BRIDGE FOUNDATION INVESTIGATION REPORT (LRFD)

CR 153 (Cypress Lake Road) Over Dry Branch
Bulloch County, Georgia

PREPARED FOR:
Heath & Lineback Engineers, Inc.
2390 Canton Road
Marietta, Georgia 30066

County Project No. E15
NOVA Project No. 10102-2025112

March 4, 2026

NOVA
PROFESSIONAL | PRACTICAL | PROVEN

March 4, 2026

HEATH & LINEBACK ENGINEERS, INC.
2390 Canton Road
Marietta, Georgia 30066

Attention: Randy Boykin, PE, SE, CBI
Senior Structural Project Manager

Subject: Bridge Foundation Investigation Report (LRFD)
CR 153 (Cypress Lake Road) Over Dry Branch
Bulloch County, Georgia
County Project No. E15
NOVA Project No. 10102-2025112

Dear Mr. Boykin:

NOVA Engineering and Environmental, LLC (NOVA) has completed the referenced Bridge Foundation Investigation (BFI). The results of the Bridge Foundation Investigation with supporting documents are included with this letter. The Bridge Foundation Investigation was performed in general accordance with GDOT requirements as outlined in the GDOT OMAT Geotechnical Manual.

We appreciate being part of the Heath & Lineback Engineers, Inc. team for this important project. If you have questions, please contact us.

Thank you.

Sincerely,
NOVA Engineering and Environmental, LLC

Ezequiel Q. Segismundo, P.E.
Project Engineer
GA P.E. License No. 051012

Eric K. Tay, P.E.
Principal Engineer
GA P.E. License No. 022183

Bridge Foundation Investigation (LRFD)
CR 153 (Cypress Lake Road) Over Dry Branch
Bulloch County, Georgia
County Project No. E15
NOVA Project No 10102-2025112
March 4, 2026

LOCATION See attached Figures 1 and 2 in Appendix B for project site location and topographic map, respectively.

GENERAL INFORMATION

GEOLOGIC FORMATION Based on the Regional Geology Map, the site is underlain by Neogene Undifferentiated Formation of the Georgia Coastal Plain Region. See Figure 3 in Appendix B.

SUBSURFACE FEATURES The subsurface information was obtained from two NOVA soil test borings designated as B-01 and B-02. These test borings with Standard Penetration Testing (SPT) were performed on December 1, 2025, and December 2, 2025, and were drilled to approximated depths ranging from 110 to 116 feet below the existing grades (approximate elevations ranging from 39 to 33 feet). Test borings B-01 and B-02 were drilled from the asphalt roadway surface along CR 153 (Cypress Lake Road) and close to the proposed bridge replacement end Bents 1 and 4, respectively.

At the ground surface, approximately 4 inches of asphaltic concrete was encountered in test borings B-01 and B-02. Graded Aggregate Base (GAB) course material was not observed.

Below the surficial asphaltic concrete in test boring B-01 and B-02, existing fill soils described primarily as silty SAND and poorly graded SAND with silt were encountered to approximate depths of 5.5 feet below the existing grades (approximate elevation of 144 feet). The uncorrected SPT resistances ranged from 14 to 20 blows per foot (bpf).

Alluvial soils described primarily as silty SAND with uncorrected SPT resistance of 8 bpf was encountered below the existing fill soils in test boring B-02 to an approximate depth of 8 feet below the existing grade (approximate elevation of 141 feet).

Beneath the existing fill soils in test boring B-01 and beneath the alluvial soils in test boring B-02, coastal plain soils described primarily as sandy fat CLAY, poorly graded SAND with silt, silty SAND and clayey SAND were encountered to approximate depths ranging from 110 to 116 feet below the existing grades (approximate elevations ranging from 39 to 33 feet). The uncorrected SPT resistances ranged from Weight of Hammer (WOH) to 50 blows for 1 inch of penetration.

Auger refusal materials were encountered test borings B-01 and B-02 at approximate depths ranging from 110 to 116 feet below the existing grades (approximate elevations ranging from 39 to 33 feet). Auger refusal materials are very hard or very dense material which cannot be penetrated by a power auger.

Groundwater during drilling and after the completion of drilling were not recorded due to the presence of injected drilling fluids from mud rotary drilling method. The groundwater level after 24 hours of drilling completion was measured in test boring B-01 at an approximate depth of 9 feet below the existing ground surface (approximate elevation of 140 feet).

Upon completion of drilling and 24-hour groundwater measurement, soil cave-in was measured in test borings B-01 and B-02 at approximate depths ranging from 10 to 16 feet below the existing ground surface (approximate elevations ranging from 139 to 133 feet).

For additional information, see Appendix B for Figures 4-1 to 4-3 (Boring Location Plans), Appendix C for Subsurface Profiles, Test Boring Record Summary and Test Boring Records, and Appendix D for Laboratory Testing Results.

SITE CLASSIFICATION

We recommend a site class of **D** per AASHTO LRFD (9th Edition, 2020) 3.10.3.1.

1.0 – FOUNDATION RECOMMENDATIONS

Bents	Pile Bent (Type)
1 through 4	MS - Metal Shell (Fy = 45 ksi)

1.1 – PILE PROPERTIES

Pile Type	Pile Size (in)		Nominal Compression Stress (ksi)	Nominal Tension Stress (ksi)
	Diameter	Wall Thickness		
MS	18	0.3125	40.5	40.5
MS	24	0.5000	40.5	40.5

1.2 – DESIGN LOADS

Bents	Foundation Type	Maximum Factored Strength Limit State Load (kips)	Maximum Factored Service Limit State Load (kips)	Factored Extreme Event I Limit State Load (kips)
1	Pile End Bent	225	155	110
2	Pile Bent	315	240	265
3	Pile Bent	315	240	265
4	Pile End Bent	225	155	110

2.0 – FOUNDATION DESIGN

2.1 – PILE FOUNDATION DESIGN

Bents	Pile Type	Size (in)	Down Drag ** (kips)	Scour (kips)	Driving Resistance[1] * (kips)
1	MS	18	0	0	347
2	MS	24	-	36	521
3	MS	24	-	15	500
4	MS	18	0	0	347

Note[1]: Driving resistance is equivalent to pile capacity during construction. Post-construction pile capacity is reduced by the scour load if a 500-year scour event occurs.

3.0 – FOUNDATION ELEVATIONS

Bents	Reference Boring	Minimum Pile Tip (feet-NAVD 88)	Estimated Pile Tip (feet-NAVD 88)
1	B-01	113	101
2	B-01	113	101
3	B-02	101	101
4	B-02	101	101

4.0 – GENERAL NOTES

Elevations Control Point No. PNT #25004 (rebar with cap) located approximately at STA. 104+47.01, 27.44 ft. RT. with elevation of 143.95 feet-NAVD88 and coordinates at 32.393798° and -81.856093° was used in determining the existing grade elevations at locations of as-drilled test borings B-01 and B-02.

Waiting Period None required.

Staged Construction None required.

Theoretical Scour Appears feasible for the material encountered

As Built Foundation Information The as-built foundation information should be forwarded to the Bulloch County Engineering Department upon completion of the foundation system.

Special Problems The existing bridge has been closed to traffic due to sustained damage from a car accident. As such, test borings were not drilled at the proposed bridge replacement Bent 2 and 3 locations due to safety concerns.

Existing underground and overhead utilities were identified at and adjacent to the existing bridge and should be considered during construction to mitigate any potential conflicts and associated risks.

4.1 – PILE FOUNDATION NOTES

PDO Driving resistance after minimum tip elevations are achieved in conjunction with GDOT Standard Specification 520.3.05.D.2 and Special Provision 523 Dynamic Pile Testing. For this bridge, a total of three PDA tests will be required. Perform one PDA test each at Bent 1 right, Bent 2 left, and Bent 3 right.

*** Nominal Bearing Resistance of Single Pile** Driving resistance is based on the following field verification method and resistance factor φ_{dyn} AASHTO LRFD 2020 (10.5.5.2.3-1):

Resistance Determination Method	Resistance Factor
Driving criteria established by dynamic testing of at least two piles per site condition, but no less than 2% of the production piles.	0.65

****Downdrag** Downdrag is not anticipated for the piles at the end bents since these bents will be constructed after removing a section of the existing approach embankment. Also, downdrag is not anticipated at intermediate pile bents.

Drivability Drivability analyses have been completed for the piles at Bents 1 through 4 to their respective estimated tips using DELMAG D 30-23 hammer.

Freeze Bearing Piles should not be overdriven at this site. If dynamic bearing has not been achieved by 2 feet above the estimated tip elevation, pile driving should be stopped for a minimum of 24 hours and re-started with a warm hammer to check for freeze bearing.

Pile Protection All exposed MS piles should be painted with a 2P epoxy coating as protection against corrosion.

Metal Shell Piles Metal Shell piles are recommended for use at this site due to the potential for excessive pile length required for PSC piles. PSC piles that are too long are not easily handled or driven. In addition, hard driving is anticipated through dense soil layers and this presents potential problems of overstressing and cracking PSC piles. We also understand that MS piles were used as the foundation type for the nearby (approximately 0.5-mile East) CR 145 (Cypress Lake Road) Over Wateringhole Branch bridge.

Closure Plates Option 1 (friction pile) closure plates should be used on all metal shell piles.

Special Problems Erratic pile lengths can be expected.

5.0 – QA / QC

Prepared By: Ezequiel Q. Segismundo, P.E.
Project Engineer
GA P.E. License No. 051012

Naveen S. Thakur, P.E.
Principal Engineer
GA P.E. License No. 051185

Reviewed By: Daniel C. Brahana, P.E.
Principal Engineer
GA P.E. License No. 018053

Eric K. Tay. P.E.
Principal Engineer
GA P.E. License No. 022183

APPENDIX A

GDOT SPECIAL PROVISION

- Special Provision Section 523 – Dynamic Pile Testing (PDA)

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

SPECIAL PROVISION

CR 153 (Cypress Lake Road) Over Dry Branch
Bulloch County, Georgia
County Project No. E15

SECTION 523 - DYNAMIC PILE TESTING

523.1 General Description

The work consists of performing dynamic pile testing using the Pile Driving Analyzer (PDA) to monitor the driving of piles with accelerometer and strain gauges attached to the piles. Piles to be dynamically tested will be identified in the Special Provision or on the Plans. Prior to pile driving, the Engineer will determine production or test piles to be dynamically tested. Perform the dynamic pile testing in accordance with ASTM D4945-12.

Take dynamic measurements during driving of any required piles. Drive the pile as shown in the Special Provisions or on the Plans.

523.2 Materials

Furnish measuring instruments for dynamic pile testing. Attach instruments near the top of the piles with bolts placed in drilled holes. Furnish materials, labor and equipment necessary for installation of the instruments.

523.3 Construction Requirements

Measure wave speed prior to driving piles. Wave speed measurements will not be required for Steel H piles or metal shell piles. When wave speed measurements are performed, place the piles in a horizontal position not in contact with other piles.

Perform dynamic pile testing during driving. Modify the driving to reduce the stress and/or eliminate the damage, should the recommended stress level be exceeded or if damage occurs (determined visually or as indicated by the instrumentation).

Do not exceed the following maximum driving stresses, as determined by the dynamic pile testing:

1. For Steel piles:

   0.9 Fy, where Fy = Yield strength of steel

2. For Prestressed Concrete Piles:

   Compression:

   $\sigma_{dr} = (0.85f'_c - f_{pe})$

   Tension in Normal Environments:

   $\sigma_{dr} = (0.095\sqrt{f'_c} + f_{pe})$

   Tension in Severe Corrosive Environments:

   $\sigma_{dr} = \varphi_{da} f_{pe}$

   where;
   σ_{dr} = maximum allowed driving stress, ksi
   $f'c$= specified minimum 28-day compressive strength of concrete, ksi
   $f pe$= effective prestress in concrete, ksi, (after all losses) at the time of driving taken as 0.78 times the initial prestress force

Re-drive friction piles that do not obtain bearing after a freeze period of a minimum of 24 hours or for a period designated on the Plans, whichever is longer. Reset the gauges if required. Re-strike the pile with a warm hammer until a maximum penetration of 3 inches (76 mm) or 40 blows is reached, whichever occurs first. The Engineer may modify the Pile Driving Objective based on the results of the PDA work.

Provide two weeks' notice prior to the driving of designated piles and cooperate with the Engineer in connection with the performance of Dynamic Pile Testing.

Provide a complete report consisting of but not limited to PDA field monitoring data, results of CAPWAP computer analyses, and recommendations such as pile lengths, hammer fuel setting, and valid driving criteria. Valid driving criteria is defined as having the required hammer having a hammer set greater than 3 blows per inch and less than 10 blows per inch at the driving resistance for that pile. Submit the report electronically in PDF format and the electronic data files of the PDA analysis and CAPWAP to the Geotechnical Bureau and allow seven (7) calendar days for review and approval before proceeding with driving production piles.

523.4 Measurement

The Dynamic Pile Tests performed in accordance with these Specifications will be counted separately for payment. (Refer to plans summary sheet for the required amount of PDA testing.)

523.5 Payment

The Dynamic Pile Test completed and accepted will be paid for at the Contract unit Price. This payment will be full compensation for all costs of complying with this specification, including incidentals, additional work, and any delays incurred in conjunction therewith.

Payment will be made under:

Item No. 523. Dynamic Pile Test_____ . . . . . Per Each

APPENDIX B

FIGURES AND MAPS

- Figure 1 – Site Location Map
- Figure 2 – Topographic Map
- Figure 3 – Regional Geology Map
- Figures 4-1 to 4-3 – Boring Location Plans

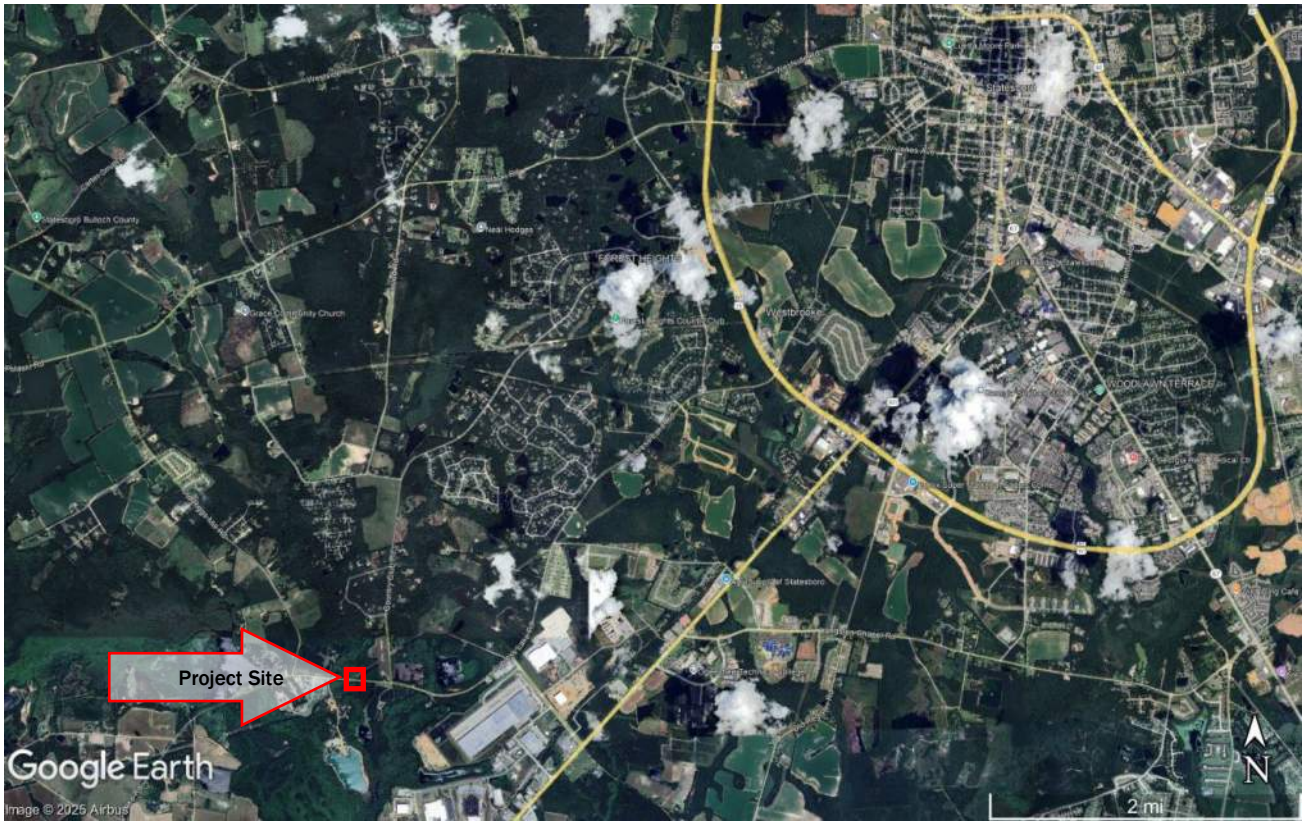

FIGURE 1 – SITE LOCATION MAP
SOURCE: Google Earth Aerial Photos
Date: Map Data @ 2025
SCALE: As Shown

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CR 153 (Cypress Lake Road)
Over Dry Branch
Bulloch County, Georgia
County Project No. E15
NOVA Project No. 10102-2025112

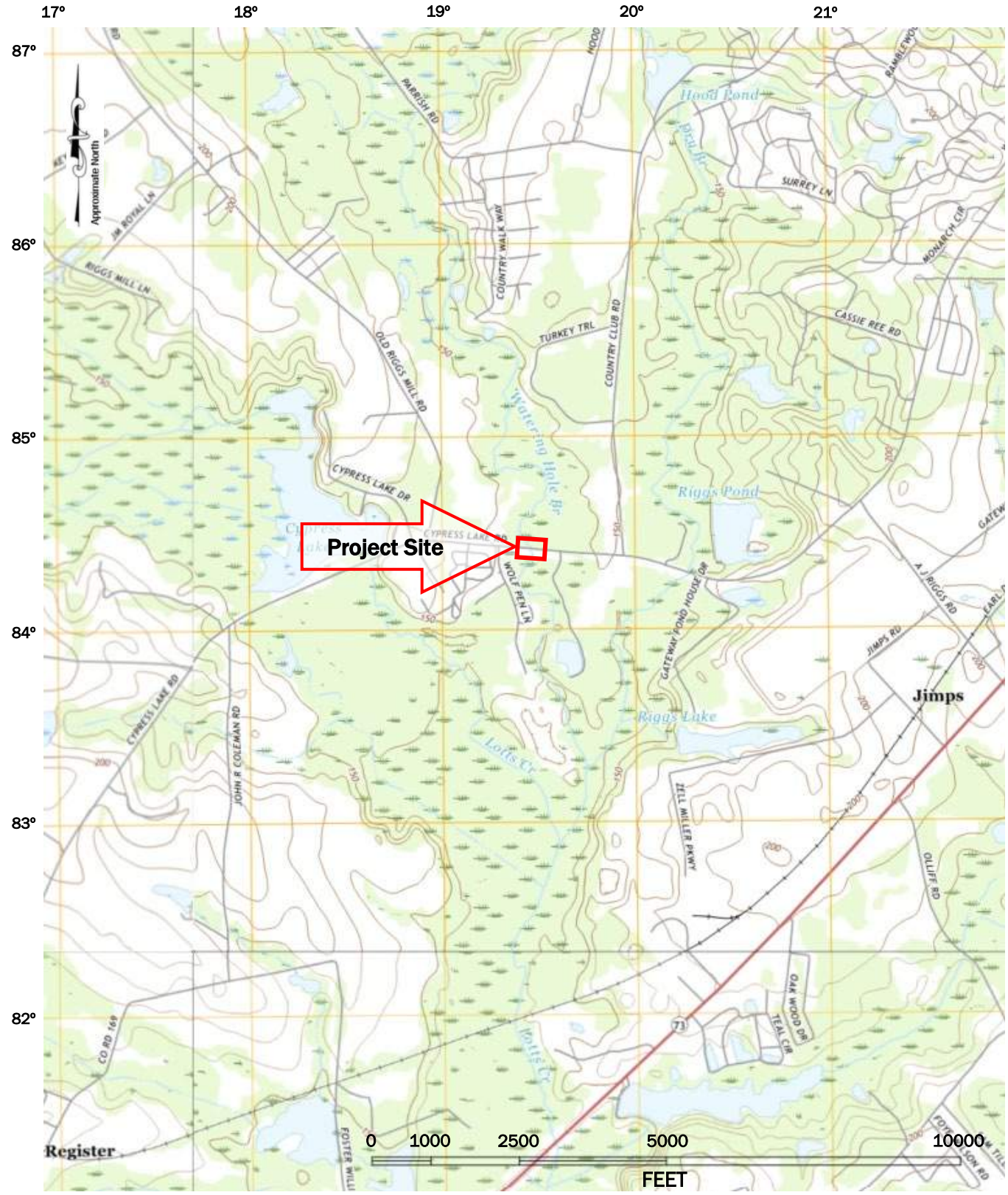

FIGURE 2 – TOPOGRAPHIC MAP
SOURCE: USGS National Map Advanced Viewer 7.5 Minute Topo
Nevils, Pulaski, Register & Statesboro GA 2020
Date Retrieved: 12/01/2025
SCALE: As Shown

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Bulloch County, Georgia
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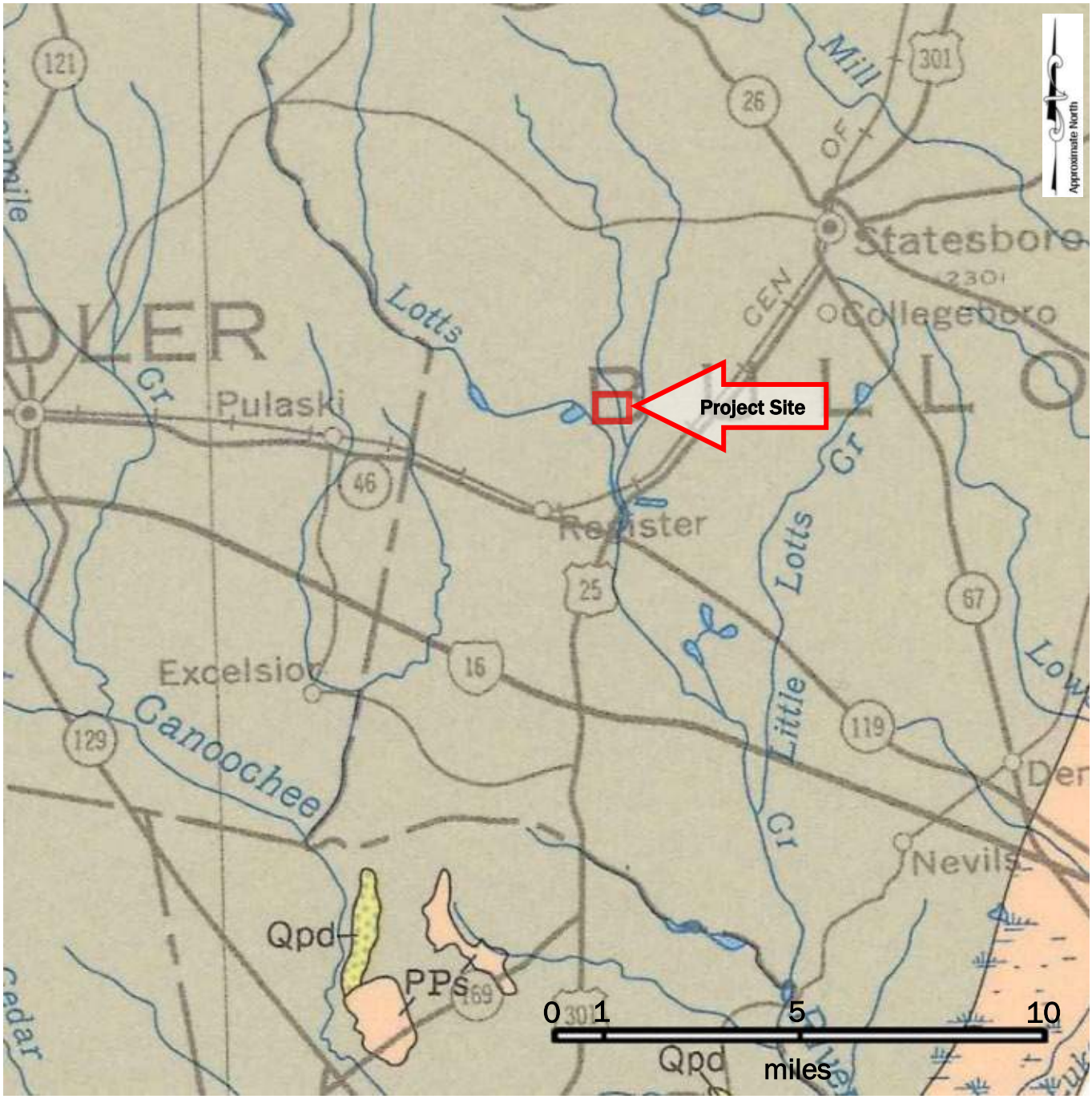

PPs — PLEISTOCENE-PLIOCENE SANDS AND GRAVELS

Nu — NEOGENE UNDIFFERENTIATED

Qpd / Qas — AEOLIAN SAND DEPOSTIS
parabolic dunes (Qpd)
formless deposits (Qas)

FIGURE 3 - REGIONAL GEOLOGY MAP
SOURCE: Geologic Map of Georgia, Georgia Department of Natural Resources, 1976
SCALE: As Shown

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CR 153 (Cypress Lake Road)
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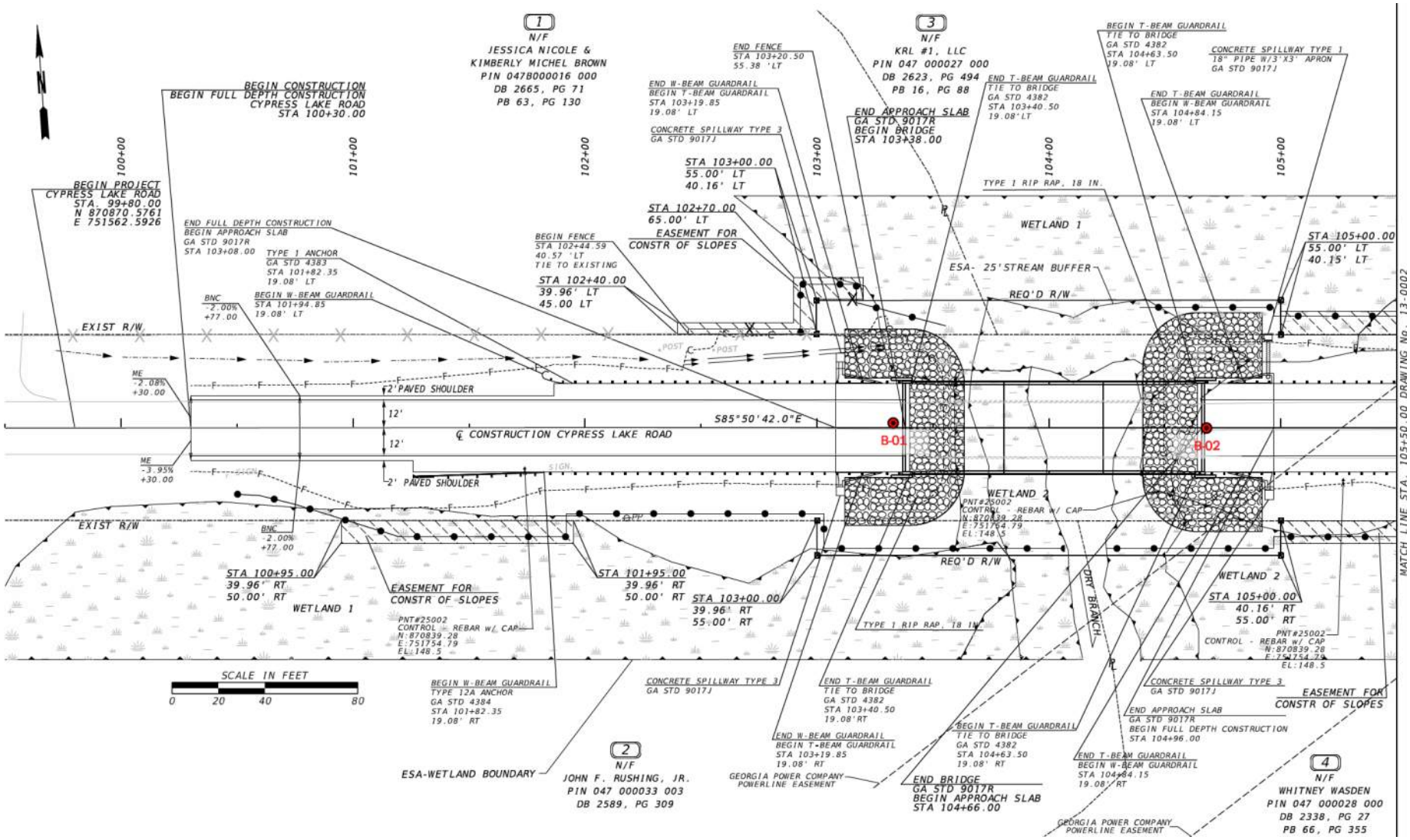

[redacted]

FIGURE 4-1 – BORING LOCATION PLANS
STA. 99+80.00 to STA. 105+50.00
SCALE: As Shown
PROVIDED BY: Heath & Lineback Engineers, Inc.
TITLE: Construction Plan (13-0001)
DATE: October 13, 2025

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CR 153 (Cypress Lake Road) Over Dry Branch
Bulloch County, Georgia
County Project No. E15
NOVA Project No. 10102-2025112

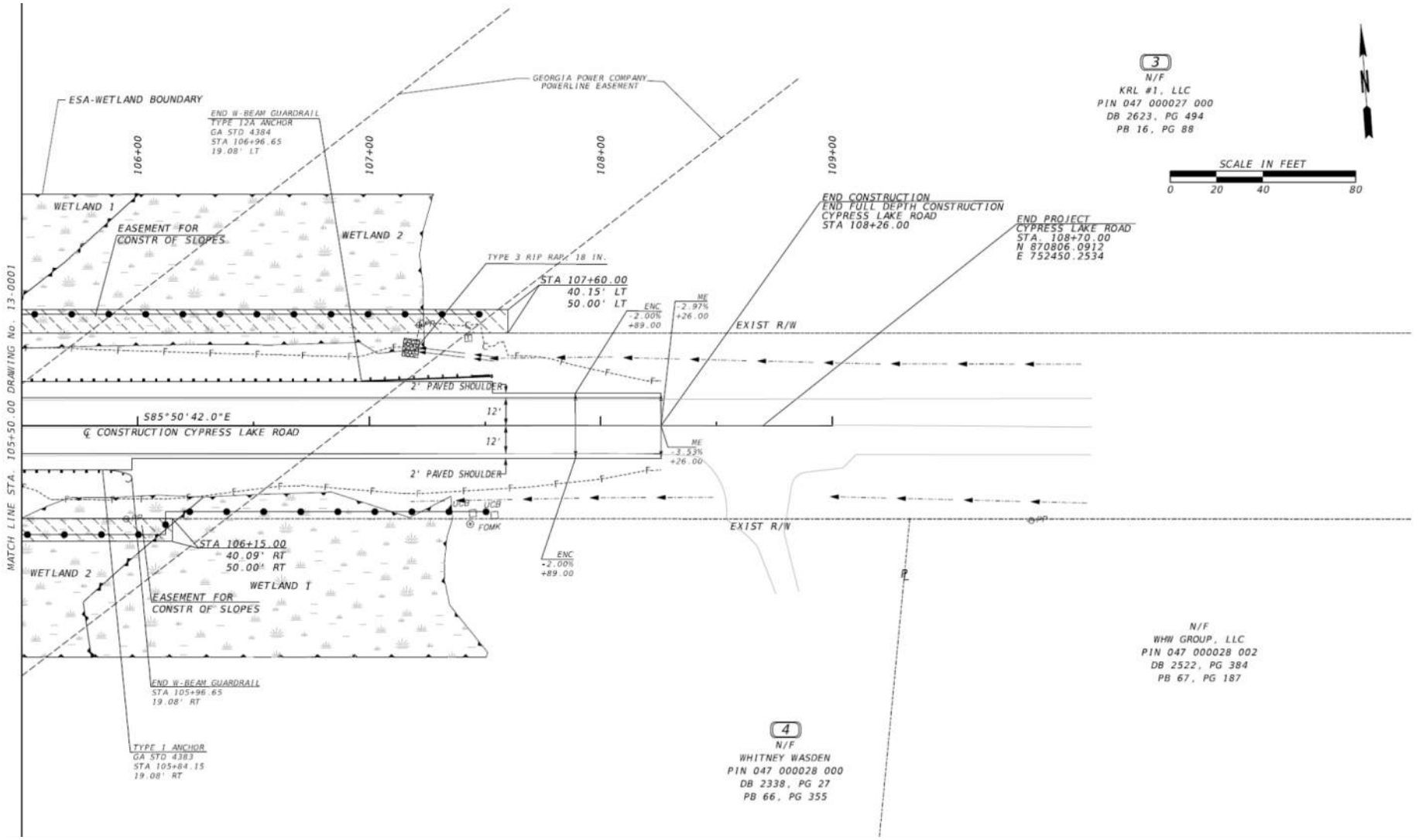

FIGURE 4-2 – BORING LOCATION PLANS
STA. 105+50.00 to STA. 108+70.00
SCALE: As Shown
PROVIDED BY: Heath & Lineback Engineers, Inc.
TITLE: Construction Plan (13-0002)
DATE: October 13, 2025

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CR 153 (Cypress Lake Road) Over Dry Branch
Bulloch County, Georgia
County Project No. E15
NOVA Project No. 10102-2025112

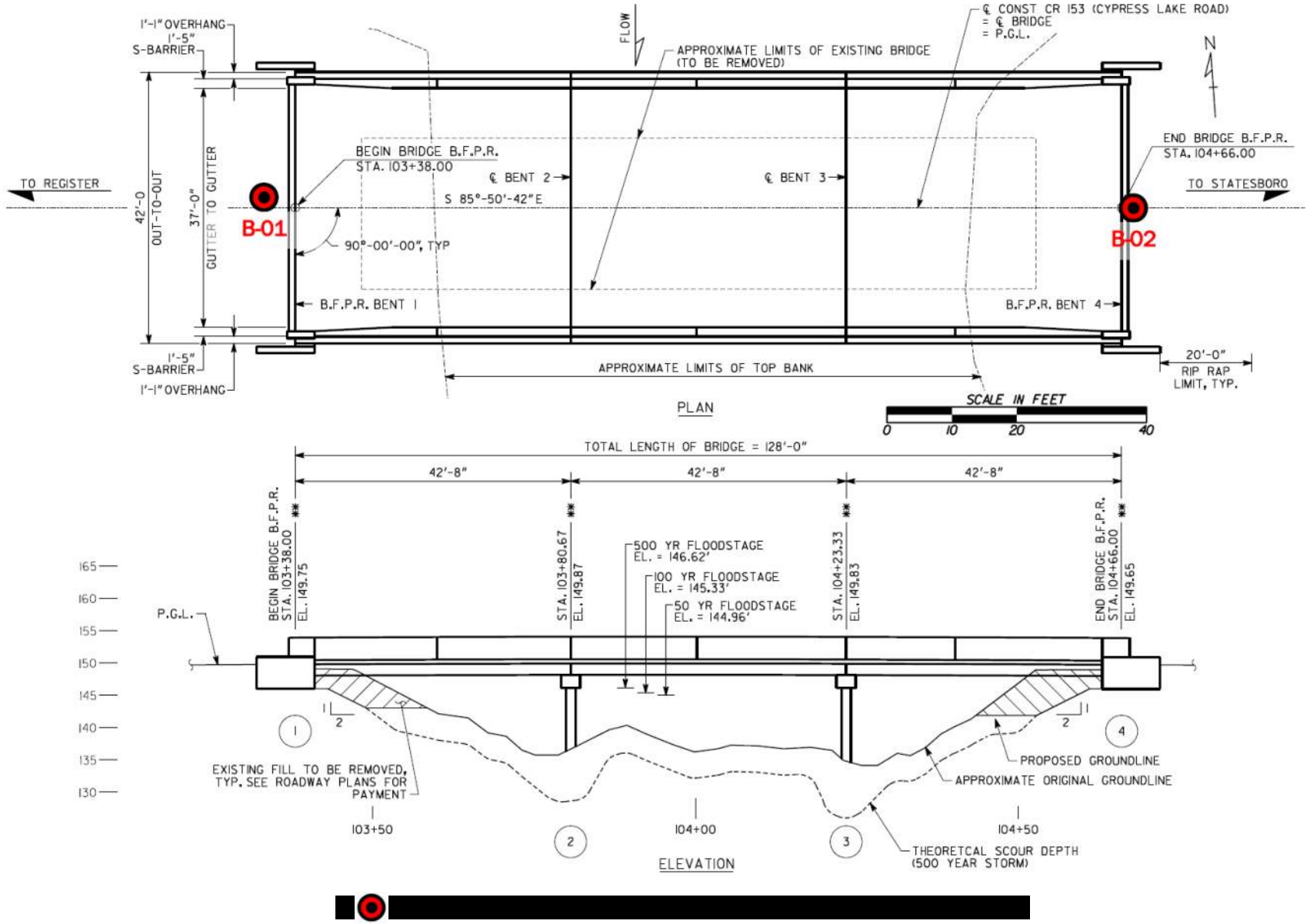

FIGURE 4-3 – BORING LOCATION PLANS
STA. 103+38.00 to STA. 104+66.00
SCALE: As Shown
PROVIDED BY: Heath & Lineback Engineers, Inc.
TITLE: Preliminary Layout (35-0001)
DATE: October 2025

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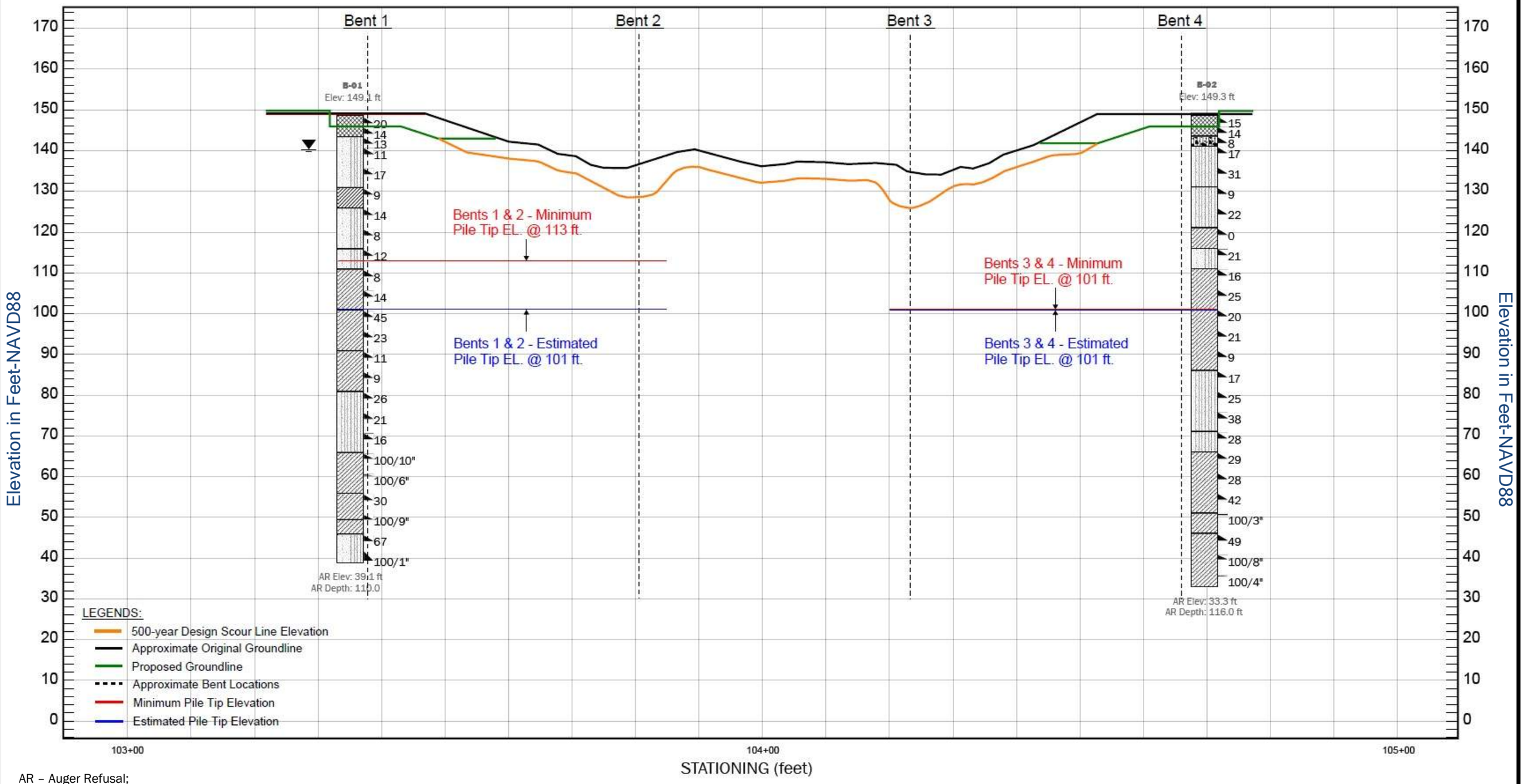
CR 153 (Cypress Lake Road) Over Dry Branch
Bulloch County, Georgia
County Project No. E15
NOVA Project No. 10102-2025112

APPENDIX C

SUBSURFACE DATA

- Subsurface Profile
- Test Boring Record Summary
- Key to Symbols and Classifications
- Test Boring Records



AR – Auger Refusal;

Paving
FILL
Alluvial Soils
clayey SAND (SC)
silty SAND (SM)
Poorly Graded SAND with silt (SP-SM)
FAT CLAY (CH)
Water table during drilling
Water table at boring completion
Depth to caving
Standard penetration test

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CR 153 (Cypress Lake Road) Over Dry Branch
Bulloch County, Georgia
County Project No. E15
NOVA Project No. 10102-2025112

TEST BORING RECORD SUMMARY

CR 153 (Cypress Lake Road) Over Dry Branch
Bridge Foundation Investigation
Bulloch County, Georgia
County Project No. E15
NOVA Project No. 10102-2025112

BORING NUMBER	EXISTING GROUND SURFACE ELEVATION (ft., NAVD88)	DEPTH TO GW * (ft.)	APPROXIMATE ELEVATION OF GW * (ft., NAVD88)	DEPTH TO FILL SOILS (ft.)	APPROXIMATE ELEVATION OF FILL (ft., NAVD88)	DEPTH TO ALLUVIAL SOILS (ft.)	APPROXIMATE ELEVATION OF ALLUVIUM (ft., NAVD88)	DEPTH TO COASTAL PLAIN SOILS (ft.)	APPROXIMATE ELEVATION OF COASTAL PLAIN (ft., NAVD88)	DEPTH TO AUGER REFUSAL (ft.)	APPROXIMATE ELEVATION OF AUGER REFUSA:L (ft., NAVD88)	DEPTH TO BORING TERMINATION (ft.)	APPROXIMATE ELEVATION OF BORING TERMINATION (ft., NAVD88)
B-01	149.1	9.0	140.1	0.3	148.8	N/E	--	5.5	143.6	110.0	39.1	110.0	39.1
B-02	149.3	N/M	--	0.3	149.0	5.5	143.8	8.0	141.3	116.0	33.3	116.0	33.3

Notes: Elevations and Depths should be considered as approximate; GW – Groundwater; N/M – Not Measured; N/E – Not Encountered;
* = measured groundwater readings and elevation after 24-hours;

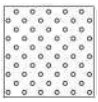
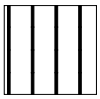
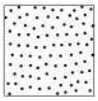
KEY TO SYMBOLS AND CLASSIFICATIONS

DRILLING SYMBOLS

	Standard Penetration Testing Sample
	Undisturbed Sample (UD)
	Auger without Sampling
	Rock Core Sample
	Bulk Sample
	Standard Penetration Resistance (ASTM D1586)
	Dynamic Cone Penetrometer (DCP) Resistance
	Water Table at least 24 Hours after drilling
	Water Table 1 Hour or less after drilling
50/2"	Number of Blows (50) to Drive the Spoon a Number of Inches (2)
NX, NQ	Core Barrel Sizes: 2⅛- and 2-Inch Diameter Rock Core, Respectively
REC	Percentage of Rock Core Recovered
RQD	Rock Quality Designation - Percentage of Recovered Core Segments 4 or more Inches Long
	Loss of Drilling Fluid
N/E	Not Encountered
N/M	Not Measured
C	Boring Cave-in Depth
WOH	Weight of Hammer

DRILLING PROCEDURES

Soil sampling and standard penetration testing performed in general accordance with ASTM D1586-18[e1]. The standard penetration resistance (N-value) is the number of blows of a 140-pound hammer falling 30 inches to drive a 2-inch O.D., 1.375-inch I.D. split-barrel sampler one foot. Core drilling performed in general accordance with ASTM D2113-14. The undisturbed sampling procedure is described by ASTM D1587-15. Unless other arrangements are made, NOVA will dispose of all soil and rock samples at the time of report submission.

 Paving	 Well Graded Sand - SW	 Silt - ML
 Gravel / Graded Aggregate Base	 Silty Sand - SM	 Elastic Silt - MH
 Fill	 Clayey Sand - SC	 Low Plasticity Clay - CL
 Topsoil	 Poorly graded silty, clayey sand - SM/SC	 High Plasticity Clay - CH
 Alluvium	 Clayey Sand and Gravel - SC/GC	 Partially Weathered Rock (PWR)
 Poorly Graded Sand - SP	 Silty Sand and Gravel - SM/GM	 Rock

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CORRELATION OF PENETRATION RESISTANCE WITH RELATIVE DENSITY AND CONSISTENCY

	Number of Blows, "N"	Approximate Relative Density
	0 – 4	Very Loose
	5 – 10	Loose
SANDS	11 – 30	Medium Dense
	31 – 50	Dense
	Over 50	Very Dense

	Number of Blows, "N"	Approximate Consistency
	0 – 2	Very Soft
	3 – 4	Soft
SILTS	5 – 8	Firm
and	9 – 15	Stiff
CLAYS	16 – 30	Very Stiff
	31 – 50	Hard
	Over 50	Very Hard

SOIL CLASSIFICATION CHART

COARSE GRAINED SOILS	**GRAVELS**	Clean Gravel less than 5% fines	GW	Well graded gravel
			GP	Poorly graded gravel
		Gravels with Fines more than 12% fines	GM	Silty gravel
			GC	Clayey gravel
	SANDS	Clean Sand less than 5% fines	SW	Well graded sand
			SP	Poorly graded sand
		Sands with Fines more than 12% fines	SM	Silty sand
			SC	Clayey sand
FINE GRAINED SOILS	**SILTS AND CLAYS** Liquid Limit less than 50	Inorganic	CL	Lean clay
			ML	Silt
		Organic	OL	Organic clay and silt
	SILTS AND CLAYS Liquid Limit 50 or more	Inorganic	CH	Fat clay
			MH	Elastic silt
		Organic	OH	Organic clay and silt
HIGHLY ORGANIC SOILS		Organic matter, dark color, organic odor	PT	Peat

PARTICLE SIZE IDENTIFICATION

GRAVELS	Coarse	¾ inch to 3 inches
	Fine	No. 4 to ¾ inch
SANDS	Coarse	No. 10 to No. 4
	Medium	No. 40 to No. 10
	Fine	No. 200 to No. 40
SILTS AND CLAYS		Passing No. 200

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NOVA ENGINEERING AND ENVIRONMENTAL

TEST BORING RECORD B-01

PROJECT NAME CR 153 (Cypress Lake Rd.) Over Dry Branch | **PROJECT NO.** 10102-2025112

CLIENT Heath & Lineback Engineers, Inc. (County Project No. E15) | **LATITUDE** 32.393901

PROJECT LOCATION Bulloch County, GA | **LONGITUDE** -81.856453

LOCATION STA. 103+33, 2 ft. LT. | **ELEVATION** 149.13' (NAVD88)

DRILLER Piedmont Environmental Drilling, Inc. (SN D50-442) | **LOGGED BY** J. Powser

DRILLING METHOD Mud Rotary - Auto | **% ENERGY** 84% | **DATE** 12/01/2025

DEPTH TO-WATER ▽ **INITIAL** N/M ▼ **AFTER 24 HOURS** 9' ○ **CAVING** 10'

Assumed No Scour at Bent 1

ELEVATION (ft)	DEPTH (ft)	MATERIAL DESCRIPTION	BLOW COUNTS (UNCORRECTED N-VALUE)
	0	ASPHALT: Approx. 4 inches	
145	0	FILL: Medium dense brown poorly graded SAND with silt (SP-SM)	6-10-10 (20)
	5		4-6-8 (14)
	5	COASTAL PLAIN: Medium dense light gray to brown poorly graded SAND with silt (SP-SM)	3-6-7 (13)
140			
	10		3-5-6 (11)
135			
	15		4-11-6 (17)
130		COASTAL PLAIN: Stiff gray medium to fine sandy FAT CLAY (CH)	2-4-5 (9)
	20		
125		COASTAL PLAIN: Medium dense to loose light gray brown poorly graded SAND with silt (SP-SM)	4-5-9 (14)
	25	Theoretical 500-year Scour EL. @ 128 feet (Bent 2)	
120			3-4-4 (8)
	30		
115		Medium dense gray poorly graded SAND with silt (SP-SM)	4-7-5 (12)
	35	Min. Depth of Pile Tip @ EL. 113 feet (Bents 1 & 2)	

● N-Value
Plastic/Liquid Limit (%)
▲ Moisture Content (%)
▫ Fines Content (%)

10 20 30 40 50 60 70 80 90

Notes: Boring elevation was determined with reference to PNT#25004 with elevation at 143.95 feet and located at STA. 104+47.01, 27.44 ft. RT.

This information pertains only to this boring and should not be interpreted as being indicative of the site.

NOVA ENGINEERING AND ENVIRONMENTAL

TEST BORING RECORD B-01

PROJECT NAME CR 153 (Cypress Lake Rd.) Over Dry Branch | **PROJECT NO.** 10102-2025112

CLIENT Heath & Lineback Engineers, Inc. (County Project No. E15) | **LATITUDE** 32.393901

PROJECT LOCATION Bulloch County, GA | **LONGITUDE** -81.856453

LOCATION STA. 103+33, 2 ft. LT. | **ELEVATION** 149.13' (NAVD88)

DRILLER Piedmont Environmental Drilling, Inc. (SN D50-442) | **LOGGED BY** J. Powser

DRILLING METHOD Mud Rotary - Auto | **% ENERGY** 84% | **DATE** 12/01/2025

DEPTH TO-WATER ▽ **INITIAL** N/M ▼ **AFTER 24 HOURS** 9' ◯ **CAVING** 10'

ELEVATION (ft)	DEPTH (ft)	MATERIAL DESCRIPTION	BLOW COUNTS (UNCORRECTED N-VALUE)
110	40	Medium dense gray poorly graded SAND with silt (SP-SM)	
		COASTAL PLAIN: Loose to medium dense gray green to yellowish gray fine clayey SAND (SC)	2-3-5 (8)
105	45		3-6-8 (14)
100	50	Dense to medium dense gray green fine clayey SAND (SC)	8-19-26 (45)
		Est. Depth of Pile Tip @ EL. 101 feet (Bents 1 & 2)	
95	55		8-10-13 (23)
90	60	Medium dense to loose gray brown fine clayey SAND (SC)	5-4-7 (11)
85	65	(No Recovery on SPT Sample taken at a depth of 63.5 to 65.0 feet)	2-4-5 (9)
80	70	COASTAL PLAIN: Medium dense gray silty medium to fine SAND (SM)	9-12-14 (26)
75			7-9-12 (21)

● N-Value
Plastic/Liquid Limit (%)
▲ Moisture Content (%)
▫ Fines Content (%)

10 20 30 40 50 60 70 80 90

Notes: Boring elevation was determined with reference to PNT#25004 with elevation at 143.95 feet and located at STA. 104+47.01, 27.44 ft. RT.

This information pertains only to this boring and should not be interpreted as being indicative of the site.

NOVA ENGINEERING AND ENVIRONMENTAL

TEST BORING RECORD B-01

PROJECT NAME CR 153 (Cypress Lake Rd.) Over Dry Branch **PROJECT NO.** 10102-2025112

CLIENT Heath & Lineback Engineers, Inc. (County Project No. E15) **LATITUDE** 32.393901

PROJECT LOCATION Bulloch County, GA **LONGITUDE** -81.856453

LOCATION STA. 103+33, 2 ft. LT. **ELEVATION** 149.13' (NAVD88)

DRILLER Piedmont Environmental Drilling, Inc. (SN D50-442) **LOGGED BY** J. Powser

DRILLING METHOD Mud Rotary - Auto **% ENERGY** 84% **DATE** 12/01/2025

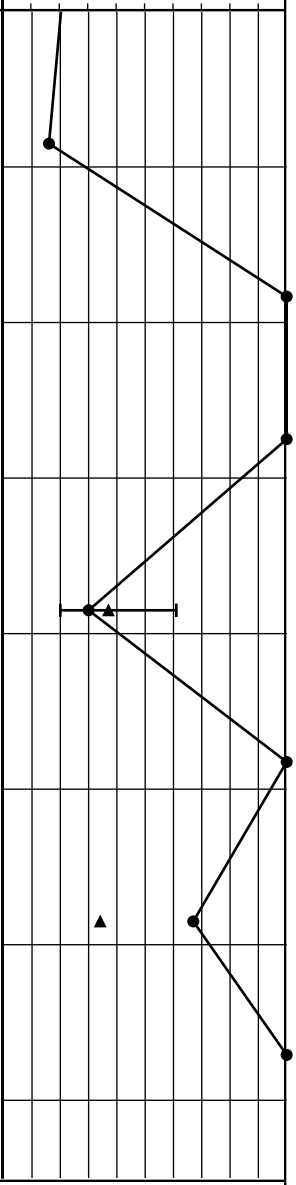
DEPTH TO-WATER ▽ **INITIAL** N/M ▼ **AFTER 24 HOURS** 9' ○ **CAVING** 10'

ELEVATION (ft)	DEPTH (ft)	MATERIAL DESCRIPTION	BLOW COUNTS (UNCORRECTED N-VALUE)
70	80	COASTAL PLAIN: Medium dense gray silty medium to fine SAND (SM)	4-6-10 (16)
65	85	COASTAL PLAIN: Very dense gray brown clayey medium to fine SAND (SC)	20-30-50/4"
60	90		50/6"
55	95	Medium dense gray fine clayey SAND (SC)	10-14-16 (30)
50	100	Very dense gray brown fine clayey SAND (SC)	13-20-50/3"
45	105	COASTAL PLAIN: Very dense gray poorly graded clayey SAND with silt (SP-SM)	17-25-42 (67)
40	110	Auger Refusal at 110 ft.	50/1"

GRAPHIC LOG | WATER LEVELS (ft) | SAMPLE TYPE

● N-Value
Plastic/Liquid Limit (%)
▲ Moisture Content (%)
▫ Fines Content (%)

10 20 30 40 50 60 70 80 90



Notes: Boring elevation was determined with reference to PNT#25004 with elevation at 143.95 feet and located at STA. 104+47.01, 27.44 ft. RT.

This information pertains only to this boring and should not be interpreted as being indicative of the site.

NOVA ENGINEERING AND ENVIRONMENTAL

TEST BORING RECORD B-02

PROJECT NAME CR 153 (Cypress Lake Rd.) Over Dry Branch | **PROJECT NO.** 10102-2025112

CLIENT Heath & Lineback Engineers, Inc. (County Project No. E15) | **LATITUDE** 32.393868

PROJECT LOCATION Bulloch County, GA | **LONGITUDE** -81.856018

LOCATION STA. 104+68, CL. | **ELEVATION** 149.29' (NAVD88)

DRILLER Piedmont Environmental Drilling, Inc. (SN D50-442) | **LOGGED BY** J. Powser

DRILLING METHOD Mud Rotary - Auto | **% ENERGY** 84% | **DATE** 12/02/2025

DEPTH TO-WATER ▽ **INITIAL** N/M ▼ **AFTER 24 HOURS** N/M ◯ **CAVING** 16'

Assumed No Scour at Bent 4

ELEVATION (ft)	DEPTH (ft)	MATERIAL DESCRIPTION	BLOW COUNTS (UNCORRECTED N-VALUE)
145	0	ASPHALT: Approx. 4 inches	
		FILL: Medium dense reddish brown to gray brown silty medium to fine SAND (SM)	5-7-8 (15)
	5		4-5-9 (14)
		ALLUVIUM: Loose brownish gray silty medium to fine SAND (SM) with organic odor	2-3-5 (8)
140		COASTAL PLAIN: Medium dense to dense light gray silty medium to fine SAND (SM)	5-8-9 (17)
	10		
135			8-16-15 (31)
	15		
130		Loose to medium dense light gray silty medium to fine SAND (SM)	4-5-4 (9)
	20		
		Theoretical 500-year Scour EL. @ 126 feet (Bent 3)	
125			7-10-12 (22)
	25		
120		COASTAL PLAIN: Very loose light gray clayey fine SAND (SC)	WOH-WOH WOH (0)
	30		
115		COASTAL PLAIN: Medium dense gray poorly graded SAND with silt (SP-SM)	4-7-14 (21)
	35		

GRAPHIC LOG | WATER LEVELS (ft) | SAMPLE TYPE

● N-Value
Plastic/Liquid Limit (%)
▲ Moisture Content (%)
▫ Fines Content (%)

10 20 30 40 50 60 70 80 90

Notes: Boring elevation was determined with reference to PNT#25004 with elevation at 143.95 feet and located at STA. 104+47.01, 27.44 ft. RT.

