ARKANSAS DEPARTMENT OF TRANSPORTATION

SUBSURFACE INVESTIGATION

STATE JOB NO. 061613

FEDERAL AID PROJECT NO. BFP-TAPU-0043(37)

I-40 STRS. & APPRS. (HWYS. 13 & 31) (CARLISLE & LONOKE) (S)

STATE HIGHWAY 13 & 31 **SECTION** 10 & 3

IN LONOKE **COUNTY**

The information contained herein was obtained by the Department for design and estimating purposes only. It is being furnished with the express understanding that said information does not constitute a part of the Proposal or Contract and represents only the best knowledge of the Department as to the location, character and depth of the materials encountered. The information is only included and made available so that bidders may have access to subsurface information obtained by the Department and is not intended to be a substitute for personal investigation, interpretation and judgment of the bidder. The bidder should be cognizant of the possibility that conditions affecting the cost and/or quantities of work to be performed may differ from those indicated herein.

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MATERIALS DIVISION
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October 12, 2020

TO: Mr. Trinity Smith, Engineer of Roadway Design

SUBJECT: Job No. 061613
I-40 Strs. & Apprs. (Hwys. 13 & 31) (S)
Routes 13 & 31 Sections 3 & 10
Lonoke County

Based on soil information from projects in the surrounding area, an estimated R-Value of less than five is appropriate for pavement design.

Listed below is the additional information requested for use in developing the plans:

Asphalt Concrete Hot Mix

Type	Asphalt Cement %	Mineral Aggregate %
Surface Course	5.2	94.8
Binder Course	4.1	95.9
Base Course	3.8	96.2

Jonathan A. Annable
Materials Engineer

JAA:pt:bjj
Attachment
cc: State Constr. Eng. – Master File Copy
District 6 Engineer
System Information and Research Div.
G. C. File

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March 1, 2022

TO: Mr. Rick Ellis, Bridge Engineer

SUBJECT: Job No. 061613
I-40 Strs. & Apprs. (Hwys. 13 & 31) (S)
Route 31, Section 3 (Site 1) and Route 13, Section 10 (Site 2)
Lonoke County

Introduction

Submitted herein are results of subsurface investigation performed for and geotechnical recommendations developed for the two (2) proposed replacement bridges over Interstate 40 (I-40) in Lonoke County. Preliminary results and recommendations have been provided to Bridge Division and the Design Consultant (Garver) throughout the course of this geotechnical investigation.

Both proposed bridges are overpass structures that are comprised of a replacement bridge on State Highway 31 over I-40 (Site 1) and a replacement bridge on State Highway 13 over I-40 (Site 2). These bridges are planned to the east of the existing bridges, in offset alignments. The proposed Highway 31 bridge at Site 1 consists of one (1) 220-foot continuous composite plate girder unit with two (2) equal 110-foot spans and an out-to-out width of 63 feet. The other proposed bridge (Highway 13 bridge at Site 2) consists of one (1) 225-foot continuous composite plate girder unit with two (2) unequal spans (120 feet and 105 feet) and an out-to-out width of 45.5 feet.

Based on discussions with Garver / Bridge Division, foundation loads are expected to be supported on 18-inch-diameter and / or 24-inch-diameter, close-ended, steel shell piles. Mechanically stabilized earth (MSE) walls are planned at the bridge ends to transition grade.

Field Investigation

A subsurface investigation was requested on July 2, 2021 by Bridge Division personnel to develop recommendations for bridge and MSE wall. A total of 14 borings were requested for the two (2) bridges and 10 borings were drilled. The requested borings at the intermediate bents were not performed due to site inaccessibility and relatively uniform subsurface conditions at each site.

The approximate locations of the borings are presented in the Plans of Borings included in Attachment A for Site 1 and Attachment B for Site 2, respectively. The borings were advanced with a track-mounted Acker Renegade rotary drill rig using a combination of hollow-stem auger and rotary wash drilling methods. The boring logs, showing the subsurface conditions encountered in the borings and the results of field and laboratory tests, are also included in respective attachments, immediately following corresponding Plans of Borings. A Legend is attached after the boring logs to interpret / explain the symbols, terms, and conventions used on logs. Standard Penetration Tests (SPT) were conducted in accordance with ASTM D1586 for field testing and soil sampling. Correction factor for the hammer is indicated on the boring logs. Liners were not used inside the standard split-barrel samplers.

The number of blows required to drive the standard split-barrel sampler for each 6-inch penetration of the total 18-inch drive were counted and shown on the logs. SPT N-values are defined as the number of blows required to advance the split barrel the final 12 inches. The SPT N-values indicated on the logs are raw (uncorrected) blow count measured in field.

Undisturbed samples of cohesive soils were obtained for laboratory determination of engineering properties using thin-wall tube samplers (Shelby tubes) hydraulically inserted into the subsurface soils. Groundwater was also observed during the drilling process. Groundwater observations are noted on the logs.

Lab Investigation

All samples were brought to the Materials Division laboratory for further evaluation and testing. These samples were tested to evaluate index and engineering properties and to verify soil type and classification. Lab tests were performed on representative soil samples to determine moisture content, Atterberg limits, and gradation. Tested soils are classified by licensed geologists in accordance with both USCS and AASHTO soil classification systems. Strength of cohesive soils was evaluated by unconsolidated-undrained (UU) triaxial compression tests on undisturbed Shelby tube samples.

The laboratory test results are presented in Attachment C and Attachment D for Site 1 and Site 2, respectively. These test results are also plotted or indicated on logs using appropriate denotation (symbols in accordance with scale, number, text, etc.) Table 1 lists the laboratory tests, their corresponding ASTM and AASHTO test methods, and respective denotation on logs.

Table 1: Summary of Laboratory Tests

Laboratory Test	ASTM	AASHTO	Denotation on Logs
Moisture Content	D2216	T 265	Solid Circle Symbol (●)
Atterberg Limits	D4318	T 89	Plus Symbol (+) on the Right for Liquid Limit
		T 90	Plus Symbol (+) on the Left for Plastic Limit
Grain Size Distribution	D6913	T 88	Whole Number in the "- No. 200 %" Column (e.g., 12)
Unconsolidated Undrained Triaxial Compression	D2850	T 296	Su for Undrained Shear Strength in psi (e.g., Su=12.3psi); γ_d for Dry Unit Weight in pcf (γ_d=123.4pcf)

Site Conditions

The existing bridge at Site 1 is the Highway 31 over I-40 overpass (Bridge No. 03228) located at log mile 1.64. This bridge is located approximately 60 ft. west of the proposed new construction and is a 31.7 feet wide, 222 feet long, 4 span bridge consisting of steel I-beams supported by concrete columns on concrete pile footings.

The existing bridge at Site 2 is the Highway 13 over I-40 overpass (Bridge No. 03655) located at log mile 1.41. This bridge is located approximately 60 feet west of the proposed new

construction and is a 33.7 feet wide, 224 feet long, 4 span bridge consisting of steel I-beams supported by concrete columns on concrete pile footings.

Site Geology and General Subsurface Conditions

The soils at both project sites appear to be part of the Grand Prairie Complex. This complex consists of several depositional environments whose lithology and sedimentary characteristics vary widely and differ only due to variations in weathering, desiccation, and consolidation. The soils encountered at the bridge sites consist of a mixture of sand, silt, and clay that could represent both aeolian and alluvial/fluvial deposits.

Seismic Conditions

Seismic Site Class and Seismic Performance Zone. In light of the average subsurface conditions as revealed by the borings, a **Seismic Site Class D (Stiff Soil Profile)** is calculated for Site 1 (Highway 31 over I-40). Utilizing the Seismic Site Class D and the approximate GPS coordinates of the project site, the following design peak ground acceleration coefficient (A_S), design short-period spectral acceleration coefficient (S_{DS}), as well as design long-period spectral acceleration coefficient (S_{D1}), are determined for this site. These seismic coefficients are summarized in Table 2a. For the design long-period spectral acceleration coefficient (S_{D1}) of 0.250g, a **Seismic Performance Zone 2** is considered applicable to Site 1.

Table 2a: Design Ground Motion Acceleration Response Coefficients – Site 1

Acceleration Coefficient	Value (g)
A_S (Site PGA)	0.240
S_{DS} (0.2 sec)	0.536
S_{D1} (1 sec)	0.250

For Site 2 (Highway 13 over I-40), a **Seismic Site Class E (Soft Soil Profile)** is determined. Design seismic coefficients for this site are summarized below in Table 2b. For S_{D1} of 0.380g, a **Seismic Performance Zone 3** is considered fitting to Site 2.

Table 2b: Design Ground Motion Acceleration Response Coefficients – Site 2

Acceleration Coefficient	Value (g)
A_S (Site PGA)	0.331
S_{DS} (0.2 sec)	0.785
S_{D1} (1 sec)	0.380

Design Response Spectrums are presented in Attachment E and Attachment F for Site 1 and Site 2, respectively.

Liquefaction Potential. Liquefaction potential of the subsurface soils were evaluated based on the results of the borings and utilizing the current Microsoft Excel© spreadsheet developed for ARDOT by University of Arkansas. Three (3) procedures are incorporated into this spreadsheet, i.e., Youd et al. (2001) procedure, Cetin et al. (2004) procedure, and Idriss and Boulanger (2008)

procedure. The results of liquefaction analyses performed utilizing the more recent Idriss and Boulanger (2008) procedure are recommended and presented in this report.

An earthquake Moment Magnitude (M_w) of 7.5 was modelled in the analyses for both sites. Design peak ground acceleration coefficients (A_S) of 0.240g and 0.331g were utilized in evaluation of Site 1 and Site 2, respectively. The results of the deeper borings (Borings 2 and 4 at Site 1 and Borings 2 and 5 at Site 2) were chosen for liquefaction analyses. These deeper borings were advanced in excess of 100 feet, near the construction centerline of the proposed bridge alignments. The results of liquefaction analyses are presented as a plot of calculated factor of safety against liquefaction versus depth below existing ground surface at the boring location. These results are provided in Attachment E for Site 1 and Attachment F for Site 2.

Although the spreadsheet was developed with the capability to calculate factor of safety against liquefaction to any depth, researchers reported there has been so far only one case history in which liquefaction occurred at a depth greater than 50 feet. Liquefaction below 50-foot depth is generally considered unlikely. Consequently, it is recommended liquefiable zones below 50-foot-depth be neglected from design consideration.

The results of analyses indicate the liquefaction potential at Site 1 (Attachment E) is low for the design seismic event. At Site 2 (see Attachment F), liquefaction potential at the west bridge abutment is also determined to be low. At the east abutment of that site, factors of safety less than 1.0 have been calculated in some zones. However, these zones are generally below 35-foot depth. In addition, the soils in these zones are predominantly cohesive. Consequently, it is recommended both the two sites be designed with overall low liquefaction potential.

MSE WALLS

MSE walls are planned at the bridge abutments of both bridges. Preliminary drawings of the MSE walls are received on February 14, 2022. These drawings are included in the report as Attachment G for Site 1 and Attachment H for Site 2, respectively. Elevation views of the preliminary MSE wall drawings indicate wall height varies. Wall bearing pressure will vary with configuration of the walls (wall height, back slope, etc.), length of reinforcing straps, unit weight of the reinforced zone fill, and properties (unit weight, friction angle, etc.) of the retained fill. Detailed information on strap length, reinforced fill, and retained fill is not known at this time.

Table 3 below summarizes the maximum wall height inferred from the preliminary wall design drawings and the maximum factored bearing pressures provided by Garver. These bearing pressure values are determined assuming a minimum strap length of 0.7 times the wall height, a unit weight of 125 pcf for the fill in the reinforced zone, and unclassified soil as retained fill.

Table 3: Summary of Maximum Wall Height and Factored Bearing Pressure

Wall Number	Location	Maximum Wall Height, feet	Maximum Factored Bearing Pressure, ksf
1	Begin Bridge – Highway 31	25	6.6
2	End Bridge – Highway 31	23	6.0
3	Begin Bridge – Highway 13	20	5.5
4	End Bridge – Highway 13	23	5.8

As discussed, bearing pressure will vary with final wall configuration. MSE walls may be founded on the stable native subgrade soils in accordance with the recommended maximum bearing capacities summarized in Table 4 below. All foundation / subgrade excavations should be observed and inspected by the Engineer. Subgrade preparation should include thorough proof-rolling. Subgrade soils in some areas may be locally unstable and compressible and some undercut could be warranted. Localized undercut should be properly backfilled with Aggregate Base Course (ARDOT Standard Specifications Section 303, Class 7) or Coarse Aggregate for Class S Concrete (ARDOT Standard Specifications Section 802.02(c)). However, design resistance parameters should be based on the native subgrade soils.

Increased bearing capacity may be achieved by undercutting a minimum of 4 feet below the plan subgrade elevations and backfilling to the plan subgrade elevations with compacted Class 7 Base or densified Coarse Aggregate for Class S Concrete. For the same wall alignment, it is acceptable to use a combination of stable native subgrade in lighter wall sections and improved subgrade by undercut and replacement in heavier wall sections.

Undercut should extend at least 5 feet outside the footprint of a MSE wall reinforced zone. The Class 7 Base utilized for undercut backfill should be compacted to a minimum of 98% of the laboratory-determined maximum dry density near optimum moisture content in accordance with ARDOT Standard Specifications Sub-Section 210.10. Fill and backfill should be placed in horizontal, nominal 6- to 8-inch thick loose lifts. Density and moisture of each lift of backfill and fill should be tested (minimum one test per lift) and approved prior to placing subsequent lifts.

Where undercut is shallow, the likelihood to encounter groundwater during undercut is expected to be low. However, minor seepage into the undercut bottom should be anticipated. Where undercut is relatively deep, groundwater and significant seepage should be expected. Provisions should be included to maintain a dry excavation bottom at the time of backfill placement.

To further increase bearing resistance and reduce settlement, ground improvements using Aggregate Piers can be utilized. Final design of Aggregate Piers should be performed by Pier Designer. However, the following parameters are recommended for preliminary design of Aggregate Piers.

- Nominal pier penetration of 15 feet below plan wall subgrade elevations
- Minimum pier coverage ratio of 20%
- Minimum one (1) row outside the footprint of reinforced zone
- Aggregate Piers be utilized in an entire wall alignment. It is not suitable to use a combination of Aggregate Piers and native subgrade or other ground improvements in the same wall alignment.

Bearing capacities and sliding resistance for various foundation alternatives are summarized in Table 4 for all the four (4) MSE walls at both sites. Aggregate Pier design parameters must be verified by the Pier Designer.

Table 4: Nominal and Factored Bearing Capacity and Sliding Resistance

Design Parameter	Foundation Alternative		
	Stable Onsite Soils	Undercut and Backfill	Aggregate Piers
Estimated Depth of Undercut Below Plan Subgrade, feet	0	4	0
Nominal Bearing Capacity, q_n, ksf	8.0	10.5	12.0
Resistance Factor for Bearing, φ_b	0.65	0.65	0.65
Factored Bearing Capacity, q_R ,ksf	5.2	6.8	7.8
Nominal Sliding Factor, tanδ	0.47	0.67	0.58
Resistance Factor for Sliding, φ_τ	0.9	0.9	0.9
Factored Sliding Factor, $\varphi_\tau$tanδ	0.42	0.61	0.52

Approach Embankments Behind MSE Walls

The on-site soils are comprised of either moderate- to high-plasticity clay or silty soils (silt, sandy silt, etc.). The clay exhibits high potential for shrink-swell activity and can develop desiccation cracks that will initiate embankment sliding. The silty soils are moisture-sensitive and will become unstable at elevated moisture content and / or when disturbed. Without proper screening or chemical treatment, these soils are not suitable for use within the top 3 feet of subgrade or within exterior 3 feet of embankment side slopes. In lieu of screening, treatment, plating, it is recommended the embankment materials be comprised of soils complying with the attached job Special Provision (Attachment I).

Deep Foundations

Axial Capacities. Based on the conversations with Bridge designers, it is understood that close-ended, steel shell piles are to be utilized to support the foundation loads at the abutments. Required nominal axial compression capacity per pile has not been determined / provided. Consequently, both 18-in.-diameter piles and 24-in.-diameter piles are evaluated.

Nominal axial capacities (compression and uplift) vs. pile tip penetration / elevation curves for single, 18-in.-diameter and 24-in.-diameter steel shell piles are provided in Attachment J and Attachment K for Site 1 and Site 2, respectively. These nominal axial capacities have been calculated using static analysis method. For single, isolated foundations, a resistance factor (φ_{stat}) of 0.45 is recommended for calculating factored compression resistance and a resistance factor (φ_{up}) of 0.35 is recommended for determining factored uplift resistance.

Considering the construction sequence that piles will be driven after the MSE walls are made in place, downdrag on piling is expected to be negligible. In addition, these capacities are determined for piles driven to the required penetration / elevation. If jetting or other methods are used to assist in advancing the piles, re-evaluation of these pile capacities will be warranted.

The nominal capacities are based on single, isolated foundations. Group effect on pile resistance should be evaluated in accordance with AASHTO LRFD Sections 10.7.3.9 and 10.7.3.10 for compression resistance and uplift resistance respectively. For evaluation of pile

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group settlement, Sections 10.7.2.3 applies. Materials Division is available to assist in evaluating group effect upon request when detailed pile group configuration is provided.

It is understood driveability analysis will be performed by the Design Consultant. Materials Division is available to provide geotechnical input parameters upon request.

Geotechnical Input Parameters for Lateral Load Analysis Using Lpile. Lateral load analysis will be performed by the Structural Engineer using commercial computer program LPile. The following geotechnical input parameters are recommended for use in LPile lateral load analysis.

Table 5a: Recommended Geotechnical Parameters for LPile Analysis – Bents 1 of Site 1

Elevation, ft	p-y Curve Model	Effective Unit Weight, γ', pcf	Undrained Shear Strength, c_u, psf	Strain Factor, ε_{50}	Friction Angle, ϕ, °	Soil Modulus, k, pci
Above ground (fill)	Stiff Clay w/o Free Water	125	1500	0.007	NA	NA
Ground to 198	Stiff Clay w/o Free Water	125	1750	0.007	NA	NA
198 to 168	Sand (Reese)	70	NA	NA	34	65
Below 168	Sand (Reese)	80	NA	NA	37	100

Table 5b: Recommended Geotechnical Parameters for LPile Analysis – Bents 2 of Site 1

Elevation, ft	p-y Curve Model	Effective Unit Weight, γ', pcf	Undrained Shear Strength, c_u, psf	Strain Factor, ε_{50}	Friction Angle, ϕ, °	Soil Modulus, k, pci
Ground to 198	Stiff Clay w/o Free Water	125	1750	0.007	NA	NA
198 to 168	Sand (Reese)	70	NA	NA	34	65
Below 168	Sand (Reese)	80	NA	NA	37	100

Table 5c: Recommended Geotechnical Parameters for LPile Analysis – Bent 3 of Site 1

Elevation, ft	p-y Curve Model	Effective Unit Weight, γ', pcf	Undrained Shear Strength, c_u, psf	Strain Factor, ε_{50}	Friction Angle, ϕ, °	Soil Modulus, k, pci
Above ground (fill)	Stiff Clay w/o Free Water	125	1500	0.007	NA	NA
Ground to 201	Sand (Reese)	120	NA	NA	32	40
201 to 176	Sand (Reese)	75	NA	NA	35	75
Below 176	Sand (Reese)	80	NA	NA	37	100

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Table 6a: Recommended Geotechnical Parameters for LPile Analysis – Bent 1 of Site 2

Elevation, ft	p-y Curve Model	Effective Unit Weight, γ', pcf	Undrained Shear Strength, c_u, psf	Strain Factor, ε_{50}	Friction Angle, ϕ, °	Soil Modulus, k, pci
Above ground (fill)	Stiff Clay w/o Free Water	125	1500	0.007	NA	NA
Ground to 159	Stiff Clay w/o Free Water	125	1750	0.007	NA	NA
159 to 144	Soft Clay (Matlock)	50	300	0.02	NA	NA
Below 144	Sand (Reese)	80	NA	NA	38	120

Table 6b: Recommended Geotechnical Parameters for LPile Analysis – Bent 2 of Site 2

Elevation, ft	p-y Curve Model	Effective Unit Weight, γ', pcf	Undrained Shear Strength, c_u, psf	Strain Factor, ε_{50}	Friction Angle, ϕ, °	Soil Modulus, k, pci
Ground to 159	Stiff Clay w/o Free Water	125	1750	0.007	NA	NA
159 to 144	Soft Clay (Matlock)	50	300	0.02	NA	NA
Below 144	Sand (Reese)	80	NA	NA	38	120

Table 6c: Recommended Geotechnical Parameters for LPile Analysis – Bent 3 of Site 2

Elevation, ft	p-y Curve Model	Effective Unit Weight, γ', pcf	Undrained Shear Strength, c_u, psf	Strain Factor, ε_{50}	Friction Angle, ϕ, °	Soil Modulus, k, pci
Above ground (fill)	Stiff Clay w/o Free Water	125	1500	0.007	NA	NA
Ground to 213	Sand (Reese)	125	NA	NA	33	75
213 to 158	Stiff Clay w/o Free Water	120	1250	0.007	NA	NA
158 to 143	Soft Clay (Matlock)	50	300	0.02	NA	NA
Below 143	Sand (Reese)	80	NA	NA	38	120

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Pile Installation. Piles should be installed in accordance with Section 805 (2014 Edition). Prior to piling, hammer systems furnished by the Contractor should be evaluated and approved by the Engineer.

Prebore is not anticipated to be required. Water jetting, vibrating, or other means for the purpose of assisting pile penetration are generally not expected. If warranted by specific subsurface conditions, the use of water jetting or vibrating should be approved by the Engineer. In addition, the final 5 feet of pile penetration should be achieved by driving.

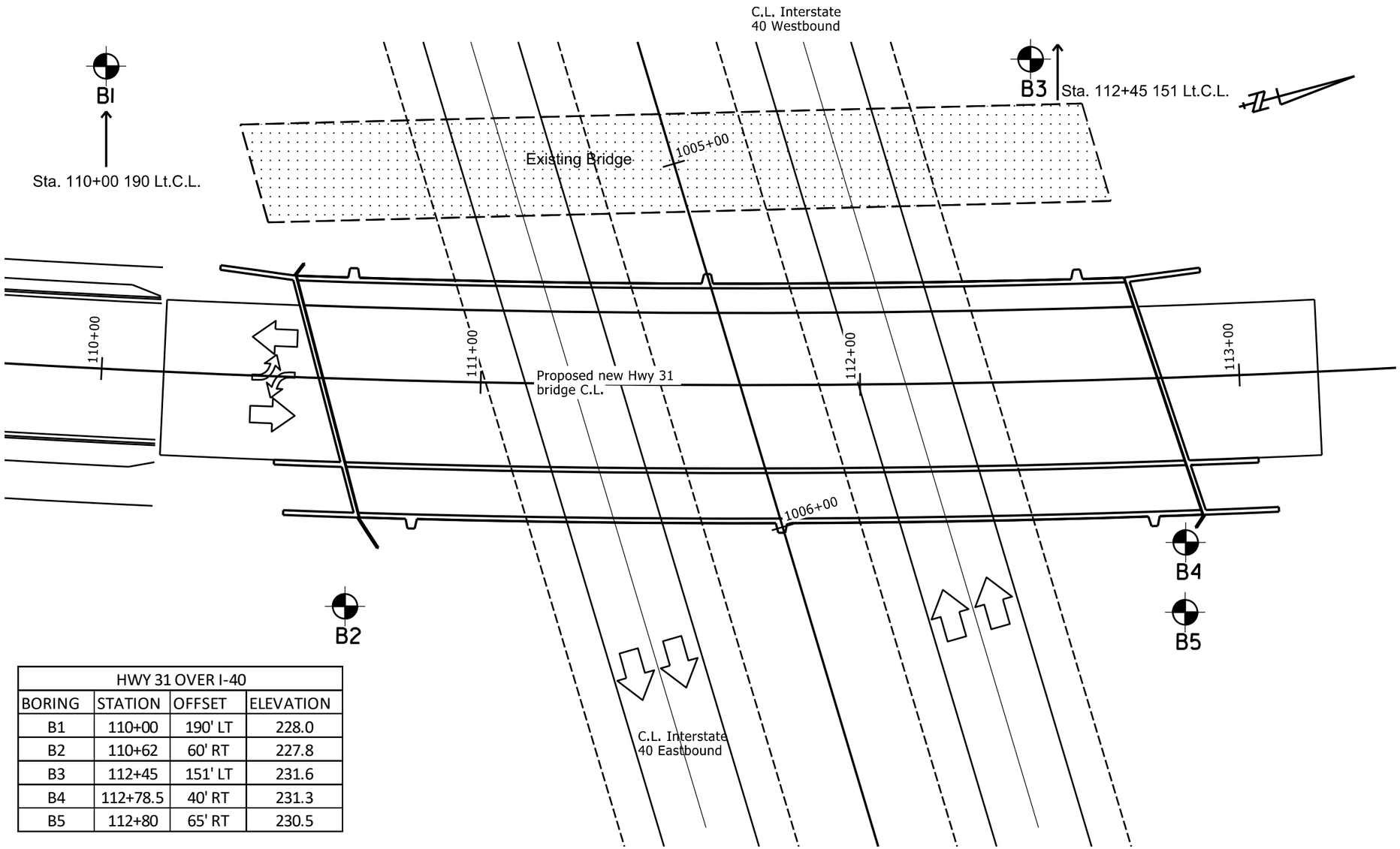
Piling should be observed and recorded by the Engineer. Test piles are not required but may be driven for the Contractor's information. Nominal bearing capacity should be determined in accordance with Subsection 805.09(b), "Method B - Wave Equation Analysis (WEAP)".

