

ARKANSAS DEPARTMENT OF TRANSPORTATION



**SUBSURFACE INVESTIGATION**

STATE JOB NO. 070509

FEDERAL AID PROJECT NO. FEDERAL AID PROJECT NHPP-TAPR-0010(52)

CADDO RIVER STR. & APPRS. (CADDO VALLEY) (S)

STATE HIGHWAY 67 SECTION 6

IN CLARK 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.



February 27, 2023

**TO:** Mr. Rick Ellis, Bridge Engineer  
**SUBJECT:** Job No. 070509  
Caddo River Str. & Apprs. (Caddo Valley) (S)  
Clark County  
Route 67, Section 6

### **Introduction**

Submitted herein are results of the subsurface investigation performed for and geotechnical recommendations developed for the proposed replacement bridge planned on Highway 67 over Caddo River in Clark County.

The project consists of constructing one structure to replace the existing bridge spanning the Caddo River. The proposed bridge will be 1137 ft. 2 in. in length and consist of three 255 ft. Composite Prestressed Concrete Girder Units, and one, 370 ft. Continuous Composite Plate Girder unit. The proposed structure will have an out-to-out width of 52 ft. 3.8 in. The proposed alignment will be located west of the existing bridge.

Based on the geotechnical investigation request from Bridge Division, foundation loads are expected to be supported on 24 in. and 30 in. steel shell piles at the intermediate bents and 18 in. steel shell piles at the end bents. 3-Horizontal to 1-Vertical (3H:1V) side slopes and 2H:1V end slopes are planned at both proposed abutments. Approximately 16 ft. of fill is anticipated at the south abutment and approximately 5 ft. of fill is anticipated at the north abutment.

### **Field Investigation**

A subsurface investigation was requested on April 28, 2022 by Neel-Schaffer to develop recommendations for bridge foundations and abutment slopes. Thirteen (13) borings were requested and thirteen (13) borings were drilled. Boring 1 and Borings 5-13 were offset from 10 to 31 feet right of the proposed centerline due to accessibility issues and underground utilities.

The approximate locations of the borings are presented in the Plan of Borings included in Attachment A. The borings were advanced with a track-mounted Acker Renegade rotary drill rig using a combination of hollow-stem auger, rotary wash drilling methods and rock coring. The boring logs, showing the subsurface conditions encountered in the borings, and the results of field and laboratory tests, are also included in Attachment A, immediately following the Plan 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. The 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 increment of the total 18-inch drive were measured and recorded on the boring logs. SPT N-values are defined as the total number of blows required to advance the split barrel sampler the final 12 inches of the total 18-inch drive depth. The SPT N-values indicated on the logs are raw



(uncorrected) blow counts measured in the field. 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 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 were classified by licensed geologists in accordance with both USCS and AASHTO soil classification systems.

These test results are plotted or indicated on the 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 and Methods

| Laboratory Test         | ASTM  | AASHTO | Denotation on Logs                                  |
|-------------------------|-------|--------|---|
| Moisture Content        | D2216 | T 265  | Solid Circle Symbol (●)                             |
| Grain Size Distribution | D6913 | T 88   | Whole Number in the “- No. 200 %” Column (e.g., 12) |
| Atterberg Limits        | D4318 | T 89   | Plus, Symbol (+) on the Right for Plastic Limit     |
|                         |       | T 90   | Plus, Symbol (+) on the Left for Plastic Limit      |

The particle size through which 50% of particles by weight passing, D<sub>50</sub>, is summarized below in Table 2. Detailed particle size distribution curves used for D<sub>50</sub> determination are included in Attachment B.

Table 2: Summary of D<sub>50</sub> for Scour Analysis

| Hydraulic Feature Name | Station                | Sample Type | Location   | D <sub>50</sub> (mm) |
|------------------------|------------------------|-------------|------------|----------------------|
| Caddo River            | 122+51, 38' LT of C.L. | Bulk        | Creek Side | 0.18                 |

**Site Conditions**

The existing bridge (No. 00899) is 1103 ft. long, 31.5 ft. wide and consists of thirty 30-ft. reinforced concrete deck girder spans and two 101 ft. steel girder spans. The 30-ft. spans are supported on concrete caps with concrete piling. The 101 ft. spans are supported on monolithic concrete piers supported on timber pile supported footings. The existing bridge is located approximately 50 feet east of the proposed structure at log mile 3.54 on Hwy. 67. Overhead power lines parallel the east side of the existing bridge and underground utilities parallel the west side. Steel guardrails lead up to and cross over the existing bridge.

**Site Geology & General Subsurface Conditions**

The project alignment is located in the mapped outcrop of Quaternary alluvial deposits. In general, alluvial sediments are deposits by present streams and consist of unconsolidated



gravels, sandy gravels, sands, silty sands, silts, silty clays, clays, and mixtures of any and all of these. The alluvial deposits encountered in the borings vary in thickness from approximately 10 to 35 feet and consist of silt, silty clay, lean clay, silty sand and gravel with sand.

The alluvial deposits overlie the Cretaceous-aged Nacatoch Formation. In general, the Nacatoch Sand is composed of cross-bedded, yellowish and gray fine quartz sand; hard, fossiliferous sandy limestone; coarse, highly glauconitic sand; fine-grained, argillaceous blue-black sand; bedded light-gray clay and marl. The sands in the Nacatoch are generally unconsolidated. At the base of the unit, hard, fossiliferous limestones and marl are present. Thin-bedded gray clay is present, interbedded with fine sands close to the top of the unit. The Nacatoch Sand has an unconformity at its base. The formation varies in thickness from 150 to 400 feet.

An outcrop of the Nacatoch at High Bluff, located southeast of the project location, has a layer described as massive, dark gray, fine-grained, argillaceous sand containing thin, hard, calcareous beds, lenses, and irregular concretions. The beds may be up to 6 inches thick, have irregular under surfaces, and may extend for as much as 50 feet. Along the highway between Arkadelphia and Caddo Valley, approximately 1.2 miles north of Arkadelphia, there is a report of encountering calcite cemented sandstone concretions that were approximately two feet across and one foot thick. Similar sandstone concretions were observed in the river approximately 450 feet downstream from the bridge. The concretions observed in the river were several feet across, however, their exact dimensions were obscured by the fact that they were underwater and partly covered with gravel. At or near the top of the Nacatoch section, hard, cemented sandstone concretions were encountered in Borings 2, 3, 8, and 10. The thickness of the concretions varied from 0.3 to 1.4 feet. The concretions are located randomly in the upper part of the Nacatoch Formation at this locality. The potential of encountering these hard concretions should be anticipated at all pile locations.

A generalized Subsurface Profile is included in Attachment C to aid in visualizing subsurface conditions and stratigraphy. In light of natural variations in stratigraphy and subsurface conditions, particularly the varying nature of the cemented Sandstone, deviation from these illustrated on the profile must be anticipated.

### **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)** was calculated for the proposed bridge over the Caddo River. 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 3. For the design long-period spectral acceleration coefficient ( $S_{D1}$ ) of 0.155g, a **Seismic Performance Zone 2** is considered applicable.

Table 3: Design Ground Motion Acceleration Response Coefficients

| Acceleration Coefficient | Value (g) |
|--------------------------|-----------|
| $A_S$ (Site PGA)         | 0.126     |
| $S_{DS}$ (0.2 sec)       | 0.288     |
| $S_{D1}$ (1 sec)         | 0.155     |

Design Response Spectrums are presented in Attachment D.

**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 The 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 the project location. Design peak ground acceleration coefficient ( $A_S$ ) of 0.126g was utilized. All thirteen (13) borings were analyzed for liquefaction potential. The results of liquefaction analysis 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.

Although the spreadsheet was developed with the capability to calculate factor of safety against liquefaction to any depth, research suggest that there has only been one case in which liquefaction has 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 analysis indicate that localized zones at a depth ranging from 15 to 20 feet at Bents 1 and 2 has a factor of safety less than 1.0. All other strata have a factor of safety greater than 1. The overall liquefaction potential at the project site is considered low.

### **Approach Embankments**

**Embankment Configuration** - As noted, 2H:1V end slopes and 3H:1V side slopes are planned for the embankments. Maximum embankment height varies from 4 feet to 14 feet.

**Settlement Potential** - The underlying soils mainly comprise of silty clay, sand, silt and sand with silt. It is anticipated that most of the settlement that occurs will be elastic settlement and take place shortly after loading is applied. Long-Term consolidation settlement is expected to be minimal.

**Approach Stability** - Stability analyses have been performed to evaluate the design abutment configuration. Slope stability analyses were performed utilizing a commercial computer program Slide2 (Version 2021) developed by RocScience. Spencer analysis method was utilized to analyze the north and south abutment. Three (3) general loading conditions were analyzed with respect to slope stability: Short Term / End of Construction Condition, Long Term Condition, and Seismic / Pseudo-Static Condition. A horizontal acceleration coefficient ( $K_h$ ) of 0.063 (0.126  $A_S/g$ )



was utilized for analysis of the Seismic / Psuedo-Static Condition. A surcharge of 250 psf is used to model the live load in the Long Term Condition.

Plan Embankments - Slope stability analyses were performed on the 2H:1V end slopes at the south abutment (Bent 1) and the north abutment (Bent 13), to evaluate suitability of the plan configuration. Table 4 includes the results of the slope stability analyses with the plan embankment layout. Slope stability analysis results are included in Attachment F.

Table 4: Results of Slope Stability Analyses Utilizing Plan Configuration

| Design Condition                 | Factor of Safety |                  | Recommended Minimum Factor of Safety |
|----------------------------------|------------------|------------------|--------------------------------------|
|                                  | South Embankment | North Embankment |                                      |
| End of Construction (Short Term) | 3.56             | 2.47             | 1.3                                  |
| Long Term                        | 1.55             | 1.51             | 1.5                                  |
| Pseudo-Static (Seismic)          | 2.89             | 2.14             | 1.1                                  |

Conclusions and Recommendations - Based on results from the slope stability analysis, plan configuration of the north and south abutment are suitable.

**Deep Foundations**

Axial Capacities - Based on conversations with Bridge Division, it is understood that Concrete Filled Steel Shell Piles are to be utilized to support the foundation loads at all bents. Pile sizes and their corresponding capacities are listed in Table 5.

Nominal axial capacities (compression and uplift) vs. pile tip penetration / elevation curves are provided in Attachment G. These nominal axial capacities have been calculated using static analysis method. Utilizing the axial pile capacity curves included in Attachment G, the minimum recommended pile length to achieve the required design nominal axial compression pile capacities is summarized in Table 5.



Table 5: Recommended Shallowest Tip Elevation

| Bent No. | Required Nominal Axial Resistance (tons) | Pile Diameter (in.) | Recommended Shallowest Tip Elev. (ft.) |
|----------|--|---------------------|--|
| 1        | 180                                      | 18                  | 160                                    |
| 2        | 255                                      | 24                  | 160                                    |
| 3        | 255                                      | 24                  | 160                                    |
| 4        | 255                                      | 24                  | 160                                    |
| 5        | 255                                      | 24                  | 165                                    |
| 6        | 255                                      | 24                  | 160                                    |
| 7        | 255                                      | 24                  | 160                                    |
| 8        | 255                                      | 24                  | 165                                    |
| 9        | 255                                      | 24                  | 160                                    |
| 10       | 230                                      | 24                  | 165                                    |
| 11       | 370                                      | 30                  | 165                                    |
| 12       | 370                                      | 30                  | 165                                    |
| 13       | 165                                      | 18                  | 170                                    |

For single, isolated foundations, a resistance factor ( $\phi_{stat}$ ) of 0.45 is recommended for calculating factored compression resistance and a resistance factor ( $\phi_{up}$ ) of 0.35 is recommended for determining factored uplift resistance.

Considering that piles at the abutments will be driven after the embankment is 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 piles are expected to be tipped in the predominantly sandy / silty soils that are likely to be liquefied during driving with considerable resistance loss at the end of initial drive. If the required nominal bearing capacity has not been obtained when the top of the piles are 6 inches above plan grade, considerations may be given to restriking the piles with a warmed-up hammer after a minimum 24-hour waiting time.

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 group settlement, Section 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 that the drivability analysis will be performed by the Structural Engineer.

Geotechnical Input Parameters for Lateral Load Analysis Using LPile - Lateral load analysis will be performed by the Structural Engineer using the commercial computer program LPile. Table 6a through 6n, located in Attachment H contain the geotechnical input parameters recommended for use in LPile lateral load analysis.

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

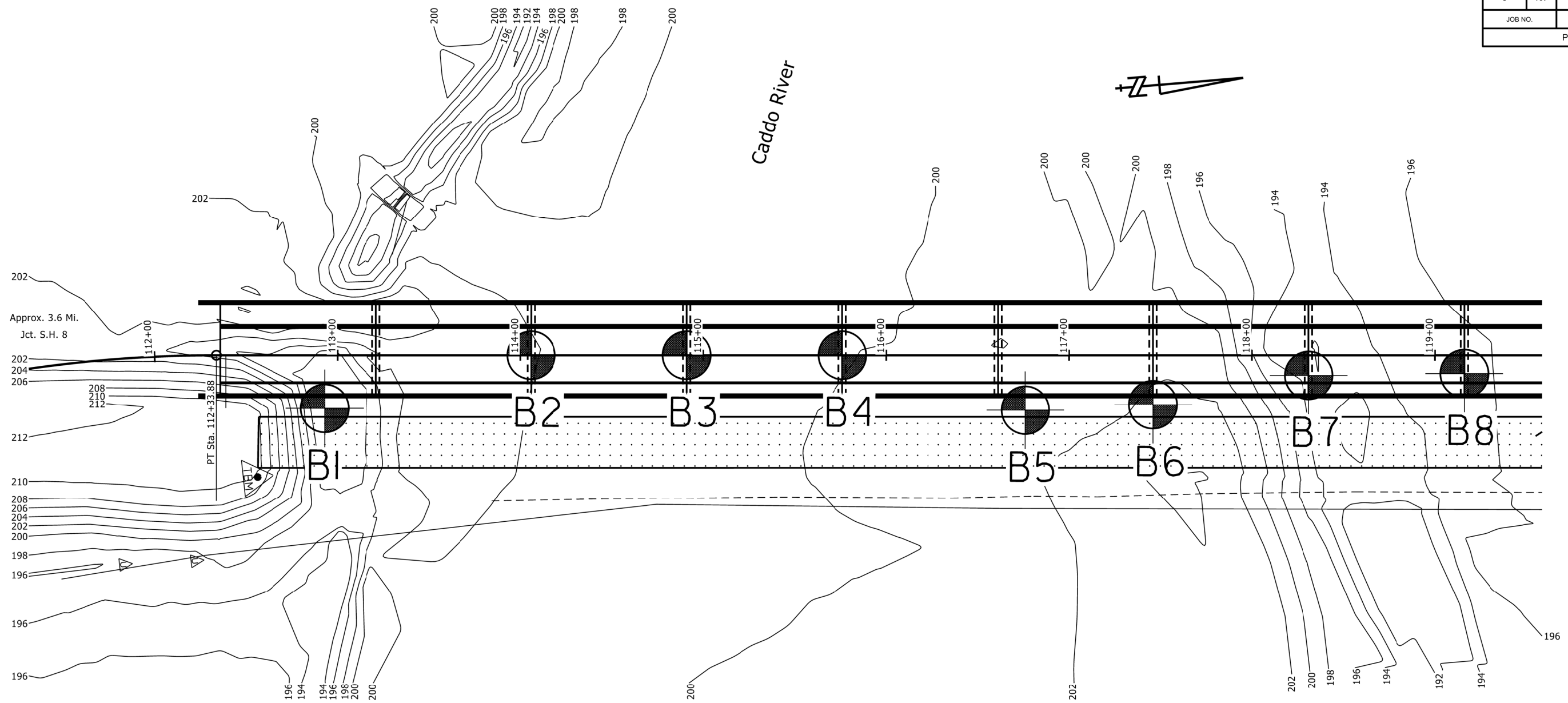
Due to gravel, very dense sand layers and sandstone, it is recommended prebore be performed to plan tip elevation. In addition, it is recommended that conical pile tips are utilized due to hard driving conditions. Water jetting, vibrating, or other means for the purpose of assisting pile penetration are generally not expected. If warranted by specific subsurface conditions, the use of water jetting or vibrating would require review and approval by the Engineer. 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 the contractor may pursue the use of test piles for information purposes.

Paul Tinsley  
Materials Engineer

PT:yz:mlg:pjt:pwc  
cc: State Construction Engineer  
District 7 Engineer  
Roadway Design Engineer  
G. C. File

## Attachment A

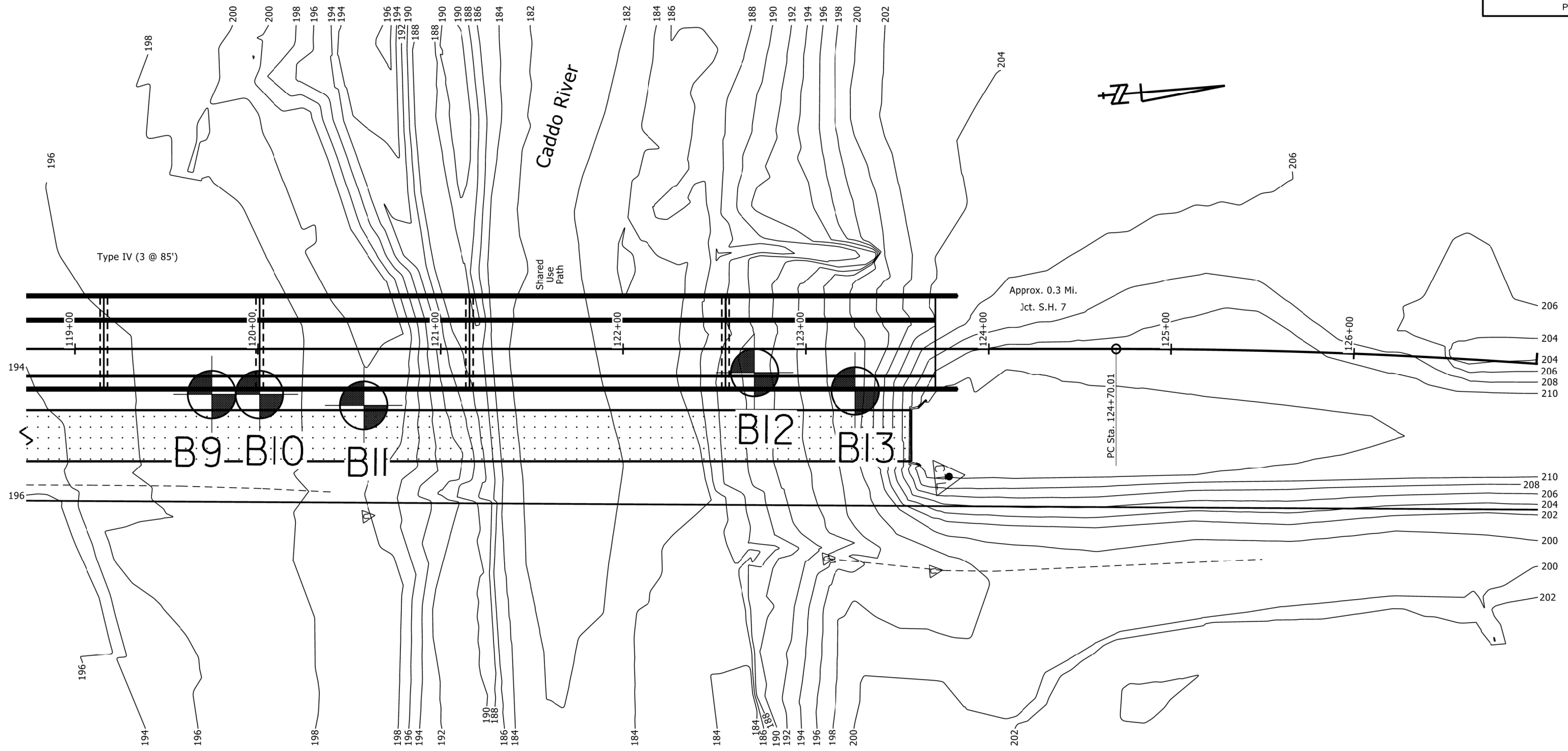
|                     |       |                    |           |              |
|---------------------|-------|--------------------|-----------|--------------|
| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
| 6                   | AR    |                    |           |              |
| JOB NO.             |       | 070509             |           |              |
| PLAN OF BORINGS     |       |                    |           |              |



| BORING | STATION | OFFSET    |
|--------|---------|-----------|
| B1     | 112+93  | 29' RT CL |
| B2     | 114+06  | CL        |
| B3     | 114+91  | CL        |
| B4     | 115+76  | CL        |
| B5     | 116+76  | 30' RT    |
| B6     | 117+46  | 27' RT    |
| B7     | 118+31  | 11' RT    |
| B8     | 119+16  | 10' RT    |

|   |           |
|---|-----------|
| PLAN OF BORINGS   |           |
| CADDO RIVER STR. & APPRS.<br>(CADDO VALLEY)(S)<br>ROUTE 67, SECTION 6<br>CLARK COUNTY<br>FED. AID PROJECT |           |
| JOB NO. 070509  | SHEET 1/2 |
| NTS   |           |

|                     |       |                    |           |              |
|---------------------|-------|--------------------|-----------|--------------|
| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | SHEET NO. | TOTAL SHEETS |
| 6                   | AR    |                    |           |              |
| JOB NO.             |       | 070509             |           |              |
| PLAN OF BORINGS     |       |                    |           |              |



| BORING | STATION | OFFSET |
|--------|---------|--------|
| B9     | 119+75  | 25' RT |
| B10    | 120+01  | 25' RT |
| B11    | 120+58  | 31' RT |
| B12    | 122+72  | 13' RT |
| B13    | 123+27  | 23' RT |

|   |           |
|---|-----------|
| PLAN OF BORINGS   |           |
| CADDO RIVER STR. & APPRS.<br>(CADDO VALLEY)(S)<br>ROUTE 67, SECTION 6<br>CLARK COUNTY<br>FED. AID PROJECT |           |
| JOB NO. 070509  | SHEET 2/2 |
| NTS   |           |

**ARKANSAS DEPARTMENT OF TRANSPORTATION  
MATERIALS DIVISION - GEOTECHNICAL SECTION**

BORING NO. 1  
PAGE 1 OF 3

JOB NO. 070509 Clark County  
JOB NAME: Caddo River Str. & Apprs. (Caddo Valley) (S)  
Route 67, Section 6  
STATION: 112+93  
LOCATION: 29' Right of Construction Centerline  
LOGGED BY: Don McCollum

DATE: October 5, 2022  
TYPE OF DRILLING:  
Hollow Stem Auger - Rotary Wash  
EQUIPMENT: Acker 1  
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 89.7

| DEPTH<br>FT.             | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL   | SOIL GROUP      | MOISTURE CONTENT (%) |    |    |    |    |    |    |    |    |  | PERCENT PASSING<br>NO. 200 SIEVE | NO. OF BLOWS<br>PER 6-IN. | %<br>T<br>C<br>R | %<br>R<br>Q<br>D |  |
|--------------------------|--------|---------|---|-----------------|----------------------|----|----|----|----|----|----|----|----|--|----------------------------------|---------------------------|------------------|------------------|--|
|                          |        |         |   |                 | PL                   | 10 | 20 | 30 | 40 | 50 | 60 | 70 | LL |  |                                  |                           |                  |                  |  |
| SURFACE ELEVATION: 194.9 |        |         |   |                 |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |  |
| 5                        |        |         | Moist, Stiff, Brown and Gray Silty Clay   | -<br>CL-ML<br>- |                      |    |    |    |    |    |    |    |    |  |                                  | 87                        | 3<br>4-7         |                  |  |
|                          |        |         | Wet, Soft, Brown and Gray Sandy, Silty Clay   | CL-ML<br>-      |                      |    |    |    |    |    |    |    |    |  |                                  | 66                        | 1<br>1-1         |                  |  |
| 10                       |        |         |   | CL-ML<br>-      |                      |    |    |    |    |    |    |    |    |  |                                  | 67                        | 0<br>0-3         |                  |  |
|                          |        |         | Wet, Very Loose, Gray Silty Sand  | SM<br>-         |                      |    |    |    |    |    |    |    |    |  |                                  | 39                        | 0<br>2-2         |                  |  |
| 15                       |        |         |   | SM<br>-         |                      |    |    |    |    |    |    |    |    |  |                                  | 46                        | 0<br>0-2         |                  |  |
|                          |        |         | Wet, Very Loose, Dark Gray Silty Sand with Trace Gravel and Trace Organic Matter (Wood) | GP-GM<br>-      |                      |    |    |    |    |    |    |    |    |  |                                  | 5                         | 11<br>13-12      |                  |  |
| 20                       |        |         |   | GP-GM<br>-      |                      |    |    |    |    |    |    |    |    |  |                                  | 0                         | 6<br>4-6         |                  |  |
|                          |        |         | Wet, Loose, Brown Poorly Graded Sand with Gravel  | SP<br>-         |                      |    |    |    |    |    |    |    |    |  |                                  | 0                         | 6<br>4-6         |                  |  |
| 25                       |        |         |   | SP<br>-         |                      |    |    |    |    |    |    |    |    |  |                                  | 3                         | 9-14             |                  |  |
|                          |        |         | Wet, Medium Dense, Brown Gravel   | -<br>-          |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |  |
| 30                       |        |         |   | -<br>-          |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |  |
| 35                       |        |         |   |                 |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |  |

REMARKS:

**ARKANSAS DEPARTMENT OF TRANSPORTATION  
MATERIALS DIVISION - GEOTECHNICAL SECTION**

BORING NO. 1  
PAGE 2 OF 3

JOB NO. 070509 Clark County  
JOB NAME: Caddo River Str. & Apprs. (Caddo Valley) (S)  
Route 67, Section 6  
STATION: 112+93  
LOCATION: 29' Right of Construction Centerline  
LOGGED BY: Don McCollum

DATE: October 5, 2022  
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Hollow Stem Auger - Rotary Wash  
EQUIPMENT: Acker 1  
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 89.7

| DEPTH<br>FT. | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL  | SOIL GROUP | MOISTURE CONTENT (%) |    |    |    |    |    |    |    |    |  | PERCENT PASSING<br>NO. 200 SIEVE | NO. OF BLOWS<br>PER 6-IN. | %<br>T<br>C<br>R | %<br>R<br>Q<br>D |
|--------------|--------|---------|--|------------|----------------------|----|----|----|----|----|----|----|----|--|----------------------------------|---------------------------|------------------|------------------|
|              |        |         |  |            | PL                   | 10 | 20 | 30 | 40 | 50 | 60 | 70 | LL |  |                                  |                           |                  |                  |
|              |        |         | SURFACE ELEVATION: 194.9   |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |
| 40           |        | X       | Wet, Very Dense, Dark Gray Poorly Graded Sand with Silt (Nacatoch Formation) | SP-SM      |                      |    |    |    |    |    |    |    |    |  | 10                               | 6<br>33-58                |                  |                  |
| 45           |        | X       | Wet, Very Dense, Gray Poorly Graded Sand with Silt                           | SP-SM      |                      |    |    |    |    |    |    |    |    |  | 11                               | 26<br>100<br>(6")         |                  |                  |
| 50           |        | X       | Wet, Very Dense, Gray Sand with Silt   | -          |                      |    |    |    |    |    |    |    |    |  |                                  | 100<br>(5")               |                  |                  |
| 55           |        | X       | Wet, Very Dense, Gray Poorly Graded Sand with Silt                           | SP-SM      |                      |    |    |    |    |    |    |    |    |  | 9                                | 29<br>100<br>(6")         |                  |                  |
| 60           |        | X       | Wet, Very Dense, Gray Poorly Graded Sand with Silt and Gravel                | SP-SM      |                      |    |    |    |    |    |    |    |    |  | 5                                | 100<br>(5")               |                  |                  |
| 65           |        | X       | Wet, Very Dense, Gray Poorly Graded Sand with Silt and Trace Gravel          | SP-SM      |                      |    |    |    |    |    |    |    |    |  | 12                               | 42<br>100<br>(6")         |                  |                  |
| 70           |        | X       | Wet, Very Dense, Gray Sand with Silt and Trace Gravel                        |            |                      |    |    |    |    |    |    |    |    |  |                                  | 100<br>(4")               |                  |                  |

REMARKS:

**ARKANSAS DEPARTMENT OF TRANSPORTATION  
MATERIALS DIVISION - GEOTECHNICAL SECTION**

BORING NO. 1  
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JOB NO. 070509 Clark County  
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Route 67, Section 6  
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Hollow Stem Auger - Rotary Wash  
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|--------------|--------|---------|---|------------|----------------------|----|----|----|----|----|----|----|----|--|----------------------------------|---------------------------|------------------|------------------|
|              |        |         |   |            | PL                   | 10 | 20 | 30 | 40 | 50 | 60 | 70 | LL |  |                                  |                           |                  |                  |
|              |        |         | SURFACE ELEVATION: 194.9  |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |
| 75           |        |         | Very Dense, Poorly Cemented Sand<br>(No Sample Recovered)         | -          |                      |    |    |    |    |    |    |    |    |  | 100 (4")                         |                           |                  |                  |
| 80           |        |         | Very Dense, Poorly Cemented Sand with Poorly Cemented Silt Layers | -          |                      |    |    |    |    |    |    |    |    |  | 100 (4")                         |                           |                  |                  |
| 85           |        |         | SANDSTONE - Unweathered, Cemented, Gray                           |            |                      |    |    |    |    |    |    |    |    |  | 100 (2")                         | 89                        | 37               |                  |
| 90           |        |         | Boring Terminated   |            |                      |    |    |    |    |    |    |    |    |  | 100                              |                           | 36               |                  |
| 95           |        |         |   |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |
| 100          |        |         |   |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |
| 105          |        |         |   |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |

REMARKS:

**ARKANSAS DEPARTMENT OF TRANSPORTATION  
MATERIALS DIVISION - GEOTECHNICAL SECTION**

BORING NO. 2  
PAGE 1 OF 3

JOB NO. 070509 Clark County  
JOB NAME: Caddo River Str. & Apprs. (Caddo Valley) (S)  
Route 67, Section 6  
STATION: 114+06  
LOCATION: Construction Centerline  
LOGGED BY: Don McCollum

DATE: October 4, 2022  
TYPE OF DRILLING:  
Hollow Stem Auger - Rotary Wash  
EQUIPMENT: Acker 1  
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 80

| DEPTH<br>FT.             | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL                                     | SOIL GROUP | MOISTURE CONTENT (%) |    |    |    |    |    |    |    |    |  | PERCENT PASSING<br>NO. 200 SIEVE | NO. OF BLOWS<br>PER 6-IN. | % T C R          | % R Q D |  |
|--------------------------|--------|---------|---|------------|----------------------|----|----|----|----|----|----|----|----|--|----------------------------------|---------------------------|------------------|---------|--|
|                          |        |         |   |            | PL                   | 10 | 20 | 30 | 40 | 50 | 60 | 70 | LL |  |                                  |                           |                  |         |  |
| SURFACE ELEVATION: 200.2 |        |         |   |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |         |  |
| 5                        |        |         | Moist, Loose, Brown Sandy Silt with Trace Gravel            | ML         |                      |    |    |    |    |    |    |    |    |  |                                  | 64                        | 4<br>4-5         |         |  |
|                          |        |         |   |            |                      |    |    |    |    |    |    |    |    |  |                                  | 88                        | 3<br>3-5         |         |  |
| 10                       |        |         | Moist, Medium Stiff, Brown Silty Clay                       | CL-ML      |                      |    |    |    |    |    |    |    |    |  |                                  |                           | 2<br>3-4         |         |  |
|                          |        |         |   |            |                      |    |    |    |    |    |    |    |    |  |                                  | 60                        | 0<br>2-4         |         |  |
| 15                       |        |         | Wet, Medium Stiff, Brown Sandy, Silty Clay with Some Gravel | CL-ML      |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |         |  |
|                          |        |         |   |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           | 3<br>4-9         |         |  |
| 20                       |        |         | Wet, Medium Dense, Brown Gravel with Silt and Sand*         | -          |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |         |  |
|                          |        |         |   |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           | 11<br>17-19      |         |  |
| 25                       |        |         | Wet, Very Dense, Brown Gravel with Sand                     | -          |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |         |  |
|                          |        |         |   |            |                      |    |    |    |    |    |    |    |    |  |                                  | 4                         | 7<br>11-10       |         |  |
| 30                       |        |         | SANDSTONE (Nacatoch Formation)                              | SM         |                      |    |    |    |    |    |    |    |    |  |                                  | 16                        | 15<br>40<br>(1") |         |  |
|                          |        |         | Wet, Very Dense, Gray Silty Sand with Trace Gravel          | -          |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |         |  |
| 35                       |        |         |   |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |         |  |

REMARKS: \* The 24 hour water level reading was 16' below ground level.

**ARKANSAS DEPARTMENT OF TRANSPORTATION  
MATERIALS DIVISION - GEOTECHNICAL SECTION**

BORING NO. 2  
PAGE 2 OF 3

JOB NO. 070509 Clark County  
JOB NAME: Caddo River Str. & Apprs. (Caddo Valley) (S)  
Route 67, Section 6  
STATION: 114+06  
LOCATION: Construction Centerline  
LOGGED BY: Don McCollum

DATE: October 4, 2022  
TYPE OF DRILLING:  
Hollow Stem Auger - Rotary Wash  
EQUIPMENT: Acker 1  
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 80

| DEPTH<br>FT. | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL   | SOIL GROUP | MOISTURE CONTENT (%) |    |    |    |    |    |    |    |    |  | PERCENT PASSING<br>NO. 200 SIEVE | NO. OF BLOWS<br>PER 6-IN. | %<br>T<br>C<br>R | %<br>R<br>Q<br>D |  |
|--------------|--------|---------|---|------------|----------------------|----|----|----|----|----|----|----|----|--|----------------------------------|---------------------------|------------------|------------------|--|
|              |        |         |   |            | PL                   | 10 | 20 | 30 | 40 | 50 | 60 | 70 | LL |  |                                  |                           |                  |                  |  |
|              |        |         | SURFACE ELEVATION: 200.2  |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |  |
| 40           |        |         | Wet, Medium Dense, Gray Silty, Clayey Sand  | SC-SM      |                      |    |    |    |    |    |    |    |    |  |                                  | 47                        | 5<br>8-9         |                  |  |
| 45           |        |         | Wet, Very Dense, Gray Poorly Graded Sand with Silt and Trace Gravel and Trace Lignite | SP-SM      |                      |    |    |    |    |    |    |    |    |  |                                  | 8                         | 100<br>(5")      |                  |  |
| 50           |        |         | Wet, Very Dense, Gray Silty Sand  | -          |                      |    |    |    |    |    |    |    |    |  |                                  |                           | 60<br>(5")       |                  |  |
| 55           |        |         | Wet, Very Dense, Gray Sand with Silt and Trace Gravel                                 | SP-SM      |                      |    |    |    |    |    |    |    |    |  |                                  | 9                         | 100<br>(1")      |                  |  |
| 60           |        |         | Wet, Very Dense, Gray Silty Sand  | -          |                      |    |    |    |    |    |    |    |    |  |                                  |                           | 100<br>(1")      |                  |  |
| 65           |        |         | Wet, Very Dense, Gray Sand with Silt  |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           | 100<br>(4")      |                  |  |
|              |        |         | Some Gravel encountered at 63 feet.   |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |  |
| 70           |        |         | Wet, Very Dense, Gray Sand with Silt and Trace Gravel                                 | SP-SM      |                      |    |    |    |    |    |    |    |    |  |                                  | 12                        | 31<br>69-45      |                  |  |

REMARKS: \* The 24 hour water level reading was 16' below ground level.

**ARKANSAS DEPARTMENT OF TRANSPORTATION  
MATERIALS DIVISION - GEOTECHNICAL SECTION**

BORING NO. 2  
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JOB NO. 070509 Clark County  
JOB NAME: Caddo River Str. & Apprs. (Caddo Valley) (S)  
Route 67, Section 6  
STATION: 114+06  
LOCATION: Construction Centerline  
LOGGED BY: Don McCollum

DATE: October 4, 2022  
TYPE OF DRILLING:  
Hollow Stem Auger - Rotary Wash  
EQUIPMENT: Acker 1  
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 80

| DEPTH<br>FT. | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL          | SOIL GROUP | MOISTURE CONTENT (%) |    |    |    |    |    |    |    |    |  | PERCENT PASSING<br>NO. 200 SIEVE | NO. OF BLOWS<br>PER 6-IN. | %<br>T<br>C<br>R | %<br>R<br>Q<br>D |
|--------------|--------|---------|----------------------------------|------------|----------------------|----|----|----|----|----|----|----|----|--|----------------------------------|---------------------------|------------------|------------------|
|              |        |         |                                  |            | PL                   | 10 | 20 | 30 | 40 | 50 | 60 | 70 | LL |  |                                  |                           |                  |                  |
|              |        |         | SURFACE ELEVATION: 200.2         |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |
| 75           |        |         | Very Dense, Poorly Cemented Sand | -          |                      |    |    |    |    |    |    |    |    |  | 100 (2")                         |                           |                  |                  |
| 80           |        |         |                                  |            |                      |    |    |    |    |    |    |    |    |  |                                  | 100 (4")                  |                  |                  |
| 85           |        |         | Boring Terminated                |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |
| 90           |        |         |                                  |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |
| 95           |        |         |                                  |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |
| 100          |        |         |                                  |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |
| 105          |        |         |                                  |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |

REMARKS: \* The 24 hour water level reading was 16' below ground level.