NOVA ENGINEERING AND ENVIRONMENTAL

TEST BORING RECORD B-02

PROJECT NAME CR 153 (Cypress Lake Rd.) Over Dry Branch | **PROJECT NO.** 10102-2025112

CLIENT Heath & Lineback Engineers, Inc. (County Project No. E15) | **LATITUDE** 32.393868

PROJECT LOCATION Bulloch County, GA | **LONGITUDE** -81.856018

LOCATION STA. 104+68, CL. | **ELEVATION** 149.29' (NAVD88)

DRILLER Piedmont Environmental Drilling, Inc. (SN D50-442) | **LOGGED BY** J. Powser

DRILLING METHOD Mud Rotary - Auto | **% ENERGY** 84% | **DATE** 12/02/2025

DEPTH TO-WATER ▽ **INITIAL** N/M | ▼ **AFTER 24 HOURS** N/M | ◯ **CAVING** 16'

ELEVATION (ft)	DEPTH (ft)	MATERIAL DESCRIPTION	BLOW COUNTS (UNCORRECTED N-VALUE)
110	40	COASTAL PLAIN: Medium dense gray poorly graded SAND with silt (SP-SM)	6-8-8 (16)
		COASTAL PLAIN: Medium dense to loose green gray to light gray clayey fine SAND (SC)	
105	45		6-10-15 (25)
		Min. Depth of Pile Tip @ EL. 101 feet (Bents 3 & 4)	
100	50	Est. Depth of Pile Tip @ EL. 101 feet (Bents 3 & 4)	4-8-12 (20)
95	55		4-10-11 (21)
90	60		4-4-5 (9)
85	65	COASTAL PLAIN: Medium dense to dense gray silty medium to fine SAND (SM)	5-8-9 (17)
80	70		8-12-13 (25)
75			12-18-20 (38)

GRAPHIC LOG | WATER LEVELS (ft) | SAMPLE TYPE

● N-Value
Plastic/Liquid Limit (%)
▲ Moisture Content (%)
▫ Fines Content (%)

10 20 30 40 50 60 70 80 90

Notes: Boring elevation was determined with reference to PNT#25004 with elevation at 143.95 feet and located at STA. 104+47.01, 27.44 ft. RT.

NOVA ENGINEERING AND ENVIRONMENTAL

TEST BORING RECORD B-02

PROJECT NAME CR 153 (Cypress Lake Rd.) Over Dry Branch **PROJECT NO.** 10102-2025112

CLIENT Heath & Lineback Engineers, Inc. (County Project No. E15) **LATITUDE** 32.393868

PROJECT LOCATION Bulloch County, GA **LONGITUDE** -81.856018

LOCATION STA. 104+68, CL. **ELEVATION** 149.29' (NAVD88)

DRILLER Piedmont Environmental Drilling, Inc. (SN D50-442) **LOGGED BY** J. Powser

DRILLING METHOD Mud Rotary - Auto **% ENERGY** 84% **DATE** 12/02/2025

DEPTH TO-WATER ▽ **INITIAL** N/M ▼ **AFTER 24 HOURS** N/M ○ **CAVING** 16'

ELEVATION (ft)	DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS (UNCORRECTED N-VALUE)
70	80	COASTAL PLAIN: Medium dense to dense gray silty medium to fine SAND (SM)		
		Medium dense gray silty medium to fine SAND (SM)		4-18-10 (28)
65	85	COASTAL PLAIN: Medium dense to dense gray clayey fine SAND (SC)		4-12-17 (29)
60	90			8-12-16 (28)
55	95			8-16-26 (42)
50	100	Very dense gray brown clayey fine SAND (SC)		50/3"
45	105	Dense to very dense gray to green gray clayey fine SAND (SC)		13-19-30 (49)
40	110			17-32-50/2"

● N-Value
Plastic/Liquid Limit (%)
▲ Moisture Content (%)
▫ Fines Content (%)

10 20 30 40 50 60 70 80 90

Notes: Boring elevation was determined with reference to PNT#25004 with elevation at 143.95 feet and located at STA. 104+47.01, 27.44 ft. RT.

This information pertains only to this boring and should not be interpreted as being indicative of the site.

NOVA ENGINEERING AND ENVIRONMENTAL

TEST BORING RECORD B-02

PROJECT NAME CR 153 (Cypress Lake Rd.) Over Dry Branch **PROJECT NO.** 10102-2025112

CLIENT Heath & Lineback Engineers, Inc. (County Project No. E15) **LATITUDE** 32.393868

PROJECT LOCATION Bulloch County, GA **LONGITUDE** -81.856018

LOCATION STA. 104+68, CL. **ELEVATION** 149.29' (NAVD88)

DRILLER Piedmont Environmental Drilling, Inc. (SN D50-442) **LOGGED BY** J. Powser

DRILLING METHOD Mud Rotary - Auto **% ENERGY** 84% **DATE** 12/02/2025

DEPTH TO-WATER ▽ **INITIAL** N/M ▼ **AFTER 24 HOURS** N/M ○ **CAVING** 16'

ELEVATION (ft)	DEPTH (ft)	MATERIAL DESCRIPTION	GRAPHIC LOG	WATER LEVELS (ft)	SAMPLE TYPE	BLOW COUNTS (UNCORRECTED N-VALUE)
35	115	Dense to very dense gray to green gray clayey fine SAND (SC)			◪	50/4"
		Auger Refusal at 116 ft.				
30	120					
25	125					
20	130					
15	135					
10	140					
5	145					
0						

● N-Value
Plastic/Liquid Limit (%)
▲ Moisture Content (%)
▫ Fines Content (%)

10 20 30 40 50 60 70 80 90

Notes: Boring elevation was determined with reference to PNT#25004 with elevation at 143.95 feet and located at STA. 104+47.01, 27.44 ft. RT.

APPENDIX D

LABORATORY TESTING RESULTS

- Laboratory Testing Summary
- Atterberg Limits and Mechanical Sieve Analysis Results

LABORATORY TESTING SUMMARY

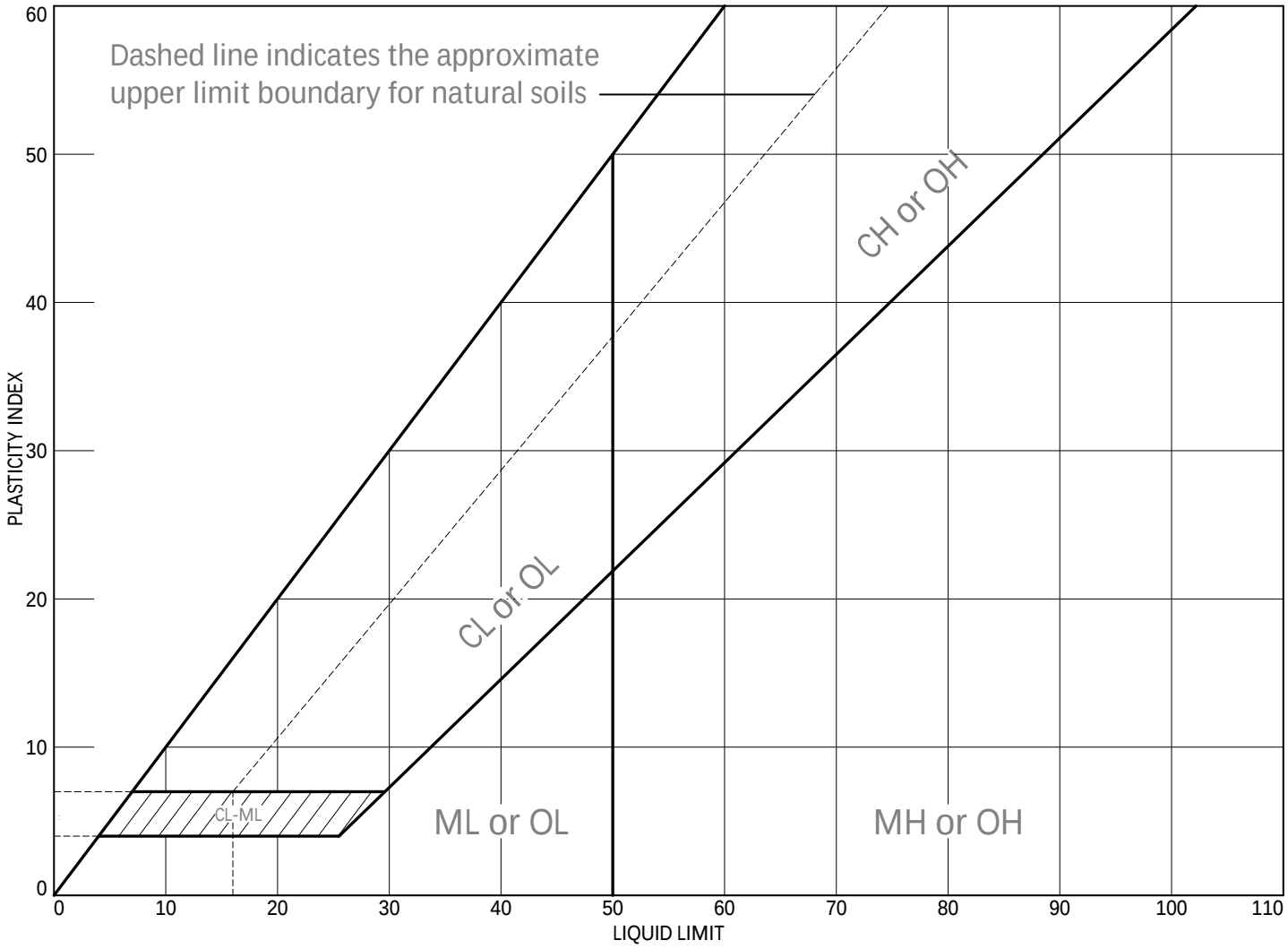
CR 153 (Cypress Lake Rd.) Over Dry Branch
Bridge Foundation Investigation
Bulloch County, Georgia
County Project No. E15
NOVA Project No. 10102-2025112

MECHANICAL SIEVE ANALYSES AND ATTERBERG LIMITS TEST RESULTS

BORING NO./ SAMPLE TYPE	SAMPLE DEPTH (ft.)	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	PLASTICITY INDEX (%)	PERCENT FINER #40	PERCENT FINER #200	USCS CLASSIFICATION	MOISTURE CONTENT (%)
B-01/SS	3.5 - 5.0	NP	NP	NP	75.2	8.8	SP-SM	4.7
	18.5 - 20.0	74	18	56	85.8	62.9	CH	56.1
	43.5 - 45.0	41	19	22	98.2	35.9	SC	27.0
	58.5 - 60.0	33	17	16	95.5	34.0	SC	26.3
	73.5 - 75.0	NP	NP	NP	94.1	13.8	SM	31.4
	93.5 - 95.0	61	20	41	99.7	46.6	SC	37.0
	103.5 - 105.0	NP	NP	NP	99.4	9.5	SP-SM	24.1
B-02/SS	1.0 - 2.5	NP	NP	NP	82.4	16.8	SM	8.6
	6.0 - 7.5	NP	NP	NP	92.3	13.3	SM	23.3
	18.5 - 20.0	NP	NP	NP	76.5	13.5	SM	25.6
	28.5 - 30.0	42	17	25	96.4	28.9	SC	39.4
	48.5 - 50.0	36	17	19	99.7	46.7	SC	26.0
	58.5 - 60.0	44	20	24	99.1	37.3	SC	36.7
	73.5 - 75.0	NP	NP	NP	82.8	12.2	SM	27.1
	93.5 - 95.0	48	20	28	96.8	37.8	SC	32.2
	103.5 - 105.0	30	18	12	99.0	27.4	SC	22.0

Note: "NP" denotes the material as "Non-Plastic"; SS - Split Spoon Sample;

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Brown poorly graded SAND with silt	NP	NP	NP	75.2	8.8	SP-SM

Project No. 10102-2025112 Client: Heath & Lineback Engineers, Inc.

Project: CR 153 (Cypress Lake Rd.) Over Dry Branch

●Source of Sample: B-01 Depth: 3.5-5.0 ft. Sample Number: 2

Remarks:

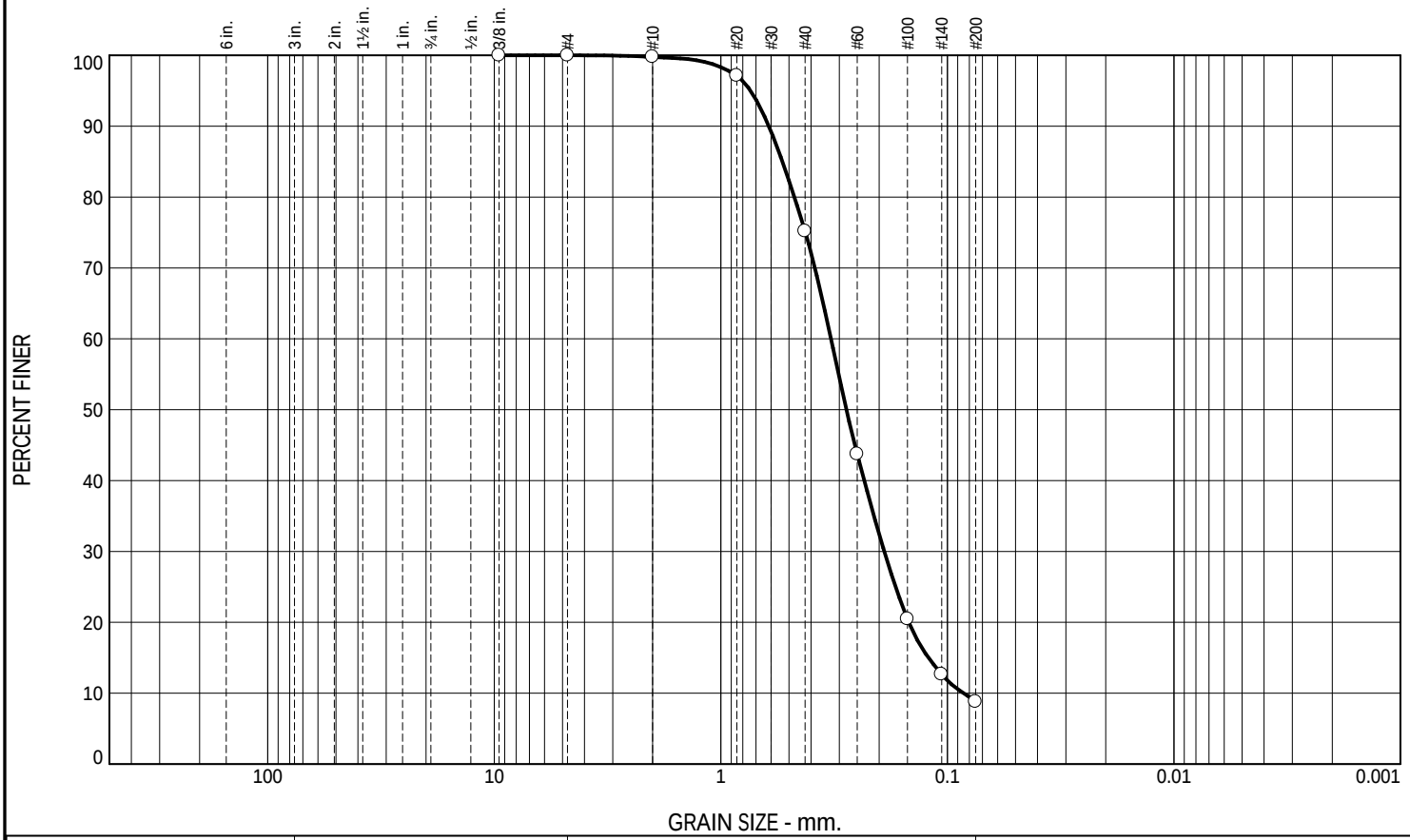
NOVA ENGINEERING
Kennesaw, Georgia
770-425-0777

Date Tested 12/29/25

Tested By: GH Checked By: MLS

Particle Size Distribution Report

ASTM D6913



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.2	24.6	66.4	8.8	

Test Results (ASTM D6913)

Sieve Size or Diam. (mm.)	Finer (%)	Spec.* (%)	Out of Spec. (%)	Pct. of Fines
3/8	100.0			
#4	100.0			
#10	99.8			
#20	97.1			
#40	75.2			
#60	43.7			
#100	20.4			
#140	12.7			
#200	8.8			

* (no specification provided)

Material Description

Brown poorly graded SAND with silt

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{90}= 0.6140 D_{85}= 0.5346 D_{60}= 0.3264
D_{50}= 0.2790 D_{30}= 0.1899 D_{15}= 0.1212
D_{10}= 0.0848 C_u= 3.85 C_c= 1.30

Classification

USCS= SP-SM AASHTO= A-3

Test Remarks

NMC = 4.7%

Source of Sample: B-01 Depth: 3.5-5.0 ft.
Sample Number: 2 Sample Date:

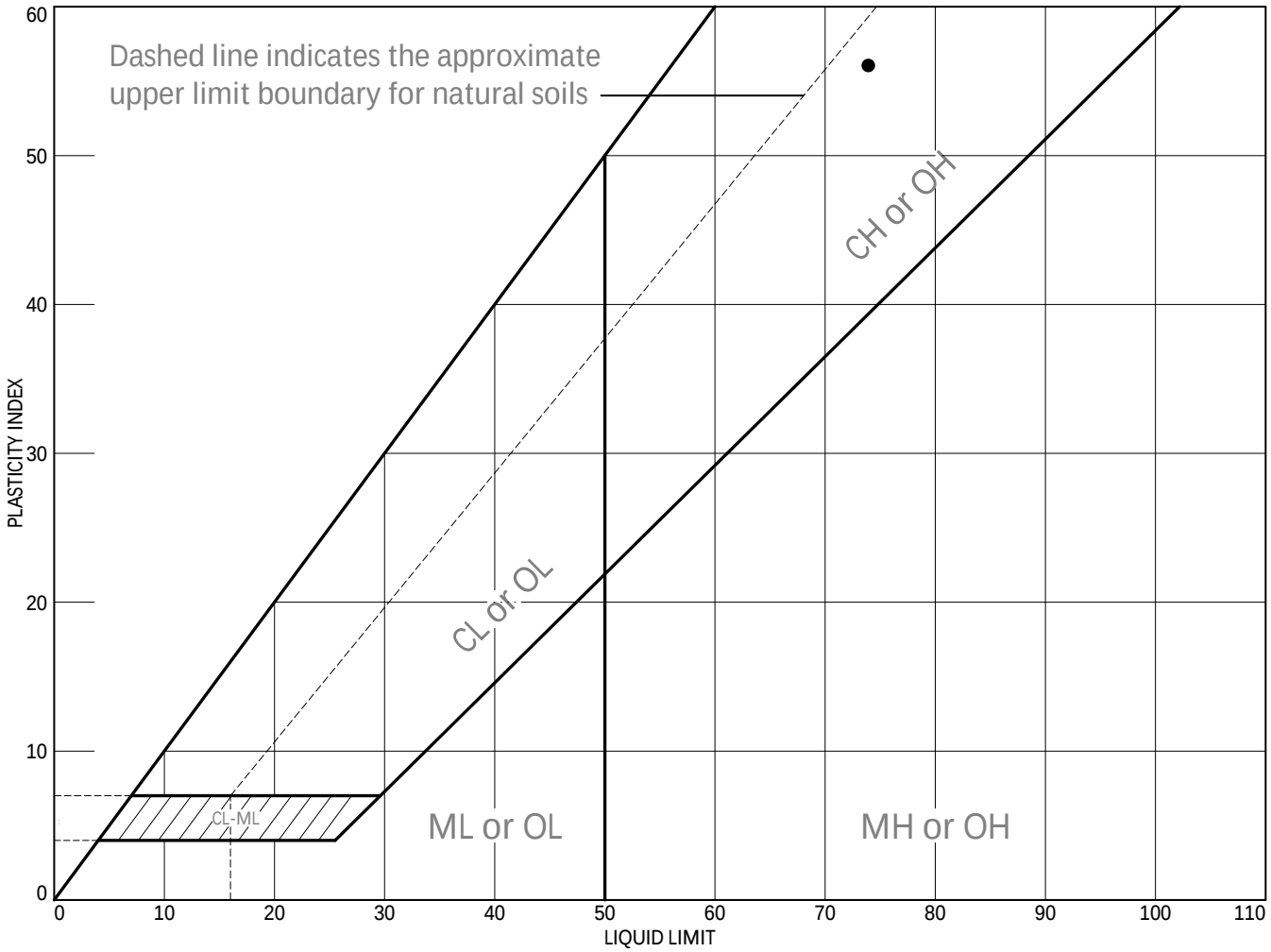
NOVA ENGINEERING
Kennesaw, Georgia
770-425-0777

Client: Heath & Lineback Engineers, Inc.
Project: CR 153 (Cypress Lake Rd.) Over Dry Branch

Project No: 10102-2025112 Date Tested 12/18/25

Tested By: LY Checked By: MLS

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray medium to fine sandy fat CLAY	74	18	56	85.8	62.9	CH

Project No. 10102-2025112 Client: Heath & Lineback Engineers, Inc.

Project: CR 153 (Cypress Lake Rd.) Over Dry Branch

●Source of Sample: B-01 Depth: 18.5-20.0 ft. Sample Number: 6

Remarks:

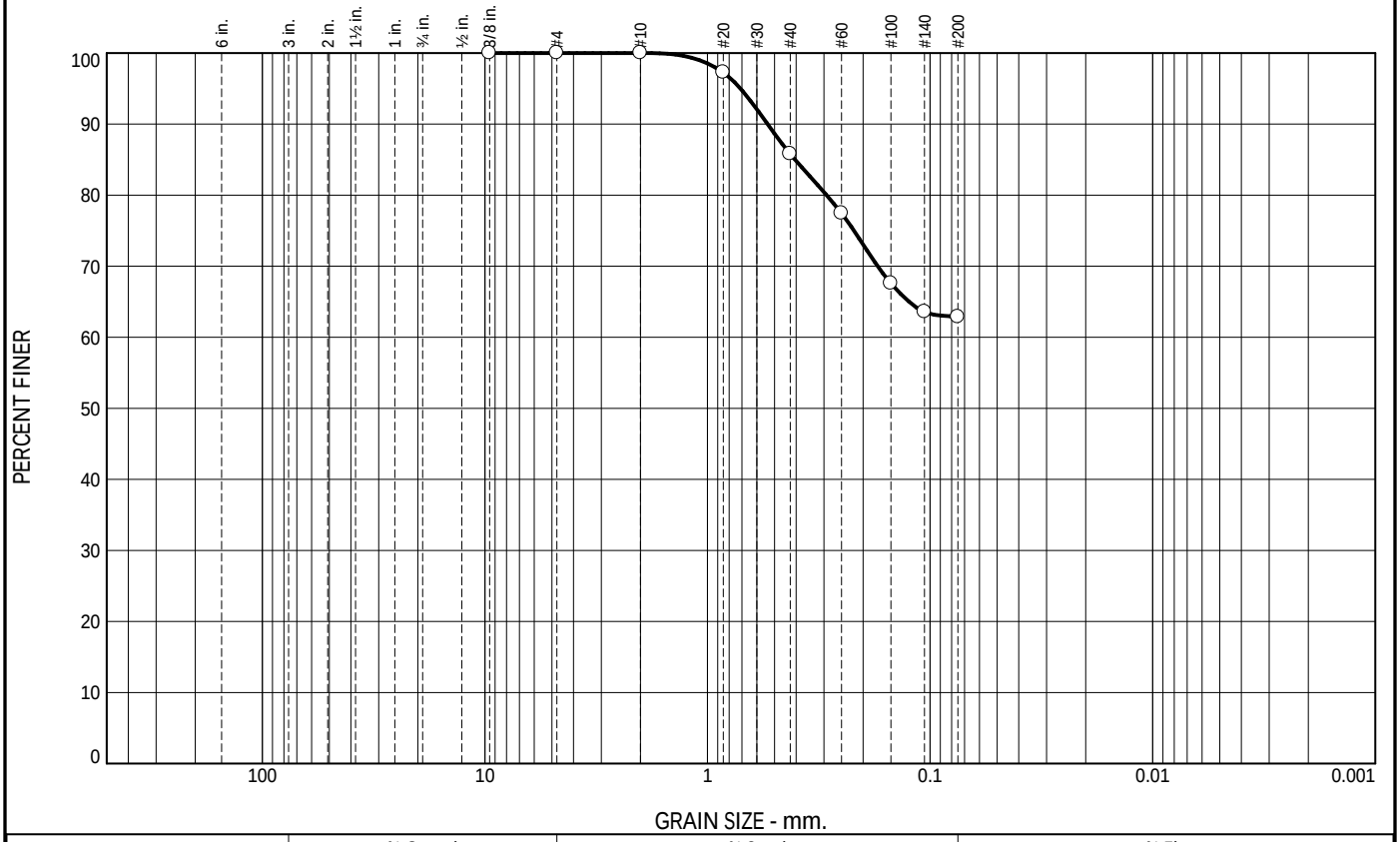
NOVA ENGINEERING
Kennesaw, Georgia
770-425-0777

Date Tested 12/27/25

Tested By: GH Checked By: MLS

Particle Size Distribution Report

ASTM D6913



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	14.2	22.9	62.9	

Test Results (ASTM D6913)

Sieve Size or Diam. (mm.)	Finer (%)	Spec.* (%)	Out of Spec. (%)	Pct. of Fines
3/8	100.0			
#4	100.0			
#10	100.0			
#20	97.3			
#40	85.8			
#60	77.4			
#100	67.6			
#140	63.6			
#200	62.9			

* (no specification provided)

Material Description

Gray medium to fine sandy fat CLAY

Atterberg Limits

PL= 18 LL= 74 PI= 56

Coefficients

D_{90}= 0.5370 D_{85}= 0.4042 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CH AASHTO= A-7-6(32)

Test Remarks

NMC = 56.1%

Source of Sample: B-01 Depth: 18.5-20.0 ft.
Sample Number: 6 Sample Date:

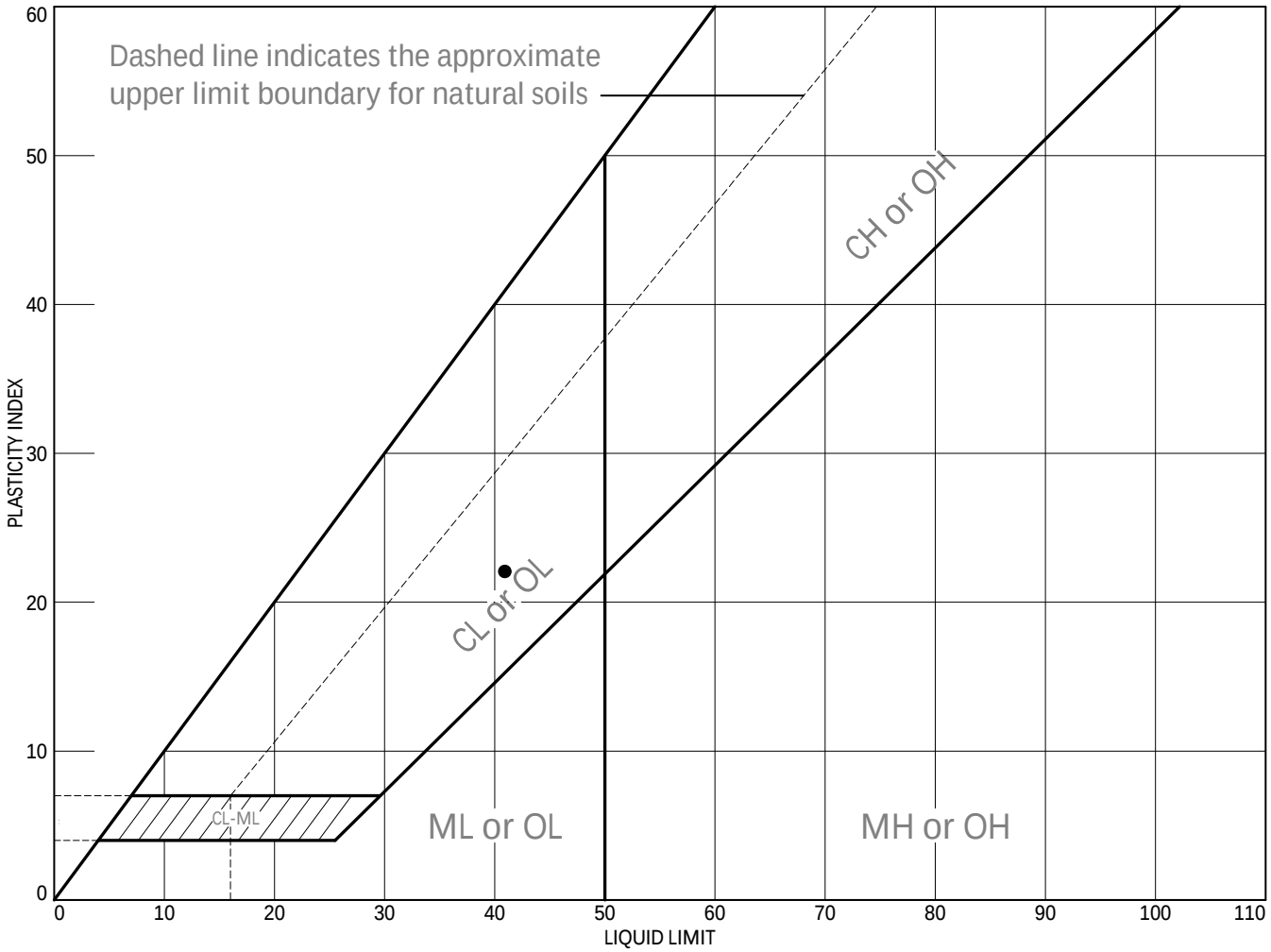
NOVA ENGINEERING
Kennesaw, Georgia
770-425-0777

Client: Heath & Lineback Engineers, Inc.
Project: CR 153 (Cypress Lake Rd.) Over Dry Branch

Project No: 10102-2025112 Date Tested 12/18/25

Tested By: LY Checked By: MLS

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Yellowish gray clayey fine SAND	41	19	22	98.2	35.9	SC

Project No. 10102-2025112 Client: Heath & Lineback Engineers, Inc.

Project: CR 153 (Cypress Lake Rd.) Over Dry Branch

●Source of Sample: B-01 Depth: 43.5-45.0 ft. Sample Number: 11

Remarks:

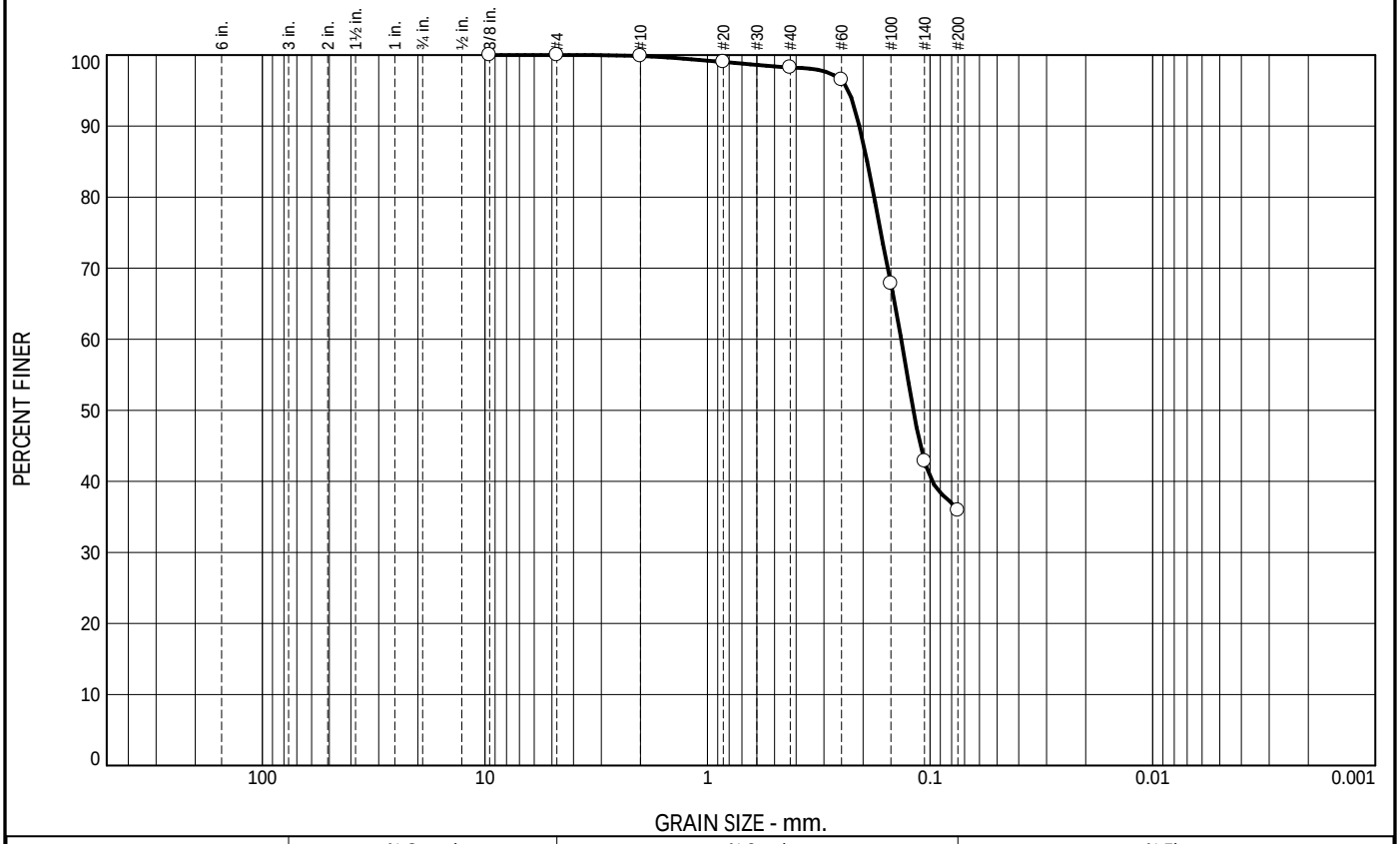
NOVA ENGINEERING
Kennesaw, Georgia
770-425-0777

Date Tested 12/19/25

Tested By: GH Checked By: MLS

Particle Size Distribution Report

ASTM D6913



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	1.7	62.3	35.9	

Test Results (ASTM D6913)

Sieve Size or Diam. (mm.)	Finer (%)	Spec.* (%)	Out of Spec. (%)	Pct. of Fines
3/8	100.0			
#4	100.0			
#10	99.9			
#20	99.0			
#40	98.2			
#60	96.5			
#100	67.8			
#140	42.8			
#200	35.9			

* (no specification provided)

Material Description

Yellowish gray clayey fine SAND

Atterberg Limits

PL= 19 LL= 41 PI= 22

Coefficients

D_{90}= 0.2079 D_{85}= 0.1918 D_{60}= 0.1349
D_{50}= 0.1189 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SC AASHTO= A-7-6(3)

Test Remarks

NMC = 27.0%

Source of Sample: B-01 Depth: 43.5-45.0 ft.
Sample Number: 11 Sample Date:

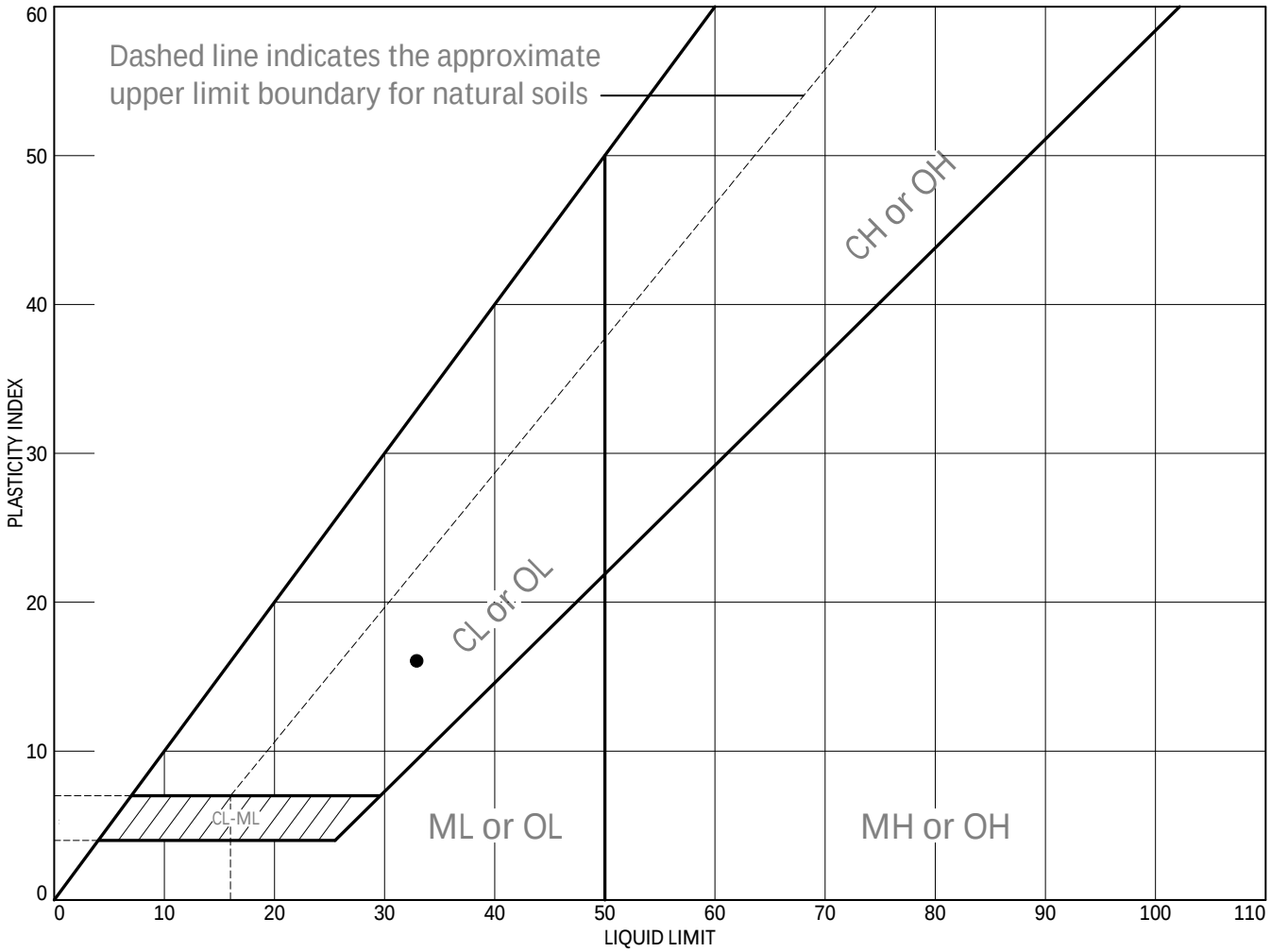
NOVA ENGINEERING
Kennesaw, Georgia
770-425-0777

Client: Heath & Lineback Engineers, Inc.
Project: CR 153 (Cypress Lake Rd.) Over Dry Branch

Project No: 10102-2025112 Date Tested 12/18/25

Tested By: LY Checked By: MLS

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray clayey fine SAND	33	17	16	95.5	34.0	SC

Project No. 10102-2025112 Client: Heath & Lineback Engineers, Inc.

Project: CR 153 (Cypress Lake Rd.) Over Dry Branch

●Source of Sample: B-01 Depth: 58.5-60.0 ft. Sample Number: 14

Remarks:

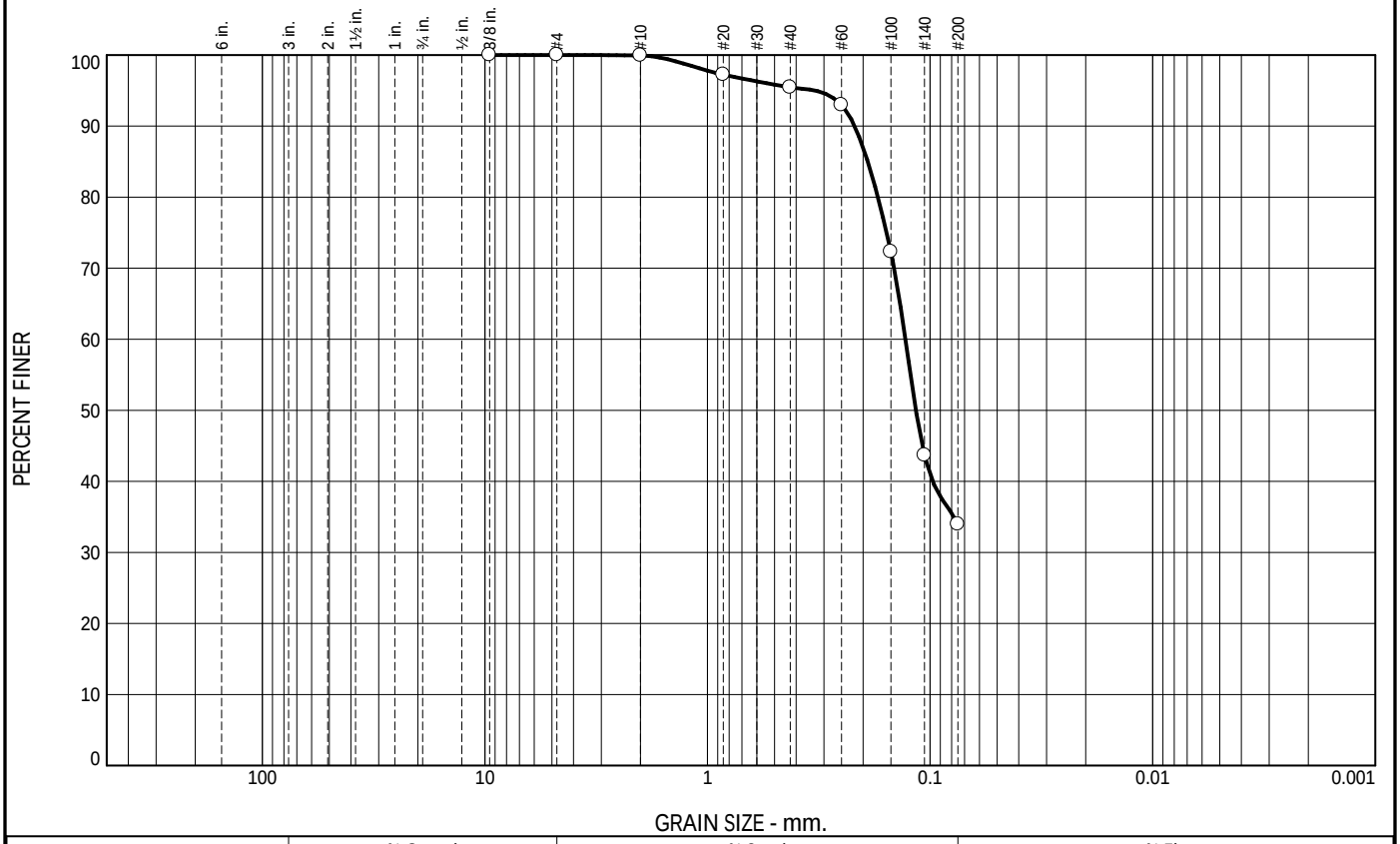
NOVA ENGINEERING
Kennesaw, Georgia
770-425-0777

Date Tested 12/19/25

Tested By: GH Checked By: MLS

Particle Size Distribution Report

ASTM D6913



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	4.4	61.5	34.0	

Test Results (ASTM D6913)

Sieve Size or Diam. (mm.)	Finer (%)	Spec.* (%)	Out of Spec. (%)	Pct. of Fines
3/8	100.0			
#4	100.0			
#10	99.9			
#20	97.2			
#40	95.5			
#60	93.0			
#100	72.3			
#140	43.7			
#200	34.0			

* (no specification provided)

Material Description

Gray clayey fine SAND

Atterberg Limits

PL= 17 LL= 33 PI= 16

Coefficients

D_{90}= 0.2184 D_{85}= 0.1906 D_{60}= 0.1292
D_{50}= 0.1158 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SC AASHTO= A-2-6(1)

Test Remarks

NMC = 26.3%

Source of Sample: B-01 Depth: 58.5-60.0 ft.
Sample Number: 14 Sample Date:

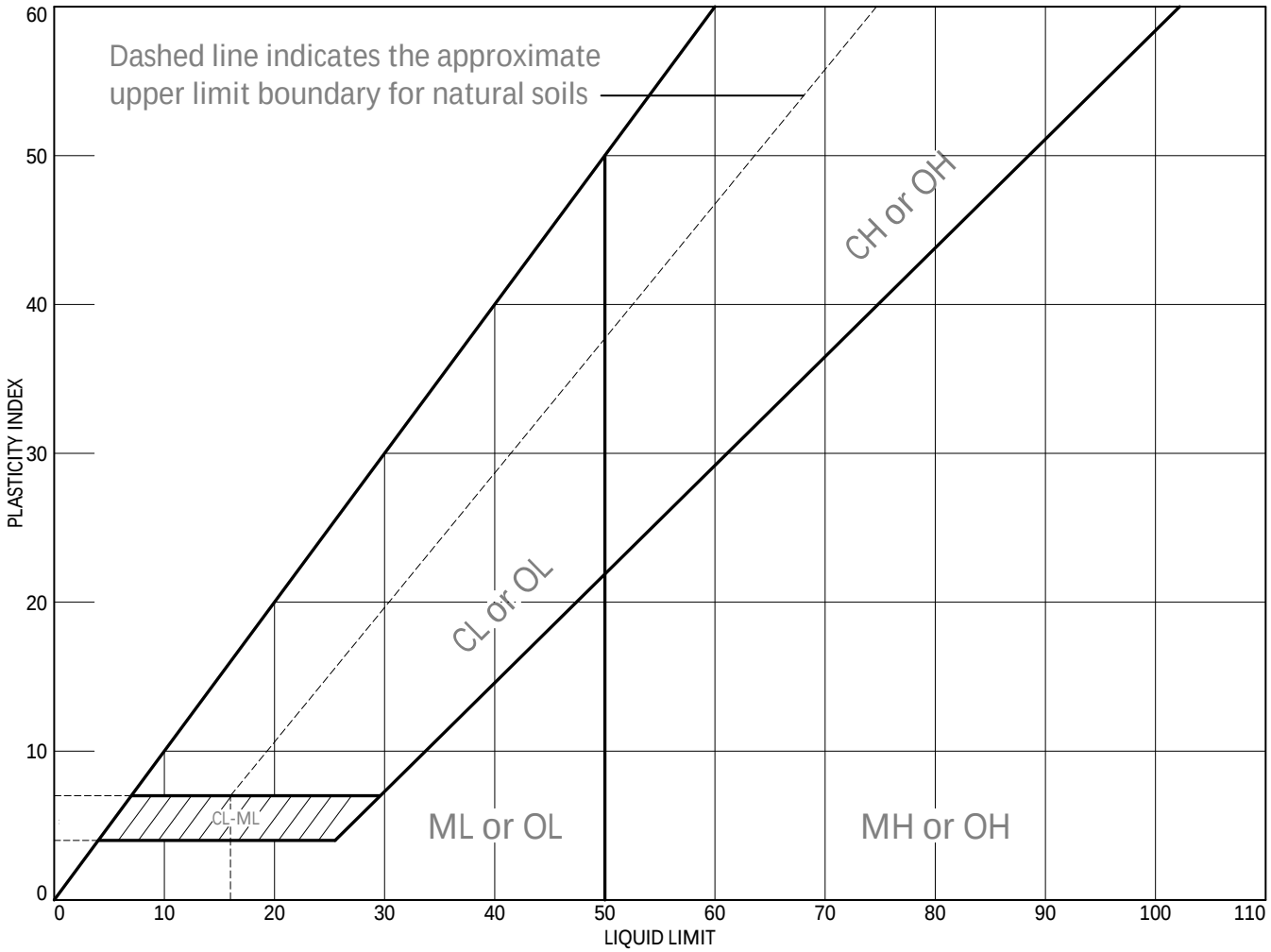
NOVA ENGINEERING
Kennesaw, Georgia
770-425-0777

Client: Heath & Lineback Engineers, Inc.
Project: CR 153 (Cypress Lake Rd.) Over Dry Branch

Project No: 10102-2025112 Date Tested 12/18/25

Tested By: LY Checked By: MLS

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray silty medium to fine SAND	NP	NP	NP	94.1	13.8	SM

Project No. 10102-2025112 Client: Heath & Lineback Engineers, Inc.

Project: CR 153 (Cypress Lake Rd.) Over Dry Branch

●Source of Sample: B-01 Depth: 73.5-75.0 ft. Sample Number: 17

Remarks:

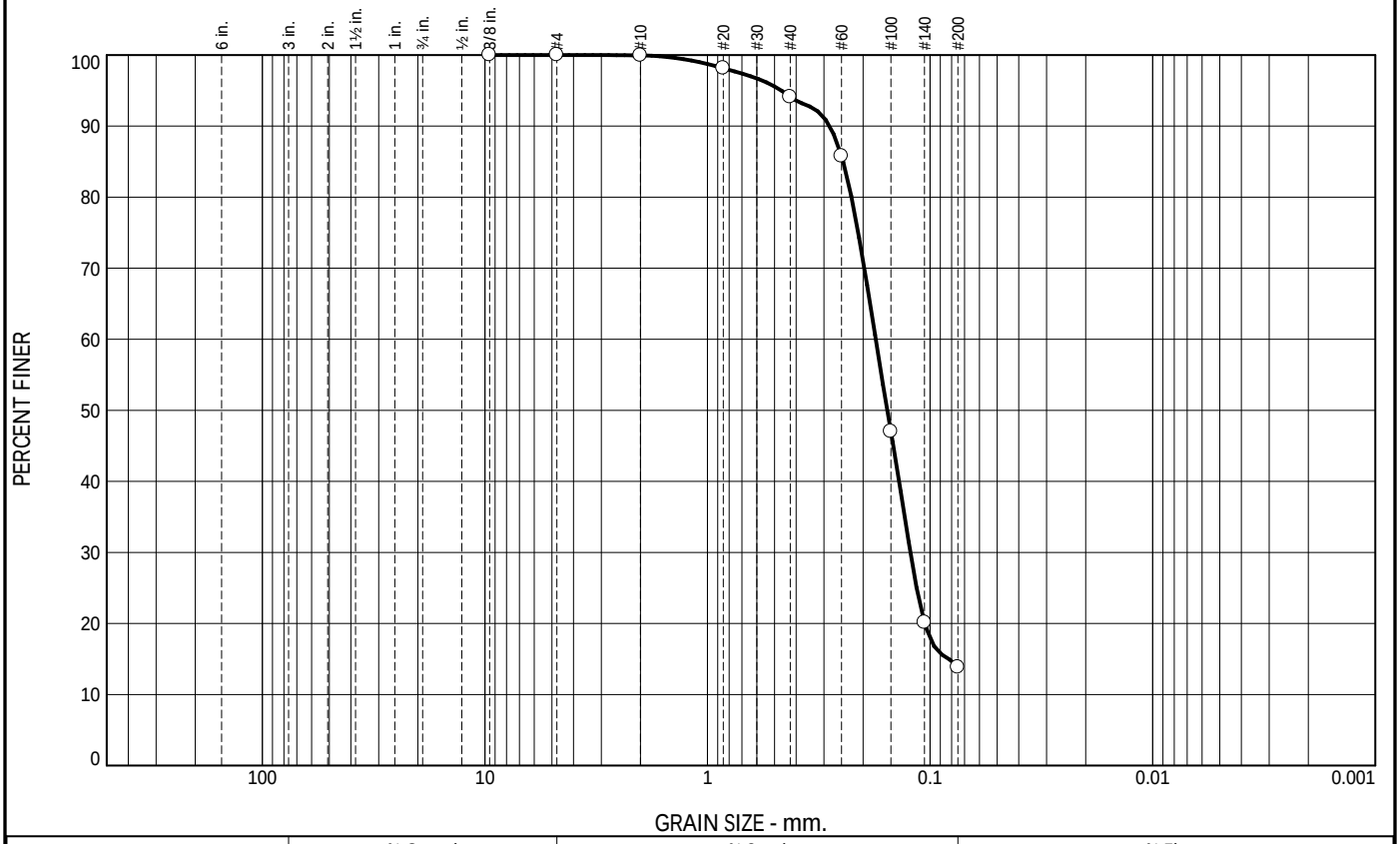
NOVA ENGINEERING
Kennesaw, Georgia
770-425-0777

Date Tested 12/18/25

Tested By: GH Checked By: MLS

Particle Size Distribution Report

ASTM D6913



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	5.9	80.3	13.8	

Test Results (ASTM D6913)

Sieve Size or Diam. (mm.)	Finer (%)	Spec.* (%)	Out of Spec. (%)	Pct. of Fines
3/8	100.0			
#4	100.0			
#10	100.0			
#20	98.1			
#40	94.1			
#60	85.8			
#100	47.0			
#140	20.1			
#200	13.8			

* (no specification provided)

Material Description

Gray silty medium to fine SAND

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{90}= 0.2826 D_{85}= 0.2459 D_{60}= 0.1755
D_{50}= 0.1558 D_{30}= 0.1227 D_{15}= 0.0825
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Test Remarks

NMC = 31.4%

Source of Sample: B-01 Depth: 73.5-75.0 ft.
Sample Number: 17 Sample Date:

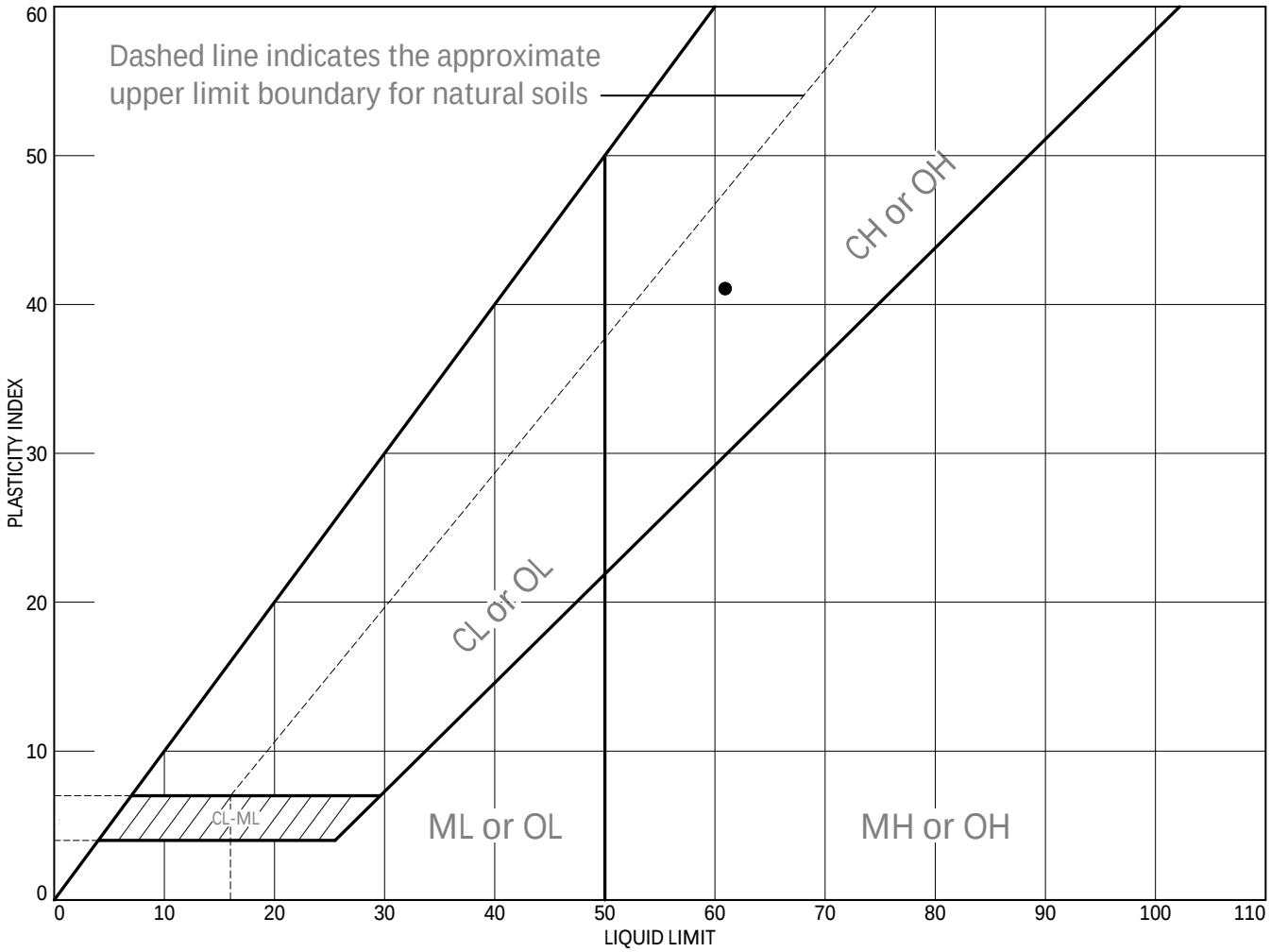
NOVA ENGINEERING
Kennesaw, Georgia
770-425-0777

Client: Heath & Lineback Engineers, Inc.
Project: CR 153 (Cypress Lake Rd.) Over Dry Branch

Project No: 10102-2025112 Date Tested 12/18/25

Tested By: LY Checked By: MLS

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray clayey fine SAND	61	20	41	99.7	46.6	SC

Project No. 10102-2025112 Client: Heath & Lineback Engineers, Inc.

