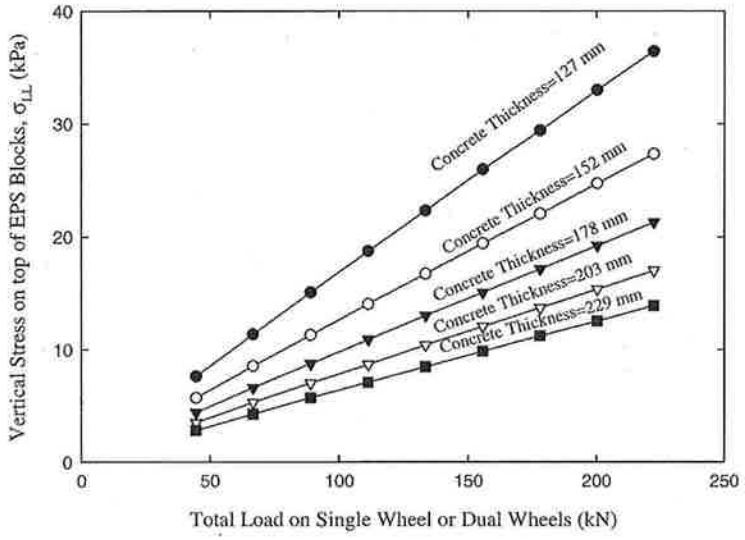

Figure 42. Vertical stress on top of the EPS blocks, σ_{LL}, due to traffic loads on top of a 610-mm (24-in.) portland cement concrete pavement system.

5.5.2.4 Step 4: Estimate Gravity Stresses at the Top of EPS Blocks. Stresses resulting from the gravity load of the pavement system and any road hardware placed on top of the roadway must be added to the traffic stresses obtained in Step 3 to conduct a load-bearing analysis of the EPS. The gravity stress from the weight of the pavement system is as follows:

$$\sigma_{DL} = T_{pavement} * \gamma_{pavement} \quad (36)$$

Where

σ_{DL} = gravity stress due to dead loads,
$T_{pavement}$ = pavement system thickness, and
$\gamma_{pavement}$ = average unit weight of the pavement system.

The various components of the pavement system can be assumed to have an average unit weight of 20 kN/m³ (130 lbf/ft³). Because the traffic stresses in Figures 41 through 43 are based on a pavement system with a total thickness of 610 mm (24 in.), a value of $T_{pavement}$ equal to 610 mm (24 in.) should be used to estimate σ_{DL} to ensure consistency.

5.5.2.5 Step 5: Calculate Total Stresses at the Top of EPS Blocks. The total vertical stress at the top of EPS blocks underlying the pavement system from traffic and gravity loads, σ_{total}, is as follows:

$$\sigma_{total} = \sigma_{LL} + \sigma_{DL} \quad (37)$$

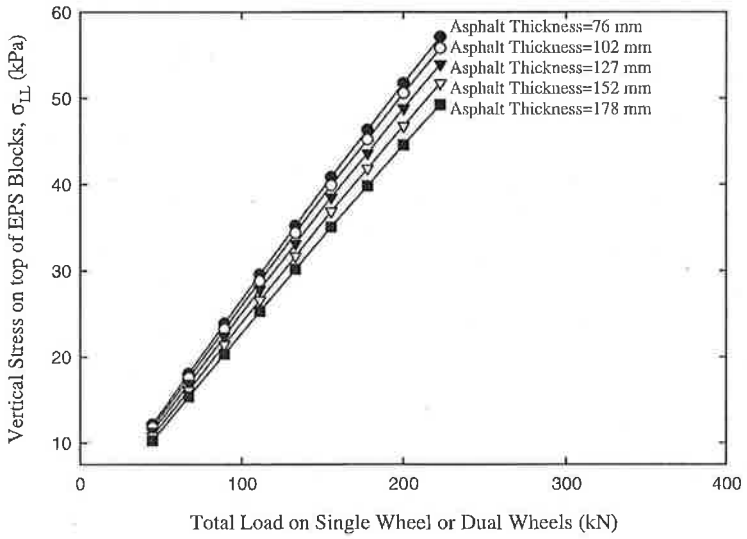

Figure 43. Vertical stress on top of the EPS blocks, σ_{LL}, due to traffic loads on top of a 610-mm (24-in.) asphalt concrete pavement system with a 102-mm (4-in.) concrete separation layer between the pavement system and EPS blocks.