**ARKANSAS DEPARTMENT OF TRANSPORTATION  
MATERIALS DIVISION - GEOTECHNICAL SECTION**

BORING NO. 3  
PAGE 1 OF 3

JOB NO. 070509 Clark County  
JOB NAME: Caddo River Str. & Apprs. (Caddo Valley) (S)  
Route 67, Section 6  
STATION: 114+91  
LOCATION: Construction Centerline  
LOGGED BY: Don McCollum

DATE: Sept. 27, 28, and Oct. 3, 2022  
TYPE OF DRILLING:  
Hollow Stem Auger - Rotary Wash  
EQUIPMENT: Acker 1  
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 80

| DEPTH<br>FT. | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL   | SOIL GROUP | MOISTURE CONTENT (%) |    |    |    |    |    |    |    |    |  |    | PERCENT PASSING<br>NO. 200 SIEVE | NO. OF BLOWS<br>PER 6-IN. | %<br>T<br>C<br>R | %<br>R<br>Q<br>D |
|--------------|--------|---------|---|------------|----------------------|----|----|----|----|----|----|----|----|--|----|----------------------------------|---------------------------|------------------|------------------|
|              |        |         |   |            | PL                   | 10 | 20 | 30 | 40 | 50 | 60 | 70 | LL |  |    |                                  |                           |                  |                  |
|              |        |         | SURFACE ELEVATION: 198.8  |            |                      |    |    |    |    |    |    |    |    |  |    |                                  |                           |                  |                  |
| 5            |        |         | Moist, Medium Dense, Brown Silt   | -          |                      |    |    |    |    |    |    |    |    |  |    |                                  | 4                         | 8-8              |                  |
|              |        |         |   | -          |                      |    |    |    |    |    |    |    |    |  |    |                                  |                           |                  |                  |
|              |        |         | Moist, Loose, Brown Silt with Sand                                      | ML         |                      |    |    |    |    |    |    |    |    |  | 73 | 3                                | 4-5                       |                  |                  |
|              |        |         |   | -          |                      |    |    |    |    |    |    |    |    |  |    |                                  |                           |                  |                  |
| 10           |        |         | Moist, Loose, Brown Silty Sand with Some Gravel                         | SM         |                      |    |    |    |    |    |    |    |    |  | 18 | 3                                | 3-7                       |                  |                  |
|              |        |         |   | -          |                      |    |    |    |    |    |    |    |    |  |    |                                  |                           |                  |                  |
| 15           |        |         | Wet, Loose, Brown Poorly Graded Gravel with Silt and Sand*              | GP-GM      |                      |    |    |    |    |    |    |    |    |  | 10 | 2                                | 5-5                       |                  |                  |
|              |        |         |   | -          |                      |    |    |    |    |    |    |    |    |  |    |                                  |                           |                  |                  |
| 20           |        |         | Wet, Medium Dense, Brown Well Graded Gravel with Sand                   | GW         |                      |    |    |    |    |    |    |    |    |  | 1  | 6                                | 9-10                      |                  |                  |
|              |        |         |   | -          |                      |    |    |    |    |    |    |    |    |  |    |                                  |                           |                  |                  |
| 25           |        |         | Wet, Very Dense, Brown Well Graded Sand with Gravel                     | SW         |                      |    |    |    |    |    |    |    |    |  | 2  | 60                               | (2")                      |                  |                  |
|              |        |         |   |            |                      |    |    |    |    |    |    |    |    |  |    |                                  |                           |                  |                  |
| 30           |        |         | Wet, Very Hard, Gray Clay with Cemented Sand Seams (Nacatoch Formation) |            |                      |    |    |    |    |    |    |    |    |  |    | 3                                | 60                        | (1")             |                  |
|              |        |         | SANDSTONE - Unweathered, Medium Hard, Calcareous, Gray Sand with Silt   |            |                      |    |    |    |    |    |    |    |    |  |    |                                  |                           |                  |                  |
| 35           |        |         | Wet, Medium Dense, Gray Sand with Silt and Trace Gravel                 | -          |                      |    |    |    |    |    |    |    |    |  |    | 7                                | 11-18                     |                  |                  |

REMARKS: 24 hour water level reading was 12' below ground level

**ARKANSAS DEPARTMENT OF TRANSPORTATION  
MATERIALS DIVISION - GEOTECHNICAL SECTION**

BORING NO. 3  
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JOB NO. 070509 Clark County  
JOB NAME: Caddo River Str. & Apprs. (Caddo Valley) (S)  
Route 67, Section 6  
STATION: 114+91  
LOCATION: Construction Centerline  
LOGGED BY: Don McCollum

DATE: Sept. 27, 28, and Oct. 3, 2022  
TYPE OF DRILLING:  
Hollow Stem Auger - Rotary Wash  
EQUIPMENT: Acker 1  
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 80

| DEPTH<br>FT. | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL                               | SOIL GROUP | MOISTURE CONTENT (%) |    |    |    |    |    |    |    |    |  | PERCENT PASSING<br>NO. 200 SIEVE | NO. OF BLOWS<br>PER 6-IN. | %<br>T<br>C<br>R | %<br>R<br>Q<br>D |
|--------------|--------|---------|---|------------|----------------------|----|----|----|----|----|----|----|----|--|----------------------------------|---------------------------|------------------|------------------|
|              |        |         |   |            | PL                   | 10 | 20 | 30 | 40 | 50 | 60 | 70 | LL |  |                                  |                           |                  |                  |
|              |        |         | SURFACE ELEVATION: 198.8                              |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |
| 40           |        |         | Wet, Dense, Gray Silty Sand with Gravel               |            |                      |    |    |    |    |    |    |    |    |  |                                  | 5                         | 18-27            |                  |
| 45           |        |         | Wet, Very Dense, Gray Silty Sand                      |            |                      |    |    |    |    |    |    |    |    |  |                                  | 100                       | (6")             |                  |
| 50           |        |         | Wet, Very Dense, Gray Sand with Silt and Trace Gravel | SP-SM      |                      |    |    |    |    |    |    |    |    |  |                                  | 8                         | 35               | 60               |
| 55           |        |         | Wet, Very Dense, Gray Sand with Silt                  | -          |                      |    |    |    |    |    |    |    |    |  |                                  | 60                        | (4")             |                  |
| 60           |        |         | Wet, Very Dense, Gray Sand with Silt and Trace Gravel |            |                      |    |    |    |    |    |    |    |    |  |                                  | 100                       | (5")             |                  |
| 65           |        |         | Wet, Very Dense, Gray Sand with Silt and Trace Gravel | SP-SM      |                      |    |    |    |    |    |    |    |    |  |                                  | 12                        | 3                | 7-50             |
| 70           |        |         | Wet, Very Dense, Gray Sand with Silt and Trace Gravel | SP-SM      |                      |    |    |    |    |    |    |    |    |  |                                  | 7                         | 60               | (1")             |

REMARKS: 24 hour water level reading was 12' below ground level

**ARKANSAS DEPARTMENT OF TRANSPORTATION  
MATERIALS DIVISION - GEOTECHNICAL SECTION**

BORING NO. 3  
PAGE 3 OF 3

JOB NO. 070509 Clark County  
JOB NAME: Caddo River Str. & Apprs. (Caddo Valley) (S)  
Route 67, Section 6  
STATION: 114+91  
LOCATION: Construction Centerline  
LOGGED BY: Don McCollum

DATE: Sept. 27, 28, and Oct. 3, 2022  
TYPE OF DRILLING:  
Hollow Stem Auger - Rotary Wash  
EQUIPMENT: Acker 1  
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 80

| DEPTH<br>FT. | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL                            | SOIL GROUP | MOISTURE CONTENT (%) |    |    |    |    |    |    |    |    |  |  | PERCENT PASSING<br>NO. 200 SIEVE | NO. OF BLOWS<br>PER 6-IN. | %<br>T<br>C<br>R | %<br>R<br>Q<br>D |
|--------------|--------|---------|--|------------|----------------------|----|----|----|----|----|----|----|----|--|--|----------------------------------|---------------------------|------------------|------------------|
|              |        |         |  |            | PL                   | 10 | 20 | 30 | 40 | 50 | 60 | 70 | LL |  |  |                                  |                           |                  |                  |
|              |        |         | SURFACE ELEVATION: 198.8                           |            |                      |    |    |    |    |    |    |    |    |  |  |                                  |                           |                  |                  |
| 75           |        |         | Very Dense, Poorly Cemented Sand with Silt         | -          |                      |    |    |    |    |    |    |    |    |  |  | 9<br>100<br>(1")                 |                           |                  |                  |
| 80           |        |         | Very Dense, Poorly Cemented Sand with Trace Gravel |            |                      |    |    |    |    |    |    |    |    |  |  | 60<br>(2")                       |                           |                  |                  |
| 85           |        |         | Boring Terminated                                  |            |                      |    |    |    |    |    |    |    |    |  |  |                                  |                           |                  |                  |
| 90           |        |         |  |            |                      |    |    |    |    |    |    |    |    |  |  |                                  |                           |                  |                  |
| 95           |        |         |  |            |                      |    |    |    |    |    |    |    |    |  |  |                                  |                           |                  |                  |
| 100          |        |         |  |            |                      |    |    |    |    |    |    |    |    |  |  |                                  |                           |                  |                  |
| 105          |        |         |  |            |                      |    |    |    |    |    |    |    |    |  |  |                                  |                           |                  |                  |

REMARKS: 24 hour water level reading was 12' below ground level

**ARKANSAS DEPARTMENT OF TRANSPORTATION  
MATERIALS DIVISION - GEOTECHNICAL SECTION**

BORING NO. 4  
PAGE 1 OF 3

JOB NO. 070509 Clark County  
JOB NAME: Caddo River Str. & Apprs. (Caddo Valley) (S)  
Route 67, Section 6  
STATION: 115+76  
LOCATION: Construction Centerline  
LOGGED BY: Don McCollum checked by James Carson Sloan

DATE: September 26 and 27, 2022  
TYPE OF DRILLING:  
EQUIPMENT: Acker 1  
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 100.1

| DEPTH<br>FT. | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL  | SOIL GROUP | MOISTURE CONTENT (%) |    |    |    |    |    |    |    |    |  | PERCENT PASSING<br>NO. 200 SIEVE | NO. OF BLOWS<br>PER 6-IN. | %<br>T<br>C<br>R | %<br>R<br>Q<br>D |
|--------------|--------|---------|--|------------|----------------------|----|----|----|----|----|----|----|----|--|----------------------------------|---------------------------|------------------|------------------|
|              |        |         |  |            | PL                   | 10 | 20 | 30 | 40 | 50 | 60 | 70 | LL |  |                                  |                           |                  |                  |
|              |        |         | SURFACE ELEVATION: 199.7   |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |
| 5            |        |         | Moist, Very Stiff, Brown Lean Clay<br>(samples at 2.5 and 5.0 combined<br>to ensure enough sample to test) | CL         |                      |    |    |    |    |    |    |    |    |  | 92                               | 9<br>9-7                  |                  |                  |
|              |        |         |  | -          |                      |    |    |    |    |    |    |    |    |  |                                  | 6<br>7-9                  |                  |                  |
| 10           |        |         | Moist, Loose, Brown Silty Sand   | SM         |                      |    |    |    |    |    |    |    |    |  | 41                               | 4<br>3-3                  |                  |                  |
|              |        |         |  | -          |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |
| 15           |        |         | Wet, Medium Dense, Brown Silty<br>Gravel with Sand*  | GM         |                      |    |    |    |    |    |    |    |    |  | 15                               | 5<br>9-12                 |                  |                  |
|              |        |         |  | -          |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |
| 20           |        |         | Wet, Very Loose, Brown Gravel with<br>Sand   |            |                      |    |    |    |    |    |    |    |    |  |                                  | 3<br>2-2                  |                  |                  |
|              |        |         |  | GP         |                      |    |    |    |    |    |    |    |    |  | 3                                | 18<br>2-9<br>(9")         |                  |                  |
| 25           |        |         | Wet, Medium Dense, Brown Poorly<br>Graded Gravel with Sand   | -          |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |
|              |        |         |  | SP         |                      |    |    |    |    |    |    |    |    |  | 4                                | 6<br>13-11                |                  |                  |
| 30           |        |         | Wet, Medium Dense, Brown Poorly<br>Graded Sand with Gravel   |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |
|              |        |         |  | -          |                      |    |    |    |    |    |    |    |    |  |                                  | 4<br>7-7                  |                  |                  |
| 35           |        |         | Wet, Medium Dense, Gray Silty<br>Sand<br>(Nacatoch Formation)  |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |

REMARKS: \* Water level was measured at 12' below ground level on September 27.

**ARKANSAS DEPARTMENT OF TRANSPORTATION  
MATERIALS DIVISION - GEOTECHNICAL SECTION**

BORING NO. 4  
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JOB NO. 070509 Clark County  
JOB NAME: Caddo River Str. & Apprs. (Caddo Valley) (S)  
Route 67, Section 6  
STATION: 115+76  
LOCATION: Construction Centerline  
LOGGED BY: Don McCollum checked by James Carson Sloan

DATE: September 26 and 27, 2022  
TYPE OF DRILLING:  
EQUIPMENT: Acker 1  
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 100.1

| DEPTH<br>FT. | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL  | SOIL GROUP | MOISTURE CONTENT (%) |    |    |    |    |    |    |    |  |  | PERCENT PASSING<br>NO. 200 SIEVE | NO. OF BLOWS<br>PER 6-IN. | %<br>T<br>C<br>R | %<br>R<br>Q<br>D |
|--------------|--------|---------|--|------------|----------------------|----|----|----|----|----|----|----|--|--|----------------------------------|---------------------------|------------------|------------------|
|              |        |         |  |            | PL                   | 20 | 30 | 40 | 50 | 60 | 70 | LL |  |  |                                  |                           |                  |                  |
|              |        |         | SURFACE ELEVATION: 199.7   |            |                      |    |    |    |    |    |    |    |  |  |                                  |                           |                  |                  |
| 40           |        | X       | Wet, Very Dense, Gray Silty Sand with Some Gravel and Trace Lignite                                    |            |                      |    |    |    |    |    |    |    |  |  | 11                               | 30-75                     |                  |                  |
| 45           |        | X       | Wet, Very Dense, Gray Poorly Graded Sand with Trace Lignite  | SP         |                      |    |    |    |    |    |    |    |  |  | 4                                | 65                        |                  |                  |
|              |        |         |  |            |                      |    |    |    |    |    |    |    |  |  |                                  | 60                        |                  |                  |
| 50           |        |         | Wet, Very Dense, Gray Sand with Silt and Trace Gravel (Some lignite was observed in cuttings at 49.5') |            |                      |    |    |    |    |    |    |    |  |  |                                  | 60                        |                  |                  |
| 55           |        | X       | Wet, Very Dense, Gray Sand with Silt   | -          |                      |    |    |    |    |    |    |    |  |  |                                  | 85                        |                  |                  |
|              |        |         |  |            |                      |    |    |    |    |    |    |    |  |  |                                  | 15                        |                  |                  |
| 60           |        | X       | Wet, Very Dense, Gray Sand with Silt and Trace Gravel  | SP-SM      |                      |    |    |    |    |    |    |    |  |  | 12                               | 16                        |                  |                  |
|              |        |         |  |            |                      |    |    |    |    |    |    |    |  |  |                                  | 74-40                     |                  |                  |
| 65           |        | X       |  |            |                      |    |    |    |    |    |    |    |  |  |                                  | 100                       |                  |                  |
|              |        |         |  |            |                      |    |    |    |    |    |    |    |  |  |                                  | 5"                        |                  |                  |
| 70           |        |         |  |            |                      |    |    |    |    |    |    |    |  |  |                                  | 100                       |                  |                  |
|              |        |         |  |            |                      |    |    |    |    |    |    |    |  |  |                                  | 5"                        |                  |                  |

REMARKS: \* Water level was measured at 12' below ground level on September 27.

**ARKANSAS DEPARTMENT OF TRANSPORTATION  
MATERIALS DIVISION - GEOTECHNICAL SECTION**

BORING NO. 4  
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JOB NO. 070509 Clark County  
JOB NAME: Caddo River Str. & Apprs. (Caddo Valley) (S)  
Route 67, Section 6  
STATION: 115+76  
LOCATION: Construction Centerline  
LOGGED BY: Don McCollum checked by James Carson Sloan

DATE: September 26 and 27, 2022  
TYPE OF DRILLING:  
EQUIPMENT: Acker 1  
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 100.1

| DEPTH<br>FT. | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL  | SOIL GROUP | MOISTURE CONTENT (%) |    |    |    |    |    |    |    |    |  | PERCENT PASSING<br>NO. 200 SIEVE | NO. OF BLOWS<br>PER 6-IN. | %<br>T<br>C<br>R | %<br>R<br>Q<br>D |
|--------------|--------|---------|--|------------|----------------------|----|----|----|----|----|----|----|----|--|----------------------------------|---------------------------|------------------|------------------|
|              |        |         |  |            | PL                   | 10 | 20 | 30 | 40 | 50 | 60 | 70 | LL |  |                                  |                           |                  |                  |
|              |        |         | SURFACE ELEVATION: 199.7   |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |
| 75           |        |         | Wet, Very Dense, Gray Sand with Silt (Poorly Cemented Seams)     |            |                      |    |    |    |    |    |    |    |    |  |                                  | 60 (2")                   |                  |                  |
| 80           |        |         | Wet, Very Dense, Gray Poorly Cemented Silty Sand                 | -          |                      |    |    |    |    |    |    |    |    |  |                                  | 60 (1")                   |                  |                  |
| 85           |        |         | Moist, Very Dense, Gray Cemented Silt                            |            |                      |    |    |    |    |    |    |    |    |  |                                  | 100 (1")                  |                  |                  |
| 90           |        |         | Wet, Very Dense, Gray Poorly Cemented Silty Sand                 |            |                      |    |    |    |    |    |    |    |    |  |                                  | 100 (5")                  |                  |                  |
| 95           |        |         | Wet, Very Dense, Gray Poorly Cemented Sand (No Sample Recovered) |            |                      |    |    |    |    |    |    |    |    |  |                                  | 60 (2")                   |                  |                  |
| 100          |        |         | Wet, Very Dense, Gray Poorly Cemented Sand                       |            |                      |    |    |    |    |    |    |    |    |  |                                  | 60 (4")                   |                  |                  |
|              |        |         | Boring Terminated  |            |                      |    |    |    |    |    |    |    |    |  |                                  | 100 (1")                  |                  |                  |
| 105          |        |         |  |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |

REMARKS: \* Water level was measured at 12' below ground level on September 27.

**ARKANSAS DEPARTMENT OF TRANSPORTATION  
MATERIALS DIVISION - GEOTECHNICAL SECTION**

BORING NO. 5  
PAGE 1 OF 3

JOB NO. 070509 Clark County  
JOB NAME: Caddo River Str. & Apprs. (Caddo Valley) (S)  
Route 67, Section 6  
STATION: 116+76  
LOCATION: 30' Right of Construction Centerline  
LOGGED BY: Don McCollum checked by James Carson Sloan

DATE: September 20, 2022  
TYPE OF DRILLING:  
Hollow Stem Auger - Rotary Wash  
EQUIPMENT: Acker 1  
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 100.1

| DEPTH<br>FT. | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL  | SOIL GROUP | MOISTURE CONTENT (%) |    |    |    |    |    |    |    |    |  |    | PERCENT PASSING<br>NO. 200 SIEVE | NO. OF BLOWS<br>PER 6-IN. | %<br>T<br>C<br>R | %<br>R<br>Q<br>D |
|--------------|--------|---------|--|------------|----------------------|----|----|----|----|----|----|----|----|--|----|----------------------------------|---------------------------|------------------|------------------|
|              |        |         |  |            | PL                   | 10 | 20 | 30 | 40 | 50 | 60 | 70 | LL |  |    |                                  |                           |                  |                  |
|              |        |         | SURFACE ELEVATION: 200.7   |            |                      |    |    |    |    |    |    |    |    |  |    |                                  |                           |                  |                  |
| 5            |        |         | Moist, Loose, Brown Lean Clay with Sand<br>(samples at 2.5 and 5.0 combined to ensure enough sample to test) | CL         |                      |    |    |    |    |    |    |    |    |  | 84 | 3<br>4-4                         |                           |                  |                  |
|              |        |         |  | -          |                      |    |    |    |    |    |    |    |    |  |    |                                  |                           |                  |                  |
| 10           |        |         | Wet, Loose, Brown Sandy Silt   | ML         |                      |    |    |    |    |    |    |    |    |  | 65 | 0<br>2-4                         |                           |                  |                  |
|              |        |         |  | -          |                      |    |    |    |    |    |    |    |    |  |    |                                  |                           |                  |                  |
| 15           |        |         | Wet, Loose, Brown Silty Sand   | SM         |                      |    |    |    |    |    |    |    |    |  | 41 | 1<br>3-3                         |                           |                  |                  |
|              |        |         |  | -          |                      |    |    |    |    |    |    |    |    |  |    |                                  |                           |                  |                  |
| 20           |        |         | Wet, Very Loose, Gray Sandy Silt   | ML         |                      |    |    |    |    |    |    |    |    |  | 51 | 0<br>0-0                         |                           |                  |                  |
|              |        |         | Wet, Dense, Brown Gravel with Silt and Sand  | -          |                      |    |    |    |    |    |    |    |    |  |    |                                  |                           |                  |                  |
| 25           |        |         | Wet, Dense, Brown Well Graded Gravel with Silt and Sand  | GW-GM      |                      |    |    |    |    |    |    |    |    |  | 5  | 9<br>24-16                       |                           |                  |                  |
|              |        |         |  | -          |                      |    |    |    |    |    |    |    |    |  |    |                                  |                           |                  |                  |
| 30           |        |         | Wet, Medium Dense, Brown Well Graded Gravel with Sand  | GW         |                      |    |    |    |    |    |    |    |    |  | 3  | 6<br>5-6                         |                           |                  |                  |
|              |        |         |  | -          |                      |    |    |    |    |    |    |    |    |  |    |                                  |                           |                  |                  |
| 35           |        |         | Wet, Medium Dense, Gray Silty, Clayey Sand   | SC-SM      |                      |    |    |    |    |    |    |    |    |  | 41 | 4<br>7-7                         |                           |                  |                  |
|              |        |         |  | -          |                      |    |    |    |    |    |    |    |    |  |    |                                  |                           |                  |                  |

REMARKS:

**ARKANSAS DEPARTMENT OF TRANSPORTATION  
MATERIALS DIVISION - GEOTECHNICAL SECTION**

BORING NO. 5  
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JOB NO. 070509 Clark County  
JOB NAME: Caddo River Str. & Apprs. (Caddo Valley) (S)  
Route 67, Section 6  
STATION: 116+76  
LOCATION: 30' Right of Construction Centerline  
LOGGED BY: Don McCollum checked by James Carson Sloan

DATE: September 20, 2022  
TYPE OF DRILLING:  
Hollow Stem Auger - Rotary Wash  
EQUIPMENT: Acker 1  
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 100.1

| DEPTH<br>FT. | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL                               | SOIL GROUP | MOISTURE CONTENT (%) |    |    |    |    |    |    |    |    |  | PERCENT PASSING<br>NO. 200 SIEVE | NO. OF BLOWS<br>PER 6-IN. | %<br>T<br>C<br>R | %<br>R<br>Q<br>D |  |
|--------------|--------|---------|---|------------|----------------------|----|----|----|----|----|----|----|----|--|----------------------------------|---------------------------|------------------|------------------|--|
|              |        |         |   |            | PL                   | 10 | 20 | 30 | 40 | 50 | 60 | 70 | LL |  |                                  |                           |                  |                  |  |
|              |        |         | SURFACE ELEVATION: 200.7<br>(Nacatoch Formation)      | SC-SM      |                      |    |    |    |    |    |    |    |    |  |                                  | 29                        | 3<br>6-9         |                  |  |
| 40           |        |         |   | -          |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |  |
|              |        |         | Wet, Very Dense, Gray Poorly Graded Sand with Silt    | SP-SM      |                      |    |    |    |    |    |    |    |    |  |                                  | 11                        | 58<br>94-96      |                  |  |
| 45           |        |         |   |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |  |
|              |        |         | Wet, Very Dense, Gray Sand with Silt                  | -          |                      |    |    |    |    |    |    |    |    |  |                                  |                           | 100<br>(1")      |                  |  |
| 50           |        |         |   |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |  |
|              |        |         | Wet, Very Dense, Gray Sand with Silt and Trace Gravel |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           | 100<br>(1")      |                  |  |
| 55           |        |         |   |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |  |
|              |        |         | Gravel with Sand                                      |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |  |
| 60           |        |         |   | SM         |                      |    |    |    |    |    |    |    |    |  |                                  | 15                        | 31<br>36-60      |                  |  |
|              |        |         | Wet, Very Dense, Gray Silty Sand                      |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |  |
| 65           |        |         |   |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |  |
|              |        |         | Wet, Very Dense, Gray Silty Sand with Some Lignite    |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           | 100<br>(2")      |                  |  |
| 70           |        |         |   |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |  |

REMARKS:

**ARKANSAS DEPARTMENT OF TRANSPORTATION  
MATERIALS DIVISION - GEOTECHNICAL SECTION**

BORING NO. 5  
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JOB NO. 070509 Clark County  
JOB NAME: Caddo River Str. & Apprs. (Caddo Valley) (S)  
Route 67, Section 6  
STATION: 116+76  
LOCATION: 30' Right of Construction Centerline  
LOGGED BY: Don McCollum checked by James Carson Sloan

DATE: September 20, 2022  
TYPE OF DRILLING:  
Hollow Stem Auger - Rotary Wash  
EQUIPMENT: Acker 1  
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 100.1

| DEPTH<br>FT. | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL          | SOIL GROUP | MOISTURE CONTENT (%) |    |    |    |    |    |    |    |    |  |  | PERCENT PASSING<br>NO. 200 SIEVE | NO. OF BLOWS<br>PER 6-IN. | %<br>T<br>C<br>R | %<br>R<br>Q<br>D |
|--------------|--------|---------|----------------------------------|------------|----------------------|----|----|----|----|----|----|----|----|--|--|----------------------------------|---------------------------|------------------|------------------|
|              |        |         |                                  |            | PL                   | 10 | 20 | 30 | 40 | 50 | 60 | 70 | LL |  |  |                                  |                           |                  |                  |
|              |        |         | SURFACE ELEVATION: 200.7         |            |                      |    |    |    |    |    |    |    |    |  |  |                                  |                           |                  |                  |
| 75           |        |         | Wet, Very Dense, Gray Silty Sand |            |                      |    |    |    |    |    |    |    |    |  |  |                                  | 100 (4")                  |                  |                  |
|              |        |         |                                  |            |                      |    |    |    |    |    |    |    |    |  |  |                                  | 100 (4")                  |                  |                  |
| 80           |        |         |                                  | -          |                      |    |    |    |    |    |    |    |    |  |  |                                  | 100 (1")                  |                  |                  |
|              |        |         |                                  |            |                      |    |    |    |    |    |    |    |    |  |  |                                  | 100 (4")                  |                  |                  |
| 85           |        |         |                                  |            |                      |    |    |    |    |    |    |    |    |  |  |                                  | 100 (4")                  |                  |                  |
|              |        |         | Very Dense, Poorly Cemented Sand |            |                      |    |    |    |    |    |    |    |    |  |  |                                  | 100 (4")                  |                  |                  |
| 90           |        |         |                                  |            |                      |    |    |    |    |    |    |    |    |  |  |                                  | 100 (4")                  |                  |                  |
|              |        |         |                                  |            |                      |    |    |    |    |    |    |    |    |  |  |                                  | 100 (1")                  |                  |                  |
| 95           |        |         |                                  |            |                      |    |    |    |    |    |    |    |    |  |  |                                  | 100 (1")                  |                  |                  |
|              |        |         |                                  |            |                      |    |    |    |    |    |    |    |    |  |  |                                  | 100 (1")                  |                  |                  |
| 100          |        |         |                                  |            |                      |    |    |    |    |    |    |    |    |  |  |                                  | 100 (1")                  |                  |                  |
|              |        |         | Boring Terminated                |            |                      |    |    |    |    |    |    |    |    |  |  |                                  | 100 (1")                  |                  |                  |
| 105          |        |         |                                  |            |                      |    |    |    |    |    |    |    |    |  |  |                                  |                           |                  |                  |

REMARKS:

**ARKANSAS DEPARTMENT OF TRANSPORTATION  
MATERIALS DIVISION - GEOTECHNICAL SECTION**

BORING NO. 6  
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JOB NO. 070509 Clark County  
JOB NAME: Caddo River Str. & Apprs. (Caddo Valley) (S)  
Route 67, Section 6  
STATION: 117+46  
LOCATION: 27' Right of Construction Centerline  
LOGGED BY: Don McCollum checked by James Carson Sloan

DATE: September 14, 2022  
TYPE OF DRILLING:  
Hollow Stem Auger - Rotary Wash  
EQUIPMENT: Acker 1  
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 100.1

| DEPTH<br>FT. | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL  | SOIL GROUP | MOISTURE CONTENT (%) |    |    |    |    |    |    |    |    |  |  | PERCENT PASSING<br>NO. 200 SIEVE | NO. OF BLOWS<br>PER 6-IN. | %<br>T<br>C<br>R | %<br>R<br>Q<br>D |
|--------------|--------|---------|--|------------|----------------------|----|----|----|----|----|----|----|----|--|--|----------------------------------|---------------------------|------------------|------------------|
|              |        |         |  |            | PL                   | 10 | 20 | 30 | 40 | 50 | 60 | 70 | LL |  |  |                                  |                           |                  |                  |
|              |        |         | SURFACE ELEVATION: 202.5   |            |                      |    |    |    |    |    |    |    |    |  |  |                                  |                           |                  |                  |
| 5            |        |         | Moist, Stiff, Brown Silty Clay<br>(samples at 2.5 and 5.0 combined<br>to ensure enough sample to test) | CL-ML      |                      |    |    |    |    |    |    |    |    |  |  | 86                               | 5<br>7-7                  |                  |                  |
|              |        |         |  |            |                      |    |    |    |    |    |    |    |    |  |  |                                  | 5<br>5-5                  |                  |                  |
| 10           |        |         | Moist, Loose, Brown Silty Sand*  | SM         |                      |    |    |    |    |    |    |    |    |  |  | 32                               | 2<br>3-4                  |                  |                  |
|              |        |         |  |            |                      |    |    |    |    |    |    |    |    |  |  |                                  |                           |                  |                  |
| 15           |        |         | Moist, Loose, Brown Silty Sand   | SM         |                      |    |    |    |    |    |    |    |    |  |  | 27                               | 4<br>4-4                  |                  |                  |
|              |        |         |  |            |                      |    |    |    |    |    |    |    |    |  |  |                                  |                           |                  |                  |
| 20           |        |         | Wet, Dense, Brown Silty Gravel with<br>Sand**  | GM         |                      |    |    |    |    |    |    |    |    |  |  | 15                               | 4<br>18-22                |                  |                  |
|              |        |         |  |            |                      |    |    |    |    |    |    |    |    |  |  |                                  |                           |                  |                  |
| 25           |        |         | Wet, Medium Dense, Brown Silty<br>Sand with Gravel**   | SM         |                      |    |    |    |    |    |    |    |    |  |  | 27                               | 3<br>4-11                 |                  |                  |
|              |        |         |  |            |                      |    |    |    |    |    |    |    |    |  |  |                                  |                           |                  |                  |
| 30           |        |         | Wet, Medium Dense, Brown Poorly<br>Graded Gravel with Sand   | GP         |                      |    |    |    |    |    |    |    |    |  |  | 4                                | 5<br>7-7                  |                  |                  |
|              |        |         |  |            |                      |    |    |    |    |    |    |    |    |  |  |                                  |                           |                  |                  |
| 35           |        |         | Wet, Medium Dense, Gray Sandy<br>Silt<br>(Nacatoch Formation)  | ML         |                      |    |    |    |    |    |    |    |    |  |  | 52                               | 15<br>7-10                |                  |                  |

REMARKS: \* Water level was measured at 9.0 below ground level 9/22/22.  
\*\* The lab results for 15' and 20' samples and thus the descriptions may be switched with each other.

**ARKANSAS DEPARTMENT OF TRANSPORTATION  
MATERIALS DIVISION - GEOTECHNICAL SECTION**

BORING NO. 6  
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JOB NO. 070509 Clark County  
JOB NAME: Caddo River Str. & Apprs. (Caddo Valley) (S)  
Route 67, Section 6  
STATION: 117+46  
LOCATION: 27' Right of Construction Centerline  
LOGGED BY: Don McCollum checked by James Carson Sloan

DATE: September 14, 2022  
TYPE OF DRILLING:  
Hollow Stem Auger - Rotary Wash  
EQUIPMENT: Acker 1  
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 100.1

| DEPTH<br>FT. | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL                               | SOIL GROUP | MOISTURE CONTENT (%) |    |    |    |    |    |    |    |    |  | PERCENT PASSING<br>NO. 200 SIEVE | NO. OF BLOWS<br>PER 6-IN. | %<br>T<br>C<br>R | %<br>R<br>Q<br>D |  |
|--------------|--------|---------|---|------------|----------------------|----|----|----|----|----|----|----|----|--|----------------------------------|---------------------------|------------------|------------------|--|
|              |        |         |   |            | PL                   | 10 | 20 | 30 | 40 | 50 | 60 | 70 | LL |  |                                  |                           |                  |                  |  |
|              |        |         | SURFACE ELEVATION: 202.5                              |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |  |
| 40           |        | X       | Wet, Medium Dense, Gray Silty Sand with Some Gravel   | SM         |                      |    |    |    |    |    |    |    |    |  |                                  | 17                        | 8<br>11-16       |                  |  |
| 45           |        | X       | Wet, Very Dense, Gray Silty Sand                      | -          |                      |    |    |    |    |    |    |    |    |  |                                  |                           | 100<br>(6")      |                  |  |
| 50           |        | X       | Wet, Very Dense, Gray Poorly Graded Sand with Silt    | SP-SM      |                      |    |    |    |    |    |    |    |    |  |                                  | 8                         | 100<br>(6")      |                  |  |
| 55           |        |         | Wet, Very Dense, Gray Sand with Silt and Trace Gravel | -          |                      |    |    |    |    |    |    |    |    |  |                                  |                           | 100<br>(2")      |                  |  |
| 60           |        |         | Wet, Very Dense, Gray Sand with Silt                  |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           | 100<br>(1")      |                  |  |
| 65           |        | X       | Wet, Very Dense, Gray Silty Sand with Trace Gravel    | SM         |                      |    |    |    |    |    |    |    |    |  |                                  | 15                        | 35<br>36-66      |                  |  |
| 70           |        |         |   |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           | 100<br>(2")      |                  |  |

REMARKS: \* Water level was measured at 9.0 below ground level 9/22/22.  
\*\* The lab results for 15' and 20' samples and thus the descriptions may be switched with each other.

**ARKANSAS DEPARTMENT OF TRANSPORTATION  
MATERIALS DIVISION - GEOTECHNICAL SECTION**

BORING NO. 6  
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JOB NO. 070509 Clark County  
JOB NAME: Caddo River Str. & Apprs. (Caddo Valley) (S)  
Route 67, Section 6  
STATION: 117+46  
LOCATION: 27' Right of Construction Centerline  
LOGGED BY: Don McCollum checked by James Carson Sloan

DATE: September 14, 2022  
TYPE OF DRILLING:  
Hollow Stem Auger - Rotary Wash  
EQUIPMENT: Acker 1  
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 100.1

| DEPTH<br>FT. | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL  | SOIL GROUP | MOISTURE CONTENT (%) |    |    |    |    |    |    |    |    |  |  | PERCENT PASSING<br>NO. 200 SIEVE | NO. OF BLOWS<br>PER 6-IN. | %<br>T<br>C<br>R | %<br>R<br>Q<br>D |  |
|--------------|--------|---------|--|------------|----------------------|----|----|----|----|----|----|----|----|--|--|----------------------------------|---------------------------|------------------|------------------|--|
|              |        |         |  |            | PL                   | 10 | 20 | 30 | 40 | 50 | 60 | 70 | LL |  |  |                                  |                           |                  |                  |  |
|              |        |         | SURFACE ELEVATION: 202.5   |            |                      |    |    |    |    |    |    |    |    |  |  |                                  |                           |                  |                  |  |
| 75           |        |         | Wet, Very Dense, Gray Silty Sand   |            |                      |    |    |    |    |    |    |    |    |  |  |                                  |                           | 100<br>(1")      |                  |  |
| 80           |        |         |  |            |                      |    |    |    |    |    |    |    |    |  |  |                                  |                           | 100<br>(1")      |                  |  |
| 85           |        |         | Very Dense, Poorly Cemented Sand<br>(No Sample Recovered)                      |            |                      |    |    |    |    |    |    |    |    |  |  |                                  |                           | 100<br>(1")      |                  |  |
| 90           |        |         |  |            |                      |    |    |    |    |    |    |    |    |  |  |                                  |                           | 100<br>(1")      |                  |  |
| 95           |        |         |  |            |                      |    |    |    |    |    |    |    |    |  |  |                                  |                           | 100<br>(1")      |                  |  |
| 100          |        |         | Very Dense, Poorly Cemented Sand   |            |                      |    |    |    |    |    |    |    |    |  |  |                                  |                           | 100<br>(1")      |                  |  |
| 105          |        |         | Very Dense, Poorly Cemented Sand<br>(No Sample Recovered)<br>Boring Terminated |            |                      |    |    |    |    |    |    |    |    |  |  |                                  |                           | 100<br>(1")      |                  |  |

REMARKS: \* Water level was measured at 9.0 below ground level 9/22/22.  
\*\* The lab results for 15' and 20' samples and thus the descriptions may be switched with each other.