Jonathan A. Annable
Materials Engineer

JAA:yz:mlg:pwc
cc: State Construction Engineer
District 6 Engineer
Roadway Design Engineer
G. C. File

Attachment A

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
6	AR		1 OF 2	2
JOB NO.		061613		
PLAN OF BORINGS (SITE 1)				



HWY 31 OVER I-40			
BORING	STATION	OFFSET	ELEVATION
B1	110+00	190' LT	228.0
B2	110+62	60' RT	227.8
B3	112+45	151' LT	231.6
B4	112+78.5	40' RT	231.3
B5	112+80	65' RT	230.5

PLAN OF BORINGS (SITE 1)

I-40 STRS. & APPRS. - HWY. 31 & 13 (S)
ROUTE 31, SECTION 3
LONOKE COUNTY

JOB NO. 061613 | SHEET 1/2

SCALE: 1"=30'

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MATERIALS DIVISION - GEOTECHNICAL SEC.

BORING NO. 1
PAGE 1 OF 2

JOB NO. 061613 Lonoke County
JOB NAME: I-40 Strs. & Apprs. (Hwys. 13 & 31) (S)
Route 31, Section 3 & Route 13, Section 10
STATION: 110+00
LOCATION: 190' Left of Construction Centerline
LOGGED BY: Connor Bunton

DATE: December 1, 2021
TYPE OF DRILLING: Hollow Stem Auger -
EQUIPMENT: Acker 1
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 36.5

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	MOISTURE CONTENT (%) PL + – – – – – – – + LL (10 20 30 40 50 60 70)	PERCENT PASSING NO. 200 SIEVE	NO. OF BLOWS PER 6-IN.	% TCR	% RQD
			SURFACE ELEVATION: 228.0						
			Moist, Stiff, Brown Silty Clay				1 5-6 3 4-5		
5									
			Most, Reddish Brown Fat Clay	CH	Su = 9.0 psi γ_d = 99.0 pcf	99			
			Moist, Stiff, Reddish Brown Clay	-			2 6-8		
10									
			Moist, Reddish Brown Fat Clay	CH	Su = 5.3 psi γ_d = 92.1 pcf	99			
15									
			Moist, Stiff, Reddish Brown Clay				3 6-9		
20									
			Moist, Medium Dense, Light Gray Silt	-			2 7-9 2 5-7		
25									
30									
			Moist, Dense, Light Gray Silty Sand				6 14-27		
35									

REMARKS: Lonoke MSE Wall Boring. No water was observed during or 24 hours after completion of the boring.

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BORING NO. 1
PAGE 2 OF 2

JOB NO. 061613 Lonoke County
JOB NAME: I-40 Strs. & Apprs. (Hwys. 13 & 31) (S)
Route 31, Section 3 & Route 13, Section 10
STATION: 110+00
LOCATION: 190' Left of Construction Centerline
LOGGED BY: Connor Bunton

DATE: December 1, 2021
TYPE OF DRILLING: Hollow Stem Auger -
EQUIPMENT: Acker 1
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 36.5

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	MOISTURE CONTENT (%) PL + – – – – – – – + LL (10 20 30 40 50 60 70)	PERCENT PASSING NO. 200 SIEVE	NO. OF BLOWS PER 6-IN.	% TCR	% RQD
			SURFACE ELEVATION: 228.0						
			Moist, Medium Dense, Light Brown Sand		●		7 8-7		
			Boring Terminated						
40									
45									
50									
55									
60									
65									
70									

REMARKS: Lonoke MSE Wall Boring. No water was observed during or 24 hours after completion of the boring.

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BORING NO. 2
PAGE 1 OF 3

JOB NO. 061613 Lonoke County
JOB NAME: I-40 Strs. & Apprs. (Hwys. 13 & 31) (S)
Route 31, Section 3 & Route 13, Section 10
STATION: 110+62
LOCATION: 60' Right of Construction Centerline
LOGGED BY: Anthony Nichoson

DATE: November 16, 2021
TYPE OF DRILLING: Shelby - Hollow Stem Auger - Diamond Core
EQUIPMENT: Acker 1
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 101.5

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL SURFACE ELEVATION: 227.8	SOIL GROUP	MOISTURE CONTENT (%) PL + – – – – – – – – + LL (10 20 30 40 50 60 70)	PERCENT PASSING NO. 200 SIEVE	NO. OF BLOWS PER 6-IN.	% TCR	% RQD
			Moist, Stiff, Reddish Brown Lean Clay	CL	+	94	2 5-8		
				-		99	5 9-13		
5			Moist, Very Stiff, Reddish Brown Clay				3 7-12		
			Moist, Reddish Brown Silt	ML		99			
10									
			Moist, Very Stiff, Reddish Brown Clay	-			5 7-12		
15									
			Moist, Stiff, Reddish Brown Clay				3 5-6		
20									
			Wet, Medium Stiff, Brown Lean Clay	CL	+ +	99	1 2-4		
				-					
25									
			Wet, Stiff, Gray Silty Clay	CL-ML	+ +	86	3 6-9		
				-					
30									
			Moist, Loose, Brown Silt with Sand	ML		75	3 4-6		
				-					
35									

REMARKS: Lonoke Bridge Boring.

ARKANSAS DEPARTMENT OF TRANSPORTATION
MATERIALS DIVISION - GEOTECHNICAL SEC.

BORING NO. 2
PAGE 2 OF 3

JOB NO. 061613 Lonoke County
JOB NAME: I-40 Strs. & Apprs. (Hwys. 13 & 31) (S)
Route 31, Section 3 & Route 13, Section 10
STATION: 110+62
LOCATION: 60' Right of Construction Centerline
LOGGED BY: Anthony Nichoson

DATE: November 16, 2021
TYPE OF DRILLING: Shelby - Hollow Stem Auger - Diamond Core
EQUIPMENT: Acker 1
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 101.5

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	MOISTURE CONTENT (%) PL + – – – – – – – + LL (10 20 30 40 50 60 70)	PERCENT PASSING NO. 200 SIEVE	NO. OF BLOWS PER 6-IN.	% TCR	% RQD
			SURFACE ELEVATION: 227.8						
40			Wet, Medium Dense, Brown Silty Sand with Some Gravel	SM -		25	5 7-9		
45			Wet, Medium Dense, Brown Poorly Graded Sand with Silt	SP-SM -		11	7 11-17		
50			Wet, Dense, Brown Poorly Graded Sand with Silt and Gravel	SP-SM		11	8 22-25		
55			Wet, Medium Dense, Brown Sand with Some Gravel				8 12-14		
60			Wet, Dense, Brown Sand				9 16-22		
65			Wet, Very Dense, Brown Sand	-			28 40-48		
70			Sand and Gravel				27 35-29		

REMARKS: Lonoke Bridge Boring.

ARKANSAS DEPARTMENT OF TRANSPORTATION
MATERIALS DIVISION - GEOTECHNICAL SEC.

BORING NO. 2
PAGE 3 OF 3

JOB NO. 061613 Lonoke County
JOB NAME: I-40 Strs. & Apprs. (Hwys. 13 & 31) (S)
Route 31, Section 3 & Route 13, Section 10
STATION: 110+62
LOCATION: 60' Right of Construction Centerline
LOGGED BY: Anthony Nichoson

DATE: November 16, 2021
TYPE OF DRILLING: Shelby - Hollow Stem Auger - Diamond Core
EQUIPMENT: Acker 1
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 101.5

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	MOISTURE CONTENT (%) PL + – – – – – – – – + LL (10 20 30 40 50 60 70)	PERCENT PASSING NO. 200 SIEVE	NO. OF BLOWS PER 6-IN.	% TCR	% RQD
			SURFACE ELEVATION: 227.8						
75			Wet, Very Dense, Brown Sand with Some Gravel				15 31-43		
80			Wet, Medium Dense, Brown Sand with Some Gravel				10 10-10		
85			Wet, Very Dense, Brown Poorly Graded Sand with Silt and Gravel	SP-SM		8	21 33-28		
90				-			22 26-37		
95							16 24-28		
100							12 30-36		
			Wet, Very Dense, Brown Well Graded Sand with Silt and Gravel	SW-SM		7	21 42-44		
105			Boring Terminated						

REMARKS: Lonoke Bridge Boring.

ARKANSAS DEPARTMENT OF TRANSPORTATION
MATERIALS DIVISION - GEOTECHNICAL SEC.

BORING NO. 3
PAGE 1 OF 2

JOB NO. 061613 Lonoke County
JOB NAME: I-40 Strs. & Apprs. (Hwys. 13 & 31) (S)
Route 31, Section 3 & Route 13, Section 10
STATION: 112+45
LOCATION: 151' Left of Construction Centerline
LOGGED BY: Connor Bunton

DATE: November 15, 2021
TYPE OF DRILLING: Shelby - Hollow Stem Auger - Diamond Core
EQUIPMENT: Acker 1
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 36.5

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL SURFACE ELEVATION: 231.6	SOIL GROUP	MOISTURE CONTENT (%) PL + – – – – – – – + LL (10 20 30 40 50 60 70)	PERCENT PASSING NO. 200 SIEVE	NO. OF BLOWS PER 6-IN.	% TCR	% RQD
			Moist, Loose, Brown Silty Sand				1 2-8		
5			Moist, Medium Dense, Brown Silty Clay				5 6-6		
			Moist, Stiff, Brown Clay	-			5 8-10		
10			Moist, Stiff, Reddish Brown Clay				4 7-8		
15			Moist, Reddish Brown Silty Clay	CL-ML	+ + Su = 7.7 psi	97			
20			Moist, Medium Stiff, Brown Clay with Traces of Gravel				1 4-4		
25			Moist, Stiff, Reddish Brown Clay	-			2 4-6		
30			Moist, Medium Dense, Light Brown Silt				4 7-9		
35			Moist, Medium Dense, Light Brown Sandy Silt				6 8-10		

REMARKS: Lonoke MSE Wall Boring. A water level was recorded at 7 feet below groung level 18 hours after completion of the boring.

ARKANSAS DEPARTMENT OF TRANSPORTATION
MATERIALS DIVISION - GEOTECHNICAL SEC.

BORING NO. 3
PAGE 2 OF 2

JOB NO. 061613 Lonoke County
JOB NAME: I-40 Strs. & Apprs. (Hwys. 13 & 31) (S)
Route 31, Section 3 & Route 13, Section 10
STATION: 112+45
LOCATION: 151' Left of Construction Centerline
LOGGED BY: Connor Bunton

DATE: November 15, 2021
TYPE OF DRILLING: Shelby - Hollow Stem Auger - Diamond Core
EQUIPMENT: Acker 1

HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 36.5

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	MOISTURE CONTENT (%) PL + – – – – – – – + LL (10 20 30 40 50 60 70)	PERCENT PASSING NO. 200 SIEVE	NO. OF BLOWS PER 6-IN.	% TCR	% RQD
			SURFACE ELEVATION: 231.6						
			Moist, Medium Dense, Light Gray Silty Sand				8 15-15		
			Boring Terminated						
40									
45									
50									
55									
60									
65									
70									

REMARKS: Lonoke MSE Wall Boring. A water level was recorded at 7 feet below groung level 18 hours after completion of the boring.

ARKANSAS DEPARTMENT OF TRANSPORTATION
MATERIALS DIVISION - GEOTECHNICAL SEC.

BORING NO. 4
PAGE 1 OF 3

JOB NO. 061613 Lonoke County
JOB NAME: I-40 Strs. & Apprs. (Hwys. 13 & 31) (S)
Route 31, Section 3 & Route 13, Section 10
STATION: 112+78.5
LOCATION: 40' Right of Construction Centerline
LOGGED BY: Anthony Nicholson

DATE: November 8, 2021
TYPE OF DRILLING: Shelby - Hollow Stem Auger - Diamond Core
EQUIPMENT: Acker 1
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 101.4

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	MOISTURE CONTENT (%) PL + – – – – – – – + LL (10 20 30 40 50 60 70)	PERCENT PASSING NO. 200 SIEVE	NO. OF BLOWS PER 6-IN.	% TCR	% RQD
			SURFACE ELEVATION: 231.3						
			Moist, Medium Dense, Brown Silt with Sand	ML		80	1 3-15		
				-					
			Moist, Medium Dense, Brown Silt	ML		91	9 7-6		
5				-					
			Moist, Reddish Brown Fat Clay	CH	Su = 13.0 psi γ_d = 96.1 pcf	99			
				-					
			Moist, Medium Dense, Brown Silt	ML		90	6 9-10		
10				-					
			Moist, Reddish Brown Lean Clay	CL		99			
			Wet, Reddish Brown Silt	ML	Su = 2.4 psi γ_d = 95.2 pcf	99			
15				-					
			Moist, Loose, Reddish Brown Silt	ML		99	1 3-5		
				-					
20				ML		99	2 4-4		
				-					
25									
			Moist, Very Loose, Brown Silt	ML		96	2 2-2		
				-					
30									
			Moist, Medium Dense, Brown Silt with Fine Sand	ML		75	6 12-12		
				-					
35									

REMARKS: Lonoke Bridge Boring. No water was visibly observed 24 hours after completion of the boring.

ARKANSAS DEPARTMENT OF TRANSPORTATION
MATERIALS DIVISION - GEOTECHNICAL SEC.

BORING NO. 4
PAGE 2 OF 3

JOB NO. 061613 Lonoke County
JOB NAME: I-40 Strs. & Apprs. (Hwys. 13 & 31) (S)
Route 31, Section 3 & Route 13, Section 10
STATION: 112+78.5
LOCATION: 40' Right of Construction Centerline
LOGGED BY: Anthony Nicholson

DATE: November 8, 2021
TYPE OF DRILLING: Shelby - Hollow Stem Auger - Diamond Core
EQUIPMENT: Acker 1
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 101.4

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	MOISTURE CONTENT (%) PL + ---------- + LL (10 20 30 40 50 60 70)	PERCENT PASSING NO. 200 SIEVE	NO. OF BLOWS PER 6-IN.	% TCR	% RQD
40			SURFACE ELEVATION: 231.3 Wet, Medium Dense, Gray Fine Sandy Silt	ML -		54	5 7-11		
45			Wet, Dense, Brown Silty Fine Sand with Traces of Gravel	SM -		14	6 17-17		
50			Wet, Dense, Gray Poorly Graded Fine Sand with Silt and Some Gravel	SP-SM -		11	10 15-35		
55			Wet, Dense, Gray Silty Fine Sand with Some Gravel	SM -		14	11 17-20		
60			Wet, Very Dense, Brown Silty Fine Sand with Traces of Gravel	SM -		13	21 49-42		
65				SM -		16	10 23-30		
70			Wet, Very Dense, Brown Silty Fine Sand	SM -		28	13 23-47		

REMARKS: Lonoke Bridge Boring. No water was visibly observed 24 hours after completion of the boring.

ARKANSAS DEPARTMENT OF TRANSPORTATION
MATERIALS DIVISION - GEOTECHNICAL SEC.

BORING NO. 4
PAGE 3 OF 3

JOB NO. 061613 Lonoke County
JOB NAME: I-40 Strs. & Apprs. (Hwys. 13 & 31) (S)
Route 31, Section 3 & Route 13, Section 10
STATION: 112+78.5
LOCATION: 40' Right of Construction Centerline
LOGGED BY: Anthony Nicholson

DATE: November 8, 2021
TYPE OF DRILLING: Shelby - Hollow Stem Auger - Diamond Core
EQUIPMENT: Acker 1
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 101.4

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	MOISTURE CONTENT (%) PL + LL (10 20 30 40 50 60 70)	PERCENT PASSING NO. 200 SIEVE	NO. OF BLOWS PER 6-IN.	% TCR	% RQD
75			SURFACE ELEVATION: 231.3						
			Wet, Medium Dense, Brown Poorly Graded Fine Sand with Silt and Organic Matter (Wood)	SP-SM		11	7 9-11		
				-					
80			Wet, Very Dense, Gray Poorly Graded Fine Sand with Silt and Gravel	SP-SM		6	20 43-43		
				-					
85			Wet, Dense, Brown Well Graded Fine Sand with Silt and Gravel	SW-SM		11	17 16-32		
				-					
90			Wet, Very Dense, Brown Poorly Graded Fine Sand with Silt and Gravel	SP-SM		9	15 28-36		
				-					
95				SP-SM		11	23 43-41		
				-					
100			Wet, Very Dense, Brown Silty Fine Sand with Gravel	SM		14	40 (5")		
				-					
105			Boring Terminated	SM		22	14 33-45 (11")		

REMARKS: Lonoke Bridge Boring. No water was visibly observed 24 hours after completion of the boring.

ARKANSAS DEPARTMENT OF TRANSPORTATION
MATERIALS DIVISION - GEOTECHNICAL SEC.

BORING NO. 5
PAGE 1 OF 2

JOB NO. 061613 Lonoke County
JOB NAME: I-40 Strs. & Apprs. (Hwys. 13 & 31) (S)
Route 31, Section 3 & Route 13, Section 10
STATION: 112+80
LOCATION: 65' Right of Construction Centerline
LOGGED BY: Connor Bunton

DATE: November 10, 2021
TYPE OF DRILLING: Shelby - Hollow Stem Auger - Diamond Core
EQUIPMENT: Acker 1
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 35.5

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL SURFACE ELEVATION: 230.5	SOIL GROUP	MOISTURE CONTENT (%) PL – LL (10 20 30 40 50 60 70)	PERCENT PASSING NO. 200 SIEVE	NO. OF BLOWS PER 6-IN.	% TCR	% RQD
			Moist, Loose, Brown Silt				2 2-6		
			Moist, Loose, Brown Sandy Silt				4 4-4		
5			Moist, Very Stiff, Light Gray Silty Clay				6 7-9		
			Moist, Very Stiff, Reddish Brown Silty Clay				4 8-8		
10			Moist, Reddish Brown Fat Clay	CH	Su = 9.3 psi γ_d = 96.4 pcf	99			
			Moist, Reddish Brown Silt	ML		99			
15			Moist, Stiff, Reddish Brown Clay				3 6-7		
20			Wet, Stiff, Reddish Brown and Light Gray Silty Clay	-			1 4-7		
25			Wet, Loose, Light Brown Silt				1 3-3		
30			Wet, Medium Dense, Light Gray Silty Sand				6 11-12		
35			Wet, Medium Dense, Light Brown				3		

REMARKS: Lonoke MSE Wall Boring.

ARKANSAS DEPARTMENT OF TRANSPORTATION
MATERIALS DIVISION - GEOTECHNICAL SEC.

BORING NO. 5
PAGE 2 OF 2

JOB NO. 061613 Lonoke County
JOB NAME: I-40 Strs. & Apprs. (Hwys. 13 & 31) (S)
Route 31, Section 3 & Route 13, Section 10
STATION: 112+80
LOCATION: 65' Right of Construction Centerline
LOGGED BY: Connor Bunton

DATE: November 10, 2021
TYPE OF DRILLING: Shelby - Hollow Stem Auger - Diamond Core
EQUIPMENT: Acker 1
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 35.5

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	MOISTURE CONTENT (%) PL + – – – – – – – – + LL 10 20 30 40 50 60 70	PERCENT PASSING NO. 200 SIEVE	NO. OF BLOWS PER 6-IN.	% TCR	% RQD
			SURFACE ELEVATION: 230.5						
			Sand				7-8		
			Boring Terminated						
40									
45									
50									
55									
60									
65									
70									

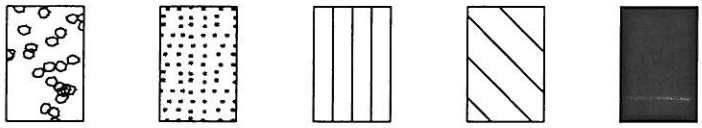
REMARKS: Lonoke MSE Wall Boring.

LEGEND

SOIL TYPES

(SHOWN IN SYMBOL COLUMN)

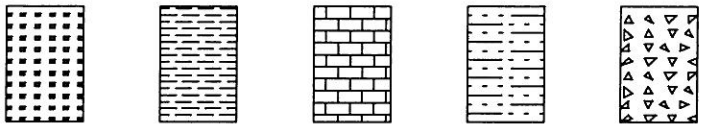
(PREDOMINANT TYPE SHOWN HEAVY)



GRAVEL | SAND | SILT | CLAY | ORGANIC MATTER

ROCK TYPES

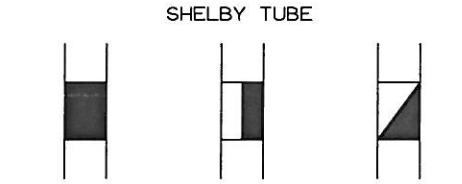
(SHOWN IN SYMBOL COLUMN)



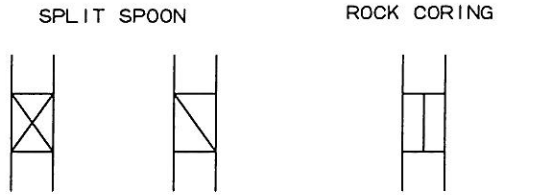
SANDSTONE | SHALE or SILTSTONE | LIMESTONE or DOLOMITE | ALTERNATING LAYERS of SHALE and SANDSTONE | OTHER

SAMPLER TYPES

(SHOWN IN SAMPLE COLUMN)



UNDISTURBED SAMPLE RECOVERY | DISTURBED SAMPLE RECOVERY | NO RECOVERY



SAMPLE RECOVERY | NO RECOVERY | % RECOVERY INDICATED ON LOGS

TERMS DESCRIBING CONSISTENCY OR CONDITION

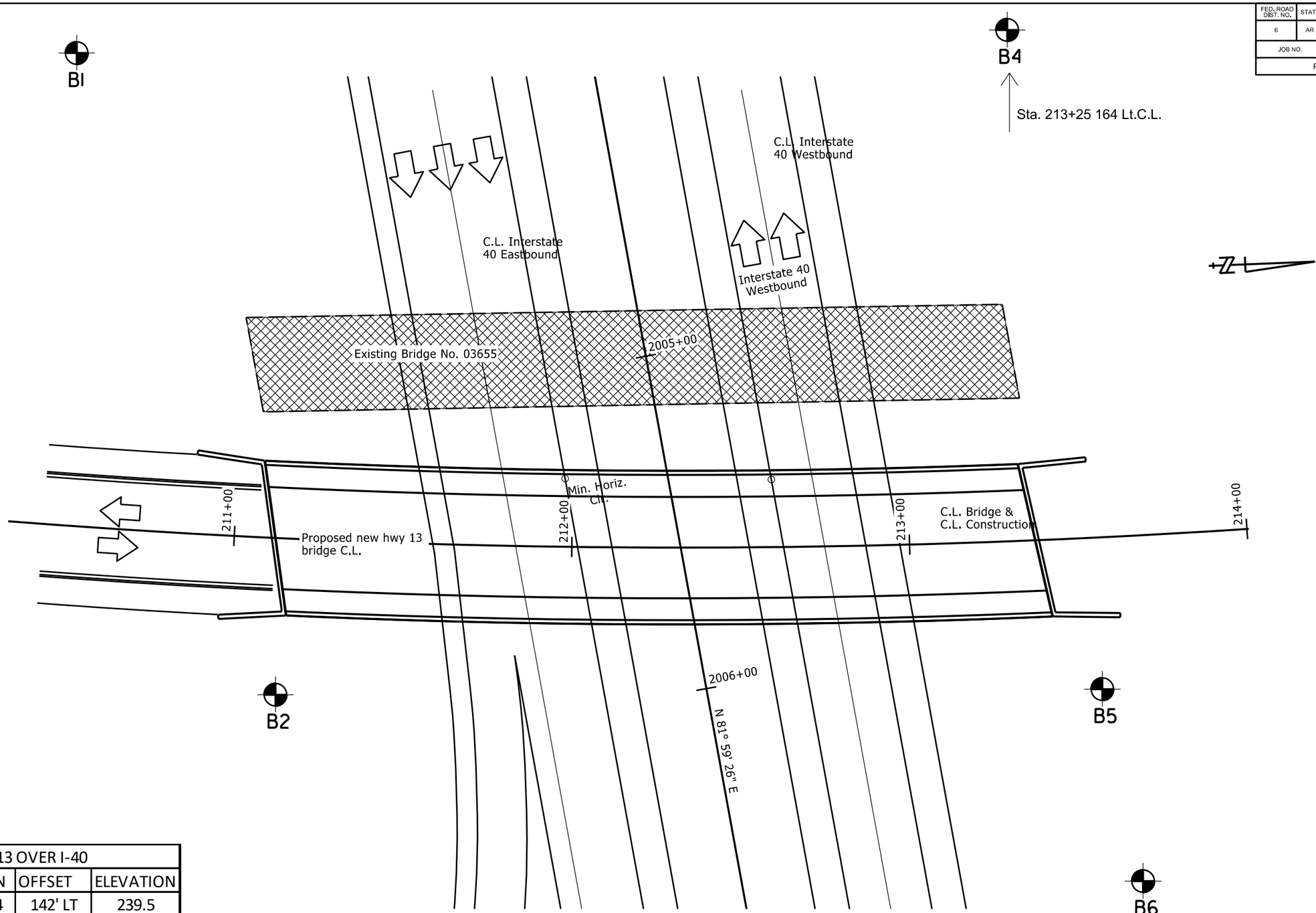
GRANULAR SOIL		CLAY		CLAY-SHALE		SHALE	
'N' Value	Density	'N' Value	Consistency	'N' Value	Consistency	'N' Value	Consistency
0-4	Very Loose	0-1	Very Soft	0-1	Very Soft		
5-10	Loose	2-4	Soft	2-4	Soft	31-60	Soft
11-30	Medium Dense	5-8	Medium Stiff	5-8	Medium Stiff	Over 60	
31-50	Dense	9-15	Stiff	9-15	Stiff	More than 2'	
Over 50	Very Dense	16-30	Very Stiff	16-30	Very Stiff	Penetration	
		31-60	Hard	31-60	Hard	in 60 Blows:	Medium Hard
		Over 60	Very Hard	Over 60	Very Hard	Less than 2'	
						Penetration	
						in 60 Blows:	Hard

1. Ground water elevations indicated on boring logs represent ground water elevations at date or time shown on boring log. Absence of water surface implies that no ground water data is available but does not necessarily mean that ground water will not be encountered at locations or within the vertical reaches of these borings.
2. Borings represent subsurface conditions at their respective locations for their respective depths. Variations in conditions between or adjacent to boring locations may be encountered.
3. Terms used for describing soils according to their texture or grain size distribution are in accordance with the Unified Soil Classification System.