Project: CR 153 (Cypress Lake Rd.) Over Dry Branch

●Source of Sample: B-01 Depth: 93.5-95.0 ft. Sample Number: 21

Remarks:

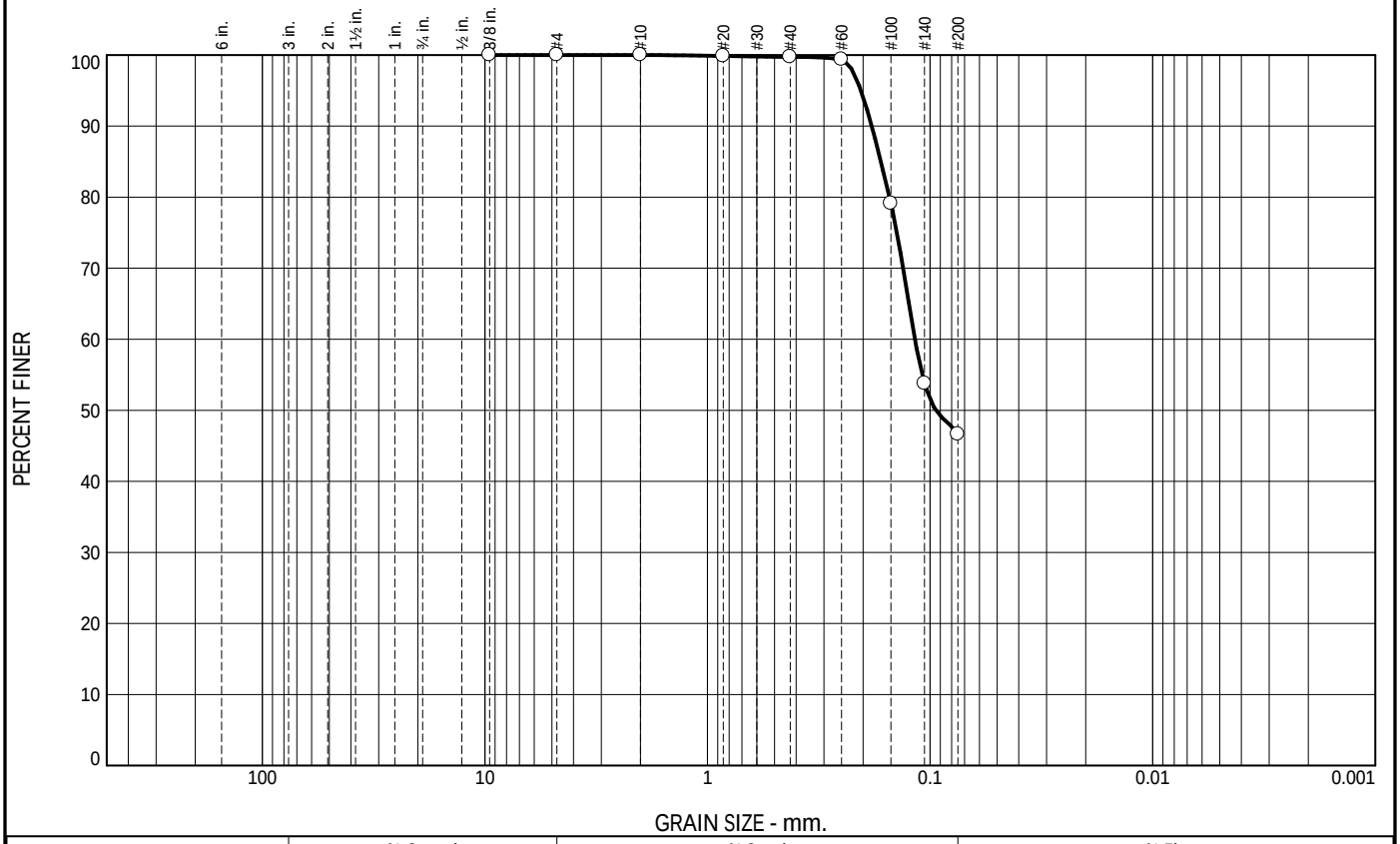
NOVA ENGINEERING
Kennesaw, Georgia
770-425-0777

Date Tested 12/19/25

Tested By: GH Checked By: MLS

Particle Size Distribution Report

ASTM D6913



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.3	53.1	46.6	

Test Results (ASTM D6913)				
Sieve Size or Diam. (mm.)	Finer (%)	Spec.* (%)	Out of Spec. (%)	Pct. of Fines
3/8	100.0			
#4	100.0			
#10	100.0			
#20	99.9			
#40	99.7			
#60	99.4			
#100	79.1			
#140	53.8			
#200	46.6			

* (no specification provided)

Material Description

Gray clayey fine SAND

Atterberg Limits

PL= 20 LL= 61 PI= 41

Coefficients

D_{90}= 0.1829 D_{85}= 0.1665 D_{60}= 0.1170
D_{50}= 0.0942 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SC AASHTO= A-7-6(14)

Test Remarks

NMC = 37.0%

Source of Sample: B-01 Depth: 93.5-95.0 ft.
Sample Number: 21 Sample Date:

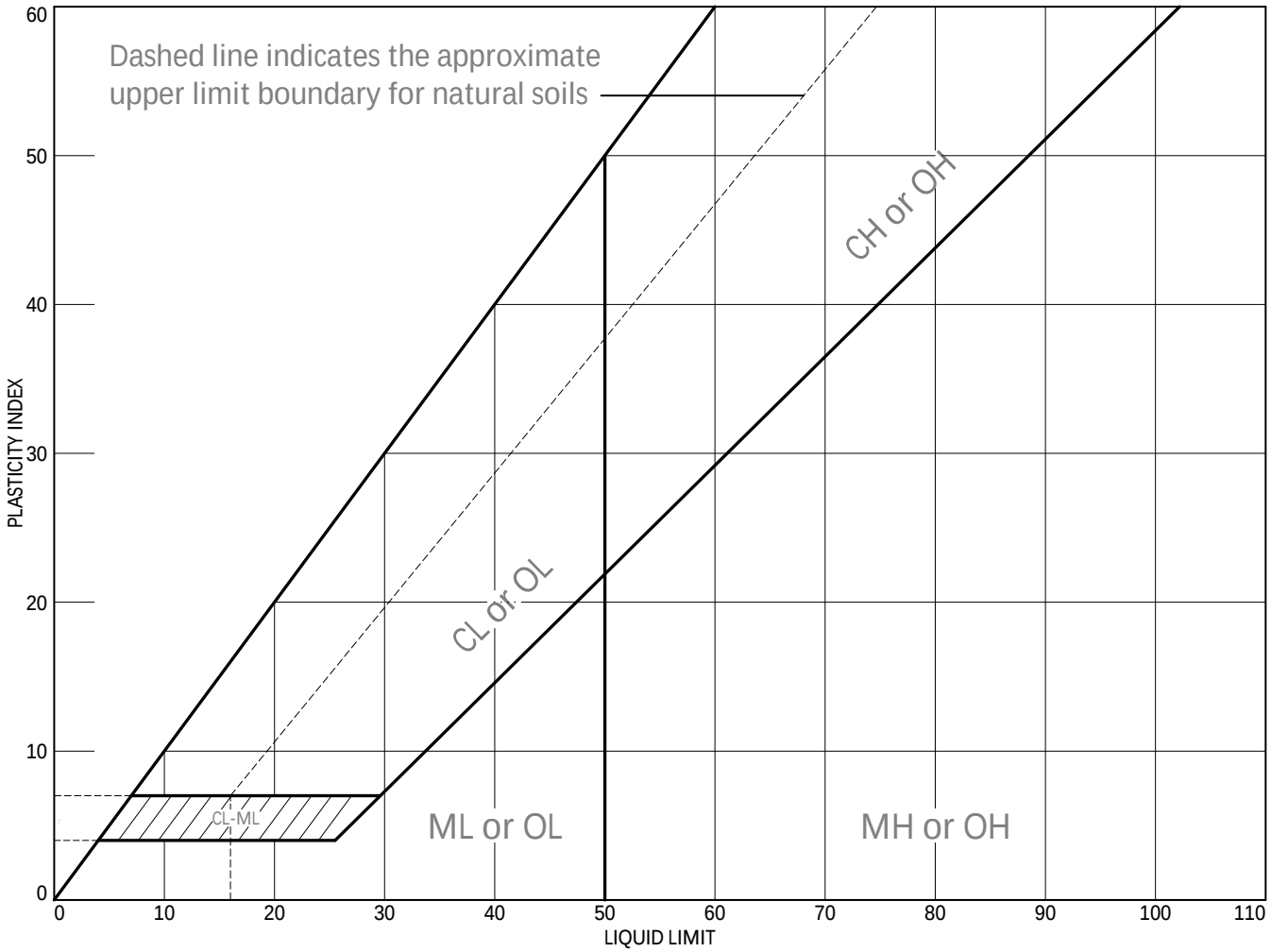
NOVA ENGINEERING
Kennesaw, Georgia
770-425-0777

Client: Heath & Lineback Engineers, Inc.
Project: CR 153 (Cypress Lake Rd.) Over Dry Branch

Project No: 10102-2025112 Date Tested 12/18/25

Tested By: LY Checked By: MLS

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray poorly graded SAND with silt	NP	NP	NP	99.4	9.5	SP-SM

Project No. 10102-2025112 Client: Heath & Lineback Engineers, Inc.

Project: CR 153 (Cypress Lake Rd.) Over Dry Branch

●Source of Sample: B-01 Depth: 103.5-105.0 ft. Sample Number: 23

Remarks:

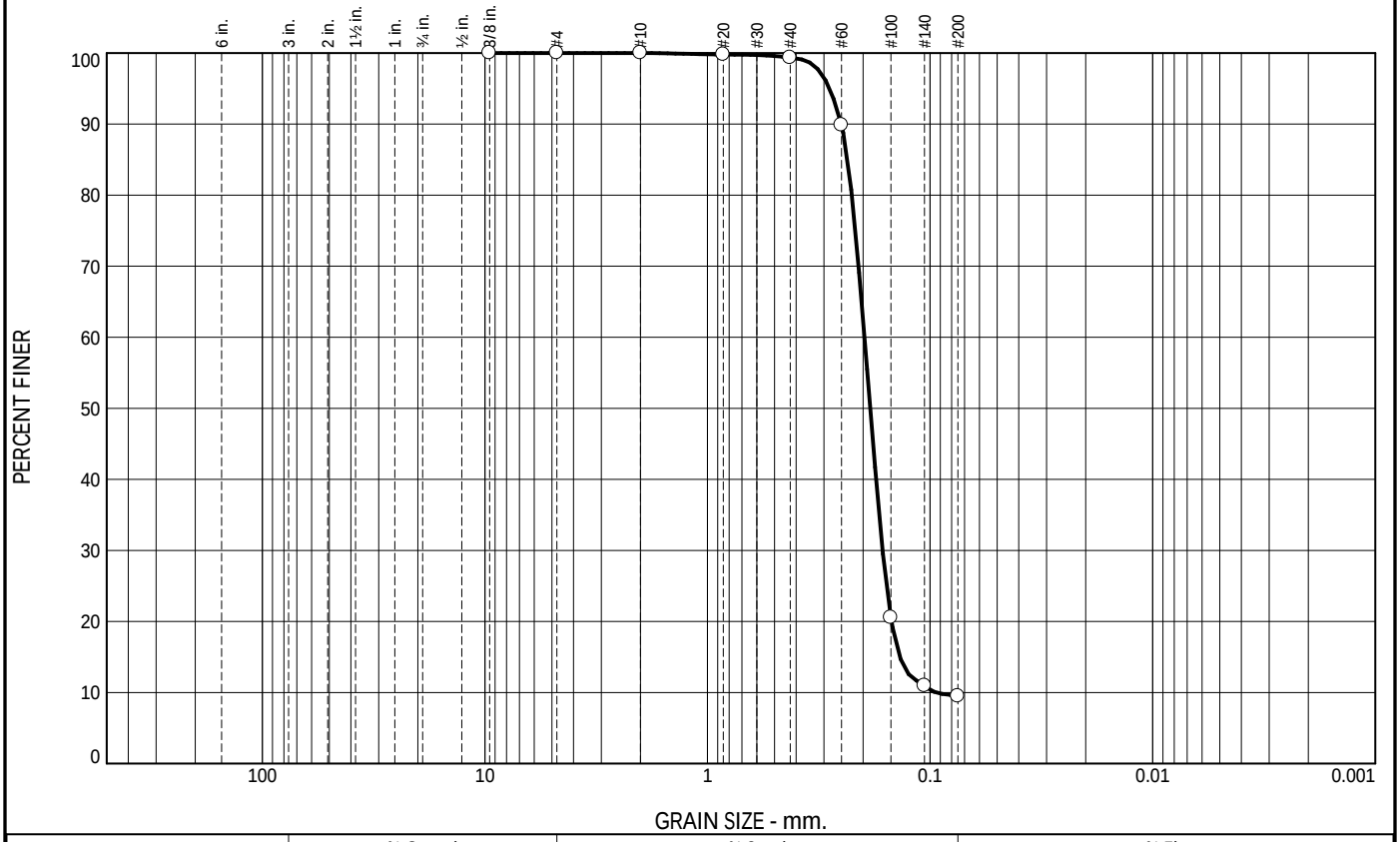
NOVA ENGINEERING
Kennesaw, Georgia
770-425-0777

Date Tested 12/19/25

Tested By: GH Checked By: MLS

Particle Size Distribution Report

ASTM D6913



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.6	89.9	9.5	

Test Results (ASTM D6913)

Sieve Size or Diam. (mm.)	Finer (%)	Spec.* (%)	Out of Spec. (%)	Pct. of Fines
3/8	100.0			
#4	100.0			
#10	100.0			
#20	99.8			
#40	99.4			
#60	89.8			
#100	20.5			
#140	11.0			
#200	9.5			

* (no specification provided)

Material Description

Gray poorly graded SAND with silt

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{90}= 0.2508 D_{85}= 0.2349 D_{60}= 0.1971
D_{50}= 0.1858 D_{30}= 0.1635 D_{15}= 0.1367
D_{10}= 0.0938 C_u= 2.10 C_c= 1.45

Classification

USCS= SP-SM AASHTO= A-3

Test Remarks

NMC = 24.1%

Source of Sample: B-01 Depth: 103.5-105.0 ft.
Sample Number: 23 Sample Date:

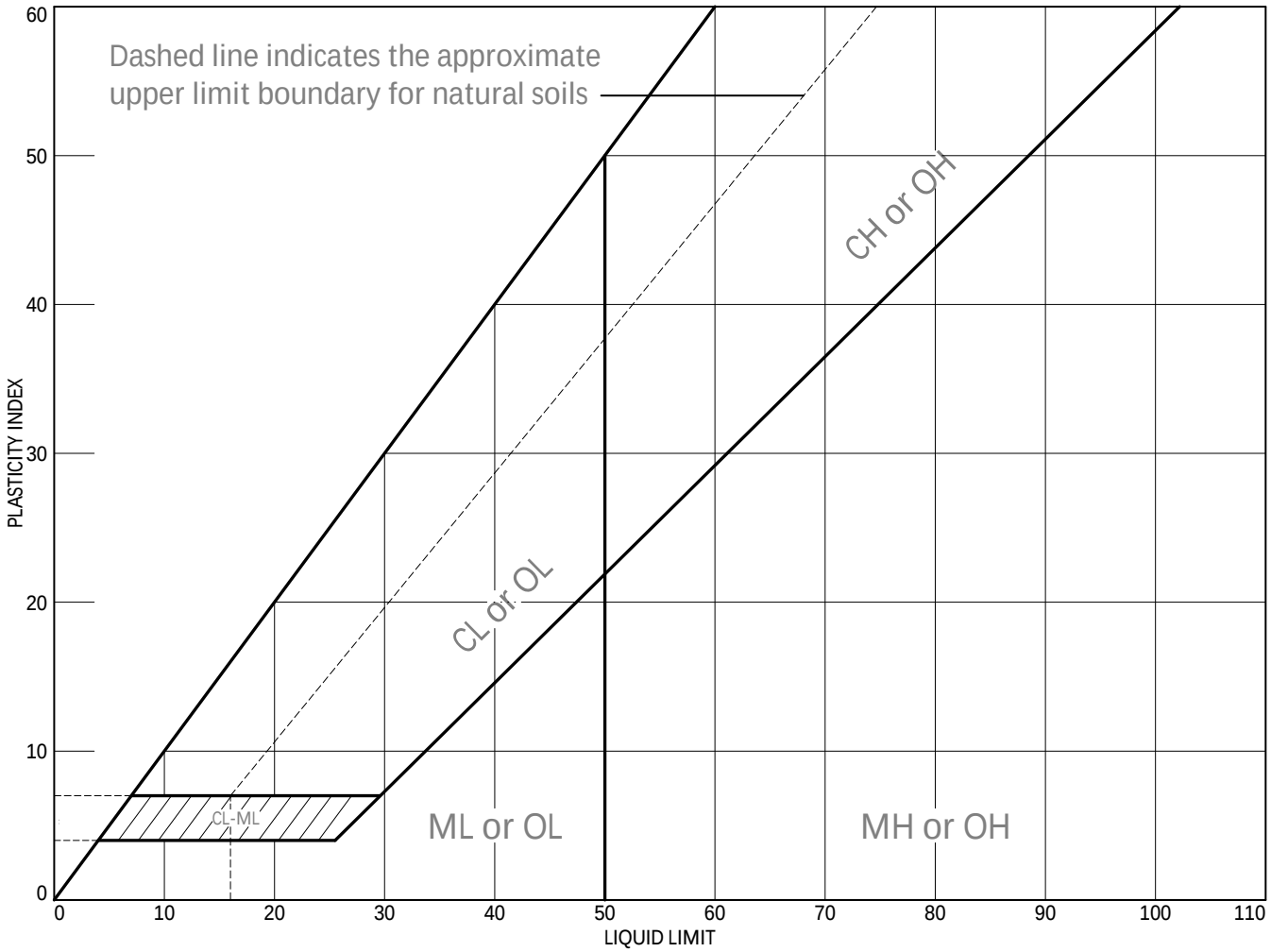
NOVA ENGINEERING
Kennesaw, Georgia
770-425-0777

Client: Heath & Lineback Engineers, Inc.
Project: CR 153 (Cypress Lake Rd.) Over Dry Branch

Project No: 10102-2025112 Date Tested 12/18/25

Tested By: LY Checked By: MLS

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Reddish brown silty medium to fine SAND	NP	NP	NP	82.4	16.8	SM

Project No. 10102-2025112 Client: Heath & Lineback Engineers, Inc.

Project: CR 153 (Cypress Lake Rd.) Over Dry Branch

●Source of Sample: B-02 Depth: 1.0-2.5 ft. Sample Number: 1

Remarks:

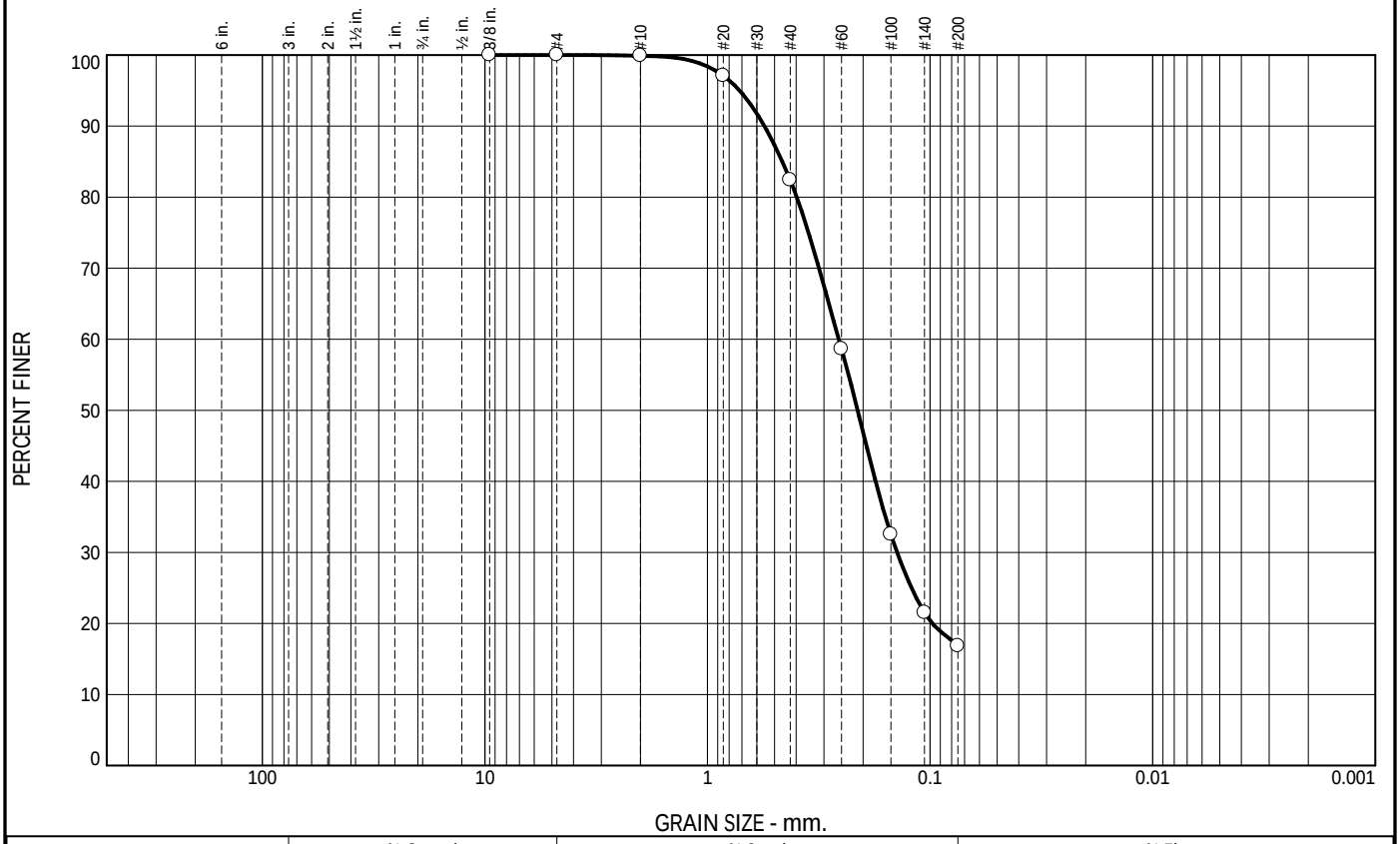
NOVA ENGINEERING
Kennesaw, Georgia
770-425-0777

Date Tested 12/22/25

Tested By: GH Checked By: MLS

Particle Size Distribution Report

ASTM D6913



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	17.5	65.6	16.8	

Test Results (ASTM D6913)

Sieve Size or Diam. (mm.)	Finer (%)	Spec.* (%)	Out of Spec. (%)	Pct. of Fines
3/8	100.0			
#4	100.0			
#10	99.9			
#20	97.1			
#40	82.4			
#60	58.6			
#100	32.5			
#140	21.5			
#200	16.8			

* (no specification provided)

Material Description

Reddish brown silty medium to fine SAND

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{90}= 0.5551 D_{85}= 0.4612 D_{60}= 0.2573
D_{50}= 0.2117 D_{30}= 0.1407 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Test Remarks

NMC = 8.6%

Source of Sample: B-02 Depth: 1.0-2.5 ft.
Sample Number: 1 Sample Date:

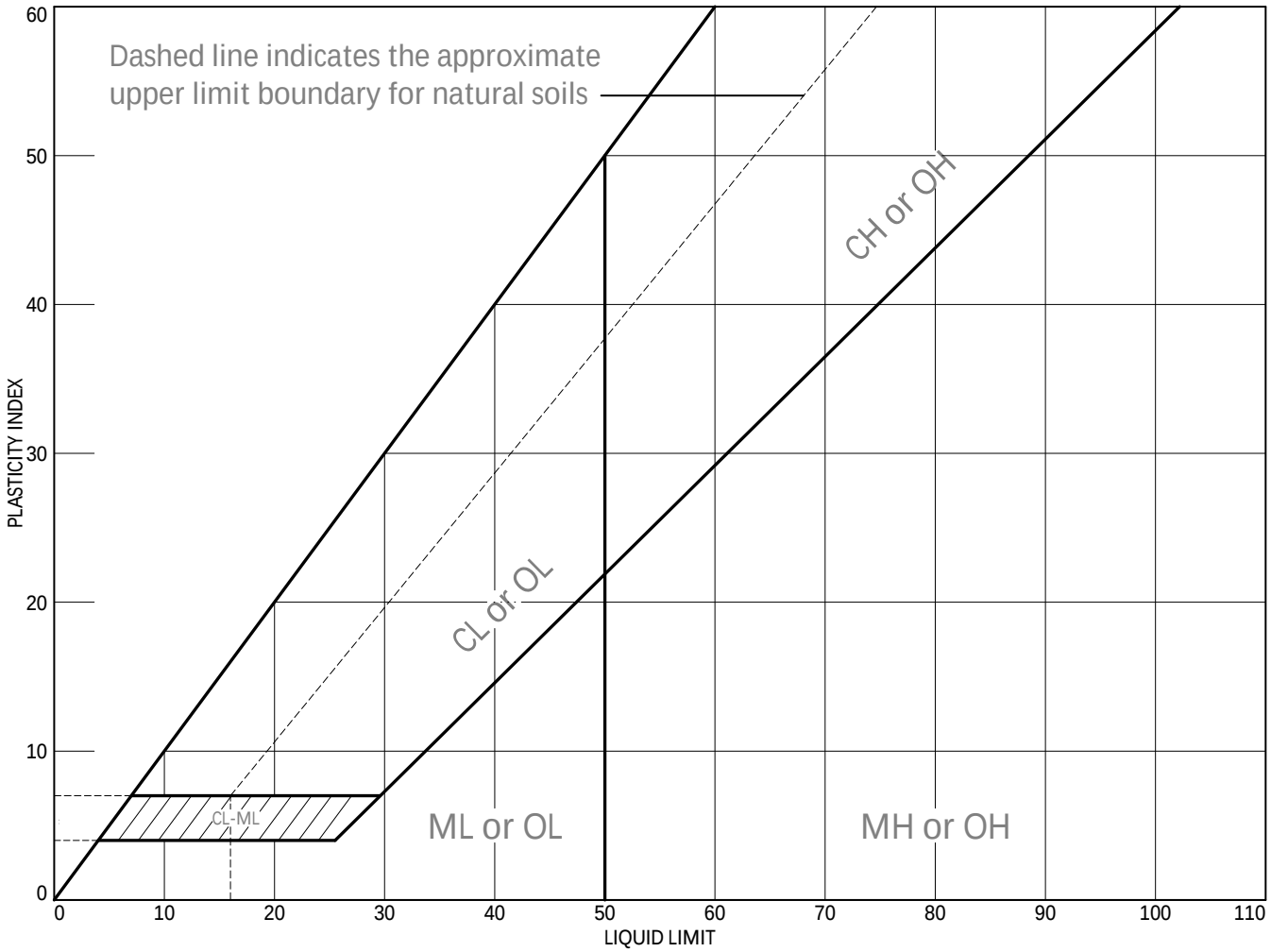
NOVA ENGINEERING
Kennesaw, Georgia
770-425-0777

Client: Heath & Lineback Engineers, Inc.
Project: CR 153 (Cypress Lake Rd.) Over Dry Branch

Project No: 10102-2025112 Date Tested 12/22/25

Tested By: LY Checked By: MLS

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Brownish gray silty medium to fine SAND	NP	NP	NP	92.3	13.3	SM

Project No. 10102-2025112 Client: Heath & Lineback Engineers, Inc.

Project: CR 153 (Cypress Lake Rd.) Over Dry Branch

●Source of Sample: B-02 Depth: 6.0-7.5 ft. Sample Number: 3

Remarks:

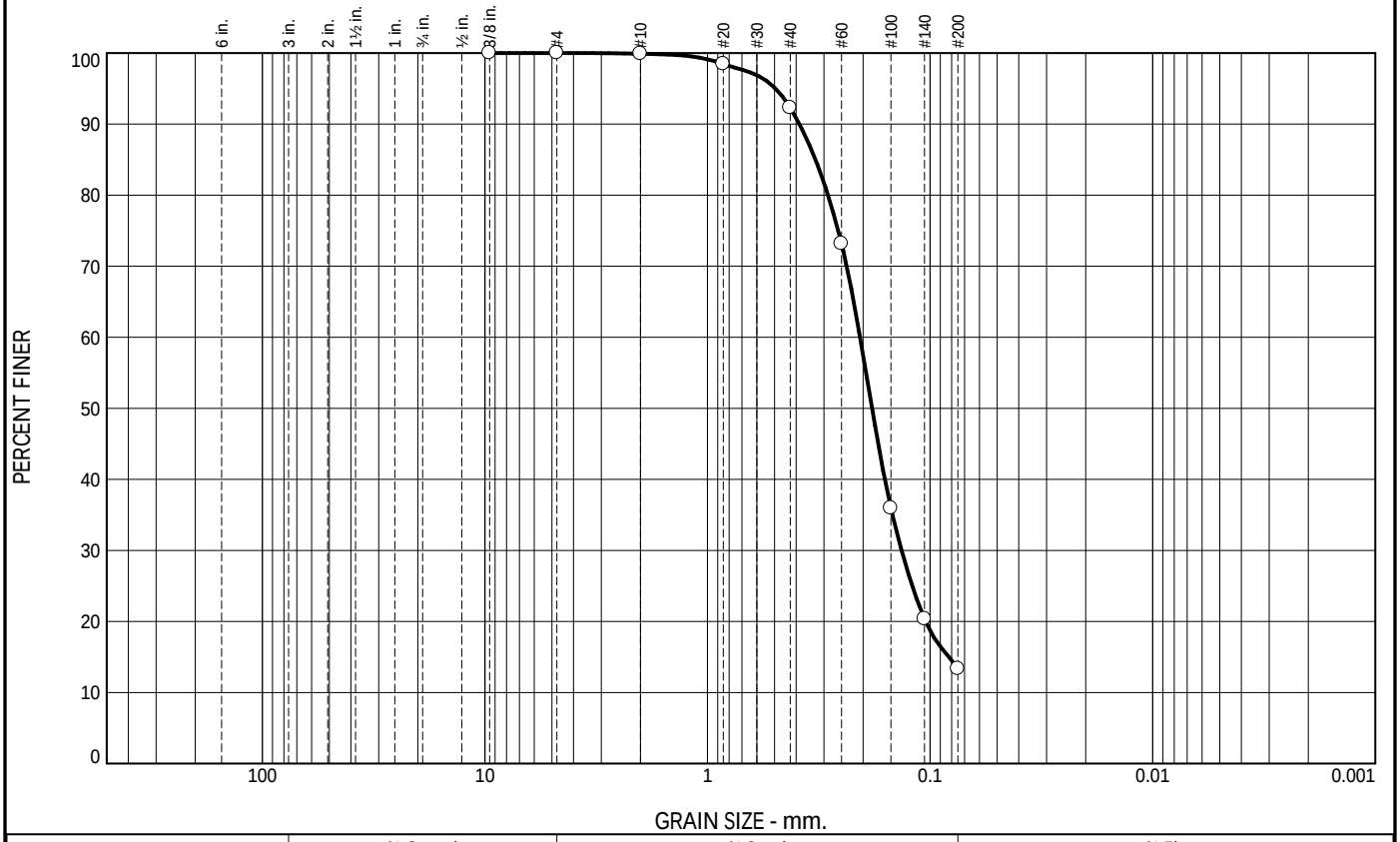
NOVA ENGINEERING
Kennesaw, Georgia
770-425-0777

Date Tested 12/22/25

Tested By: GH Checked By: MLS

Particle Size Distribution Report

ASTM D6913



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	7.6	79.0	13.3	

Test Results (ASTM D6913)

Sieve Size or Diam. (mm.)	Finer (%)	Spec.* (%)	Out of Spec. (%)	Pct. of Fines
3/8	100.0			
#4	100.0			
#10	99.9			
#20	98.5			
#40	92.3			
#60	73.2			
#100	36.0			
#140	20.4			
#200	13.3			

* (no specification provided)

Material Description

Brownish gray silty medium to fine SAND

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{90}= 0.3866 D_{85}= 0.3273 D_{60}= 0.2065
D_{50}= 0.1823 D_{30}= 0.1344 D_{15}= 0.0823
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Test Remarks

NMC = 23.3%

Source of Sample: B-02 Depth: 6.0-7.5 ft.
Sample Number: 3 Sample Date:

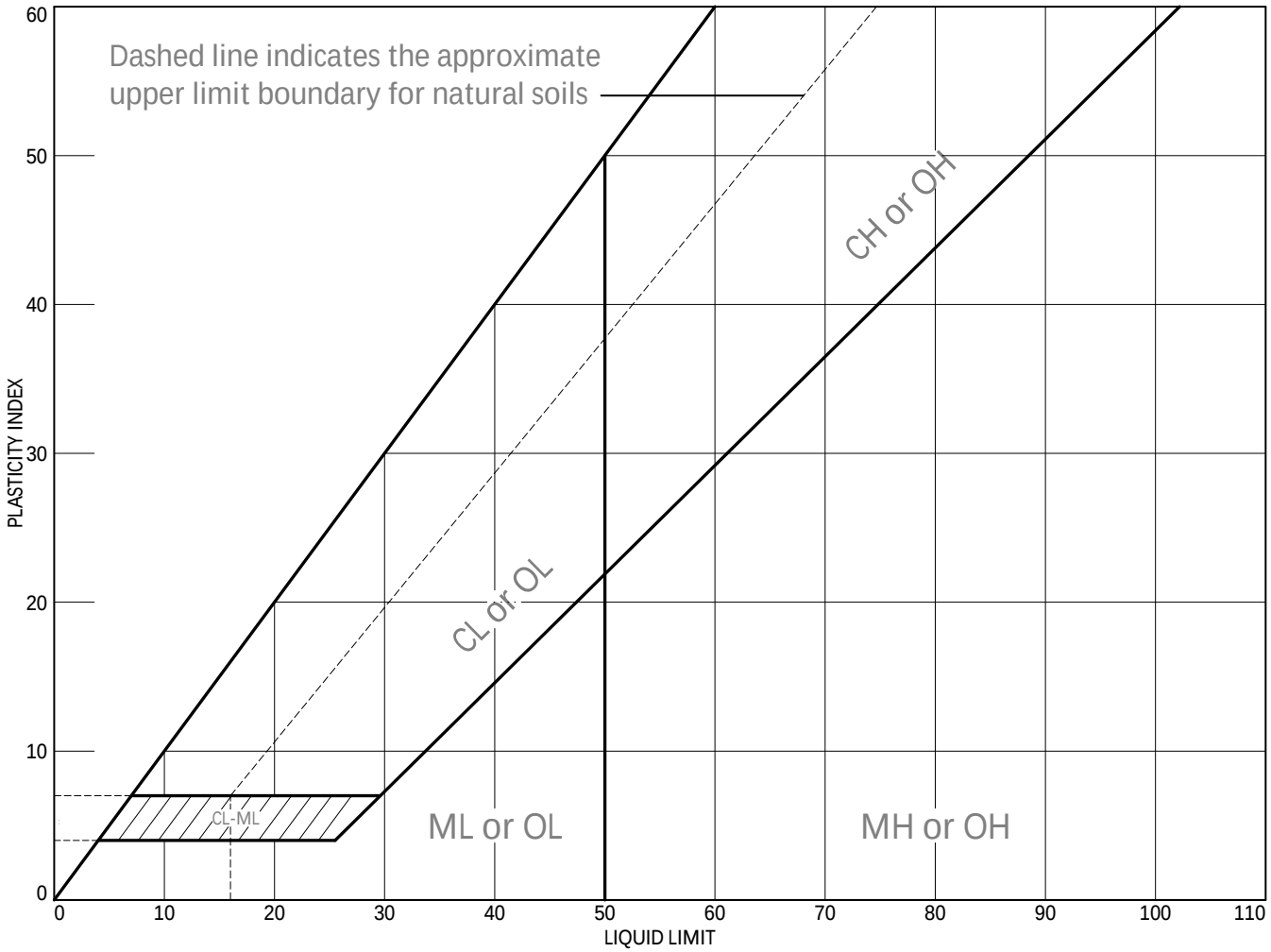
NOVA ENGINEERING
Kennesaw, Georgia
770-425-0777

Client: Heath & Lineback Engineers, Inc.
Project: CR 153 (Cypress Lake Rd.) Over Dry Branch

Project No: 10102-2025112 Date Tested 12/22/25

Tested By: LY Checked By: MLS

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Light gray silty medium to fine SAND	NP	NP	NP	76.5	13.5	SM

Project No. 10102-2025112 Client: Heath & Lineback Engineers, Inc.

Project: CR 153 (Cypress Lake Rd.) Over Dry Branch

●Source of Sample: B-02 Depth: 18.5-20.0 ft. Sample Number: 6

Remarks:

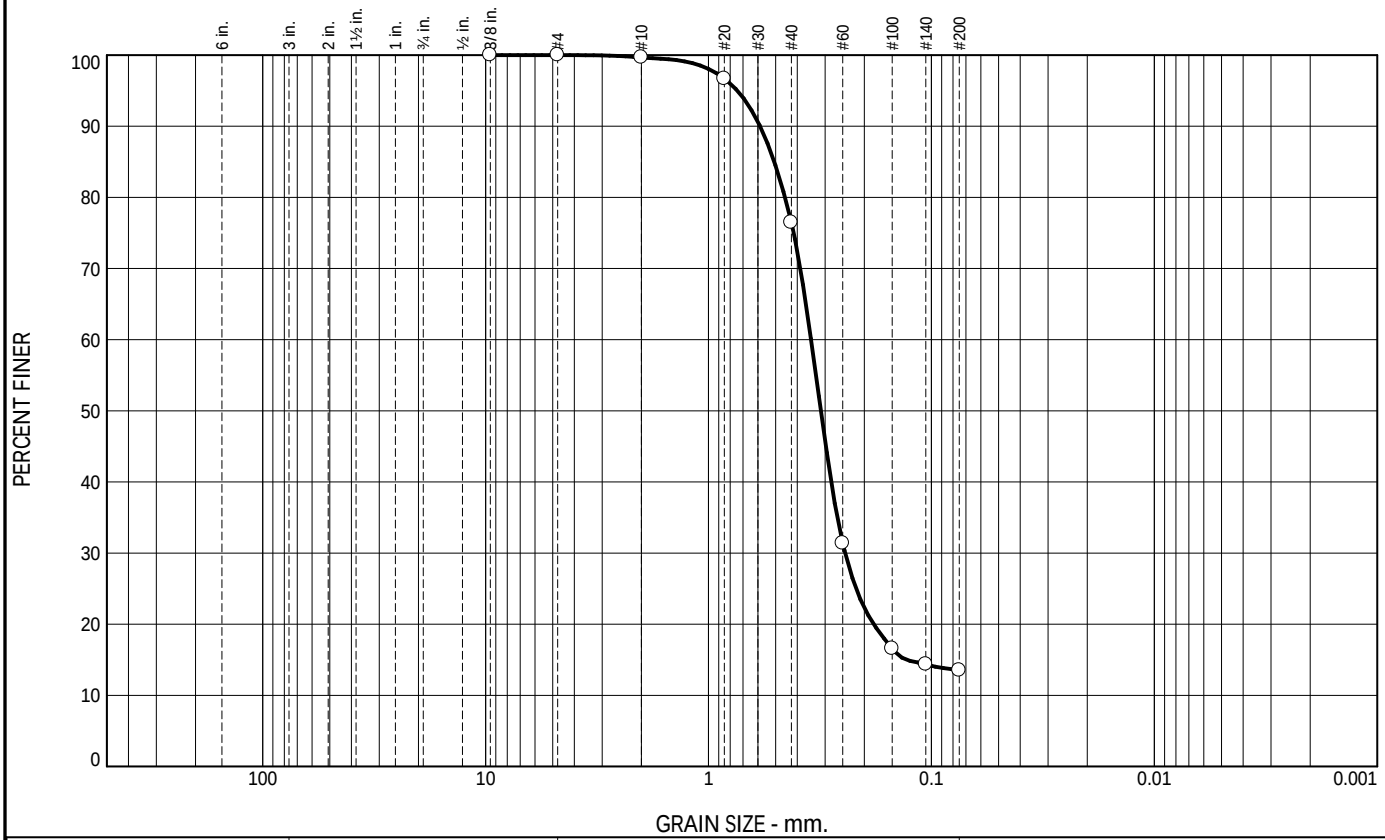
NOVA ENGINEERING
Kennesaw, Georgia
770-425-0777

Date Tested 12/22/25

Tested By: GH Checked By: MLS

Particle Size Distribution Report

ASTM D6913



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.3	23.2	63.0	13.5	

Test Results (ASTM D6913)

Sieve Size or Diam. (mm.)	Finer (%)	Spec.* (%)	Out of Spec. (%)	Pct. of Fines
3/8	100.0			
#4	100.0			
#10	99.7			
#20	96.7			
#40	76.5			
#60	31.4			
#100	16.6			
#140	14.4			
#200	13.5			

* (no specification provided)

Material Description

Light gray silty medium to fine SAND

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{90}= 0.5873 D_{85}= 0.5070 D_{60}= 0.3468
D_{50}= 0.3133 D_{30}= 0.2439 D_{15}= 0.1294
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Test Remarks

NMC = 25.6%

Source of Sample: B-02 Depth: 18.5-20.0 ft.
Sample Number: 6 Sample Date:

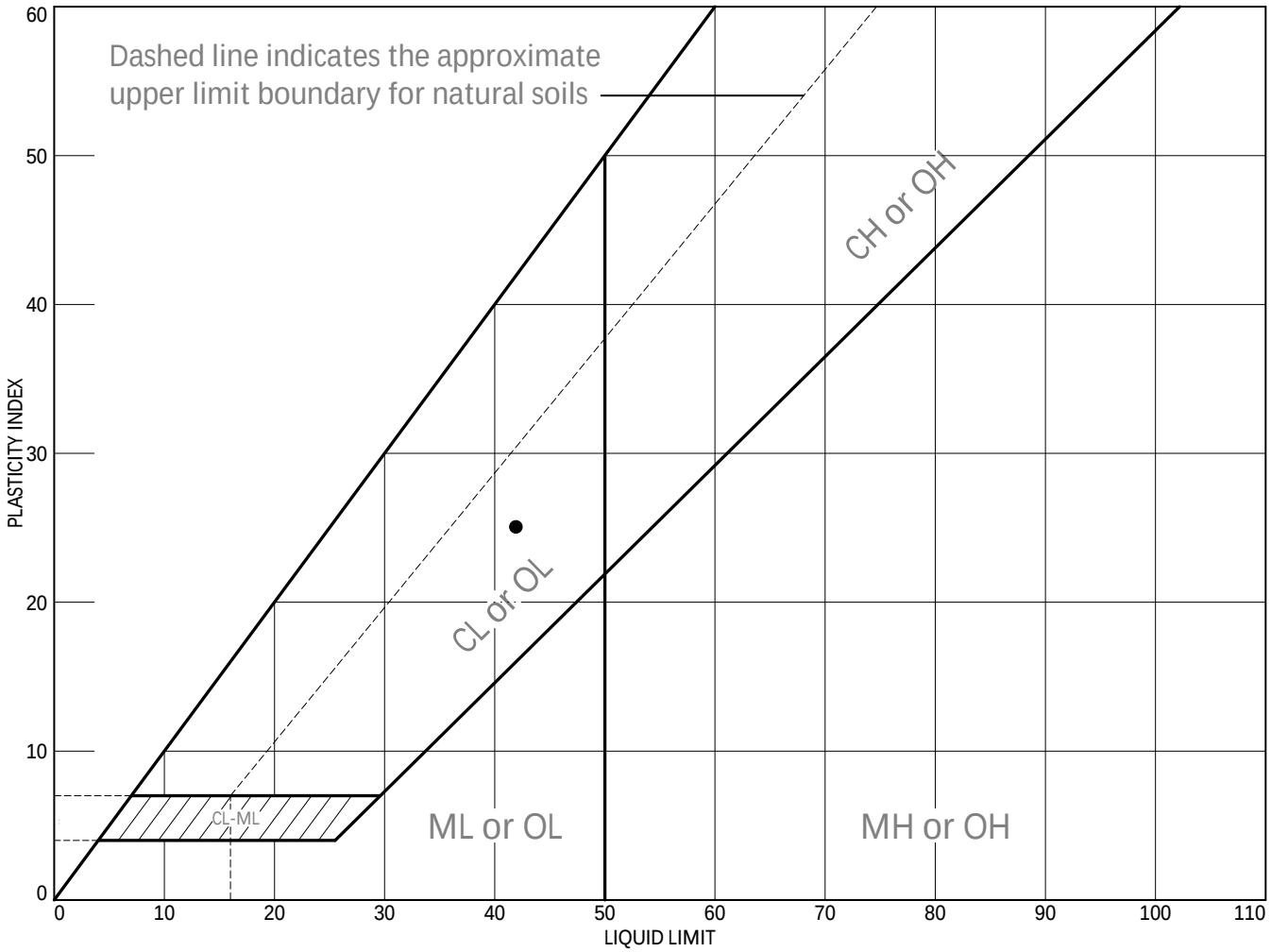
NOVA ENGINEERING
Kennesaw, Georgia
770-425-0777

Client: Heath & Lineback Engineers, Inc.
Project: CR 153 (Cypress Lake Rd.) Over Dry Branch

Project No: 10102-2025112 Date Tested 12/22/25

Tested By: LY Checked By: MLS

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Light gray clayey fine SAND	42	17	25	96.4	28.9	SC

Project No. 10102-2025112 Client: Heath & Lineback Engineers, Inc.

Project: CR 153 (Cypress Lake Rd.) Over Dry Branch

●Source of Sample: B-02 Depth: 28.5-30.0 ft. Sample Number: 8

Remarks:

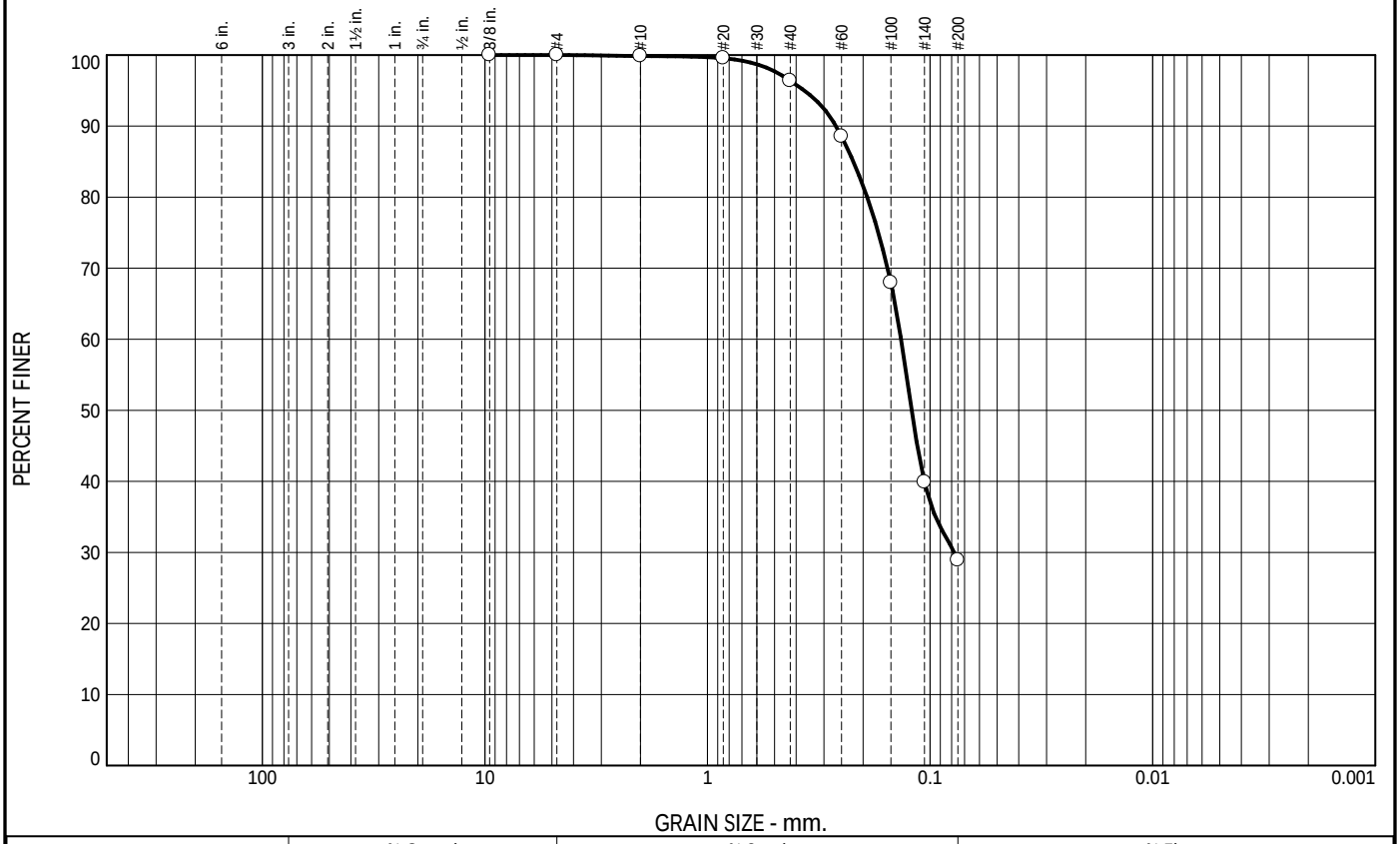
NOVA ENGINEERING
Kennesaw, Georgia
770-425-0777

Date Tested 12/22/25

Tested By: GH Checked By: MLS

Particle Size Distribution Report

ASTM D6913



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	3.5	67.5	28.9	

Test Results (ASTM D6913)

Sieve Size or Diam. (mm.)	Finer (%)	Spec.* (%)	Out of Spec. (%)	Pct. of Fines
3/8	100.0			
#4	100.0			
#10	99.9			
#20	99.6			
#40	96.4			
#60	88.6			
#100	68.0			
#140	39.9			
#200	28.9			

* (no specification provided)

Material Description

Light gray clayey fine SAND

Atterberg Limits

PL= 17 LL= 42 PI= 25

Coefficients

D_{90}= 0.2647 D_{85}= 0.2214 D_{60}= 0.1351
D_{50}= 0.1210 D_{30}= 0.0779 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SC AASHTO= A-2-7(2)

Test Remarks

NMC = 39.4%

Source of Sample: B-02 Depth: 28.5-30.0 ft.
Sample Number: 8 Sample Date:

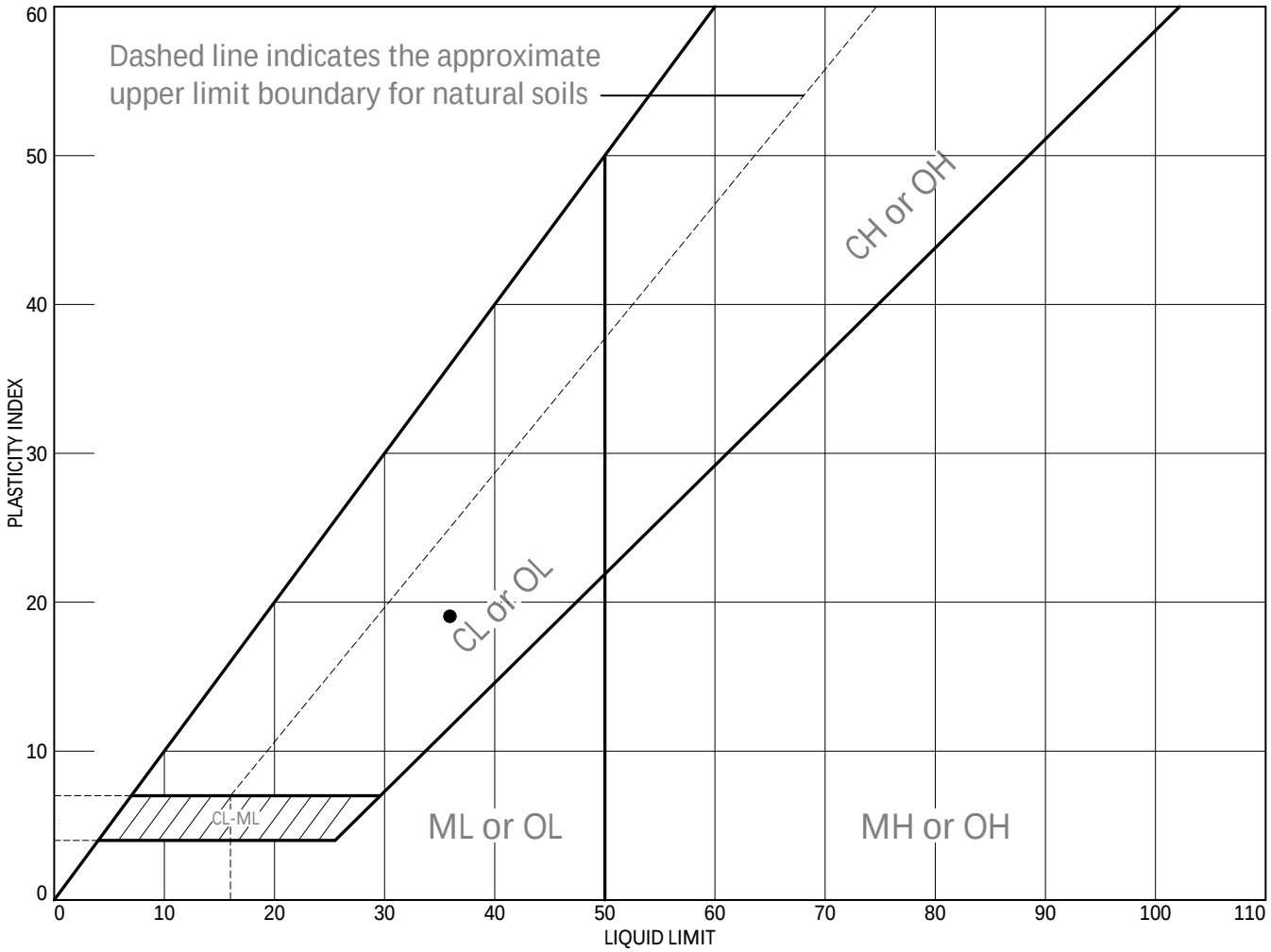
NOVA ENGINEERING
Kennesaw, Georgia
770-425-0777

Client: Heath & Lineback Engineers, Inc.
Project: CR 153 (Cypress Lake Rd.) Over Dry Branch

Project No: 10102-2025112 Date Tested 12/22/25

Tested By: LY Checked By: MLS

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Light gray clayey fine SAND	36	17	19	99.7	46.7	SC

Project No. 10102-2025112 Client: Heath & Lineback Engineers, Inc.

