

June 1, 2022

LG&E and KU One Quality Street Lexington, KY 40507

RE: Report of Geotechnical Exploration Hardin Co. – Glendale South Structure 10A Glendale, KY AEI Project No. 222-032

1. INTRODUCTION

A summary of the geotechnical parameters necessary to facilitate foundation design has been prepared for the immediate use of the design team. The project is a part of the Hardin Co. – Glendale South line in Glendale, KY. This summary is provided for Structure 10A, a 3CS Tower.

Structure Number	Structure Description	Height (ft)	Centerline Elevation (ft)	Latitude (DMS)	Longitude (DMS)	Trans. Moment (ft-k)	Long. Moment (ft-k)
10A	3CS Tower	90	751.9	37°36′4.59″N	85°52′41.32″W	4,196	4,453
-	Leg 1	-	751.6	37°36′4.42″N	85°52′41.27″W	-	-
-	Leg 2	-	753.2	37°36′4.63″N	85°52′41.12″W	-	-
-	Leg 3	-	752.2	37°36′4.76″N	85°52′41.36″W	-	-
_	Leg 4	-	751.5	37°36′4.54″N	85°52′41.53″W	_	_

Table 1: Tower Details

2. DRILLING AND SAMPLING

The geotechnical exploration consisted of four borings, including one soil test boring, one soil test boring with rock core and two rockline soundings. The soil test borings were advanced to a depth of 49 feet and about 61 feet beneath the surface. The rockline soundings were advanced to a depth of about 32 feet to 60 feet beneath the surface. The boring locations were staked by KU personnel. A boring layout is included in Appendix A of this report.

3. SUBSURFACE SOIL CONDITIONS

The generalized subsurface conditions encountered at the boring locations, including descriptions of the various strata and their depths and thicknesses are presented on the typed boring logs in Appendix B.

Topsoil was encountered at the surface with thicknesses of approximately five to six inches. Beneath the surface materials, sandy lean clay, clayey sand and poorly graded sand with clay were encountered to refusal depths in each of the borings. The sandy lean clay was typically described as brown in color, saturated to wet and very stiff in relative soil strength. The clayey sand was typically described as fine to medium grained, brown to gray in color, wet and loose to medium dense in relative density. The poorly graded sand with clay was typically described as fine to medium grained, yellowish brown to white in color, wet to saturated and medium dense in relative density.

Detailed laboratory results are included in Appendix C of this report.

4. BEDROCK CONDITIONS

Refusal, as would be indicated by the Driller on the field boring logs, indicates a depth where essentially no downward progress can be made by the auger. It is normally indicative of a very hard or very dense material such as large boulders or the upper bedrock surface or where the N-value indicates essentially no penetration of the split-spoon sampler. Auger refusal was encountered in the soil test borings at the depths shown in the table below.

			Surface	Auge	er Refusal								
			Elevation (ft.)	Depth	Elevation								
Hole No.	Latitude	Longitude	MSL	(ft.)	(ft.) MSL								
STR 10A L1	37°36′4.59″N	85°52′41.32″W	749.8	26.8	723.0								
STR 10A L2	37°36′4.42″N	85°52′41.27″W	749.4	N/A*	N/A*								
STR 10A L3	37°36′4.63″N	85°52′41.12″W	750.5	N/A*	N/A*								
STR 10A L4	37°36′4.76″N	85°52′41.36″W	751.0	31.6	719.4								

Table 2: Structure 10A – Summary of Borings

*Auger refusal was not encountered

5. FOUNDATION DESIGN PARAMETERS

5.1 <u>Lateral Design Parameters</u> – MFAD soil parameters are provided in the table below. These values are derived from the laboratory and standard penetration testing in combination with recommended soil properties from the Naval Engineering Command (NAVFAC) Design Manual 7.02. The soil deformation moduli provided below were derived from Figure 3-2 and Figure 3-4 of the User Guide for MFAD 5.0 (Moment Foundation Analysis and Design).

Structure			Approximate	Modulus of
Structure Number	Soil Type	Depth (feet)	Angle of Internal	Deformation
Number			Friction	(ksi)
STR 10A	SC	5.0-11.0	32°	1.0
STR 10A	SC	11.0-19.0	32°	1.0
STR 10A	SP-SC	19.0-61.0*	35°	2.0

Table 3: MFAD Geotechnical Design Parameters

*Overburden depths vary from 26.8' to greater than 60'

Lateral soil parameters recommended for drilled shaft design are shown below in Table 4 using estimations by Reese, et. al. (1974) for sand above and below the water table. These values are derived from laboratory and standard penetration testing in combination with recommended soil properties from the Naval Engineering Command (NAVFAC) Design Manual 7.02.

Structure Number	Soil Type	Depth (feet)	Friction Factor, tan (delta)	Initial Soil Stiffness (k _{py}) (pci)
STR 10A	SC	5.0-11.0	0.4	90
STR 10A	SC	11.0-19.0	0.4	60
STR 10A	SP-SC*	19.0-61.0	0.4	60

Table 4: L-Pile Soil Parameters for Design of Drilled Shafts

*Overburden depths vary from 26.8' to greater than 60'

5.2 <u>Axial Design Parameters</u> – Due to the karst conditions at the site, it is recommended to design the drilled shaft as soil bearing. Axial soil parameters recommended for drilled shaft design are shown below in Table 5. These values are derived from laboratory and standard penetration testing in combination with recommended soil properties from the Naval Engineering Command (NAVFAC) Design Manual 7.02. An ultimate friction angle for clayey fine to medium sand in contact with concrete of 19° should be used for design. For cohesionless soils, utilize a skin friction resistance factor (ϕ) of 0.55 in accordance with the Brown et al. (2010) method. Utilize an uplift resistance factor of 0.45 for cohesionless soils in accordance with the Brown et al. (2018) method. Due to karst features present at the proposed tower location, it is recommended that base resistance be neglected for design purposes.

Structure Number	Soil Type	Depth (feet)	Effective Unit Weight* (pcf)	Nominal Side Resistance (q₅) (ksf)									
STR 10A	SC	5.0-11.0	125	0.9									
STR 10A	SC	11.0-19.0	62.6	0.9									
STR 10A	SP-SC**	19.0-61.0	67.6	1.5									

Table 5: Axial Soil Parameters for Design of Drilled Shafts

*Effective Unit Weight accounts for Buoyancy **Overburden depths vary from 26.8' to greater than 60'

The designer should feel free to contact AEI at 270-651-7220 for further recommendations or if any questions arise pertaining to this project.

Sincerely,

AMERICAN ENGINEERS, INC.

Aaron Anderson, EIT Geotechnical Engineer

Bonett

Dusty Barrett, PE, PMP Director of Geotechnical Services

Attachments:

- Boring Layout
- Typed Boring Logs
- Laboratory Data

APPENDIX A

Boring Layout





APPENDIX B

Boring Logs



FIELD TESTING PROCEDURES

The general field procedures employed by the Field Services Center are summarized in the following outline. The procedures utilized by the AEI Field Service Center are recognized methods for determining soil and rock distribution and ground water conditions. These methods include geophysical and in situ methods as well as borings.

Soil Borings are drilled to obtain subsurface samples using one of several alternate techniques depending upon the surface conditions. Borings are advanced into the ground using continuous flight augers. At prescribed intervals throughout the boring depths, soil samples are obtained with a split-spoon or thin-walled sampler and sealed in airtight glass jars and labeled. The sampler is first seated 6 inches to penetrate loose cuttings and then driven an additional foot, where possible, with blows from a 140 pound hammer falling 30 inches. The number of blows required to drive the sampler each six-inch increment is recorded. The penetration resistance, or "N-value" is designated as the number of hammer blows required to drive the sampler the final foot and, when properly evaluated, is an index to cohesion for clays and relative density for sands. The split spoon sampling procedures used during the exploration are in general accordance with ASTM D 1586. Split spoon samples are considered to provide *disturbed* samples, yet are appropriate for most engineering applications. Thin-walled (Shelby tube) samples are considered to provide *undisturbed* samples and obtained when warranted in general accordance with ASTM D 1587.

These drilling methods are not capable of penetrating through material designated as "refusal materials." Refusal, thus indicated, may result from hard cemented soil, soft weathered rock, coarse gravel or boulders, thin rock seams, or the upper surface of sound continuous rock. Core drilling procedures are required to determine the character and continuity of refusal materials.

Core Drilling Procedures for use on refusal materials. Prior to coring, casing is set in the boring through the overburden soils. Refusal materials are then cored according to ASTM D-2113 using a diamond bit attached to the end of a hollow double tube core barrel. This device is rotated at high speeds and the cuttings are brought to the surface by circulating water. Samples of the material penetrated are protected and retained in the inner tube, which is retrieved at the end of each drill run. Upon retrieval of the inner tube the core is recovered, measured and placed in boxes for storage.

The subsurface conditions encountered during drilling are reported on a field test boring record by the driller. The record contains information concerning the boring method, samples attempted and recovered, indications of the presence of various materials such as coarse gravel, cobbles, etc., and observations between samples. Therefore, these boring records contain both factual and interpretive information. The field boring records are on file in our office.

The soil and rock samples plus the field boring records are reviewed by a geotechnical engineer. The engineer classifies the soil in general accordance with the procedures outlined in ASTM D 2487 and D 2488 and prepares the final boring records which are the basis for all evaluations and recommendations.

Representative portions of soil samples are placed in sealed containers and transported to the laboratory. In the laboratory, the samples are examined to verify the driller's field classifications. Test Boring Records are attached which show the soil descriptions and penetration resistances.

The final boring records represent our interpretation of the contents of the field records based on the results of the engineering examinations and tests of the field samples. These records depict subsurface conditions at the specific locations and at the particular time when drilled. Soil conditions at other locations may differ from conditions occurring at these boring locations. Also, the passage of time may result in a change in the subsurface soil and ground water conditions at these boring locations. The lines designate the interface between soil or refusal materials on the records and on profiles represent approximate boundaries. The transition between materials may be gradual. The final boring records are included with this report.

Water table readings are normally taken in conjunction with borings and are recorded on the "Boring Logs". These readings indicate the approximate location of the hydrostatic water table at the time of our field investigation. Where impervious soils are encountered (clayey soils) the amount of water seepage into the boring is small, and it is generally not possible to establish the location of hydrostatic water table through water level readings. The ground water table may also be dependent upon the amount of precipitation at the site during a particular period of time. Fluctuations in the water table should be expected with variations in precipitation, surface run-off, evaporation and other factors.

The time of boring water level reported on the boring records is determined by field crews as the drilling tools are advanced. The boring water level is detected by changes in the drilling rate, soil samples obtained, etc. Additional water table readings are generally obtained at least 24 hours after the borings are completed. The time lag of at least 24 hours is used to permit stabilization of the ground water table which has been disrupted by the drilling operations. The readings are taken by dropping a weighted line down the boring or using as electrical probe to detect the water level surface.

Occasionally the borings will cave-in, preventing water level readings from being obtained or trapping drilling water above the caved-in zone. The cave-in depth is also measured and recorded on the boring records.

Sampling Terminology

<u>Undisturbed Sampling</u>: Thin-walled or Shelby tube samples used for visual examination, classification tests and quantitative laboratory testing. This procedure is described by ASTM D 1587. Each tube, together with the encased soil, is carefully removed from the ground, made airtight and transported to the laboratory. Locations and depths of undisturbed samples are shown on the "Boring Logs."

Bag Sampling: Bulk samples of soil are obtained at selected locations. These samples consist of soil brought to the surface by the drilling augers, or obtained from test pits or the ground surface using hand tools. Samples are placed in bags, with sealed jar samples of the material, and taken to our laboratory for testing where more mass material is required (i.e. Proctors and CBR's). The locations of these samples are indicated on the appropriate logs, or on the Boring Location Plan.

CLASSIFICATION SYSTEM FOR SOIL EXPLORATION

COHESIVE SOILS

(Clay, Silt, and Mixtures)

CONSISTENCY	SPT N-VALUE	Qu/Qp (tsf)	PLASTICITY	
Very Soft Soft Medium Stiff Stiff Very Stiff Hard	2 blows/ft or less 2 to 4 blows/ft 4 to 8 blows/ft 8 to 15 blows/ft 15 to 30 blows/ft 30 blows/ft or more	$\begin{array}{c} 0 - 0.25 \\ 0.25 - 0.49 \\ 0.50 - 0.99 \\ 1.00 - 2.00 \\ 2.00 - 4.00 \\ > 4.00 \end{array}$	Degree of PlasticityPlastic Index $0 - 7$ Low $0 - 7$ Medium $8 - 22$ Highover 22	(<u>PI)</u>

NON-COHESIVE SOILS

(Silt, Sand, Gravel, and Mixtures)

DENSITY	SPT N-VALUE	PARTICLE	SIZE IDENTIFICATION
Very Loose	4 blows/ft or less	Boulders	12 inch diameter or more
Loose	4 to 10 blows/ft	Cobbles	3 to 12 inch diameter
Medium Dense	10 to 30 blows/ft	Gravel	Coarse -1 to 3 inch
Dense	30 to 50 blows/ft		Medium $-\frac{1}{2}$ to 1 inch
Very Dense	50 blows/ft or more		Fine $-\frac{1}{4}$ to $\frac{1}{2}$ inch
		Sand	Coarse – 0.6mm to ¹ / ₄ inch
RELATIVE PROPO	DRTIONS		Medium – 0.2mm to 0.6mm
Descriptive Term	Percent		
Trace	1 - 10		Fine -0.05 mm to 0.2 mm
Trace to Some	11 - 20		
Some	21 – 35	Silt	0.05mm to 0.005mm
And	36 - 50		
		Clay	0.005mm

NOTES

Classification – The Unified Soil Classification System is used to identify soil unless otherwise noted.

N:

Standard "N" Penetration Test (SPT) (ASTM D1586) – Driving a 2-inch O.D., 1 3/8-inch I.D. sampler a distance of 1 foot into undisturbed soil with a 140-pound hammer free falling a distance of 30 inches. It is customary to drive the spoon 6inches to seat the sampler into undisturbed soil, and then perform the test. The number of hammer blows for seating the spoon and making the tests are recorded for each 6 inches of penetration on the field drill long (e.g., 10/8/7). On the report log, the Standard Penetration Test result (i.e., the N value) is normally presented and consists of the sum of the 2nd and 3rd penetration counts (i.e., N = 8 + 7 = 15 blows/ft.)

Soil Property Symbols

- Ou: Unconfined Compressive Strength
- Unconfined Comp. Strength (pocket pent.) omc: Qp: PL:
- LL: Liquid Limit, % (Atterberg Limit)
- PI: Plasticity Index

Standard Penetration Value (see above) Optimum Moisture content Plastic Limit, % (Atterberg Limit) Maximum Dry Density mdd:

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Har												
35				RC	58			_				

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	 		thick bedded, soft to hard <i>(continued)</i>		RC 4	80 (12)							
GLENDALE SUULINL	 45				RC 5	56 (28)							
			Refusal at 26.8 feet.		5	(20)							
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GLEN			OVERBURDEN (60.0 FEET) (continued)										
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2 PRO			Bottom of borehole at 60.0 feet.										
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	10				ST 2	100		3.75	18	27	10	17	Qu = 3,225 psf
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9/222-032 LG&E	 												
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219-22	30			X	SPT 4	67	3-9-15 (24)	-	23				
GEOLE	35			X	SPT	87	8-8-17	-	18				

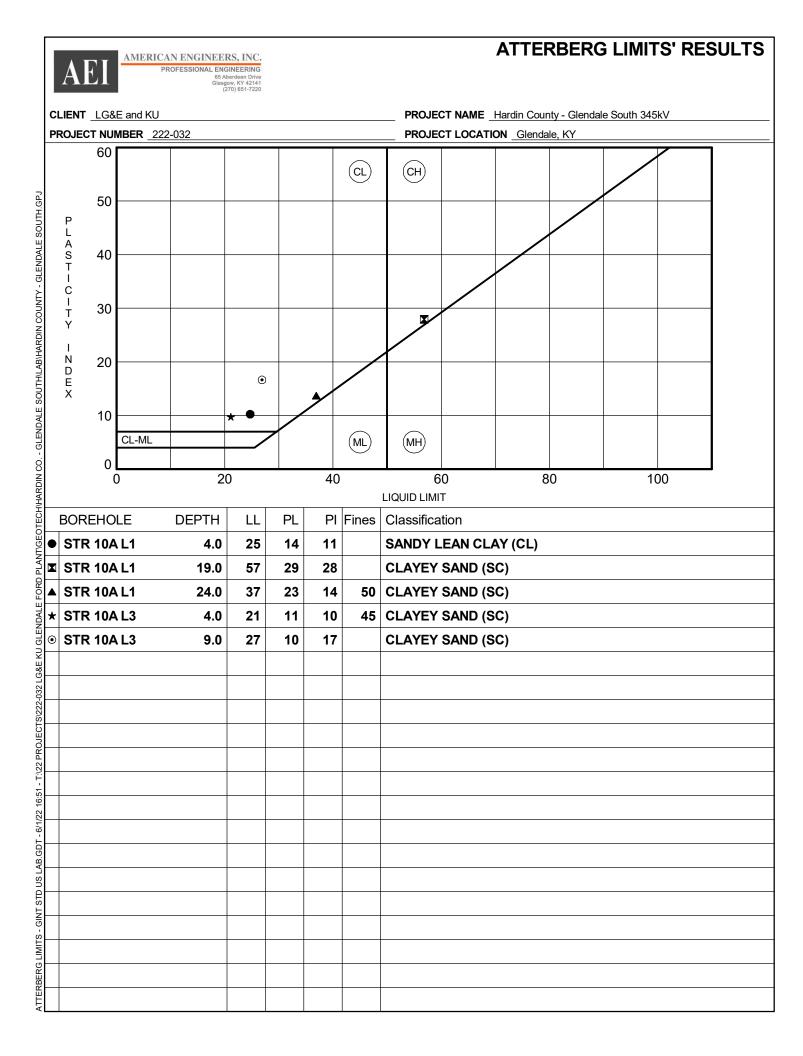
n County - Glenda	lale South 345kV				
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5-7-9 - (16)	24				
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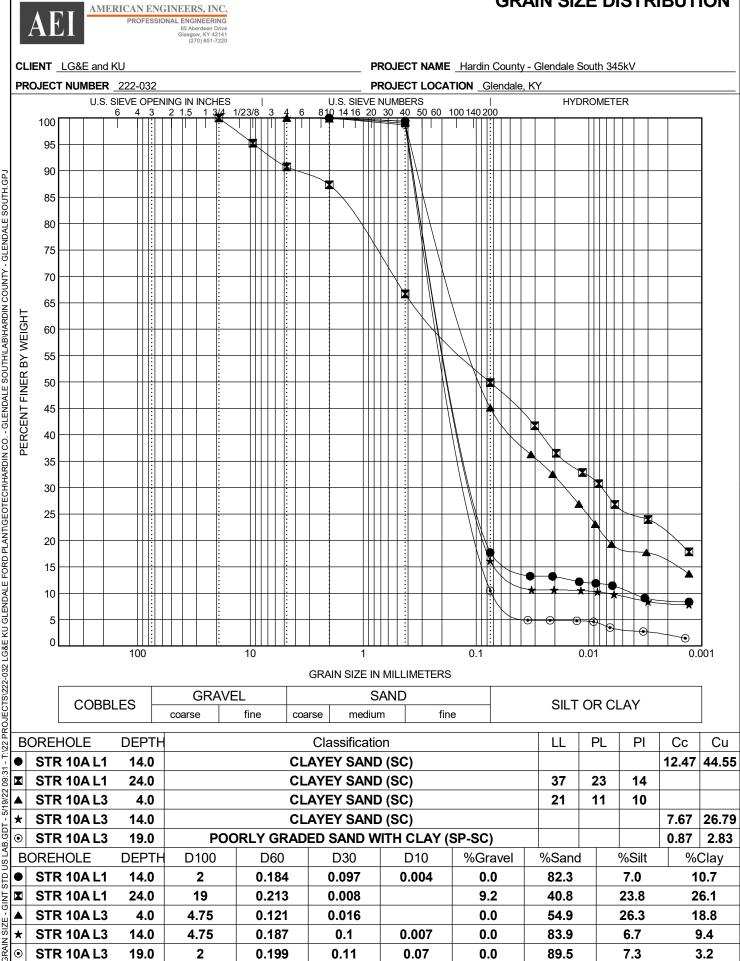
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GEULECH BH CULUMNS													

APPENDIX C

Laboratory Testing Results







- T:/22 PROJECTS/222-032 LG&E KU GLENDALE FORD PLANTIGEOTECH/HARDIN CO. - GLENDALE SOUTH/LABI/HARDIN COUNTY - GLENDALE SOUTH GPJ 09:31 - 5/19/22 GDT LAB. S STD GINT

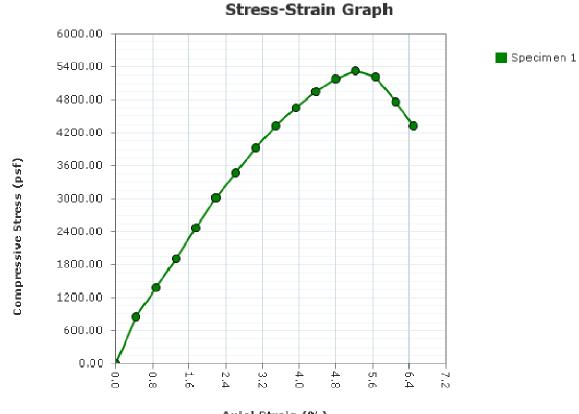
GRAIN SIZE DISTRIBUTION

65 Aberdeen Drive Glasgow, KY 42141 (270) 651-7220 PROJECT NAME Hardin County - Glendale South 345kV CLIENT LG&E and KU PROJECT NUMBER 222-032 PROJECT LOCATION Glendale, KY U.S. SIEVE NUMBERS HYDROMETER U.S. SIEVE OPENING IN INCHES 1 3/4 1/23/8 810 14 16 20 30 40 50 60 100 140 200 3 4 6 4 3 2 1.5 6 100 95 90 US LAB.GDT - 5/19/22 09:32 - 17:22 PROJECTS/222-032 LG&E KU GLENDALE FORD PLANT/GEOTECH/HARDIN CO. - GLENDALE SOUTH/LAB/HARDIN COUNTY - GLENDALE SOUTH.GPJ 85 : 80 75 70 65 PERCENT FINER BY WEIGHT 60 55 50 45 40 35 30 25 20 15 10 5 . • 0 0.001 100 10 0.1 0.01 1 **GRAIN SIZE IN MILLIMETERS** GRAVEL SAND COBBLES SILT OR CLAY fine medium fine coarse coarse BOREHOLE DEPTH LL PL ΡI Сс Classification Cu **STR 10A L3** 49.0 POORLY GRADED SAND WITH CLAY (SP-SC) 0.83 2.59 BOREHOLE DEPTH D100 D60 D30 D10 %Gravel %Sand %Silt %Clay 2 0.202 92.2 6.2 STD • STR 10A L3 49.0 0.114 0.078 0.0 1.6 GINT **GRAIN SIZE**

AMERICAN ENGINEERS, INC. PROFESSIONAL ENGINEERING 65 Aberdeen Drive

GRAIN SIZE DISTRIBUTION

ASTM D2166



Axial Strain (%)

Project:Hardin Co. - Glendale SouthProject Number:222-032Received Date:4/13/2022Sampling Date:4/13/2022Sample Number:ST 1Sample Depth:4.0-6.0 ftBoring Number:STR 10A L1Location:Glendale, KYClient Name:LG&E and KURemarks:K

Project Name: Hardin Co. - Glendale South Project Number: 222-032

Date: _

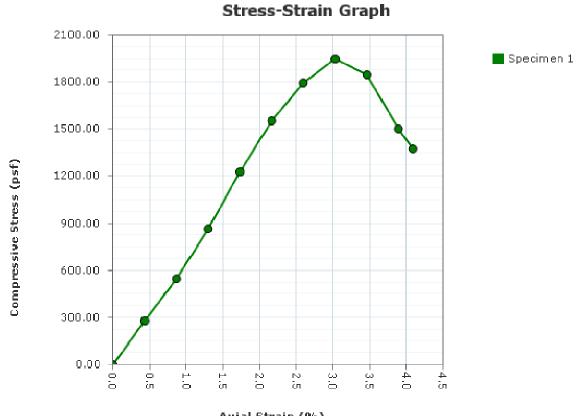
ASTM D2166

	4	•		pecimer	n Numbo		=	0
Before Test	1	2	3	4	5	6	7	8
Moisture Content (%):								
Wet Density (pcf)								
Dry Density (pcf)								
Saturation (%):								
Void Ratio:								
Height (in)								
Diameter (in)								
Strain Limit @ 15% (in)								
Height To Diameter Ratio:	2.08							
Test Data	1	. 2	. 3	4	5	6	. 7	. 8
Failure Angle (°):								
Strain Rate (in/min)	0.1							
Strain Rate (%/min):								
Unconfined Compressive Strength (psf)								
Undrained Shear Strength (psf)								
Strain at Failure (%):	5.23							
Specific Gravity: 2.72	Pla	astic Limit:	14		I	Liquid Limi	it: 25	
Type: UD	Soil Cla	ssification:	CL				·	
Project: Hardin Co Glendale So Project Number: 222-032 Sampling Date: 4/13/2022	uth							
Sample Number: ST 1								
Sample Depth: 4.0-6.0 ft								
Boring Number: STR 10A L1								
Location: Glendale, KY								
Client Name: LG&E and KU								
Remarks:								
Specimen 1 Specimen 2 Specimen 3 Failure Sketch Failure Sketch Failure Sketch	Specim Failure S		Specimen 5 ailure Sketo		imen 6 e Sketch	Specime Failure Sk		ecimen 8 ure Sketch

Project Name: Hardin Co. - Glendale South Project Number: 222-032

Checked By: _____ Date: ____

ASTM D2166



Axial Strain (%)

Project:Hardin Co. - Glendale SouthProject Number:222-032Received Date:4/13/2022Sampling Date:4/13/2022Sample Number:ST 4Sample Depth:4.0-6.0 ftBoring Number:STR 10A L3Location:Glendale, KYClient Name:LG&E and KURemarks:K

Project Name: Hardin Co. - Glendale South Project Number: 222-032

Checked By: ____

Date: _

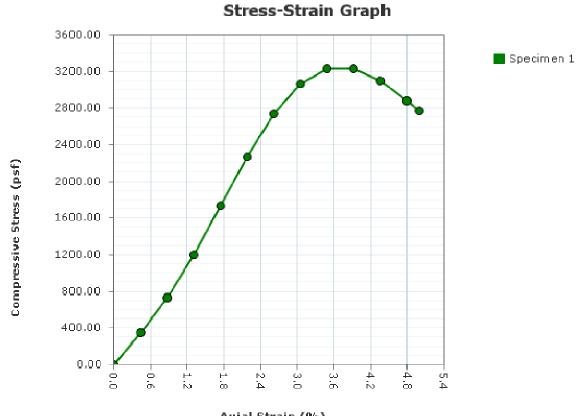
ASTM D2166

Before Test	1	2	S	pecimer 4	ı Numbo 5	er 6	7	8
Moisture Content (%):	15.6	_		-				
Wet Density (pcf)	134.1							
Dry Density (pcf)	116.0							
Saturation (%):	91.3							
Void Ratio:	0.464							
Height (in)	5.7800							
Diameter (in)	2.8400							
Strain Limit @ 15% (in)	0.9							
Height To Diameter Ratio:	2.04							
Test Data	1	2	3	4	5	6	7	8
Failure Angle (°):	0							
Strain Rate (in/min)	0.1							
Strain Rate (%/min):	1.73							
Unconfined Compressive Strength (psf)	1945.44							
Undrained Shear Strength (psf)	972.72							
Strain at Failure (%):	3.03							
Specific Gravity: 2.72	Pla	stic Limit:	11		I	Liquid Limi	it: 21	
Type: UD	Soil Clas	sification:	SC				•	
Project: Hardin Co Glendale Sou Project Number: 222-032	ıth							
Sampling Date: 4/13/2022								
Sample Number: ST 4								
Sample Depth: 4.0-6.0 ft								
Boring Number: STR 10A L3								
Location: Glendale, KY								
Client Name: LG&E and KU								
Remarks:								
Specimen 1 Specimen 2 Specimen 3 Failure Sketch Failure Sketch Failure Sketch	Specime Failure Sl		Specimen 5 ailure Skete		imen 6 e Sketch	Specime Failure Sk		pecimen 8 ure Sketch

Project Name: Hardin Co. - Glendale South Project Number: 222-032

Checked By: _____ Date: ____

ASTM D2166



Axial Strain (%)

Project: Hardin Co. - Glendale South Project Number: 222-032 Received Date: 4/13/2022 Sampling Date: 4/13/2022 Sample Number: ST 5 Sample Depth: 9.0-11.0 ft Boring Number: STR 10A L3 Location: Glendale, KY Client Name: LG&E and KU Remarks:

Project Name: Hardin Co. - Glendale South Project Number: 222-032

Test Date: 4/13/2022 Report Created: 5/19/2022 Checked By: ____

Date:

ASTM D2166

Before Test	1	2	S 3	pecimei 4	n Numbo 5	er 6	7	8
Moisture Content (%):				-			1	
Wet Density (pcf)								
Dry Density (pcf)								
Saturation (%):								
Void Ratio:								
Height (in)								
Diameter (in)								
Strain Limit @ 15% (in)								
Height To Diameter Ratio:								
Test Data	1	2	3	4	5	. 6	7	. 8
Failure Angle (°):	0							
Strain Rate (in/min)								
Strain Rate (%/min):	1.74							
Unconfined Compressive Strength (psf)	3226.87							
Undrained Shear Strength (psf)	1613.44							
Strain at Failure (%):	3.92							
Specific Gravity: 2.72	Pla	astic Limit:	10		I	Liquid Limi	t: 27	
Type: UD	Soil Clas	ssification:	CL					
Project: Hardin Co Glendale So Project Number: 222-032 Sampling Date: 4/13/2022 Sample Number: ST 5 Sample Depth: 9.0-11.0 ft Boring Number: STR 10A L3 Location: Glendale, KY Client Name: LG&E and KU Remarks:	uth							
Specimen 1 Specimen 2 Specimen 3 Failure Sketch Failure Sketch Failure Sketch	Specime Failure S		Specimen 5 ailure Sketo		imen 6 e Sketch	Specime Failure Sk		vecimen 8 ure Sketch

Project Name: Hardin Co. - Glendale South Project Number: 222-032

Checked By: _____ Date: ____

Your Geotechnical Engineering Report

To help manage your risks, this information is being provided because subsurface issues are a major cause of construction delays, cost overruns, disputes, and claims.

