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Roadway Geotechnical Report

ROADWAY IMPROVEMENTS 1270 BRIDGE OVER MISSISSIPPI RIVER SECTION 60B-1 MADISON COUNTY, ILLINOIS

Thomas J. Casey, P.E. (618) 624-6969 July 16, 2021 Revised November 2021

Prepared for: Horner & Shifrin, Inc. Civil Engineer Mr. Brad E. Riechmann, P.E. 604 Pierce Boulevard #300 O'Fallon, Illinois 62269 (618) 726-0307

THOMAS JOSEPH CASE /2021 062-061853

SCI No. 2017-3167.10



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GEOTECHNICAL ENVIRONMENTAL NATURAL RESOURCES CULTURAL RESOURCES CONSTRUCTION SERVICES

November 19, 2021

Brad E. Riechmann, P.E. Horner & Shifrin, Inc. 604 Pierce Boulevard #300 O'Fallon, Illinois 62269

RE: Roadway Geotechnical Report I270 Bridge over Mississippi River Section 60B-1 Madison County, Illinois SCI No. 2017-3167.10

Dear Brad Riechmann:

Enclosed is our *Roadway Geotechnical Report (RGR)* dated July 2021 and revised November 2021. It should be read in its entirety, and our recommendations considered in the design and construction of the proposed roadway widening. Please call if you have any questions.

Respectfully,

SCI ENGINEERING, INC.

Prakash Paudel

Staff Engineer

Thomas J. Casey, P.E. Chief Geotechnical Engineer

PP/TJC/tlw/snp

Enclosure

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1.0	PRO	JECT DI	ESCRIPTION	1		
2.0	FIEL	D EXPL	ORATION AND LABORATORY TESTING	2		
	2.1	Geolog	gy			
	2.2	Subsu	rface Exploration			
		2.2.1	Drilling Exploration Methods			
		2.2.2	CPTu Exploration Methods	5		
	2.3		atory Testing			
	2.4		dwater Conditions			
	2.5	Climat	te Conditions	9		
5.0	GEO		ICAL EVALUATIONS			
	3.1	Mining	g Activity			
	3.2	Seismi	c Consideration			
4.0	I-270	STA 184	40+00 TO STA 1874+00			
	4.1	Site D	escription			
	4.2	Subsu	rface Conditions	11		
		4.2.1	Existing Pavement	11		
		4.2.2	Existing Fill	11		
		4.2.3	Natural Soil			
	4.3	Recorr	nmendations			
		4.3.1	Topsoil and Existing Pavement	13		
		4.3.2	Embankment	13		
		4.3.3	Subgrade Recommendations	14		
		4.3.4	Roadway Drainage Conditions and Subgrade Support Rating	14		
		4.3.5	Settlement	15		
		4.3.6	Slope Stability	15		
.0	I-270		74+00 TO STA 1905+00			
	5.1	Site Description1				
	5.2	Subsu	rface Conditions	16		
		5.2.1	Existing Pavement			
		5.2.2	Existing Fill			
		5.2.3	Natural Soil			
	5.3	Recorr	nmendations			
		5.3.1	Topsoil and Existing Pavement			
		5.3.2	Embankment			
		5.3.3	Subgrade Recommendations			
		5.3.4	Roadway Drainage Conditions and Subgrade Support Rating			
		5.3.5	Settlement			
		5.3.6	Slope Stability			
			5.3.6.1 General Information			
			5.3.6.2 Slope Stability for I-270 Embankments			
		5.3.7	Reuse of Existing Embankment Soils			
6.0	GEN	ERAL R	ECOMMENDATIONS			
7.0	LIM	TATIO	NS			

TABLE OF CONTENTS

TABLES

Table 2.1 – Summary of Borings	4
Table 2.2 – Summary of Soundings	6
Table 2.3 – Groundwater Summary	8
Table 2.4 – Precipitation Prior to Soil Exploration	. 10
Table 4.1 – Pavement Summary (STA 1840+00 to 1874+00)	. 11
Table 4.2 – Existing Fill Summary (STA 1840+00 to 1874+00)	12
Table 4.3 - Summary of Subgrade Treatment Recommendations (STA 1840+00 to 1874+00)	14
Table 4.4 – Summary of Drainage Conditions (STA 1840+00 to 1874+00)	. 14
Table 4.5 - IBV and Standard Proctor Compaction Test Results (STA 1840+00 to 1874+00)	15
Table 5.1 – Pavement Summary (STA 1874+00 to 1905+00)	. 16
Table 5.2 – Existing Fill Summary (STA 1874+00 to 1905+00)	17
Table 5.3 - Summary of I-270 Slope Stability Factors of Safety (STA 1874+00 to 1905+00)	20
FIGURES	

Figure 1 – Vicinity and Topographic Map

Figure 2 – Aerial Photograph

Figure 3 – Site Plan

Figure 4 – Eastbound Subsurface Profiles

Figure 5 – Westbound Subsurface Profiles

APPENDICES

Appendix A – Boring logs

- Appendix B CPTu Sounding Logs
- Appendix C Laboratory Testing Results, BD-508A forms, and Subgrade Support Rating (SSR) forms

Appendix D – Slope Stability Analyses Results

Appendix E – GIS Information of Explored Locations

Roadway Geotechnical Report

ROADWAY IMPROVEMENTS 1270 BRIDGE OVER MISSISSIPPI RIVER SECTION 60B-1 MADISON COUNTY, ILLINOIS

1.0 PROJECT DESCRIPTION

The geotechnical study summarized in this report was performed for the realignment of I-270 along the east approach embankment of the Mississippi River Bridge and all the way up to the west approach abutment of Chain of Rocks Canal Bridge in Madison County, Illinois. The purpose of our study was to explore the subsurface conditions, develop design and construction recommendations for the areas of roadway widening, and provide recommendations for subgrade improvement for the roadway. There is a relatively flat surface on the top of embankment immediately south of the existing I-270 eastbound lane from approximate STA 1896+00 to STA 1904+00. This area used to be part of the embankment from the previous Chain of Rocks Canal Bridge alignment that was modified in approximately 2013. The scope of this report is also to discuss the suitability of this existing fill material from the old embankment to use as an embankment material for the new proposed sections. The location of the site is shown on the *Vicinity and Topographic Map*, Figure 1.

The I-270 improvements discussed in this report will comprise approximately 1.23 miles (6,500 feet) of roadway from west to east from Station (STA) 1840+00 to STA 1905+00. The improvements will include a combination of realignment, widening, refilling, and resurfacing. This project is part of a larger project that includes the construction of a multi-span bridge carrying I-270 over the Mississippi River and the geotechnical recommendations regarding the bridge are included in a separate Structural Geotechnical Report (SGR).

The existing pavement is on average 38 feet wide in each direction and consists of approximately 10 inches of asphalt pavement. The roadway is two lanes of traffic and a full-width paved shoulder in each direction with average lane widths of 12 feet. Based on the *Final Project Report, Volume 1* (FPR), dated July 9, 2018, the Condition Rating Survey (CRS) for the existing pavement is 8.0 on a 10 scale, indicating excellent condition. During a visual observation performed for inclusion in this report, the pavement did not show signs of significant failure. The FPR also stated that the pavement will be widened to accommodate six-lanes of traffic (three lanes in each direction), however the pavement will be striped for four lanes initially.

2.0 FIELD EXPLORATION AND LABORATORY TESTING

2.1 Geology

The project site begins approximately 2,400 feet east of the Mississippi River in the alluvial flood plain described as the American Bottoms. Soils in the project area consist of imported fill overlying fine grained alluvial sediments until encountering bedrock at an approximate depth of 120 feet. Generally, the alluvial deposit consists of silts, clays, sands, and gravels and the soil profile typically coarsens with depth.

More specifically, the near surface natural soils in the immediate area of the project are mostly comprised of the Nameoki Silty Clay Loam and Darwin Silty Clay (Soil Survey of Madison County, Illinois, USDA, Soil Conservation Service), with a small amount of Beaucoup silty clay loam. Except for the roadway embankment, the terrain in this area has gentle slopes ranging from 0 to 2 percent. The silty clay and silty clay loam soils are poorly drained to somewhat poorly drained.

Underlying the near surface fine-grained soils, the alluvium consists of deposits of sand and gravel with varying amounts of clay and silt, associated with the Mississippi flood plain. These deposits are typically on the order of 100 feet thick in this area. Fifty-six borings drilled for the proposed I-270 Bridge over the Mississippi River indicated apparent sandy limestone bedrock at approximate elevations of 331 in the vicinity of the embankment.

2.2 Subsurface Exploration

Both SPT borings and CPTu soundings were utilized to evaluate the subsurface conditions of the project site. The boring/sounding locations were staked/marked in the field by SCI personnel using a GPS unit with submeter accuracy and the elevation at each explored location were interpreted by SCI from the publicly available LiDAR data.

The northing, easting, station, and offset at each location were provided to us by Horner & Shifrin, Inc. on June 28, 2021. Additionally, both eastbound (EB) and westbound (WB) stations and offsets were provided for each location. However, for sake of consistency, we have used EB stations and offsets in this report. The table of both EB and WB stations and offsets for each explored location along with approximate northing and easting is shown on Appendix E. The latitude and longitude at each location were interpreted by SCI and should be considered approximate in nature. The field exploration was performed in general accordance with procedures outlined in the *2016 IDOT Geotechnical Manual* and *2020 IDOT Geotechnical Manual* for 2018 dated borings and 2021 dated borings/soundings, respectively.

The location of the site is shown on *Vicinity and Topographic Map*, Figure 1, and the explored locations are shown on the *Aerial Photograph*, Figure 2A and 2B, and *Site Plan*, Figure 3A through 3D. Representative subsurface profiles for the Eastbound and Westbound lanes can be found in Figures 4A through 4E and 5A through 5B, respectively.

2.2.1 Drilling Exploration Methods

Thirty-one (31) SPT borings were drilled for the proposed roadway improvements along I-270. Among them, twenty (20) borings were drilled on the shoulders of eastbound and westbound I-270 and the remaining eleven (11) borings were drilled in grassed areas at the toe of the northern and southern side slopes. The existing embankment was likely placed during the construction of the Chain of Rocks Canal Bridge around 1966. The roadway borings extended to nominal depths of 10 to 50 feet below the existing pavement surface while the grass borings at the bottom of the embankment were explored to the nominal depth of 30 feet, unless the boring refused at a shallower depth.

A Diedrich D-50 turbo drill rig with continuous flight augers was used to drill the borings. Mud rotary techniques were also utilized for the 50-foot and the 30-foot borings that penetrated into the deeper sands underlying the embankment. Samples were collected using a standard split-spoon sampler according to the methods outlined in ASTM D1586, "Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils. The split-spoon samples were obtained on 2½-foot intervals in the upper 30 feet and on 5-foot intervals thereafter. Unconfined compressive strengths of cohesive split-spoon samples were measured with a Rimac testing apparatus or a pocket penetrometer when the sample was not conducive to Rimac testing. Additionally, Shelby tubes were collected for the shallow 10- to 15-footer borings (B-119 through B-127) due to mechanical breakdown of the SPT hammer during night-time drilling. A geologist or geotechnical engineer from SCI was onsite to supervise drilling, log the borings, and perform field unconfined compressive strength tests using Rimac testing apparatus.

A summary of the borings is detailed below in Table 2.1. Detailed information regarding the nature and thickness of the soils encountered, and the results of the field sampling and laboratory testing are shown on the *Boring Logs, and Laboratory Test Results* in Appendix A and as laboratory testing results in Appendix C. The laboratory testing for the upper 5 feet is summarized on the *Illinois Department of Transportation (IDOT) BD-508A Form* included in Appendix C.

Boring	Boring Depth (ft)	Station (EB)	Offset (feet)	Direction	Elevation (ft)
B-119	15	1841+58.73	3.66	Right	442.4
B-120	15	1844+98.98	2.30	Right	443.4
B-121	10	1848+02.12	8.08	Right	443.9
B-122	10	1850+88.90	11.21	Right	444.1
B-123	10	1854+11.03	14.87	Right	444.1
B-124	10	1856+78.10	18.60	Right	443.1
B-125	10	1860+12.82	20.89	Right	442.4
B-126	10	1863+05.98	23.72	Right	442.1
B-127	10	1866+21.89	25.51	Right	442.2
B-128	50	1873+30.14	48.16	Right	441.5
B-129	30	1873+43.58	180.25	Right	419.5
B-132	50	1874+90.30	48.85	Right	441.5
B-133	30	1879+04.87	159.65	Right	412.4
B-136	50	1883+83.92	30.53	Right	442.2
B-137	30	1883+89.17	139.72	Right	419.1
B-138	39	1883+89.66	58.51	Left	446.3
B-139	30	1884+00.88	147.81	Left	419.7
B-144	50	1888+75.49	37.13	Right	441.9
B-145	30	1888+68.39	125.91	Right	429.7
B-146	50	1888+76.70	43.18	Left	447.8
B-147	30	1888+81.31	139.47	Left	417.4
B-152	50	1892+87.25	42.45	Right	442.1
B-153	30	1892+80.16	137.81	Right	439.3
B-154	50	1892+85.77	34.25	Left	449.0
B-155	30	1892+83.21	142.50	Left	418.6
B-160	50	1898+33.46	51.34	Right	448.8
B-161	30	1898+09.30	217.14	Right	429.4
B-162	50	1898+35.23	19.41	Left	456.7
B-163	30	1898+33.45	148.84	Left	419.7
B-169	30	1903+27.09	319.12	Right	427.5
B-170	50	1903+80.15	19.01	Left	472.8

Table 2.1 – Summary of Borings

2.2.2 CPTu Exploration Methods

In addition to the soil test borings, twenty (20) CPTu soundings were advanced for the proposed roadway improvements along I-270. Among them, seven (7) soundings were performed on the shoulders of eastbound and westbound I-270 and remaining thirteen (13) soundings were performed on the grass at the top or bottom of the side slopes. The soundings extended to a range of depths of 30 to 50 feet below the existing ground surface, unless penetration refusal terminated them at shallower depth. The sounding locations are shown on *Aerial Photograph* and *Site Plan*.

The CPTu soundings were conducted in accordance with ASTM D5778 "Standard Test Method for Performing Electric Friction Cone and Piezocone Penetration Testing of Soils." The equipment used is a Vertek Scorpion S4 mounted on a skid-steer. The skid-steer is equipped with two auger anchors which, when deployed, can provide up to 20 tons of down pressure reaction. Refusal is determined when the anchors fail or pull from the ground. Alternatively, refusal can be achieved when the pressure tolerances of the cone are exceeded. Refusal of penetration is indicative of very dense or hard material, typically bedrock, boulders, or debris.

The CPTu hydraulically pushes an instrumented cone through the soil while continuous readings are recorded on a portable computer. The cone is advanced through the ground at a constant rate of 1 inch per second. Load cells or strain gauges within the cone measure the in-situ parameters of the soil: tip resistance, friction, and pore water pressure. These in-situ measurements are recorded every approximately 1 inch.

The data obtained from the soundings were processed with our CPTu data presentation and interpretation software, CPeT-IT v.2.1.1.8 and the CPTu logs were generated. A summary of the CPTu soundings is detailed below in Table 2.2. Detailed information regarding the nature and thickness of the soils interpreted from the software generated Soil Behavior Type plot, correlated SPT N-values, and the interpreted GWT readings are shown on *CPTu Logs* (Appendix B)

		-		-	
Sounding	Depth (ft)	Station (EB)	Offset (ft)	Direction	Elevation (ft)
C-131	30	1875+46.97	175.83	Right	419.5
C-135	30	1880+97.37	187.53	Right	410.1
C-141	30	1886+26.43	130.49	Right	424.6
C-142	50	1886+34.66	53.40	Left	447.2
C-143	30	1886+45.43	146.21	Left	418.5
C-148	4	1890+92.17	40.39	Right	441.7
C-149	28	1890+90.75	134.51	Right	433.8
C-150	42	1890+94.99	38.92	Left	448.4
C-151	30	1890+97.70	124.19	Left	421.5
C-156	48	1895+30.09	44.90	Right	443.2
C-157	17	1895+33.70	148.59	Right	443.8
C-158	50	1895+30.70	26.81	Left	450.5
C-159	30	1895+29.67	131.76	Left	421.0
C-160	10	1898+29.63	51.39	Right	448.9
C-164	38	1901+22.56	157.72	Right	457.6
C-165	30	1901+34.90	287.39	Right	424.3
C-166	43	1901+50.15	19.88	Left	465.9
C-167	20	1901+80.52	180.97	Left	419.3
C-168	50	1904+11.77	156.82	Right	466.6
C-171	30	1904+34.63	188.96	Left	420.7

 Table 2.2 – Summary of Soundings

2.3 Laboratory Testing

Advanced laboratory testing was conducted to classify the samples, determine index properties, and characterize the soil's behavior. These tests include:

- Sieve Analysis / Grain Size Analysis (ASTM D422);
- Sieve Analysis / Wash <#200 (ASTM D1140);
- Unconfined Compressive Strength testing (ASTM D2166);
- One Dimensional Consolidation (ASTM D2435);
- Unconsolidated Undrained Triaxial (ASTM D2850);
- Unit Weight Determination (ASTM D2937);
- Standard Proctor Compaction Test (ASTM D698);

- Illinois Bearing Value (per IDOT Subgrade Stabilization Manual);
- Atterberg Limits (ASTM D4318);
- Moisture Content (ASTM D4959); and
- Sieve Analysis / Hydrometer (ASTM D7928).

All tests were performed in general accordance with IDOT-recommended procedures. The soil test data for the upper 5 feet from all SPT borings are summarized in on the BD-508a forms (Appendix C). Detailed information regarding the nature and thickness of the soils and rocks encountered, and the results of the field sampling and laboratory testing are presented on the boring logs in Appendix A and as laboratory testing results in Appendix C.

2.4 Groundwater Conditions

During drilling, groundwater was observed in some borings and delayed groundwater readings were also taken where feasible. It is not anticipated that groundwater will affect the process of fill removal, fill replacement, and road construction activities. However, the groundwater level is subject to seasonal and climatic variations, the water level in the nearby river and channels, and other factors; and may be present at different depths in the future. In addition, without extended periods of observation, measurement of true groundwater levels may not be possible.

The measured and interpreted depths and elevations of groundwater respectively for SPT borings and CPTu soundings are shown together in Table 2.3. For the borings with groundwater depth measured during drilling and after a delayed interval, the readings corresponding to the delayed interval are presented in this table as they are considered more accurate.

Boring/Sounding	Approximate Ground/Pavement Surface Elevation (ft)	Groundwater Depth (ft)	Approximate Groundwater Elevation (ft)
B-119	442.4	NE	NA
B-120	443.7	NE	NA
B-121	444.7	NE	NA
B-122	444.9	NE	NA
B-123	444.1	NE	NA
B-124	443.1	NE	NA
B-125	442.5	NE	NA
B-126	442.5	NE	NA
B-127	442.5	NE	NA
B-128	441.5	NE	NA
B-129	419.5	22.0	397.5
C-131	419.5	21.5*	398.0*
B-132	441.5	NE	NA
B-133	412.4	3.5	408.9
C-135	410.1	1.5*	408.6*
B-136	442.2	5.0	437.2
B-137	419.1	18.5	400.6
B-138	446.3	NE	NA
B-139	419.7	NE	NA
C-141	424.6	24.5*	400.1*
C-142	447.2	28.0*	419.2*
C-143	418.5	8.0*	410.5*
B-144	441.9	6.0	435.9
B-145	429.7	23.0	406.7
B-146	447.8	NE	NA
B-147	417.4	6.0	411.4
C-148	441.7	8.5*	433.2*
C-149	433.8	8.5*	425.3*
C-150	448.4	28.0*	420.4*
C-151	421.5	11.0*	410.5*
B-152	442.1	11.0	431.1
B-153	439.3	22.0	417.3
B-154	449	NE	NA

Table 2.3 – Groundwater Summary

Boring/Sounding	Approximate Ground/Pavement Surface Elevation (ft)	Groundwater Depth (ft)	Approximate Groundwater Elevation (ft)
B-155	418.6	21.0	397.6
C-156	443.2	12.0*	431.2*
C-157	443.8	27.0*	416.8*
C-158	450.5	30.0*	420.5*
C-159	421	23.0*	398.0*
B-160	448.9	NE	NA
C-160	448.9	40.0*	408.9*
B-161	429.4	24	405.4
B-162	456.7	NE	NA
B-163	419.7	22.0	397.7
C-164	457.6	51.0*	406.6*
C-165	424.3	19.0*	405.3*
C-166	465.9	67.0*	398.9*
C-167	419.3	21.0*	398.3*
C-168	466.6	49.5*	417.1*
B-169	427.5	10.5	417.0
B-170	472.8	NE	NA
C-171	420.7	23*	397.7*

 Table 2.3 – Groundwater Summary (continued)

NE - Not Encountered

NA – Not Applicable

*Estimated GWT Depth

2.5 Climate Conditions

The borings and soundings were advanced on December 2018 and April 2021 through June 2021. Based on available climate data, the precipitation measured for downtown St. Louis during the exploration as well as the three months prior to each field exploration is shown in Table 2.4. The data used for compiling the climate information in this section was provided by the National Weather Service (NWS) Forecast Office, St. Louis, Missouri¹. The source data provided by the NWS is compiled from a weather gauge maintained by the National Oceanic and Atmospheric Administration (NOAA) located at the St. Louis Science Center (NOAA Network ID GHCND: USC00237452). The St. Louis Science center is located at 5050 Oakland Avenue in St. Louis, Missouri 63110, which is approximately 11 miles from the project site.

Month	Actual Precipitation (in)	Normal Precipitation (in)	Difference (in)
September 2018	2.0	3.13	-1.13
October 2018	3.20	3.33	-0.13
November 2018	2.74	3.91	-1.17
January 2021	3.82	2.40	1.42
February 2021	1.64	2.24	-0.60
March 2021	5.17	3.32	1.85
April 2021	4.10	3.69	0.41
May 2021	2.86	4.82	-1.96

 Table 2.4 – Precipitation Prior to Soil Exploration

3.0 GEOTECHNICAL EVALUATIONS

3.1 Mining Activity

According to the *Illinois State Geological Survey -- ILMINES*, dated April 20, 2021, the subject site was not undermined. The listed disclaimer indicates locations of some features on the mine map may be offset by 500 or more feet due to errors in the original source maps, the compilation process, digitizing, or a combination of these factors. The subject site is more than 6.0 miles away from the closest mining area shown on the map.

3.2 Seismic Consideration

As no structure is planned for this roadway improvement, the seismic consideration is not deemed necessary at this time.

4.0 I-270 STA 1840+00 TO STA 1874+00

4.1 Site Description

The elevation of the existing pavement surface along the proposed alignment from STA 1840+00 to STA 1874+00 ranges between approximately 442 and 445 indicating a nearly level topography. The proposed grading varies with up to a maximum fill of approximately 21 feet with very minimal quantity of cut (on the order of 1 to 3 feet) in some sections. Roadway soil survey borings B-119 through B-129 and a sounding C-131 were advanced along this section. The explored locations extended to nominal depths of 10 to 50 feet from the pavement surface. Soil conditions encountered during our subsurface exploration are shown on the CPTu sounding logs and SPT boring logs appended in this report.

4.2 Subsurface Conditions

4.2.1 Existing Pavement

The pavement material consisted of asphalt pavement in all borings except B-128 which consisted of Portland cement concrete underlain by successive layers of asphalt and crushed rock. The summary of the pavement materials encountered in the SPT boreholes, and their corresponding thicknesses are shown in Table 4.1.

Boring/Sounding	Concrete (in)	Asphalt (in)	Crushed Rock (in)
B-119	-	14.4	-
B-120	-	14.4	-
B-121	-	14.4	-
B-122	-	14.4	-
B-123	-	14.4	-
B-124	-	14.4	-
B-125	-	14.4	-
B-126	-	14.4	-
B-127	-	14.4	-
B-128	12	6	12

Table 4.1 – Pavement Summary (STA 1840+00 to 1874+00)

4.2.2 Existing Fill

The pavement was underlain by cohesive fill materials in all borings that was likely placed during the construction of the existing I-270. Additionally, the fill layer extended to the termination depth on the shallow borings (B-117 through B-127). The fill materials in the shallow borings generally consisted of silty clay (A-6 or A-7) with clay (A-7), clay loam (A-6), sandy loam (A-4), sandy clay loam (A-4), and silty sand (A-2).

SPT N-values (sum of the second and the third blow count in each sampling interval), as observed from the boring logs for B-128 and B-129, ranged from 8 to 18 blows per foot (bpf) with an average of approximately 14 bpf, classifying the soil as medium stiff to very stiff in consistency. Additionally, unconfined compressive strength tests conducted on the cohesive samples using the rimac apparatus on the site and undisturbed Shelby tube samples using the compression testing machine in the lab resulted in values ranging from 0.7 to 3.7 tons per square foot (tsf) with an average of approximately 1.64 tsf, classifying the soils as medium stiff to stiff in consistency. Moisture content in the measured samples ranged from 12 to 34 percent, averaging approximately 23 percent.

Additional laboratory tests included unit weight determination, sieve analysis, washed sieve analysis with percent finer than #200, hydrometer analysis, Illinois Bearing Value (IBV), and triaxial testing on select sample/s and the results are appended in this report. The summary of the existing fill is shown in Table 4.2 below. It should be noted that the embankment in this section of roadway ranges from approximately 20 to 35 feet high in relation to the surrounding grades, so a majority of these borings terminated within the fill.

Boring	Approximate Ground/Pavement Surface Elevation (ft)	Approximate Fill Depth (ft)	Approximate Bottom of the Fill Elevation (ft)
B-119	442.4	15*	427.4
B-120	443.7	15*	428.7
B-121	444.7	10*	434.7
B-122	444.9	10*	434.9
B-123	444.1	10*	434.1
B-124	443.1	10*	433.1
B-125	442.5	10*	432.5
B-126	442.5	10*	432.5
B-127	442.5	10*	432.5
B-128	441.5	25.5	416.0
B-129	419.5	NE	NA

Table 4.2 – Existing Fill Summary (STA 1840+00 to 1874+00)

NE - Not Encountered

NA – Not Applicable

* - Fill depth extended to the termination depth of boring

4.2.3 Natural Soil

Natural soil was encountered in borings B-128 and B-129 and sounding C-131. The natural soil in these locations consisted of interbedded layers of cohesive soil with various percentages of sand, silt, and clay down to the elevation ranging from approximately 398.5 to 407.0. The near surface interbedded layers are underlain by sand or sandy loam thereafter. Overall, the soils generally encountered were sandy to silty clay (A-6 or A-7), silty loam (A-4 or A-5), and relatively clean to silty sand (A-3 or A-2).

SPT N-values in the native soil, ranged from 1 to 40 bpf, with an average of approximately 14 bpf, classifying the soils as soft/loose to very stiff/very dense in consistency/relative density. Unconfined compressive strength (Qu) measured on cohesive samples ranged from 0.4 to 3.0 tsf, with an average of approximately 1.2 tsf, classifying the soils as soft to very stiff in consistency. In addition, moisture contents in the measured samples ranged from 24 to 42 percent, averaging approximately 33 percent. Additional laboratory tests included sieve analysis, washed sieve analysis with percent finer than #200, and Atterberg limits on select samples and the results are appended in this report.

4.3 Recommendations

4.3.1 Topsoil and Existing Pavement

Within the improvement area, surface vegetation/topsoil and existing pavements should be stripped. Although topsoil was not encountered during drilling, anticipate that up to 6 inches of topsoil will be encountered on the existing embankment side-slopes. The actual depth should be determined by field observations. Unsuitable soils should be identified by proofrolling where feasible. Proofrolling is accomplished by systematically passing over the subgrade to achieve complete coverage with proper compaction or loaded construction equipment, and observing the subgrade for pockets of excessively soft, wet, or disturbed soil, or otherwise unacceptable materials.

As per the plans provided, the grade in the existing pavement area will generally be raised up to 7 feet between STA 1840+00 to 1846+00 with the fill heights decreasing from west to east. From STA 1846+00 to 1874+00, the proposed grade will feature a minimal cut or be at existing grade. If the existing pavements and shoulders need to be milled off to construct the new ones, we recommend it be done in accordance with Section 1031 of the IDOT Standard Specifications for Road and Bridge Construction, 2016.

4.3.2 Embankment

As per the roadway cross sections provided to us in June 2021, redressing of the existing embankment slope/s by placing additional fill materials is planned in between these stations. The slopes should be benched prior to placement of the fill. Benching will provide level surfaces for compaction and reduce the potential for development of inclined planes of weakness between the existing soil and newly placed compacted fill. Benches should not exceed a maximum height of 5 feet. For additional construction considerations, we recommend you follow *the IDOT Standard Specifications for Road and Bridge Construction*, 2016.

4.3.3 Subgrade Recommendations

Silty clay soils with high moisture content and/or potential for volume change were generally encountered along the existing subgrade in this section. These soils may be unstable and/or unsuitable when they are exposed during construction and may require improvement. Lime treatment should only be used if the requirements of the standard specifications do not produce satisfactory results to the Engineer. The recommended depth of treatment is 12 inches in fill sections and 24 inches in cut or at-grade sections, if needed. The width of the treatment should extend at least 2 feet beyond the edge of the pavement, or to the toe of the embankment in fill areas. Per IDOT policy, the last 12 inches of any fill placed immediately beneath the pavement should be lime stabilized or consist of crushed rock. A summary of the recommended treatment methods and depths is detailed in Table 4.3 below.

Stations	Treatment Depth (inches)	Problem/Concern Soil	Treatment Type
STA 1840+00 to 1846+50	12	Silty Clay Loam (A-6)	Replace with crushed rock or Lime stabilization
STA 1846+50 to 1857+00	24	Highly Plastic Clay to Silty Clay (A-7)	Lime Stabilization
STA 1857+00 to 1868+00	12	Highly Plastic Clay to Silty Clay (A-7)	Lime Stabilization
STA 1868+00 to 1874+00	24	Highly Plastic Clay to Silty Clay (A-7)	Lime Stabilization

4.3.4 Roadway Drainage Conditions and Subgrade Support Rating

We do not anticipate that groundwater will be encountered during roadway grading activities. Drainage conditions in this section range from fair to poor, as summarized in Table 4.4.

Table 4.4 - Summary of Drainage Conditions (STA 1840+00 to 1874+00)))
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Station	Drainage Conditions
1840+00 to 1855+53	Poor
1855+53 to 1874+00	Fair

The existing subgrade soils are comprised of A-6 and A-7 soils with varying amounts of silt content. For mechanistic pavement design, the recommended SSR is poor. The results of Illinois Bearing Value (IBV) test and standard proctor test on combined bulk samples from B-119 (STA 1841+81) and B-120 (1845+17), and from B-126 (STA 1863+09) and B-127 (STA 1866+23) are summarized in Table 4.5 below. The detailed laboratory results are included in Appendix C.

Bulk Sample	Bulk Sample IBV Maximum Dry Density (pcf)		Optimum Moisture Content (%)	
B-119 and B-120	2.2 at 110% MC	112.1	16.1	
B-126 and B-127	3.4 at 110% MC	111.4	16.2	

Table 1.5 IBV and Standard Prostor C	ompaction Test Results (STA 1840+00 to 1874+00)
Table 4.5 – ID v and Standard Proctor C	0 mpaction rest Results (STA 1040+00 to 10/4+00)

4.3.5 Settlement

The cross sections provided by Horner & Shifrin, Inc., indicated up to approximately 21 feet of fill could be placed on the side-slopes for the western extent of the project. Based on the soils encountered, the maximum settlement due to the additional fill was estimated to be less than 1 inch. While excessive settlement isn't expected, to minimize the effects of settlement, we recommend the fill materials be placed at least 30 days prior to final paving. Additionally, secondary compression is not anticipated to be a major concern on this project. It should be noted that the discussion of settlement within this RGR is separate from the discussion of settlement and its effects on the proposed bridge structure included in the SGR previously referenced.

4.3.6 Slope Stability

Due to relatively minimal changes to the overall slope configurations in this section, we anticipate the final slopes will be stable based on the performance of the existing slopes. For this section, a rigorous slope stability analysis was not performed at this time considering that the recommendations provided in sections 4.3.1, 4.3.2, and 4.3.2 will also be followed.

5.0 I-270 STA 1874+00 TO STA 1905+00

5.1 Site Description

The elevation of the existing ground surface along the proposed alignment from STA 1874+00 to STA 1905+00 ranges between approximately 442 and 473 indicating a mild to moderately sloping topography. The new proposed embankment profile will require up to approximately 34 feet of cut along the southern side-slopes between approximate STA 1897+00 and STA 1905+00 and approximately up to 12 feet of fill on the northern side-slopes throughout this section.

Twenty (20) SPT borings and nineteen (19) CPTu soundings were advanced along this section. Among them, seven (7) soundings and ten (10) borings were performed on the existing shoulders, while the remaining borings and soundings were performed at the toe of the existing embankment. Soil conditions encountered during our subsurface exploration are shown on the CPTu sounding logs and SPT boring logs appended in this report.

5.2 Subsurface Conditions

5.2.1 Existing Pavement

The pavement material generally consisted of Portland cement concrete underlain by successive layers of asphalt and crushed rock. A total of 16 inches of pavement materials were encountered in all of the CPT holes while the summary of the pavement materials encountered in the SPT boreholes, and their corresponding thicknesses are shown in Table 5.1.

Boring/Sounding	Concrete (in)	Asphalt (in)	Crushed Rock (in)
B-132	12	-	18
B-136	12	3.6	44.4
B-138	12	-	18
B-144	12	3.6	8.4
B-146	12	-	18
B-152	12	7.2	8.4
B-154	13.2	-	16.8
B-160	12	3.6	8.4
B-162	13.2	-	16.8
B-170	14.4	-	15.6

Table 5.1 – Pavement Summary (STA 1874+00 to STA 1905+00)

5.2.2 Existing Fill

Existing fill was encountered in all borings performed within the limits of the existing embankment. The fill materials generally consisted of interbedded layers of cohesive soil with various percentages of sand, silt, and clay and was likely placed during the construction of the existing I-270. The fill layers extended to approximate elevations 404.6 and 431.7. The soils encountered were silty to sandy clay (A-6 or A-7), silty to clayey loam (A-4 or A-6), and relatively clean to silty sand (A-2 to A-3). It should be noted that the embankment in this section of roadway ranges from approximately 23 to 55 feet high in relation to the surrounding grades, so some of these borings (B-138 and B-170) terminated within the fill.

SPT N-values in the fill ranged from 3 to 53 blows per foot (bpf), with an average of approximately 16 bpf, classifying the soils as soft/loose to very stiff/very dense in consistency/relative density. Rimac Qu strengths ranged from 0.2 to 5.6 tsf, with an average of approximately 1.9 tsf, classifying the soils as soft to very stiff in consistency. Moisture contents in the measured samples ranged from 15 to 41 percent,

averaging approximately 22 percent. Additional laboratory tests included sieve analysis, washed sieve analysis with percent finer than #200, and Atterberg limits on select samples and the results are appended in this report. The summary of the existing fill is shown in Table 5.2 below.

Boring	Approximate Ground/Pavement Surface Elevation (ft)	Approximate Fill Depth (ft)	Approximate Bottom of the Fill Elevation (ft)
B-132	441.4	25.4	416
B-133	412.4	5.0	407.4
B-136	442.2	10.5	431.7
B-137	419.1	7.5	411.6
B-138	446.3	39	407.3
B-139	419.7	5.0	414.7
B-144	441.9	32.0	409.9
B-145	429.7	7.0	422.7
B-146	447.8	37.0	410.8
B-147	417.4	4.0	413.4
B-152	442.1	37.5	404.6
B-153	439.3	10.5	428.8
B-154	449	32.0	417
B-155	418.6	NE	NA
B-160	448.8	37.9	410.9
B-161	429.4	4.0	425.4
B-162	456.7	42.0	414.7
B-163	419.7	5.0	414.7
B-169	427.5	NE	NA
B-170	472.8	50.0 422.8	

Table 5.2 – Existing Fill Summary (STA 1874+00 to STA 1905+00)

NE – Not Encountered

NA – Not Applicable

5.2.3 Natural Soil

Natural soil was encountered in all borings except B-138 and B-170 where the fill materials extended all the way down to the termination depth as discussed earlier. The natural soil consisted of interbedded layers of cohesive soil with various percentages of sand, silt, and clay down to the elevation ranging from

approximately 392.2 to 452.6. The near surface interbedded layers are underlain by sand or sandy loam thereafter. Overall, the soils encountered were generally sandy to silty clay (A-6 or A-7), silty loam (A-4 or A-5), and relatively clean to silty sand (A-3 or A-2).

SPT N-values from the borings logs in the native soil ranged from 2 to 40 bpf, with an average of approximately 12 bpf, and the correlated SPT N-values from CPTu sounding logs ranged from 1 to 100 bpf, averaging approximately 22 bpf, classifying the soils as soft/loose to very stiff/very dense in consistency/relative density. Rimac Qu strengths of the cohesive samples ranged from 0.2 to 4.5 tsf, with an average of approximately 1.2 tsf, classifying the soils as soft to very stiff in consistency. In addition, moisture contents in the measured samples ranged from 10 to 52 percent, averaging approximately 31 percent. Additional laboratory tests included sieve analyses, washed sieve analyses with percent finer than #200, and Atterberg limits on select samples and the results are appended in this report.

5.3 Recommendations

5.3.1 Topsoil and Existing Pavement

Within the improvement area, surface vegetation/topsoil and any pavements not being reused should be stripped. Although topsoil was not encountered during drilling, anticipate that up to 6 inches of topsoil will be encountered on the existing embankment side slopes. The actual depth should be determined by field observations. The existing pavements and shoulders shall be milled off to construct the new ones in accordance with Section 1031 of the IDOT Standard Specifications for Road and Bridge Construction, 2016.

5.3.2 Embankment

As per the June dated roadway cross sections provided, redressing of the existing embankment slopes by placing additional fill materials is planned along the northern side-slopes throughout this section, while the southern side-slopes will be cut to achieve the finished grades. For fill sections, the slopes should be benched prior to placement of the fill. Benching will provide level surfaces for compaction and reduce the potential for development of inclined planes of weakness between the existing soil and newly placed compacted fill. Benches should not exceed a maximum height of 5 feet. Additionally, cut sections are planned on the southern slope from approximate STA 1874+00 to 1882+50 and STA 1896+00 to 1905+00. For the section from approximate STA 1874+00 to 1882+50 and between approximate elevations 436 and 425, we anticipate that sandy soils may be encountered at the finished grade that will not be suitable for dressing the side slopes. Sandy soils are prone to erosion and raveling and may not promote vegetative cover. Within the cut areas of this section, we recommend that at least 18 inches of the sandy soils be

overexcavated followed by benching and replacement of suitable fill materials to achieve the finished grade. Benching shall be performed in accordance with the procedures described earlier within this section. We also recommend you follow *the IDOT Standard Specifications for Road and Bridge Construction, 2016* for additional construction consideration.

5.3.3 Subgrade Recommendations

Within the limits of the existing roadway, the subgrade appears to consist of crushed rock over silty clay. Based on the presence of the crushed rock, we are not anticipating any remediation within the current pavement limits. If unsuitable soils are encountered, they can be remediated using either lime stabilization for soils containing more than 15 percent clay or remove and replace with crushed rock for soils not conducive to lime stabilization. The benching and fill placement discussed previously for side slopes should be followed within this section.

5.3.4 Roadway Drainage Conditions and Subgrade Support Rating

We do not anticipate that the groundwater will be encountered during roadway grading activities. Based upon the hydrometer test of the soil samples at shallow depths, drainage conditions in this entire section are expected to be poor. As previously discussed, the existing subgrade soils are comprised of A-6 and A-7 soils. Therefore, the recommended SSR is poor for mechanistic pavement design.

5.3.5 Settlement

As the pavement construction will be almost at-grade with minimal quantity of new fill being planned to raise the pavement elevation, the settlement is not anticipated to be a major concern for this extent of the project. However, the new fills should be compacted to achieve the required dry density and moisture content as per *2016 IDOT Standard Specifications for Road and Bridge Construction Manual*.

5.3.6 Slope Stability

5.3.6.1 General Information

The global slope stability of the proposed embankment was analyzed for end-of-construction (short-term) and long-term loading conditions, at six stations for both the north and south slopes, totaling 12 cross sections. The results of the analyses are shown in *Slope Stability Analyses*, Appendix D. The analyses were conducted using limit equilibrium slope stability methods and the commercially available software program Slide 2018 (developed by RocScience). The analyses considered soil properties from the

subsurface exploration data, and the given slope geometries. To account for traffic loading, a surcharge load of 250 psf was applied to the analyses. Soil parameters used in the analyses and the results of the analyses are shown on the output plots in Appendix D.

A Morgenstern-Price analysis with a circular mode of failure was used to search for the critical factor of safety (FS). The required minimum factors of safety were obtained from Section 6.10.3 of the 2020 IDOT Geotechnical Manual for the global slope stability. Based on the level of investigation and that the embankment soils are all fill materials, a required factor of safety of 1.5 was utilized for the analysis.

5.3.6.2 Slope Stability for I-270 Embankments

Slope stability analyses were performed along the existing I-270 alignment for both the proposed north and south slopes at STAs 1889+50, 1892+00, 1894+50, 1898+70, 1901+50, and 1904+28. The north slopes of each analyzed stations are fill slopes while the south slopes at STAs 1898+70, 1901+50, and 1904+28 are cut slopes. Each section analyzed met the required factor of safety as detailed below in Table 5.3.

		End-of-Construction (Short- Term)		Long-Term	
Location	Direction of Slope	Required Minimum Factor of Safety	Estimated Factor of Safety	Required Minimum Factor of Safety	Estimated Factor of Safety
STA 1889+50		1.5	1.95	1.5	1.58
STA 1892+00	ల	1.5	1.79	1.5	1.52
STA 1894+50	Slop	1.5	2.55	1.5	1.73
STA 1898+70	North Slope	1.5	2.24	1.5	2.00
STA 1901+50	Z	1.5	1.91	1.5	1.70
STA 1904+28		1.5	2.21	1.5	1.89
STA 1889+50		1.5	2.28	1.5	1.76
STA 1892+00	ు	1.5	1.97	1.5	1.60
STA 1894+50	Slop	1.5	2.72	1.5	2.03
STA 1898+70	South Slope	1.5	2.37	1.5	2.09
STA 1901+50	Š	1.5	1.98	1.5	1.75
STA 1904+28		1.5	2.39	1.5	2.24

Table 5.3 – Summary of I-270 Slope Stability Factors of Safety (STA 1874+00 to STA 1905+00)

5.3.7 Reuse of Existing Embankment Soils

A majority of the excavated soils along the southern side-slopes are anticipated to be clayey in nature with varying silt and sand contents as well as isolated lenses of silt and sand. In general, a majority of the soils can be reused to construct the new embankment sections. Silty and sandy soils should be blended with clayey soils before reuse. If blending them is not feasible, care should be taken to ensure that they are utilized within the core of the embankment and covered with a minimum of 36 inches of clayey materials to protect them from erosion. Silt and sand soils should not be used as the final surficial materials. The outside 3 feet of those portions of the embankment which will be permanently exposed in the completed roadway shall be constructed using native materials of a classification that will support vegetation and contain a minimum plasticity index of 12 to reduce frost susceptibility and potential for erosion. The outside cover of the embankment shall be placed perpendicular to the outside surface. Depending on the prevailing weather conditions during construction, the cut soils may be wet of optimum and need to be dried, either mechanically, by disking and air-drying, or chemically with lime as previously discussed in this report.

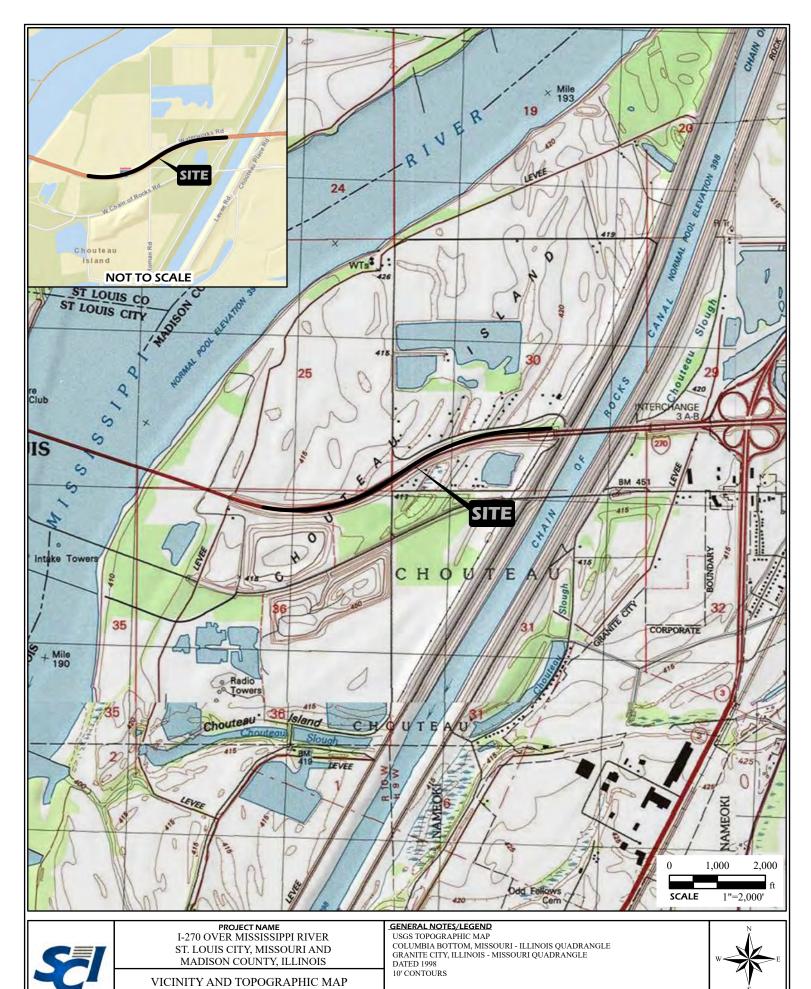
6.0 GENERAL RECOMMENDATIONS

In addition to the previously discussed recommendations, we suggest these general recommendations be followed in the design and construction of the roadways:

- Areas to receive fill should be stripped of topsoil. The amounts of topsoil to be stripped were discussed in previous sections. The topsoil can be stockpiled for future use in non-structural areas.
- Soils with a clay content less than 15 percent are typically unsuitable for lime treatment and will require modification by adding fly ash with the lime, or with cement stabilization, or removal and replacement with materials meeting the criteria set forth in the IDOT Geotechnical Manual (2020). A mixture of 5 percent lime and 5 percent fly ash by volume has shown to achieve satisfactory silt subgrade stabilization on previous projects. The amount of cement to be used can range from 4 to 5 percent by weight. If requested, additional testing could be performed to confirm the appropriate mix design for the soils and conditions at the time of construction. However, for estimating purposes, 5 percent (by dry weight) of cement generally works for silty (A-4) soils, if encountered in this area. For cement or lime treatment, water will need to be added to facilitate stabilization.
- Wet or soft soils could complicate construction. Soft and/or disturbed areas may require undercutting and replacement. If the materials are not reactive with lime or flyash, crushed rock, such as IDOT CA-7 or CA-11, can be used as the backfill. The A-4 silty soils will likely need to be modified with cement or be undercut and replaced with suitable fill soil meeting the IDOT Geotechnical Manual.