**ARKANSAS DEPARTMENT OF TRANSPORTATION  
MATERIALS DIVISION - GEOTECHNICAL SECTION**

BORING NO. 7

PAGE 1 OF 3

JOB NO. 070509 Clark County  
 JOB NAME: Caddo River Str. & Apprs. (Caddo Valley) (S)  
 Route 67, Section 6  
 STATION: 118+31  
 LOCATION: 11' Right of Construction Centerline  
 LOGGED BY: Don McCollum checked by James Carson Sloan

DATE: September 12 and 13, 2022  
 TYPE OF DRILLING:  
 Hollow Stem Auger - Rotary Wash  
 EQUIPMENT: Acker 1  
 HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 100.1

| DEPTH<br>FT. | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL  | SOIL GROUP | MOISTURE CONTENT (%) |    |    |    |    |    |    |    |    |    | PERCENT PASSING<br>NO. 200 SIEVE | NO. OF BLOWS<br>PER 6-IN. | %<br>T<br>C<br>R | %<br>R<br>Q<br>D |
|--------------|--------|---------|--|------------|----------------------|----|----|----|----|----|----|----|----|----|----------------------------------|---------------------------|------------------|------------------|
|              |        |         |  |            | PL                   | 10 | 20 | 30 | 40 | 50 | 60 | 70 | LL |    |                                  |                           |                  |                  |
|              |        |         | SURFACE ELEVATION: 191.9   |            |                      |    |    |    |    |    |    |    |    |    |                                  |                           |                  |                  |
| 5            |        |         | Moist, Stiff, Brown Lean Clay and Some Organic Matter (Roots)                | CL         |                      |    |    |    |    |    |    |    |    | 90 | 6<br>6-5                         |                           |                  |                  |
|              |        |         | Moist, Loose, Brown Silt with Sand and Trace Gravel                          | -          |                      |    |    |    |    |    |    |    |    |    | 2<br>2-8                         |                           |                  |                  |
| 10           |        |         | Wet, Medium Dense, Brown Well Graded Gravel with Silt and Sand               | GW-GM      |                      |    |    |    |    |    |    |    |    | 5  | 5<br>7-11                        |                           |                  |                  |
|              |        |         | Wet, Medium Dense, Brown Poorly Graded Gravel and Cobbles with Silt and Sand | GP-GM      |                      |    |    |    |    |    |    |    |    | 6  | 7<br>5-8                         |                           |                  |                  |
| 15           |        |         | Wet, Loose, Brown Poorly Graded Gravel with Silt and Sand                    | GP-GM      |                      |    |    |    |    |    |    |    |    | 6  | 3<br>2-3                         |                           |                  |                  |
| 20           |        |         | Wet, Medium Dense, Brown Poorly Graded Gravel and Cobbles with Silt and Sand | GP-GM      |                      |    |    |    |    |    |    |    |    | 5  | 5<br>11-12                       |                           |                  |                  |
| 25           |        |         | Wet, Very Dense, Gray Poorly Graded Sand with Silt (Nacatoch Formation)      | SP-SM      |                      |    |    |    |    |    |    |    |    | 9  | 60<br>(6")                       |                           |                  |                  |
| 30           |        |         |  |            |                      |    |    |    |    |    |    |    |    |    | 100<br>(6")                      |                           |                  |                  |
| 35           |        |         |  |            |                      |    |    |    |    |    |    |    |    |    |                                  |                           |                  |                  |

REMARKS:

**ARKANSAS DEPARTMENT OF TRANSPORTATION  
MATERIALS DIVISION - GEOTECHNICAL SECTION**

BORING NO. 7

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JOB NO. 070509 Clark County  
 JOB NAME: Caddo River Str. & Apprs. (Caddo Valley) (S)  
 Route 67, Section 6  
 STATION: 118+31  
 LOCATION: 11' Right of Construction Centerline  
 LOGGED BY: Don McCollum checked by James Carson Sloan

DATE: September 12 and 13, 2022  
 TYPE OF DRILLING:  
 Hollow Stem Auger - Rotary Wash  
 EQUIPMENT: Acker 1  
 HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 100.1

| DEPTH<br>FT. | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL                                   | SOIL GROUP | MOISTURE CONTENT (%) |    |    |    |    |    |    |    |    |  | PERCENT PASSING<br>NO. 200 SIEVE | NO. OF BLOWS<br>PER 6-IN. | %<br>T<br>C<br>R | %<br>R<br>Q<br>D |
|--------------|--------|---------|---|------------|----------------------|----|----|----|----|----|----|----|----|--|----------------------------------|---------------------------|------------------|------------------|
|              |        |         |   |            | PL                   | 10 | 20 | 30 | 40 | 50 | 60 | 70 | LL |  |                                  |                           |                  |                  |
|              |        |         | SURFACE ELEVATION: 191.9                                  |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |
| 40           |        |         |   |            |                      |    |    |    |    |    |    |    |    |  | 9                                | 100<br>(6")               |                  |                  |
| 45           |        |         | Wet, Very Dense, Gray Poorly Graded Sand with Silt        | SP-SM      |                      |    |    |    |    |    |    |    |    |  |                                  | 60<br>(2")                |                  |                  |
| 50           |        |         | Wet, Very Dense, Gray Silty Sand with Trace Gravel        | SM         |                      |    |    |    |    |    |    |    |    |  | 26                               | 18<br>47-34               |                  |                  |
| 55           |        |         |   |            |                      |    |    |    |    |    |    |    |    |  |                                  | 75<br>(4")                |                  |                  |
| 60           |        |         | Wet, Very Dense, Gray Silty Sand                          |            |                      |    |    |    |    |    |    |    |    |  |                                  | 60<br>(1")                |                  |                  |
| 65           |        |         |   |            |                      |    |    |    |    |    |    |    |    |  |                                  | 60<br>(1")                |                  |                  |
| 70           |        |         | Very Dense, Poorly Cemented Sand<br>(No sample recovered) |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |

REMARKS:

**ARKANSAS DEPARTMENT OF TRANSPORTATION  
MATERIALS DIVISION - GEOTECHNICAL SECTION**

BORING NO. 7  
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JOB NO. 070509 Clark County  
JOB NAME: Caddo River Str. & Apprs. (Caddo Valley) (S)  
Route 67, Section 6  
STATION: 118+31  
LOCATION: 11' Right of Construction Centerline  
LOGGED BY: Don McCollum checked by James Carson Sloan

DATE: September 12 and 13, 2022  
TYPE OF DRILLING:  
Hollow Stem Auger - Rotary Wash  
EQUIPMENT: Acker 1  
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 100.1

| DEPTH<br>FT. | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL                      | SOIL GROUP | MOISTURE CONTENT (%) |    |    |    |    |    |    |    |    |  |  | PERCENT PASSING<br>NO. 200 SIEVE | NO. OF BLOWS<br>PER 6-IN. | %<br>T<br>C<br>R | %<br>R<br>Q<br>D |
|--------------|--------|---------|--|------------|----------------------|----|----|----|----|----|----|----|----|--|--|----------------------------------|---------------------------|------------------|------------------|
|              |        |         |  |            | PL                   | 10 | 20 | 30 | 40 | 50 | 60 | 70 | LL |  |  |                                  |                           |                  |                  |
|              |        |         | SURFACE ELEVATION: 191.9                     |            |                      |    |    |    |    |    |    |    |    |  |  |                                  |                           |                  |                  |
| 75           |        |         |  |            |                      |    |    |    |    |    |    |    |    |  |  |                                  | 60 (1")                   |                  |                  |
| 80           |        |         | Moist, Very Dense, Gray Poorly Cemented Sand | -          |                      |    |    |    |    |    |    |    |    |  |  |                                  | 60 (1")                   |                  |                  |
| 85           |        |         | (No sample recovered)                        |            |                      |    |    |    |    |    |    |    |    |  |  |                                  | 100 (1")                  |                  |                  |
| 90           |        |         | Moist, Very Dense, Gray Poorly Cemented Sand |            |                      |    |    |    |    |    |    |    |    |  |  |                                  | 100 (1")                  |                  |                  |
| 95           |        |         | (No Sample recovered)                        |            |                      |    |    |    |    |    |    |    |    |  |  |                                  | 100 (0.5")                |                  |                  |
| 100          |        |         |  |            |                      |    |    |    |    |    |    |    |    |  |  |                                  | 100 (1")                  |                  |                  |
|              |        |         | Boring Terminated                            |            |                      |    |    |    |    |    |    |    |    |  |  |                                  | 100 (1")                  |                  |                  |
| 105          |        |         |  |            |                      |    |    |    |    |    |    |    |    |  |  |                                  |                           |                  |                  |

REMARKS:

**ARKANSAS DEPARTMENT OF TRANSPORTATION  
MATERIALS DIVISION - GEOTECHNICAL SECTION**

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JOB NO. 070509 Clark County  
JOB NAME: Caddo River Str. & Apprs. (Caddo Valley) (S)  
Route 67, Section 6  
STATION: 119+16  
LOCATION: 10' Right of Construction Centerline  
LOGGED BY: Don McCollum checked by James Carson Sloan

DATE: August 25, 31 and September 7, 2022  
TYPE OF DRILLING: Hollow Stem Auger -  
Rotary Wash - Diamond Core  
EQUIPMENT: Acker 1  
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 100.1

| DEPTH<br>FT. | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL   | SOIL GROUP | MOISTURE CONTENT (%) |    |    |    |    |    |    |    |    |  | PERCENT PASSING<br>NO. 200 SIEVE | NO. OF BLOWS<br>PER 6-IN. | %<br>T<br>C<br>R | %<br>R<br>Q<br>D |
|--------------|--------|---------|---|------------|----------------------|----|----|----|----|----|----|----|----|--|----------------------------------|---------------------------|------------------|------------------|
|              |        |         |   |            | PL                   | 10 | 20 | 30 | 40 | 50 | 60 | 70 | LL |  |                                  |                           |                  |                  |
|              |        |         | SURFACE ELEVATION: 195.7  |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |
| 5            |        |         | Moist, Stiff, Brown Silty Clay with Sand<br>(samples at 2.5 and 5.0 combined to ensure enough sample to test) | CL-ML      |                      |    |    |    |    |    |    |    |    |  | 84                               | 5<br>5-7                  |                  |                  |
|              |        |         |   |            |                      |    |    |    |    |    |    |    |    |  |                                  | 4<br>6-7                  |                  |                  |
| 10           |        |         | Moist, Stiff, Brown Sandy Lean Clay   | CL         |                      |    |    |    |    |    |    |    |    |  |                                  | 5<br>6-7                  |                  |                  |
| 15           |        |         | Moist, Very Dense, Brown Silty Sand with Gravel<br>(Cobbles observed on auger flights)*                       | -          |                      |    |    |    |    |    |    |    |    |  |                                  | 22<br>26-31               |                  |                  |
| 20           |        |         | Wet, Very Dense, Brown Well Graded Sand with Silt and Gravel<br>(Cobbles observed on auger flights)           | SW-SM      |                      |    |    |    |    |    |    |    |    |  | 7                                | 5<br>8-60                 |                  |                  |
|              |        |         | Sand<br>(Nacatoch Formation)  |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |
|              |        |         | SANDSTONE   |            |                      |    |    |    |    |    |    |    |    |  |                                  | 40<br>(0")                |                  |                  |
| 25           |        |         | Wet, Medium Dense, Gray Silty Sand  | -          |                      |    |    |    |    |    |    |    |    |  |                                  | 4<br>4-7                  |                  |                  |
| 30           |        |         | Wet, Very Dense, Gray Silty Sand  | SM         |                      |    |    |    |    |    |    |    |    |  | 13                               | 22<br>29-60               |                  |                  |
| 35           |        |         |   |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |

REMARKS: \* Water level measured on 9/7 was 11.0' below ground level

**ARKANSAS DEPARTMENT OF TRANSPORTATION  
MATERIALS DIVISION - GEOTECHNICAL SECTION**

BORING NO. 8  
PAGE 2 OF 3

JOB NO. 070509 Clark County  
JOB NAME: Caddo River Str. & Apprs. (Caddo Valley) (S)  
Route 67, Section 6  
STATION: 119+16  
LOCATION: 10' Right of Construction Centerline  
LOGGED BY: Don McCollum checked by James Carson Sloan

DATE: August 25, 31 and September 7, 2022  
TYPE OF DRILLING: Hollow Stem Auger -  
Rotary Wash - Diamond Core  
EQUIPMENT: Acker 1  
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 100.1

| DEPTH<br>FT. | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL                                      | SOIL GROUP | MOISTURE CONTENT (%) |    |    |    |    |    |    |    |    |  | PERCENT PASSING<br>NO. 200 SIEVE | NO. OF BLOWS<br>PER 6-IN. | %<br>T<br>C<br>R | %<br>R<br>Q<br>D |
|--------------|--------|---------|--|------------|----------------------|----|----|----|----|----|----|----|----|--|----------------------------------|---------------------------|------------------|------------------|
|              |        |         |  |            | PL                   | 10 | 20 | 30 | 40 | 50 | 60 | 70 | LL |  |                                  |                           |                  |                  |
|              |        |         | SURFACE ELEVATION: 195.7                                     |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |
| 40           |        | X       | Wet, Very Dense, Gray Sand with Silt with Trace Gravel       | -          |                      |    |    |    |    |    |    |    |    |  | 2                                | 60 (6")                   |                  |                  |
| 45           |        | X       | Wet, Very Dense, Gray Silty Sand                             | -          |                      |    |    |    |    |    |    |    |    |  | 55                               | 60 (6")                   |                  |                  |
| 50           |        | X       | Wet, Very Dense, Gray Silty Sand with Trace Cemented Nodules | -          |                      |    |    |    |    |    |    |    |    |  | 40                               | (4")                      |                  |                  |
| 55           |        | X       | Wet, Dense, Gray Silty Sand with Gravel                      | SM         |                      |    |    |    |    |    |    |    |    |  | 19                               | 8                         | 16-21            |                  |
| 60           |        | X       | Wet, Very Dense, Gray Silty Sand                             | -          |                      |    |    |    |    |    |    |    |    |  | 9                                | 60 (6")                   |                  |                  |
| 65           |        | X       | Wet, Very Dense, Gray Silty Sand with Some Gravel            | -          |                      |    |    |    |    |    |    |    |    |  | 60                               | 35 (1")                   |                  |                  |
| 70           |        |         |  |            |                      |    |    |    |    |    |    |    |    |  | 30                               | (3")                      | 0                | 0                |

REMARKS: \* Water level measured on 9/7 was 11.0' below ground level

**ARKANSAS DEPARTMENT OF TRANSPORTATION  
MATERIALS DIVISION - GEOTECHNICAL SECTION**

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JOB NO. 070509 Clark County  
JOB NAME: Caddo River Str. & Apprs. (Caddo Valley) (S)  
Route 67, Section 6  
STATION: 119+16  
LOCATION: 10' Right of Construction Centerline  
LOGGED BY: Don McCollum checked by James Carson Sloan

DATE: August 25, 31 and September 7, 2022  
TYPE OF DRILLING: Hollow Stem Auger -  
Rotary Wash - Diamond Core  
EQUIPMENT: Acker 1  
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 100.1

| DEPTH<br>FT. | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL            | SOIL GROUP | MOISTURE CONTENT (%) |    |    |    |    |    |    |    |    |  | PERCENT PASSING<br>NO. 200 SIEVE | NO. OF BLOWS<br>PER 6-IN. | %<br>T<br>C<br>R | %<br>R<br>Q<br>D |
|--------------|--------|---------|------------------------------------|------------|----------------------|----|----|----|----|----|----|----|----|--|----------------------------------|---------------------------|------------------|------------------|
|              |        |         |                                    |            | PL                   | 10 | 20 | 30 | 40 | 50 | 60 | 70 | LL |  |                                  |                           |                  |                  |
|              |        |         | SURFACE ELEVATION: 195.7           |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |
| 75           |        |         | Silty Sand (No Recovery)           |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           | 0                | 0                |
|              |        | X       |                                    | SM         |                      |    |    |    |    |    |    |    |    |  | 33                               | 4                         |                  |                  |
| 80           |        |         | Wet, Very Dense, Gray Silty Sand   |            |                      |    |    |    |    |    |    |    |    |  |                                  | 10-50                     |                  |                  |
|              |        |         |                                    | -          |                      |    |    |    |    |    |    |    |    |  |                                  | 100<br>(2")               |                  |                  |
| 85           |        | X       |                                    | SM         |                      |    |    |    |    |    |    |    |    |  | 42                               | 93                        |                  |                  |
|              |        |         | Moist, Very Dense, Gray Silty Sand |            |                      |    |    |    |    |    |    |    |    |  |                                  | 3<br>(0")                 |                  |                  |
| 90           |        |         |                                    | -          |                      |    |    |    |    |    |    |    |    |  |                                  | 100<br>(1")               |                  |                  |
|              |        |         |                                    | -          |                      |    |    |    |    |    |    |    |    |  |                                  | 100<br>(1")               |                  |                  |
| 95           |        |         | Very Dense, Poorly Cemented Sand   |            |                      |    |    |    |    |    |    |    |    |  |                                  | 100<br>(1")               |                  |                  |
| 100          |        |         |                                    |            |                      |    |    |    |    |    |    |    |    |  |                                  | 100<br>(1")               |                  |                  |
|              |        |         | Boring Terminated                  |            |                      |    |    |    |    |    |    |    |    |  |                                  | 100<br>(1")               |                  |                  |
| 105          |        |         |                                    |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |

REMARKS: \* Water level measured on 9/7 was 11.0' below ground level

**ARKANSAS DEPARTMENT OF TRANSPORTATION  
MATERIALS DIVISION - GEOTECHNICAL SECTION**

BORING NO. 9

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JOB NO. 070509 Clark County  
JOB NAME: Caddo River Str. & Apprs. (Caddo Valley) (S)  
Route 67, Section 6

DATE: August 23, 2022  
TYPE OF DRILLING:  
Hollow Stem Auger - Rotary Wash  
EQUIPMENT: Acker 1

STATION: 119+75  
LOCATION: 25' Right of Construction Centerline  
LOGGED BY: Don McCollum checked by James Carson Sloan

HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 40.5

| DEPTH<br>FT. | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL  | SOIL GROUP | MOISTURE CONTENT (%) |    |    |    |    |    |    |    |    |  | PERCENT PASSING<br>NO. 200 SIEVE | NO. OF BLOWS<br>PER 6-IN. | % TCR | % RQD |
|--------------|--------|---------|--|------------|----------------------|----|----|----|----|----|----|----|----|--|----------------------------------|---------------------------|-------|-------|
|              |        |         |  |            | PL                   | 10 | 20 | 30 | 40 | 50 | 60 | 70 | LL |  |                                  |                           |       |       |
|              |        |         | SURFACE ELEVATION: 196.6   |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           |       |       |
| 5            |        |         | Moist, Medium Dense, Brown Sandy Silt  | -          |                      |    |    |    |    |    |    |    |    |  | 83                               | 4<br>4-7                  |       |       |
|              |        |         | Moist, Medium Dense, Brown Silty, Clayey Sand with Trace Organic Matter (Roots)                        | SC-SM      |                      |    |    |    |    |    |    |    |    |  | 17                               | 3<br>6-7                  |       |       |
|              |        |         | Moist, Loose, Brown Silty Sand with Trace Gravel   |            |                      |    |    |    |    |    |    |    |    |  |                                  | 4<br>4-6                  |       |       |
| 10           |        |         | Moist, Medium Dense, Brown Silty Sand with Trace Gravel  | -          |                      |    |    |    |    |    |    |    |    |  |                                  | 3<br>4-8                  |       |       |
|              |        |         | Moist, Medium Dense, Brown Sand with Silt and Gravel   |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           |       |       |
| 15           |        |         | Wet, Medium Dense, Brown Well Graded Sand with Silt and Gravel   | SW-SM      |                      |    |    |    |    |    |    |    |    |  | 6                                | 5<br>8-18                 |       |       |
| 20           |        |         | Wet, Medium Dense, Gray Silty Sand (Nacatoch Formation)  | -          |                      |    |    |    |    |    |    |    |    |  |                                  | 17<br>12-17               |       |       |
| 25           |        |         | Wet, Medium Dense, Gray Poorly Graded Silty Sand (Drilling error caused fall-in decreasing blow count) | SM         |                      |    |    |    |    |    |    |    |    |  | 38                               | 0<br>5-6                  |       |       |
| 30           |        |         | Wet, Very Dense, Gray Sand with Silt and Trace Gravel  | -          |                      |    |    |    |    |    |    |    |    |  |                                  | 100<br>(5")               |       |       |
| 35           |        |         |  |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           |       |       |

REMARKS:

**ARKANSAS DEPARTMENT OF TRANSPORTATION  
MATERIALS DIVISION - GEOTECHNICAL SECTION**

BORING NO. 9

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JOB NO. 070509 Clark County  
JOB NAME: Caddo River Str. & Apprs. (Caddo Valley) (S)  
Route 67, Section 6

DATE: August 23, 2022

TYPE OF DRILLING:  
Hollow Stem Auger - Rotary Wash

STATION: 119+75

EQUIPMENT: Acker 1

LOCATION: 25' Right of Construction Centerline

LOGGED BY: Don McCollum checked by James Carson Sloan

HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 40.5

| DEPTH<br>FT. | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL  | SOIL GROUP | MOISTURE CONTENT (%) |    |    |    |    |    |    |    |    |  |   | PERCENT PASSING<br>NO. 200 SIEVE | NO. OF BLOWS<br>PER 6-IN. | %<br>T<br>C<br>R | %<br>R<br>Q<br>D |
|--------------|--------|---------|--|------------|----------------------|----|----|----|----|----|----|----|----|--|---|----------------------------------|---------------------------|------------------|------------------|
|              |        |         |  |            | PL                   | 10 | 20 | 30 | 40 | 50 | 60 | 70 | LL |  |   |                                  |                           |                  |                  |
|              |        |         | SURFACE ELEVATION: 196.6   |            |                      |    |    |    |    |    |    |    |    |  |   |                                  |                           |                  |                  |
| 40           |        | X       | Wet, Very Dense, Gray Poorly Graded Sand with Silt and Trace Lignite | SP-SM      |                      |    |    |    |    |    |    |    |    |  | 9 | 35<br>32-20                      |                           |                  |                  |
|              |        | X       | Wet, Very Dense, Gray Sand with Silt                                 | -          |                      |    |    |    |    |    |    |    |    |  |   | 100<br>(6")                      |                           |                  |                  |
|              |        |         | Boring Terminated  |            |                      |    |    |    |    |    |    |    |    |  |   |                                  |                           |                  |                  |
| 45           |        |         |  |            |                      |    |    |    |    |    |    |    |    |  |   |                                  |                           |                  |                  |
| 50           |        |         |  |            |                      |    |    |    |    |    |    |    |    |  |   |                                  |                           |                  |                  |
| 55           |        |         |  |            |                      |    |    |    |    |    |    |    |    |  |   |                                  |                           |                  |                  |
| 60           |        |         |  |            |                      |    |    |    |    |    |    |    |    |  |   |                                  |                           |                  |                  |
| 65           |        |         |  |            |                      |    |    |    |    |    |    |    |    |  |   |                                  |                           |                  |                  |
| 70           |        |         |  |            |                      |    |    |    |    |    |    |    |    |  |   |                                  |                           |                  |                  |

REMARKS:

**ARKANSAS DEPARTMENT OF TRANSPORTATION  
MATERIALS DIVISION - GEOTECHNICAL SECTION**

BORING NO. 10  
PAGE 1 OF 2

JOB NO. 070509 Clark County  
JOB NAME: Caddo River Str. & Apprs. (Caddo Valley) (S)  
Route 67, Section 6  
STATION: 120+01  
LOCATION: 25' Right of Construction Centerline  
LOGGED BY: Connor Bunton checked by James Carson Sloan

DATE: August 16 and 17, 2022  
TYPE OF DRILLING: Hollow Stem Auger -  
Diamond Core - Rotary Wash  
EQUIPMENT: Acker 1  
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 50.7

| DEPTH<br>FT. | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL  | SOIL GROUP | MOISTURE CONTENT (%) |    |    |    |    |    |    |    |    |    | PERCENT PASSING<br>NO. 200 SIEVE | NO. OF BLOWS<br>PER 6-IN. | %<br>T<br>C<br>R | %<br>R<br>Q<br>D |
|--------------|--------|---------|--|------------|----------------------|----|----|----|----|----|----|----|----|----|----------------------------------|---------------------------|------------------|------------------|
|              |        |         |  |            | PL                   | 10 | 20 | 30 | 40 | 50 | 60 | 70 | LL |    |                                  |                           |                  |                  |
|              |        |         | SURFACE ELEVATION: 196.8   |            |                      |    |    |    |    |    |    |    |    |    |                                  |                           |                  |                  |
| 5            |        |         | Dry, Very Loose, Brown Sandy Silt  | ML         |                      |    |    |    |    |    |    |    |    | 69 | 2                                |                           |                  |                  |
|              |        |         |  |            |                      |    |    |    |    |    |    |    |    |    | 2-1                              |                           |                  |                  |
|              |        |         | Dry, Very Loose, Brown Silt with Sand with Trace Organic Matter (Roots)  | -          |                      |    |    |    |    |    |    |    |    | 75 | 1                                |                           |                  |                  |
|              |        |         |  |            |                      |    |    |    |    |    |    |    |    |    | 0-1                              |                           |                  |                  |
|              |        |         |  |            |                      |    |    |    |    |    |    |    |    |    | 0                                |                           |                  |                  |
|              |        |         |  |            |                      |    |    |    |    |    |    |    |    |    | 0-0                              |                           |                  |                  |
| 10           |        |         |  |            |                      |    |    |    |    |    |    |    |    |    |                                  |                           |                  |                  |
|              |        |         | Wet, Loose, Brown Silty Sand with Gravel and Some Organic Matter (Wood)* | SM         |                      |    |    |    |    |    |    |    |    | 24 | 2                                |                           |                  |                  |
|              |        |         |  |            |                      |    |    |    |    |    |    |    |    |    | 2-5                              |                           |                  |                  |
| 15           |        |         |  |            |                      |    |    |    |    |    |    |    |    |    |                                  |                           |                  |                  |
|              |        |         | Wet, Medium Dense, Brown Well Graded Gravel with Sand                    | GW         |                      |    |    |    |    |    |    |    |    | 2  | 7                                |                           |                  |                  |
|              |        |         |  |            |                      |    |    |    |    |    |    |    |    |    | 11-11                            |                           |                  |                  |
| 20           |        |         | SANDSTONE - Weathered, Cemented, Calcareous, Brown (Nacatoch Formation)  |            |                      |    |    |    |    |    |    |    |    |    | 15 (4")                          |                           |                  |                  |
|              |        |         | SANDSTONE - Unweathered, Cemented, Calcareous, Gray sand (no recovery)   |            |                      |    |    |    |    |    |    |    |    |    |                                  | 24                        | 20               |                  |
| 25           |        |         |  |            |                      |    |    |    |    |    |    |    |    |    |                                  |                           |                  |                  |
|              |        |         | Sand, Gravel at the bottom of the run. Gravel may be fall-in.            | -          |                      |    |    |    |    |    |    |    |    |    |                                  | 13                        | 0                |                  |
| 30           |        |         |  |            |                      |    |    |    |    |    |    |    |    |    |                                  |                           |                  |                  |
|              |        |         | Sand (No recovery)   |            |                      |    |    |    |    |    |    |    |    |    |                                  |                           |                  |                  |
| 35           |        |         |  |            |                      |    |    |    |    |    |    |    |    |    |                                  |                           |                  |                  |

REMARKS: \* Water level was 11' below ground level at 5 days after drilling  
\*\* Much of the first 6 inches may be fall-in affecting the blow count.

**ARKANSAS DEPARTMENT OF TRANSPORTATION  
MATERIALS DIVISION - GEOTECHNICAL SECTION**

BORING NO. 10  
PAGE 2 OF 2

JOB NO. 070509 Clark County  
JOB NAME: Caddo River Str. & Apprs. (Caddo Valley) (S)  
Route 67, Section 6  
STATION: 120+01  
LOCATION: 25' Right of Construction Centerline  
LOGGED BY: Connor Bunton checked by James Carson Sloan

DATE: August 16 and 17, 2022  
TYPE OF DRILLING: Hollow Stem Auger -  
Diamond Core - Rotary Wash  
EQUIPMENT: Acker 1  
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 50.7

| DEPTH<br>FT. | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL  | SOIL GROUP | MOISTURE CONTENT (%) |    |    |    |    |    |    |    |    |  | PERCENT PASSING<br>NO. 200 SIEVE | NO. OF BLOWS<br>PER 6-IN. | %<br>T<br>C<br>R | %<br>R<br>Q<br>D |
|--------------|--------|---------|--|------------|----------------------|----|----|----|----|----|----|----|----|--|----------------------------------|---------------------------|------------------|------------------|
|              |        |         |  |            | PL                   | 10 | 20 | 30 | 40 | 50 | 60 | 70 | LL |  |                                  |                           |                  |                  |
|              |        |         | SURFACE ELEVATION: 196.8   |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |
|              |        |         | Wet, Very Dense, Gray Silty Sand                                   | SM         |                      |    |    |    |    |    |    |    |    |  | 20                               | 60<br>(5")                |                  |                  |
| 40           |        |         | Wet, Very Dense, Gray Sand with Silt**                             | -          |                      |    |    |    |    |    |    |    |    |  |                                  | 5<br>100<br>(5")          |                  |                  |
| 45           |        |         | Wet, Very Dense, Gray Sand (No Recovery - damaged catcher)         |            |                      |    |    |    |    |    |    |    |    |  |                                  | 100<br>(5")               |                  |                  |
| 50           |        |         | Wet, Very Dense, Gray Poorly Graded Sand with Silt and Some Gravel | SP-SM      |                      |    |    |    |    |    |    |    |    |  |                                  | 35<br>65<br>(2")          |                  |                  |
|              |        |         | Boring Terminated  |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |
| 55           |        |         |  |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |
| 60           |        |         |  |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |
| 65           |        |         |  |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |
| 70           |        |         |  |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |

REMARKS: \* Water level was 11' below ground level at 5 days after drilling  
\*\* Much of the first 6 inches may be fall-in affecting the blow count.

**ARKANSAS DEPARTMENT OF TRANSPORTATION  
MATERIALS DIVISION - GEOTECHNICAL SECTION**

BORING NO. 11  
PAGE 1 OF 3

JOB NO. 070509 Clark County  
JOB NAME: Caddo River Str. & Apprs. (Caddo Valley) (S)  
Route 67, Section 6  
STATION: 120+58  
LOCATION: 31' Right of Construction Centerline  
LOGGED BY: Don McCollum checked by James Carson Sloan

DATE: August 24 and 29, 2022  
TYPE OF DRILLING:  
Hollow Stem Auger - Rotary Wash  
EQUIPMENT: Acker 1  
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 95.01

| DEPTH<br>FT. | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL  | SOIL GROUP | MOISTURE CONTENT (%) |    |    |    |    |    |    |    |    |  | PERCENT PASSING<br>NO. 200 SIEVE | NO. OF BLOWS<br>PER 6-IN. | %<br>T<br>C<br>R | %<br>R<br>Q<br>D |
|--------------|--------|---------|--|------------|----------------------|----|----|----|----|----|----|----|----|--|----------------------------------|---------------------------|------------------|------------------|
|              |        |         |  |            | PL                   | 10 | 20 | 30 | 40 | 50 | 60 | 70 | LL |  |                                  |                           |                  |                  |
|              |        |         | SURFACE ELEVATION: 200.2   |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |
| 5            |        | X       | Moist, Loose, Brown Sandy Silt<br>(samples at 2.5 and 5.0 combined<br>to ensure enough sample to test) | ML         |                      |    |    |    |    |    |    |    |    |  |                                  | 70                        | 3<br>3-4         |                  |
|              |        | X       |  | -          |                      |    |    |    |    |    |    |    |    |  |                                  |                           | 1<br>2-3         |                  |
| 10           |        | X       | Moist, Loose, Brown Silt with Sand   | ML         |                      |    |    |    |    |    |    |    |    |  |                                  | 81                        | 1<br>2-5         |                  |
|              |        | X       |  | -          |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |
| 15           |        | X       | Moist, Loose, Brown Silty, Clayey<br>Sand  | SC-SM      |                      |    |    |    |    |    |    |    |    |  |                                  | 39                        | 2<br>3-4         |                  |
|              |        | X       |  | -          |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |
| 20           |        | X       | Wet, Very Loose, Sand with Silt and<br>Some Gravel   | SP-SM      |                      |    |    |    |    |    |    |    |    |  |                                  | 9                         | 1<br>1-2         |                  |
|              |        | X       |  | -          |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |
| 25           |        | X       | Wet, Medium Dense, Brown Well<br>Graded Gravel with Silt and Sand                                      | GW-GM      |                      |    |    |    |    |    |    |    |    |  |                                  | 5                         | 1<br>5-8         |                  |
|              |        | X       |  | -          |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |
| 30           |        | X       | Wet, Stiff, Gray Sandy, Silty Clay<br>(Nacatoch Formation)   | CL-ML      |                      |    |    |    |    |    |    |    |    |  |                                  | 52                        | 3<br>7-7         |                  |
|              |        | X       |  | -          |                      |    |    |    |    |    |    |    |    |  |                                  |                           |                  |                  |
| 35           |        | X       |  | -          |                      |    |    |    |    |    |    |    |    |  |                                  |                           | 20<br>60-40      |                  |

REMARKS: \* Tricone bit failed from drilling between 90 and 95 feet below ground level.

**ARKANSAS DEPARTMENT OF TRANSPORTATION  
MATERIALS DIVISION - GEOTECHNICAL SECTION**

BORING NO. 11  
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JOB NO. 070509 Clark County  
JOB NAME: Caddo River Str. & Apprs. (Caddo Valley) (S)  
Route 67, Section 6  
STATION: 120+58  
LOCATION: 31' Right of Construction Centerline  
LOGGED BY: Don McCollum checked by James Carson Sloan

DATE: August 24 and 29, 2022  
TYPE OF DRILLING:  
Hollow Stem Auger - Rotary Wash  
EQUIPMENT: Acker 1  
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 95.01

| DEPTH<br>FT. | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL                               | SOIL GROUP | MOISTURE CONTENT (%) |    |    |    |    |    |    |    |    |  | PERCENT PASSING<br>NO. 200 SIEVE | NO. OF BLOWS<br>PER 6-IN. | % T C R | % R Q D |
|--------------|--------|---------|---|------------|----------------------|----|----|----|----|----|----|----|----|--|----------------------------------|---------------------------|---------|---------|
|              |        |         |   |            | PL                   | 10 | 20 | 30 | 40 | 50 | 60 | 70 | LL |  |                                  |                           |         |         |
|              |        |         | SURFACE ELEVATION: 200.2                              |            |                      |    |    |    |    |    |    |    |    |  |                                  |                           |         |         |
| 40           |        |         | Wet, Very Dense, Gray Silty Sand                      |            |                      |    |    |    |    |    |    |    |    |  | 14                               | 83<br>36<br>(0")          |         |         |
| 45           |        |         |   | SM         |                      |    |    |    |    |    |    |    |    |  |                                  | 22<br>64<br>(0")          |         |         |
| 50           |        |         | Wet, Very Dense, Gray Sand with Silt and Trace Gravel | -          |                      |    |    |    |    |    |    |    |    |  |                                  | 100<br>(6")               |         |         |
| 55           |        |         | Wet, Very Dense, Gray Sand with Gravel                |            |                      |    |    |    |    |    |    |    |    |  |                                  | 100<br>(5")               |         |         |
| 60           |        |         | Wet, Very Dense, Gray Poorly Graded Sand with Gravel  | SP         |                      |    |    |    |    |    |    |    |    |  | 4                                | 100<br>34<br>(5")         |         |         |
| 65           |        |         | Wet, Very Dense, Gray Gravel with Sand                |            |                      |    |    |    |    |    |    |    |    |  |                                  | 45<br>60<br>(5")          |         |         |
| 70           |        |         | Wet, Very Dense, Gray Silty Sand with Trace Gravel    |            |                      |    |    |    |    |    |    |    |    |  |                                  | 100<br>40<br>(5")         |         |         |

REMARKS: \* Tricone bit failed from drilling between 90 and 95 feet below ground level.

**ARKANSAS DEPARTMENT OF TRANSPORTATION  
MATERIALS DIVISION - GEOTECHNICAL SECTION**

BORING NO. 11  
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JOB NO. 070509 Clark County  
JOB NAME: Caddo River Str. & Apprs. (Caddo Valley) (S)  
Route 67, Section 6  
STATION: 120+58  
LOCATION: 31' Right of Construction Centerline  
LOGGED BY: Don McCollum checked by James Carson Sloan

DATE: August 24 and 29, 2022  
TYPE OF DRILLING:  
Hollow Stem Auger - Rotary Wash  
EQUIPMENT: Acker 1  
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 95.01

| DEPTH<br>FT. | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL   | SOIL GROUP | MOISTURE CONTENT (%) |    |    |    |    |    |    |    |  |  | PERCENT PASSING<br>NO. 200 SIEVE | NO. OF BLOWS<br>PER 6-IN. | %<br>T<br>C<br>R | %<br>R<br>Q<br>D |
|--------------|--------|---------|---|------------|----------------------|----|----|----|----|----|----|----|--|--|----------------------------------|---------------------------|------------------|------------------|
|              |        |         |   |            | PL                   | 20 | 30 | 40 | 50 | 60 | 70 | LL |  |  |                                  |                           |                  |                  |
|              |        |         | SURFACE ELEVATION: 200.2  |            |                      |    |    |    |    |    |    |    |  |  |                                  |                           |                  |                  |
| 75           |        |         |   |            |                      |    |    |    |    |    |    |    |  |  |                                  | 100<br>(2")               |                  |                  |
| 80           |        |         | Wet, Very Dense, Gray Silty Sand<br>with Trace Cemented Nodules | -          |                      |    |    |    |    |    |    |    |  |  |                                  | 11<br>60<br>(1")          |                  |                  |
| 85           |        |         | Very Dense, Poorly Cemented<br>Sand                             |            |                      |    |    |    |    |    |    |    |  |  |                                  | 60<br>(1")                |                  |                  |
| 90           |        |         | Very Dense, Poorly Cemented<br>Sand<br>(No recovery)*           |            |                      |    |    |    |    |    |    |    |  |  |                                  | 60<br>(1")                |                  |                  |
| 95           |        |         |   |            |                      |    |    |    |    |    |    |    |  |  |                                  | 40<br>(0")                |                  |                  |
|              |        |         | Boring Terminated   |            |                      |    |    |    |    |    |    |    |  |  |                                  | 40<br>(0")                |                  |                  |
| 100          |        |         |   |            |                      |    |    |    |    |    |    |    |  |  |                                  |                           |                  |                  |
| 105          |        |         |   |            |                      |    |    |    |    |    |    |    |  |  |                                  |                           |                  |                  |

REMARKS: \* Tricone bit failed from drilling between 90 and 95 feet below ground level.