Geotechnical Services are Performed for Specific Projects, Purposes, and People

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering exploration conducted for an engineer may not fulfill the needs of a contractor or even another engineer. Each geotechnical engineering exploration and report is unique and is prepared solely for the client. No one except the client should rely on the geotechnical engineering report without first consulting with the geotechnical engineer who prepared it. The report should not be applied for any project or purpose except the one originally intended.

Read the Entire Report

To avoid serious problems, the full geotechnical engineering report should be read in its entirety. Do not only read selected sections or the executive summary.

A Unique Set of Project-Specific Factors is the Basis for a Geotechnical Engineering Report

Geotechnical engineers consider a numerous unique, project-specific factors when determining the scope of a study. Typical factors include: the client's goals, objectives, project costs, risk management preferences, proposed structures, structures on site, topography, and other proposed or existing site improvements, such as access roads, parking lots, and utilities. Unless indicated otherwise by the geotechnical engineer who conducted the original exploration, a geotechnical engineering report should not be relied upon if it was:

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

Typical changes that can lessen 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 multi-story hotel to a parking lot
- finished floor elevation, location, orientation, or weight of the proposed structure, anticipated loads or
- project ownership

Geotechnical engineers cannot be held liable or

responsible for issues that occur because their report did not take into account development items of which they were not informed. The geotechnical engineer should always be notified of any project changes. Upon notification, it should be requested of the geotechnical engineer to give an assessment of the impact of the project changes.

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that exist at the time of the exploration. A geotechnical engineering report should not be relied upon if its reliability could be in question due to factors such as man-made events as construction on or adjacent to the site, natural events such as floods, earthquakes, or groundwater fluctuation, or time. To determine if a geotechnical report is still reliable, contact the geotechnical engineer. Major problems could be avoided by performing a minimal amount of additional analysis and/or testing.

Most Geotechnical Findings are Professional Opinions

Geotechnical site explorations identify subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field logs and laboratory data and apply their professional judgment to make conclusions about the subsurface conditions throughout the site. Actual subsurface conditions may differ from those indicated in the report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risk associated with unanticipated conditions.

The Recommendations within a Report Are Not Final

Do not put too much faith on the construction recommendations included in the report. The recommendations are not final due to geotechnical engineers developing them principally from judgment and opinion. Only by observing actual subsurface conditions revealed during construction can geotechnical engineers finalize their recommendations. Responsibility and liability cannot be assumed for the recommendations within the report by the geotechnical engineer who developed the report if that engineer does not perform construction observation.

A Geotechnical Engineering Report Is Subject To Misinterpretation

Misinterpretation of geotechnical engineering reports has resulted in costly problems. The risk of misinterpretation can be lowered after the submittal of the final report by having the geotechnical engineer consult with appropriate members of the design team. The geotechnical engineer could also be retained to review crucial parts of the plans and specifications put together by the design team. The geotechnical engineering report can also be misinterpreted by contractors which can result in many problems. By participating in pre-bid and preconstruction meetings and providing construction observations by the geotechnical engineer, many risks can be reduced.

Final Boring Logs Should not be Re-drawn

Geotechnical engineers prepare final boring logs and testing results based on field logs and laboratory data. The logs included in a final geotechnical engineering report should never be redrawn to be included in architectural or design drawings due to errors that could be made. Electronic reproduction is acceptable, along with photographic reproduction, but it should be understood that separating logs from the report can elevate risk.

Contractors Need a Complete Report and Guidance

By limiting what is provided for bid preparation, contractors are not liable for unforeseen subsurface conditions although some owners and design professionals believe the opposite to be true. The complete geotechnical engineering report, accompanied with a cover letter or transmittal, should be provided to contractors to help prevent costly problems. The letter states that the report was not prepared for purposes of bid

development and the report's accuracy is limited. Although a fee may be required, encourage the contractors to consult with the geotechnical engineer who prepared the report and/or to conduct additional studies to obtain the specific types of information they need or prefer. A prebid conference involving the owner, geotechnical engineer, and contractors can prove to be very valuable. If needed, allow contractors sufficient time to perform additional studies. Upon doing this you might 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.

Closely Read Responsibility Provisions

Geotechnical engineering is not as exact as other engineering disciplines. This lack of understanding by clients, design professionals, and contractors has created unrealistic expectations that have led to disappointments, claims, and disputes. To minimize such risks, a variety of explanatory provisions may be included in the report by the geotechnical engineer. To help others recognize their own responsibilities and risks, many of these provisions indicate where the geotechnical engineer's responsibilities begin and end. These provisions should be read carefully, questions asked if needed, and the geotechnical engineer should provide satisfactory responses.

Environmental Issues/Concerns are not Covered

Unforeseen environmental issues can lead to project delays or even failures. Geotechnical engineering reports do not usually include environmental findings, conclusions, or recommendations. As with a geotechnical engineering report, do not rely on an environmental report that was prepared for someone else.



65 Aberdeen Drive Glasgow, KY 42141 270-651-7220



May 13, 2022



LG&E and KU One Quality Street Lexington, KY 40507

RE: Report of Geotechnical Exploration Ford 138kV Glendale Industrial West Structure 26W Glendale, KY AEI Project No. 222-032

1. INTRODUCTION

A summary of the geotechnical parameters necessary to facilitate foundation design has been prepared for the immediate use of the design team. The project is a part of the Ford 138kV Glendale Industrial West in Glendale, KY. This summary is provided for Structure 26W, a double circuit, tangent pole which will be supported by direct embedment.

	Table 1: Tower Details											
Structure	Chrysophumo	Unight	Centerline	Structure C	Coordinates	Trans.	Long.					
Structure Number	Structure Description	Height (ft)	Elevation (ft)	Latitude (DMS)	Longitude (DMS)	Moment (ft-k)	Moment (ft-k)					
26W	Double Circuit	115	696.8	37°34'40.46"N	85°53′6.43″W	906	284					

2. DRILLING AND SAMPLING

The geotechnical exploration consisted of one soil test boring. The soil test boring was advanced to a depth of about 25 feet beneath the surface. The boring location was staked by KU personnel. A boring layout is included in Appendix A of this report.

3. SUBSURFACE SOIL CONDITIONS

The generalized subsurface conditions encountered at the boring location, including descriptions of the various strata and their depths and thicknesses are presented on the typed boring log in Appendix B.

Topsoil was encountered at the surface with a thickness of eight inches. Beneath the surface material, lean clay was encountered to a depth of nine feet. Fat clay was encountered from nine feet to the auger refusal depth. The lean clay was typically

described as brown to reddish brown in color, moist and stiff to very stiff in soil strength consistency. The fat clay was typically described as containing trace amounts of gravel, reddish brown in color, moist and stiff in soil strength consistency.

4. BEDROCK CONDITIONS

Refusal, as would be indicated by the Driller on the field boring log, indicates a depth where essentially no downward progress can be made by the auger. It is normally indicative of a very hard or very dense material such as large boulders or the upper bedrock surface or where the N-value indicates essentially no penetration of the split-spoon sampler. The auger refusal depth is provided in the table below.

			Surface	Auge	r Refusal
			Elevation	Depth	Elevation
Hole No.	Latitude	Longitude	(ft.) MSL	(ft.)	(ft.) MSL
STR 26W	37°34'40.46"N	85°53′6.43″W	696.7	25.3	671.4

Table 2: Structure 26W – Summary of Boring

5. FOUNDATION DESIGN PARAMETERS

5.1 <u>Lateral Design Parameters</u> – MFAD soil parameters are provided in the table below. These values are derived from the laboratory and standard penetration testing in combination with recommended soil properties from the Naval Engineering Command (NAVFAC) Design Manual 7.02. The soil deformation moduli provided below were derived from Figure 3-2 and Figure 3-4 of the User Guide for MFAD 5.0 (Moment Foundation Analysis and Design).

Structure Number	Soil Type	Depth (feet)	Soil Undrained Shear Strength (ksf)	Modulus of Deformation (ksi)
STR 26W	CL	5.0-9.0	2.1	1.3
STR 26W	СН	9.0-25.0	0.5	0.3

Table 3: MFAD Geotechnical Design Parameters

Lateral soil parameters recommended for drilled shaft design are shown below in Table 4 using estimations by Matlock (1970) for soft clays with free water and by Reese, et. al (1975) for stiff clay with free water. These values are derived from laboratory and standard penetration testing in combination with recommended soil properties from the Naval Engineering Command (NAVFAC) Design Manual 7.02.

Structure Number	Soil Type	Depth (feet)	Estimated Strain at 50% Stress (ε ₅₀)	Initial Soil Stiffness (k _{py}) (pci)
STR 26W	CL	5.0-9.0	0.03	400
STR 26W	СН	9.0-25.0	0.02	-

Table 4: L-Pile Soil Parameters for Design of Drilled Shafts

5.2 <u>Axial Design Parameters</u> – Axial soil parameters recommended for drilled shaft design are shown below in Table 5. These values are derived from laboratory and standard penetration testing in combination with recommended soil properties from the Naval Engineering Command (NAVFAC) Design Manual 7.02. An ultimate friction angle for clay in contact with concrete of 17° should be used for design. For cohesive soils, utilize a skin friction resistance factor (ϕ) of 0.45 in accordance with the Brown et al. (2010) method. Utilize an uplift resistance factor of 0.35 for cohesive soils in accordance with the Brown et al. (2018) method. Due to karst features present at the proposed tower location, it is recommended that base resistance be neglected for design purposes.

Structure Number	Soil Type	Depth (feet)	Effective Unit Weight* (pcf)	Undrained Shear Strength (S _u) (ksf)	Nominal Side Resistance (q₅) (ksf)
STR 26W	CL	5.0-9.0	125.0	2.1	0.9
STR 26W	СН	9.0-25.0	120.0	0.5	0.6

*Effective Unit Weight accounts for Buoyancy

The designer should feel free to contact AEI at 270-651-7220 for further recommendations or if any questions arise pertaining to this project.

Sincerely,

AMERICAN ENGINEERS, INC.

Aaron Anderson, EIT Geotechnical Engineer

Attachments:

- Boring Layout
- Typed Boring Log
- Laboratory Data

Dusty Barrett, PE, PMP Director of Geotechnical Services

APPENDIX A

Boring Layout







ALL BORING LOCATIONS ARE APPROXIMATE

APPENDIX B

Boring Log



FIELD TESTING PROCEDURES

The general field procedures employed by the Field Services Center are summarized in the following outline. The procedures utilized by the AEI Field Service Center are recognized methods for determining soil and rock distribution and ground water conditions. These methods include geophysical and in situ methods as well as borings.

Soil Borings are drilled to obtain subsurface samples using one of several alternate techniques depending upon the surface conditions. Borings are advanced into the ground using continuous flight augers. At prescribed intervals throughout the boring depths, soil samples are obtained with a split-spoon or thin-walled sampler and sealed in airtight glass jars and labeled. The sampler is first seated 6 inches to penetrate loose cuttings and then driven an additional foot, where possible, with blows from a 140 pound hammer falling 30 inches. The number of blows required to drive the sampler each six-inch increment is recorded. The penetration resistance, or "N-value" is designated as the number of hammer blows required to drive the sampler the final foot and, when properly evaluated, is an index to cohesion for clays and relative density for sands. The split spoon sampling procedures used during the exploration are in general accordance with ASTM D 1586. Split spoon samples are considered to provide *disturbed* samples, yet are appropriate for most engineering applications. Thin-walled (Shelby tube) samples are considered to provide *undisturbed* samples and obtained when warranted in general accordance with ASTM D 1587.

These drilling methods are not capable of penetrating through material designated as "refusal materials." Refusal, thus indicated, may result from hard cemented soil, soft weathered rock, coarse gravel or boulders, thin rock seams, or the upper surface of sound continuous rock. Core drilling procedures are required to determine the character and continuity of refusal materials.

Core Drilling Procedures for use on refusal materials. Prior to coring, casing is set in the boring through the overburden soils. Refusal materials are then cored according to ASTM D-2113 using a diamond bit attached to the end of a hollow double tube core barrel. This device is rotated at high speeds and the cuttings are brought to the surface by circulating water. Samples of the material penetrated are protected and retained in the inner tube, which is retrieved at the end of each drill run. Upon retrieval of the inner tube the core is recovered, measured and placed in boxes for storage.

The subsurface conditions encountered during drilling are reported on a field test boring record by the driller. The record contains information concerning the boring method, samples attempted and recovered, indications of the presence of various materials such as coarse gravel, cobbles, etc., and observations between samples. Therefore, these boring records contain both factual and interpretive information. The field boring records are on file in our office.

The soil and rock samples plus the field boring records are reviewed by a geotechnical engineer. The engineer classifies the soil in general accordance with the procedures outlined in ASTM D 2487 and D 2488 and prepares the final boring records which are the basis for all evaluations and recommendations.

Representative portions of soil samples are placed in sealed containers and transported to the laboratory. In the laboratory, the samples are examined to verify the driller's field classifications. Test Boring Records are attached which show the soil descriptions and penetration resistances.

The final boring records represent our interpretation of the contents of the field records based on the results of the engineering examinations and tests of the field samples. These records depict subsurface conditions at the specific locations and at the particular time when drilled. Soil conditions at other locations may differ from conditions occurring at these boring locations. Also, the passage of time may result in a change in the subsurface soil and ground water conditions at these boring locations. The lines designate the interface between soil or refusal materials on the records and on profiles represent approximate boundaries. The transition between materials may be gradual. The final boring records are included with this report.

Water table readings are normally taken in conjunction with borings and are recorded on the "Boring Logs". These readings indicate the approximate location of the hydrostatic water table at the time of our field investigation. Where impervious soils are encountered (clayey soils) the amount of water seepage into the boring is small, and it is generally not possible to establish the location of hydrostatic water table through water level readings. The ground water table may also be dependent upon the amount of precipitation at the site during a particular period of time. Fluctuations in the water table should be expected with variations in precipitation, surface run-off, evaporation and other factors.

The time of boring water level reported on the boring records is determined by field crews as the drilling tools are advanced. The boring water level is detected by changes in the drilling rate, soil samples obtained, etc. Additional water table readings are generally obtained at least 24 hours after the borings are completed. The time lag of at least 24 hours is used to permit stabilization of the ground water table which has been disrupted by the drilling operations. The readings are taken by dropping a weighted line down the boring or using as electrical probe to detect the water level surface.

Occasionally the borings will cave-in, preventing water level readings from being obtained or trapping drilling water above the caved-in zone. The cave-in depth is also measured and recorded on the boring records.

Sampling Terminology

<u>Undisturbed Sampling</u>: Thin-walled or Shelby tube samples used for visual examination, classification tests and quantitative laboratory testing. This procedure is described by ASTM D 1587. Each tube, together with the encased soil, is carefully removed from the ground, made airtight and transported to the laboratory. Locations and depths of undisturbed samples are shown on the "Boring Logs."

Bag Sampling: Bulk samples of soil are obtained at selected locations. These samples consist of soil brought to the surface by the drilling augers, or obtained from test pits or the ground surface using hand tools. Samples are placed in bags, with sealed jar samples of the material, and taken to our laboratory for testing where more mass material is required (i.e. Proctors and CBR's). The locations of these samples are indicated on the appropriate logs, or on the Boring Location Plan.

CLASSIFICATION SYSTEM FOR SOIL EXPLORATION

COHESIVE SOILS

(Clay, Silt, and Mixtures)

CONSISTENCY	SPT N-VALUE	Qu/Qp (tsf)	PLASTICITY	
Very Soft Soft Medium Stiff Stiff Very Stiff Hard	2 blows/ft or less 2 to 4 blows/ft 4 to 8 blows/ft 8 to 15 blows/ft 15 to 30 blows/ft 30 blows/ft or more	$\begin{array}{c} 0 - 0.25 \\ 0.25 - 0.49 \\ 0.50 - 0.99 \\ 1.00 - 2.00 \\ 2.00 - 4.00 \\ > 4.00 \end{array}$	Degree of PlasticityPlastic Index $0 - 7$ Low $0 - 7$ Medium $8 - 22$ Highover 22	(<u>PI)</u>

NON-COHESIVE SOILS

(Silt, Sand, Gravel, and Mixtures)

DENSITY	SPT N-VALUE	PARTICLE	SIZE IDENTIFICATION
Very Loose	4 blows/ft or less	Boulders	12 inch diameter or more
Loose	4 to 10 blows/ft	Cobbles	3 to 12 inch diameter
Medium Dense	10 to 30 blows/ft	Gravel	Coarse – 1 to 3 inch
Dense	30 to 50 blows/ft		Medium $-\frac{1}{2}$ to 1 inch
Very Dense	50 blows/ft or more		Fine $-\frac{1}{4}$ to $\frac{1}{2}$ inch
		Sand	Coarse – 0.6mm to ¹ / ₄ inch
RELATIVE PROPO	DRTIONS		Medium – 0.2mm to 0.6mm
Descriptive Term	Percent		
Trace	1 - 10		Fine -0.05 mm to 0.2 mm
Trace to Some	11 - 20		
Some	21 – 35	Silt	0.05mm to 0.005mm
And	36 - 50		
		Clay	0.005mm

NOTES

Classification – The Unified Soil Classification System is used to identify soil unless otherwise noted.

N:

Standard "N" Penetration Test (SPT) (ASTM D1586) – Driving a 2-inch O.D., 1 3/8-inch I.D. sampler a distance of 1 foot into undisturbed soil with a 140-pound hammer free falling a distance of 30 inches. It is customary to drive the spoon 6inches to seat the sampler into undisturbed soil, and then perform the test. The number of hammer blows for seating the spoon and making the tests are recorded for each 6 inches of penetration on the field drill long (e.g., 10/8/7). On the report log, the Standard Penetration Test result (i.e., the N value) is normally presented and consists of the sum of the 2nd and 3rd penetration counts (i.e., N = 8 + 7 = 15 blows/ft.)

Soil Property Symbols

- Ou: Unconfined Compressive Strength
- Unconfined Comp. Strength (pocket pent.) omc: Qp: PL:
- LL: Liquid Limit, % (Atterberg Limit)
- PI: Plasticity Index

Standard Penetration Value (see above) Optimum Moisture content Plastic Limit, % (Atterberg Limit) Maximum Dry Density mdd:

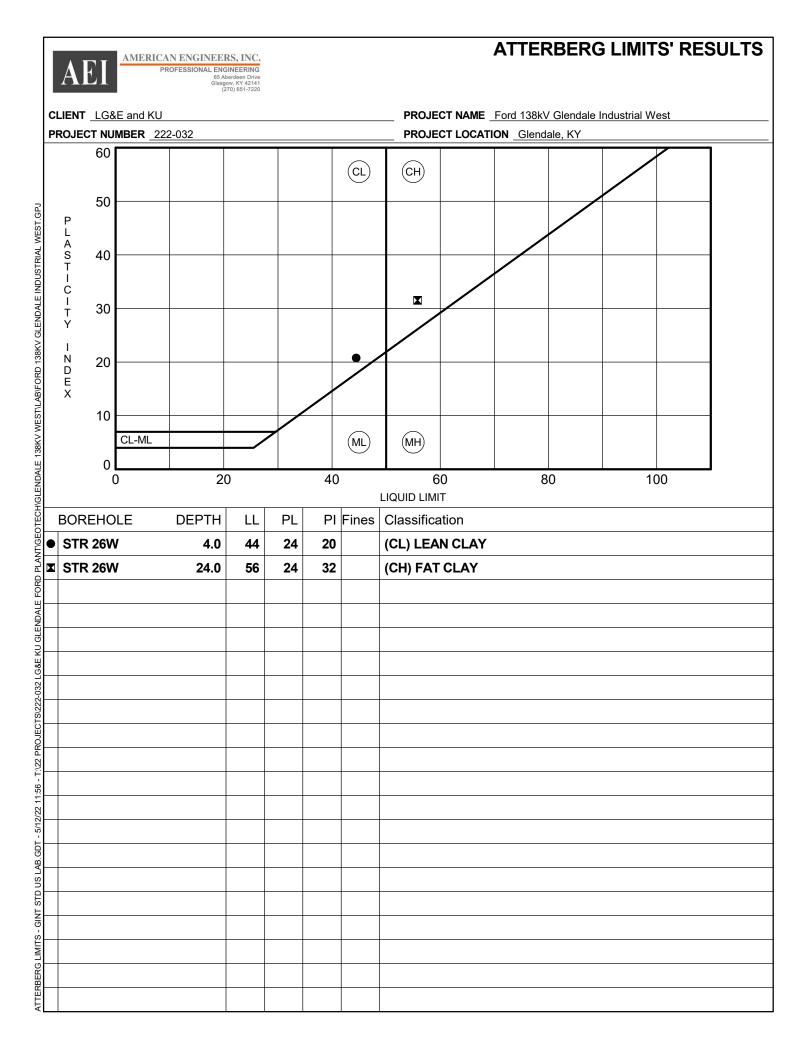
	A	EI	AMERICAN ENGINEERS, INC. PROFESSIONAL ENGINEERING 65 Abordeen Drive Giasgow, KY 42141 (270) 651-7220										R 26W 1 OF 1
	CLIEN	NT LG	&E and KU P	ROJEC	T NAME	Ford	138kV Gle	ndale	ndusti	rial We	est		
			TED _3/18/22 COMPLETED _3/18/22 G	GROUND	ELEVA		696.7 ft						
					WATER								
19. -			ETHOD Hollow Stem Auger				LING						
V EO			Peyton Linder CHECKED BY Aaron Anderson				.ING						
T T	NOTE	.s		AF		LLING					ERBE		
		0			Ë L	% /	(a (ii)	z	ц (%)			3	S
ALF	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)		<u>0</u>	È.×	REMARKS
LENU	DEI (i	SRA LC			MPL	Q.R.	N V/	А Э Э	10IS	LIQUID	PLASTIC LIMIT	STIC PEC	KEM,
פ אר גר	0				SAI	RE		P	≥ö			PLASTICITY INDEX	LE L
			(CL) lean CLAY, brown to reddish brown, moist, stiff to very	stiff	ST 1	85		4.0	24				Qu = 3,340 psf
NEO	5				ST 2	90		4.5+	27	44	24	20	Qu = 5,400
201/1					Z								psf
Ч Ч Ч													
LENU,	- 10 -		(CH) fat CLAY, trace gravel, reddish brown, moist, stiff		SPT	100	4-6-6	3.25	30				
							(12)						
Ц С													
5					OT	100		0.5					0
A L L A	_ 15 _				ST 3	100		3.5	32				Qu = 990 psf
DALE													
S LEN	20				SPT 2	73	5-5-4 (9)	3.25	35				
2 2 1							(3)						
בפא													
22-03	25				ST	100		3.25	28	56	24	32	
2/2/2			Refusal at 25.3 feet.										
Ч С С С С С С С С			Bottom of borehole at 25.3 feet.										
1 ZZ													
- 10													
2/13/2													
<u>-</u>													
SID US LAB.GU													
n N													
- GIN													
CH BH CULUMINS													
ñ L													
Ú,													

С Ш С

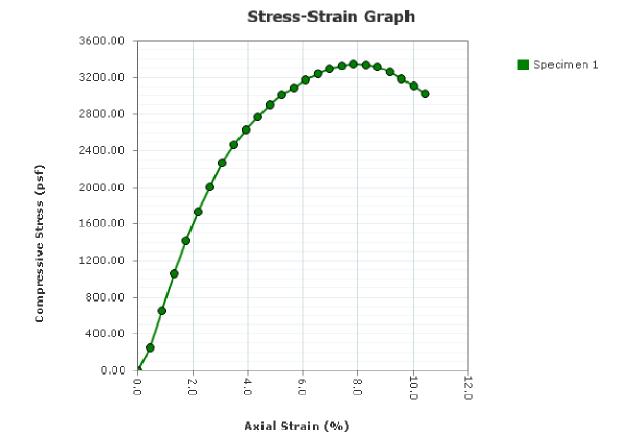
APPENDIX C

Laboratory Testing Results





ASTM D2166



Project:Ford 138kV Glendale Industrial WestProject Number:222-032Received Date:3/21/2022Sampling Date:3/21/2022Sample Number:ST 1Sample Depth:1.0-3.0 ftBoring Number:STR 26WLocation:Glendale, KYClient Name:LG&E and KURemarks:K

Project Name: Ford 138kV Glendale Industrial West Project Number: 222-032

Checked By: _____

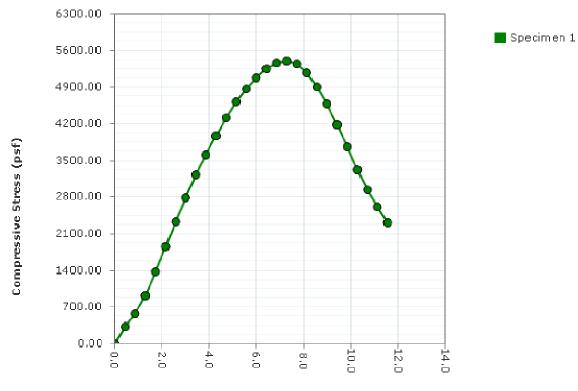
Date: _

ASTM D2166

Before Test	1	2	S 3		n Numbe 5	er 6	7	8
Moisture Content (%):		4			5	0		0
Wet Density (pcf)								
Dry Density (pcf)								
Saturation (%):								
Void Ratio:								
Height (in)								
Diameter (in)								
Strain Limit @ 15% (in)								
Height To Diameter Ratio:								
Test Data	1	2	3	4	5	6	7	8
Failure Angle (°):	0							
Strain Rate (in/min)								
Strain Rate (%/min):	1.74							
Unconfined Compressive Strength (psf)	3343.57							
Undrained Shear Strength (psf)	1671.79							
Strain at Failure (%):	8.28							
Specific Gravity: 2.72		astic Limit:	0		T	Liquid Lim	it: 0	
Type: UD		ssification:			L	Iquiu Liii	11. 0	
Project: Ford 138kV Glendale Ind	ustrial We	st						
Project Number: 222-032								
Sampling Date: 3/21/2022								
Sample Number: ST 1								
Sample Depth: 1.0-3.0 ft								
Boring Number: STR 26W								
Location: Glendale, KY								
Client Name: LG&E and KU Remarks:								
Specimen 1 Specimen 2 Specimen 3	Specim		Specimen		imen 6	Specime		ecimen 8
Failure Sketch Failure Sketch Failure Sketch	Failure S	ketch I	Failure Sket	ch Failur	e Sketch	Failure Sl	ketch Fail	ure Sketch
··	÷	!		! !	! !		!	