Standard Penetration Test – Driving a 2.0" O.D., 1-3/8" I.D. sampler a distance of 1.0 foot into undisturbed soil with a 140 pound hammer free falling a distance of 30 inches. It is customary to drive the spoon 6.0 inches to seat into undisturbed soil, then perform the test. The number of hammer blows for seating the spoon and performing the test are recorded for each 6 inches of penetration on the drill log. The field "N" Value (N_f) can be obtained by adding the bottom two numbers for example: $\frac{6}{8-9} \Rightarrow 8+9=17 blows/ft$. The "N" Value corrected to 60% efficiency (N_{60}) can be obtained by multiplying N_f by the hammer correction factor published on the boring log.

Attachment B

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
6	AR		2 OF 2	2
JOB NO.		061613		
PLAN OF BORINGS (SITE 2)				



HWY 13 OVER I-40			
BORING	STATION	OFFSET	ELEVATION
B1	210+54	142' LT	239.5
B2	211+11	45' RT	239.3
B3	211+39	133' RT	237.3
B4	213+25	164' LT	237.9
B5	213+53	42' RT	237.7
B6	213+61.5	104' RT	236.9

PLAN OF BORINGS (SITE 2)

I-40 STRS. & APPRS. - HWY. 31 & 13 (S)
ROUTE 13, SECTION 10
LONOKE COUNTY

JOB NO. 061613 | SHEET 2/2

SCALE: 1"=30'

ARKANSAS DEPARTMENT OF TRANSPORTATION
MATERIALS DIVISION - GEOTECHNICAL SEC.

BORING NO. 1
PAGE 1 OF 2

JOB NO. 061613 Lonoke County
JOB NAME: I-40 Strs. & Apprs. (Hwys. 13 & 31) (S)
Route 31, Section 3 & Route 13, Section 10
STATION: 210+54
LOCATION: 142' Left of Construction Centerline
LOGGED BY: Connor Bunton

DATE: November 1, 2021
TYPE OF DRILLING: Shelby - Hollow Stem Auger - Rotary Wash
EQUIPMENT: Acker 1
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 36.5

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL SURFACE ELEVATION: 239.5	SOIL GROUP	MOISTURE CONTENT (%) PL – LL (10 20 30 40 50 60 70)	PERCENT PASSING NO. 200 SIEVE	NO. OF BLOWS PER 6-IN.	% TCR	% RQD
			Moist, Loose, Brown Clayey Sand				2 3-6		
5			Moist, Brown Silt	ML	Su = 13.0 psi γ_d = 99.9 pcf	95 98			
			Moist, Medium Dense, Light Brown Silt	-			5 5-6		
10			Moist, Light Brown Lean Clay	CL	Su = 11.0 psi γ_d = 104.2 pcf	94			
			Moist, Medium Dense, Light Gray Silt				4 5-7		
15									
			Moist, Medium Stiff, Light Gray Silty Clay				2 3-5		
20									
			Moist, Medium Dense, Light Brown Silt	-			4 7-9		
25									
			Moist, Stiff, Light Gray Silty Clay				2 4-6		
30									
			Wet, Medium Stiff, Light Brown Silty Clay				2 3-5		
35									

REMARKS: Carlisle Overpass MSE Wall Boring. *A 20 hour water reading of 27.5 feet below ground level was recorded after completion of the boring.

ARKANSAS DEPARTMENT OF TRANSPORTATION
MATERIALS DIVISION - GEOTECHNICAL SEC.

BORING NO. 1
PAGE 2 OF 2

JOB NO. 061613 Lonoke County
JOB NAME: I-40 Strs. & Apprs. (Hwys. 13 & 31) (S)
Route 31, Section 3 & Route 13, Section 10
STATION: 210+54
LOCATION: 142' Left of Construction Centerline
LOGGED BY: Connor Bunton

DATE: November 1, 2021
TYPE OF DRILLING: Shelby - Hollow Stem Auger - Rotary Wash
EQUIPMENT: Acker 1
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 36.5

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL SURFACE ELEVATION: 239.5	SOIL GROUP	MOISTURE CONTENT (%) PL + ● LL (10 20 30 40 50 60 70)	PERCENT PASSING NO. 200 SIEVE	NO. OF BLOWS PER 6-IN.	% TCR	% RQD
			Wet, Stiff, Brown Silty Clay		●		4 4-6		
			Boring Terminated						
40									
45									
50									
55									
60									
65									
70									

REMARKS: Carlisle Overpass MSE Wall Boring. *A 20 hour water reading of 27.5 feet below ground level was recorded after completion of the boring.

ARKANSAS DEPARTMENT OF TRANSPORTATION
MATERIALS DIVISION - GEOTECHNICAL SEC.

BORING NO. 2
PAGE 1 OF 4

JOB NO. 061613 Lonoke County
JOB NAME: I-40 Strs. & Apprs. (Hwys. 13 & 31) (S)
Route 31, Section 3 & Route 13, Section 10
STATION: 211+11
LOCATION: 45' Right of Construction Centerline
LOGGED BY: Anthony Nicholson

DATE: October 25, 2021
TYPE OF DRILLING: Shelby - Hollow Stem Auger - Rotary Wash
EQUIPMENT: Acker 1
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 121.5

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL SURFACE ELEVATION: 239.3	SOIL GROUP	MOISTURE CONTENT (%) PL + – – – – – – – + LL (10 20 30 40 50 60 70)	PERCENT PASSING NO. 200 SIEVE	NO. OF BLOWS PER 6-IN.	% TCR	% RQD
			Moist, Medium Dense, Brown Silt	ML		91	2 6-11		
			Moist, Loose, Brown Silt	-			2 4-5		
5			Moist, Brown Lean Clay	CL	Su = 11.4 psi γ_d = 103.2 pcf	97			
				-					
			Moist, Very Stiff, Brown Lean Clay	CL		94	3 6-10		
10				-					
			Moist, Brown Silt	ML	Su = 13.7 psi γ_d = 109.1 pcf	89			
				CL		87	4 6-8		
15			Moist, Stiff, Gray Lean Clay				3 5-8		
20				-					
			Moist, Stiff, Gray Silty Clay*				3 5-9		
25									
				CL		98	3 5-6		
30			Moist, Stiff, Brown Lean Clay				3 5-7		
35									

REMARKS: Carlisle Overpass. *A 24 hour water level of 20 feet below ground level was measured after drilling mud was added to the bore hole.

ARKANSAS DEPARTMENT OF TRANSPORTATION
MATERIALS DIVISION - GEOTECHNICAL SEC.

BORING NO. 2
PAGE 2 OF 4

JOB NO. 061613 Lonoke County
JOB NAME: I-40 Strs. & Apprs. (Hwys. 13 & 31) (S)
Route 31, Section 3 & Route 13, Section 10
STATION: 211+11
LOCATION: 45' Right of Construction Centerline
LOGGED BY: Anthony Nicholson

DATE: October 25, 2021
TYPE OF DRILLING: Shelby - Hollow Stem Auger - Rotary Wash
EQUIPMENT: Acker 1
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 121.5

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL SURFACE ELEVATION: 239.3	SOIL GROUP	MOISTURE CONTENT (%) PL + – – – – – – – – + LL (10 20 30 40 50 60 70)	PERCENT PASSING NO. 200 SIEVE	NO. OF BLOWS PER 6-IN.	% TCR	% RQD
40			Moist, Medium Stiff, Brown Silty Clay	-			3 3-5		
45			Moist, Stiff, Brown Clay				5 6-6		
50			Moist, Medium Stiff, Brown Clay				1 3-5		
55			Moist, Stiff, Brown Clay				1 4-5		
60							1 5-8		
65							2 5-7		
70			Moist, Very Stiff, Brown Clay				1 11-17		

REMARKS: Carlisle Overpass. *A 24 hour water level of 20 feet below ground level was measured after drilling mud was added to the bore hole.

ARKANSAS DEPARTMENT OF TRANSPORTATION
MATERIALS DIVISION - GEOTECHNICAL SEC.

BORING NO. 2
PAGE 3 OF 4

JOB NO. 061613 Lonoke County
JOB NAME: I-40 Strs. & Apprs. (Hwys. 13 & 31) (S)
Route 31, Section 3 & Route 13, Section 10
STATION: 211+11
LOCATION: 45' Right of Construction Centerline
LOGGED BY: Anthony Nicholson

DATE: October 25, 2021
TYPE OF DRILLING: Shelby - Hollow Stem Auger - Rotary Wash
EQUIPMENT: Acker 1
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 121.5

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL SURFACE ELEVATION: 239.3	SOIL GROUP	MOISTURE CONTENT (%) PL + – – – – – – – – + LL (10 20 30 40 50 60 70)	PERCENT PASSING NO. 200 SIEVE	NO. OF BLOWS PER 6-IN.	% TCR	% RQD
75			Moist, Stiff, Brown Silty Clay with Sand and Traces of Gravel	CL-ML	+ +	73	2 5-6		
80			Moist, Stiff, Brown Clay with Sand				2 4-5		
85			Moist, Very Soft, Brown Clay	-			0 0-1		
90							0 0-0		
95							0 0-1		
100			Moist, Medium Dense, Light Gray Clayey Sand with Gravel				3 5-7		
105			Moist, Dense, Brown Silt with Sand and Trace Gravel	ML		79	12 9-23		

REMARKS: Carlisle Overpass. *A 24 hour water level of 20 feet below ground level was measured after drilling mud was added to the bore hole.

ARKANSAS DEPARTMENT OF TRANSPORTATION
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BORING NO. 2
PAGE 4 OF 4

JOB NO. 061613 Lonoke County
JOB NAME: I-40 Strs. & Apprs. (Hwys. 13 & 31) (S)
Route 31, Section 3 & Route 13, Section 10
STATION: 211+11
LOCATION: 45' Right of Construction Centerline
LOGGED BY: Anthony Nicholson

DATE: October 25, 2021
TYPE OF DRILLING: Shelby - Hollow Stem Auger - Rotary Wash
EQUIPMENT: Acker 1
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 121.5

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL SURFACE ELEVATION: 239.3	SOIL GROUP	MOISTURE CONTENT (%) PL + – – – – – – – – + LL (10 20 30 40 50 60 70)	PERCENT PASSING NO. 200 SIEVE	NO. OF BLOWS PER 6-IN.	% TCR	% RQD
110			Moist, Very Dense, Brown Sand	-			40 (5")		
115			Moist, Very Dense, Brown Sand with Traces of Gravel				50 (6")		
120			Moist, Very Dense, Brown Sand and Gravel				15 35-50		
							17 59-59		
125			Boring Terminated						
130									
135									
140									

REMARKS: Carlisle Overpass. *A 24 hour water level of 20 feet below ground level was measured after drilling mud was added to the bore hole.

ARKANSAS DEPARTMENT OF TRANSPORTATION
MATERIALS DIVISION - GEOTECHNICAL SEC.

BORING NO. 3
PAGE 1 OF 2

JOB NO. 061613 Lonoke County
JOB NAME: I-40 Strs. & Apprs. (Hwys. 13 & 31) (S)
Route 31, Section 3 & Route 13, Section 10
STATION: 211+39
LOCATION: 133' Right of Construction Centerline
LOGGED BY: Tracy Henderson and Guy King

DATE: October 19, 2021
TYPE OF DRILLING: Shelby - Hollow Stem Auger - Rotary Wash
EQUIPMENT: Acker 1
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 36.5

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	MOISTURE CONTENT (%) PL + – – – – – – – + LL (10 20 30 40 50 60 70)	PERCENT PASSING NO. 200 SIEVE	NO. OF BLOWS PER 6-IN.	% TCR	% RQD
			SURFACE ELEVATION: 237.3						
			Moist, Loose, Brown Sandy Silt	-			2 3-3		
			Moist, Brown Lean Clay	CL	γ_d = 99.1 pcf	98			
5			Moist, Stiff, Brown Silty Clay				4 5-7		
			Moist, Hard, Brown Silty Clay				7 13-20		
10			Moist, Very Stiff, Brown Silty Clay				7 9-14		
			Moist, Very Stiff, Brown Silty Clay				7 11-15		
15									
							6 9-11		
20			Moist, Medium Dense, Brown Sandy Silt	-			9 10-14		
25									
							4 5-8		
30			Moist, Stiff, Brown Silty Clay				1 4-5		
35									

REMARKS: Carlisle Overpass MSE Wall Boring. *No water was observed in the boring after 24 hr period.

ARKANSAS DEPARTMENT OF TRANSPORTATION
MATERIALS DIVISION - GEOTECHNICAL SEC.

BORING NO. 3
PAGE 2 OF 2

JOB NO. 061613 Lonoke County
JOB NAME: I-40 Strs. & Apprs. (Hwys. 13 & 31) (S)
Route 31, Section 3 & Route 13, Section 10
STATION: 211+39
LOCATION: 133' Right of Construction Centerline
LOGGED BY: Tracy Henderson and Guy King

DATE: October 19, 2021
TYPE OF DRILLING: Shelby - Hollow Stem Auger - Rotary Wash
EQUIPMENT: Acker 1
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 36.5

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	MOISTURE CONTENT (%) PL + – – – – – – – – + LL (10 20 30 40 50 60 70)	PERCENT PASSING NO. 200 SIEVE	NO. OF BLOWS PER 6-IN.	% TCR	% RQD
			SURFACE ELEVATION: 237.3						
			Moist, Medium Stiff, Brown Clay				0 / 1-4		
			Boring Terminated						
40									
45									
50									
55									
60									
65									
70									

REMARKS: Carlisle Overpass MSE Wall Boring. *No water was observed in the boring after 24 hr period.

ARKANSAS DEPARTMENT OF TRANSPORTATION
MATERIALS DIVISION - GEOTECHNICAL SEC.

BORING NO. 4
PAGE 1 OF 2

JOB NO. 061613 Lonoke County
JOB NAME: I-40 Strs. & Apprs. (Hwys. 13 & 31) (S)
Route 31, Section 3 & Route 13, Section 10
STATION: 213+25
LOCATION: 164' Left of Construction Centerline
LOGGED BY: Guy King and Tracy Henderson

DATE: October 18, 2021
TYPE OF DRILLING: Shelby - Hollow Stem Auger - Rotary Wash
EQUIPMENT: Acker 1
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 36.5

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	MOISTURE CONTENT (%) PL + – – – – – – – – + LL (10 20 30 40 50 60 70)	PERCENT PASSING NO. 200 SIEVE	NO. OF BLOWS PER 6-IN.	% TCR	% RQD
			SURFACE ELEVATION: 237.9						
			Moist, Stiff, Brown and Gray Silty Clay		●		3 4-8		
5			Moist, Silty Clay	CL-ML	● ++ γ_d = 105.6 pcf	96			
			Moist, Very Stiff, Brown and Gray Silty Clay*		●		6 10-13		
10			Cemented Silty Sand		●		8 10-11		
15			Moist, Medium Dense, Brown Silty Sand						
20			Moist, Medium Dense, Brown Sandy Silt				5 8-10		
25			Moist, Very Stiff, Brown Silty Clay	-			12 12-12		
30			Moist, Stiff, Brown Silty Clay				0 4-6		
35							2 6-8		

REMARKS: Carlisle Overpass MSE Wall Boring. *Shelby tube refusal at 9.0 feet below ground level due to cemented silty sand layer. No soil could be processed from this sample.

ARKANSAS DEPARTMENT OF TRANSPORTATION
MATERIALS DIVISION - GEOTECHNICAL SEC.

BORING NO. 4
PAGE 2 OF 2

JOB NO. 061613 Lonoke County
JOB NAME: I-40 Strs. & Apprs. (Hwys. 13 & 31) (S)
Route 31, Section 3 & Route 13, Section 10
STATION: 213+25
LOCATION: 164' Left of Construction Centerline
LOGGED BY: Guy King and Tracy Henderson

DATE: October 18, 2021
TYPE OF DRILLING: Shelby - Hollow Stem Auger - Rotary Wash
EQUIPMENT: Acker 1
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 36.5

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	MOISTURE CONTENT (%) PL + – – – – – – – – + LL (10 20 30 40 50 60 70)	PERCENT PASSING NO. 200 SIEVE	NO. OF BLOWS PER 6-IN.	% TCR	% RQD
			SURFACE ELEVATION: 237.9						
			Moist, Medium Stiff, Brown Clay				2 2-5		
			Boring Terminated						
40									
45									
50									
55									
60									
65									
70									

REMARKS: Carlisle Overpass MSE Wall Boring. *Shelby tube refusal at 9.0 feet below ground level due to cemented silty sand layer. No soil could be processed from this sample.

ARKANSAS DEPARTMENT OF TRANSPORTATION
MATERIALS DIVISION - GEOTECHNICAL SEC.

BORING NO. 5
PAGE 1 OF 4

JOB NO. 061613 Lonoke County
JOB NAME: I-40 Strs. & Apprs. (Hwys. 13 & 31) (S)
Route 31, Section 3 & Route 13, Section 10
STATION: 213+53
LOCATION: 42' Right of Construction Centerline
LOGGED BY: Anthony Nicholson

DATE: October 12, 2021
TYPE OF DRILLING: Shelby - Hollow Stem Auger - Rotary Wash
EQUIPMENT: Acker 1
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 121.5

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL SURFACE ELEVATION: 237.7	SOIL GROUP	MOISTURE CONTENT (%) PL – LL (10 20 30 40 50 60 70)	PERCENT PASSING NO. 200 SIEVE	NO. OF BLOWS PER 6-IN.	% TCR	% RQD
			Moist, Medium Dense, Brown Silt	ML		93	2 13-9		
				-					
			Moist, Very Stiff, Brown Silty Clay	-		10	7 9-9		
5				-					
			Moist, Brown Silt	ML	Su = 13.3 psi γd = 104.2 pcf	92			
			Moist, Medium Dense, Gray Silt	ML		93	10 12-7		
10				-					
			Moist, Brown Sandy Lean Clay	CL	Su = 9.7 psi γd = 102.8 pcf	62			
			Moist, Medium Dense, Brown Sandy Silt*	ML		54	4 7-7		
15				-					
			Moist, Medium Dense, Brown Silt with Fine Sand	ML		85	2 4-8		
20				-					
			Moist, Medium Dense, Brown Silty Sand	SM		50	5 7-10		
25				-					
			Moist, Very Stiff, Brown Lean Clay	CL		95	5 8-10		
30				-					
			Moist, Medium Dense, Brown Silt	ML		93	3 6-7		
35				-					

REMARKS: Carlisle Overpass. *A 24 hour water reading of 11.0 feet below ground level was recorded after completion of the boring.

ARKANSAS DEPARTMENT OF TRANSPORTATION
MATERIALS DIVISION - GEOTECHNICAL SEC.

BORING NO. 5
PAGE 2 OF 4

JOB NO. 061613 Lonoke County
JOB NAME: I-40 Strs. & Apprs. (Hwys. 13 & 31) (S)
Route 31, Section 3 & Route 13, Section 10
STATION: 213+53
LOCATION: 42' Right of Construction Centerline
LOGGED BY: Anthony Nicholson

DATE: October 12, 2021
TYPE OF DRILLING: Shelby - Hollow Stem Auger - Rotary Wash
EQUIPMENT: Acker 1
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 121.5

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL SURFACE ELEVATION: 237.7	SOIL GROUP	MOISTURE CONTENT (%) PL + – – – – – – – + LL (10 20 30 40 50 60 70)	PERCENT PASSING NO. 200 SIEVE	NO. OF BLOWS PER 6-IN.	% TCR	% RQD
40			Moist, Soft, Reddish Brown Lean Clay	CL -	+ – –	99	1 1-3		
45			Moist, Medium Stiff, Reddish Brown Lean Clay	CL -	+ +	94	1 3-4		
50			Moist, Soft, Reddish Brown Silty Clay	CL-ML -	+ +	95	0 0-3		
55			Moist, Medium Stiff, Reddish Brown Clay	- -			1 2-6		
60			Moist, Medium Dense, Reddish Brown Silt	ML -		99	1 4-7		
65			Moist, Stiff, Reddish Brown Silty Clay	CL-ML -	+ +	92	4 6-7		
70			Moist, Medium Stiff, Brown Lean Clay	CL -	+ +	96	2 3-5		

REMARKS: Carlisle Overpass. *A 24 hour water reading of 11.0 feet below ground level was recorded after completion of the boring.

ARKANSAS DEPARTMENT OF TRANSPORTATION
MATERIALS DIVISION - GEOTECHNICAL SEC.

BORING NO. 5
PAGE 3 OF 4

JOB NO. 061613 Lonoke County
JOB NAME: I-40 Strs. & Apprs. (Hwys. 13 & 31) (S)
Route 31, Section 3 & Route 13, Section 10
STATION: 213+53
LOCATION: 42' Right of Construction Centerline
LOGGED BY: Anthony Nicholson

DATE: October 12, 2021
TYPE OF DRILLING: Shelby - Hollow Stem Auger - Rotary Wash
EQUIPMENT: Acker 1
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 121.5

SURFACE ELEVATION: 237.7

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	MOISTURE CONTENT (%) PL + – – – – – – – + LL (10 20 30 40 50 60 70)	PERCENT PASSING NO. 200 SIEVE	NO. OF BLOWS PER 6-IN.	% TCR	% RQD
75			Moist, Soft, Brown Silty Clay	CL-ML -	+ +	95	1 1-3		
80			Moist, Loose, Reddish Brown Silt	ML -		99	3 3-5		
85			Moist, Very Soft, Reddish Brown Lean Clay	CL -	+ – – – +	95	0 0-0		
90			Moist, Very Soft, Reddish Brown Fat Clay	CH -	– – – – – – –	99	0 0-0		
95			Moist, Very Soft, Reddish Brown Fat Clay	CH -	+ – – +	99	0 0-1		
100			Moist, Very Dense, Reddish Brown Silt Moist, Very Dense, Gray Silty Fine Sand with Gravel	ML SM -		83 23	8 42-48		
105			Moist, Medium Dense, Gray Silty Fine Sand with Gravel	SM -		29	10 9-20		

REMARKS: Carlisle Overpass. *A 24 hour water reading of 11.0 feet below ground level was recorded after completion of the boring.