**ARKANSAS DEPARTMENT OF TRANSPORTATION  
MATERIALS DIVISION - GEOTECHNICAL SECTION**

BORING NO. 12  
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JOB NO. 070509 Clark County  
JOB NAME: Caddo River Str. & Apprs. (Caddo Valley) (S)  
Route 67, Section 6  
STATION: 122+72  
LOCATION: 13' Right of Construction Centerline  
LOGGED BY: Stanley Bates checked by Carson Sloan

DATE: October 25, 2012  
TYPE OF DRILLING: Hollow Stem Auger -  
Rotary Wash - Diamond Core  
EQUIPMENT: Acker 1  
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 77.21

| DEPTH<br>FT. | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL   | SOIL GROUP | MOISTURE CONTENT (%) |    |    |    |    |    |    |    |    |  |  | PERCENT PASSING<br>NO. 200 SIEVE | NO. OF BLOWS<br>PER 6-IN. | %<br>T<br>C<br>R | %<br>R<br>Q<br>D |
|--------------|--------|---------|---|------------|----------------------|----|----|----|----|----|----|----|----|--|--|----------------------------------|---------------------------|------------------|------------------|
|              |        |         |   |            | PL                   | 10 | 20 | 30 | 40 | 50 | 60 | 70 | LL |  |  |                                  |                           |                  |                  |
|              |        |         | SURFACE ELEVATION: 191.1  |            |                      |    |    |    |    |    |    |    |    |  |  |                                  |                           |                  |                  |
| 5            |        | ⊗       | Moist, Dense, Brown Poorly Graded Gravel with Silt and Sand                         | GP-GM      |                      |    |    |    |    |    |    |    |    |  |  | 11                               | 5<br>16-22                |                  |                  |
|              |        | ⊗       | Moist, Medium Dense, Brown Poorly Graded Gravel with Silt and Sand                  | -          |                      |    |    |    |    |    |    |    |    |  |  |                                  | 6<br>12-14                |                  |                  |
| 10           |        | ⊗       | Wet, Dense, Brown Poorly Graded Gravel with Silt and Sand                           | GP-GM      |                      |    |    |    |    |    |    |    |    |  |  | 12                               | 6<br>10-26                |                  |                  |
|              |        | ⊗       | Wet, Medium Dense, Brown and Gray Silty Sand with Trace Gravel (Nacatoch Formation) | SM         |                      |    |    |    |    |    |    |    |    |  |  | 36                               | 10<br>8-9                 |                  |                  |
| 15           |        | ⊗       | Wet, Medium Dense, Dark Gray Silty Sand with Trace Gravel                           | SM         |                      |    |    |    |    |    |    |    |    |  |  | 34                               | 3<br>4-7                  |                  |                  |
| 20           |        | ⊗       | Wet, Very Dense, Dark Gray Silty Sand with Trace Gravel                             | SM         |                      |    |    |    |    |    |    |    |    |  |  | 25                               | 41<br>62<br>(4")          |                  |                  |
| 25           |        | ⊗       | Wet, Very Dense, Gray Poorly Graded Sand with Silt                                  | SP-SM      |                      |    |    |    |    |    |    |    |    |  |  | 9                                | 50<br>50<br>(2")          |                  |                  |
| 30           |        | ⊗       | Wet, Very Dense, Gray Poorly Graded Sand with Silt                                  | SP-SM      |                      |    |    |    |    |    |    |    |    |  |  | 6                                | 50<br>50<br>(4")          |                  |                  |
| 35           |        |         |   |            |                      |    |    |    |    |    |    |    |    |  |  |                                  |                           |                  |                  |

REMARKS:

**ARKANSAS DEPARTMENT OF TRANSPORTATION  
MATERIALS DIVISION - GEOTECHNICAL SECTION**

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JOB NO. 070509 Clark County  
JOB NAME: Caddo River Str. & Apprs. (Caddo Valley) (S)  
Route 67, Section 6  
STATION: 122+72  
LOCATION: 13' Right of Construction Centerline  
LOGGED BY: Stanley Bates checked by Carson Sloan

DATE: October 25, 2012  
TYPE OF DRILLING: Hollow Stem Auger -  
Rotary Wash - Diamond Core  
EQUIPMENT: Acker 1  
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 77.21

| DEPTH<br>FT. | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL                                    | SOIL GROUP | MOISTURE CONTENT (%) |    |    |    |    |    |    |    |    |       | PERCENT PASSING<br>NO. 200 SIEVE | NO. OF BLOWS<br>PER 6-IN. | %<br>T<br>C<br>R | %<br>R<br>Q<br>D |
|--------------|--------|---------|--|------------|----------------------|----|----|----|----|----|----|----|----|-------|----------------------------------|---------------------------|------------------|------------------|
|              |        |         |  |            | PL                   | 10 | 20 | 30 | 40 | 50 | 60 | 70 | LL |       |                                  |                           |                  |                  |
|              |        |         | SURFACE ELEVATION: 191.1                                   |            |                      |    |    |    |    |    |    |    |    |       |                                  |                           |                  |                  |
| 40           |        |         |  | -          |                      |    |    |    |    |    |    |    |    |       |                                  |                           |                  |                  |
| 45           |        |         | Wet, Very Dense, Gray Silty Sand with Some Gravel          | SM         |                      |    |    |    |    |    |    |    | 14 | 21    |                                  |                           |                  |                  |
|              |        |         |  | -          |                      |    |    |    |    |    |    |    |    | 25-48 |                                  |                           |                  |                  |
| 50           |        |         | Wet, Very Dense, Gray Poorly Graded Sand with Silt         | SP-SM      |                      |    |    |    |    |    |    |    | 11 | 18    |                                  |                           |                  |                  |
|              |        |         |  |            |                      |    |    |    |    |    |    |    |    | 60    |                                  |                           |                  |                  |
|              |        |         | Wet, Very Dense, Gray Sand with Silt                       |            |                      |    |    |    |    |    |    |    |    | 60    |                                  | 0                         | 0                |                  |
| 55           |        |         |  |            |                      |    |    |    |    |    |    |    |    |       |                                  |                           |                  |                  |
|              |        |         | Wet, Very Dense, Gray Sand with Silt (No Sample Recovered) |            |                      |    |    |    |    |    |    |    |    |       |                                  | 0                         | 0                |                  |
| 60           |        |         |  |            |                      |    |    |    |    |    |    |    |    |       |                                  |                           |                  |                  |
|              |        |         |  |            |                      |    |    |    |    |    |    |    |    |       |                                  | 0                         | 0                |                  |
| 65           |        |         |  |            |                      |    |    |    |    |    |    |    |    |       |                                  |                           |                  |                  |
|              |        |         |  |            |                      |    |    |    |    |    |    |    |    | 60    |                                  |                           |                  |                  |
|              |        |         |  |            |                      |    |    |    |    |    |    |    |    | 60    |                                  |                           |                  |                  |
| 70           |        |         |  |            |                      |    |    |    |    |    |    |    |    |       |                                  |                           |                  |                  |

REMARKS:

**ARKANSAS DEPARTMENT OF TRANSPORTATION  
MATERIALS DIVISION - GEOTECHNICAL SECTION**

BORING NO. 12  
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JOB NO. 070509 Clark County  
JOB NAME: Caddo River Str. & Apprs. (Caddo Valley) (S)  
Route 67, Section 6  
STATION: 122+72  
LOCATION: 13' Right of Construction Centerline  
LOGGED BY: Stanley Bates checked by Carson Sloan

DATE: October 25, 2012  
TYPE OF DRILLING: Hollow Stem Auger -  
Rotary Wash - Diamond Core  
EQUIPMENT: Acker 1  
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 77.21

| DEPTH<br>FT. | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL  | SOIL GROUP | MOISTURE CONTENT (%) |    |    |    |    |    |    |    |    |  |  | PERCENT PASSING NO. 200 SIEVE | NO. OF BLOWS PER 6-IN. | % TCR | % RQD |
|--------------|--------|---------|--|------------|----------------------|----|----|----|----|----|----|----|----|--|--|-------------------------------|------------------------|-------|-------|
|              |        |         |  |            | PL                   | 10 | 20 | 30 | 40 | 50 | 60 | 70 | LL |  |  |                               |                        |       |       |
|              |        |         | SURFACE ELEVATION: 191.1   |            |                      |    |    |    |    |    |    |    |    |  |  |                               |                        |       |       |
|              |        |         | Very Dense, Poorly Cemented Sand with Silt (No Sample Recovered) |            |                      |    |    |    |    |    |    |    |    |  |  |                               | 60 (1")                | 0     | 0     |
| 75           |        |         |  |            |                      |    |    |    |    |    |    |    |    |  |  |                               |                        | 0     | 0     |
|              |        |         | Boring Terminated  |            |                      |    |    |    |    |    |    |    |    |  |  |                               | 60 (0")                |       |       |
| 80           |        |         |  |            |                      |    |    |    |    |    |    |    |    |  |  |                               |                        |       |       |
| 85           |        |         |  |            |                      |    |    |    |    |    |    |    |    |  |  |                               |                        |       |       |
| 90           |        |         |  |            |                      |    |    |    |    |    |    |    |    |  |  |                               |                        |       |       |
| 95           |        |         |  |            |                      |    |    |    |    |    |    |    |    |  |  |                               |                        |       |       |
| 100          |        |         |  |            |                      |    |    |    |    |    |    |    |    |  |  |                               |                        |       |       |
| 105          |        |         |  |            |                      |    |    |    |    |    |    |    |    |  |  |                               |                        |       |       |

REMARKS:

**ARKANSAS DEPARTMENT OF TRANSPORTATION  
MATERIALS DIVISION - GEOTECHNICAL SECTION**

BORING NO. 13  
PAGE 1 OF 3

JOB NO. 070509 Clark County  
JOB NAME: Caddo River Str. & Apprs. (Caddo Valley) (S)  
Route 67, Section 6  
STATION: 123+27  
LOCATION: 23' Right of Construction Centerline  
LOGGED BY: Stanley Bates

DATE: November 1, 2022  
TYPE OF DRILLING:  
Hollow Stem Auger - Rotary Wash  
EQUIPMENT: Acker 1  
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 80.1

| DEPTH<br>FT. | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL  | SOIL GROUP | MOISTURE CONTENT (%) |    |    |    |    |    |    | PERCENT PASSING<br>NO. 200 SIEVE | NO. OF BLOWS<br>PER 6-IN. | % T C R | % R Q D |    |
|--------------|--------|---------|--|------------|----------------------|----|----|----|----|----|----|----------------------------------|---------------------------|---------|---------|----|
|              |        |         |  |            | PL                   | 10 | 20 | 30 | 40 | 50 | 60 |                                  |                           |         |         | 70 |
|              |        |         | SURFACE ELEVATION: 196.4   |            |                      |    |    |    |    |    |    |                                  |                           |         |         |    |
| 5            |        |         | Moist, Loose, Brown Silty Sand with Trace Gravel                         | SM         |                      |    |    |    |    |    |    | 41                               | 4<br>3-2                  |         |         |    |
|              |        |         | Moist, Very Loose, Brown Sandy Silt with Trace Gravel                    | ML         |                      |    |    |    |    |    |    | 52                               | 3<br>2-2                  |         |         |    |
| 10           |        |         | Moist, Loose, Brown Silty Sand with Trace Gravel                         | SM         |                      |    |    |    |    |    |    | 34                               | 3<br>3-2                  |         |         |    |
|              |        |         | Wet, Very Loose, Brown Clayey Sand with Some Gravel                      | -          |                      |    |    |    |    |    |    | 38                               | 1<br>0-1                  |         |         |    |
| 15           |        |         | Wet, Dense, Reddish Brown Poorly Graded Gravel with Silt and Sand        | GP-GM      |                      |    |    |    |    |    |    | 10                               | 5<br>16-18                |         |         |    |
| 20           |        |         | Wet, Medium Dense, Dark Gray Silty Sand with Trace Lignite (Nacatoch Fm) | SM         |                      |    |    |    |    |    |    | 41                               | 3<br>8-9                  |         |         |    |
| 25           |        |         | Wet, Very Dense, Gray Silt with Sand                                     | ML         |                      |    |    |    |    |    |    | 73                               | 27<br>60<br>(5")          |         |         |    |
| 30           |        |         | Wet, Very Dense, Gray Sand with Silt                                     |            |                      |    |    |    |    |    |    |                                  | 60<br>(6")                |         |         |    |
| 35           |        |         | Wet, Very Dense, Gray Sand with Silt with Some Lignite                   |            |                      |    |    |    |    |    |    |                                  |                           |         |         |    |

REMARKS:

**ARKANSAS DEPARTMENT OF TRANSPORTATION  
MATERIALS DIVISION - GEOTECHNICAL SECTION**

BORING NO. 13  
PAGE 2 OF 3

JOB NO. 070509 Clark County  
JOB NAME: Caddo River Str. & Apprs. (Caddo Valley) (S)  
Route 67, Section 6  
STATION: 123+27  
LOCATION: 23' Right of Construction Centerline  
LOGGED BY: Stanley Bates

DATE: November 1, 2022  
TYPE OF DRILLING:  
Hollow Stem Auger - Rotary Wash  
EQUIPMENT: Acker 1  
HAMMER CORRECTION FACTOR: 1.54

COMPLETION DEPTH: 80.1

| DEPTH<br>FT. | SYMBOL | SAMPLES | DESCRIPTION OF MATERIAL                               | SOIL GROUP | MOISTURE CONTENT (%) |    |    |    |    |    |    |    |    |    | PERCENT PASSING<br>NO. 200 SIEVE | NO. OF BLOWS<br>PER 6-IN. | %<br>T<br>C<br>R | %<br>R<br>Q<br>D |
|--------------|--------|---------|---|------------|----------------------|----|----|----|----|----|----|----|----|----|----------------------------------|---------------------------|------------------|------------------|
|              |        |         |   |            | PL                   | 10 | 20 | 30 | 40 | 50 | 60 | 70 | LL |    |                                  |                           |                  |                  |
|              |        |         | SURFACE ELEVATION: 196.4                              |            |                      |    |    |    |    |    |    |    |    |    |                                  |                           |                  |                  |
| 40           |        |         | Wet, Very Dense, Gray Sand with Trace Lignite         | -          |                      |    |    |    |    |    |    |    |    |    | 60 (5")                          |                           |                  |                  |
| 45           |        |         | Wet, Very Dense, Gray Sand with Trace Gravel          | -          |                      |    |    |    |    |    |    |    |    |    | 60 (4")                          |                           |                  |                  |
| 50           |        |         | Wet, Very Dense, Gray Silty Sand with Trace Gravel    | SM         |                      |    |    |    |    |    |    |    |    | 15 | 15<br>23-50                      |                           |                  |                  |
| 55           |        |         | Wet, Very Dense, Gray Sand with Silt Trace Gravel     | -          |                      |    |    |    |    |    |    |    |    |    | 10                               | 48<br>60 (4")             |                  |                  |
| 60           |        |         | Wet, Very Dense, Gray Sand with Silt                  | SP-SM      |                      |    |    |    |    |    |    |    |    |    |                                  | 60 (5")                   |                  |                  |
| 65           |        |         | Wet, Very Dense, Gray Sand with Silt and Trace Gravel | -          |                      |    |    |    |    |    |    |    |    |    |                                  | 60 (2")                   |                  |                  |
| 70           |        |         |   | -          |                      |    |    |    |    |    |    |    |    |    |                                  | 60 (2")                   |                  |                  |

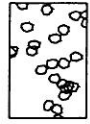
REMARKS:



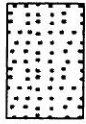
# LEGEND

## SOIL TYPES

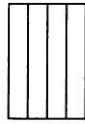
(SHOWN IN SYMBOL COLUMN)  
(PREDOMINANT TYPE SHOWN HEAVY)



GRAVEL



SAND



SILT



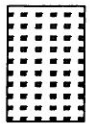
CLAY



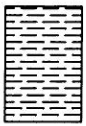
ORGANIC  
MATTER

## ROCK TYPES

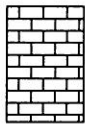
(SHOWN IN SYMBOL COLUMN)



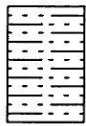
SANDSTONE



SHALE  
or  
SILTSTONE



LIMESTONE  
or  
DOLOMITE



ALTERNATING  
LAYERS of  
SHALE and  
SANDSTONE



OTHER

## SAMPLER TYPES

(SHOWN IN SAMPLE COLUMN)

### SHELBY TUBE



UNDISTURBED  
SAMPLE  
RECOVERY

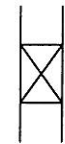


DISTURBED  
SAMPLE  
RECOVERY

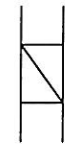


NO  
RECOVERY

### SPLIT SPOON

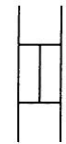


SAMPLE  
RECOVERY



NO  
RECOVERY

### ROCK CORING



% 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        |             |

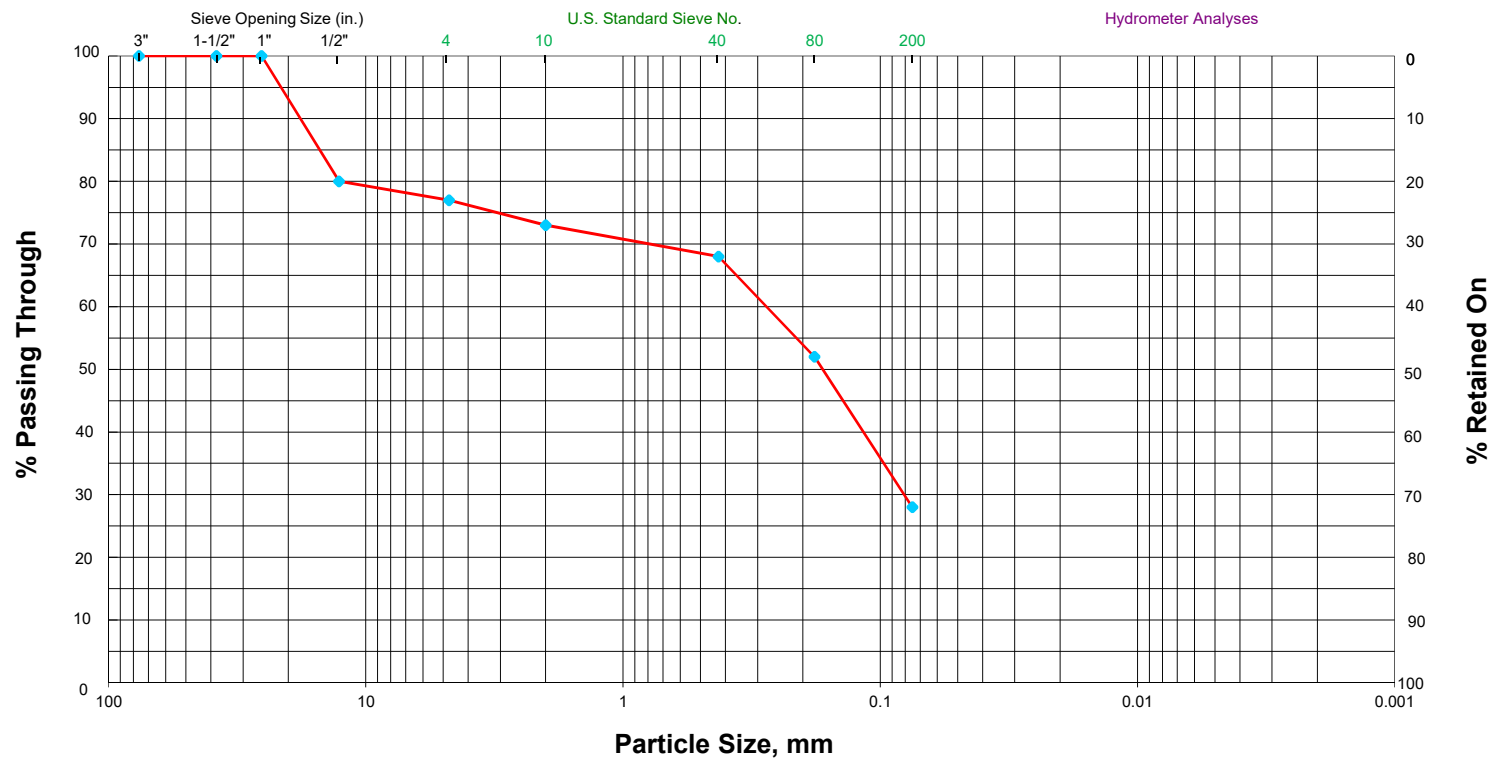
1. Ground water elevations indicated on boring logs represent ground water elevations at date or time shown on boring log. Absence of water surface implies that no ground water data is available but does not necessarily mean that ground water will not be encountered at locations or within the vertical 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:  $\frac{6}{8-9} \Rightarrow 8+9 = 17 \text{ blows/ft}$ . 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.

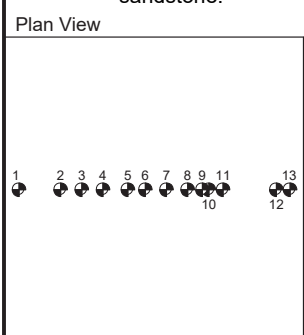
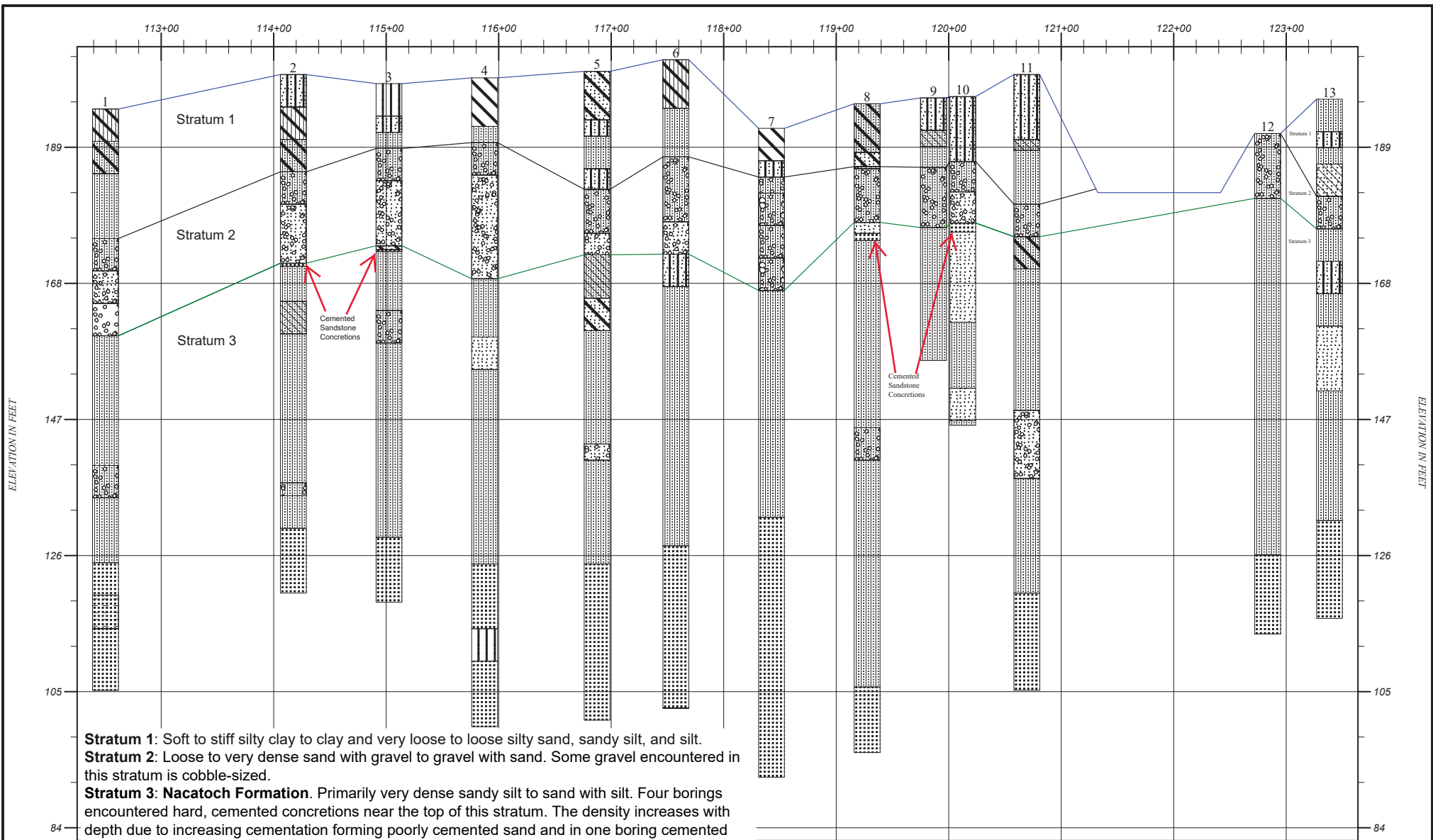
## Attachment B



**Particle Size Distribution Curve**  
**Station 122+51/38' Rt of CL**



## Attachment C



**Strata symbols**

|  |                                |  |                            |  |                               |
|--|--------------------------------|--|----------------------------|--|-------------------------------|
|  | silty clay                     |  | sand and gravel            |  | silty, clayey sand            |
|  | sandy, silty clay              |  | gravel                     |  | silt/cemented silt            |
|  | silty sand                     |  | cemented sand/sandstone    |  | Clay with Cemented Sand Seams |
|  | silty sand with gravel         |  | sandstone with shale seams |  | clay                          |
|  | silty sand, gravel and cobbles |  | sandy silt                 |  | sand                          |
|  |                                |  | clayey sand                |  | sandy clay                    |

## Generalized Subsurface Profile

|   |  |                          |
|---|--|--------------------------|
| HORIZONTAL SCALE: Not to scale                                      | DRAWN BY/APPROVED BY<br>James Carson Sloan | DATE DRAWN<br>11/16/2022 |
| Caddo River Str. & Apprs. (Caddo Valley) (S)<br>Route 67, Section 6 |  |                          |
| PROJECT NO. 070509<br>Clark County                                  |  | FIGURE NUMBER            |

## Attachment D

Title: 070509 - Caddo River Str. & Apprs. (Caddo Valley)(S)

Latitude: 34.176554

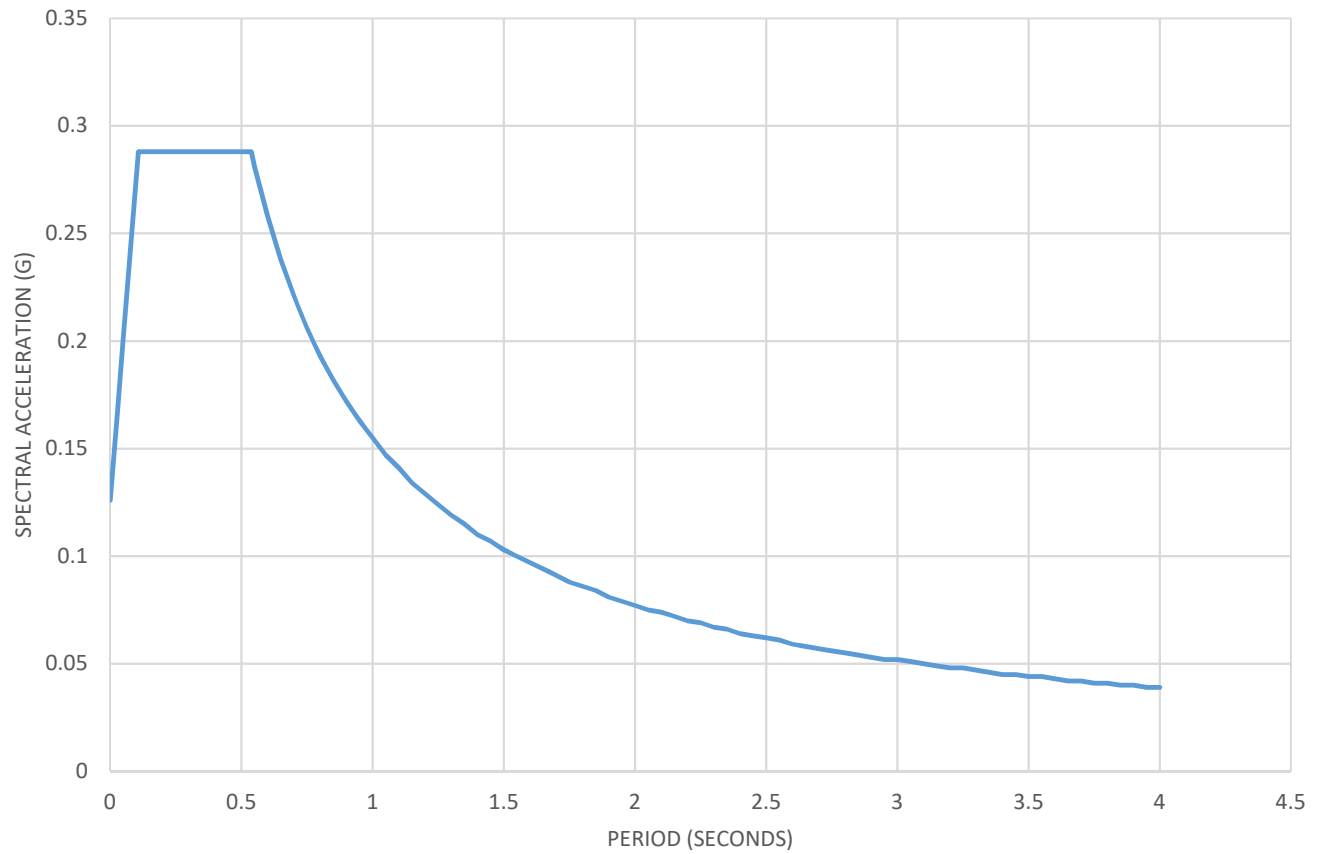
Longitude: -93.071173

Site Class: D

Get USGS Data

|                    |       |
|--------------------|-------|
| PGA:               | 0.079 |
| F <sub>PGA</sub> : | 1.6   |
| A <sub>S</sub> :   | 0.126 |
| S <sub>S</sub> :   | 0.18  |
| F <sub>A</sub> :   | 1.6   |
| S <sub>DS</sub> :  | 0.288 |
| S <sub>1</sub> :   | 0.064 |
| F <sub>V</sub> :   | 2.4   |
| S <sub>D1</sub> :  | 0.155 |
| S <sub>DC</sub> :  | B     |
| T <sub>S</sub> :   | 0.537 |
| T <sub>0</sub> :   | 0.107 |