Project Name: Ford 138kV Glendale Industrial West Project Number: 222-032

ASTM D2166



Stress-Strain Graph

Axial Strain (%)

Project:Ford 138kV Glendale Industrial WestProject Number:222-032Received Date:3/21/2022Sampling Date:3/21/2022Sample Number:ST 2Sample Depth:4.0-6.0 ftBoring Number:STR 26WLocation:Glendale, KYClient Name:LG&E and KURemarks:K

Project Name: Ford 138kV Glendale Industrial West Project Number: 222-032

Checked By: _____

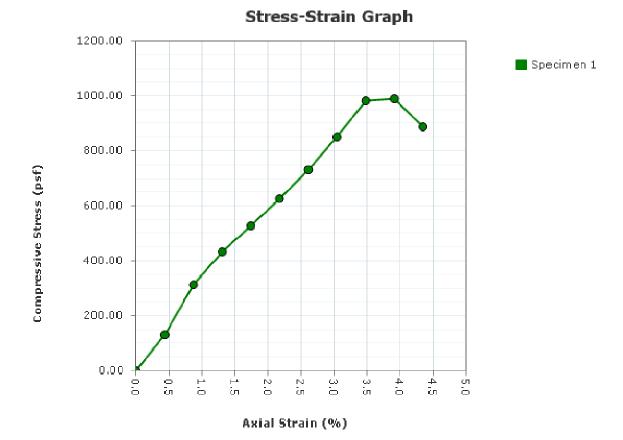
Date: _

ASTM D2166

Before Test	1	2	S 3	pecimer 4	1 Numbe 5	er 6	7	8
Moisture Content (%):	26.6					V		
Wet Density (pcf)	122.9							
Dry Density (pcf)	97.1							
Saturation (%):	96.7							
Void Ratio:								
Height (in)	5.8400							
Diameter (in)								
Strain Limit @ 15% (in)	0.9							
Height To Diameter Ratio:								
Test Data	1	2	3	4	5	6	7	8
Failure Angle (°):	0							
Strain Rate (in/min)	0.1							
Strain Rate (%/min):	1.71							
Unconfined Compressive Strength (psf)	5401.10							
Undrained Shear Strength (psf)	2700.55							
Strain at Failure (%):	7.28							
Specific Gravity: 2.72		astic Limit:	24		T	iquid Lim	it: 11	
Type: UD		ssification:	i		L	iquia Lim	11. 144	
Project: Ford 138kV Glendale Ind	ustrial We	st						
Project Number: 222-032								
Sampling Date: 3/21/2022								
Sample Number: ST 2								
Sample Depth: 4.0-6.0 ft								
Boring Number: STR 26W								
Location: Glendale, KY								
Client Name: LG&E and KU Remarks:								
Specimen 1 Specimen 2 Specimen 3	Specim		Specimen		imen 6	Specime		ecimen 8
Failure Sketch Failure Sketch Failure Sketch	Failure S	ketch I	ailure Sket	ch Failur	e Sketch	Failure Sk	ketch Fail	ure Sketch

Project Name: Ford 138kV Glendale Industrial West Project Number: 222-032

ASTM D2166



Project:Ford 138kV Glendale Industrial WestProject Number:222-032Received Date:3/21/2022Sampling Date:3/21/2022Sample Number:ST 3Sample Depth:14.0-16.0 ftBoring Number:STR 26WLocation:Glendale, KYClient Name:LG&E and KURemarks:K

Project Name: Ford 138kV Glendale Industrial West Project Number: 222-032

Checked By: _____

Date:

ASTM D2166

Before Test	1	2	S 3	pecimer 4	n Numbo 5	er 6	7	8
Moisture Content (%):	31.8							
Wet Density (pcf)	114.1							
Dry Density (pcf)	86.6							
Saturation (%):	90.0							
Void Ratio:	0.961							
Height (in)	5.7500							
Diameter (in)	2.8700							
Strain Limit @ 15% (in)	0.9							
Height To Diameter Ratio:	2.00							
Test Data	1	2	3	4	5	6	7	. 8
Failure Angle (°):	0							
Strain Rate (in/min)	0.1							
Strain Rate (%/min):	1.74							
Unconfined Compressive Strength (psf)	990.28							
Undrained Shear Strength (psf)	495.14							
Strain at Failure (%):	3.91							
Specific Gravity: 2.72		astic Limit:	0		T	Liquid Lim	i+: 0	
Type: UD		ssification:	1		1		III. [U	
Туре. ОБ	5011 C14	ssification.						
Project: Ford 138kV Glendale Inde	ustrial We	st						
Project Number: 222-032								
Sampling Date: 3/21/2022								
Sample Number: ST 3								
Sample Depth: 14.0-16.0 ft								
Boring Number: STR 26W								
Location: Glendale, KY								
Client Name: LG&E and KU								
Remarks:								
Specimen 1 Specimen 2 Specimen 3 Failure Sketch Failure Sketch Failure Sketch	Specim Failure S		Specimen 5 Failure Skete		imen 6 e Sketch	Specime Failure Sk		ecimen 8 ure Sketch
R .								

Project Name: Ford 138kV Glendale Industrial West Project Number: 222-032

Your Geotechnical Engineering Report

To help manage your risks, this information is being provided because subsurface issues are a major cause of construction delays, cost overruns, disputes, and claims.

Geotechnical Services are Performed for Specific Projects, Purposes, and People

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering exploration conducted for an engineer may not fulfill the needs of a contractor or even another engineer. Each geotechnical engineering exploration and report is unique and is prepared solely for the client. No one except the client should rely on the geotechnical engineering report without first consulting with the geotechnical engineer who prepared it. The report should not be applied for any project or purpose except the one originally intended.

Read the Entire Report

To avoid serious problems, the full geotechnical engineering report should be read in its entirety. Do not only read selected sections or the executive summary.

A Unique Set of Project-Specific Factors is the Basis for a Geotechnical Engineering Report

Geotechnical engineers consider a numerous unique, project-specific factors when determining the scope of a study. Typical factors include: the client's goals, objectives, project costs, risk management preferences, proposed structures, structures on site, topography, and other proposed or existing site improvements, such as access roads, parking lots, and utilities. Unless indicated otherwise by the geotechnical engineer who conducted the original exploration, a geotechnical engineering report should not be relied upon if it was:

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

Typical changes that can lessen 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 multi-story hotel to a parking lot
- finished floor elevation, location, orientation, or weight of the proposed structure, anticipated loads or
- project ownership

Geotechnical engineers cannot be held liable or

responsible for issues that occur because their report did not take into account development items of which they were not informed. The geotechnical engineer should always be notified of any project changes. Upon notification, it should be requested of the geotechnical engineer to give an assessment of the impact of the project changes.

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that exist at the time of the exploration. A geotechnical engineering report should not be relied upon if its reliability could be in question due to factors such as man-made events as construction on or adjacent to the site, natural events such as floods, earthquakes, or groundwater fluctuation, or time. To determine if a geotechnical report is still reliable, contact the geotechnical engineer. Major problems could be avoided by performing a minimal amount of additional analysis and/or testing.

Most Geotechnical Findings are Professional Opinions

Geotechnical site explorations identify subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field logs and laboratory data and apply their professional judgment to make conclusions about the subsurface conditions throughout the site. Actual subsurface conditions may differ from those indicated in the report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risk associated with unanticipated conditions.

The Recommendations within a Report Are Not Final

Do not put too much faith on the construction recommendations included in the report. The recommendations are not final due to geotechnical engineers developing them principally from judgment and opinion. Only by observing actual subsurface conditions revealed during construction can geotechnical engineers finalize their recommendations. Responsibility and liability cannot be assumed for the recommendations within the report by the geotechnical engineer who developed the report if that engineer does not perform construction observation.

A Geotechnical Engineering Report Is Subject To Misinterpretation

Misinterpretation of geotechnical engineering reports has resulted in costly problems. The risk of misinterpretation can be lowered after the submittal of the final report by having the geotechnical engineer consult with appropriate members of the design team. The geotechnical engineer could also be retained to review crucial parts of the plans and specifications put together by the design team. The geotechnical engineering report can also be misinterpreted by contractors which can result in many problems. By participating in pre-bid and preconstruction meetings and providing construction observations by the geotechnical engineer, many risks can be reduced.

Final Boring Logs Should not be Re-drawn

Geotechnical engineers prepare final boring logs and testing results based on field logs and laboratory data. The logs included in a final geotechnical engineering report should never be redrawn to be included in architectural or design drawings due to errors that could be made. Electronic reproduction is acceptable, along with photographic reproduction, but it should be understood that separating logs from the report can elevate risk.

Contractors Need a Complete Report and Guidance

By limiting what is provided for bid preparation, contractors are not liable for unforeseen subsurface conditions although some owners and design professionals believe the opposite to be true. The complete geotechnical engineering report, accompanied with a cover letter or transmittal, should be provided to contractors to help prevent costly problems. The letter states that the report was not prepared for purposes of bid

development and the report's accuracy is limited. Although a fee may be required, encourage the contractors to consult with the geotechnical engineer who prepared the report and/or to conduct additional studies to obtain the specific types of information they need or prefer. A prebid conference involving the owner, geotechnical engineer, and contractors can prove to be very valuable. If needed, allow contractors sufficient time to perform additional studies. Upon doing this you might 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.

Closely Read Responsibility Provisions

Geotechnical engineering is not as exact as other engineering disciplines. This lack of understanding by clients, design professionals, and contractors has created unrealistic expectations that have led to disappointments, claims, and disputes. To minimize such risks, a variety of explanatory provisions may be included in the report by the geotechnical engineer. To help others recognize their own responsibilities and risks, many of these provisions indicate where the geotechnical engineer's responsibilities begin and end. These provisions should be read carefully, questions asked if needed, and the geotechnical engineer should provide satisfactory responses.

Environmental Issues/Concerns are not Covered

Unforeseen environmental issues can lead to project delays or even failures. Geotechnical engineering reports do not usually include environmental findings, conclusions, or recommendations. As with a geotechnical engineering report, do not rely on an environmental report that was prepared for someone else.



65 Aberdeen Drive Glasgow, KY 42141 270-651-7220



May 13, 2022

LG&E and KU One Quality Street Lexington, KY 40507

RE: Report of Geotechnical Exploration Ford 138kV Glendale Industrial West Structure 27W Glendale, KY AEI Project No. 222-032

1. INTRODUCTION

A summary of the geotechnical parameters necessary to facilitate foundation design has been prepared for the immediate use of the design team. The project is a part of the Ford 138kV Glendale Industrial West in Glendale, KY. This summary is provided for Structure 27W, a double circuit, angle dead end which will be supported by a drilled shaft foundation.

Structure	Structure Description	Hoight	Centerline	Structure C	Coordinates	Trans.	Long.
Structure Number		Height (ft)	Elevation (ft)	Latitude (DMS)	Longitude (DMS)	Moment (ft-k)	Moment (ft-k)
27W	Double Circuit	105	697.4	37°34'39.41"N	85°52′58.82"W	1,820	6,664

Table 1: Tower Details

2. DRILLING AND SAMPLING

The geotechnical exploration consisted of one soil test boring. The soil test boring was advanced to a depth of about 54 feet beneath the surface. The boring location was staked by KU personnel. A boring layout is included in Appendix A of this report.

3. SUBSURFACE SOIL CONDITIONS

The generalized subsurface conditions encountered at the boring location, including descriptions of the various strata and their depths and thicknesses are presented on the typed boring log in Appendix B.

Topsoil was encountered at the surface with a thickness of four inches. Beneath the surface material, lean clay was encountered to a depth of 19 feet. Fat clay was encountered from 19 feet to the auger refusal depth. The lean clay was typically

described as brown to red in color, wet and stiff to very stiff in soil strength consistency. The fat clay was typically described as reddish brown to red in color, containing varying amounts of gravel, wet to saturated and medium stiff to stiff in soil strength consistency.

4. BEDROCK CONDITIONS

Refusal, as would be indicated by the Driller on the field boring log, indicates a depth where essentially no downward progress can be made by the auger. It is normally indicative of a very hard or very dense material such as large boulders or the upper bedrock surface or where the N-value indicates essentially no penetration of the split-spoon sampler. The auger refusal depth is provided in the table below.

				5		
			Surface	Auger Refusal		
			Elevation	Depth	Elevation	
Hole No.	Latitude	Longitude	(ft.) MSL	(ft.)	(ft.) MSL	
STR 27W	37°34'39.41"N	85°52′58.82″W	697.3	40.6	656.7	

Table 2: Structure 27W – Summary of Boring

5. FOUNDATION DESIGN PARAMETERS

5.1 <u>Lateral Design Parameters</u> – MFAD soil parameters are provided in the table below. These values are derived from the laboratory and standard penetration testing in combination with recommended soil properties from the Naval Engineering Command (NAVFAC) Design Manual 7.02. The soil deformation moduli provided below were derived from Figure 3-2 and Figure 3-4 of the User Guide for MFAD 5.0 (Moment Foundation Analysis and Design).

Structure Number	Soil Type	Depth (feet)	Soil Undrained Shear Strength (ksf)	Modulus of Deformation (ksi)					
STR 27W	CL	5.0-19.0	1.8	1.0					
STR 27W	СН	19.0-40.0	1.0	0.6					

Table 3: MFAD Geotechnical Design Parameters

Lateral soil parameters recommended for drilled shaft design are shown below in Table 4 using estimations by Matlock (1970) for soft clays with free water and by Reese, et. al (1975) for stiff clay with free water. These values are derived from laboratory and standard penetration testing in combination with recommended soil properties from the Naval Engineering Command (NAVFAC) Design Manual 7.02.

Structure Number	Soil Type	Depth (feet)	Estimated Strain at 50% Stress (ε ₅₀)	Initial Soil Stiffness (k _{py}) (pci)
STR 27W	CL	5.0-19.0	0.02	200
STR 27W	СН	19.0-40.0	0.02	-

Table 4: L-Pile Soil Parameters for Design of Drilled Shafts

5.2 <u>Axial Design Parameters</u> – Axial soil parameters recommended for drilled shaft design are shown below in Table 5. These values are derived from laboratory and standard penetration testing in combination with recommended soil properties from the Naval Engineering Command (NAVFAC) Design Manual 7.02. An ultimate friction angle for clay in contact with concrete of 17° should be used for design. For cohesive soils, utilize a skin friction resistance factor (ϕ) of 0.45 in accordance with the Brown et al. (2010) method. Utilize an uplift resistance factor of 0.35 for cohesive soils in accordance with the Brown et al. (2018) method. Due to karst features present at the proposed tower location, it is recommended that base resistance be neglected for design purposes.

Structure Number	Soil Type	Depth (feet)	Effective Unit Weight* (pcf)	Undrained Shear Strength (S _u) (ksf)	Nominal Side Resistance (q _s) (ksf)					
STR 27W	CL	5.0-19.0	125.0	1.8	1.0					
STR 27W	СН	19.0-40.0	57.6	1.0	0.8					

Table 5: Axial Soil Parameters for Design of Drilled Shafts

*Effective Unit Weight accounts for Buoyancy

Ford 138kV Glendale Industrial West Structure 27W

May 13, 2022 Page **4** of **4**

The designer should feel free to contact AEI at 270-651-7220 for further recommendations or if any questions arise pertaining to this project.

Sincerely,

AMERICAN ENGINEERS, INC.

Aaron Anderson, EIT Geotechnical Engineer

Bont

Dusty Barrett, PE, PMP Director of Geotechnical Services

Attachments:

- Boring Layout
- Typed Boring Log
- Laboratory Data

APPENDIX A

Boring Layout





• SOIL TEST BORING WITH ROCK CORE

APPENDIX B

Boring Logs



FIELD TESTING PROCEDURES

The general field procedures employed by the Field Services Center are summarized in the following outline. The procedures utilized by the AEI Field Service Center are recognized methods for determining soil and rock distribution and ground water conditions. These methods include geophysical and in situ methods as well as borings.

Soil Borings are drilled to obtain subsurface samples using one of several alternate techniques depending upon the surface conditions. Borings are advanced into the ground using continuous flight augers. At prescribed intervals throughout the boring depths, soil samples are obtained with a split-spoon or thin-walled sampler and sealed in airtight glass jars and labeled. The sampler is first seated 6 inches to penetrate loose cuttings and then driven an additional foot, where possible, with blows from a 140 pound hammer falling 30 inches. The number of blows required to drive the sampler each six-inch increment is recorded. The penetration resistance, or "N-value" is designated as the number of hammer blows required to drive the sampler the final foot and, when properly evaluated, is an index to cohesion for clays and relative density for sands. The split spoon sampling procedures used during the exploration are in general accordance with ASTM D 1586. Split spoon samples are considered to provide *disturbed* samples, yet are appropriate for most engineering applications. Thin-walled (Shelby tube) samples are considered to provide *undisturbed* samples and obtained when warranted in general accordance with ASTM D 1587.

These drilling methods are not capable of penetrating through material designated as "refusal materials." Refusal, thus indicated, may result from hard cemented soil, soft weathered rock, coarse gravel or boulders, thin rock seams, or the upper surface of sound continuous rock. Core drilling procedures are required to determine the character and continuity of refusal materials.

Core Drilling Procedures for use on refusal materials. Prior to coring, casing is set in the boring through the overburden soils. Refusal materials are then cored according to ASTM D-2113 using a diamond bit attached to the end of a hollow double tube core barrel. This device is rotated at high speeds and the cuttings are brought to the surface by circulating water. Samples of the material penetrated are protected and retained in the inner tube, which is retrieved at the end of each drill run. Upon retrieval of the inner tube the core is recovered, measured and placed in boxes for storage.

The subsurface conditions encountered during drilling are reported on a field test boring record by the driller. The record contains information concerning the boring method, samples attempted and recovered, indications of the presence of various materials such as coarse gravel, cobbles, etc., and observations between samples. Therefore, these boring records contain both factual and interpretive information. The field boring records are on file in our office.

The soil and rock samples plus the field boring records are reviewed by a geotechnical engineer. The engineer classifies the soil in general accordance with the procedures outlined in ASTM D 2487 and D 2488 and prepares the final boring records which are the basis for all evaluations and recommendations.

Representative portions of soil samples are placed in sealed containers and transported to the laboratory. In the laboratory, the samples are examined to verify the driller's field classifications. Test Boring Records are attached which show the soil descriptions and penetration resistances.

The final boring records represent our interpretation of the contents of the field records based on the results of the engineering examinations and tests of the field samples. These records depict subsurface conditions at the specific locations and at the particular time when drilled. Soil conditions at other locations may differ from conditions occurring at these boring locations. Also, the passage of time may result in a change in the subsurface soil and ground water conditions at these boring locations. The lines designate the interface between soil or refusal materials on the records and on profiles represent approximate boundaries. The transition between materials may be gradual. The final boring records are included with this report.

Water table readings are normally taken in conjunction with borings and are recorded on the "Boring Logs". These readings indicate the approximate location of the hydrostatic water table at the time of our field investigation. Where impervious soils are encountered (clayey soils) the amount of water seepage into the boring is small, and it is generally not possible to establish the location of hydrostatic water table through water level readings. The ground water table may also be dependent upon the amount of precipitation at the site during a particular period of time. Fluctuations in the water table should be expected with variations in precipitation, surface run-off, evaporation and other factors.

The time of boring water level reported on the boring records is determined by field crews as the drilling tools are advanced. The boring water level is detected by changes in the drilling rate, soil samples obtained, etc. Additional water table readings are generally obtained at least 24 hours after the borings are completed. The time lag of at least 24 hours is used to permit stabilization of the ground water table which has been disrupted by the drilling operations. The readings are taken by dropping a weighted line down the boring or using as electrical probe to detect the water level surface.

Occasionally the borings will cave-in, preventing water level readings from being obtained or trapping drilling water above the caved-in zone. The cave-in depth is also measured and recorded on the boring records.

Sampling Terminology

<u>Undisturbed Sampling</u>: Thin-walled or Shelby tube samples used for visual examination, classification tests and quantitative laboratory testing. This procedure is described by ASTM D 1587. Each tube, together with the encased soil, is carefully removed from the ground, made airtight and transported to the laboratory. Locations and depths of undisturbed samples are shown on the "Boring Logs."

Bag Sampling: Bulk samples of soil are obtained at selected locations. These samples consist of soil brought to the surface by the drilling augers, or obtained from test pits or the ground surface using hand tools. Samples are placed in bags, with sealed jar samples of the material, and taken to our laboratory for testing where more mass material is required (i.e. Proctors and CBR's). The locations of these samples are indicated on the appropriate logs, or on the Boring Location Plan.

CLASSIFICATION SYSTEM FOR SOIL EXPLORATION

COHESIVE SOILS

(Clay, Silt, and Mixtures)

CONSISTENCY	SPT N-VALUE	Qu/Qp (tsf)	PLASTICITY	
Very Soft Soft Medium Stiff Stiff Very Stiff Hard	2 blows/ft or less 2 to 4 blows/ft 4 to 8 blows/ft 8 to 15 blows/ft 15 to 30 blows/ft 30 blows/ft or more	$\begin{array}{c} 0 - 0.25 \\ 0.25 - 0.49 \\ 0.50 - 0.99 \\ 1.00 - 2.00 \\ 2.00 - 4.00 \\ > 4.00 \end{array}$	Degree of PlasticityPlastic Index $0 - 7$ Low $0 - 7$ Medium $8 - 22$ Highover 22	(<u>PI)</u>

NON-COHESIVE SOILS

(Silt, Sand, Gravel, and Mixtures)

DENSITY	SPT N-VALUE	PARTICLE	SIZE IDENTIFICATION
Very Loose	4 blows/ft or less	Boulders	12 inch diameter or more
Loose	4 to 10 blows/ft	Cobbles	3 to 12 inch diameter
Medium Dense	10 to 30 blows/ft	Gravel	Coarse -1 to 3 inch
Dense	30 to 50 blows/ft		Medium $-\frac{1}{2}$ to 1 inch
Very Dense	50 blows/ft or more		Fine $-\frac{1}{4}$ to $\frac{1}{2}$ inch
		Sand	Coarse – 0.6mm to ¹ / ₄ inch
RELATIVE PROPO	DRTIONS		Medium – 0.2mm to 0.6mm
Descriptive Term	Percent		
Trace	1 - 10		Fine -0.05 mm to 0.2 mm
Trace to Some	11 - 20		
Some	21 – 35	Silt	0.05mm to 0.005mm
And	36 - 50		
		Clay	0.005mm

NOTES

Classification – The Unified Soil Classification System is used to identify soil unless otherwise noted.

N:

Standard "N" Penetration Test (SPT) (ASTM D1586) – Driving a 2-inch O.D., 1 3/8-inch I.D. sampler a distance of 1 foot into undisturbed soil with a 140-pound hammer free falling a distance of 30 inches. It is customary to drive the spoon 6inches to seat the sampler into undisturbed soil, and then perform the test. The number of hammer blows for seating the spoon and making the tests are recorded for each 6 inches of penetration on the field drill long (e.g., 10/8/7). On the report log, the Standard Penetration Test result (i.e., the N value) is normally presented and consists of the sum of the 2nd and 3rd penetration counts (i.e., N = 8 + 7 = 15 blows/ft.)