Where

σ_{LL} = vertical stress applied to the top of EPS-block geofoam due to traffic loads under a particular pavement system.

5.5.2.6 Step 6: Determine the Minimum Required Elastic Limit Stress for EPS Under the Pavement System. The minimum required elastic limit stress of the EPS block under the pavement system can be calculated by multiplying the total vertical stress from Step 5 by a factor of safety, as shown in Equation 38:

$$\sigma_e \geq \sigma_{total} * FS \quad (38)$$

Where

σ_e = minimum elastic limit stress of EPS and
FS = factor of safety = 1.2.

The main component of σ_{total} is the traffic stress and not the gravity stress from the pavement. Because traffic is a main component of σ_{total} and traffic is a transient load like wind loading, a factor of safety of 1.2 is recommended for the load-bearing analysis. This is the same value of factor of safety recommended for other transient or temporary loadings, such as wind, hydrostatic uplift, sliding, and seismic loading used for external stability analyses.

5.5.2.7 Step 7: Select the Appropriate EPS Block to Satisfy the Required EPS Elastic Limit Stress for Underneath the Pavement System, e.g., EPS50, EPS70, or EPS100. Select an EPS type from Table 8 that exhibits an elastic limit stress greater than or equal to the required σ_e determined in Step 6. The EPS designation system in Table 8 defines the minimum elastic limit stress of the block as a whole in kilopascals. For example, EPS50 will have a minimum elastic limit stress of 50 kPa (7.2 lbs/in^2). The EPS selected will be the EPS block type that will be used directly beneath the pavement system for a minimum depth of 610 mm (24 in.) in the EPS fill. This minimum depth is recommended because it is typically the critical depth assumed in pavement design for selection of an average resilient modulus for design of the pavement system (*14*). Thus, the 610-mm (24-in.) depth is only an analysis depth and is not based on the thickness of the EPS blocks. Of course, if the proposed block thickness is greater than 610 mm (24 in.), the block selected in this step will conservatively extend below the 610-mm (24-in.) zone. The use of EPS40 is not recommended directly beneath paved areas because an elastic limit stress of 40 kPa (5.8 lbs/in^2) has resulted in pavement settlement problems.

5.5.2.8 Step 8: Select the Preliminary Pavement System Type and Determine Whether a Separation Layer Is Required. A cost analysis should be performed in Step 8 to preliminarily select the optimal pavement system that will be used over the type of EPS blocks determined in Step 7. The cost analysis can focus on one or all three of the pavement systems evaluated in Step 3—i.e., asphalt concrete, PCC, and a composite pavement system. The EPS selected for a depth of 610 m (24 in.) below the pavement system is a function of the pavement system selected because the vertical stress induced at the top of the EPS varies with the pavement system, as shown in Figures 41 through 43. Therefore, several cost scenarios can be analyzed—e.g., a PCC versus asphalt concrete pavement system and the accompanying EPS for each pavement system—to determine the optimal combination of pavement system and EPS. The cost analysis will also determine whether a concrete separation layer between

Designation: D 6817 – 07

(REFERENCE 3)

Standard Specification for Rigid Cellular Polystyrene Geofoam[1]

This standard is issued under the fixed designation D 6817; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This specification covers the types, physical properties and dimensions of rigid cellular polystyrene intended for use as geofoam.

1.2 This specification does not cover the layout, placement and workmanship for proper installation and performance of rigid cellular polystyrene geofoam.

1.3 Rigid cellular polystyrene geofoam covered by this specification may need protection from certain chemicals, environmental exposure, and concentrated loads. Additional design considerations may include thermal conductivity and buoyancy. Guidelines regarding these end use considerations are included in Appendix X1.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory requirements prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:* [2]

C 165 Test Method for Measuring Compressive Properties of Thermal Insulations

C 203 Test Methods for Breaking Load and Flexural Properties of Block-Type Thermal Insulation

C 303 Test Method for Dimensions and Density of Preformed Block and Board–Type Thermal Insulation

C 390 Practice for Sampling and Acceptance of Thermal Insulation Lots

C 578 Specification for Rigid, Cellular Polystyrene Thermal Insulation

D 1621 Test Method for Compressive Properties Of Rigid Cellular Plastics

D 1622 Test Method for Apparent Density of Rigid Cellular Plastics

D 2863 Test Method for Measuring the Minimum Oxygen Concentration to Support Candle-Like Combustion of Plastics (Oxygen Index)

3. Terminology

3.1 *Definitions:*

3.1.1 Terms used in this specification are defined in Terminology D 4439.

3.1.2 *geofoam*—block or planar rigid cellular foam polymeric material used in geotechnical engineering applications.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *EPS, XX*—number designation for expanded polystyrene geofoam Type(s) having a minimum density of XX kg/m^3(lb/ft^3).