7.0 LIMITATIONS

The recommendations provided herein were based on undated plans provided by Horner & Shifrin, Inc., in June 2021. Any changes to the plans may alter the recommendations contained in this report. The recommendations are for the exclusive use of Horner & Shifrin and IDOT. They are specific only to the project described, and are based on subsurface information obtained at nine widely spaced boring locations within the proposed roadway improvements, our understanding of the project as described herein, and geotechnical engineering practice consistent with the standard of care. No other warranty is expressed or implied. SCI should be contacted if conditions encountered during construction are not consistent with those described.



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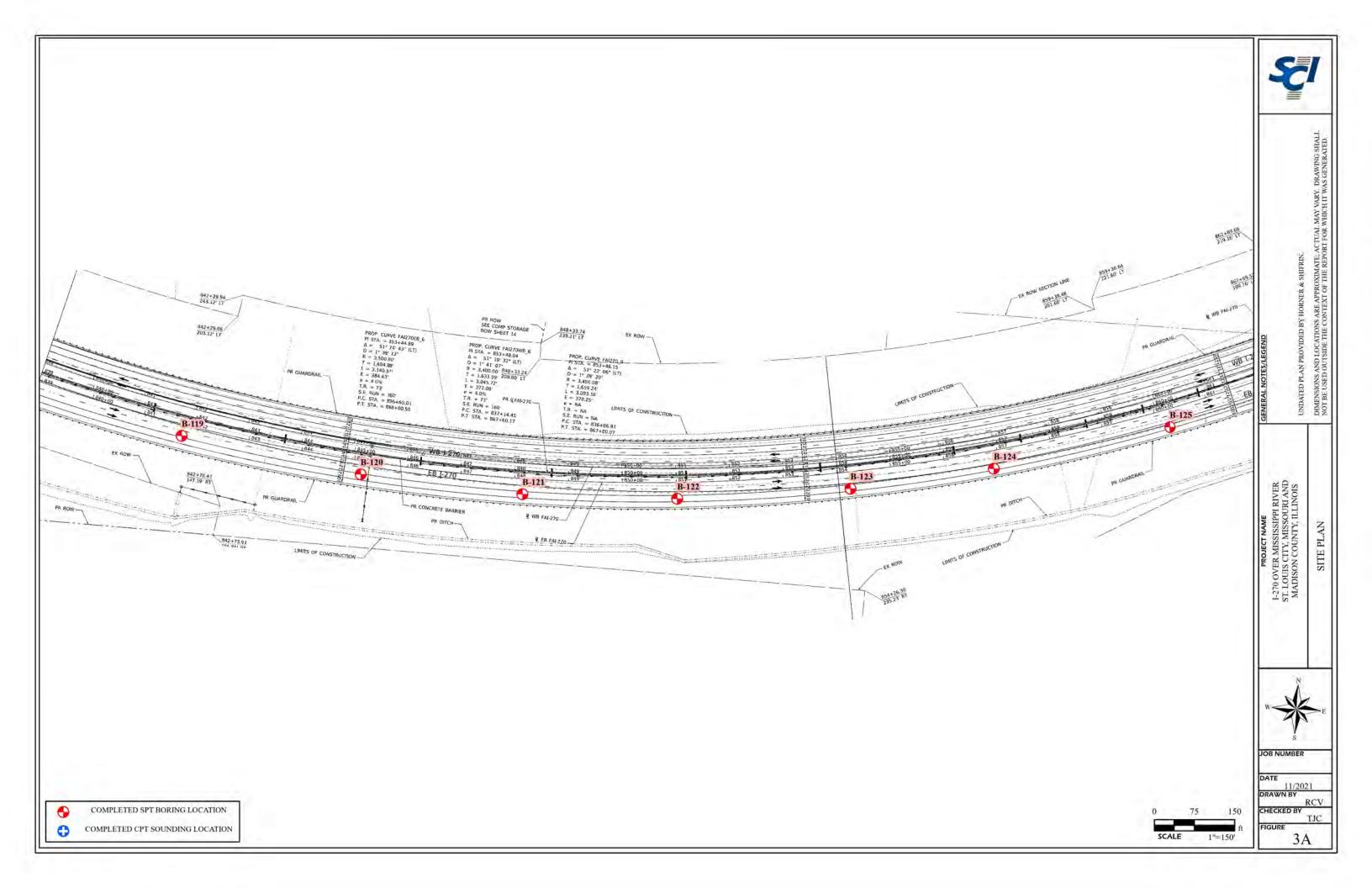
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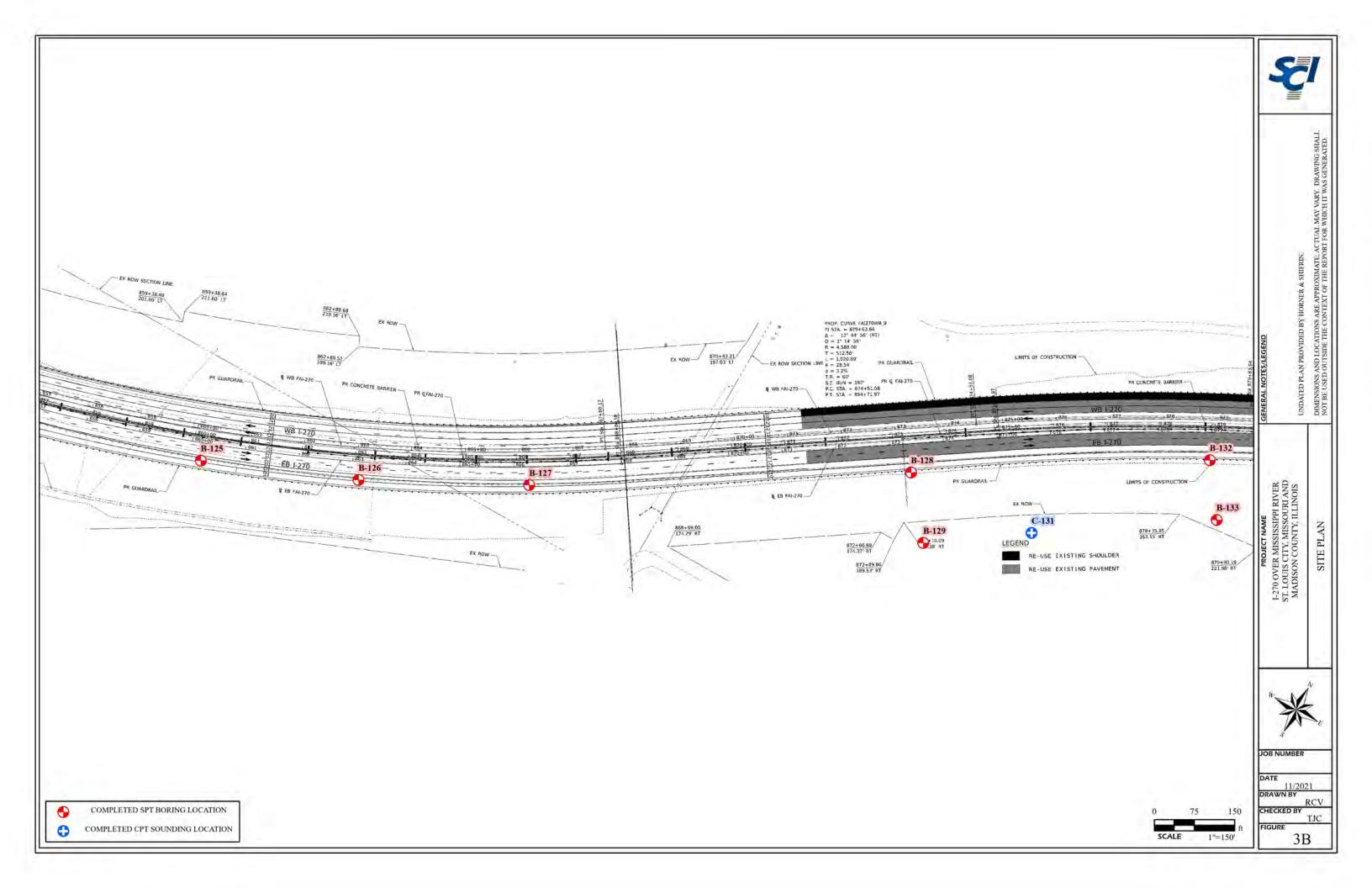
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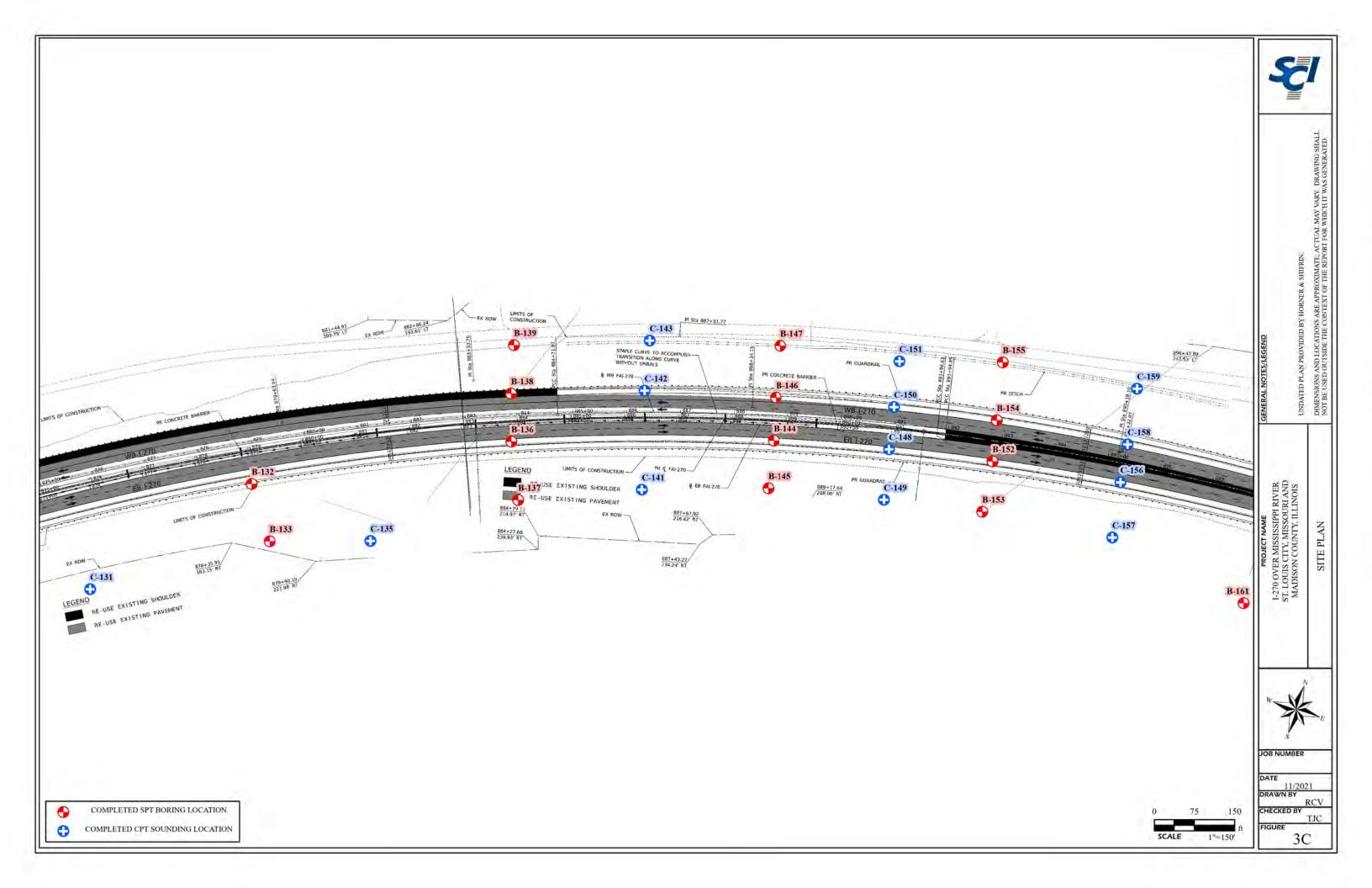


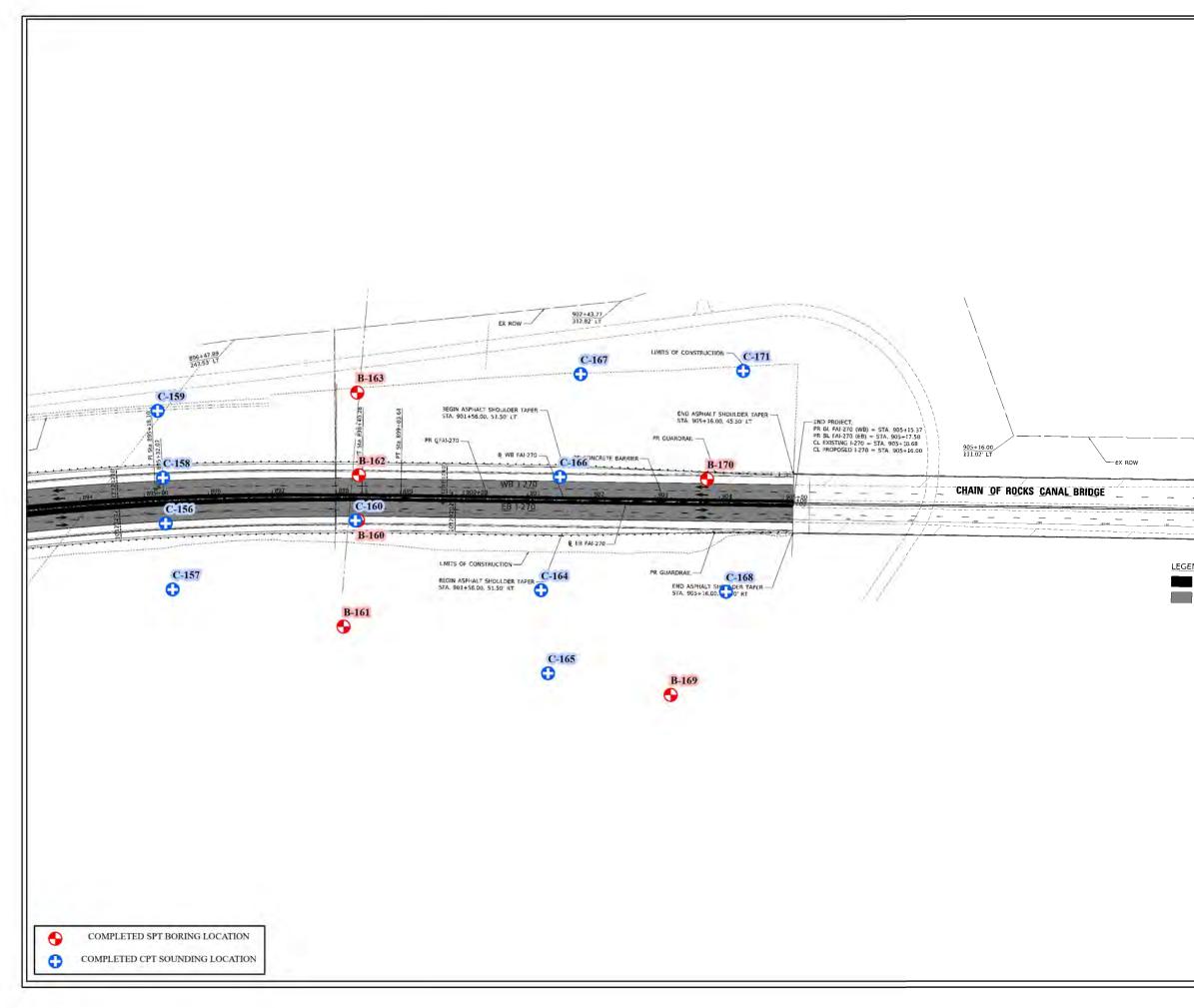




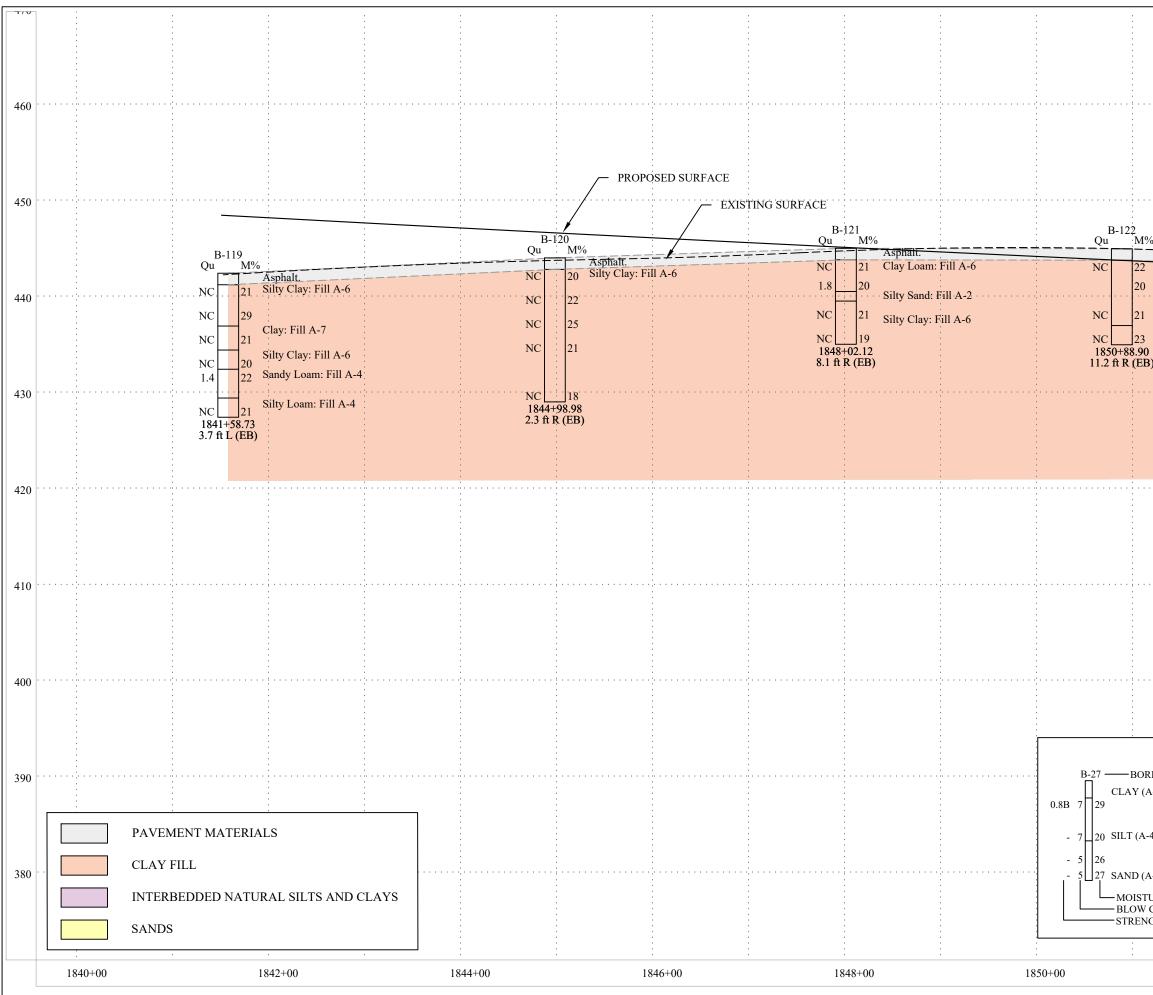




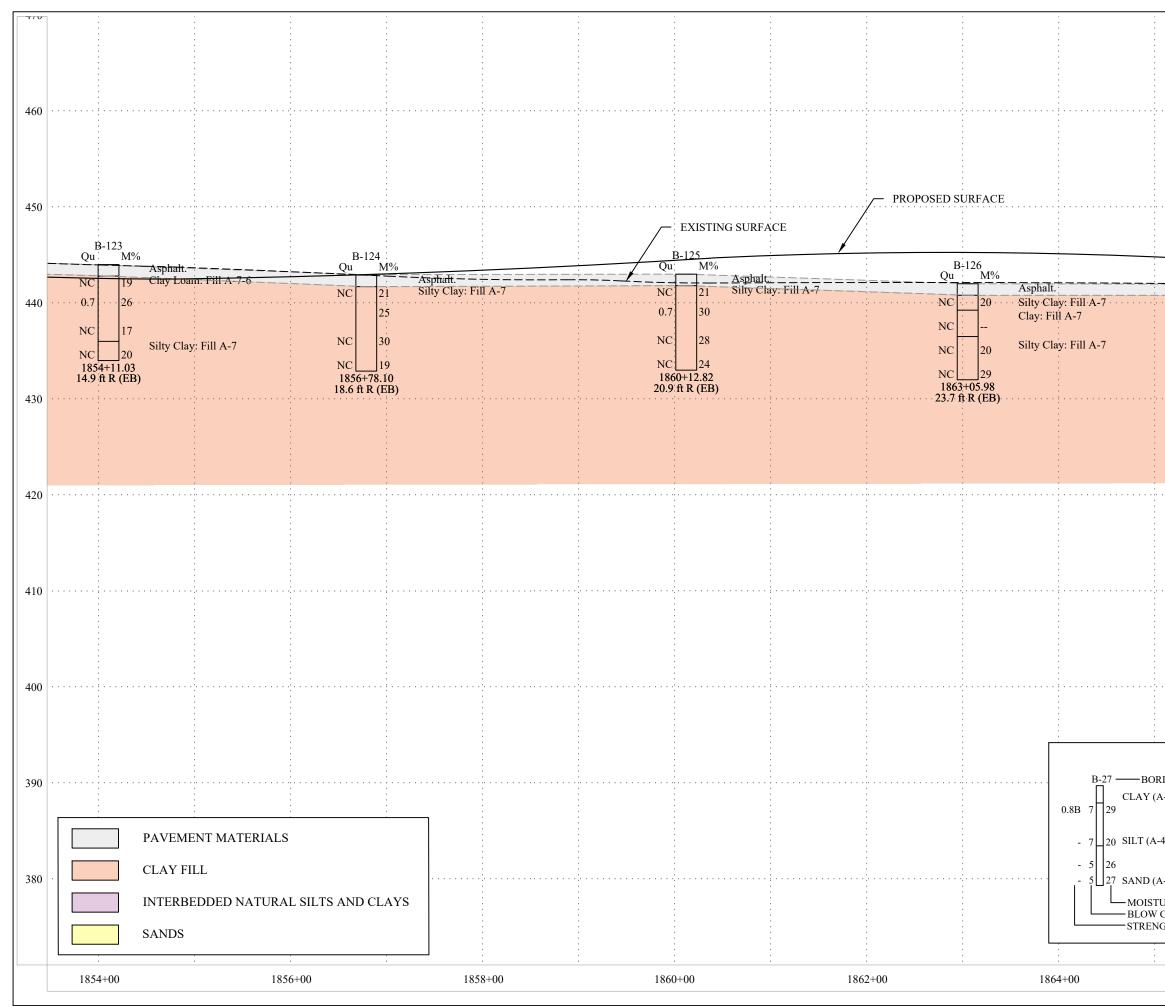




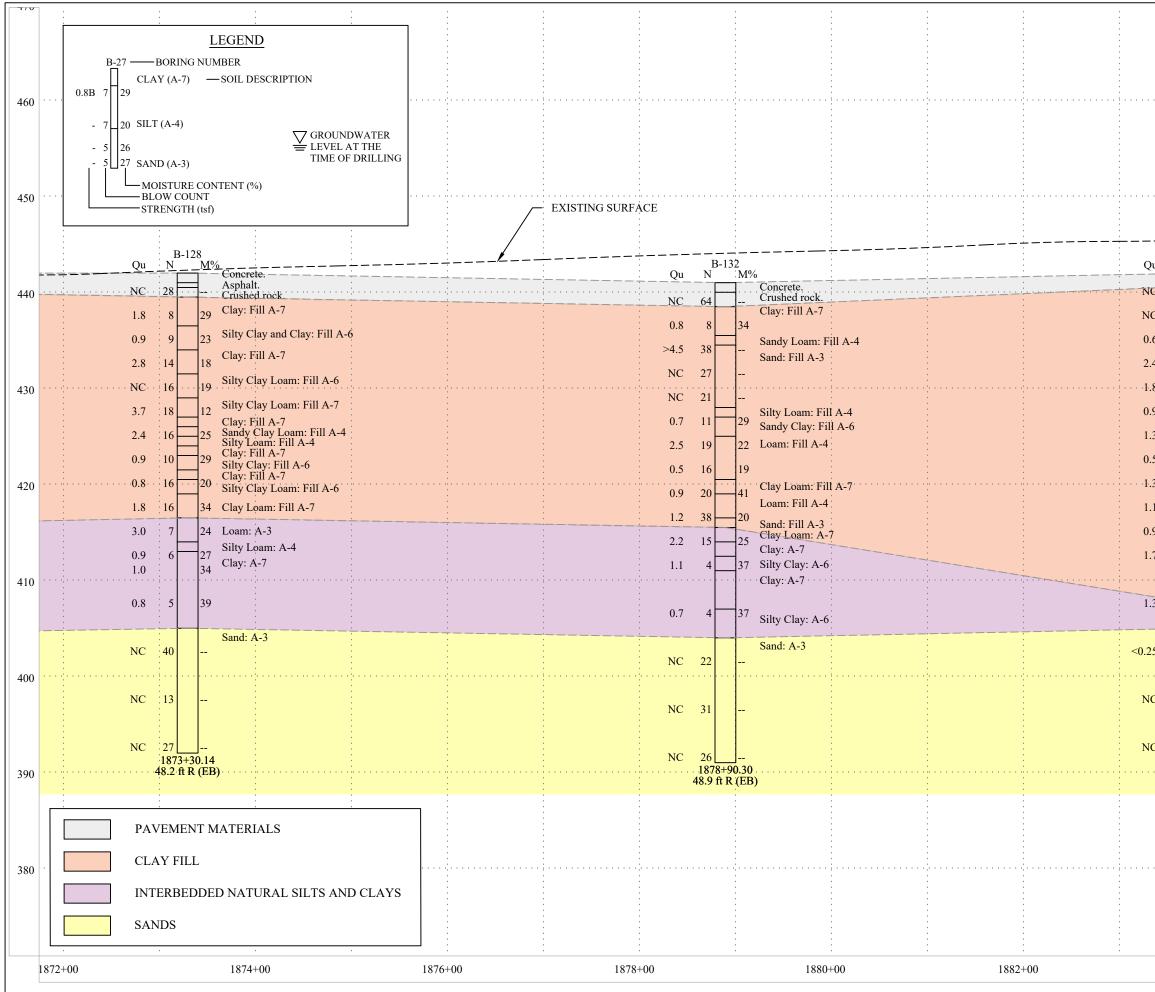
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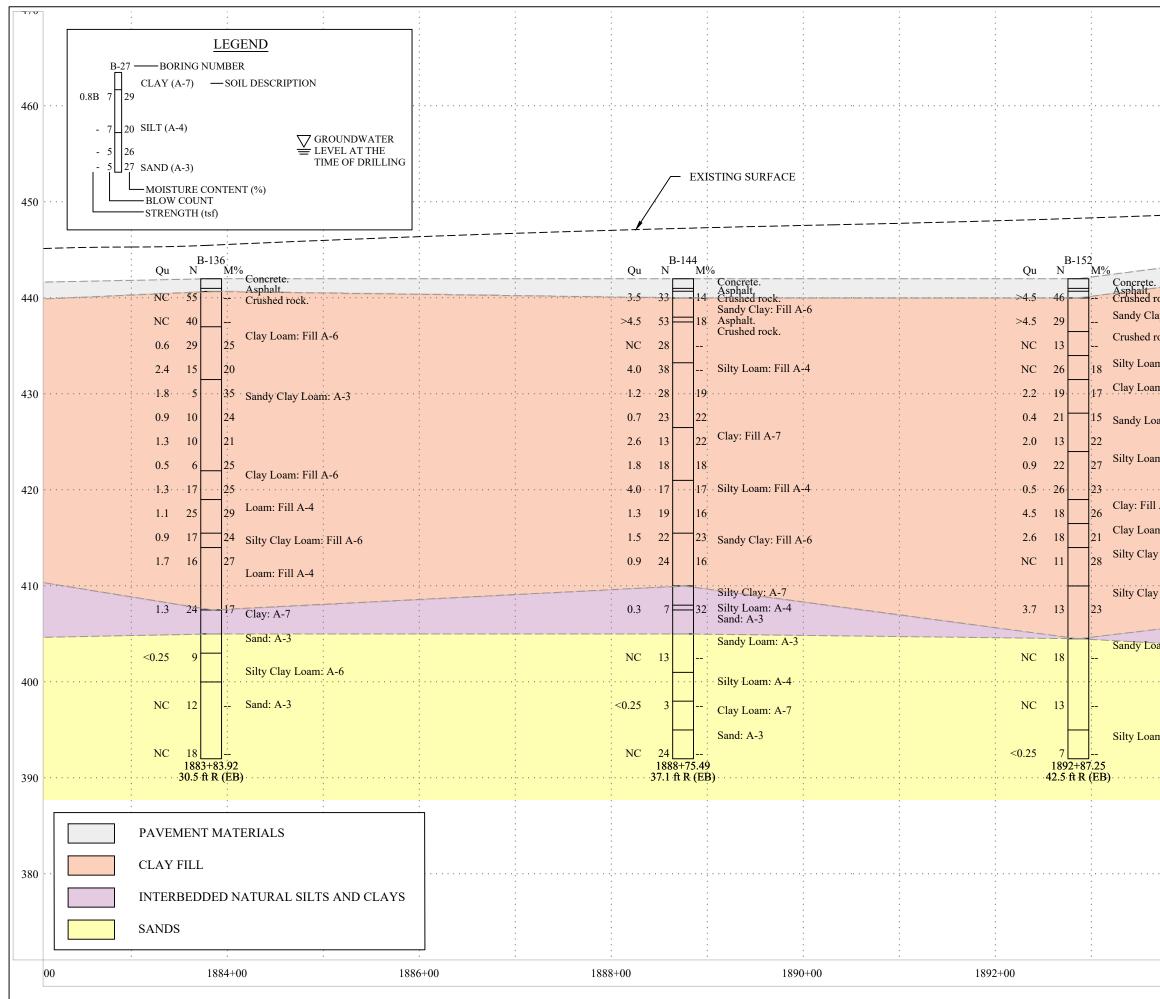
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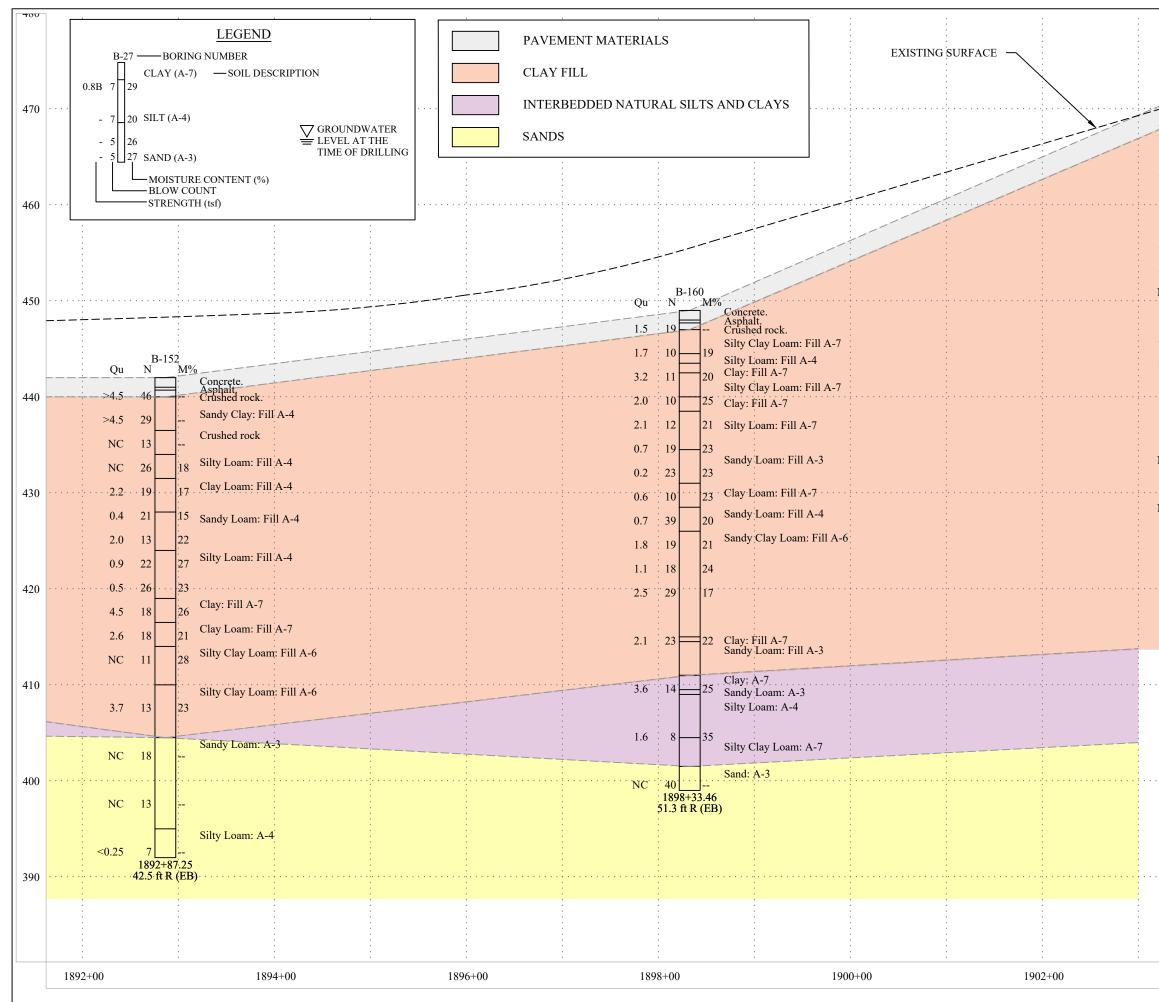
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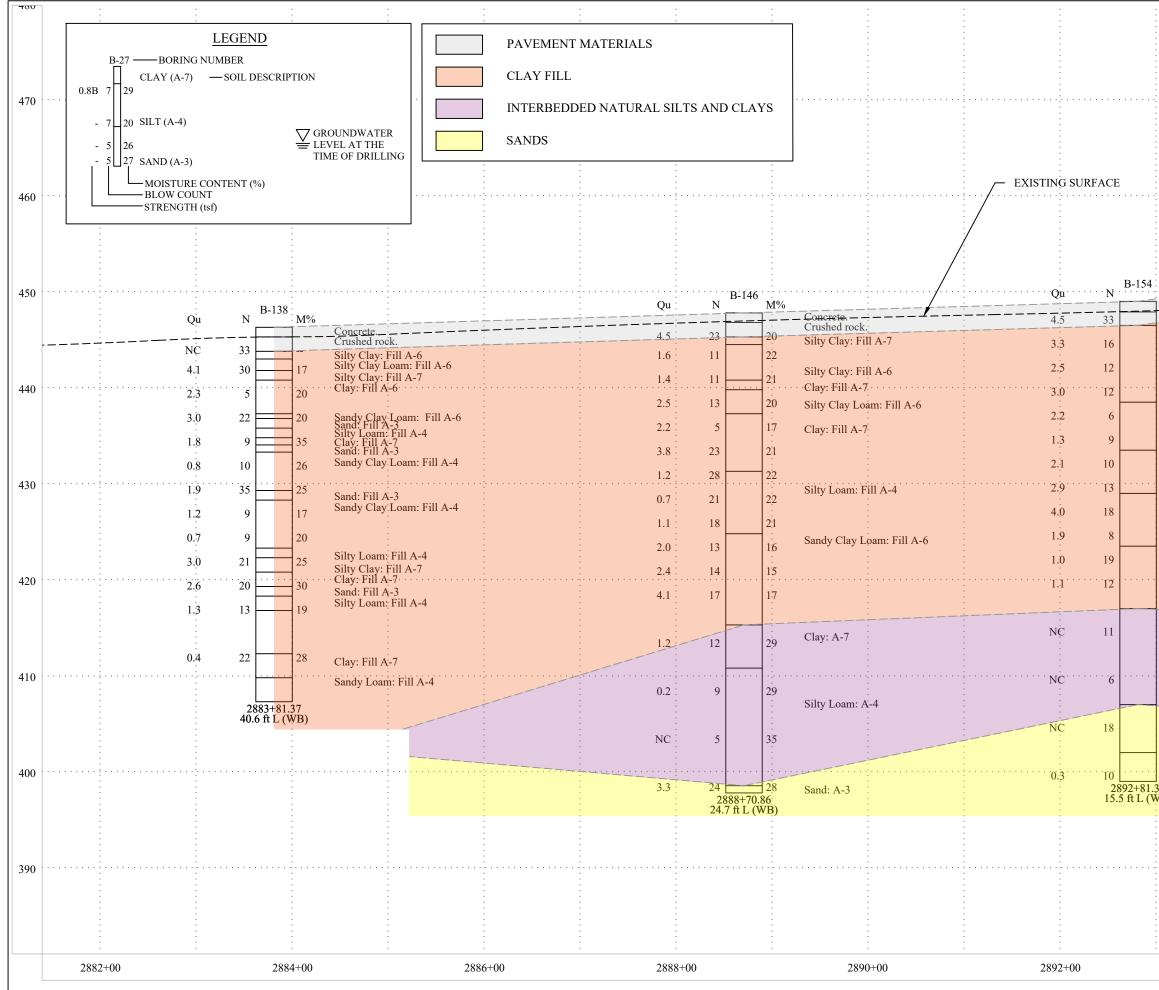
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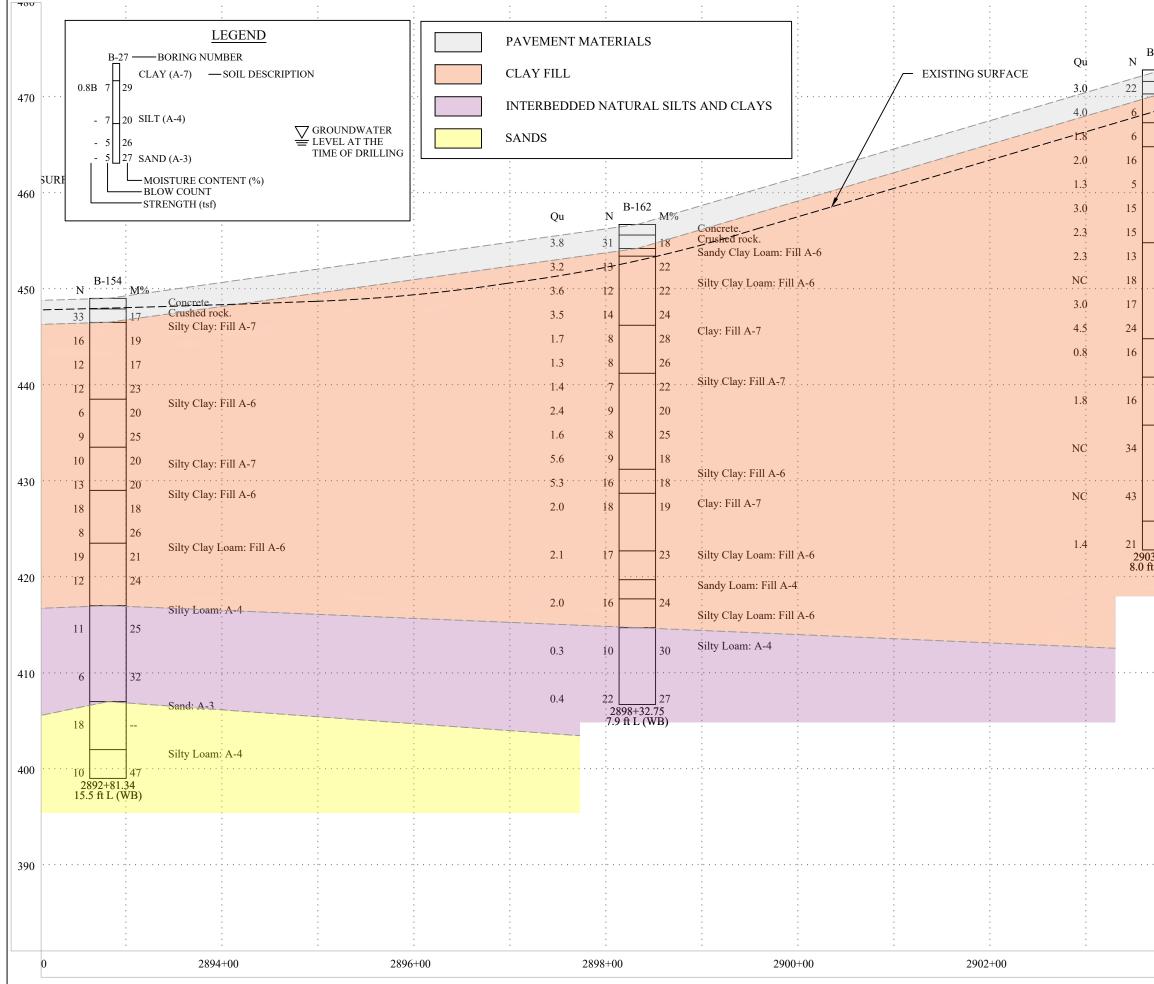
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m: A-4				410	DJECT NAME R MISSISSIPP CITY, MISSIOU I COUNTY, IL SUBSURFAC
	am: A-	5		400	PR I-270 OVEJ ST. LOUIS (MADISON EASTBOUND
	m: A-4			390	
380 SCALE 1" = 10' V 1" = 100' H JOB NUMBER 2017-3167.10				380	1" = 10' V 1" = 100' H JOB NUMBER 2017-3167.10
Image: Date Image: Date <t< th=""><th>1894</th><th>+00</th><th>1896+00</th><th></th><th>11/2021 DRAWN BY RCV CHECKED BY TJC FIGURE</th></t<>	1894	+00	1896+00		11/2021 DRAWN BY RCV CHECKED BY TJC FIGURE



	-00	
B-170 Qu N M%		
3.0 - 22 19 Crushed rock.	470	
4.0 6 22 Silty Clay: Fill A-6	470	
1.8 6 19 Clay Loam: FILL A-7		
2.0 16 21 Silty Clay: Fill A-7		
1.3 5 22	460	XIST D ARE
3.0 15 18		ELY E2 ED AN
2.3 15 18		UD LIK RPRET
2.3 13 18 Silty Clay: Fill A-6		AY AN LINTER
NC 18 27	450	US ARE
3.0 17 20		General Notes/Legend Variations in Subsurface conditions may and likely exist Between Borings. Dashed Horizons are interpreted and are shown for Illustration only.
4.5 24 Silty Clay Learn Fill A 6		CE CO
0.8 16 21 Silty Clay Loam: Fill A-6		gend SURFA DASF RATIO
Image: Silty Loam: Fill.A-4 1.8 21	440	General Notes/Legend Variations in Subsurf/ Between Borings. Dasi Shown for Illustratio
		I NOUS I TONS I FOR II
NC 34 Sand: Fill A-3		enera ARIAT ETWEH HOWN
		<u>ي چ ج</u>
NC 43	430	ш
		JAME SSIPPI RIVER ISSOURI AND 'Y, ILLINOIS RFACE PROFILE
Sandy Loam: Fill A-3		E I RIVER URI ANI LINOIS E PROF
2903+77.95 8.0 ft L (WB)	120	IAME SSIPPI SSOUT Y, ILL RFACE
	420	F NA SISSI MISS MISS UTY
		JEC1 MISS MISS TY, COUL
		PRO VER ON C ON C
	410	PROJECT N/ I-270 OVER MISSISS ST. LOUIS CITY, MIS MADISON COUNTY EASTBOUND SUBSURF
	10	I-27 ST. I MA
		E/
	400	
		SCALE
	390	1" = 10' V 1" = 100' H JOB NUMBER
		2017-3167.10
		DATE 11/2021
		DRAWN BY RCV CHECKED BY TJC
1904+00		FIGURE 4E
	1	



1		: [1 00	
			470	ŞI
			470	ш
			460	AND LIKELY EXIST TERPRETED AND AR
M%Concrete 17Crushed roc Silty Clay:			450	E CONDITIONS MAY D HORIZONS ARE IN DNLY.
19 17 23 20 25 Silty Clay: 1 25	Fill A-6		440	General Notes/Legend VARIATIONS IN SUBSURFACE CONDITIONS MAY AND LIKELY EXIST BETWEEN BORINGS. DASHED HORIZONS ARE INTERPRETED AND ARE SHOWN FOR ILLUSTRATION ONLY.
20 Silty Clay: 20 Silty Clay:		· · · · · · · · · · · · ·	430	
18 26 21 24 24	.oam: Fill A-6		420	F NAME SISSIPPI RIVER MISSOURI AND NTY, ILLINOIS URFACE PROFIL
25 32 Sand: A-3	A-4		410	PROJECT NAME I-270 OVER MISSISSIPPI RIVER ST. LOUIS CITY, MISSOURI AND MADISON COUNTY, ILLINOIS WESTBOUND SUBSURFACE PROFILE
 Silty Loam: 47 34 VB)	A-4		400	
			390	SCALE 1" = 10' V 1" = 100' H JOB NUMBER 2017-3167.10 DATE
2894	4+00			11/2021 DRAWN BY RCV CHECKED BY TJC FIGURE 5A



			tou		
	• • •	• • • • • • • • • • • • • • • • • • •			
	•			5	7/
3-170	M%				-
-	Concrete.				
	19 Crushed roc.	к. ill A-6	470		
	:22	· · · · · · · · · · · · · · · · · · ·			
	Clay Loam:	Fill A-7			
	21 Silty Clay: F	Aill A-7			
	•	· · · · · · · · · · · · · · · · · · ·		RE	
	22	· · · · · · · · · · · · · · · · · · · ·	460	EXIS1 ND A	
	18	· · ·		ELY ED A	
	18	· · · · · · · · · · · · · · · · · · ·		O LIK PRET	
	Silty Clay: F	Sill A-6		/ ANI	
	: :27			REIN	
	20	······································	450	IONS A SNO	
	20	· · · · · · · · · · · · · · · · · · ·		NDIT ORIZO Y.	
	Silty Clay I	oam: Fill A-6		General Notes/Legend Variations in subsurface conditions may and likely exist between borings. Dashed Horizons are interpreted and are shown for illustration only.	
	21 Silty Clay L	oani. Fill A-0		nd RFAC ASHE TION	
	Silty Loam:	Fill A-4		General Notes/Legend VARIATIONS IN SUBSURFA BETWEEN BORINGS. DASH SHOWN FOR ILLUSTRATIO	
	21	· · · · · · · · · · · · · · · · · · ·	440	es/L IN SU RING LLUS	
		· · · · · · · · · · · · · · · · · · ·		Not ONS N BO FOR I	
	Sand: Fill A	; 3		neral RIATI WEE WN I	
				Ger VAF BET SHC	
	:	: 	430		
	: :	· · · · · · · · · · · · · · · · · · ·	430		щ
				а Ө х	FIL
	Sandy Loam	ı: Fill A-3		RIVER JRI ANI LINOIS	PRC
3+77.9 t L (W]: 95	· · · · · · · · · · · · · · · · · · ·		AME SIPPI RIVER SSOURI AND Y, ILLINOIS	CE I
tL(W	/B)	· · · · · · · · · · · · · · · · · · ·	420	AME SIPPI SSOU Y, ILL	FA
	- - -	· · · · · · · · · · · · · · · · · · ·		PROJECT NA I-270 OVER MISSISSI ST. LOUIS CITY, MISS MADISON COUNTY,	WESTBOUND SUBSURFACE PROFILE
	•	· · · ·		IY,	UB
	•	· · · · · · · · · · · · · · · · · · ·		N CI R N	D SI
	•	· · · ·		I P IVC USIU	Ŋ
	•		410	10 (10 (10 (BO
	•	· · ·		I-2 M.	EST
	•				≥
	- 	· · · · · · · · · · · · · · · · · · ·			
	•				
		· · · · · · · · · · · · · · · · · · · ·	400		
		· · · · · · · · · · · · · · · · · · ·			
	•	· · · · · · · · · · · · · · · · · · ·			
	•				
	- - -			SCALE 1" = 100	
	• • • • • • • • • • • • • • • • • • • •	· · · · · · · · · · · · · · · · · · ·	390	1" = 100 JOB NUMBER	
		· · · · · · · · · · · · · · · · · · ·		2017-316	7.10
	•	· · · · · · · · · · · · · · · · · · ·		DATE 11/202	1
	• • •	· · · · · · · · · · · · · · · · · · ·		DRAWN BY	RCV
				CHECKED BY	TJC
2904	4+00	2906+00		5B	

Appendix A



Division of Highways SCI Engineering, Inc.