ARKANSAS DEPARTMENT OF TRANSPORTATION
MATERIALS DIVISION - GEOTECHNICAL SEC.

BORING NO. 5
PAGE 4 OF 4

JOB NO. 061613 Lonoke County
JOB NAME: I-40 Strs. & Apprs. (Hwys. 13 & 31) (S)
Route 31, Section 3 & Route 13, Section 10
STATION: 213+53
LOCATION: 42' Right of Construction Centerline
LOGGED BY: Anthony Nicholson

DATE: October 12, 2021
TYPE OF DRILLING: Shelby - Hollow Stem Auger - Rotary Wash
EQUIPMENT: Acker 1
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 121.5

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	MOISTURE CONTENT (%) PL + – – – – – – – – + LL (10 20 30 40 50 60 70)	PERCENT PASSING NO. 200 SIEVE	NO. OF BLOWS PER 6-IN.	% TCR	% RQD
			SURFACE ELEVATION: 237.7						
				SM		16	17 / 27-37		
				-					
110			Moist, Very Dense, Gray Silty Fine Sand with Traces of Gravel	SM		21	30 (5")		
				-					
115									
				SP-SM		10	17 / 49-65		
			Moist, Very Dense, Gray Poorly Graded Fine Sand with Silt and Some of Gravel	-					
120									
				SP-SM		8	19 / 31-40		
			Boring Terminated						
125									
130									
135									
140									

REMARKS: Carlisle Overpass. *A 24 hour water reading of 11.0 feet below ground level was recorded after completion of the boring.

ARKANSAS DEPARTMENT OF TRANSPORTATION
MATERIALS DIVISION - GEOTECHNICAL SEC.

BORING NO. 6
PAGE 1 OF 2

JOB NO. 061613 Lonoke County
JOB NAME: I-40 Strs. & Apprs. (Hwys. 13 & 31) (S)
Route 31, Section 3 & Route 13, Section 10
STATION: 213+61.5
LOCATION: 104' Right of Construction Centerline
LOGGED BY: Anthony Nicholson

DATE: October 7 and 11, 2021
TYPE OF DRILLING: Shelby - Hollow Stem Auger - Rotary Wash
EQUIPMENT: Acker 1
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 36.5

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL SURFACE ELEVATION: 236.9	SOIL GROUP	MOISTURE CONTENT (%) PL + – – – – – – – – + LL (10 20 30 40 50 60 70)	PERCENT PASSING NO. 200 SIEVE	NO. OF BLOWS PER 6-IN.	% TCR	% RQD
			Moist, Loose, Brown Silt with Traces of Gravel				0 3-3		
			Moist, Medium Dense, Brown Silt				6 11-11		
5			Moist, Very Stiff, Gray Silty Clay				5 7-9		
			Moist, Gray Silt	ML	Su = 31.2 psi γ_d = 101.7 pcf	87			
10			Moist, Very Stiff, Brown Clay				5 10-13		
			Moist, Very Stiff, Brown Silty Clay				6 10-14		
15							7 11-15		
			Moist, Medium Dense, Brown Clayey Sand				6 12-13		
20			Moist, Medium Dense, Brown Silt				6 7-10		
			Moist, Very Stiff, Brown Silty Clay	-			3 7-9		
25							4 5-8		
			Moist, Stiff, Brown Silty Clay				2 4-8		
30							0 5-5		
			Moist, Medium Dense, Brown Silt				3 5-9		
35									

REMARKS: Carlisle Overpass MSE Wall Boring

ARKANSAS DEPARTMENT OF TRANSPORTATION
MATERIALS DIVISION - GEOTECHNICAL SEC.

BORING NO. 6
PAGE 2 OF 2

JOB NO. 061613 Lonoke County
JOB NAME: I-40 Strs. & Apprs. (Hwys. 13 & 31) (S)
Route 31, Section 3 & Route 13, Section 10
STATION: 213+61.5
LOCATION: 104' Right of Construction Centerline
LOGGED BY: Anthony Nicholson

DATE: October 7 and 11, 2021
TYPE OF DRILLING: Shelby - Hollow Stem Auger - Rotary Wash
EQUIPMENT: Acker 1
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 36.5

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	MOISTURE CONTENT (%) PL + – – – – – – – – + LL (10 20 30 40 50 60 70)	PERCENT PASSING NO. 200 SIEVE	NO. OF BLOWS PER 6-IN.	% TCR	% RQD
			SURFACE ELEVATION: 236.9						
			Moist, Medium Stiff, Brown Clay				0 2-3		
			Boring Terminated						
40									
45									
50									
55									
60									
65									
70									

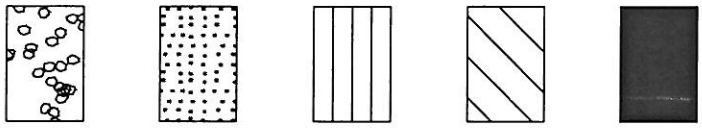
REMARKS: Carlisle Overpass MSE Wall Boring

LEGEND

SOIL TYPES

(SHOWN IN SYMBOL COLUMN)

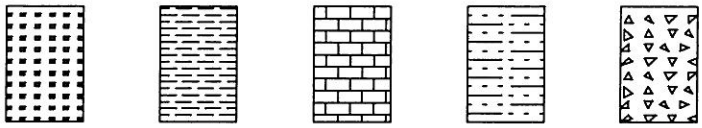
(PREDOMINANT TYPE SHOWN HEAVY)



GRAVEL | SAND | SILT | CLAY | ORGANIC MATTER

ROCK TYPES

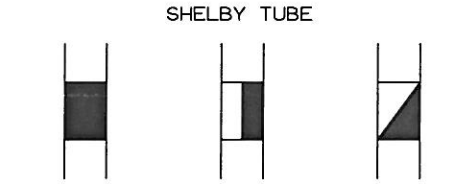
(SHOWN IN SYMBOL COLUMN)



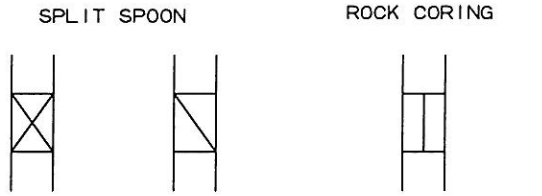
SANDSTONE | SHALE or SILTSTONE | LIMESTONE or DOLOMITE | ALTERNATING LAYERS of SHALE and SANDSTONE | OTHER

SAMPLER TYPES

(SHOWN IN SAMPLE COLUMN)



UNDISTURBED SAMPLE RECOVERY | DISTURBED SAMPLE RECOVERY | NO RECOVERY



SAMPLE RECOVERY | NO RECOVERY | % RECOVERY INDICATED ON LOGS

TERMS DESCRIBING CONSISTENCY OR CONDITION

GRANULAR SOIL		CLAY		CLAY-SHALE		SHALE	
'N' Value	Density	'N' Value	Consistency	'N' Value	Consistency	'N' Value	Consistency
0-4	Very Loose	0-1	Very Soft	0-1	Very Soft		
5-10	Loose	2-4	Soft	2-4	Soft	31-60	Soft
11-30	Medium Dense	5-8	Medium Stiff	5-8	Medium Stiff	Over 60	
31-50	Dense	9-15	Stiff	9-15	Stiff	More than 2'	
Over 50	Very Dense	16-30	Very Stiff	16-30	Very Stiff	Penetration	
		31-60	Hard	31-60	Hard	in 60 Blows:	Medium Hard
		Over 60	Very Hard	Over 60	Very Hard	Less than 2'	
						Penetration	
						in 60 Blows:	Hard

1. Ground water elevations indicated on boring logs represent ground water elevations at date or time shown on boring log. Absence of water surface implies that no ground water data is available but does not necessarily mean that ground water will not be encountered at locations or within the vertical reaches of these borings.
2. Borings represent subsurface conditions at their respective locations for their respective depths. Variations in conditions between or adjacent to boring locations may be encountered.
3. Terms used for describing soils according to their texture or grain size distribution are in accordance with the Unified Soil Classification System.

Standard Penetration Test – Driving a 2.0" O.D., 1-3/8" I.D. sampler a distance of 1.0 foot into undisturbed soil with a 140 pound hammer free falling a distance of 30 inches. It is customary to drive the spoon 6.0 inches to seat into undisturbed soil, then perform the test. The number of hammer blows for seating the spoon and performing the test are recorded for each 6 inches of penetration on the drill log. The field "N" Value (N_f) can be obtained by adding the bottom two numbers for example: $\frac{6}{8-9} \Rightarrow 8+9=17 blows/ft$. The "N" Value corrected to 60% efficiency (N_{60}) can be obtained by multiplying N_f by the hammer correction factor published on the boring log.

Attachment C

Materials Division

Results of Classification Tests
ARDOT Project No.: 061613
Project: I-40 Strs. & Apprs. (Hwys. 13 & 31) (S)
Site 1 Highway 31 Overpass

Summarized by: PWC
Checked by: JCS

Sample Identification					Moisture	Atterberg Limits			% Fines	Soil Classification	
Boring	Structure	Station	Offset	Depth, ft	Content, %	LL	PL	PI		USCS	AASHTO
1	Highway 31	110+00	190' LT	5.0 - 7.0	25	64	18	46	99	CH	A-7-6(51)
1	Highway 31	110+00	190' LT	10.0 - 12.0	29	59	16	43	99	CH	A-7-6(47)
2	Highway 31	110+62	60' Rt	0.0-1.5		30	21	9	94	CL	A-4
2	Highway 31	110+62	60' Rt	2.5-4.0					99		
2	Highway 31	110+62	60' Rt	7.5-9.5	20				99	ML	A-4
2	Highway 31	110+62	60' Rt	20.0-21.5		31	21	10	99	CL	A-4
2	Highway 31	110+62	60' Rt	25.0-26.5		26	19	7	86	CL-ML	A-4
2	Highway 31	110+62	60' Rt	30.0-31.5					75	ML	A-4
2	Highway 31	110+62	60' Rt	35.0-36.5					25	SM	A-2-4
2	Highway 31	110+62	60' Rt	40.0-41.5					11	SP-SM	A-2-4
2	Highway 31	110+62	60' Rt	45.0-46.5					11	SP-SM	A-2-4
2	Highway 31	110+62	60' Rt	80.0-81.5					8	SP-SM	A-1-b
2	Highway 31	110+62	60' Rt	100.0-101.5					7	SW-SM	A-1-a
3	Highway 31	112+45	151' Rt	10.0-12.0		28	21	7	97	CL-ML	A-4
4	Highway 31	112+78.5	40' RT	0.0-1.5	20				80	ML	A-4
4	Highway 31	112+78.5	40' RT	2.5-4.0	19				91	ML	A-4
4	Highway 31	112+78.5	40' RT	5.0-7.0	28	50	18	32	99	CH	A-7-6(34)
4	Highway 31	112+78.5	40' RT	7.5-9.0	21	29	23	6	90	ML	A-4
4	Highway 31	112+78.5	40' RT	10.0-11.0	28	40	18	22	99	CL	A-6
4	Highway 31	112+78.5	40' RT	11.0-12.0	28				99	ML	A-4
4	Highway 31	112+78.5	40' RT	15.0-16.5	36				99	ML	A-4
4	Highway 31	112+78.5	40' RT	20.0-21.5					99	ML	A-4
4	Highway 31	112+78.5	40' RT	25.0-26.5		27	22	5	96	ML	A-4
4	Highway 31	112+78.5	40' RT	30.0-31.5					75	ML	A-4
4	Highway 31	112+78.5	40' RT	35.0-36.5					54	ML	A-4

Materials Division

Results of Classification Tests
ARDOT Project No.: 061613
Project: I-40 Strs. & Apprs. (Hwys. 13 & 31) (S)
Site 1 Highway 31 Overpass

Summarized by: PWC
Checked by: JCS

Sample Identification					Moisture Content, %	Atterberg Limits			% Fines	Soil Classification	
Boring	Structure	Station	Offset	Depth, ft		LL	PL	PI		USCS	AASHTO
4	Highway 31	112+78.5	40' RT	40.0-41.5					14	SM	A-2-4
4	Highway 31	112+78.5	40' RT	45.0-46.5					11	SP-SM	A-2-4
4	Highway 31	112+78.5	40' RT	50.0-51.5					14	SM	A-2-4
4	Highway 31	112+78.5	40' RT	55.0-56.5					13	SM	A-2-4
4	Highway 31	112+78.5	40' RT	60.0-61.5					16	SM	A-2-4
4	Highway 31	112+78.5	40' RT	65.0-66.5					28	SM	A-2-4
4	Highway 31	112+78.5	40' RT	70.0-71.5					11	SP-SM	A-2-4
4	Highway 31	112+78.5	40' RT	75.0-76.5					6	SP-SM	A-1-b
4	Highway 31	112+78.5	40' RT	80.0-81.5					11	SW-SM	A-1-a
4	Highway 31	112+78.5	40' RT	85.0-86.5					9	SP-SM	A-1-b
4	Highway 31	112+78.5	40' RT	90.0-91.5					11	SP-SM	A-1-b
4	Highway 31	112+78.5	40' RT	95.0-95.4					14	SM	A-1-a
4	Highway 31	112+78.5	40' RT	100-100.4					22	SM	A-1-b
5	Highway 31	112+80	65' RT	9.9-10.7	27	50	17	33	99	CH	A-7-6(35)
5	Highway 31	112+80	65' RT	10.7-11.5					99	ML	A-4

Attachment D

Materials Division

Results of Classification Tests
ARDOT Project No.: 061613
Project: I-40 Strs. & Apprs. (Hwys. 13 & 31) (S)
Site 2 Highway 13 Overpass

Summarized by: PWC
Checked by: JCS

Sample Identification					Moisture	Atterberg Limits			% Fines	Soil Classification	
Boring	Structure	Station	Offset	Depth, ft	Content, %	LL	PL	PI		USCS	AASHTO
1	Highway 13	210+54	142' LT	2.5-3.2	19				95	ML	A-4
1	Highway 13	210+54	142' LT	3.2-4.5	18.6	32	24	8	98	ML	A-4
1	Highway 13	210+54	142' LT	7.5-9.5	21	33	15	18	94	CL	A-6
2	Highway 13	211+11	45' Rt	0.0-1.5					91	ML	A-4
2	Highway 13	211+11	45' Rt	5.0-7.0	20.36	30	16	14	97	CL	A-6
2	Highway 13	211+11	45' Rt	7.5-9.0		37	14	23	94	CL	A-6
2	Highway 13	211+11	45' Rt	10.0-12.0					89	ML	A-4
2	Highway 13	211+11	45' Rt	12.0-13.5		34	14	20	87	CL	A-6
2	Highway 13	211+11	45' Rt	25.0-26.5		36	18	18	98	CL	A-6
2	Highway 13	211+11	45' Rt	70.0-71.5		26	19	7	73	CL-ML	A-4
2	Highway 13	211+11	45' Rt	100.0-101.5					29	SM	A-2-4
3	Highway 13	211+39	133' Rt	2.5-4.5	15	30	18	12	98	CL	A-6
4	Highway 13	213+25	164' Rt	2.5-4.5	10	22	17	5	96	CL-ML	A-4
5	Highway 13	213+53	42' Rt	0.0-1.5	15.53				93	ML	A-4
5	Highway 13	213+53	42' Rt	5.0-7.0	24				92	ML	A-4
5	Highway 13	213+53	42' Rt	7.0-8.5	17				93	ML	A-4
5	Highway 13	213+53	42' Rt	9.5-11.5	20	23	14	9	62	CL	A-4
5	Highway 13	213+53	42' Rt	11.5-13.0	19				54	ML	A-4
5	Highway 13	213+53	42' Rt	15.0-16.5	19				85	ML	A-4
5	Highway 13	213+53	42' Rt	20.0-21.5	20				49.7	SM	A-4
5	Highway 13	213+53	42' Rt	25-26.5		30	19	11	95	CL	A-6
5	Highway 13	213+53	42' Rt	30.0-31.5					93	ML	A-4
5	Highway 13	213+53	42' Rt	35.0-36.5		30	19	11	99	CL	A-6
5	Highway 13	213+53	42' Rt	40.0-41.5		26	18	8	94	CL	A-4
5	Highway 13	213+53	42' Rt	45.0-46.5		25	18	7	95	CL-ML	A-4

Materials Division

Results of Classification Tests
ARDOT Project No.: 061613
Project: I-40 Strs. & Apprs. (Hwys. 13 & 31) (S)
Site 2 Highway 13 Overpass

Summarized by: PWC
Checked by: JCS

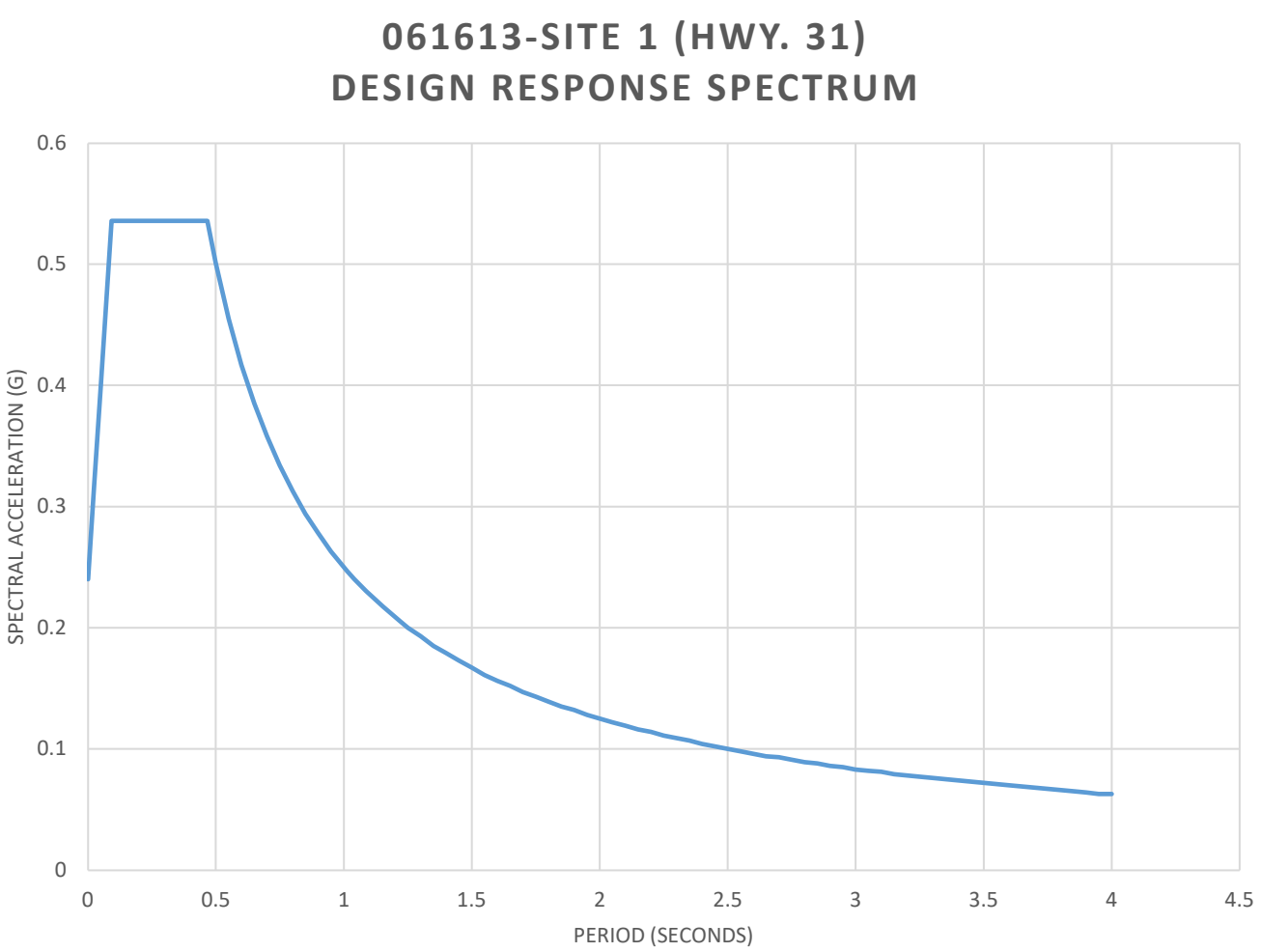
Sample Identification					Moisture Content, %	Atterberg Limits			% Fines	Soil Classification	
Boring	Structure	Station	Offset	Depth, ft		LL	PL	PI		USCS	AASHTO
5	Highway 13	213+53	42' Rt	55.0-56.5					99	ML	A-4
5	Highway 13	213+53	42' Rt	60.0-61.5		25	18	7	92	CL-ML	A-4
5	Highway 13	213+53	42' Rt	65.0-66.5		29	19	10	96	CL	A-4
5	Highway 13	213+53	42' Rt	70.0-71.5		25	18	7	95	CL-ML	A-4
5	Highway 13	213+53	42' Rt	75.0-76.5					99	ML	A-4
5	Highway 13	213+53	42' Rt	80.0-81.5		49	24	25	99	CL	A-7-6(28)
5	Highway 13	213+53	42' Rt	85.0-86.5		60	20	40	99	CH	A-7-6(44)
5	Highway 13	213+53	42' Rt	90.0-91.5		58	19	39	99	CH	A-7-6(43)
5	Highway 13	213+53	42' Rt	95.0-95.7					83	ML	A-4
5	Highway 13	213+53	42' Rt	95.7-96.5					23	SM	A-1-b
5	Highway 13	213+53	42' Rt	100.0-101.5					29	SM	A-2-4
5	Highway 13	213+53	42' Rt	105.0-106.5					16	SM	A-2-4
5	Highway 13	213+53	42' Rt	110.0-110.5					21	SM	A-2-4
5	Highway 13	213+53	42' Rt	115.0-116.5					10	SP-SM	A-1-b
5	Highway 13	213+53	42' Rt	120.0-121.5					8	SP-SM	A-1-b
6	Highway 13	213+61.5	104' RT	7.5-9.5	19				87	ML	A-4