Soil Property Symbols

- Ou: Unconfined Compressive Strength
- Unconfined Comp. Strength (pocket pent.) omc: Qp: PL:
- LL: Liquid Limit, % (Atterberg Limit)
- PI: Plasticity Index

Standard Penetration Value (see above) Optimum Moisture content Plastic Limit, % (Atterberg Limit) Maximum Dry Density mdd:

	A	EI	AMERICAN ENGINEERS, INC. PROFESSIONAL ENGINEERING 65 Abordeen Drive Glasgow, KY 42141 (270) 651-7220									-	R 27W E 1 OF 2
	CLIEN	NT LG	&E and KU F	PROJEC	T NAME	Ford	138kV Gle	ndale	Industi	ial We	est		
	PROJ	IECT N	UMBER _222-032 F	PROJEC	T LOCAT		Glendale, ł	٢Y					
	DATE	STAR	TED _3/23/22 COMPLETED _3/23/22 0	GROUNE	ELEVA		697.3 ft						
	DRILL	LING C	ONTRACTOR Adam Thompson	GROUNE	WATER	LEVE	LS:						
GPJ.	DRILL	LING M	ETHOD HSA/ Diamond impregnated coring bit	$ar{2}$ at	TIME OF	DRIL	LING _ 19.0)0 ft / E	Elev 67	′8.30 f	t		
VEST	LOGO	GED BY	Adam Cash CHECKED BY Aaron Anderson	AT	END OF	DRILL	.ING						
AL <	NOTE	S		AF	ter Dri	LLING							
					ш	%					ERBE		
	o DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY 9 (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	LIQUID		PLASTICITY INDEX	REMARKS
	 		CL) lean CLAY, brown to red, wet to saturated, stiff to very	J stiff	ST 1	90		-	24				Qu = 3,460 psf
138KV WES	5				ST 2	100		-	25	42	22	20	Qu = 4,570 psf
	 - 10				SPT 1	100	4-5-7 (12)	-	29				
	 15												
			∇ (CH) fat CLAY with gravel, reddish brown to red, wet to satu		ST	100			45	70	20	50	Qu = 1,715
Z-03Z LG&E	20		(CH) fat CLAY with gravel, reddish brown to red, wet to satu medium stiff to stiff	irated,	3	100		-	45	70	20	50	psf
	25												
ZZX: I - / G:													
1.22					CDT	100	3-4-9	-	44				
- 5/13/22 10	30				SPT 2	100	(13)	<u> </u>					
ק	 												
	35												
	 40				ST	100		-	38				Qu = 1,400
GEOTECH BI			LIMESTONE, interbedded with clay, gray with brown stainin to medium grained, soft to moderately hard, highly fractured highly weathered	ng, fine 1,	4 RC 1	47 (0)							psf

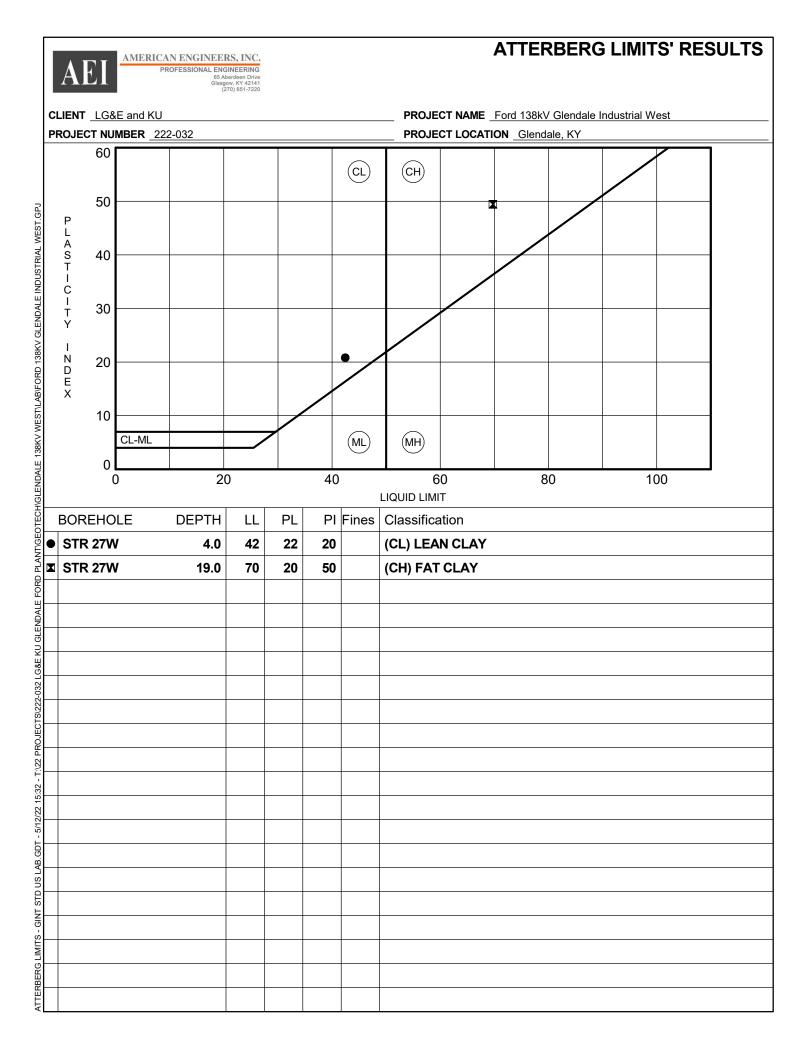
(Continued Next Page)

AEI	PROFESSIONAL ENGINEERING B65 Abardeen Drive Glangow, KY 42141 (270) 851-7220									STF PAGE	27W 2 OF 2
					138kV Gle		Indust	rial We	est		
PROJECT NUMBER DEPTH (ft) DIHdty D	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	Glendale, I BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	LIMIT LIMIT			REMARKS
45 LIME mode	STONE, gray, fine to medium grained, th rately hard to hard	in to thick bedded,	RC 2 RC 3	68 (34) 52 (16)							Vertical fracture (46.0'-46.2
	Bottom of borehole at 53.8 fe										

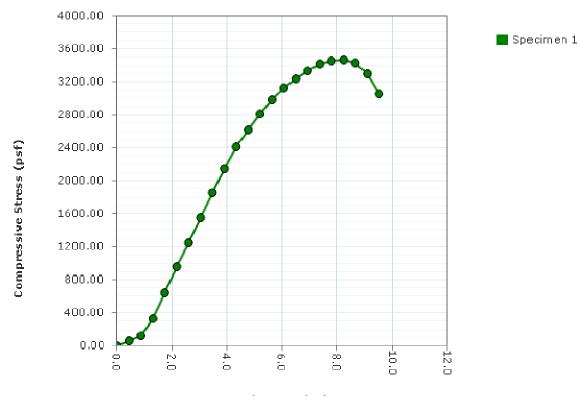
APPENDIX C

Laboratory Testing Results





ASTM D2166



Stress-Strain Graph

Axial Strain (%)

Project:Ford 138kV Glendale Industrial WestProject Number:222-032Received Date:3/24/2022Sampling Date:3/24/2022Sample Number:ST 1Sample Depth:1.0-3.0 ftBoring Number:STR #27WLocation:Glendale, KYClient Name:LG&E and KURemarks:K

Project Name: Ford 138kV Glendale Industrial West Project Number: 222-032

Checked By: _____

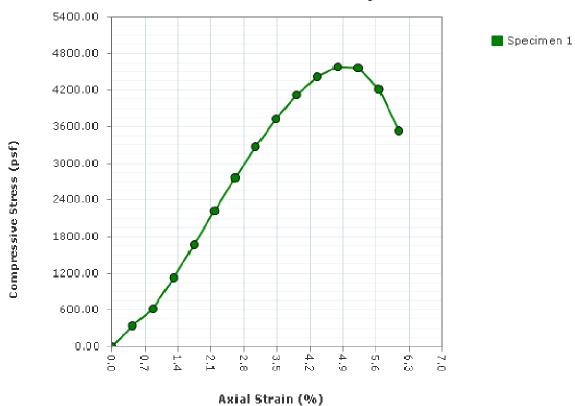
Date: _

ASTM D2166

Before Test	1	2	S 3	pecimer 4	n Numbo 5	er 6	7	8
Moisture Content (%):	24.4							
Wet Density (pcf)	125.0							
Dry Density (pcf)	100.4							
Saturation (%):								
Void Ratio:	0.691							
Height (in)	5.7700							
Diameter (in)	2.8400							
Strain Limit @ 15% (in)	0.9							
Height To Diameter Ratio:	2.03							
Test Data	1	2	3	4	5	6	7	8
Failure Angle (°):	0							
Strain Rate (in/min)	0.1							
Strain Rate (%/min):	1.73							
Unconfined Compressive Strength (psf)	3464.88							
Undrained Shear Strength (psf)	1732.44							
Strain at Failure (%):	8.23							
Specific Gravity: 2.72	Pla	stic Limit:	0		I	Liquid Limi	t: 0	
Type: UD	Soil Clas	ssification:	CL			•	:	
Project:Ford 138kV Glendale IndProject Number:222-032Sampling Date:3/24/2022Sample Number:ST 1Sample Depth:1.0-3.0 ftBoring Number:STR #27WLocation:Glendale, KYClient Name:LG&E and KURemarks:KU								
Specimen 1 Specimen 2 Specimen 3 Failure Sketch Failure Sketch Failure Sketch	Specimo Failure S		Specimen 5 Failure Sketo		imen 6 e Sketch	Specime Failure Sk		ecimen 8 ure Sketch

Project Name: Ford 138kV Glendale Industrial West Project Number: 222-032

ASTM D2166



Stress-Strain Graph

Project:Ford 138kV Glendale Industrial WestProject Number:222-032Received Date:3/24/2022Sampling Date:3/24/2022Sample Number:ST 2Sample Depth:4.0-6.0 ftBoring Number:STR 27WLocation:Glendale, KYClient Name:LG&E and KURemarks:K

Project Name: Ford 138kV Glendale Industrial West Project Number: 222-032

Checked By: _____

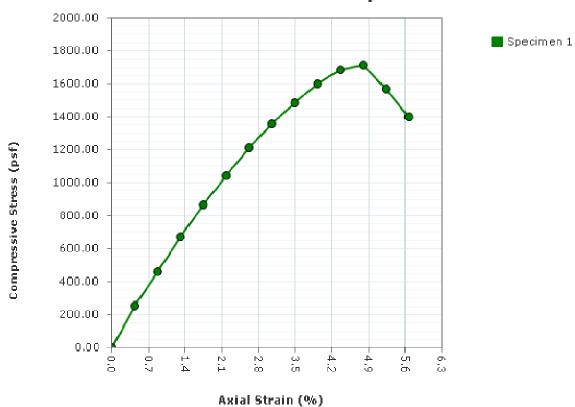
Date: _

ASTM D2166

Before Test	1	2	S 3	pecimer 4	n Numbo 5	er 6	7	8
Moisture Content (%):	25.3	_		-				
Wet Density (pcf)								
Dry Density (pcf)								
Saturation (%):	97.7							
Void Ratio:	0.704							
Height (in)	5.7500							
Diameter (in)	2.8500							
Strain Limit @ 15% (in)	0.9							
Height To Diameter Ratio:								
Test Data	1	2	3	4	5	6	7	8
Failure Angle (°):	0							
Strain Rate (in/min)	0.1							
Strain Rate (%/min):	1.74							
Unconfined Compressive Strength (psf)	4572.26							
Undrained Shear Strength (psf)	2286.13							
Strain at Failure (%):	5.22							
Specific Gravity: 2.72	Pla	stic Limit:	22		T	Liquid Limi	i+· 12	
Type: UD		ssification:	i		1	Jiquiu Liin	11. 142	
Project: Ford 138kV Glendale Ind	ustrial We	st						
Project Number: 222-032								
Sampling Date: 3/24/2022								
Sample Number: ST 2								
Sample Depth: 4.0-6.0 ft								
Boring Number: STR 27W								
Location: Glendale, KY								
Client Name: LG&E and KU Remarks:								
Kemarks:								
Specimen 1 Specimen 2 Specimen 3	Specim		Specimen 5		imen 6	Specime		ecimen 8
Failure Sketch Failure Sketch Failure Sketch	Failure S	ketch F	ailure Skete	ch Failur	e Sketch	Failure Sk	etch Fail	ure Sketch
	i 			!		i 		

Project Name: Ford 138kV Glendale Industrial West Project Number: 222-032

ASTM D2166



Stress-Strain Graph

Project:Ford 138kV Glendale Industrial WestProject Number222-032Received Date:3/24/2022Sampling Date:3/24/2022Sample Number:ST 3Sample Depth:19.0-21.0 ftBoring Number:Glendale, KYClient Name:LG&E and KURemarks:Kemarks

Project Name: Ford 138kV Glendale Industrial West Project Number: 222-032

Checked By: _____

Date: _

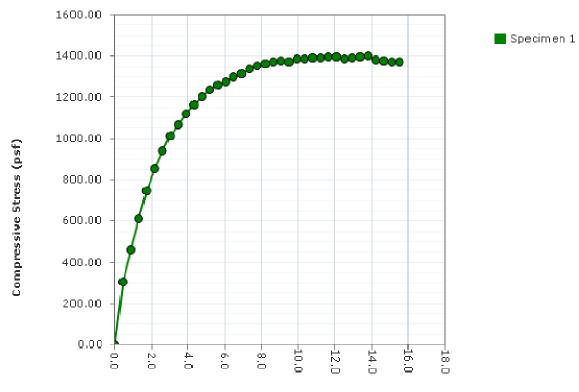
1

ASTM D2166

Before Test	1	2	S 3	bpecimer 4	1 Numbe 5	er 6	7	8
Moisture Content (%):	45.2					0		
Wet Density (pcf)								
Dry Density (pcf)								
Saturation (%):	102.0							
Void Ratio:								
Height (in)	5.7400							
Diameter (in)								
Strain Limit @ 15% (in)	0.9							
Height To Diameter Ratio:								
Test Data	1	2	. 3	. 4	5	6	. 7	. 8
Failure Angle (°):	0							
Strain Rate (in/min)	0.1							
Strain Rate (%/min):	1.74							
Unconfined Compressive Strength (psf)	1716.51							
Undrained Shear Strength (psf)	858.25							
Strain at Failure (%):	4.79							
Specific Gravity: 2.72	Pla	astic Limit:	20		T	iquid Lim	it: 70	
Type: UD		ssification:	i		L	iquia Liin	11. 70	
Project: Ford 138kV Glendale Ind	ustrial We	st						
Project Number: 222-032								
Sampling Date: 3/24/2022								
Sample Number: ST 3								
Sample Depth: 19.0-21.0 ft								
Boring Number: STR #27W Location: Glendale, KY								
Client Name: LG&E and KU								
Remarks:								
Specimen 1 Specimen 2 Specimen 3	Specim		Specimen		imen 6	Specime		ecimen 8
Failure Sketch Failure Sketch Failure Sketch	Failure S	ketch l	Failure Sket	ch Failur	e Sketch	Failure Sk	etch Fail	ure Sketch

Project Name: Ford 138kV Glendale Industrial West Project Number: 222-032

ASTM D2166



Stress-Strain Graph

Axial Strain (%)

Project:Ford 138kV Glendale Industrial WestProject Number:222-032Received Date:3/24/2022Sampling Date:3/24/2022Sample Number:ST 4Sample Depth:39.0-40.2 ftBoring Number:STR #27WLocation:Glendale, KYClient Name:LG&E and KURemarks:K

Project Name: Ford 138kV Glendale Industrial West Project Number: 222-032

Checked By: _____

Date: _

ASTM D2166

1	2		Δ	5	6	7	8
38.1	_	3		5	U		0
113.2							
1	2	. 3	4	5	6	7	8
0							
0.1							
1.72							
1399.46							
699.73							
13.79							
Pla	stic Limit:	0		T	iquid Limi	it. 10	
				L	iquiu Liin	. 0	
istrial Wes	st						
							ecimen 8
Failure Sl	ketch l	Failure Sket	ch Failur	e Sketch	Failure Sk	etch Fail	ure Sketch
	82.0 96.7 1.071 5.8000 2.8600 0.9 2.03 1 0 0.1 1.72 1399.46 699.73 13.79 Pla Soil Clas Istrial Wes	82.0 96.7 1.071 5.8000 2.8600 0.9 2.03 1 2 0 0.1 1.72 1399.46 699.73 13.79 Plastic Limit: Soil Classification: Istrial West	82.0 96.7 96.7 1.071 1.071 5.8000 2.8600 0 0.9 2.03 1 2 3 0 0 0.1 1.72 1399.46 6 699.73 13.79 Plastic Limit: 0 Soil Classification: CH	82.0 96.7 1.071 5.8000 2.8600 0 0.9 2.03 1 2 3 4 0 0 1 1 1.72 1 1 1 1 1.72 1 1 1 1 1 1 1.72 1	82.0 96.7 1.071 5.8000 2.8600 90.9 2.03 4 1 2 3 4 0 0 1 1 1.72 1 1 1 1.72 1 1 1 1.72 1 1 1 1.72 1 1 1 1.72 1 1 1 1.72 1 1 1 1.73 1 1 1 1 1.72 1 1 1 1 1.73 1 1 1 1 1.73 1 1 1 1 1.73 1 1 1 1 1.79 1 1 1 1 1 1.8 1 1 1 1 1 1 1.79 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	82.0 96.7 1.071 5.8000 2.8600 0 0.9 2.03 1 2 3 4 5 6 0 0.1 1.72 1.399.46 6 6 6 699.73 13.79 1.3.79 Liquid Limits 1.1.72 Plastic Limit: 0 Liquid Limits Soil Classification: CH CH Strial West	82.0 96.7 1.071 5.8000 2.8600 0.9 2.03 2.03 1 2 3 4 5 6 7 0 0.1 1.72 1.399.46 6 6 6 6 99.73 1.379 1.379 1.100 Liquid Limit: 0 0 5 5 6 7 0 0 1.172

Project Name: Ford 138kV Glendale Industrial West Project Number: 222-032

Your Geotechnical Engineering Report

To help manage your risks, this information is being provided because subsurface issues are a major cause of construction delays, cost overruns, disputes, and claims.

Geotechnical Services are Performed for Specific Projects, Purposes, and People

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering exploration conducted for an engineer may not fulfill the needs of a contractor or even another engineer. Each geotechnical engineering exploration and report is unique and is prepared solely for the client. No one except the client should rely on the geotechnical engineering report without first consulting with the geotechnical engineer who prepared it. The report should not be applied for any project or purpose except the one originally intended.

Read the Entire Report

To avoid serious problems, the full geotechnical engineering report should be read in its entirety. Do not only read selected sections or the executive summary.

A Unique Set of Project-Specific Factors is the Basis for a Geotechnical Engineering Report

Geotechnical engineers consider a numerous unique, project-specific factors when determining the scope of a study. Typical factors include: the client's goals, objectives, project costs, risk management preferences, proposed structures, structures on site, topography, and other proposed or existing site improvements, such as access roads, parking lots, and utilities. Unless indicated otherwise by the geotechnical engineer who conducted the original exploration, a geotechnical engineering report should not be relied upon if it was:

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

Typical changes that can lessen 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 multi-story hotel to a parking lot
- finished floor elevation, location, orientation, or weight of the proposed structure, anticipated loads or
- project ownership

Geotechnical engineers cannot be held liable or

responsible for issues that occur because their report did not take into account development items of which they were not informed. The geotechnical engineer should always be notified of any project changes. Upon notification, it should be requested of the geotechnical engineer to give an assessment of the impact of the project changes.

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that exist at the time of the exploration. A geotechnical engineering report should not be relied upon if its reliability could be in question due to factors such as man-made events as construction on or adjacent to the site, natural events such as floods, earthquakes, or groundwater fluctuation, or time. To determine if a geotechnical report is still reliable, contact the geotechnical engineer. Major problems could be avoided by performing a minimal amount of additional analysis and/or testing.

Most Geotechnical Findings are Professional Opinions

Geotechnical site explorations identify subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field logs and laboratory data and apply their professional judgment to make conclusions about the subsurface conditions throughout the site. Actual subsurface conditions may differ from those indicated in the report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risk associated with unanticipated conditions.

The Recommendations within a Report Are Not Final

Do not put too much faith on the construction recommendations included in the report. The recommendations are not final due to geotechnical engineers developing them principally from judgment and opinion. Only by observing actual subsurface conditions revealed during construction can geotechnical engineers finalize their recommendations. Responsibility and liability cannot be assumed for the recommendations within the report by the geotechnical engineer who developed the report if that engineer does not perform construction observation.

A Geotechnical Engineering Report Is Subject To Misinterpretation

Misinterpretation of geotechnical engineering reports has resulted in costly problems. The risk of misinterpretation can be lowered after the submittal of the final report by having the geotechnical engineer consult with appropriate members of the design team. The geotechnical engineer could also be retained to review crucial parts of the plans and specifications put together by the design team. The geotechnical engineering report can also be misinterpreted by contractors which can result in many problems. By participating in pre-bid and preconstruction meetings and providing construction observations by the geotechnical engineer, many risks can be reduced.

Final Boring Logs Should not be Re-drawn

Geotechnical engineers prepare final boring logs and testing results based on field logs and laboratory data. The logs included in a final geotechnical engineering report should never be redrawn to be included in architectural or design drawings due to errors that could be made. Electronic reproduction is acceptable, along with photographic reproduction, but it should be understood that separating logs from the report can elevate risk.

Contractors Need a Complete Report and Guidance

By limiting what is provided for bid preparation, contractors are not liable for unforeseen subsurface conditions although some owners and design professionals believe the opposite to be true. The complete geotechnical engineering report, accompanied with a cover letter or transmittal, should be provided to contractors to help prevent costly problems. The letter states that the report was not prepared for purposes of bid

development and the report's accuracy is limited. Although a fee may be required, encourage the contractors to consult with the geotechnical engineer who prepared the report and/or to conduct additional studies to obtain the specific types of information they need or prefer. A prebid conference involving the owner, geotechnical engineer, and contractors can prove to be very valuable. If needed, allow contractors sufficient time to perform additional studies. Upon doing this you might 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.

Closely Read Responsibility Provisions

Geotechnical engineering is not as exact as other engineering disciplines. This lack of understanding by clients, design professionals, and contractors has created unrealistic expectations that have led to disappointments, claims, and disputes. To minimize such risks, a variety of explanatory provisions may be included in the report by the geotechnical engineer. To help others recognize their own responsibilities and risks, many of these provisions indicate where the geotechnical engineer's responsibilities begin and end. These provisions should be read carefully, questions asked if needed, and the geotechnical engineer should provide satisfactory responses.

Environmental Issues/Concerns are not Covered

Unforeseen environmental issues can lead to project delays or even failures. Geotechnical engineering reports do not usually include environmental findings, conclusions, or recommendations. As with a geotechnical engineering report, do not rely on an environmental report that was prepared for someone else.



65 Aberdeen Drive Glasgow, KY 42141 270-651-7220



May 16, 2022

LG&E and KU

One Quality Street Lexington, KY 40507

RE: Report of Geotechnical Exploration Ford 138kV Glendale Industrial West Structure 28BW Glendale, KY AEI Project No. 222-032

1. INTRODUCTION

A summary of the geotechnical parameters necessary to facilitate foundation design has been prepared for the immediate use of the design team. The project is a part of the Ford 138kV Glendale Industrial West in Glendale, KY. This summary is provided for Structure 28BW, a single circuit, angle dead end which will be supported by a drilled shaft foundation.

Chrysterro	Chrysothuro	Height	Centerline Structure Coordinates Trans				Long.
Structure Number	Structure Description	(ft)	Elevation (ft)	Latitude (DMS)	Longitude (DMS)	Moment (ft-k)	Moment (ft-k)
28BW	Single Circuit	110	685.5	37°34′37.90″N	85°52′48.70″W	2,660	3,856

Table 1: Tower Details

2. DRILLING AND SAMPLING

The geotechnical exploration consisted of one soil test boring. The soil test boring was advanced to a depth of about 41 feet beneath the surface. The boring location was staked by KU personnel. A boring layout is included in Appendix A of this report.

3. SUBSURFACE SOIL CONDITIONS

The generalized subsurface conditions encountered at the boring location, including descriptions of the various strata and their depths and thicknesses are presented on the typed boring log in Appendix B.

Topsoil was encountered at the surface with a thickness of six inches. Beneath the surface material, lean clay was encountered to a depth of nine feet. Fat clay was encountered from nine feet to the auger refusal depth. The lean clay was typically

described as reddish brown in color, wet and very stiff in soil strength consistency. The fat clay was typically described as reddish brown to red in color, wet to saturated and stiff in soil strength consistency.

4. BEDROCK CONDITIONS

Refusal, as would be indicated by the Driller on the field boring log, indicates a depth where essentially no downward progress can be made by the auger. It is normally indicative of a very hard or very dense material such as large boulders or the upper bedrock surface or where the N-value indicates essentially no penetration of the split-spoon sampler. The auger refusal depth is provided in the table below.

			,	>	
			Surface	Auge	r Refusal
			Elevation	Depth	Elevation
Hole No.	Latitude	Longitude	(ft.) MSL	(ft.)	(ft.) MSL
STR 28BW	37°34'37.90"N	85°52′48.70″W	685.9	40.7	645.2

Table 2: Structure 28BW – Summary of Boring

5. FOUNDATION DESIGN PARAMETERS

5.1 <u>Lateral Design Parameters</u> – MFAD soil parameters are provided in the table below. These values are derived from the laboratory and standard penetration testing in combination with recommended soil properties from the Naval Engineering Command (NAVFAC) Design Manual 7.02. The soil deformation moduli provided below were derived from Figure 3-2 and Figure 3-4 of the User Guide for MFAD 5.0 (Moment Foundation Analysis and Design).

Structure Number	Soil Type	Depth (feet)	Soil Undrained Shear	Modulus of Deformation
			Strength (ksf)	(ksi)
STR 28BW	CL	5.0-9.0	3.0	2.0
STR 28BW	СН	9.0-36.0	1.4	0.8
STR 28BW	СН	36.0-40.0	1.2	0.7

Table 3: MFAD Geotechnical Design Parameters

Lateral soil parameters recommended for drilled shaft design are shown below in Table 4 using estimations by Matlock (1970) for soft clays with free water and by Reese, et. al (1975) for stiff clay with free water. These values are derived from laboratory and standard penetration testing in combination with recommended soil properties from the Naval Engineering Command (NAVFAC) Design Manual 7.02.

Structure Number	Soil Type	Depth (feet)	Estimated Strain at 50% Stress (ε ₅₀)	Initial Soil Stiffness (k _{py}) (pci)
STR 28BW	CL	5.0-9.0	0.01	400
STR 28BW	СН	9.0-36.0	0.01	200
STR 28BW	СН	36.0-40.0	0.01	200

Table 4: L-Pile Soil Parameters for Design of Drilled Shafts

5.2 <u>Axial Design Parameters</u> – Axial soil parameters recommended for drilled shaft design are shown below in Table 5. These values are derived from laboratory and standard penetration testing in combination with recommended soil properties from the Naval Engineering Command (NAVFAC) Design Manual 7.02. An ultimate friction angle for clay in contact with concrete of 17° should be used for design. For cohesive soils, utilize a skin friction resistance factor (φ) of 0.45 in accordance with the Brown et al. (2010) method. Utilize an uplift resistance factor of 0.35 for cohesive soils in accordance with the Brown et al. (2018) method. Due to karst features present at the proposed tower location, it is recommended that base resistance be neglected for design purposes.

rubic 5. Axial son raranteters for besign of brined sharts										
Structure Number	Soil Type	Depth (feet)	Effective Unit Weight* (pcf)	Undrained Shear Strength (S _u) (ksf)	Nominal Side Resistance (q _s) (ksf)					
STR 28BW	CL	5.0-9.0	125.0	3.0	1.2					
STR 28BW	СН	9.0-36.0	120.0	1.4	1.0					
STR 28BW	СН	36.0-40.0	57.6	1.2	1.0					

Table 5: Axial Soil Parameters for Design of Drilled Shafts

*Effective Unit Weight accounts for Buoyancy

Ford 138kV Glendale Industrial West Structure 28BW

May 16, 2022 Page **4** of **4**

The designer should feel free to contact AEI at 270-651-7220 for further recommendations or if any questions arise pertaining to this project.

Sincerely,

AMERICAN ENGINEERS, INC.

Aaron Anderson, EIT Geotechnical Engineer

Bont

Dusty Barrett, PE, PMP Director of Geotechnical Services

Attachments:

- Boring Layout
- Typed Boring Log
- Laboratory Data

APPENDIX A

Boring Layout







APPENDIX B

Boring Log



FIELD TESTING PROCEDURES

The general field procedures employed by the Field Services Center are summarized in the following outline. The procedures utilized by the AEI Field Service Center are recognized methods for determining soil and rock distribution and ground water conditions. These methods include geophysical and in situ methods as well as borings.

Soil Borings are drilled to obtain subsurface samples using one of several alternate techniques depending upon the surface conditions. Borings are advanced into the ground using continuous flight augers. At prescribed intervals throughout the boring depths, soil samples are obtained with a split-spoon or thin-walled sampler and sealed in airtight glass jars and labeled. The sampler is first seated 6 inches to penetrate loose cuttings and then driven an additional foot, where possible, with blows from a 140 pound hammer falling 30 inches. The number of blows required to drive the sampler each six-inch increment is recorded. The penetration resistance, or "N-value" is designated as the number of hammer blows required to drive the sampler the final foot and, when properly evaluated, is an index to cohesion for clays and relative density for sands. The split spoon sampling procedures used during the exploration are in general accordance with ASTM D 1586. Split spoon samples are considered to provide *disturbed* samples, yet are appropriate for most engineering applications. Thin-walled (Shelby tube) samples are considered to provide *undisturbed* samples and obtained when warranted in general accordance with ASTM D 1587.

These drilling methods are not capable of penetrating through material designated as "refusal materials." Refusal, thus indicated, may result from hard cemented soil, soft weathered rock, coarse gravel or boulders, thin rock seams, or the upper surface of sound continuous rock. Core drilling procedures are required to determine the character and continuity of refusal materials.

Core Drilling Procedures for use on refusal materials. Prior to coring, casing is set in the boring through the overburden soils. Refusal materials are then cored according to ASTM D-2113 using a diamond bit attached to the end of a hollow double tube core barrel. This device is rotated at high speeds and the cuttings are brought to the surface by circulating water. Samples of the material penetrated are protected and retained in the inner tube, which is retrieved at the end of each drill run. Upon retrieval of the inner tube the core is recovered, measured and placed in boxes for storage.

The subsurface conditions encountered during drilling are reported on a field test boring record by the driller. The record contains information concerning the boring method, samples attempted and recovered, indications of the presence of various materials such as coarse gravel, cobbles, etc., and observations between samples. Therefore, these boring records contain both factual and interpretive information. The field boring records are on file in our office.

The soil and rock samples plus the field boring records are reviewed by a geotechnical engineer. The engineer classifies the soil in general accordance with the procedures outlined in ASTM D 2487 and D 2488 and prepares the final boring records which are the basis for all evaluations and recommendations.

Representative portions of soil samples are placed in sealed containers and transported to the laboratory. In the laboratory, the samples are examined to verify the driller's field classifications. Test Boring Records are attached which show the soil descriptions and penetration resistances.

The final boring records represent our interpretation of the contents of the field records based on the results of the engineering examinations and tests of the field samples. These records depict subsurface conditions at the specific locations and at the particular time when drilled. Soil conditions at other locations may differ from conditions occurring at these boring locations. Also, the passage of time may result in a change in the subsurface soil and ground water conditions at these boring locations. The lines designate the interface between soil or refusal materials on the records and on profiles represent approximate boundaries. The transition between materials may be gradual. The final boring records are included with this report.