SOIL BORING LOG

Page <u>1</u> of <u>1</u>

ROUTE	FAI 270	DE				ŀ	-270 over the Mississipp	_ LOGG	ED BY	SCI	
SECTION	60B-1		_ L	OCAT	ION	Roadw	vay, SEC. 36, TWP. 4N, 3.7610421 Long -90.159	RNG. 10W			
	Madison DR								PE	Automa	atic
STRUCT. NO.	<u>060-0350 (EB)</u>		D E	B L	U C	M	Surface Water Elev.	f	t		
	806+89.23		P T	0 W	S	I S	Stream Bed Elev.	f	t		
Station	B-119 1841+58.73		н	S	Qu	T		None. f			
Offset Ground Surf	3.7 ft R (EB) ace Elev. 442.4	ft	(ft)	(/6'')	(tsf)	(%)	Upon Completion After Hrs.	f f	t t		
Asphalt.									-		
Silty Clay: Bro A-6.	wn, fill,	_441.2			NC	21					
					NC	29					
			-5			29					
Clay: Brown to A-7.	o dark brown, fill,	436.9									
					NC	21					
		_4 <u>34.4</u>									
fill, A-6.	wn, with Sandy loam,				NC						
//-0.		400.4				20					
Sandy Loam: fill,	Brown, fine grained,	4 <u>32.4</u>	-10	ST							
A-4. Unconfined Co	ompression Test				1.4 S	22					
performed.											
Silty Loam: Br		4 <u>29.4</u>									
A-4.	own, m,										
					NC	21					
Boring termina	ated at 15.0 feet.	427.4	- <u>15</u>								
Boring back fill chips and cap patch.	led with bentonite ped with asphalt cold										
paton.											
			-20								



Division of Highways SCI Engineering, Inc.

SOIL BORING LOG

Page <u>1</u> of <u>1</u>

ROUTE	FAI 270	DES	CRIPTIO	N		-270 over the Mississip	pi River L	-OGGED BY SCI
SECTION	60B-1		LOCA	TION_	Roady	vay, SEC. 36, TWP. 4N, 3.76091169 Long -90.156	RNG. 10W	
COUNTY	Madison DF	RILLING N	IETHOD			CFA		Automatic
STRUCT. NO	060-0350 (EB) 806+89.23	— ı	D B E L D O	U C S	M O I	Surface Water Elev. Stream Bed Elev.	ft ft	
Station Offset	B-120 1844+98.98 2.3 ft R (EB)	·	T W H S	Qu	S T	Groundwater Elev.: First Encounter Upon Completion	None. ft ft	
Ground Surfa	ce Elev. 443.4	ft (1	ft) (/6")	(tsf)	(%)	After Hrs.	ft	
Asphalt.								
A-6.	rn and gray, fill,	442.2		NC	20			
		_	_					
		_		NC	22			
			_					
Gray.		_	_	NC	25			
		_						
		_		NC	21			
			-10					
		_	ST					
		_		NC	18			
Boring back fille	ted at 15.0 feet. ed with bentonite ved with asphalt cold	-						



Division of Highways SCI Engineering, Inc.

SOIL BORING LOG

Page <u>1</u> of <u>1</u>

ROUTE FAI 270	DES	CRIPTIO	N	ŀ	-270 over the Mississipp	i River LO	GGED BY SCI
SECTION 60B-1				Roadw Lat 38	vay, SEC. 36, TWP. 4N, 3.76087025 Long -90.157	RNG. 10W	
COUNTY Madison DF		NETHOD			-	_ HAMMER TYPE _	Automatic
STRUCT. NO. 060-0350 (EB) Station 806+89.23		D B E L P O	U C S	M O I	Surface Water Elev. Stream Bed Elev.	ft ft	
BORING NO. B-121 Station 1848+02.12 Offset 8.1 ft R (EB) Ground Surface Elev. 443.9	_	T W H S (ft) (/6'')	Qu (tsf)	S T (%)	Groundwater Elev.: First Encounter Upon Completion	None. ft	
Asphalt.	_π_\			(70)	After Hrs.	π	
Clay Loam: Brown, fill, A-6.	<u>442.7</u>		NC	21			
Unconfined Compression Test performed. Silty Sand: Brown, fine grained, fill,	439.4	ST	1.8 S	20			
A-2. Silty Clay: Gray, fill, A-6.	4 <u>38.4</u>						
	_		NC	21			
	_		NC	19			
Boring terminated at 10.0 feet. Boring back filled with bentonite chips and capped with asphalt cold patch.	433.9	 					



Division of Highways SCI Engineering, Inc.

SOIL BORING LOG

Date ______12/01/18__

Page <u>1</u> of <u>1</u>

ROUTE FAI 270	DE					-270 over the Mississipp	i River	LOGGED BY SCI		
SECTION 60B-1						/ay, SEC. 36, TWP. 4N, 3.76090394 Long -90.156	RNG. 10W			
COUNTY Madison DR	RILLING					-		Autom	natic	
STRUCT. NO. 060-0350 (EB) Station 806+89.23		D E	BL	U C	M O	Surface Water Elev. Stream Bed Elev.	ft ft			
BORING NO. B-122 Station 1850+88.90 Offset 11.2 ft R (EB) Ground Surface Elev. 444.1		P T H	O W S (/6")	S Qu (tsf)	I S T (%)	Groundwater Elev.: First Encounter Upon Completion After Hrs.	ft			
Asphalt.										
Silty Clay Loam: Gray, fill,	442.9			NC	22					
A-7-6 (23). Atterberg Limits and Particle Size Analysis Tests performed.			ST		20					
Dark gray.		 		NC	21					
Silty Clay: Gray, fill, A-7.	<u>436.1</u>									
	434.1	-10		NC	23					
Boring terminated at 10.0 feet. Boring back filled with bentonite chips and capped with asphalt cold patch.	_									
		- <u>15</u>								
		-20								



Division of Highways SCI Engineering, Inc.

SOIL BORING LOG

Page <u>1</u> of <u>1</u>

ROUTE FAI 270	DE	SCR	IPTIO	N		-270 over the Mississipp	i River	LOGG	ED BY SC	
SECTION 60B-1		_ I	LOCAT	ION	Roady	vay, SEC. 36, TWP. 4N, 1 3.76101832 Long -90.155	RNG. 10W			
COUNTY Madison DF	RILLING	MET	HOD			-		(PE	Automatic	
					1					
STRUCT. NO. 060-0350 (EB)		D	В	U	М	Surface Water Elev.		ft		
Station806+89.23		Е	L	С	ο	Stream Bed Elev.		ft		
		Ρ	0	S	1					
BORING NO. B-123		Т	W		S	Groundwater Elev.:				
Station 1854+11.03		н	S	Qu	Т	First Encounter	None.	ft		
Station 1854+11.03 Offset 14.9 ft R (EB)						Upon Completion		ft		
Ground Surface Elev. 444.1	ft	(ft)	(/6")	(tsf)	(%)	After Hrs.		ft		
Asphalt.										
L	442.9					-				
Clay Loam: Brown, fill,				NC	10					
A-7-6 (17). Atterberg Limits and					19					
Particle Size Analysis Tests performed.						-				
1.						-				
Unconfined Compression Test performed.										
penonneu.			ST	0.7	26					
				S						
		5								
				NC						
					17					
L	4 <u>36.1</u>									
Silty Clay: Gray, fill,										
A-7.										
				NC	20					
	434.1	-10								
Boring terminated at 10.0 feet.										
Boring back filled with bentonite										
chips and capped with asphalt cold patch.										
			1							
		-15								
		-15								
		-20								



Division of Highways SCI Engineering, Inc.

SOIL BORING LOG

Page <u>1</u> of <u>1</u>

ROUTE	FAI 270	DE	SCR	IPTION	N	ŀ	-270 over the Mississipp	oi River	_ LOGGED	BY <u>SCI</u>
SECTION	60B-1		_ L	LOCAT	10N	Roadw Lat 38	/ay, SEC. 36, TWP. 4N, 3.76117244 Long -90.154	RNG. 10W		
COUNTY	Madison DF	RILLING	MET	HOD			-		ΈPE Α	utomatic
		[
STRUCT. NO.	060-0350 (EB)		D	B	U	M	Surface Water Elev.	f	ft	
Station	806+89.23		E P	L	C S	0	Stream Bed Elev.	1	ft	
	B-124		T	w		s	Groundwater Elev.:			
Station	1856+78.10		н	S	Qu	Т	First Encounter	None.	ft	
Offset	1856+78.10 18.6 ft R (EB)						Upon Completion	1	ft	
Ground Surfa	ce Elev. 443.1	ft	(ft)	(/6")	(tsf)	(%)	After Hrs.	1	ft	
Asphalt.										
L		4 <u>41.9</u> -								
Silty Clay: Brow	 vn, fill,				NC	21				
A-7. Atterbera Limits	s Test performed.					21				
	· · · · / · · · · ·									
	erberg Limits and									
Particle Size Ar performed.	nalysis lests			ST		25				
porrormou.										
			5							
					NC	30				
					NC	19				
		433.1	-10							
Boring terminat	ted at 10.0 feet.									
boring back fille	ed with bentonite bed with asphalt cold									
patch.										
			- <u>15</u>							
			-20							



Division of Highways SCI Engineering, Inc.

SOIL BORING LOG

Date ______12/01/18__

Page <u>1</u> of <u>1</u>

ROUTE FAI 270	DES	DESCRIPTION			-270 over the Mississipp	pi River	LOGGED BY SCI		
SECTION 60B-1					/ay, SEC. 36, TWP. 4N, 3.76144889 Long -90.15	RNG. 10W			
COUNTY Madison	DRILLING N	IETHOD			-		E Auton	natic	
STRUCT. NO. 060-0350 (E Station 806+89.23	3	D B E L	U C	M O	Surface Water Elev. Stream Bed Elev.	ft ft			
BORING NO. B-125 Station 1860+12.8 Offset 20.9 ft R (El Ground Surface Elev. 44	<u>2</u> 3)	P O T W H S (ft) (/6")	S Qu (tsf)	I S T (%)	Groundwater Elev.: First Encounter Upon Completion After Hrs.	ft			
Asphalt.	<u></u> n N		(,	(,,,,		n			
Silty Clay: Brown, fill,	441.2		NC	21					
Unconfined Compression Test performed.	_	ST 	0.7 S	30					
A-7-6 (26). Atterberg Limits and Particle Size Analysis Tests performed.	-		NC	28					
	-432.4	-10	NC	24					
Boring terminated at 10.0 feet. Boring back filled with bentonite chips and capped with asphalt of patch.	old – – –								



Division of Highways SCI Engineering, Inc.

SOIL BORING LOG

Page <u>1</u> of <u>1</u>

ROUTE	FAI 270	DE				ļ	-270 over the Mississipp	_ LOGO	GED BY	SCI	
SECTION	60B-1		_ L	OCAT	10N	Roadw	/ay, SEC. 36, TWP. 4N, 3.76175734 Long -90.152	RNG. 10W			
	Madison DR								(PE	Automatio	2
STRUCT. NO.	<u>060-0350 (EB)</u>		D E	B L	U C	M O	Surface Water Elev.		ft		
	806+89.23		P T	0 W	s	I S	Stream Bed Elev.		ft		
BORING NO. Station	B-126 1863+05.98 23.7 ft R (EB)		н	S	Qu	T	Groundwater Elev.: First Encounter	None.			
Offset Ground Surf	23.7 ft R (EB) ace Elev. 442.1	ft	(ft)	(/6'')	(tsf)	(%)	Upon Completion After Hrs.		ft ft		
Asphalt.											
Silty Clay: Bro		440.9			NC						
A-7. Atterberg performed.		4 <u>39.4</u>			_	20					
Clay: Brown, f A-7.	<u> </u>										
					NC						
Soft.		436.6	-5	-							
Silty Clay: Gra A-7.	y, fill,										
					NC	20					
Dark gray, A-7	7-6 (32). 's and Particle Size				NC						
Analysis Tests	performed.	432.1	-10			29					
Boring back fi	ited at 10.0 feet. led with bentonite										
patch.	ped with asphalt cold										
			- <u>15</u>								
			-20								



Division of Highways SCI Engineering, Inc.

SOIL BORING LOG

Page <u>1</u> of <u>1</u>

ROUTE	FAI 270				N N	ŀ	-270 over the Mississipp	oi River		BY SCI
SECTION	60B-1		_ L	OCAT	ION	Roadw	/ay, SEC. 36, TWP. 4N, 8.76216188 Long -90.15	RNG. 10W		
COUNTY	Madison DR	ILLING	MET	HOD					PE	Automatic
STRUCT. NO. Station	060-0350 (EB) 806+89.23		D E P	B L O	U C S	M O I	Surface Water Elev. Stream Bed Elev.	fi fi	t t	
Station Offset	B-127 1866+21.89 25.5 ft R (EB)		T H	W S	Qu	S T	Groundwater Elev.: First Encounter Upon Completion	ft	t	
Ground Surface	ce Elev. 442.2	ft	(ft)	(/6")	(tsf)	(%)	After Hrs.	ft	t	
	- <u>a</u> u	441 0 -								
Silty Clay: Gray, A-7.	- fill, 				NC	29				
A-7-6 (34). Atte Particle Size An performed.	rberg Limits and alysis Tests		-5	ST	NC	27				
					NC	21				
					NC	23				
Boring terminat Boring backfiller chips and capp patch.	ed at 10.0 feet. d with bentonite ed with asphalt cold	432.2	-10 							

Page <u>1</u> of <u>2</u>



Illinois Department of Transportation

Division of Highways SCI Engineering, Inc.

SOIL BORING LOG

Date 05/25/21

ROUTE FAI 270	DE					-270 over the Mississipp	i River	LC	OGGE	ED BY	S	ID3
SECTION 60B-1		_ เ	.OCAT	ION	Roadw	vay, SEC. 30, TWP. 4N, 3.76317271 Long -90.148	RNG. 9W					
COUNTY Madison & St. Louis D	RILLING	MET	HOD			FA, Mud Rotary		TYPE		Auto	omatic	
STRUCT. NO. 060-0350 (EB) Station 806+89.23		D E P	B L O	U C S	M O I	Surface Water Elev. Stream Bed Elev.		_ ft _ ft	D E P	B L O	U C S	M O I
BORING NO. B-128 Station 1873+30.14 Offset 48.2 ft R (EB) Cround Surface Flag 441.5		T H (ft)	W S (/6'')	Qu (tsf)	S T (%)	Upon Completion		_ ft	T H (ft)	W S (/6")	Qu (tsf)	S T (%)
Ground Surface Elev. 441.5 Concrete.	π	(14)	(,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	((3))	(70)	Silty Clay: Brown, stiff,	moist, fill,	_ π 421.0		(10)	((3))	(70)
	440.5					A-6 (continued) Clay: Gray, moist, fill,						
Asphalt.	440.0		33 18	NC		A-7.		_4 <u>20.0</u>		5 6	0.8	20
	4 <u>39.0</u>		10			Silty Clay Loam: Brown moist, fill, A-6.	n, very stiff,			10	S/10	
Clay: Brown, medium stiff, moist, fill,						A-6. Clay Loam: Brown, wit	th gray, very	4 <u>18.5</u>				
A-7.			3	1.8		stiff, moist, fill, A-7.				7	1.8	
		-5	3 5	S/10	29				-25	6 10	S/10	34
Silty Clay and Clay: Brown, medium	436.0					Loam: Brown, medium		416.0	_			
stiff, moist, fill,	1		3			A-3	i sun, moisi,			3		
A-6. Atterberg Limits test performed.			4	0.9 S/10	23					3	3.0 S/5	24
	433.5	_	5					413.5		4		
Clay: Brown, stiff, moist, fill, A-7.		_				Silty Loam: Brown, so A-4.	ft, moist,					
		-10	4 7 7	2.8 S/15	18	CLAY: Brown, mediun A-7.	n stiff, moist,	412.5	-30	1 2 4	0.9 S/15	27
	4 <u>3</u> 1.0					Becomes brownish an	id gray.					
Silty Clay Loam: Brown, with gray, very stiff, moist, fill, A-6.			4	NC	19	Unconfined Compress	ion test			ST	1.0 S	34
Grain Size Analysis performed.			9		19							
Silty Clay Loam: Gray, very stiff,	428.5											
moist, fill, A-7.			4	3.7	40					2	0.8	20
	426.5	-15	8 10	S/15	12				-35	2 3	P	39
Clay, Brown, moist, fill,	425.5											
Sandy Clay Loam: Brown, stiff, moist, fill, A-4.	424.5		6 8	2.4 S/10	25			404.5				
Silty Loam: Brown, moist, fill, A-4.] <u>423.5</u>		8			Sand: Brown, fine grai moist, A-3.	ined, dense,					
Grain Size Analysis performed.	4 <u>22.5</u>	_	3			-			_	13		
			4	0.9 S/10	29					15	NC	
L		-20	6						-40	25		



Division of Highways SCI Engineering, Inc.

SOIL BORING LOG

Page <u>2</u> of <u>2</u>

Date 05/25/21

ROUTE _	FAI 270				ŀ	-270 over the Mississipp	i River	LOGG	ED BY	SCI
SECTION	60B-1		LOCAT	ION	Roadw	/ay, SEC. 30, TWP. 4N, 3.76317271 Long - 90.148	RNG. 9W			
COUNTY	Madison & St. Louis DR	ILLING ME	THOD			FA, Mud Rotary		YPE	Automa	atic
STRUCT. N Station	IO. <u>060-0350 (EB)</u> 806+89.23	D E P	B L O	U C S	M O I	Surface Water Elev. Stream Bed Elev.		ft ft		
Station _ Offset _	O. B-128 1873+30.14 48.2 ft R (EB) Gurface Elev. 441.5	H	W S	Qu (tsf)	с S T (%)	Groundwater Elev.: First Encounter Upon Completion After Hrs.	None.	ft		
	wn, fine grained, dense,	IL [(9]						<u></u>		
Medium de	ense.	 4! 	6 6 7	NC						
Gray.			5	NC						
Boring bac	ninated at 50.0 feet. k filled with bentonite capped with asphalt cold	<u> 391.5 50</u>								



Division of Highways SCI Engineering, Inc.

SOIL BORING LOG

Page <u>1</u> of <u>1</u>

Date 04/21/21

ROUTE FAI 270	DE	SCR	IPTIO	۱	ŀ	-270 over the Mississip	pi River	L(oggi	ED BY	S	CI
SECTION 60B-1		_ L	.OCAT	ION	Roadw	/ay, SEC. 30, TWP. 4N, 3.76289037 Long -90.14	, RNG. 9W					
COUNTY Madison DF	RILLING	MET	HOD			FA, Mud Rotary		TYPE		Auto	omatic	
STRUCT. NO. 060-0350 (EB) Station 806+89.23		D E P	B L O	U C S	M O I	Surface Water Elev. Stream Bed Elev.		_ ft _ ft	D E P	B L O	U C S	M O I
BORING NO. B-129 Station 1873+43.58 Offset 180.3 ft R (EB)		T H	W S	Qu	S T	Groundwater Elev.: First Encounter Upon Completion	414.5	_ ft ⊻ _ ft	T H	W S (/6")	Qu	S T
Ground Surface Elev. 419.5	ft	(ft)	(/6")	(tsf)	(%)	Aller <u>24</u> Hrs.		_ ft ⊻	(ft)	(/0)	(tsf)	(%)
Sandy Loam: Grayish-brown, fine grained, very loose, moist,						Silt: Gray, very soft to moist,	medium stiff,					
A-3. Grain Size Analysis performed.			1			A-4. (continued)				2	NO	
			1	NC					<u> </u>	3	NC	
			1			Silty Loam: Gray, stiff		<u>397.0</u>		7		
						A-4.	, 1106,					
			2							4		
	415.0	· —	1	NC					_	6	NC	
Silty Loam: Gray, very soft, moist, A-4.		▼ -5	1			Sand: Gray, trace bro		394.5	<u>-25</u>	9		
						graineu, meulum uen	se, moist,					
			1			A-3.				7		
			1	0.3 P	33					8	NC	
Clay: Gray, with brown, medium	412.0	·	1						_	15		
stiff to soft, moist,								391.0				
A-7. Atterberg Limits test performed.			1			Sand: Gray with trace	brown, fine		·	10		
Allemeny Limits lest performed.			2	0.9 B/20	42	to coarse grained, me moist,	edium dense,			10	NC	
		-10	3	2/20		A-1.		389.5	-30	12		
						Boring terminated at a Borehole caved in at	30.0 feet.	-				
			1			24 hours.						
			0	0.4 B/20	35							
Silt: Gray, very soft to medium stiff,	407.0		1									
moist,												
A-4.			1									
			1	NC								
		- <u>15</u>	1						- <u>35</u>			
			1									
			2	NC								
			3									
			3									
			2	NC								
		-20	2						-40			

Page $\underline{1}$ of $\underline{2}$



Illinois Department of Transportation

Division of Highways SCI Engineering, Inc.

SOIL BORING LOG

Date 05/24/21

ROUTE FAI 270	DE				ļ	-270 over the Mississippi River	LC	OGGE	ED BY	S	I.J.
SECTION 60B-1		_ L	OCAT	10N	Roadw Lat 38	vay, SEC. 30, TWP. 4N, RNG. 9W 3.76397481 Long -90.14732973					
COUNTY Madison & St. Louis D	RILLING	MET	HOD			FA, Mud Rotary HAMMER	TYPE		Auto	omatic	
STRUCT. NO. 060-0350 (EB) Station 806+89.23		D E P	B L O	U C S	M O I	Surface Water Elev Stream Bed Elev	_ ft _ ft	D E P	B L O	U C S	M O I
BORING NO. B-132 Station 1878+90.30 Offset 48.9 ft R (EB)		T H (ft)	W S (/6")	Qu (tsf)	S T (%)	Groundwater Elev.: First Encounter <u>None.</u> Upon Completion	_ ft	T H (ft)	W S (/6")	Qu (tsf)	S T (%)
Ground Surface Elev. 441.5 Concrete.	π	(11)	(,0)	((3))	(/0)	After Hrs	_ ft 421.0		(/0)	((3))	(70)
	440.5					Clay Loam: Brown, very stiff, moist,	421.0				
Crushed rock.	420.0		40 32 32	NC		fill, A-7. Loam: Brown, moist, very stiff, fill, -	419.5		3 10 10	0.9 B/20	41
Clay: Gray, medium stiff to stiff, moist, fill, A-7.	<u>439.0</u>					with clay lumps, A-4.			10		
Atterberg Limits test performed.			3 3 5	0.8 S/10	34	Sand: Brown, fine grained, very	417.0	-25	8 18 20	1.2 S/5	20
	436.0	-0				dense, moist, fill, A-3.	416.0		20		
Sandy Loam: Brown, very stiff, moist, fill, A-4.			10 13	>4.5		Clay Loam: Gray, stiff, moist, A-7.	414.5		5 6	2.2	25
Particle Size Analysis performed. Sand: Brown, fine grained, dense, dry to moist, fill,	· ل		25	P		Clay: Gray, stiff, moist, A-7.			9	B/20	
A-3. With clay lumps.			9 12	NC		Silty Clay: Gray, soft, moist, A-6.	413.0		1 1	1.1 S/10	37
		-10	15			Grain Size Analysis performed. Clay: Gray, soft, moist, A-7.	<u>411.5</u>	-30	3	5/10	
			10 10 11	NC							
Silty Loam: Brown, moist, fill, A-4.	<u>428.5</u> 427.5		8			Brown, with gray.	407.5		1		
Sandy Clay: Brown, moist, stiff, fill, A-6.		- <u>15</u>	4 7	0.7 S/10	29	Silty Clay: Gray, with brown, soft, moist, A-6.		-35	2 2	0.7 B/20	37
Loam: Brown, very stiff, moist, fill,	425.5		6								
with clay lumps, A-4.			7 12	2.5 P	22	Sand: Brown, fine grained, dense, moist,	404.5				
			4	0.5		A-3.			8	NO	
		-20	6 10	0.5 S/10	19			-40	9 13	NC	



Division of Highways SCI Engineering, Inc.

SOIL BORING LOG

Page <u>2</u> of <u>2</u>

Date 05/24/21

ROUTE	FAI 270				۱	ŀ	-270 over the Mississipp	oi River	LOG	GED BY	SCI
SECTION	60B-1		_ L	.OCAT	ION	Roadw	/ay, SEC. 30, TWP. 4N, 8.76397481 Long -90.147	RNG. 9W			
COUNTY Ma	dison & St. Louis DR	RILLING	MET	THOD			FA, Mud Rotary		YPE	Autom	atic
Station	060-0350 (EB) 806+89.23		D E P	B L O	U C S	M O I	Surface Water Elev. Stream Bed Elev.		ft ft		
BORING NO. Station Offset Ground Surfa	B-132 1878+90.30 48.9 ft R (EB) ace Elev. 441.5	ff	T H (ft)	W S (/6")	Qu (tsf)	S T (%)	Groundwater Elev.: First Encounter Upon Completion After Hrs.	None.	ft		
	fine grained, dense,	n							<u>- n</u>		
Fine to coarse	grained.		45		NC						
		391.5	-50	11 15 11	NC						
Boring back fil	ited at 50.0 feet. led with bentonite bed with asphalt cold		-55								



Division of Highways SCI Engineering, Inc.

SOIL BORING LOG

Page <u>1</u> of <u>1</u>

Date 04/21/21

ROUTE	FAI 270					ŀ	270 over the Mississippi River	L(DGGE	ED BY	S	CI
SECTION	60B-1		L	LOCAT	10N	Roadw Lat 38	vay, SEC. 30, TWP. 4N, RNG. 9W .76372622 Long -90.14710027					
COUNTY							FA, Mud Rotary HAMMER	TYPE		Auto	matic	
Station	<u>060-0350 (EB)</u> 806+89.23		D E P	B L O	U C S	M O I	Surface Water Elev Stream Bed Elev	_ ft _ ft	D E P	B L O	U C S	M 0 1
Offset	B-133 1879+04.87 159.7 ft R (EB)		H H	W S	Qu	S T		_ ft	H H	W S	Qu	S T
	ace Elev. <u>412.4</u>	ft	(ft)	(/6")	(tsf)	(%)	After Hrs	_ ft	(ft)	(/6")	(tsf)	(%)
A-6.	y, soft, moist, fill,						Sand: Gray, fine to coarse grained, loose to medium dense, moist,					
Grain Size Ana	alysis performed.	409.9		2 2 2	<0.25 P	19	A-1.			5 4 7	NC	
Silty Clay: Dark	k gray, soft, moist, fill,											
A-6.			⊻	1	0.9 B/20	41				9 9	NC	
		4 <u>07.4</u>	-5	2	D/20				-25	12		
Silty Loam: Da moist, A-4.	rk gray, very soft,			1						5		
				1	NC	40				4 5	NC	
			-10	1 1 2	NC	34		382.4	-30	7 11 14	NC	
							Boring terminated at 30.0 feet.	002.4				
Grain Size Ana	alysis performed.			0 1 1	0.4 B/20	40						
Sandy Loam: (Gray, fine grained, m dense, moist,	<u>397.9</u>	- <u>-15</u>	4 7 9	0.4 B/20				-35			
A-3.				1								
	ne grained, medium	<u>395.4</u>		3 6	NC							
dense, moist, A-3.												
		202.4		6 6 8	NC							
		392.4	-20	0					-40			

Page $\underline{1}$ of $\underline{2}$



Illinois Department of Transportation

Division of Highways SCI Engineering, Inc.

SOIL BORING LOG

Date 06/02/21

ROUTE FAI 270	DE				ļ	-270 over the Mississippi Rive	er	LO	GGE	DBY	S	CI
SECTION 60B-1		_ เ	OCAT	ION	Roadw Lat 38	/ay, SEC. 30, TWP. 4N, RNG. 3.76459921 Long -90.14580971	<u>9W</u>					
COUNTY Madison & St. Louis DR	RILLING	MET	HOD			FA, Mud Rotary HA		Ξ		Auto	matic	
STRUCT. NO. 060-0350 (EB) Station 806+89.23		D E P	B L O	U C S	M O I	Surface Water Elev Stream Bed Elev	ft ft		D E P	B L O	U C S	M 0 1
BORING NO. B-136 Station 1883+83.92 Offset 30.5 ft R (EB) Ground Surface Elev. 442.2	ft	T H	W S	Qu (tsf)	S T (%)	Groundwater Elev.: First Encounter Upon Completion After Hrs	ft	<u>*</u>	T H (ft)	W S (/6")	Qu (tsf)	S T (%)
Concrete.						Clay Loam: Brown, very stiff			_			
Asphalt Crushed rock.	<u>441.2</u> 440.9		30 27 28	NC		A-6.		_		4 7 10	1.3 S/10	25
			12	NG		Loam: Brown, stiff, moist, fill A-4.	4 <u>1</u> I,	<u>9.2</u>		6		
Clay Loam: Brown, very stiff, moist,	4 <u>37.2</u>	<u>▼ -5</u>	22 18	NC				_	-25	8 17	1.1 S/10	29
fill, A-6. Grain Size Analysis performed.			4	0.6 S/10	25	Silty Clay Loam: Brown, stiff	41 f, moist,	<u>5.7</u>		8 9	0.9 S/5	24
	4 <u>34.2</u>		15	3/10		fill, A-6.	41	4.2		8	0/0	
Silty Clay Loam: Brown, stiff, moist, fill, A-6. <i>Particle Size Analysis performed.</i>			4 6 9	2.4 S/15	20	Loam: Brown, stiff, moist, fill A-4.	l,	_	-30	6 7 9	1.7 S/10	27
Sandy Clay Loam: Brown, fine grained, loose, moist,	4 <u>31.7</u>		2					_				
A-3. Grain Size Analysis performed.			2	1.8 P	35			_				
With sandy loam.		-15	3 3 7	0.9 S/10	24	Clay: Brown, moist, trace or A-7.	ganics,	_ 	-35	7 11 13	1.3 S/10	17
			3	1.3 S/5	21			_ <u>5.2</u> _				
			6			Sand: Brown, fine, very moi A-3.	SI,	_				
With clay.	422.2	-20	2 3 3	0.5 B/20	25		40	3.2	-40	5 5 4	<0.25 P	



Division of Highways SCI Engineering, Inc.

SOIL BORING LOG

Page <u>2</u> of <u>2</u>

Date 06/02/21

ROUTE _	FAI 270				ŀ	-270 over the Mississipp	oi River	LOGGE	DBY	SCI
SECTION	60B-1		LOCAT	ION	Roadw	vay, SEC. 30, TWP. 4N, 3.76459921 Long -90.145	RNG. 9W			
COUNTY	Madison & St. Louis DF		THOD			FA, Mud Rotary		YPE	Automat	ic
Station	NO. 060-0350 (EB) 806+89.23	P	B L O	U C S	M O I	Surface Water Elev. Stream Bed Elev.		ft ft		
Station Offset _	B-136 1883+83.92 30.5 ft R (EB) Surface Elev. 442.2	H	W S (/6")	Qu (tsf)	S T (%)	Groundwater Elev.: First Encounter Upon Completion After Hrs.		ft		
Silty Clay L stiff, very n A-6. <i>(conti</i>	oam: Brown, medium noist, <i>nued)</i> wn, fine, medium dense,		-							
A-3.			5 6 5 6	NC						
			-							
		 392.2 -50	7 9) 9	NC						
Boring bac	ninated at 50.0 feet. ck filled with bentonite capped with asphalt cold									



Division of Highways SCI Engineering, Inc.

SOIL BORING LOG

Page <u>1</u> of <u>1</u>

Date 04/21/21

ROUTE	FAI 270				۱	ŀ	270 over the Mississippi River	L	OGGE	ED BY	<u> </u>	CI
SECTION	60B-1		_ L	OCAT	ION	Roadw	vay, SEC. 30, TWP. 4N, RNG. 9 .76432753 Long -90.14564687	9W				
	Madison DR	RILLING	MET	HOD			A, Mud Rotary HAM			Auto	matic	
Station	060-0350 (EB) 806+89.23		D E P T	B L O W	U C S	M O I S	Surface Water Elev Stream Bed Elev	ft ft	D E P T	B L O W	U C S	M O I S
Station Offset	B-137 1883+89.17 139.7 ft R (EB)		н	S	Qu	T	Groundwater Elev.: First Encounter4 Upon Completion	09.1 ft ⊻ ft		S	Qu	T
Ground Surfac	e Elev. 419.1	ft	(ft)	(/6")	(tsf)	(%)	After <u>48</u> Hrs. <u>4</u>	00.6 ft 🝸	(ft)	(/6")	(tsf)	(%)
Sandy Loam: Da grained, loose, r A-3.	ark gray, fine noist, fill,						Sandy Loam: Dark gray, fine grained, medium dense, mois A-3.	st,				
Silty Clay: Dark	nav shalev	417.1		5 4 4	1.2 B/20					6 8 11	NC	
medium stiff, mo A-6.				4								
Sandy Loam: Da grained, mediun	ark gray, fine n dense, moist, fill,	<u>415.1</u> 414.1		4 4 6	0.9 B/20	24		394.1	-25	6 10 10	NC	
A-3. Silty Clay: Dark g moist, fill,	gray, medium stiff,						Sand: Dark gray, fine to coar grained, medium dense, mois A-1.	se	_			
A-6. Trace roots. <i>Grain Size Anal</i> y		4 <u>11.6</u>		3 3 6	3.2 S/15	26				5 10 12	NC	
to stiff, moist,	gray, medium stiff									-		
				2 2 4	NC	33		389.1	-30	8 8 7	NC	
							Boring terminated at 30.0 fee Borehole caved in at 21 feet a 48 hours.	et. after				
		4 <u>06.6</u>		5 5 4	NC	34						
Silt: Gray, very s A-4. <i>Grain Size Anal</i> y				2								
			- <u>15</u>	1	0.3 P	35			- <u>35</u>			
		401.6		1 1 3	NC	38						
Sand: Gray, with grained, mediun A-3.	n brown, fine n dense, moist,		<u> </u>	-								
		399.1	-20	6 9 9	NC				-40			



Page <u>1</u> of <u>1</u>

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Illinois Department of Transportation

Division of Highways SCI Engineering, Inc.

SOIL BORING LOG

Date 05/12/21

ROUTE FAI 270	DE	SCR	RIPTION	۱	ŀ	-270 over the Mississipp	oi River	LC	OGGE	ED BY	S	CI
SECTION 60B-1		_ เ		10N	Roadw Lat 38	vay, SEC. 30, TWP. 4N, 3.76483121 Long -90.145	RNG. 9W					
COUNTY Madison DI	RILLING	MET	THOD			FA, Mud Rotary		IYPE .		Auto	matic	
STRUCT. NO. 060-0350 (EB) Station 806+89.23		D E P	B L O	U C S	M O I	Surface Water Elev. Stream Bed Elev.		_ ft _ ft	D E P	B L O	U C S	M O I
BORING NO. B-138 Station 1883+89.66 Offset 58.5 ft L (EB)		T H	W S	Qu	S T	Upon Completion	None.	ft	T H	W S	Qu	S T
Ground Surface Elev. 446.3	ft	(ft)	(/6")	(tsf)	(%)	After Hrs.		ft	(ft)	(/6")	(tsf)	(%)
Concrete.	445.0		-			Sandy Clay Loam: Bro moist, fill,	own, sun,		_			
Crushed rock.	445.3		-			A-4. (continued)				2		
			12						_	2	0.7 S/15	20
L	443.8		20	NC						7	5/15	
Silty Clay: Brown, stiff, moist, fill, A-6.	112 0		13					423.3				
Silty Clay Loam: Brown, very stiff,	443.0					Silty Loam: Brown, mo	dist, Till,		_	0		
moist, fill,	441.8		7 15	4.1	17	Silty Clay: Brown, very	stiff. moist.	422.3		8 6	3.0	25
A-6. Atterberg Limits test performed.	1	-5	15	S/10		fill,	·,		-25	15	B/20	20
Silty Clay: Brown, very stiff, moist,	440.8					A-7.		420.8				
fill,						Clay: Brown, moist, fill A-7	,					
A-7 Clay: Brown, medium stiff, moist,	J		2	2.3		A-1			_	3	2.6	
fill,			2	B/20	20	Sand: Brown, fine gra	inod modium	419.3		6	B/20	30
A-6.			3			dense, moist to very m	noist, fill,			14		
Grain Size Analysis performed. Wood encountered during drilling			-			A-3.		<u>418.3</u>				
at approximately 8 feet.	437.3		6			Silty Loam: Brown, mo	oist, fill,		_	5		
	436.8		10	3.0 P	20			416.8		5	1.3 S/15	19
Sandy Clay Loam: Brown, moist, fill, A-6.	'	-10	12			Clay: Brown, stiff, moi A-7.	st, fill,		-30	8	0,10	
Sand: Brown, fine grained, medium	-1 -1											
dense, moist, fill, A-3.	434.8	·	5	1.8	35				_			
Silty Loam: Brown, moist, fill,	434.1		2	S/15	30							
A-4.	4 <u>33.3</u>		-						\neg			
Clay: Brown, stiff, moist, fill, A-7.]		4					412.3		8		
Sand: Brown, fine grained, moist, fill, A-3.	1	-15	5	0.8 S/10	26	Sandy Loam: Brown, medium dense, moist,			-35	10 12	0.4 S/5	28
Sandy Clay Loam: Brown, stiff, moist, fill,	J	<u>-13</u>				A-4			<u>-35</u>			
A-4. Grain Size Analysis performed.	429.3		2 13	1.9	25	Very hard drilling at 30		409.8				
Sand: Brown, fine grained, medium dense, moist, fill, A-3.			22	S/5		(possible reinforced co from 36.5 to 39.0 feet. dropped on bottom of	Tri-cone					
Sandy Clay Loam: Brown, stiff,	L					sounded like metal on	metal.		_			
moist, fill,			3	1.2	17	Boring abandoned at 3		407.3				
A-4.		-20	1	S/5		Boring terminated at 3	99.0 ICCL.		-40			
L		-20		1	1	11			-40			



Division of Highways SCI Engineering, Inc.

SOIL BORING LOG

Page <u>1</u> of <u>1</u>

Date 04/23/21

ROUTE	FAI 270	DESCRIPTION			۱	ŀ	-270 over the Mississippi River	LC	OGGE	ED BY	S	CI
SECTION	60B-1		_ L	OCAT	10N	Roadw	vay, SEC. 30, TWP. 4N, RNG. 9W 3.76507 Long -90.14599198					
COUNTY	Madison DR	RILLING	MET	HOD			FA, Mud Rotary HAMMER	TYPE .		Auto	matic	
Station	060-0350 (EB) 806+89.23 B-139		D E P T	B L O W	U C S	M O I S	Surface Water Elev Stream Bed Elev Groundwater Elev.:	_ ft	D E P T	B L O W	U C S	M O I S
Station	B-139 1884+00.88 147.8 ft L (EB)		н	S	Qu	Т	First Encounter None.	_ ft	н	S	Qu	Т
Ground Surfa	ce Elev. <u>419.7</u>	ft	(ft)	(/6'')	(tsf)	(%)	Upon Completion After Hrs	_ n _ ft	(ft)	(/6'')	(tsf)	(%)
Clay: Dark gray moist, fill, A-7.	r, medium stiff,						Silty Clay: Brown and gray, soft to medium stiff, moist, A-6.					
Trace roots.				3 4 6	1.6 B	26	Unconfined Compressive Strength test performed.			ST	0.6 S	52
								396.2				
		414.7	-5	2 4 4	0.9 S/10	21	Silty Loam: Dark gray, soft, moist, A-4.		-25	1 2 2	<0.25 P	36
Silty Clay: Dark moist, A-7.	gray, medium stiff,								_			
	ırk gray, stiff, moist,	413.2		2 4 5	1.4 B	20		392.2		1 2 5	0.8 P	31
							Sandy Loam: Dark gray, fine grained, loose, moist, A-3.					
			-10	4 6 10	0.7 S/10	32		389.7	-30	4 3 4	NC	
							Boring terminated at 30.0 feet.					
		407.2		4 6 10	2.7 B	32						
Silty Clay: Dark medium stiff, m A-6.	gray, soft to oist,			2								
			- <u>15</u>	2 3 3	1.8 B	37			- <u>35</u>			
				1 2 2	1.0 B	49						
	_											
Gray and brown	n.	399.7	-20	1 2 2	1.3 S/15	49			-40			

Page <u>1</u> of <u>2</u>



Illinois Department of Transportation

Division of Highways SCI Engineering, Inc.

SOIL BORING LOG

Date 06/03/21

ROUTE FAI 270	DE	SCR	RIPTION	۱	ŀ	-270 over the Mississipp	oi River	L(OGGE	ED BY	S	CI
SECTION 60B-1		_ I	OCAT	10N	Roadw	vay, SEC. 30, TWP. 4N, 3.76502712 Long -90.144	RNG. 9W					
COUNTY Madison & St. Louis DR	RILLING	MET	THOD			A, Mud Rotary		TYPE		Auto	omatic	
STRUCT. NO. 060-0350 (EB) Station 806+89.23		D E P	B L O	U C S	M O I	Surface Water Elev. Stream Bed Elev.			D E P	B L O	U C S	M O I
BORING NO. B-144 Station 1888+75.49 Offset 37.1 ft R (EB)		T H (ft)	W S (/6")	Qu (tsf)	S T (%)	Upon Completion		_ ft	T H (ft)	W S (/6")	Qu (tsf)	S T (%)
Ground Surface Elev. 441.9 Concrete.	ft	(11)	(/0)	((5))	(70)	After Hrs Clay: Brown, very stiff,		_ ft	(11)	(/0)	((5))	(70)
	440.9					A-7. (continued)		420.9				
Sandy Clay: Brown, moist, with	440 <u>.6</u> 439.9		43 20 13	3.5 P	14	Silty Loam: Brown, ver fill, A-4.	ry stiff, moist,			4 7 10	4.0 S/10	17
clay, fill, A-6.	437.9		10	. 4.5						4	1.0	
Asphalt. Crushed rock. Grain Size Analysis performed.	437.4	5	22 31	>4.5 P	18				-25	6 13	1.3 S/15	16
		₹	14 12 16	NC		Sandy Clay: Brown, ve fill, A-6.	ery stiff, moist,	415.4		4 8 14	1.5 S/5	23
Silty Loam: Brown, very stiff, moist, fill, A-4.	433.2		10 17 21	4.0 P					-30	5 11 13	0.9 S/5	16
Stiff.			9 12 16	1.2 S/5	19	Silty Clay: Brown, mois A-7.	 st,	4 <u>09.9</u>				
	426.4	-15	9 10 13	0.7 S/5	22	Silty Loam: Brown, me moist, A-4.		407.9 ,407.4	-35	3 2 5	0.3 S/15	32
Clay: Brown, stiff, moist, fill, A-7. <i>Atterberg Limits test performed.</i>	120.4		3 5 8	2.6 B/20	22	Sand: Brown, fine gra moist, A-3. Sandy Loam: Brown, i dense, very moist to w	fine grained,	404.9				
Very stiff.	421.9		3 9 9	1.8 S/15	18	A-3.			-40	7 7 6	NC	



Division of Highways SCI Engineering, Inc.

SOIL BORING LOG

Page <u>2</u> of <u>2</u>

Date 06/03/21

ROUTE	FAI 270	DE	SCR	IPTION	۱	ļ	-270 over the Mississipp	i River	_ LOGGE	DBY	SCI
SECTION _	60B-1		_ L	OCAT	10N	Roadw	vay, SEC. 30, TWP. 4N, 1 3.76502712 Long -90.144	RNG. 9W			
	adison & St. Louis DR						FA, Mud Rotary	_ HAMMER TYP	PE	Automa	atic
STRUCT. NO. Station	060-0350 (EB) 806+89.23		D E P	B L O	U C S	M O I	Surface Water Elev. Stream Bed Elev.	fi fi	t t		
Station Offset	B-144 1888+75.49 37.1 ft R (EB) face Elev. 441.9	ft	T H (ft)	W S (/6")	Qu (tsf)	S T (%)	Groundwater Elev.: First Encounter Upon Completion After Hrs.	<u>435.9</u> ff ff ff	t		
	rown, soft, very moist,	4 <u>00.9</u>							-		
Clay Loam: B A-7.	rown, soft, very moist,	<u>397.9</u>	-45	3 1 2	<0.25 P						
Sand: Brown, dense, very m A-3.	fine grained, medium noist to wet,	_ <u>394.9</u>									
Poring termin	ated at 50.0 feet.	391.9	-50	8 11 13	NC						
Boring termin	aled at 50.0 leel.										



Division of Highways SCI Engineering, Inc.

SOIL BORING LOG

Page <u>1</u> of <u>1</u>

Date 04/20/21

ROUTE FAI 270	DE	ESCR	RIPTIO	N	ŀ	-270 over the Mississip	pi River	LC	OGGE	ED BY	S	CI
SECTION 60B-1		_ L	LOCAT	ION	Roadw	/ay, SEC. 30, TWP. 4N 3.76478787 Long - 90.14	, RNG. 9W					
COUNTY Madison	DRILLING	MET	THOD			FA, Mud Rotary		TYPE		Auto	omatic	
STRUCT. NO. 060-0350 (E Station 806+89.23	<u>B)</u>	D E P	B L O	U C S	M O I	Surface Water Elev. Stream Bed Elev.			D E P	B L O	U C S	M O I
BORING NO. B-145 Station 1888+68.39 Offset 125.9 ft R (El)) 3)	T H	W S	Qu	S T	Groundwater Elev.: First Encounter Upon Completion		_ ft	T H	W S	Qu	S T
Ground Surface Elev. 429		(ft)	(/6")	(tsf)	(%)	After 72 Hrs.	406.7	_ ft ⊻	(ft)	(/6")	(tsf)	(%)
Sandy Clay Loam: Brown, mediu stiff, moist, fill, A-6.	IM					A-3. Loam: Brown, loose, A-4.	moist, — — —	j				
			3	2.0 S/10	34	Grain Size Analysis p (continued)	erformed.	_4 <u>08.2</u> 		2 2	0.3 B/20	38
With brown, clay, A-7	426.7		3			Gray. Clay Loam: Gray, me	dium stiff,	4 <u>06.7</u>		3		
Loam: Brown, stiff, moist, fill, A-4.			6					, _		3		
Grain Size Analysis performed.		-5	7	1.5 P	21	Silty Loam: Gray, mo A-4. Sand: Gray, fine grain		_405.2	-25	5 8	NC	
Silty Clay Loam: Brown, moist, fil	4 <u>24.2</u> I,					dense, very moist to A-3.						
A-6.	423.2		5	47						8		
Clay: Gray, medium stiff, moist, fi A-7.	ill, <u>_422.7</u> 		6 7	1.7 B/20	17					12 13	NC	
Silty Loam: Brown, stiff, moist, A-4.	4 <u>21.7</u>											
Silty Clay Loam: Brown, soft, mo A-6.	ist,		2	0.3	30					8 10	NC	
		-10		B/20	50	Boring terminated at	20.0 foot	399.7	-30	9		
	418.7		ST		35	Borehole caved in at 72 hours.						
Sand: Brown, fine, medium dens very moist to wet, A-3.	ie,											
Washed Sieve Analysis performe	ed.											
			11 11	NC								
		- <u>15</u>	12						-35			
Silty Loam: Brown, moist,	412.7		8 10	NC								
A-4.			8									
	410.7		3	NC								
Sand: Brown, fine, medium dens very moist to wet,	se, <u>410.2</u>	-20	4 4						-40			



Division of Highways SCI Engineering, Inc.