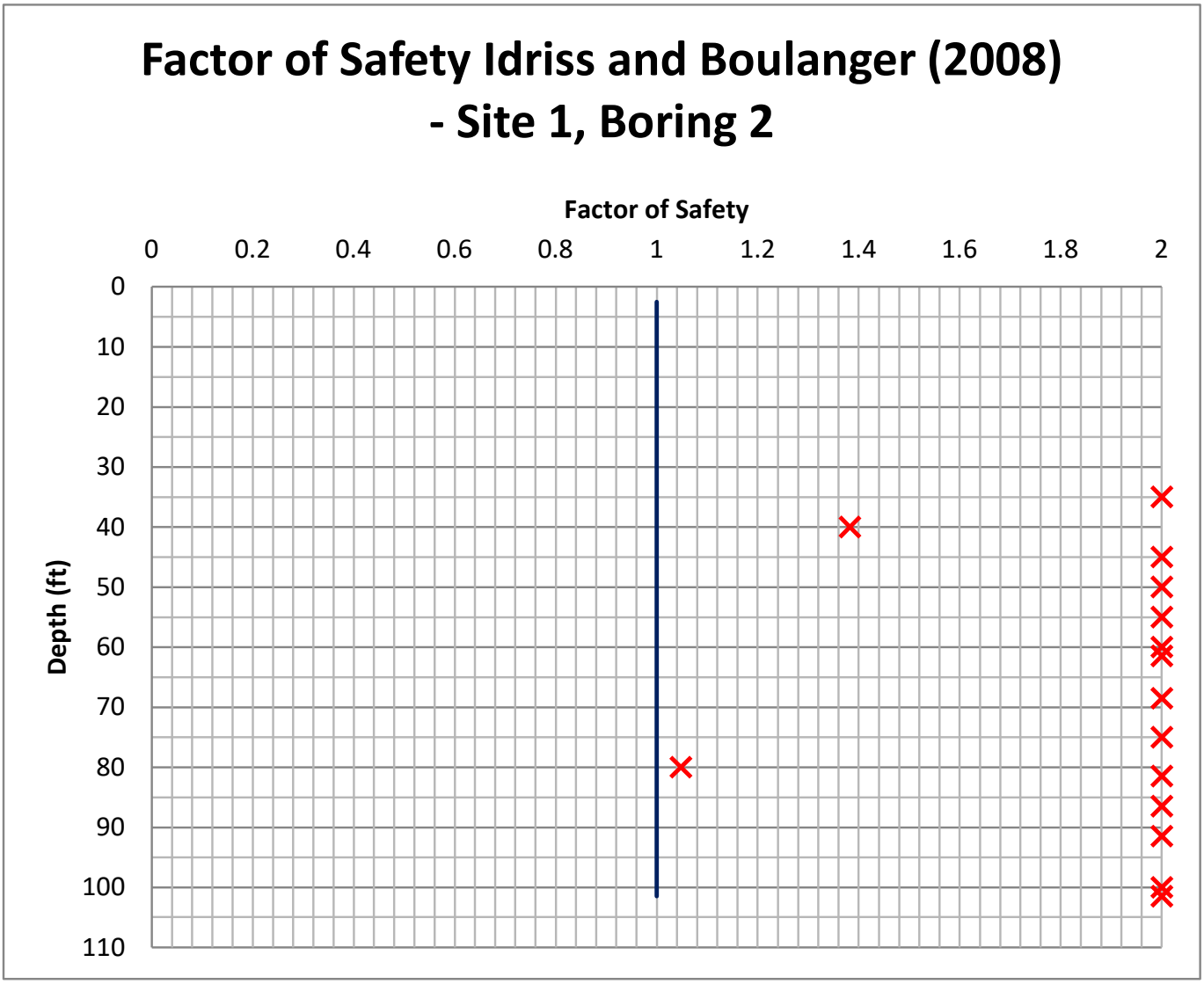
Attachment E

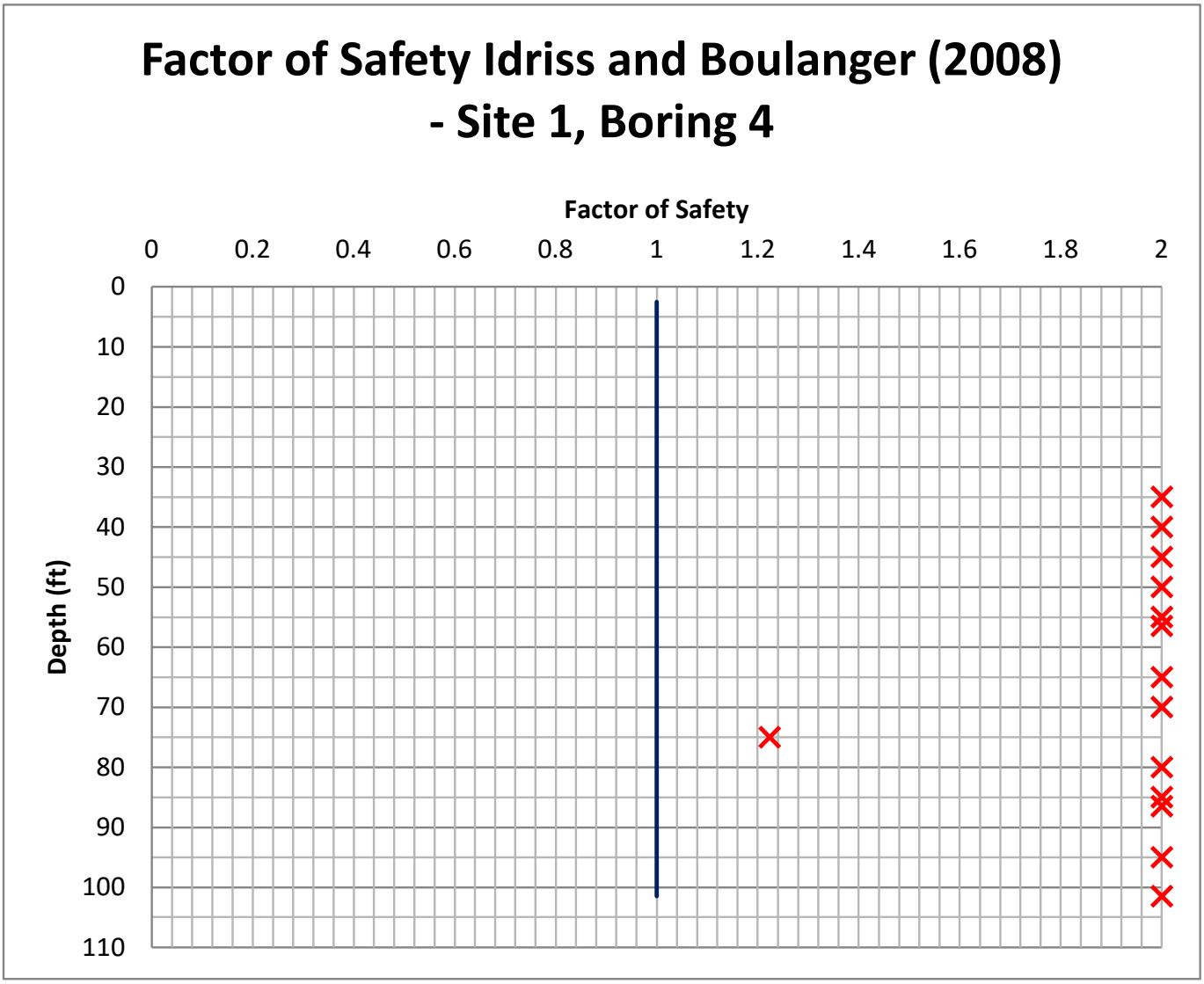
Title:	061613-Site 1 (Hwy. 31)
Latitude:	34.8041444
Longitude:	-91.8886389
Site Class	D

Get USGS Data

PGA:	0.163
F_{PGA}:	1.474
A_S:	0.24
S_S:	0.353
F_A:	1.517
S_{DS}:	0.536
S_1:	0.105
F_V:	2.379
S_{D1}:	0.25
S_{Dc}:	B
T_S:	0.467
T_0:	0.093




Factor of Safety Idriss and Boulanger (2008)
- Site 1, Boring 2
Factor of Safety
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
Depth (ft)
0
10
20
30
40
50
60
70
80
90
100
110

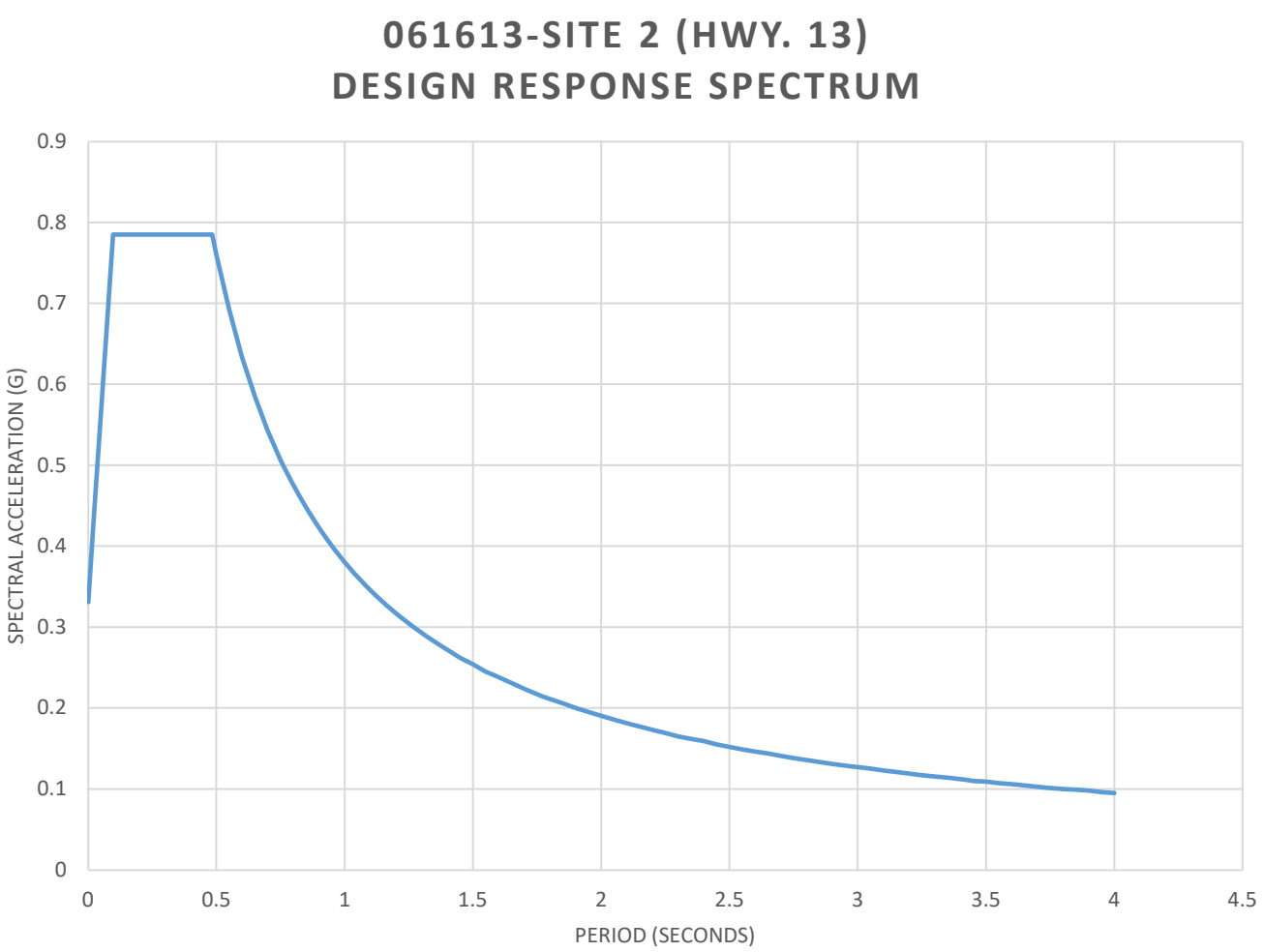

Factor of Safety Idriss and Boulanger (2008)
- Site 1, Boring 4
Factor of Safety
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
Depth (ft)
0
10
20
30
40
50
60
70
80
90
100
110

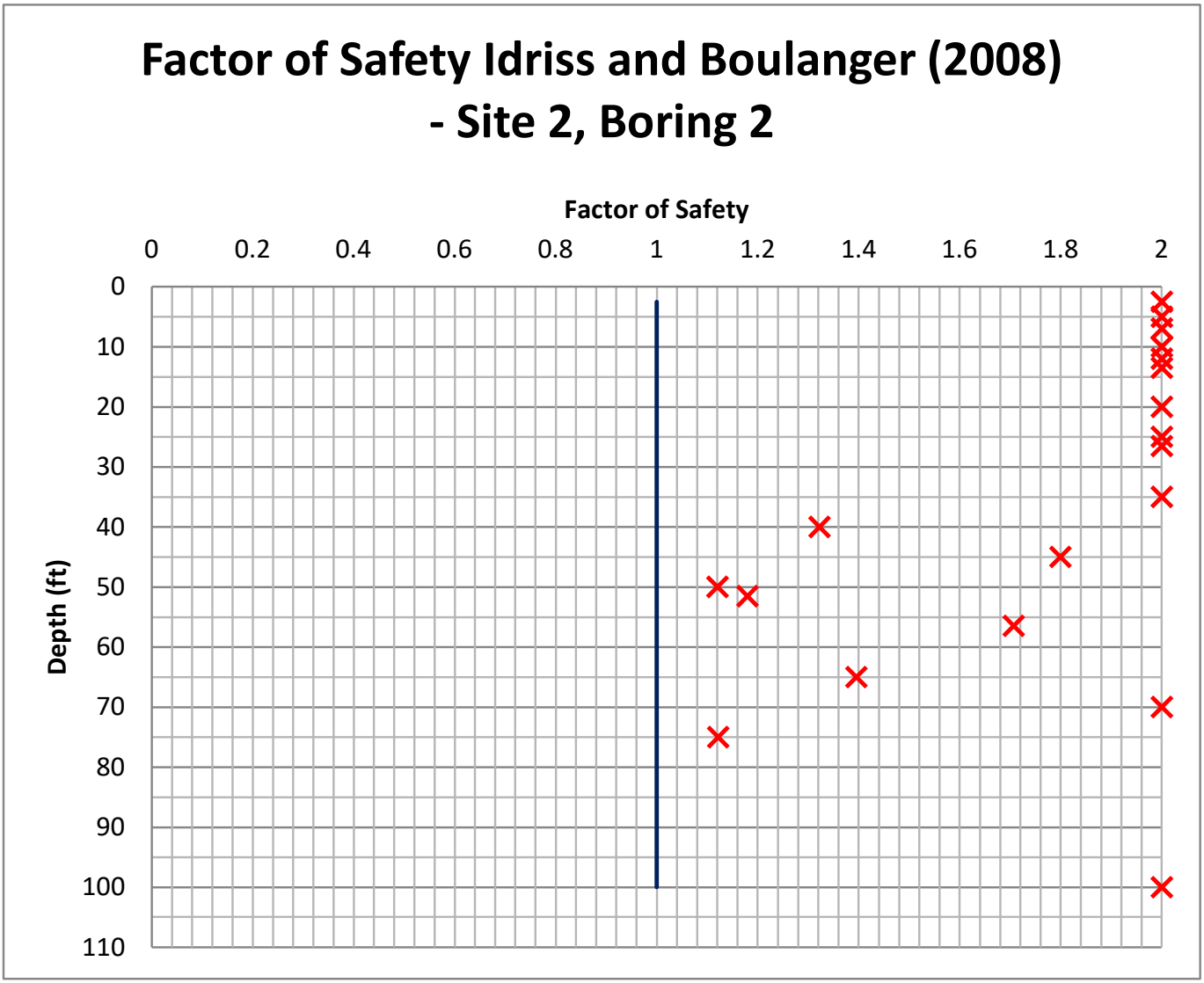
Attachment F

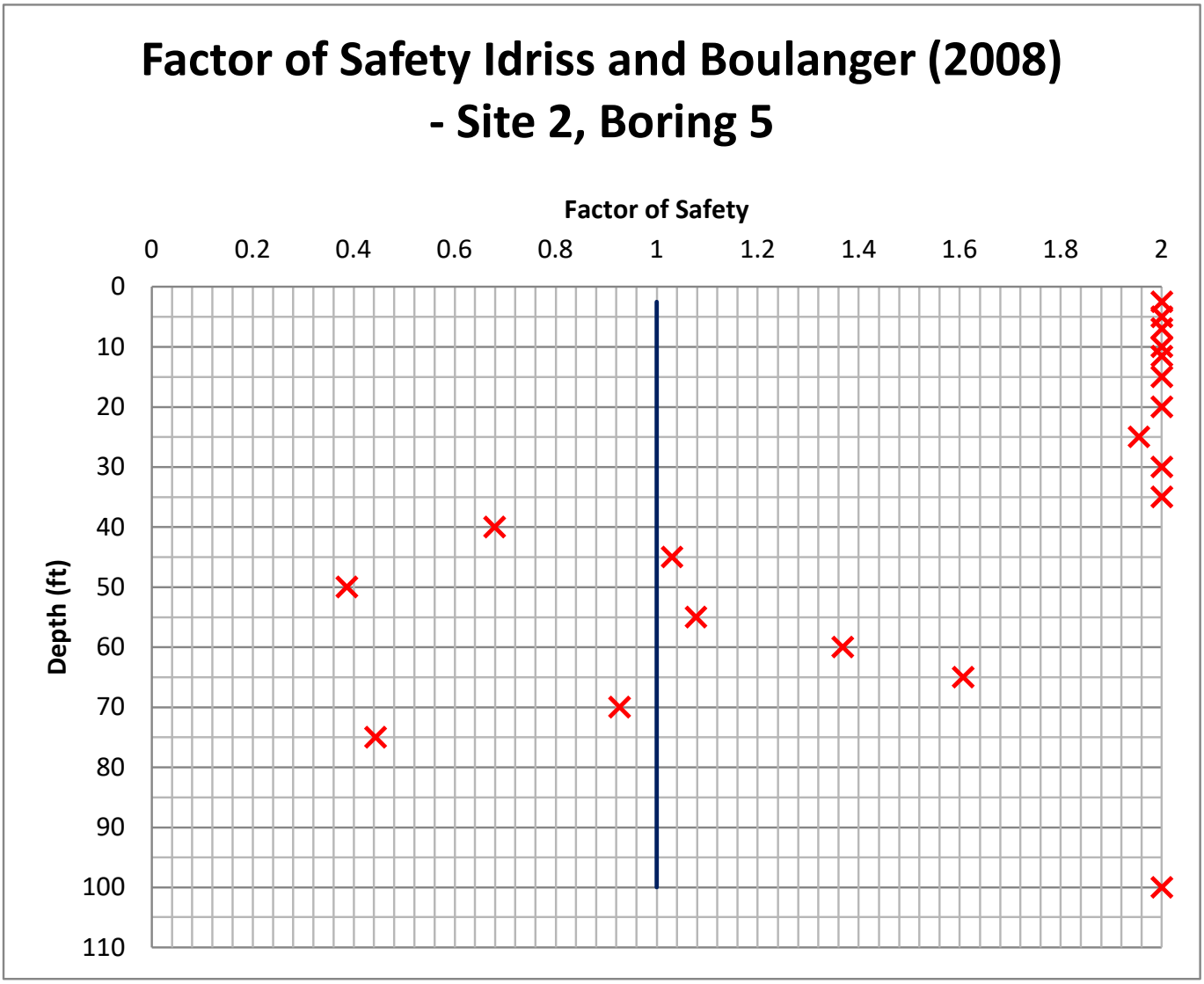
Title:	061613-Site 2 (Hwy. 13)
Latitude:	34.8000722
Longitude:	-91.7504972
Site Class	E

Get USGS Data

PGA:	0.172
F_{PGA}:	1.925
A_S:	0.331
S_S:	0.373
F_A:	2.108
S_{DS}:	0.785
S_1:	0.11
F_V:	3.471
S_{D1}:	0.38
S_{Dc}:	C
T_S:	0.484
T_0:	0.097




Factor of Safety Idriss and Boulanger (2008) - Site 2, Boring 2
Factor of Safety
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
Depth (ft)
0
10
20
30
40
50
60
70
80
90
100
110


Factor of Safety Idriss and Boulanger (2008) - Site 2, Boring 5
Factor of Safety
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
Depth (ft)
0
10
20
30
40
50
60
70
80
90
100
110

Attachment G

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
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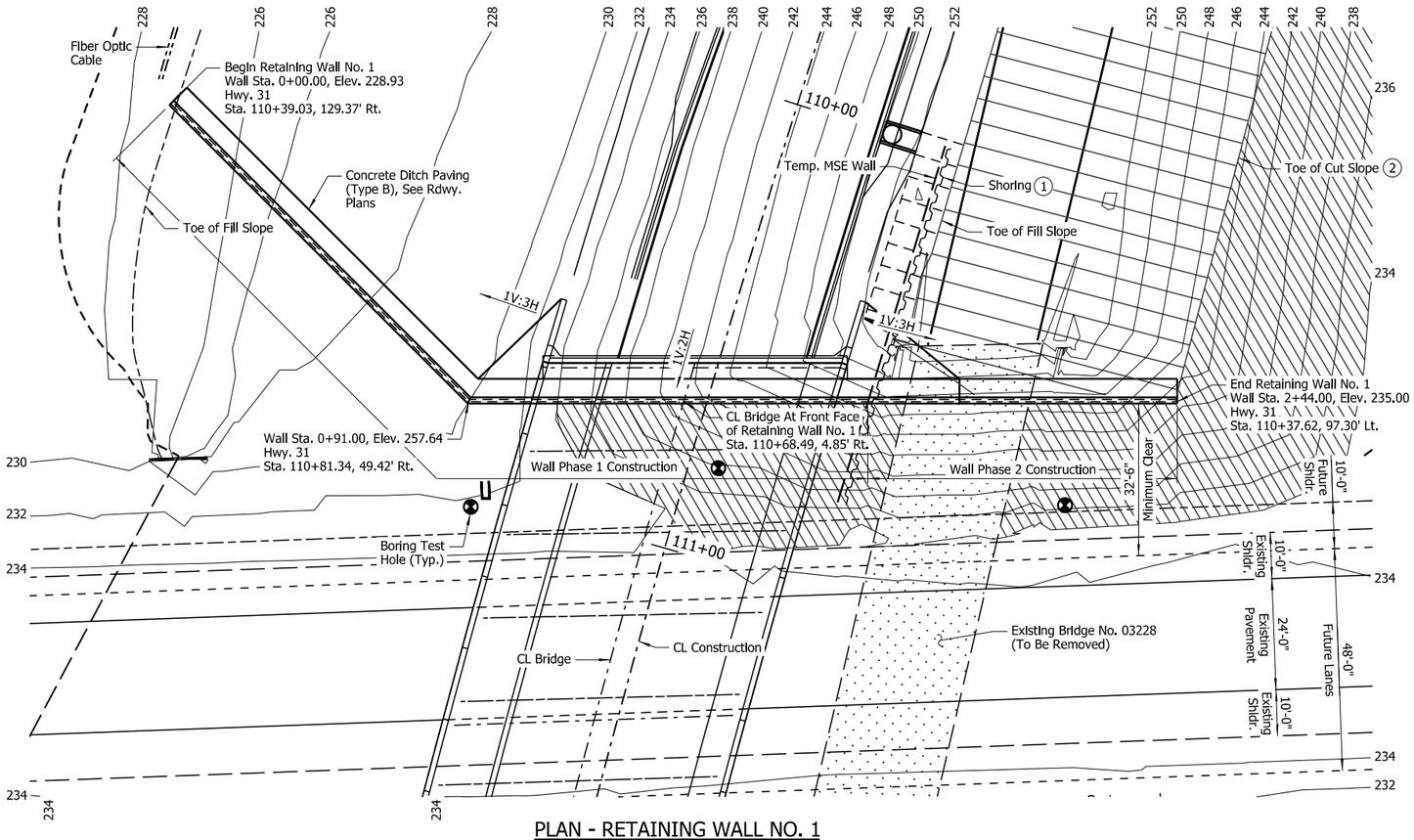
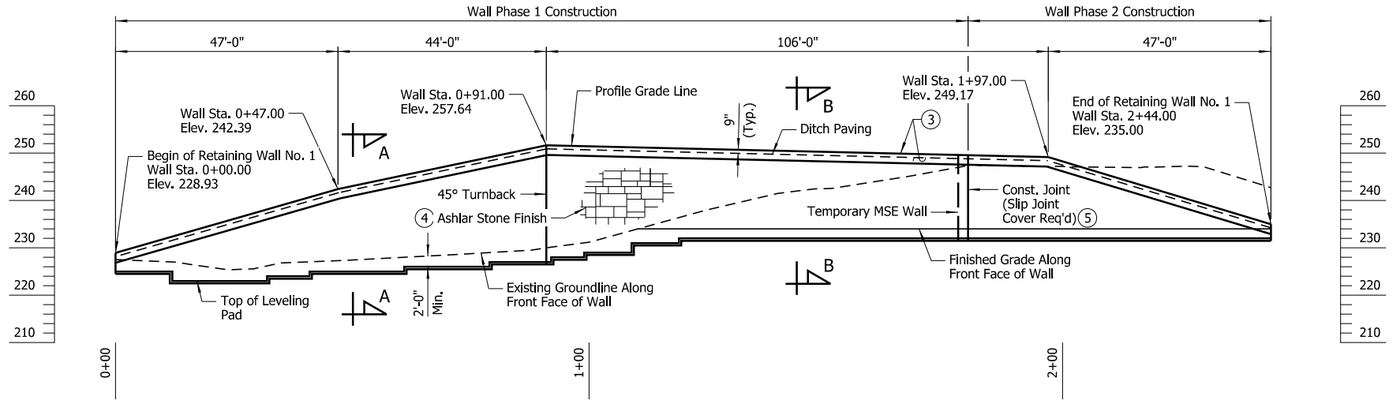
				① $BN01$		RETAINING WALLS		$DN601$



PLAN - RETAINING WALL NO. 1

Scale: 1/16" = 1'-0"



ELEVATION - RETAINING WALL NO. 1

(Looking at Front Face of Wall)
Scale: 1/16" = 1'-0"

NOTES:
For "SECTION A-A" and "SECTION B-B", see Dwg. No. $DN605$.

For "GENERAL NOTES", "TABLE OF QUANTITIES", and "N-VALUES", see Dwg. No. $DN606$.

Offset dimensions for Retaining Wall No. 1 are measured from CL Construction to Front Face of Wall.

Wall stationing shown is taken along Front Face of Wall.

Wall Elevations shown are measured along Profile Grade Line at top of coping.