Water table readings are normally taken in conjunction with borings and are recorded on the "Boring Logs". These readings indicate the approximate location of the hydrostatic water table at the time of our field investigation. Where impervious soils are encountered (clayey soils) the amount of water seepage into the boring is small, and it is generally not possible to establish the location of hydrostatic water table through water level readings. The ground water table may also be dependent upon the amount of precipitation at the site during a particular period of time. Fluctuations in the water table should be expected with variations in precipitation, surface run-off, evaporation and other factors.

The time of boring water level reported on the boring records is determined by field crews as the drilling tools are advanced. The boring water level is detected by changes in the drilling rate, soil samples obtained, etc. Additional water table readings are generally obtained at least 24 hours after the borings are completed. The time lag of at least 24 hours is used to permit stabilization of the ground water table which has been disrupted by the drilling operations. The readings are taken by dropping a weighted line down the boring or using as electrical probe to detect the water level surface.

Occasionally the borings will cave-in, preventing water level readings from being obtained or trapping drilling water above the caved-in zone. The cave-in depth is also measured and recorded on the boring records.

Sampling Terminology

<u>Undisturbed Sampling</u>: Thin-walled or Shelby tube samples used for visual examination, classification tests and quantitative laboratory testing. This procedure is described by ASTM D 1587. Each tube, together with the encased soil, is carefully removed from the ground, made airtight and transported to the laboratory. Locations and depths of undisturbed samples are shown on the "Boring Logs."

Bag Sampling: Bulk samples of soil are obtained at selected locations. These samples consist of soil brought to the surface by the drilling augers, or obtained from test pits or the ground surface using hand tools. Samples are placed in bags, with sealed jar samples of the material, and taken to our laboratory for testing where more mass material is required (i.e. Proctors and CBR's). The locations of these samples are indicated on the appropriate logs, or on the Boring Location Plan.

CLASSIFICATION SYSTEM FOR SOIL EXPLORATION

COHESIVE SOILS

(Clay, Silt, and Mixtures)

CONSISTENCY	SPT N-VALUE	Qu/Qp (tsf)	PLASTICITY	
Very Soft Soft Medium Stiff Stiff Very Stiff Hard	2 blows/ft or less 2 to 4 blows/ft 4 to 8 blows/ft 8 to 15 blows/ft 15 to 30 blows/ft 30 blows/ft or more	$\begin{array}{c} 0 - 0.25 \\ 0.25 - 0.49 \\ 0.50 - 0.99 \\ 1.00 - 2.00 \\ 2.00 - 4.00 \\ > 4.00 \end{array}$	Degree of PlasticityPlastic Index $0 - 7$ Low $0 - 7$ Medium $8 - 22$ Highover 22	(<u>PI)</u>

NON-COHESIVE SOILS

(Silt, Sand, Gravel, and Mixtures)

DENSITY	SPT N-VALUE	PARTICLE	SIZE IDENTIFICATION
Very Loose	4 blows/ft or less	Boulders	12 inch diameter or more
Loose	4 to 10 blows/ft	Cobbles	3 to 12 inch diameter
Medium Dense	10 to 30 blows/ft	Gravel	Coarse -1 to 3 inch
Dense	30 to 50 blows/ft		Medium $-\frac{1}{2}$ to 1 inch
Very Dense	50 blows/ft or more		Fine $-\frac{1}{4}$ to $\frac{1}{2}$ inch
		Sand	Coarse – 0.6mm to ¹ / ₄ inch
RELATIVE PROPO	DRTIONS		Medium – 0.2mm to 0.6mm
Descriptive Term	Percent		
Trace	1 - 10		Fine -0.05 mm to 0.2 mm
Trace to Some	11 - 20		
Some	21 – 35	Silt	0.05mm to 0.005mm
And	36 - 50		
		Clay	0.005mm

NOTES

Classification – The Unified Soil Classification System is used to identify soil unless otherwise noted.

N:

Standard "N" Penetration Test (SPT) (ASTM D1586) – Driving a 2-inch O.D., 1 3/8-inch I.D. sampler a distance of 1 foot into undisturbed soil with a 140-pound hammer free falling a distance of 30 inches. It is customary to drive the spoon 6inches to seat the sampler into undisturbed soil, and then perform the test. The number of hammer blows for seating the spoon and making the tests are recorded for each 6 inches of penetration on the field drill long (e.g., 10/8/7). On the report log, the Standard Penetration Test result (i.e., the N value) is normally presented and consists of the sum of the 2nd and 3rd penetration counts (i.e., N = 8 + 7 = 15 blows/ft.)

Soil Property Symbols

- Ou: Unconfined Compressive Strength
- Unconfined Comp. Strength (pocket pent.) omc: Qp: PL:
- LL: Liquid Limit, % (Atterberg Limit)
- PI: Plasticity Index

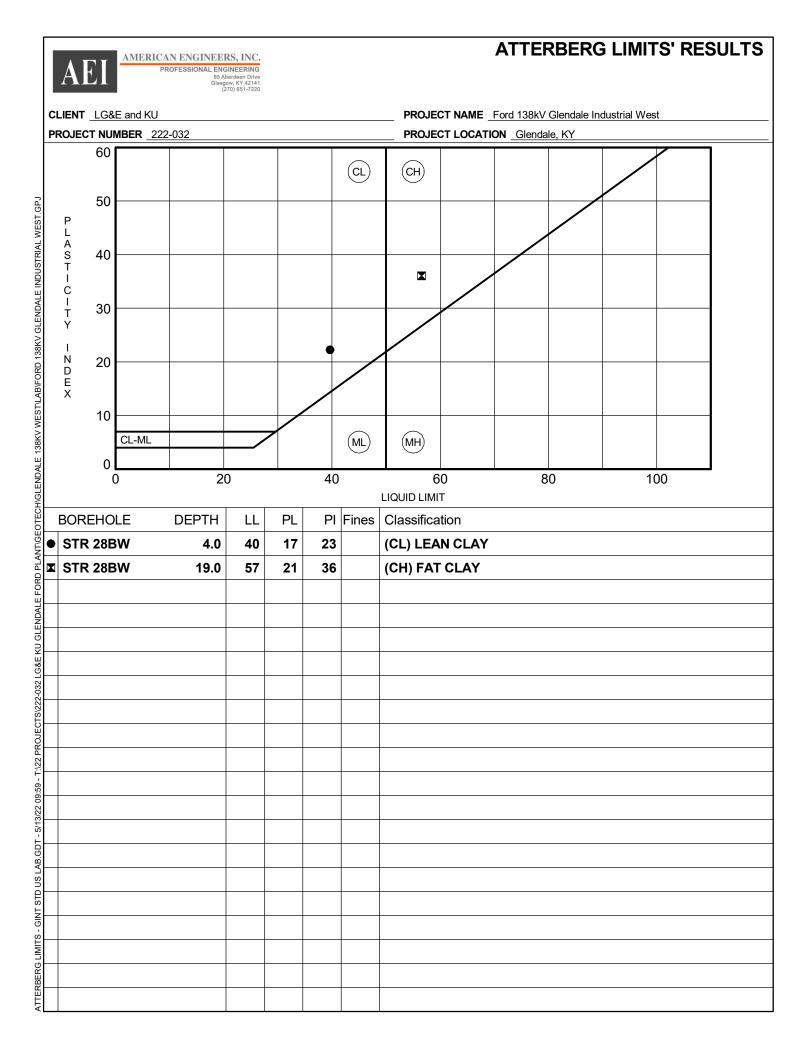
Standard Penetration Value (see above) Optimum Moisture content Plastic Limit, % (Atterberg Limit) Maximum Dry Density mdd:

	A	EI	AMERICAN ENGINEERS, INC. PROFESSIONAL ENGINEERING 65 Abbridgeow, KY 42141 (270) 651-7220								S		28BW
	CLIEN	IT LG	&E and KU	PROJECT	NAME	Ford ²	138kV Glen	dale In	dustria	l West	t		
	PROJ	ECT N	UMBER _222-032	PROJECT	LOCAT		Glendale, K	Y					
			TED _3/30/22 COMPLETED _3/30/22		ELEVA		685.9 ft						
21			ONTRACTOR Adam Thompson										
0			ETHOD Hollow Stem Augers				LING _36.0						
1			Adam Cash CHECKED BY Aaron Anderson				.ING						
1210	NOTE	s		AF	fer Dri			1		AT	TERBE		
NUN		0			Ц Ц	% /	<i>(</i>) ()	z.	щ®		LIMITS	3	o v
DALE	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	MOISTURE CONTENT (%)	<u>م</u> .	<u>⊔</u> ,	Ĕ	REMARKS
SLEN	DEF (f	BRA	MATERIAL DESCRIPTION		MPL	NO NO NO NO	BL(К ЦЩ Щ	NTE N	LIQUID	PLASTIC LIMIT	STIC IDE)	E W
138KV (0				SAI	RE		Ъ	≥ö			PLASTICITY INDEX	Ľ.
	0												
			(CL) lean CLAY, reddish brown, wet, very stiff	_	ST 1	90		2.0	26				
	-				•								
	5				ST 2	90		4.5+	25	40	17	23	Qu = 7,010
	-				2								psf
	-												
	-				CDT	400	450			-			
	10		(CH) fat CLAY, reddish brown to red, wet to saturated, stiff		SPT 1	100	4-5-6 (11)	-	33	-			
	-												
	-												
	15												
	-												
- ER	-												
	20				ST 3	65		2.5	35	57	21	36	Qu = 3,730 psf
- 28	-				5								psi
22-032	-												
	25												
22-22-22	-												
	-												
2:01	30				SPT 2	20	1-4-5	-	33				
13/21	-						(9)						
Ĭ	-												
P.9P.	-												
20-02-	35		7										
	_		¥										
בוב פוב	-												
	40				SPT	53	3-5-5	-	34				
	-10		Refusal at 40.7 feet.		SPT 3		(10)						
CH BU			Refusal at 40.7 feet. Bottom of borehole at 40.7 feet.										
ËOF													

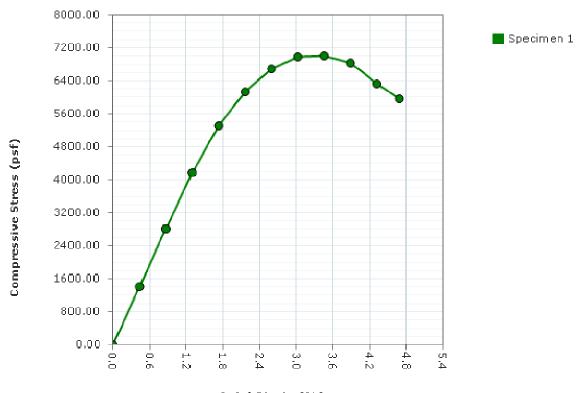
APPENDIX C

Laboratory Testing Results





ASTM D2166



Stress-Strain Graph

Axial Strain (%)

Project:Ford 138kV Glendale Industrial WestProject Number:222-032Received Date:4/12/2022Sampling Date:4/12/2022Sample Number:ST 2Sample Depth:4.0-6.0 ftBoring Number:STR 28BWLocation:Glendale, KYClient Name:LG&E and KURemarks:K

Project Name: Ford 138kV Glendale Industrial West Project Number: 222-032

Checked By: _____

Date: _

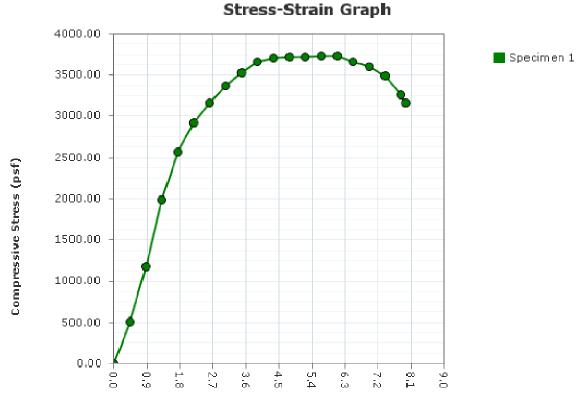
ASTM D2166

Before Test	1	2	S 3	pecimer 4	ı Numbo 5	er 6	7	8
Moisture Content (%):	24.5							
Wet Density (pcf)	126.7							
Dry Density (pcf)	101.8							
Saturation (%):	99.7							
Void Ratio:	0.668							
Height (in)	5.7900							
Diameter (in)	2.7200							
Strain Limit @ 15% (in)	0.9							
Height To Diameter Ratio:	2.13							
Test Data	1	2	3	4	5	6	7	8
Failure Angle (°):	0							
Strain Rate (in/min)	0.1							
Strain Rate (%/min):	1.73							
Unconfined Compressive Strength (psf)	7010.25							
Undrained Shear Strength (psf)	3505.13							
Strain at Failure (%):	3.45							
Specific Gravity: 2.72	Pla	stic Limit:	17		I	Liquid Limi	t: 40	
Type: UD	Soil Clas	ssification:	CL					
Project: Ford 138kV Glendale Ind Project Number: 222-032	ustrial Wes	st						
Sampling Date: 4/12/2022								
Sample Number: ST 2								
Sample Depth: 4.0-6.0 ft								
Boring Number: STR 28BW								
Location: Glendale, KY								
Client Name: LG&E and KU								
Remarks:								
Specimen 1 Specimen 2 Specimen 3 Failure Sketch Failure Sketch Failure Sketch	Specime Failure S		Specimen 5 ailure Sketo		imen 6 e Sketch	Specime Failure Sk		ecimen 8 ure Sketch

Project Name: Ford 138kV Glendale Industrial West Project Number: 222-032

Checked By: _____ Date: ____

ASTM D2166



Axial Strain (%)

Project:Ford 138kV Glendale Industrial WestProject Number:222-032Received Date:4/12/2022Sampling Date:4/12/2022Sample Number:ST 3Sample Depth:19.0-21.0 ftBoring Number:STR 28BWLocation:Glendale, KYClient Name:LG&E and KURemarks:K

Project Name: Ford 138kV Glendale Industrial West Project Number: 222-032

Checked By: _____

Date: _

ASTM D2166

Before Test	1	2	S 3	pecimer 4	n Numbe 5	er 6	7	8
Moisture Content (%):								
Wet Density (pcf)								
Dry Density (pcf)								
Saturation (%):								
Void Ratio:	0.922							
Height (in)	5.7500							
Diameter (in)	2.8500							
Strain Limit @ 15% (in)	0.9							
Height To Diameter Ratio:	2.02							
Test Data	1	2	3	4	5	6	7	8
Failure Angle (°):	0							
Strain Rate (in/min)	0.1							
Strain Rate (%/min):	1.74							
Unconfined Compressive Strength (psf)	3734.65							
Undrained Shear Strength (psf)								
Strain at Failure (%):	6.09							
Specific Gravity: 2.72	Pla	astic Limit:	21		Ι	Liquid Limi	t: 57	
Type: UD	Soil Clas	ssification:						
Project: Ford 138kV Glendale Ind Project Number: 222-032 Sampling Date: 4/12/2022 Sample Number: ST 3 Sample Depth: 19.0-21.0 ft Boring Number: STR 28BW Location: Glendale, KY Client Name: LG&E and KU Remarks:	ustrial Wes	st						
Specimen 1 Specimen 2 Specimen 3 Failure Sketch Failure Sketch Failure Sketch	Specimo Failure S		Specimen 5 ailure Sketo		imen 6 e Sketch	Specime Failure Sk		ecimen 8 ure Sketch

Project Name: Ford 138kV Glendale Industrial West Project Number: 222-032

Checked By: _____ Date: ____

Your Geotechnical Engineering Report

To help manage your risks, this information is being provided because subsurface issues are a major cause of construction delays, cost overruns, disputes, and claims.

Geotechnical Services are Performed for Specific Projects, Purposes, and People

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering exploration conducted for an engineer may not fulfill the needs of a contractor or even another engineer. Each geotechnical engineering exploration and report is unique and is prepared solely for the client. No one except the client should rely on the geotechnical engineering report without first consulting with the geotechnical engineer who prepared it. The report should not be applied for any project or purpose except the one originally intended.

Read the Entire Report

To avoid serious problems, the full geotechnical engineering report should be read in its entirety. Do not only read selected sections or the executive summary.

A Unique Set of Project-Specific Factors is the Basis for a Geotechnical Engineering Report

Geotechnical engineers consider a numerous unique, project-specific factors when determining the scope of a study. Typical factors include: the client's goals, objectives, project costs, risk management preferences, proposed structures, structures on site, topography, and other proposed or existing site improvements, such as access roads, parking lots, and utilities. Unless indicated otherwise by the geotechnical engineer who conducted the original exploration, a geotechnical engineering report should not be relied upon if it was:

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

Typical changes that can lessen 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 multi-story hotel to a parking lot
- finished floor elevation, location, orientation, or weight of the proposed structure, anticipated loads or
- project ownership

Geotechnical engineers cannot be held liable or

responsible for issues that occur because their report did not take into account development items of which they were not informed. The geotechnical engineer should always be notified of any project changes. Upon notification, it should be requested of the geotechnical engineer to give an assessment of the impact of the project changes.

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that exist at the time of the exploration. A geotechnical engineering report should not be relied upon if its reliability could be in question due to factors such as man-made events as construction on or adjacent to the site, natural events such as floods, earthquakes, or groundwater fluctuation, or time. To determine if a geotechnical report is still reliable, contact the geotechnical engineer. Major problems could be avoided by performing a minimal amount of additional analysis and/or testing.

Most Geotechnical Findings are Professional Opinions

Geotechnical site explorations identify subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field logs and laboratory data and apply their professional judgment to make conclusions about the subsurface conditions throughout the site. Actual subsurface conditions may differ from those indicated in the report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risk associated with unanticipated conditions.

The Recommendations within a Report Are Not Final

Do not put too much faith on the construction recommendations included in the report. The recommendations are not final due to geotechnical engineers developing them principally from judgment and opinion. Only by observing actual subsurface conditions revealed during construction can geotechnical engineers finalize their recommendations. Responsibility and liability cannot be assumed for the recommendations within the report by the geotechnical engineer who developed the report if that engineer does not perform construction observation.

A Geotechnical Engineering Report Is Subject To Misinterpretation

Misinterpretation of geotechnical engineering reports has resulted in costly problems. The risk of misinterpretation can be lowered after the submittal of the final report by having the geotechnical engineer consult with appropriate members of the design team. The geotechnical engineer could also be retained to review crucial parts of the plans and specifications put together by the design team. The geotechnical engineering report can also be misinterpreted by contractors which can result in many problems. By participating in pre-bid and preconstruction meetings and providing construction observations by the geotechnical engineer, many risks can be reduced.

Final Boring Logs Should not be Re-drawn

Geotechnical engineers prepare final boring logs and testing results based on field logs and laboratory data. The logs included in a final geotechnical engineering report should never be redrawn to be included in architectural or design drawings due to errors that could be made. Electronic reproduction is acceptable, along with photographic reproduction, but it should be understood that separating logs from the report can elevate risk.

Contractors Need a Complete Report and Guidance

By limiting what is provided for bid preparation, contractors are not liable for unforeseen subsurface conditions although some owners and design professionals believe the opposite to be true. The complete geotechnical engineering report, accompanied with a cover letter or transmittal, should be provided to contractors to help prevent costly problems. The letter states that the report was not prepared for purposes of bid

development and the report's accuracy is limited. Although a fee may be required, encourage the contractors to consult with the geotechnical engineer who prepared the report and/or to conduct additional studies to obtain the specific types of information they need or prefer. A prebid conference involving the owner, geotechnical engineer, and contractors can prove to be very valuable. If needed, allow contractors sufficient time to perform additional studies. Upon doing this you might 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.

Closely Read Responsibility Provisions

Geotechnical engineering is not as exact as other engineering disciplines. This lack of understanding by clients, design professionals, and contractors has created unrealistic expectations that have led to disappointments, claims, and disputes. To minimize such risks, a variety of explanatory provisions may be included in the report by the geotechnical engineer. To help others recognize their own responsibilities and risks, many of these provisions indicate where the geotechnical engineer's responsibilities begin and end. These provisions should be read carefully, questions asked if needed, and the geotechnical engineer should provide satisfactory responses.

Environmental Issues/Concerns are not Covered

Unforeseen environmental issues can lead to project delays or even failures. Geotechnical engineering reports do not usually include environmental findings, conclusions, or recommendations. As with a geotechnical engineering report, do not rely on an environmental report that was prepared for someone else.



65 Aberdeen Drive Glasgow, KY 42141 270-651-7220

GEOTECHNICAL ENGINEERING INVESTIGATION

LG&E-KU FORD GLENDALE 345 KV TRANSMISSION

HODGENVILLE WEST ROAD, GLENDALE, KENTUCKY ATLAS PROJECT NO. LOUGE22043

PREPARED FOR:

Southeast Power Corporation 136 Precision Court Lancaster, KY 40444

PREPARED BY:

Atlas Technical Consultants LLC 2724 River Green Circle Louisville, KY 40206



2724 River Green Circle Louisville, KY 40206 (502) 722-1401 | oneatlas.com

June 15, 2022

MR. GREG CRUTCHFIELD SOUTHEAST POWER CORPORATION 136 PRECISION COURT LANCASTER, KENTUCKY 40444

Subject: Geotechnical Engineering Investigation LG&E-KU Ford Glendale 345 kV Transmission Hodgenville Road West, Glendale, Kentucky Atlas Project No. LOUGE22043

Dear Mr. Crutchfield:

Atlas Technical Consultants LLC has completed a geotechnical exploration in support of improvements for proposed overhead electrical transmission towers at the referenced site. The attached report presents a review of project information provided to us, descriptions of observed site and subsurface conditions, and a summary of foundation recommendations for use in project design and construction. The report Appendix contains site and test boring location plans, and results of field and laboratory testing. Our services have been provided in accordance with Atlas proposal number LOUGE22043 dated March 11, 2022.

We appreciate the opportunity to have provided these services and we look forward to serving as your geotechnical consultant throughout project design and execution. Please contact us with any questions regarding the information presented.

Respectfully submitted, Atlas Technical Consultants LLC

Ryan Ortiz, PE Senior Geotechnical Engineer Licensed Kentucky 33219



Travis Andres, PE Senior Geotechnical Engineer Licensed Kentucky 29429



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APPENDICES

"Important Information about This Geotechnical-Engineering Report" "Legend to Soil Classification and Symbols" Figures 1-6 – Boring Location Plan Figures 7-13 – Fences Test Boring Logs Laboratory Testing Results



1. PURPOSE AND SCOPE OF EXPLORATION

Atlas Technical Consultants LLC (Atlas) has completed a geotechnical engineering exploration for proposed transmission line alignments in Glendale, Kentucky. The purpose of this exploration has been to obtain site-specific subsurface data, to review available site development and geologic information, and to develop recommendations for use in design and construction of the foundations. Geotechnical services reported herein include drilling at nine structures including engineering soil test borings at 28 self-support tower legs and two monopole structures, analysis of resulting data, and geotechnical recommendations.

2. PROJECT INFORMATION

Two transmission line alignments are planned in Glendale, Kentucky. A west route extends from south of the intersection of Jaggers Road and Hodgenville Road West to the intersection of Gaither Station Road and Ring Road. An east route extends from southwest of the intersection of Hodgenville Road West and Robey Drive to Meadowview Drive West. The lines are planned to service Ford's Blue Oval SK Battery Park in Glendale, Ky. A Vicinity map, Figure 1, appears in Appendix.

Proposed improvements are expected to include new self-support towers and monopole structures supported on driller pier foundations. Boring locations were provided by LG&E-KU based on the location of planned additions. Based on maximum loading conditions provided by LG&E-KU, the maximum axial, shear, and moment loads are about 200 kips, 60 kips, and 2 kipfeet. We understand the drilled piers may have a minimum diameter of about 6 feet. The planned depth of the drilled piers is not known at the issuance of this report.

In the case of drilled pier foundations, overturning and lateral resistance will be provided through a combination of the dead weight of the buried foundation structure, along with side capacity through the interaction of the concrete pile and surrounding soil. In case of use of a buried structural mat foundation, overturning and lateral resistance will be provided through the dead weight of the buried foundation structures and placed soil fill above the foundation and surrounding soil.

3. EXPLORATORY FINDINGS

3.1 Surface Conditions

The site extends through rolling agricultural fields and karst topography. Based on review of publicly available survey data provided by LG&E-KU, elevations at the east route structure locations range from 720.8 to 753.2 feet. Elevations at the west route range from 663.5 to 698.3 feet. The boring locations were selected by LG&E-KU. The borings were marked in the field using a using the approximate coordinates provided.

3.2 Site Geology

Based on review of the Kentucky Geological Survey (KGS) Geologic Survey Map, the following bedrock formations underlie the site.



Geologic Formations	Descriptions	Location on Site
St. Louis Limestone	Limestone, yellowish-gray to olive-gray, medium- to fine- grained, argillaceous, dolomitic, silty, thin to thick-bedded, massive; contains several zones of gray chert, some irregular and scattered and some nodular, along bedding planes. Silty clay shale weathers yellowish to greenish gray. Limestone, dolomite, and shale: Limestone is yellowish gray, light olive gray to medium bluish gray; very fine to fine grained; thin to thick bedded; locally laminated to very thin bedded where clayey or dolomitic. Dolomite is light olive gray; weathers yellowish gray, very fine to fine grained, thin to thick bedded; commonly spalls: contains fist-sized pockets of crystalline calcite. Shale is yellowish green to dark brown, calcareous, carbonaceous near base of unit, in thin beds.	Mapped Underlying Structures 4, 5, 21, 26, and 23A Mapped Near Structures 16, 17, 21 25, and 25A
Alluvium	Sand, silt, clay, and gravel: Sand is very fine to fine, poorly sorted; interbedded with silt and clay. Gravel composed of pebbles, cobbles, and scattered boulders of chert, limestone, silicified limestone, and some limonite- cemented sandstone concretions. Loess soil as thick as 2 feet covers some of area, not mapped. Slumped sandstone and shale Sand, sandstone, silt, shale, and limestone: Loose, poorly indurated, jumbled sandstone, silt, and shale, mixed with soil, sand, and scattered boulders of limestone. Derived from rocks that overlay the Ste. Genevieve Limestone and which slumped into sinkholes in the Ste. Genevieve and St. Louis Limestones, probably during an early cycle of karst erosion.	Mapped Underlying Structures 25 Mapped Near Structures 5, 16, 17, 21 23A, and 26
Ste. Genevieve Limestone	Limestone, dolomite, and shale: Limestone is light yellowish gray; weathers to light gray; characteristically oolitic in beds 0.5 to 4 feet thick, massive; interbedded with about equal amounts of bioclastic limestone, locally shaly, cherty, or pyritic; weathers to smooth rounded surfaces. Dolomite is yellowish gray, very fine grained, massive; locally calcareous: bed near base contains fist-sized vugs filled with crystalline calcite. Silty clay shale is yellowish to greenish gray, locally calcareous. Soil cover is commonly as thick as 30 feet.	Mapped Underlying Structure 16, 17, 21, and 25A Mapped Near Structures 5, 16, 17, 23A, and 26
Lost River Chert of Elrod	Limestone, very pale orange to yellowish-gray, medium- to coarse grained; contains very coarse fossil fragments; slightly oolitic; medium bedded, massive; rarely exposed except in road cuts or sinks; generally silicified in one or more beds 0.1 to 1.5 feet thick; resulting chert marked by well-preserved casts of bryozoans and brachiopods, including Orthotetes, and is probably the Lost River Chert of Elrod (1899); top of chert is only mappable horizon in this part of stratigraphic section.	Not mapped, but expected at the contact between the Ste. Genevieve and St. Louis Limestone

Table 1: Geologic Formations Descriptions

Based on review of publicly available KGS Karst Potential Maps, the underlying limestone formations are severely karst susceptible. KGS mapped sinkholes are located east of Structures 4 and 5. A karst feature is also mapped near Structure 39 along the alignment; however, borings at this particular structure were excluded from the exploration scope.