SOIL BORING LOG

Page <u>1</u> of <u>2</u>

Date 05/12/21

ROUTE FAI 270	DE	SCR	RIPTION	۱	ŀ	-270 over the Mississippi	River	LC	OGGE	ED BY	S	CI
SECTION 60B-1		_ L	OCAT	10N	Roadw Lat 38	/ay, SEC. 30, TWP. 4N, F 3.76523964 Long -90.1442	RNG. 9W					
COUNTY Madison DR	RILLING	MET	THOD			FA, Mud Rotary		IYPE .		Auto	matic	
STRUCT. NO. 060-0350 (EB) Station 806+89.23		D E P T	B L O W	U C S	M O I S	Surface Water Elev		_ ft _ ft	D E P T	B L O W	U C S	M O I S
BORING NO. B-146 Station 1888+76.70 Offset 43.2 ft L (EB) Ground Surface Elev. 447.8	 ft	H (ft)	S	Qu (tsf)	с Т (%)	Groundwater Elev.: First Encounter _ Upon Completion _ After Hrs		_ ft _ ft _ ft	н (ft)	S (/6")	Qu (tsf)	т (%)
Concrete.						Silty Loam: Brown, trac very stiff, moist, fill,						. ,
Crushed rock.		_	16 18	4.5	20	A-4. (<i>continued</i>) With clay lumps.				4 9 9	1.1 S/5	21
Silty Clay: Brown, medium stiff, moist, fill, A-7.	445.3 444.5		5	P		Sandy Clay Loam: Brow very stiff, moist, fill,	wn, stiff to	424.8				
Silty Clay: Brown, stiff, moist, fill, A-6. Atterberg Limits test performed.		5	2 3 8	1.6 B	22	A-6.			-25	4 5 8	2.0 B	16
			3							5		
Clay: Brown, stiff, moist, fill,	440.8		5 6	1.4 B	21					6 8	2.4 S/10	15
Particle Size Analysis performed. Silty Clay Loam: Brown, stiff, moist, fill, A-6.			2	2.5	20					5	4.1	17
Grain Size Analysis performed.	_437.3	-10		S/10		Very hard drilling from			-30	10	S/15	
stiff, moist, fill, A-7.			2 2 3	2.2 S/10	17	approximately 31.5 to 3 (possible stump, roadbe water).	ed, etc lost	<u>415.3</u>				
			5	3.8		Clay: Brown, stiff, moist disturbed, A-7.	t, appears			6	1.2	
		- <u>15</u>	11 12	P	21				- <u>35</u>	4 8	B	29
Trace coarse gravel. Sample damaged by gravel. Silty Loam: Brown, trace organics, very stiff, moist, fill,	431.3		6 11 17	1.2 S/5	22	Silty Loam: Brown, med very stiff, very moist,	dium stiff to	410.8				
A-4.			8 9 12	0.7 S/5	22	A-4.				4 4 5	0.2 S/10	29



Division of Highways SCI Engineering, Inc.

SOIL BORING LOG

Page <u>2</u> of <u>2</u>

Date 05/12/21

ROUTE	FAI 270	DESC	RIPTIO	N		-270 over the Mississipp	pi River LC	GGED BY SCI
SECTION	60B-1		LOCAT		Roady	vay, SEC. 30, TWP. 4N, 3.76523964 Long -90.144	RNG. 9W	
	Madison D	RILLING ME	THOD			FA, Mud Rotary		Automatic
Station	060-0350 (EB) 806+89.23	E	L O	U C S	M 0 1	Surface Water Elev. Stream Bed Elev.	ft ft	
BORING NO Station Offset	B-146 1888+76.70 43.2 ft L (EB)	H	S	Qu	S T	Groundwater Elev.: First Encounter Upon Completion	<u></u>	
Ground Surfa	ce Elev. 447.8	ft (ft) (/6")	(tsf)	(%)	After Hrs.	ft	
Silty Loam: Bro very stiff, very n A-4. <i>(continued</i>	wn, medium stiff to noist,)							
			3 2 5 3	NC	35			
Moist, medium		<u>398.6</u> 	7 12 0 12	3.3 P	28			
Boring terminat	ted at 50.0 feet.							



Division of Highways SCI Engineering, Inc.

SOIL BORING LOG

Page <u>1</u> of <u>1</u>

Date 04/22/21

ROUTE FAI 270	DE	SCR	IPTION	۱	ŀ	-270 over the Mississippi River	LC	OGGE	ED BY	S	CI
SECTION 60B-1		_ เ	OCAT	10N	Roadw	/ay, SEC. 30, TWP. 4N, RNG. 9W 3.76549703 Long -90.14434293					
COUNTY Madison DF	RILLING	MET	THOD			FA, Mud Rotary HAMMER	IYPE .		Auto	matic	
STRUCT. NO. 060-0350 (EB) Station 806+89.23 BORING NO. B-147		D E P T	B L O W	U C S	M O I S	Surface Water Elev Stream Bed Elev Groundwater Elev.:	_ ft _ ft	D E P T	B L O W	U C S	M O I S
BORING NO. B-147 Station 1888+81.31 Offset 139.5 ft L (EB)		н	S	Qu	Т	First Encounter 408.9 Upon Completion	_ft ⊻ ft	н	S	Qu	Т
Ground Surface Elev. 417.4	ft	(ft)	(/6")	(tsf)	(%)	After <u>24</u> Hrs. <u>411.4</u>	_ ft ⊻	(ft)	(/6'')	(tsf)	(%)
Clay: Dark gray, very stiff, moist, fill, A-7.						Sandy Loam: Gray, and brown, fine to coarse grained, medium dense,					
Atterberg Limits test performed.			4 6 10	5.2 S/10	25	moist, A-1. Sand: Gray, coarse grained, medium dense to loose, moist,	<u>395.9</u>		4 8 9	NC	
	413.9					A-1.					
Sand: Dark gray, fine grained, moist, fill, A-3	4 <u>13.4</u>		11 5 8	4.5 S/15	29				4	NC	
Clay: Dark gray, stiff, moist, fill, A-7.	_4 <u>12.4</u>	5	0					-25	6		
Silty Loam: Light gray, medium stiff, moist,		<u> </u>	4			Fine to coarse grained.			4		
A-4.	400.0		3	NC	20				7 10	NC	
Silt: Gray, soft, moist, A-4.	409.9								10		
Grain Size Analysis performed.		¥	2	NC	31				6 4	NC	
	406.4	<u>-10</u>	1			Boring terminated at 30.0 feet. Borehole caved in at 20 feet after 24 hours.	387.4	-30	4		
Silty Loam: Gray, medium stiff, moist, A-4.			3 4 2	NC	28						
	403.4		1	NO							
Sandy Loam: Gray, fine grained, loose, moist, A-3.		<u>-15</u>	4 5	NC				- <u>35</u>			
	399.9		4 5 6	NC							
Silt: Gray, soft, moist, A-4.			1								
	397.4	-20	1 2	NC	44			-40			



Division of Highways SCI Engineering, Inc.

SOIL BORING LOG

Page <u>1</u> of <u>2</u>

Date 06/03/21

ROUTE FAI 27	<u>)</u>	ESCR	RIPTION	N	ŀ	-270 over the Mississipp	oi River	LC	OGGE	ED BY	<u> </u>	CI
SECTION 6	0B-1	I	OCAT	ION	Roadw	vay, SEC. 30, TWP. 4N, 3.76527985 Long -90.142	RNG. 9W					
COUNTY Madison	DRILLING	MET	THOD			FA, Mud Rotary		TYPE		Auto	matic	
STRUCT. NO. 060-03 Station 806+	50 (EB) 89.23	D E P	B L O	U C S	M O I	Surface Water Elev. Stream Bed Elev.		_ ft _ ft	D E P	B L O	U C S	M O I
BORING NOB- Station1892+ Offset42.5 ft Ground Surface Elev	<u>∙87.25</u> R (EB)	T H (ft)	W S (/6")	Qu (tsf)	S T	Groundwater Elev.: First Encounter Upon Completion After Hrs.	431.1	ft	T H (ft)	W S (/6")	Qu (tsf)	S T (%)
Concrete.			-			Silty Loam: Brown, ve						
Asphalt Crushed rock. Sandy Clay: Dark brown, h moist fill	441.1 440 <u>.8</u> 440.1 ard,	-	23 27 19	>4.5 P		A-4. (continued)				7 13 13	0.5 S/10	23
moist, fill, A-4.			-			Clay: Brown, stiff, moi		4 <u>19.1</u>				
			17 11 18	>4.5 P		A-7. Atterberg Limits test p			-25	5 7 11	4.5 B/20	26
Crushed rock: with crushe	436.6	· —	-			Clay Loam: Brown, st	iff, moist, fill,	416.6				
asphalt, concrete, and tras	h, fill.		4 6 7	NC		A-7.				6 9 9	2.6 S/10	21
Silty Loam: Brown, very sti fill, A-4.	4 <u>34.1</u> f, moist,		7	NC		Silty Clay Loam: Brow fill, A-6.	n, stiff, moist,	<u>414.1</u>		4	NC	
	431.6	-10	13 13		18				-30	3 8		28
Clay Loam: Brown, very sti fill, A-4.	ff, moist,	⊻	3 8 11	2.2 S/10	17	Silty Clay Loam: Brow fill, A-6.	n, stiff, moist,	<u>410.1</u>				
Sandy Loam: Brown, fine of medium dense, moist, fill, A-4.	428.1 jrained,		3 8 13	0.4 S/10	15				-35	2 7 6	3.7 S/10	23
			12 6 7	2.0 P	22	Sandy Loam: Brown,	fine grained	404.6				
Silty Loam: Brown, very stit	f, moist,		6			Medium dense, very n A-3.				4		
A-4.		-20	8 14	0.9 S/10	27				-40	8 10	NC	



Division of Highways SCI Engineering, Inc.

SOIL BORING LOG

Page <u>2</u> of <u>2</u>

Date 06/03/21

ROUTE	FAI 270	DE	SCR	RIPTION	۱	ŀ	-270 over the Mississipp	i River	_ LOGG	ED BY S	CI
SECTION	60B-1		_ เ	_OCAT	10N	Roadw	vay, SEC. 30, TWP. 4N, 1 3.76527985 Long -90.142	RNG. 9W			
	Madison DR						FA, Mud Rotary		PE	Automatic	
STRUCT. NO. Station	060-0350 (EB) 806+89.23		D E P	B L O	U C S	M O I	Surface Water Elev. Stream Bed Elev.	f f	ït ït		
Station Offset	B-152 1892+87.25 42.5 ft R (EB) ce Elev. 442.1	 ft	T H (ft)	W S (/6")	Qu (tsf)	S T (%)	Groundwater Elev.: First Encounter Upon Completion After Hrs.	<u>431.1</u> f	ť		
Sandy Loam: E	Brown, fine grained, , very moist to wet,	n				(70)		,	L		
		205.4	45	5 6 7	NC						
Silty Loam: Bro moist, A-4.	wn, medium stiff,	<u>395.1</u>		4							
		392.1	-50	2	<0.25 P						
Boring backfille	ted at 50.0 feet. d with 2 bags of and capped with	002.1									



Division of Highways SCI Engineering, Inc.

SOIL BORING LOG

Page <u>1</u> of <u>1</u>

Date 04/20/21

ROUTE FAI 270	DE	SCR	IPTION	۱	ŀ	-270 over the Mississip	pi River	L(OGGE	ED BY	S	CI
SECTION 60B-1		_ L	OCAT	10N	Roadw Lat 38	vay, SEC. 30, TWP. 4N, 3.76501932 Long -90.14	, RNG. 9W 275313					
COUNTY Madison DR						FA, Mud Rotary						
STRUCT. NO. 060-0350 (EB) Station 806+89.23		D E P	B L O	U C S	M O I	Surface Water Elev. Stream Bed Elev.		_ ft _ ft	D E P	B L O	U C S	M O I
BORING NO. B-153 Station 1892+80.16 Offset 137.8 ft R (EB)		T H	W S	Qu	S T	Upon Completion	None.	ft	T H	W S	Qu	S T
Ground Surface Elev. 439.3	ft	(11)	(/6")	(tsf)	(%)	After <u>72</u> Hrs.	417.3	_ ft ¥_	(ft)	(/6")	(tsf)	(%)
Silty Clay Loam: Brown, moist, fill, A-6.						Sand: Brown, fine gra dense, very moist to v A-3. <i>(continued)</i>	ainea, meaium wet,					
Clay: Brown, stiff, moist, fill, A-7 Loam: Brown, stiff, moist, fill,	437.8 437.3		1 3 6	0.9 B/20	35	Trace organics.			¥	2 7 9	NC	
A-3. <i>Grain Size Analysis performed.</i>	435.3		4							8		
Clay: Brown, stiff, moist, fill, A-7. Sand: Brown, fine grained, moist,	434.8		5 7	2.4 B/20	37	Coarse sand deposit gravel.	with trace fine		-25	12 14	NC	
fill, A-3.	432.8		3							11		
Clay: Brown, stiff, moist, fill, A-7. Atterberg Limits test performed.		- <u> </u>	4 5	2.5 P	29	Organic deposit - app inches.	roximately 2			9 6	NC	
						Sandy Loam: Brown, very moist to wet,	fine grained,	411.3				
Gray.			3	3.2 S/10	33	A-3. Sand: Brown, fine gra	 ained, medium	410.3		9 6	NC	
Brown.	428.8	<u>-10</u>	5			dense, very moist to v A-3.	wet,	409.3	- <u>30</u>	8		
Silty Loam: Brown, stiff, moist, A-4.			2 4 5	NC	33	Trace shells. Boring terminated at 3	30.0 feet.					
		- <u>15</u>	3 4 6	0.5 P	37				-35			
Sandy Loam: Brown, fine grained, medium dense, very moist to wet, A-3.	423.8		5	NC								
Grain Size Analysis performed.	10.1.5		8 10									
Sand: Brown, fine grained, medium dense, very moist to wet,	4 <u>21.3</u>		5	NC								
A-3.		-20	6 5	NC					-40			



Division of Highways SCI Engineering, Inc.

SOIL BORING LOG

Page <u>1</u> of <u>2</u>

Date 05/11/21

ROUTEFA	AI 270	DE	SCR	IPTION	۱	ŀ	-270 over the Mississippi	River	LC	OGGE	ED BY	S	CI
SECTION	60B-1		_ L	.OCAT	10N	Roadw	/ay, SEC. 30, TWP. 4N, F 3.76548559 Long -90.1428	RNG. 9W					
COUNTY Madi	son DR	ILLING	MET	THOD			FA, Mud Rotary		YPE		Auto	matic	
STRUCT. NO06	60-0350 (EB) 806+89.23		D E P	B L O	U C S	M O I	Surface Water Elev Stream Bed Elev		ft ft	D E P	B L O	U C S	М О І
BORING NO	B-154 892+85.77 4.3 ft L (EB)		T H		Qu (tsf)	S T (%)	Groundwater Elev.: First Encounter _ Upon Completion _		ft	T H (ft)	W S (/6")	Qu (tsf)	S T (%)
Concrete	. <u>449.0</u>	n	(14)	(, , ,		(70)	Silty Clay: Brown, very		. 11	(14)	(10)	((0))	(70)
Crushed rock.		447.9		13 20 13	4.5 P	17	moist, fill, A-6. Trace coarse gravel.				5 7 11	4.0 S/10	18
Silty Clay Loam: Brow stiff, moist, fill, A-7.				7							3		
Particle Size Analysis	performed.		5	8 8	3.3 S/10	19				-25	3 5	1.9 B	26
Silty Clay: Brown, stiff, A-7.	, moist, fill,	<u>443.5</u>		3 6 6	2.5 P	17	Silty Clay Loam: Brown stiff, moist, fill, A-6.	a, very stiff to	423.5		6 8 11	1.0 S/5	21
			-10	3 6 6	3.0 P	23	With clay mixture.			-30	4 7 5	1.1 S/5	24
Silty Clay: Brown, med stiff, moist, fill, A-6. Trace fine gravel.	dium stiff to	<u>438.5</u>		3 2 4	2.2 S/15	20	Silty Loam: Brown, stif stiff, very moist, A-4.	f to medium	<u>417.0</u>				
Grain Size Analysis pe	erformed.		- <u>15</u>	0 4 5	1.3 S/10	25				- <u>35</u>	5 5 6	NC	25
Silty Clay: Brown, stiff, A-7.	, moist, fill,	<u>433.5</u>		4 4 6	2.1 B	20							
		429.0	-20	5 5 8	2.9 B	20				-40	1 3 3	NC	32



Division of Highways SCI Engineering, Inc.

SOIL BORING LOG

Page <u>2</u> of <u>2</u>

Date 05/11/21

ROUTE	FAI 270	DE	SCR	IPTION	۱	ŀ	-270 over the Mississipp	oi River	Logg	ED BY	SCI
SECTION	60B-1		_ L	OCAT		Roadw	/ay, SEC. 30, TWP. 4N, 3.76548559 Long -90.142	RNG. 9W			
	Madison DR	ILLING	MET	THOD			FA, Mud Rotary		YPE	Automa	atic
STRUCT. NO. Station	060-0350 (EB) 806+89.23		D E P	B L O	U C S	M O I	Surface Water Elev. Stream Bed Elev.		ft ft		
Station Offset	B-154 1892+85.77 34.3 ft L (EB) ice Elev. 449.0	ft	T H (ft)	W S (/6")	Qu (tsf)	S T (%)		None.	ft		
Silty Loam: Bro stiff, very moist A-4. (continued Sand: Brown, dense, very mo	own, stiff to medium	n									
A-3.			-45	10 8 10	NC						
Silty Loam: Br	own, stiff, very moist	402.0									
to wet, A-4.	, , ,			2	0.3	47					
Boring termina	ted at 50.0 feet.	399.0	-50	2 8	P	47					
			55 								



Division of Highways SCI Engineering, Inc.

SOIL BORING LOG

Page <u>1</u> of <u>1</u>

Date 04/22/21

ROUTE	FAI 270	DE	SCR	RIPTIO	N	ļ	-270 over the Mississip	pi River	L(DGGE	ED BY	S	CI
SECTION	60B-1		_ L	-OCAT	ION	Roady	vay, SEC. 30, TWP. 4N, 3.76577572 Long -90.14	RNG. 9W					
COUNTY	Madison DF	RILLING	MET	THOD			FA, Mud Rotary		TYPE		Auto	omatic	
STRUCT. NO. Station	060-0350 (EB) 806+89.23		D E P	B L O	U C S	M O I	Surface Water Elev. Stream Bed Elev.		_ ft _ ft	D E P	B L O	U C S	M O I
BORING NO Station Offset	B-155 1892+83.21 142.5 ft L (EB)		T H		Qu	S T	Groundwater Elev.: First Encounter Upon Completion		_ ft	T H	W S	Qu	S T
Ground Surfa	ce Elev. 418.6	ft	(ft)	(/6")	(tsf)	(%)	After <u>24</u> Hrs.	397.6	_ ft ⊻	(ft)	(/6'')	(tsf)	(%)
Silt: Gray, med moist. A-4.	ium stiff to soft,			-			Sandy Loam: Brown, medium dense, moist A-3. <i>(continued)</i>	fine grained,		V			
	lysis performed.			4	<0.25						5	NC	
				4	P	17					9 12		
				2					395.6		12		
			_	1			Sand: Gray, fine to co loose to medium dens	arse grained,	<u>395.0</u>		3		
				2	<0.25 P	24	A-1.				4	NC	
			-5	2	F					-25	4		
				1							5		
				1	<0.25 P	31					7	NC	
		411.1		2	' '						11		
Silty Loam: Gra	ay, medium stiff,			-									
A-4.				3							8		
				3	NC	30					10	NC	
		408.6	-10	3					388.6	-30	10		
Silt: Gray, med moist,	ium stiff to soft,						Boring terminated at 3 Borehole caved in at 3	30.0 feet.					
A-4.							24 hours.						
				3	NC	41							
				3									
Croin Size Are	lucia porformed									_			
Grain Size Ana	lysis performed.			2	NC	37							
			-15							-35			
				1	NC								
				2 2		33							
L		399.6		2	NC								
				6						_			
			-20	7						-40			



Division of Highways SCI Engineering, Inc.

SOIL BORING LOG

Page <u>1</u> of <u>2</u>

Date 06/04/21

ROUTE FAI 270	DE	SCR	RIPTION	۱	ŀ	-270 over the Mississippi	River	LC	OGGE	D BY	S	CI
SECTION 60B-1		_ L	OCAT	10N	Roadw Lat 38	/ay, SEC. 30, TWP. 4N, F 3.76545643 Long -90.1409	RNG. 9W					
COUNTY Madison DR	ILLING	MET	THOD			FA, Mud Rotary		TYPE		Auto	matic	
STRUCT. NO. 060-0350 (EB) Station 806+89.23		D E P	B L O	U C S	M O I	Surface Water Elev Stream Bed Elev		_ ft _ ft	D E P	B L O	U C S	M O I
BORING NO. B-160 Station 1898+33.46 Offset 51.3 ft R (EB)		T H	W S (/6'')	Qu (tef)	S T (%)	Upon Completion _	None.	ft	T H	W S (/6")	Qu	S T
Ground Surface Elev. 448.8 Concrete.	ft	(ft)	(/0)	(tsf)	(70)	After Hrs			(ft)	(/0)	(tsf)	(%)
Asphalt.	4 <u>47.8</u> 4 <u>47.5</u>		16			Sandy Loam: Brown, v moist, fill,	ery stiff,	420.5		8		
Silty Clay Loam: Brown, medium	_446.8		13 6	1.5 P		A-4.				18 21	0.7 S/10	20
stiff, moist, fill, A-7. <i>Grain Size Analysis performed.</i>						Sandy Clay Loam: Bro	wn, very stiff,	425.8				
	_444.3		2 4 6	1.7 S/10	19	A-6.			-25	6 7 12	1.8 S/5	21
A-4. Clay: Gray, moist, fill,	4 <u>43.3</u>	<u>-</u> _										
A-7. Silty Clay Loam: Brown, stiff, moist, with silty clay, fill, A-7.	442.3		4 5 6	3.2 S/15	20					4 7 11	1.1 S/15	24
Clay: Brown, stiff, moist, fill,	4 <u>39.8</u>		3	2.0	25					13 12	2.5	17
A-7.	438.3	-10		B/20					-30	17	P	
Silty Loam: Brown, stiff, moist, fill, A-7.			3 5 7	2.1 S/15	21							
Grain Size Analysis performed. Sandy Loam: Brown, medium dense, moist, fill,	_434.3	- <u>15</u>	6 6 13	0.7 S/10	23	Clay: Brown, moist, fill, A-7. Sandy Loam: Brown, n	i	<u>414.8</u> <u>414.3</u>	-35	6 7 16	2.1 S/10	22
A-3.			7	0.0		dense, moist, fill, A-3.						
	100.0		11 12	0.2 S/10	23							
Clay Loam: Brown, stiff, moist, with sandy loam, fill,	4 <u>30.8</u>		3			Clay: Brown, moist, A-7.		4 <u>10.8</u>		5		
A-7.		-20	3	0.6 S/15	23	Sandy Loam: Brown, n	nedium — — —	409.3 408.8	-40	7 7	3.6 S/10	25



Division of Highways SCI Engineering, Inc.

SOIL BORING LOG

Page <u>2</u> of <u>2</u>

Date 06/04/21

ROUTE	FAI 270	DE	ESCR	IPTION	N	ļ	-270 over the Mississipp	i River	LOGGED BY	SCI
SECTION	60B-1		_ L	OCAT	10N	Roadw	vay, SEC. 30, TWP. 4N, 3.76545643 Long -90.140	RNG. 9W		
	Madison DR						FA, Mud Rotary		EAutomati	C
STRUCT. NO.	060-0350 (EB) 806+89.23		D E	B L	U C	M	Surface Water Elev. Stream Bed Elev.	ft ft		
BORING NO Station Offset	B-160 1898+33.46 51.3 ft R (EB)		P T H	O W S	S Qu	I S T	Groundwater Elev.: First Encounter Upon Completion	None. ft		
	ce Elev. 448.8	ft	(ft)	(/6")	(tsf)	(%)	After Hrs.	ft		
dense, moist, A-3. Silty Loam: Bro A-4.	wn, very moist,									
Silty Clay Loam stiff, moist, A-7.	: Brown, medium	_404.3	45	2 3 5	1.6 S/10	35				
Sand: Brown, f very moist to w A-3.	ine grained, dense, — et,	_401.3		10	NC					
Boring backfille	ted at 50.0 feet. d with 2 bags of and capped with	398.8	 							



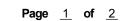
Division of Highways SCI Engineering, Inc.

SOIL BORING LOG

Page <u>1</u> of <u>1</u>

Date 04/20/21

ROUTE FAI 270	DE	SCR	IPTION	N	ŀ	-270 over the Mississip	pi River	L(OGGE	ED BY	S	CI
SECTION 60B-1		_ L	OCAT	ION	Roadw	vay, SEC. 30, TWP. 4N, 3.76499848 Long -90.14	, RNG. 9W					
COUNTY <u>Madison</u> DR	ILLING	MET	HOD			FA, Mud Rotary		TYPE		Auto	matic	
STRUCT. NO. 060-0350 (EB) Station 806+89.23		D E P	B L O	U C S	M O I	Surface Water Elev. Stream Bed Elev.		_ ft _ ft	D E P	B L O	U C S	M O I
BORING NO. B-161 Station 1898+09.30 Offset 217.1 ft R (EB)		T H	W S	Qu	S T	Groundwater Elev.: First Encounter Upon Completion		ft	T H	W S	Qu	S T
Ground Surface Elev. <u>429.4</u> Silty Clay Loam: Brown, stiff, moist,	ft	(ft)	(/6")	(tsf)	(%)	After <u>72</u> Hrs. Sand: Brown, fine gra			(ft)	(/6")	(tsf)	(%)
fill,						dense, moist,	anca, mealam					
A-6. Grain Size Analysis performed.			4 5 5	4.5 P	18	A-3.				3 4 6	NC	
Silty Loam: Brown, medium stiff,	425.4		3	NC	20	Trace fine gravel observed of sample.	erved on top			6	NC	
dry to moist, A-4.		-5	4		20				-25	11		
			2 3 3	NC	10					4 6 8	NC	
			2	1.5	24					7	NC	
		-10	~	S/10	24	Dening terminated at (20.0 faat	399.4	-30			
Clay Loam: Brown, moist, A-7.			2			Boring terminated at 3 Borehole caved in at 3 72 hours.	24.5 feet after					
Silty Loam: Brown, stiff, moist, A-4.	417.4		3 6	0.6 B/20	37							
Grain Size Analysis performed. Sand: Brown, fine grained, medium dense, moist,	416.4		6	NC								
A-3.		-15	7 7						- <u>35</u>			
			4 6 5	NC								
Very loose. Grain Size Analysis performed.			2	NC								
With organics.	409.4	-20	1 1						-40			



R

Illinois Department of Transportation

Division of Highways SCI Engineering, Inc.

SOIL BORING LOG

Date 05/11/21

	AI 270	DE	ESCR	IPTION	۱	ŀ	-270 over the Mississipp	i River	LC	OGGE	ED BY	S	CI
SECTION	60B-1		_ L	.OCAT	10N	Roadw	vay, SEC. 30, TWP. 4N, 1 3.76565144 Long -90.140	RNG. 9W					
COUNTY Mad	dison DRI	LLING	MET	HOD			FA, Mud Rotary		IYPE .		Auto	matic	
STRUCT. NO	060-0350 (EB) 806+89.23		D E P	B L O	U C S	M O I	Surface Water Elev. Stream Bed Elev.		_ ft _ ft	D E P	B L O	U C S	M O I
BORING NO Station Offset Ground Surface Ele	<u>1898+35.23</u> 19.4 ft L (EB)		T H (ft)	W S	Qu (tsf)	S T	Groundwater Elev.: First Encounter Upon Completion After Hrs.		ft	T H (ft)	W S (/6")	Qu (tsf)	S T (%)
Concrete.	ev. <u>430.7</u>	_ n	,	()	(101)	(70)	Silty Clay: Brown, med	ium stiff to	_ n	,	(,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	(,	(70)
Crushed rock.		<u>455.6</u> <u>454.2</u>		24 17 14	3.8 P	18	A-7. (continued)				3 4 4	1.6 S/15	25
Sandy Clay Loam: B moist, fill, A-6. Silty Clay Loam: Bro	r	453.4		2							5	5.0	
stiff, moist, fill, A-6. <i>Grain Size Analysis</i>			5	6 7	3.2 S/15	22			431.2	-25	3 6	5.6 B	18
				5			Silty Clay: Brown, very fill,	stiff, moist,			7		
With silt loam mixture organics.	e and trace			5 7	3.6 B	22	A-6.				7 9	5.3 S/10	18
Grain Size Analysis µ	performed.			2	3.5		Clay: Brown, very stiff, A-7.	moist, fill,	428.7		5	2.0	
		_4 <u>46.2</u>	-10	5 9	P	24	With coarse gravel.			-30	9 9	P	19
Clay: Brown, medium fill, A-7.	n stiff, moist,			2 3 5	1.7 B	28							
Atterberg Limits test	performed.			2 3 5	1.3 B	26	Silty Clay Loam: Brown moist, fill, A-6.	n, very stiff,	422.7	-35	5 6 11	2.1 S/10	23
Silty Clay: Brown, mo stiff, moist, fill, A-7.	edium stiff to	<u>441.2</u>		3 3 4	1.4 S/15	22	Sandy Loam: Brown, f	ine, moist, fill,	419.7				
				3 3 6	2.4 S/15	20			417.7		7 6 10	2.0 S/10	24



Division of Highways SCI Engineering, Inc.

SOIL BORING LOG

Page <u>2</u> of <u>2</u>

Date 05/11/21

ROUTE	FAI 270	DE	SCR	IPTION	۱	ŀ	-270 over the Mississipp	i River	LOG	GED BY	SCI
SECTION	60B-1		_ L	OCAT	10N	Roadw	/ay, SEC. 30, TWP. 4N, 1 3.76565144 Long -90.140	RNG. 9W			
	Madison DR	RILLING	MET	THOD			FA, Mud Rotary		YPE	Autom	atic
Station	060-0350 (EB) 806+89.23		D E P	B L O	U C S	M O I	Surface Water Elev. Stream Bed Elev.		ft ft		
BORING NO. Station Offset	B-162 1898+35.23 19.4 ft L (EB) ce Elev. 456.7		T H (ft)	W S (/6")	Qu (tsf)	S T (%)	Upon Completion		ft		
Silty Clay Loam moist, fill, A-6. <i>(continued</i>	n: Brown, very stiff,	n					After Hrs		<u>.</u> n		
			45	555	0.3 P	30					
		406.7	-50	11 11 11	0.4 S/5	27					
Boring termina	ted at 50.0 feet.										



Division of Highways SCI Engineering, Inc.

SOIL BORING LOG

Page <u>1</u> of <u>1</u>

Date 04/22/21

ROUTE FAI 270	DE	ESCR	RIPTIO	N	ŀ	-270 over the Mississip	pi River	L(oggi	ED BY	S	CI
SECTION 60B-1		_ L	LOCAT	ION	Roadw	/ay, SEC. 30, TWP. 4N, 8.76600538 Long -90.14	RNG. 9W					
COUNTY Madison DF	RILLING	MET	THOD			FA, Mud Rotary		TYPE		Auto	omatic	
STRUCT. NO. 060-0350 (EB) Station 806+89.23		D E P	B L O	U C S	M O I	Surface Water Elev. Stream Bed Elev.		_ ft _ ft	D E P	B L O	U C S	М О І
BORING NO. B-163 Station 1898+33.45 Offset 148.8 ft L (EB)		T H	W S	Qu	S T	Groundwater Elev.: First Encounter Upon Completion	410.7	_ ft ⊻ _ ft	T H	W S	Qu	S T
Ground Surface Elev. 419.7	ft	(ft)	(/6")	(tsf)	(%)	After <u>24</u> Hrs.	397.7	_ ft ¥	(ft)	(/6")	(tsf)	(%)
Clay: Brownish-gray, medium stiff, moist, fill.						Sandy Loam: Gray, fi medium dense, moist	ne grained, 					
A-7			4	10		A-3.				6	NC	
Trees and the star star			4	1.0 P	15				<u> </u>	12	NC	
Trace crushed rock.			4							15		
			-			Sand: Gray, fine to co	arse grained.	396.7				
Brown and gray.			3			loose to medium dens	se, moist.			5		
			3	1.4 B/20	18	A-1.				5	NC	
Silty Clay: Gray with brown,	<u>414.7</u>	-5	3	D/20					-25	6		
modulin oun, moloc												
A-6. Atterberg Limits test performed.			2							5		
Allerberg Limits lest performed.			2	0.6 S/15	19					4	NC	
Silt: Gray, very soft, moist.	412.2		3							2		
A-4.			-									
Grain Size Analysis performed.		•	3							6		
		<u> </u>	1	<0.25 P	35					6	NC	
		-10	1	Р				389.7	-30	7		
			-			Boring terminated at 3 Borehole caved in at 3	30.0 feet.					
			2			24 hours.						
			1	NC	37							
	407.2		2		_							
Sand: Gray, fine to coarse grained, medium dense, moist.												
A-1.			5									
			7	NC								
		-15	6						- <u>35</u>			
	404.2		-									
Sandy Loam: Gray, fine to coarse grained, medium dense, moist.												
A-3.	402.7		5	NC								
Sand: Dark gray, fine grained,	402.7		6									
loose, moist. A-1.												
		_							_			
With organics. Grain Size Analysis performed.			1	NC								
	399.7	-20	1						-40			
	399.1	-20		1	1	UI			-40			



Division of Highways SCI Engineering, Inc.

SOIL BORING LOG

Page <u>1</u> of <u>1</u>

Date 04/19/21

ROUTE FAI 270	DE	ESCR	RIPTION	۱	ŀ	-270 over the Mississipp	oi River	LC	OGGE	ED BY	<u> </u>	CI
SECTION 60B-1		_ เ	OCAT	10N	Roadw Lat 38	/ay, SEC. 30, TWP. 4N, 3.76480848 Long -90.139	RNG. 9W					
COUNTY Madison	ORILLING	MET	THOD			FA, Mud Rotary		TYPE		Auto	matic	
STRUCT. NO. 060-0350 (EB Station 806+89.23)	DE	BL	U C	M O	Surface Water Elev. Stream Bed Elev.		_ ft _ ft	D E	B L	U C	M O
BORING NO. B-169 Station 1903+27.09 Offset 319.1 ft R (EB Ground Surface Elev. 427.3) 5ft	P T H	O W S (/6'')	S Qu (tsf)	І S T (%)	Groundwater Elev.: First Encounter Upon Completion After Hrs.	417.0	_ ft	P T H	O W S (/6")	S Qu (tsf)	I S T (%)
Loam: Brown, very stiff, moist, A-4.	<u> </u>					Sand: Brown, fine gra medium dense, very n	ined, loose to				. ,	. ,
Grain Size Analysis performed.			4 8 10	0.4 S/15	13	A-3. (continued)				5 8 16	NC	
Sand: Gray, fine grained, moist, A-3.	424.5 423.5		4							2		
Clay: Gray, medium stiff, moist, A-7. Gray.	120.0	5	4	2.1 B/20	27				-25	3 4	NC	
Brown. Atterberg Limits test performed. Silty Clay: Brown, medium stiff, moist,	4 <u>21.0</u> 		2 2 6	0.7 B/20	32					4 7 8	NC	
A-6. Sandy Loam: Brown, fine grained medium dense, moist,	4 <u>19.5</u>		4	1.3						2	NC	
A-3.	417.0	_ <u>-10</u> ▼	7 8	P	24	Silty Loam: Gray, stiff, A-4.		398.0 397.5		6 6		
Silty Loam: Brown, medium dense very moist to wet, A-4. <i>Grain Size Analysis performed</i> .	3,		4 5 4	1.5 P	27	Boring terminated at 3	30.0 teet.					
Sand: Brown, fine grained, loose t medium dense, very moist to wet,	413.0 o		2 3 5	2.0 P	31				-35			
A-3. With silty loam deposit from approximately 16.5 to 17 feet.			4 7 7	NC								
		-20	2 5 7	NC					-40			



Division of Highways SCI Engineering, Inc.

SOIL BORING LOG

Page <u>1</u> of <u>2</u>

Date 5/10-11/2021

ROUTE	FAI 270	DE	SCR	IPTION	۱	ŀ	-270 over the Mississipp	oi River	LC	OGGE	ED BY	S	CI
SECTION	60B-1		_ L	.OCAT	10N	Roadw Lat 38	vay, SEC. 30, TWP. 4N, 3.76574409 Long -90.139	RNG. 9W					
COUNTY	Madison DR	RILLING	MET	HOD			FA, Mud Rotary		YPE		Auto	matic	
STRUCT. NO. Station	060-0350 (EB) 806+89.23		D E P	B L O	U C S	M O I	Surface Water Elev. Stream Bed Elev.		ft ft	D E P	B L O	U C S	M O I
BORING NO Station Offset	B-170 1903+80.15 19.0 ft L (EB) ce Elev. 472.8		T H (ft)	W S (/6'')	Qu (tsf)	S T	Groundwater Elev.: First Encounter Upon Completion After Hrs.		ft	T H (ft)	W S (/6")	Qu (tsf)	S T (%)
Concrete.	<u> 472.0</u>	n	(,	,	((0))	(70)	Silty Clay: Brown, stiff		_ 11	(14)	(, •)	(,	(70)
		471.6 470.3		16 17 5	3.0 P	19	moist, fill, A-6. (continued) Poor recovery - sampl not be indicative of ma (possible fall-in).	e in jar may aterials			6 8 10	NC	27
stiff, moist, fill, A-6.	: Brown, medium			3							7		
Particle Size Ar	nalysis performed.		-5	2 4	4.0 P	22				-25	8 9	3.0 S/5	20
Clay Loam: Bro moist, fill, A-7.	wn, medium stiff,	4 <u>67.3</u>		2	4.0		Poor recovery - trace of	coarse gravel.			7	4.5	
	lysis performed.	464.8		2 4	1.8 B	19			444.8		12 12	4.5 P	
Silty Clay: Brow very stiff, moist, A-7. With silty loam		404.0 .		5 8	2.0 S/15	21	Silty Clay Loam: Brow moist, fill, A-6.	n, very stiff,	444.0		6 6	0.8 S/15	21
			-10	8						-30	10		
				4 2 3	1.3 S/10	22	Silty Loam: Brown, ve	ry stiff, moist,	440.8				
			- <u>15</u>	4 6 9	3.0 S/5	18	A-4.			- <u>35</u>	7 7 9	1.8 P	21
Grain Size Anal Trace fine grave				4 6 9	2.3 S/15	18	Sand: Brown, fine gra	ined. dense	435.8				
moist, fill,	n, stiff to very stiff,	454.8		7			to very dense, very mo A-3.	oist, fill,			14		
A-6.			-20	6 7	2.3 S/5	18	With clay lumps and s mixture.	ilty loam		-40	14 16 18	NC	



Division of Highways SCI Engineering, Inc.

SOIL BORING LOG

Page <u>2</u> of <u>2</u>

Date 5/10-11/2021

ROUTE FAI 270	DE	ESCR	RIPTION	N N	ŀ	-270 over the Mississipp	i River	LOGGED	BY SCI
SECTION 60B-1		_ I		ION	Roadw	vay, SEC. 30, TWP. 4N, 3.76574409 Long -90.139	RNG. 9W		
COUNTY Madison D	RILLING	ME	rhod			FA, Mud Rotary		YPE/	Automatic
STRUCT. NO. 060-0350 (EB) Station 806+89.23		D E P	B L O	U C S	M O I	Surface Water Elev. Stream Bed Elev.		ft ft	
BORING NO. B-170 Station 1903+80.15 Offset 19.0 ft L (EB) Ground Surface Elev. 472.8		T H (ft)	W S (/6")	Qu (tsf)	S T (%)	Groundwater Elev.: First Encounter Upon Completion After Hrs.	None.	ft	
Sand: Brown, fine grained, dense to very dense, very moist, fill, A-3. <i>(continued)</i>	"								
		-45	14 21 22	NC					
Condul com Drawn first availand	4 <u>25.8</u>		-						
Sandy Loam: Brown, fine grained, dense, very moist, fill, A-3.									
Trace blade of grass.	422.8		8 7 14	1.4 S/10					
Boring terminated at 50.0 feet.	422.0	-500 							

Appendix B

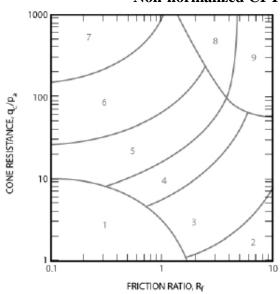
www.sciengineering.com



USE and UNDERSTANDING of CPTu Logs

The CPTu logs show the corrected Tip Resistance (q_t) , Friction (f_s) , Porewater Pressure (U_2) , SPT N_{60} correlation (N_{60}) , and the Soil Behavior interpretation results. The corrected cone tip resistance (q_t) is measured as the maximum force over the projected area of the cone tip. It is a point stress related to the bearing capacity of the soil. The measured uncorrected tip value (q_c) must be corrected for porewater pressure effects (Lunne et al, 1997), especially in clays and silts where porewater pressures typically vary greatly from hydrostatic. The sleeve friction (fs) is used as a measure of soil type and can be expressed by friction ratio (R_F) which is used in the soil behavior classification. The u_2 position element is required for the measurement of penetration porewater pressures and the correction of tip resistance. Calculations of q_t , R_F , and the SPT N_{60} calculation are discussed below.

The estimated stratigraphic profiles included in the CPTu logs are based on relationships between q_t , f_s , and U2 as shown graphically in the figure below.