Project: CR 153 (Cypress Lake Rd.) Over Dry Branch

●Source of Sample: B-02 Depth: 48.5-50.0 ft. Sample Number: 12

Remarks:

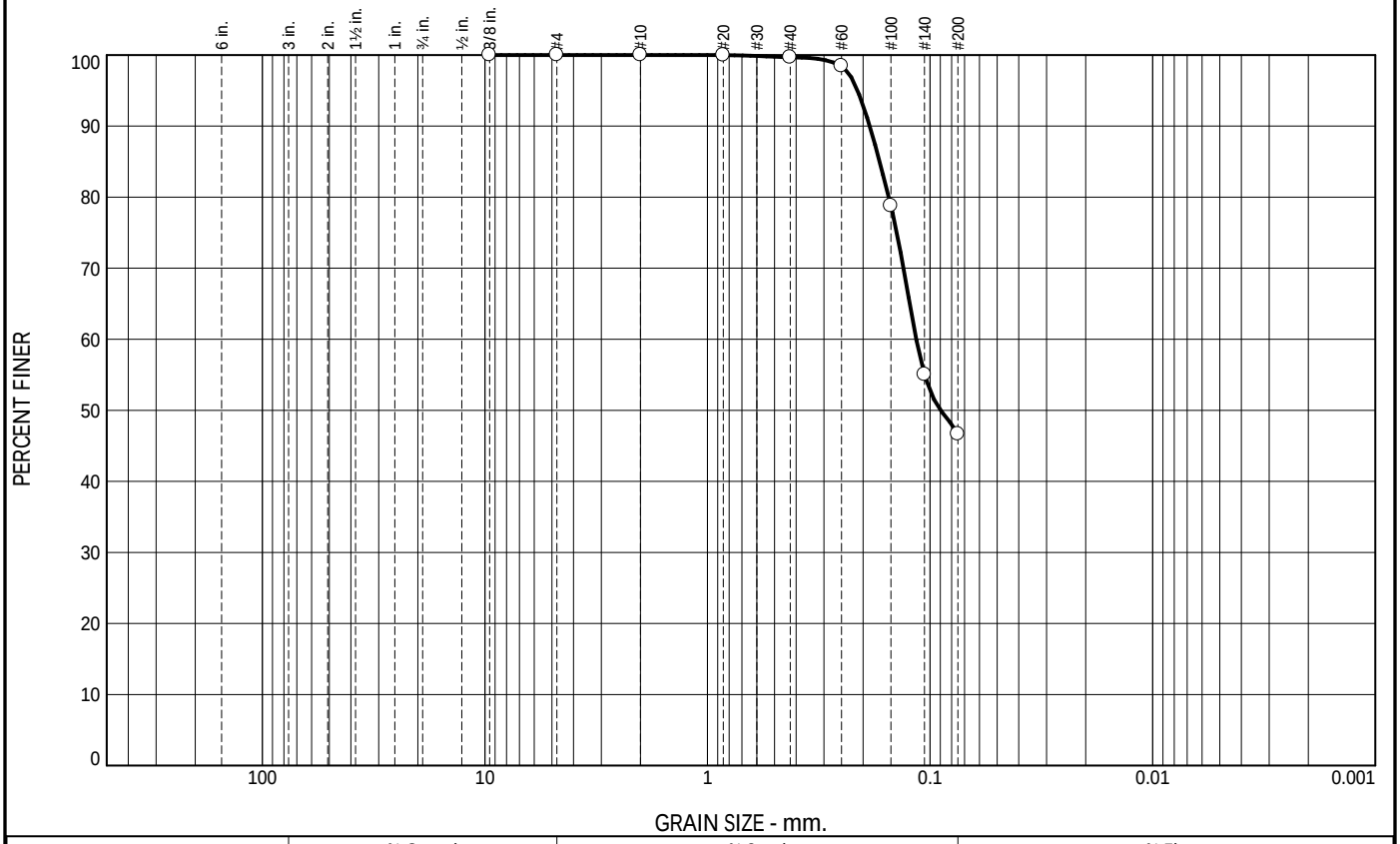
NOVA ENGINEERING
Kennesaw, Georgia
770-425-0777

Date Tested 12/23/25

Tested By: GH Checked By: MLS

Particle Size Distribution Report

ASTM D6913



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.3	53.0	46.7	

Test Results (ASTM D6913)

Sieve Size or Diam. (mm.)	Finer (%)	Spec.* (%)	Out of Spec. (%)	Pct. of Fines
3/8	100.0			
#4	100.0			
#10	100.0			
#20	100.0			
#40	99.7			
#60	98.5			
#100	78.8			
#140	55.0			
#200	46.7			

* (no specification provided)

Material Description

Light gray clayey fine SAND

Atterberg Limits

PL= 17 LL= 36 PI= 19

Coefficients

D_{90}= 0.1868 D_{85}= 0.1687 D_{60}= 0.1154
D_{50}= 0.0897 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SC AASHTO= A-6(5)

Test Remarks

NMC = 26.0%

Source of Sample: B-02 Depth: 48.5-50.0 ft.
Sample Number: 12 Sample Date:

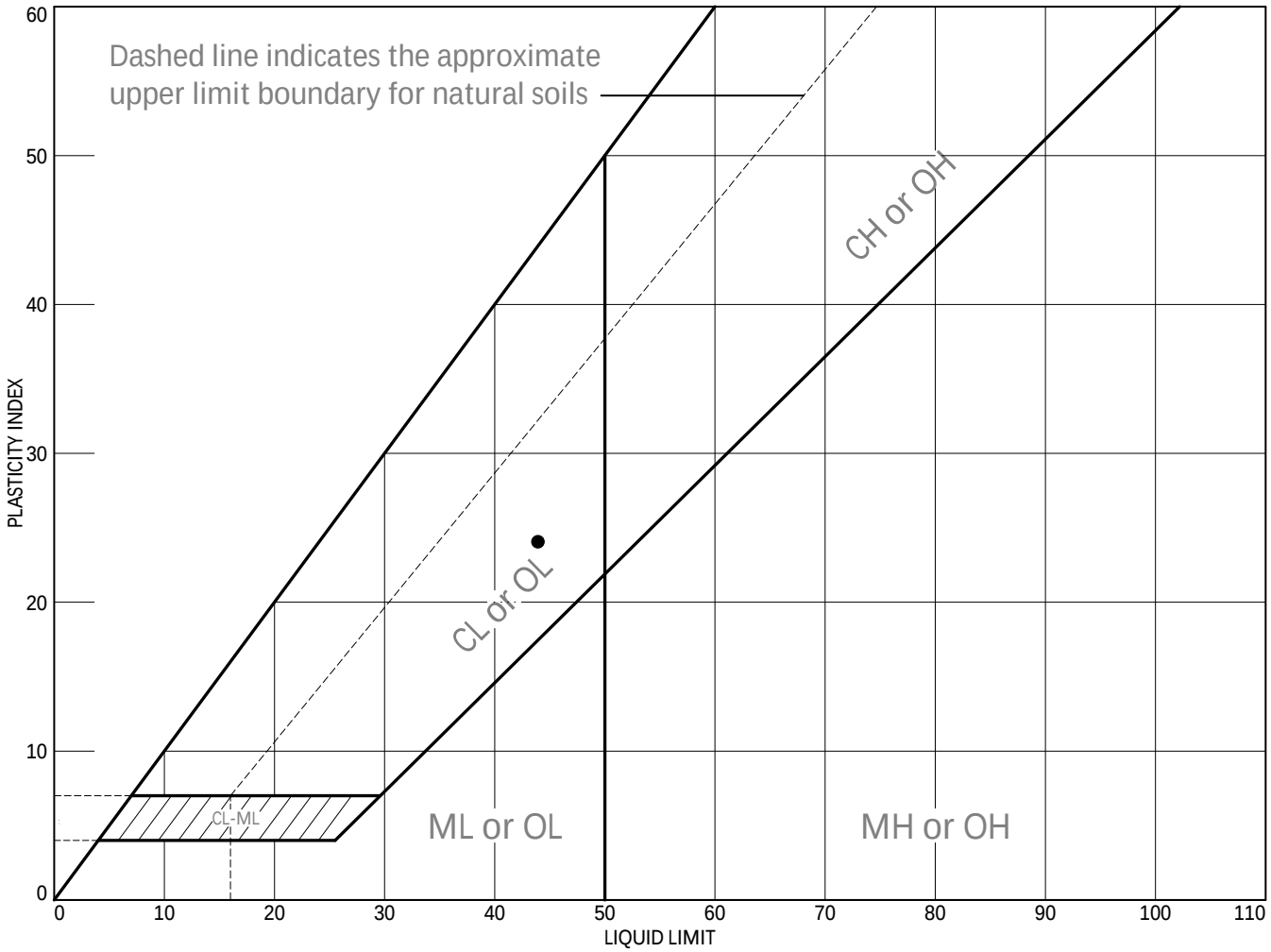
NOVA ENGINEERING
Kennesaw, Georgia
770-425-0777

Client: Heath & Lineback Engineers, Inc.
Project: CR 153 (Cypress Lake Rd.) Over Dry Branch

Project No: 10102-2025112 Date Tested 12/22/25

Tested By: LY Checked By: MLS

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Light gray clayey fine SAND	44	20	24	99.1	37.3	SC

Project No. 10102-2025112 Client: Heath & Lineback Engineers, Inc.

Project: CR 153 (Cypress Lake Rd.) Over Dry Branch

●Source of Sample: B-02 Depth: 58.5-60.0 ft. Sample Number: 14

Remarks:

NOVA ENGINEERING
Kennesaw, Georgia
770-425-0777

Date Tested 12/23/25

Tested By: GH Checked By: MLS

Particle Size Distribution Report

ASTM D6913

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.9	61.8	37.3	

Test Results (ASTM D6913)

Sieve Size or Diam. (mm.)	Finer (%)	Spec.* (%)	Out of Spec. (%)	Pct. of Fines
3/8	100.0			
#4	100.0			
#10	100.0			
#20	99.9			
#40	99.1			
#60	96.8			
#100	72.3			
#140	44.2			
#200	37.3			

* (no specification provided)

Material Description

Light gray clayey fine SAND

Atterberg Limits

PL= 20 LL= 44 PI= 24

Coefficients

D_{90}= 0.2024 D_{85}= 0.1840 D_{60}= 0.1293
D_{50}= 0.1156 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SC AASHTO= A-7-6(4)

Test Remarks

NMC = 36.7%

Source of Sample: B-02 Depth: 58.5-60.0 ft.
Sample Number: 14 Sample Date:

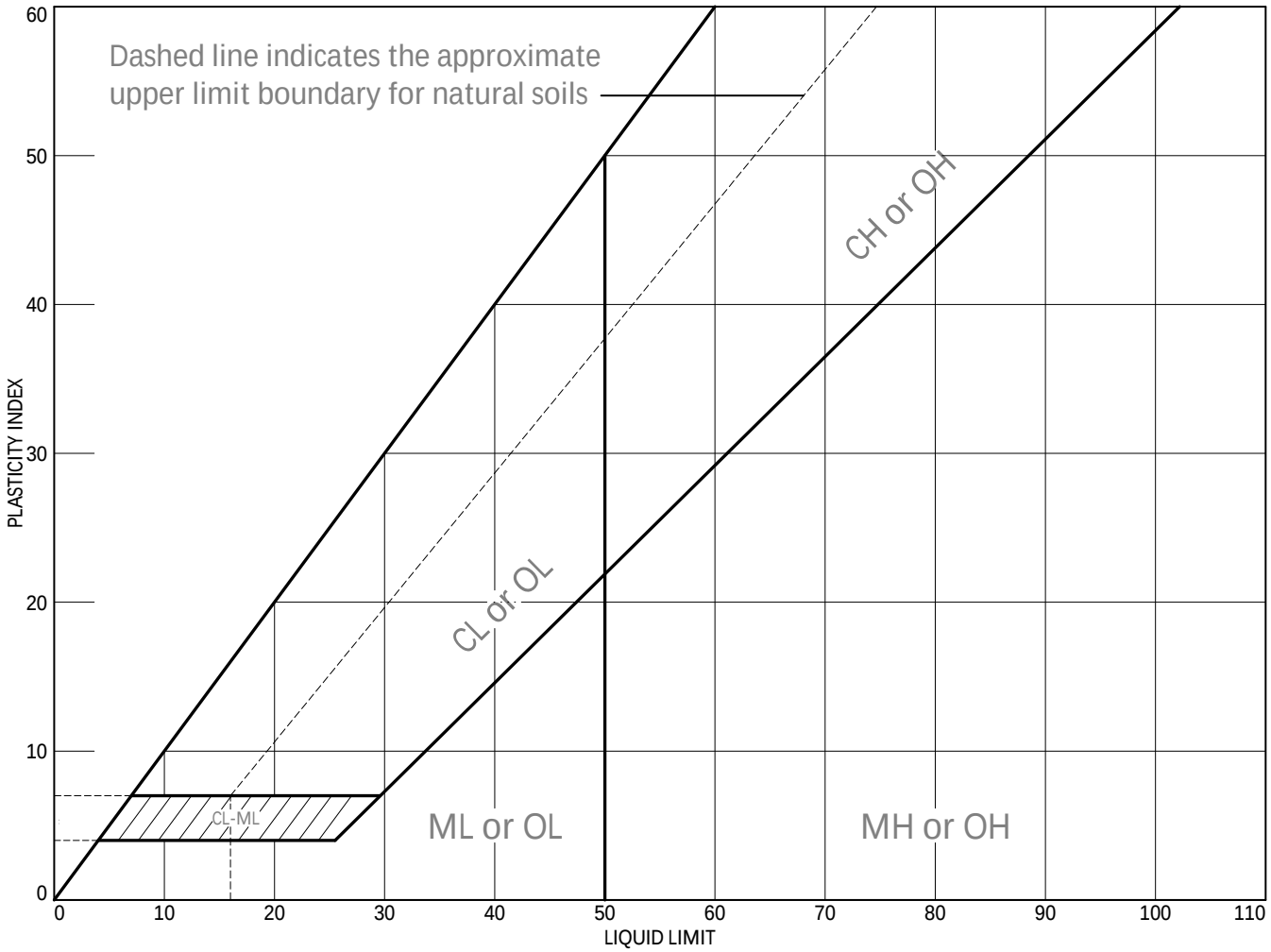
NOVA ENGINEERING
Kennesaw, Georgia
770-425-0777

Client: Heath & Lineback Engineers, Inc.
Project: CR 153 (Cypress Lake Rd.) Over Dry Branch

Project No: 10102-2025112 Date Tested 12/22/25

Tested By: LY Checked By: MLS

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray silty medium to fine SAND	NP	NP	NP	82.8	12.2	SM

Project No. 10102-2025112 Client: Heath & Lineback Engineers, Inc.

Project: CR 153 (Cypress Lake Rd.) Over Dry Branch

●Source of Sample: B-02 Depth: 73.5-75.0 ft. Sample Number: 17

Remarks:

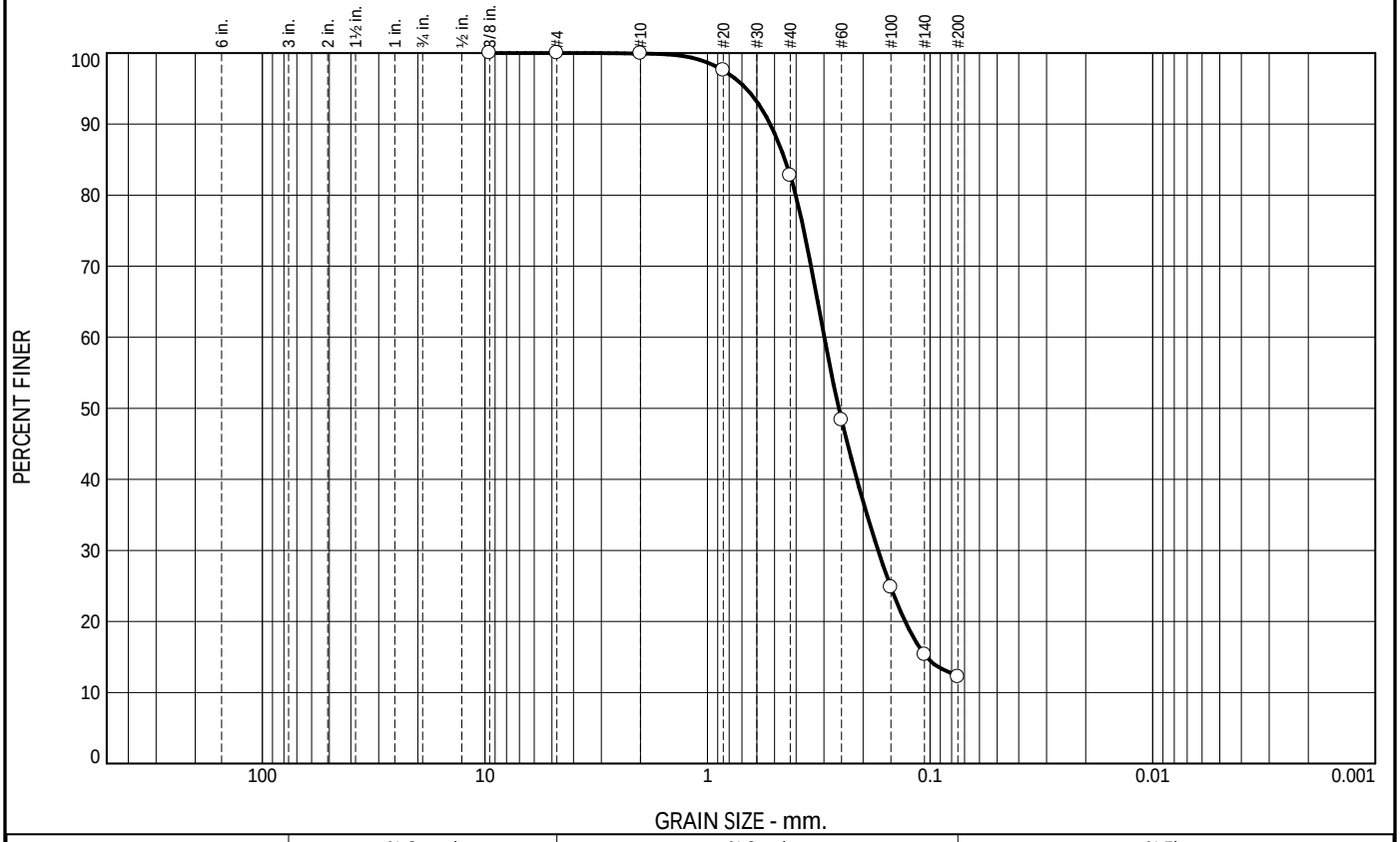
NOVA ENGINEERING
Kennesaw, Georgia
770-425-0777

Date Tested 12/22/25

Tested By: GH Checked By: MLS

Particle Size Distribution Report

ASTM D6913



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	17.1	70.6	12.2	

Test Results (ASTM D6913)

Sieve Size or Diam. (mm.)	Finer (%)	Spec.* (%)	Out of Spec. (%)	Pct. of Fines
3/8	100.0			
#4	100.0			
#10	99.9			
#20	97.6			
#40	82.8			
#60	48.4			
#100	24.8			
#140	15.3			
#200	12.2			

* (no specification provided)

Material Description

Gray silty medium to fine SAND

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{90}= 0.5231 D_{85}= 0.4488 D_{60}= 0.2986
D_{50}= 0.2572 D_{30}= 0.1713 D_{15}= 0.1040
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Test Remarks

NMC = 27.1%

Source of Sample: B-02 Depth: 73.5-75.0 ft.
Sample Number: 17 Sample Date:

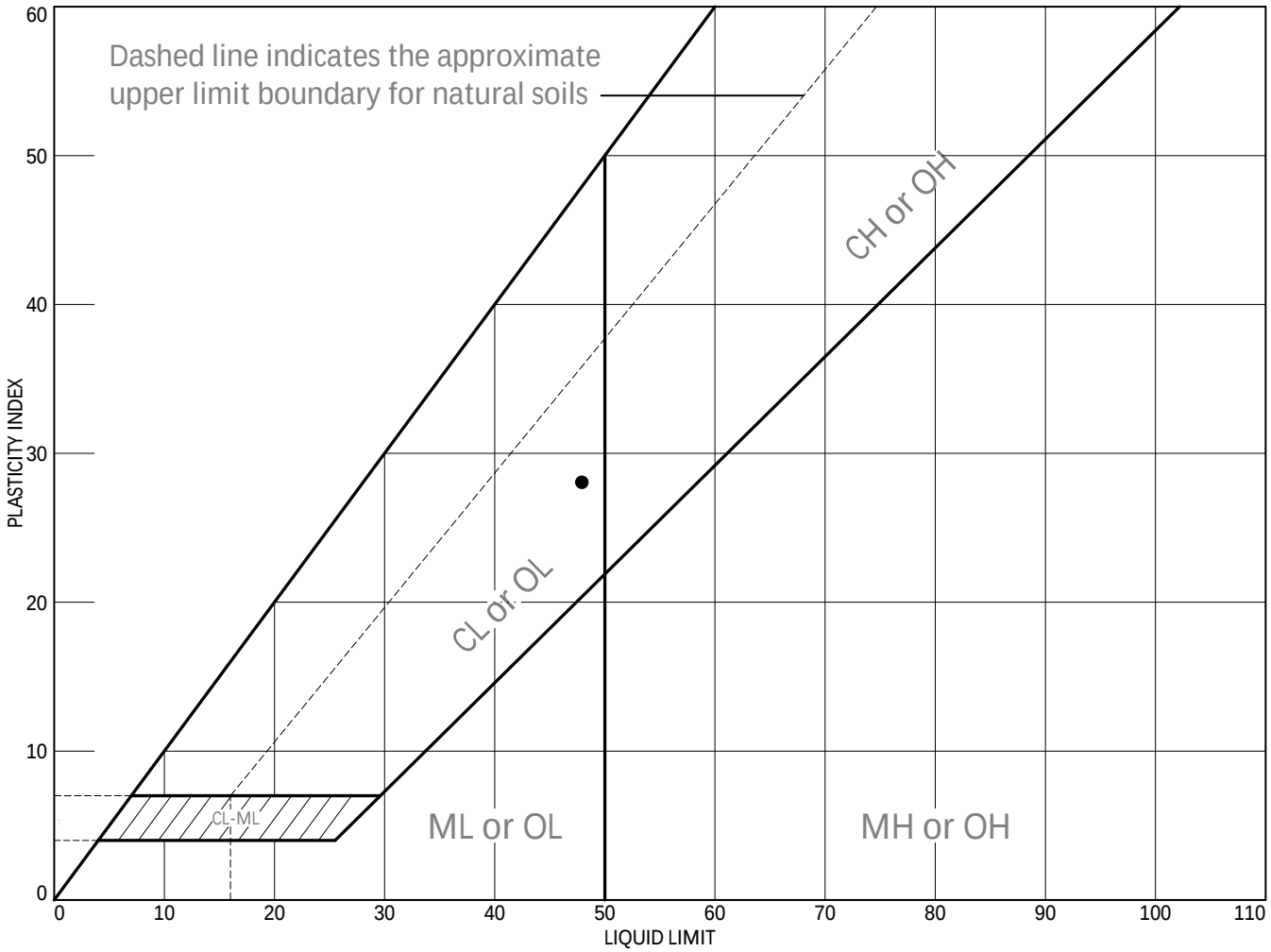
NOVA ENGINEERING
Kennesaw, Georgia
770-425-0777

Client: Heath & Lineback Engineers, Inc.
Project: CR 153 (Cypress Lake Rd.) Over Dry Branch

Project No: 10102-2025112 Date Tested 12/22/25

Tested By: LY Checked By: MLS

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray clayey fine SAND	48	20	28	96.8	37.8	SC

Project No. 10102-2025112 Client: Heath & Lineback Engineers, Inc.

Project: CR 153 (Cypress Lake Rd.) Over Dry Branch

●Source of Sample: B-02 Depth: 93.5-95.0 ft. Sample Number: 21

Remarks:

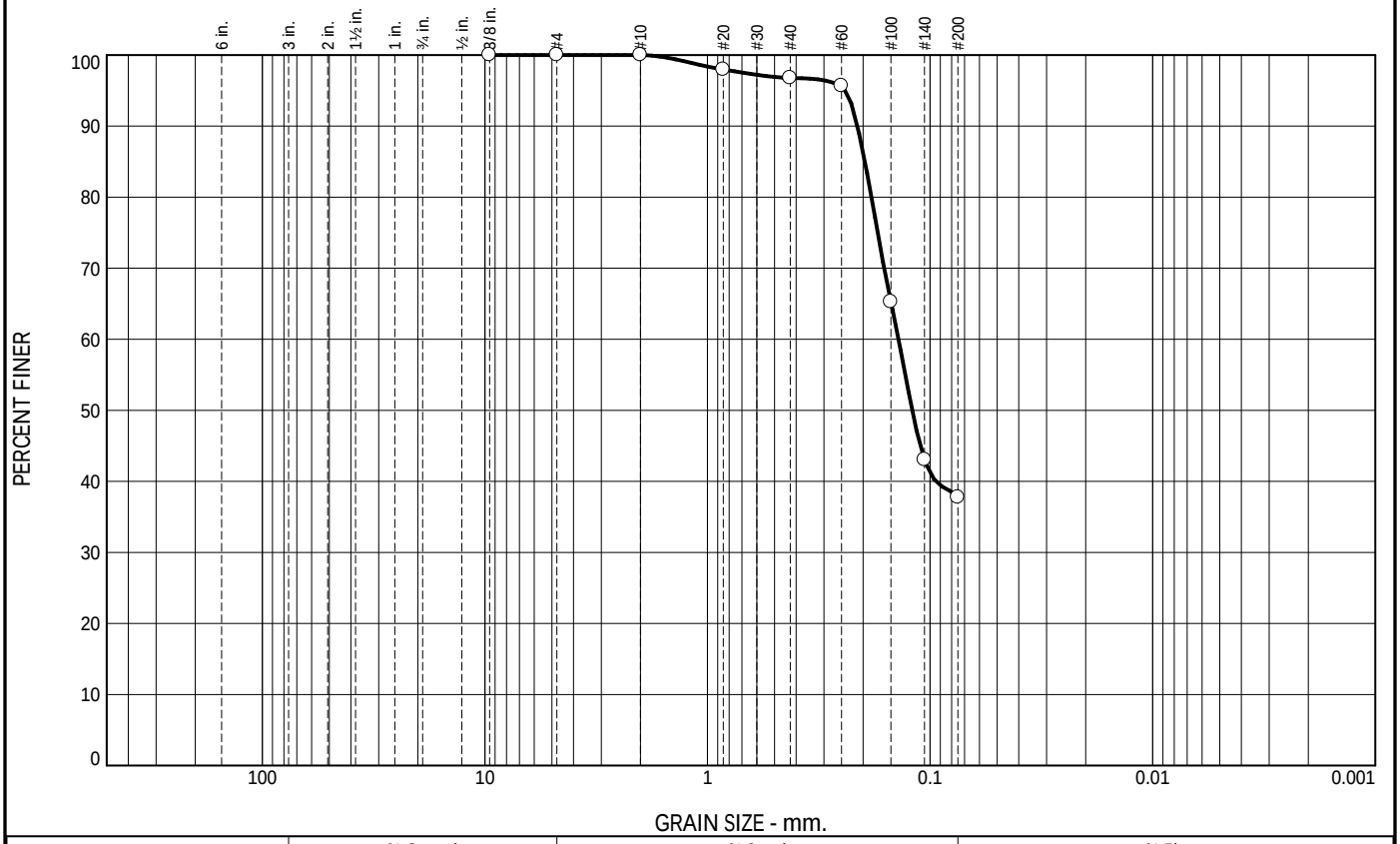
NOVA ENGINEERING
Kennesaw, Georgia
770-425-0777

Date Tested 12/22/25

Tested By: GH Checked By: MLS

Particle Size Distribution Report

ASTM D6913



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	3.2	59.0	37.8	

Test Results (ASTM D6913)

Sieve Size or Diam. (mm.)	Finer (%)	Spec.* (%)	Out of Spec. (%)	Pct. of Fines
3/8	100.0			
#4	100.0			
#10	100.0			
#20	98.0			
#40	96.8			
#60	95.7			
#100	65.3			
#140	43.1			
#200	37.8			

* (no specification provided)

Material Description

Gray clayey fine SAND

Atterberg Limits

PL= 20 LL= 48 PI= 28

Coefficients

D_{90}= 0.2122 D_{85}= 0.1964 D_{60}= 0.1386
D_{50}= 0.1203 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SC AASHTO= A-7-6(5)

Test Remarks

NMC = 32.2%

Source of Sample: B-02 Depth: 93.5-95.0 ft.
Sample Number: 21 Sample Date:

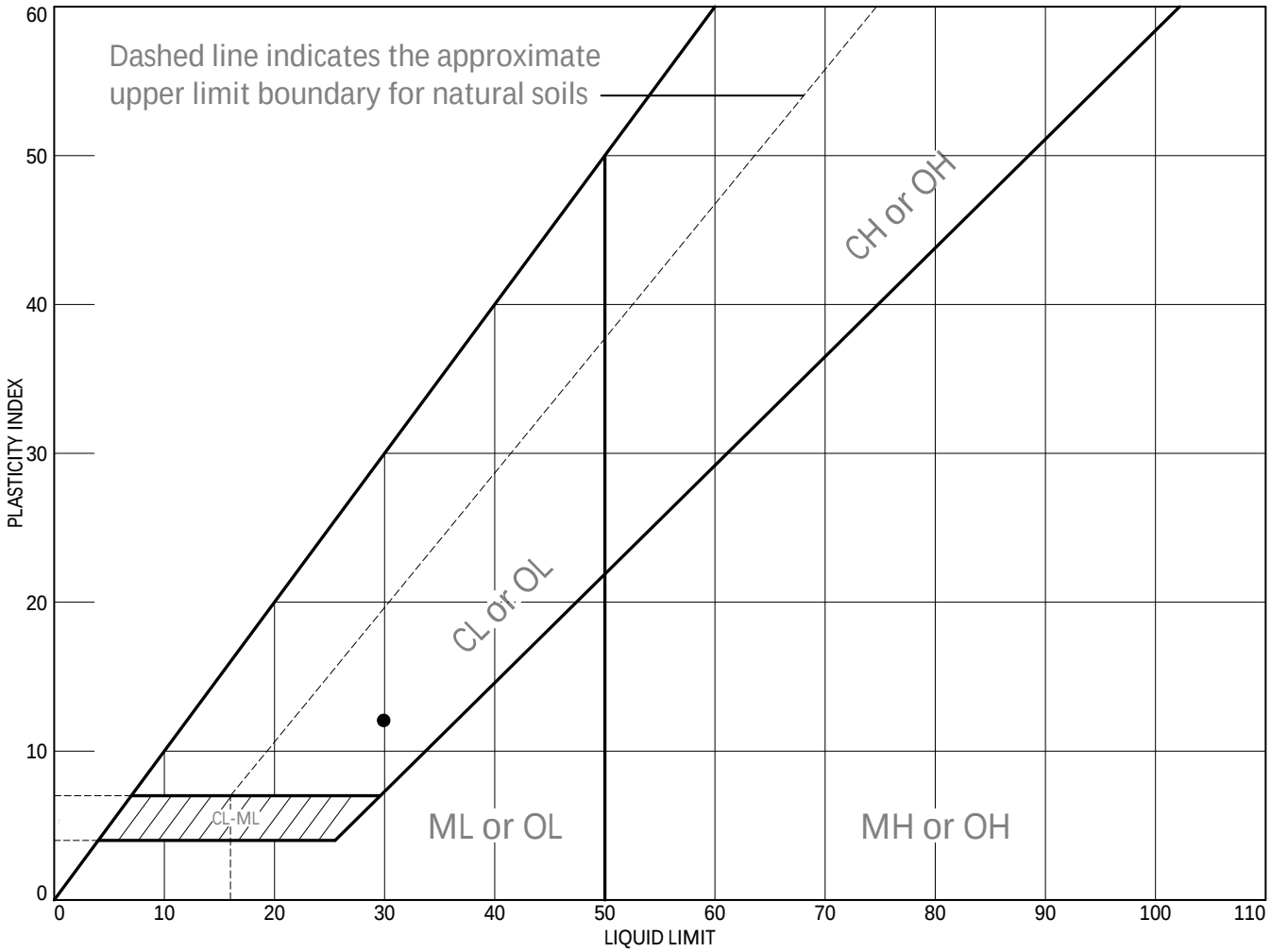
NOVA ENGINEERING
Kennesaw, Georgia
770-425-0777

Client: Heath & Lineback Engineers, Inc.
Project: CR 153 (Cypress Lake Rd.) Over Dry Branch

Project No: 10102-2025112 Date Tested 12/22/25

Tested By: LY Checked By: MLS

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray clayey fine SAND	30	18	12	99.0	27.4	SC

Project No. 10102-2025112 Client: Heath & Lineback Engineers, Inc.

Project: CR 153 (Cypress Lake Rd.) Over Dry Branch

●Source of Sample: B-02 Depth: 103.5-105.0 ft. Sample Number: 23

Remarks:

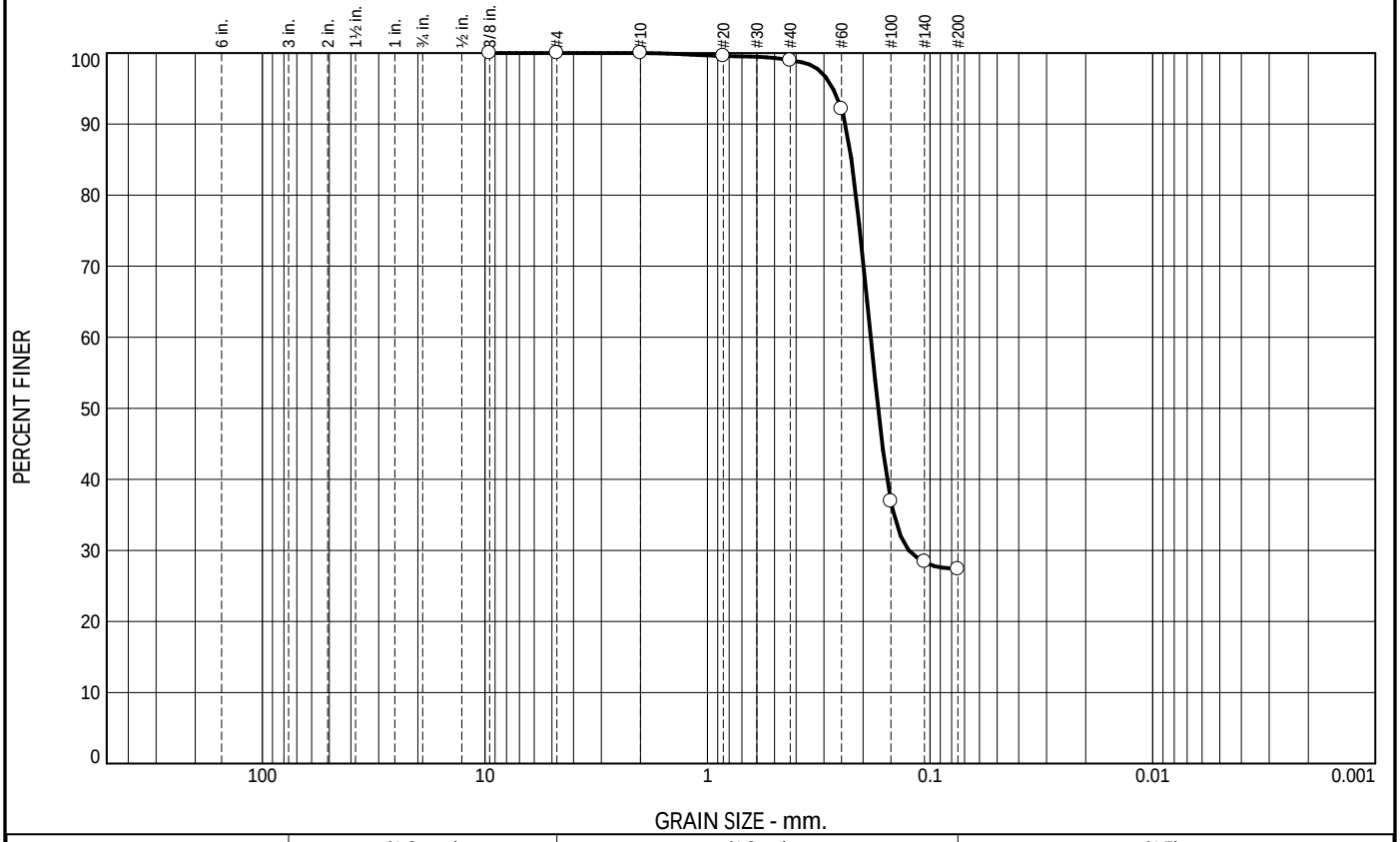
NOVA ENGINEERING
Kennesaw, Georgia
770-425-0777

Date Tested 12/22/25

Tested By: GH Checked By: MLS

Particle Size Distribution Report

ASTM D6913



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	1.0	71.6	27.4	

Test Results (ASTM D6913)

Sieve Size or Diam. (mm.)	Finer (%)	Spec.* (%)	Out of Spec. (%)	Pct. of Fines
3/8	100.0			
#4	100.0			
#10	100.0			
#20	99.6			
#40	99.0			
#60	92.2			
#100	36.9			
#140	28.4			
#200	27.4			

* (no specification provided)

Material Description

Gray clayey fine SAND

Atterberg Limits

PL= 18 LL= 30 PI= 12

Coefficients

D_{90}= 0.2399 D_{85}= 0.2258 D_{60}= 0.1849
D_{50}= 0.1713 D_{30}= 0.1246 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SC AASHTO= A-2-6(0)

Test Remarks

NMC = 22.0%

Source of Sample: B-02 Depth: 103.5-105.0 ft.
Sample Number: 23 Sample Date:

NOVA ENGINEERING
Kennesaw, Georgia
770-425-0777

Client: Heath & Lineback Engineers, Inc.
Project: CR 153 (Cypress Lake Rd.) Over Dry Branch

Project No: 10102-2025112 Date Tested 12/22/25

Tested By: LY Checked By: MLS

APPENDIX E

SEISMIC SITE CLASS CALCULATIONS

SEISMIC SITE CLASS SUMMARY

CR 153 (Cypress Lake Road) Over Dry Branch

County Project No. E15/ NOVA Project No. 10102-2025112

Borehole No.	Station	Offset	Average N	Site Class
B-01	103+33	2 ft. LT	21.2	D
B-02	104+68	CL	13.9	E
		Average	17.6	D

NOVA

SEISMIC SITE CLASS CALCULATION
(AASHTO LRFD 3.10.3.1 - Method B)

CR 153 (Cypress Lake Road) Over Dry Branch

County Project No. E15/ NOVA Project No. 10102-2025112

Boring No.		B-01		% Energy:		84.0
Location/Station:		STA. 103+33, 2 ft. LT		Boring Elevation (feet):		149.1
SC Reference Elev. (feet):		149.1		Date		3/4/2026
Elevation (feet)	Boring Depth (feet) *	N (bl/ft)	SC Depth (feet) **	N_{60} (bl/ft)	d_i (feet)	d_i/N_i
145.6	3.5	20	3.5	28.0	3.5	0.12500
143.6	5.5	14	5.5	19.6	2.0	0.10204
140.6	8.5	13	8.5	18.2	3.0	0.16484
135.6	13.5	11	13.5	15.4	5.0	0.32468
131.1	18.0	17	18.0	23.8	4.5	0.18908
126.1	23.0	9	23.0	12.6	5.0	0.39683
120.6	28.5	14	28.5	19.6	5.5	0.28061
116.1	33.0	8	33.0	11.2	4.5	0.40179
111.1	38.0	12	38.0	16.8	5.0	0.29762
105.6	43.5	8	43.5	11.2	5.5	0.49107
101.1	48.0	14	48.0	19.6	4.5	0.22959
95.6	53.5	45	53.5	63.0	5.5	0.08730
91.1	58.0	23	58	32.2	4.5	0.13975
85.6	63.5	11	63.5	15.4	5.5	0.35714
81.1	68.0	9	68	12.6	4.5	0.35714
75.6	73.5	26	73.5	36.4	5.5	0.15110
70.6	78.5	21	78.5	29.4	5.0	0.17007
66.1	83.0	16	83	22.4	4.5	0.20089
60.6	88.5	100	88.5	100.0	5.5	0.05500
56.1	93.0	100	93	100.0	4.5	0.04500
49.6	99.5	30	99.5	42.0	6.5	0.15476
49.1	100.0	100	100	100.0	0.5	0.00500

* Boring log depth to bottom of layer. ** Site Class depth to bottom of layer.

Average N	21.2
Site Class	D

SEISMIC SITE CLASS CALCULATION
(AASHTO LRFD 3.10.3.1 - Method B)

CR 153 (Cypress Lake Road) Over Dry Branch

County Project No. E15/ NOVA Project No. 10102-2025112

Boring No.		B-02		% Energy:		84.0
Location/Station:		STA. 104+68, CL		Boring Elevation (feet):		149.3
SC Reference Elev. (feet):		149.3		Date		3/4/2026
Elevation (feet)	Boring Depth (feet) *	N (bl/ft)	SC Depth (feet) **	N_{60} (bl/ft)	d_i (feet)	d_i/N_i
145.8	3.5	15	3.5	21.0	3.5	0.16667
143.8	5.5	14	5.5	19.6	2.0	0.10204
141.3	8.0	8	8.0	11.2	2.5	0.22321
135.8	13.5	17	13.5	23.8	5.5	0.23109
131.3	18.0	31	18.0	43.4	4.5	0.10369
125.8	23.5	9	23.5	12.6	5.5	0.43651
121.3	28.0	22	28.0	30.8	4.5	0.14610
116.3	33.0	1	33.0	1.4	5.0	3.57143
111.3	38.0	21	38.0	29.4	5.0	0.17007
105.8	43.5	16	43.5	22.4	5.5	0.24554
100.8	48.5	25	48.5	35.0	5.0	0.14286
95.8	53.5	20	53.5	28.0	5.0	0.17857
90.8	58.5	21	58.5	29.4	5.0	0.17007
86.3	63.0	9	63	12.6	4.5	0.35714
80.8	68.5	17	68.5	23.8	5.5	0.23109
75.8	73.5	25	73.5	35.0	5.0	0.14286
71.3	78.0	38	78	53.2	4.5	0.08459
66.3	83.0	28	83	39.2	5.0	0.12755
60.8	88.5	29	88.5	40.6	5.5	0.13547
55.8	93.5	28	93.5	39.2	5.0	0.12755
51.3	98.0	42	98	58.8	4.5	0.07653
49.3	100.0	100	100	100.0	2.0	0.02000

* Boring log depth to bottom of layer. ** Site Class depth to bottom of layer.

Average N	13.9
Site Class	E

APPENDIX F

FOUNDATION DESIGN LOADS

Heath & Lineback Engineers, Inc.
10 Glenlake Pkwy NE, North Tower, Suite 800 | Sandy Springs, Georgia 30328
e-mail: hle@heath-lineback.com
770.424.1668 • (FAX) 770.424.2907

A BCC COMPANY

January 28, 2026

Mr. Eric Tay
Project Geotechnical Engineer
3900 Kennesaw 75 Parkway, Suite 100
Kennesaw, GA 30144

RE: CR 153 (Cypress Lake Road) over Dry Branch

Dear Mr. Tay,

Our office has completed the calculation of the pile loads for each bent. Tabulated below are the anticipated Foundation Loads for the referenced project to complete the BFI.

PILE DESIGN LOADS AND PILE PROPERTIES

Bent(s)	Bent Description	PILE TYPE	Maximum Factored Strength Limit State Load (kips)	Maximum Factored Service Limit State Load (kips)	Factored Extreme Event I Limit State Load (kips)	Pile Size (in)		Nominal Compression Stress (ksi)	Nominal Tension Stress (ksi)	Maximum Factored Structural Resistance (kips)
						Dia.	Wall Thickness			
1	End Bent	Metal Shell Pile	225	155	110	18	0.3125	40.5	40.5	-
2	Pile Bent	Metal Shell Pile	315	240	265	24	0.5	40.5	40.5	-
3	Pile Bent	Metal Shell Pile	315	240	265	24	0.5	40.5	40.5	-
4	End Bent	Metal Shell Pile	225	155	110	18	0.3125	40.5	40.5	-

Note: Reactions are given at assumed fixity point (10ft below groundline per GDOT Bridge Policy Manual) and include the self weight of the piles

Please let us know if you have any questions.

Sincerely,
Heath & Lineback Engineers, Inc.

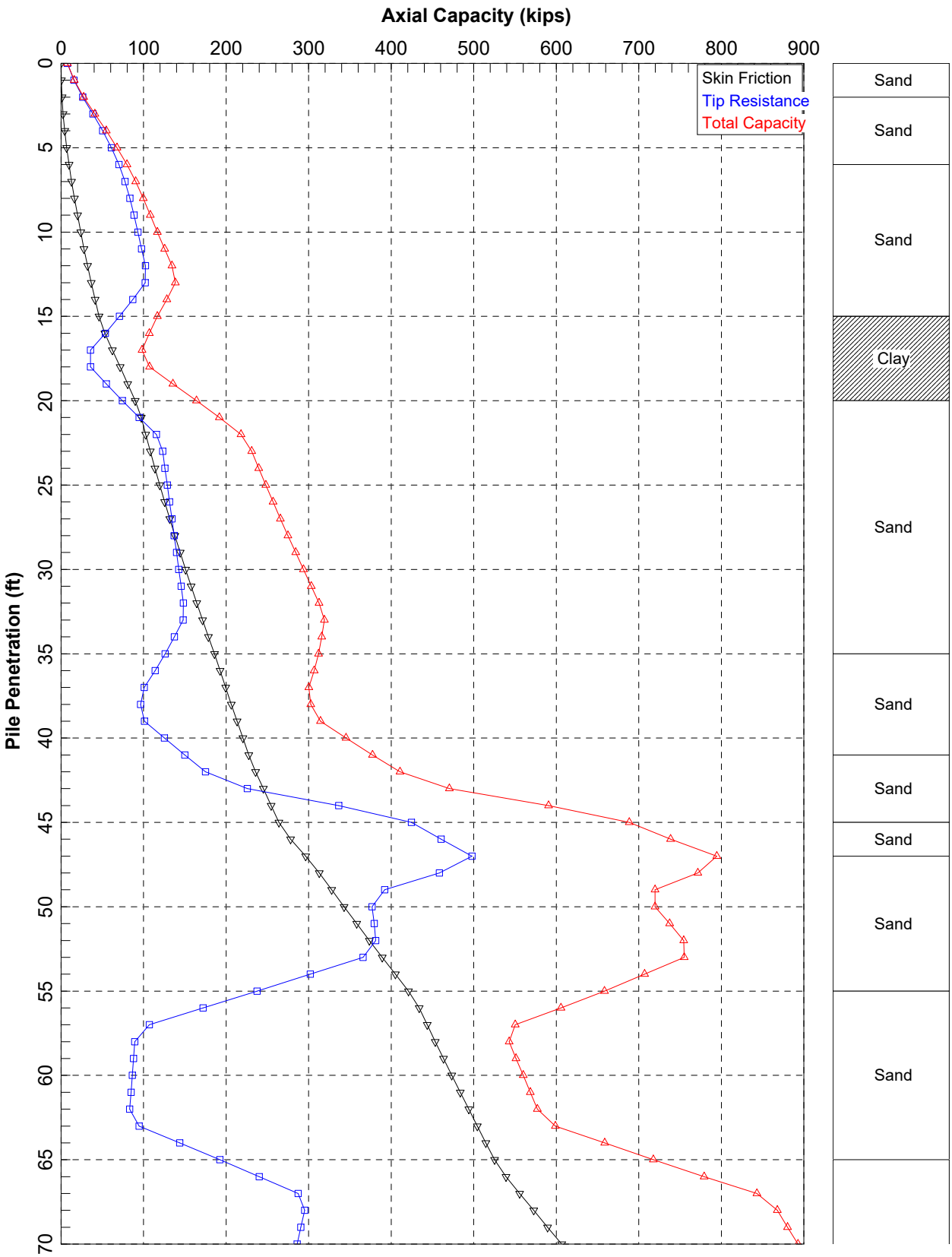
Denzel Caldwell, P.E.

APPENDIX G

AXIAL PILE RESISTANCE ANALYSES

(APILE Version 2025.11.1)

Reference Elevation at 146 feet



CR 153 Over Dry Branch - BENT 1 (MS Pile - 18" dia.)

Reference Elevation at 146 feet

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

                                   APILE 2025.11.1

                         A Program for Analyzing the Axial Capacity
                         and Short-term Settlement of Driven Piles
                                   under Axial Loading.

                              License ID : C6148310213
                              License Type : Office Cloud
                    This software is licensed for exclusive use by Nova Engineering & Environmenta

                              (c) Copyright ENSOFT, Inc., 1987-2024
                                   All Rights Reserved

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


     Model ran by               : ESegismundo

     Path to file locations     : C:\Users\esegismundo\OneDrive - NOVA Engineering and
Environmental\Desktop\BFI\Calculations\APile\BENT 1 (B-01)\
     Name of input data file    : CR153 Over Dry Branch-Bent 1.ap11d
     Name of output file        : CR153 Over Dry Branch-Bent 1.ap11o
     Name of plot output file   : CR153 Over Dry Branch-Bent 1.ap11p

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

               Date:  February 10, 2026     Time:  05:51:54


1
          **********************
          * INPUT INFORMATION *
          **********************

          PROJECT DESCRIPTION   :
          CR 153 Over Dry Branch - BENT 1 (MS Pile - 18" dia.)
          DESIGNER   : Ezequiel Q. Segismundo
          JOB NUMBER : 10102-2025112

          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 :
          Steel pipe pile or non-tapered portion of monotube pile
          - Close-Ended Pile

           AVERAGE DEPTH TO ESTIMATE TIP RESISTANCE:
          - USE 1.5 DIAMETERS ABOVE AND BELOW TIP

          DATA FOR AXIAL STIFFNESS :
          - MODULUS OF ELASTICITY     = 0.290E+08 PSI
          - CROSS SECTION AREA        =     17.36 IN2