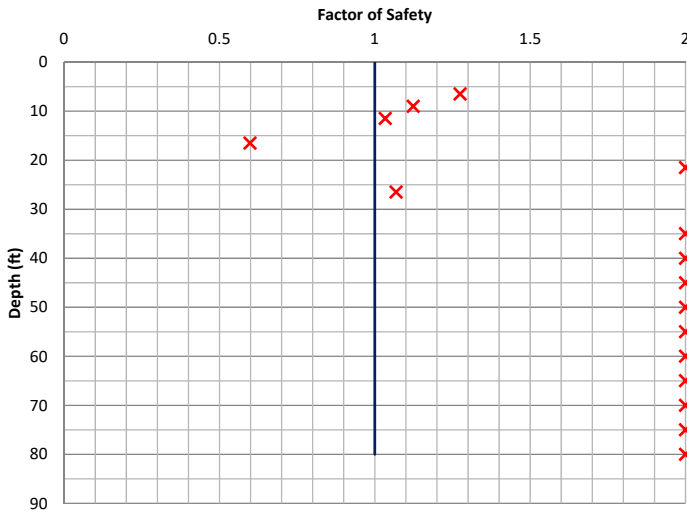
### 070509 DESIGN RESPONSE SPECTRUM



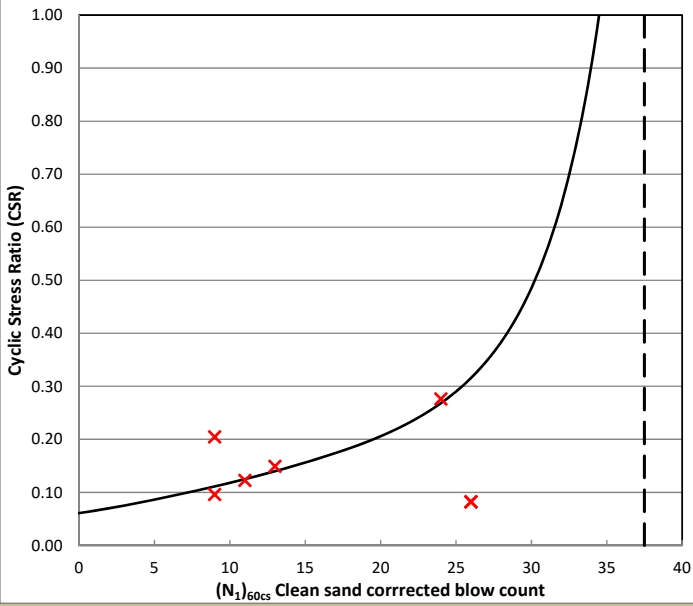
## Attachment E

### Boring Elevation

#### Factor of Safety Idriss and Boulanger (2008)

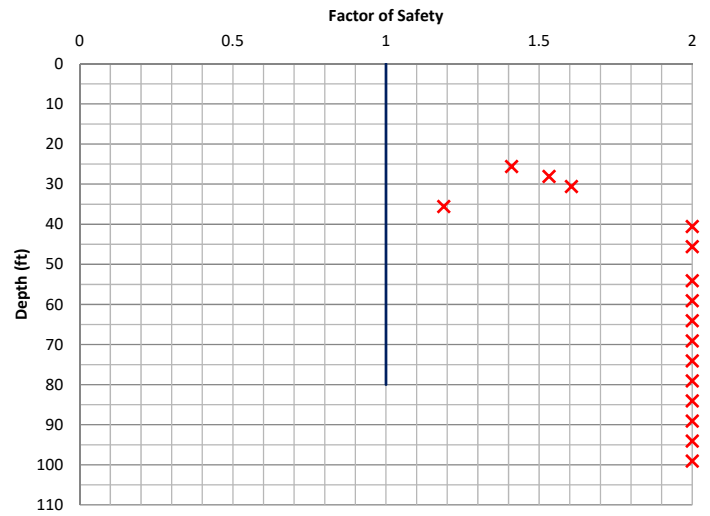


#### Clean Sand CRR Curve

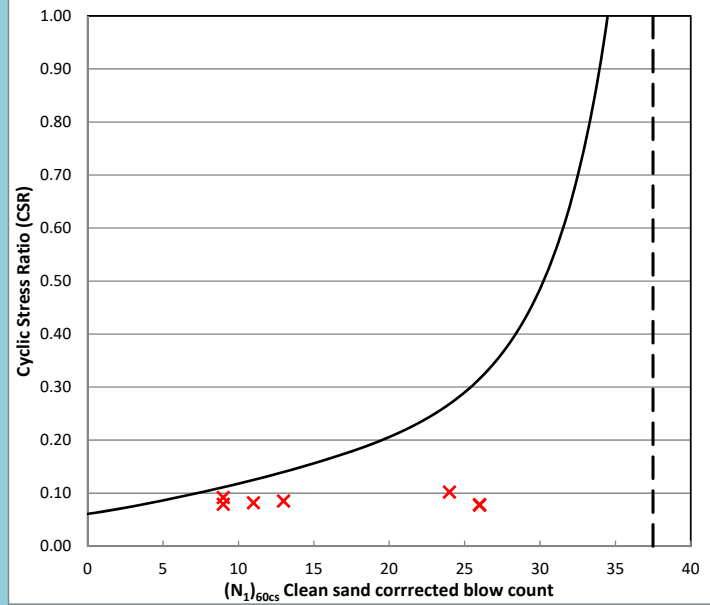


### Grade Elevation

#### Factor of Safety Idriss and Boulanger (2008)

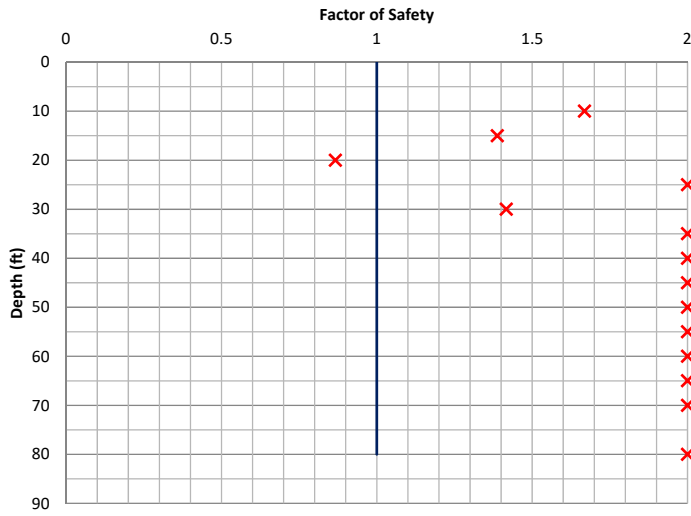


#### Clean Sand CRR Curve

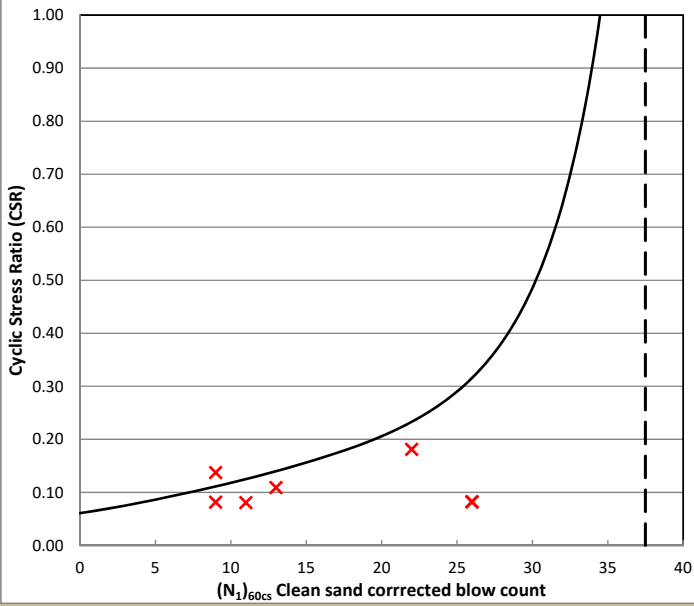


### Boring Elevation

#### Factor of Safety Idriss and Boulanger (2008)

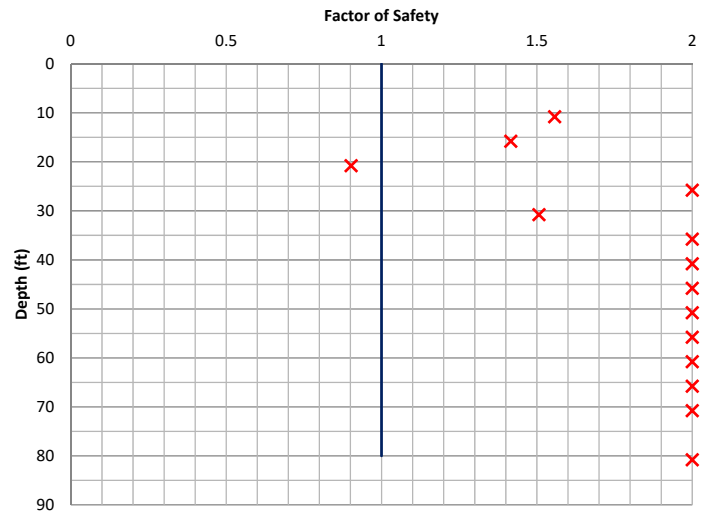


#### Clean Sand CRR Curve

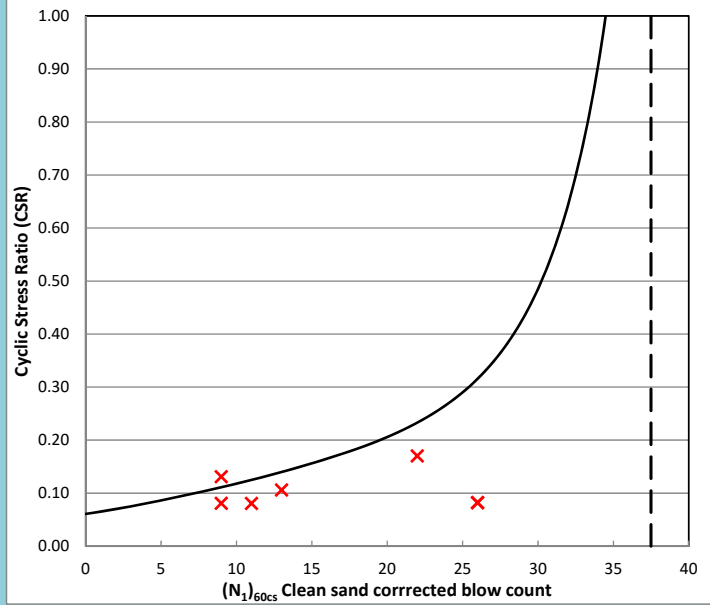


### Grade Elevation

#### Factor of Safety Idriss and Boulanger (2008)

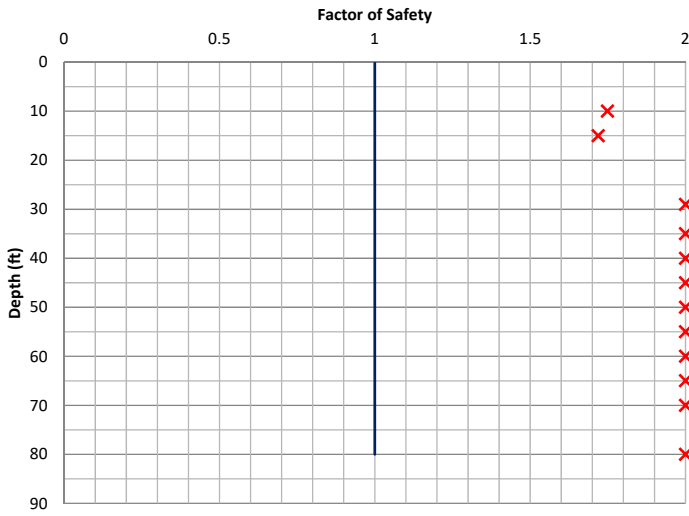


#### Clean Sand CRR Curve

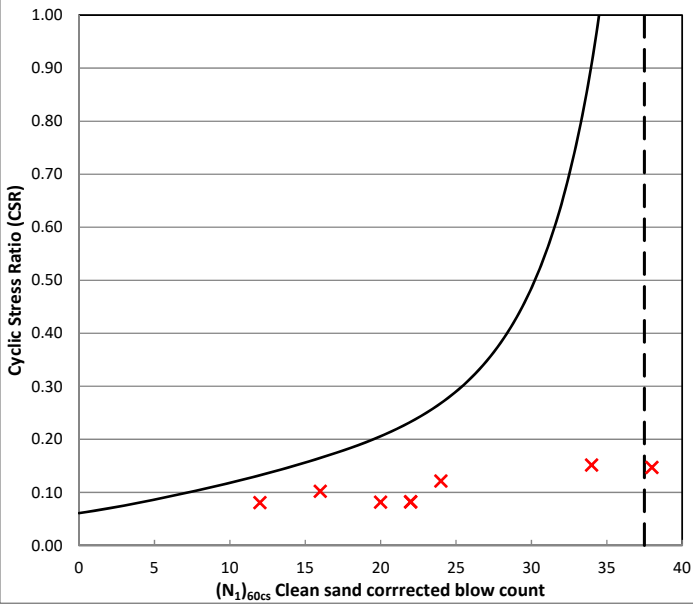


### Boring Elevation

#### Factor of Safety Idriss and Boulanger (2008)

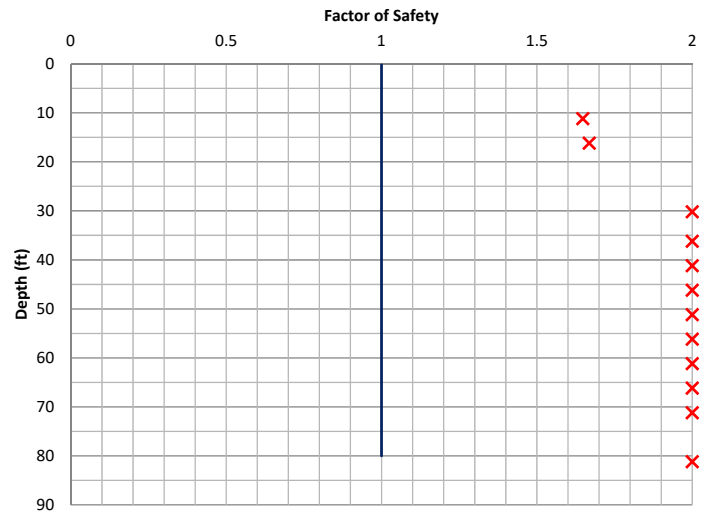


#### Clean Sand CRR Curve

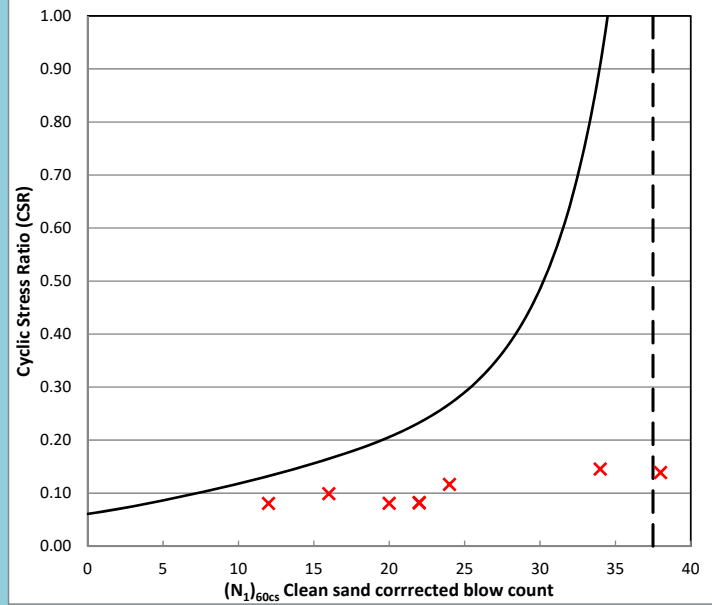


### Grade Elevation

#### Factor of Safety Idriss and Boulanger (2008)

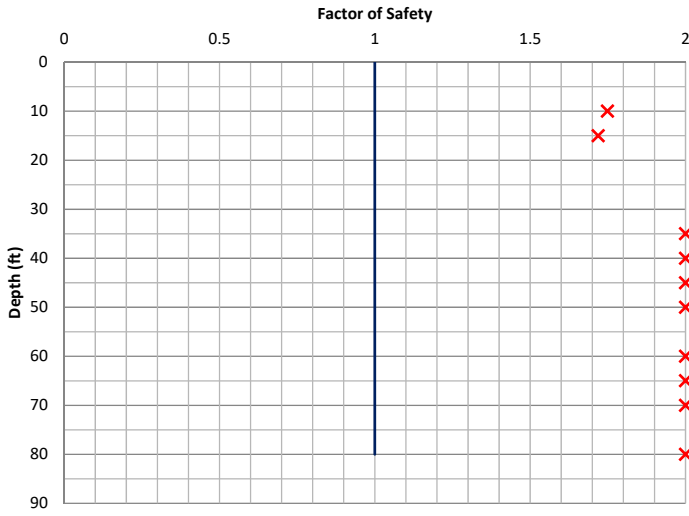


#### Clean Sand CRR Curve

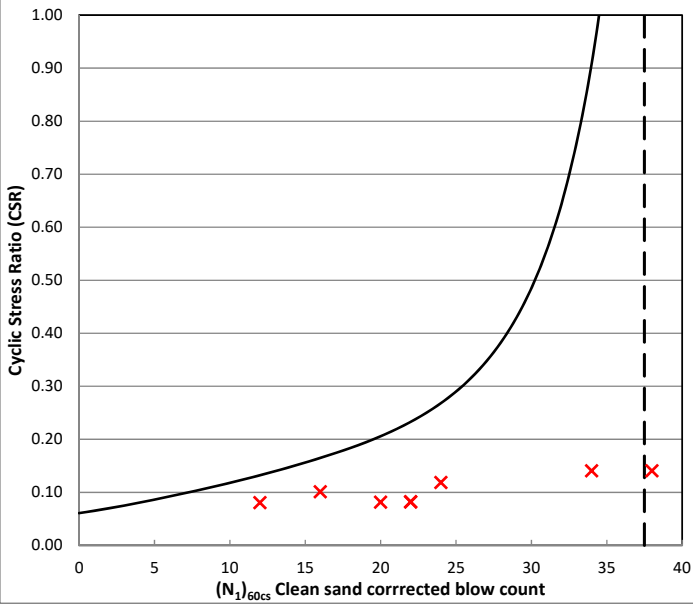


### Boring Elevation

#### Factor of Safety Idriss and Boulanger (2008)

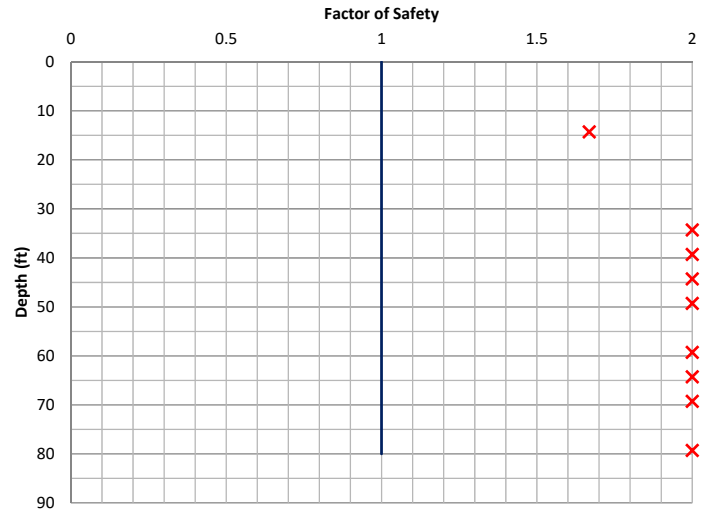


#### Clean Sand CRR Curve

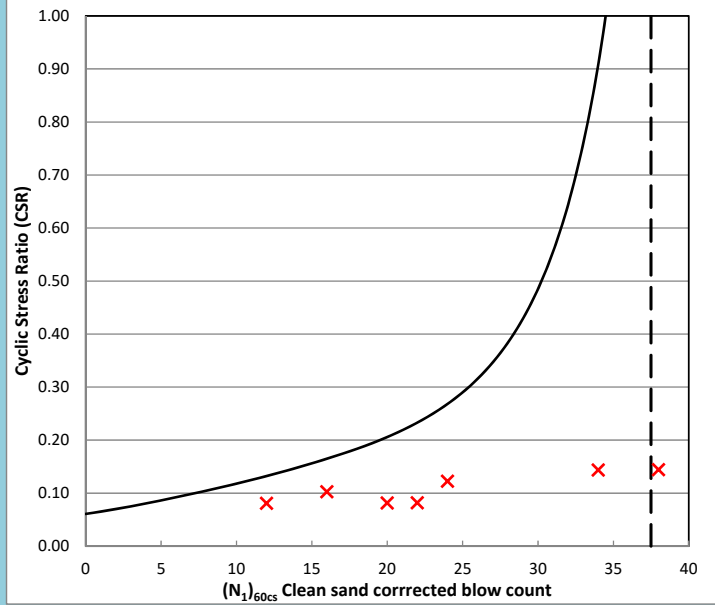


### Grade Elevation

#### Factor of Safety Idriss and Boulanger (2008)

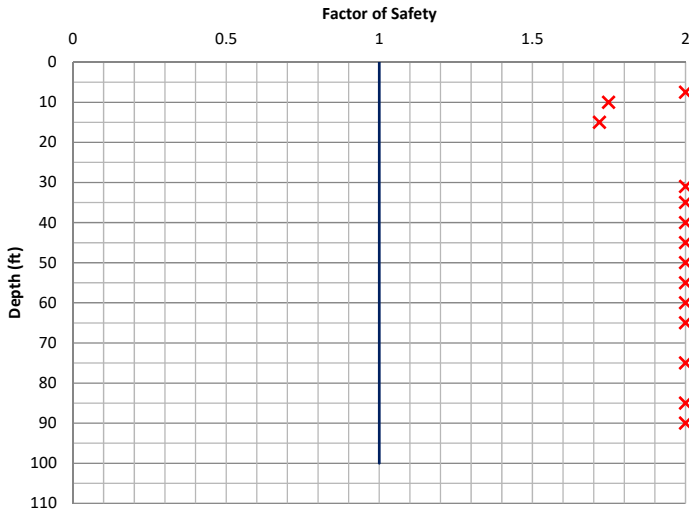


#### Clean Sand CRR Curve

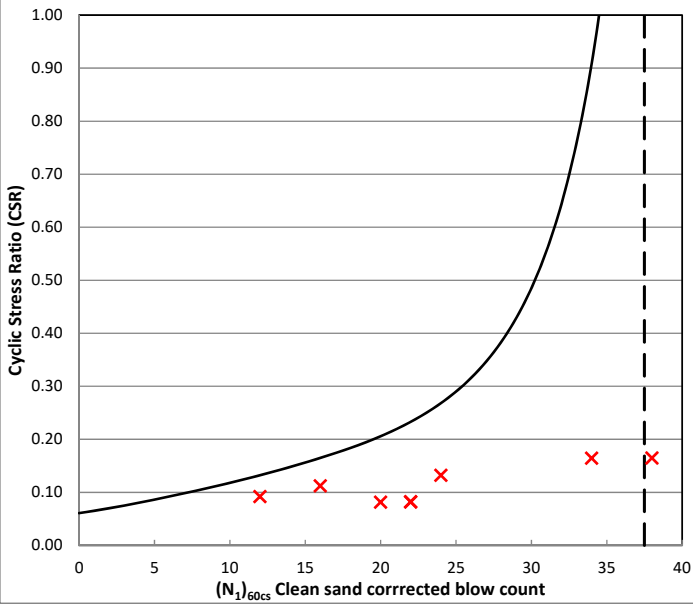


### Boring Elevation

#### Factor of Safety Idriss and Boulanger (2008)

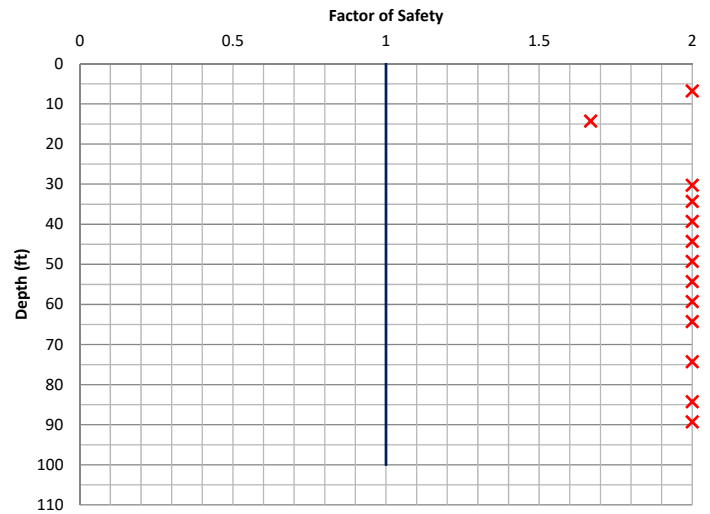


#### Clean Sand CRR Curve

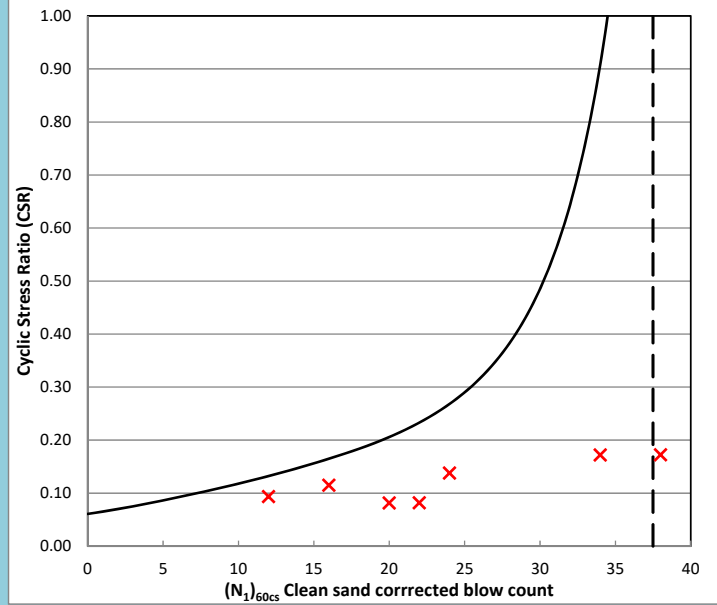


### Grade Elevation

#### Factor of Safety Idriss and Boulanger (2008)

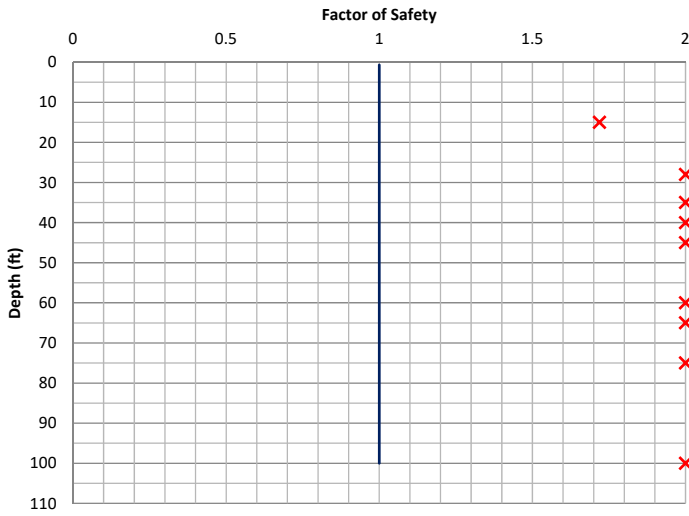


#### Clean Sand CRR Curve

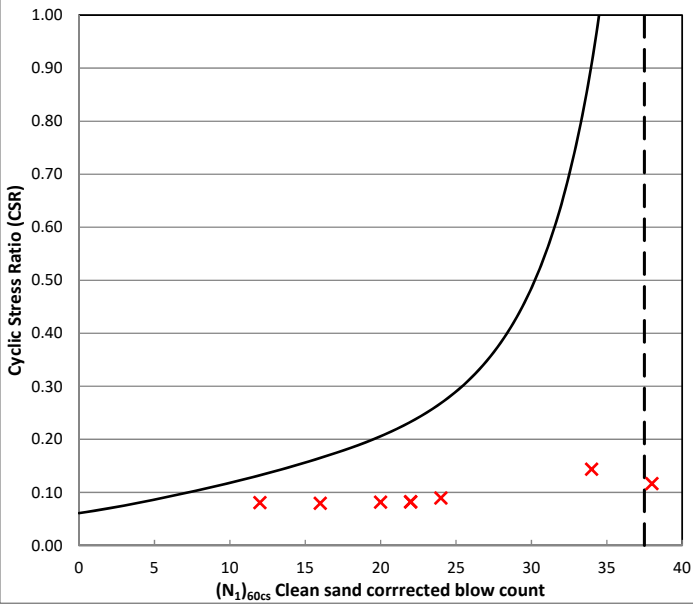


**Boring Elevation**

**Factor of Safety Idriss and Boulanger (2008)**

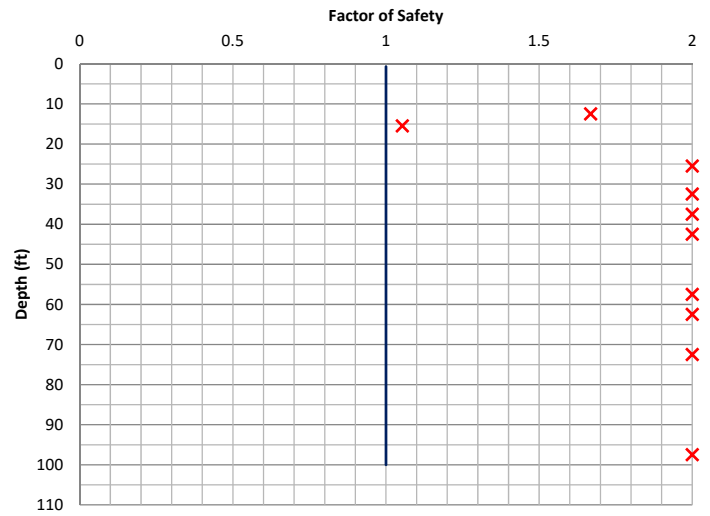


**Clean Sand CRR Curve**

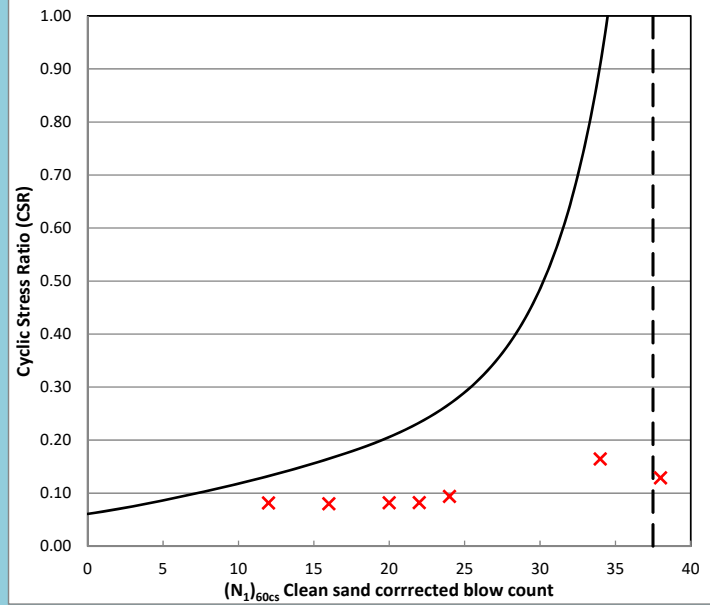


**Grade Elevation**

**Factor of Safety Idriss and Boulanger (2008)**

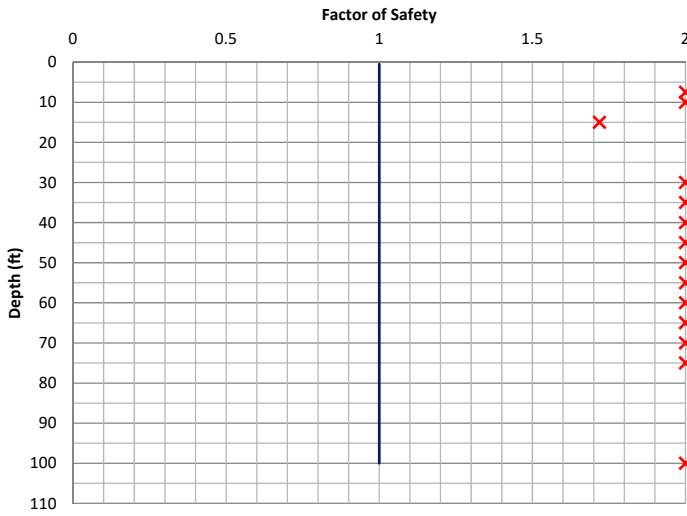


**Clean Sand CRR Curve**

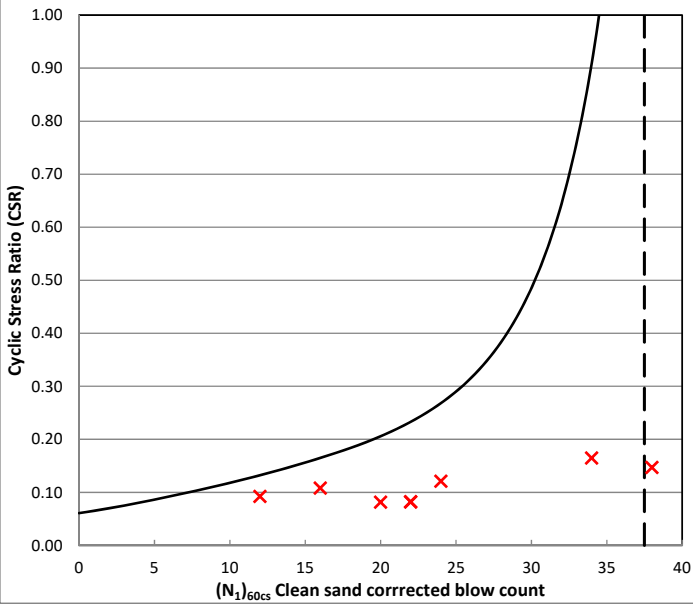


### Boring Elevation

#### Factor of Safety Idriss and Boulanger (2008)

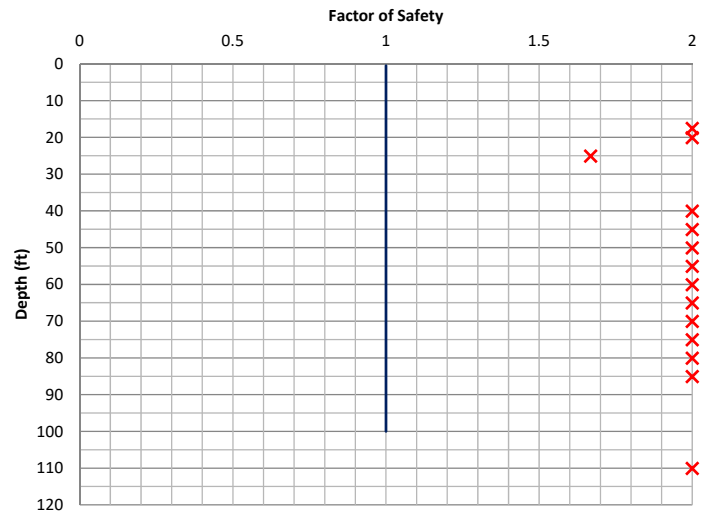


#### Clean Sand CRR Curve

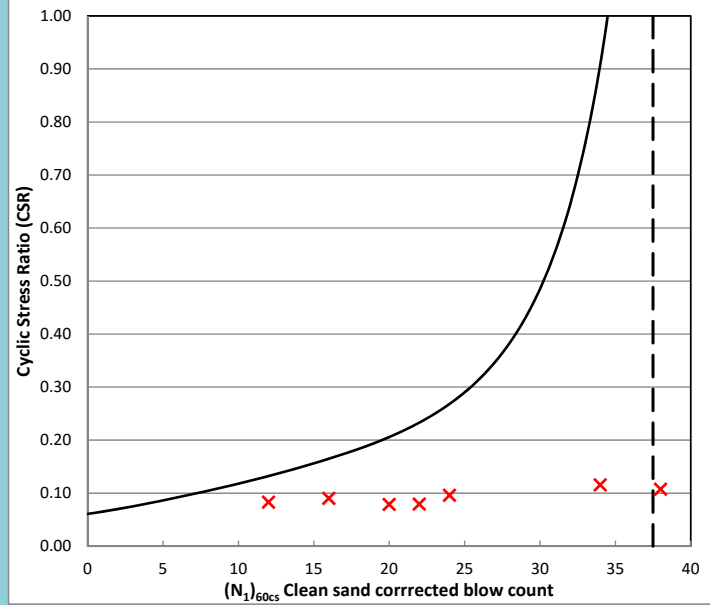


### Grade Elevation

#### Factor of Safety Idriss and Boulanger (2008)

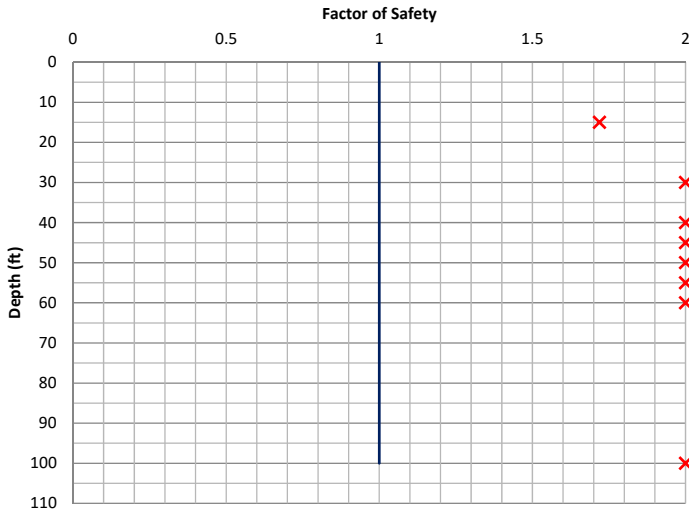


#### Clean Sand CRR Curve

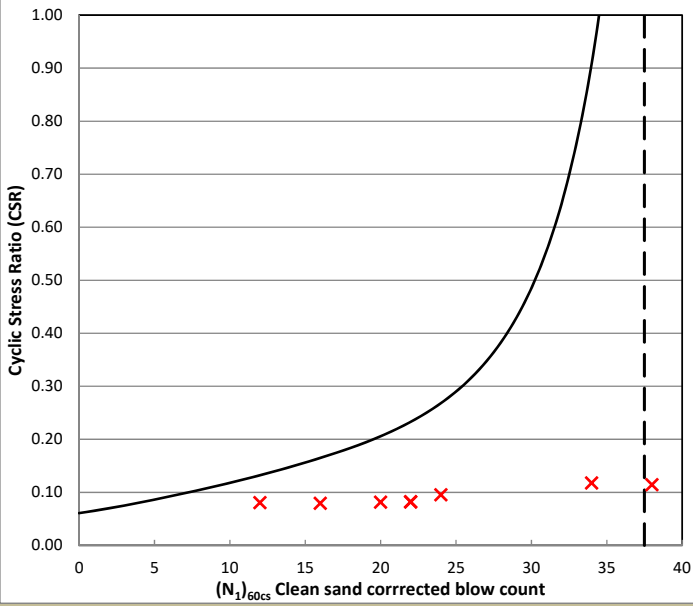


**Boring Elevation**

**Factor of Safety Idriss and Boulanger (2008)**

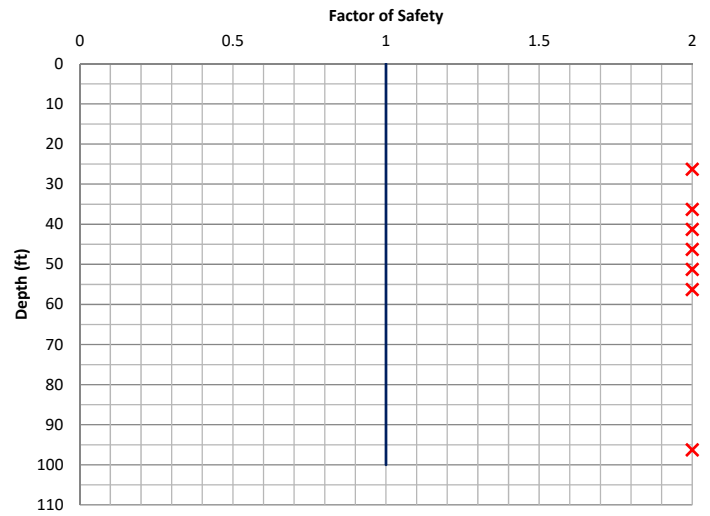


**Clean Sand CRR Curve**

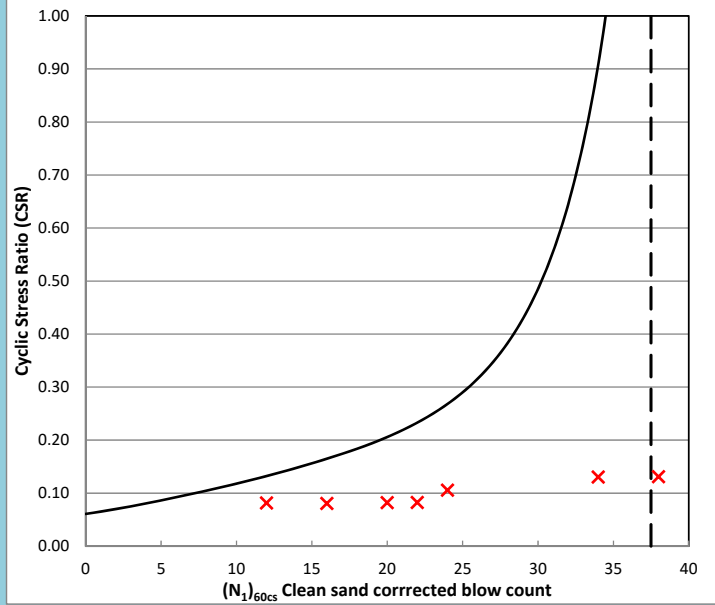


**Grade Elevation**

**Factor of Safety Idriss and Boulanger (2008)**

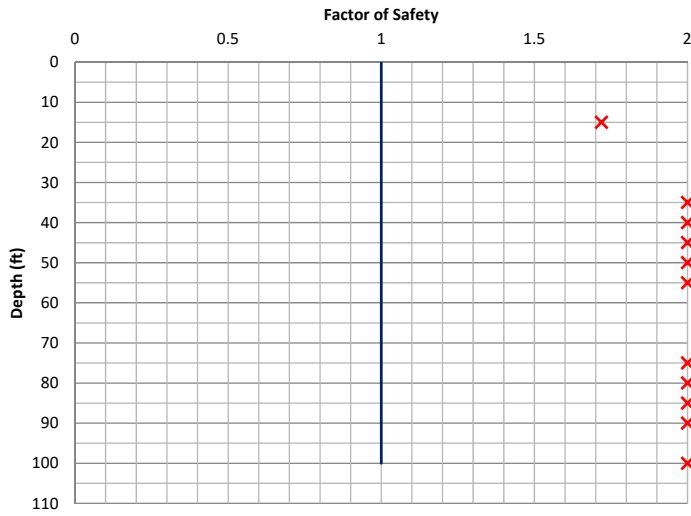


**Clean Sand CRR Curve**

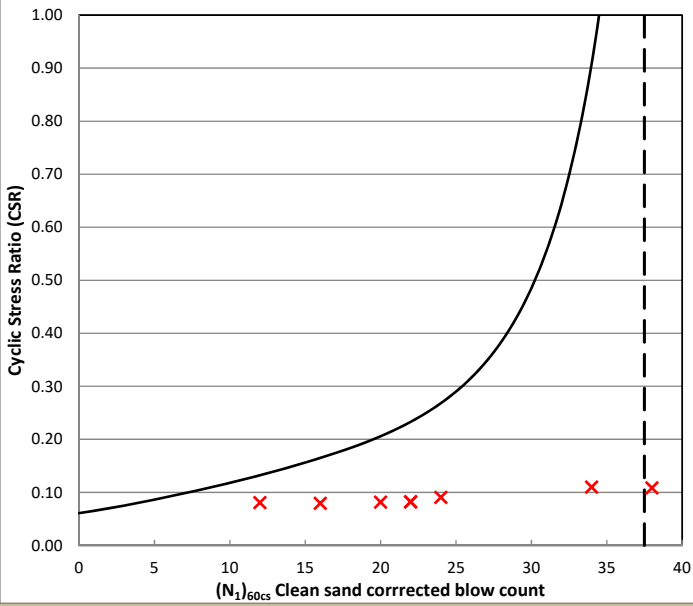


### Boring Elevation

#### Factor of Safety Idriss and Boulanger (2008)

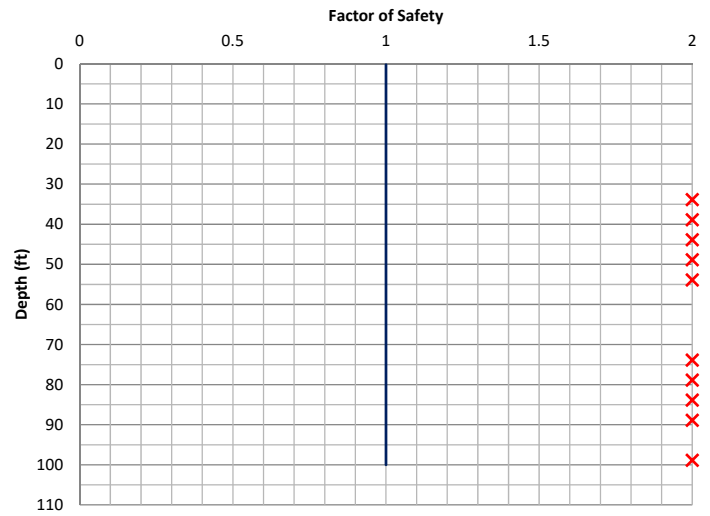


#### Clean Sand CRR Curve

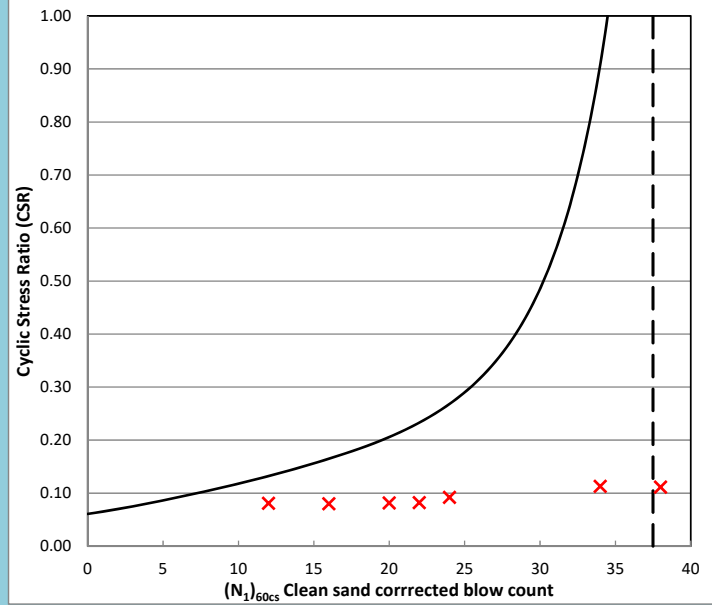


### Grade Elevation

#### Factor of Safety Idriss and Boulanger (2008)

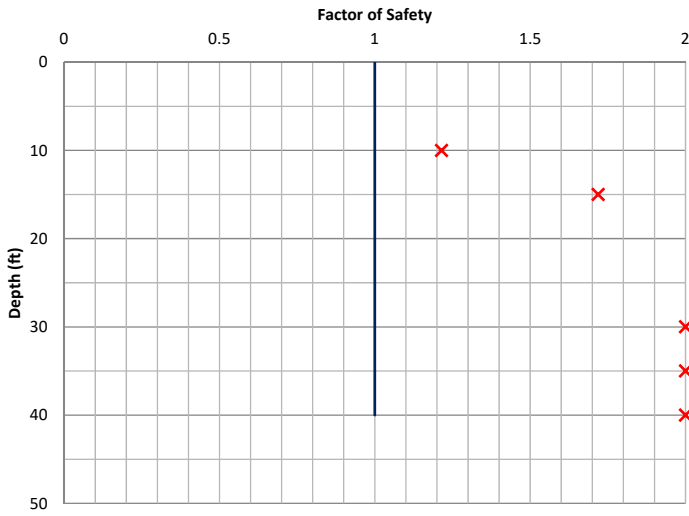


#### Clean Sand CRR Curve

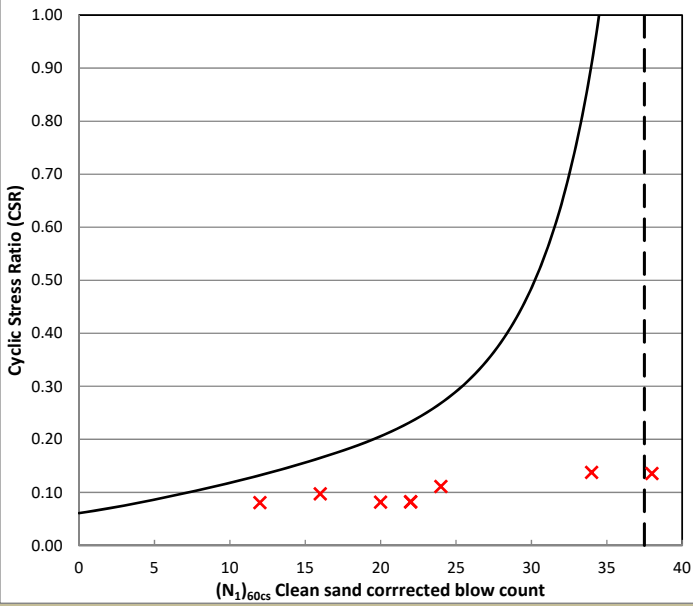


### Boring Elevation

#### Factor of Safety Idriss and Boulanger (2008)

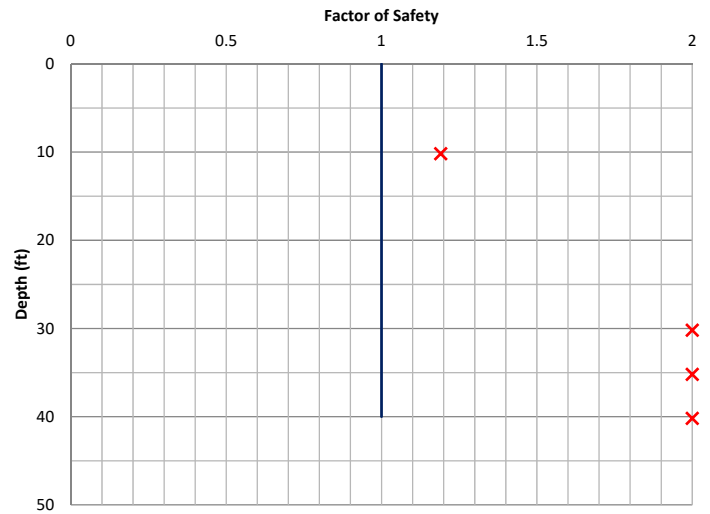


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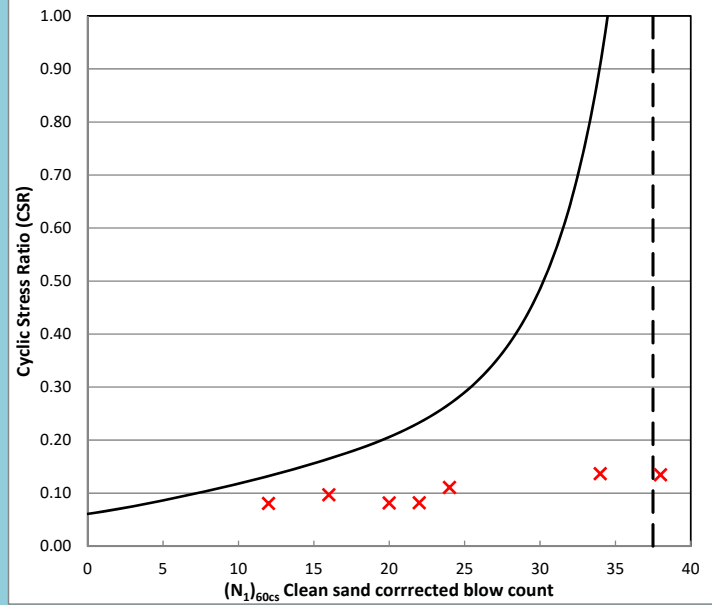