Non-normalized CPT Soil Behavior Type (SBT) chart

Z	Soil Behavior Type
1	Sensitive, fine grained
2	Organic soils - clay
3	Clay – silty clay to clay
4	Silt mixtures – clayey silt to silty clay
5	Sand mixtures – silty sand to sandy silt
6	Sands – clean sand to silty sand
7	Gravelly sand to dense sand
8	Very stiff sand to clayey sand*
9	Very stiff fine grained*

* Heavily overconsolidated or cemented

 $P_a = atmospheric \ pressure = 100 \ kPa = 1 \ tsf$

Equivalent SPT N60, (blows/ft) Lunne et al. (1997)

$$\frac{(q_0/p_a)}{N_{60}} = 8.5 \text{ X} \qquad \left(1 - \frac{I_c}{4.6}\right)$$

Where $I_c = ((3.47 - \log Q_{t1})2 + (\log R_F + 1.22)2)0.5$ And $Qt_n = ((q_t - sv_o)/p_a) \times (p_a/(s'v_o)n, and$ recalculate I_c , then iterate for n:

n = 0.381 × I_c + 0.05 ×
$$\left(\frac{s_{vo}}{p_a}\right)$$
 = 0.15

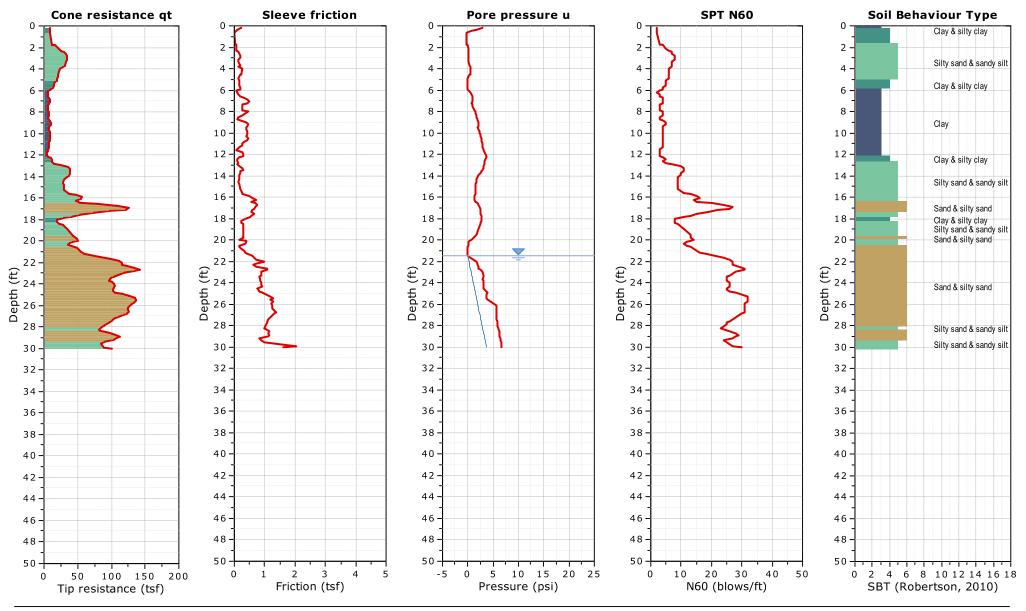
Iterate until the change in n, $\Delta_n < 0.01$

$\label{eq:corrected} \frac{\mbox{Derived Values from CPT}}{\mbox{Corrected cone resistance: } q_t = q_c + u_2(1\mbox{-}a) } \\ \mbox{Friction ratio: } R_f = (f_s/q_t) \ x \ 100\%$



Project: I-270 over Mississippi River: 2017-3167.10 Task 300 Location: Madison County, IL

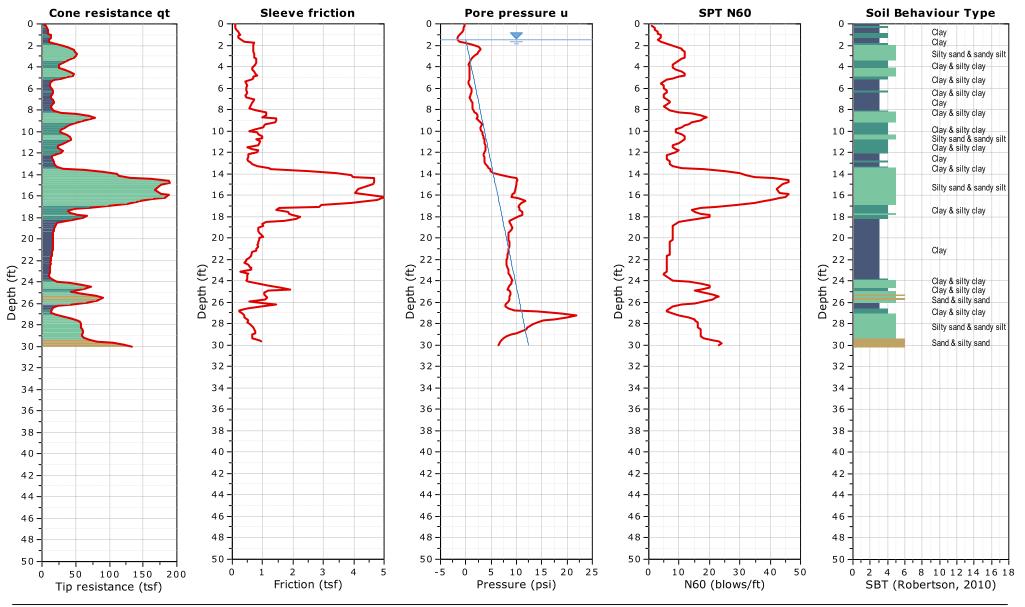
CPT: C-131 Total depth: 30.02 ft, Date: 5/6/2021 Surface Elevation: 419.5 ft Coords: lat 38.763205° lon -90.148111° Section: 30 Township: 4N Range: 9W STA: 1875+46.97 (EB) Offest: 175.83 ft RT





Project: I-270 over Mississippi River: 2017-3167.10 Task 300 Location: Madison County, IL

CPT: C-135 Total depth: 30.02 ft, Date: 5/6/2021 Surface Elevation: 410.1 ft Coords: lat 38.76389° lon -90.146478° Section: 30 Township: 4N Range: 9W STA: 1880+97.37 (EB) Offest: 187.53 ft RT

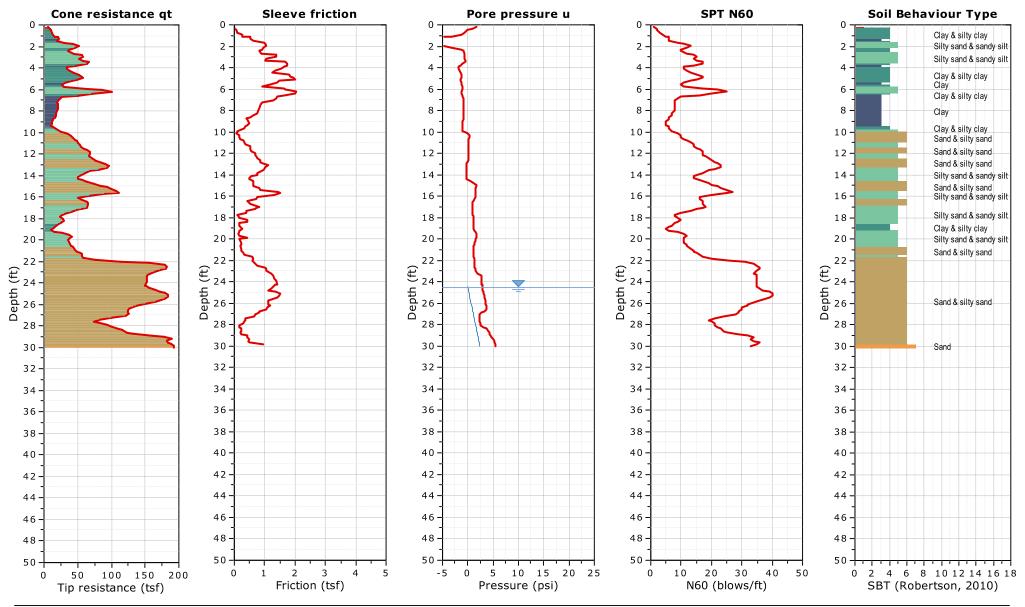


CPeT-IT v.2.1.1.8 - CPTU data presentation & interpretation software - Report created on: 6/21/2021, 2:43:32 PM Project file: \\scieng\shared\OFallon\emtapps\PROJECT FILES\!2017 PROJECTS\2017-3167 I-270 over Mississippi River (185-20)\GS\RGR\CPT DATA 42621\17-3167_CPTALL RGR.cpt



Project: I-270 over Mississippi River: 2017-3167.10 Task 300 Location: Madison County, IL

CPT: C-141 Total depth: 30.02 ft, Date: 5/6/2021 Surface Elevation: 424.6 ft Coords: lat 38.764577° lon -90.144904° Section: 30 Township: 4N Range: 9W STA: 1886+26.43 (EB) Offest: 130.49 ft RT

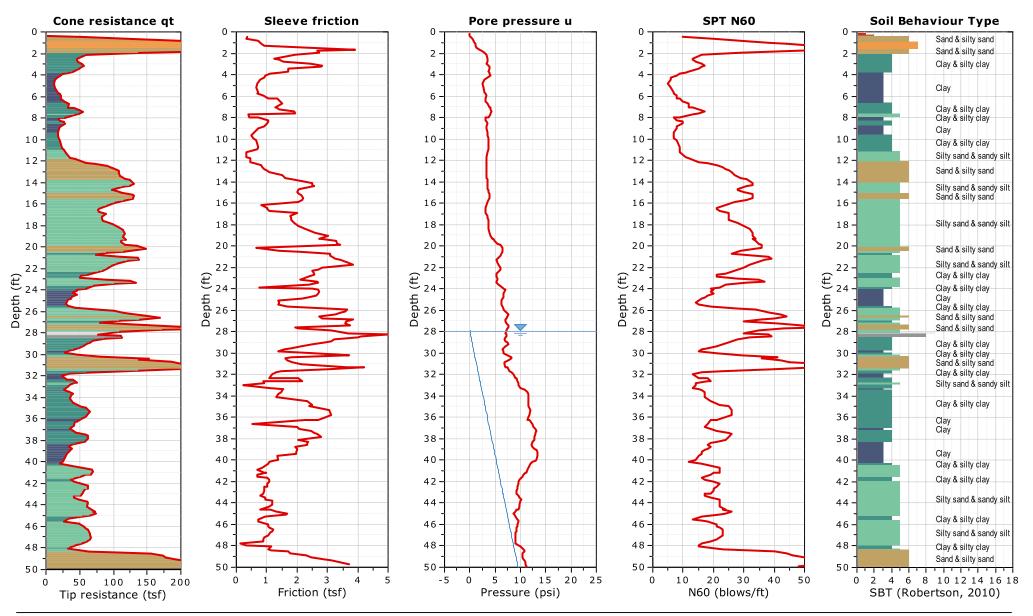


CPeT-IT v.2.1.1.8 - CPTU data presentation & interpretation software - Report created on: 6/21/2021, 2:43:33 PM Project file: \\scieng\shared\OFallon\emtapps\PROJECT FILES\!2017 PROJECTS\2017-3167 I-270 over Mississippi River (185-20)\GS\RGR\CPT DATA 42621\17-3167_CPTALL RGR.cpt



Project: I-270 over Mississippi River: 2017-3167.10 Task 300 Location: Madison County, IL

CPT: C-142 Total depth: 50.03 ft, Date: 5/12/2021 Surface Elevation: 447.2 ft Coords: lat 38.765114° lon -90.145114° Section: 30 Township: 4N Range: 9W STA: 1886+34.66 (EB) Offest: 53.40 ft LT

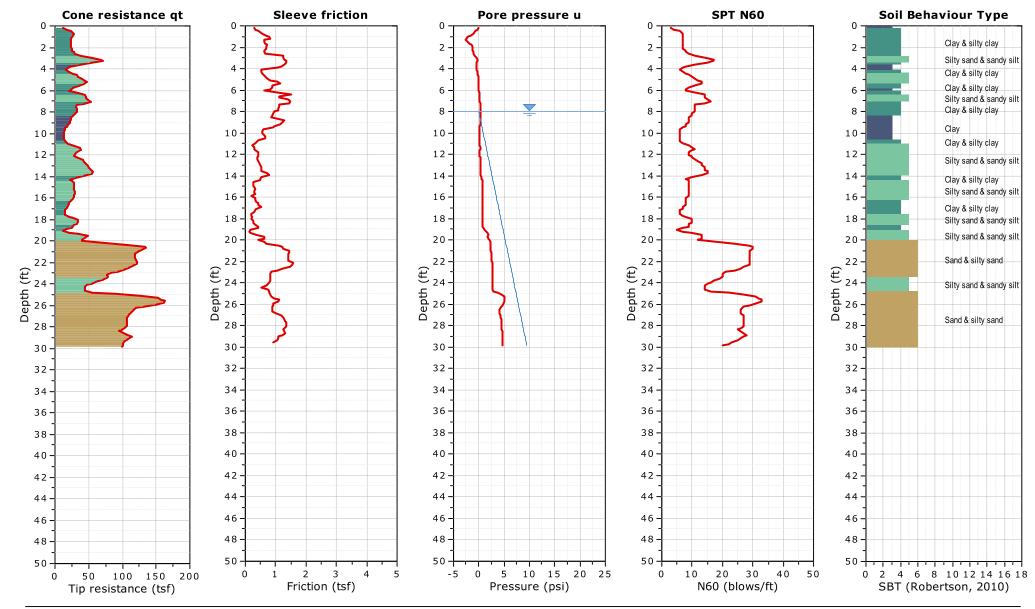


CPeT-IT v.2.1.1.8 - CPTU data presentation & interpretation software - Report created on: 6/21/2021, 2:43:34 PM Project file: \\scieng\shared\OFallon\emtapps\PROJECT FILES\!2017 PROJECTS\2017-3167 I-270 over Mississippi River (185-20)\GS\RGR\CPT DATA 42621\17-3167_CPTALL RGR.cpt



Project: I-270 over Mississippi River: 2017-3167.10 Task 300 Location: Madison County, IL

CPT: C-143 Total depth: 29.86 ft, Date: 5/6/2021 Surface Elevation: 418.5 ft Coords: lat 38.765311° lon -90.145162° Section: 30 Township: 4N Range: 9W STA: 1886+45.43 (EB) Offest: 146.21 ft LT

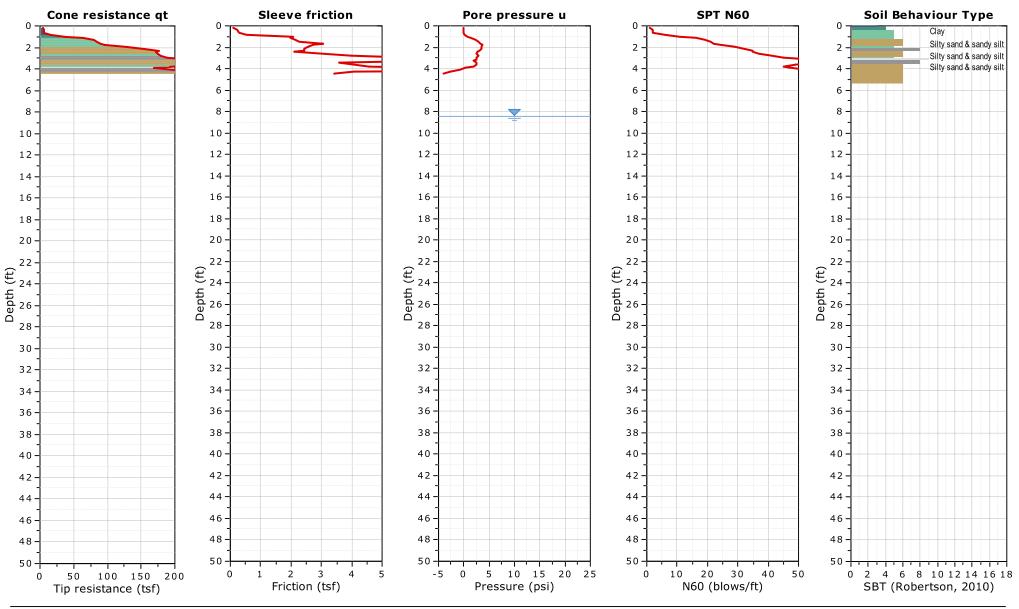


CPeT-IT v.2.1.1.8 - CPTU data presentation & interpretation software - Report created on: 6/21/2021, 2:43:34 PM Project file: \\scieng\shared\OFallon\emtapps\PROJECT FILES\!2017 PROJECTS\2017-3167 I-270 over Mississippi River (185-20)\GS\RGR\CPT DATA 42621\17-3167_CPTALL RGR.cpt



Project: I-270 over Mississippi River: 2017-3167.10 Task 300 Location: Madison County, IL

CPT: C-148 Total depth: 4.43 ft, Date: 6/1/2021 Surface Elevation: 441.7 ft Coords: lat 38.765148° lon -90.143452° Section: 30 Township: 4N Range: 9W STA: 1890+92.17 (EB) Offest: 40.39 ft RT

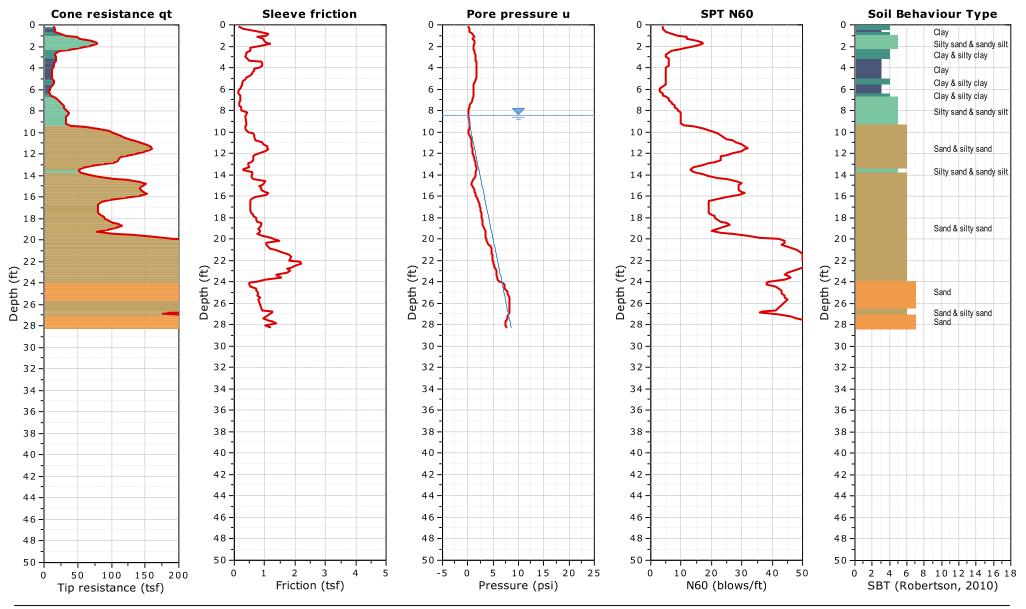


CPeT-IT v.2.1.1.8 - CPTU data presentation & interpretation software - Report created on: 6/21/2021, 2:43:36 PM Project file: \\scieng\shared\OFallon\emtapps\PROJECT FILES\!2017 PROJECTS\2017-3167 I-270 over Mississippi River (185-20)\GS\RGR\CPT DATA 42621\17-3167_CPTALL RGR.cpt



Project: I-270 over Mississippi River: 2017-3167.10 Task 300 Location: Madison County, IL

CPT: C-149 Total depth: 28.22 ft, Date: 5/6/2021 Surface Elevation: 433.8 ft Coords: lat 38.764919° lon -90.143385° Section: 30 Township: 4N Range: 9W STA: 1890+90.75 (EB) Offest: 134.51 ft RT

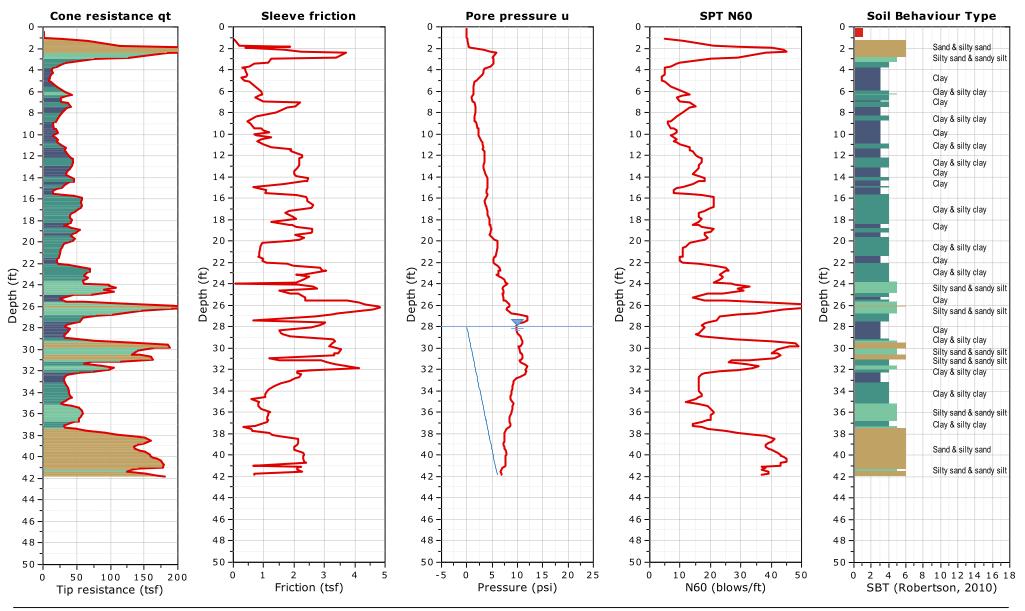


CPeT-IT v.2.1.1.8 - CPTU data presentation & interpretation software - Report created on: 6/21/2021, 2:43:38 PM Project file: \\scieng\shared\OFallon\emtapps\PROJECT FILES\!2017 PROJECTS\2017-3167 I-270 over Mississippi River (185-20)\GS\RGR\CPT DATA 42621\17-3167_CPTALL RGR.cpt



Project: I-270 over Mississippi River: 2017-3167.10 Task 300 Location: Madison County, IL

CPT: C-150 Total depth: 41.83 ft, Date: 5/12/2021 Surface Elevation: 448.4 ft Coords: lat 38.765452° lon -90.143533° Section: 30 Township: 4N Range: 9W STA: 1890+94.99 (EB) Offest: 38.92 ft LT

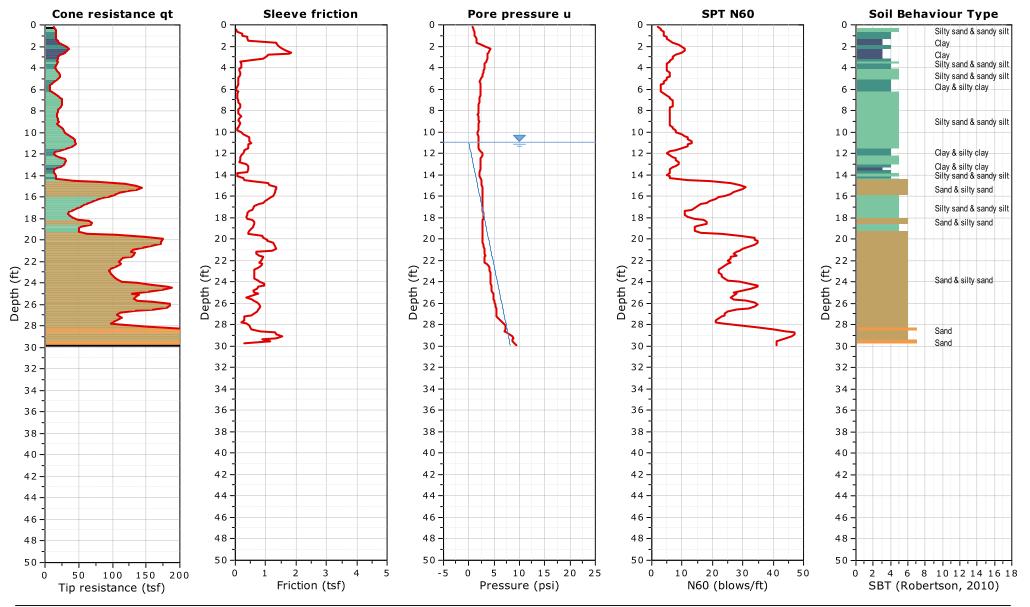


CPeT-IT v.2.1.1.8 - CPTU data presentation & interpretation software - Report created on: 6/21/2021, 2:43:41 PM Project file: \\scieng\shared\OFallon\emtapps\PROJECT FILES\!2017 PROJECTS\2017-3167 I-270 over Mississippi River (185-20)\GS\RGR\CPT DATA 42621\17-3167_CPTALL RGR.cpt



Project: I-270 over Mississippi River: 2017-3167.10 Task 300 Location: Madison County, IL

Total depth: 29.89 ft, Date: 5/6/2021 Surface Elevation: 421.5 ft Coords: lat 38.765614° lon -90.143575° Section: 30 Township: 4N Range: 9W STA: 1890+97.70 (WB) Offest: 124.19 ft LT



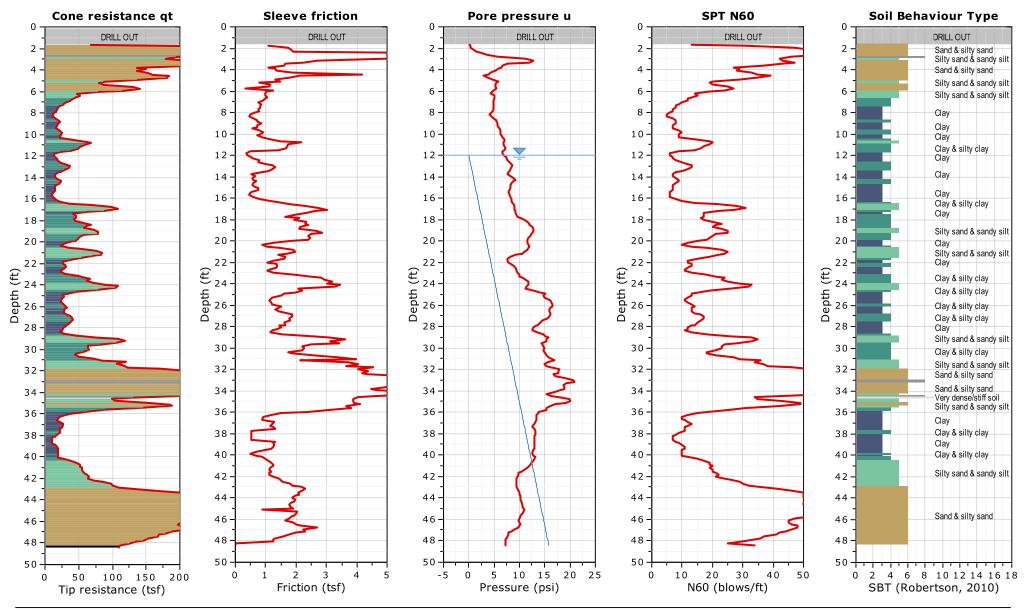
CPeT-IT v.2.1.1.8 - CPTU data presentation & interpretation software - Report created on: 6/21/2021, 2:43:43 PM Project file: \\scieng\shared\OFallon\emtapps\PROJECT FILES\!2017 PROJECTS\2017-3167 I-270 over Mississippi River (185-20)\GS\RGR\CPT DATA 42621\17-3167_CPTALL RGR.cpt

CPT: C-151



Project: I-270 over Mississippi River: 2017-3167.10 Task 300 Location: Madison County, IL

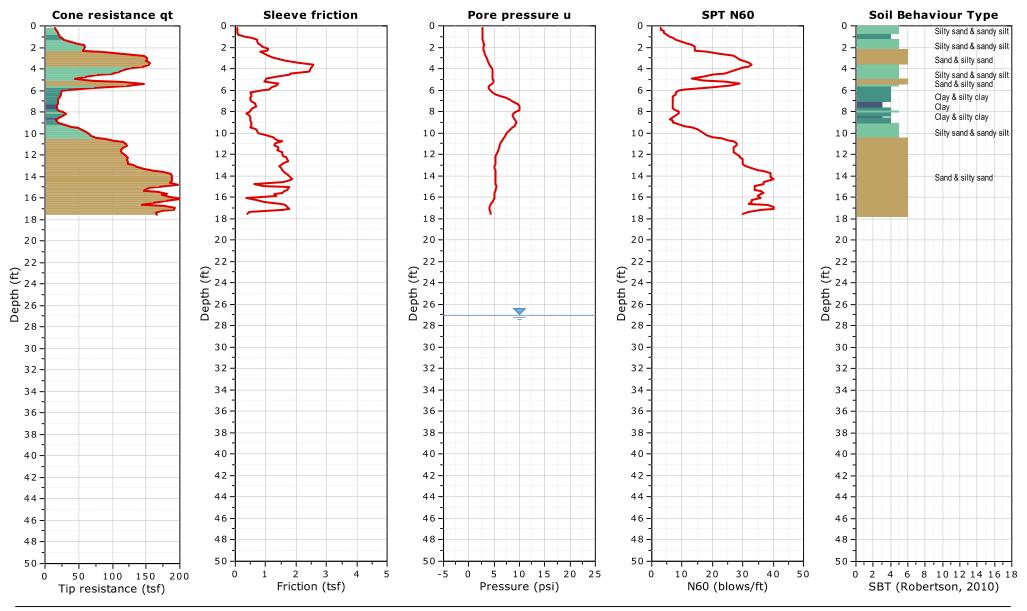
CPT: C-156 Total depth: 48.39 ft, Date: 6/1/2021 Surface Elevation: 443.2 ft Coords: lat 38.765375° lon -90.14196° Section: 30 Township: 4N Range: 9W STA: 1895+30.09 (EB) Offest: 44.90 ft RT





Project: I-270 over Mississippi River: 2017-3167.10 Task 300 Location: Madison County, IL

CPT: C-157 Total depth: 17.55 ft, Date: 5/6/2021 Surface Elevation: 422.0 ft Coords: lat 38.765104° lon -90.141898° Section: 30 Township: 4N Range: 9W STA: 1895+33.70 (EB) Offest: 148.59 ft RT

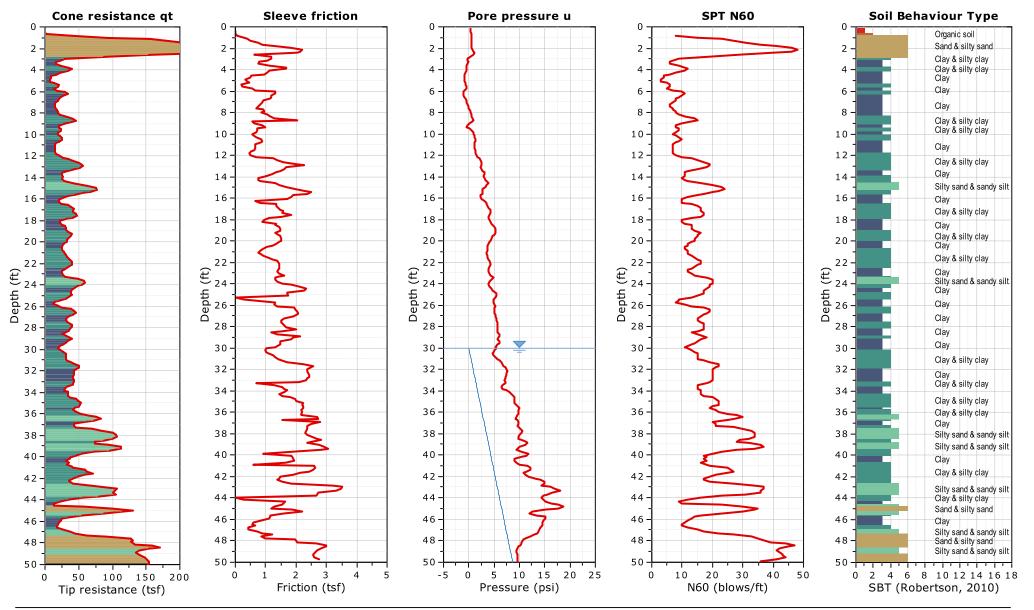


CPeT-IT v.2.1.1.8 - CPTU data presentation & interpretation software - Report created on: 6/21/2021, 2:43:49 PM Project file: \\scieng\shared\OFallon\emtapps\PROJECT FILES\!2017 PROJECTS\2017-3167 I-270 over Mississippi River (185-20)\GS\RGR\CPT DATA 42621\17-3167_CPTALL RGR.cpt



Project: I-270 over Mississippi River: 2017-3167.10 Task 300 Location: Madison County, IL

CPT: C-158 Total depth: 50.03 ft, Date: 5/12/2021 Surface Elevation: 450.5 ft Coords: lat 38.76566° lon -90.142008° Section: 30 Township: 4N Range: 9W STA: 1895+30.70 (WB) Offest: 26.81 ft LT

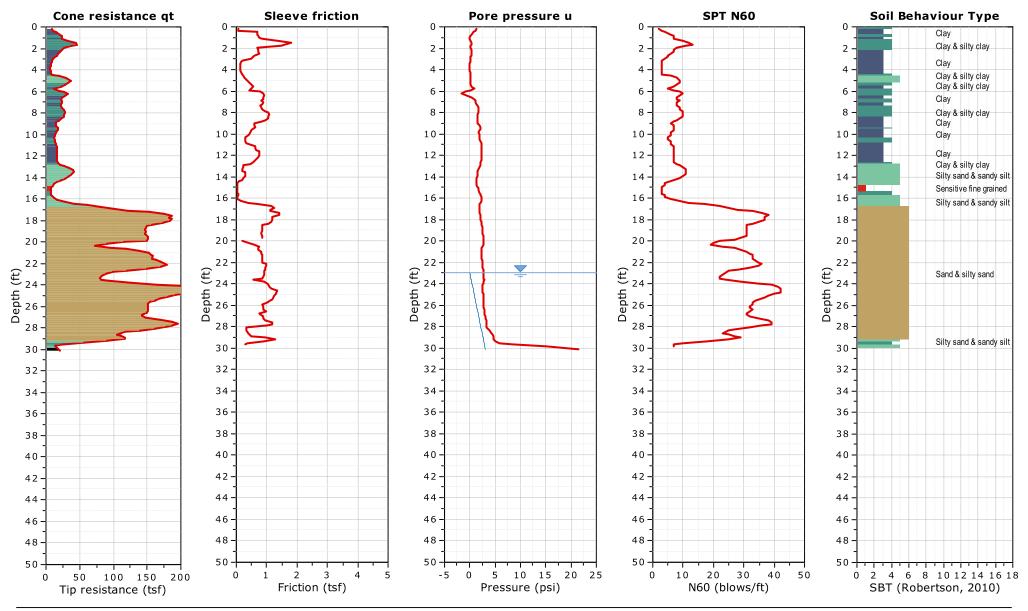


CPeT-IT v.2.1.1.8 - CPTU data presentation & interpretation software - Report created on: 6/21/2021, 2:43:52 PM Project file: \\scieng\shared\OFallon\emtapps\PROJECT FILES\!2017 PROJECTS\2017-3167 I-270 over Mississippi River (185-20)\GS\RGR\CPT DATA 42621\17-3167_CPTALL RGR.cpt



Project: I-270 over Mississippi River: 2017-3167.10 Task 300 Location: Madison County, IL

CPT: C-159 Total depth: 30.12 ft, Date: 5/6/2021 Surface Elevation: 421.0 ft Coords: lat 38.765864° lon -90.142051° Section: 30 Township: 4N Range: 9W STA: 1895+29.67 (EB) Offest: 131.76 ft LT

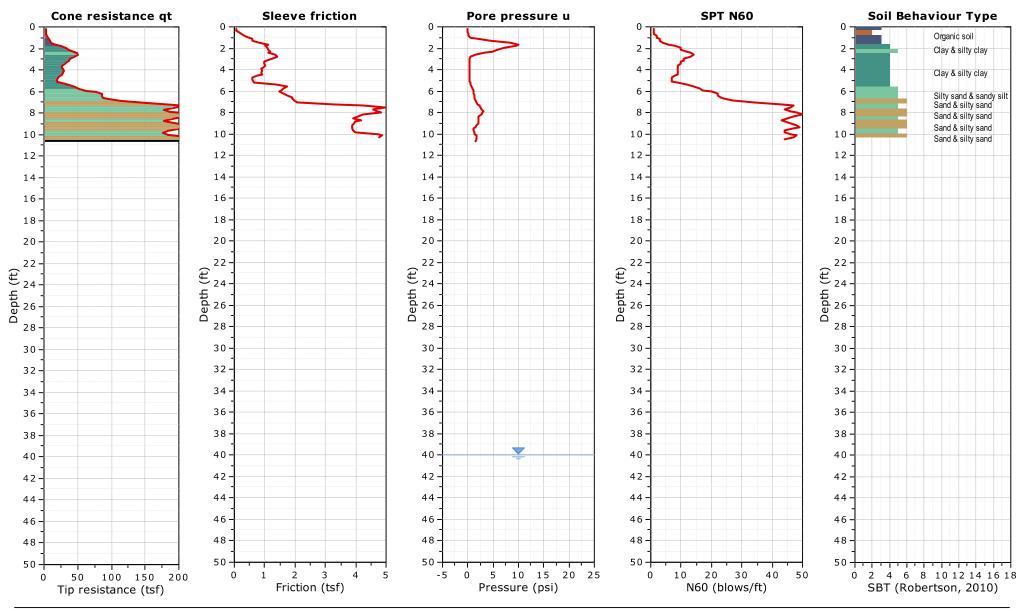


CPeT-IT v.2.1.1.8 - CPTU data presentation & interpretation software - Report created on: 6/21/2021, 2:43:55 PM Project file: \\scieng\shared\OFallon\emtapps\PROJECT FILES\!2017 PROJECTS\2017-3167 I-270 over Mississippi River (185-20)\GS\RGR\CPT DATA 42621\17-3167_CPTALL RGR.cpt



Project: I-270 over Mississippi River: 2017-3167.10 Task 300 Location: Madison County, IL

CPT: C-160 Total depth: 10.66 ft, Date: 6/1/2021 Surface Elevation: 448.9 ft Coords: lat 38.765456° lon -90.140926° Section: 30 Township: 4N Range: 9W STA: 1898+29.63 (EB) Offest: 51.39 ft RT

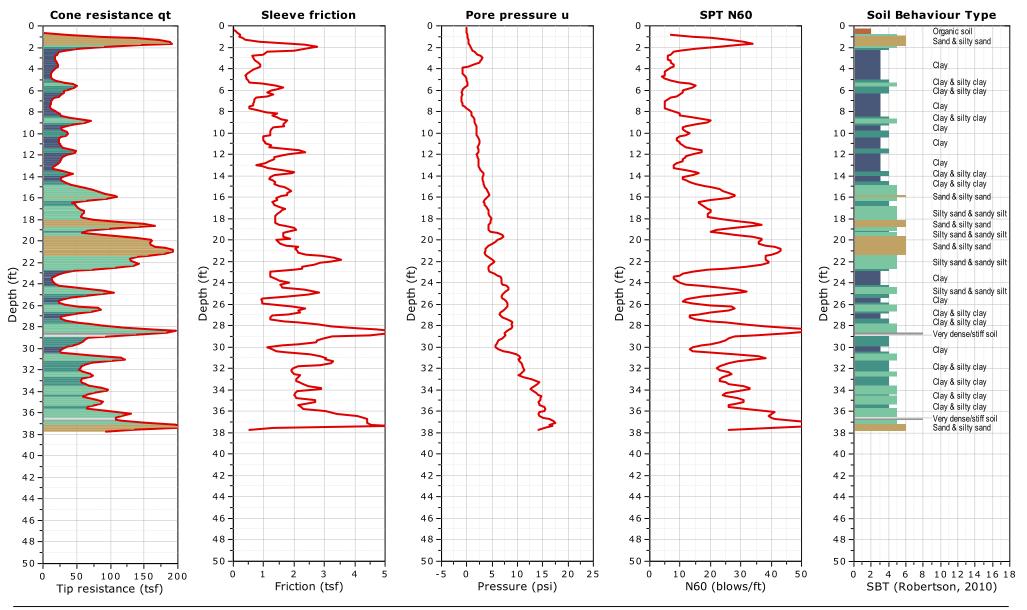


CPeT-IT v.2.1.1.8 - CPTU data presentation & interpretation software - Report created on: 6/21/2021, 2:43:58 PM Project file: \\scieng\shared\OFallon\emtapps\PROJECT FILES\!2017 PROJECTS\2017-3167 I-270 over Mississippi River (185-20)\GS\RGR\CPT DATA 42621\17-3167_CPTALL RGR.cpt



Project: I-270 over Mississippi River: 2017-3167.10 Task 300 Location: Madison County, IL

CPT: C-164 Total depth: 37.73 ft, Date: 6/1/2021 Surface Elevation: 457.6 ft Coords: lat 38.765216° lon -90.139881° Section: 30 Township: 4N Range: 9W STA: 1901+22.56 (EB) Offest: 157.72 ft RT

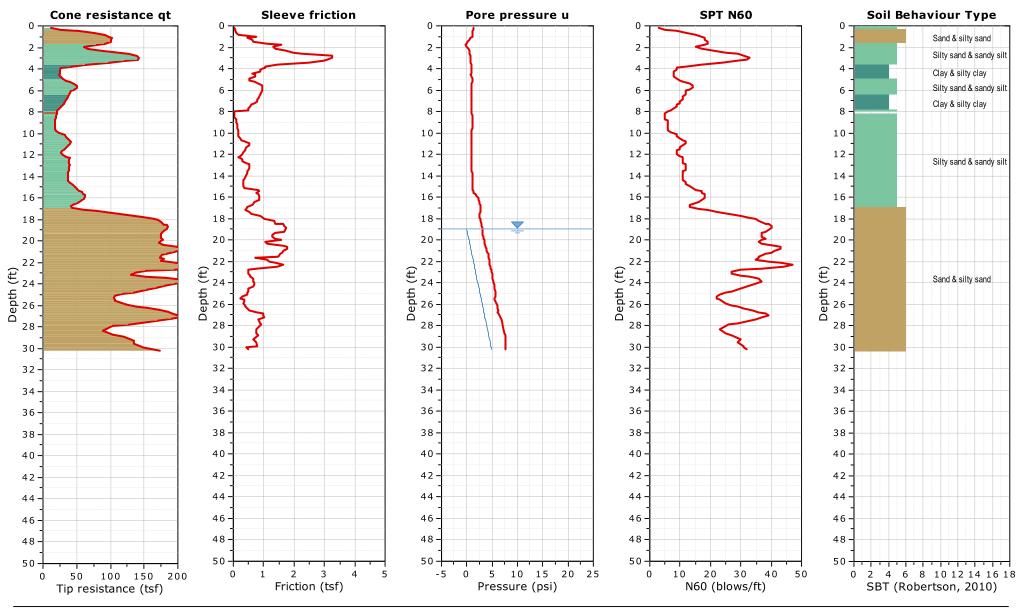


CPeT-IT v.2.1.1.8 - CPTU data presentation & interpretation software - Report created on: 6/21/2021, 2:44:02 PM Project file: \\scieng\shared\OFallon\emtapps\PROJECT FILES\!2017 PROJECTS\2017-3167 I-270 over Mississippi River (185-20)\GS\RGR\CPT DATA 42621\17-3167_CPTALL RGR.cpt



Project: I-270 over Mississippi River: 2017-3167.10 Task 300 Location: Madison County, IL

CPT: C-165 Total depth: 30.22 ft, Date: 5/6/2021 Surface Elevation: 424.3 ft Coords: lat 38.764863° lon -90.13981° Section: 30 Township: 4N Range: 9W STA: 1901+34.90 (EB) Offest: 287.39 ft RT

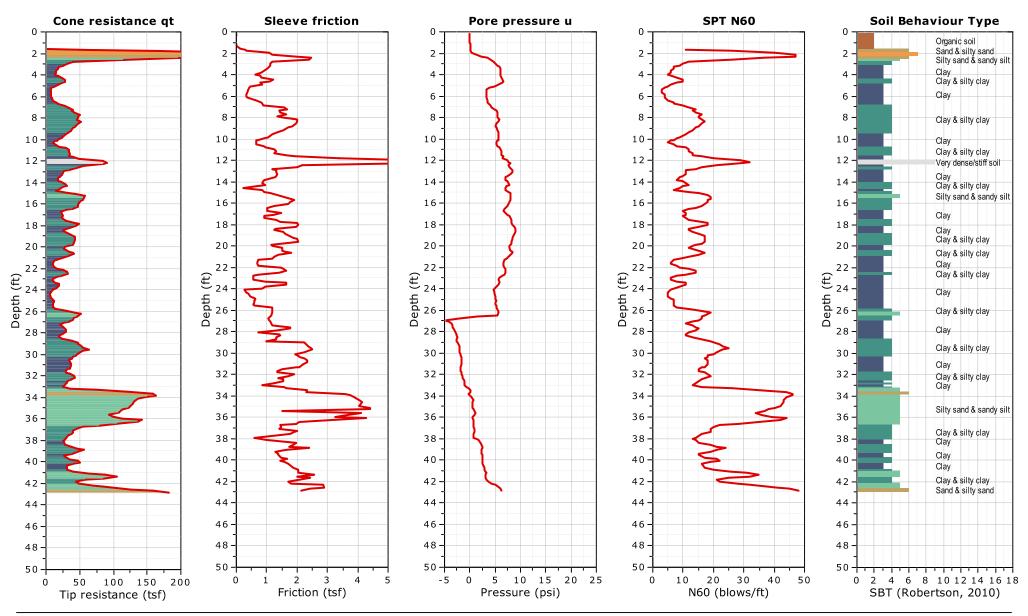


CPeT-IT v.2.1.1.8 - CPTU data presentation & interpretation software - Report created on: 6/21/2021, 2:44:06 PM Project file: \\scieng\shared\OFallon\emtapps\PROJECT FILES\!2017 PROJECTS\2017-3167 I-270 over Mississippi River (185-20)\GS\RGR\CPT DATA 42621\17-3167_CPTALL RGR.cpt



Project: I-270 over Mississippi River: 2017-3167.10 Task 300 Location: Madison County, IL

CPT: C-166 Total depth: 42.85 ft, Date: 5/12/2021 Surface Elevation: 465.9 ft Coords: lat 38.765792° lon -90.139829° Section: 30 Township: 4N Range: 9W STA: 1901+50.15 (EB) Offest: 19.88 ft LT

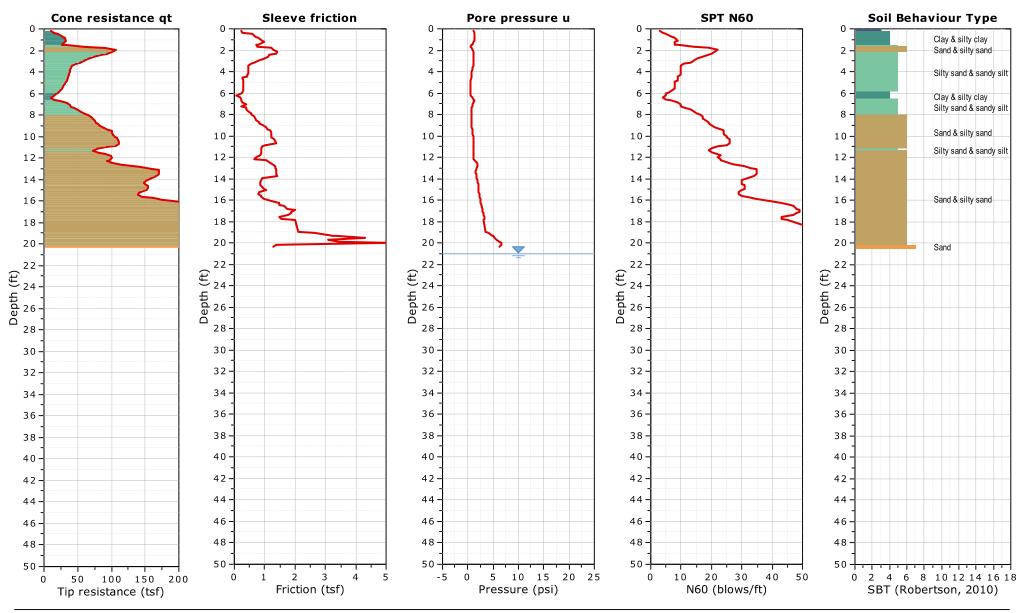


CPeT-IT v.2.1.1.8 - CPTU data presentation & interpretation software - Report created on: 6/21/2021, 2:44:09 PM Project file: \\scieng\shared\OFallon\emtapps\PROJECT FILES\!2017 PROJECTS\2017-3167 I-270 over Mississippi River (185-20)\GS\RGR\CPT DATA 42621\17-3167_CPTALL RGR.cpt



Project: I-270 over Mississippi River: 2017-3167.10 Task 300 Location: Madison County, IL

CPT: C-167 Total depth: 20.34 ft, Date: 5/6/2021 Surface Elevation: 419.3 ft Coords: lat 38.766154° lon -90.139751° Section: 30 Township: 4N Range: 9W STA: 1901+80.52 (EB) Offest: 180.97 ft LT

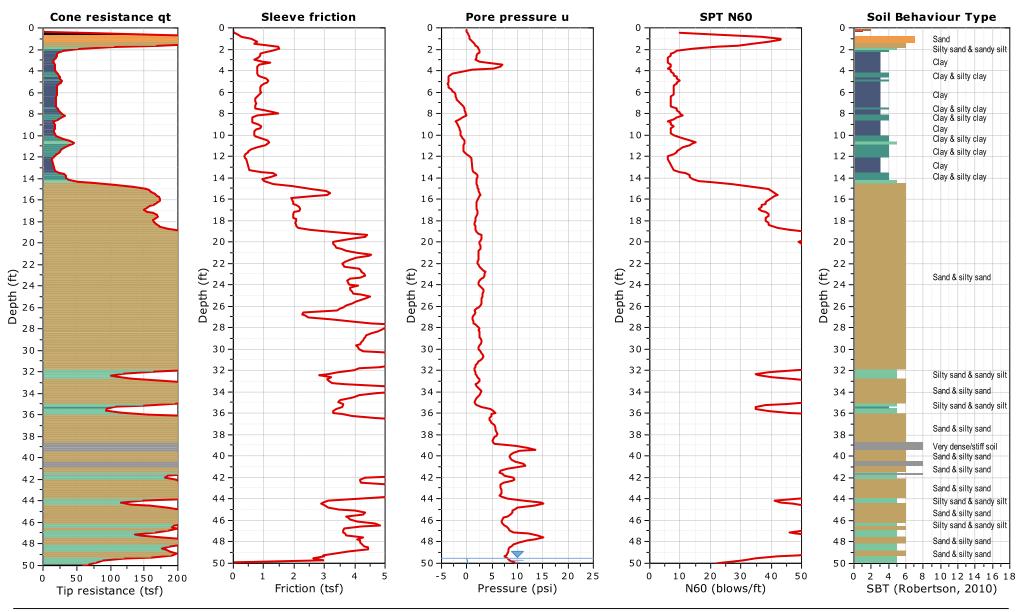


CPeT-IT v.2.1.1.8 - CPTU data presentation & interpretation software - Report created on: 6/21/2021, 2:44:13 PM Project file: \\scieng\shared\OFallon\emtapps\PROJECT FILES\!2017 PROJECTS\2017-3167 I-270 over Mississippi River (185-20)\GS\RGR\CPT DATA 42621\17-3167_CPTALL RGR.cpt



Project: I-270 over Mississippi River: 2017-3167.10 Task 300 Location: Madison County, IL

CPT: C-168 Total depth: 50.03 ft, Date: 6/1/2021 Surface Elevation: 466.6 ft Coords: lat 38.765268° lon -90.138869° Section: 30 Township: 4N Range: 9W STA: 1904+11.77 (EB) Offest: 156.82 ft RT

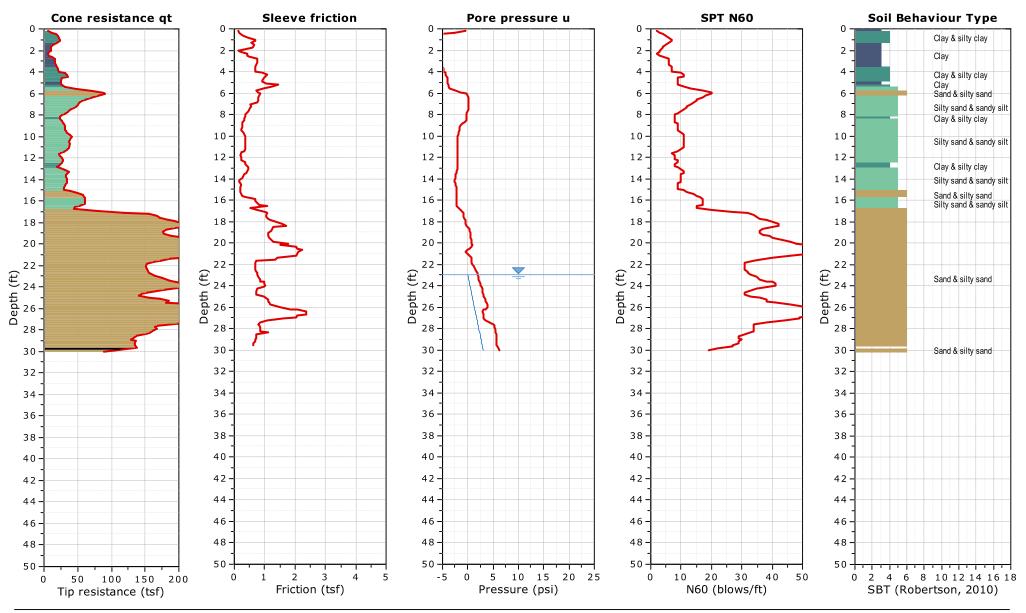


CPeT-IT v.2.1.1.8 - CPTU data presentation & interpretation software - Report created on: 6/21/2021, 2:44:18 PM Project file: \\scieng\shared\OFallon\emtapps\PROJECT FILES\!2017 PROJECTS\2017-3167 I-270 over Mississippi River (185-20)\GS\RGR\CPT DATA 42621\17-3167_CPTALL RGR.cpt



Project: I-270 over Mississippi River: 2017-3167.10 Task 300 Location: Madison County, IL

CPT: C-171 Total depth: 30.02 ft, Date: 5/6/2021 Surface Elevation: 420.7 ft Coords: lat 38.766219° lon -90.138864° Section: 30 Township: 4N Range: 9W STA: 1904+34.63 (EB) Offest: 188.96 ft LT



CPeT-IT v.2.1.1.8 - CPTU data presentation & interpretation software - Report created on: 6/21/2021, 2:44:22 PM Project file: \\scieng\shared\OFallon\emtapps\PROJECT FILES\!2017 PROJECTS\2017-3167 I-270 over Mississippi River (185-20)\GS\RGR\CPT DATA 42621\17-3167_CPTALL RGR.cpt

Appendix C



SHELBY TUBE TEST RESULTS

Date 12/01/18

	FAI 270 DESCR	IPTION I-270 over the Mississippi River DRILLED	BY GeoS	ervio	ces, l	Inc.				TRIA	(IAL D)A'
ection Ounty		LOCATION Roadway, SEC. 36, TWP. 4N, RNG. 10W STRUCT. NO. 060-0350 (EB)		-	S P E	R E C	UNIT W	S T R	M O I	C O H	P H I	
	B-119	Station806+89.23			C I	O V	E	E N	S T	E S	Α	
	1841+58.73	Ground Surface Elev. 437.9 ft Tube Length		-	M E	E R	G H	G T	U R	 0	N G	
Offset	3.7 ft L (EB)	Begin Sampling Depth ft Tube Diameter			N	Y	T	H H	E	N		
SOIL TY	PE, DESCRIPTI	ON, AND OBSERVATIONS	(1	ťt) (no)	(%)	(pcf)	(tsf)	(%)	(tsf)	(deg))
	m: Brown, fine grained				5T-1	20	126	1.4	22			+
				_								
				_								
			_	_								
				_								
				15								
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				20								
				20								
			_									
				_								
				\neg								

The "Unit Weight" column indicates the "wet" or "moist" unit weight of the sample. The "Strength" column represents the "unconfined compressive" strength of the sample (AASHTO T 208). The "Test Type" indicates if Unconsolidated Undrained (UU) or Consolidated Undrained (CU) test procedures (AASHTO T 296 or T 297) were used.