          CIRCULAR PILE PROPERTIES :
          - OUTSIDE DIAMETER, OD      =     18.00 IN.
          - INTERNAL DIAMETER, ID     =     17.38 IN.
          - TOTAL PILE LENGTH, TL     =     70.00 FT.
          - BATTER ANGLE              =      0.00 DEG
          - PILE STICKUP LENGTH, PSL  =      0.00 FT.
          - ZERO FRICTION LENGTH, ZFL =      0.00 FT.
          - INCREMENT OF PILE LENGTH
            USED IN COMPUTATION       =      1.00 FT.
          - PRINTING INCREMENT        =         1
          - LENGTH OF ENHANCED
            END SECTION               =     70.00 FT.
          - INTERNAL DIAMETER OF
            ENHANCED END SECTION      =     17.38 IN.
```

Reference Elevation at 146 feet

PLUGGED/UNPLUGGED CONDITIONS :
Internal Pile Plug Calculated by Program

SOIL INFORMATIONS :

DEPTH FT.	SOIL TYPE	LATERAL EARTH PRESSURE	EFFECTIVE UNIT WEIGHT LB/FT^3	FRICTION ANGLE DEGREES	Nq FACTOR FHWA
0.00	SAND	0.80*	115.00	0.00	4.80**
2.00	SAND	0.80*	115.00	0.00	4.80**
2.00	SAND	0.80*	115.00	0.00	4.80**
6.00	SAND	0.80*	115.00	0.00	4.80**
6.00	SAND	0.80*	52.60	0.00	4.80**
15.00	SAND	0.80*	52.60	0.00	4.80**
15.00	CLAY	0.80*	47.60	0.00	4.80**
20.00	CLAY	0.80*	47.60	0.00	4.80**
20.00	SAND	0.80*	50.90	0.00	4.80**
35.00	SAND	0.80*	50.90	0.00	4.80**
35.00	SAND	0.80*	47.60	0.00	4.80**
41.00	SAND	0.80*	47.60	0.00	4.80**
41.00	SAND	0.80*	52.60	0.00	4.80**
45.00	SAND	0.80*	52.60	0.00	4.80**
45.00	SAND	0.80*	62.60	0.00	4.80**
47.00	SAND	0.80*	62.60	0.00	4.80**
47.00	SAND	0.80*	57.60	0.00	4.80**
55.00	SAND	0.80*	57.60	0.00	4.80**
55.00	SAND	0.80*	50.10	0.00	4.80**
65.00	SAND	0.80*	50.10	0.00	4.80**
65.00	SAND	0.80*	55.90	0.00	4.80**
80.00	SAND	0.80*	55.90	0.00	4.80**
80.00	SAND	0.80*	67.60	0.00	4.80**
90.00	SAND	0.80*	67.60	0.00	4.80**
90.00	SAND	0.80*	57.60	0.00	4.80**
97.00	SAND	0.80*	57.60	0.00	4.80**
97.00	SAND	0.80*	67.60	0.00	4.80**
107.00	SAND	0.80*	67.60	0.00	4.80**

* VALUE ASSUMED BY THE PROGRAM
** VALUE ESTIMATED BY THE PROGRAM BASED ON FRICTION ANGLE

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*	0.10E+08*	0.00	0.00	20.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	20.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	19.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	19.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	19.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	19.00	0.00	0.00
0.10E+08*	0.10E+08*	1.95	0.00	0.00	0.00	0.00
0.10E+08*	0.10E+08*	1.95	0.00	0.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	16.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	16.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	11.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	11.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	20.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	20.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	63.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	63.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	32.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	32.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	14.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	14.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	29.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	29.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	100.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	100.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	42.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	42.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	100.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	100.00	0.00	0.00

* MAXIMUM UNIT FRICTION AND/OR MAXIMUM UNIT BEARING
WERE SET TO LARGE VALUES INDICATING THAT APILE
USES THE LIMITS SPECIFIED BY EACH SELECTED
CRITERIA (IF ANY).

Reference Elevation at 146 feet

DEPTH FT.	LRFD FACTOR ON UNIT FRICTION	LRFD FACTOR ON UNIT BEARING
0.00	1.000	1.000
2.00	1.000	1.000
2.00	1.000	1.000
6.00	1.000	1.000
6.00	1.000	1.000
15.00	1.000	1.000
15.00	1.000	1.000
20.00	1.000	1.000
20.00	1.000	1.000
35.00	1.000	1.000
35.00	1.000	1.000
41.00	1.000	1.000
41.00	1.000	1.000
45.00	1.000	1.000
45.00	1.000	1.000
47.00	1.000	1.000
47.00	1.000	1.000
55.00	1.000	1.000
55.00	1.000	1.000
65.00	1.000	1.000
65.00	1.000	1.000
80.00	1.000	1.000
80.00	1.000	1.000
90.00	1.000	1.000
90.00	1.000	1.000
97.00	1.000	1.000
97.00	1.000	1.000
107.00	1.000	1.000

DEPTH FT.	Z PEAK IN.	T RESIDUAL
0.00	0.180 *	0.00
2.00	0.180 *	0.00
2.00	0.180 *	0.00
6.00	0.180 *	0.00
6.00	0.180 *	0.00
15.00	0.180 *	0.00
15.00	0.180 *	0.90 **
20.00	0.180 *	0.90 **
20.00	0.180 *	0.00
35.00	0.180 *	0.00
35.00	0.180 *	0.00
41.00	0.180 *	0.00
41.00	0.180 *	0.00
45.00	0.180 *	0.00
45.00	0.180 *	0.00
47.00	0.180 *	0.00
47.00	0.180 *	0.00
55.00	0.180 *	0.00
55.00	0.180 *	0.00
65.00	0.180 *	0.00
65.00	0.180 *	0.00
80.00	0.180 *	0.00
80.00	0.180 *	0.00
90.00	0.180 *	0.00
90.00	0.180 *	0.00
97.00	0.180 *	0.00
97.00	0.180 *	0.00
107.00	0.180 *	0.00

* DEFAULT VALUE = 0.01 D
** DEFAULT VALUE = 0.9

1

****
* COMPUTATION RESULT *
****

Reference Elevation at 146 feet

****
* FED. HWY. METHOD *
****

PILE LENGTH BELOW GND. FT.	SKIN FRICTION KIP	END BEARING KIP	ULTIMATE CAPACITY KIP
0.00	0.0	7.7	7.7
1.00	0.3	15.6	15.9
2.00	1.1	26.2	27.3
3.00	2.5	38.5	41.0
4.00	4.4	50.4	54.7
5.00	6.8	61.0	67.7
6.00	9.6	70.0	79.7
7.00	12.8	77.5	90.3
8.00	16.3	83.5	99.7
9.00	19.9	88.3	108.2
10.00	23.8	93.0	116.8
11.00	27.8	97.6	125.5
12.00	32.1	102.2	134.3
13.00	36.6	101.9	138.5
14.00	41.2	86.8	128.1
15.00	46.1	70.8	116.8
16.00	53.1	53.7	106.8
17.00	62.3	35.7	98.0
18.00	71.5	35.6	107.2
19.00	80.7	54.7	135.4
20.00	89.9	74.3	164.2
21.00	97.1	94.6	191.8
22.00	102.5	115.6	218.1
23.00	108.1	123.0	231.1
24.00	113.7	125.8	239.6
25.00	119.6	128.6	248.1
26.00	125.5	131.4	256.9
27.00	131.6	134.2	265.8
28.00	137.9	137.1	274.9
29.00	144.3	139.9	284.2
30.00	150.8	142.7	293.6
31.00	157.5	145.5	303.0
32.00	164.4	148.2	312.6
33.00	171.4	147.8	319.1
34.00	178.5	137.4	315.9
35.00	185.8	126.1	311.9
36.00	192.8	114.0	306.7
37.00	199.5	100.9	300.3
38.00	206.3	96.3	302.7
39.00	213.2	101.1	314.4
40.00	220.3	125.2	345.4
41.00	227.4	150.0	377.4
42.00	235.7	175.0	410.7
43.00	245.0	225.6	470.6
44.00	254.5	336.3	590.8
45.00	264.1	424.4	688.5
46.00	278.0	460.6	738.7
47.00	296.4	498.0	794.4
48.00	313.0	458.5	771.5
49.00	327.8	392.0	719.8
50.00	342.9	376.9	719.8
51.00	358.1	379.4	737.5
52.00	373.5	381.1	754.6
53.00	389.1	365.8	755.0
54.00	405.0	302.0	707.0
55.00	421.0	237.4	658.3
56.00	433.9	171.9	605.8
57.00	443.6	106.8	550.4
58.00	453.5	89.4	542.9
59.00	463.5	87.9	551.3
60.00	473.5	86.3	559.9
61.00	483.7	84.8	568.5
62.00	494.0	83.2	577.2
63.00	504.4	94.5	598.8
64.00	514.8	143.8	658.6
65.00	525.4	192.4	717.7
66.00	539.0	240.2	779.2
67.00	555.7	287.2	843.0
68.00	572.6	295.3	867.9
69.00	589.6	290.6	880.2

Minimum Depth of Pile Tip @ 33 ft.

Estimated Depth of Pile Tip @ 45 ft.

Bent 1
Required Nominal Driving Resistance, Rndr = 347 kips

Reference Elevation at 146 feet

70.00	606.7	286.2	892.9

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	0.4167E-01		
			0.0000E+00	0.0000E+00
			0.1053E-01	0.2880E-01
			0.1754E-01	0.5580E-01
			0.2631E-01	0.1026E+00
			0.3158E-01	0.1440E+00
			0.3509E-01	0.1800E+00
			0.3509E-01	0.3600E+00
			0.3509E-01	0.5400E+00
			0.3509E-01	0.9000E+00
			0.3509E-01	0.3600E+01
2	10	0.1000E+01		
			0.0000E+00	0.0000E+00
			0.2526E+00	0.2880E-01
			0.4210E+00	0.5580E-01
			0.6315E+00	0.1026E+00
			0.7578E+00	0.1440E+00
			0.8420E+00	0.1800E+00
			0.8420E+00	0.3600E+00
			0.8420E+00	0.5400E+00
			0.8420E+00	0.9000E+00
			0.8420E+00	0.3600E+01
3	10	0.1958E+01		
			0.0000E+00	0.0000E+00
			0.4886E+00	0.2880E-01
			0.8144E+00	0.5580E-01
			0.1222E+01	0.1026E+00
			0.1466E+01	0.1440E+00
			0.1629E+01	0.1800E+00
			0.1629E+01	0.3600E+00
			0.1629E+01	0.5400E+00
			0.1629E+01	0.9000E+00
			0.1629E+01	0.3600E+01
4	10	0.2042E+01		
			0.0000E+00	0.0000E+00
			0.5079E+00	0.2880E-01
			0.8465E+00	0.5580E-01
			0.1270E+01	0.1026E+00
			0.1524E+01	0.1440E+00
			0.1693E+01	0.1800E+00
			0.1693E+01	0.3600E+00
			0.1693E+01	0.5400E+00
			0.1693E+01	0.9000E+00
			0.1693E+01	0.3600E+01
5	10	0.4000E+01		
			0.0000E+00	0.0000E+00
			0.9411E+00	0.2880E-01
			0.1569E+01	0.5580E-01
			0.2353E+01	0.1026E+00
			0.2823E+01	0.1440E+00
			0.3137E+01	0.1800E+00
			0.3137E+01	0.3600E+00
			0.3137E+01	0.5400E+00
			0.3137E+01	0.9000E+00
			0.3137E+01	0.3600E+01
6	10	0.5958E+01		
			0.0000E+00	0.0000E+00
			0.1365E+01	0.2880E-01
			0.2276E+01	0.5580E-01
			0.3413E+01	0.1026E+00
			0.4096E+01	0.1440E+00

Reference Elevation at 146 feet

			0.4551E+01	0.1800E+00
			0.4551E+01	0.3600E+00
			0.4551E+01	0.5400E+00
			0.4551E+01	0.9000E+00
			0.4551E+01	0.3600E+01
7	10	0.6042E+01		
			0.0000E+00	0.0000E+00
			0.1378E+01	0.2880E-01
			0.2297E+01	0.5580E-01
			0.3446E+01	0.1026E+00
			0.4135E+01	0.1440E+00
			0.4594E+01	0.1800E+00
			0.4594E+01	0.3600E+00
			0.4594E+01	0.5400E+00
			0.4594E+01	0.9000E+00
			0.4594E+01	0.3600E+01
8	10	0.1050E+02		
			0.0000E+00	0.0000E+00
			0.1794E+01	0.2880E-01
			0.2990E+01	0.5580E-01
			0.4485E+01	0.1026E+00
			0.5383E+01	0.1440E+00
			0.5981E+01	0.1800E+00
			0.5981E+01	0.3600E+00
			0.5981E+01	0.5400E+00
			0.5981E+01	0.9000E+00
			0.5981E+01	0.3600E+01
9	10	0.1496E+02		
			0.0000E+00	0.0000E+00
			0.2185E+01	0.2880E-01
			0.3642E+01	0.5580E-01
			0.5462E+01	0.1026E+00
			0.6555E+01	0.1440E+00
			0.7283E+01	0.1800E+00
			0.7283E+01	0.3600E+00
			0.7283E+01	0.5400E+00
			0.7283E+01	0.9000E+00
			0.7283E+01	0.3600E+01
10	10	0.1504E+02		
			0.0000E+00	0.0000E+00
			0.2267E+01	0.2880E-01
			0.3778E+01	0.5580E-01
			0.5667E+01	0.1026E+00
			0.6800E+01	0.1440E+00
			0.7555E+01	0.1800E+00
			0.6800E+01	0.3600E+00
			0.6800E+01	0.5400E+00
			0.6800E+01	0.9000E+00
			0.6800E+01	0.3600E+01
11	10	0.1750E+02		
			0.0000E+00	0.0000E+00
			0.4063E+01	0.2880E-01
			0.6771E+01	0.5580E-01
			0.1016E+02	0.1026E+00
			0.1219E+02	0.1440E+00
			0.1354E+02	0.1800E+00
			0.1219E+02	0.3600E+00
			0.1219E+02	0.5400E+00
			0.1219E+02	0.9000E+00
			0.1219E+02	0.3600E+01
12	10	0.1996E+02		
			0.0000E+00	0.0000E+00
			0.4063E+01	0.2880E-01
			0.6771E+01	0.5580E-01
			0.1016E+02	0.1026E+00
			0.1219E+02	0.1440E+00
			0.1354E+02	0.1800E+00
			0.1219E+02	0.3600E+00
			0.1219E+02	0.5400E+00
			0.1219E+02	0.9000E+00
			0.1219E+02	0.3600E+01
13	10	0.2004E+02		
			0.0000E+00	0.0000E+00
			0.3991E+01	0.2880E-01
			0.6652E+01	0.5580E-01
			0.9978E+01	0.1026E+00
			0.1197E+02	0.1440E+00
			0.1330E+02	0.1800E+00
			0.1330E+02	0.3600E+00
			0.1330E+02	0.5400E+00

Reference Elevation at 146 feet

			0.1330E+02	0.9000E+00
			0.1330E+02	0.3600E+01
14	10	0.2750E+02		
			0.0000E+00	0.0000E+00
			0.2762E+01	0.2880E-01
			0.4603E+01	0.5580E-01
			0.6905E+01	0.1026E+00
			0.8286E+01	0.1440E+00
			0.9206E+01	0.1800E+00
			0.9206E+01	0.3600E+00
			0.9206E+01	0.5400E+00
			0.9206E+01	0.9000E+00
			0.9206E+01	0.3600E+01
15	10	0.3496E+02		
			0.0000E+00	0.0000E+00
			0.3251E+01	0.2880E-01
			0.5419E+01	0.5580E-01
			0.8128E+01	0.1026E+00
			0.9754E+01	0.1440E+00
			0.1084E+02	0.1800E+00
			0.1084E+02	0.3600E+00
			0.1084E+02	0.5400E+00
			0.1084E+02	0.9000E+00
			0.1084E+02	0.3600E+01
16	10	0.3504E+02		
			0.0000E+00	0.0000E+00
			0.3241E+01	0.2880E-01
			0.5401E+01	0.5580E-01
			0.8102E+01	0.1026E+00
			0.9722E+01	0.1440E+00
			0.1080E+02	0.1800E+00
			0.1080E+02	0.3600E+00
			0.1080E+02	0.5400E+00
			0.1080E+02	0.9000E+00
			0.1080E+02	0.3600E+01
17	10	0.3800E+02		
			0.0000E+00	0.0000E+00
			0.3039E+01	0.2880E-01
			0.5065E+01	0.5580E-01
			0.7598E+01	0.1026E+00
			0.9118E+01	0.1440E+00
			0.1013E+02	0.1800E+00
			0.1013E+02	0.3600E+00
			0.1013E+02	0.5400E+00
			0.1013E+02	0.9000E+00
			0.1013E+02	0.3600E+01
18	10	0.4096E+02		
			0.0000E+00	0.0000E+00
			0.3185E+01	0.2880E-01
			0.5308E+01	0.5580E-01
			0.7962E+01	0.1026E+00
			0.9555E+01	0.1440E+00
			0.1062E+02	0.1800E+00
			0.1062E+02	0.3600E+00
			0.1062E+02	0.5400E+00
			0.1062E+02	0.9000E+00
			0.1062E+02	0.3600E+01
19	10	0.4104E+02		
			0.0000E+00	0.0000E+00
			0.3225E+01	0.2880E-01
			0.5375E+01	0.5580E-01
			0.8063E+01	0.1026E+00
			0.9676E+01	0.1440E+00
			0.1075E+02	0.1800E+00
			0.1075E+02	0.3600E+00
			0.1075E+02	0.5400E+00
			0.1075E+02	0.9000E+00
			0.1075E+02	0.3600E+01
20	10	0.4300E+02		
			0.0000E+00	0.0000E+00
			0.4162E+01	0.2880E-01
			0.6936E+01	0.5580E-01
			0.1040E+02	0.1026E+00
			0.1249E+02	0.1440E+00
			0.1387E+02	0.1800E+00
			0.1387E+02	0.3600E+00
			0.1387E+02	0.5400E+00
			0.1387E+02	0.9000E+00
			0.1387E+02	0.3600E+01
21	10	0.4496E+02		

Reference Elevation at 146 feet

			0.0000E+00	0.0000E+00
			0.4268E+01	0.2880E-01
			0.7113E+01	0.5580E-01
			0.1067E+02	0.1026E+00
			0.1280E+02	0.1440E+00
			0.1423E+02	0.1800E+00
			0.1423E+02	0.3600E+00
			0.1423E+02	0.5400E+00
			0.1423E+02	0.9000E+00
			0.1423E+02	0.3600E+01
22	10	0.4504E+02		
			0.0000E+00	0.0000E+00
			0.4426E+01	0.2880E-01
			0.7377E+01	0.5580E-01
			0.1107E+02	0.1026E+00
			0.1328E+02	0.1440E+00
			0.1475E+02	0.1800E+00
			0.1475E+02	0.3600E+00
			0.1475E+02	0.5400E+00
			0.1475E+02	0.9000E+00
			0.1475E+02	0.3600E+01
23	10	0.4600E+02		
			0.0000E+00	0.0000E+00
			0.8024E+01	0.2880E-01
			0.1337E+02	0.5580E-01
			0.2006E+02	0.1026E+00
			0.2407E+02	0.1440E+00
			0.2675E+02	0.1800E+00
			0.2675E+02	0.3600E+00
			0.2675E+02	0.5400E+00
			0.2675E+02	0.9000E+00
			0.2675E+02	0.3600E+01
24	10	0.4696E+02		
			0.0000E+00	0.0000E+00
			0.8195E+01	0.2880E-01
			0.1366E+02	0.5580E-01
			0.2049E+02	0.1026E+00
			0.2459E+02	0.1440E+00
			0.2732E+02	0.1800E+00
			0.2732E+02	0.3600E+00
			0.2732E+02	0.5400E+00
			0.2732E+02	0.9000E+00
			0.2732E+02	0.3600E+01
25	10	0.4704E+02		
			0.0000E+00	0.0000E+00
			0.8132E+01	0.2880E-01
			0.1355E+02	0.5580E-01
			0.2033E+02	0.1026E+00
			0.2440E+02	0.1440E+00
			0.2711E+02	0.1800E+00
			0.2711E+02	0.3600E+00
			0.2711E+02	0.5400E+00
			0.2711E+02	0.9000E+00
			0.2711E+02	0.3600E+01
26	10	0.5100E+02		
			0.0000E+00	0.0000E+00
			0.6778E+01	0.2880E-01
			0.1130E+02	0.5580E-01
			0.1694E+02	0.1026E+00
			0.2033E+02	0.1440E+00
			0.2259E+02	0.1800E+00
			0.2259E+02	0.3600E+00
			0.2259E+02	0.5400E+00
			0.2259E+02	0.9000E+00
			0.2259E+02	0.3600E+01
27	10	0.5496E+02		
			0.0000E+00	0.0000E+00
			0.7112E+01	0.2880E-01
			0.1185E+02	0.5580E-01
			0.1778E+02	0.1026E+00
			0.2134E+02	0.1440E+00
			0.2371E+02	0.1800E+00
			0.2371E+02	0.3600E+00
			0.2371E+02	0.5400E+00
			0.2371E+02	0.9000E+00
			0.2371E+02	0.3600E+01
28	10	0.5504E+02		
			0.0000E+00	0.0000E+00
			0.6998E+01	0.2880E-01
			0.1166E+02	0.5580E-01

Reference Elevation at 146 feet

			0.1749E+02	0.1026E+00
			0.2099E+02	0.1440E+00
			0.2333E+02	0.1800E+00
			0.2333E+02	0.3600E+00
			0.2333E+02	0.5400E+00
			0.2333E+02	0.9000E+00
			0.2333E+02	0.3600E+01
29	10	0.6000E+02		
			0.0000E+00	0.0000E+00
			0.4475E+01	0.2880E-01
			0.7459E+01	0.5580E-01
			0.1119E+02	0.1026E+00
			0.1343E+02	0.1440E+00
			0.1492E+02	0.1800E+00
			0.1492E+02	0.3600E+00
			0.1492E+02	0.5400E+00
			0.1492E+02	0.9000E+00
			0.1492E+02	0.3600E+01
30	10	0.6496E+02		
			0.0000E+00	0.0000E+00
			0.4687E+01	0.2880E-01
			0.7812E+01	0.5580E-01
			0.1172E+02	0.1026E+00
			0.1406E+02	0.1440E+00
			0.1562E+02	0.1800E+00
			0.1562E+02	0.3600E+00
			0.1562E+02	0.5400E+00
			0.1562E+02	0.9000E+00
			0.1562E+02	0.3600E+01
31	10	0.6504E+02		
			0.0000E+00	0.0000E+00
			0.4800E+01	0.2880E-01
			0.8000E+01	0.5580E-01
			0.1200E+02	0.1026E+00
			0.1440E+02	0.1440E+00
			0.1600E+02	0.1800E+00
			0.1600E+02	0.3600E+00
			0.1600E+02	0.5400E+00
			0.1600E+02	0.9000E+00
			0.1600E+02	0.3600E+01
32	10	0.7250E+02		
			0.0000E+00	0.0000E+00
			0.7591E+01	0.2880E-01
			0.1265E+02	0.5580E-01
			0.1898E+02	0.1026E+00
			0.2277E+02	0.1440E+00
			0.2530E+02	0.1800E+00
			0.2530E+02	0.3600E+00
			0.2530E+02	0.5400E+00
			0.2530E+02	0.9000E+00
			0.2530E+02	0.3600E+01
33	10	0.7996E+02		
			0.0000E+00	0.0000E+00
			0.7591E+01	0.2880E-01
			0.1265E+02	0.5580E-01
			0.1898E+02	0.1026E+00
			0.2277E+02	0.1440E+00
			0.2530E+02	0.1800E+00
			0.2530E+02	0.3600E+00
			0.2530E+02	0.5400E+00
			0.2530E+02	0.9000E+00
			0.2530E+02	0.3600E+01
34	10	0.8004E+02		
			0.0000E+00	0.0000E+00
			0.7591E+01	0.2880E-01
			0.1265E+02	0.5580E-01
			0.1898E+02	0.1026E+00
			0.2277E+02	0.1440E+00
			0.2530E+02	0.1800E+00
			0.2530E+02	0.3600E+00
			0.2530E+02	0.5400E+00
			0.2530E+02	0.9000E+00
			0.2530E+02	0.3600E+01
35	10	0.8500E+02		
			0.0000E+00	0.0000E+00
			0.7591E+01	0.2880E-01
			0.1265E+02	0.5580E-01
			0.1898E+02	0.1026E+00
			0.2277E+02	0.1440E+00
			0.2530E+02	0.1800E+00

Reference Elevation at 146 feet

			0.2530E+02	0.3600E+00
			0.2530E+02	0.5400E+00
			0.2530E+02	0.9000E+00
			0.2530E+02	0.3600E+01
36	10	0.8996E+02		
			0.0000E+00	0.0000E+00
			0.7591E+01	0.2880E-01
			0.1265E+02	0.5580E-01
			0.1898E+02	0.1026E+00
			0.2277E+02	0.1440E+00
			0.2530E+02	0.1800E+00
			0.2530E+02	0.3600E+00
			0.2530E+02	0.5400E+00
			0.2530E+02	0.9000E+00
			0.2530E+02	0.3600E+01
37	10	0.9004E+02		
			0.0000E+00	0.0000E+00
			0.7591E+01	0.2880E-01
			0.1265E+02	0.5580E-01
			0.1898E+02	0.1026E+00
			0.2277E+02	0.1440E+00
			0.2530E+02	0.1800E+00
			0.2530E+02	0.3600E+00
			0.2530E+02	0.5400E+00
			0.2530E+02	0.9000E+00
			0.2530E+02	0.3600E+01
38	10	0.9350E+02		
			0.0000E+00	0.0000E+00
			0.7591E+01	0.2880E-01
			0.1265E+02	0.5580E-01
			0.1898E+02	0.1026E+00
			0.2277E+02	0.1440E+00
			0.2530E+02	0.1800E+00
			0.2530E+02	0.3600E+00
			0.2530E+02	0.5400E+00
			0.2530E+02	0.9000E+00
			0.2530E+02	0.3600E+01
39	10	0.9696E+02		
			0.0000E+00	0.0000E+00
			0.7591E+01	0.2880E-01
			0.1265E+02	0.5580E-01
			0.1898E+02	0.1026E+00
			0.2277E+02	0.1440E+00
			0.2530E+02	0.1800E+00
			0.2530E+02	0.3600E+00
			0.2530E+02	0.5400E+00
			0.2530E+02	0.9000E+00
			0.2530E+02	0.3600E+01
40	10	0.9704E+02		
			0.0000E+00	0.0000E+00
			0.7591E+01	0.2880E-01
			0.1265E+02	0.5580E-01
			0.1898E+02	0.1026E+00
			0.2277E+02	0.1440E+00
			0.2530E+02	0.1800E+00
			0.2530E+02	0.3600E+00
			0.2530E+02	0.5400E+00
			0.2530E+02	0.9000E+00
			0.2530E+02	0.3600E+01
41	10	0.1020E+03		
			0.0000E+00	0.0000E+00
			0.7591E+01	0.2880E-01
			0.1265E+02	0.5580E-01
			0.1898E+02	0.1026E+00
			0.2277E+02	0.1440E+00
			0.2530E+02	0.1800E+00
			0.2530E+02	0.3600E+00
			0.2530E+02	0.5400E+00
			0.2530E+02	0.9000E+00
			0.2530E+02	0.3600E+01
42	10	0.1070E+03		
			0.0000E+00	0.0000E+00
			0.7591E+01	0.2880E-01
			0.1265E+02	0.5580E-01
			0.1898E+02	0.1026E+00
			0.2277E+02	0.1440E+00
			0.2530E+02	0.1800E+00
			0.2530E+02	0.3600E+00
			0.2530E+02	0.5400E+00
			0.2530E+02	0.9000E+00

Reference Elevation at 146 feet

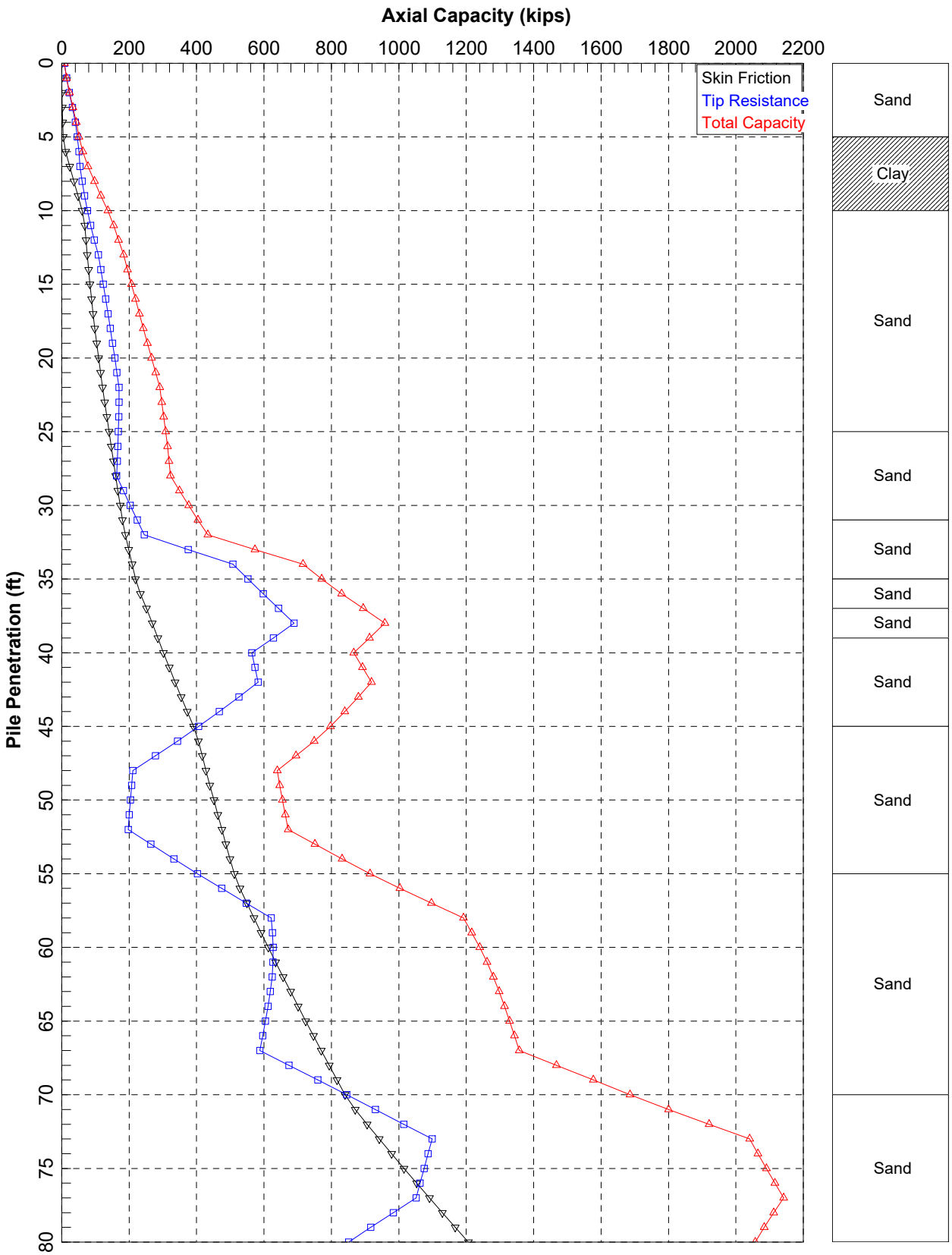
0.2530E+02 0.3600E+01

TIP LOAD KIP	TIP MOVEMENT IN.
0.0000E+00	0.0000E+00
0.1789E+02	0.9000E-02
0.3578E+02	0.1800E-01
0.7155E+02	0.3600E-01
0.1431E+03	0.2340E+00
0.2147E+03	0.7560E+00
0.2576E+03	0.1314E+01
0.2862E+03	0.1800E+01
0.2862E+03	0.2700E+01
0.2862E+03	0.3600E+01

LOAD VERSUS SETTLEMENT CURVE
****

TOP LOAD KIP	TOP MOVEMENT IN.	TIP LOAD KIP	TIP MOVEMENT IN.
0.3809E+01	0.2802E-02	0.1988E+00	0.1000E-03
0.3898E+02	0.2846E-01	0.1988E+01	0.1000E-02
0.1690E+03	0.1351E+00	0.9938E+01	0.5000E-02
0.2794E+03	0.2430E+00	0.1988E+02	0.1000E-01
0.4081E+03	0.4018E+00	0.3975E+02	0.2000E-01
0.5687E+03	0.6516E+00	0.7661E+02	0.5000E-01
0.6332E+03	0.7736E+00	0.8745E+02	0.8000E-01
0.6633E+03	0.8389E+00	0.9468E+02	0.1000E+00
0.7328E+03	0.1051E+01	0.1308E+03	0.2000E+00
0.7816E+03	0.1432E+01	0.1796E+03	0.5000E+00
0.8201E+03	0.1796E+01	0.2180E+03	0.8000E+00
0.8355E+03	0.2022E+01	0.2334E+03	0.1000E+01
0.8882E+03	0.3110E+01	0.2862E+03	0.2000E+01

Reference Elevation at 136 feet
500 Year Scour Elevation at 128 feet



CR 153 Over Dry Branch - BENT 2 (MS Pile - 24" dia.)

Reference Elevation at 136 feet
500 Year Scour Elevation at 128 feet

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

                                   APILE 2025.11.1

                         A Program for Analyzing the Axial Capacity
                         and Short-term Settlement of Driven Piles
                                   under Axial Loading.

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


     Model ran by               : ESegismundo

     Path to file locations     : C:\Users\esegismundo\OneDrive - NOVA Engineering and
Environmental\Desktop\BFI\Calculations\APile\BENT 2 (B-01)\
     Name of input data file    : CR153 Over Dry Branch-Bent 2.ap11d
     Name of output file        : CR153 Over Dry Branch-Bent 2.ap11o
     Name of plot output file   : CR153 Over Dry Branch-Bent 2.ap11p

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

               Date:  February 17, 2026     Time:  18:05:19


1
          **********************
          * INPUT INFORMATION *
          **********************

          PROJECT DESCRIPTION   :
          CR 153 Over Dry Branch - BENT 2 (MS Pile - 24" dia.)
          DESIGNER   : Ezequiel Q. Segismundo
          JOB NUMBER : 10102-2025112

          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 :
          Steel pipe pile or non-tapered portion of monotube pile
          - Close-Ended Pile

           AVERAGE DEPTH TO ESTIMATE TIP RESISTANCE:
          - USE 1.5 DIAMETERS ABOVE AND BELOW TIP

          DATA FOR AXIAL STIFFNESS :
          - MODULUS OF ELASTICITY     = 0.290E+08 PSI
          - CROSS SECTION AREA        =     36.91 IN2

          CIRCULAR PILE PROPERTIES :
          - OUTSIDE DIAMETER, OD      =     24.00 IN.
          - INTERNAL DIAMETER, ID     =     23.00 IN.
          - TOTAL PILE LENGTH, TL     =     90.00 FT.
          - BATTER ANGLE              =      0.00 DEG
          - PILE STICKUP LENGTH, PSL  =     10.00 FT.
          - ZERO FRICTION LENGTH, ZFL =      0.00 FT.
          - INCREMENT OF PILE LENGTH
            USED IN COMPUTATION       =      1.00 FT.
          - PRINTING INCREMENT        =         1
          - LENGTH OF ENHANCED
            END SECTION               =     90.00 FT.
          - INTERNAL DIAMETER OF
            ENHANCED END SECTION      =     23.00 IN.
```

Reference Elevation at 136 feet
500 Year Scour Elevation at 128 feet

PLUGGED/UNPLUGGED CONDITIONS :
Internal Pile Plug Calculated by Program

SOIL INFORMATIONS :

DEPTH FT.	SOIL TYPE	LATERAL EARTH PRESSURE	EFFECTIVE UNIT WEIGHT LB/FT^3	FRICTION ANGLE DEGREES	Nq FACTOR FHWA
0.00	SAND	0.80*	52.60	0.00	4.80**
5.00	SAND	0.80*	52.60	0.00	4.80**
5.00	CLAY	0.80*	47.60	0.00	4.80**
10.00	CLAY	0.80*	47.60	0.00	4.80**
10.00	SAND	0.80*	50.90	0.00	4.80**
25.00	SAND	0.80*	50.90	0.00	4.80**
25.00	SAND	0.80*	47.60	0.00	4.80**
31.00	SAND	0.80*	47.60	0.00	4.80**
31.00	SAND	0.80*	52.60	0.00	4.80**
35.00	SAND	0.80*	52.60	0.00	4.80**
35.00	SAND	0.80*	62.60	0.00	4.80**
37.00	SAND	0.80*	62.60	0.00	4.80**
37.00	SAND	0.80*	57.60	0.00	4.80**
39.00	SAND	0.80*	57.60	0.00	4.80**
39.00	SAND	0.80*	57.60	0.00	4.80**
45.00	SAND	0.80*	57.60	0.00	4.80**
45.00	SAND	0.80*	50.10	0.00	4.80**
55.00	SAND	0.80*	50.10	0.00	4.80**
55.00	SAND	0.80*	55.90	0.00	4.80**
70.00	SAND	0.80*	55.90	0.00	4.80**
70.00	SAND	0.80*	67.60	0.00	4.80**
80.00	SAND	0.80*	67.60	0.00	4.80**
80.00	SAND	0.80*	57.60	0.00	4.80**
87.00	SAND	0.80*	57.60	0.00	4.80**
87.00	SAND	0.80*	67.60	0.00	4.80**
97.00	SAND	0.80*	67.60	0.00	4.80**

* VALUE ASSUMED BY THE PROGRAM
** VALUE ESTIMATED BY THE PROGRAM BASED ON FRICTION ANGLE

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*	0.10E+08*	0.00	0.00	19.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	19.00	0.00	0.00
0.10E+08*	0.10E+08*	1.95	0.00	0.00	0.00	0.00
0.10E+08*	0.10E+08*	1.95	0.00	0.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	16.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	16.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	11.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	11.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	20.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	20.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	63.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	63.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	32.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	32.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	32.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	32.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	14.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	14.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	29.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	29.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	100.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	100.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	42.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	42.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	100.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	100.00	0.00	0.00

* MAXIMUM UNIT FRICTION AND/OR MAXIMUM UNIT BEARING
WERE SET TO LARGE VALUES INDICATING THAT APILE
USES THE LIMITS SPECIFIED BY EACH SELECTED
CRITERIA (IF ANY).

LRFD FACTOR ON UNIT	LRFD FACTOR ON UNIT

Reference Elevation at 136 feet
500 Year Scour Elevation at 128 feet

DEPTH FT.	FRICTION	BEARING
0.00	1.000	1.000
5.00	1.000	1.000
5.00	1.000	1.000
10.00	1.000	1.000
10.00	1.000	1.000
25.00	1.000	1.000
25.00	1.000	1.000
31.00	1.000	1.000
31.00	1.000	1.000
35.00	1.000	1.000
35.00	1.000	1.000
37.00	1.000	1.000
37.00	1.000	1.000
39.00	1.000	1.000
39.00	1.000	1.000
45.00	1.000	1.000
45.00	1.000	1.000
55.00	1.000	1.000
55.00	1.000	1.000
70.00	1.000	1.000
70.00	1.000	1.000
80.00	1.000	1.000
80.00	1.000	1.000
87.00	1.000	1.000
87.00	1.000	1.000
97.00	1.000	1.000

DEPTH FT.	Z PEAK IN.	T RESIDUAL
0.00	0.240 *	0.00
5.00	0.240 *	0.00
5.00	0.240 *	0.90 **
10.00	0.240 *	0.90 **
10.00	0.240 *	0.00
25.00	0.240 *	0.00
25.00	0.240 *	0.00
31.00	0.240 *	0.00
31.00	0.240 *	0.00
35.00	0.240 *	0.00
35.00	0.240 *	0.00
37.00	0.240 *	0.00
37.00	0.240 *	0.00
39.00	0.240 *	0.00
39.00	0.240 *	0.00
45.00	0.240 *	0.00
45.00	0.240 *	0.00
55.00	0.240 *	0.00
55.00	0.240 *	0.00
70.00	0.240 *	0.00
70.00	0.240 *	0.00
80.00	0.240 *	0.00
80.00	0.240 *	0.00
87.00	0.240 *	0.00
87.00	0.240 *	0.00
97.00	0.240 *	0.00

* DEFAULT VALUE = 0.01 D
** DEFAULT VALUE = 0.9

1

****
* COMPUTATION RESULT *
****

****
* FED. HWY. METHOD *
****

PILE LENGTH	SKIN	END	ULTIMATE

Reference Elevation at 136 feet
500 Year Scour Elevation at 128 feet

Bent 2
Approx. Scour Load @ 8 ft.
= 36 kips

Minimum Depth of Pile Tip
@ 23 ft.

Bent 2
Required Nominal Driving
Resistance, Rndr = 521 kips

Estimated Depth of Pile Tip
@ 35 ft.

BELOW GND. FT.	FRICTION KIP	BEARING KIP	CAPACITY KIP
0.00	0.0	8.2	8.2
1.00	0.2	14.5	14.7
2.00	0.7	22.5	23.2
3.00	1.7	31.7	33.4
4.00	2.9	40.0	42.9
5.00	4.6	46.4	51.0
6.00	11.6	51.1	62.7
7.00	23.9	54.0	77.8
8.00	36.1	60.8	97.0
9.00	48.4	67.8	116.2
10.00	60.6	76.1	136.7
11.00	68.4	85.6	154.0
12.00	71.8	96.4	168.2
13.00	75.6	108.4	183.9
14.00	79.6	115.8	195.4
15.00	83.8	123.1	206.9
16.00	88.4	130.2	218.6
17.00	93.2	137.2	230.4
18.00	98.2	144.1	242.3
19.00	103.6	150.8	254.3
20.00	109.1	157.4	266.5
21.00	114.9	163.8	278.7
22.00	121.0	170.1	291.0
23.00	127.3	169.7	297.0
24.00	133.8	169.0	302.8
25.00	140.6	168.0	308.5
26.00	147.1	166.6	313.7
27.00	153.3	165.0	318.3
28.00	159.8	163.0	322.8
29.00	166.4	183.0	349.4
30.00	173.2	203.4	376.6
31.00	180.2	224.1	404.3
32.00	188.6	245.1	433.8
33.00	198.5	374.9	573.3
34.00	208.6	507.6	716.1
35.00	218.9	552.2	771.1
36.00	233.2	597.4	830.6
37.00	251.5	643.2	894.7
38.00	268.9	689.5	958.4
39.00	285.2	627.9	913.1
40.00	301.9	564.1	866.0
41.00	319.0	573.4	892.3
42.00	336.4	582.3	918.7
43.00	354.2	526.0	880.2
44.00	372.4	467.4	839.8
45.00	390.9	406.5	797.4
46.00	405.7	343.4	749.2
47.00	416.8	278.2	695.0
48.00	428.1	211.1	639.2
49.00	439.6	207.1	646.7
50.00	451.2	203.5	654.6
51.00	463.0	200.1	663.1
52.00	475.0	197.1	672.1
53.00	487.1	264.1	751.2
54.00	499.4	332.6	832.1
55.00	511.9	402.8	914.7
56.00	528.5	474.4	1003.0
57.00	549.2	547.6	1096.8
58.00	570.2	621.4	1191.6
59.00	591.5	625.2	1216.6
60.00	612.9	626.9	1239.9
61.00	634.7	626.7	1261.4
62.00	656.7	624.0	1280.7
63.00	678.9	618.8	1297.7
64.00	701.3	612.0	1313.3
65.00	724.0	604.4	1328.4
66.00	746.9	596.3	1343.2
67.00	770.0	587.5	1357.5
68.00	793.3	674.0	1467.3
69.00	816.8	759.9	1576.8
70.00	840.6	845.3	1685.9
71.00	870.3	930.3	1800.5
72.00	906.0	1014.7	1920.6
73.00	942.1	1098.6	2040.7
74.00	978.7	1086.7	2065.4
75.00	1015.6	1074.9	2090.5
76.00	1053.0	1063.1	2116.0
77.00	1090.7	1051.3	2142.0

Reference Elevation at 136 feet
500 Year Scour Elevation at 128 feet

78.00	1128.9	983.6	2112.4
79.00	1167.4	916.9	2084.3
80.00	1206.3	851.4	2057.6

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	0.4167E-01		
			0.0000E+00	0.0000E+00
			0.5136E-02	0.3840E-01
			0.8560E-02	0.7440E-01
			0.1284E-01	0.1368E+00
			0.1541E-01	0.1920E+00
			0.1712E-01	0.2400E+00
			0.1712E-01	0.4800E+00
			0.1712E-01	0.7200E+00
			0.1712E-01	0.1200E+01
			0.1712E-01	0.4800E+01
2	10	0.2500E+01		
			0.0000E+00	0.0000E+00
			0.3052E+00	0.3840E-01
			0.5087E+00	0.7440E-01
			0.7631E+00	0.1368E+00
			0.9157E+00	0.1920E+00
			0.1017E+01	0.2400E+00
			0.1017E+01	0.4800E+00
			0.1017E+01	0.7200E+00
			0.1017E+01	0.1200E+01
			0.1017E+01	0.4800E+01
3	10	0.4958E+01		
			0.0000E+00	0.0000E+00
			0.5967E+00	0.3840E-01
			0.9945E+00	0.7440E-01
			0.1492E+01	0.1368E+00
			0.1790E+01	0.1920E+00
			0.1989E+01	0.2400E+00
			0.1989E+01	0.4800E+00
			0.1989E+01	0.7200E+00
			0.1989E+01	0.1200E+01
			0.1989E+01	0.4800E+01
4	10	0.5042E+01		
			0.0000E+00	0.0000E+00
			0.7458E+00	0.3840E-01
			0.1243E+01	0.7440E-01
			0.1865E+01	0.1368E+00
			0.2237E+01	0.1920E+00
			0.2486E+01	0.2400E+00
			0.2237E+01	0.4800E+00
			0.2237E+01	0.7200E+00
			0.2237E+01	0.1200E+01
			0.2237E+01	0.4800E+01
5	10	0.7500E+01		
			0.0000E+00	0.0000E+00
			0.4063E+01	0.3840E-01
			0.6771E+01	0.7440E-01
			0.1016E+02	0.1368E+00
			0.1219E+02	0.1920E+00
			0.1354E+02	0.2400E+00
			0.1219E+02	0.4800E+00
			0.1219E+02	0.7200E+00
			0.1219E+02	0.1200E+01
			0.1219E+02	0.4800E+01
6	10	0.9958E+01		
			0.0000E+00	0.0000E+00
			0.4063E+01	0.3840E-01
			0.6771E+01	0.7440E-01

Reference Elevation at 136 feet
500 Year Scour Elevation at 128 feet

			0.1016E+02	0.1368E+00
			0.1219E+02	0.1920E+00
			0.1354E+02	0.2400E+00
			0.1219E+02	0.4800E+00
			0.1219E+02	0.7200E+00
			0.1219E+02	0.1200E+01
			0.1219E+02	0.4800E+01
7	10	0.1004E+02		
			0.0000E+00	0.0000E+00
			0.3939E+01	0.3840E-01
			0.6565E+01	0.7440E-01
			0.9847E+01	0.1368E+00
			0.1182E+02	0.1920E+00
			0.1313E+02	0.2400E+00
			0.1313E+02	0.4800E+00
			0.1313E+02	0.7200E+00
			0.1313E+02	0.1200E+01
			0.1313E+02	0.4800E+01
8	10	0.1750E+02		
			0.0000E+00	0.0000E+00
			0.1678E+01	0.3840E-01
			0.2796E+01	0.7440E-01
			0.4194E+01	0.1368E+00
			0.5033E+01	0.1920E+00
			0.5592E+01	0.2400E+00
			0.5592E+01	0.4800E+00
			0.5592E+01	0.7200E+00
			0.5592E+01	0.1200E+01
			0.5592E+01	0.4800E+01
9	10	0.2496E+02		
			0.0000E+00	0.0000E+00
			0.2277E+01	0.3840E-01
			0.3796E+01	0.7440E-01
			0.5693E+01	0.1368E+00
			0.6832E+01	0.1920E+00
			0.7591E+01	0.2400E+00
			0.7591E+01	0.4800E+00
			0.7591E+01	0.7200E+00
			0.7591E+01	0.1200E+01
			0.7591E+01	0.4800E+01
10	10	0.2504E+02		
			0.0000E+00	0.0000E+00
			0.2270E+01	0.3840E-01
			0.3784E+01	0.7440E-01
			0.5676E+01	0.1368E+00
			0.6811E+01	0.1920E+00
			0.7568E+01	0.2400E+00
			0.7568E+01	0.4800E+00
			0.7568E+01	0.7200E+00
			0.7568E+01	0.1200E+01
			0.7568E+01	0.4800E+01
11	10	0.2800E+02		
			0.0000E+00	0.0000E+00
			0.2166E+01	0.3840E-01
			0.3609E+01	0.7440E-01
			0.5414E+01	0.1368E+00
			0.6497E+01	0.1920E+00
			0.7219E+01	0.2400E+00
			0.7219E+01	0.4800E+00
			0.7219E+01	0.7200E+00
			0.7219E+01	0.1200E+01
			0.7219E+01	0.4800E+01
12	10	0.3096E+02		
			0.0000E+00	0.0000E+00
			0.2354E+01	0.3840E-01
			0.3923E+01	0.7440E-01
			0.5885E+01	0.1368E+00
			0.7062E+01	0.1920E+00
			0.7846E+01	0.2400E+00
			0.7846E+01	0.4800E+00
			0.7846E+01	0.7200E+00
			0.7846E+01	0.1200E+01
			0.7846E+01	0.4800E+01
13	10	0.3104E+02		
			0.0000E+00	0.0000E+00
			0.2393E+01	0.3840E-01
			0.3988E+01	0.7440E-01
			0.5982E+01	0.1368E+00
			0.7178E+01	0.1920E+00
			0.7975E+01	0.2400E+00

Reference Elevation at 136 feet
500 Year Scour Elevation at 128 feet

			0.7975E+01	0.4800E+00
			0.7975E+01	0.7200E+00
			0.7975E+01	0.1200E+01
			0.7975E+01	0.4800E+01
14	10	0.3300E+02		
			0.0000E+00	0.0000E+00
			0.3307E+01	0.3840E-01
			0.5512E+01	0.7440E-01
			0.8269E+01	0.1368E+00
			0.9922E+01	0.1920E+00
			0.1102E+02	0.2400E+00
			0.1102E+02	0.4800E+00
			0.1102E+02	0.7200E+00
			0.1102E+02	0.1200E+01
			0.1102E+02	0.4800E+01
15	10	0.3496E+02		
			0.0000E+00	0.0000E+00
			0.3467E+01	0.3840E-01
			0.5778E+01	0.7440E-01
			0.8666E+01	0.1368E+00
			0.1040E+02	0.1920E+00
			0.1156E+02	0.2400E+00
			0.1156E+02	0.4800E+00
			0.1156E+02	0.7200E+00
			0.1156E+02	0.1200E+01
			0.1156E+02	0.4800E+01
16	10	0.3504E+02		
			0.0000E+00	0.0000E+00
			0.3574E+01	0.3840E-01
			0.5957E+01	0.7440E-01
			0.8936E+01	0.1368E+00
			0.1072E+02	0.1920E+00
			0.1191E+02	0.2400E+00
			0.1191E+02	0.4800E+00
			0.1191E+02	0.7200E+00
			0.1191E+02	0.1200E+01
			0.1191E+02	0.4800E+01
17	10	0.3600E+02		
			0.0000E+00	0.0000E+00
			0.5980E+01	0.3840E-01
			0.9966E+01	0.7440E-01
			0.1495E+02	0.1368E+00
			0.1794E+02	0.1920E+00
			0.1993E+02	0.2400E+00
			0.1993E+02	0.4800E+00
			0.1993E+02	0.7200E+00
			0.1993E+02	0.1200E+01
			0.1993E+02	0.4800E+01
18	10	0.3696E+02		
			0.0000E+00	0.0000E+00
			0.6172E+01	0.3840E-01
			0.1029E+02	0.7440E-01
			0.1543E+02	0.1368E+00
			0.1852E+02	0.1920E+00
			0.2057E+02	0.2400E+00
			0.2057E+02	0.4800E+00
			0.2057E+02	0.7200E+00
			0.2057E+02	0.1200E+01
			0.2057E+02	0.4800E+01
19	10	0.3704E+02		
			0.0000E+00	0.0000E+00
			0.6146E+01	0.3840E-01
			0.1024E+02	0.7440E-01
			0.1536E+02	0.1368E+00
			0.1844E+02	0.1920E+00
			0.2049E+02	0.2400E+00
			0.2049E+02	0.4800E+00
			0.2049E+02	0.7200E+00
			0.2049E+02	0.1200E+01
			0.2049E+02	0.4800E+01
20	10	0.3800E+02		
			0.0000E+00	0.0000E+00
			0.5344E+01	0.3840E-01
			0.8906E+01	0.7440E-01
			0.1336E+02	0.1368E+00
			0.1603E+02	0.1920E+00
			0.1781E+02	0.2400E+00
			0.1781E+02	0.4800E+00
			0.1781E+02	0.7200E+00
			0.1781E+02	0.1200E+01

Reference Elevation at 136 feet
500 Year Scour Elevation at 128 feet

			0.1781E+02	0.4800E+01
21	10	0.3896E+02		
			0.0000E+00	0.0000E+00
			0.5466E+01	0.3840E-01
			0.9110E+01	0.7440E-01
			0.1366E+02	0.1368E+00
			0.1640E+02	0.1920E+00
			0.1822E+02	0.2400E+00
			0.1822E+02	0.4800E+00
			0.1822E+02	0.7200E+00
			0.1822E+02	0.1200E+01
			0.1822E+02	0.4800E+01
22	10	0.3904E+02		
			0.0000E+00	0.0000E+00
			0.5476E+01	0.3840E-01
			0.9127E+01	0.7440E-01
			0.1369E+02	0.1368E+00
			0.1643E+02	0.1920E+00
			0.1825E+02	0.2400E+00
			0.1825E+02	0.4800E+00
			0.1825E+02	0.7200E+00
			0.1825E+02	0.1200E+01
			0.1825E+02	0.4800E+01
23	10	0.4200E+02		
			0.0000E+00	0.0000E+00
			0.5843E+01	0.3840E-01
			0.9738E+01	0.7440E-01
			0.1461E+02	0.1368E+00
			0.1753E+02	0.1920E+00
			0.1948E+02	0.2400E+00
			0.1948E+02	0.4800E+00
			0.1948E+02	0.7200E+00
			0.1948E+02	0.1200E+01
			0.1948E+02	0.4800E+01
24	10	0.4496E+02		
			0.0000E+00	0.0000E+00
			0.6193E+01	0.3840E-01
			0.1032E+02	0.7440E-01
			0.1548E+02	0.1368E+00
			0.1858E+02	0.1920E+00
			0.2064E+02	0.2400E+00
			0.2064E+02	0.4800E+00
			0.2064E+02	0.7200E+00
			0.2064E+02	0.1200E+01
			0.2064E+02	0.4800E+01
25	10	0.4504E+02		
			0.0000E+00	0.0000E+00
			0.6092E+01	0.3840E-01
			0.1015E+02	0.7440E-01
			0.1523E+02	0.1368E+00
			0.1828E+02	0.1920E+00
			0.2031E+02	0.2400E+00
			0.2031E+02	0.4800E+00
			0.2031E+02	0.7200E+00
			0.2031E+02	0.1200E+01
			0.2031E+02	0.4800E+01
26	10	0.5000E+02		
			0.0000E+00	0.0000E+00
			0.3886E+01	0.3840E-01
			0.6477E+01	0.7440E-01
			0.9716E+01	0.1368E+00
			0.1166E+02	0.1920E+00
			0.1295E+02	0.2400E+00
			0.1295E+02	0.4800E+00
			0.1295E+02	0.7200E+00
			0.1295E+02	0.1200E+01
			0.1295E+02	0.4800E+01
27	10	0.5496E+02		
			0.0000E+00	0.0000E+00
			0.4167E+01	0.3840E-01
			0.6944E+01	0.7440E-01
			0.1042E+02	0.1368E+00
			0.1250E+02	0.1920E+00
			0.1389E+02	0.2400E+00
			0.1389E+02	0.4800E+00
			0.1389E+02	0.7200E+00
			0.1389E+02	0.1200E+01
			0.1389E+02	0.4800E+01
28	10	0.5504E+02		
			0.0000E+00	0.0000E+00

Reference Elevation at 136 feet
500 Year Scour Elevation at 128 feet

			0.4280E+01	0.3840E-01
			0.7133E+01	0.7440E-01
			0.1070E+02	0.1368E+00
			0.1284E+02	0.1920E+00
			0.1427E+02	0.2400E+00
			0.1427E+02	0.4800E+00
			0.1427E+02	0.7200E+00
			0.1427E+02	0.1200E+01
			0.1427E+02	0.4800E+01
29	10	0.6250E+02		
			0.0000E+00	0.0000E+00
			0.7365E+01	0.3840E-01
			0.1228E+02	0.7440E-01
			0.1841E+02	0.1368E+00
			0.2210E+02	0.1920E+00
			0.2455E+02	0.2400E+00
			0.2455E+02	0.4800E+00
			0.2455E+02	0.7200E+00
			0.2455E+02	0.1200E+01
			0.2455E+02	0.4800E+01
30	10	0.6996E+02		
			0.0000E+00	0.0000E+00
			0.7901E+01	0.3840E-01
			0.1317E+02	0.7440E-01
			0.1975E+02	0.1368E+00
			0.2370E+02	0.1920E+00
			0.2634E+02	0.2400E+00
			0.2634E+02	0.4800E+00
			0.2634E+02	0.7200E+00
			0.2634E+02	0.1200E+01
			0.2634E+02	0.4800E+01
31	10	0.7004E+02		
			0.0000E+00	0.0000E+00
			0.8065E+01	0.3840E-01
			0.1344E+02	0.7440E-01
			0.2016E+02	0.1368E+00
			0.2419E+02	0.1920E+00
			0.2688E+02	0.2400E+00
			0.2688E+02	0.4800E+00
			0.2688E+02	0.7200E+00
			0.2688E+02	0.1200E+01
			0.2688E+02	0.4800E+01
32	10	0.7500E+02		
			0.0000E+00	0.0000E+00
			0.1232E+02	0.3840E-01
			0.2054E+02	0.7440E-01
			0.3080E+02	0.1368E+00
			0.3696E+02	0.1920E+00
			0.4107E+02	0.2400E+00
			0.4107E+02	0.4800E+00
			0.4107E+02	0.7200E+00
			0.4107E+02	0.1200E+01
			0.4107E+02	0.4800E+01
33	10	0.7996E+02		
			0.0000E+00	0.0000E+00
			0.1295E+02	0.3840E-01
			0.2158E+02	0.7440E-01
			0.3237E+02	0.1368E+00
			0.3884E+02	0.1920E+00
			0.4316E+02	0.2400E+00
			0.4316E+02	0.4800E+00
			0.4316E+02	0.7200E+00
			0.4316E+02	0.1200E+01
			0.4316E+02	0.4800E+01
34	10	0.8004E+02		
			0.0000E+00	0.0000E+00
			0.1295E+02	0.3840E-01
			0.2159E+02	0.7440E-01
			0.3238E+02	0.1368E+00
			0.3886E+02	0.1920E+00
			0.4317E+02	0.2400E+00
			0.4317E+02	0.4800E+00
			0.4317E+02	0.7200E+00
			0.4317E+02	0.1200E+01
			0.4317E+02	0.4800E+01
35	10	0.8350E+02		
			0.0000E+00	0.0000E+00
			0.1295E+02	0.3840E-01
			0.2159E+02	0.7440E-01
			0.3238E+02	0.1368E+00

Reference Elevation at 136 feet
500 Year Scour Elevation at 128 feet

			0.3886E+02	0.1920E+00
			0.4317E+02	0.2400E+00
			0.4317E+02	0.4800E+00
			0.4317E+02	0.7200E+00
			0.4317E+02	0.1200E+01
			0.4317E+02	0.4800E+01
36	10	0.8696E+02		
			0.0000E+00	0.0000E+00
			0.1295E+02	0.3840E-01
			0.2159E+02	0.7440E-01
			0.3238E+02	0.1368E+00
			0.3886E+02	0.1920E+00
			0.4317E+02	0.2400E+00
			0.4317E+02	0.4800E+00
			0.4317E+02	0.7200E+00
			0.4317E+02	0.1200E+01
			0.4317E+02	0.4800E+01
37	10	0.8704E+02		
			0.0000E+00	0.0000E+00
			0.1295E+02	0.3840E-01
			0.2159E+02	0.7440E-01
			0.3238E+02	0.1368E+00
			0.3886E+02	0.1920E+00
			0.4317E+02	0.2400E+00
			0.4317E+02	0.4800E+00
			0.4317E+02	0.7200E+00
			0.4317E+02	0.1200E+01
			0.4317E+02	0.4800E+01
38	10	0.9200E+02		
			0.0000E+00	0.0000E+00
			0.1295E+02	0.3840E-01
			0.2159E+02	0.7440E-01
			0.3238E+02	0.1368E+00
			0.3886E+02	0.1920E+00
			0.4317E+02	0.2400E+00
			0.4317E+02	0.4800E+00
			0.4317E+02	0.7200E+00
			0.4317E+02	0.1200E+01
			0.4317E+02	0.4800E+01
39	10	0.9696E+02		
			0.0000E+00	0.0000E+00
			0.1295E+02	0.3840E-01
			0.2159E+02	0.7440E-01
			0.3238E+02	0.1368E+00
			0.3886E+02	0.1920E+00
			0.4317E+02	0.2400E+00
			0.4317E+02	0.4800E+00
			0.4317E+02	0.7200E+00
			0.4317E+02	0.1200E+01
			0.4317E+02	0.4800E+01

TIP LOAD KIP	TIP MOVEMENT IN.
0.0000E+00	0.0000E+00
0.5321E+02	0.1200E-01
0.1064E+03	0.2400E-01
0.2128E+03	0.4800E-01
0.4257E+03	0.3120E+00
0.6385E+03	0.1008E+01
0.7662E+03	0.1752E+01
0.8514E+03	0.2400E+01
0.8514E+03	0.3600E+01
0.8514E+03	0.4800E+01

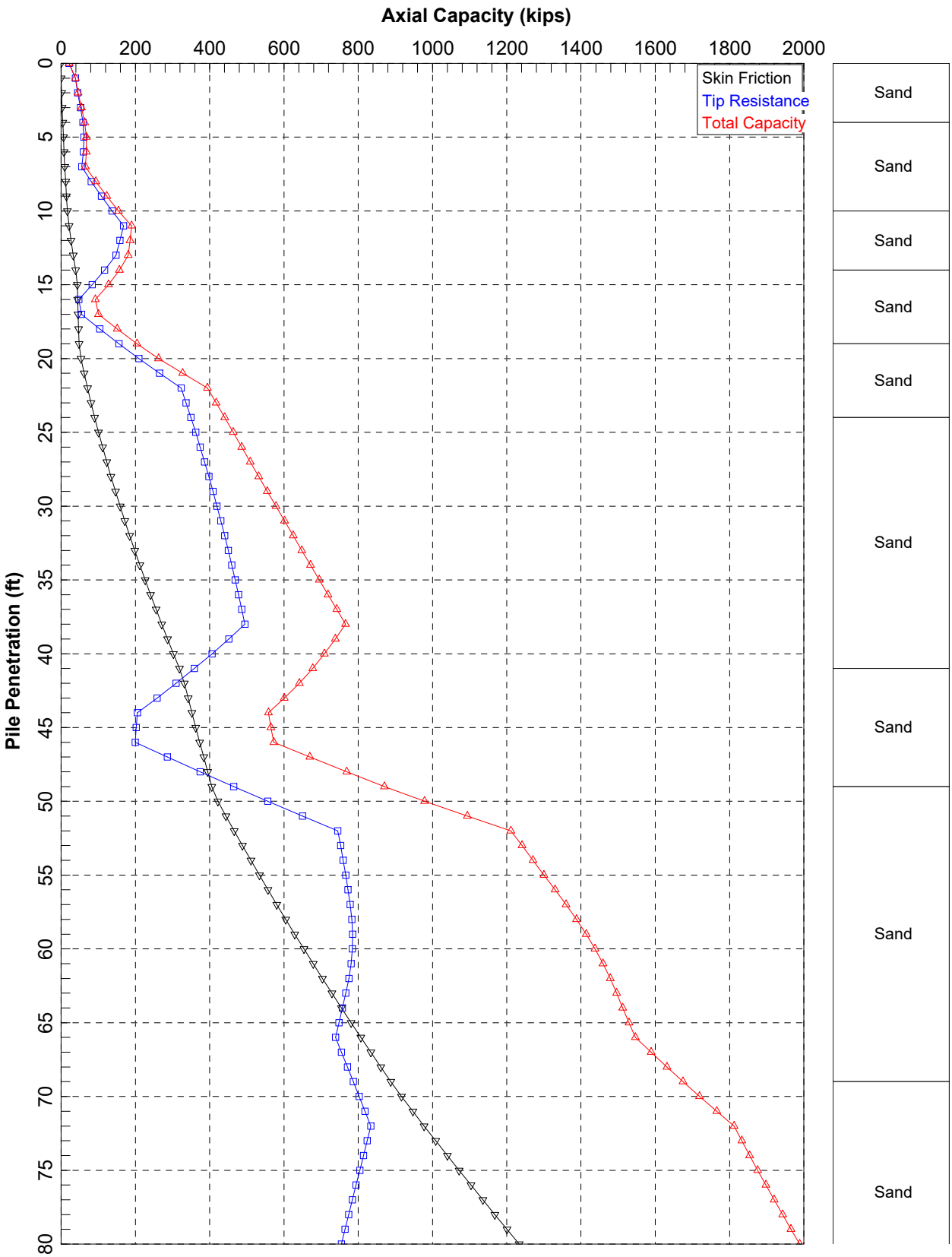
LOAD VERSUS SETTLEMENT CURVE
****

TOP LOAD KIP	TOP MOVEMENT IN.	TIP LOAD KIP	TIP MOVEMENT IN.
0.4950E+01	0.2815E-02	0.4434E+00	0.1000E-03
0.5027E+02	0.2845E-01	0.4434E+01	0.1000E-02
0.2385E+03	0.1405E+00	0.2217E+02	0.5000E-02
0.4198E+03	0.2609E+00	0.4434E+02	0.1000E-01

Reference Elevation at 136 feet
500 Year Scour Elevation at 128 feet

0.6752E+03	0.4559E+00	0.8869E+02	0.2000E-01
0.1092E+04	0.8413E+00	0.2145E+03	0.5000E-01
0.1226E+04	0.9916E+00	0.2386E+03	0.8000E-01
0.1298E+04	0.1078E+01	0.2548E+03	0.1000E+00
0.1522E+04	0.1392E+01	0.3354E+03	0.2000E+00
0.1682E+04	0.1854E+01	0.4832E+03	0.5000E+00
0.1774E+04	0.2246E+01	0.5749E+03	0.8000E+00
0.1835E+04	0.2508E+01	0.6361E+03	0.1000E+01
0.1998E+04	0.3672E+01	0.7988E+03	0.2000E+01

Reference Elevation at 135 feet
500 Year Scour Elevation at 126 feet



CR 153 Over Dry Branch - BENT 3 (MS Pile - 24" dia.)

Reference Elevation at 135 feet
500 Year Scour Elevation at 126 feet

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

                                   APILE 2025.11.1

                         A Program for Analyzing the Axial Capacity
                         and Short-term Settlement of Driven Piles
                                   under Axial Loading.