3.2.2 *XPS, XX*—number designation for extruded polystyrene geofoam Type(s) having a minimum density of XX kg/m^3(lb/ft^3).

3.2.3 *RCPS*—letter designation for EPS and XPS rigid cellular polystyrene geofoam covered by this specification.

4. Ordering Information

4.1 Acquisition documents shall specify the following:

4.1.1 Title, number and year of this specification.

4.1.2 Type, as per Table 1, or minimum density required.

4.1.3 Total product volume required of each Type, or minimum density.

5. Materials and Manufacture

5.1 RCPS geofoam shall be formed by the expansion of polystyrene resin beads or granules in a molding process (EPS) or by the expansion of polystyrene base resin in an extrusion process (XPS). RCPS geofoam may be manufactured with reprocessed polystyrene foam (regrind).

5.2 RCPS geofoam shall be of uniform density and have essentially closed cells. RCPS geofoam is an organic material and is considered combustible. It should not be exposed to flames or other ignition sources.

[1] This specification is under the jurisdiction of ASTM Committee D35 on Geosynthetics and is the direct responsibility of Subcommittee D35.03 on Permeability and Filtration.

Current edition approved Dec. 1, 2007. Published December 2007. Originally approved in 2002. Last previous edition approved in 2006 as D 6817 – 06a.

[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

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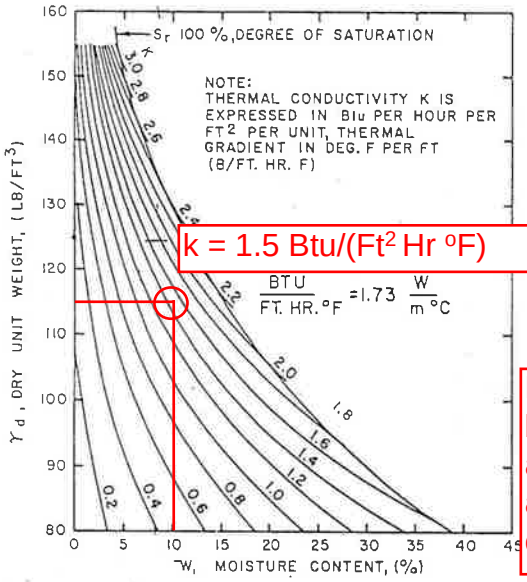
TABLE 1 Physical Property Requirements of RCPS Geofoam[A,B]

Type	EPS12	EPS15	EPS19	EPS22	EPS29	EPS39	EPS46	XPS20	XPS21	XPS26	XPS29	XPS36	XPS48
Density, min., kg/m^3(lb/ft^3)	11.2 (0.70)	14.4 (0.90)	18.4 (1.15)	21.6 (1.35)	28.8 (1.80)	38.4 (2.40)	45.7 (2.85)	19.2 (1.20)	20.8 (1.30)	25.6 (1.60)	28.8 (1.80)	35.2 (2.20)	48.0 (3.00)
Compressive Resistance, min., kPa (psi) at 1 %	15 (2.2)	25 (3.6)	40 (5.8)	50 (7.3)	75 (10.9)	103 (15.0)	128 (18.6)	20 (2.9)	35 (5.1)	75 (10.9)	105 (15.2)	160 (23.2)	280 (40.6)
Compressive Resistance, min., kPa (psi) at 5 %	35 (5.1)	55 (8.0)	90 (13.1)	115 (16.7)	170 (24.7)	241 (35.0)	300 (43.5)	85 (12.3)	110 (16.0)	185 (26.8)	235 (34.1)	335 (48.6)	535 (77.6)
Compressive Resistance, min., kPa (psi) at 10 %[A]	40 (5.8)	70 (10.2)	110 (16.0)	135 (19.6)	200 (29.0)	276(40.0)	345 (50)	104 (15.0)	104 (15.0)	173 (25.0)	276 (40.0)	414 (60.0)	690 (100.0)
Flexural Strength, min., kPa (psi)	69 (10.0)	172 (25.0)	207 (30.0)	276 (40.0)	345 (50.0)	414 (60.0)	517 (75.0)	276 (40.0)	276 (40.0)	345 (50.0)	414 (60.0)	517 (75.0)	689 (100.0)
Oxygen index, min., volume %	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0