Karst in the region is typically characterized as solution weathering caused by slightly acidic groundwater moving down and through the bedrock along vertical joints and horizontal bedding planes. The limestone dissolves in this weak acid, resulting in an irregular upper rock surface and development of open channels and cavities in the underlying rock. As the openings widen, overburden soils may collapse into the rock voids and be carried away by water movement. The



void of collapsing soil progresses upward and outward until the overlying soil arch cannot support the load above it. When the surface soils collapse into the underlying void, the resultant surface feature is termed a sinkhole. Evidence of severe sinkhole development was not evident from the surface during the subsurface exploration in the immediate area of the planned structures; however, our experience in the vicinity indicates incipient sinkholes and other karstic activity may be encountered outside of the boring locations on site and potentially subsurface during construction.

3.3 Subsurface Conditions

Subsurface conditions were explored at nine proposed structures via engineering test borings for 28 self-support structure legs and 2 monopole structures. Borings were drilled for a location for Structure 5, that was abandoned due to an underlying sewer. The results for this abandoned location is presented in the appendix as "OLD STR 5", but are not considered in this report. The results are described on boring logs in the Appendix. Subsurface strata descriptions represent our interpretation based on visual examination of recovered samples. Contacts between various strata on the test boring logs represent approximate depths, as transitions between strata may be gradual.

Surface Cover: The ground surface consisted of topsoil and/or organic agriculturally aerated soil. Interpreted topsoil or organic soils thicknesses were observed ranging from 2 to 12 inches.

Existing Fill: Apparent existing fill comprised of lean to fat clay soils was encountered beneath surface materials in borings at STR 16 to about 22 feet below existing grade (BEG) and at STR 17 L1 to about 2.5 feet BEG. The clay was visually classified as brown with Standard Penetration Tests (SPT) resulting in N-Values ranging from 9 to 16 blows per foot (bpf). The existing fill at both locations contained various types of organic soils, including topsoil, root fragments, and wood fragments.

Native Cohesive Soil: Lean and/or Fat Clay (CL) with variable quantities of silt, sand, and limestone fragments was encountered beneath the surface materials at all borings. The clay was visually classified as brown, reddish brown and gray and very soft to hard with SPT N-Values resulting in ranging from Weight of Hammer (WOH is defined as no blows of the sampling equipment required for sampler penetration) to 9 bpf. The clay materials extended to depths ranging from 4.1 to 12 feet BEG.

Native Granular Soil: Sand soil types with variable amounts of silt, sand, and gravel were encountered at several locations. We expect these sandy soils are deposits from nearby alluvial formations or are residual weathered limestone layers. Granular soils were encountered at Structure 5 L3 and Structure 25A L1 as 2 foot thick layers, and were visually classified as light brown and loose to medium dense with SPT N-values ranging 8 to 12 bpf.

Weathered and/or Karst Limestone: Weathered/karstic limestone was commonly encountered with in overburden soil layers. Typically, indications of these conditions were observed based on drilling performance and/or in recovered soil samples. These observations included limestone fragments in recovered split spoon samples, difficult augering performance (slow augering or auger chatter), by encountering auger refusal shallower than competent limestone bedrock, and through coring through weathered or karst limestone prior to encountering competent limestone bedrock. These drilling conditions are interpreted (pending boring-specific drilling performance or



notes) as possible limestone boulders, limestone pinnacles, interbedded limestone and soil, weathered limestone, or as voids encountered in bedrock.

Limestone Bedrock: Auger refusal was encountered at the boring locations ranging from 17 to 64.5 feet BEG. Rock sampling methods were used to advance monopole structure borings and one tower leg boring at each structure beyond where auger refusal, if encountered. Recovered core samples were generally comprised of limestone. Based on coring performance, voids and/or clay layers were commonly interpreted based on low down pressure and/or coring tooling drops during drilling operations. The recovered bedrock samples were described as slightly to highly weathered. Approximate recoveries ranging from 0 to 100 percent were measured and exhibited Rock Quality Designation (RQD) values ranging from 0 to 100 percent. Please refer to the boring logs in the Appendix for specific conditions.

The majority of the borings for this project were drilled to auger refusal. Auger refusal is defined herein as the depth at which a boring can no longer be advanced using conventional soil drilling methods. In an area of limestone bedrock overlain by residual soil, auger refusal can result on weathered bedrock that includes fractured bedrock with clay filled joints or seams, on slabs of unweathered limestone suspended in the residual soil matrix ("floaters"), on rock "pinnacles" rising above the surrounding bedrock surface, in crevices, or on the upper surface of continuous bedrock surface since the augers can penetrate the upper weathered or fractured bedrock in some cases. Auger refusal can also occur on obstructions (such as debris, old foundations, slabs, etc.) above the bedrock surface at this site is variable with differences in bedrock surface elevations occurring over relatively short lateral distances. It should be noted that bedrock may be encountered much shallower or deeper than the depths noted during this exploration, which is relatively common in the area.

3.4 Groundwater Conditions

Groundwater level observations were made both during and at the completion of drilling operations. Groundwater was observed at the following locations and depths:

Boring ID	Free Water Depth (ft)	Boring ID	Free Water Depth (ft)
STR 4	25	STR 23A L3	22
OLD STR 5 L3	9	STR 25A L1	22
STR 16	32.7	STR 25A L3	26
STR 17 L1	31	STR 25A L4	44
STR 17 L3	32	STR 26 L3	18
STR 23A L1	22		

Table 2: Observed Groundwater Conditions

Water was introduced into the borings for rock coring operations so water levels could not be obtained beyond auger refusal depth. Groundwater levels may fluctuate in response to short-term and seasonal variations in precipitation and surface runoff, and local pockets of groundwater may be present at shallower depths in the profile during wetter periods. Due to the cohesive materials of relatively low permeability encountered at this site, the boring may not have been allowed to remain open for a duration for the groundwater table to stabilize. Due to the presence of water



encountered, groundwater should generally be expected across the site. Subsurface water is likely to be encountered perched near the natural soil-bedrock interface or above more competent layers of weathered limestone. Groundwater may also be encountered within voids and fractures in the bedrock.

3.5 Seismic Site Class

Based on geologic mapping, our experience in the project area, and the results of the test borings, it is our opinion that the majority of subsurface conditions at this site meet the criteria for **Site Class C** based on Section 1613.3.2 of the 2018 International Building Code. However, there were several exceptions where the subsurface strata encountered met the criteria of other site classes. At Structure 4 and 17, the encountered subsurface conditions meet the criteria for a **Site Class E**. At Structure 16, 23A, and 26, the encountered subsurface conditions meet the criteria for a **Site Class D**. We should be allowed to review the final grading plan to confirm the provided site class for each structure. Site specific seismic studies may be considered.

4. **RECOMMENDATIONS**

The following recommendations were developed on the basis of previously described Project Information (Section 2), Subsurface Conditions (Section 3), and our experience. If there is any change in the project criteria, including the location of structures on the site, foundation loading, etc., a review should be made by this office and any modifications to our recommendations should be implemented accordingly. Foundation and other design recommendations presented herein are based, in part, on the assumption that the site will be prepared as recommended in this report. We understand that driller pier foundations are primarily considered for support of the structures. We understand that shallow foundations will not be considered for this project.

Karst Considerations

The proposed project site is underlain by a limestone formation that has an irregular surface and is subject to dissolution along joints and bedding planes within the rock mass. It is understood that karst features (such as clay-filled zones, solution channels, voids and sinkholes) have developed in the project vicinity and on site. Construction within an area of severe karst terrain and geology, such as on this site, is accompanied by a major degree of risk due to the potential for future ground subsidence. Karst conditions and indicators were encountered in the borings, including variable auger refusal depths/elevations, voids/clay layers in bedrock, weathered bedrock, free water encountered in overlying bedrock, and soil softening shallower than auger refusal. Groundwater was encountered in the borings shallower than auger refusal and is a critical factor in karst development. Due to the presence of significant amounts of groundwater in the borings, the risk of future development of karst features should be considered high and will present some difficulty to foundation excavation and construction.

The deep foundation parameters provided herein represent the current subsurface soil and bedrock conditions, and do not consider future subsidence, or changing geologic conditions. If a design for future subsidence is desired, the parameters shallower than the bottom of voids should be reduced or neglected.

Due to the presence of karst features at the site and in our borings, and the highly variable nature of karst bedrock over a short distance, it is likely that additional karst features may be found during foundation inspections, and the drilled pier contractor should be prepared to deepen drilled pier



excavations, as required. Any karst features identified during construction should be evaluated by a qualified geotechnical engineer on a base-by-case basis. Due to the severely karst prone bedrock and encountered karst features, a geotechnical engineer's representative should observe drilled pier excavations and bearing conditions on a full-time basis. Full-time observation by a geotechnical engineer's representative will yield more efficient karst solutions, when encountered (compared to delayed site visit, standby time by drill crew). Full-time observation may also indicate potential karst conditions otherwise not identified by the contractor.

The primary concern regarding karst features is support of structures, managing subsidence, and the possibility of collapse. However, the karst conditions encountered in these borings also present some constructability issues and risks for deep foundations. Difficult drilling performance was observed in the subsurface exploration due to limestone floaters, weathered limestone layers, and other conditions encountered shallower than bedrock. Based on auger refusal depths encountered, the bedrock surface appeared variable over short distances. Further, groundwater and soft soils were encountered above bedrock. Casing should be available, if not required, to manage groundwater and potential soft soil caving. Further, poured concrete may be "washed" or "sloughed" into underlying or adjacent voids, soft clay layers, or areas with flowing water. The contractor, owner, and design team should be prepared with alternative installation techniques where these circumstances are encountered during construction. Alternatives may include phased concrete placement, to "seal" karst features, or to install permanent casing. A qualified deep foundations contractor should be selected with experience in similar karst conditions, and with methods readily available onsite to manage karst, groundwater, seepage, soil collapse, and other constructability issues identified in the borings.

The planned drilled pier bearing elevations should be investigated by test holes via additional drilling (i.e. air track test holes, downhole pier test holes, borings, etc) to inspect for voids or otherwise soft layers below foundations. The method of advancement for the test holes may be at the contractor's discretion, but the testing program should be approved and observed by a qualified geotechnical engineer. The contractor should be able to perform test holes (number and extents depending on the deep foundation dimensions and depths), to confirm depth of bedrock, and the presence of quality bedrock below the deep foundation bearing surface. The test holes should extend at least 2 to 3 diameters below the bottom of the foundation. The contractor performed test holes, observed by a qualified geotechnical engineer or representative, will be adequate to estimate and manage the risk of karst effects on deep foundations.

Additional exploration options are available to further explore karst conditions. Air track test holes performed in the project planning stage will be beneficial to further quantify the bedrock surface (i.e. pinnacle/cutter bedrock topography). Further, geophysical services will provide information to determine the size, width, and location of karst features, thus further quantifying the risk to foundations.

Post construction testing will be beneficial to confirm the integrity of the pile after concrete placement. Post construction testing is particularly important on this project, due to the presence of groundwater and, in particular, flowing water and karst conditions. These issues may cause washout of placed concrete or cement, or outflow into underground voids. The most common type of testing is thermal integrity profiling. Commonly, thermal integrity instrumentation is placed in the foundation element attached to the rebar cage, and may also be used with PVC placed in the drilled pier. Other options for evaluating pile integrity may include downhole seismic testing or destructive methods (i.e. performing test holes in finished concrete). The contractor should



provide methods to evaluate pile integrity, for approval by the design team, prior to mobilization for construction.

Existing Fill

Existing fill comprised of lean to fat clay soils was encountered beneath the surface materials in borings at STR 16 to about 22 feet below existing grade (BEG) and at STR 17 L1 to about 2.5 feet BEG. The existing fill at both locations contained various types of organic soils, including topsoil, root fragments, and wood fragments. Existing fill material, without documentation of compaction, has potential to be highly variable and unsuitable for foundation support. The existing fill materials encountered present a potential risk of long-term differential settlements for any structures bearing on such materials. We recommend bearing all foundation below the existing fill material.

4.1 Drilled Pier Foundations

We understand that drilled piers are the primary foundation type considered for this project. We have also provided alternative foundation types and/or ground improvement that may be more economical and feasible for the conditions encountered.

If selected, drilled piers should be designed to resist both uplift and axial loads. For purposes of this study, axial load is defined as the downward vertical load imparted to the foundation. The drilled pier subgrade should be judged suitable for the proposed loading by the geotechnical engineer.

The proposed improvements are in a severe karst geologic setting. To bear drilled piers below any known karst features or soft soil layers, we recommend the following structures bear at the minimum depths and/or elevations.

Structure ID	Bearing	Bearing	Bedrock	Bedrock
Structure ID	Depth (ft) ^{1,2}	Elevation (ft) ²	Depth (ft) ^{1,3}	Elevations (ft) ³
Structure 4	45.0 ⁴	~625.0	45.0 ⁴	~625.0
OLD Structure 5	17.0 ⁵	~651.0	17.0 ⁵	~651.0
Structure 16	45.0	~703.0	51.0	~697.0
Structure 17	33.5	~711.5	43.5	~701.5
Structure 21	N/A	N/A	31.0	~656.0
Structure 23A	60.0	~660.0	60.0	~660.0
Structure 25	20.0	~645.0	48.0	~697.0
Structure 25A	N/A	N/A	53.5	~678.0
Structure 26	38.0	~648.0	65.0	~621.0

Table 3: Drilled Pier Minimum Bearing Strata Depth and/or Elevatior	Table 3:	Drilled Pier	Minimum	Bearing	Strata	Depth	and/or El	evation
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1. Depths are below existing grade. The final depths should consider any grading performed after the geotechnical field services.

2. Drilled piers are recommended to bear deeper than the bearing depth or elevation provided, due to interpreted karst features or soft soils.

3. Drilled piers are recommended to bear deeper than the bedrock depth or elevation provided, where the competent limestone bedrock parameters are used.

- 4. Structure may require bearing as deep as 55 feet, pending inspection and contractor test holes.
- 5. Drilled piers should bear in competent limestone bedrock, to limit differential settlements across the structure.



Due to the severe karst potential at this site, the piers should be inspected by a geotechnical engineer's representative. We recommend the contractor perform additional coring or inspection of the underlying rock in foundation areas (i.e. test holes or down hole coring/testing), to confirm soft layers are not present within 2 to 3 pier diameters below the drilled pier footprint. Following approval by a specialty contractor and the design team, the foundations may bear shallower than the required bearing depth, if the ground improvement measures in Section 4.2.3 are implemented prior to construction.

The drilled piers for **Structure 4** should be designed based on the following parameters:

Drilled Pier Foundations:

Allowable Overburden Soil and Rock skin friction:	100 psf
Allowable Competent Limestone Bedrock skin friction:	400 psf
Recommended Competent Limestone Bedrock allowable bearing pressure:	5,000 psf

The drilled piers for **Structures 16, 23A, 25, 26** should be designed based on the following parameters:

Drilled Pier Foundations:

Allowable Overburden Soil and Rock skin friction:	300 psf
Recommended Overburden Soil and Rock allowable bearing pressure:	2,000 psf
Allowable Competent Limestone Bedrock skin friction:	800 psf
Recommended Competent Limestone Bedrock allowable bearing pressure:	10,000 psf

The drilled piers for **Structures 5**, **17**, **21**, **25A** should be designed based on the following parameters:

Drilled Pier Foundations:

Allowable Overburden Soil and Rock skin friction:	400 psf
Recommended Overburden Soil and Rock allowable bearing pressure:	3,000 psf
Allowable Competent Limestone Bedrock skin friction:	4,000 psf
Recommended Competent Limestone Bedrock allowable bearing pressure:	40,000 psf

Based on parameters outlined in LPILE 5.0Plus, we have estimated values for use in lateral loading analysis. Several of the provided values are based on engineering properties, laboratory testing, and public correlations, such as the unit weight values and unconfined compressive strength.



For lateral loading, the following design parameters are recommended for use in design using the program L-Pile input parameters:

Strata Description	Model	Soil or Rock Unit Weight (pcf)	Unconfined Compressive Strength (psi)	Design RQD (%)	Soil Modulus (pci)	Strain ε ₅₀ (in/in)
Overburden	Soft Soil	90	2	-	50	0.03
Limestone	Hard Soil	120	50	-	800	0.004

Table 4: Parameters for Lateral Pile Capacity Analysis for Structure 4

Strata Description	Model	Soil or Rock Unit Weight (pcf) ²	Unconfined Compressive Strength (psi)	Design RQD (%)	Soil Modulus (pci) ¹	Strain ε ₅₀ (in/in) ¹
Overburden	Stiff Soil	110	13.5	-	200	0.01
Limestone	Weak Rock ¹	130	2,000	30	-	

1- Limestone should be modelled as weak rock, with K_m of 0.0005 and E_{ri} of 1500 psi

Table 6: Parameters for LPILE Capacity Analysis for Structures 5, 17, 21, 25A	Table 6:	Parameters for	or LPILE Capacity	/ Analysis for Structure	s 5, 17, 21, 25A
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Strata Description	Model	Soil or Rock Unit Weight (pcf) ²	Unconfined Compressiv e Strength (psi)	Design RQD (%)	Soil Modulus (pci) ¹	Strain ε ₅₀ (in/in) ¹
Overburden	Stiff Soil	120	20	-	400	0.005
Limestone	Strong Rock	150	4,000	60	-	

4.1.1 Uplift Resistance

In order to resist uplift, the weight of the reinforced portion of the pier along with the ultimate unit side friction values provided in this report should be considered. Skin friction in the upper 5 feet of the drilled pier should be neglected. A minimum safety factor of 1.5 is recommended to determine allowable design values.

4.1.2 Drilled Pier Construction Considerations

We recommend subsurface conditions in pier excavations be monitored until concrete is placed to verify that an otherwise competent bearing condition is not compromised by ground water seepage, surface water infiltration, or sidewall cave-in. It is recommended that pier excavations



be observed by qualified personnel in order to confirm an acceptable bearing surface is constructed and to identify significant deviations from the specified or anticipated conditions. Observed soil conditions suggest steel casing may be required to provide stable shaft excavations. The potential for groundwater entering shaft excavations should be considered minimal; casing will serve to prevent water from filling the shaft. Construction phase observations and documentation should include:

- Pier top locations within tolerances,
- Correct plan dimensions,
- Plumbness within tolerances,
- Materials excavated match boring data,
- Construction procedures with respect to excavation, groundwater management and concreting,
- Correct placement of steel reinforcing and anchorage bolts,
- Sampling and testing of plastic concrete,
- Concrete placement procedures,
- Proper temporary casing removal.

Significant deviations from specified or anticipated conditions should be reported immediately to the owner's representative and the project design team.

If pier excavations are to be entered, temporary casing will be required and all local, state and federal safety regulations regarding confined space entry should be followed. No open flame should be permitted on the site near a drilled pier excavation and no personnel should be allowed to enter the excavation until proper safety precautions for confined space entry have been taken. Such precautions should include proper personal protective equipment and monitoring of the excavations for explosive vapors and oxygen deficiency. Additional safety measures may be needed depending upon specific conditions at the foundation location, construction procedures employed and applicable local, state and federal Occupational Health and Safety Regulations and LG&E/KU safety requirements. The following recommendations are provided to aid in the successful construction of drilled shafts at this site:

- Retain the project geotechnical consultant to observe drilled shaft construction.
- Once a pier design is available, it is suggested that the contractor perform a subsurface exploration (i.e. using air track rig or other methods) to two to three pier diameters below the bearing surface. The purpose of this exploration is to confirm that that voids or other discontinuities are present below the foundations, and to confirm the subsurface conditions (i.e. groundwater) just prior to construction.
- Make provisions for ground water removal from the drilled shaft excavations. Use appropriate measures to remove water accumulation from the drilled shaft excavations. If the shaft can be fully dewatered (i.e., less than 2 inches of water on the bottom of the shaft) and concrete can be placed in the shaft quickly (i.e., more than 1 truck discharging into the shaft at one time) then the concrete can be placed by conventional methods. If the shaft cannot be fully dewatered and/or if there is continual flow of water into the shaft, then the concrete should be placed by tremie methods. If this condition should occur, it should be evaluated and excavation methods should be revised accordingly.
- Place concrete in the drilled shafts immediately upon completion of excavation. To minimize
 the potential for lateral movement of the drilled shafts during loading, the contractor must
 place the drilled shaft concrete in direct contact with undisturbed natural soil and rock, filling



any voids or enlargements in the drilled shaft excavations with concrete at the time of concrete placement.

- Utilize drilled shaft concrete with a mix designed for a slump of 5 to 7 inches to reduce the
 potential for arching and to provide a workable material. Should tremie placement of the
 concrete be required, the concrete mix should be designed with a slump ranging from 7 to 9
 inches, without reduction in design strength, to facilitate placement with the tremie tube. A
 means of preventing concrete from intermixing with the water or slurry, such as a bottom
 discharge gate or rubber ball for a tremie pipe, or a pig for use in a concrete pump must be
 provided. In no case should concrete be placed through standing water in the drilled shaft
 excavation or tremie pipe.
- Maintain a positive head of concrete within the temporary casing, relative to water trapped outside the casing, to reduce the risk of water and/or soil from infiltrating into the drilled shaft excavation and contaminating the concrete. An improper head balance could potentially cause water and/or soil to flow into the shaft and compromise the concrete integrity. Should tremie placement be required, water which typically becomes intermixed with the uppermost portion of the concrete, contaminating the concrete, must be completely removed, down to fresh concrete, prior to final concrete placement to complete the drilled shaft. The drilled shaft contractor must be experienced and prepared to deal with potentially difficult soil, rock and groundwater conditions.
- Install a temporary protective steel casing to prevent side wall collapse, prevent excessive mud and water intrusion, and to allow workers to safely enter, clean and inspect the drilled shaft, if required.
- Direct the concrete placement into the drilled hole through a centering chute to reduce side flow or segregation.
- Extract the protective steel casing as the concrete is placed, to provide a sufficient head of concrete to prevent soil or water intrusion into the newly placed concrete.
- Maintain the shaft reinforcing steel cage in the proper position and at the correct elevation during removal of the temporary casing in order to permit the proper location of the structure anchor bolts.

4.2 Deep Foundation or Ground Improvement Alternatives

Based on the boring data, the following stability concerns or construction feasibility issues are noted in regard to construction of drilled piers:

- Groundwater table Drilled pier construction is less feasible and more costly in subsurface conditions with a groundwater table or seepage conditions. Casing may be needed for the full length of the drilled pier, due to soft, wet soils and groundwater/seepage. The contractor should be prepared to dewater the excavation with groundwater and active seepage.
- Confirmation of bearing surface Drilled piers are commonly socketed in competent bedrock. As depths to bedrock are highly variable over short distances, it will be difficult to confirm the bearing surface of the pier. Piers that bear partially on soil and rock may experience poor performance. These will be difficult to inspect due to the depths underground.
- Concrete wash out Karst features were encountered in this exploration, including voids, soft clay layers, and water flow conditions, which are susceptible to result in concrete wash out or sloughing during construction.

These conditions are often cost-prohibitive for drilled piers, and alternative deep foundation options increasingly become more cost efficient. With these conditions and constructability issues



for this project, driven piles, auger-cast piles, or micropiles may be a more feasible from a constructability perspective.

For these specialty foundation or ground improvement alternatives, a design/build contractor must be aware of the groundwater or seepage conditions, the underlying voids, where encountered, soil and rock conditions, and confirm that the design and installation methods are compatible with the site conditions. Since these foundation alternatives are proprietary specialty foundation elements, the specific design criteria and pile characteristics shall be developed and prepared by an engineer registered in the State of Kentucky on behalf of the specialty geotechnical contractor who shall be entirely responsible for the design, installation, performance and warranty of the deep foundation or ground improvement system.

We understand that drilled pier foundations are the primary foundation type considered for this project. However, the following deep foundation alternatives may provide a more cost effective or lower risk solution due to the free water, obstructions prior to auger refusal, and karst conditions encountered in the subsurface exploration. We are available to provide additional details, and qualified contractors, on request.

4.2.1 Ground Improvement

Ground improvement options are available and applicable for karst conditions to reduce risk of karst development in the footprint of foundations. In particular, the primary methods for improving karst bedrock conditions include infilling voids and/or infilling at the top of bedrock. The material used for infilling is commonly a low mobility grout. These materials are injected under pressure to infill voids, solution cavities, and soft soils. Confirmation of grouting success is typically achieved by monitoring the pressure required for grouting and the grout quantity the subsurface accepts. These methods should be considered where drilled piers bear shallower than karst features. Any ground improvement should be performed by a speciality contractor experienced with karst conditions.

Infilling of voids should be considered where drilled piers bear shallower than karst features. Infilling of voids commonly includes a planned grid of locations in and some distance outside the footprint of the proposed foundation. A grouting program in karst bedrock may influence the local hydrology, resulting in accelerated karst feature development outside of the infilled voids. However, where nearby structures are not at risk, this ground improvement option may be considered. Grouting activities should extend 3 pier diameters below the drilled pier bearing elevation, and a 1 horizontal to 1 vertical below the bottom of the deep foundation. If this option is implemented, we should be allowed to review the final deep foundation plans to provide additional recommendations, if warranted.

Infilling at the top of bedrock (e.g. cap grouting) may be performed where deep foundations bear in the soil and rock overburden. This foundation option is not warranted or beneficial where deep foundation bear below the top of competent bedrock. This remediation option is generally performed in a grid spacing pattern of 5 to 10 ft, and individual grout column locations are terminated when grout quantities exceeds design volume or grout pressure exceeds the design limit. The purpose of this remediation option is to seal the top of bedrock surface, so that subsidence risk is reduced. Further, this remediation option has reduced risk of hydrologic impact.



4.2.2 Augered Cast-in-Place Piles

Cast-in-place piles can be placed with minimal vibration, without driving equipment noise, and with minimal disturbance to adjacent footings and structures. These piles are constructed by advancing hollow stem augers to the design bearing depth and injecting grout through the bottom of augers as they are withdrawn. The advantage of cast-in-place piles over drilled piers is the contact between the pile grout and the supporting soils. On the other hand, if the pile is withdrawn ahead of the grout placed, a gap in the pile will form, rendering the pile useless. For this reason, only qualified contractors should be employed to install the piles, and pile installation should be subject to continuous inspection.

Cast-in-place piles may be advantageous in conditions with groundwater conditions, such as this project. The piles may be required to be pre-drilled, due to the obstructions encountered in this project. Locally, cast-in-place piles are typically not installed in bedrock. Where bedrock bearing foundations are required, a qualified contactor should be consulted for feasibility considerations. In general, due to the extensive dewatering required for drilled piers, cast-in-place piles may be a more feasible and cost efficient alternative. However, where seepage conditions are present, cast-in-place piles have risk of wash out or sloughing due to flowing water and voids.

4.2.3 Micropiles

Micropiles may be used to support structures, and are particularly beneficial below any karst features. The micropiles should be installed at least a pile diameter below any encountered voids. Micropiles are relatively small diameter drilled and grouted in-place piles with diameters ranging from about 5 inches to 10 inches. Since micropiles are proprietary foundation elements, the actual pile capacities, pile diameters, pile lengths, etc. must be determined by the specialty geotechnical contractor working in conjunction with the design structural engineers.

Micropiles should be designed and installed as a design/build component of the project and as such the specific characteristics of the micropiles should be designed by a specialty geotechnical contractor based upon the loading conditions required in conjunction with their specific materials and installation methods. The micropile design and construction should be in general accordance with the FHWA Document NHI-05-039 "Micropile Design and Construction".

Similar to cast-in place piles, micropiles are advantageous where groundwater or free water conditions are expected. Further, micropiles are commonly rock bearing foundations, and may be an economical alternative for foundation support. In addition, micropiles often are considered a minimal risk option for karst considerations.

4.2.4 Driven Piles

Driven piles into a rock bearing surface are typically driven into place using a hammer source. Typical pile types considered for driven piles are steel H-piles or pipe piles, however, other pile types may be considered. These foundation types do not required dewatering, rendering these more economical and feasible where a groundwater table is expected. These foundations are not easily installed where obstructions are present, such as wood fragments, limestone fragments, weathered rock, etc. Pre-drilling of driven pile locations will likely be required, to limit risk of obstructions damaging or skewing the driven pile installation.