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


     Model ran by               : ESegismundo

     Path to file locations     : C:\Users\esegismundo\OneDrive - NOVA Engineering and
Environmental\Desktop\BFI\Calculations\APile\BENT 3 (B-02)\
     Name of input data file    : CR153 Over Dry Branch-Bent 3.ap11d
     Name of output file        : CR153 Over Dry Branch-Bent 3.ap11o
     Name of plot output file   : CR153 Over Dry Branch-Bent 3.ap11p

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

               Date:  February 10, 2026     Time:  06:18:29


1
          **********************
          * INPUT INFORMATION *
          **********************

          PROJECT DESCRIPTION   :
          CR 153 Over Dry Branch - BENT 3 (MS Pile - 24" dia.)
          DESIGNER   : Ezequiel Q. Segismundo
          JOB NUMBER : 10102-2025112

          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 :
          Steel pipe pile or non-tapered portion of monotube pile
          - Close-Ended Pile

           AVERAGE DEPTH TO ESTIMATE TIP RESISTANCE:
          - USE 1.5 DIAMETERS ABOVE AND BELOW TIP

          DATA FOR AXIAL STIFFNESS :
          - MODULUS OF ELASTICITY     = 0.290E+08 PSI
          - CROSS SECTION AREA        =     36.91 IN2

          CIRCULAR PILE PROPERTIES :
          - OUTSIDE DIAMETER, OD      =     24.00 IN.
          - INTERNAL DIAMETER, ID     =     23.00 IN.
          - TOTAL PILE LENGTH, TL     =     91.00 FT.
          - BATTER ANGLE              =      0.00 DEG
          - PILE STICKUP LENGTH, PSL  =     11.00 FT.
          - ZERO FRICTION LENGTH, ZFL =      0.00 FT.
          - INCREMENT OF PILE LENGTH
            USED IN COMPUTATION       =      1.00 FT.
          - PRINTING INCREMENT        =         1
          - LENGTH OF ENHANCED
            END SECTION               =     91.00 FT.
          - INTERNAL DIAMETER OF
            ENHANCED END SECTION      =     23.00 IN.
```

Reference Elevation at 135 feet
500 Year Scour Elevation at 126 feet

PLUGGED/UNPLUGGED CONDITIONS :
Internal Pile Plug Calculated by Program

SOIL INFORMATIONS :

DEPTH FT.	SOIL TYPE	LATERAL EARTH PRESSURE	EFFECTIVE UNIT WEIGHT LB/FT^3	FRICTION ANGLE DEGREES	Nq FACTOR FHWA
0.00	SAND	0.80*	57.60	0.00	4.80**
4.00	SAND	0.80*	57.60	0.00	4.80**
4.00	SAND	0.80*	47.60	0.00	4.80**
10.00	SAND	0.80*	47.60	0.00	4.80**
10.00	SAND	0.80*	57.60	0.00	4.80**
14.00	SAND	0.80*	57.60	0.00	4.80**
14.00	SAND	0.80*	32.60	0.00	4.80**
19.00	SAND	0.80*	32.60	0.00	4.80**
19.00	SAND	0.80*	57.60	0.00	4.80**
24.00	SAND	0.80*	57.60	0.00	4.80**
24.00	SAND	0.80*	55.10	0.00	4.80**
41.00	SAND	0.80*	55.10	0.00	4.80**
41.00	SAND	0.80*	47.60	0.00	4.80**
49.00	SAND	0.80*	47.60	0.00	4.80**
49.00	SAND	0.80*	56.40	0.00	4.80**
69.00	SAND	0.80*	56.40	0.00	4.80**
69.00	SAND	0.80*	59.30	0.00	4.80**
84.00	SAND	0.80*	59.30	0.00	4.80**
84.00	SAND	0.80*	67.60	0.00	4.80**
89.00	SAND	0.80*	67.60	0.00	4.80**
89.00	SAND	0.80*	62.60	0.00	4.80**
96.00	SAND	0.80*	62.60	0.00	4.80**
96.00	SAND	0.80*	67.60	0.00	4.80**
102.00	SAND	0.80*	67.60	0.00	4.80**

* VALUE ASSUMED BY THE PROGRAM
** VALUE ESTIMATED BY THE PROGRAM BASED ON FRICTION ANGLE

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*	0.10E+08*	0.00	0.00	43.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	43.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	13.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	13.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	31.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	31.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	1.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	1.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	29.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	29.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	29.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	29.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	13.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	13.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	38.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	38.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	46.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	46.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	100.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	100.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	69.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	69.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	100.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	100.00	0.00	0.00

* MAXIMUM UNIT FRICTION AND/OR MAXIMUM UNIT BEARING
WERE SET TO LARGE VALUES INDICATING THAT APILE
USES THE LIMITS SPECIFIED BY EACH SELECTED
CRITERIA (IF ANY).

DEPTH FT.	LRFD FACTOR ON UNIT FRICTION	LRFD FACTOR ON UNIT BEARING
0.00	1.000	1.000
4.00	1.000	1.000

Reference Elevation at 135 feet
500 Year Scour Elevation at 126 feet

4.00	1.000	1.000
10.00	1.000	1.000
10.00	1.000	1.000
14.00	1.000	1.000
14.00	1.000	1.000
19.00	1.000	1.000
19.00	1.000	1.000
24.00	1.000	1.000
24.00	1.000	1.000
41.00	1.000	1.000
41.00	1.000	1.000
49.00	1.000	1.000
49.00	1.000	1.000
69.00	1.000	1.000
69.00	1.000	1.000
84.00	1.000	1.000
84.00	1.000	1.000
89.00	1.000	1.000
89.00	1.000	1.000
96.00	1.000	1.000
96.00	1.000	1.000
102.00	1.000	1.000

DEPTH FT.	Z PEAK IN.	T RESIDUAL
0.00	0.240 *	0.00
4.00	0.240 *	0.00
4.00	0.240 *	0.00
10.00	0.240 *	0.00
10.00	0.240 *	0.00
14.00	0.240 *	0.00
14.00	0.240 *	0.00
19.00	0.240 *	0.00
19.00	0.240 *	0.00
24.00	0.240 *	0.00
24.00	0.240 *	0.00
41.00	0.240 *	0.00
41.00	0.240 *	0.00
49.00	0.240 *	0.00
49.00	0.240 *	0.00
69.00	0.240 *	0.00
69.00	0.240 *	0.00
84.00	0.240 *	0.00
84.00	0.240 *	0.00
89.00	0.240 *	0.00
89.00	0.240 *	0.00
96.00	0.240 *	0.00
96.00	0.240 *	0.00
102.00	0.240 *	0.00

* DEFAULT VALUE = 0.01 D

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****
* COMPUTATION RESULT *
****

****
* FED. HWY. METHOD *
****

PILE LENGTH BELOW GND. FT.	SKIN FRICTION KIP	END BEARING KIP	ULTIMATE CAPACITY KIP
0.00	0.0	21.7	21.7
1.00	0.3	38.3	38.6
2.00	1.1	44.8	46.0
3.00	2.6	52.4	55.0
4.00	4.5	58.8	63.3
5.00	6.4	61.3	67.8
6.00	8.1	60.3	68.4

Reference Elevation at 135 feet
500 Year Scour Elevation at 126 feet

Bent 3
Approx. Scour Load @ 9 ft.
= 15 kips

Bent 3
Required Nominal Driving
Resistance, Rndr = 500 kips

Minimum & Estimated
Depth of Pile Tip @ 34 ft.

7.00	10.0	55.7	65.7
8.00	12.2	81.1	93.3
9.00	14.6	108.4	123.0
10.00	17.2	137.5	154.8
11.00	21.3	168.5	189.8
12.00	26.9	158.7	185.6
13.00	33.0	148.0	181.0
14.00	39.6	117.4	157.0
15.00	43.6	83.9	127.5
16.00	44.8	47.6	92.3
17.00	46.0	54.7	100.7
18.00	47.3	104.0	151.3
19.00	48.7	155.5	204.2
20.00	53.5	209.3	262.8
21.00	62.2	265.2	327.3
22.00	71.2	323.1	394.3
23.00	80.7	336.7	417.4
24.00	90.6	349.7	440.4
25.00	101.0	362.4	463.4
26.00	111.8	374.6	486.4
27.00	122.9	386.4	509.4
28.00	134.5	397.9	532.4
29.00	146.5	409.0	555.4
30.00	158.8	419.8	578.6
31.00	171.6	430.2	601.8
32.00	184.7	440.4	625.0
33.00	198.2	450.2	648.3
34.00	212.0	459.7	671.7
35.00	226.2	468.9	695.1
36.00	240.8	477.8	718.6
37.00	255.8	486.4	742.1
38.00	271.0	494.6	765.7
39.00	286.7	451.6	738.2
40.00	302.6	406.3	709.0
41.00	319.0	359.0	677.9
42.00	332.2	309.6	641.8
43.00	342.2	258.6	600.8
44.00	352.4	205.8	558.2
45.00	362.8	202.4	565.3
46.00	373.4	199.4	572.7
47.00	384.1	285.9	670.0
48.00	395.0	374.4	769.4
49.00	406.1	464.7	870.7
50.00	422.4	556.6	979.0
51.00	444.0	650.2	1094.2
52.00	466.0	745.3	1211.3
53.00	488.3	752.7	1241.0
54.00	511.0	759.7	1270.7
55.00	534.0	766.4	1300.3
56.00	557.3	772.8	1330.0
57.00	580.9	778.7	1359.7
58.00	604.9	783.2	1388.1
59.00	629.2	785.0	1414.1
60.00	653.7	784.1	1437.9
61.00	678.6	780.8	1459.4
62.00	703.8	775.0	1478.7
63.00	729.3	766.8	1496.0
64.00	755.0	757.4	1512.4
65.00	781.0	748.1	1529.1
66.00	807.3	738.8	1546.1
67.00	833.9	755.0	1588.9
68.00	860.7	771.0	1631.7
69.00	887.8	786.9	1674.8
70.00	916.6	802.7	1719.3
71.00	947.0	818.5	1765.5
72.00	977.7	834.1	1811.8
73.00	1008.7	824.1	1832.9
74.00	1040.0	814.2	1854.2
75.00	1071.6	804.3	1875.9
76.00	1103.5	794.4	1897.9
77.00	1135.6	784.6	1920.2
78.00	1168.0	774.7	1942.8
79.00	1200.7	764.9	1965.6
80.00	1233.6	755.1	1988.7

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.

Reference Elevation at 135 feet
500 Year Scour Elevation at 126 feet

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      ************************************************
      * COMPUTE LOAD-DISTRIBUTION AND LOAD-SETTLEMENT *
      * CURVES FOR AXIAL LOADING                      *
      ************************************************
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T-Z CURVE NO.	NO. OF POINTS	DEPTH TO CURVE FT.	LOAD TRANSFER PSI	PILE MOVEMENT IN.
1	10	0.4167E-01		
			0.0000E+00	0.0000E+00
			0.7855E-02	0.3840E-01
			0.1309E-01	0.7440E-01
			0.1964E-01	0.1368E+00
			0.2357E-01	0.1920E+00
			0.2618E-01	0.2400E+00
			0.2618E-01	0.4800E+00
			0.2618E-01	0.7200E+00
			0.2618E-01	0.1200E+01
			0.2618E-01	0.4800E+01
2	10	0.2000E+01		
			0.0000E+00	0.0000E+00
			0.3768E+00	0.3840E-01
			0.6280E+00	0.7440E-01
			0.9420E+00	0.1368E+00
			0.1130E+01	0.1920E+00
			0.1256E+01	0.2400E+00
			0.1256E+01	0.4800E+00
			0.1256E+01	0.7200E+00
			0.1256E+01	0.1200E+01
			0.1256E+01	0.4800E+01
3	10	0.3958E+01		
			0.0000E+00	0.0000E+00
			0.7448E+00	0.3840E-01
			0.1241E+01	0.7440E-01
			0.1862E+01	0.1368E+00
			0.2234E+01	0.1920E+00
			0.2483E+01	0.2400E+00
			0.2483E+01	0.4800E+00
			0.2483E+01	0.7200E+00
			0.2483E+01	0.1200E+01
			0.2483E+01	0.4800E+01
4	10	0.4042E+01		
			0.0000E+00	0.0000E+00
			0.7425E+00	0.3840E-01
			0.1238E+01	0.7440E-01
			0.1856E+01	0.1368E+00
			0.2228E+01	0.1920E+00
			0.2475E+01	0.2400E+00
			0.2475E+01	0.4800E+00
			0.2475E+01	0.7200E+00
			0.2475E+01	0.1200E+01
			0.2475E+01	0.4800E+01
5	10	0.7000E+01		
			0.0000E+00	0.0000E+00
			0.6757E+00	0.3840E-01
			0.1126E+01	0.7440E-01
			0.1689E+01	0.1368E+00
			0.2027E+01	0.1920E+00
			0.2252E+01	0.2400E+00
			0.2252E+01	0.4800E+00
			0.2252E+01	0.7200E+00
			0.2252E+01	0.1200E+01
			0.2252E+01	0.4800E+01
6	10	0.9958E+01		
			0.0000E+00	0.0000E+00
			0.9123E+00	0.3840E-01
			0.1520E+01	0.7440E-01
			0.2281E+01	0.1368E+00
			0.2737E+01	0.1920E+00
			0.3041E+01	0.2400E+00
			0.3041E+01	0.4800E+00
			0.3041E+01	0.7200E+00
			0.3041E+01	0.1200E+01
			0.3041E+01	0.4800E+01
7	10	0.1004E+02		
			0.0000E+00	0.0000E+00

Reference Elevation at 135 feet
500 Year Scour Elevation at 126 feet

			0.9513E+00	0.3840E-01
			0.1586E+01	0.7440E-01
			0.2378E+01	0.1368E+00
			0.2854E+01	0.1920E+00
			0.3171E+01	0.2400E+00
			0.3171E+01	0.4800E+00
			0.3171E+01	0.7200E+00
			0.3171E+01	0.1200E+01
			0.3171E+01	0.4800E+01
8	10	0.1200E+02		
			0.0000E+00	0.0000E+00
			0.1942E+01	0.3840E-01
			0.3236E+01	0.7440E-01
			0.4854E+01	0.1368E+00
			0.5825E+01	0.1920E+00
			0.6473E+01	0.2400E+00
			0.6473E+01	0.4800E+00
			0.6473E+01	0.7200E+00
			0.6473E+01	0.1200E+01
			0.6473E+01	0.4800E+01
9	10	0.1396E+02		
			0.0000E+00	0.0000E+00
			0.2266E+01	0.3840E-01
			0.3776E+01	0.7440E-01
			0.5664E+01	0.1368E+00
			0.6797E+01	0.1920E+00
			0.7552E+01	0.2400E+00
			0.7552E+01	0.4800E+00
			0.7552E+01	0.7200E+00
			0.7552E+01	0.1200E+01
			0.7552E+01	0.4800E+01
10	10	0.1404E+02		
			0.0000E+00	0.0000E+00
			0.2194E+01	0.3840E-01
			0.3656E+01	0.7440E-01
			0.5484E+01	0.1368E+00
			0.6581E+01	0.1920E+00
			0.7312E+01	0.2400E+00
			0.7312E+01	0.4800E+00
			0.7312E+01	0.7200E+00
			0.7312E+01	0.1200E+01
			0.7312E+01	0.4800E+01
11	10	0.1650E+02		
			0.0000E+00	0.0000E+00
			0.4097E+00	0.3840E-01
			0.6829E+00	0.7440E-01
			0.1024E+01	0.1368E+00
			0.1229E+01	0.1920E+00
			0.1366E+01	0.2400E+00
			0.1366E+01	0.4800E+00
			0.1366E+01	0.7200E+00
			0.1366E+01	0.1200E+01
			0.1366E+01	0.4800E+01
12	10	0.1896E+02		
			0.0000E+00	0.0000E+00
			0.4574E+00	0.3840E-01
			0.7624E+00	0.7440E-01
			0.1144E+01	0.1368E+00
			0.1372E+01	0.1920E+00
			0.1525E+01	0.2400E+00
			0.1525E+01	0.4800E+00
			0.1525E+01	0.7200E+00
			0.1525E+01	0.1200E+01
			0.1525E+01	0.4800E+01
13	10	0.1904E+02		
			0.0000E+00	0.0000E+00
			0.5549E+00	0.3840E-01
			0.9249E+00	0.7440E-01
			0.1387E+01	0.1368E+00
			0.1665E+01	0.1920E+00
			0.1850E+01	0.2400E+00
			0.1850E+01	0.4800E+00
			0.1850E+01	0.7200E+00
			0.1850E+01	0.1200E+01
			0.1850E+01	0.4800E+01
14	10	0.2150E+02		
			0.0000E+00	0.0000E+00
			0.3002E+01	0.3840E-01
			0.5004E+01	0.7440E-01
			0.7506E+01	0.1368E+00

Reference Elevation at 135 feet
500 Year Scour Elevation at 126 feet

			0.9007E+01	0.1920E+00
			0.1001E+02	0.2400E+00
			0.1001E+02	0.4800E+00
			0.1001E+02	0.7200E+00
			0.1001E+02	0.1200E+01
			0.1001E+02	0.4800E+01
15	10	0.2396E+02		
			0.0000E+00	0.0000E+00
			0.3360E+01	0.3840E-01
			0.5601E+01	0.7440E-01
			0.8401E+01	0.1368E+00
			0.1008E+02	0.1920E+00
			0.1120E+02	0.2400E+00
			0.1120E+02	0.4800E+00
			0.1120E+02	0.7200E+00
			0.1120E+02	0.1200E+01
			0.1120E+02	0.4800E+01
16	10	0.2404E+02		
			0.0000E+00	0.0000E+00
			0.3372E+01	0.3840E-01
			0.5620E+01	0.7440E-01
			0.8430E+01	0.1368E+00
			0.1012E+02	0.1920E+00
			0.1124E+02	0.2400E+00
			0.1124E+02	0.4800E+00
			0.1124E+02	0.7200E+00
			0.1124E+02	0.1200E+01
			0.1124E+02	0.4800E+01
17	10	0.3250E+02		
			0.0000E+00	0.0000E+00
			0.4472E+01	0.3840E-01
			0.7454E+01	0.7440E-01
			0.1118E+02	0.1368E+00
			0.1342E+02	0.1920E+00
			0.1491E+02	0.2400E+00
			0.1491E+02	0.4800E+00
			0.1491E+02	0.7200E+00
			0.1491E+02	0.1200E+01
			0.1491E+02	0.4800E+01
18	10	0.4096E+02		
			0.0000E+00	0.0000E+00
			0.5457E+01	0.3840E-01
			0.9094E+01	0.7440E-01
			0.1364E+02	0.1368E+00
			0.1637E+02	0.1920E+00
			0.1819E+02	0.2400E+00
			0.1819E+02	0.4800E+00
			0.1819E+02	0.7200E+00
			0.1819E+02	0.1200E+01
			0.1819E+02	0.4800E+01
19	10	0.4104E+02		
			0.0000E+00	0.0000E+00
			0.5371E+01	0.3840E-01
			0.8952E+01	0.7440E-01
			0.1343E+02	0.1368E+00
			0.1611E+02	0.1920E+00
			0.1790E+02	0.2400E+00
			0.1790E+02	0.4800E+00
			0.1790E+02	0.7200E+00
			0.1790E+02	0.1200E+01
			0.1790E+02	0.4800E+01
20	10	0.4500E+02		
			0.0000E+00	0.0000E+00
			0.3474E+01	0.3840E-01
			0.5790E+01	0.7440E-01
			0.8685E+01	0.1368E+00
			0.1042E+02	0.1920E+00
			0.1158E+02	0.2400E+00
			0.1158E+02	0.4800E+00
			0.1158E+02	0.7200E+00
			0.1158E+02	0.1200E+01
			0.1158E+02	0.4800E+01
21	10	0.4896E+02		
			0.0000E+00	0.0000E+00
			0.3694E+01	0.3840E-01
			0.6157E+01	0.7440E-01
			0.9235E+01	0.1368E+00
			0.1108E+02	0.1920E+00
			0.1231E+02	0.2400E+00
			0.1231E+02	0.4800E+00

Reference Elevation at 135 feet
500 Year Scour Elevation at 126 feet

			0.1231E+02	0.7200E+00
			0.1231E+02	0.1200E+01
			0.1231E+02	0.4800E+01
22	10	0.4904E+02		
			0.0000E+00	0.0000E+00
			0.3839E+01	0.3840E-01
			0.6398E+01	0.7440E-01
			0.9597E+01	0.1368E+00
			0.1152E+02	0.1920E+00
			0.1280E+02	0.2400E+00
			0.1280E+02	0.4800E+00
			0.1280E+02	0.7200E+00
			0.1280E+02	0.1200E+01
			0.1280E+02	0.4800E+01
23	10	0.5900E+02		
			0.0000E+00	0.0000E+00
			0.8099E+01	0.3840E-01
			0.1350E+02	0.7440E-01
			0.2025E+02	0.1368E+00
			0.2430E+02	0.1920E+00
			0.2700E+02	0.2400E+00
			0.2700E+02	0.4800E+00
			0.2700E+02	0.7200E+00
			0.2700E+02	0.1200E+01
			0.2700E+02	0.4800E+01
24	10	0.6896E+02		
			0.0000E+00	0.0000E+00
			0.9023E+01	0.3840E-01
			0.1504E+02	0.7440E-01
			0.2256E+02	0.1368E+00
			0.2707E+02	0.1920E+00
			0.3008E+02	0.2400E+00
			0.3008E+02	0.4800E+00
			0.3008E+02	0.7200E+00
			0.3008E+02	0.1200E+01
			0.3008E+02	0.4800E+01
25	10	0.6904E+02		
			0.0000E+00	0.0000E+00
			0.9068E+01	0.3840E-01
			0.1511E+02	0.7440E-01
			0.2267E+02	0.1368E+00
			0.2721E+02	0.1920E+00
			0.3023E+02	0.2400E+00
			0.3023E+02	0.4800E+00
			0.3023E+02	0.7200E+00
			0.3023E+02	0.1200E+01
			0.3023E+02	0.4800E+01
26	10	0.7650E+02		
			0.0000E+00	0.0000E+00
			0.1066E+02	0.3840E-01
			0.1776E+02	0.7440E-01
			0.2664E+02	0.1368E+00
			0.3197E+02	0.1920E+00
			0.3552E+02	0.2400E+00
			0.3552E+02	0.4800E+00
			0.3552E+02	0.7200E+00
			0.3552E+02	0.1200E+01
			0.3552E+02	0.4800E+01
27	10	0.8396E+02		
			0.0000E+00	0.0000E+00
			0.1096E+02	0.3840E-01
			0.1826E+02	0.7440E-01
			0.2739E+02	0.1368E+00
			0.3287E+02	0.1920E+00
			0.3652E+02	0.2400E+00
			0.3652E+02	0.4800E+00
			0.3652E+02	0.7200E+00
			0.3652E+02	0.1200E+01
			0.3652E+02	0.4800E+01
28	10	0.8404E+02		
			0.0000E+00	0.0000E+00
			0.1096E+02	0.3840E-01
			0.1826E+02	0.7440E-01
			0.2739E+02	0.1368E+00
			0.3287E+02	0.1920E+00
			0.3652E+02	0.2400E+00
			0.3652E+02	0.4800E+00
			0.3652E+02	0.7200E+00
			0.3652E+02	0.1200E+01
			0.3652E+02	0.4800E+01

Reference Elevation at 135 feet
500 Year Scour Elevation at 126 feet

29	10	0.8650E+02		
			0.0000E+00	0.0000E+00
			0.1096E+02	0.3840E-01
			0.1826E+02	0.7440E-01
			0.2739E+02	0.1368E+00
			0.3287E+02	0.1920E+00
			0.3652E+02	0.2400E+00
			0.3652E+02	0.4800E+00
			0.3652E+02	0.7200E+00
			0.3652E+02	0.1200E+01
			0.3652E+02	0.4800E+01
30	10	0.8896E+02		
			0.0000E+00	0.0000E+00
			0.1096E+02	0.3840E-01
			0.1826E+02	0.7440E-01
			0.2739E+02	0.1368E+00
			0.3287E+02	0.1920E+00
			0.3652E+02	0.2400E+00
			0.3652E+02	0.4800E+00
			0.3652E+02	0.7200E+00
			0.3652E+02	0.1200E+01
			0.3652E+02	0.4800E+01
31	10	0.8904E+02		
			0.0000E+00	0.0000E+00
			0.1096E+02	0.3840E-01
			0.1826E+02	0.7440E-01
			0.2739E+02	0.1368E+00
			0.3287E+02	0.1920E+00
			0.3652E+02	0.2400E+00
			0.3652E+02	0.4800E+00
			0.3652E+02	0.7200E+00
			0.3652E+02	0.1200E+01
			0.3652E+02	0.4800E+01
32	10	0.9250E+02		
			0.0000E+00	0.0000E+00
			0.1096E+02	0.3840E-01
			0.1826E+02	0.7440E-01
			0.2739E+02	0.1368E+00
			0.3287E+02	0.1920E+00
			0.3652E+02	0.2400E+00
			0.3652E+02	0.4800E+00
			0.3652E+02	0.7200E+00
			0.3652E+02	0.1200E+01
			0.3652E+02	0.4800E+01
33	10	0.9596E+02		
			0.0000E+00	0.0000E+00
			0.1096E+02	0.3840E-01
			0.1826E+02	0.7440E-01
			0.2739E+02	0.1368E+00
			0.3287E+02	0.1920E+00
			0.3652E+02	0.2400E+00
			0.3652E+02	0.4800E+00
			0.3652E+02	0.7200E+00
			0.3652E+02	0.1200E+01
			0.3652E+02	0.4800E+01
34	10	0.9604E+02		
			0.0000E+00	0.0000E+00
			0.1096E+02	0.3840E-01
			0.1826E+02	0.7440E-01
			0.2739E+02	0.1368E+00
			0.3287E+02	0.1920E+00
			0.3652E+02	0.2400E+00
			0.3652E+02	0.4800E+00
			0.3652E+02	0.7200E+00
			0.3652E+02	0.1200E+01
			0.3652E+02	0.4800E+01
35	10	0.9900E+02		
			0.0000E+00	0.0000E+00
			0.1096E+02	0.3840E-01
			0.1826E+02	0.7440E-01
			0.2739E+02	0.1368E+00
			0.3287E+02	0.1920E+00
			0.3652E+02	0.2400E+00
			0.3652E+02	0.4800E+00
			0.3652E+02	0.7200E+00
			0.3652E+02	0.1200E+01
			0.3652E+02	0.4800E+01
36	10	0.1020E+03		
			0.0000E+00	0.0000E+00
			0.1096E+02	0.3840E-01

Reference Elevation at 135 feet
500 Year Scour Elevation at 126 feet

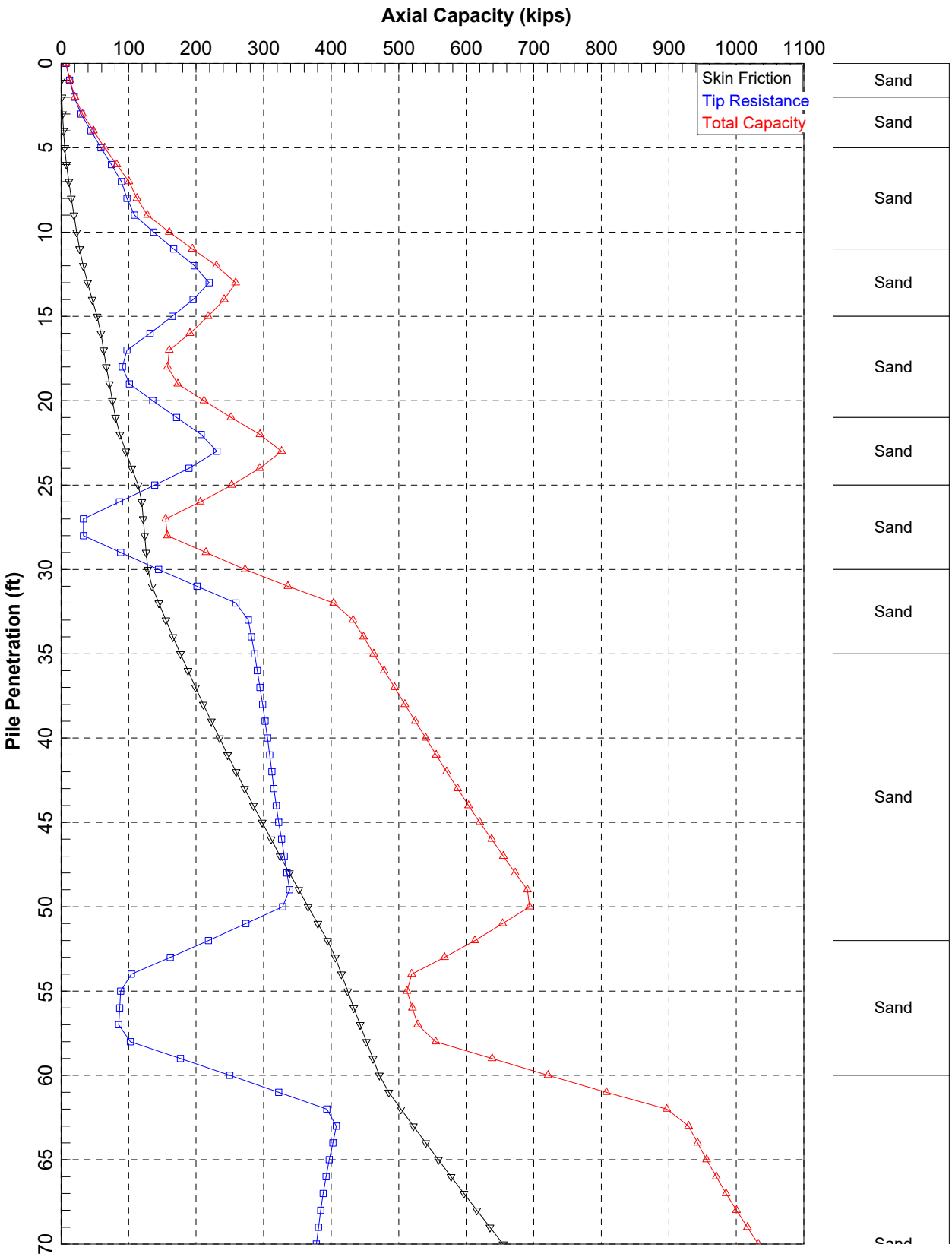
0.1826E+02	0.7440E-01
0.2739E+02	0.1368E+00
0.3287E+02	0.1920E+00
0.3652E+02	0.2400E+00
0.3652E+02	0.4800E+00
0.3652E+02	0.7200E+00
0.3652E+02	0.1200E+01
0.3652E+02	0.4800E+01

TIP LOAD KIP	TIP MOVEMENT IN.
0.0000E+00	0.0000E+00
0.4719E+02	0.1200E-01
0.9439E+02	0.2400E-01
0.1888E+03	0.4800E-01
0.3775E+03	0.3120E+00
0.5663E+03	0.1008E+01
0.6796E+03	0.1752E+01
0.7551E+03	0.2400E+01
0.7551E+03	0.3600E+01
0.7551E+03	0.4800E+01

LOAD VERSUS SETTLEMENT CURVE
****

TOP LOAD KIP	TOP MOVEMENT IN.	TIP LOAD KIP	TIP MOVEMENT IN.
0.4582E+01	0.2824E-02	0.3933E+00	0.1000E-03
0.4654E+02	0.2855E-01	0.3933E+01	0.1000E-02
0.2255E+03	0.1420E+00	0.1966E+02	0.5000E-02
0.4033E+03	0.2648E+00	0.3933E+02	0.1000E-01
0.6654E+03	0.4647E+00	0.7865E+02	0.2000E-01
0.1088E+04	0.8498E+00	0.1902E+03	0.5000E-01
0.1230E+04	0.1005E+01	0.2117E+03	0.8000E-01
0.1303E+04	0.1092E+01	0.2260E+03	0.1000E+00
0.1519E+04	0.1399E+01	0.2975E+03	0.2000E+00
0.1662E+04	0.1845E+01	0.4285E+03	0.5000E+00
0.1744E+04	0.2228E+01	0.5099E+03	0.8000E+00
0.1798E+04	0.2483E+01	0.5641E+03	0.1000E+01
0.1942E+04	0.3630E+01	0.7085E+03	0.2000E+01

Reference Elevation at 146 feet



CR 153 Over Dry Branch - BENT 4 (MS Pile - 18" dia.)

Reference Elevation at 146 feet

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

                                   APILE 2025.11.1

                        A Program for Analyzing the Axial Capacity
                        and Short-term Settlement of Driven Piles
                                  under Axial Loading.

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


     Model ran by               : ESegismundo

     Path to file locations     : C:\Users\esegismundo\OneDrive - NOVA Engineering and
Environmental\Desktop\BFI\Calculations\APile\BENT 4 (B-02)\
     Name of input data file    : CR153 Over Dry Branch-Bent 4.ap11d
     Name of output file        : CR153 Over Dry Branch-Bent 4.ap11o
     Name of plot output file   : CR153 Over Dry Branch-Bent 4.ap11p

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

               Date:  February 10, 2026     Time:  06:20:10


1
          **********************
          * INPUT INFORMATION *
          **********************

          PROJECT DESCRIPTION   :
          CR 153 Over Dry Branch - BENT 4 (MS Pile - 18" dia.)
          DESIGNER   : Ezequiel Q. Segismundo
          JOB NUMBER : 10102-2025112

          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 :
          Steel pipe pile or non-tapered portion of monotube pile
          - Close-Ended Pile

           AVERAGE DEPTH TO ESTIMATE TIP RESISTANCE:
          - USE 1.5 DIAMETERS ABOVE AND BELOW TIP

          DATA FOR AXIAL STIFFNESS :
          - MODULUS OF ELASTICITY     = 0.290E+08 PSI
          - CROSS SECTION AREA        =     17.36 IN2

          CIRCULAR PILE PROPERTIES :
          - OUTSIDE DIAMETER, OD      =     18.00 IN.
          - INTERNAL DIAMETER, ID     =     17.38 IN.
          - TOTAL PILE LENGTH, TL     =     70.00 FT.
          - BATTER ANGLE              =      0.00 DEG
          - PILE STICKUP LENGTH, PSL  =      0.00 FT.
          - ZERO FRICTION LENGTH, ZFL =      0.00 FT.
          - INCREMENT OF PILE LENGTH
            USED IN COMPUTATION       =      1.00 FT.
          - PRINTING INCREMENT        =         1
          - LENGTH OF ENHANCED
            END SECTION               =     70.00 FT.
          - INTERNAL DIAMETER OF
            ENHANCED END SECTION      =     17.38 IN.
```

Reference Elevation at 146 feet

PLUGGED/UNPLUGGED CONDITIONS :
Internal Pile Plug Calculated by Program

SOIL INFORMATIONS :

DEPTH FT.	SOIL TYPE	LATERAL EARTH PRESSURE	EFFECTIVE UNIT WEIGHT LB/FT^3	FRICTION ANGLE DEGREES	Nq FACTOR FHWA
0.00	SAND	0.80*	115.00	0.00	4.80**
2.00	SAND	0.80*	115.00	0.00	4.80**
2.00	SAND	0.80*	110.00	0.00	4.80**
5.00	SAND	0.80*	110.00	0.00	4.80**
5.00	SAND	0.80*	52.60	0.00	4.80**
11.00	SAND	0.80*	52.60	0.00	4.80**
11.00	SAND	0.80*	57.60	0.00	4.80**
15.00	SAND	0.80*	57.60	0.00	4.80**
15.00	SAND	0.80*	47.60	0.00	4.80**
21.00	SAND	0.80*	47.60	0.00	4.80**
21.00	SAND	0.80*	57.60	0.00	4.80**
25.00	SAND	0.80*	57.60	0.00	4.80**
25.00	SAND	0.80*	32.60	0.00	4.80**
30.00	SAND	0.80*	32.60	0.00	4.80**
30.00	SAND	0.80*	57.60	0.00	4.80**
35.00	SAND	0.80*	57.60	0.00	4.80**
35.00	SAND	0.80*	55.10	0.00	4.80**
52.00	SAND	0.80*	55.10	0.00	4.80**
52.00	SAND	0.80*	47.60	0.00	4.80**
60.00	SAND	0.80*	47.60	0.00	4.80**
60.00	SAND	0.80*	56.40	0.00	4.80**
80.00	SAND	0.80*	56.40	0.00	4.80**
80.00	SAND	0.80*	59.30	0.00	4.80**
95.00	SAND	0.80*	59.30	0.00	4.80**
95.00	SAND	0.80*	67.60	0.00	4.80**
100.00	SAND	0.80*	67.60	0.00	4.80**
100.00	SAND	0.80*	62.60	0.00	4.80**
107.00	SAND	0.80*	62.60	0.00	4.80**
107.00	SAND	0.80*	67.60	0.00	4.80**
113.00	SAND	0.80*	67.60	0.00	4.80**

* VALUE ASSUMED BY THE PROGRAM
** VALUE ESTIMATED BY THE PROGRAM BASED ON FRICTION ANGLE

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*	0.10E+08*	0.00	0.00	20.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	20.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	11.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	11.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	24.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	24.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	43.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	43.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	13.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	13.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	31.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	31.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	1.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	1.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	29.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	29.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	29.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	29.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	13.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	13.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	38.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	38.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	46.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	46.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	100.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	100.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	69.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	69.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	100.00	0.00	0.00
0.10E+08*	0.10E+08*	0.00	0.00	100.00	0.00	0.00

Reference Elevation at 146 feet

* MAXIMUM UNIT FRICTION AND/OR MAXIMUM UNIT BEARING
  WERE SET TO LARGE VALUES INDICATING THAT APILE
  USES THE LIMITS SPECIFIED BY EACH SELECTED
  CRITERIA (IF ANY).

DEPTH FT.	LRFD FACTOR ON UNIT FRICTION	LRFD FACTOR ON UNIT BEARING
0.00	1.000	1.000
2.00	1.000	1.000
2.00	1.000	1.000
5.00	1.000	1.000
5.00	1.000	1.000
11.00	1.000	1.000
11.00	1.000	1.000
15.00	1.000	1.000
15.00	1.000	1.000
21.00	1.000	1.000
21.00	1.000	1.000
25.00	1.000	1.000
25.00	1.000	1.000
30.00	1.000	1.000
30.00	1.000	1.000
35.00	1.000	1.000
35.00	1.000	1.000
52.00	1.000	1.000
52.00	1.000	1.000
60.00	1.000	1.000
60.00	1.000	1.000
80.00	1.000	1.000
80.00	1.000	1.000
95.00	1.000	1.000
95.00	1.000	1.000
100.00	1.000	1.000
100.00	1.000	1.000
107.00	1.000	1.000
107.00	1.000	1.000
113.00	1.000	1.000

DEPTH FT.	Z PEAK IN.	T RESIDUAL
0.00	0.180 *	0.00
2.00	0.180 *	0.00
2.00	0.180 *	0.00
5.00	0.180 *	0.00
5.00	0.180 *	0.00
11.00	0.180 *	0.00
11.00	0.180 *	0.00
15.00	0.180 *	0.00
15.00	0.180 *	0.00
21.00	0.180 *	0.00
21.00	0.180 *	0.00
25.00	0.180 *	0.00
25.00	0.180 *	0.00
30.00	0.180 *	0.00
30.00	0.180 *	0.00
35.00	0.180 *	0.00
35.00	0.180 *	0.00
52.00	0.180 *	0.00
52.00	0.180 *	0.00
60.00	0.180 *	0.00
60.00	0.180 *	0.00
80.00	0.180 *	0.00
80.00	0.180 *	0.00
95.00	0.180 *	0.00
95.00	0.180 *	0.00
100.00	0.180 *	0.00
100.00	0.180 *	0.00
107.00	0.180 *	0.00
107.00	0.180 *	0.00
113.00	0.180 *	0.00

* DEFAULT VALUE = 0.01 D

Reference Elevation at 146 feet

1

****
* COMPUTATION RESULT *
****

****
* FED. HWY. METHOD *
****

PILE LENGTH BELOW GND. FT.	SKIN FRICTION KIP	END BEARING KIP	ULTIMATE CAPACITY KIP
0.00	0.0	7.2	7.2
1.00	0.3	12.5	12.8
2.00	1.1	19.5	20.6
3.00	2.3	29.4	31.7
4.00	3.7	44.2	47.8
5.00	5.4	59.2	64.6
6.00	8.0	74.4	82.4
7.00	11.4	89.2	100.6
8.00	15.1	97.4	112.4
9.00	19.0	108.8	127.7
10.00	23.1	137.2	160.3
11.00	27.5	166.7	194.3
12.00	32.9	197.3	230.2
13.00	39.3	219.2	258.5
14.00	46.1	195.5	241.6
15.00	53.2	164.6	217.8
16.00	58.9	131.9	190.8
17.00	62.9	97.5	160.4
18.00	67.1	90.7	157.8
19.00	71.5	101.3	172.7
20.00	76.0	135.7	211.7
21.00	80.6	171.1	251.7
22.00	87.2	207.4	294.6
23.00	95.8	230.8	326.7
24.00	104.8	189.3	294.1
25.00	114.0	138.6	252.6
26.00	119.7	86.5	206.2
27.00	121.8	33.0	154.8
28.00	124.0	33.3	157.2
29.00	126.2	88.3	214.5
30.00	128.4	144.3	272.7
31.00	134.6	201.2	335.8
32.00	144.7	259.0	403.7
33.00	155.1	277.3	432.4
34.00	165.8	282.0	447.8
35.00	176.7	286.5	463.1
36.00	187.8	290.7	478.5
37.00	199.2	294.7	493.9
38.00	210.7	298.5	509.3
39.00	222.5	302.1	524.7
40.00	234.6	305.6	540.1
41.00	246.8	308.8	555.6
42.00	259.2	312.0	571.2
43.00	271.9	315.2	587.1
44.00	284.7	318.7	603.5
45.00	297.8	322.4	620.2
46.00	311.1	326.4	637.5
47.00	324.5	330.5	655.0
48.00	338.1	334.6	672.7
49.00	352.0	338.5	690.5
50.00	366.0	328.0	694.0
51.00	380.2	273.8	654.0
52.00	394.6	218.3	612.9
53.00	406.3	161.6	567.9
54.00	415.3	103.9	519.1
55.00	424.4	88.1	512.5
56.00	433.6	86.6	520.3
57.00	442.9	85.2	528.1
58.00	452.4	102.6	555.0
59.00	461.9	176.7	638.5
60.00	471.5	249.8	721.3
61.00	485.3	322.2	807.5
62.00	503.4	393.7	897.1

Bent 4
Required Nominal Driving Resistance, Rndr = 347 kips

Minimum & Estimated Depth of Pile Tip @ 45 ft.

Reference Elevation at 146 feet

63.00	521.7	407.6	929.3
64.00	540.2	402.4	942.6
65.00	558.8	397.3	956.1
66.00	577.6	392.6	970.2
67.00	596.6	388.3	984.9
68.00	615.8	384.5	1000.3
69.00	635.1	381.3	1016.4
70.00	654.6	378.2	1032.8

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	0.4167E-01		
			0.0000E+00	0.0000E+00
			0.1053E-01	0.2880E-01
			0.1754E-01	0.5580E-01
			0.2631E-01	0.1026E+00
			0.3158E-01	0.1440E+00
			0.3509E-01	0.1800E+00
			0.3509E-01	0.3600E+00
			0.3509E-01	0.5400E+00
			0.3509E-01	0.9000E+00
			0.3509E-01	0.3600E+01
2	10	0.1000E+01		
			0.0000E+00	0.0000E+00
			0.2526E+00	0.2880E-01
			0.4210E+00	0.5580E-01
			0.6315E+00	0.1026E+00
			0.7578E+00	0.1440E+00
			0.8420E+00	0.1800E+00
			0.8420E+00	0.3600E+00
			0.8420E+00	0.5400E+00
			0.8420E+00	0.9000E+00
			0.8420E+00	0.3600E+01
3	10	0.1958E+01		
			0.0000E+00	0.0000E+00
			0.4886E+00	0.2880E-01
			0.8144E+00	0.5580E-01
			0.1222E+01	0.1026E+00
			0.1466E+01	0.1440E+00
			0.1629E+01	0.1800E+00
			0.1629E+01	0.3600E+00
			0.1629E+01	0.5400E+00
			0.1629E+01	0.9000E+00
			0.1629E+01	0.3600E+01
4	10	0.2042E+01		
			0.0000E+00	0.0000E+00
			0.5001E+00	0.2880E-01
			0.8334E+00	0.5580E-01
			0.1250E+01	0.1026E+00
			0.1500E+01	0.1440E+00
			0.1667E+01	0.1800E+00
			0.1667E+01	0.3600E+00
			0.1667E+01	0.5400E+00
			0.1667E+01	0.9000E+00
			0.1667E+01	0.3600E+01
5	10	0.3500E+01		
			0.0000E+00	0.0000E+00
			0.6090E+00	0.2880E-01
			0.1015E+01	0.5580E-01
			0.1522E+01	0.1026E+00
			0.1827E+01	0.1440E+00
			0.2030E+01	0.1800E+00
			0.2030E+01	0.3600E+00
			0.2030E+01	0.5400E+00
			0.2030E+01	0.9000E+00

Reference Elevation at 146 feet

			0.2030E+01	0.3600E+01
6	10	0.4958E+01		
			0.0000E+00	0.0000E+00
			0.8460E+00	0.2880E-01
			0.1410E+01	0.5580E-01
			0.2115E+01	0.1026E+00
			0.2538E+01	0.1440E+00
			0.2820E+01	0.1800E+00
			0.2820E+01	0.3600E+00
			0.2820E+01	0.5400E+00
			0.2820E+01	0.9000E+00
			0.2820E+01	0.3600E+01
7	10	0.5042E+01		
			0.0000E+00	0.0000E+00
			0.8774E+00	0.2880E-01
			0.1462E+01	0.5580E-01
			0.2193E+01	0.1026E+00
			0.2632E+01	0.1440E+00
			0.2925E+01	0.1800E+00
			0.2925E+01	0.3600E+00
			0.2925E+01	0.5400E+00
			0.2925E+01	0.9000E+00
			0.2925E+01	0.3600E+01
8	10	0.8000E+01		
			0.0000E+00	0.0000E+00
			0.1672E+01	0.2880E-01
			0.2787E+01	0.5580E-01
			0.4180E+01	0.1026E+00
			0.5016E+01	0.1440E+00
			0.5573E+01	0.1800E+00
			0.5573E+01	0.3600E+00
			0.5573E+01	0.5400E+00
			0.5573E+01	0.9000E+00
			0.5573E+01	0.3600E+01
9	10	0.1096E+02		
			0.0000E+00	0.0000E+00
			0.2001E+01	0.2880E-01
			0.3336E+01	0.5580E-01
			0.5003E+01	0.1026E+00
			0.6004E+01	0.1440E+00
			0.6671E+01	0.1800E+00
			0.6671E+01	0.3600E+00
			0.6671E+01	0.5400E+00
			0.6671E+01	0.9000E+00
			0.6671E+01	0.3600E+01
10	10	0.1104E+02		
			0.0000E+00	0.0000E+00
			0.2037E+01	0.2880E-01
			0.3395E+01	0.5580E-01
			0.5092E+01	0.1026E+00
			0.6110E+01	0.1440E+00
			0.6789E+01	0.1800E+00
			0.6789E+01	0.3600E+00
			0.6789E+01	0.5400E+00
			0.6789E+01	0.9000E+00
			0.6789E+01	0.3600E+01
11	10	0.1300E+02		
			0.0000E+00	0.0000E+00
			0.2912E+01	0.2880E-01
			0.4853E+01	0.5580E-01
			0.7280E+01	0.1026E+00
			0.8736E+01	0.1440E+00
			0.9706E+01	0.1800E+00
			0.9706E+01	0.3600E+00
			0.9706E+01	0.5400E+00
			0.9706E+01	0.9000E+00
			0.9706E+01	0.3600E+01
12	10	0.1496E+02		
			0.0000E+00	0.0000E+00
			0.3239E+01	0.2880E-01
			0.5399E+01	0.5580E-01
			0.8098E+01	0.1026E+00
			0.9718E+01	0.1440E+00
			0.1080E+02	0.1800E+00
			0.1080E+02	0.3600E+00
			0.1080E+02	0.5400E+00
			0.1080E+02	0.9000E+00
			0.1080E+02	0.3600E+01
13	10	0.1504E+02		
			0.0000E+00	0.0000E+00

Reference Elevation at 146 feet

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                                        0.3184E+01      0.2880E-01
                                        0.5307E+01      0.5580E-01
                                        0.7960E+01      0.1026E+00
                                        0.9552E+01      0.1440E+00
                                        0.1061E+02      0.1800E+00
                                        0.1061E+02      0.3600E+00
                                        0.1061E+02      0.5400E+00
                                        0.1061E+02      0.9000E+00
                                        0.1061E+02      0.3600E+01
14              10      0.1800E+02
                                        0.0000E+00      0.0000E+00
                                        0.1885E+01      0.2880E-01
                                        0.3141E+01      0.5580E-01
                                        0.4712E+01      0.1026E+00
                                        0.5654E+01      0.1440E+00
                                        0.6283E+01      0.1800E+00
                                        0.6283E+01      0.3600E+00
                                        0.6283E+01      0.5400E+00
                                        0.6283E+01      0.9000E+00
                                        0.6283E+01      0.3600E+01
15              10      0.2096E+02
                                        0.0000E+00      0.0000E+00
                                        0.2074E+01      0.2880E-01
                                        0.3456E+01      0.5580E-01
                                        0.5185E+01      0.1026E+00
                                        0.6222E+01      0.1440E+00
                                        0.6913E+01      0.1800E+00
                                        0.6913E+01      0.3600E+00
                                        0.6913E+01      0.5400E+00
                                        0.6913E+01      0.9000E+00
                                        0.6913E+01      0.3600E+01
16              10      0.2104E+02
                                        0.0000E+00      0.0000E+00
                                        0.2147E+01      0.2880E-01
                                        0.3578E+01      0.5580E-01
                                        0.5367E+01      0.1026E+00
                                        0.6440E+01      0.1440E+00
                                        0.7156E+01      0.1800E+00
                                        0.7156E+01      0.3600E+00
                                        0.7156E+01      0.5400E+00
                                        0.7156E+01      0.9000E+00
                                        0.7156E+01      0.3600E+01
17              10      0.2300E+02
                                        0.0000E+00      0.0000E+00
                                        0.3891E+01      0.2880E-01
                                        0.6485E+01      0.5580E-01
                                        0.9728E+01      0.1026E+00
                                        0.1167E+02      0.1440E+00
                                        0.1297E+02      0.1800E+00
                                        0.1297E+02      0.3600E+00
                                        0.1297E+02      0.5400E+00
                                        0.1297E+02      0.9000E+00
                                        0.1297E+02      0.3600E+01
18              10      0.2496E+02
                                        0.0000E+00      0.0000E+00
                                        0.4138E+01      0.2880E-01
                                        0.6897E+01      0.5580E-01
                                        0.1035E+02      0.1026E+00
                                        0.1242E+02      0.1440E+00
                                        0.1379E+02      0.1800E+00
                                        0.1379E+02      0.3600E+00
                                        0.1379E+02      0.5400E+00
                                        0.1379E+02      0.9000E+00
                                        0.1379E+02      0.3600E+01
19              10      0.2504E+02
                                        0.0000E+00      0.0000E+00
                                        0.4009E+01      0.2880E-01
                                        0.6682E+01      0.5580E-01
                                        0.1002E+02      0.1026E+00
                                        0.1203E+02      0.1440E+00
                                        0.1336E+02      0.1800E+00
                                        0.1336E+02      0.3600E+00
                                        0.1336E+02      0.5400E+00
                                        0.1336E+02      0.9000E+00
                                        0.1336E+02      0.3600E+01
20              10      0.2750E+02
                                        0.0000E+00      0.0000E+00
                                        0.9477E+00      0.2880E-01
                                        0.1579E+01      0.5580E-01
                                        0.2369E+01      0.1026E+00
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Reference Elevation at 146 feet

			0.2843E+01	0.1440E+00
			0.3159E+01	0.1800E+00
			0.3159E+01	0.3600E+00
			0.3159E+01	0.5400E+00
			0.3159E+01	0.9000E+00
			0.3159E+01	0.3600E+01
21	10	0.2996E+02		
			0.0000E+00	0.0000E+00
			0.1005E+01	0.2880E-01
			0.1675E+01	0.5580E-01
			0.2513E+01	0.1026E+00
			0.3016E+01	0.1440E+00
			0.3351E+01	0.1800E+00
			0.3351E+01	0.3600E+00
			0.3351E+01	0.5400E+00
			0.3351E+01	0.9000E+00
			0.3351E+01	0.3600E+01
22	10	0.3004E+02		
			0.0000E+00	0.0000E+00
			0.1149E+01	0.2880E-01
			0.1915E+01	0.5580E-01
			0.2872E+01	0.1026E+00
			0.3447E+01	0.1440E+00
			0.3830E+01	0.1800E+00
			0.3830E+01	0.3600E+00
			0.3830E+01	0.5400E+00
			0.3830E+01	0.9000E+00
			0.3830E+01	0.3600E+01
23	10	0.3250E+02		
			0.0000E+00	0.0000E+00
			0.4599E+01	0.2880E-01
			0.7666E+01	0.5580E-01
			0.1150E+02	0.1026E+00
			0.1380E+02	0.1440E+00
			0.1533E+02	0.1800E+00
			0.1533E+02	0.3600E+00
			0.1533E+02	0.5400E+00
			0.1533E+02	0.9000E+00
			0.1533E+02	0.3600E+01
24	10	0.3496E+02		
			0.0000E+00	0.0000E+00
			0.4867E+01	0.2880E-01
			0.8111E+01	0.5580E-01
			0.1217E+02	0.1026E+00
			0.1460E+02	0.1440E+00
			0.1622E+02	0.1800E+00
			0.1622E+02	0.3600E+00
			0.1622E+02	0.5400E+00
			0.1622E+02	0.9000E+00
			0.1622E+02	0.3600E+01
25	10	0.3504E+02		
			0.0000E+00	0.0000E+00
			0.4875E+01	0.2880E-01
			0.8126E+01	0.5580E-01
			0.1219E+02	0.1026E+00
			0.1463E+02	0.1440E+00
			0.1625E+02	0.1800E+00
			0.1625E+02	0.3600E+00
			0.1625E+02	0.5400E+00
			0.1625E+02	0.9000E+00
			0.1625E+02	0.3600E+01
26	10	0.4350E+02		
			0.0000E+00	0.0000E+00
			0.5683E+01	0.2880E-01
			0.9472E+01	0.5580E-01
			0.1421E+02	0.1026E+00
			0.1705E+02	0.1440E+00
			0.1894E+02	0.1800E+00
			0.1894E+02	0.3600E+00
			0.1894E+02	0.5400E+00
			0.1894E+02	0.9000E+00
			0.1894E+02	0.3600E+01
27	10	0.5196E+02		
			0.0000E+00	0.0000E+00
			0.6390E+01	0.2880E-01
			0.1065E+02	0.5580E-01
			0.1598E+02	0.1026E+00
			0.1917E+02	0.1440E+00
			0.2130E+02	0.1800E+00
			0.2130E+02	0.3600E+00

Reference Elevation at 146 feet

			0.2130E+02	0.5400E+00
			0.2130E+02	0.9000E+00
			0.2130E+02	0.3600E+01
28	10	0.5204E+02		
			0.0000E+00	0.0000E+00
			0.6292E+01	0.2880E-01
			0.1049E+02	0.5580E-01
			0.1573E+02	0.1026E+00
			0.1888E+02	0.1440E+00
			0.2097E+02	0.1800E+00
			0.2097E+02	0.3600E+00
			0.2097E+02	0.5400E+00
			0.2097E+02	0.9000E+00
			0.2097E+02	0.3600E+01
29	10	0.5600E+02		
			0.0000E+00	0.0000E+00
			0.4098E+01	0.2880E-01
			0.6830E+01	0.5580E-01
			0.1025E+02	0.1026E+00
			0.1229E+02	0.1440E+00
			0.1366E+02	0.1800E+00
			0.1366E+02	0.3600E+00
			0.1366E+02	0.5400E+00
			0.1366E+02	0.9000E+00
			0.1366E+02	0.3600E+01
30	10	0.5996E+02		
			0.0000E+00	0.0000E+00
			0.4267E+01	0.2880E-01
			0.7111E+01	0.5580E-01
			0.1067E+02	0.1026E+00
			0.1280E+02	0.1440E+00
			0.1422E+02	0.1800E+00
			0.1422E+02	0.3600E+00
			0.1422E+02	0.5400E+00
			0.1422E+02	0.9000E+00
			0.1422E+02	0.3600E+01
31	10	0.6004E+02		
			0.0000E+00	0.0000E+00
			0.4422E+01	0.2880E-01
			0.7370E+01	0.5580E-01
			0.1106E+02	0.1026E+00
			0.1327E+02	0.1440E+00
			0.1474E+02	0.1800E+00
			0.1474E+02	0.3600E+00
			0.1474E+02	0.5400E+00
			0.1474E+02	0.9000E+00
			0.1474E+02	0.3600E+01
32	10	0.7000E+02		
			0.0000E+00	0.0000E+00
			0.8651E+01	0.2880E-01
			0.1442E+02	0.5580E-01
			0.2163E+02	0.1026E+00
			0.2595E+02	0.1440E+00
			0.2884E+02	0.1800E+00
			0.2884E+02	0.3600E+00
			0.2884E+02	0.5400E+00
			0.2884E+02	0.9000E+00
			0.2884E+02	0.3600E+01
33	10	0.7996E+02		
			0.0000E+00	0.0000E+00
			0.8651E+01	0.2880E-01
			0.1442E+02	0.5580E-01
			0.2163E+02	0.1026E+00
			0.2595E+02	0.1440E+00
			0.2884E+02	0.1800E+00
			0.2884E+02	0.3600E+00
			0.2884E+02	0.5400E+00
			0.2884E+02	0.9000E+00
			0.2884E+02	0.3600E+01
34	10	0.8004E+02		
			0.0000E+00	0.0000E+00
			0.8651E+01	0.2880E-01
			0.1442E+02	0.5580E-01
			0.2163E+02	0.1026E+00
			0.2595E+02	0.1440E+00
			0.2884E+02	0.1800E+00
			0.2884E+02	0.3600E+00
			0.2884E+02	0.5400E+00
			0.2884E+02	0.9000E+00
			0.2884E+02	0.3600E+01

Reference Elevation at 146 feet

35	10	0.8750E+02		
			0.0000E+00	0.0000E+00
			0.8651E+01	0.2880E-01
			0.1442E+02	0.5580E-01
			0.2163E+02	0.1026E+00
			0.2595E+02	0.1440E+00
			0.2884E+02	0.1800E+00
			0.2884E+02	0.3600E+00
			0.2884E+02	0.5400E+00
			0.2884E+02	0.9000E+00
			0.2884E+02	0.3600E+01
36	10	0.9496E+02		
			0.0000E+00	0.0000E+00
			0.8651E+01	0.2880E-01
			0.1442E+02	0.5580E-01
			0.2163E+02	0.1026E+00
			0.2595E+02	0.1440E+00
			0.2884E+02	0.1800E+00
			0.2884E+02	0.3600E+00
			0.2884E+02	0.5400E+00
			0.2884E+02	0.9000E+00
			0.2884E+02	0.3600E+01
37	10	0.9504E+02		
			0.0000E+00	0.0000E+00
			0.8651E+01	0.2880E-01
			0.1442E+02	0.5580E-01
			0.2163E+02	0.1026E+00
			0.2595E+02	0.1440E+00
			0.2884E+02	0.1800E+00
			0.2884E+02	0.3600E+00
			0.2884E+02	0.5400E+00
			0.2884E+02	0.9000E+00
			0.2884E+02	0.3600E+01
38	10	0.9750E+02		
			0.0000E+00	0.0000E+00
			0.8651E+01	0.2880E-01
			0.1442E+02	0.5580E-01
			0.2163E+02	0.1026E+00
			0.2595E+02	0.1440E+00
			0.2884E+02	0.1800E+00
			0.2884E+02	0.3600E+00
			0.2884E+02	0.5400E+00
			0.2884E+02	0.9000E+00
			0.2884E+02	0.3600E+01
39	10	0.9996E+02		
			0.0000E+00	0.0000E+00
			0.8651E+01	0.2880E-01
			0.1442E+02	0.5580E-01
			0.2163E+02	0.1026E+00
			0.2595E+02	0.1440E+00
			0.2884E+02	0.1800E+00
			0.2884E+02	0.3600E+00
			0.2884E+02	0.5400E+00
			0.2884E+02	0.9000E+00
			0.2884E+02	0.3600E+01
40	10	0.1000E+03		
			0.0000E+00	0.0000E+00
			0.8651E+01	0.2880E-01
			0.1442E+02	0.5580E-01
			0.2163E+02	0.1026E+00
			0.2595E+02	0.1440E+00
			0.2884E+02	0.1800E+00
			0.2884E+02	0.3600E+00
			0.2884E+02	0.5400E+00
			0.2884E+02	0.9000E+00
			0.2884E+02	0.3600E+01
41	10	0.1035E+03		
			0.0000E+00	0.0000E+00
			0.8651E+01	0.2880E-01
			0.1442E+02	0.5580E-01
			0.2163E+02	0.1026E+00
			0.2595E+02	0.1440E+00
			0.2884E+02	0.1800E+00
			0.2884E+02	0.3600E+00
			0.2884E+02	0.5400E+00
			0.2884E+02	0.9000E+00
			0.2884E+02	0.3600E+01
42	10	0.1070E+03		
			0.0000E+00	0.0000E+00
			0.8651E+01	0.2880E-01