### Grade Elevation

#### Factor of Safety Idriss and Boulanger (2008)

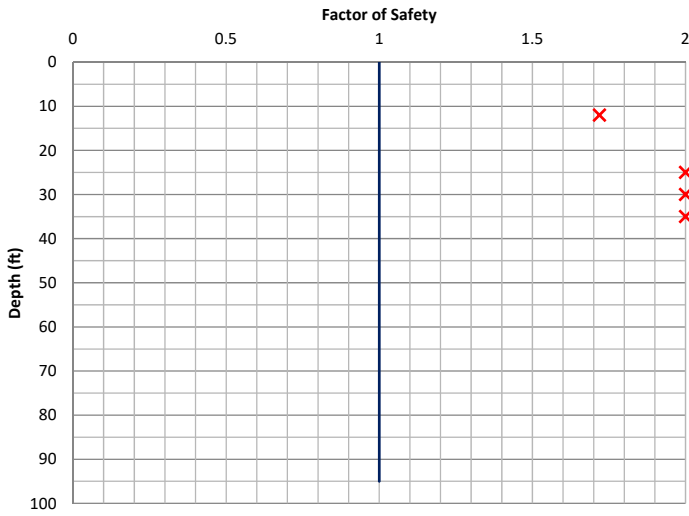


#### Clean Sand CRR Curve

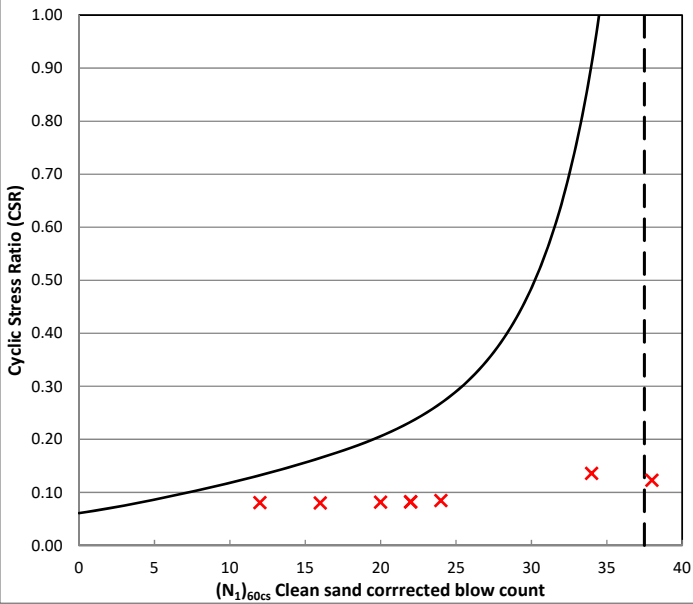


**Boring Elevation**

**Factor of Safety Idriss and Boulanger (2008)**

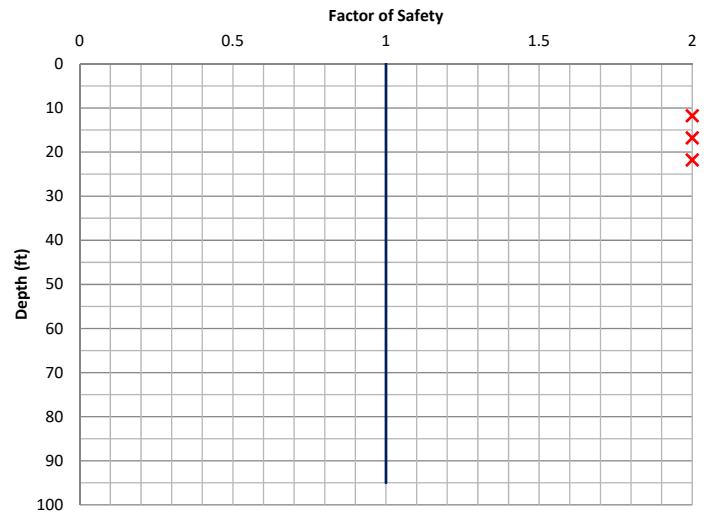


**Clean Sand CRR Curve**

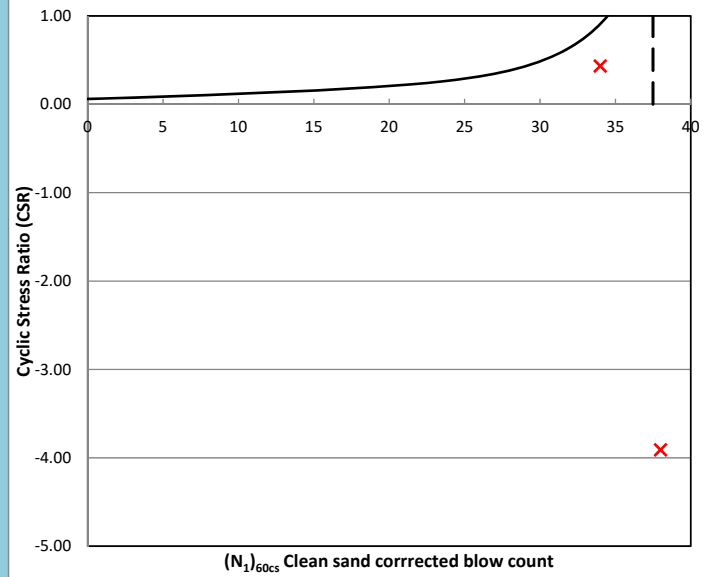


**Grade Elevation**

**Factor of Safety Idriss and Boulanger (2008)**

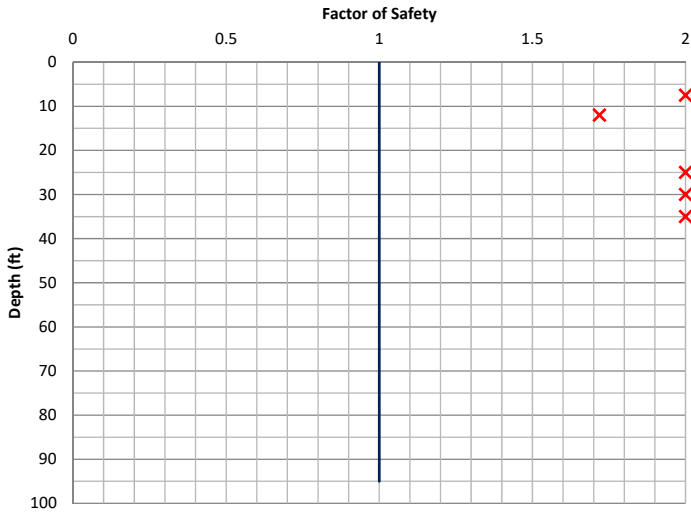


**Clean Sand CRR Curve**

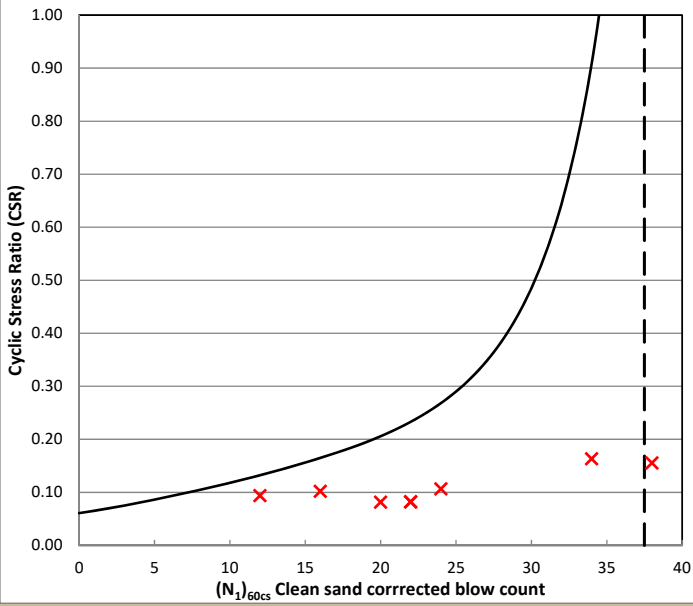


### Boring Elevation

#### Factor of Safety Idriss and Boulanger (2008)

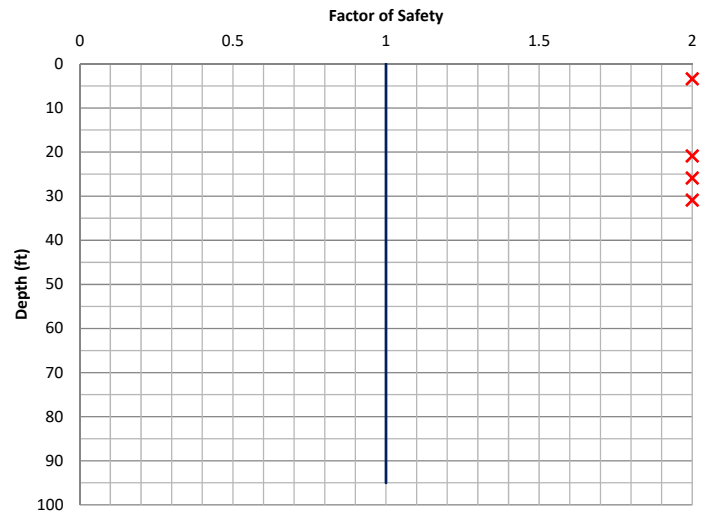


#### Clean Sand CRR Curve

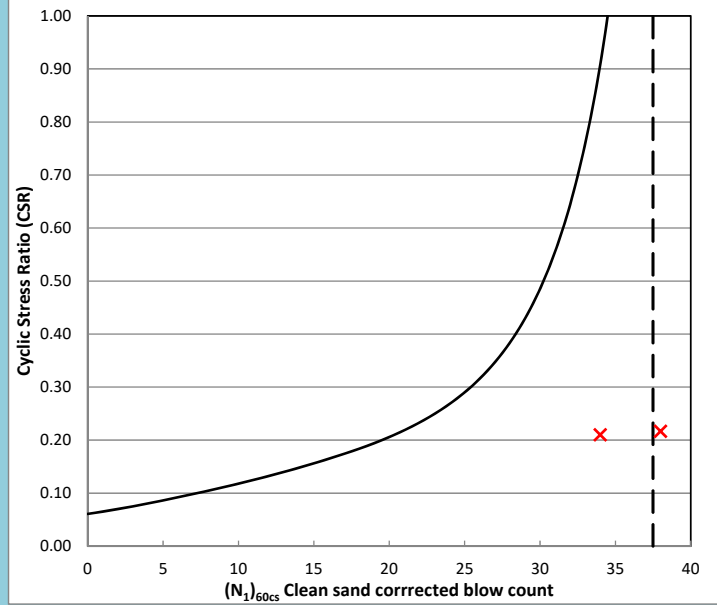


### Grade Elevation

#### Factor of Safety Idriss and Boulanger (2008)

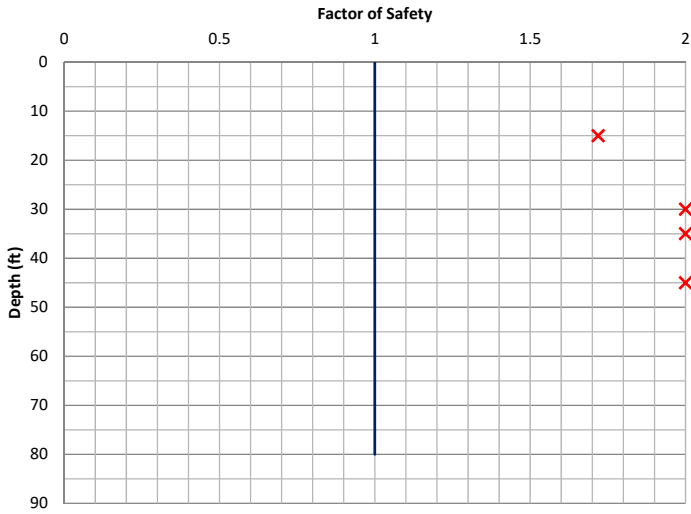


#### Clean Sand CRR Curve

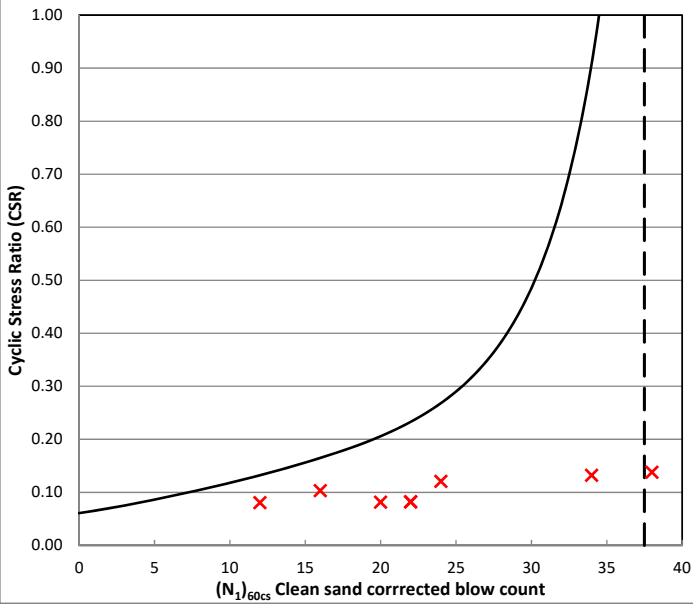


### Boring Elevation

#### Factor of Safety Idriss and Boulanger (2008)

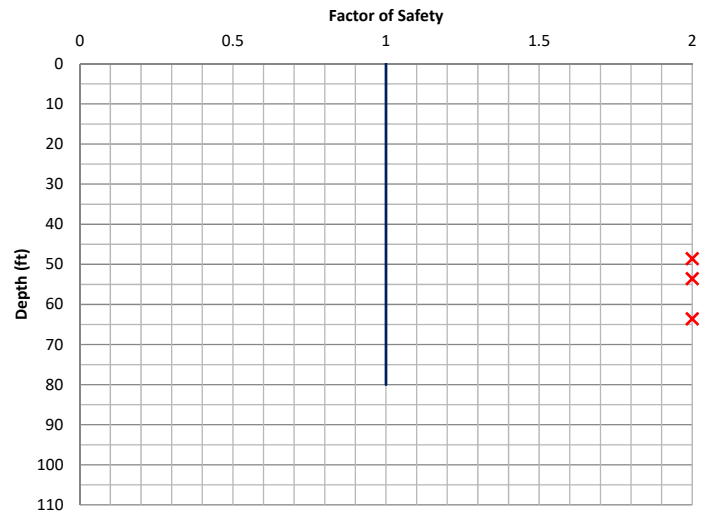


#### Clean Sand CRR Curve

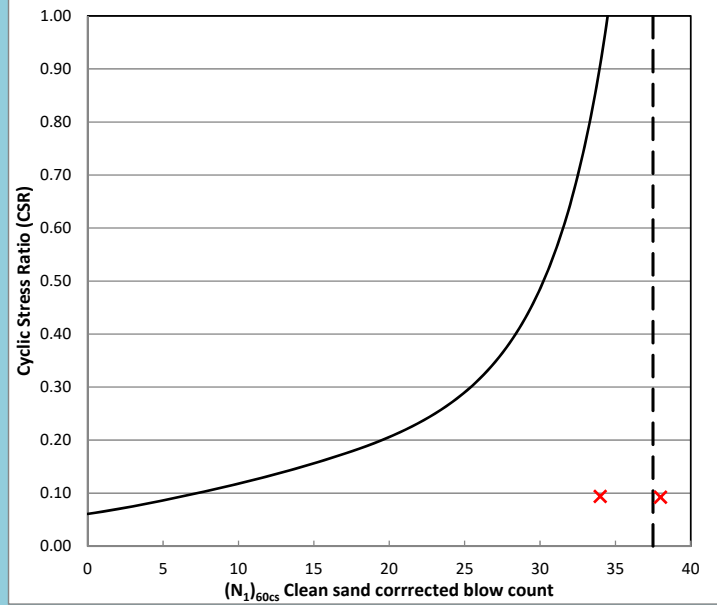


### Grade Elevation









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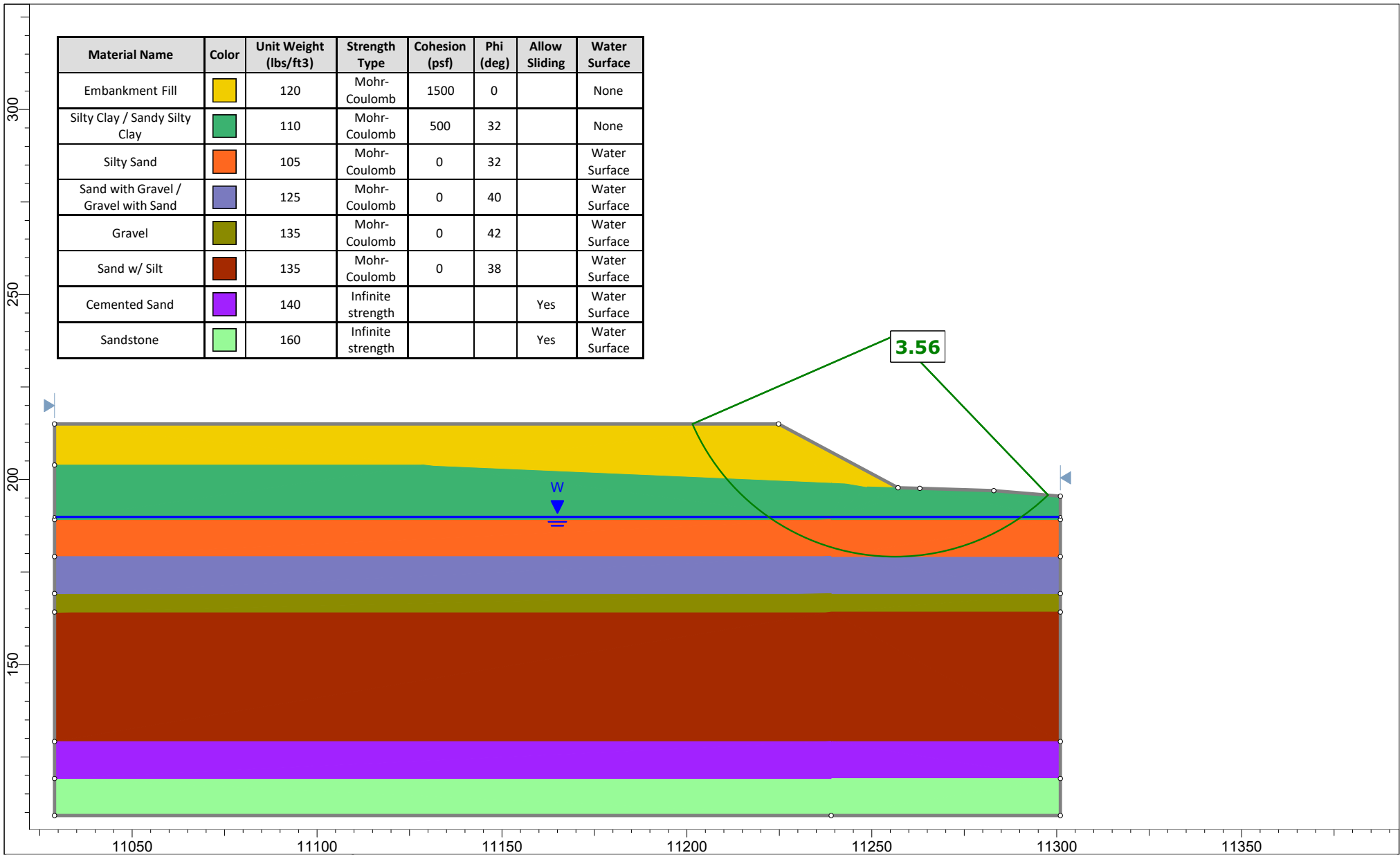



#### Clean Sand CRR Curve



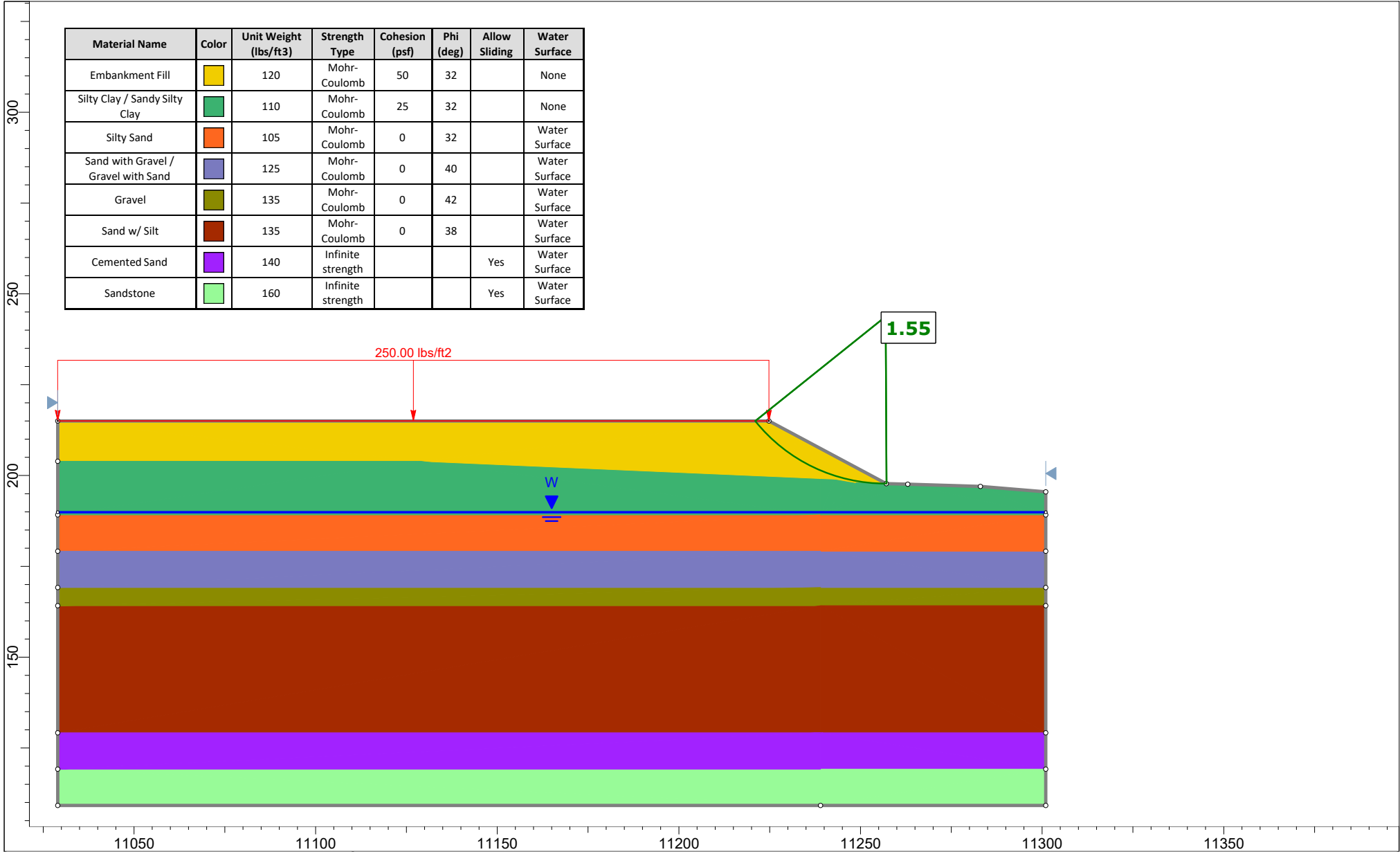
## Attachment F

| Material Name                       | Color   | Unit Weight (lbs/ft3) | Strength Type     | Cohesion (psf) | Phi (deg) | Allow Sliding | Water Surface |
|-------------------------------------|---|-----------------------|-------------------|----------------|-----------|---------------|---------------|
| Embankment Fill                     |  | 120                   | Mohr-Coulomb      | 1500           | 0         |               | None          |
| Silty Clay / Sandy Silty Clay       |  | 110                   | Mohr-Coulomb      | 500            | 32        |               | None          |
| Silty Sand                          |  | 105                   | Mohr-Coulomb      | 0              | 32        |               | Water Surface |
| Sand with Gravel / Gravel with Sand |  | 125                   | Mohr-Coulomb      | 0              | 40        |               | Water Surface |
| Gravel                              |  | 135                   | Mohr-Coulomb      | 0              | 42        |               | Water Surface |
| Sand w/ Silt                        |  | 135                   | Mohr-Coulomb      | 0              | 38        |               | Water Surface |
| Cemented Sand                       |  | 140                   | Infinite strength |                |           | Yes           | Water Surface |
| Sandstone                           |  | 160                   | Infinite strength |                |           | Yes           | Water Surface |

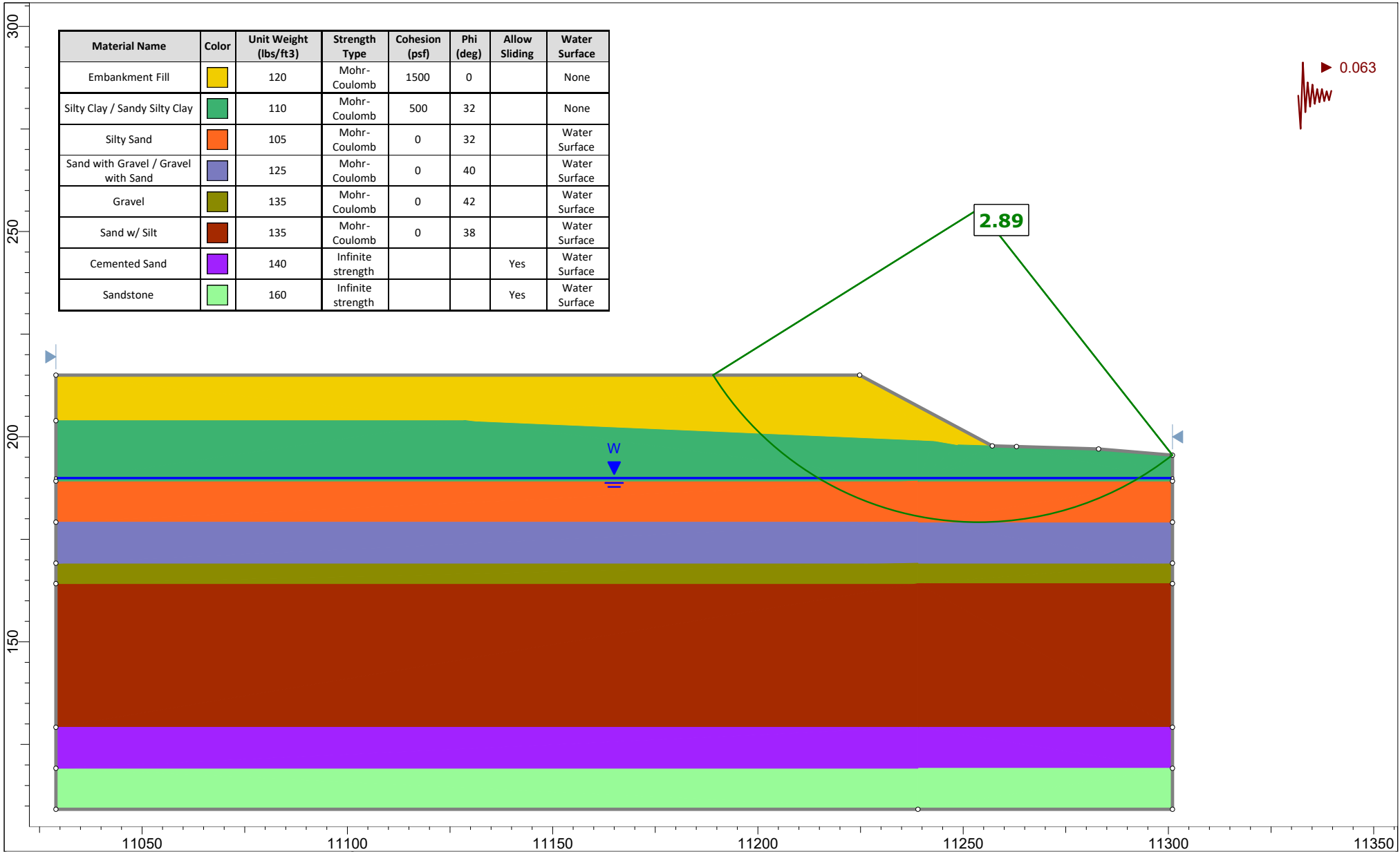


|  |  |  |
|--|--|--|
|  | Project 070509 - Caddo River Str. & Apprs. (Caddo Valley)(S) |  |
|  | Site South Embankment  | Analysis Type Short Term               |
|  | Analyzed By PT   | Configuration Hwy. 67 over Caddo River |
|  | Date 1/31/2023   |  |

| Material Name                       | Color       | Unit Weight (lbs/ft3) | Strength Type     | Cohesion (psf) | Phi (deg) | Allow Sliding | Water Surface |
|-------------------------------------|-------------|-----------------------|-------------------|----------------|-----------|---------------|---------------|
| Embankment Fill                     | Yellow      | 120                   | Mohr-Coulomb      | 50             | 32        |               | None          |
| Silty Clay / Sandy Silty Clay       | Green       | 110                   | Mohr-Coulomb      | 25             | 32        |               | None          |
| Silty Sand                          | Orange      | 105                   | Mohr-Coulomb      | 0              | 32        |               | Water Surface |
| Sand with Gravel / Gravel with Sand | Blue-Gray   | 125                   | Mohr-Coulomb      | 0              | 40        |               | Water Surface |
| Gravel                              | Olive Green | 135                   | Mohr-Coulomb      | 0              | 42        |               | Water Surface |
| Sand w/ Silt                        | Brown       | 135                   | Mohr-Coulomb      | 0              | 38        |               | Water Surface |
| Cemented Sand                       | Purple      | 140                   | Infinite strength |                |           | Yes           | Water Surface |
| Sandstone                           | Light Green | 160                   | Infinite strength |                |           | Yes           | Water Surface |

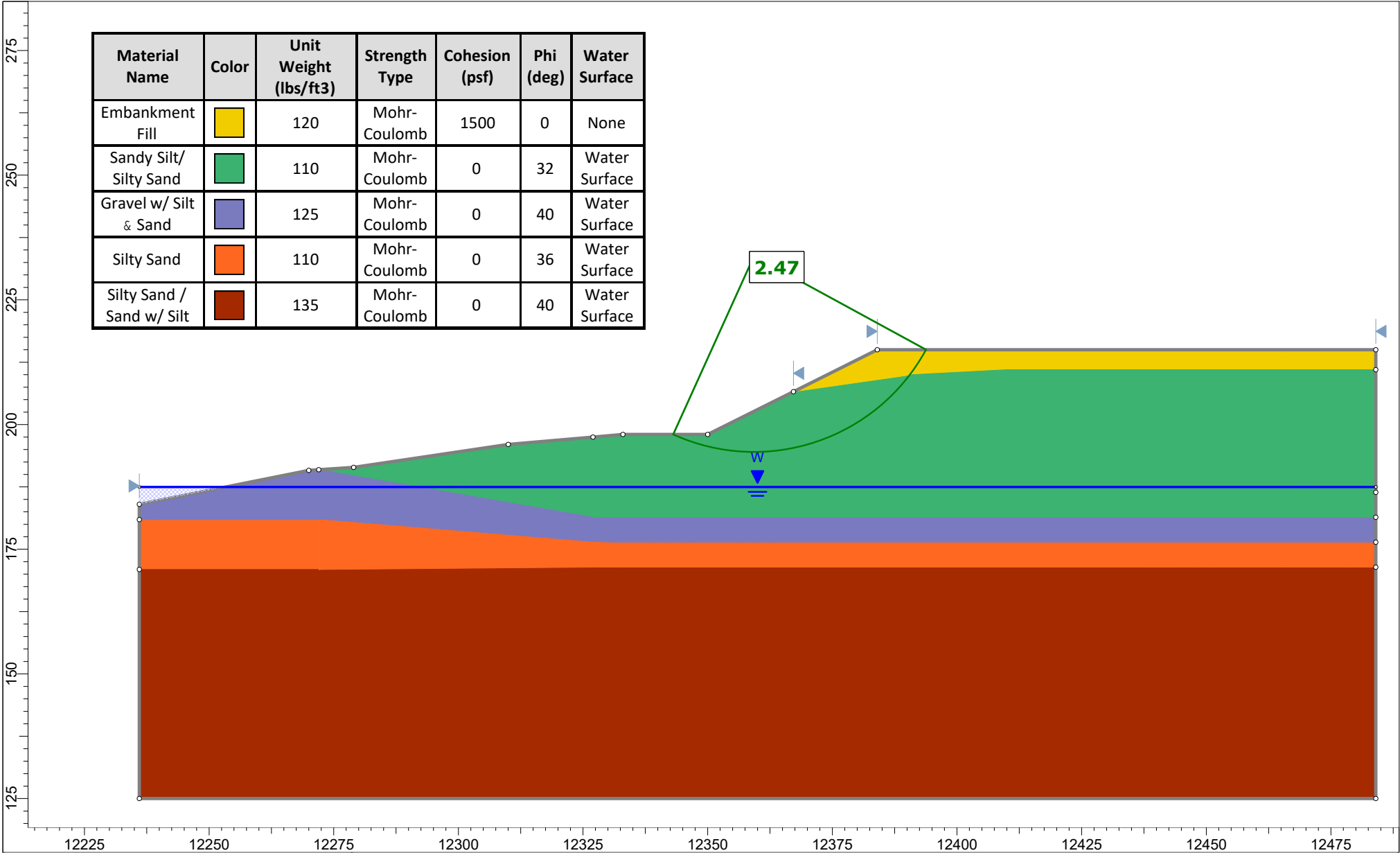


|  |             |                  |  |                          |
|--|-------------|------------------|--|--------------------------|
|  | Project     |                  | 070509 - Caddo River Str. & Apprs. (Caddo Valley)(S) |                          |
|  | Site        | South Embankment | Analysis Type  | Long Term                |
|  | Analyzed By | PT               | Configuration  | Hwy. 67 over Caddo River |
|  | Date        | 1/31/2023        |  |                          |




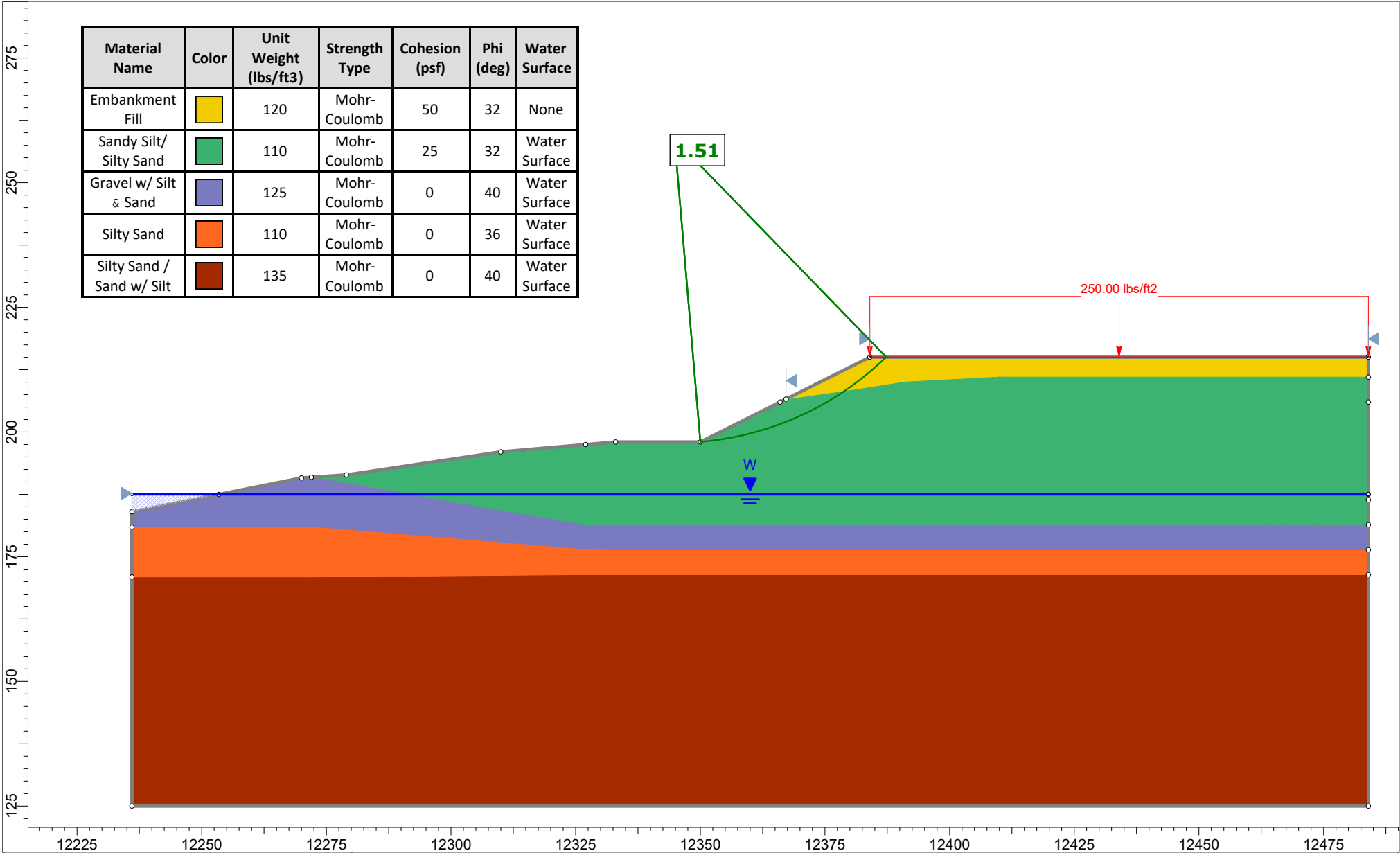
| Material Name                       | Color       | Unit Weight (lbs/ft3) | Strength Type     | Cohesion (psf) | Phi (deg) | Allow Sliding | Water Surface |
|-------------------------------------|-------------|-----------------------|-------------------|----------------|-----------|---------------|---------------|
| Embankment Fill                     | Yellow      | 120                   | Mohr-Coulomb      | 1500           | 0         |               | None          |
| Silty Clay / Sandy Silty Clay       | Green       | 110                   | Mohr-Coulomb      | 500            | 32        |               | None          |
| Silty Sand                          | Orange      | 105                   | Mohr-Coulomb      | 0              | 32        |               | Water Surface |
| Sand with Gravel / Gravel with Sand | Purple      | 125                   | Mohr-Coulomb      | 0              | 40        |               | Water Surface |
| Gravel                              | Olive       | 135                   | Mohr-Coulomb      | 0              | 42        |               | Water Surface |
| Sand w/ Silt                        | Brown       | 135                   | Mohr-Coulomb      | 0              | 38        |               | Water Surface |
| Cemented Sand                       | Purple      | 140                   | Infinite strength |                |           | Yes           | Water Surface |
| Sandstone                           | Light Green | 160                   | Infinite strength |                |           | Yes           | Water Surface |


|  |             |                  |  |                          |
|--|-------------|------------------|--|--------------------------|
|  | Project     |                  | 070509 - Caddo River Str. & Apprs. (Caddo Valley)(S) |                          |
|  | Site        | South Embankment | Analysis Type  | Seismic                  |
|  | Analyzed By | PT               | Configuration  | Hwy. 67 over Caddo River |
|  | Date        | 1/31/2023        |  |                          |