[A]If yield occurs prior to 10% deformation, report compressive resistance and deformation at yield in addition to the compressive resistance at 1%, 5% and 10% deformation.
[B]For products that have an external skin, testing shall be undertaken with skins intact.

For proposed fill material use k value for granular borrow.

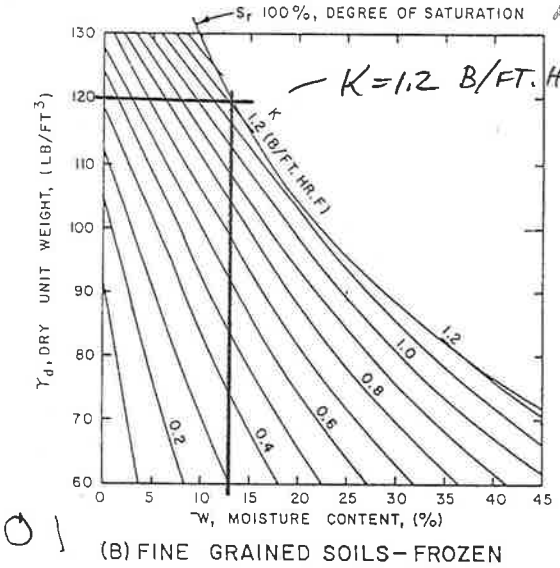
FROM REFERENCE 4



k = 1.5 Btu/(Ft² Hr °F)

(A) COARSE GRAINED SOILS – FROZEN

PRIMARILY GRAVEL AND SAND



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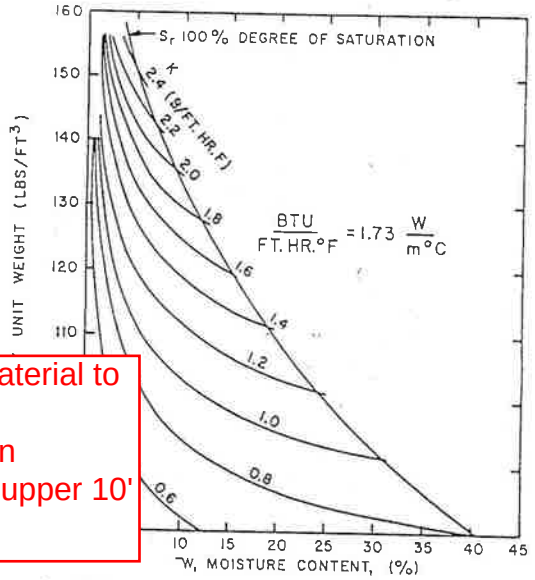
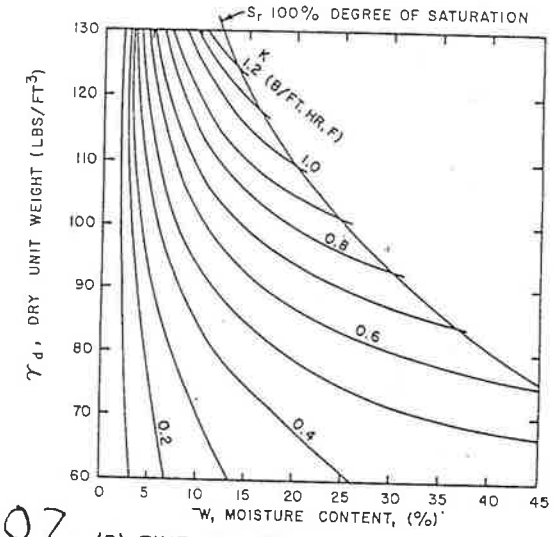
(B) FINE GRAINED SOILS – FROZEN

Figure 3–23 Thermal properties of soils. (After Kersten, 1949.)