RETAINING WALL NO. 1 ELEVATIONS

WALL STATION	PROFILE GRADE LINE	EXISTING GROUNDLINE	FINISHED GRADE
0+00.00	228.93	274.48	-
0+25.00	236.09	274.58	-
0+50.00	243.02	274.67	-
0+75.00	248.28	274.77	-
1+00.00	251.43	274.86	-
1+25.00	250.85	-	234.00
1+50.00	250.26	-	234.00
1+75.00	249.68	-	234.00
2+00.00	248.27	-	234.00
2+25.00	240.73	-	234.00
2+44.00	235.00	-	234.00

RETAINING WALL NO. 1

METHOD A	METHOD B
XXX	XXX

RETAINING WALL NO. 1 DESIGN PARAMETERS

Wall No.	Factored Bearing Resistance (KSF)	Minimum Strap Length (FT)
Wall No. 1	X.X	X.X H

NOTE:
"H" shall be measured from the top of leveling pad elevation to the finished surface.

(1) See SP "SHORING"

(2) See Roadway Plans for more information regarding removal of existing embankment

(3) Class 3 Textured Coating Finish (Color = Brown, Color Chip No. 33522)

(4) "Ashlar Stone" Pattern & CLass 3 Textured Coating Finish (Color = Brown, Color Chip = No. 30219)

(5) Location of Construction Joint shall coordinate with final location of shoring

PRELIMINARY NOT FOR CONSTRUCTION

BRIDGE ENGINEER

SHEET 1 OF 6
DETAILS OF RETAINING WALLS

ROUTE SEC.

ARKANSAS STATE HIGHWAY COMMISSION

LITTLE ROCK, ARK.

DRAWN BY: CSW DATE: FEB. 2022 FILENAME: b061613_r1.dgn
CHECKED BY: ABH DATE: XXX. 2022 SCALE: As Shown
DESIGNED BY: CSW DATE: FEB. 2022
BRIDGE NO. $BN01$ DRAWING NO. $DN601$

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WORKSPACE:ARDOT Bridge (2019)
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REVISED DATE:

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
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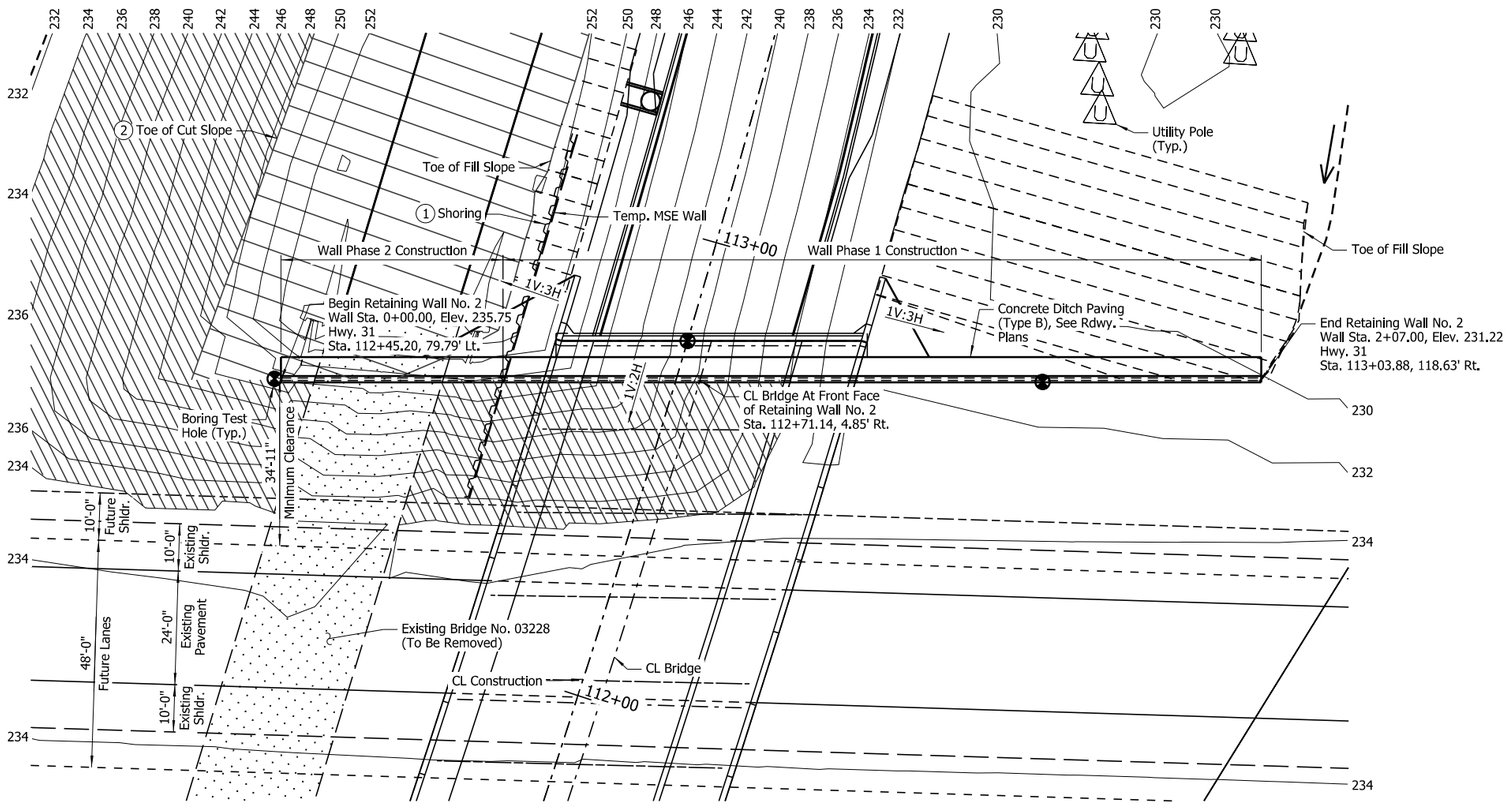
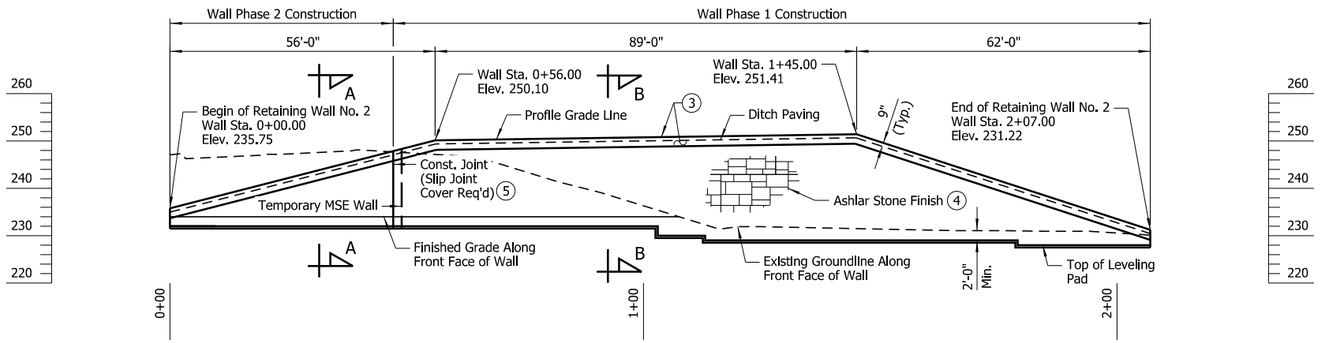
				① $BN01$		RETAINING WALLS		$DN602$



PLAN - RETAINING WALL NO. 2

Scale: 1/16" = 1'-0"



ELEVATION - RETAINING WALL NO. 2

(Looking at Front Face of Wall)
Scale: 1/16" = 1'-0"

NOTES:
For "SECTION A-A" and "SECTION B-B", see Dwg. No. $DN605$.

For "GENERAL NOTES", "TABLE OF QUANTITIES", and "N-VALUES", see Dwg. No. $DN606$.

Offset dimensions for Retaining Wall No. 2 are measured from CL Construction to Front Face of Wall.

Wall stationing shown is taken along Front Face of Wall.

Wall Elevations shown are measured along Profile Grade Line at top of coping.

RETAINING WALL NO. 2 ELEVATIONS

WALL STATION	PROFILE GRADE LINE	EXISTING GROUNDLINE	FINISHED GRADE
0+00.00	235.75	-	234.00
0+25.00	242.15	-	234.00
0+50.00	248.56	-	234.00
0+75.00	250.38	-	234.00
1+00.00	250.75	-	234.00
1+25.00	251.12	231.88	-
1+50.00	249.78	231.39	-
1+75.00	241.64	231.06	-
2+00.00	233.50	230.55	-
2+07.00	231.22	230.13	-

RETAINING WALL NO. 2

METHOD A	METHOD B
XXX	XXX

RETAINING WALL NO. 2 DESIGN PARAMETERS

Wall No.	Factored Bearing Resistance (KSF)	Minimum Strap Length (FT)
Wall No. 1	X.X	X.X H

NOTE:
"H" shall be measured from the top of leveling pad elevation to the finished surface.

① See SP "SHORING"

② See Roadway Plans for more information regarding removal of existing embankment

③ Class 3 Textured Coating Finish (Color = Brown, Color Chip No. 33522)

④ "Ashlar Stone" Pattern & CLass 3 Textured Coating Finish (Color = Brown, Color Chip = No. 30219)

⑤ Location of Construction Joint shall coordinate with final location of shoring

PRELIMINARY NOT FOR CONSTRUCTION

BRIDGE ENGINEER

SHEET 2 OF 6
DETAILS OF RETAINING WALLS

ROUTE SEC.

ARKANSAS STATE HIGHWAY COMMISSION

LITTLE ROCK, ARK.

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CHECKED BY: ABH DATE: XXX. 2022 SCALE: As Shown
DESIGNED BY: CSW DATE: FEB. 2022

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REVISED DATE:

Attachment H

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
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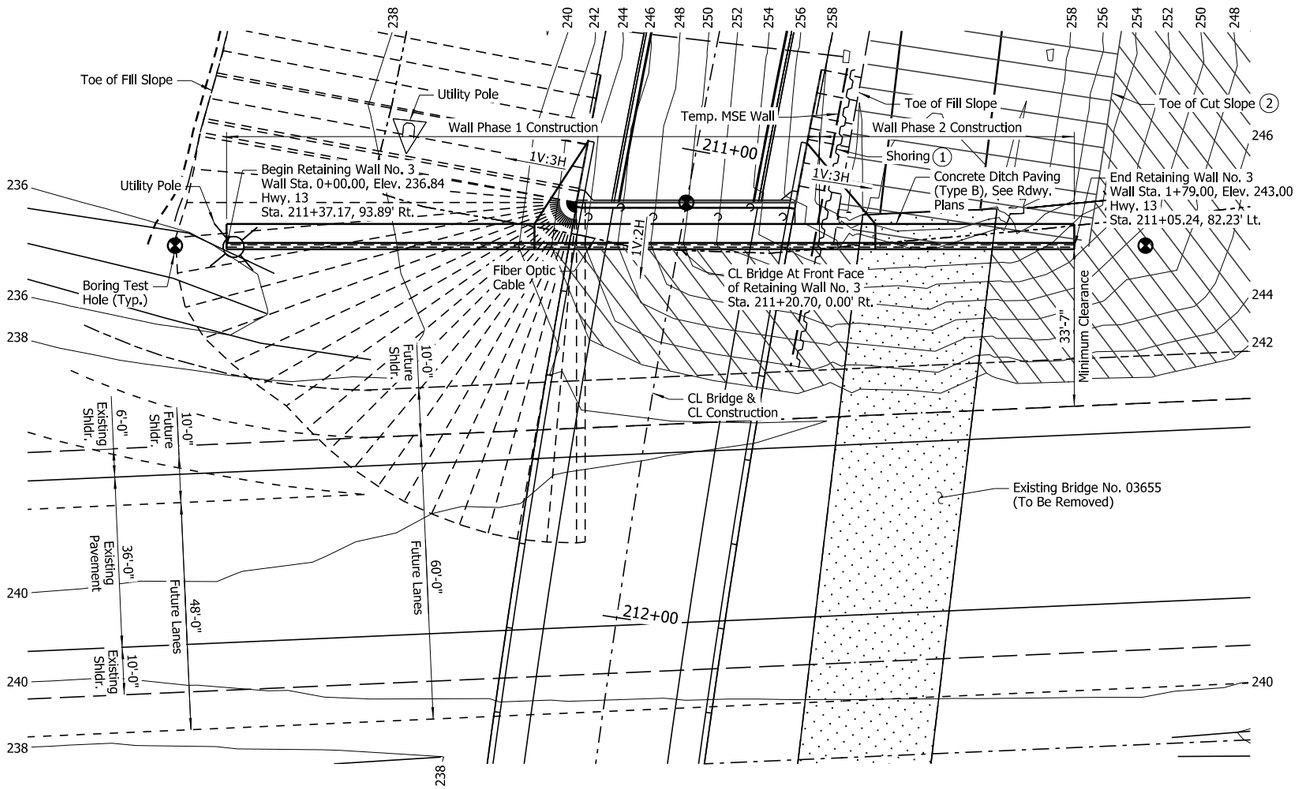
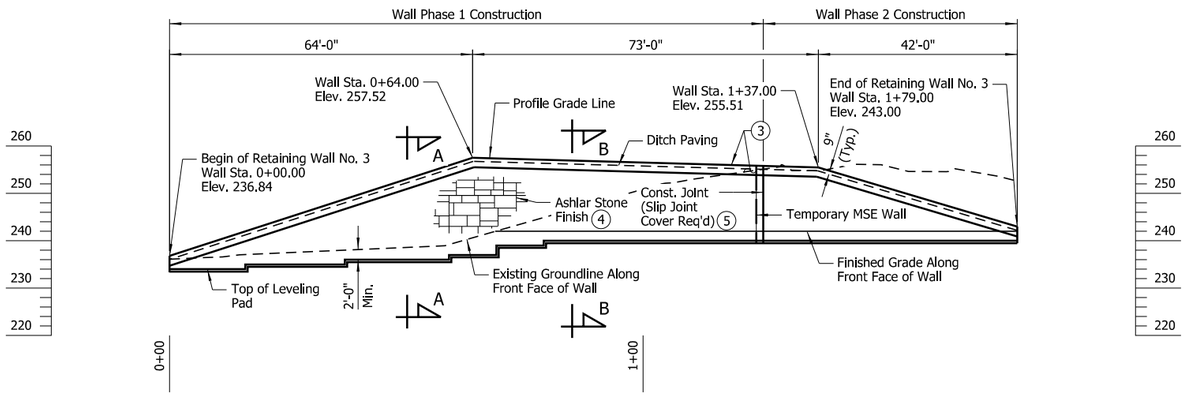


PLAN - RETAINING WALL NO. 3

Scale: 1/16" = 1'-0"



ELEVATION - RETAINING WALL NO. 3

(Looking at Front Face of Wall)

Scale: 1/16" = 1'-0"

NOTES:

For "SECTION A-A" and "SECTION B-B", see Dwg. No. $DN605$.

For "GENERAL NOTES", "TABLE OF QUANTITIES", and "N-VALUES", see Dwg. No. $DN606$.

Offset dimensions for Retaining Wall No. 3 are measured from CL Construction to Front Face of Wall.

Wall stationing shown is taken along Front Face of Wall.

Wall Elevations shown are measured along Profile Grade Line at top of coping.

RETAINING WALL NO. 3 ELEVATIONS

WALL STATION	PROFILE GRADE LINE	EXISTING GROUNDLINE	FINISHED GRADE
0+00.00	236.84	236.09	-
0+25.00	244.92	237.52	-
0+50.00	253.00	238.61	-
0+75.00	257.22	-	242.00
1+00.00	256.53	-	242.00
1+25.00	255.84	-	242.00
1+50.00	251.64	-	242.00
1+75.00	244.19	-	242.00
1+79.00	243.00	-	242.00

RETAINING WALL NO. 3

METHOD A	METHOD B
XXX	XXX

RETAINING WALL NO. 3 DESIGN PARAMETERS

Wall No.	Factored Bearing Resistance (KSF)	Minimum Strap Length (FT)
Wall No. 1	X.X	X.X H

NOTE:

"H" shall be measured from the top of leveling pad elevation to the finished surface.

(1) See SP "SHORING"

(2) See Roadway Plans for more information regarding removal of existing embankment

(3) Class 3 Textured Coating Finish (Color = Brown, Color Chip No. 33522)

(4) "Ashlar Stone" Pattern & CLass 3 Textured Coating Finish (Color = Brown, Color Chip = No. 30219)

(5) Location of Construction Joint shall coordinate with final location of shoring

PRELIMINARY NOT FOR CONSTRUCTION

BRIDGE ENGINEER

SHEET 3 OF 6

DETAILS OF RETAINING WALLS

ROUTE SEC.

ARKANSAS STATE HIGHWAY COMMISSION

LITTLE ROCK, ARK.

DRAWN BY: CSW DATE: FEB. 2022 FILENAME: b061613_r3.dgn

CHECKED BY: ABH DATE: XXX. 2022 SCALE: As Shown

DESIGNED BY: CSW DATE: FEB. 2022

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REVISED DATE:

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
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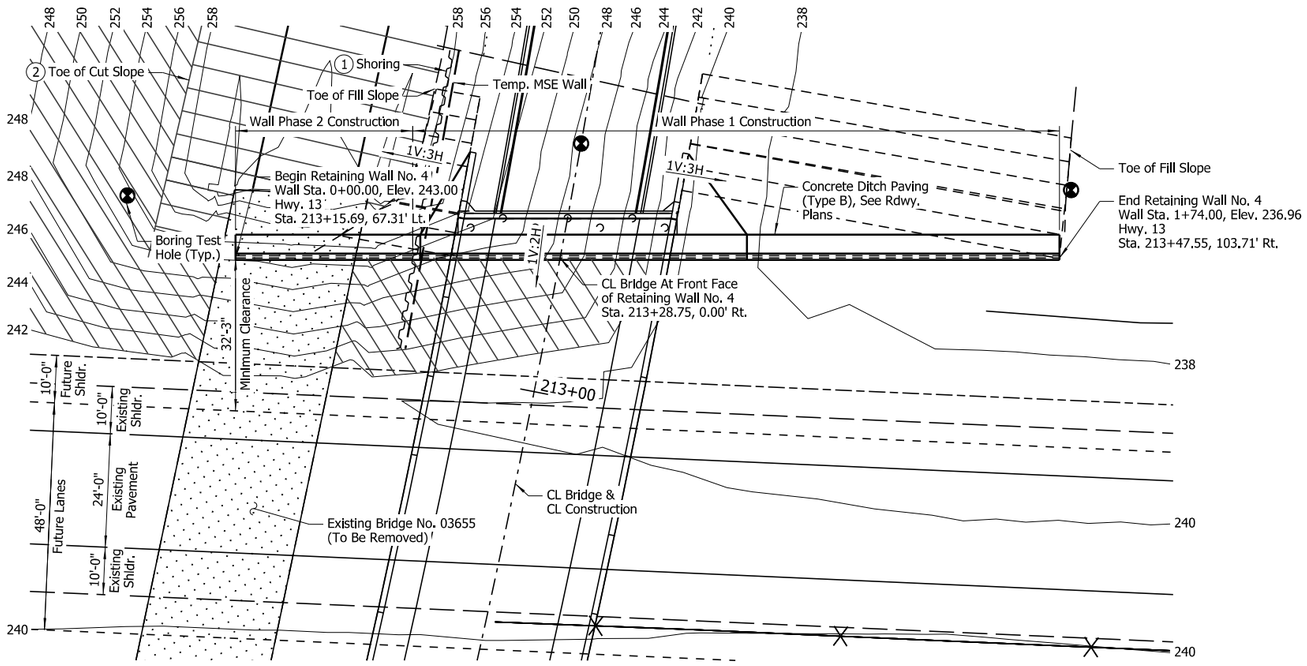
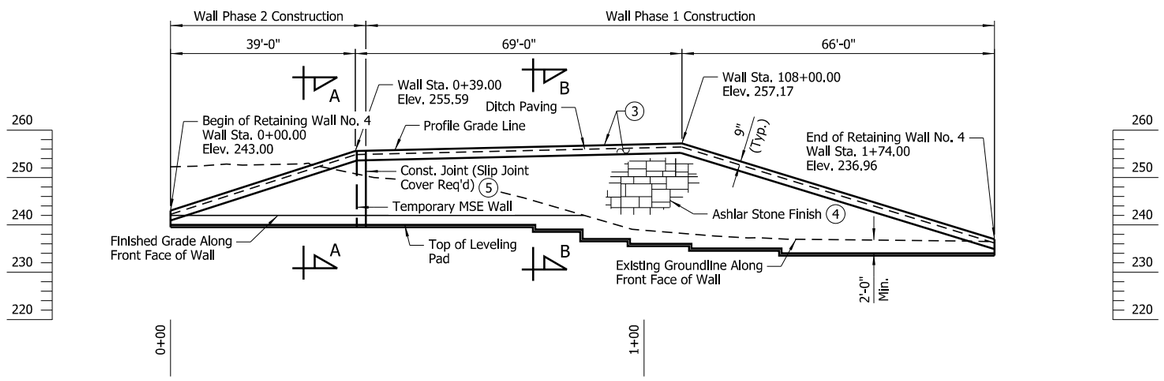
				JOB NO.		061613	$SN604$	XXX
				(1) $BN02$		RETAINING WALLS		$DN604$



PLAN - RETAINING WALL NO. 4

Scale: 1/16" = 1'-0"



ELEVATION - RETAINING WALL NO. 4

(Looking at Front Face of Wall)

Scale: 1/16" = 1'-0"

NOTES:

For "SECTION A-A" and "SECTION B-B", see Dwg. No. $DN605$.

For "GENERAL NOTES", "TABLE OF QUANTITIES", and "N-VALUES", see Dwg. No. $DN606$.

Offset dimensions for Retaining Wall No. 4 are measured from CL Construction to Front Face of Wall.

Wall stationing shown is taken along Front Face of Wall.

Wall Elevations shown are measured along Profile Grade Line at top of coping.

RETAINING WALL NO. 4 ELEVATIONS

WALL STATION	PROFILE GRADE LINE	EXISTING GROUNDLINE	FINISHED GRADE
0+00.00	243.00	-	242.00
0+25.00	251.07	-	242.00
0+50.00	255.84	-	242.00
0+75.00	256.41	-	242.00
1+00.00	256.99	238.84	-
1+25.00	251.96	237.24	-
1+50.00	244.31	236.77	-
1+74.00	236.96	236.44	-

RETAINING WALL NO. 4

METHOD A	METHOD B
XXX	XXX

RETAINING WALL NO. 4 DESIGN PARAMETERS

Wall No.	Factored Bearing Resistance (KSF)	Minimum Strap Length (FT)
Wall No. 1	X.X	X.X H

NOTE:

"H" shall be measured from the top of leveling pad elevation to the finished surface.

(1) See SP "SHORING"

(2) See Roadway Plans for more information regarding removal of existing embankment

(3) Class 3 Textured Coating Finish (Color = Brown, Color Chip No. 33522)

(4) "Ashlar Stone" Pattern & CLass 3 Textured Coating Finish (Color = Brown, Color Chip = No. 30219)

(5) Location of Construction Joint shall coordinate with final location of shoring

PRELIMINARY NOT FOR CONSTRUCTION

BRIDGE ENGINEER

SHEET 4 OF 6

DETAILS OF RETAINING WALLS

ROUTE SEC.

ARKANSAS STATE HIGHWAY COMMISSION

LITTLE ROCK, ARK.

DRAWN BY: CSW DATE: FEB. 2022 FILENAME: b061613_r4.dgn

CHECKED BY: ABH DATE: XXX. 2022 SCALE: As Shown

DESIGNED BY: CSW DATE: FEB. 2022

BRIDGE NO. $BN02$ DRAWING NO. $DN604$

CSWylie
2/15/2022 8:22:16 AM
WORKSPACE: ARDOT Bridge (2019)
L:\2021\21T01028 - ARDOT 061613 I-40 Strs and Apprs\Drawings\b061613_S604_WALL.dgn
REVISED DATE:

Attachment I

ARKANSAS DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION

JOB NO. 061613

COMPACTED EMBANKMENT

Description. This Special Provision shall be supplementary to Section 210, Excavation and Embankment, of the Standard Specifications, Edition of 2014.

Materials. With exception of cohesionless sand and silty sand, soils with AASHTO M 145 general classification "Granular Materials" are acceptable for use in embankment construction. Sandy soils classified as "Granular Materials" and suitable for embankment construction shall have a minimum plasticity index of 5.

Soils with AASHTO M 145 general classification "Silt-Clay" are acceptable for use in embankment construction if they have a plasticity index of between 8 and 20 and a maximum 65% passing the #200 sieve. Soils not meeting these requirements shall not be utilized for compacted embankment regardless of the source.