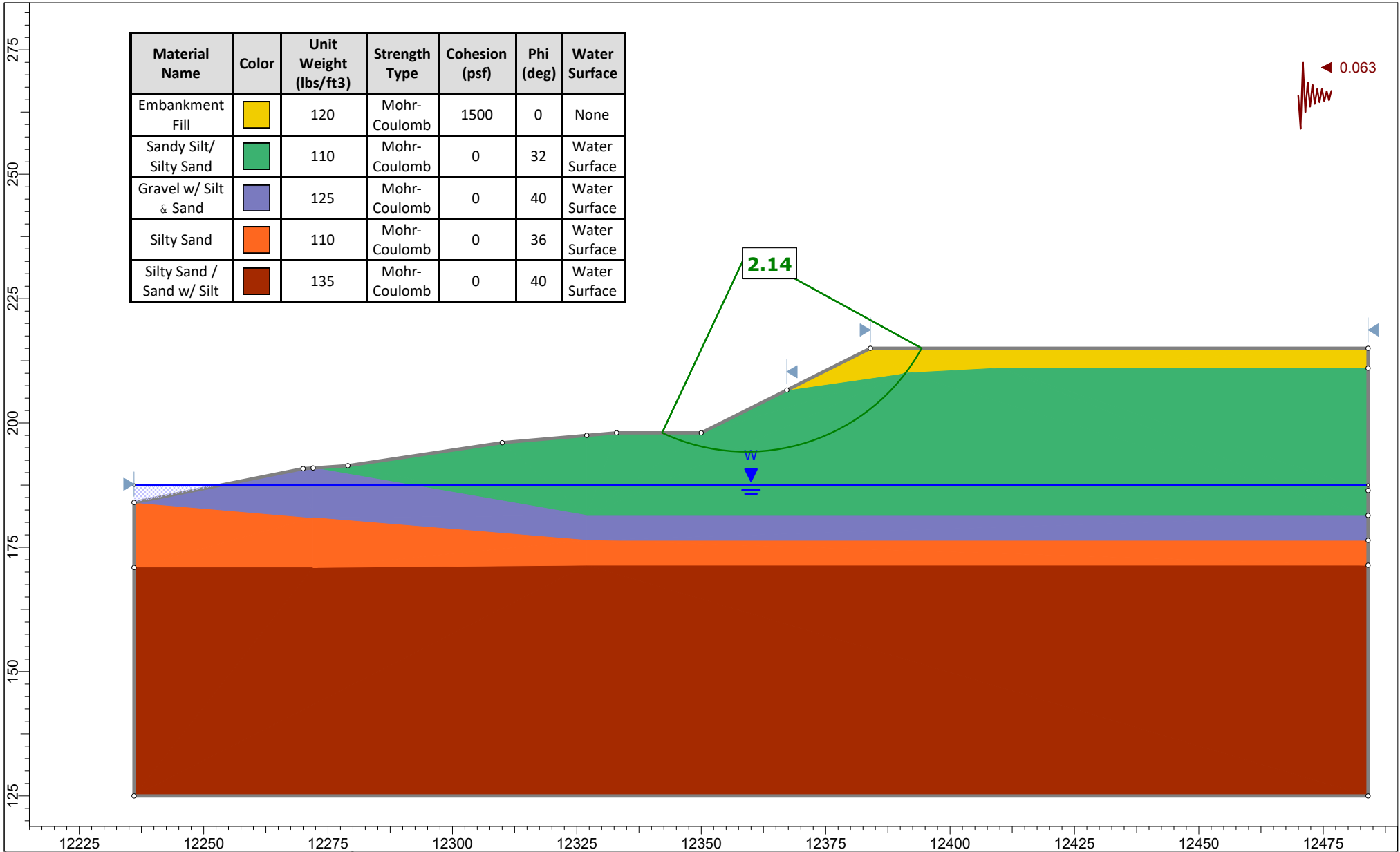
| Material Name             | Color  | Unit Weight (lbs/ft3) | Strength Type | Cohesion (psf) | Phi (deg) | Water Surface |
|---------------------------|--------|-----------------------|---------------|----------------|-----------|---------------|
| Embankment Fill           | Yellow | 120                   | Mohr-Coulomb  | 1500           | 0         | None          |
| Silty Sand                | Green  | 110                   | Mohr-Coulomb  | 0              | 32        | Water Surface |
| Gravel w/ Silt & Sand     | Purple | 125                   | Mohr-Coulomb  | 0              | 40        | Water Surface |
| Silty Sand                | Orange | 110                   | Mohr-Coulomb  | 0              | 36        | Water Surface |
| Silty Sand / Sand w/ Silt | Brown  | 135                   | Mohr-Coulomb  | 0              | 40        | Water Surface |

|  |             |                  |  |                          |
|--|-------------|------------------|--|--------------------------|
|  | Project     |                  | 070509 - Caddo River Str. & Apprs. (Caddo Valley)(S) |                          |
|  | Site        | North Embankment | Analysis Type  | Short Term               |
|  | Analyzed By | PT               | Configuration  | Hwy. 67 over Caddo River |
|  | Date        | 1/31/2023        |  |                          |



|  |             |                  |  |                          |
|--|-------------|------------------|--|--------------------------|
|  | Project     |                  | 070509 - Caddo River Str. & Apprs. (Caddo Valley)(S) |                          |
|  | Site        | North Embankment | Analysis Type  | Long Term                |
|  | Analyzed By | PT               | Configuration  | Hwy. 67 over Caddo River |
|  | Date        | 1/31/2023        |  |                          |

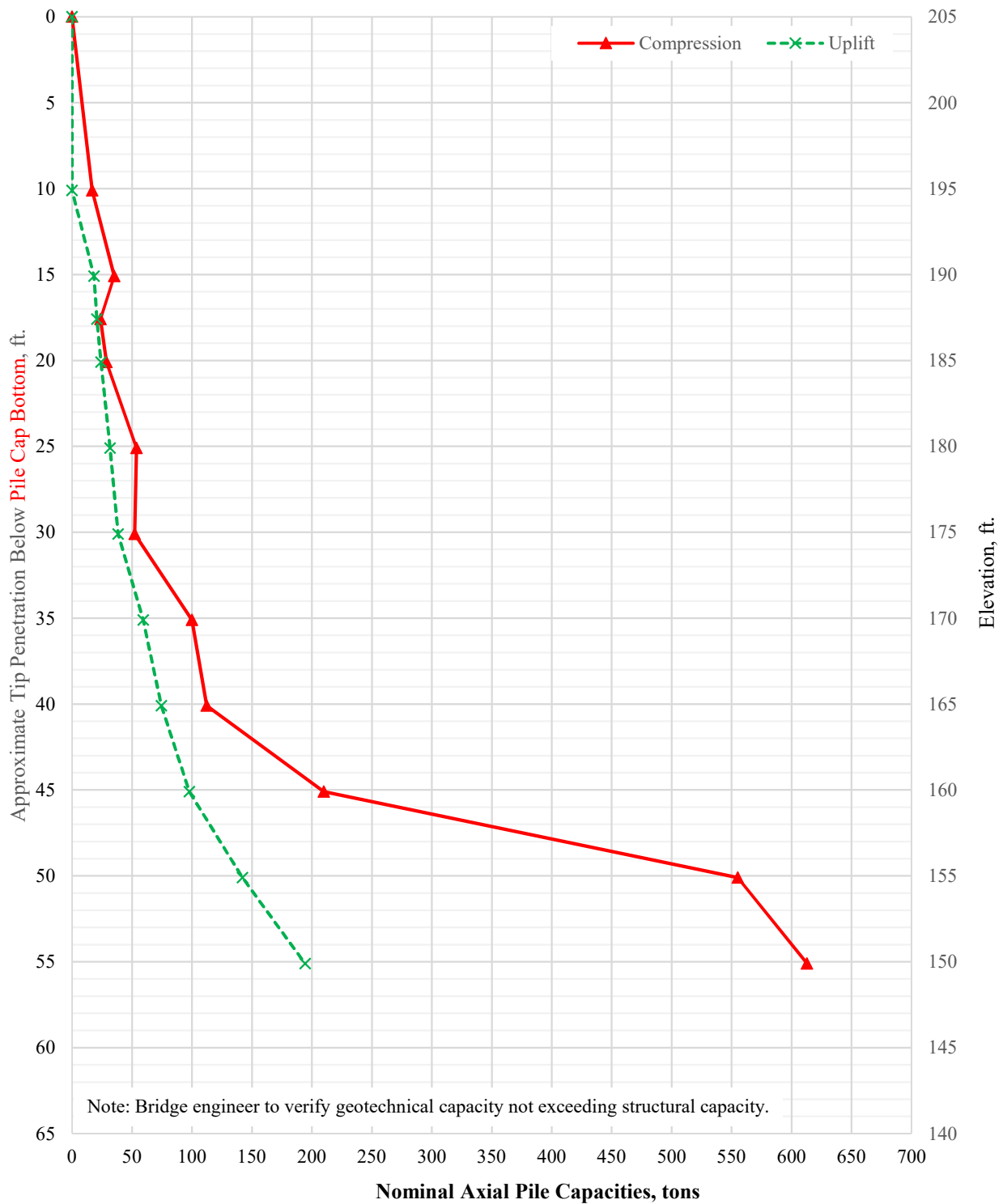
| Material Name             | Color   | Unit Weight (lbs/ft3) | Strength Type | Cohesion (psf) | Phi (deg) | Water Surface |
|---------------------------|---|-----------------------|---------------|----------------|-----------|---------------|
| Embankment Fill           |  | 120                   | Mohr-Coulomb  | 1500           | 0         | None          |
| Sandy Silt/ Silty Sand    |  | 110                   | Mohr-Coulomb  | 0              | 32        | Water Surface |
| Gravel w/ Silt & Sand     |  | 125                   | Mohr-Coulomb  | 0              | 40        | Water Surface |
| Silty Sand                |  | 110                   | Mohr-Coulomb  | 0              | 36        | Water Surface |
| Silty Sand / Sand w/ Silt |  | 135                   | Mohr-Coulomb  | 0              | 40        | Water Surface |



SLIDEINTERPRET 9.020

|             |  |               |                          |
|-------------|--|---------------|--------------------------|
| Project     | 070509 - Caddo River Str. & Apprs. (Caddo Valley)(S) |               |                          |
| Site        | North Embankment                                     | Analysis Type | Seismic                  |
| Analyzed By | PT   | Configuration | Hwy. 67 over Caddo River |
| Date        | 1/31/2023  |               |                          |

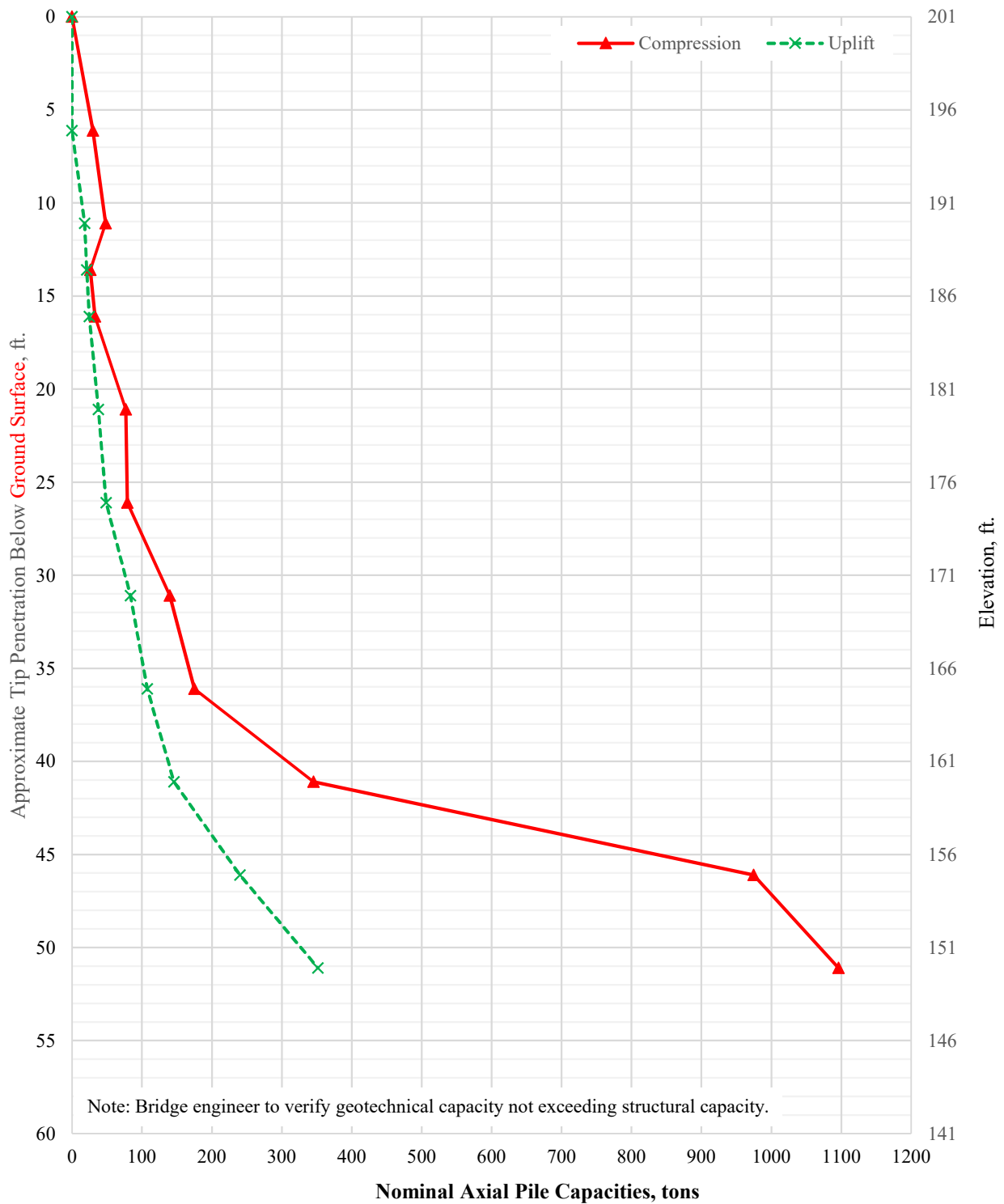
## Attachment G



**SINGLE 18"-DIAMETER CLOSED-END STEEL SHELL PILE**

Bent 1 - Sta. 112+35  
 Project No.: 070509  
 Location: Clark County

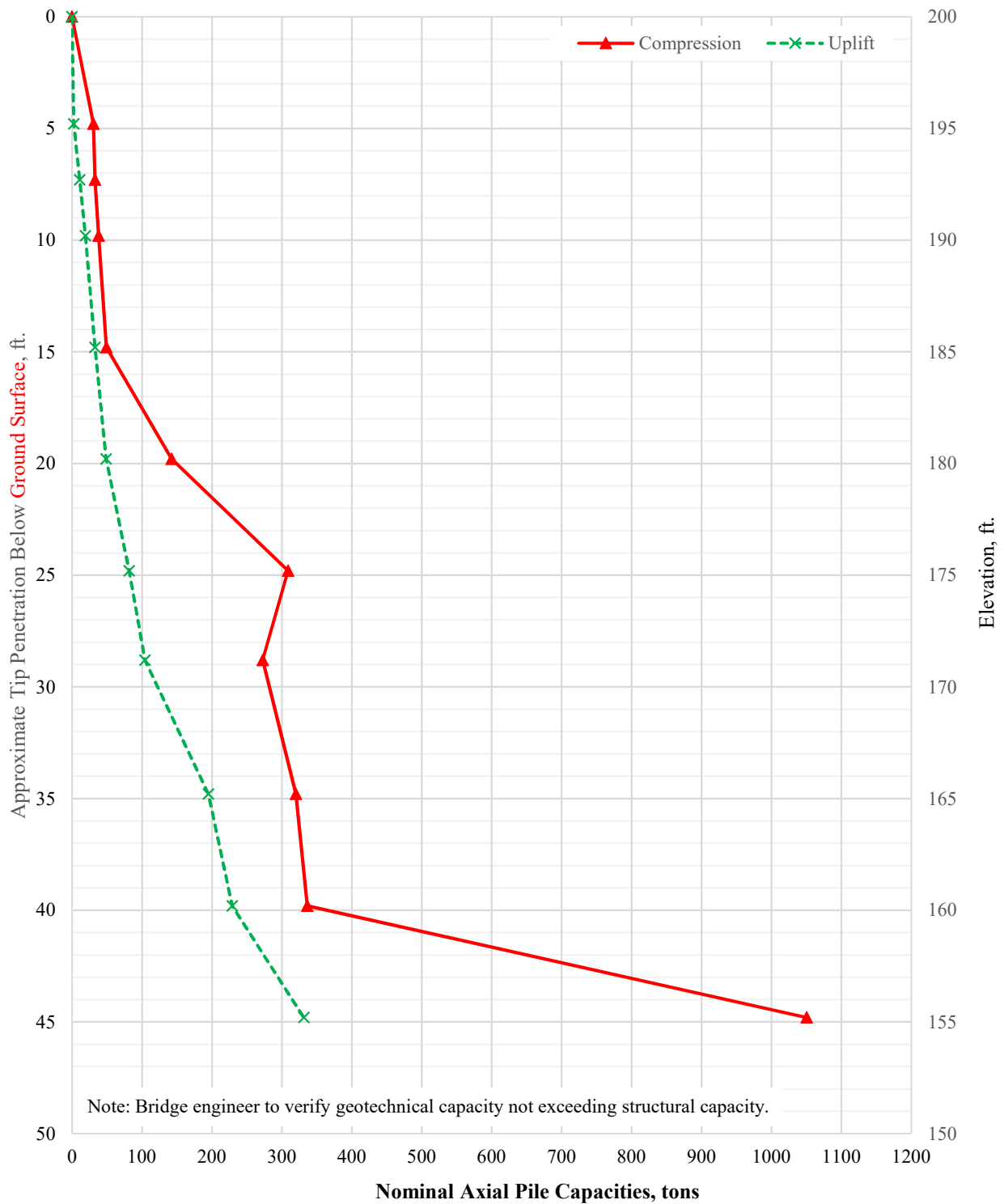




SINGLE 24"-DIAMETER CLOSED-END STEEL SHELL PILE

Bent 2 - Sta. 113+21  
 Project No.: 070509  
 Location: Clark County

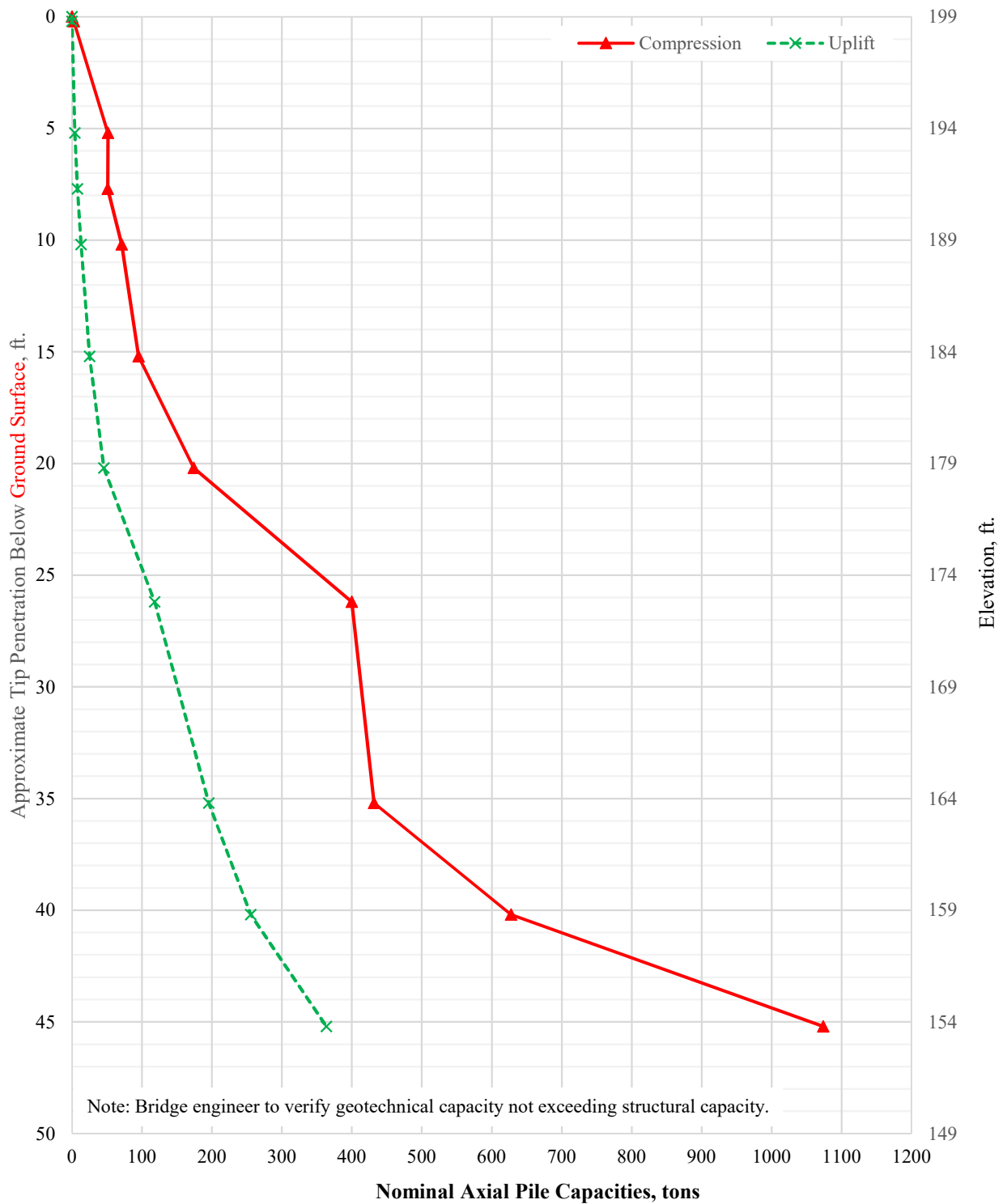




**SINGLE 24"-DIAMETER CLOSED-END STEEL SHELL PILE**

Bent 3 - Sta. 114+06  
 Project No.: 070509  
 Location: Clark County



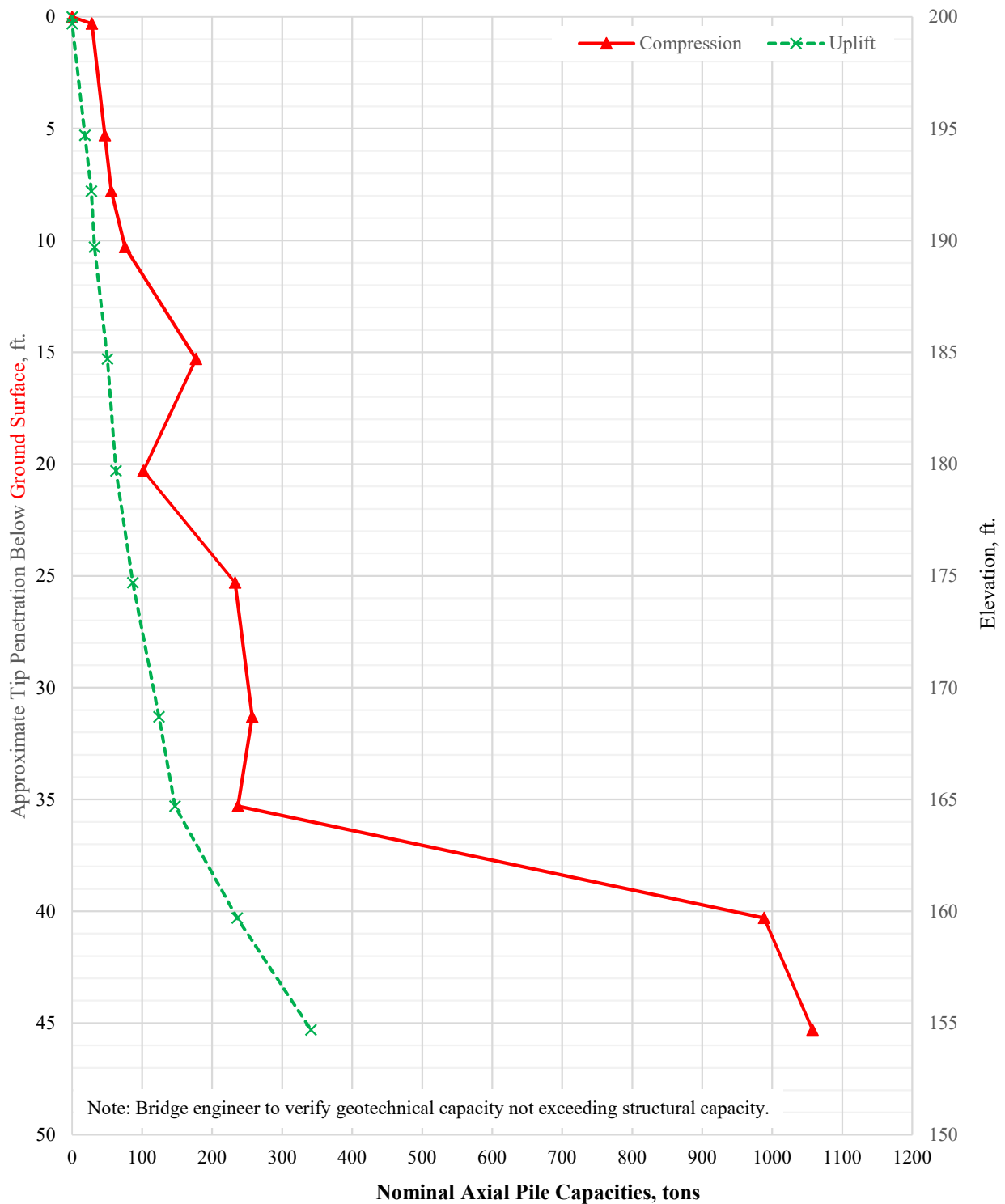


Note: Bridge engineer to verify geotechnical capacity not exceeding structural capacity.

**SINGLE 24"-DIAMETER CLOSED-END STEEL SHELL PILE**

Bent 4 - Sta. 114+91  
 Project No.: 070509  
 Location: Clark County



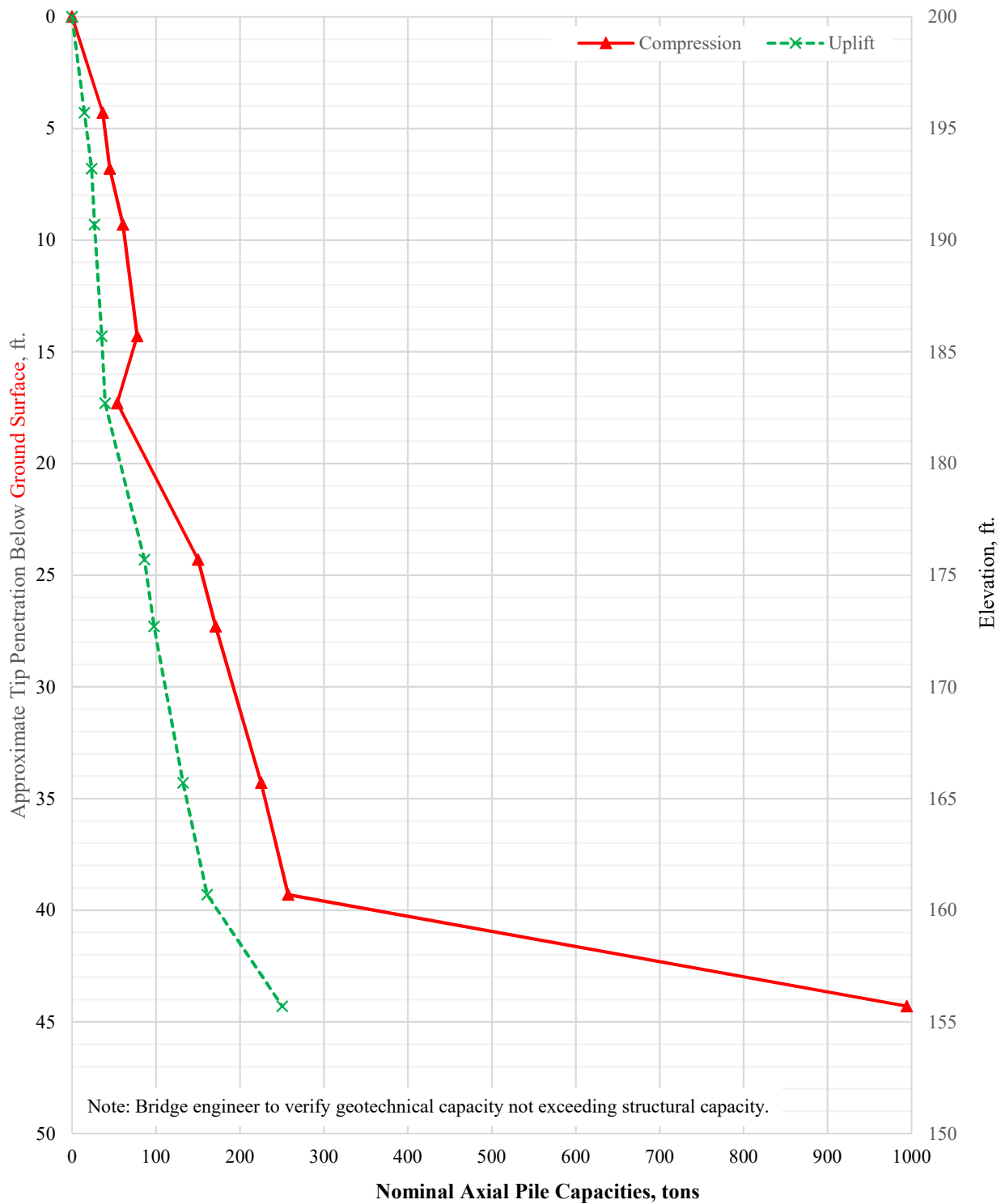


Note: Bridge engineer to verify geotechnical capacity not exceeding structural capacity.

**SINGLE 24"-DIAMETER CLOSED-END STEEL SHELL PILE**

Bent 5 - Sta. 115+76  
 Project No.: 070509  
 Location: Clark County



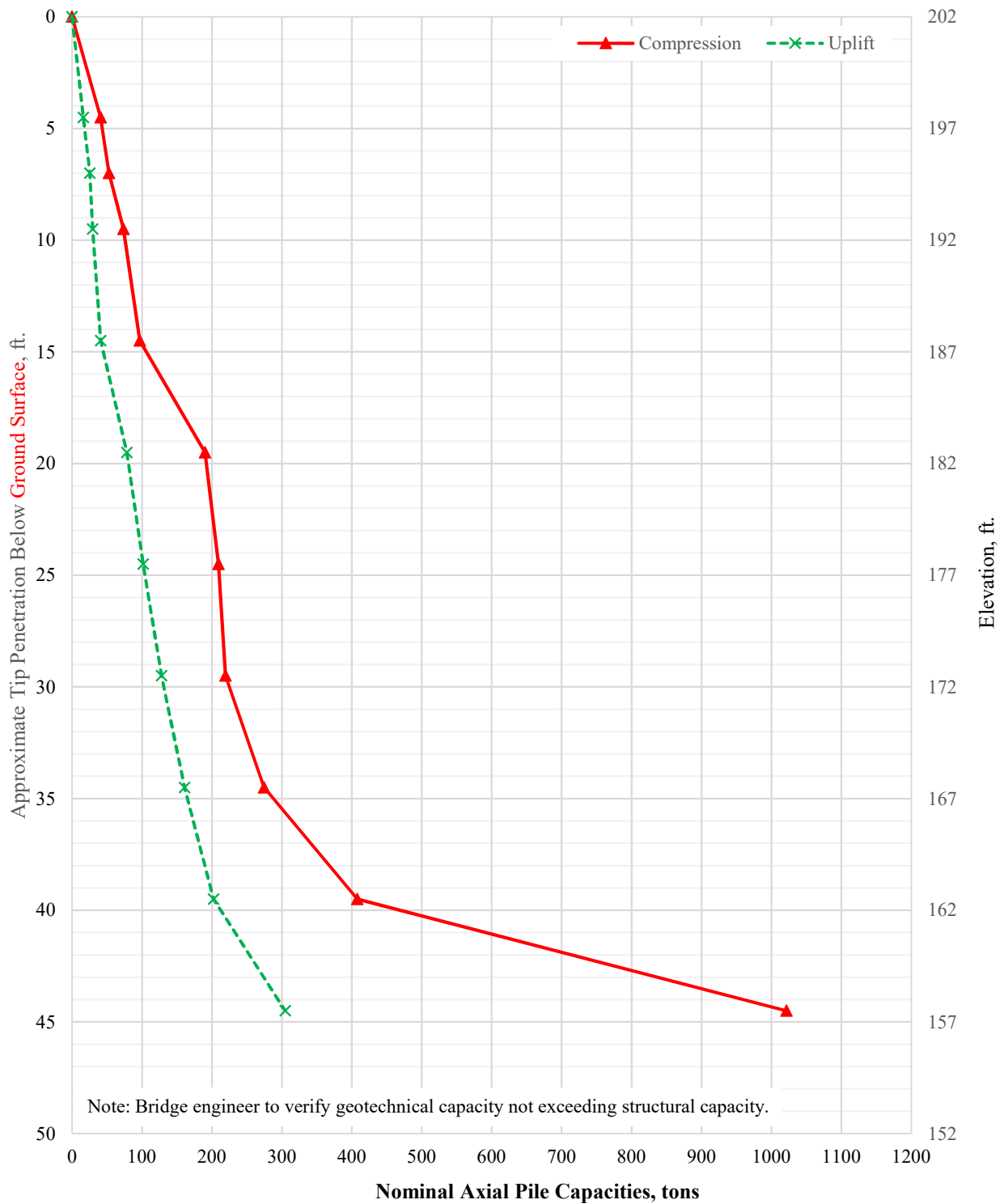


Note: Bridge engineer to verify geotechnical capacity not exceeding structural capacity.

**SINGLE 24"-DIAMETER CLOSED-END STEEL SHELL PILE**

Bent 6 - Sta. 116+61  
 Project No.: 070509  
 Location: Clark County



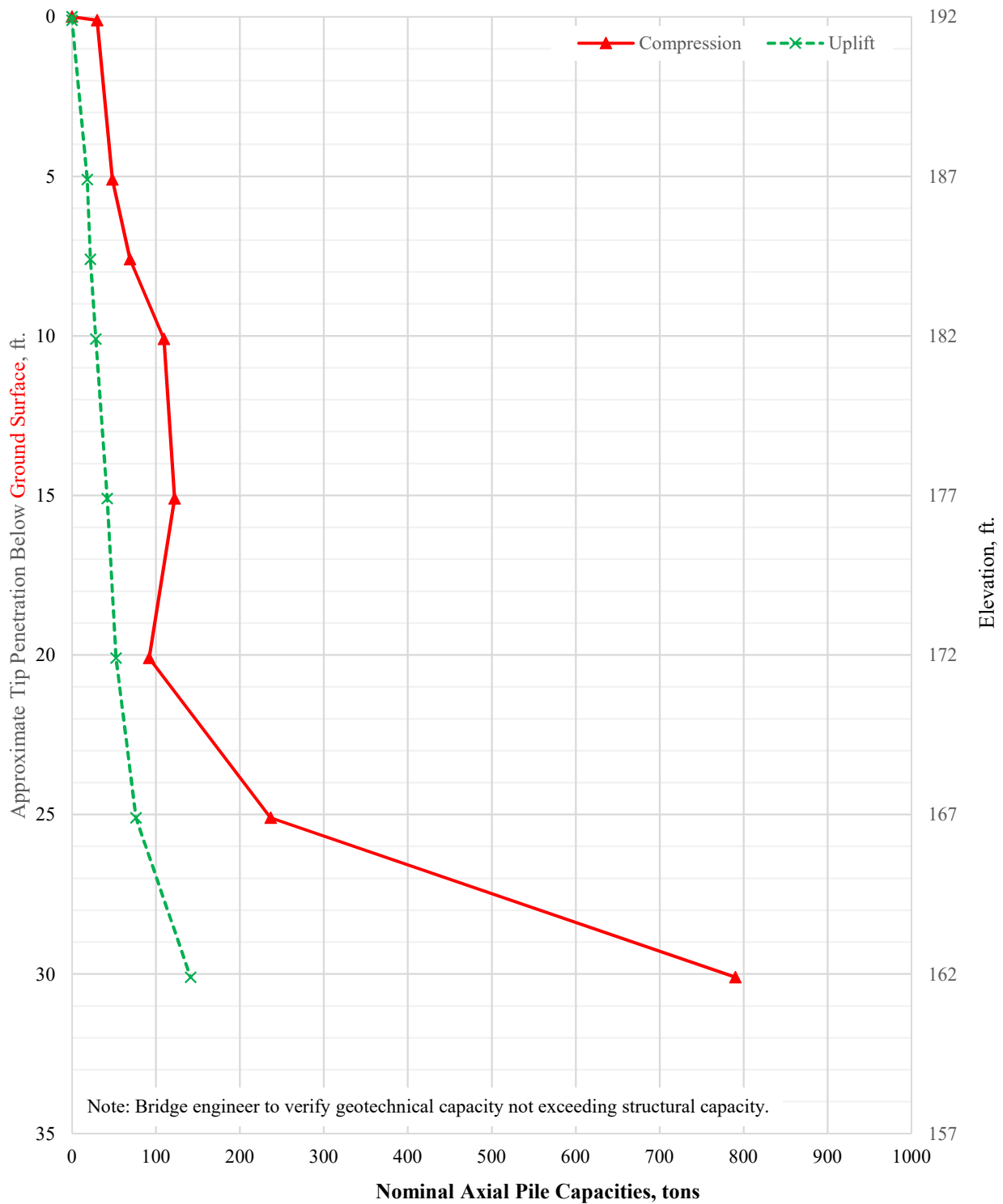


Note: Bridge engineer to verify geotechnical capacity not exceeding structural capacity.