4.3 Site Preparation

We understand that the project sites will not contain slabs or pavements that will require typical site preparation, such as topsoil stripping, proofrolling, and other considerations. However, we do expect some site grading may be performed prior to construction of foundations. Further, we site preparation activities described herein will be beneficial to provide support for construction equipment. The recommendations in the following section should be adhered to, particularly in the footprint of structures or where new fill is placed.

All areas that will support pavements, new fill, or any manmade or earthen structures should be properly prepared. After rough grade has been established and prior to placement of new fill, the exposed subgrade should be carefully observed by the geotechnical engineer, or a qualified soils technician working under the direction of the geotechnical engineer, by probing, testing, and proofrolling as needed. Any organic material still in place, frozen, wet, soft or loose soil, uncontrolled fill, existing demolition debris and pavements, foundation remnants, utilities, and other undesirable materials should be removed. The exposed subgrade should be evaluated by proofrolling with suitable equipment to check for pockets of soft material hidden beneath a thin crust of better soil. Any unsuitable materials thus exposed should be removed and replaced with well-compacted, engineered fill as outlined in Section 4.4.

It is important that positive surface drainage be established at the beginning of the earthwork operations and be maintained throughout the project. Surface water must not be allowed to pond. Furthermore, compaction and sealing of the subgrade surface is important when precipitation is expected. The site storm drainage elements (i.e., catch basins, pipes, manholes, etc.) should be installed as early as possible, which will aid in control of surface and ground water.

Care should be exercised during the grading operations at the site. Due to the nature of the near surface soils, the traffic of construction equipment may create pumping and general deterioration of the shallower soils, especially if excess surface water is present. The grading, therefore, should be done during a dry season, if at all possible. Based on our experience on other nearby sites, it is likely that the subgrade soils in some areas will be wet and soft when exposed. The extent to which yielding subgrade may be a problem is difficult to predict beforehand since it is dependent upon several factors including seasonal conditions, precipitation, cut depths, sequencing and scheduling of the earthwork, surface and subsurface drainage measures, the weight and traffic patterns of construction equipment, etc. Therefore, it is suggested that provisions be made in the contract documents for subgrade improvements to be used where determined to be necessary in the field at the time of construction.

It may be possible to improve or stabilize the subgrade soils in the areas that are found to be excessively wet, soft or yielding at the time of construction, by discing, aerating and recompacting. However, this will require a combination of time to allow for working the soils, favorable weather conditions for drying and firmer soils at shallow depth below the yielding soils in order to be successful. If site grading operations are planned through the winter months, subgrade stabilization is expected to be required as part of fill construction to aid in moisture conditioning during fill construction through the seasonably wetter winter months.

If it is not possible to improve the subgrade soils in this manner because of weather conditions, scheduling or other constraints or site conditions (which is most often the case); mechanical stabilization (i.e., a geogrid with additional crushed limestone placed over the subgrade), or removal of the unsuitable soils and replacement with crushed limestone or engineered soil fill.



The best method for stabilizing the subgrade should be determined in the field at the time of construction based upon the actual field conditions in conjunction with the specific soil type encountered at the locations requiring stabilization, the size of the areas requiring stabilization and the construction schedule.

4.4 Fill Compaction

All new engineered fill beneath footings, floor slabs and pavements should be compacted to a dry density of at least 98 percent of the standard Proctor maximum dry density (ASTM D-698). For soil, the compaction should be accomplished by placing the new fill in about 8 inches (or less) loose lifts and mechanically compacting each lift to at least the specified minimum dry density.

We recommend that only well-graded granular material, such as pit-run sand, gravel, or KYTC DGA or lean concrete be used to fill excavations of limited lateral dimensions where proper compaction of cohesive materials is difficult and compaction can only be accomplished with small vibratory equipment.

Clay fill materials should be compacted using a non-vibratory sheeps-foot roller and aggregate fill materials should be compacted using a vibratory smooth-drum roller or as judged acceptable by the geotechnical engineer. Field density tests should be performed on each lift as necessary to insure that adequate moisture conditioning and compaction is being achieved.

Prior to beginning fill construction, we recommend samples of proposed borrow materials be collected for standard Proctor testing. The following criteria are recommended where soil material is utilized for structural fill:

- Limit maximum particle sizes to 4-inches (in the largest dimension) and less than 3 percent organic material by weight.
- Maintain the moisture content of the fill soils to within ±2 percentage points of the soils' optimum moisture content.
- Perform one in-place density test in every 5,000 square feet for each one-footthick fill layer, with a minimum of two tests per lift.
- Retain the geotechnical engineer to observe, document and test fill placement and compaction operations.
- Provide and maintain efficient drainage of building and pavement subgrades both during and after construction to prevent ponding of water and to promote rapid and efficient surface drainage.
- Maintain positive surface drainage to prevent water from ponding on surfaces during all earthwork operations.
- Roll fill surfaces with a rubber-tired or steel-drummed roller prior to precipitation events to improve surface runoff if precipitation is expected.
- Contact the geotechnical engineer should the subgrade soils become excessively wet, dry, or frozen.

4.5 Site Drainage

We recommend the site be adequately drained throughout construction to prevent ponding of water. Final site grading should prevent stormwater from accumulating near foundation components and to provide rapid runoff of stormwater. Water accumulating in excavations should



be removed in a timely manner to keep it from causing deterioration of the foundation bearing surface.

4.6 Excavation Safety

Excavation for construction of the proposed foundation may exceed 4 feet depth. Excavations of this depth require protective systems. A *competent person* should evaluate the excavation and determine that protective measures are appropriate and adequate. For purposes of trenching and excavations, a competent person is a person who is capable of identifying existing and predictable hazards or working conditions that are hazardous to workers. For design purposes, the natural site soils meet the requirements of OSHA soil type "B" to OSHA soil type "C", and temporary excavations less than 20 feet in height may be sloped at a rate of 1 H to 1 V to 1.5H to 1 V. This condition should be confirmed by a competent person during the excavation process. Additional excavation safety requirements typically include:

- Keep heavy equipment away from trench edges with distance a function of trench height and vehicle type.
- Identify sources, such as ground water, external factors associated with construction operations, or natural subsurface conditions that may affect sidewall stability.
- Keep excavated spoils and equipment a minimum of two feet beyond trench edges.
- Identify and stabilize underground utilities.
- Perform LEL and O₂ testing.
- Check trench edges and condition for stability prior to the start of work shifts, following precipitation events, and if excavations become inundated.

These recommendations are presented as guidelines for trenching and excavation operations and do not constitute an excavation safety plan. A complete excavation safety plan is recommended for any excavations over five feet in depth.

5. BASIS FOR RECOMMENDATIONS

Recommendations presented herein are based, in part, on project information provided to Atlas and only apply to the specific project and site described in this report. If the project information section in this report contains incorrect information or if additional information is available, please convey the correct or additional information to Atlas and retain us to review the recommendations within this report. Atlas can then modify recommendations if they are inappropriate for the proposed project.

Neither assessment of site environmental conditions nor efforts to detect the presence of contaminants in the soil, rock, surface water or ground water of the site included in the scope of this exploration.

Regardless of the thoroughness of a geotechnical exploration, there is always a possibility that conditions between borings will be different from those at specific boring locations and that conditions will not be as anticipated by the designers or contractors. In addition, the construction process may itself alter soil conditions. Therefore, experienced geotechnical personnel should observe and document the construction procedures used and the conditions encountered. Unanticipated conditions and inadequate procedures should be reported to the design team along with timely recommendations to solve the problems created. We recommend that the owner



retain Atlas to provide this service based upon our familiarity with the project, the subsurface conditions and the intent of the recommendations.

Atlas recommends that this complete report be provided to the various design team members, the contractors and the project owner. Potential contractors should be informed of this report in the "instructions to bidders" section of the bid documents. The report should not be included or referenced in the actual contract documents.

We wish to remind you that our exploration services include storing the samples collected and making them available for inspection for 30 days. The samples are then discarded unless you request otherwise.

Important Information about This Geotechnical-Engineering Report

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

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

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

Understand the Geotechnical-Engineering Services Provided for this Report

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

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

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

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

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

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

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

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

Read this Report in Full

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

You Need to Inform Your Geotechnical Engineer About Change

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

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

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept* responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.

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

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

This Report's Recommendations Are Confirmation-Dependent

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

This Report Could Be Misinterpreted

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

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

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

Give Constructors a Complete Report and Guidance

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

Read Responsibility Provisions Closely

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

Geoenvironmental Concerns Are Not Covered

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

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

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

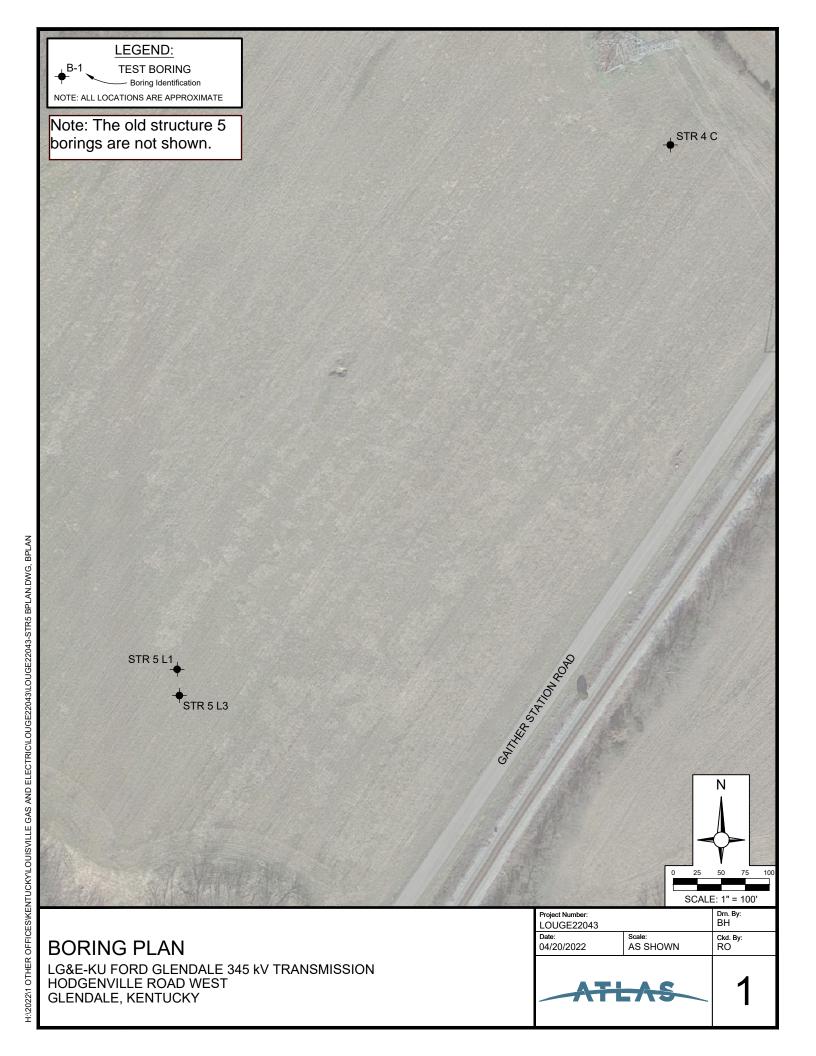


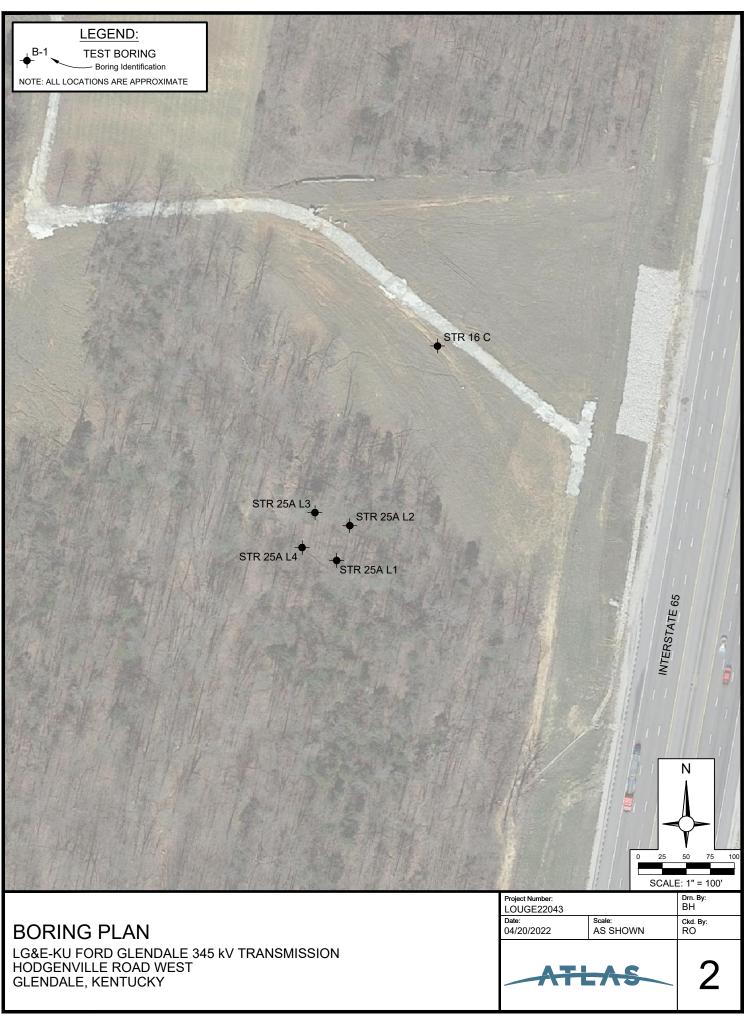
Telephone: 301/565-2733 e-mail: info@geoprofessional.org www.geoprofessional.org

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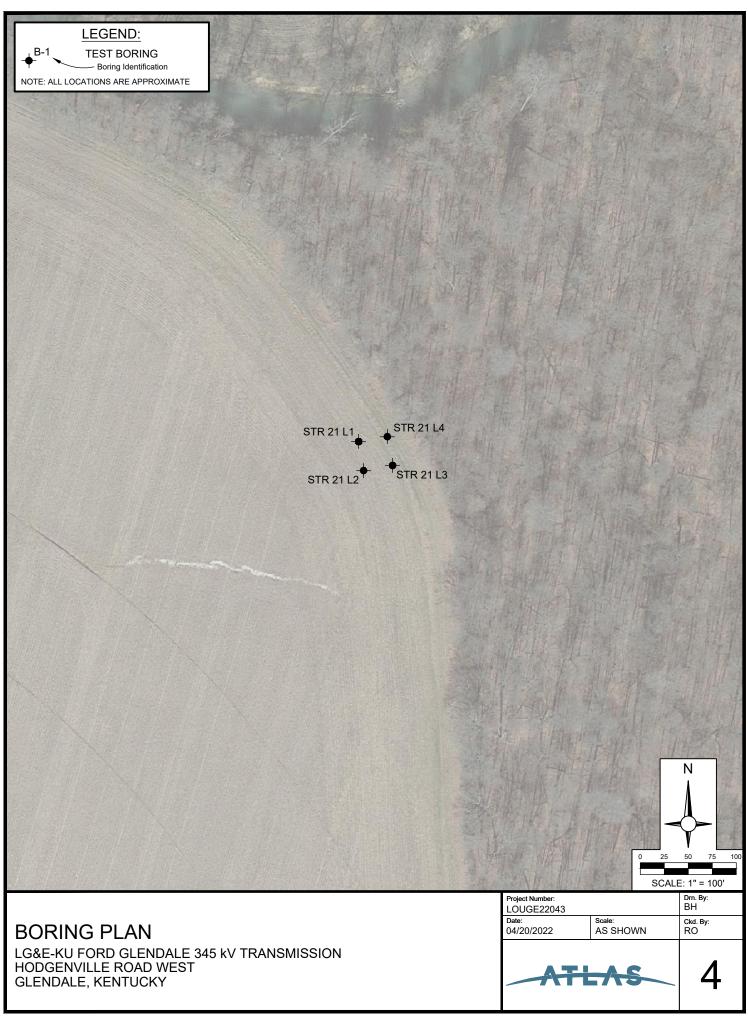
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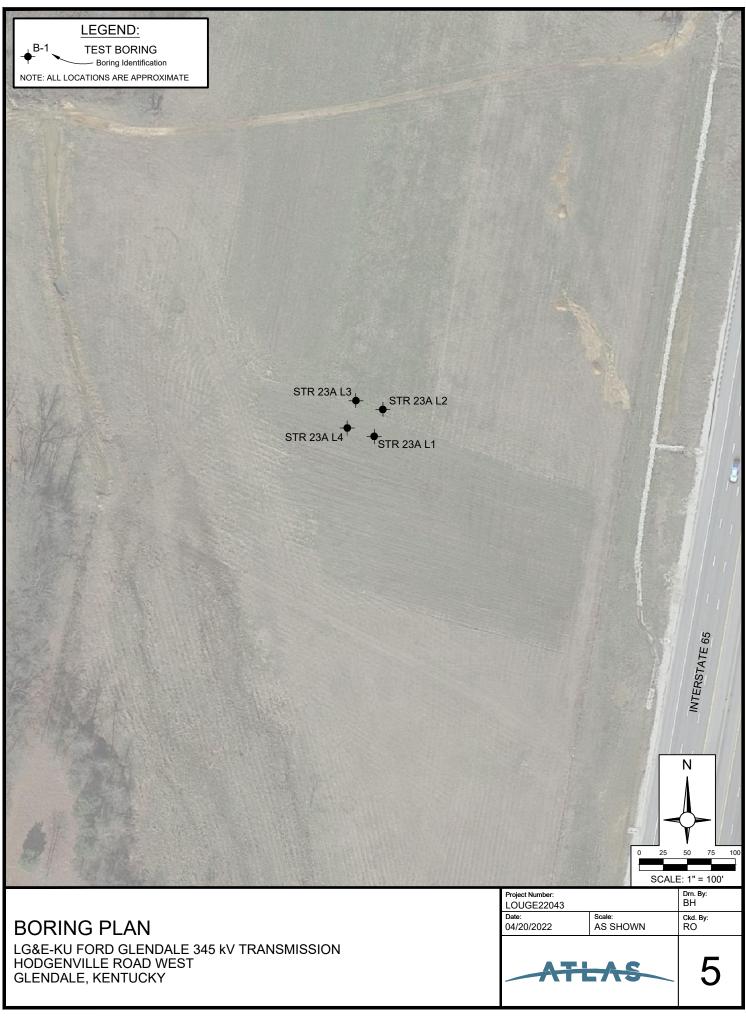
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	Asphalt	<u>SPT "N"</u> <u>VALUE</u>	<u>CONSISTENCY</u>	<u>COMPRESSIVE</u> STRENGTH (PSF)	<u>SPT "N"</u> VALUE	<u>RELATIVE</u> <u>DENSITY</u>
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	Gravel	2-3 4-6	Soft Medium Stiff	500-1,000 1,000-2,000	5 to 10 11 to 30	Loose Medium Dense
	5and	7-12	Stiff	2,000-4,000	31 to 50	Dense
	Sit	13-26 >26	Very Stiff Hard	4,000-8,000 >8,000	>50	Very Dense
	Lean Clay	E	STIMATES RELA	TIVE	PART	TICLE SIZE
	Fat Clay		OISTURE COND		IDENT	IFICATION
	Silty Sand	(Visual cla	ssification relative to assu e content (OMC) of stand	umed optimum		TM D2488)
	Clayey Sand	_			Boulders	> 12 inches
	Sandy Silt	Dry Slightly Moist Moist	-Air dry to dusty -Dusty to approximate -Approximate ±2% ON		Cobbles Gravel Coarse	12 to 3 inches 3 to ¾ inches
	Clayey Silt	Very Moist Wet	-Approximate +2% ON -Contains free water a	IC to saturated	Fine Sand ¹	³ to 4.75 mm
	Sandy Clay	<u>RELA</u>	TIVE HARDNESS	S OF ROCK	Coarse Medium	4.75 to 2 mm 2 to 0.425
	Silty Clay		(Automatic Hamme	•	Fine	0.425 to 0.075 mm
335355		Very Soft	-Pieces 1 inch or more in	thickness can be broken		<0.075 mm
HT I	Limestone	Soft	by finger pressure. -May be broken with fing	Jers		e to No. 200 Sieve No. 200 Sieve
	Sandstone	Medium	-Corners and edges may -Moderate blow of ham	be broken with fingers		DRTION OF
× × ×	Siltstone	Hard	sample			ND GRAVEL
		Hard Very Hard	-Hard blow of hammer re-Several hard blows of ha			Dry Weight)
	Shale		sample		Trace	<15%
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(Shown ir	Sampler Column)	Fresh		thering, slight discolorat		101 229%
	Shelby Tube	Slightly Moderately	-Discoloration and dis		PRO	PORTION OF FINES
\boxtimes	Split Spoon	Highly	-More than half disint	•	(P	y Dry Weight)
П	Rock Core	Completely	_	into soil. Rock matrix int	act.	
8_8	Rock Cole	Residual Soil	-All rock converted to	soil. Rock matrix destroy	ed. Trace With	<5% 5 to 12%
50 Z	Grab Sample			TERMS	Modi	
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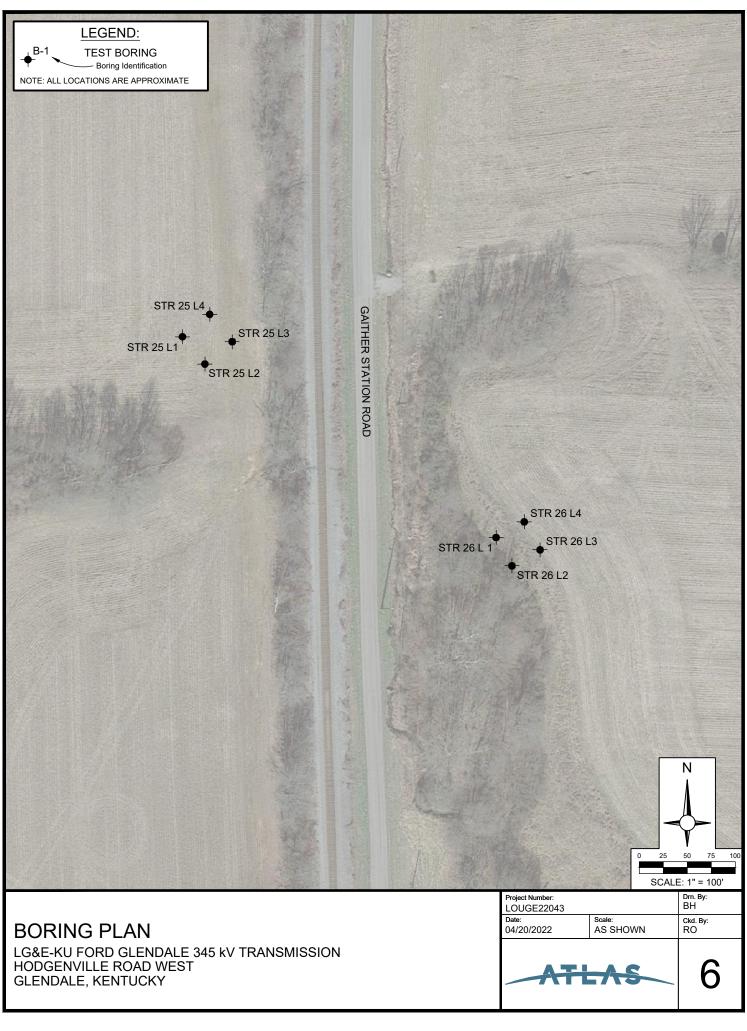