For Fill granular borrow material to be used as backfill
assume w = 10% based on average of existing MC in upper 10'
estimated γ_d = 115 pcf



(A) COARSE GRAINED SOILS – UNFROZEN



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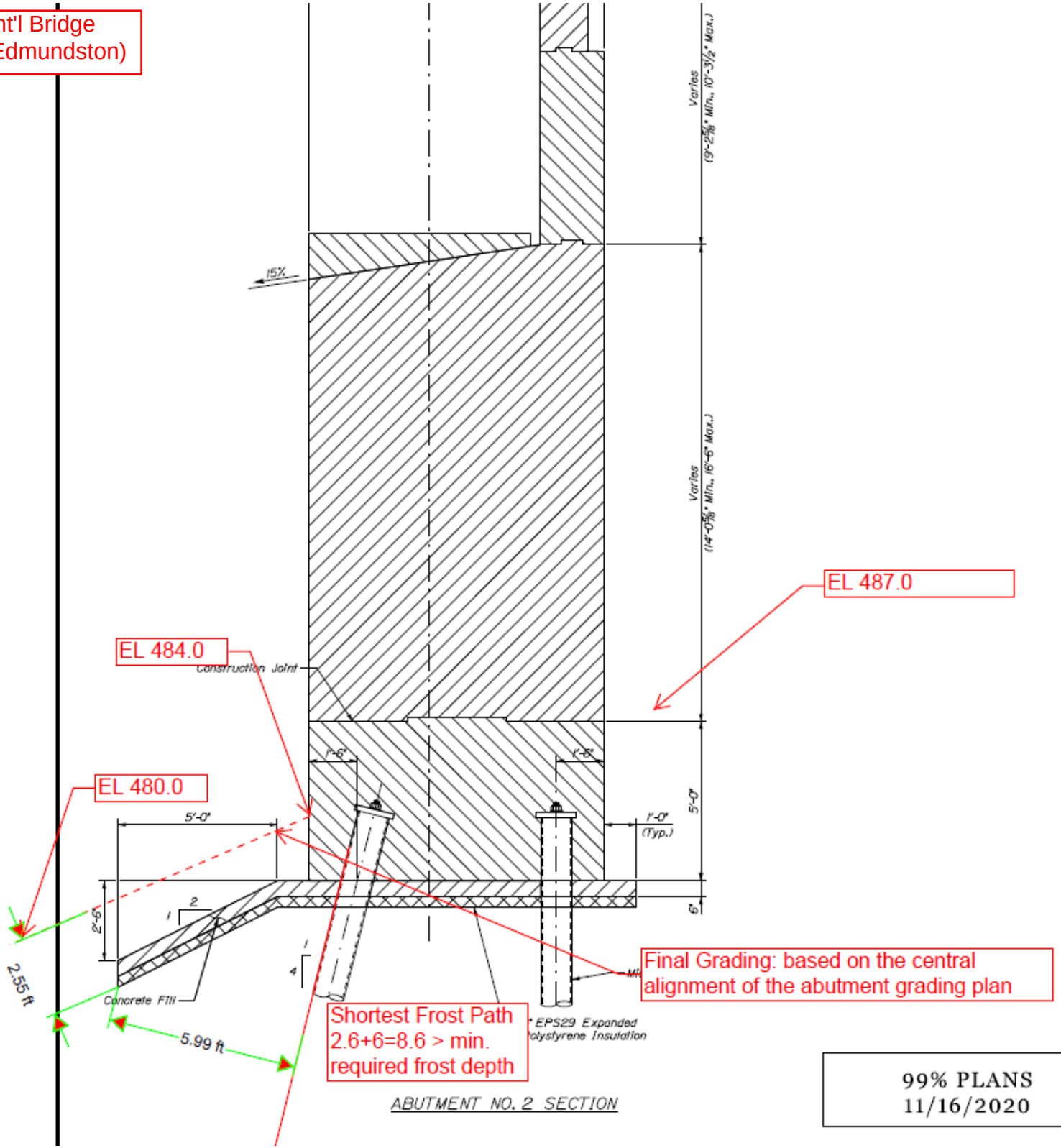
(B) FINE GRAINED SOILS – UNFROZEN

Figure 3–24 Thermal properties of soils. (After Kersten, 1949.)

Madawaska Int'l Bridge
Abutment 2 (Edmundston)



ABUTMENT NO. 2 SECTION

99% PLANS
11/16/2020