BMPR FORM 1004A (Rev. 8-99)



SHELBY TUBE TEST RESULTS

Date 12/01/18

	AI 270 DESCR	PTION I-270 over the Mississippi River DRILLED BY			Inc.				TRIA		
	60B-1	LOCATION Roadway, SEC. 36, TWP. 4N, RNG. 10W			R	UNIT	S	M	c	Р	
	Madison	STRUCT. NO. 060-0350 (EB) Station 806+89.23	DE	P E C	E C O	W E	T R E	O I S	O H E	H	
ORING NO.	B-120		P	I M	V E	I G	N G	T U	S I	A N	
Station	1844+98.98	Ground Surface Elev443.4 ft Tube Length i		E	R	Ĥ	T	R	ò	G	
	2.3 ft R (EB)	Begin Sampling Depth10 ft Tube Diameter i	n H	N	Y	Т	н	E	N	•	
SOIL TY	PE, DESCRIPTI	ON, AND OBSERVATIONS	(ft)	(no)	(%)	(pcf)	(tsf)	(%)	(tsf)	(deg))
Silty Clay: E	Brown and gray, fill, A	-6.		ST-1							
				-							
			_	-							
]							
				-							
			_	-							
				1							
			_	-							
				1							
				-							
			_	-							
				1							
				-							
			-20	-							
				-							
			_	-							
				1							
			_	1							

The "Unit Weight" column indicates the "wet" or "moist" unit weight of the sample. The "Strength" column represents the "unconfined compressive" strength of the sample (AASHTO T 208). The "Test Type" indicates if Unconsolidated Undrained (UU) or Consolidated Undrained (CU) test procedures (AASHTO T 296 or T 297) were used.

BMPR FORM 1004A (Rev. 8-99)



SHELBY TUBE TEST RESULTS

Date 12/01/18

	AI 270 DESCR	IPTION I-270 over the Mississippi River DRILLE	ED BY	eoSer	vices,	Inc.			 	TRIA	AT	
		LOCATION Roadway, SEC. 36, TWP. 4N, RNG. 10W			S P	R E	UNIT	S T	M O	C O	P H	-
DUNTY	Madison	STRUCT. NO. 060-0350 (EB) Station 806+89.23		D E	E C I	C O V	W E I	R E N	I S T	H E S	I A	
RING NO.	B-121		lue .	P	м	Ĕ	G	G	Ů	1	Ñ	
ffset	1848+02.12 8.1 ft R (EB)	Ground Surface Elev. <u>443.9</u> ft Tube Length Begin Sampling Depth3 ft Tube Diameter	in in	T H	E N	R Y	H T	Т	R	0	G	
				-				Н	E	N	•	
		ON, AND OBSERVATIONS		(ft)	(no)	(%)	(pcf)	(tsf)	(%)	(tsf)	(deg))
CLAY LOAI	M: Brown, fill, A-6.			_	ST-1	67	129	1.8	20			
				-5								
				_								
				-								
				_								
				-10								
				_								
				_								
				_								
				15								

The "Unit Weight" column indicates the "wet" or "moist" unit weight of the sample. The "Strength" column represents the "unconfined compressive" strength of the sample (AASHTO T 208). The "Test Type" indicates if Unconsolidated Undrained (UU) or Consolidated Undrained (CU) test procedures (AASHTO T 296 or T 297) were used.

BMPR FORM 1004A (Rev. 8-99)



Date 12/01/18

	FAI 270 DESCR	IPTION I-270 over the Mississippi River DRILLED BY	GeoSer	vices,	Inc.				TRIA	(IAL D	AT.
	60B-1	LOCATION Roadway, SEC. 36, TWP. 4N, RNG. 10W		S P	R E	UNIT	S T	M	C O	P H	E
OUNTY	Madison	STRUCT. NO. 060-0350 (EB) Station 806+89.23	D	E	C O	W E	R	I S	H	ï	S T
Station	B-122 1850+88.90	Ground Surface Elev444.1 ft Tube Length in		I M E	V E R	I G H	N G T	T U R	S I O	A N G	ו ו
Offset	11.2 ft R (EB)	Begin Sampling Depth3 ft Tube Diameter in	н	Ň	Ŷ	т	Ĥ	E	Ň		
	•	ON, AND OBSERVATIONS	(ft)		(%)	(pcf)	(tsf)	(%)	(tsf)	(deg))
Silty Clay L	oam: Gray, fill, A-7-6	(23).		ST-1	67			20			
			5								
			_	-							
				-							
				-							
				-							
			-10								
				1							
			_	-							
				-							
			15	-							
			_	1							

The "Unit Weight" column indicates the "wet" or "moist" unit weight of the sample. The "Strength" column represents the "unconfined compressive" strength of the sample (AASHTO T 208). The "Test Type" indicates if Unconsolidated Undrained (UU) or Consolidated Undrained (CU) test procedures (AASHTO T 296 or T 297) were used.



Date 12/01/18

OUTEF	AI 270 DESCR	IPTION I-270 over the Mississippi River DRILLED BY _	GeoSer	vices,	Inc.	1	1		TRIA	(IAL D	AT
	60B-1	LOCATION Roadway, SEC. 36, TWP. 4N, RNG. 10W		S P	R E	UNIT	S T	M O	c o	Р	
	Madison	STRUCT. NO. 060-0350 (EB) Station 806+89.23	D E	E C	C O	W E	R E	l S	H E	H I	
Station		Ground Surface Elev. <u>443.5</u> ft Tube Length in Begin Sampling Depth -3 ft Tube Diameter in	P T H	I M E	V E R	I G H	N G T	T U R	S I O	A N G	
			(ft)	N (no)	Y (%)	T (pcf)	H (tsf)	E (%)	N (tsf)	(deg)))
	M: Brown, A-6.	·		ST-1		123	0.7	26			+
			-5								
			_								
			10								
			_								
			-15								

The "Unit Weight" column indicates the "wet" or "moist" unit weight of the sample. The "Strength" column represents the "unconfined compressive" strength of the sample (AASHTO T 208). The "Test Type" indicates if Unconsolidated Undrained (UU) or Consolidated Undrained (CU) test procedures (AASHTO T 296 or T 297) were used.



Date 12/01/18

	AI 270 DESCR	IPTION I-270 over the Mississippi River DRILLED BY	GeoSer	vices,	Inc.				TRIA	KIAL D	A
	60B-1	LOCATION Roadway, SEC. 36, TWP. 4N, RNG. 10W		S P	R E	UNIT	S T	M O	c o	P H	
	Madison	STRUCT. NO. 060-0350 (EB)	D	E	С	w	R		н	ï	
	B-124	Station806+89.23	E	C I	O V	E	E N	S T	E S	Α	
Station	1856+78.10	Ground Surface Elev. 442.1 ft Tube Length in	P T	M	E R	G H	G T	U	 0	N G	
Offset	18.6 ft R (EB)	Begin Sampling Depth3 ft Tube Diameter in		E N	Υ Υ	T	H	R E	N		
SOIL TY	PE, DESCRIPTI	ON, AND OBSERVATIONS	(ft)	(no)	(%)	(pcf)	(tsf)	(%)	(tsf)	(deg))
	Brown, fill, A-7-6 (40).			ST-1				25			-
			5								
			_								
			-10								
			_								
											ľ
											ſ
			15								
											Î

The "Unit Weight" column indicates the "wet" or "moist" unit weight of the sample. The "Strength" column represents the "unconfined compressive" strength of the sample (AASHTO T 208). The "Test Type" indicates if Unconsolidated Undrained (UU) or Consolidated Undrained (CU) test procedures (AASHTO T 296 or T 297) were used.



Date 12/01/18

ROUTE FAI 270 DESCR	IPTION I-270 over the Mississippi River DRILLED BY	GeoSer	vices,	Inc.				TRIAX	IAL D	AT/
SECTION 60B-1	LOCATION _Roadway, SEC. 36, TWP. 4N, RNG. 10W STRUCT. NO060-0350 (EB)		S P E	R E C	UNIT W	S T R	M O I	C O H	P H I	T E S
BORING NO. B-125 Station 1860+12.82 Offset 20.9 ft R (EB)	Station 806+89.23 Ground Surface Elev. 442.4 Begin Sampling Depth -3 ft Tube Diameter in	E P T H	C I M E	O V E R	E I G H	E N G T	S T U R	E S I O	A N G	ר ר ץ
	ON, AND OBSERVATIONS	(ft)	N (no)	Y (%)	T (pcf)	H (tsf)	E (%)	N (tsf)	(deg)	F E
Silty Clay: Brown, fill, A-7.			ST-1		119	0.7	30			+
		5								
		-10								
		-15								
		_								

The "Unit Weight" column indicates the "wet" or "moist" unit weight of the sample. The "Strength" column represents the "unconfined compressive" strength of the sample (AASHTO T 208). The "Test Type" indicates if Unconsolidated Undrained (UU) or Consolidated Undrained (CU) test procedures (AASHTO T 296 or T 297) were used.



Date 12/01/18

OUTE FAI	1 270 DESCR	IPTION I-270 over the Mississippi River DRILLED I	BY GeoS	ervic	es, In	<u>1C.</u>				TRIA	KIAL D	AT
COUNTYN BORING NO Station	60B-1 Madison B-126 1863+05.98 23.7 ft R (EB)	LOCATION Roadway, SEC. 36, TWP. 4N, RNG. 10W STRUCT. NO. 060-0350 (EB) Station 806+89.23 Ground Surface Elev. 442.1 ft Begin Sampling Depth -3 ft Tube Length	 _ in			R E C O V E R	UNIT W E I G H	S T R E N G T	M O I S T U R	C O H E S I O	P H I A N G	
		ON, AND OBSERVATIONS		י ו t) (n	0)	Y (%)	T (pcf)	H (tsf)	E (%)	N (tsf)	(dea)	
Clay: Brown, fi					-1	(70)	(1991)	(,	(/0)	(,	(+
			_									
				-5								
			_	_								
				_								
			_									
				10								
			_	_								
			_	_								
				45								
				15								

The "Unit Weight" column indicates the "wet" or "moist" unit weight of the sample. The "Strength" column represents the "unconfined compressive" strength of the sample (AASHTO T 208). The "Test Type" indicates if Unconsolidated Undrained (UU) or Consolidated Undrained (CU) test procedures (AASHTO T 296 or T 297) were used.



Date 12/01/18

	AI 270 DESCR	IPTION I-270 over the Mississippi River DRILLED E	BY Geo	Ser	vices,	Inc.				TRIA	KIAL D)AT/
	60B-1	LOCATION Roadway, SEC. 36, TWP. 4N, RNG. 10W			S P	R	UNIT	S T	м	C	Р	1
	Madison	STRUCT. NO. 060-0350 (EB) Station 806+89.23		D E	P E C	E C O	W	R E	O I S	O H E	H	E S
BORING NO.	B-127			Ρ	I M	V E	l G	N G	T U	S I	A N	l 1
Offset	1866+21.89 25.5 ft R (EB)	Ground Surface Elev. <u>442.2</u> ft Tube Length Begin Sampling Depth3 ft Tube Diameter	_ in _ in	T H	E N	R Y	H T	T H	R E	O N	G) F
		ON, AND OBSERVATIONS									(dog)	E
	Gray, fill, A-6.	JN, AND OBSERVATIONS		(ft)	(no) ST-1	(%) 100	(pcf)	(tsf)	(%) 27	(tsf)	(aeg)	<u>'</u>
Only Oldy. C	Jray, III, A-0.				01-1				21			
				-5								
				-10								
				-15								

The "Unit Weight" column indicates the "wet" or "moist" unit weight of the sample. The "Strength" column represents the "unconfined compressive" strength of the sample (AASHTO T 208). The "Test Type" indicates if Unconsolidated Undrained (UU) or Consolidated Undrained (CU) test procedures (AASHTO T 296 or T 297) were used.



Date 05/25/21

OUTE F	AI 270 DESCR	PTION I-270 over the Mississippi River	DRILLED BY				1	1		TRIA	KIAL D)AT
ECTION		LOCATION Roadway, SEC. 30, TWP. 4N, RNG. 9W			S P	R E	UNIT	S T	M O	с 0	P H	
	lison & St. Louis	STRUCT. NO. 060-0350 (EB) Station 806+89.23		DE	E C I	C O V	E I	R E N	I S T	H E S	I A	
Station	B-128 1873+30.14	Ground Surface Elev. <u>441.5</u> ft Tube Leng		P T	М Е	E R	G H	G	U R	 	N G	
	48.2 ft R (EB)		eter in	H	Ν	Y	т	H	E	N		
	PE, DESCRIPIN	ON, AND OBSERVATIONS		(ft)	(no) ST-1	(%) 100	(pcf) 118	(tsf)	(%) 34	(tsf)	(deg))
olay. Brown	and gray, / / /				011	100		1.0				
				-35								
				55								
				-40								

The "Unit Weight" column indicates the "wet" or "moist" unit weight of the sample.
The "Strength" column represents the "unconfined compressive" strength of the sample (AASHTO T 208).
The "Test Type" indicates if Unconsolidated Undrained (UU) or Consolidated Undrained (CU) test procedures (AASHTO T 296 or T 297) were used.



Date 04/23/21

	FAI 270 DESCRI	PTION I-270 over the Mississippi River DRILLED B	Y GeoSe	vices,	Inc.	T			TRIA	(IAL D	AT
COUNTY	Madison B-139	LOCATION Roadway, SEC. 30, TWP. 4N, RNG. 9W STRUCT. NO. 060-0350 (EB) Station 806+89.23	D E P	S P E C I M	R E C V E	UNIT W E I G	S T R E N G	M O I S T U	C O H E S I	P H I A N	
Offset	2883+91.61 130.0 ft L (WB)	Ground Surface Elev. <u>419.7</u> ft Tube Length Begin Sampling Depth <u>-21</u> ft Tube Diameter	_ in T _ in H	E N	R Y	H T	т н	R E	O N	G	
		ON, AND OBSERVATIONS	(ft)		(%)	(pcf)	(tsf)	(%)	(tsf)	(deg))
SILTY CLA	Y: Brown and gray, A-	6.	_	ST-1	100	106	0.6	52			
				-							
			-	-							
				1							
				5							
			_	-							
				-							
			-	-							
				1							
				0							
			_	-							
				1							
				1							
			_	-							
				-							
			-	1							

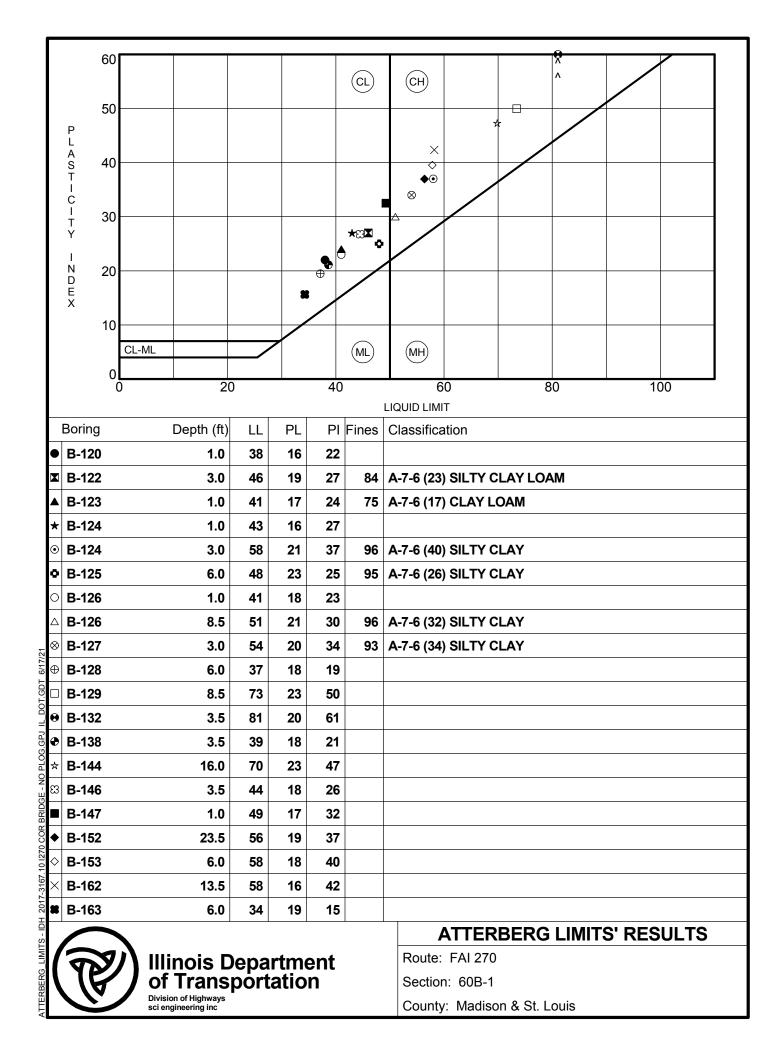
The "Unit Weight" column indicates the "wet" or "moist" unit weight of the sample. The "Strength" column represents the "unconfined compressive" strength of the sample (AASHTO T 208). The "Test Type" indicates if Unconsolidated Undrained (UU) or Consolidated Undrained (CU) test procedures (AASHTO T 296 or T 297) were used.

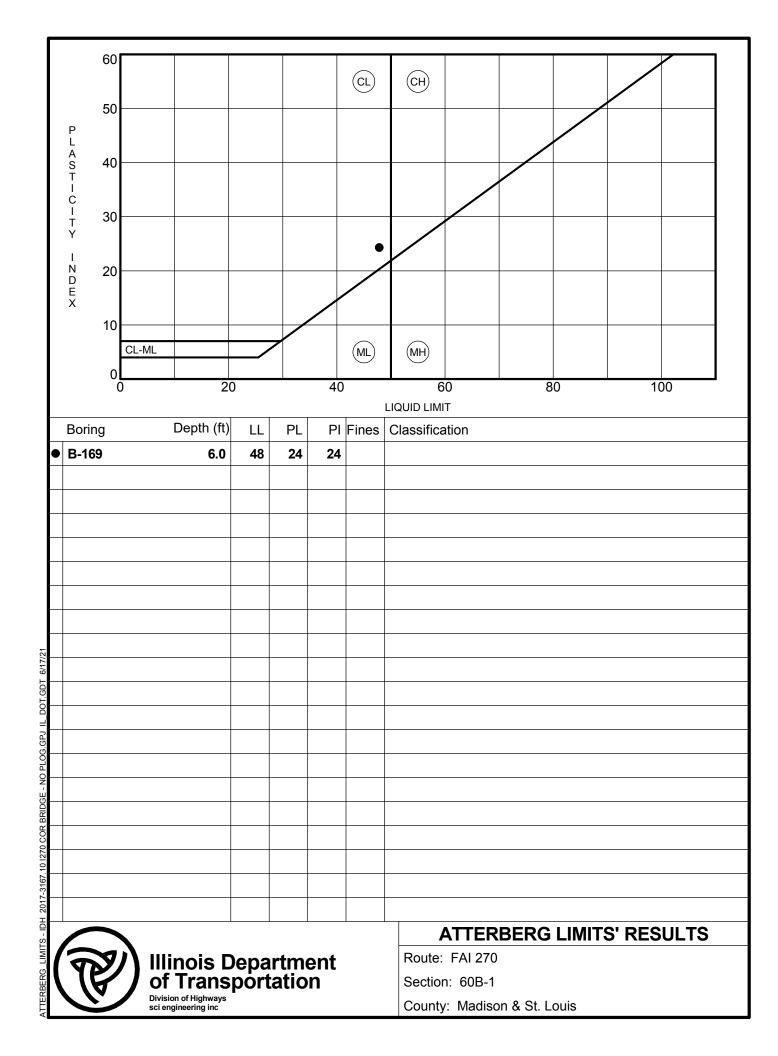


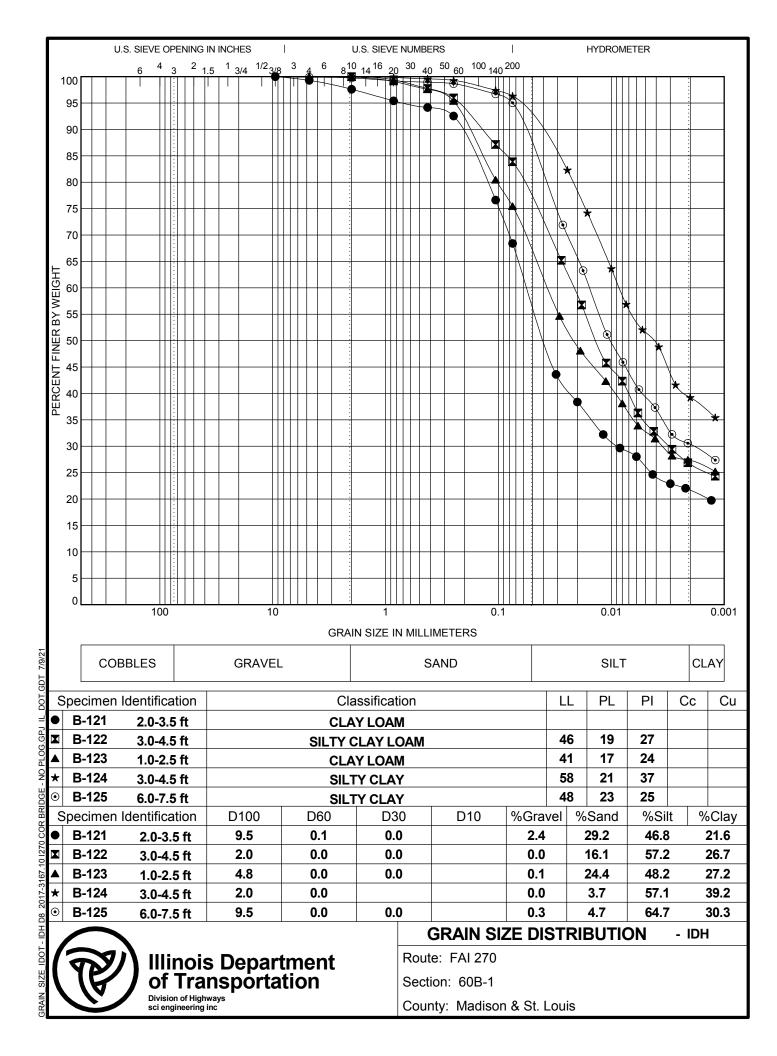
Date 04/20/21

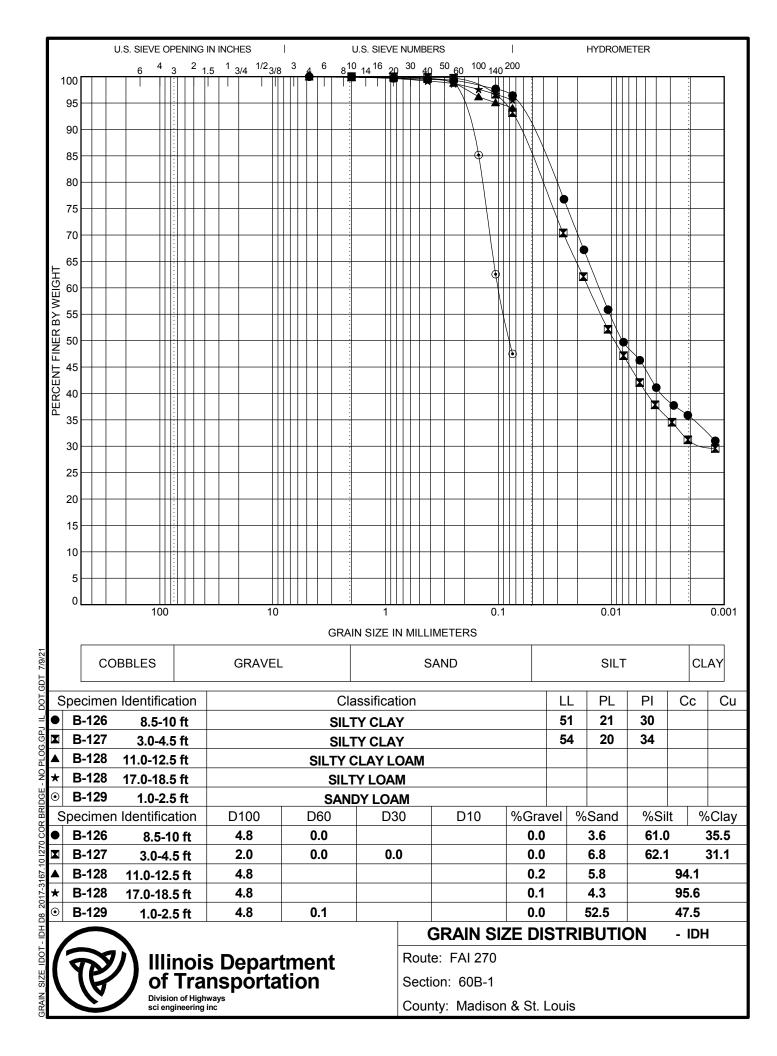
	AI 270 DESCRI	PTION I-270 over the Mississippi River DRILLED	BY Geos	Serv	ices,	Inc.				TRIA	XIAL D	AT.
OUNTY	Madison B-145 1888+68.39	LOCATION Roadway, SEC. 30, TWP. 4N, RNG. 9W STRUCT. NO. 060-0350 (EB) Station 806+89.23 Ground Surface Elev. 429.7 ft	in	D E P T	S P E C I M E	R E C O V E R	UNIT W E I G H	S T R E N G T	M O I S T U R	C O H E S I O	P H I A N G	ד ב ד ד א
Offset		Begin Sampling Depth10 ft Tube Diameter DN, AND OBSERVATIONS		H ft)	N (no)	Y (%)	T (pcf)	H (tsf)	E (%)	N	(deg)	F
Silty Clay Lo	oam: Brown, soft, mois	st, A-6.		_	ST-1	100			35			+
Sand: Brow	n, fine, medium dense	, very moist to wet, A-3.	-	_								
	, .,		_									
				_								
			_	-								
			_									
				-15								
			_									
			_	_								
				-								
			_									
			_	_								
			_									
				-20								
			-	-20								
			_	_								
			_	-								
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				\neg								

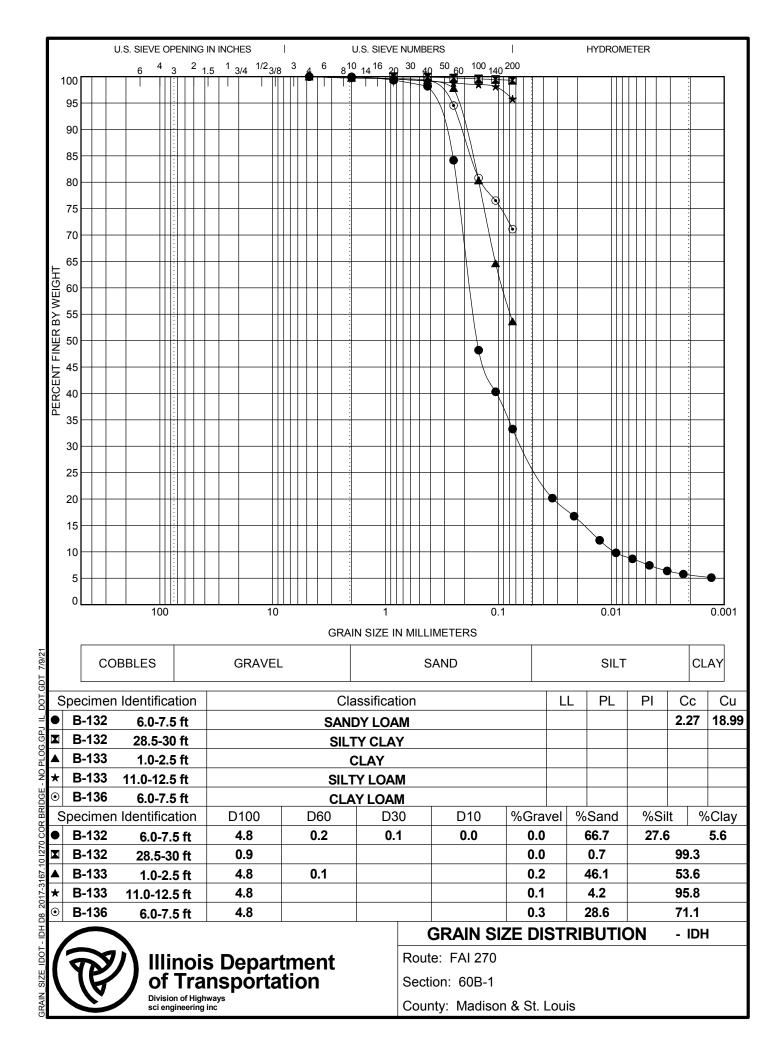
The "Unit Weight" column indicates the "wet" or "moist" unit weight of the sample. The "Strength" column represents the "unconfined compressive" strength of the sample (AASHTO T 208). The "Test Type" indicates if Unconsolidated Undrained (UU) or Consolidated Undrained (CU) test procedures (AASHTO T 296 or T 297) were used.

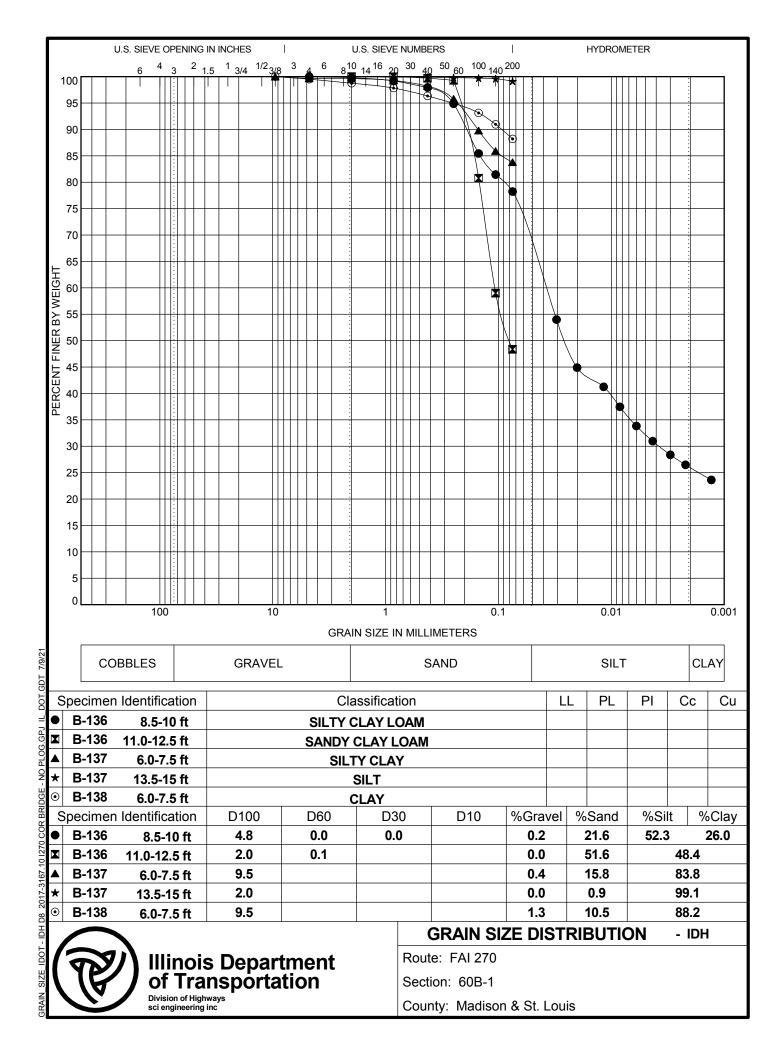


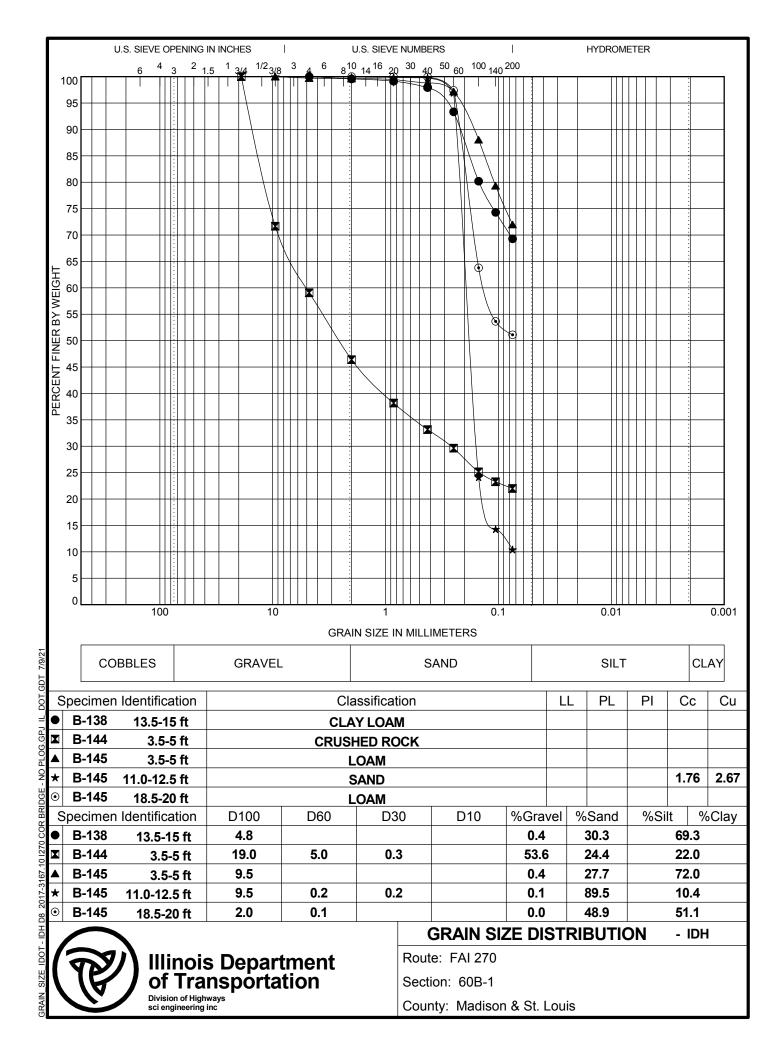


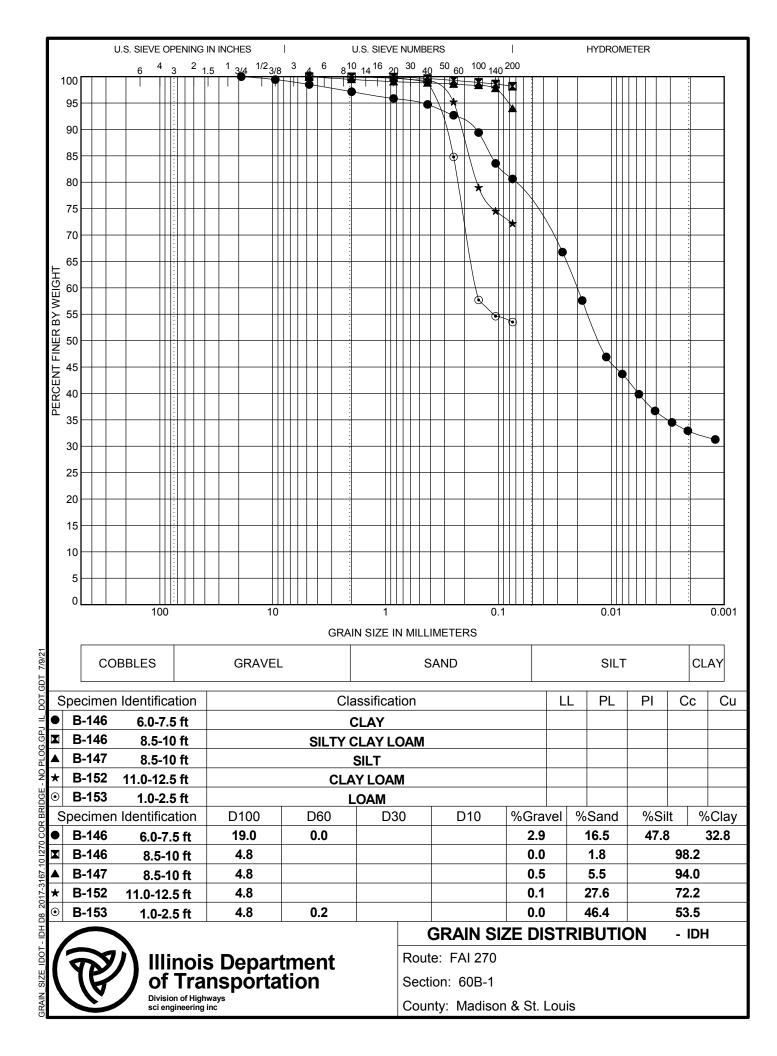


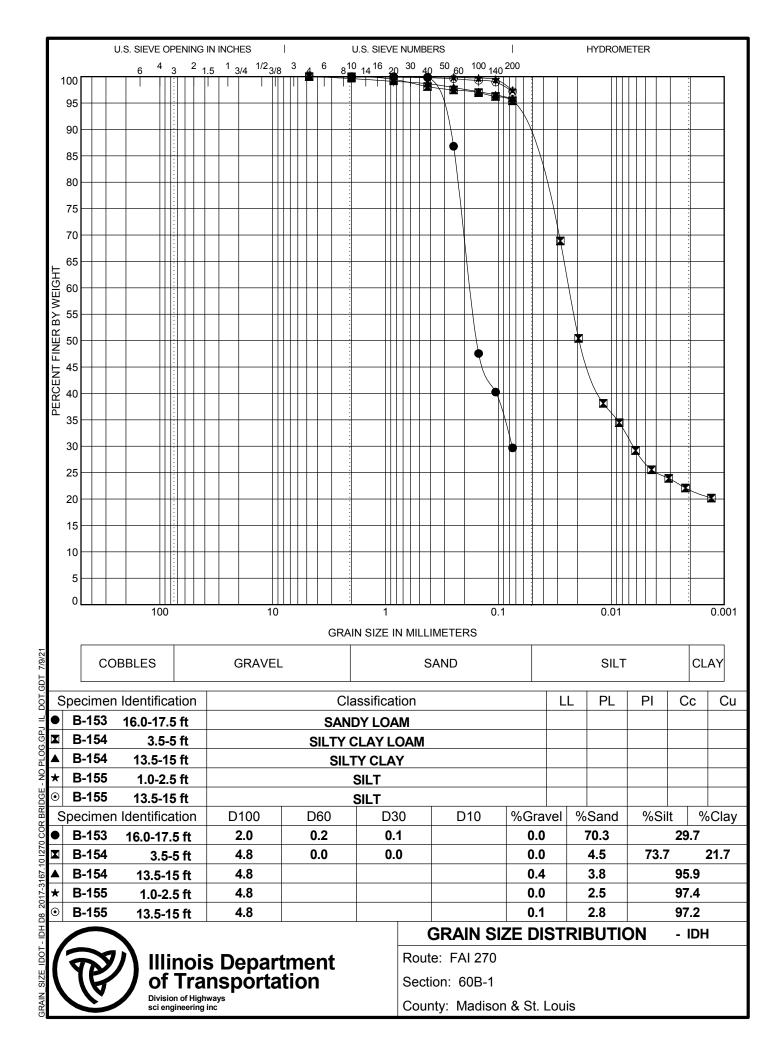


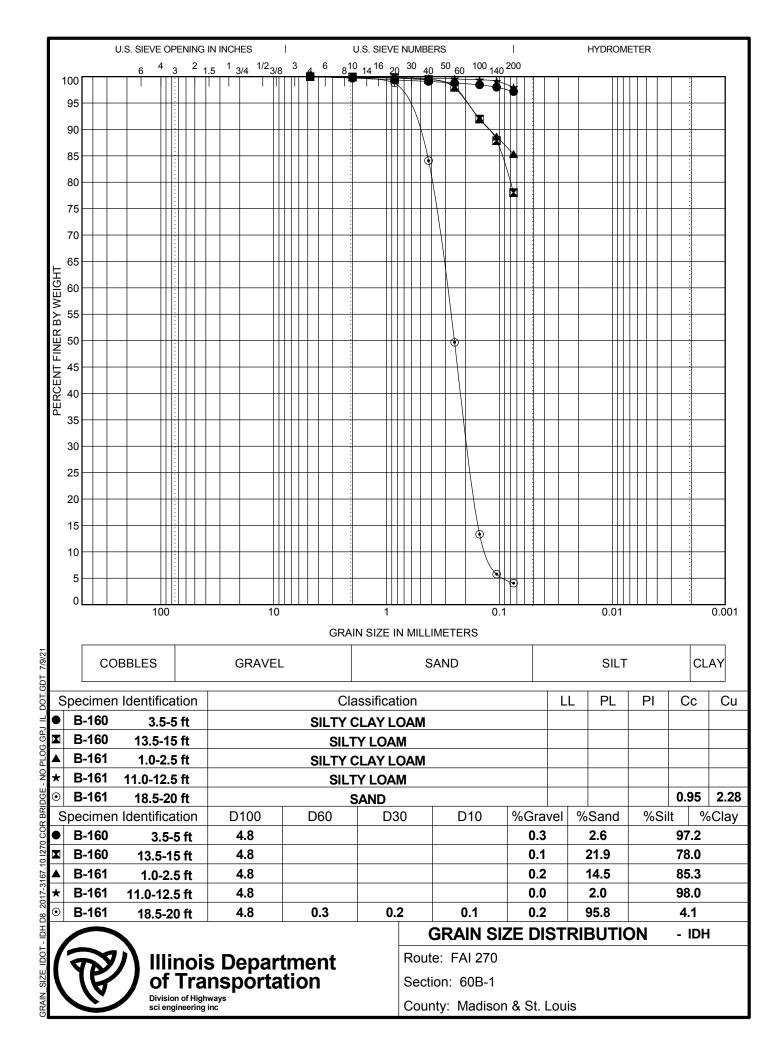


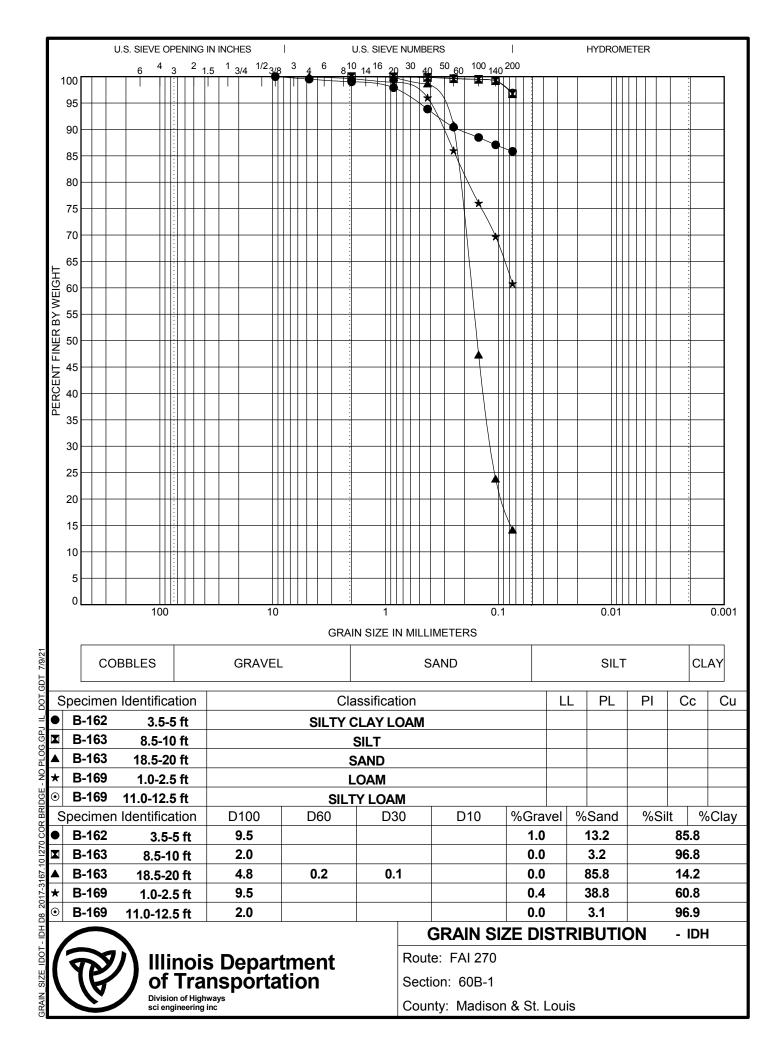


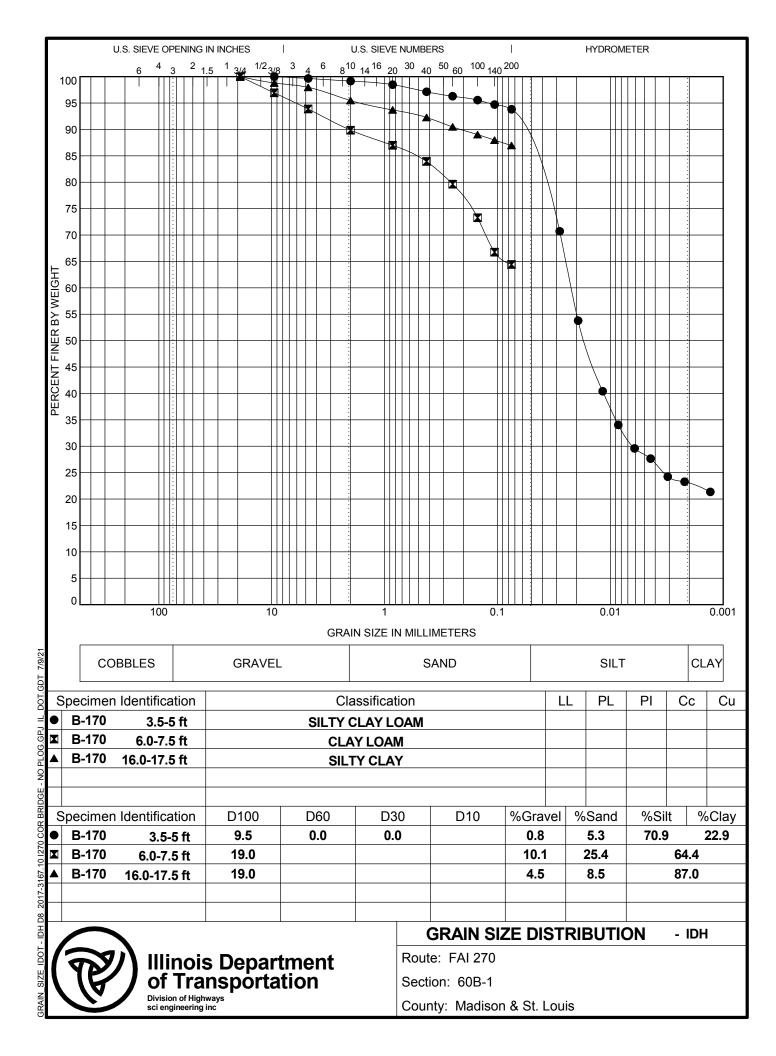


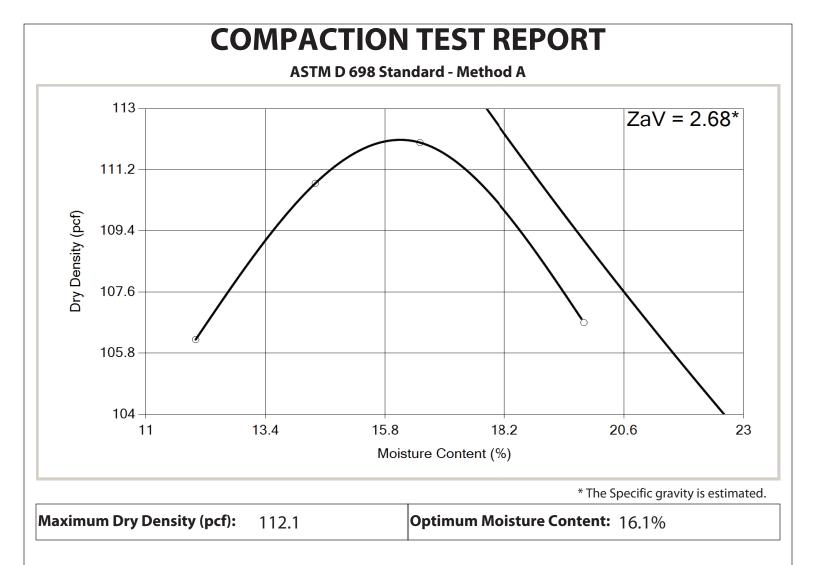












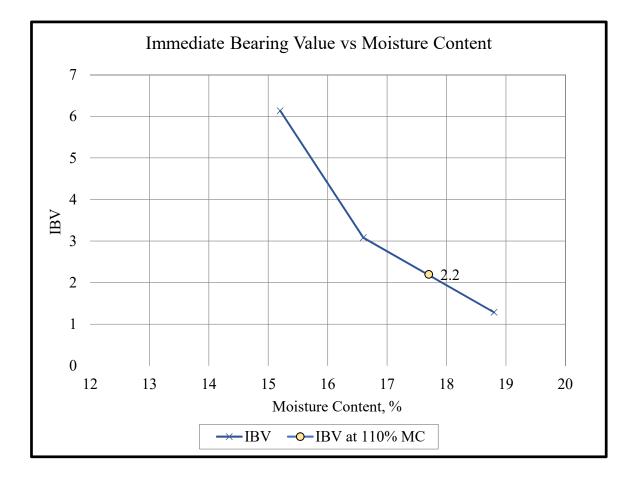
		Tes	st Data			
	1	2	3	4	5	6
Weight of Mold and Soil (g)	3,865.0	3,982.1	4,037.2	3,998.1		
Weight of Mold (g)	2,073.4	2,073.4	2,073.4	2,073.4		
Weight of Wet Soil & Tare (g)	585.3	704.9	741.6	537.6		
Weight of Dry Soil & Tare (g)	532.0	627.6	649.2	463.1		
Weight of Tare (g)	86.9	89.1	88.3	87.5		
Moisture Content (%)	12.0	14.4	16.5	19.8		
Dry Density (pcf)	106.2	110.8	112.0	106.7		