Construction Requirements. Prior to embankment construction, all sod and vegetable matter shall be completely removed from the natural ground surface upon which the embankment is to be constructed, regardless of embankment height. In addition, the natural ground surface on which an embankment is to constructed, shall be adequately compacted in accordance with the compaction requirements specified in Subsection 210.10, regardless of embankment height. These requirements may be modified by the Engineer as conditions justify.

Quality Control and Acceptance Testing. Quality control and acceptance sampling and testing shall be performed in accordance with Subsection 210.02 and 210.10 of the Standard Specifications. Tests for plasticity index and gradation shall be performed in accordance with Section 306 of the Standard Specifications, except that the size of the standard lots will be 3000 cubic yards. In addition to the required test, the Engineer may require the Contractor to test any location that, by visual inspection appears different from previously approved material.

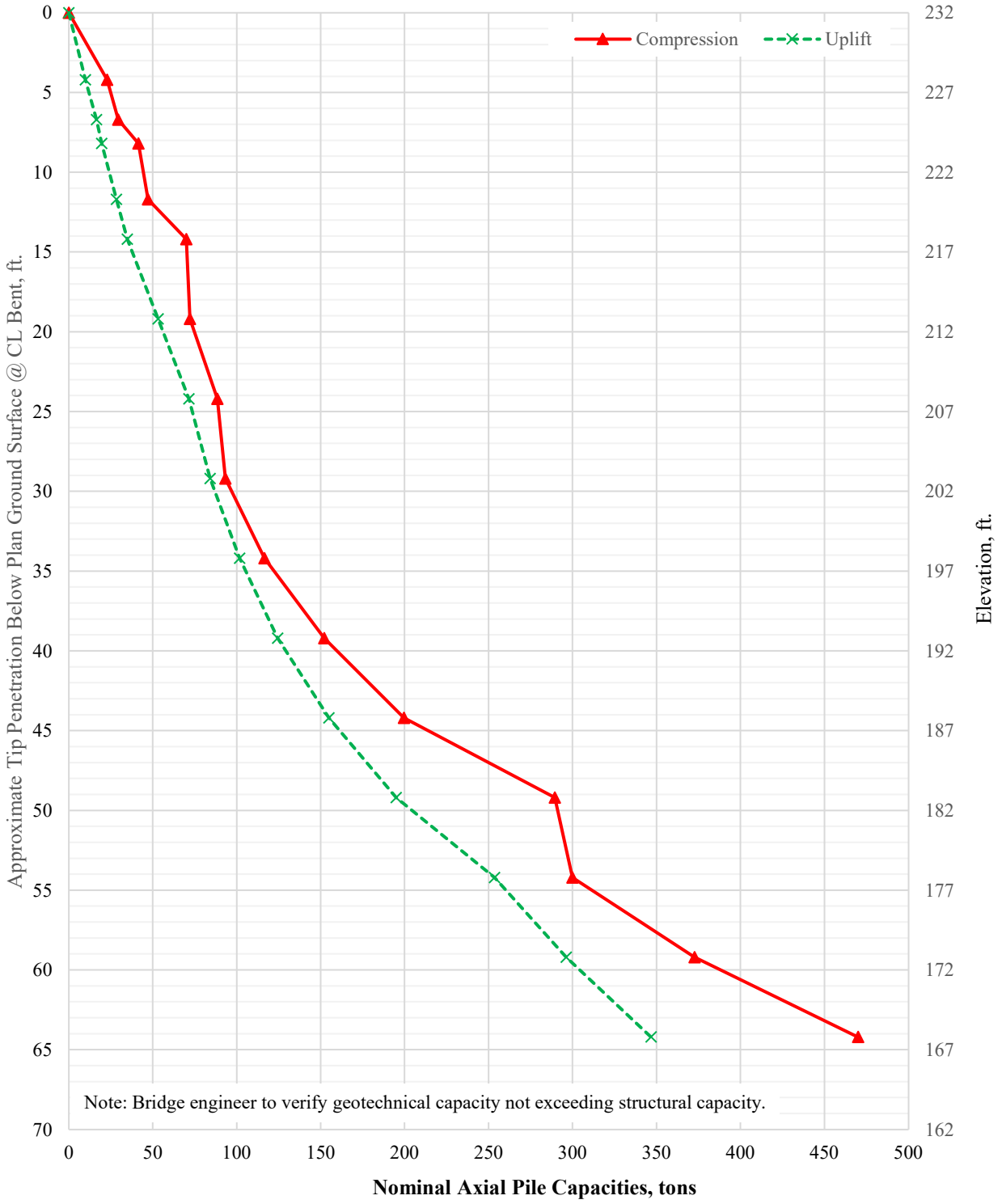
Method of Measurement. All embankments constructed as described above will be measured as Compacted Embankment in accordance with Section 210 of the Standard Specifications.

Basis of Payment. All embankments constructed as described above shall be paid in accordance with Subsection 210.13 of the Standard Specifications and shall also include all labor, material, and equipment necessary to achieve the Compacted Embankment requirements as specified herein.

Payment will be made under:

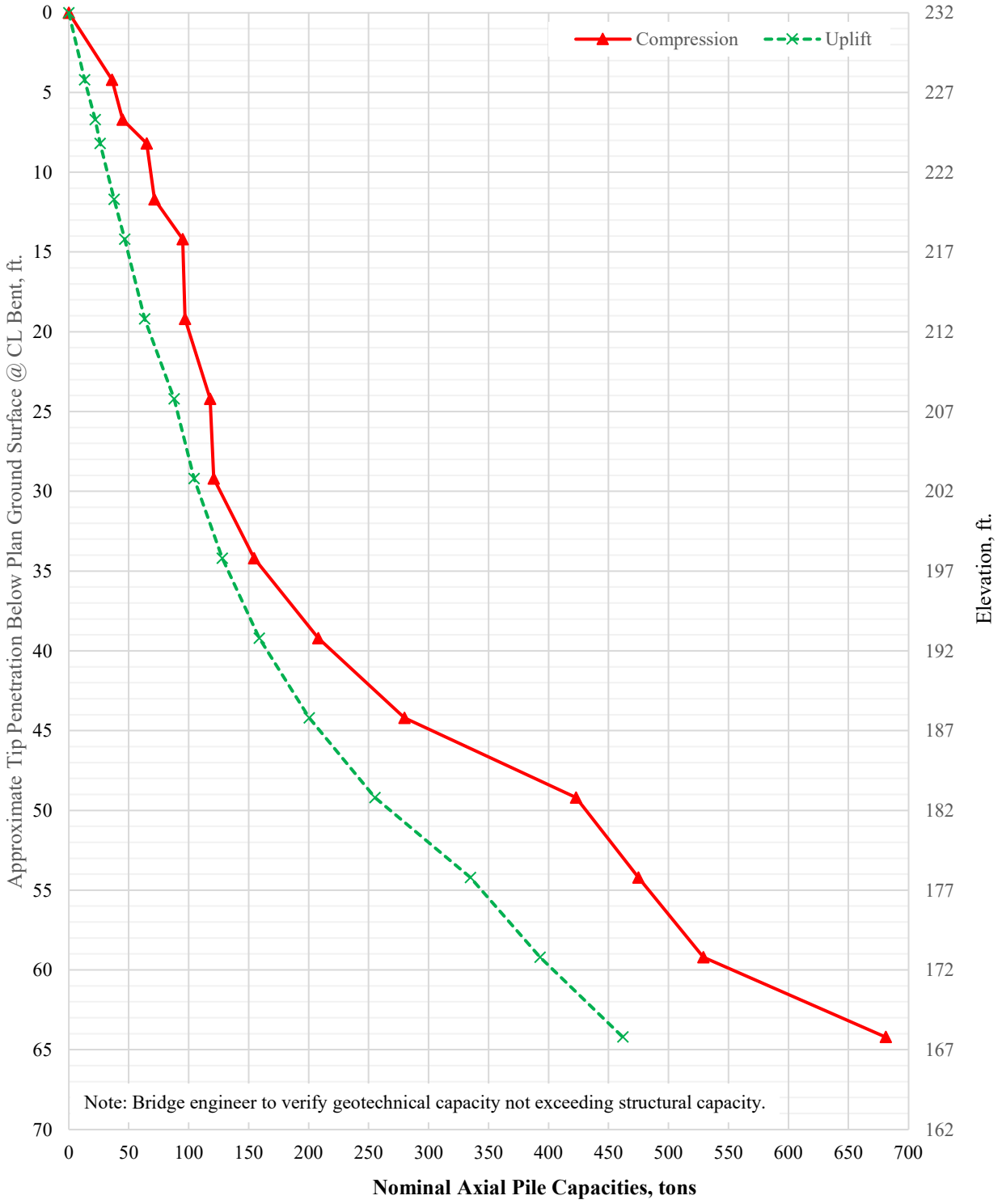
Pay Item	**Pay Unit**
Compacted Embankment	Cubic Yard

Attachment J



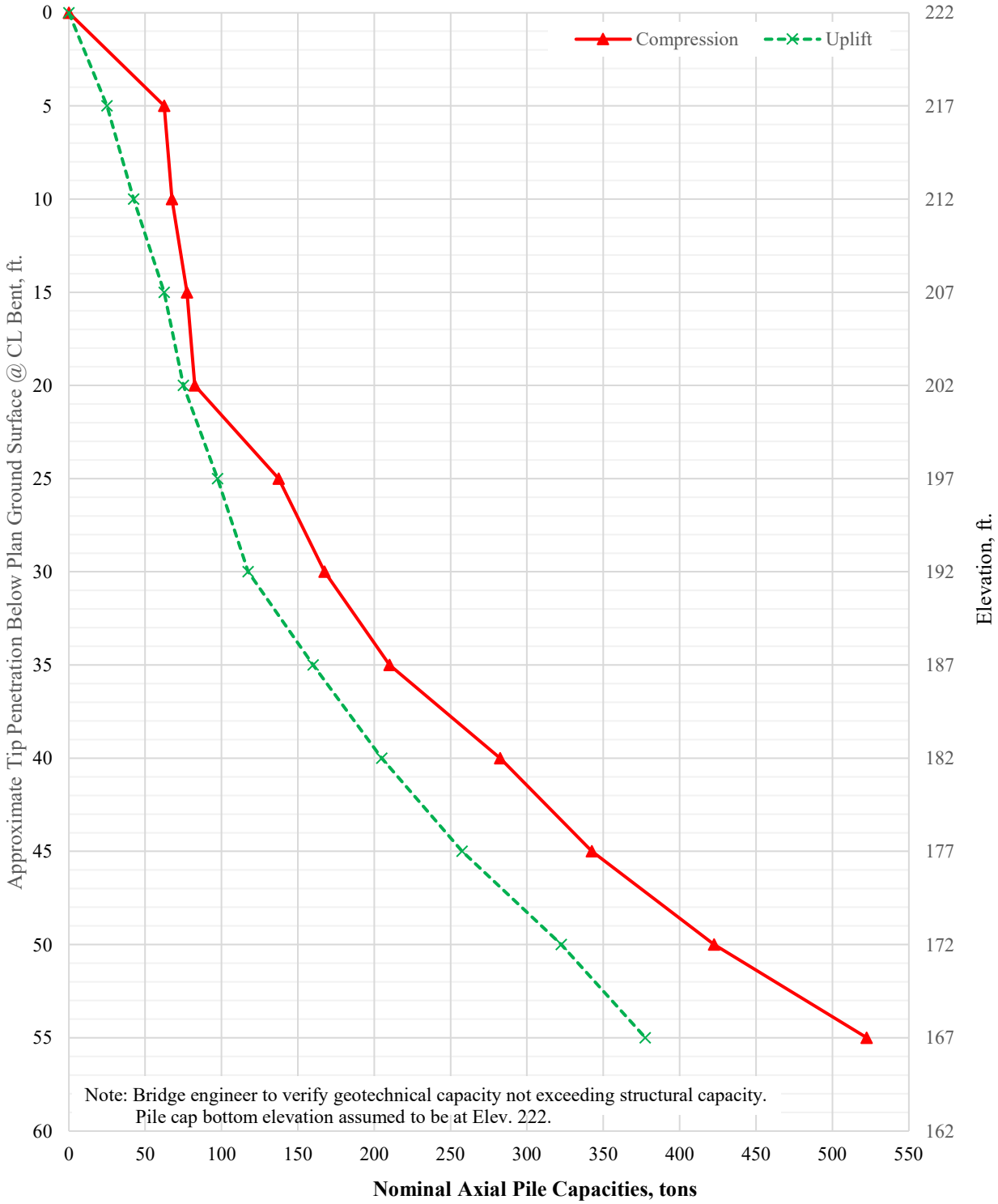
SINGLE 18"-DIAMETER CLOSED-END STEEL SHELL PILE

Bent 1 - Sta. 110+57, CL
Site No. 1 - Highway 31 over I-40
Project No.: 061613
Location: Lonoke County



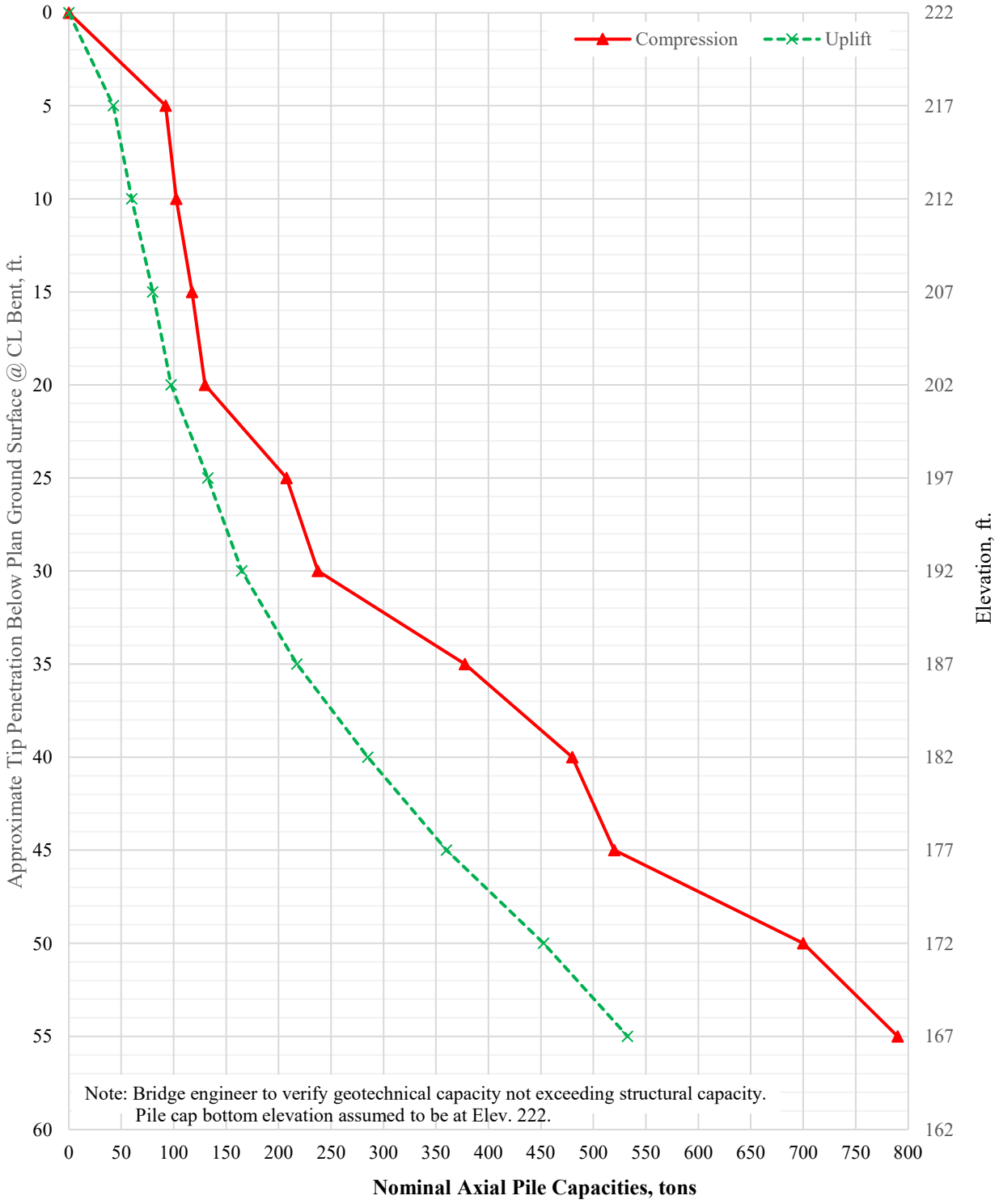
SINGLE 24"-DIAMETER CLOSED-END STEEL SHELL PILE

Bent 1 - Sta. 110+57, CL
Site No. 1 - Highway 31 over I-40
Project No.: 061613
Location: Lonoke County



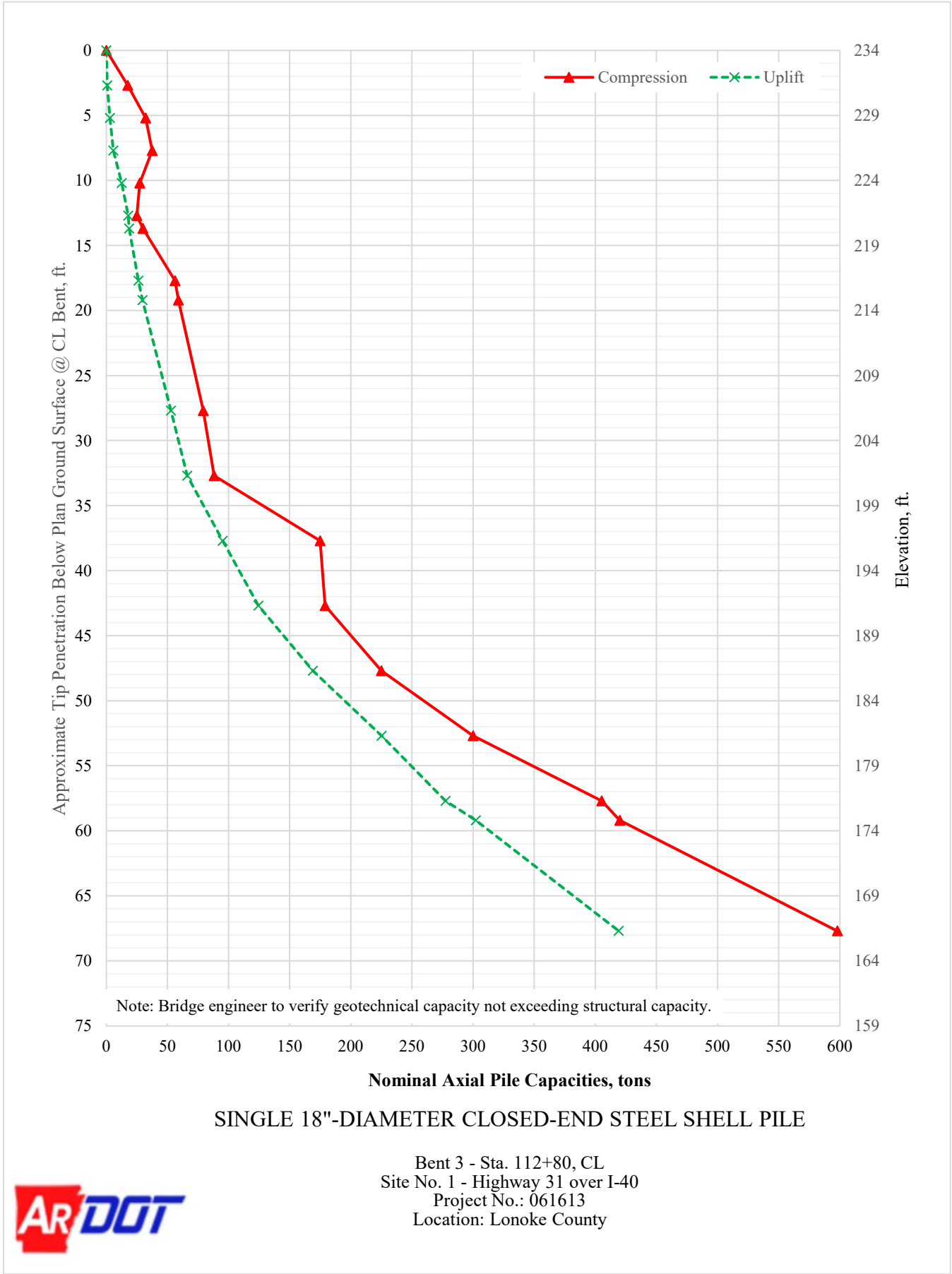
SINGLE 18"-DIAMETER CLOSED-END STEEL SHELL PILE

Bent 2 - Sta. 111+68, CL
Site No. 1 - Highway 31 over I-40
Project No.: 061613
Location: Lonoke County



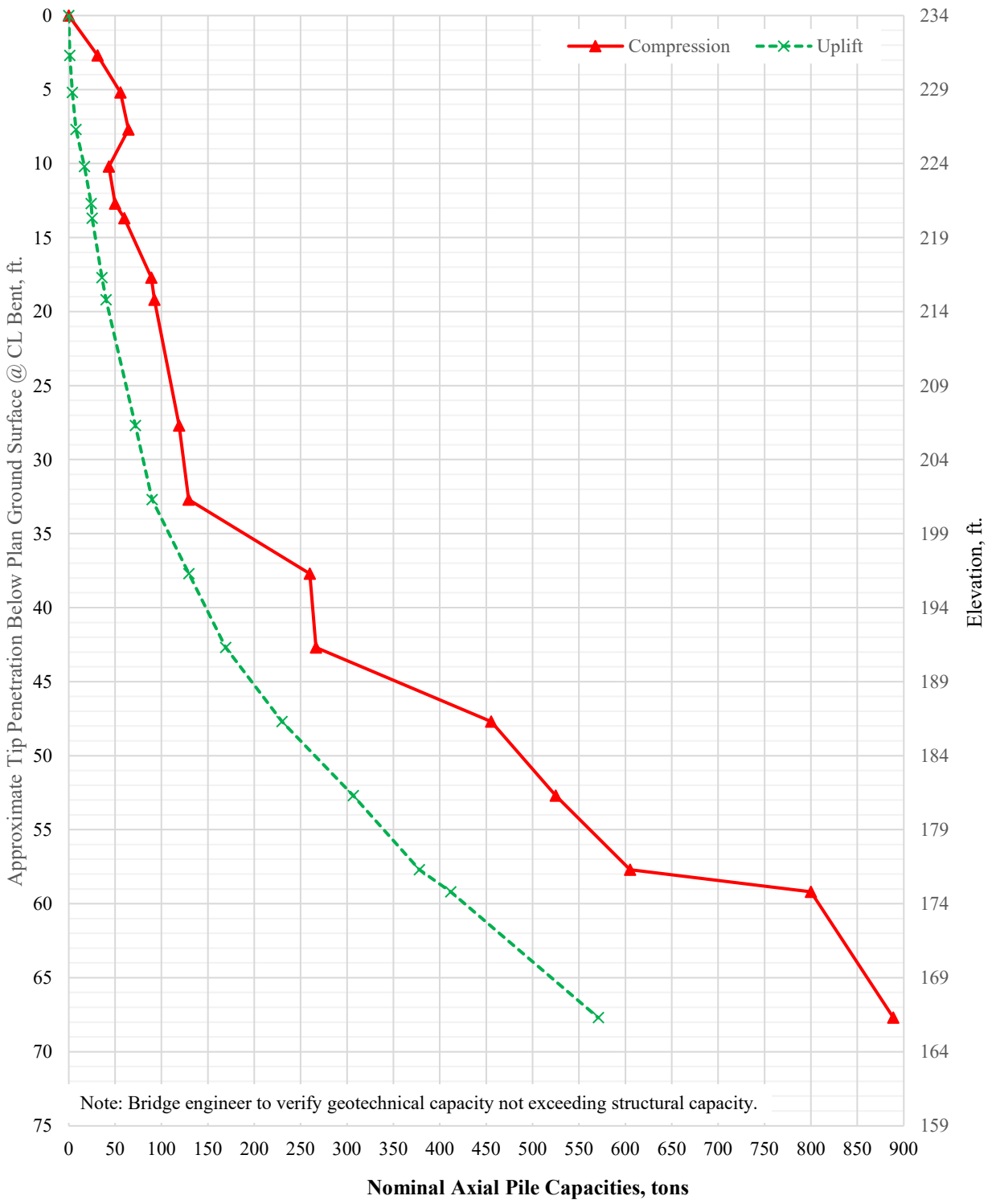
SINGLE 24"-DIAMETER CLOSED-END STEEL SHELL PILE