Reference Elevation at 146 feet

			0.1442E+02	0.5580E-01
			0.2163E+02	0.1026E+00
			0.2595E+02	0.1440E+00
			0.2884E+02	0.1800E+00
			0.2884E+02	0.3600E+00
			0.2884E+02	0.5400E+00
			0.2884E+02	0.9000E+00
			0.2884E+02	0.3600E+01
43	10	0.1070E+03		
			0.0000E+00	0.0000E+00
			0.8651E+01	0.2880E-01
			0.1442E+02	0.5580E-01
			0.2163E+02	0.1026E+00
			0.2595E+02	0.1440E+00
			0.2884E+02	0.1800E+00
			0.2884E+02	0.3600E+00
			0.2884E+02	0.5400E+00
			0.2884E+02	0.9000E+00
			0.2884E+02	0.3600E+01
44	10	0.1100E+03		
			0.0000E+00	0.0000E+00
			0.8651E+01	0.2880E-01
			0.1442E+02	0.5580E-01
			0.2163E+02	0.1026E+00
			0.2595E+02	0.1440E+00
			0.2884E+02	0.1800E+00
			0.2884E+02	0.3600E+00
			0.2884E+02	0.5400E+00
			0.2884E+02	0.9000E+00
			0.2884E+02	0.3600E+01
45	10	0.1130E+03		
			0.0000E+00	0.0000E+00
			0.8651E+01	0.2880E-01
			0.1442E+02	0.5580E-01
			0.2163E+02	0.1026E+00
			0.2595E+02	0.1440E+00
			0.2884E+02	0.1800E+00
			0.2884E+02	0.3600E+00
			0.2884E+02	0.5400E+00
			0.2884E+02	0.9000E+00
			0.2884E+02	0.3600E+01

TIP LOAD KIP	TIP MOVEMENT IN.
0.0000E+00	0.0000E+00
0.2364E+02	0.9000E-02
0.4728E+02	0.1800E-01
0.9455E+02	0.3600E-01
0.1891E+03	0.2340E+00
0.2837E+03	0.7560E+00
0.3404E+03	0.1314E+01
0.3782E+03	0.1800E+01
0.3782E+03	0.2700E+01
0.3782E+03	0.3600E+01

LOAD VERSUS SETTLEMENT CURVE
****

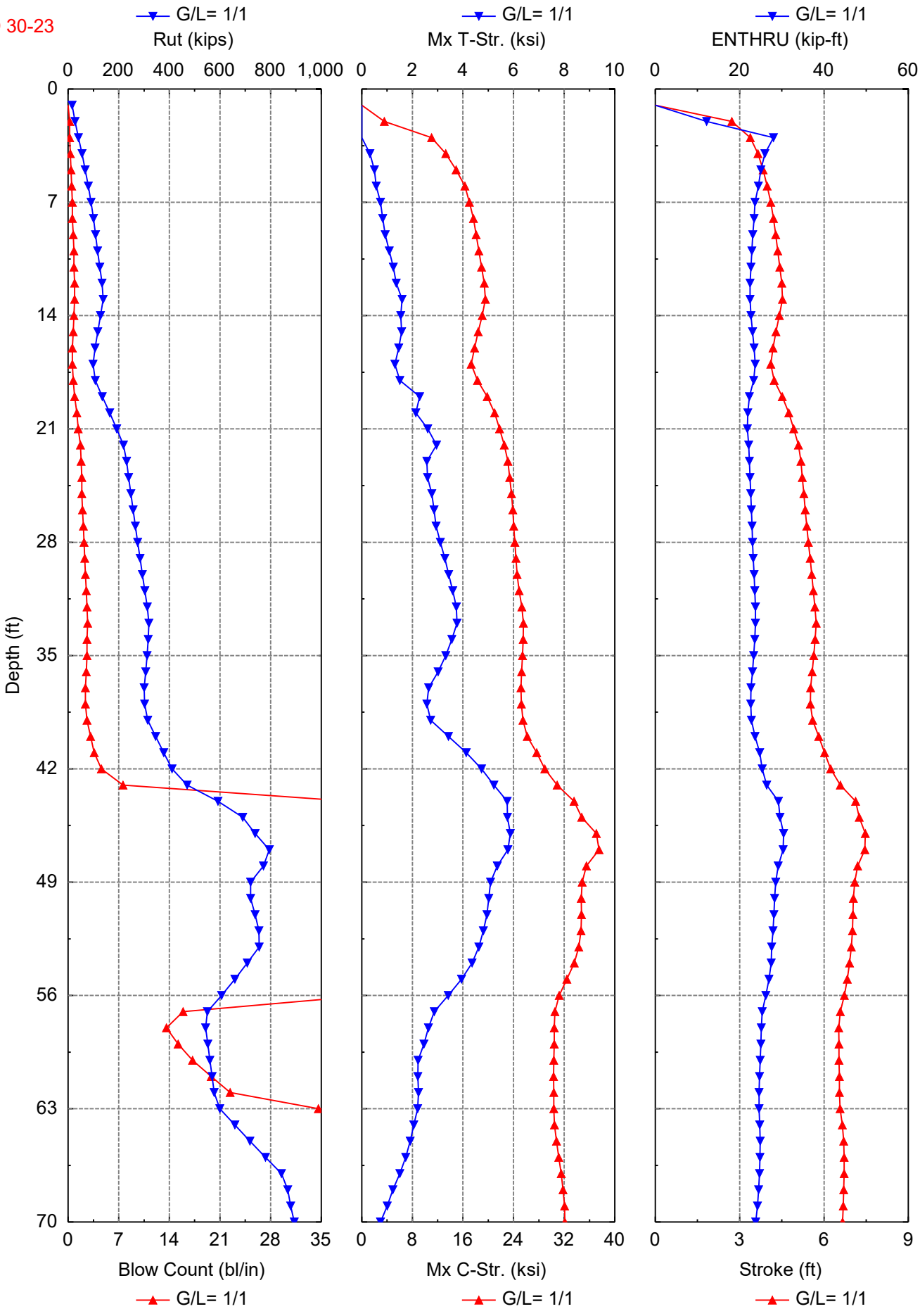
TOP LOAD KIP	TOP MOVEMENT IN.	TIP LOAD KIP	TIP MOVEMENT IN.
0.4776E+01	0.3555E-02	0.2626E+00	0.1000E-03
0.4904E+02	0.3628E-01	0.2626E+01	0.1000E-02
0.2033E+03	0.1681E+00	0.1313E+02	0.5000E-02
0.3244E+03	0.2949E+00	0.2626E+02	0.1000E-01
0.4680E+03	0.4804E+00	0.5253E+02	0.2000E-01
0.6475E+03	0.7609E+00	0.1012E+03	0.5000E-01
0.7120E+03	0.8876E+00	0.1156E+03	0.8000E-01
0.7433E+03	0.9564E+00	0.1251E+03	0.1000E+00
0.8274E+03	0.1193E+01	0.1729E+03	0.2000E+00
0.8918E+03	0.1600E+01	0.2373E+03	0.5000E+00
0.9427E+03	0.1985E+01	0.2881E+03	0.8000E+00
0.9630E+03	0.2219E+01	0.3085E+03	0.1000E+01
0.1033E+04	0.3335E+01	0.3782E+03	0.2000E+01

APPENDIX H

WEAP ANALYSES

(GRLWEAP 14 Version 14.1.20.1)

DELMAG D 30-23



Driveability Analysis Summary

Gain/Loss Factor at Shaft/Toe = 1.000/1.000 FS=1

Depth	Rut	Rshaft	Rtoe	Blow Ct	Mx C-Str	Mx T-Str.	Stroke	ENTHRU	Hammer
ft	kips	kips	kips	bl/in	ksi	ksi	ft	kip-ft	-
1.0	15.9	0.3	15.6	0.0	0.000	0.000	0.00	0.0	D 30-23
2.0	27.3	1.1	26.2	0.2	3.580	0.000	2.72	12.2	D 30-23
3.0	41.0	2.5	38.5	0.2	11.050	0.000	3.38	28.0	D 30-23
4.0	54.7	4.4	50.4	0.3	13.279	0.322	3.65	26.0	D 30-23
5.0	67.7	6.7	60.9	0.4	14.913	0.503	3.83	25.0	D 30-23
6.0	79.6	9.6	70.0	0.5	16.301	0.569	3.98	24.4	D 30-23
7.0	90.4	12.8	77.5	0.6	17.006	0.739	4.11	23.6	D 30-23
8.0	99.9	16.3	83.6	0.6	17.641	0.829	4.20	23.4	D 30-23
9.0	108.3	19.9	88.4	0.7	18.081	0.925	4.28	23.1	D 30-23
10.0	116.7	23.8	92.9	0.8	18.500	1.091	4.35	22.9	D 30-23
11.0	125.5	27.9	97.7	0.8	18.951	1.245	4.42	22.7	D 30-23
12.0	134.3	32.1	102.2	0.9	19.348	1.365	4.50	22.4	D 30-23
13.0	138.6	36.6	102.0	0.9	19.544	1.594	4.52	22.4	D 30-23
14.0	128.1	41.3	86.9	0.8	19.051	1.539	4.41	22.7	D 30-23
15.0	116.9	46.1	70.8	0.7	18.419	1.579	4.29	23.0	D 30-23
16.0	106.8	53.2	53.6	0.6	17.826	1.459	4.19	23.4	D 30-23
17.0	98.1	62.4	35.7	0.6	17.313	1.314	4.11	23.7	D 30-23
18.0	107.1	71.6	35.5	0.7	18.288	1.509	4.23	23.3	D 30-23
19.0	135.4	80.7	54.6	0.9	19.821	2.291	4.51	22.3	D 30-23
20.0	164.2	89.9	74.3	1.2	20.997	2.139	4.75	22.0	D 30-23
21.0	191.9	97.2	94.7	1.4	21.787	2.607	4.92	21.8	D 30-23
22.0	218.2	102.6	115.6	1.7	22.538	2.957	5.09	22.2	D 30-23
23.0	231.0	108.1	122.9	1.8	23.103	2.573	5.17	22.3	D 30-23
24.0	239.4	113.8	125.6	1.9	23.381	2.604	5.23	22.4	D 30-23
25.0	248.3	119.6	128.7	1.9	23.655	2.768	5.28	22.6	D 30-23
26.0	257.0	125.6	131.4	2.0	23.873	2.859	5.33	22.8	D 30-23
27.0	265.9	131.7	134.2	2.1	24.040	2.937	5.39	22.9	D 30-23
28.0	274.9	137.9	137.0	2.2	24.192	3.111	5.45	23.0	D 30-23
29.0	284.1	144.3	139.7	2.3	24.368	3.284	5.50	23.2	D 30-23
30.0	293.6	150.9	142.8	2.4	24.567	3.438	5.56	23.4	D 30-23
31.0	303.1	157.6	145.5	2.5	24.889	3.599	5.62	23.6	D 30-23
32.0	312.5	164.4	148.1	2.6	25.294	3.740	5.68	23.7	D 30-23
33.0	319.2	171.4	147.8	2.7	25.547	3.766	5.72	23.8	D 30-23
34.0	316.1	178.6	137.5	2.6	25.515	3.557	5.68	23.6	D 30-23
35.0	312.0	185.9	126.1	2.6	25.419	3.319	5.63	23.3	D 30-23
36.0	306.9	192.9	114.1	2.5	25.255	3.021	5.58	23.0	D 30-23
37.0	300.5	199.5	101.0	2.4	25.148	2.642	5.52	22.7	D 30-23
38.0	302.5	206.4	96.2	2.4	25.232	2.573	5.52	22.6	D 30-23
39.0	314.3	213.3	101.0	2.6	25.474	2.727	5.59	22.8	D 30-23
40.0	345.5	220.3	125.1	3.1	26.158	3.428	5.81	23.6	D 30-23
41.0	377.6	227.5	150.1	3.6	27.667	4.128	6.02	24.7	D 30-23
42.0	410.7	235.7	175.0	4.6	28.950	4.739	6.23	25.3	D 30-23

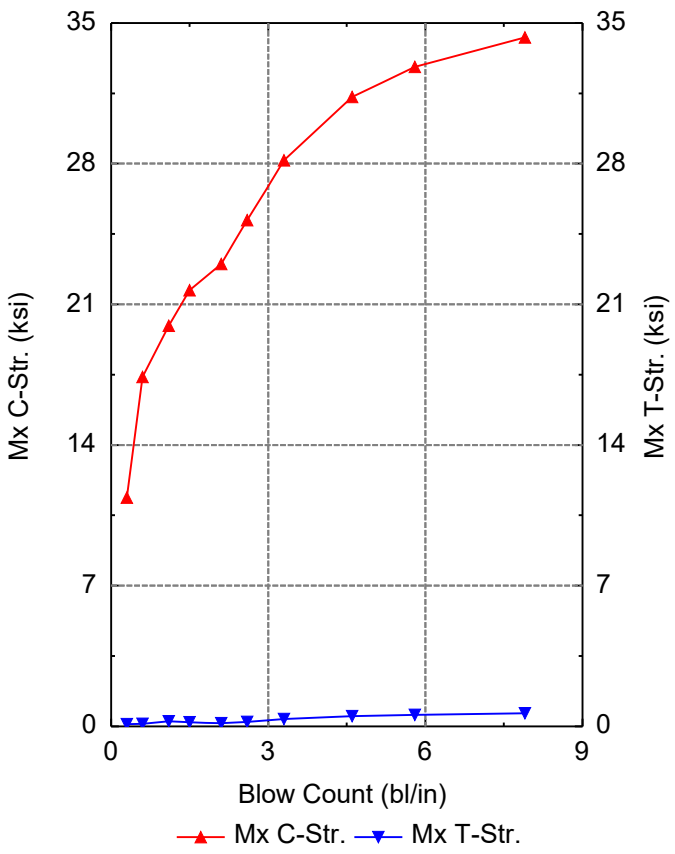
Min. Depth @ 33 ft.

Rndr=347 kips

42.0	410.7	235.7	175.0	4.6	28.950	4.739	6.23	25.3	D 30-23
43.0	470.7	245.1	225.6	7.6	30.896	5.227	6.58	26.4	D 30-23
44.0	592.0	254.6	337.4	39.1	33.556	5.753	7.12	29.2	D 30-23
45.0	689.7	264.2	425.5	9999.0	34.775	5.757	7.25	29.6	D 30-23
46.0	738.8	278.0	460.8	9999.0	37.090	5.876	7.47	30.4	D 30-23
47.0	794.9	296.4	498.5	9999.0	37.519	5.772	7.45	30.3	D 30-23
48.0	771.3	313.1	458.3	9999.0	35.507	5.354	7.20	29.1	D 30-23
49.0	720.7	327.9	392.8	9999.0	34.849	5.094	7.09	28.6	D 30-23
50.0	720.6	343.0	377.7	9999.0	34.691	5.023	7.04	28.3	D 30-23
51.0	738.4	358.2	380.2	9999.0	34.718	4.945	7.03	28.1	D 30-23
52.0	753.9	373.7	380.2	9999.0	34.660	4.809	7.01	27.9	D 30-23
53.0	754.4	389.3	365.1	9999.0	34.319	4.631	6.97	27.6	D 30-23
54.0	707.3	405.2	302.1	9999.0	33.590	4.361	6.91	27.5	D 30-23
55.0	658.7	421.2	237.4	9999.0	32.408	3.946	6.83	26.9	D 30-23
56.0	606.1	434.2	172.0	41.5	31.205	3.417	6.72	26.2	D 30-23
57.0	550.7	443.9	106.8	15.9	30.541	2.865	6.58	25.4	D 30-23
58.0	543.2	453.8	89.4	13.6	30.444	2.636	6.53	25.1	D 30-23
59.0	551.7	463.8	87.9	15.2	30.427	2.456	6.53	25.0	D 30-23
60.0	560.2	473.9	86.4	17.2	30.344	2.226	6.53	24.9	D 30-23
61.0	568.9	484.0	84.9	19.8	30.315	2.221	6.54	24.7	D 30-23
62.0	577.4	494.3	83.1	22.4	30.345	2.246	6.55	24.6	D 30-23
63.0	599.1	504.7	94.4	34.6	30.359	2.209	6.57	24.6	D 30-23
64.0	658.9	515.1	143.8	9999.0	30.462	2.059	6.65	24.8	D 30-23
65.0	718.1	525.7	192.4	9999.0	30.770	1.911	6.70	24.9	D 30-23
66.0	779.6	539.4	240.2	9999.0	31.151	1.737	6.72	24.8	D 30-23
67.0	843.1	556.1	287.0	9999.0	31.543	1.503	6.72	24.7	D 30-23
68.0	867.5	573.0	294.6	9999.0	31.815	1.229	6.70	24.5	D 30-23
69.0	879.5	589.9	289.5	9999.0	32.062	1.004	6.68	24.2	D 30-23
70.0	894.0	607.0	287.0	9999.0	32.106	0.746	6.66	23.8	D 30-23

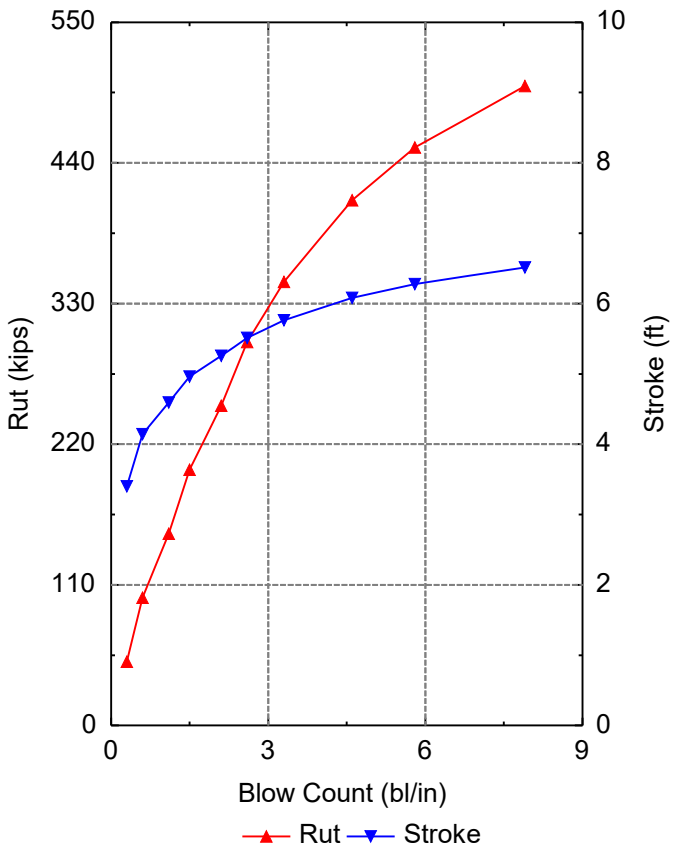
Est. Depth @ 45 ft.

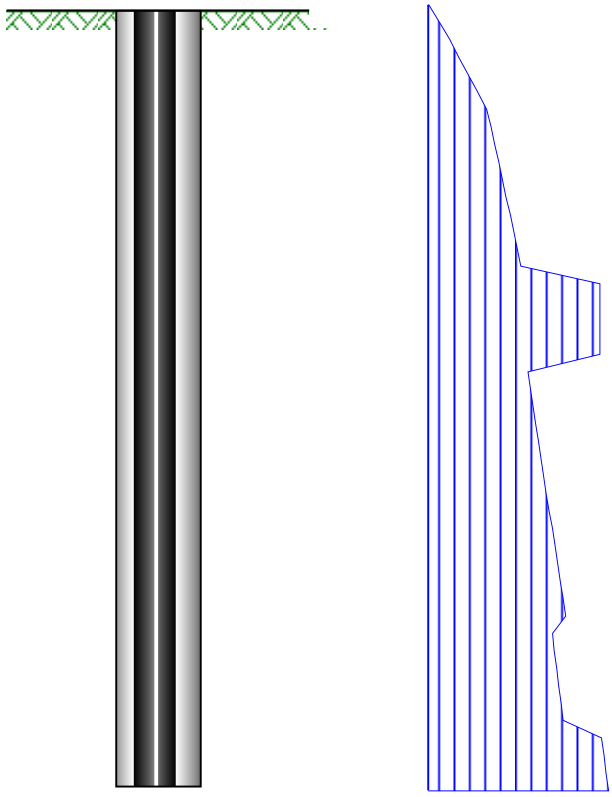
Refusal occurred; no driving time output possible.



DELMAG D 30-23 (FS=1)

Ram Weight	6.60	kips
Efficiency	0.800	
Pressure	1130.0 (73%)	psi
Helmet Weight	3.900	kips
Hammer Cushion	109976.0	kips/in
COR of H.C.	0.800	
Skin Quake	0.100	in
Toe Quake	0.150	in
Skin Damping	0.070	s/ft
Toe Damping	0.150	s/ft
Pile Length	45.00	ft
Pile Penetration	45.00	ft
Pile Top Area	17.36	in²
RSA	No	





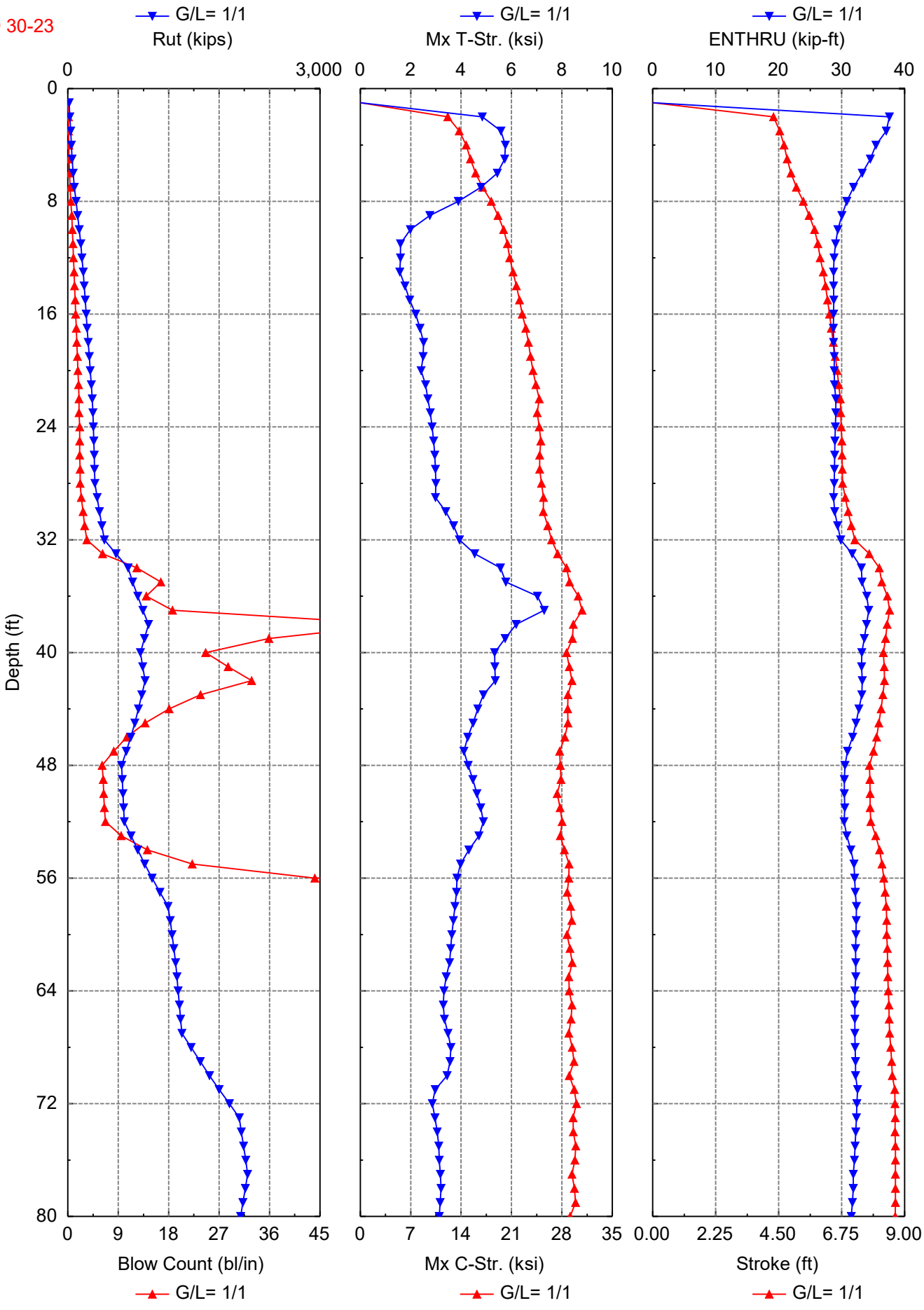
Pile Model

Shaft=38% (Prop.)

Bearing Graph Summary — DELMAG D 30-23 FS=1

	Rut kips	Mx C-Str. ksi	Top Str. ksi	Mx T-Str. ksi	Blow Ct bl/in	Stroke ft	ENTHRU kip-ft	Ham. Pow. Trfr. R. DELMAG	%
	50.0	11.38	11.38	0.11	0.3	3.40	27.26	D 30-23	36.9
	100.0	17.38	17.35	0.12	0.6	4.14	23.65	D 30-23	32.1
	150.0	19.94	19.89	0.25	1.1	4.59	21.71	D 30-23	29.4
	200.0	21.70	21.61	0.19	1.5	4.96	20.94	D 30-23	28.4
	250.0	23.01	22.92	0.16	2.1	5.26	20.83	D 30-23	28.2
	300.0	25.19	25.19	0.22	2.6	5.51	21.13	D 30-23	28.6
Rndr	347.0	28.16	28.16	0.36	3.3	5.76	21.60	D 30-23	29.3
	410.7	31.32	31.32	0.50	4.6	6.08	22.51	D 30-23	30.5
	452.0	32.81	32.81	0.57	5.8	6.28	23.03	D 30-23	31.2
	500.0	34.29	34.20	0.65	7.9	6.51	23.76	D 30-23	32.2

DELMAG D 30-23



Driveability Analysis Summary

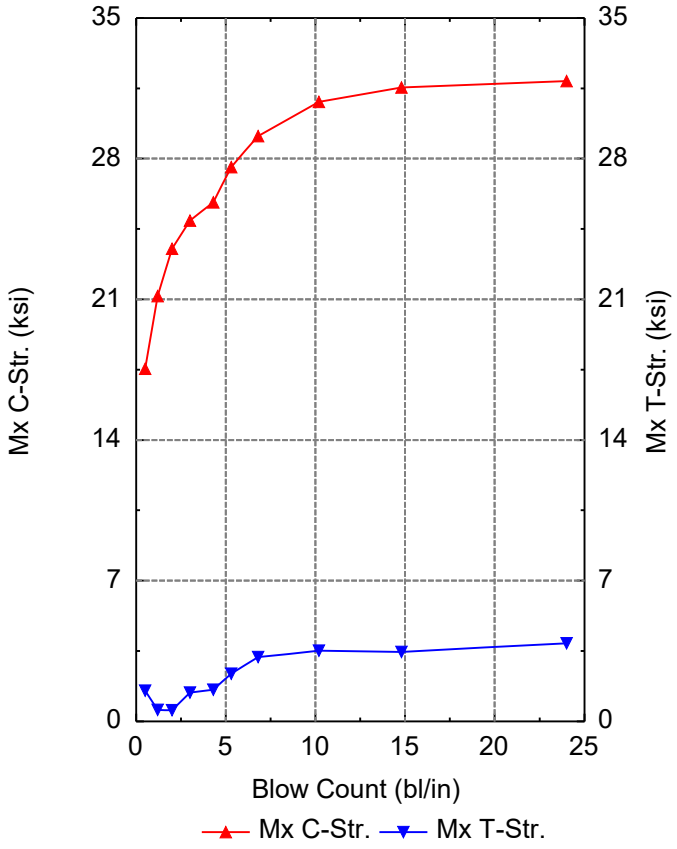
Gain/Loss Factor at Shaft/Toe = 1.000/1.000

FS=3

Depth	Rut	Rshaft	Rtoe	Blow Ct	Mx C-Str	Mx T-Str.	Stroke	ENTHRU	Hammer	
ft	kips	kips	kips	bl/in	ksi	ksi	ft	kip-ft	-	
1.0	14.7	0.2	14.5	0.0	0.000	0.000	11.18	0.0	D 30-23	
2.0	23.2	0.8	22.5	0.1	12.142	4.841	4.31	37.6	D 30-23	
3.0	33.4	1.7	31.7	0.1	13.748	5.580	4.54	37.0	D 30-23	
4.0	42.9	3.0	40.0	0.2	14.689	5.760	4.69	35.4	D 30-23	
5.0	51.0	4.6	46.4	0.2	15.287	5.729	4.80	34.5	D 30-23	
6.0	62.7	11.7	51.1	0.3	16.002	5.433	4.94	33.3	D 30-23	
7.0	77.9	23.9	54.0	0.4	16.987	4.790	5.13	31.9	D 30-23	
8.0	97.2	36.2	61.0	0.5	18.176	3.889	5.38	30.8	D 30-23	
9.0	116.4	48.4	68.0	0.6	19.132	2.758	5.59	30.0	D 30-23	
10.0	136.6	60.7	76.0	0.8	19.910	1.986	5.78	29.4	D 30-23	
11.0	154.1	68.5	85.6	0.9	20.424	1.596	5.90	29.0	D 30-23	
12.0	168.2	71.9	96.3	1.0	20.755	1.594	5.98	28.8	D 30-23	
13.0	183.7	75.6	108.1	1.1	21.198	1.565	6.09	28.7	D 30-23	
14.0	195.2	79.6	115.6	1.2	21.686	1.773	6.17	28.7	D 30-23	
15.0	206.9	83.9	123.1	1.3	22.109	1.962	6.24	28.7	D 30-23	
16.0	218.4	88.4	130.0	1.4	22.498	2.199	6.31	28.7	D 30-23	
17.0	230.2	93.2	137.0	1.5	22.972	2.367	6.38	28.7	D 30-23	
18.0	242.2	98.3	143.9	1.6	23.349	2.509	6.45	28.7	D 30-23	
19.0	254.5	103.6	150.9	1.7	23.621	2.491	6.52	28.8	D 30-23	
20.0	266.5	109.2	157.3	1.8	23.974	2.415	6.59	28.8	D 30-23	
21.0	278.7	115.0	163.7	1.9	24.376	2.592	6.65	28.8	D 30-23	
22.0	291.2	121.0	170.1	2.0	24.846	2.684	6.70	29.1	D 30-23	
23.0	296.9	127.3	169.6	2.0	24.557	2.779	6.71	29.1	D 30-23	Min. Depth @ 23 ft.
24.0	302.9	133.8	169.1	2.1	24.865	2.847	6.73	29.0	D 30-23	
25.0	308.6	140.6	168.0	2.1	25.076	2.910	6.75	28.9	D 30-23	
26.0	313.5	147.1	166.4	2.1	24.907	2.955	6.76	28.9	D 30-23	
27.0	318.1	153.3	164.8	2.2	24.908	2.986	6.77	28.8	D 30-23	
28.0	322.4	159.8	162.6	2.2	25.148	3.002	6.78	28.8	D 30-23	
29.0	349.4	166.4	183.0	2.4	25.444	2.980	6.88	28.7	D 30-23	
30.0	376.6	173.2	203.3	2.7	25.425	3.393	6.98	28.9	D 30-23	
31.0	404.4	180.2	224.2	3.0	26.020	3.707	7.09	29.4	D 30-23	
32.0	433.7	188.7	245.0	3.4	26.574	3.934	7.22	29.8	D 30-23	Rndr=521 kips
33.0	573.1	198.5	374.5	6.2	27.409	4.538	7.73	31.7	D 30-23	
34.0	715.8	208.6	507.2	12.3	28.652	5.559	8.10	33.1	D 30-23	
35.0	770.1	219.0	551.1	16.6	29.042	5.775	8.18	33.2	D 30-23	Est. Depth @ 35 ft.
36.0	832.5	233.2	599.3	14.0	30.265	7.033	8.38	34.0	D 30-23	
37.0	893.6	251.5	642.0	18.7	30.798	7.299	8.46	34.3	D 30-23	
38.0	959.2	269.0	690.2	58.9	29.569	6.187	8.37	33.9	D 30-23	
39.0	911.3	285.3	626.0	35.9	29.461	5.744	8.32	33.6	D 30-23	
40.0	863.8	302.0	561.8	24.6	28.664	5.334	8.24	33.2	D 30-23	
41.0	891.6	319.1	572.5	28.6	29.035	5.337	8.27	33.2	D 30-23	
42.0	919.7	336.5	583.2	32.8	29.395	5.358	8.28	33.3	D 30-23	

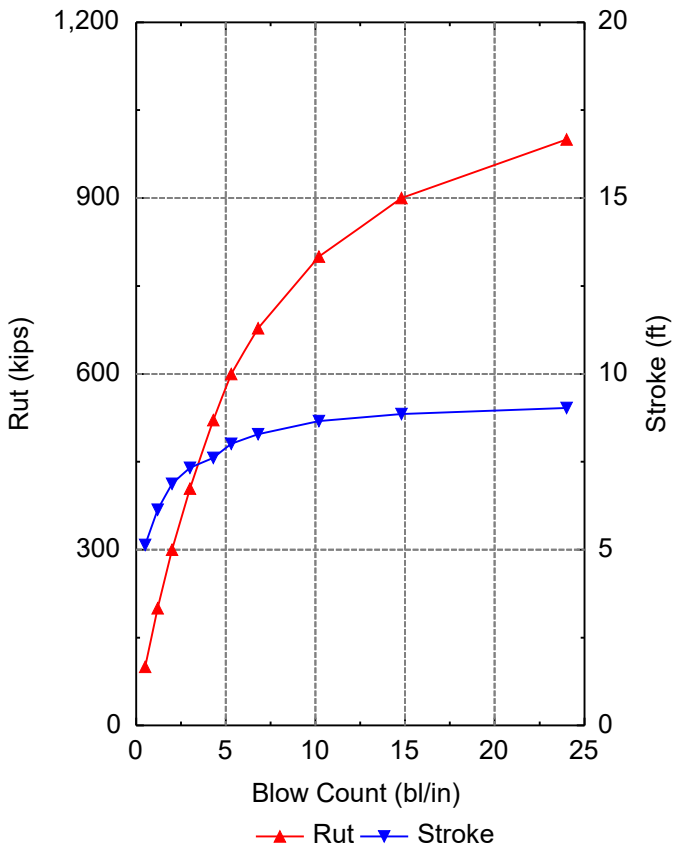
42.0	919.7	336.5	583.2	32.8	29.395	5.358	8.28	33.3	D 30-23
43.0	879.6	354.2	525.4	23.7	28.847	4.882	8.22	33.2	D 30-23
44.0	839.5	372.4	467.1	18.1	28.799	4.668	8.15	32.7	D 30-23
45.0	797.0	390.9	406.1	13.8	28.831	4.481	8.08	32.3	D 30-23
46.0	748.7	405.7	343.0	10.5	28.385	4.263	7.99	31.7	D 30-23
47.0	695.0	416.8	278.2	8.2	27.682	4.110	7.88	30.9	D 30-23
48.0	638.9	428.1	210.8	6.1	27.790	4.278	7.74	30.5	D 30-23
49.0	646.6	439.6	207.1	6.3	27.876	4.468	7.76	30.4	D 30-23
50.0	654.6	451.2	203.3	6.4	27.352	4.630	7.76	30.4	D 30-23
51.0	663.2	463.0	200.1	6.5	27.742	4.782	7.77	30.5	D 30-23
52.0	671.9	475.0	196.9	6.7	28.022	4.888	7.79	30.4	D 30-23
53.0	750.9	487.2	263.8	9.5	27.780	4.710	7.97	30.8	D 30-23
54.0	831.8	499.5	332.3	14.2	28.352	4.306	8.10	31.5	D 30-23
55.0	914.4	512.0	402.3	22.2	28.986	3.975	8.19	32.0	D 30-23
56.0	1002.6	528.6	474.0	44.1	28.944	3.835	8.25	32.1	D 30-23
57.0	1095.1	549.3	545.8	9999.0	28.737	3.818	8.30	32.1	D 30-23
58.0	1191.0	570.3	620.7	9999.0	29.214	3.760	8.34	32.3	D 30-23
59.0	1217.6	591.6	626.0	9999.0	29.368	3.691	8.36	32.3	D 30-23
60.0	1239.1	613.1	626.0	9999.0	28.716	3.634	8.36	32.3	D 30-23
61.0	1260.9	634.9	626.0	9999.0	29.123	3.588	8.38	32.2	D 30-23
62.0	1282.9	656.9	626.0	9999.0	29.433	3.543	8.39	32.2	D 30-23
63.0	1299.7	679.1	620.7	9999.0	28.969	3.412	8.40	32.2	D 30-23
64.0	1311.4	701.5	609.9	9999.0	29.016	3.319	8.42	32.1	D 30-23
65.0	1328.8	724.2	604.6	9999.0	29.393	3.296	8.43	32.1	D 30-23
66.0	1340.9	747.0	593.9	9999.0	29.272	3.341	8.44	32.1	D 30-23
67.0	1358.7	770.1	588.5	9999.0	28.956	3.481	8.46	32.1	D 30-23
68.0	1467.7	793.5	674.2	9999.0	29.424	3.598	8.50	32.1	D 30-23
69.0	1576.8	817.1	759.8	9999.0	29.682	3.562	8.53	32.2	D 30-23
70.0	1686.2	840.8	845.4	9999.0	29.027	3.448	8.55	32.2	D 30-23
71.0	1801.5	870.5	931.0	9999.0	29.693	2.973	8.64	32.5	D 30-23
72.0	1922.9	906.3	1016.6	9999.0	30.033	2.859	8.65	32.4	D 30-23
73.0	2039.3	942.4	1096.9	9999.0	29.552	2.965	8.66	32.3	D 30-23
74.0	2065.2	979.0	1086.1	9999.0	29.577	3.053	8.66	32.2	D 30-23
75.0	2091.4	1016.0	1075.4	9999.0	29.922	3.116	8.67	32.1	D 30-23
76.0	2118.0	1053.3	1064.8	9999.0	29.796	3.134	8.67	32.0	D 30-23
77.0	2139.7	1091.0	1048.7	9999.0	29.382	3.178	8.67	31.9	D 30-23
78.0	2113.6	1129.2	984.5	9999.0	29.753	3.206	8.67	31.8	D 30-23
79.0	2082.6	1167.7	914.9	9999.0	29.908	3.166	8.67	31.7	D 30-23
80.0	2057.3	1206.6	850.7	9999.0	29.142	3.136	8.66	31.5	D 30-23

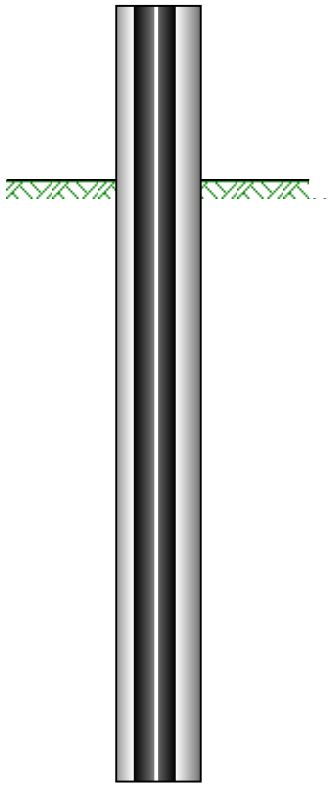
Refusal occurred; no driving time output possible.



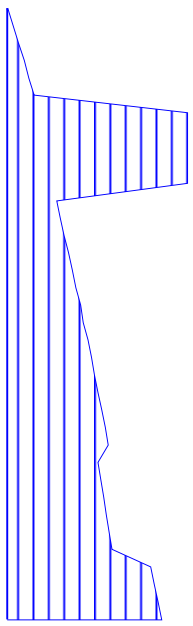
DELMAG D 30-23 (FS=3)

Ram Weight	6.60	kips
Efficiency	0.800	
Pressure	1395.0 (90%)	psi
Helmet Weight	3.900	kips
Hammer Cushion	109976.0	kips/in
COR of H.C.	0.800	
Skin Quake	0.100	in
Toe Quake	0.100	in
Skin Damping	0.089	s/ft
Toe Damping	0.150	s/ft
Pile Length	45.00	ft
Pile Penetration	35.00	ft
Pile Top Area	36.91	in²
RSA	No	





Pile Model

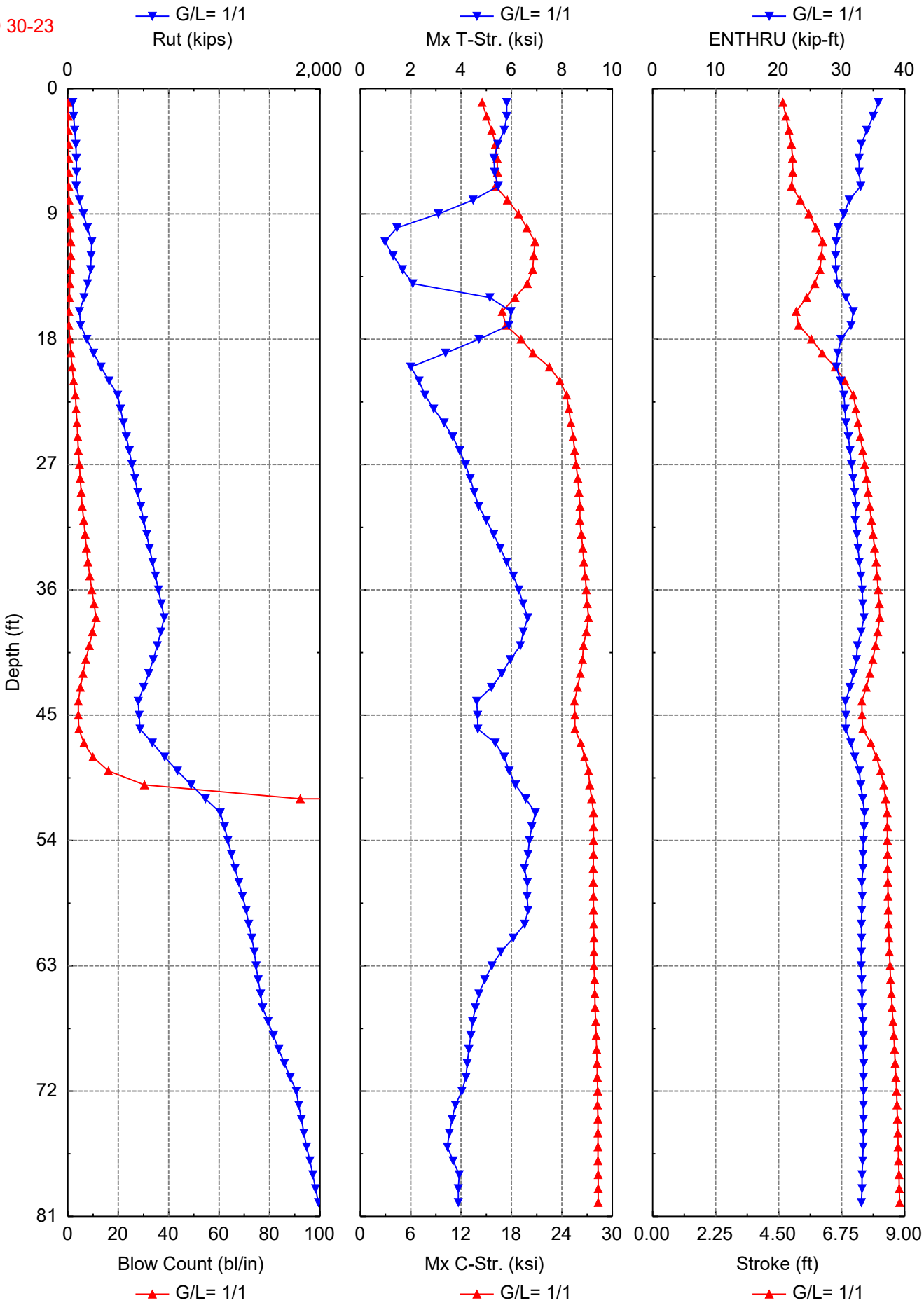


Shaft=28% (Prop.)

Bearing Graph Summary — DELMAG D 30-23 FS=3

	Rut	Mx C-Str.	Top Str.	Mx T-Str.	Blow Ct	Stroke	ENTHRU	Ham.	Pow. Trfr. R.
	kips	ksi	ksi	ksi	bl/in	ft	kip-ft	DELMAG	%
	100.0	17.54	17.42	1.52	0.5	5.14	31.78	D 30-23	43.1
	200.0	21.16	20.89	0.56	1.2	6.14	28.41	D 30-23	38.5
	300.0	23.51	23.09	0.55	2.0	6.88	27.72	D 30-23	37.6
	404.4	24.92	24.35	1.42	3.0	7.33	27.62	D 30-23	37.4
Rndr	521.0	25.83	25.12	1.57	4.3	7.61	27.68	D 30-23	37.5
	600.0	27.58	26.10	2.37	5.4	8.01	28.87	D 30-23	39.1
	678.0	29.12	26.82	3.19	6.8	8.28	30.01	D 30-23	40.7
	800.0	30.83	27.69	3.51	10.2	8.66	31.39	D 30-23	42.5
	900.0	31.54	28.22	3.46	14.8	8.86	32.12	D 30-23	43.5
	1000.0	31.87	28.62	3.88	24.0	9.03	32.68	D 30-23	44.3

DELMAG D 30-23



Ground Reference EL. @ 135 ft., Min. & Estimated Pile Tip EL. @ 101 ft.

Driveability Analysis Summary

Gain/Loss Factor at Shaft/Toe = 1.000/1.000

FS=3

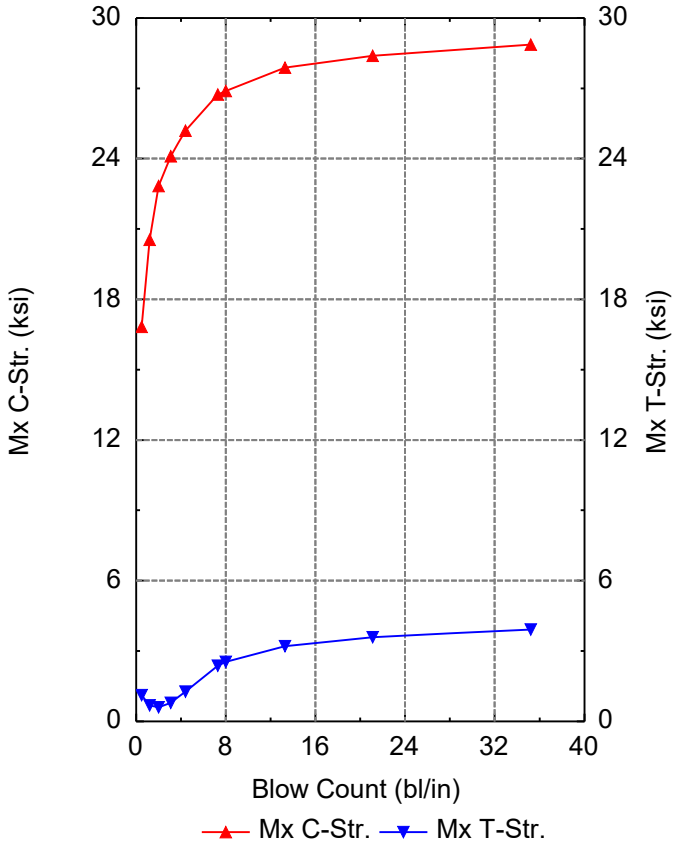
Depth	Rut	Rshaft	Rtoe	Blow Ct	Mx C-Str	Mx T-Str.	Stroke	ENTHRU	Hammer
ft	kips	kips	kips	bl/in	ksi	ksi	ft	kip-ft	-
1.0	38.5	0.3	38.3	0.2	14.485	5.812	4.65	35.8	D 30-23
2.0	45.9	1.1	44.8	0.2	15.030	5.809	4.75	35.0	D 30-23
3.0	54.9	2.5	52.4	0.2	15.640	5.713	4.87	34.0	D 30-23
4.0	63.4	4.5	58.8	0.3	16.109	5.459	4.96	33.1	D 30-23
5.0	67.4	6.4	61.0	0.3	16.273	5.305	5.00	32.8	D 30-23
6.0	68.5	8.0	60.5	0.3	16.332	5.333	5.00	32.8	D 30-23
7.0	65.6	9.9	55.6	0.3	16.110	5.475	4.97	33.0	D 30-23
8.0	92.9	12.1	80.8	0.4	17.514	4.480	5.26	31.2	D 30-23
9.0	122.5	14.5	108.1	0.6	18.836	3.096	5.58	30.3	D 30-23
10.0	154.6	17.1	137.5	0.9	19.836	1.450	5.83	29.4	D 30-23
11.0	189.7	21.1	168.5	1.1	20.783	0.983	6.07	29.1	D 30-23
12.0	185.1	26.7	158.4	1.1	20.639	1.299	6.02	29.0	D 30-23
13.0	180.5	32.8	147.7	1.0	20.516	1.673	5.97	29.1	D 30-23
14.0	156.6	39.4	117.2	0.8	19.878	2.083	5.79	29.3	D 30-23
15.0	127.4	43.4	84.0	0.6	18.423	5.144	5.50	30.7	D 30-23
16.0	92.1	44.6	47.6	0.4	16.905	5.981	5.12	31.8	D 30-23
17.0	100.4	45.8	54.6	0.4	17.318	5.904	5.21	31.5	D 30-23
18.0	150.9	47.1	103.8	0.8	19.127	4.708	5.67	29.9	D 30-23
19.0	203.6	48.4	155.2	1.2	20.559	3.379	6.05	29.4	D 30-23
20.0	262.5	53.3	209.2	1.7	22.497	2.005	6.51	29.1	D 30-23
21.0	326.8	61.9	264.8	2.3	23.759	2.335	6.86	29.8	D 30-23
22.0	393.6	71.0	322.6	3.0	24.567	2.566	7.16	30.4	D 30-23
23.0	417.1	80.5	336.6	3.3	24.835	2.910	7.25	30.5	D 30-23
24.0	439.9	90.5	349.4	3.6	25.068	3.328	7.33	30.7	D 30-23
25.0	463.1	100.8	362.2	3.9	25.317	3.672	7.41	31.1	D 30-23
26.0	486.2	111.6	374.5	4.2	25.504	3.942	7.50	31.3	D 30-23
27.0	509.1	122.8	386.3	4.6	25.677	4.170	7.57	31.5	D 30-23
28.0	531.9	134.4	397.5	5.0	25.882	4.357	7.64	31.8	D 30-23
29.0	555.1	146.3	408.8	5.3	26.014	4.524	7.69	32.1	D 30-23
30.0	578.1	158.7	419.5	5.7	26.145	4.698	7.74	32.3	D 30-23
31.0	601.6	171.4	430.2	6.3	26.141	4.999	7.81	32.1	D 30-23
32.0	624.9	184.5	440.4	6.8	26.309	5.294	7.87	32.4	D 30-23
33.0	647.9	198.0	450.0	7.4	26.465	5.549	7.93	32.6	D 30-23
34.0	671.4	211.8	459.6	8.0	26.617	5.809	7.98	32.8	D 30-23
35.0	694.7	226.0	468.7	8.7	26.776	6.075	8.01	33.0	D 30-23
36.0	717.9	240.6	477.3	9.5	26.901	6.295	8.05	33.3	D 30-23
37.0	741.3	255.5	485.8	10.4	27.021	6.459	8.09	33.3	D 30-23
38.0	765.1	270.7	494.4	11.2	27.161	6.647	8.11	33.6	D 30-23
39.0	737.9	286.4	451.6	9.8	26.897	6.473	8.04	33.1	D 30-23
40.0	708.4	302.3	406.1	8.5	26.554	6.352	7.96	32.5	D 30-23
41.0	677.6	318.6	359.0	7.1	26.448	5.951	7.86	32.3	D 30-23
42.0	641.0	331.8	309.3	6.0	26.185	5.619	7.76	31.9	D 30-23

Rndr=500 kips

Min. & Est. Depth @ 34 ft.

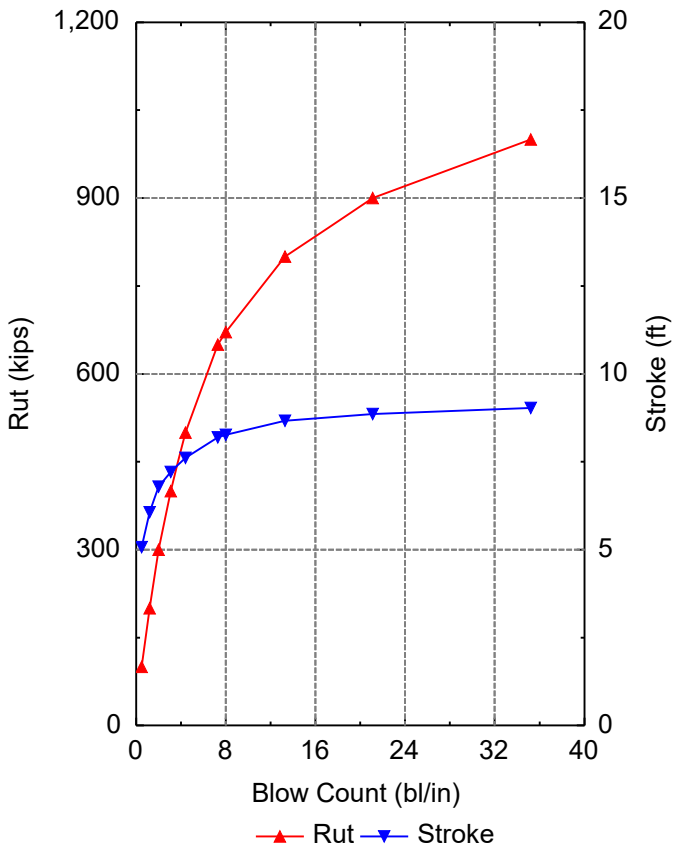
42.0	641.0	331.8	309.3	6.0	26.185	5.619	7.76	31.9	D 30-23
43.0	600.2	341.8	258.4	5.0	25.861	5.203	7.63	31.3	D 30-23
44.0	557.4	352.0	205.5	4.2	25.500	4.616	7.47	30.6	D 30-23
45.0	564.6	362.4	202.3	4.2	25.546	4.658	7.48	30.7	D 30-23
46.0	572.0	373.0	199.1	4.3	25.556	4.662	7.50	30.6	D 30-23
47.0	669.4	383.7	285.7	6.4	26.223	5.361	7.78	31.5	D 30-23
48.0	768.6	394.6	374.0	9.9	26.695	5.713	7.98	32.0	D 30-23
49.0	870.1	405.7	464.4	16.1	27.166	5.906	8.14	32.8	D 30-23
50.0	978.5	422.0	556.4	30.4	27.311	6.154	8.25	33.0	D 30-23
51.0	1091.1	443.7	647.4	92.2	27.552	6.564	8.32	33.3	D 30-23
52.0	1209.4	465.7	743.7	9999.0	27.754	6.950	8.37	33.6	D 30-23
53.0	1242.4	488.0	754.4	9999.0	27.757	6.805	8.38	33.6	D 30-23
54.0	1270.4	510.6	759.8	9999.0	27.761	6.713	8.38	33.4	D 30-23
55.0	1298.7	533.6	765.1	9999.0	27.748	6.660	8.39	33.4	D 30-23
56.0	1327.4	556.9	770.5	9999.0	27.744	6.517	8.39	33.4	D 30-23
57.0	1356.3	580.5	775.8	9999.0	27.737	6.630	8.40	33.2	D 30-23
58.0	1385.6	604.4	781.2	9999.0	27.766	6.620	8.40	33.3	D 30-23
59.0	1415.2	628.7	786.5	9999.0	27.748	6.655	8.41	33.2	D 30-23
60.0	1434.4	653.2	781.2	9999.0	27.786	6.526	8.42	33.1	D 30-23
61.0	1459.3	678.1	781.2	9999.0	27.799	6.072	8.44	33.1	D 30-23
62.0	1479.1	703.3	775.8	9999.0	27.819	5.579	8.45	33.1	D 30-23
63.0	1493.9	728.8	765.1	9999.0	27.815	5.225	8.47	33.1	D 30-23
64.0	1508.9	754.5	754.4	9999.0	27.882	4.939	8.49	33.2	D 30-23
65.0	1529.5	780.4	749.1	9999.0	27.929	4.704	8.52	33.2	D 30-23
66.0	1545.1	806.7	738.4	9999.0	27.934	4.570	8.55	33.2	D 30-23
67.0	1587.6	833.2	754.4	9999.0	28.035	4.460	8.58	33.4	D 30-23
68.0	1630.5	860.0	770.5	9999.0	28.079	4.384	8.61	33.4	D 30-23
69.0	1673.7	887.1	786.5	9999.0	28.120	4.304	8.64	33.4	D 30-23
70.0	1718.4	915.8	802.6	9999.0	28.173	4.243	8.66	33.5	D 30-23
71.0	1764.9	946.3	818.6	9999.0	28.207	4.194	8.69	33.4	D 30-23
72.0	1811.7	977.0	834.7	9999.0	28.257	4.029	8.71	33.5	D 30-23
73.0	1832.0	1008.0	824.0	9999.0	28.243	3.776	8.73	33.5	D 30-23
74.0	1852.5	1039.3	813.3	9999.0	28.281	3.640	8.74	33.4	D 30-23
75.0	1873.5	1070.9	802.6	9999.0	28.295	3.538	8.75	33.4	D 30-23
76.0	1894.6	1102.8	791.9	9999.0	28.282	3.458	8.76	33.4	D 30-23
77.0	1921.5	1134.9	786.5	9999.0	28.299	3.686	8.78	33.3	D 30-23
78.0	1943.2	1167.4	775.8	9999.0	28.307	3.930	8.79	33.2	D 30-23
79.0	1965.1	1200.0	765.1	9999.0	28.306	3.886	8.80	33.2	D 30-23
80.0	1987.4	1233.0	754.4	9999.0	28.308	3.886	8.82	33.1	D 30-23

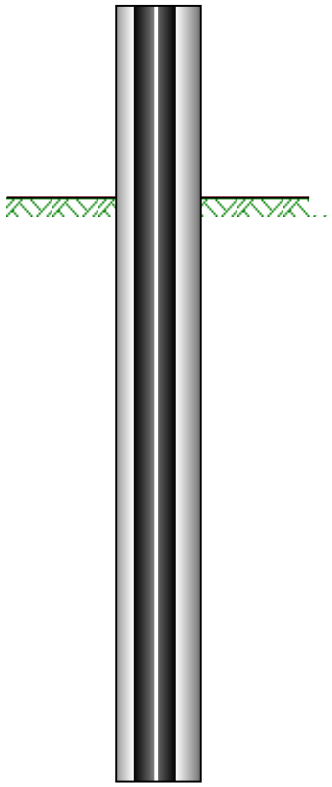
Refusal occurred; no driving time output possible.