Project Name:	I-270 Bridge	over COR		I	Proje	t Number:	2017-3167.1	0	
Project Location	n: Madison Cou	unty, Illinois		•	Client	: Hornen	& Shrifrin		
Sample Location	n: B119 & B120	Bulk Composite	2-8'	Sample Number:			Date Sampled	: 12/1	/2018
Material Descrip	otion: SILTY CL	AY LOAM A-6 (16	5)	Source:	N/A				
NM: 12.0 LL:	39 PI: 22	Soil S.G:	% Oversize:	% <no.200:< th=""><th>76.8</th><th>Rammer:</th><th>Mechanical</th><th>Prep:</th><th>Moist</th></no.200:<>	76.8	Rammer:	Mechanical	Prep:	Moist
CI	Tested By:	K. Strunk	Date Tested:	4/8/2019			Remarks:		
	Reviewed By:	Mike LaJoye	Title:	Senior Field Mana	ager				
	SCI Er	ngineering	a Inc	650 Pierce	e Blvd				
SCI ENGINEERING, INC.		igineenny	y, inc.	O'Fallon, Illin	ois 62	269			

Immediate Bearing Value

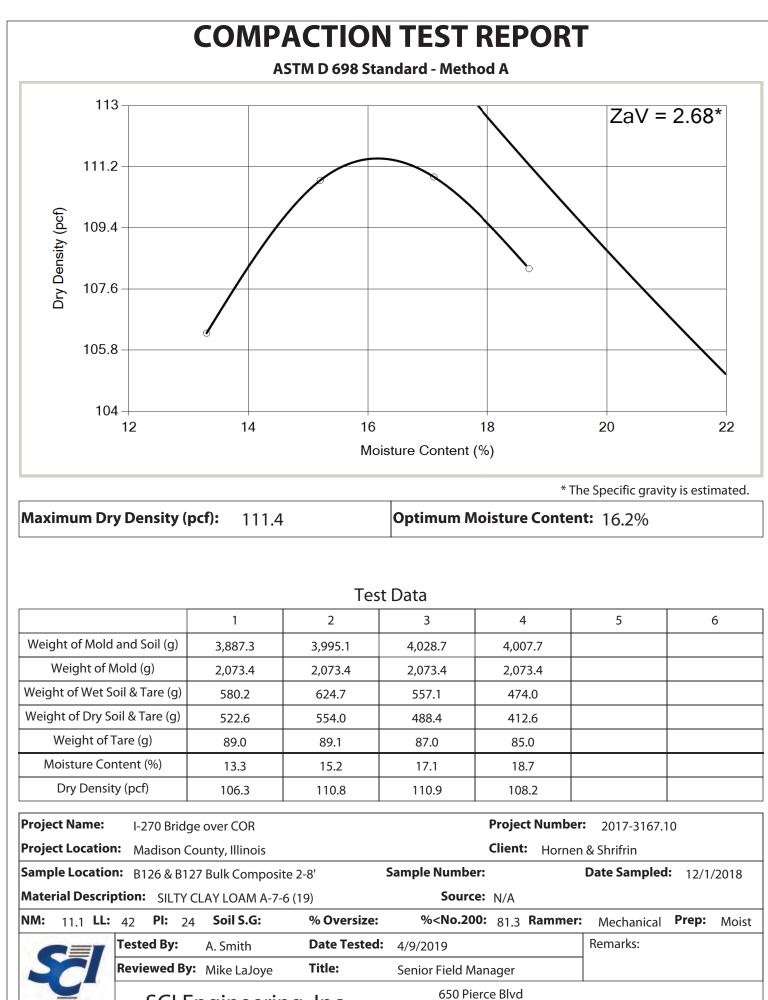
Project Name: Sample Number: Soil Classification: I270 Over COR Bridge B119 and B120 Bulk Composite SILTY CLAY LOAM A-6 (16) Project Number: 2017-3167.10

Depth: 2-8' Tested By: A. Smith Date: 4/19/2019



IBV	Moisture Content %	Dry Density (pcf)
6.1	15.2	112.3
3.1	16.6	111.3
1.3	18.8	105.5

Compaction Curve							
Max Density (pcf) 112.1							
OMC	16.1						



SCI Engineering, Inc.

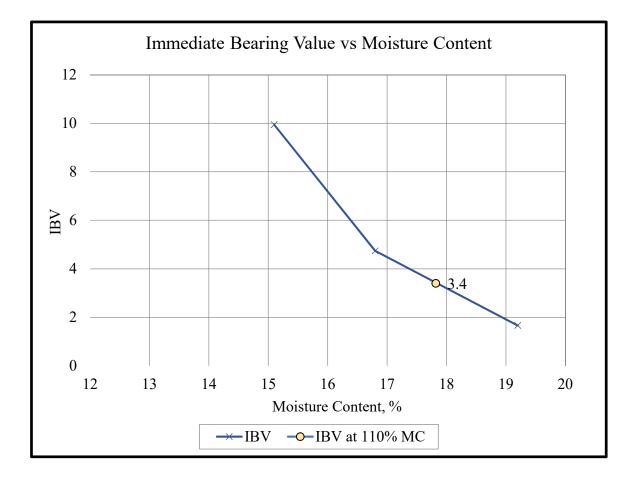
SCI ENGINEERING, INC

O'Fallon, Illinois 62269

Immediate Bearing Value

Project Name: Sample Number: Soil Classification: I270 Over COR Bridge B126 and B127 Bulk Composite SILTY CLAY LOAM A-7-6 (19) Project Number: 2017-3167.10

Depth: 2-8' Tested By: A. Smith Date: 4/19/2019



IBV	Moisture Content %	Dry Density (pcf)
9.9	15.1	106.2
4.7	16.8	109.2
1.7	19.2	105.6

Compaction Curve							
Max Density (pcf) 111.4							
OMC	16.2						



Section 60B-1

County Madison & St. Louis

Location Chouteau Township, Illinois

Boring No.		B119&120 Comp.	B-120	B-122	B-123
Station			1844+98.98	1850+88.90	1854+11.03
Offset			2.3 ft R (EB)	11.2 ft R (EB)	14.9 ft R (EB)
Depth	ft	2.0 - 9.0	1.0 - 2.5	3.0 - 5.0	1.0 - 2.5
AASHTO Classification (AASHTO M 145)				A-7-6(23)	A-7-6(17)
Illinois Textural Classification				Silty Clay Loam	Clay Loam
Gradation Passing - 1"	%			100	100
3/4"	%			100	100
1/2"	%			100	100
No. 4	%			100	100.0
No. 10	%			100.0	99.9
No. 40	%			97.8	97.6
No. 100	%			90.7	86.5
No. 200	%			83.9	75.5
Sand	%			16.1	24.5
Silt	%			57.2	48.2
CLAY	%			26.7	27.2
Liquid Limit	%	39	38	46	41
Plasticity Index	%	22	22	27	24
Organic Matter Content	%				
Std. Dry Density	pcf	112			
Optimum Moisture	%	16.1			
Subgrade Support Rating				POOR	POOR
In situ Moisture	%		20		19
Immediate Bearing Value (IBV)	%	2.2			



Section 60B-1

County Madison & St. Louis

Location Chouteau Township, Illinois

Boring No.		B-124	B-124	B-126	B126&127 Comp.
Station		1856+78.10	1856+78.10	1863+05.98	
Offset		18.6 ft R (EB)	18.6 ft R (EB)	23.7 ft R (EB)	
Depth	ft	1.0 - 2.5	3.0 - 5.0	1.0 - 2.5	2.0 - 8.0
AASHTO Classification (AASHTO M 145)			A-7-6(40)		
Illinois Textural Classification			Silty Clay		
Gradation Passing - 1"	%		100		
3/4"	%		100		
1/2"	%		100		
No. 4	%		100		
No. 10	%		100.0		
No. 40	%		99.6		
No. 100	%		98.2		
No. 200	%		96.3		
Sand	%		3.7		
Silt	%		57.1		
CLAY	%		39.2		
Liquid Limit	%	43	58	41	42
Plasticity Index	%	27	37	23	24
Organic Matter Content	%				
Std. Dry Density	pcf				111
Optimum Moisture	%				16.2
Subgrade Support Rating			FAIR		
In situ Moisture	%	21		20	
Immediate Bearing Value (IBV)	%				3.4



Section 60B-1

County Madison & St. Louis

Location Chouteau Township, Illinois

Boring No.		B-127	B-129	B-132	B-133
Station		1866+21.89	1873+43.58	1878+90.30	1879+04.87
Offset		25.5 ft R (EB)	180.3 ft R (EB)	48.9 ft R (EB)	159.7 ft R (EB)
Depth	ft	3.0 - 5.0	1.0 - 2.5	3.5 - 5.0	1.0 - 2.5
AASHTO Classification (AASHTO M 145)		A-7-6(34)			
Illinois Textural Classification		Silty Clay			
Gradation Passing - 1"	%	100	100		100
3/4"	%	100	100		100
1/2"	%	100	100		100
No. 4	%	100	100.0		100.0
No. 10	%	100.0	100.0		99.8
No. 40	%	99.8	99.7		99.3
No. 100	%	97.9	85.2		80.3
No. 200	%	93.2	47.5		53.6
Sand	%	6.8	52.5		46.4
Silt	%	62.1			
CLAY	%	31.1			
Liquid Limit	%	54		81	
Plasticity Index	%	34		61	
Organic Matter Content	%				
Std. Dry Density	pcf				
Optimum Moisture	%				
Subgrade Support Rating		FAIR			
In situ Moisture	%			34	19
Immediate Bearing Value (IBV)	%				



Section 60B-1

County Madison & St. Louis

Location Chouteau Township, Illinois

Boring No.		B-138	B-144	B-145	B-146
Station		2883+81.37	1888+75.49	1888+68.39	1888+76.70
Offset		40.6 ft L (WB)	37.1 ft R (EB)	125.9 ft R (EB)	24.7 ft L (WB)
Depth	ft	3.5 - 5.0	3.5 - 5.0	3.5 - 5.0	3.5 - 5.0
AASHTO Classification (AASHTO M 145)					
Illinois Textural Classification					
Gradation Passing - 1"	%		100	100	
3/4"	%		100.0	100	
1/2"	%		82.9	100	
No. 4	%		59.1	99.7	
No. 10	%		46.4	99.6	
No. 40	%		33.2	98.8	
No. 100	%		25.1	88.0	
No. 200	%		22.0	72.0	
Sand	%		78.0	28.0	
Silt	%				
CLAY	%				
Liquid Limit	%	39			44
Plasticity Index	%	21			26
Organic Matter Content	%				
Std. Dry Density	pcf				
Optimum Moisture	%				
Subgrade Support Rating					
In situ Moisture	%	17	18	21	22
Immediate Bearing Value (IBV)	%				



Section 60B-1

County Madison & St. Louis

Location Chouteau Township, Illinois

Boring No.		B-147	B-153	B-154	B-155
Station		1888+81.31	1892+80.16	1892+85.77	1892+83.21
Offset		121.0 ft L (WB)	137.8 ft R (EB)	15.5 ft L (WB)	123.8 ft L (WB)
Depth	ft	1.0 - 2.5	1.0 - 2.5	3.5 - 5.0	1.0 - 2.5
AASHTO Classification (AASHTO M 145)					
Illinois Textural Classification				Silty Clay Loam	
Gradation Passing - 1"	%		100	100	100
3/4"	%		100	100	100
1/2"	%		100	100	100
No. 4	%		100.0	100.0	100.0
No. 10	%		100.0	100.0	100.0
No. 40	%		99.0	98.1	100.0
No. 100	%		57.7	97.0	99.7
No. 200	%		53.5	95.4	97.4
Sand	%		46.5	4.6	2.6
Silt	%			73.7	
CLAY	%			21.7	
Liquid Limit	%	49			
Plasticity Index	%	32			
Organic Matter Content	%				
Std. Dry Density	pcf				
Optimum Moisture	%				
Subgrade Support Rating				POOR	
In situ Moisture	%	25	35	19	17
Immediate Bearing Value (IBV)	%				



Section 60B-1

County Madison & St. Louis

Location Chouteau Township, Illinois

Boring No.		B-160	B-161	B-162	B-169
Station		1898+33.46	1898+09.30	1898+35.23	1903+27.09
Offset		51.3 ft R (EB)	217.1 ft R (EB)	7.9 ft L (WB)	319.1 ft R (EB)
Depth	ft	3.5 - 5.0	1.0 - 2.5	3.5 - 5.0	1.0 - 2.5
AASHTO Classification (AASHTO M 145)					
Illinois Textural Classification					
Gradation Passing - 1"	%	100	100	100	100
3/4"	%	100	100	100	100
1/2"	%	100	100	100	100
No. 4	%	100.0	100.0	99.5	99.9
No. 10	%	99.7	99.8	99.0	99.6
No. 40	%	99.1	99.5	93.9	96.0
No. 100	%	98.4	92.0	88.5	76.0
No. 200	%	97.2	85.3	85.8	60.8
Sand	%	2.8	14.7	14.2	39.2
Silt	%				
CLAY	%				
Liquid Limit	%				
Plasticity Index	%				
Organic Matter Content	%				
Std. Dry Density	pcf				
Optimum Moisture	%				
Subgrade Support Rating					
In situ Moisture	%	19	18	22	13
Immediate Bearing Value (IBV)	%				



 Route
 FAI 270

 Section
 60B-1

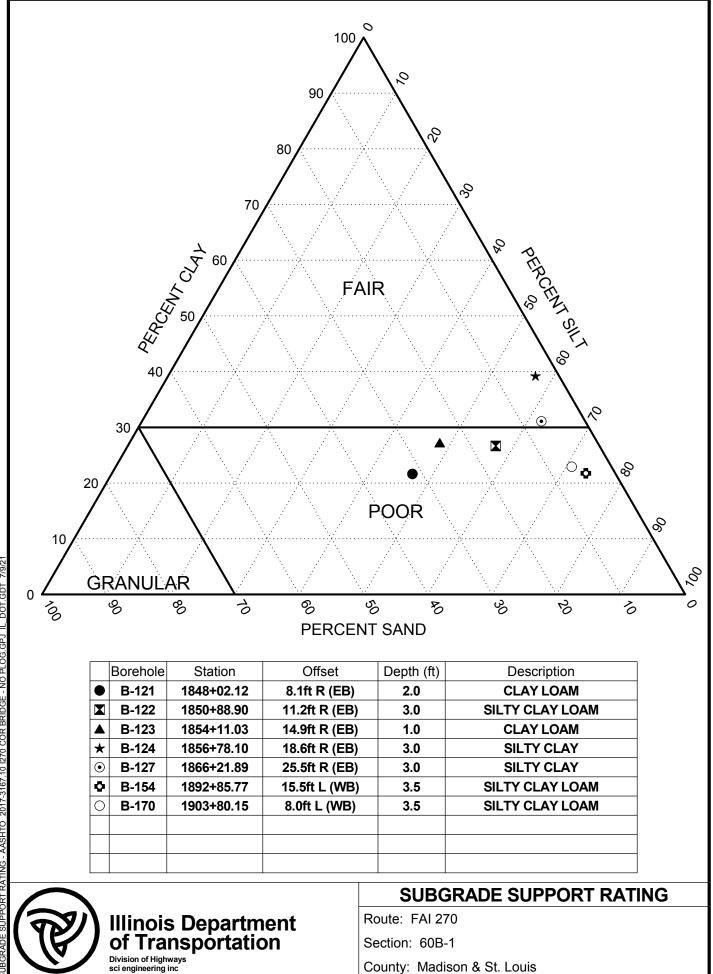
County Madison & St. Louis

Location Chouteau Township, Illinois

Job No. 2017-3167.10

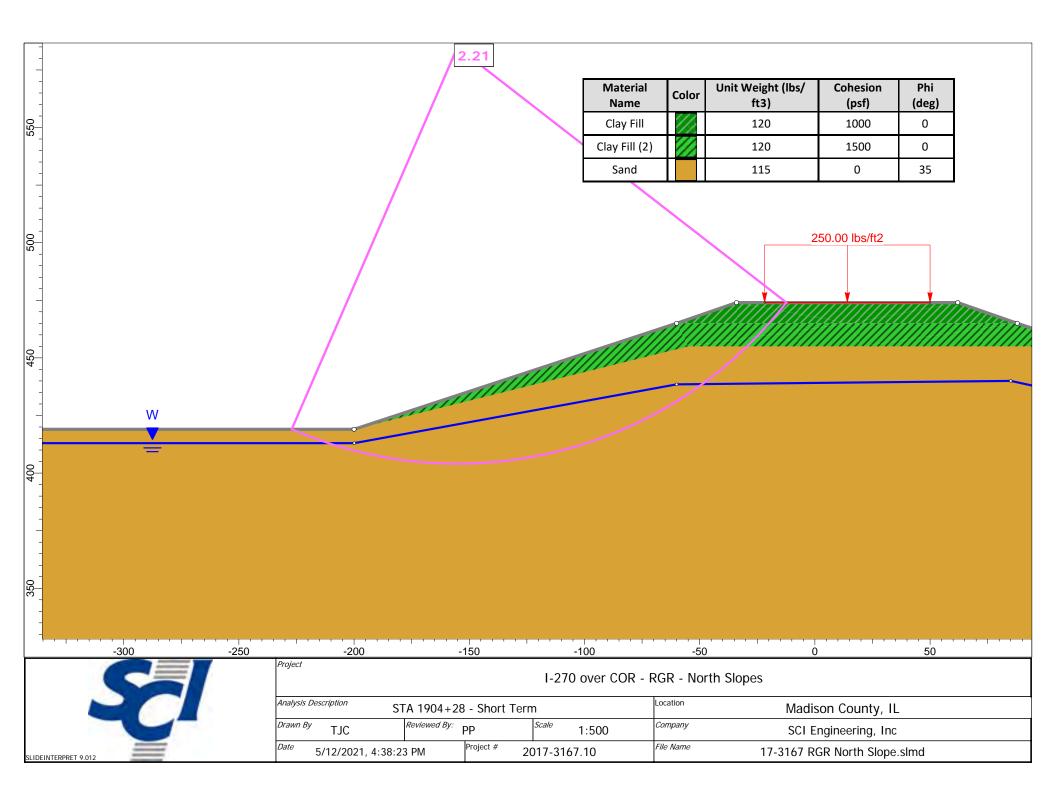
Boring No.		B-170		
Station		1903+80.15		
Offset		8.0 ft L (WB)		
Depth	ft	3.5 - 5.0		
AASHTO Classification (AASHTO M 145)				
Illinois Textural Classification		Silty Clay Loam		
Gradation Passing - 1"	%	100		
3/4"	%	100		
1/2"	%	100		
No. 4	%	99.7		
No. 10	%	99.2		
No. 40	%	97.1		
No. 100	%	95.6		
No. 200	%	93.8		
Sand	%	6.2		
Silt	%	70.9		
CLAY	%	22.9		
Liquid Limit	%			
Plasticity Index	%			
Organic Matter Content	%			
Std. Dry Density	pcf			
Optimum Moisture	%			
Subgrade Support Rating		POOR		
In situ Moisture	%	22		
Immediate Bearing Value (IBV)	%			

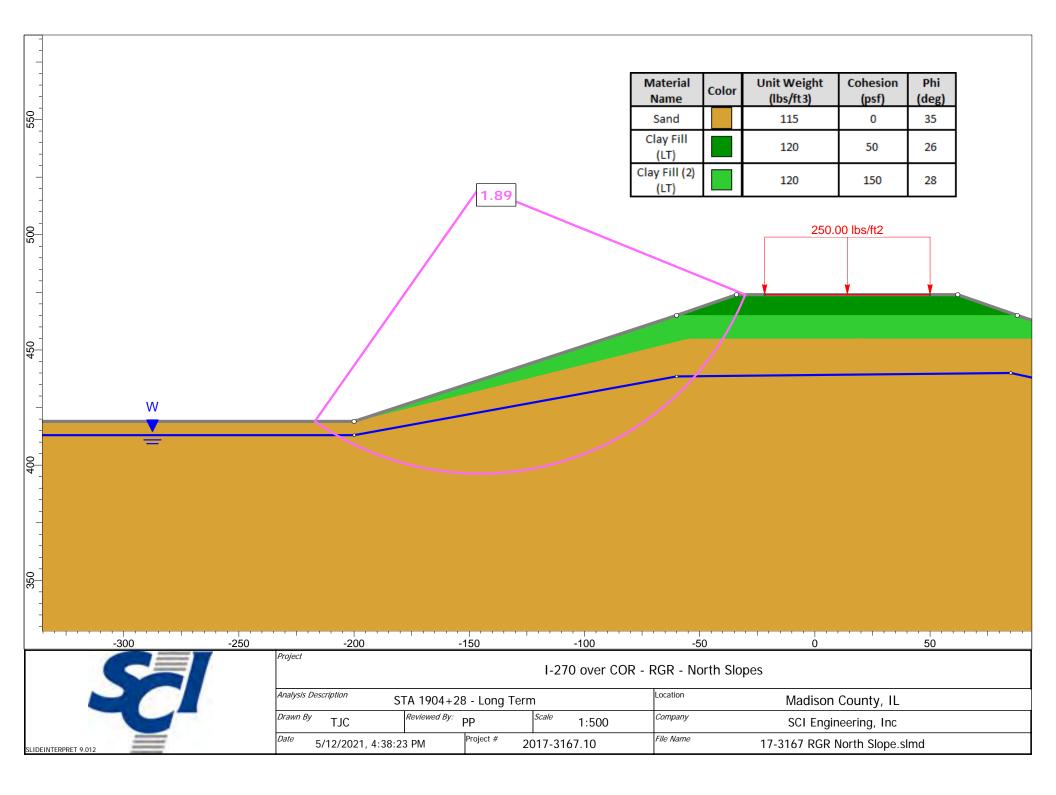
Soil Test Data

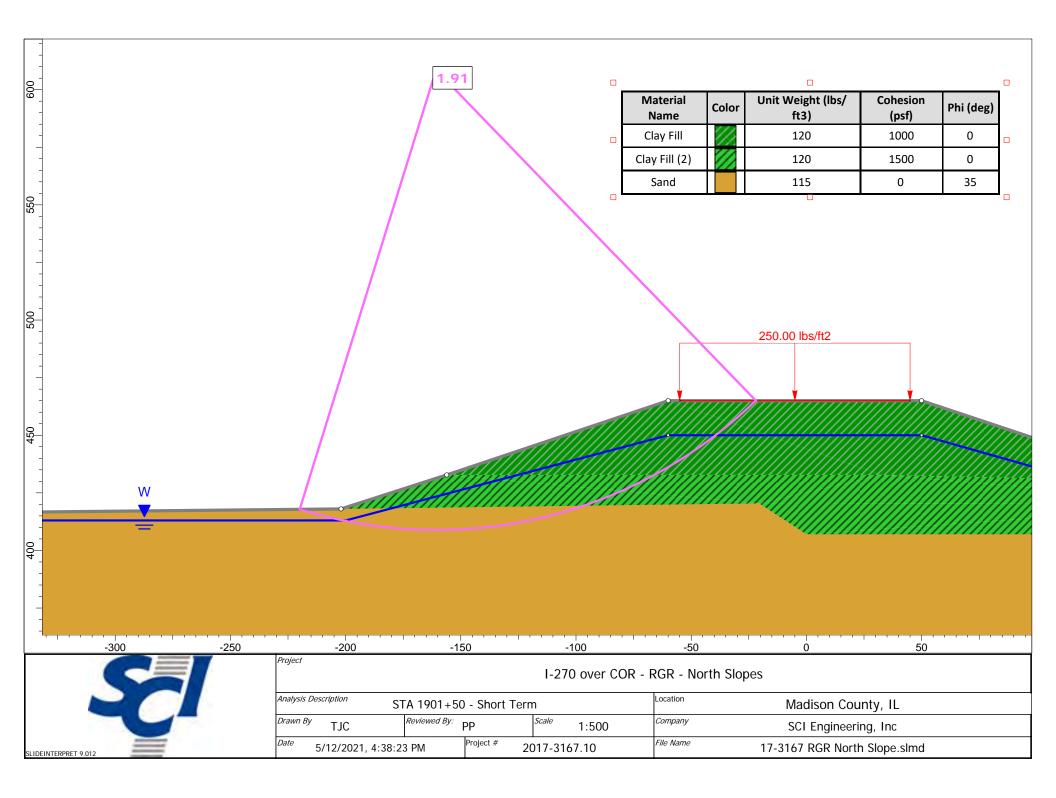


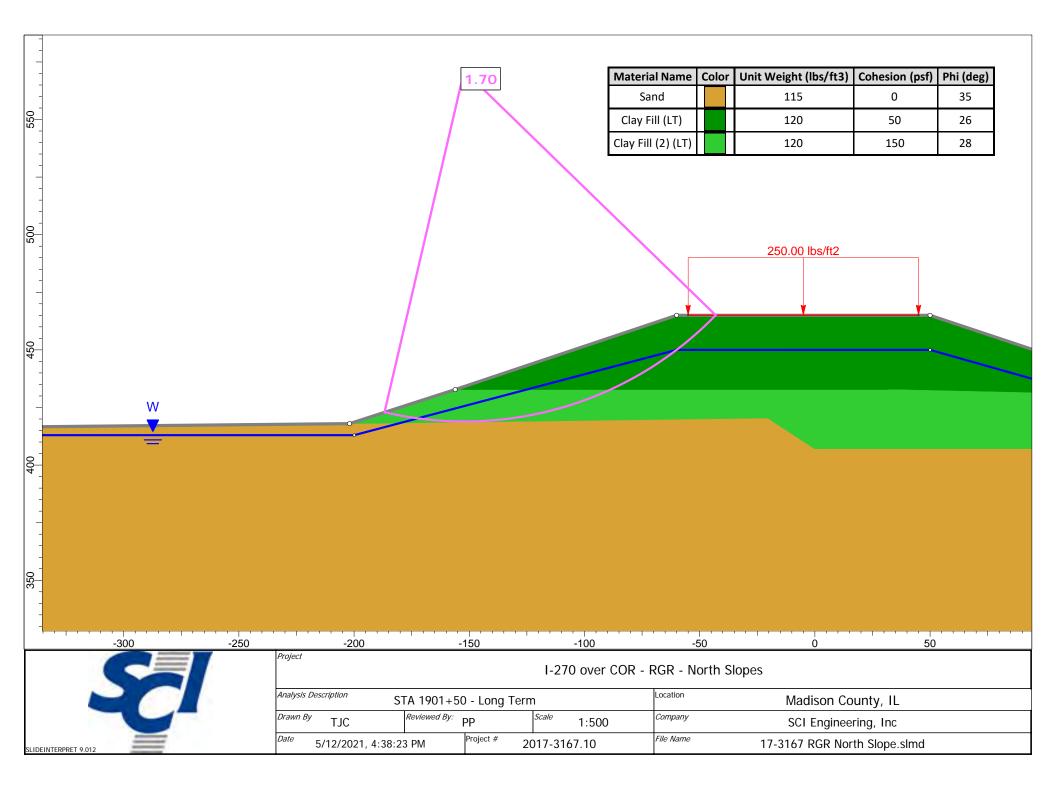
IPPORT RATING - AASHTO 2017-3167.10 1270 COR BRIDGE - NO PLOG.GPJ IL_DOT.GDT 7/9/21

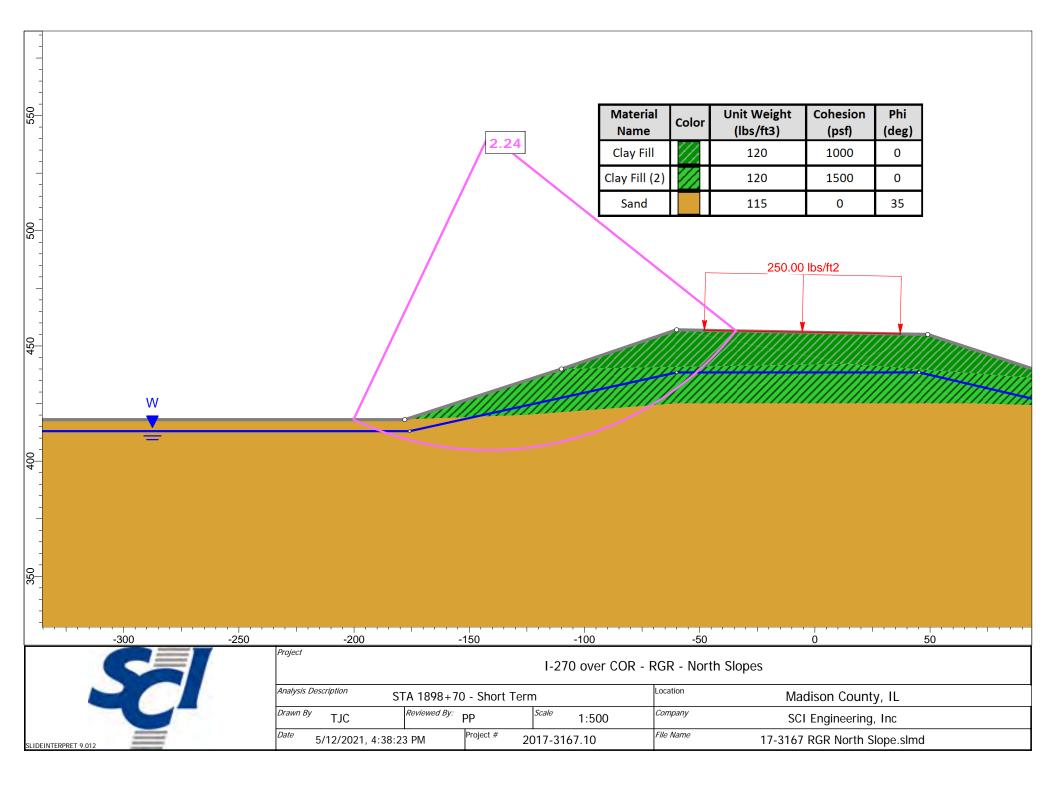
Appendix D

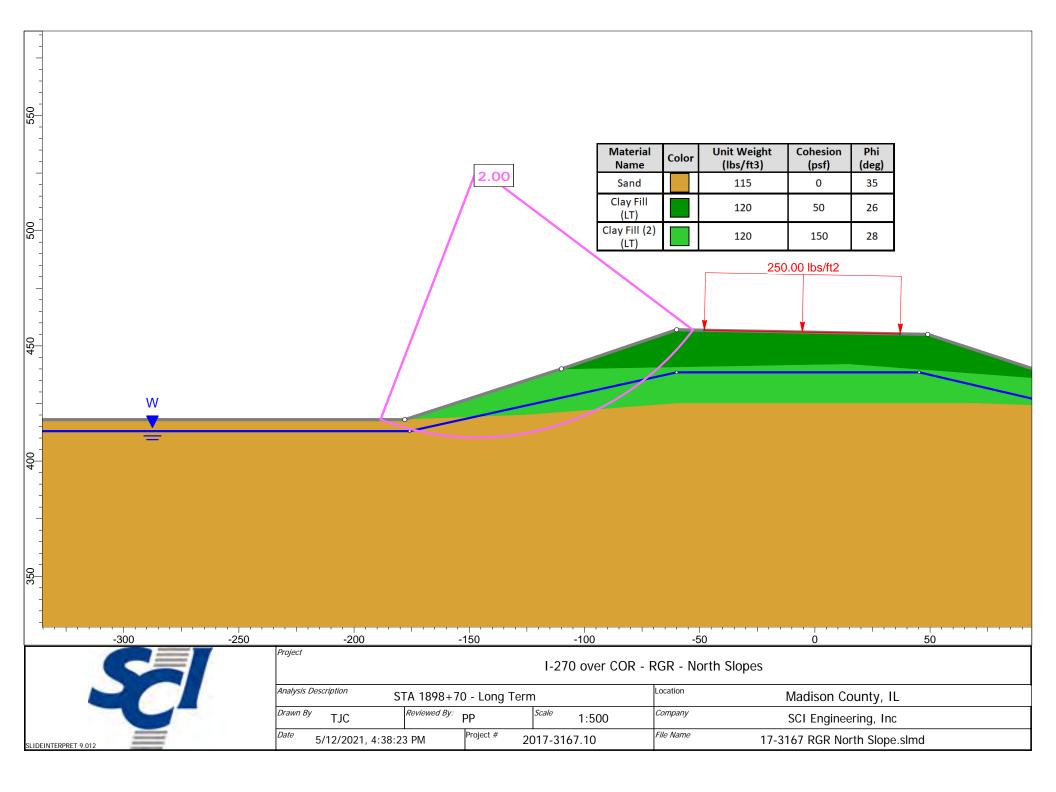




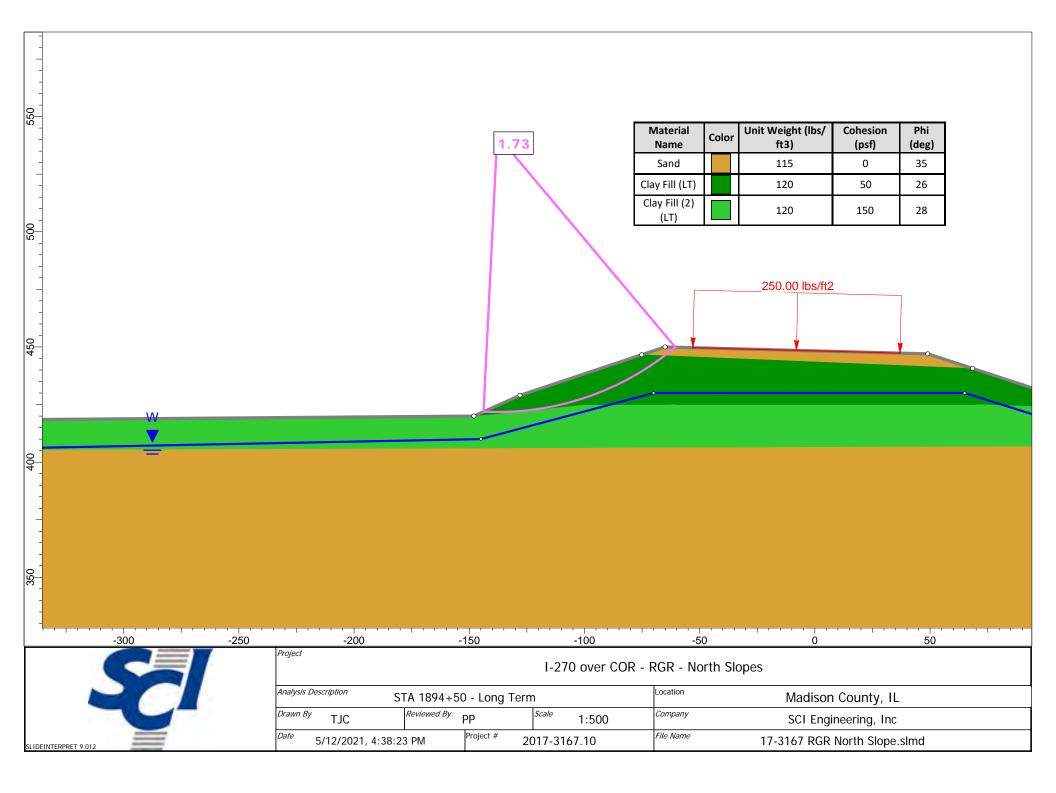


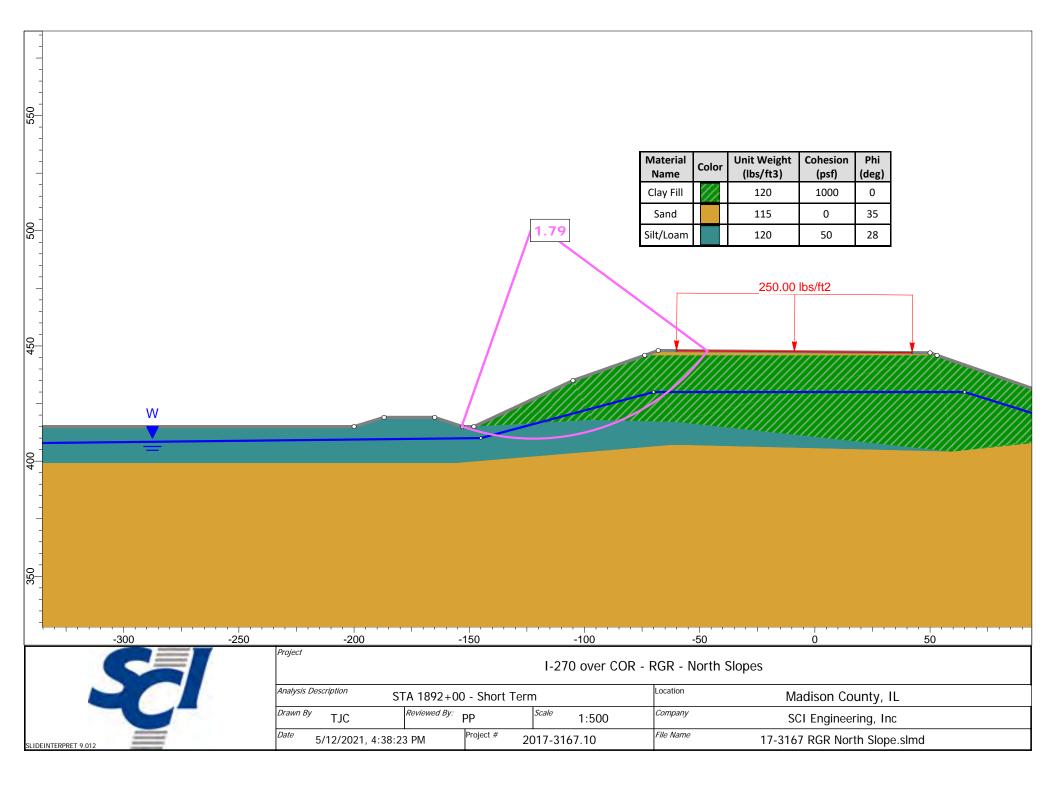


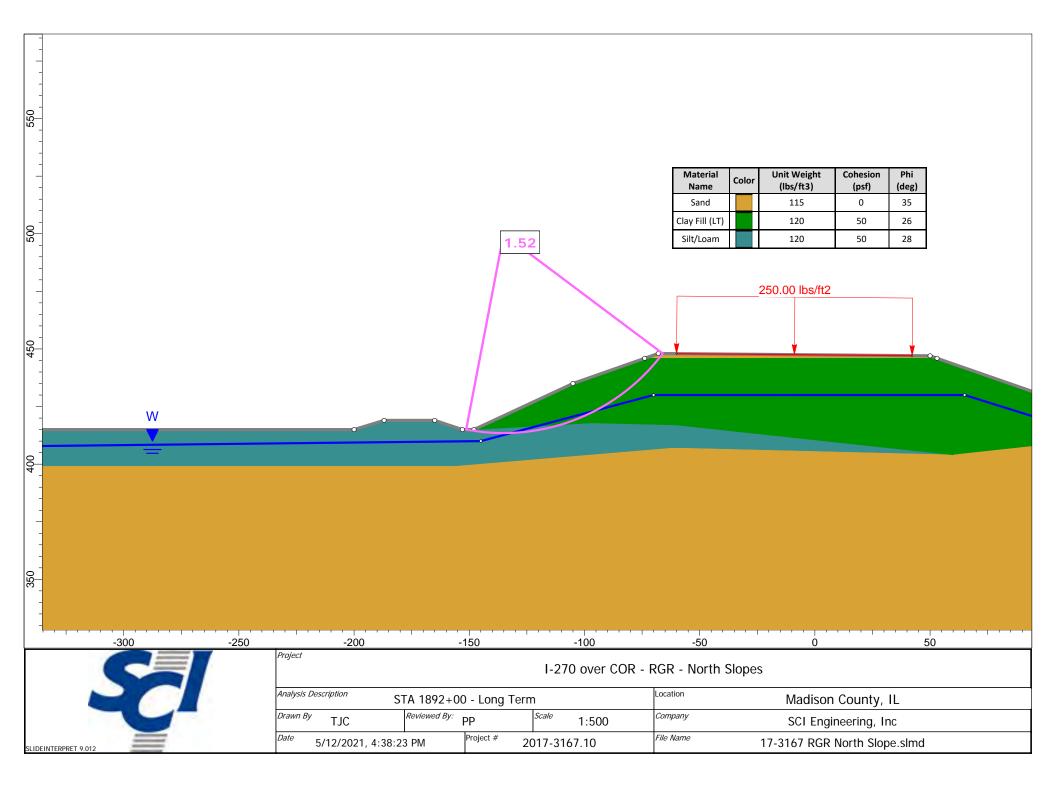


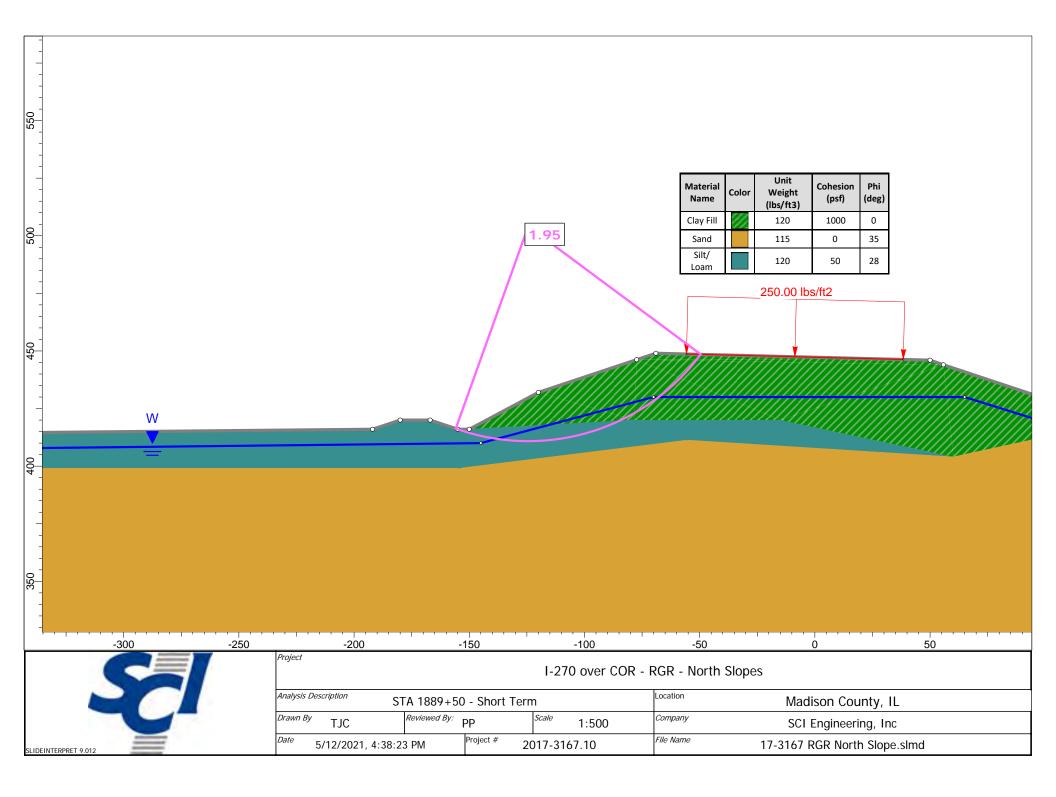


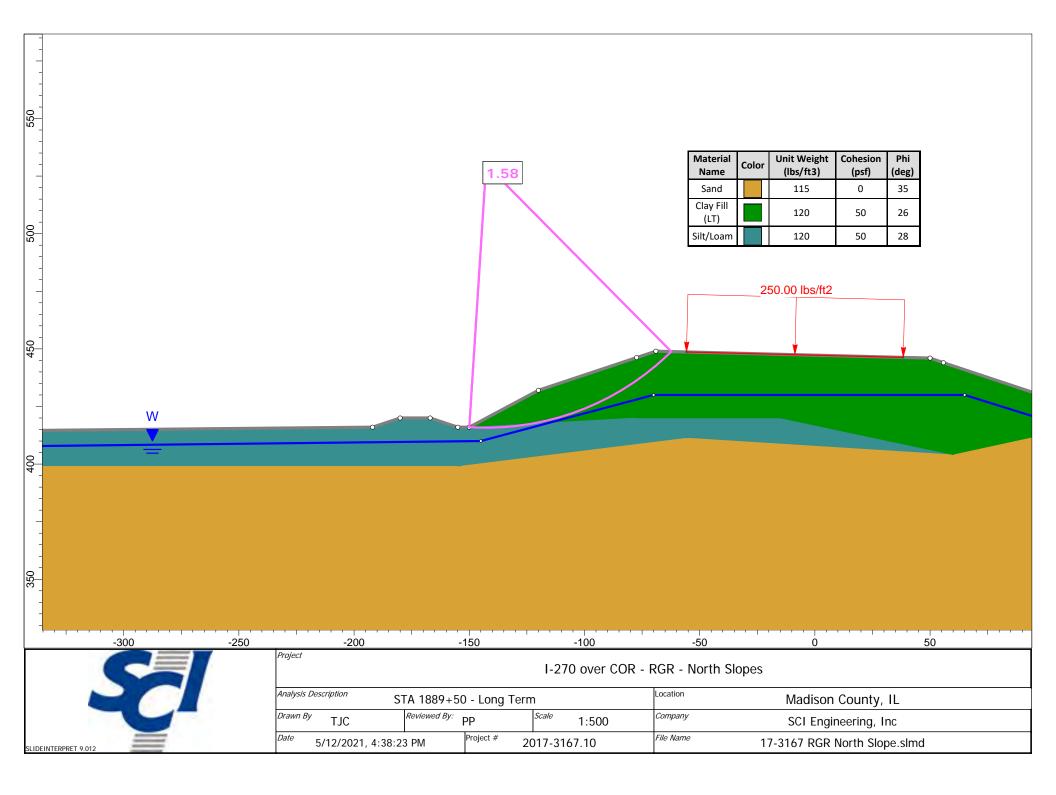
			Material Name Color U Clay Fill Image: Clay Fill Image: Clay Fill Sand Image: Clay Fill Image: Clay Fill Clay Fill Image: Clay Fill Image: Clay Fill Sand Image: Clay Fill Image: Clay Fill Sand Image: Clay Fill Image: Clay Fill Sand Image: Clay Fill Image: Clay Fill <tr< th=""><th>120 120 115</th><th>Cohesion (psf) Phi (deg) 1000 0 1500 0 0 35</th><th></th></tr<>	120 120 115	Cohesion (psf) Phi (deg) 1000 0 1500 0 0 35	
	-200	-150	-100	-50	· · · · · · · · · · · · · · · · · · ·	50
-300 -250	Project		0 over COR - RGR -	North Slones		
-300 -250		1-2/(North Slopes		
	Analysis Description ST	TA 1894+50 - Short Term	Locatior			IL
SI	Analysis Description ST	I-270 FA 1894+50 - Short Term Reviewed By: PP		1	Madison County, SCI Engineering, II	