Bent 2 - Sta. 111+68, CL
Site No. 1 - Highway 31 over I-40
Project No.: 061613
Location: Lonoke County



SINGLE 18"-DIAMETER CLOSED-END STEEL SHELL PILE

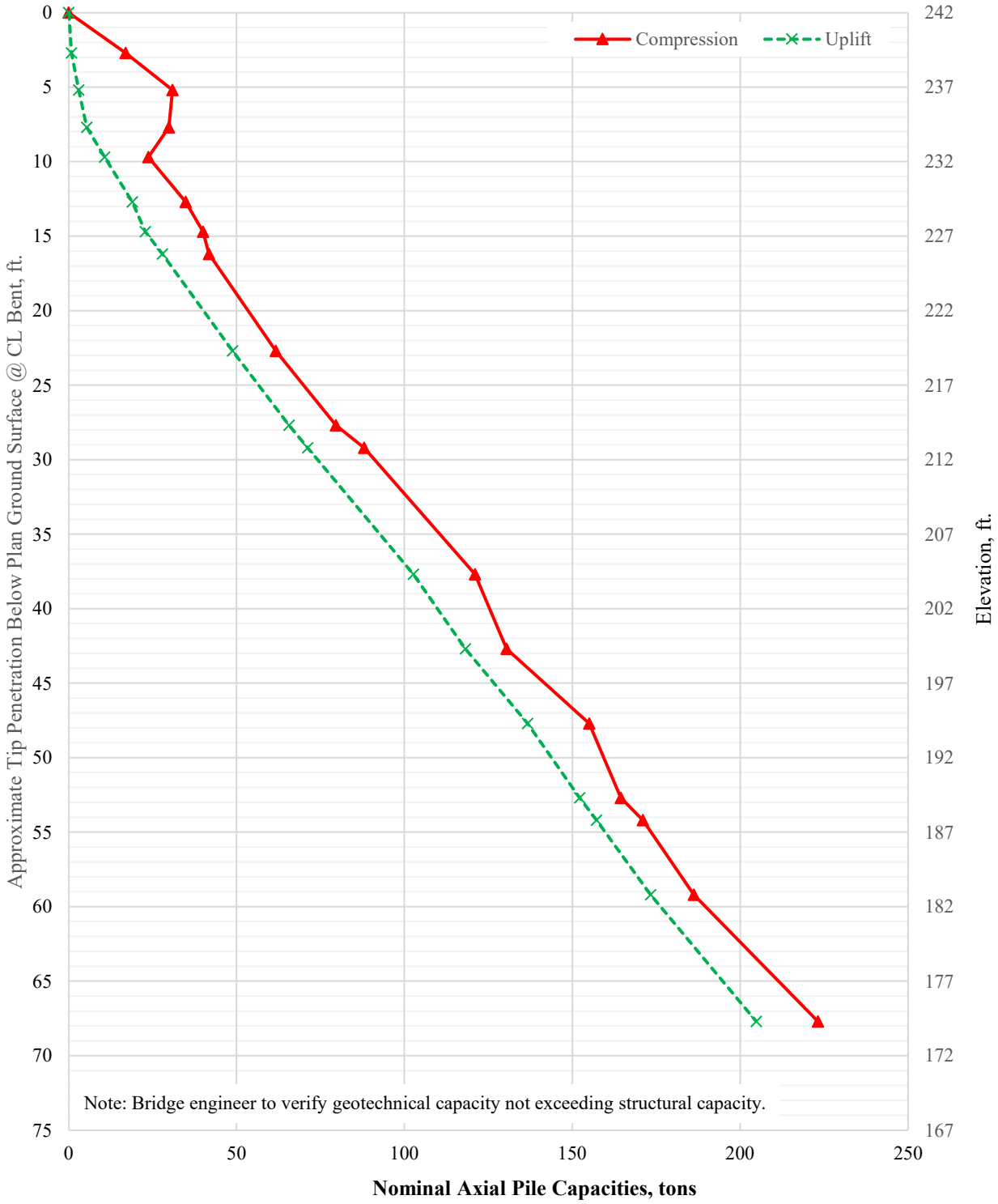
Bent 3 - Sta. 112+80, CL
Site No. 1 - Highway 31 over I-40
Project No.: 061613
Location: Lonoke County



SINGLE 24"-DIAMETER CLOSED-END STEEL SHELL PILE

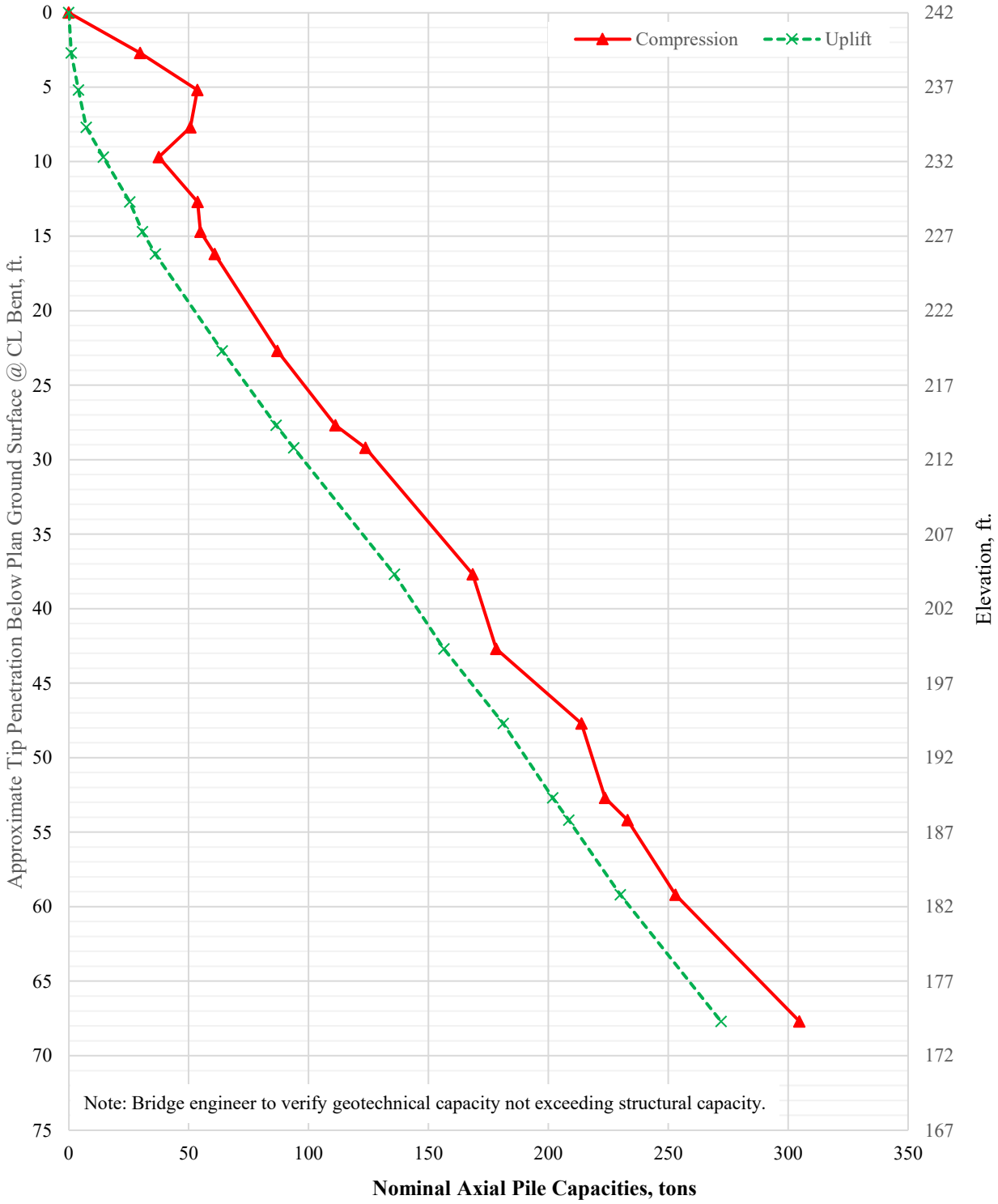
Bent 3 - Sta. 112+80, CL
Site No. 1 - Highway 31 over I-40
Project No.: 061613
Location: Lonoke County

Attachment K



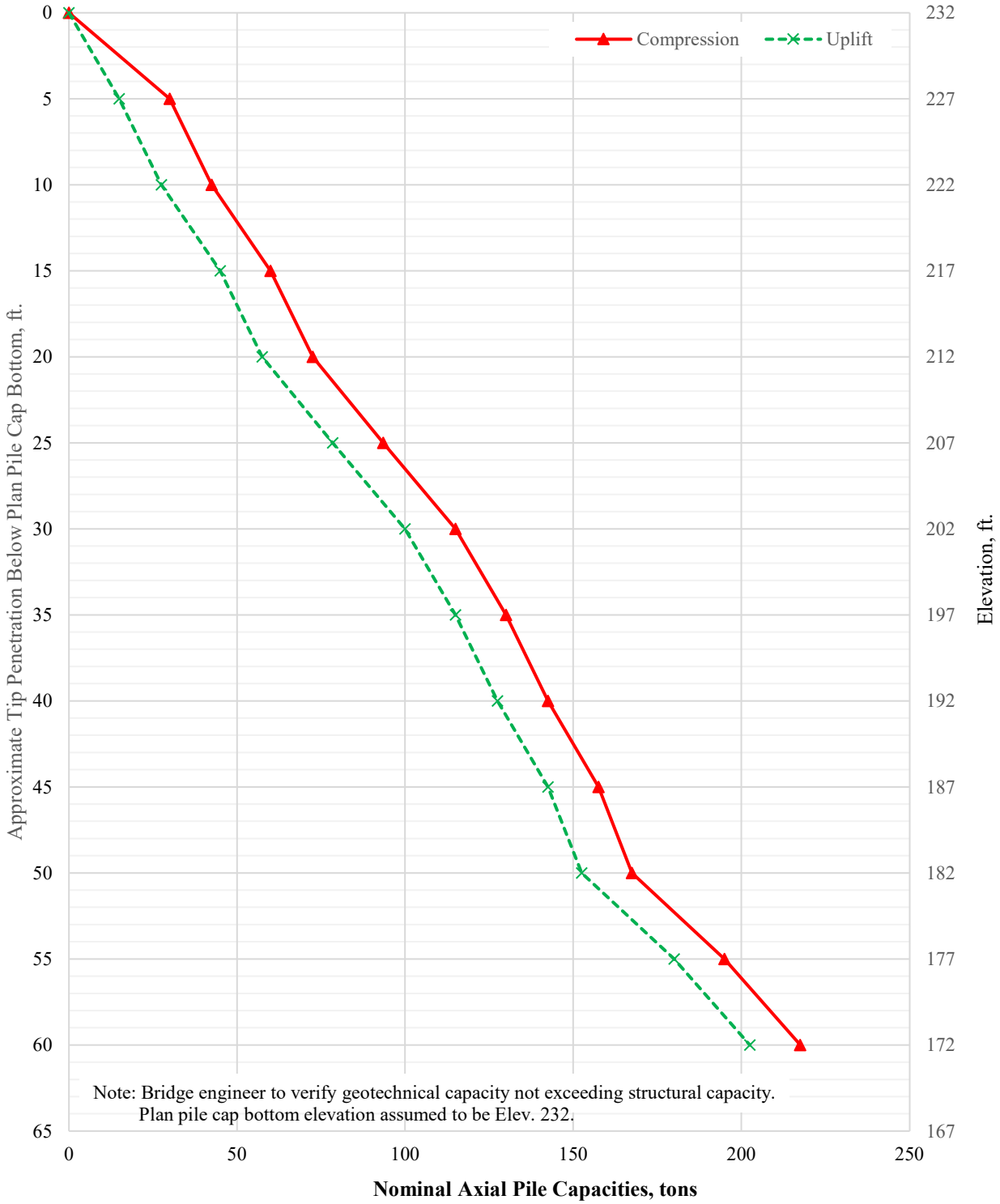
SINGLE 18"-DIAMETER CLOSED-END STEEL SHELL PILE

Bent 1 - Sta. 211+11, CL
Site No. 2 - Highway 13 over I-40
Project No.: 061613
Location: Lonoke County



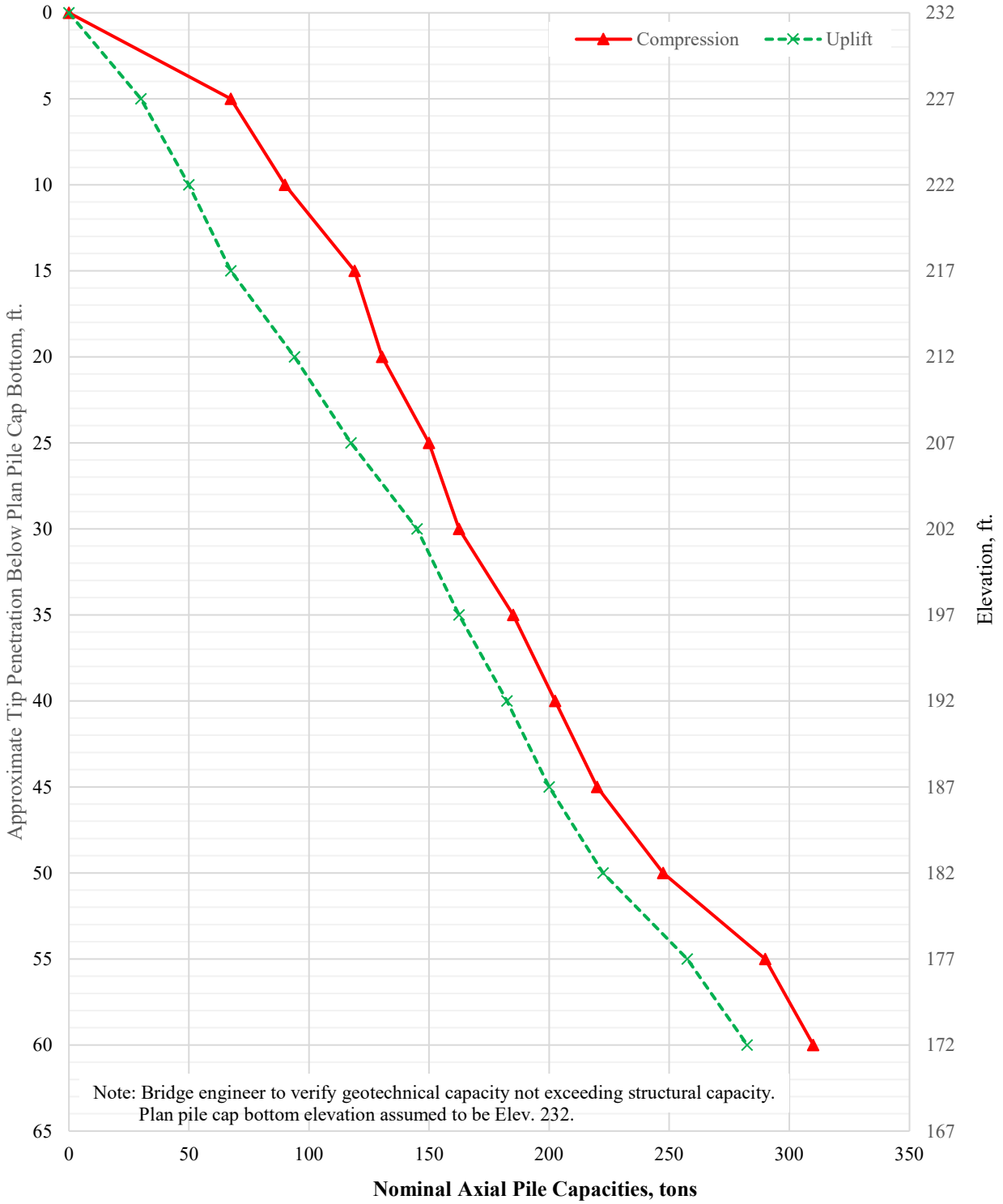
SINGLE 24"-DIAMETER CLOSED-END STEEL SHELL PILE

Bent 1 - Sta. 211+11, CL
Site No. 2 - Highway 13 over I-40
Project No.: 061613
Location: Lonoke County



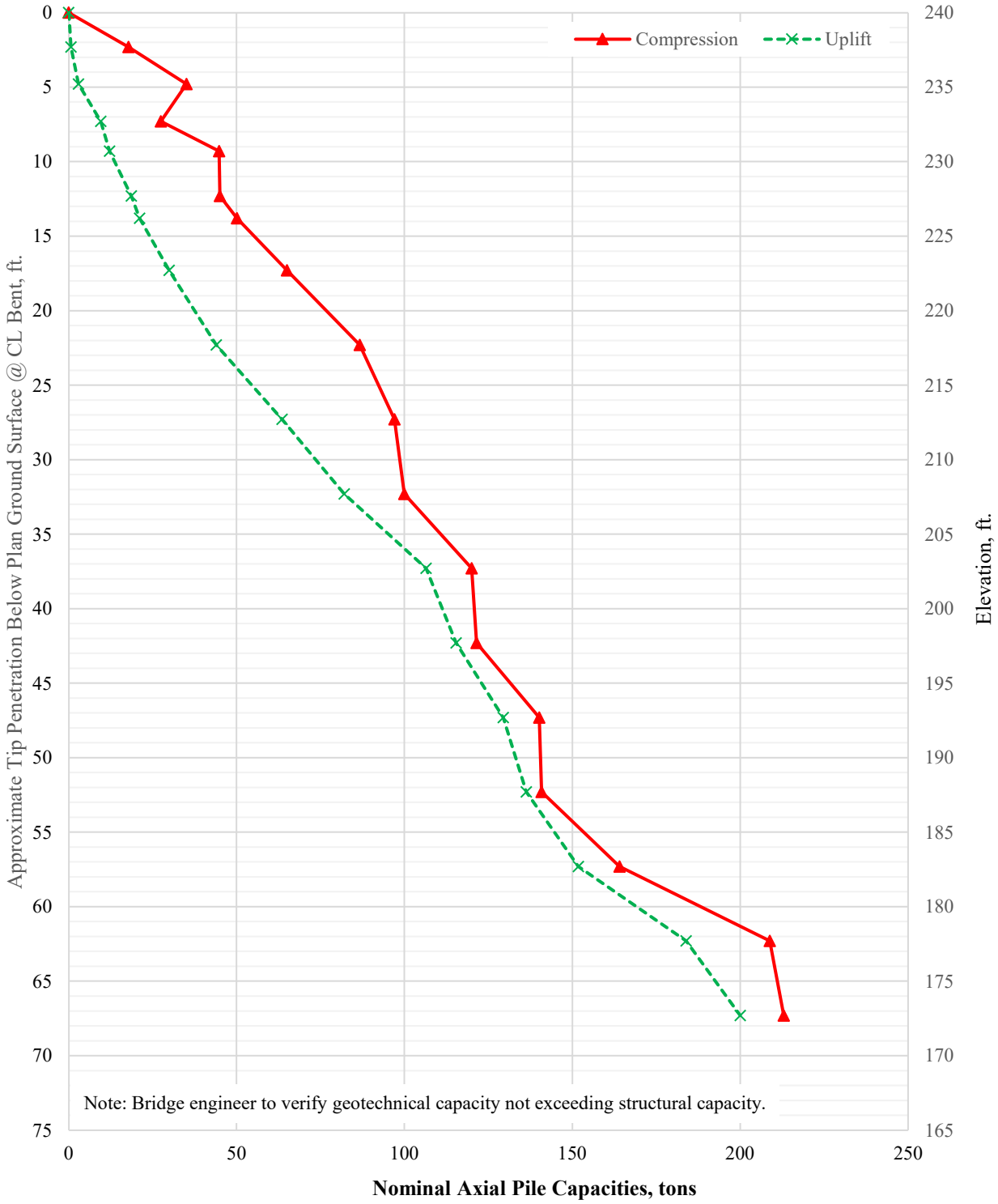
SINGLE 18"-DIAMETER CLOSED-END STEEL SHELL PILE

Bent 2 - Sta. 212+32, CL
Site No. 2 - Highway 13 over I-40
Project No.: 061613
Location: Lonoke County



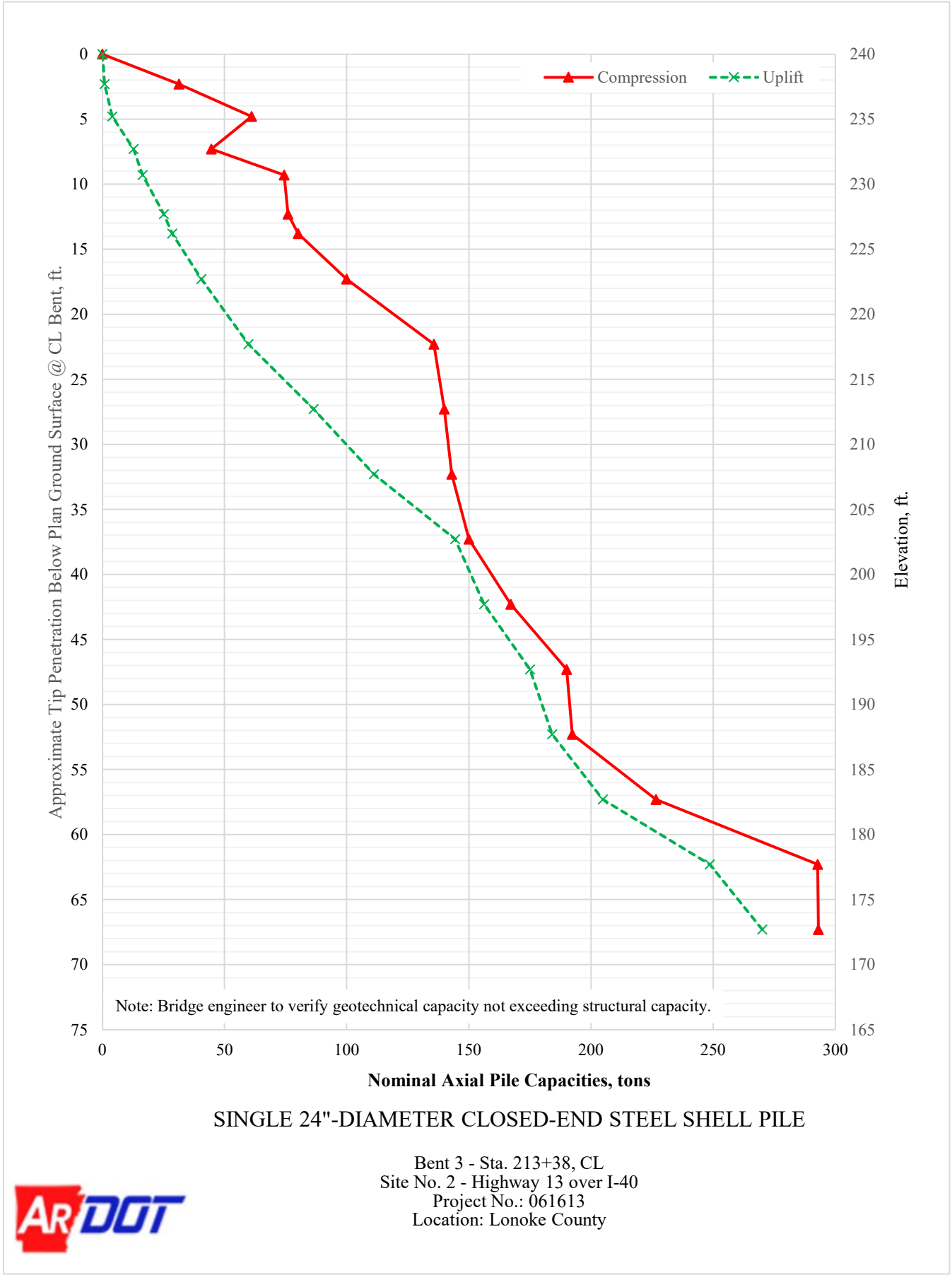
SINGLE 24"-DIAMETER CLOSED-END STEEL SHELL PILE

Bent 2 - Sta. 212+32, CL
Site No. 2 - Highway 13 over I-40
Project No.: 061613
Location: Lonoke County



SINGLE 18"-DIAMETER CLOSED-END STEEL SHELL PILE

Bent 3 - Sta. 213+38, CL
Site No. 2 - Highway 13 over I-40
Project No.: 061613
Location: Lonoke County



SINGLE 24"-DIAMETER CLOSED-END STEEL SHELL PILE

Bent 3 - Sta. 213+38, CL
Site No. 2 - Highway 13 over I-40
Project No.: 061613
Location: Lonoke County