**SINGLE 24"-DIAMETER CLOSED-END STEEL SHELL PILE**

Bent 7 - Sta. 117+46  
 Project No.: 070509  
 Location: Clark County



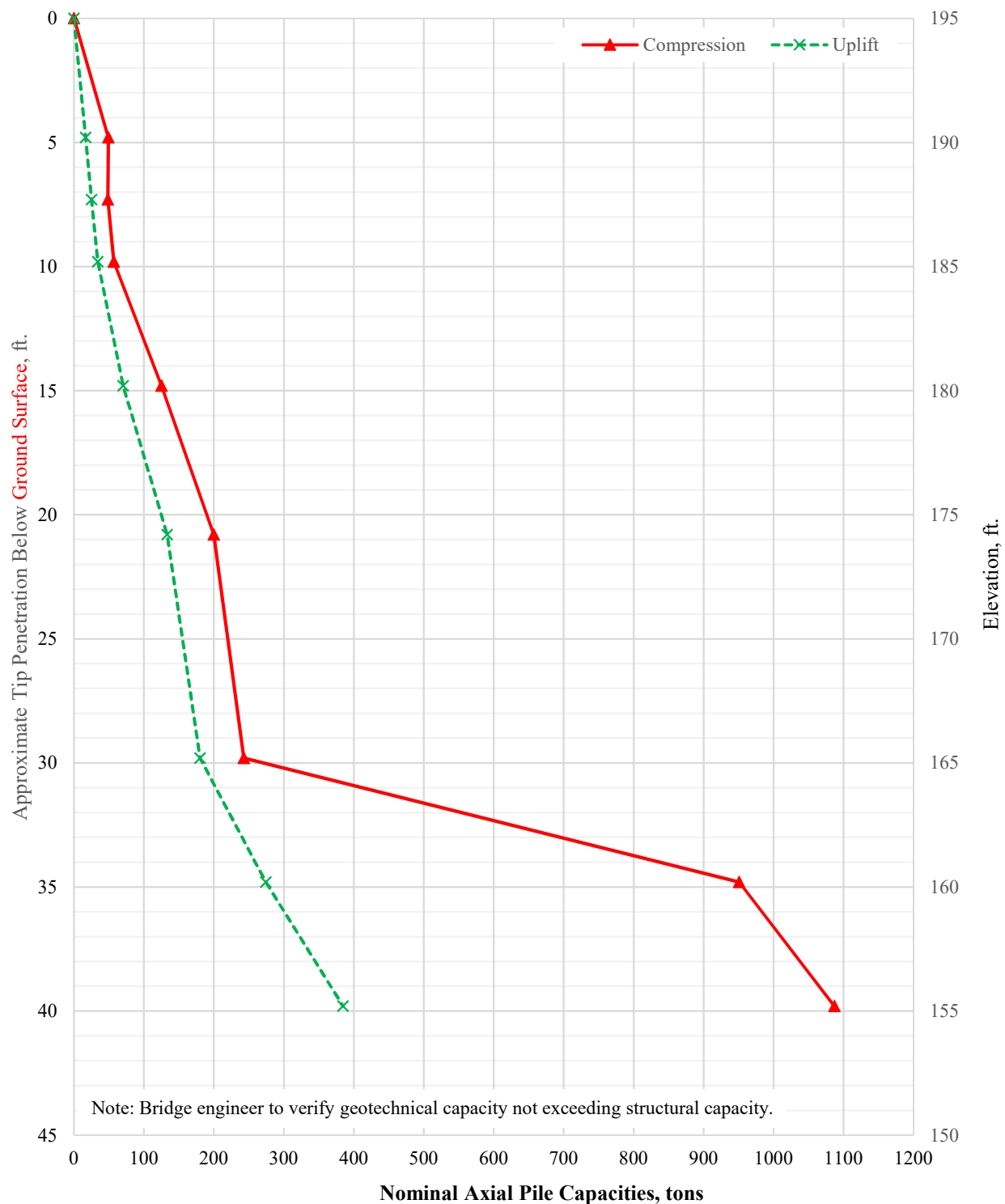


Note: Bridge engineer to verify geotechnical capacity not exceeding structural capacity.

**SINGLE 24"-DIAMETER CLOSED-END STEEL SHELL PILE**

Bent 8 - Sta. 118+31  
 Project No.: 070509  
 Location: Clark County



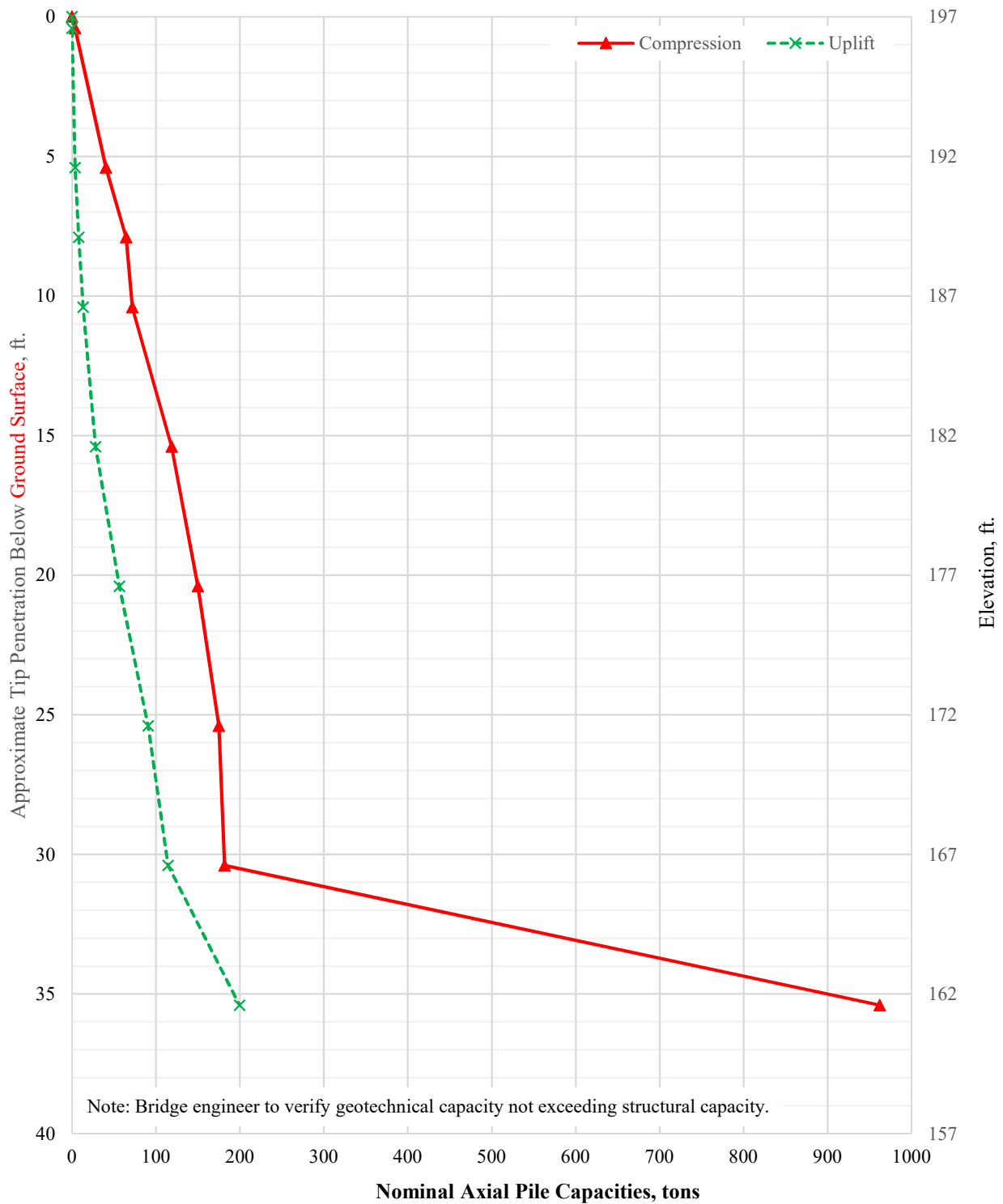


Note: Bridge engineer to verify geotechnical capacity not exceeding structural capacity.

**SINGLE 24"-DIAMETER CLOSED-END STEEL SHELL PILE**

Bent 9 - Sta. 119+16  
 Project No.: 070509  
 Location: Clark County

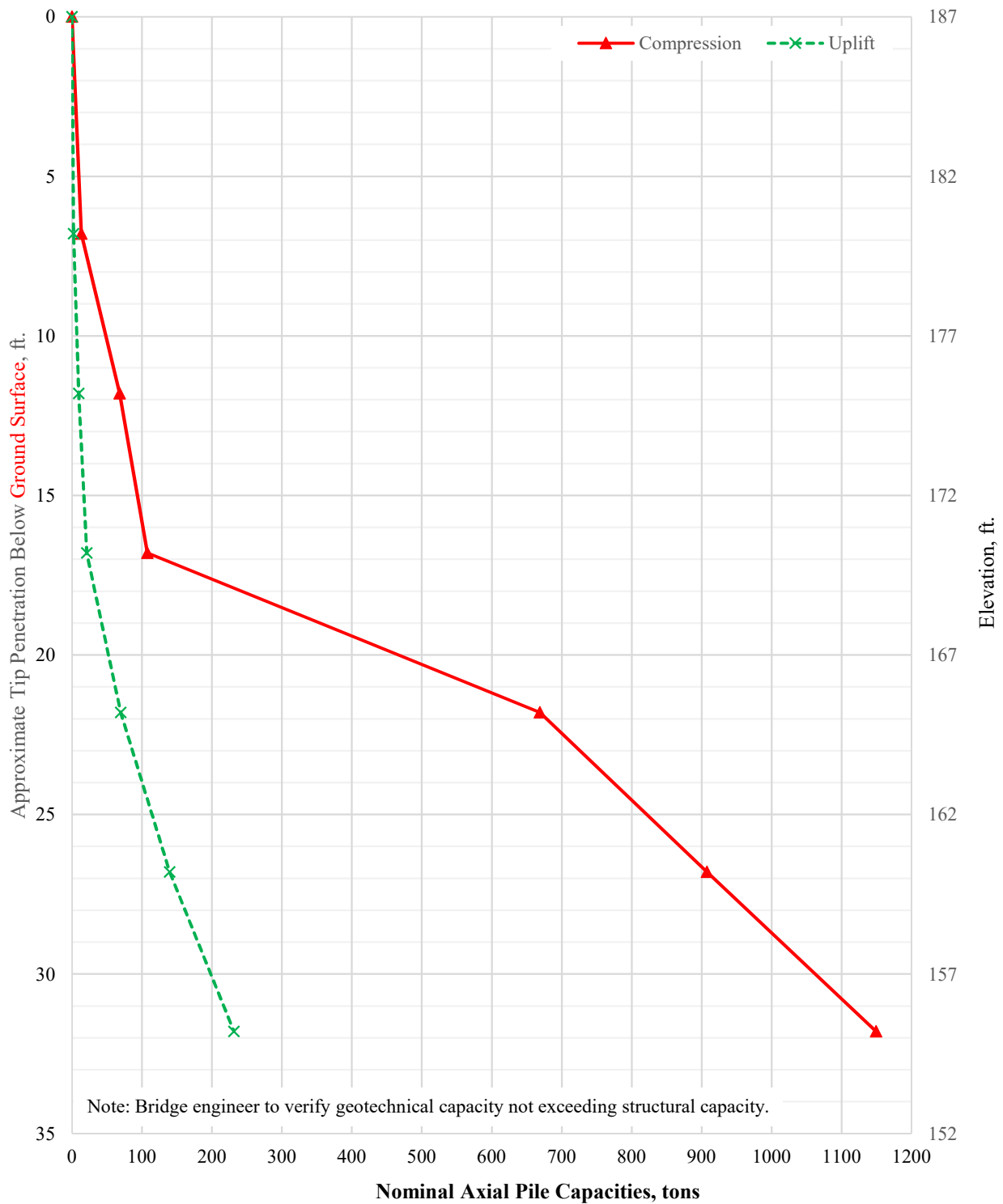




**SINGLE 24"-DIAMETER CLOSED-END STEEL SHELL PILE**

Bent 10 - Sta. 120+01  
 Project No.: 070509  
 Location: Clark County



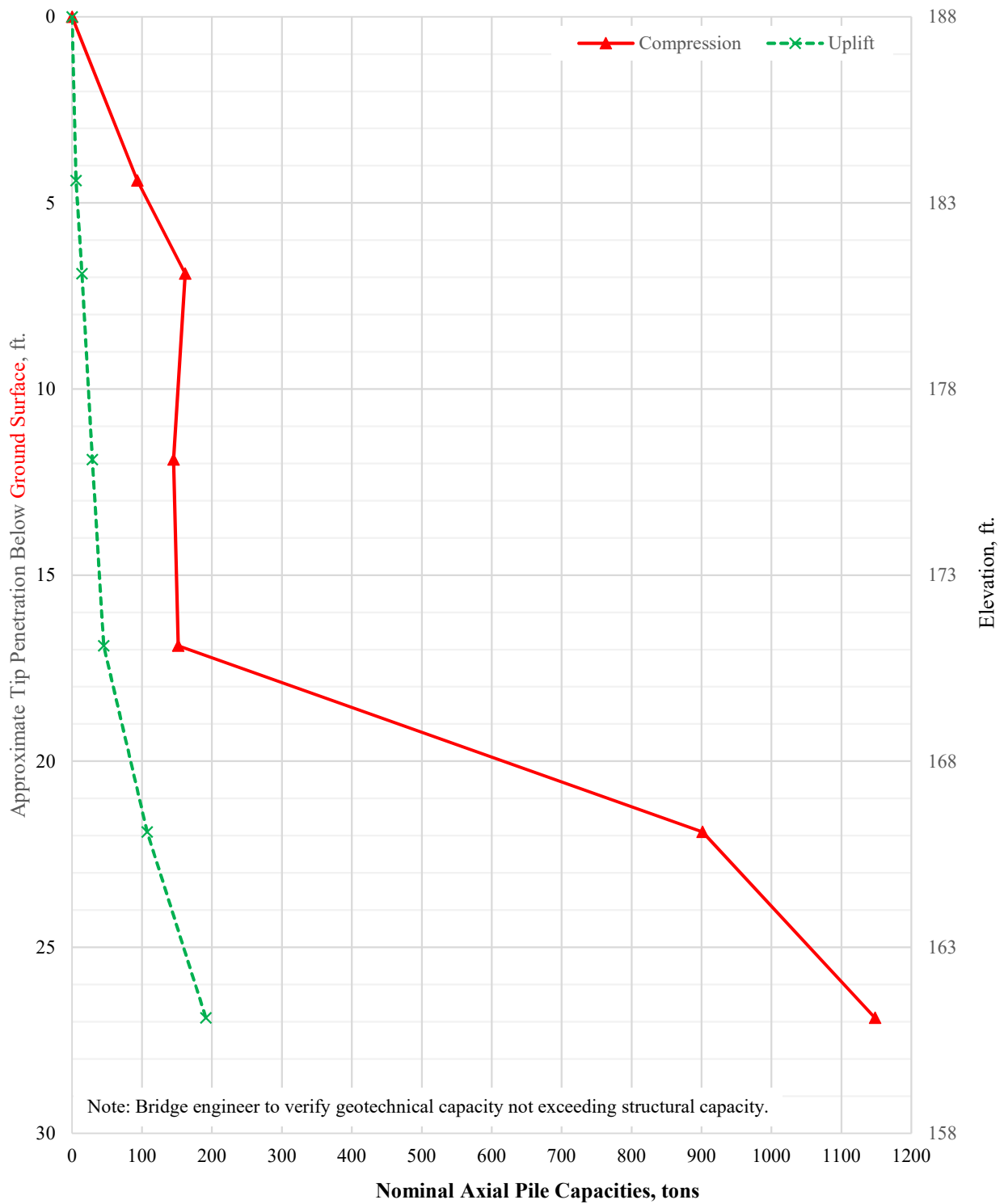


Note: Bridge engineer to verify geotechnical capacity not exceeding structural capacity.

**SINGLE 30"-DIAMETER CLOSED-END STEEL SHELL PILE**

Bent 11 - Sta. 121+16  
 Project No.: 070509  
 Location: Clark County



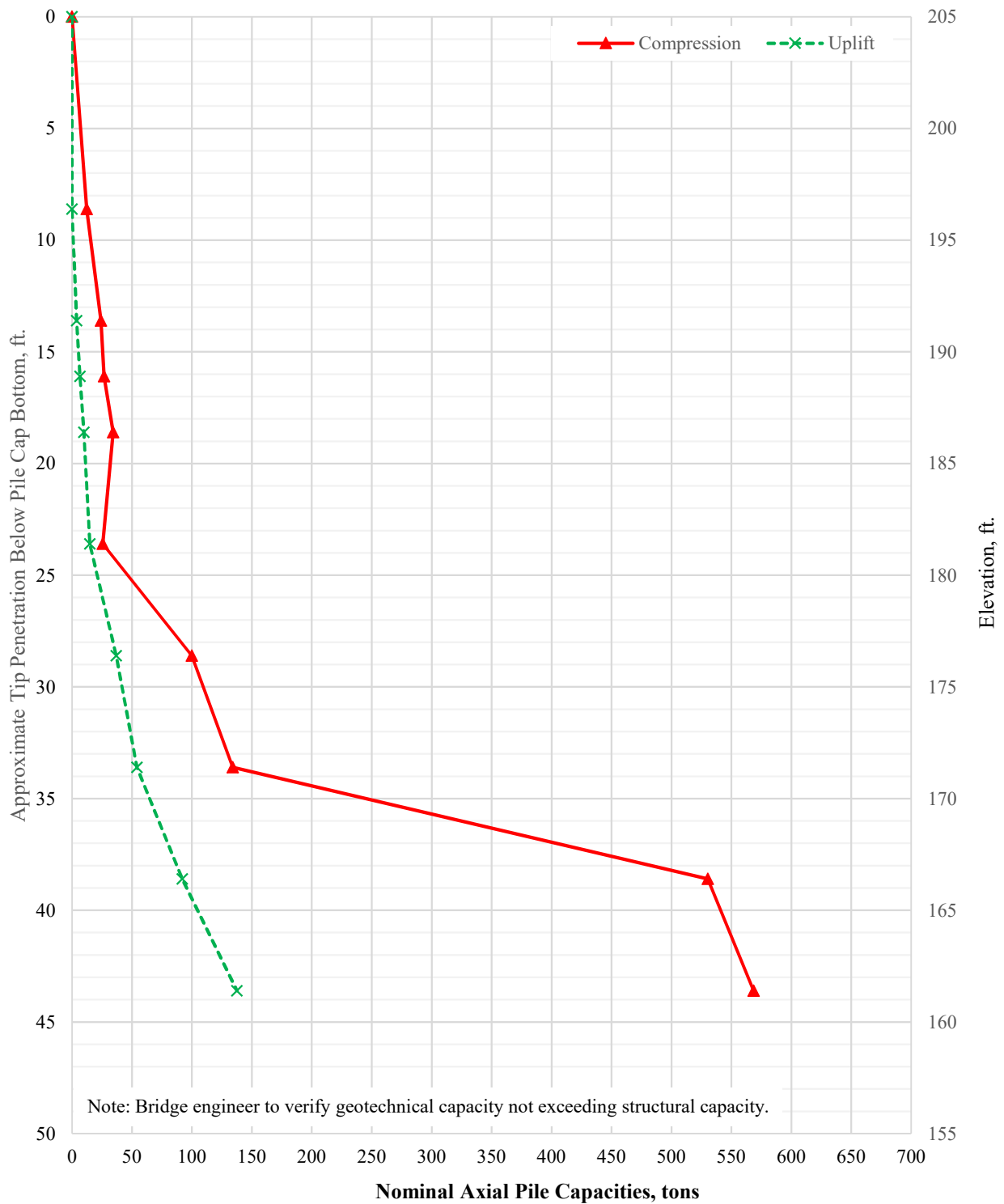


Note: Bridge engineer to verify geotechnical capacity not exceeding structural capacity.

**SINGLE 30"-DIAMETER CLOSED-END STEEL SHELL PILE**

Bent 12 - Sta. 122+56  
 Project No.: 070509  
 Location: Clark County





Note: Bridge engineer to verify geotechnical capacity not exceeding structural capacity.

**SINGLE 18"-DIAMETER CLOSED-END STEEL SHELL PILE**

Bent 13 - Sta. 123+72  
 Project No.: 070509  
 Location: Clark County



## Attachment H

Table 6a: Recommended Geotechnical Parameters for L-Pile Analysis – Bent 1

| Elevation (ft.)             | p-y Curve Model      | Effective Unit Weight ( $\gamma'$ ) (pcf) | Undrained Shear Strength ( $c_u$ ) (psf) | Strain Factor, $\epsilon_{50}$ (Soil)/ $k_{rm}$ (Rock) | Friction Angle ( $\phi$ ) (Deg.) | Soil Modulus (k) (pci) | Compressive Strength (psi) | Modulus of Rock Mass, psi $\times 10^6$ | RQD, % |
|-----------------------------|----------------------|---|--|--|----------------------------------|------------------------|----------------------------|---|--------|
| Above Existing Grade (fill) | Soft Clay (Matlock)  | 125                                       | 750                                      | 0.01   | NA                               | NA                     | NA                         | NA                                      | NA     |
| Existing Grade to 190       | Stiff Clay w/o Water | 110                                       | 1000                                     | 0.007  | NA                               | NA                     | NA                         | NA                                      | NA     |
| 190 to 185                  | Soft Clay (Matlock)  | 110                                       | 400                                      | 0.02   | NA                               | NA                     | NA                         | NA                                      | NA     |
| 185 to 175                  | Sand (Reese)         | 58  | NA                                       | NA   | 28                               | 20                     | NA                         | NA                                      | NA     |
| 175 to 165                  | Sand (Reese)         | 68  | NA                                       | NA   | 35                               | 78                     | NA                         | NA                                      | NA     |
| 165 to 160                  | Sand (Reese)         | 72  | NA                                       | NA   | 36                               | 93                     | NA                         | NA                                      | NA     |
| 160 to 115                  | Sand (Reese)         | 125                                       | NA                                       | NA   | 41                               | 144                    | NA                         | NA                                      | NA     |

Table 6b: Recommended Geotechnical Parameters for L-Pile Analysis – Bent 2

| Elevation (ft.)             | p-y Curve Model      | Effective Unit Weight ( $\gamma'$ ) (pcf) | Undrained Shear Strength ( $c_u$ ) (psf) | Strain Factor, $\epsilon_{50}$ (Soil)/ $k_{rm}$ (Rock) | Friction Angle ( $\phi$ ) (Deg.) | Soil Modulus (k) (pci) | Compressive Strength (psi) | Modulus of Rock Mass, psi $\times 10^6$ | RQD, % |
|-----------------------------|----------------------|---|--|--|----------------------------------|------------------------|----------------------------|---|--------|
| Above Existing Grade (fill) | Soft Clay (Matlock)  | 125                                       | 750                                      | 0.01   | NA                               | NA                     | NA                         | NA                                      | NA     |
| Existing Grade to 190       | Stiff Clay w/o Water | 110                                       | 1000                                     | 0.007  | NA                               | NA                     | NA                         | NA                                      | NA     |
| 190 to 185                  | Soft Clay (Matlock)  | 110                                       | 400                                      | 0.02   | NA                               | NA                     | NA                         | NA                                      | NA     |
| 185 to 175                  | Sand (Reese)         | 58  | NA                                       | NA   | 28                               | 20                     | NA                         | NA                                      | NA     |
| 175 to 165                  | Sand (Reese)         | 68  | NA                                       | NA   | 35                               | 78                     | NA                         | NA                                      | NA     |
| 165 to 160                  | Sand (Reese)         | 72  | NA                                       | NA   | 36                               | 93                     | NA                         | NA                                      | NA     |
| 160 to 115                  | Sand (Reese)         | 125                                       | NA                                       | NA   | 41                               | 144                    | NA                         | NA                                      | NA     |

Table 6c: Recommended Geotechnical Parameters for L-Pile Analysis – Bent 3

| Elevation (ft.)       | p-y Curve Model     | Effective Unit Weight ( $\gamma'$ ) (pcf) | Undrained Shear Strength ( $c_u$ ) (psf) | Strain Factor, $\epsilon_{50}$ (Soil)/ $k_{rm}$ (Rock) | Friction Angle ( $\phi$ ) (Deg.) | Soil Modulus (k) (pci) | Compressive Strength (psi) | Modulus of Rock Mass, psi $\times 10^6$ | RQD, % |
|-----------------------|---------------------|---|--|--|----------------------------------|------------------------|----------------------------|---|--------|
| Existing Grade to 195 | Sand (Reese)        | 110                                       | NA                                       | NA   | 30                               | 20                     | NA                         | NA                                      | NA     |
| 195 to 190            | Soft Clay (Matlock) | 115                                       | 750                                      | 0.02   | NA                               | NA                     | NA                         | NA                                      | NA     |
| 190 to 185            | Soft Clay (Matlock) | 43  | 500                                      | 0.02   | NA                               | NA                     | NA                         | NA                                      | NA     |
| 185 to 170            | Sand (Reese)        | 72  | NA                                       | NA   | 34                               | 67                     | NA                         | NA                                      | NA     |
| 170 to 165            | Sand (Reese)        | 84  | NA                                       | NA   | 36                               | 93                     | NA                         | NA                                      | NA     |
| 165 to 160            | Sand (Reese)        | 66  | NA                                       | NA   | 32                               | 41                     | NA                         | NA                                      | NA     |
| Below 160             | Sand (Reese)        | 125                                       | NA                                       | NA   | 41                               | 144                    | NA                         | NA                                      | NA     |

Table 6d: Recommended Geotechnical Parameters for L-Pile Analysis – Bent 4

| Elevation (ft.)       | p-y Curve Model | Effective Unit Weight ( $\gamma'$ ) (pcf) | Undrained Shear Strength ( $c_u$ ) (psf) | Strain Factor, $\epsilon_{50}$ (Soil)/ $k_{rm}$ (Rock) | Friction Angle ( $\phi$ ) (Deg.) | Soil Modulus (k) (pci) | Compressive Strength (psi) | Modulus of Rock Mass, psi $\times 10^6$ | RQD, % |
|-----------------------|-----------------|---|--|--|----------------------------------|------------------------|----------------------------|---|--------|
| Existing Grade to 194 | Sand (Reese)    | 120                                       | NA                                       | NA   | 32                               | 57                     | NA                         | NA                                      | NA     |
| 194 to 189            | Sand (Reese)    | 112                                       | NA                                       | NA   | 32                               | 41                     | NA                         | NA                                      | NA     |
| 189 to 179            | Sand (Reese)    | 66  | NA                                       | NA   | 33                               | 52                     | NA                         | NA                                      | NA     |
| 179 to 172            | Sand (Reese)    | 98  | NA                                       | NA   | 38                               | 119                    | NA                         | NA                                      | NA     |
| Below 172             | Sand (Reese)    | 125                                       | NA                                       | NA   | 41                               | 144                    | NA                         | NA                                      | NA     |

Table 6e: Recommended Geotechnical Parameters for L-Pile Analysis – Bent 5

| Elevation (ft.)       | p-y Curve Model      | Effective Unit Weight ( $\gamma'$ ) (pcf) | Undrained Shear Strength ( $c_u$ ) (psf) | Strain Factor, $\epsilon_{50}$ (Soil)/ $k_{rm}$ (Rock) | Friction Angle ( $\phi$ ) (Deg.) | Soil Modulus (k) (pci) | Compressive Strength (psi) | Modulus of Rock Mass, psi $\times 10^6$ | RQD, % |
|-----------------------|----------------------|---|--|--|----------------------------------|------------------------|----------------------------|---|--------|
| Existing Grade to 192 | Stiff Clay w/o Water | 125                                       | 1500                                     | 0.007  | NA                               | NA                     | NA                         | NA                                      | NA     |
| 192 to 188            | Sand (Reese)         | 115                                       | NA                                       | NA   | 32                               | 57                     | NA                         | NA                                      | NA     |
| 188 to 185            | Sand (Reese)         | 53  | NA                                       | NA   | 32                               | 40                     | NA                         | NA                                      | NA     |
| 185 to 180            | Sand (Reese)         | 59  | NA                                       | NA   | 30                               | 20                     | NA                         | NA                                      | NA     |
| 180 to 165            | Sand (Reese)         | 67  | NA                                       | NA   | 32                               | 40                     | NA                         | NA                                      | NA     |
| Below 165             | Sand (Reese)         | 125                                       | NA                                       | NA   | 41                               | 144                    | NA                         | NA                                      | NA     |

Table 6f: Recommended Geotechnical Parameters for L-Pile Analysis – Bent 6

| Elevation (ft.)       | p-y Curve Model      | Effective Unit Weight ( $\gamma'$ ) (pcf) | Undrained Shear Strength ( $c_u$ ) (psf) | Strain Factor, $\epsilon_{50}$ (Soil)/ $k_{rm}$ (Rock) | Friction Angle ( $\phi$ ) (Deg.) | Soil Modulus (k) (pci) | Compressive Strength (psi) | Modulus of Rock Mass, psi $\times 10^6$ | RQD, % |
|-----------------------|----------------------|---|--|--|----------------------------------|------------------------|----------------------------|---|--------|
| Existing Grade to 193 | Stiff Clay w/o Water | 125                                       | 1000                                     | 0.007  | NA                               | NA                     | NA                         | NA                                      | NA     |
| 193 to 191            | Sand (Reese)         | 110                                       | NA                                       | NA   | 29                               | 20                     | NA                         | NA                                      | NA     |
| 191 to 183            | Sand (Reese)         | 48  | NA                                       | NA   | 29                               | 20                     | NA                         | NA                                      | NA     |
| 183 to 161            | Sand (Reese)         | 70  | NA                                       | NA   | 33                               | 52                     | NA                         | NA                                      | NA     |
| Below 161             | Sand (Reese)         | 125                                       | NA                                       | NA   | 41                               | 144                    | NA                         | NA                                      | NA     |

Table 6g: Recommended Geotechnical Parameters for L-Pile Analysis – Bent 7

| Elevation (ft.)       | p-y Curve Model      | Effective Unit Weight ( $\gamma'$ ) (pcf) | Undrained Shear Strength ( $c_u$ ) (psf) | Strain Factor, $\epsilon_{50}$ (Soil)/ $k_{rm}$ (Rock) | Friction Angle ( $\phi$ ) (Deg.) | Soil Modulus (k) (pci) | Compressive Strength (psi) | Modulus of Rock Mass, psi $\times 10^6$ | RQD, % |
|-----------------------|----------------------|---|--|--|----------------------------------|------------------------|----------------------------|---|--------|
| Existing Grade to 195 | Stiff Clay w/o Water | 125                                       | 1250                                     | 0.007  | NA                               | NA                     | NA                         | NA                                      | NA     |
| 195 to 193            | Sand (Reese)         | 110                                       | NA                                       | NA   | 30                               | 20                     | NA                         | NA                                      | NA     |
| 193 to 188            | Sand (Reese)         | 61  | NA                                       | NA   | 30                               | 20                     | NA                         | NA                                      | NA     |
| 188 to 173            | Sand (Reese)         | 72  | NA                                       | NA   | 34                               | 67                     | NA                         | NA                                      | NA     |
| 173 to 163            | Sand (Reese)         | 71  | NA                                       | NA   | 33                               | 52                     | NA                         | NA                                      | NA     |
| Below 163             | Sand (Reese)         | 125                                       | NA                                       | NA   | 41                               | 144                    | NA                         | NA                                      | NA     |

Table 6h: Recommended Geotechnical Parameters for L-Pile Analysis – Bent 8

| Elevation (ft.)       | p-y Curve Model      | Effective Unit Weight ( $\gamma'$ ) (pcf) | Undrained Shear Strength ( $c_u$ ) (psf) | Strain Factor, $\epsilon_{50}$ (Soil)/ $k_{rm}$ (Rock) | Friction Angle ( $\phi$ ) (Deg.) | Soil Modulus (k) (pci) | Compressive Strength (psi) | Modulus of Rock Mass, psi $\times 10^6$ | RQD, % |
|-----------------------|----------------------|---|--|--|----------------------------------|------------------------|----------------------------|---|--------|
| Existing Grade to 187 | Stiff Clay w/o Water | 120                                       | 1000                                     | 0.007  | NA                               | NA                     | NA                         | NA                                      | NA     |
| 187 to 184            | Sand (Reese)         | 112                                       | NA                                       | NA   | 31                               | 36                     | NA                         | NA                                      | NA     |
| 184 to 167            | Sand (Reese)         | 66  | NA                                       | NA   | 33                               | 52                     | NA                         | NA                                      | NA     |
| Below 167             | Sand (Reese)         | 125                                       | NA                                       | NA   | 41                               | 144                    | NA                         | NA                                      | NA     |

Table 6i: Recommended Geotechnical Parameters for L-Pile Analysis – Bent 9

| Elevation (ft.)       | p-y Curve Model      | Effective Unit Weight ( $\gamma'$ ) (pcf) | Undrained Shear Strength ( $c_u$ ) (psf) | Strain Factor, $\epsilon_{50}$ (Soil)/ $k_{rm}$ (Rock) | Friction Angle ( $\phi$ ) (Deg.) | Soil Modulus (k) (pci) | Compressive Strength (psi) | Modulus of Rock Mass, psi $\times 10^6$ | RQD, % |
|-----------------------|----------------------|---|--|--|----------------------------------|------------------------|----------------------------|---|--------|
| Existing Grade to 186 | Stiff Clay w/o Water | 120                                       | 1500                                     | 0.007  | NA                               | NA                     | NA                         | NA                                      | NA     |
| 186 to 181            | Sand (Reese)         | 140                                       | NA                                       | NA   | 38                               | 190                    | NA                         | NA                                      | NA     |
| 181 to 175            | Sand (Reese)         | 78  | NA                                       | NA   | 38                               | 120                    | NA                         | NA                                      | NA     |
| 175 to 166            | Sand (Reese)         | 74  | NA                                       | NA   | 34                               | 67                     | NA                         | NA                                      | NA     |
| Below 166             | Sand (Reese)         | 125                                       | NA                                       | NA   | 41                               | 144                    | NA                         | NA                                      | NA     |

Table 6j: Recommended Geotechnical Parameters for L-Pile Analysis – Bent 10

| Elevation (ft.)       | p-y Curve Model | Effective Unit Weight ( $\gamma'$ ) (pcf) | Undrained Shear Strength ( $c_u$ ) (psf) | Strain Factor, $\epsilon_{50}$ (Soil)/ $k_{rm}$ (Rock) | Friction Angle ( $\phi$ ) (Deg.) | Soil Modulus (k) (pci) | Compressive Strength (psi) | Modulus of Rock Mass, psi $\times 10^6$ | RQD, % |
|-----------------------|-----------------|---|--|--|----------------------------------|------------------------|----------------------------|---|--------|
| Existing Grade to 192 | Sand (Reese)    | 115                                       | NA                                       | NA   | 32                               | 57                     | NA                         | NA                                      | NA     |
| 192 to 182            | Sand (Reese)    | 114                                       | NA                                       | NA   | 33                               | 78                     | NA                         | NA                                      | NA     |
| 182 to 167            | Sand (Reese)    | 71  | NA                                       | NA   | 34                               | 67                     | NA                         | NA                                      | NA     |
| Below 167             | Sand (Reese)    | 125                                       | NA                                       | NA   | 41                               | 144                    | NA                         | NA                                      | NA     |

Table 6k: Recommended Geotechnical Parameters for L-Pile Analysis – Bent 10A

| Elevation (ft.)       | p-y Curve Model | Effective Unit Weight ( $\gamma'$ ) (pcf) | Undrained Shear Strength ( $c_u$ ) (psf) | Strain Factor, $\epsilon_{50}$ (Soil)/ $k_{rm}$ (Rock) | Friction Angle ( $\phi$ ) (Deg.) | Soil Modulus (k) (pci) | Compressive Strength (psi) | Modulus of Rock Mass, psi $\times 10^6$ | RQD, % |
|-----------------------|-----------------|---|--|--|----------------------------------|------------------------|----------------------------|---|--------|
| Existing Grade to 187 | Sand (Reese)    | 105                                       | NA                                       | NA   | 25                               | 20                     | NA                         | NA                                      | NA     |
| 187 to 177            | Sand (Reese)    | 66  | NA                                       | NA   | 32                               | 40                     | NA                         | NA                                      | NA     |
| Below 177             | Sand (Reese)    | 125                                       | NA                                       | NA   | 41                               | 144                    | NA                         | NA                                      | NA     |

Table 6l: Recommended Geotechnical Parameters for L-Pile Analysis – Bent 11

| Elevation (ft.)       | p-y Curve Model     | Effective Unit Weight ( $\gamma'$ ) (pcf) | Undrained Shear Strength ( $c_u$ ) (psf) | Strain Factor, $\epsilon_{50}$ (Soil)/ $k_{rm}$ (Rock) | Friction Angle ( $\phi$ ) (Deg.) | Soil Modulus (k) (pci) | Compressive Strength (psi) | Modulus of Rock Mass, psi $\times 10^6$ | RQD, % |
|-----------------------|---------------------|---|--|--|----------------------------------|------------------------|----------------------------|---|--------|
| Existing Grade to 188 | Sand (Reese)        | 110                                       | NA                                       | NA   | 30                               | 20                     | NA                         | NA                                      | NA     |
| 188 to 175            | Sand (Reese)        | 62  | NA                                       | NA   | 30                               | 20                     | NA                         | NA                                      | NA     |
| 175 to 170            | Stiff Clay w/ Water | 53  | 1250                                     | 0.007  | NA                               | NA                     | NA                         | NA                                      | NA     |
| Below 170             | Sand (Reese)        | 125                                       | NA                                       | NA   | 41                               | 144                    | NA                         | NA                                      | NA     |

Table 6m: Recommended Geotechnical Parameters for L-Pile Analysis – Bent 12

| Elevation (ft.)       | p-y Curve Model | Effective Unit Weight ( $\gamma'$ ) (pcf) | Undrained Shear Strength ( $c_u$ ) (psf) | Strain Factor, $\epsilon_{50}$ (Soil)/ $k_{rm}$ (Rock) | Friction Angle ( $\phi$ ) (Deg.) | Soil Modulus (k) (pci) | Compressive Strength (psi) | Modulus of Rock Mass, psi $\times 10^6$ | RQD, % |
|-----------------------|-----------------|---|--|--|----------------------------------|------------------------|----------------------------|---|--------|
| Existing Grade to 184 | Sand (Reese)    | 135                                       | NA                                       | NA   | 38                               | 189                    | NA                         | NA                                      | NA     |
| 184 to 181            | Sand (Reese)    | 78  | NA                                       | NA   | 38                               | 119                    | NA                         | NA                                      | NA     |
| 181 to 171            | Sand (Reese)    | 66  | NA                                       | NA   | 32                               | 40                     | NA                         | NA                                      | NA     |
| Below 171             | Sand (Reese)    | 125                                       | NA                                       | NA   | 41                               | 144                    | NA                         | NA                                      | NA     |

Table 6n: Recommended Geotechnical Parameters for L-Pile Analysis – Bent 13

| Elevation (ft.)         | p-y Curve Model | Effective Unit Weight ( $\gamma'$ ) (pcf) | Undrained Shear Strength ( $c_u$ ) (psf) | Strain Factor, $\epsilon_{50}$ (Soil)/ $k_{rm}$ (Rock) | Friction Angle ( $\phi$ ) (Deg.) | Soil Modulus (k) (pci) | Compressive Strength (psi) | Modulus of Rock Mass, psi $\times 10^6$ | RQD, % |
|-------------------------|-----------------|---|--|--|----------------------------------|------------------------|----------------------------|---|--------|
| Existing Grade to 186.4 | Sand (Reese)    | 110                                       | NA                                       | NA   | 30                               | 20                     | NA                         | NA                                      | NA     |
| 186 to 181              | Sand (Reese)    | 56  | NA                                       | NA   | 25                               | 20                     | NA                         | NA                                      | NA     |
| 181 to 171              | Sand (Reese)    | 74  | NA                                       | NA   | 34                               | 66                     | NA                         | NA                                      | NA     |
| Below 171               | Sand (Reese)    | 125                                       | NA                                       | NA   | 41                               | 144                    | NA                         | NA                                      | NA     |