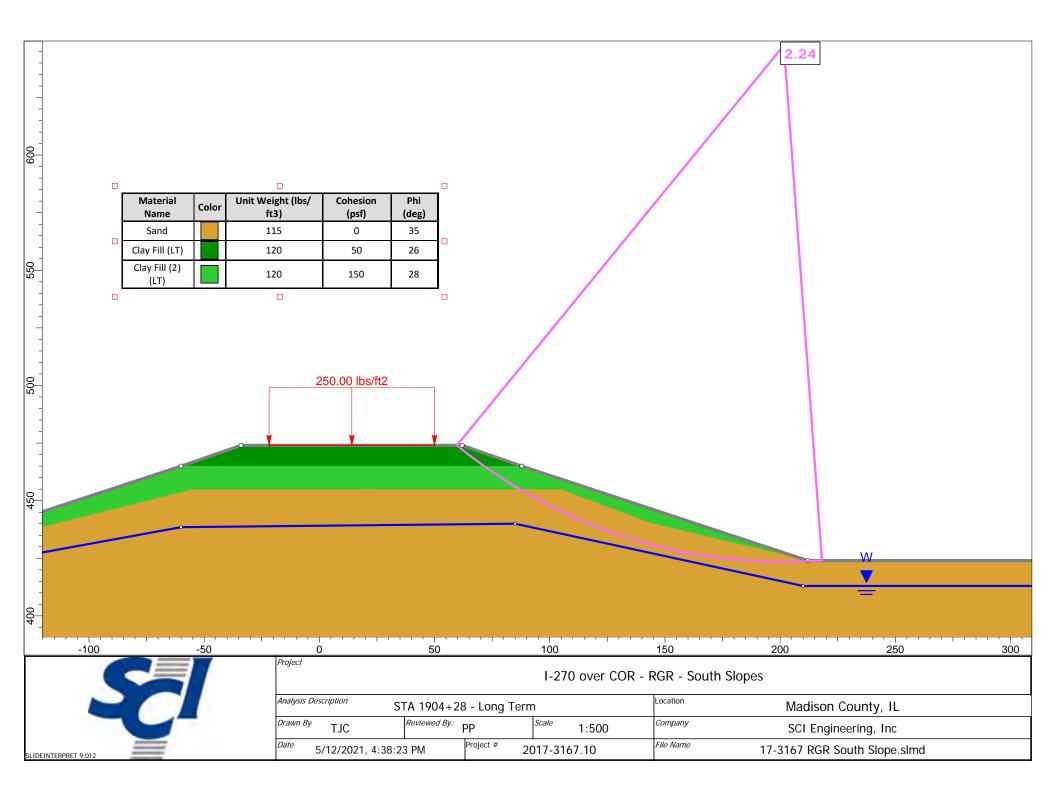


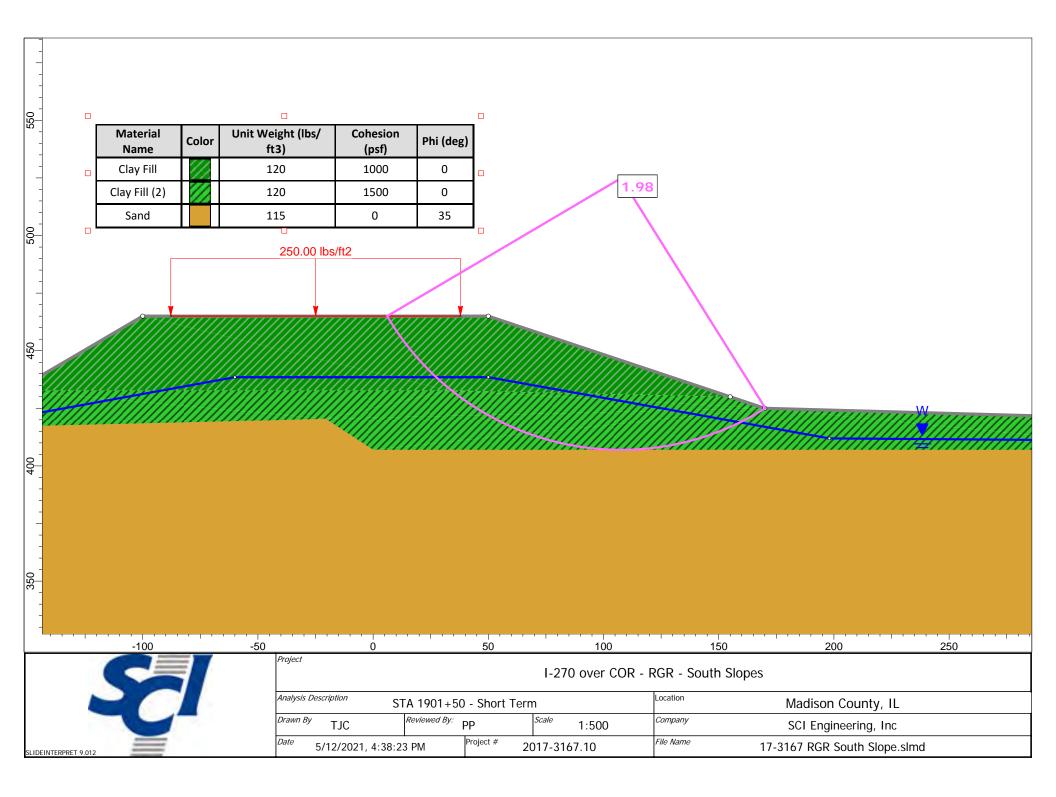


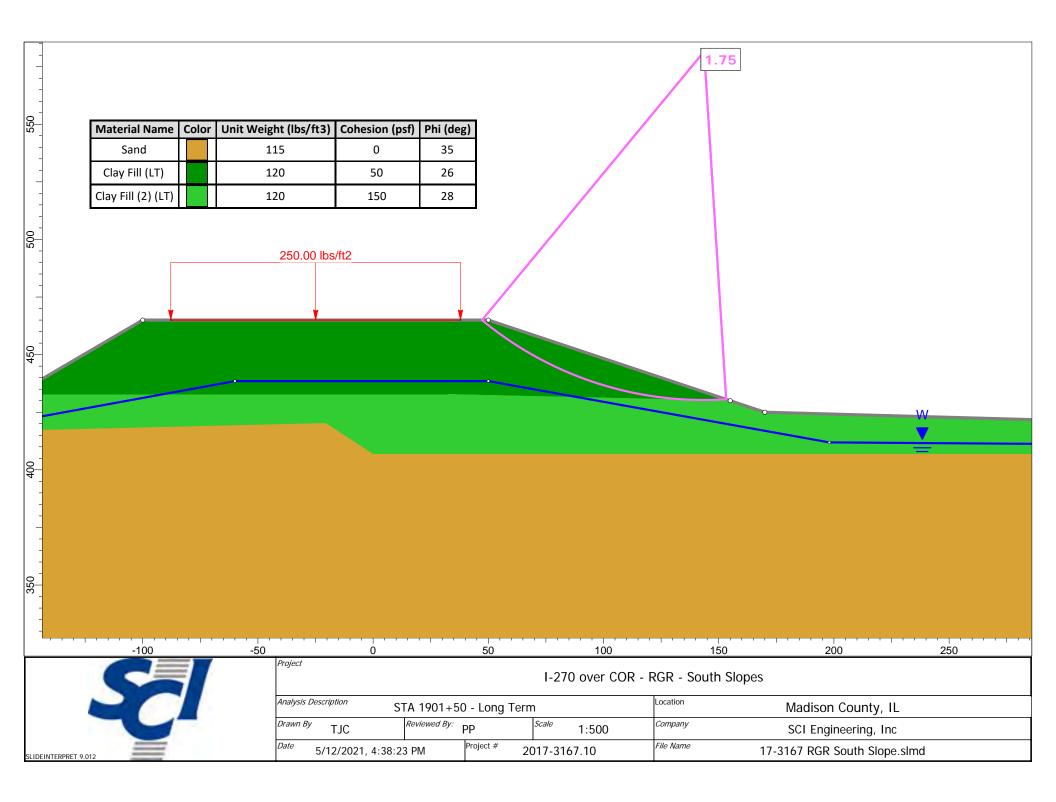


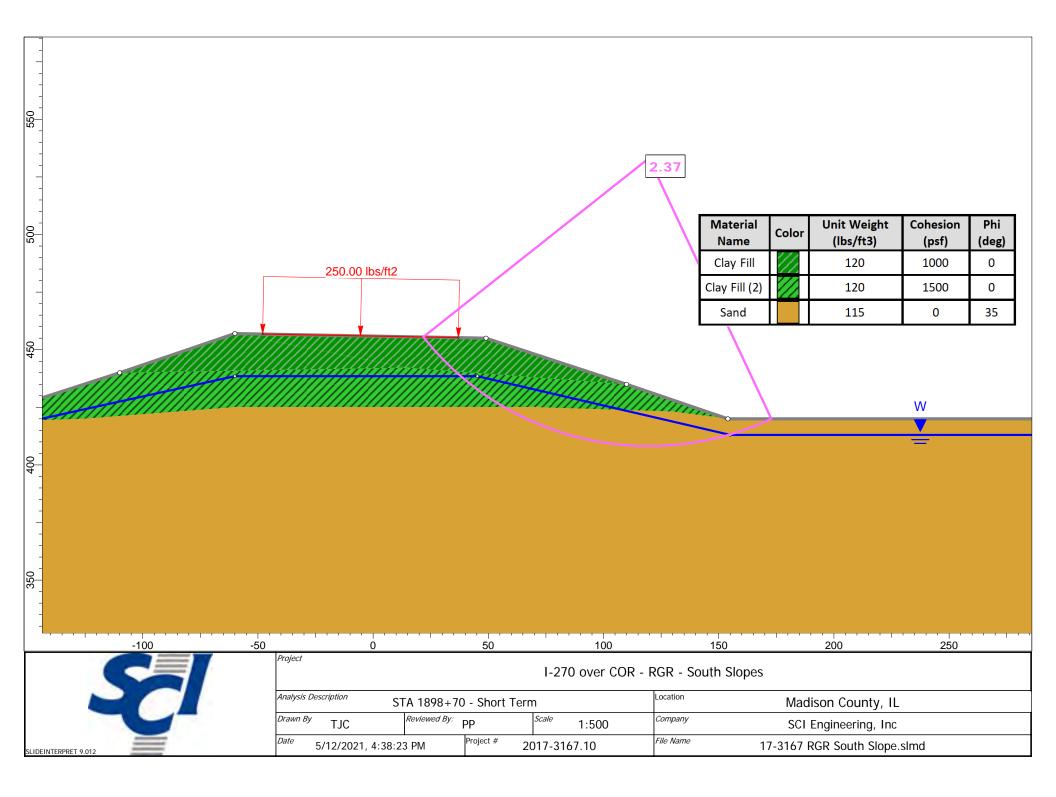


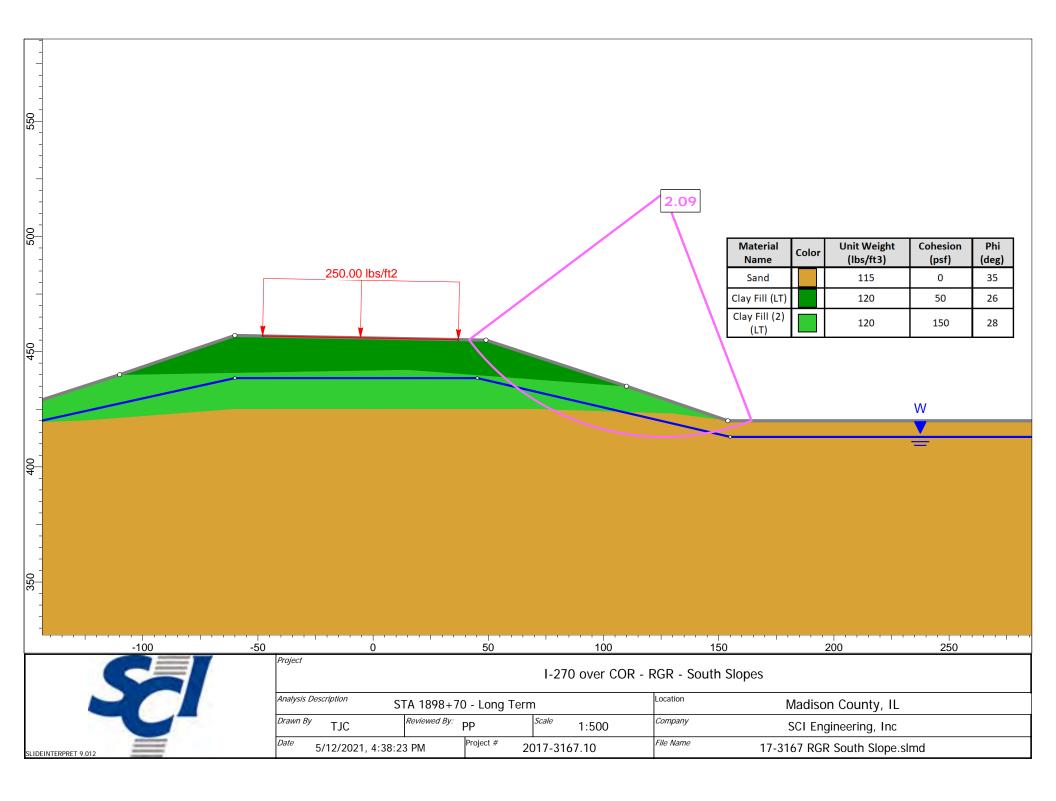
	Material NameColorClay FillClay Fill (2)	Unit Weight (lbs/ ft3) 120 120	Cohesion (psf) 1000 1500	Phi (deg) 0 0			2.39	
	Sand	115	0 250.00 lbs/ft2	35				
							Minimum	W
	- 100	-50 C	, , , , , , , , , , , , , , , , , , ,	50		150	200	250
		Project				- RGR - South Slo		200
1								
		Analysis Description	STA 1904+2	8 - Short Te	erm	Location	Madison County,	IL
	C	Analysis Description Drawn By TJC Date 5/12/2021	STA 1904+2 Reviewed By:	8 - Short Te PP Project #	erm ^{Scale} 1:500	Location Company File Name	Madison County, SCI Engineering, Ir	

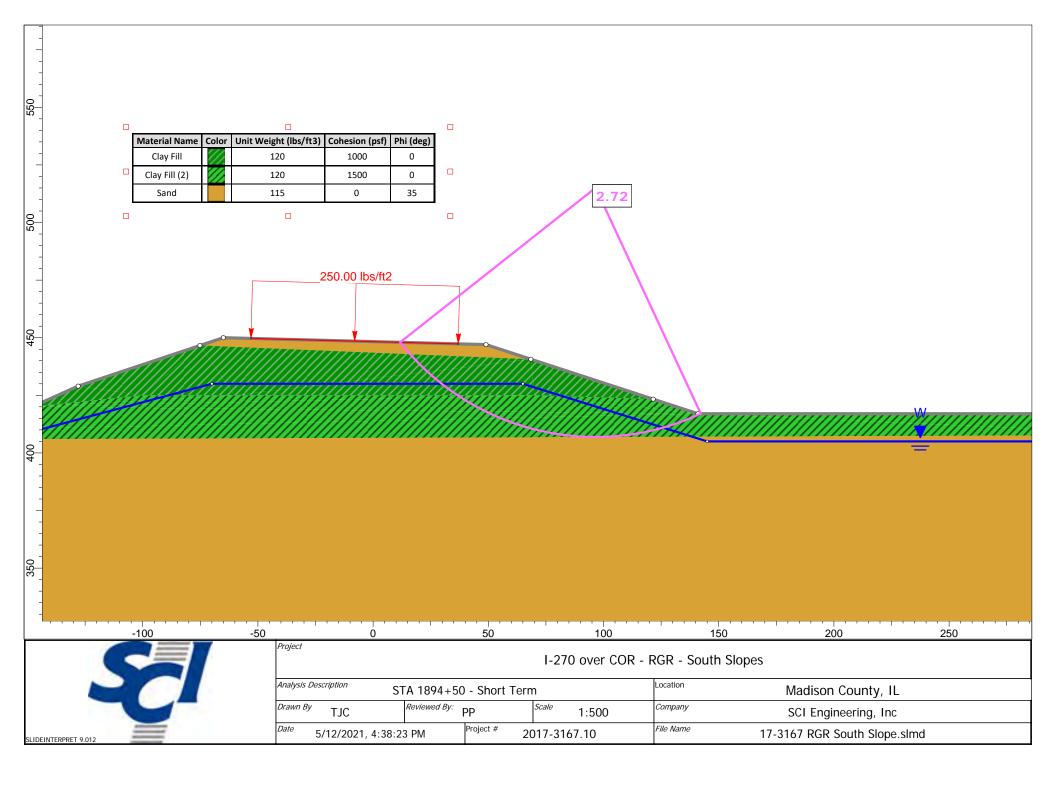


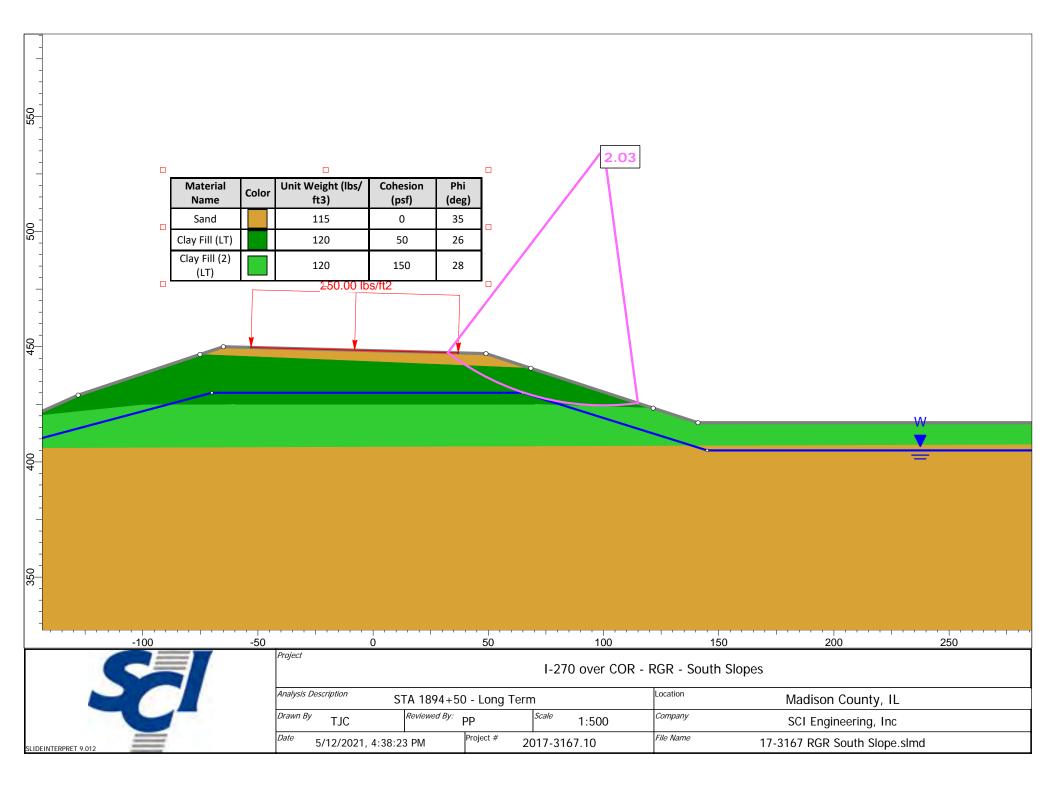


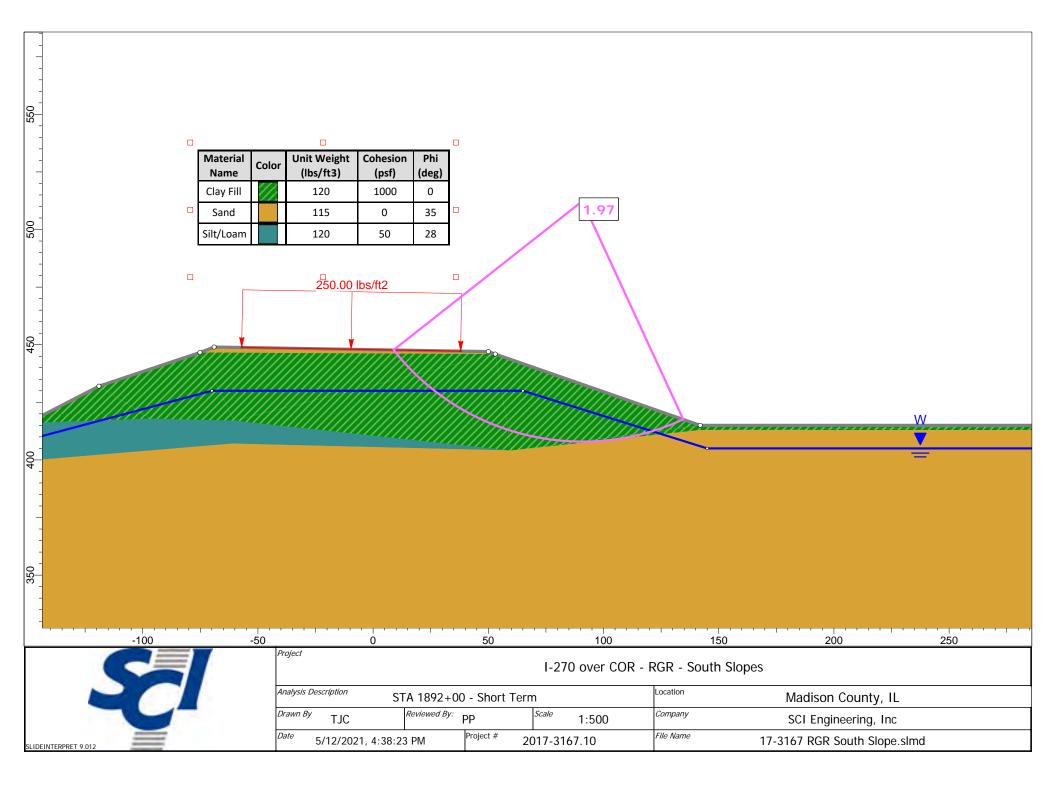


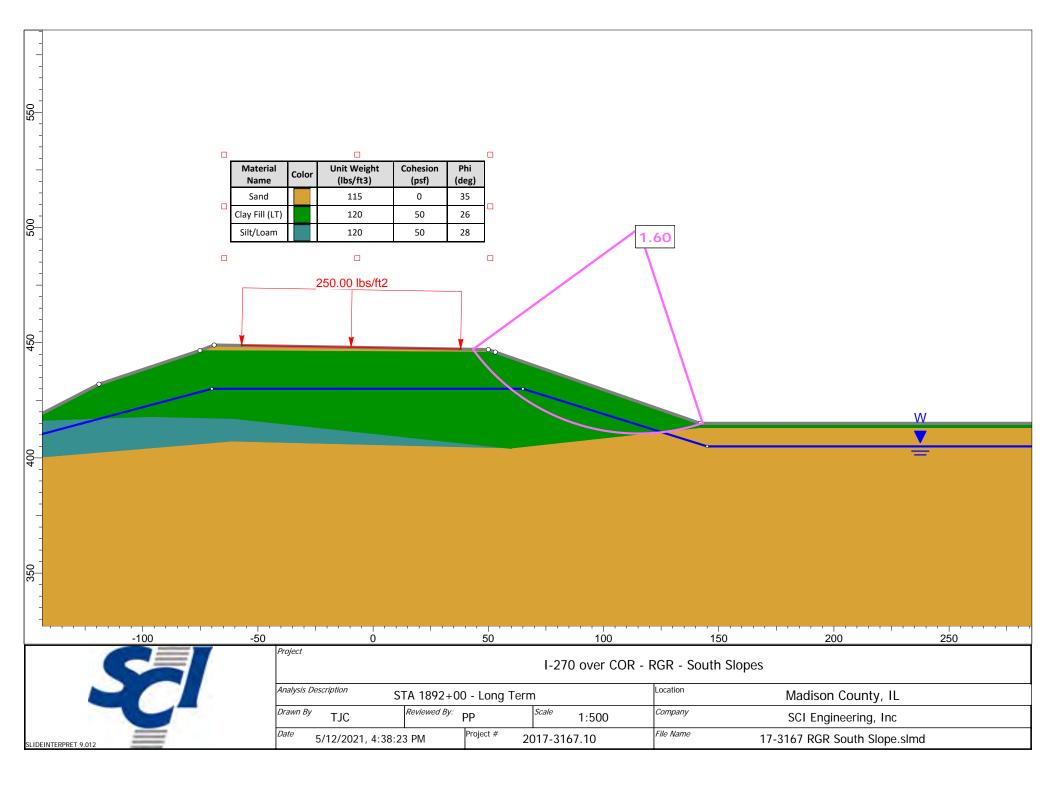


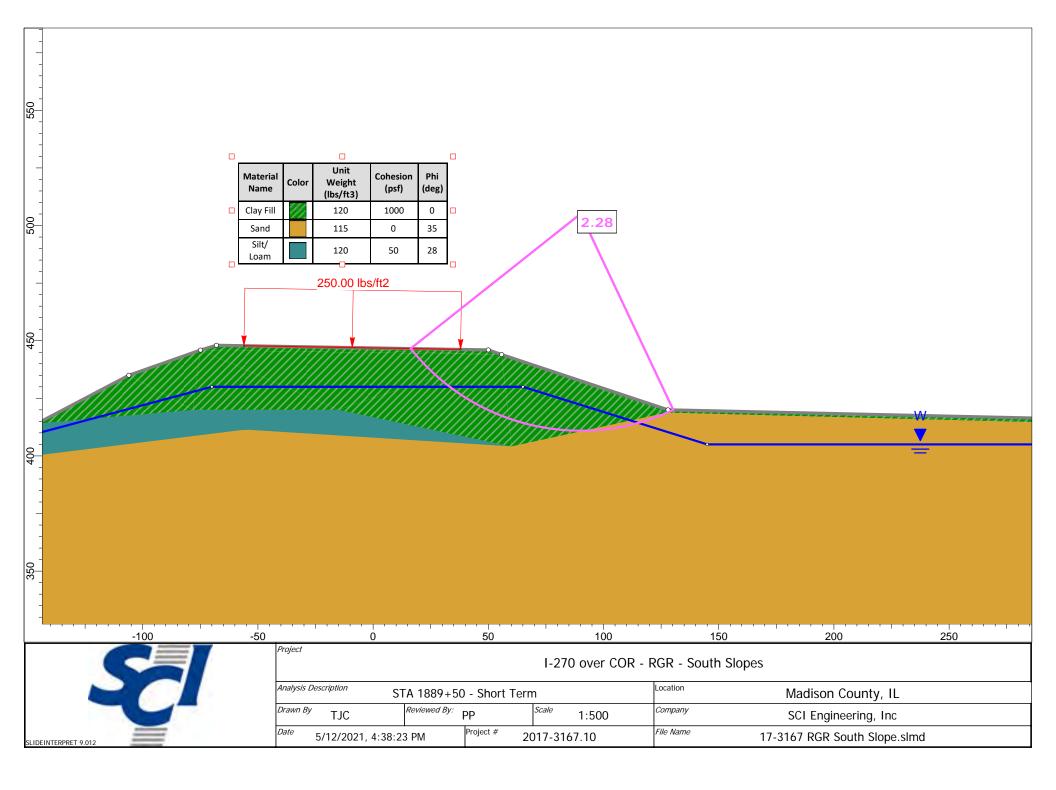


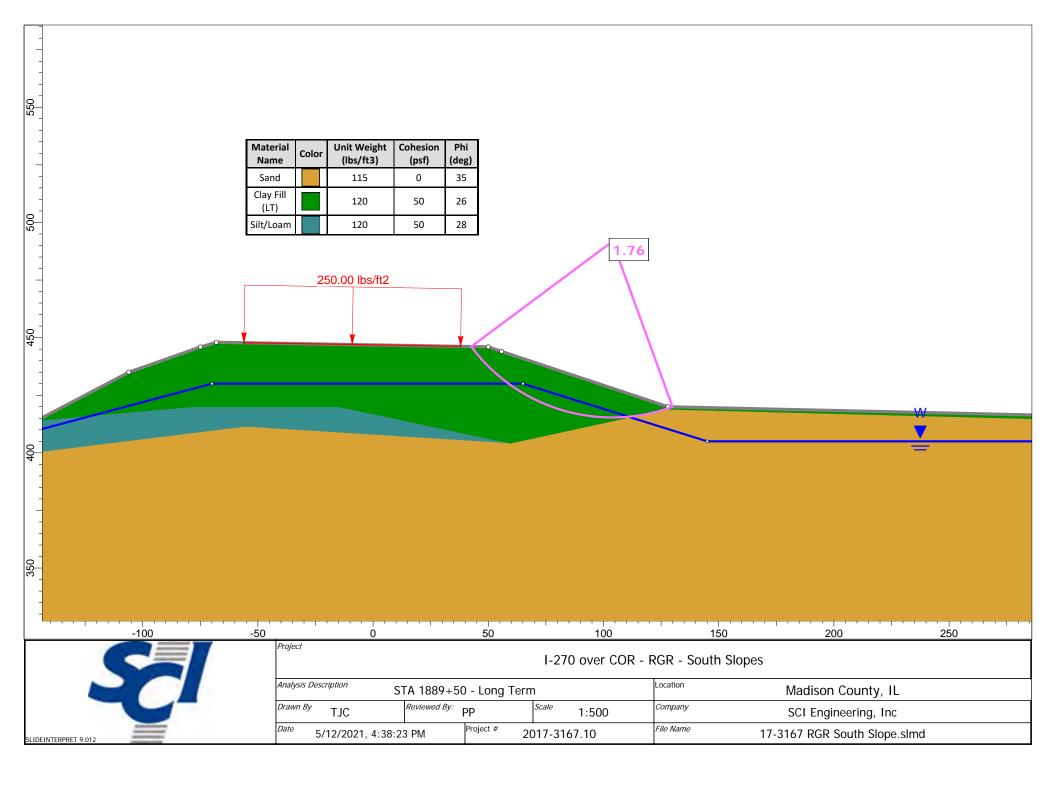












Appendix E



GIS Information for the Explored RGR Borings/Soundings

Project: **I-270 over Mississippi River** SCI No. **2017-3167.10 Task 200**

Boring/ Sounding	IL Northing	IL Easting	Project Northing	Project Easting	Latitude	Longitude	Section	Township	Range	EB Sta	EB OS FT	EB OS Side	WB Sta	WB OS FT	WB OS Side	Elevation FT
B-119	762605.3833	2298633.3980	762662.1559	298804.5210	38.7610421	-90.1594832	36	4 North	9 West	1841+58.73	3.66	LT	2841+67.38	29.12	RT	442.4
B-120	762557.9156	2298970.1410	762614.6846	299141.2891	38.7609117	-90.1583023	36	4 North	9 West	1844+98.98	2.30	RT	2845+04.56	32.26	RT	443.7
B-121	762542.8562	2299273.2950	762599.6241	299444.4656	38.7608703	-90.1572391	36	4 North	9 West	1848+02.12	8.08	RT	2848+05.16	36.09	RT	444.7
B-122	762555.1554	2299560.5250	762611.9242	299731.7170	38.7609039	-90.1562318	36	4 North	9 West	1850+88.90	11.21	RT	2850+89.66	37.88	RT	444.9
B-123	762596.8499	2299881.0340	762653.6218	300052.2499	38.7610183	-90.1551078	36	4 North	9 West	1854+11.03	14.87	RT	2854+09.31	40.63	RT	444.1
B-124	762653.0141	2300143.3750	762709.7902	300314.6104	38.7611725	-90.1541877	36	4 North	9 West	1856+78.10	18.60	RT	2856+74.36	44.10	RT	443.1
B-125	762753.7384	2300464.4140	762810.5220	300635.6733	38.7614489	-90.1530618	36	4 North	9 West	1860+12.82	20.89	RT	2860+06.54	46.68	RT	442.5
B-126	762866.1138	2300737.0910	762922.9058	300908.3706	38.7617573	-90.1521054	36	4 North	9 West	1863+05.98	23.72	RT	2862+97.41	50.34	RT	442.5
B-127	763013.4878	2301018.8850	763070.2908	301190.1856	38.7621619	-90.1511171	25	4 North	9 West	1866+21.89	25.51	RT	2866+10.74	63.62	RT	442.5
B-128	763381.7273	2301625.8660	763438.5577	301797.2118	38.7631727	-90.1489881	30	4 North	9 West	1873+30.14	48.16	RT	2873+17.95	76.45	RT	441.5
B-129	763278.9194	2301709.8660	763335.7421	301881.2180	38.7628904	-90.1486936	30	4 North	9 West	1873+43.58	180.25	RT	2873+31.59	208.52	RT	419.5
B-132	763673.9406	2302098.6670	763730.7927	302270.0480	38.7639748	-90.1473297	30	4 North	9 West	1878+90.30	48.85	RT	2878+80.99	72.54	RT	441.4
B-133	763583.4181	2302164.1130	763640.2635	302335.4989	38.7637262	-90.1471003	30	4 North	9 West	1879+04.87	159.65	RT	2878+96.94	183.17	RT	412.4
B-136	763901.4319	2302532.0200	763958.3010	302703.4332	38.7645992	-90.1458097	30	4 North	9 West	1883+83.92	30.53	RT	2883+76.66	48.55	RT	442.2
B-137	763802.5020	2302578.4750	763859.3637	302749.8917	38.7643275	-90.1456469	30	4 North	9 West	1883+89.17	139.72	RT	2883+83.28	157.66	RT	419.1
B-138	763985.9190	2302503.3450	764042.7943	302674.7561	38.7648312	-90.1459102	30	4 North	9 West	1883+89.66	58.51	LT	2883+81.37	40.55	LT	446.3
B-139	764072.8765	2302480.0110	764129.7583	302651.4204	38.7650700	-90.1459920	30	4 North	9 West	1884 + 00.88	147.81	LT	2883+91.61	129.99	LT	419.7
B-144	764057.3798	2302994.1500	764114.2605	303165.5976	38.7650271	-90.1441888	30	4 North	9 West	1888+75.49	37.13	RT	2888+69.32	55.63	RT	441.9
B-145	763970.2527	2303012.5300	764027.1269	303183.9790	38.7647879	-90.1441244	30	4 North	9 West	1888+68.39	125.91	RT	2888+61.81	144.38	RT	429.7
B-146	764134.7746	2302972.7030	764191.6610	303144.1491	38.7652396	-90.1442640	30	4 North	9 West	1888+76.70	43.18	LT	2888+70.86	24.67	LT	447.8
B-147	764228.5067	2302950.1620	764285.4001	303121.6064	38.7654970	-90.1443429	30	4 North	9 West	1888+81.31	139.47	LT	2888+75.87	120.95	LT	417.4
B-152	764149.5216	2303391.6780	764206.4091	303563.1552	38.7652799	-90.1427945	30	4 North	9 West	1892+87.25	42.45	RT	2892+83.83	61.13	RT	442.1
B-153	764054.6432	2303403.5000	764111.5237	303574.9781	38.7650193	-90.1427531	30	4 North	9 West	1892+80.16	137.81	RT	2892+77.99	156.58	RT	439.3
B-154	764224.4477	2303375.2720	764281.3408	303546.7480	38.7654856	-90.1428520	30	4 North	9 West	1892+85.77	34.25	LT	2892+81.34	15.54	LT	449.0
B-155	764330.1007	2303351.5690	764387.0017	303523.0433	38.7657757	-90.1429350	30	4 North	9 West	1892+83.21	142.50	LT	2892+77.42	123.75	LT	418.6
B-160	764214.3188	2303928.1310	764271.2111	304099.6482	38.7654564	-90.1409262	30	4 North	9 West	1898+33.46	51.34	RT	2898+31.93	62.87	RT	448.8
B-161	764047.1951	2303917.9870	764104.0750	304089.5034	38.7649985	-90.1409487	30	4 North	9 West	1898+09.30	217.14	RT	2898+10.05	228.97	RT	429.4
B-162	764284.9945	2303924.4420	764341.8921	304095.9589	38.7656514	-90.1409259	30	4 North	9 West	1898+35.23	19.41	LT	2898+32.75	7.91	LT	456.7
B-163	764413.8938	2303912.6660	764470.8010	304084.1820	38.7660054	-90.1409670	30	4 North	9 West	1898+33.45	148.84	LT	2898+29.30	137.30	LT	419.7
B-169	763978.1496	2304436.5570	764035.0244	304608.1120	38.7648085	-90.1391301	30	4 North	9 West	1903+27.09	319.12	RT	2903+24.89	330.12	RT	427.5
B-170	764318.8960	2304468.5540	764375.7961	304640.1114	38.7657441	-90.1390175	30	4 North	9 West	1903+80.15	19.01	LT	2903+77.95	8.01	LT	472.8
C-131	763393.6229	2301875.8730	763450.4542	302047.2374	38.7632052	-90.1481113	30	4 North	9 West	1875+46.97	175.83	RT	2875+37.15	203.22	RT	419.5
C-135	763643.4383	2302341.5330	763700.2881	302512.9321	38.7638909	-90.1464780	30	4 North	9 West	1880+97.37	187.53	RT	2880+90.78	208.88	RT	410.1
C-141	763893.4034	2302790.2210	763950.2719	302961.6535	38.7645770	-90.1449042	30	4 North	9 West	1886+26.43	130.49	RT	2886+18.89	147.96	RT	424.6
C-142	764069.5379	2302736.8050	764126.4195	302908.2335	38.7650607	-90.1450914	30	4 North	9 West	1886+34.66	53.40	LT	2886+27.91	35.89	LT	447.2
C-143	764160.7608	2302716.5320	764217.6492	302887.9590	38.7653112	-90.1451624	30	4 North	9 West	1886+45.43	146.21	LT	2886+39.09	128.65	LT	418.5



GIS Information for the Explored RGR Borings/Soundings

Project: **I-270 over Mississippi River** SCI No. **2017-3167.10 Task 200**

Boring/ Sounding	IL Northing	IL Easting	Project Northing	Project Easting	Latitude	Longitude	Section	Township	Range	EB Sta	EB OS FT	EB OS Side	WB Sta	WB OS FT	WB OS Side	Elevation FT
C-148	764109.8659	2303202.4780	764166.7505	303373.9412	38.7651711	-90.1434581	30	4 North	9 West	1890+92.17	40.39	RT	2890+86.87	59.78	RT	441.7
C-149	764018.0928	2303223.3660	764074.9705	303394.8307	38.7649191	-90.1433849	30	4 North	9 West	1890+90.75	134.51	RT	2890+85.04	153.89	RT	433.8
C-150	764187.5983	2303186.5180	764244.4887	303357.9800	38.7653845	-90.1435140	30	4 North	9 West	1890+94.99	38.92	LT	2890+90.03	19.52	LT	448.4
C-151	764271.1162	2303169.1280	764328.0128	303340.5887	38.7656139	-90.1435749	30	4 North	9 West	1890+97.70	124.19	LT	2890+93.08	104.78	LT	421.5
C-156	764187.7030	2303629.1290	764244.5934	303800.6239	38.7653845	-90.1419617	30	4 North	9 West	1895+30.09	44.90	RT	2895+27.60	60.42	RT	443.2
C-157	764085.5789	2303647.3810	764142.4617	303818.8773	38.7651041	-90.1418978	30	4 North	9 West	1895+33.70	148.59	RT	2895+32.64	164.06	RT	443.8
C-158	764258.7583	2303619.4950	764315.6540	303790.9892	38.7655796	-90.1419954	30	4 North	9 West	1895+30.70	26.81	LT	2895+27.26	11.29	LT	450.5
C-159	764362.4766	2303603.4870	764419.3800	303774.9800	38.7658644	-90.1420515	30	4 North	9 West	1895+29.67	131.76	LT	2895+24.90	116.21	LT	421.0
C-160	764213.9759	2303924.3580	764270.8682	304095.8749	38.7654564	-90.1409262	30	4 North	9 West	1898+29.63	51.39	RT	2898+28.09	62.97	RT	448.9
C-164	764126.5555	2304222.4290	764183.4413	304393.9681	38.7652160	-90.1398810	30	4 North	9 West	1901+22.56	157.72	RT	2901+20.36	168.72	RT	457.6
C-165	763997.9048	2304242.7810	764054.7810	304414.3216	38.7648629	-90.1398097	30	4 North	9 West	1901+34.90	287.39	RT	2901+32.70	298.39	RT	424.3
C-166	764305.5089	2304238.9570	764362.4080	304410.4973	38.7657075	-90.1398228	30	4 North	9 West	1901+50.15	19.88	LT	2901+47.95	8.88	LT	465.9
C-167	764468.1542	2304259.2890	764525.0654	304430.8308	38.7661541	-90.1397513	30	4 North	9 West	1901+80.52	180.97	LT	2901+78.32	169.97	LT	419.3
C-168	764145.3707	2304511.0040	764202.2579	304682.5646	38.7652680	-90.1388690	30	4 North	9 West	1904+11.77	156.82	RT	2904+09.56	167.82	RT	466.6
C-171	764491.8838	2304512.3950	764548.7968	304683.9557	38.7662191	-90.1388636	30	4 North	9 West	1904+34.63	188.96	LT	2904+32.43	177.96	LT	420.7

Important Information about Your Geotechnical Engineering Report

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

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

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you* — should apply the report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- · not prepared for the specific site explored, or
- · completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

 the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,

- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final*, because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual

subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.*

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk*.

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that

have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations" many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geotechnical* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures*. If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else*.

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the express purpose of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, a number of mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.

Rely, on Your ASFE-Member Geotechncial Engineer for Additional Assistance

Membership in ASFE/THE BEST PEOPLE ON EARTH exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with your ASFE-member geotechnical engineer for more information.



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