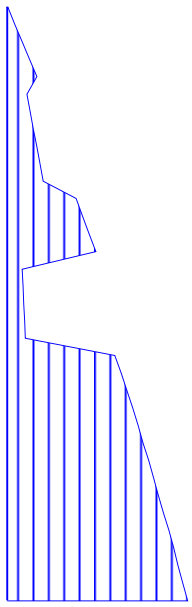
DELMAG D 30-23 (FS=3)

Ram Weight	6.60	kips
Efficiency	0.800	
Pressure	1395.0 (90%)	psi
Helmet Weight	3.900	kips
Hammer Cushion	109976.0	kips/in
COR of H.C.	0.800	
Skin Quake	0.100	in
Toe Quake	0.200	in
Skin Damping	0.080	s/ft
Toe Damping	0.150	s/ft
Pile Length	45.00	ft
Pile Penetration	34.00	ft
Pile Top Area	36.91	in²
RSA	No	





Pile Model



Shaft=32% (Prop.)

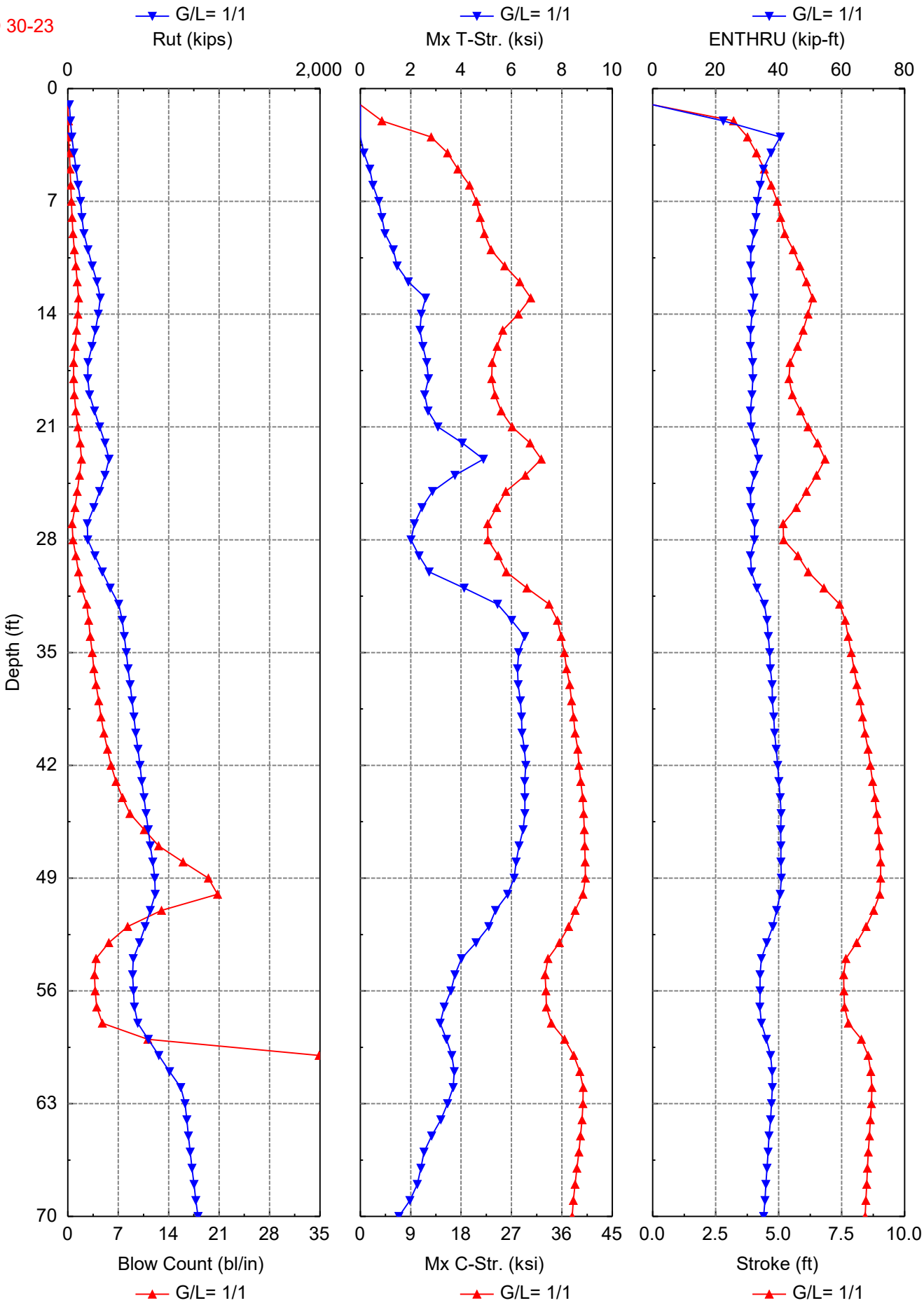
Bearing Graph Summary — DELMAG D 30-23 FS=3

Rut kips	Mx C-Str. ksi	Top Str. ksi	Mx T-Str. ksi	Blow Ct bl/in	Stroke ft	ENTHRU kip-ft	Ham.	Pow. Trfr. R. %
100.0	16.82	16.82	1.12	0.5	5.07	32.20	D 30-23	43.6
200.0	20.53	20.42	0.67	1.2	6.07	28.79	D 30-23	39.0
300.0	22.83	22.65	0.59	2.0	6.79	28.18	D 30-23	38.2
400.0	24.10	23.86	0.78	3.1	7.21	28.02	D 30-23	38.0
Rndr 500.0	25.19	24.93	1.27	4.4	7.61	28.56	D 30-23	38.7
650.0	26.74	26.43	2.37	7.3	8.19	30.18	D 30-23	40.9
671.4	26.89	26.56	2.54	8.0	8.27	30.38	D 30-23	41.2
800.0	27.88	27.54	3.21	13.3	8.67	31.91	D 30-23	43.2
900.0	28.39	28.04	3.59	21.1	8.86	32.60	D 30-23	44.2
1000.0	28.86	28.49	3.92	35.2	9.03	33.31	D 30-23	45.1

Driving Resistance at Min. Depth

Bent 4 - MS Pile (18" dia.) NOVA ENGINEERING AND ENVIRONMENTAL LLC

DELMAG D 30-23



Driveability Analysis Summary

Gain/Loss Factor at Shaft/Toe = 1.000/1.000 FS=3

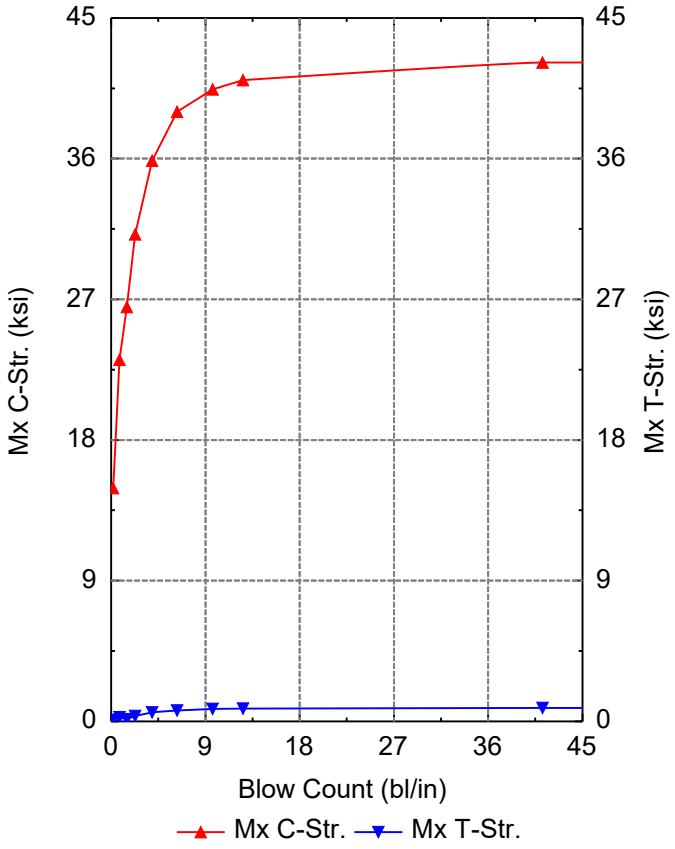
Depth	Rut	Rshaft	Rtoe	Blow Ct	Mx C-Str	Mx T-Str.	Stroke	ENTHRU	Hammer
ft	kips	kips	kips	bl/in	ksi	ksi	ft	kip-ft	-
1.0	12.8	0.3	12.5	0.0	0.000	0.000	0.00	0.0	D 30-23
2.0	20.6	1.1	19.5	0.1	3.848	0.000	3.21	22.4	D 30-23
3.0	31.7	2.3	29.5	0.1	12.651	0.000	3.76	40.5	D 30-23
4.0	47.7	3.7	44.1	0.2	15.586	0.143	4.12	37.6	D 30-23
5.0	64.6	5.4	59.2	0.3	17.441	0.380	4.43	35.2	D 30-23
6.0	82.3	8.0	74.3	0.4	19.511	0.503	4.70	34.2	D 30-23
7.0	100.5	11.4	89.1	0.5	20.748	0.737	4.94	33.2	D 30-23
8.0	112.5	15.0	97.4	0.6	21.426	0.854	5.08	32.8	D 30-23
9.0	127.7	18.9	108.8	0.7	22.161	0.980	5.24	32.2	D 30-23
10.0	160.3	23.1	137.2	0.9	23.355	1.308	5.58	31.2	D 30-23
11.0	194.2	27.5	166.7	1.1	25.770	1.461	5.84	31.1	D 30-23
12.0	230.0	32.9	197.1	1.3	28.450	1.908	6.10	31.4	D 30-23
13.0	258.4	39.3	219.1	1.5	30.427	2.590	6.34	32.1	D 30-23
14.0	241.5	46.1	195.4	1.4	28.234	2.419	6.17	31.5	D 30-23
15.0	217.9	53.3	164.7	1.2	25.424	2.370	5.96	31.1	D 30-23
16.0	190.8	58.9	131.9	1.0	24.447	2.481	5.75	31.0	D 30-23
17.0	160.4	62.9	97.4	0.8	23.558	2.637	5.45	31.7	D 30-23
18.0	157.7	67.1	90.6	0.8	23.461	2.709	5.41	31.8	D 30-23
19.0	172.7	71.4	101.2	0.9	24.034	2.551	5.54	31.5	D 30-23
20.0	211.7	75.9	135.7	1.1	25.157	2.686	5.87	31.0	D 30-23
21.0	251.6	80.6	171.0	1.4	27.110	3.079	6.16	31.3	D 30-23
22.0	294.4	87.2	207.2	1.7	30.296	4.049	6.54	32.6	D 30-23
23.0	326.5	95.9	230.6	1.9	32.307	4.886	6.84	33.6	D 30-23
24.0	294.2	104.8	189.4	1.6	29.458	3.759	6.50	32.2	D 30-23
25.0	252.5	114.1	138.5	1.3	25.995	2.867	6.10	31.0	D 30-23
26.0	206.2	119.8	86.4	1.0	24.365	2.448	5.70	31.2	D 30-23
27.0	154.9	121.9	33.0	0.6	22.729	2.145	5.17	32.4	D 30-23
28.0	157.3	124.0	33.2	0.7	22.799	2.017	5.20	32.3	D 30-23
29.0	214.6	126.2	88.4	1.1	24.617	2.336	5.76	31.0	D 30-23
30.0	272.7	128.5	144.3	1.5	26.050	2.730	6.17	31.4	D 30-23
31.0	335.8	134.6	201.2	1.9	29.761	4.125	6.80	33.1	D 30-23
32.0	404.1	144.7	259.3	2.6	33.712	5.450	7.42	35.4	D 30-23
33.0	432.1	155.1	277.0	2.9	35.212	6.008	7.64	36.3	D 30-23
34.0	447.8	165.8	282.0	3.1	35.878	6.523	7.76	36.7	D 30-23
35.0	463.8	176.7	287.0	3.4	36.441	6.283	7.88	37.2	D 30-23
36.0	477.4	187.8	289.5	3.6	36.831	6.234	7.98	37.4	D 30-23
37.0	493.8	199.2	294.6	3.9	37.410	6.262	8.11	37.9	D 30-23
38.0	510.4	210.8	299.6	4.3	37.734	6.354	8.23	38.0	D 30-23
39.0	524.8	222.6	302.1	4.6	38.067	6.401	8.32	38.4	D 30-23
40.0	539.3	234.7	304.7	5.0	38.372	6.416	8.43	38.7	D 30-23
41.0	556.6	246.9	309.7	5.5	38.818	6.513	8.55	39.2	D 30-23
42.0	571.5	259.3	312.2	6.0	39.036	6.568	8.63	39.7	D 30-23

Rndr=347 kips

42.0	571.5	259.3	312.2	6.0	39.036	6.568	8.63	39.7	D 30-23
43.0	586.7	272.0	314.7	6.7	39.340	6.524	8.72	40.1	D 30-23
44.0	604.7	284.9	319.8	7.6	39.723	6.529	8.82	40.5	D 30-23
45.0	620.3	298.0	322.3	8.6	39.886	6.528	8.89	40.7	D 30-23
46.0	638.6	311.3	327.3	10.6	39.994	6.464	8.95	40.6	D 30-23
47.0	654.6	324.8	329.8	12.6	40.069	6.298	9.00	40.7	D 30-23
48.0	673.3	338.4	334.9	16.0	40.150	6.187	9.04	40.7	D 30-23
49.0	689.7	352.3	337.4	19.5	40.182	6.100	9.05	40.8	D 30-23
50.0	693.6	366.2	327.3	20.8	39.760	5.847	9.01	40.5	D 30-23
51.0	654.9	380.4	274.5	13.0	38.346	5.364	8.77	39.4	D 30-23
52.0	613.1	394.8	218.3	8.3	37.184	5.103	8.46	38.1	D 30-23
53.0	568.1	406.5	161.6	5.7	35.558	4.588	8.09	36.2	D 30-23
54.0	519.5	415.5	104.0	3.9	33.511	4.015	7.67	34.5	D 30-23
55.0	512.8	424.7	88.1	3.7	33.000	3.756	7.57	34.1	D 30-23
56.0	520.5	433.9	86.6	3.8	33.145	3.594	7.59	34.1	D 30-23
57.0	528.3	443.2	85.1	4.0	33.230	3.329	7.61	34.0	D 30-23
58.0	555.1	452.6	102.5	4.8	34.102	3.166	7.77	34.5	D 30-23
59.0	638.9	462.2	176.8	11.1	36.482	3.416	8.28	36.1	D 30-23
60.0	721.6	471.8	249.8	34.9	38.120	3.632	8.55	37.4	D 30-23
61.0	807.9	485.6	322.3	9999.0	39.176	3.729	8.65	37.9	D 30-23
62.0	896.5	503.7	392.8	9999.0	39.776	3.685	8.70	38.0	D 30-23
63.0	929.9	522.0	407.9	9999.0	39.752	3.459	8.68	37.7	D 30-23
64.0	943.4	540.5	402.9	9999.0	39.576	3.196	8.64	37.4	D 30-23
65.0	957.0	559.2	397.8	9999.0	39.323	2.829	8.60	36.9	D 30-23
66.0	970.8	578.0	392.8	9999.0	39.032	2.529	8.56	36.6	D 30-23
67.0	984.7	597.0	387.7	9999.0	38.691	2.409	8.52	36.3	D 30-23
68.0	1001.4	616.2	385.2	9999.0	38.335	2.264	8.49	35.9	D 30-23
69.0	1015.7	635.5	380.2	9999.0	38.022	1.968	8.45	35.6	D 30-23
70.0	1032.7	655.0	377.7	9999.0	37.833	1.531	8.43	35.2	D 30-23

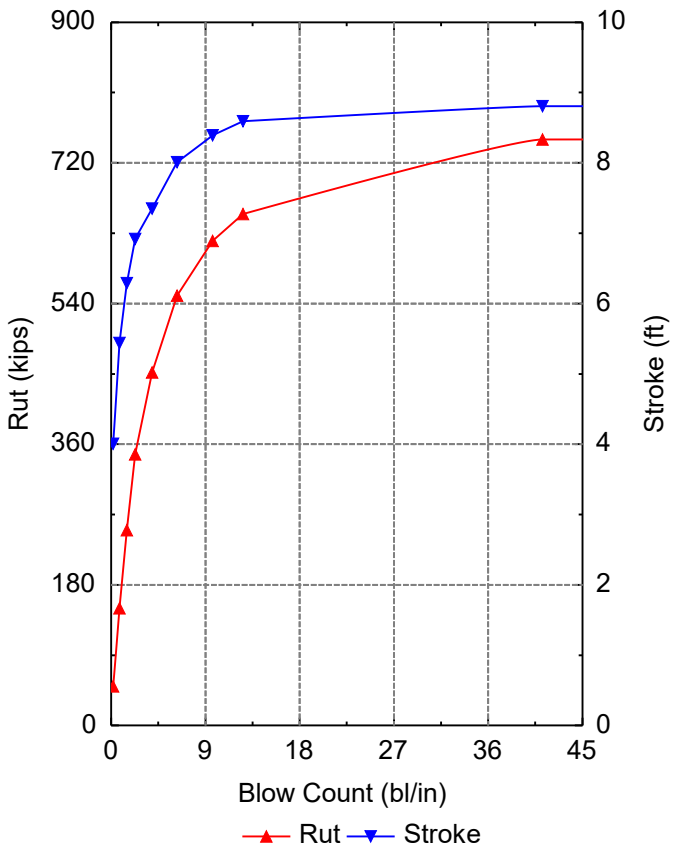
Min. & Est. Depth @ 45 ft.

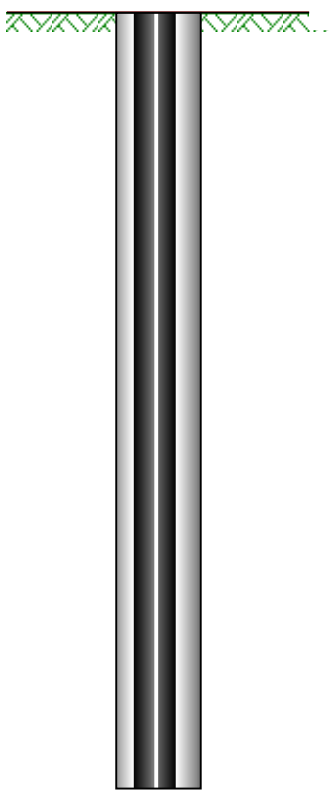
Refusal occurred; no driving time output possible.



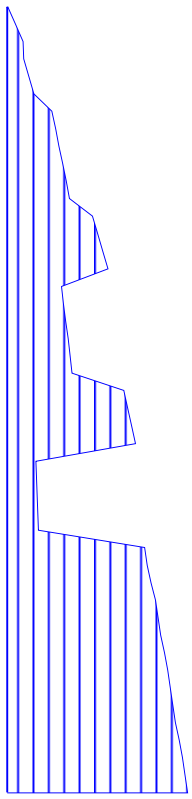
DELMAG D 30-23 (FS=3)

Ram Weight	6.60	kips
Efficiency	0.800	
Pressure	1395.0 (90%)	psi
Helmet Weight	3.900	kips
Hammer Cushion	109976.0	kips/in
COR of H.C.	0.800	
Skin Quake	0.100	in
Toe Quake	0.150	in
Skin Damping	0.098	s/ft
Toe Damping	0.150	s/ft
Pile Length	45.00	ft
Pile Penetration	45.00	ft
Pile Top Area	17.36	in²
RSA	No	





Pile Model



Shaft=48% (Prop.)

Bearing Graph Summary — DELMAG D 30-23 FS=3

Rut kips	Mx C-Str. ksi	Top Str. ksi	Mx T-Str. ksi	Blow Ct bl/in	Stroke ft	ENTHRU kip-ft	Ham. Pow. Trfr. R. DELMAG	%
50.0	14.93	14.93	0.09	0.2	4.01	37.91	D 30-23	51.4
150.0	23.13	23.04	0.26	0.8	5.44	30.70	D 30-23	41.6
250.0	26.51	26.34	0.14	1.5	6.29	29.11	D 30-23	39.5
Rndr 347.0	31.15	31.15	0.33	2.4	6.92	29.71	D 30-23	40.3
452.0	35.86	35.84	0.58	3.9	7.35	30.29	D 30-23	41.0
550.0	39.00	38.67	0.69	6.2	8.01	32.32	D 30-23	43.8
620.3	40.44	40.15	0.79	9.7	8.39	33.63	D 30-23	45.6
654.6	41.03	40.76	0.82	12.6	8.59	34.23	D 30-23	46.4
750.0	42.15	41.80	0.86	41.2	8.80	34.67	D 30-23	47.0
850.0	43.36	42.46	0.94	9999.0	8.89	34.54	D 30-23	46.8

Driving Resistance at Min. Depth

APPENDIX I

DRILL RIG ENERGY CALIBRATION

SPT Automatic Hammer Energy Measurement Report

Drill Rig Model: Diedrich D50

Drill Rig Serial Number: D50-442

Piedmont Environmental Drilling Asset Number: D50-442

March 6, 2025

Prepared for:

Terracon Consultants

Macon Exploration Services

Terracon

Explore with us

Nationwide

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- Facilities
- Environmental
- Geotechnical
- Materials

March 6, 2025

Piedmont Environmental Drilling, Inc.
2722 Simpson Circle
Norcross, GA 30071

Attn: Drew Roach, President
E: dmr@piedmontdrilling.com

Re: SPT Automatic Hammer Energy Measurement Report
Rig Serial Number: D50-442
Terracon Project Number: 49255062

Dear Mr. Burt:

This report provides the Energy Transfer Ratio (ETR) for the Standard Penetration Testing (SPT) automatic hammer as summarized below:

Table 1: Hammer Efficiency Summary

Drill Rig Make/Model	Drill Rig Serial Number	Drill Rig Year	Asset Number	Energy Transfer Ratio (ETR)	Hammer Efficiency Correction (C_E)
D50	442	2019	D50-442	84.0% ± 3.3%	1.40

If you have any questions concerning this summary, or if we may be of further service, please contact us.

Alfred H. Hartley, Jr., M.S.C.E.
Project Geotechnical Engineer, SME

Rob Kramer
Rob Kramer
Geophysical Services Manager, COG

Attachments:

Exhibit A: PDA SPT Analyzer Results
Exhibit B: PDA Equipment Calibration

MEASUREMENT SUMMARY

ITEM	DESCRIPTION
Drill Rig Owner	Piedmont Environmental Drilling, Inc. – Norcross, Georgia
Drill Rig Operator	Drew Roach; PED Exploration
Testing Date	2/28/2025
Testing Location	Norcross, GA
Boring Identification	B-4
Hammer Type	140 pounds (automatic)
Boring Method	Hollow Stem Auger
Drill Rods	■ AWJ ■ 1-¾" outside diameter ■ 3/16" wall thickness
Calibration Testing Equipment	■ 2-foot AWJ rod instrumented w/ two strain gauges and two accelerometers ■ Pile Driving Analyzer Model 8G™ (PDA)
ASTM Methods Used	**ASTM D1586**, Standard Test Method for Standard Penetration Test and Split-Barrel Sampling of Soils **ASTM D4633-16**, Standard Method for Energy Measurement for Dynamic Penetrometers
SPT Calibration Personnel	Alfred Hartley Project (Geotechnical Engineer)

ASTM suggests better results occur when performing calibrations at depths exceeding 25 ft. Due to shallow rock >50 Blow/Ft conditions at this site, testing intervals were collected at shallower depths.

Exhibit A

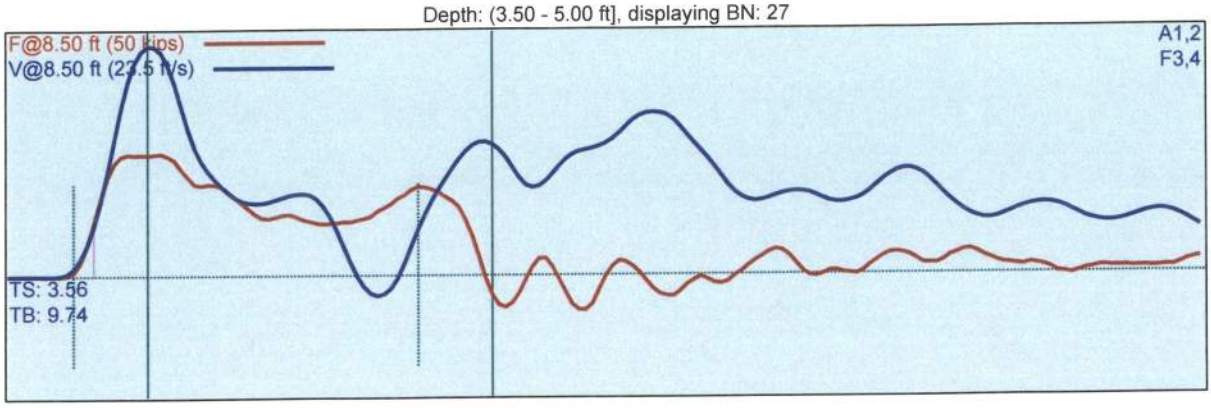
PDA SPT Analyzer Results

49255062 Piedmont Hammer Calibrations - Diedrich D50-442
AHH
SPT CALIBRATION
AR: 1.19 in^2
LE: 8.50 ft
WS: 16807.9 ft/s

3.5-5.0
Interval start: 2/28/2025

SP: 0.492 k/ft3
EM: 30000 ksi

Depth: (3.50 - 5.00 ft], displaying BN: 27



F3 : [747AWJ1] 226.49 PDICAL (1) FF4
F4 : [747AWJ2] 228.49 PDICAL (1) FF4

A1 (PR): [K5491] 297.058 mv/6.4v/5000g (1) VF4
A2 (PR): [K12283] 367.187 mv/6.4v/5000g (1) VF4

FMX: Maximum Force
VMX: Maximum Velocity
BPM: Blows/Minute

EFV: Maximum Energy
ETR: Energy Transfer Ratio - Rated

BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
1	7	34	24.5	1.9	303	88.5
2	7	32	23.9	42.9	309	88.4
3	7	34	23.7	42.8	310	90.7
4	7	35	24.3	42.4	323	92.3
5	7	35	24.8	42.6	328	93.7
6	7	35	24.4	42.7	324	92.4
7	7	28	21.8	42.5	308	88.1
8	10	29	23.2	42.6	299	85.4
9	10	29	23.6	42.5	304	87.0
10	10	27	22.2	42.5	324	92.6
11	10	28	23.3	42.7	297	84.9
12	10	27	22.6	42.5	313	89.3
13	10	25	21.5	42.4	305	87.1
14	10	25	21.7	42.7	307	87.8
15	10	25	21.2	42.5	286	81.6
16	10	28	23.0	42.5	302	86.2
17	10	25	21.1	42.5	283	80.9
18	12	25	20.9	42.5	289	82.5
19	12	25	20.5	42.5	290	82.8
20	12	25	20.2	42.7	270	77.3
21	12	26	20.9	42.5	292	83.5
22	12	26	21.1	42.6	284	81.3
23	12	25	20.8	42.6	297	84.9
24	12	25	21.4	42.6	296	84.4
25	12	25	21.4	42.6	297	85.0
26	12	25	21.7	42.6	303	86.4
27	12	25	22.0	42.5	285	81.5
28	12	26	22.6	42.6	309	88.4

29	12	26	23.0	42.6	307	87.8
	Average	26	21.8	42.6	297	84.9
	Std Dev	1	1.0	0.1	12	3.3
	Maximum	29	23.6	42.7	324	92.6
	Minimum	25	20.2	42.4	270	77.3

N-value: 22

Sample Interval Time: 39.41 seconds.

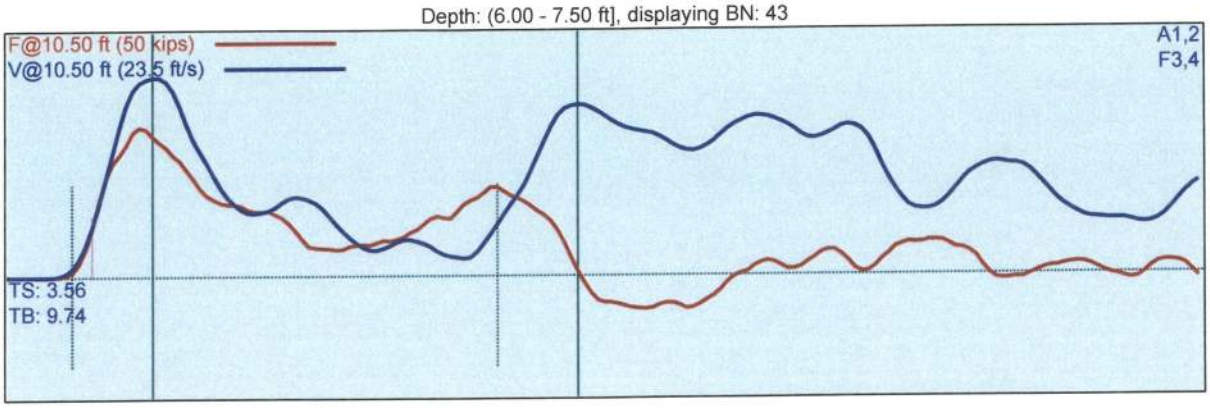
49255062 Piedmont Hammer Calibrations - Diedrich D50-442
AHH
SPT CALIBRATION

3.5-5.0
Interval start: 2/28/2025

AR: 1.19 in^2
LE: 10.50 ft
WS: 16807.9 ft/s

SP: 0.492 k/ft3
EM: 30000 ksi

Depth: (6.00 - 7.50 ft], displaying BN: 43



F3 : [747AWJ1] 226.49 PDICAL (1) FF3
F4 : [747AWJ2] 228.49 PDICAL (1) FF3

A1 (PR): [K5491] 297.058 mv/6.4v/5000g (1) VF3
A2 (PR): [K12283] 367.187 mv/6.4v/5000g (1) VF3

BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
30	4	36	23.3	1.9	321	91.6
31	4	37	23.7	39.6	319	91.2
32	4	37	23.8	39.6	316	90.3
33	6	33	21.8	39.5	307	87.8
34	6	33	21.5	39.4	316	90.2
35	6	32	20.4	39.4	302	86.3
36	6	34	20.9	39.4	305	87.1
37	6	34	21.0	39.5	304	86.8
38	6	31	19.8	39.4	286	81.7
39	8	32	20.2	39.3	295	84.3
40	8	31	19.6	39.5	300	85.7
41	8	31	19.6	39.5	299	85.4
42	8	31	19.5	39.5	296	84.7
43	8	30	19.1	39.4	290	83.0
44	8	30	18.7	39.4	287	81.9
45	8	30	18.9	39.4	283	80.8
	Average	32	20.1	39.4	298	85.1
	Std Dev	1	1.0	0.1	9	2.6
	Maximum	34	21.8	39.5	316	90.2
	Minimum	30	18.7	39.3	283	80.8

N-value: 13

Sample Interval Time: 24.39 seconds.

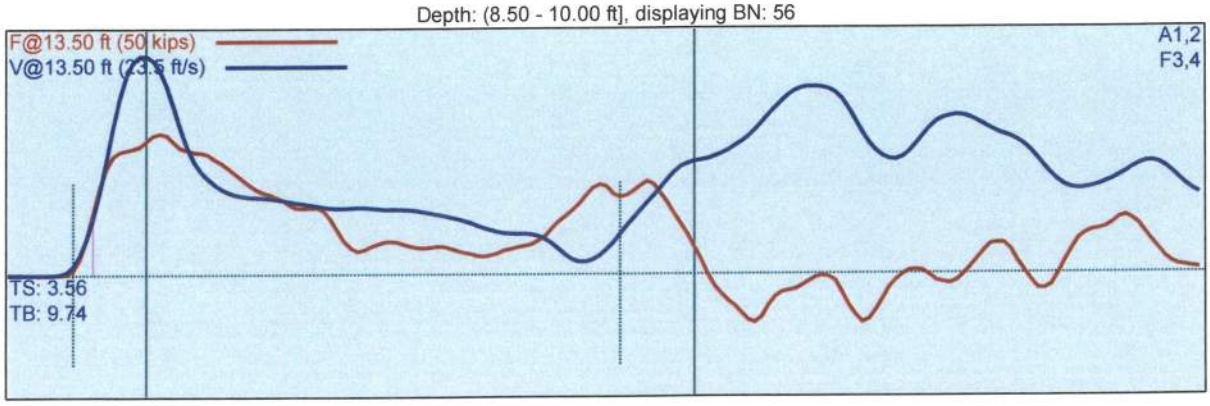
49255062 Piedmont Hammer Calibrations - Diedrich D50-442
AHH
SPT CALIBRATION

3.5-5.0
Interval start: 2/28/2025

AR: 1.19 in^2
LE: 13.50 ft
WS: 16807.9 ft/s

SP: 0.492 k/ft3
EM: 30000 ksi

Depth: (8.50 - 10.00 ft], displaying BN: 56



F3 : [747AWJ1] 226.49 PDICAL (1) FF4
F4 : [747AWJ2] 228.49 PDICAL (1) FF4

A1 (PR): [K5491] 297.058 mv/6.4v/5000g (1) VF4
A2 (PR): [K12283] 367.187 mv/6.4v/5000g (1) VF4

BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
46	2	35	22.6	1.9	301	86.0
47	2	33	21.5	41.7	294	83.9
48	5	33	22.2	41.3	276	78.8
49	5	33	22.4	41.6	274	78.3
50	5	31	22.1	41.4	290	83.0
51	5	30	21.6	41.4	291	83.0
52	5	29	20.9	41.5	280	80.1
53	6	29	21.2	41.4	270	77.1
54	6	30	21.7	41.4	288	82.4
55	6	29	21.2	41.4	295	84.4
56	6	29	21.0	41.5	303	86.5
57	6	29	20.8	41.4	292	83.5
58	6	29	21.1	41.4	275	78.7
	Average	30	21.5	41.4	285	81.4
	Std Dev	2	0.5	0.1	10	2.8
	Maximum	33	22.4	41.6	303	86.5
	Minimum	29	20.8	41.3	270	77.1

N-value: 11

Sample Interval Time: 18.80 seconds.

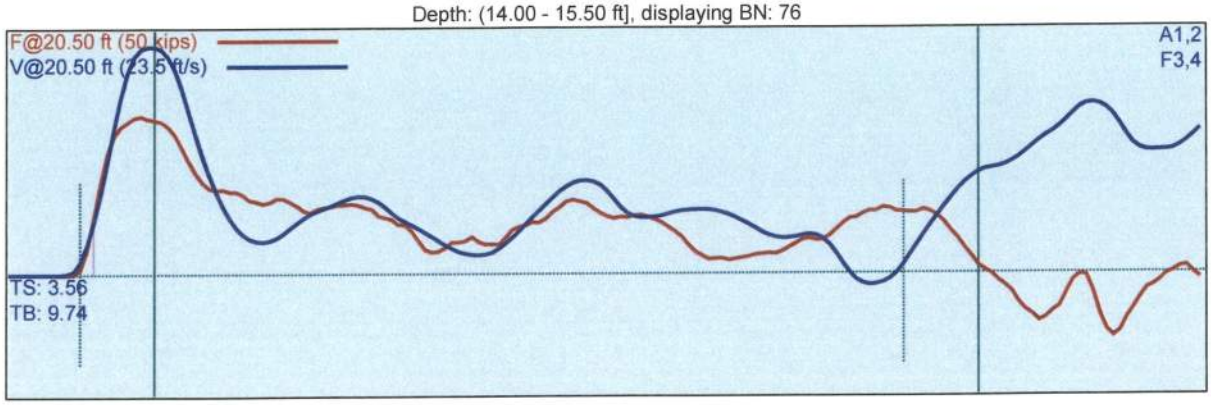
49255062 Piedmont Hammer Calibrations - Diedrich D50-442
AHH
SPT CALIBRATION

3.5-5.0
Interval start: 2/28/2025

AR: 1.19 in^2
LE: 20.50 ft
WS: 16807.9 ft/s

SP: 0.492 k/ft3
EM: 30000 ksi

Depth: (14.00 - 15.50 ft], displaying BN: 76



F3 : [747AWJ1] 226.49 PDICAL (1) FF4
F4 : [747AWJ2] 228.49 PDICAL (1) FF4

A1 (PR): [K5491] 297.058 mv/6.4v/5000g (1) VF4
A2 (PR): [K12283] 367.187 mv/6.4v/5000g (1) VF4

BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
59	5	36	23.6	1.9	293	83.6
60	5	35	22.6	38.1	311	88.8
61	5	35	22.9	38.3	306	87.3
62	5	35	22.9	38.3	314	89.7
63	5	35	23.0	38.3	315	89.9
64	7	35	22.8	38.2	315	89.9
65	7	35	23.0	38.4	309	88.4
66	7	34	22.7	38.4	303	86.6
67	7	32	21.2	38.2	292	83.5
68	7	31	21.0	38.4	290	82.8
69	7	34	23.0	38.4	306	87.5
70	7	32	21.2	38.2	288	82.4
71	8	30	20.2	38.4	275	78.5
72	8	30	20.1	38.2	283	80.9
73	8	33	22.4	38.3	305	87.1
74	8	32	21.7	38.4	293	83.6
75	8	32	21.3	38.3	285	81.5
76	8	32	21.8	38.3	287	82.0
77	8	32	22.0	38.2	288	82.2
78	8	30	20.5	38.4	280	80.0
	Average	32	21.7	38.3	293	83.8
	Std Dev	2	1.0	0.1	11	3.2
	Maximum	35	23.0	38.4	315	89.9
	Minimum	30	20.1	38.2	275	78.5

N-value: 15

Sample Interval Time: 34.49 seconds.

Summary of SPT Test Results

Project: 49255062 Piedmont Hammer Calibrations - Diedrich D50-442, Test Date: 2/28/2025

FMX: Maximum Force
VMX: Maximum Velocity
BPM: Blows/Minute
EFV: Maximum Energy
ETR: Energy Transfer Ratio - Rated

Instr. Length ft	Blows Applied /6"	**N Value**	**N60 Value**	Average FMX kips	Average VMX ft/s	Average BPM bpm	Average EFV ft-lb	Average ETR %
8.50	**7-10-12**	**22**	**30**	26	21.8	42.6	297	84.9
10.50	4-**6-8**	**14**	**19**	32	20.1	39.4	298	85.1
13.50	**2-5-6**	**11**	**15**	30	21.5	41.4	285	81.4
20.50	**5-7-8**	**15**	**21**	32	21.7	38.3	293	83.8
		Overall Average Values:		29	21.3	40.6	294	84.0
		Standard Deviation:		3	1.1	1.8	12	3.3
		Overall Maximum Value:		35	23.6	42.7	324	92.6
		Overall Minimum Value:		25	18.7	38.2	270	77.1

Exhibit B

PDA Equipment Calibration

Certificate of Calibration

Pile Dynamics, Inc. certifies that the

Pile Driving Analyzer®, Model 8G

Serial Number: 5099 LE

was calibrated on 19 March 2024

using a PDA Calibration Box whose output was calibrated with test equipment traceable to NIST.

This certificate is valid for 2 years from above date.

Calibrated by: MG

Pile Dynamics, Inc.
30725 Aurora Road
Cleveland, Ohio 44139 USA

Accelerometer Calibration Certificate
Pile Dynamics, Inc.

Calibrated by Pile Dynamics, Inc.
Calibration performed on 28Sep2023

Serial No:	K5491	**Temperature:**	22.1 °C
Model:	PR	**Humidity:**	54%
Calibrated on:	Channel 3 on 8G 5161 LE		

Ref Acc 1:	72505! 1035 g's/volt	**Cal on:**	24Mar2022
Ref Acc 2:	72517! 1049 g's/volt	**Cal on:**	24Mar2022

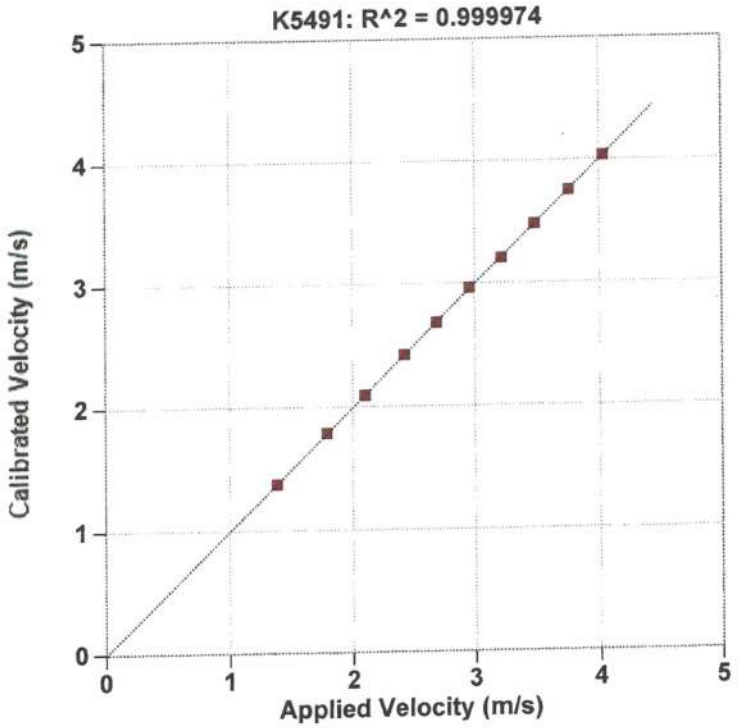
Reference accelerometer calibrations are traceable to the United States National Institute of Standards and Technology (NIST).

PDA CALIBRATION FACTOR

297.1 mv/5000g
(59.4 µv/g)
R^2: 0.999974 [Chip programmed]

Operator: William Johnson

Signed



Reference Velocity	S/N K5491 Velocity
m/s	m/s
1.380	1.381
1.790	1.795
2.099	2.100
2.425	2.425
2.688	2.685
2.958	2.967
3.214	3.206
3.482	3.481
3.759	3.758
4.035	4.036

Maximum Acceleration: 870 g's

Accelerometer Calibration Certificate
Pile Dynamics, Inc.

Calibrated by Pile Dynamics, Inc.
Calibration performed on 28Sep2023

Serial No:	K12283	**Temperature:**	22.1 °C
Model:	PR	**Humidity:**	54%
Calibrated on:	Channel 3 on 8G 5161 LE		

Ref Acc 1:	72505! 1035 g's/volt	**Cal on:**	24Mar2022
Ref Acc 2:	72517! 1049 g's/volt	**Cal on:**	24Mar2022

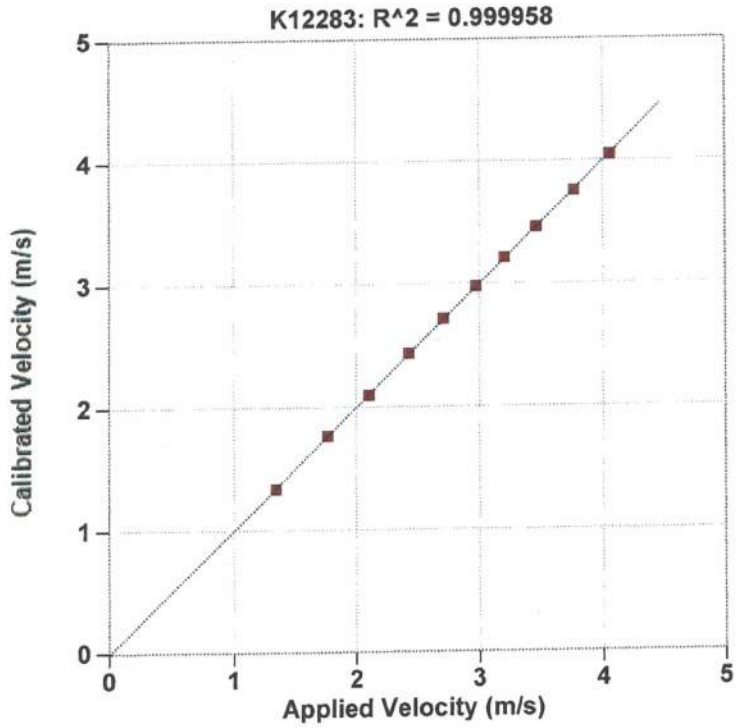
Reference accelerometer calibrations are traceable to the United States National Institute of Standards and Technology (NIST).

PDA CALIBRATION FACTOR

367.2 mv/5000g
(73.4 µv/g)
R^2: 0.999958 [Chip programmed]

Operator: William Johnson

Signed



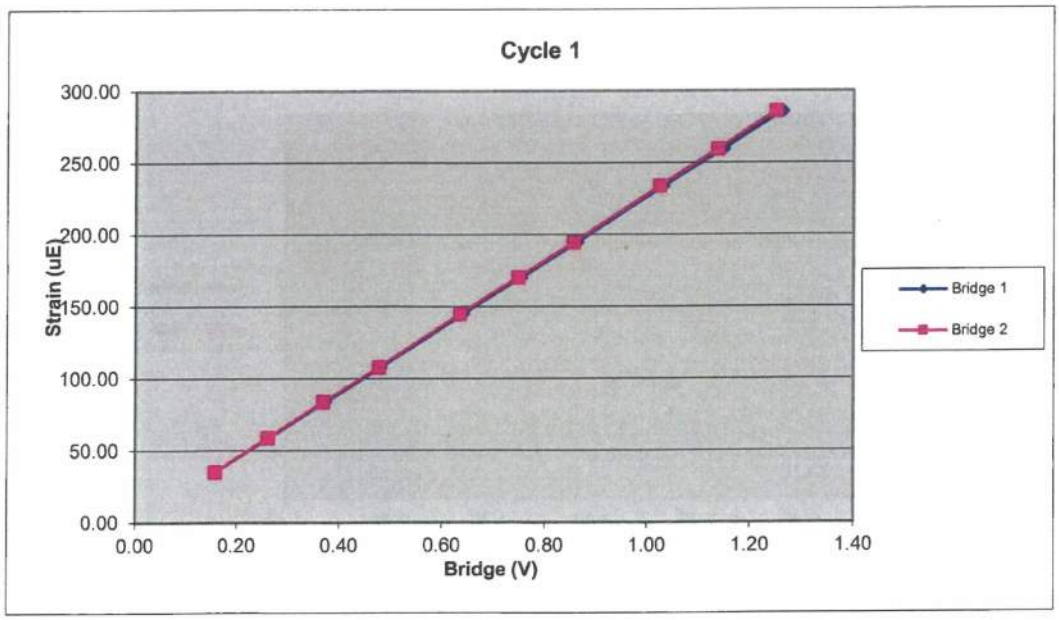
Reference Velocity	S/N K12283 Velocity
m/s	m/s
1.343	1.339
1.766	1.770
2.103	2.099
2.430	2.434
2.711	2.717
2.974	2.979
3.204	3.211
3.465	3.463
3.764	3.758
4.056	4.049

Maximum Acceleration: 874 g's

747AWJ		Cycle 1		
Sample	**Force (lb)**	**Strain (µE)**	**Bridge 1 (V)**	**Bridge 2 (V)**
1	0.00	0.00	0.00	0.00
2	1279.96	35.28	0.16	0.16
3	2117.97	59.15	0.26	0.26
4	3007.93	83.86	0.37	0.37
5	3874.69	107.94	0.48	0.48
6	5158.95	144.95	0.64	0.64
7	6068.70	170.10	0.75	0.75
8	6944.72	194.51	0.86	0.86
9	8310.95	233.57	1.03	1.03
10	9246.53	259.32	1.15	1.14
11	10150.33	285.55	1.26	1.25

Bridge 1		**Bridge 2**	
Force Calibration (lb/V)	**8042.04**	**Force Calibration (lb/V)**	**8110.94**
Offset	3.53	Offset	-2.35
Correlation	0.999999	Correlation	0.999997
Strain Calibration (µE/V)	**226.59**	**Strain Calibration (µE/V)**	**228.53**
Offset	-0.71	Offset	-0.88
Correlation	0.999994	Correlation	0.999989

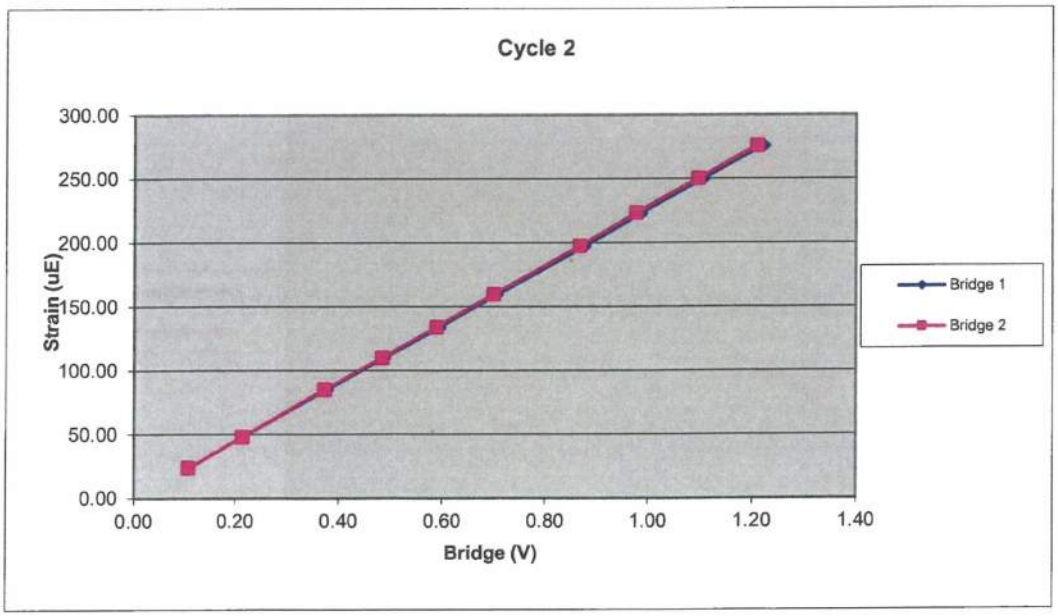
Force Strain Calibration	
EA (Kips)	**35491.88**
Offset	28.80
Correlation	0.999993



747AWJ		Cycle 2		
Sample	**Force (lb)**	**Strain (μE)**	**Bridge 1 (V)**	**Bridge 2 (V)**
1	0.00	0.00	0.00	0.00
2	879.73	23.90	0.11	0.11
3	1733.82	47.88	0.21	0.21
4	3043.12	85.01	0.38	0.37
5	3932.98	109.60	0.49	0.48
6	4790.19	133.60	0.59	0.59
7	5693.80	159.20	0.71	0.70
8	7067.93	196.84	0.88	0.87
9	7961.11	222.79	0.99	0.98
10	8924.66	249.74	1.11	1.10
11	9863.46	275.65	1.22	1.21

Bridge 1		**Bridge 2**	
Force Calibration (lb/V)	**8064.47**	**Force Calibration (lb/V)**	**8139.89**
Offset	**3.01**	Offset	**-0.61**
Correlation	**0.999999**	Correlation	**0.999998**
Strain Calibration (μE/V)	**226.02**	**Strain Calibration (μE/V)**	**228.13**
Offset	**-0.53**	Offset	**-0.63**
Correlation	**0.999992**	Correlation	**0.999992**

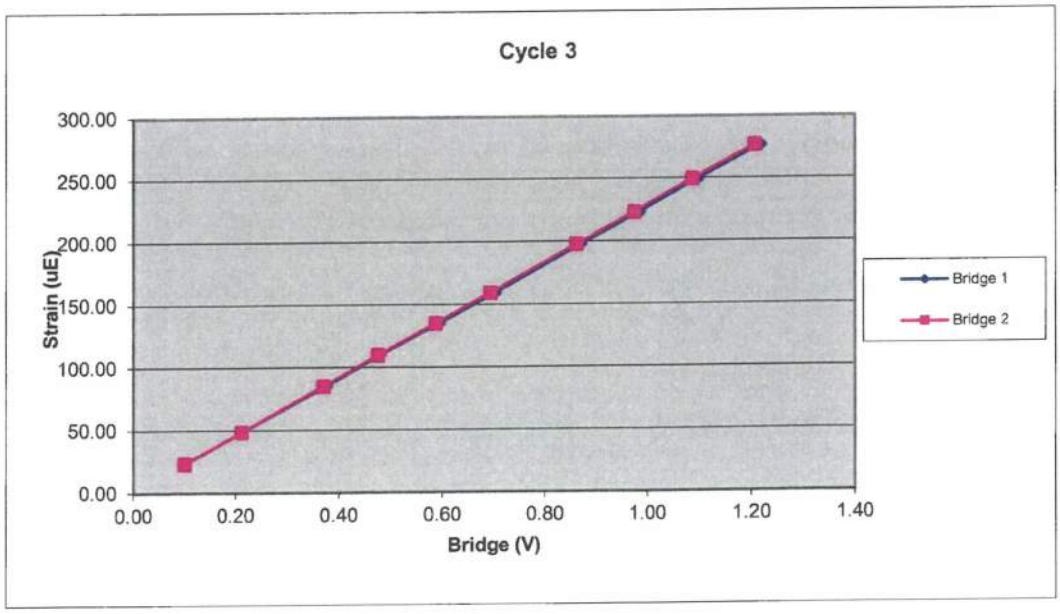
Force Strain Calibration	
EA (Kips)	**35679.93**
Offset	**22.05**
Correlation	**0.999994**



747AWJ		Cycle 3		
Sample	**Force (lb)**	**Strain (µE)**	**Bridge 1 (V)**	**Bridge 2 (V)**
1	0.00	0.00	0.00	0.00
2	834.30	23.28	0.10	0.10
3	1734.69	48.40	0.21	0.21
4	3031.52	84.77	0.38	0.37
5	3891.36	109.55	0.48	0.48
6	4801.21	134.80	0.59	0.59
7	5678.69	158.97	0.70	0.70
8	7043.36	197.52	0.87	0.86
9	7969.29	223.14	0.98	0.98
10	8876.22	249.27	1.10	1.09
11	9853.61	276.45	1.22	1.21

Bridge 1		**Bridge 2**	
Force Calibration (lb/V)	**8082.16**	**Force Calibration (lb/V)**	**8152.34**
Offset	**8.27**	Offset	**5.42**
Correlation	**0.999998**	Correlation	**0.999999**
Strain Calibration (µE/V)	**226.85**	**Strain Calibration (µE/V)**	**228.82**
Offset	**0.08**	Offset	**0.00**
Correlation	**0.999993**	Correlation	**0.999998**

Force Strain Calibration	
EA (Kips)	**35627.35**
Offset	**5.41**
Correlation	**0.999995**



Bridge Excitation (V) 5
Shunt Resitor (ohm) 60.4k

Calibration Factors	747AWJ		
Bridge 1 (µE/V)	226.49	Bridge 2 (µE/V)	228.49
EA Factor (Kips)	35599.72	Area (in^2)	1.19

Calibrated by: Sean Bowers
Calibrated Date: 6/11/2024

Pile Dynamics Inc
30725 Aurora Rd
Solon, OH 44139

Traceable to N.I.S.T.

APPENDIX J

IMPORTANT INFORMATION ABOUT THIS GEOTECHNICAL ENGINEERING REPORT

QUALIFICATIONS OF RECOMMENDATIONS

The findings, conclusions and recommendations presented in this report represent our professional opinions concerning subsurface conditions at the site. The opinions presented are relative to the dates of our on-site services and should not be relied on to represent conditions at later dates or at locations not explored. The opinions included herein are based on information provided to us, the data obtained at specific locations during the exploration and our past experience. If additional information becomes available that might impact our geotechnical opinions, it will be necessary for NOVA to review the information, reassess the potential concerns, and re-evaluate our conclusions and recommendations.

Regardless of the thoroughness of a geotechnical exploration, there is the possibility that conditions between borings will differ from those encountered at specific boring locations, that conditions are not as anticipated by the designers and/or the contractors, or that either natural events or the construction process have altered the subsurface conditions. These variations are an inherent risk associated with subsurface conditions in this region and the approximate methods used to obtain the data. These variations may not be apparent until construction.

The professional opinions presented in this geotechnical report are not final. Field observations and foundation installation monitoring by the geotechnical engineer, as well as soil density testing and other quality assurance functions associated with site earthwork and foundation construction, are an extension of this report. Therefore, NOVA should be retained by the owner to observe all earthwork and foundation construction to document that the conditions anticipated in this exploration actually exist, and to finalize or amend our conclusions and recommendations. NOVA is not responsible or liable for the conclusions and recommendations presented in this report if NOVA does not perform these observation and testing services.

This report is intended for the sole use of CLIENT only. The scope of services performed during this exploration was developed for purposes specifically intended by CLIENT and may not satisfy other users' requirements. Use of this report or the findings, conclusions or recommendations by others will be at the sole risk of the user. NOVA is not responsible or liable for the interpretation by others of the data in this report, nor their conclusions, recommendations or opinions.

Our professional services have been performed, our findings obtained, our conclusions derived and our recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices in the State of Georgia. This warranty is in lieu of all other statements or warranties, either expressed or implied.

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept*

responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are not final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals' plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for information purposes only.* To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer's services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration. Confront the risk of moisture infiltration*** by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

Telephone: 301/565-2733
e-mail: info@geoprofessional.org www.geoprofessional.org