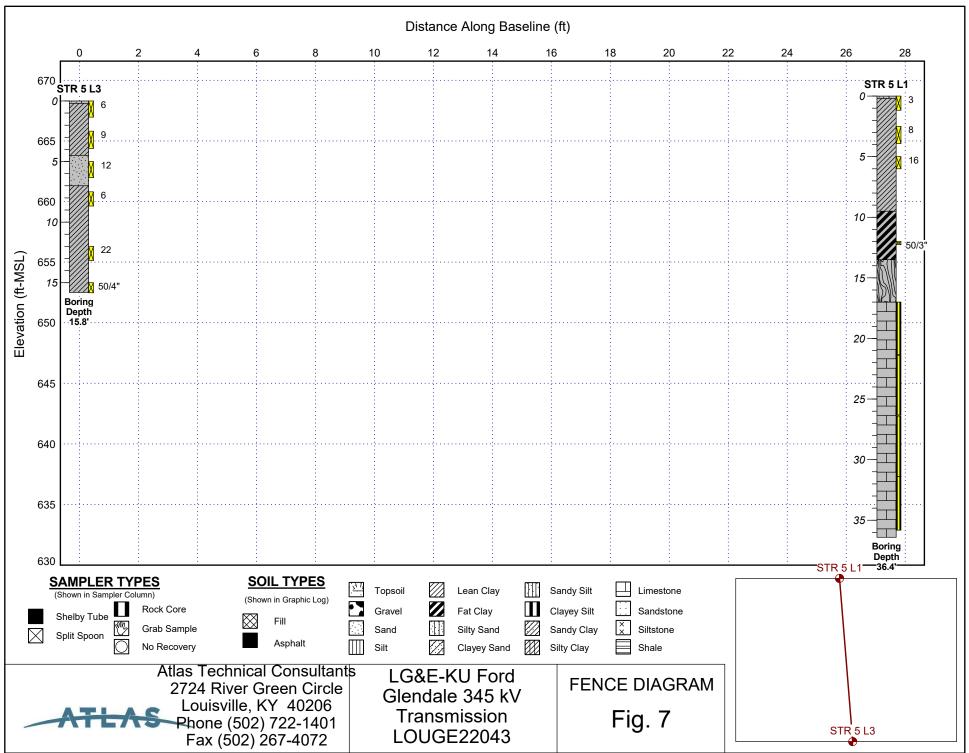


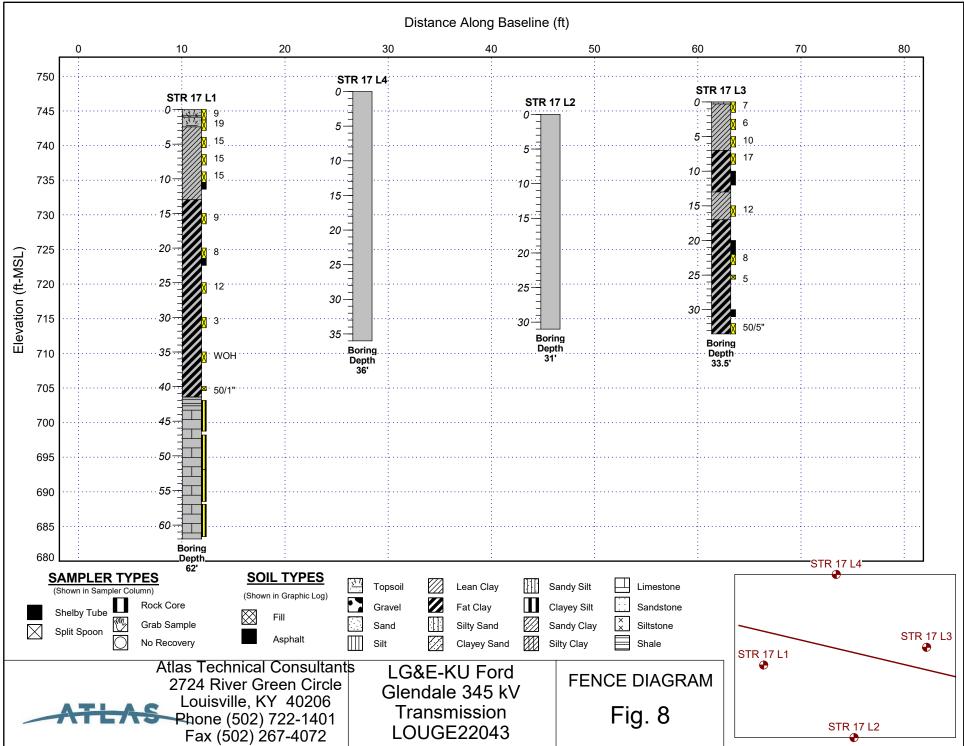




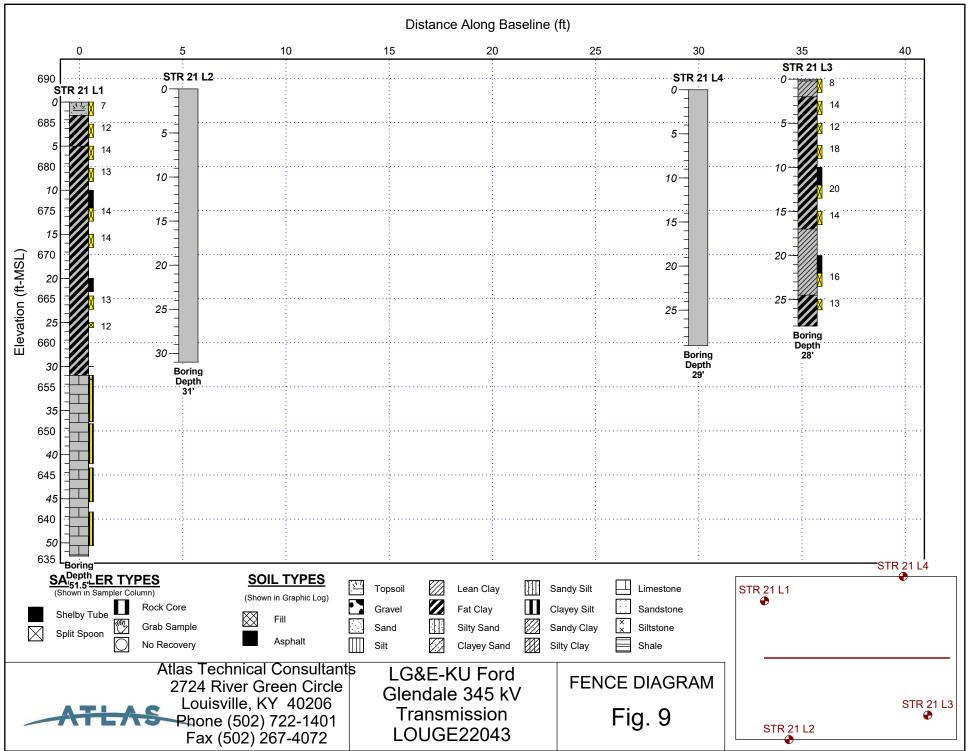


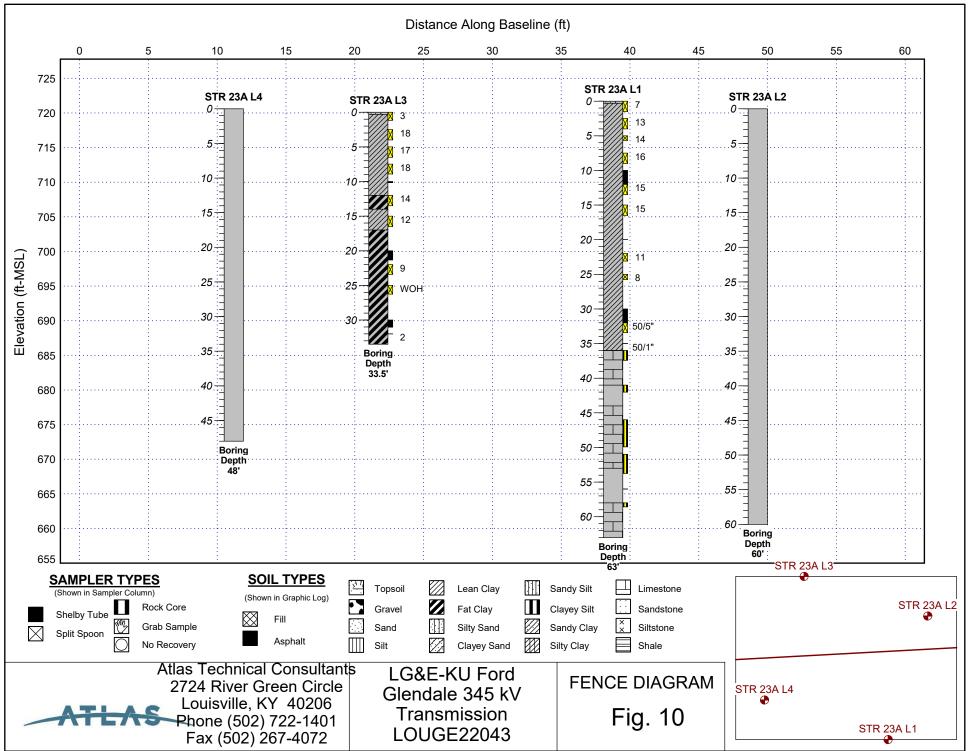


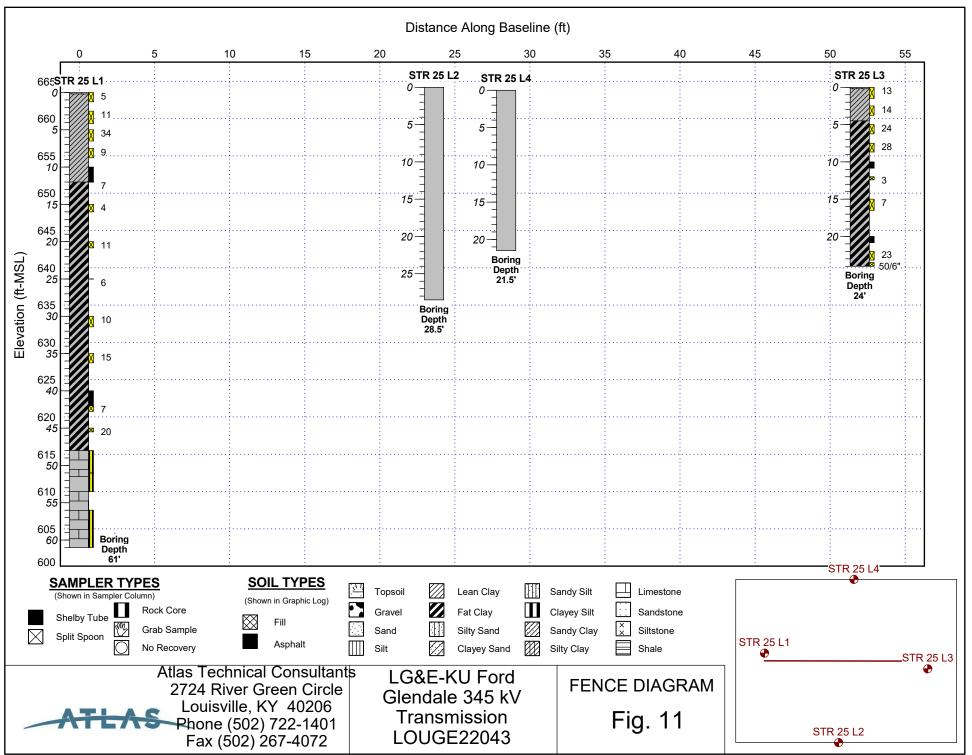




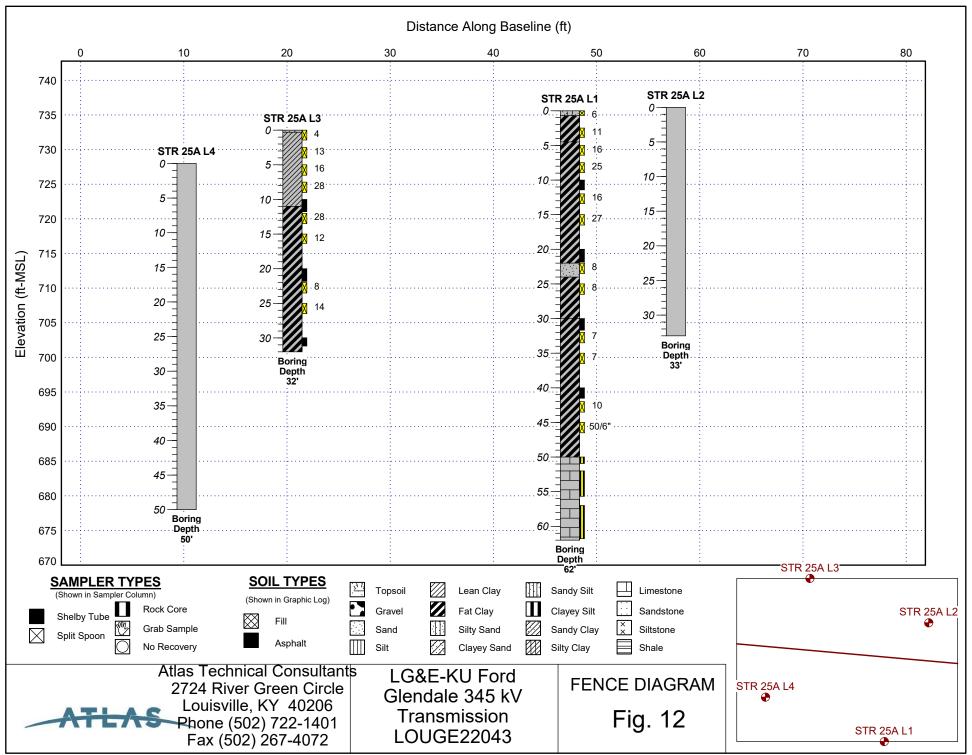
ATC STRATIGRAPHY (GINT 7) GLENDALE TRANSMISSION LINE.GPJ ATC GINT7 OFFICIAL TEMPLATE.GDT 6/15/22

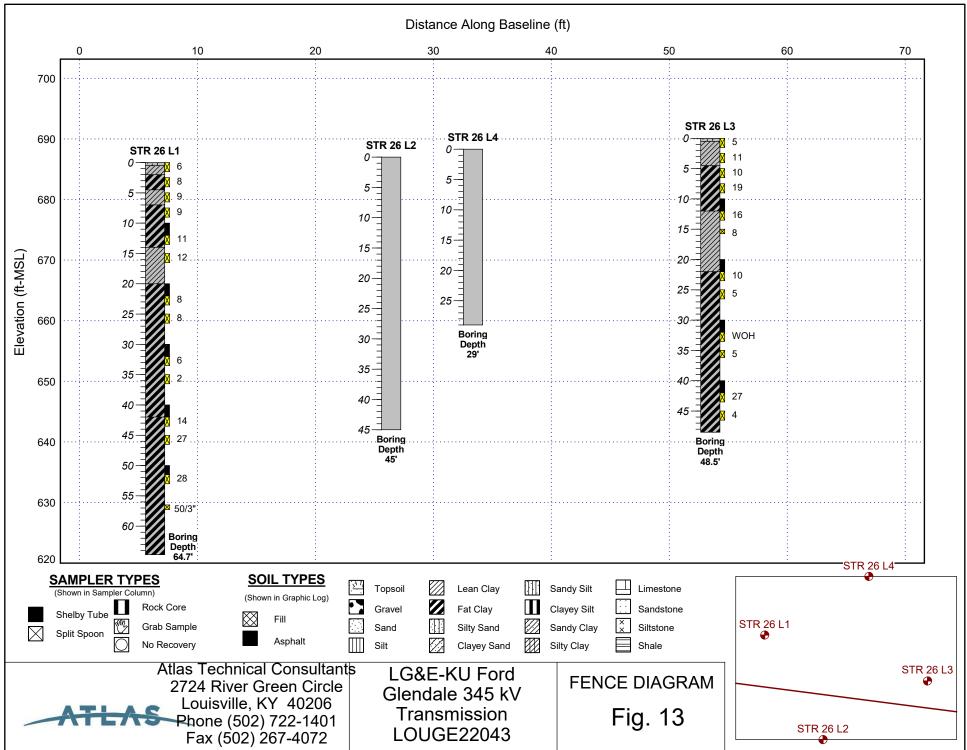






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						WOH- [<i>WOH</i>]						
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												Undisturbed sample attempt at
			30 -									about 30 ft, push refusal on rock
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CA - Continuous Flight Auger RC - Rock Core	 At Completion (open 	,	ft. ft.	MD -	Mud	ng Casing Drilling						
CU - Cuttings CT - Continuous Tube	▼ After hours		 ft.	MH -	Man	ual Hammer matic Hamm					Dr	ao 1 of 7
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TEST BORING LOG

(Continued)

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			53.5	-	RC-4										RQD=63%
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															and auger bit run off at 53.5 feet.
Sample Typ	<u>e</u>	Depth to Ground	lwater	1	I			Bori	ing Mothod	1		1	1		
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-		t Power Corpora							BORING #			<u>R 4</u>			
PROJECT NAME		Ford Glendale 3							JOB #				E22		3
PROJECT LOCATIC									DRAWN B					6	
	Glendale	, KY							APPROVE	DBY	R.	Ort	Z		
	DRILLING and \$	SAMPLING INFORMA	TION		r						TES	T DA	TA		
Date Started	3/29/22	Hammer Wt.		140	lbs.										
Date Completed		Hammer Drop			-										
Drill Foreman	J. Burdette								st					ieve	
Inspector	P. Presnell	_ Rock Core Dia.		2	_in.				u Te	th				S 00	
Boring Method	HSA, AH	_ Shelby Tube OD		3	_in.		ics hics		/foot	ed reng	nt %		L I	g #2	
				1		be	Sampler Graphics Recovery Graphics	fer	Standard Penetration Test N-Value (blows/foot)	Qu-tsf Unconfined Compressive Strength	Moisture Content %	Liquid Limit (LL)	Plastic Limit (PL)	Percent Passing #200 Sieve	
	SOIL CLASSIFIC		ε		Ð	Sample Type	er G ery (Groundwater	ard F Je (b	Unco essiv	Le C	Limi	, Lim	nt Pa	rks
SUF	RFACE ELEVATIO	N (ft): 670.1 ude (deg): -85.898728	epth	Depth Scale	Sample No.	ampl	ampl	roun	anda -Valu	I-tsf mpr	oistu	quid	astic	ercei	Remarks
			۵ŭ	٥ŏ	ΰŽ	ů	Ϋ́Α̈́	U	υż	ರೆಂ	Σ		⊡	ď	
	ERING- NO SAMPI	LES OBTAINED			4										Offset 5 feet north from Boring STR
				-											
				5 -	-										
				-	1										
				-	-										Auger refusal at 10 feet. Unable to
															core due to
	Auger Refusal at	10 feet	10.0	10 -											skewed boring an auger bit run off a
	, agoi i toracai at														refusal.
Sample Ty	ре	Depth to Ground	water	1	1	I			<u> </u>			I	I	I	
SPT - Standard Pe	enetration Test	Noted on Drilling Too	ls	-	- _ ft.	цо			<u>ing Method</u> w Stem Aug	ere					
SS - Driven Split SH - Pressed She		At Completion (in aug			- ft.	CF	A - C	Cont	inuous Flight		rs				
CA - Continuous RC - Rock Core	Flight Auger 🙂	At Completion (open After hours			– ft. – ft.	DC ME			ng Casing Drilling						
CU - Cuttings	-	After hours	-		- ft.		1 - N	Λanι	ual Hammer						

AH - Automatic Hammer

--_ ft.

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- RC Rock Core CU Cuttings CT Continuous Tube



CLI	ENT	Southeas	t Power Corpora	tion						BORING	#	ST	R 4	-B		
PRO	DJECT NAME	LG&E-KU	Ford Glendale 3	45 kV	/ Tran	smis	ssio	n		JOB #		LO	UG	E22	2043	3
	DJECT LOCATIC									DRAWN		Z .	Nicł	hols	5	
		Glendale,								APPROV						
		DRILLING and S	SAMPLING INFORMA	TION		-						TES	T DA	ТА		
0	Date Started	3/29/22	_ Hammer Wt		140	_lbs.										
0	Date Completed	3/29/22	_ Hammer Drop _		30	_in.										
0	Drill Foreman	J. Burdette	_ Spoon Sampler C	DD	2	_in.				est					Sieve	
		P. Presnell	Rock Core Dia.					(0		on T	gth	\$			200 9	
E	Boring Method	HSA, AH	_ Shelby Tube OD		3	_in.		ohics		Standard Penetration Test N-Value (blows/foot)	Qu-tsf Unconfined Compressive Strength	Moisture Content %) F	PL)	Percent Passing #200 Sieve	
		SOIL CLASSIFIC					Sample Type	Sampler Graphics Recovery Graphic	Groundwater	d Pen (blow	sive 3	Con	Liquid Limit (LL)	Plastic Limit (PL)	Pass	0
F	SUF	RFACE ELEVATIO	N (ft): 670.1 ude (deg): -85.898713	tt un	le th	Sample No.	nple	npler	Npun	ndarc	sf Ur	sture	lid Li	stic L	cent	Remarks
	Latitude (deg):	37.661471, Longit	ude (deg): -85.898713	Stra Dep	Depth Scale	San No.	San	San Rec	Gr C	Star N-V	Com Com	Moi	Liqu	Plas	Per	Ren
	BLANK AUGE	ERING- NO SAMPL	ES OBTAINED		-	-										Offset 5 feet east from Boring STR 4
					-											
					-											
_					5 -											
					-											Augor refueed at
					-											Auger refusal at 10 feet. Unable to
-				10.0	10	1										core due to skewed boring and
		Auger Refusal at	10 feet	10.0	10 -	1										auger bit run off at refusal.
											1					
0	<u>Sample Ty</u> PT - Standard Pe		Depth to Ground Noted on Drilling Too			- ft.			Bor	ing Method						
S	S - Driven Split	Spoon 🛓	At Completion (in aug		-	– n. – ft.				w Stem Au		ro				
	H - Pressed She A - Continuous	elby Tube 📈	At Completion (open			- ft.	DC	; - [Drivi	inuous Fligł ng Casing	n Auge	:15				
R	C - Rock Core	Ϋ́	After hours	-		- ft.	ME MF) - (Mud	Drilling ual Hamme	r					
C	U - Cuttings		After hours	; -	-	- ft.				matic Hamr					D -	

AH - Automatic Hammer

--_ ft.

Page 1 of 1

- RC Rock Core CU Cuttings CT Continuous Tube



		t Power Corpora							BORING #			<u>R 4</u>			
PROJECT NAME		Ford Glendale 3	45 kV	' Tran	smis	ssio	n		JOB #			UG			8
PROJECT LOCATIC	N Hodgenvi	ille Road West							DRAWN B					5	
	Glendale,	KY							APPROVE	D BY	R.	Orti	İZ		
	DRILLING and S	SAMPLING INFORMA	TION		-						TES	T DA	TA		
Date Started	3/29/22	Hammer Wt.		140	lbs.										
Date Completed		 Hammer Drop			- 1										
	J. Burdette								st					eve	
	P. Presnell								L Te	Ę				00 Si	
Boring Method		_ Shelby Tube OD			in.		ics nics		foot)	engt	nt %			g #2(
[be	Sampler Graphics Recovery Graphics	er	Standard Penetration Test N-Value (blows/foot)	Qu-tsf Unconfined Compressive Strength	Moisture Content %	Liquid Limit (LL)	Plastic Limit (PL)	Percent Passing #200 Sieve	
	SOIL CLASSIFIC	ATION	Ē		Ð	Sample Type	er G	Groundwater	ard P le (bl	Jnco essiv	e O	Limi	Lim	nt Pa	× s
	RFACE ELEVATIO		Stratum Depth	Depth Scale	Sample No.	ample	ample	ouno.	Valu	-tsf (mpre	oistu	quid	astic	ercer	Remarks
		ude (deg): -85.89873	<u>n</u> <u>n</u>	പ്പ	S S S	ŝ	ഗ്ഷ്	Ū	ນີ້ z ່	gõ	ž	Ĕ	ä	Pe	
	ERING- NO SAMPL	LES OBTAINED		-											Offset 5 feet sout from Boring STR
				-											
-				-											
				5 -											
				-	-										
				-											Auger refusal at 10 feet. Unable to
															core due to skewed boring an
	Auger Refusal at	10 feet	10.0	10 -											auger bit run off a refusal.
	0														reiusai.
Sample Ty SPT - Standard Pe		Depth to Ground Noted on Drilling Too			- fł			<u>Bor</u> i	ing Method						
SS - Driven Split	Spoon 🛓	At Completion (in aug		-	•_ ft. •_ ft.				w Stem Aug		are				
SH - Pressed She CA - Continuous	elby Tube	At Completion (open	hole)	-	• ft.	DC	; - [Drivii	inuous Flight ng Casing	Auge	15				
RC - Rock Core CU - Cuttings	Ϋ́	After <u></u> hours	-		• ft. • ft.	MC MH			Drilling ual Hammer						

AH - Automatic Hammer

--_ ft.

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- RC Rock Core CU Cuttings CT Continuous Tube



CLIENT	Southeas	t Power Corpora	tion						BORING	#	ST	R 4	-D		
		Ford Glendale 3		/ Trar	Ismis	ssio	n		JOB #		LO	UG	E22	2043	3
PROJECT LOCATIO									DRAWN			Nic	hols	5	
	Glendale,								APPROV						
	DRILLING and S	SAMPLING INFORMA	TION		-						TES	T DA	TA		
Date Started	3/29/22	_ Hammer Wt		140	lbs.										
Date Completed	3/29/22	Hammer Drop		30	_in.										
Drill Foreman	J. Burdette	Spoon Sampler C	DD	2	_in.				est					Sieve	
Inspector	P. Presnell	Rock Core Dia.		2	_in.				t u	gth	.0			200	
Boring Method	HSA, AH	Shelby Tube OD		3	_in.		Sampler Graphics Recovery Graphics		Standard Penetration Test N-Value (blows/foot)	Qu-tsf Unconfined Compressive Strength	Moisture Content %	()	PL)	Percent Passing #200	
	SOIL CLASSIFICA					Sample Type	Grap y Gra	Groundwater	d Pen (blow	iconfi sive S	Cont	Liquid Limit (LL)	Plastic Limit (PL)	Passi	(0
SUF		N (ft): 670.1 ude (deg): -85.898746	tt tt	e 🗄	Sample No.	əldı	over	nndv	ndarc alue	sf Ur pres	sture	lid Li	stic L	cent	Remarks
Latitude (deg):	37.661472, Longitu	ude (deg): -85.898746	Stra Dep	Depth Scale	San No.	San	San Rec	Gro	Star N-V	Qu-t: Com	Moi	Liqu	Plas	Pero	Ren
BLANK AUGE	ERING- NO SAMPL	ES OBTAINED			-										Offset 5 feet west from Boring STR 4
															Tom Doning of the t
_				5 -											
_															Auger refusal at
															10 feet. Unable to core due to
-			10.0	10 -											skewed boring and auger bit run off at
	Auger Refusal at 1	10 feet													refusal.
Sample Ty		Depth to Ground	wator												
		Noted on Drilling Too			- _ ft.				ing Method						
SS - Driven Split S SH - Pressed She	Spoon 🛓	At Completion (in aug	jers)	-	- ft.		A - C	Conti	w Stem Au inuous Fligl		rs				
CA - Continuous I	Flight Auger	At Completion (open After hours			– ft. – ft.	DC ME	; - C	Drivir	ng Casing Drilling	0-					
RC - Rock Core CU - Cuttings	-	After hours			- n. - ft.		I - N	Λanι	ual Hamme						

AH - Automatic Hammer

--_ ft.

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- RC Rock Core CU Cuttings CT Continuous Tube



CLIEN	NT	Southeast	Power Corpora	tion						BORING #	ŧ	ST	R 4-	·Е		
PROJ	ECT NAME	LG&E-KU F	Ford Glendale 3	45 kV	Tran	smis	ssio	n		JOB #		LO	UG	E22	2043	8
PROJ	ECT LOCATIO	N Hodgenvill	e Road West							DRAWN B	Y	R . (Orti	Z		
		Glendale, k	(Y						_	APPROVE	D BY	Τ. /	And	Ires	6	
		DRILLING and SA	MPLING INFORMA	TION		г	[TES	T DA	TA		
Da	te Started	4/11/22	Hammer Wt.		140	lbs.										
Da	te Completed	4/11/22	Hammer Drop		30	in.									a.	
	ll Foreman		• •							Test					Sieve	
		C. Clouser				-		Ś			gth	%			200	
Bo	ring Method	DC, AH	Shelby Tube OD		3	_in.		phics		netrat ws/foc	fined Stren	itent 9	(LL)	(PL)	Passing #200	
		SOIL CLASSIFICAT					Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration N-Value (blows/foot)	Qu-tsf Unconfined Compressive Strength	Moisture Content	Liquid Limit (LL)	Plastic Limit (PL)	t Pas	s
	SUR	RFACE ELEVATION 37.659837, Longitud	(ft): 670.1	tratum epth	Depth Scale	Sample No.	ample	ample	rounc	tanda -Valu	u-tsf L	oistur	quid I	astic	Percent I	Remarks
_		37.659837, Longitud		۵ ۵	٥ŏ	ΰž	ű	°õr ∏∏	U	ΰż	ರೆರೆ	Σ	Ē	₫	ď	<u>ل</u> د
	OBTAINED	NG ADVANCEWENT	- NO SAMPLES		-											Boring performed at staked tower
																center. Boring completed to
	- difficult drillin	g performance from	1 to 5 feet		-											desired depth.
		ig periornance nom	4 10 3 1661		5 -											
					-											
	- difficult drillin	g performance from	7 to 10 feet													
					-											
					10 -											
					-											
-																
					-											
					15 -											
3					-	-										
	- difficult drillin	g performance from	18 to 21 feet		-											
\exists					20 -											
					-											
]										
					-											
					25 -											
					-											
						-										
	- difficult drillin	g performance from	28 to 30 feet		-											
_					30 -	1										
\exists					-]										
_	- difficult drillin	g performance from	31.5 to 32.5 feet		-	-										
					-											
					-											
rחפ	Sample Typ	<u>oe</u> netration Test 💂 N	Depth to Ground			- ft			<u>Bori</u>	ing Method						
SS	- Driven Split S	Spoon 🖌 🛃 🖌	t Completion (in aug			•_ ft. • ft.				w Stem Aug		-				
	- Pressed She - Continuous F	lby Tube 📈 🗛	t Completion (open			• ft.	DC	- C	Drivir	inuous Flight ng Casing	Auge	IS				
RC	 Rock Core 	Y A	fter hours			•_ ft.	MD) - N	∕lud	Drilling Jal Hammer						
	- Cuttings - Continuous 1		fter <u></u> hours ave Depth			•_ ft. • ft.				matic Hamm	er				Pad	ge 1 of 2



TEST BORING LOG

(Continued)

CLIENT	Southeast	Power Corpora	tion						BORING	#	ST	R 4	-E		
PROJECT NAME	LG&E-KU F	Ford Glendale 3	45 kV	' Tran	smis	ssio	n	_	JOB#		LO	UG	E22	2043	8
PROJECT LOCATIO	N Hodgenvill	e Road West							DRAWN I	BY	R .	Orti	Ż		
	Glendale, k	(Y							APPROV	ED BY	Τ. /	And	Ires	;	
	DRILLING and SA	MPLING INFORMA	TION		Г				r		TES	T DA	TA		
Date Started	4/11/22	Hammer Wt.		140	lbs.										
Date Completed	4/11/22	Hammer Drop		30	in.										
Drill Foreman	J. Burdette	Spoon Sampler C	DD	2	in.				est					Sieve	
Inspector	C. Clouser	Rock Core Dia.		2	in.				t) To	gth	. 0			500 S	
Boring Method _	DC, AH	Shelby Tube OD		3	in.	Ð	Sampler Graphics Recovery Graphics		Standard Penetration Test N-Value (blows/foot)	Qu-tsf Unconfined Compressive Strength	Moisture Content %	(TT)	(PL)	Percent Passing #200	
	SOIL CLASSIFICAT	TION				Typ	r Gra	wate	d Pe (blo	ncon ssive	e Co	imit	Limit	: Pas	S
	(continued)		Stratum Depth	Depth Scale	Sample No.	Sample Type	mple	Groundwater	andar /alue	tsf U npre	istun	Liquid Limit (LL)	Plastic Limit (PL)	rcent	Remarks
Latitude (deg):	37.659837, Longituc	le (deg): -85.900735	Del Stra	N De	Sal No	Saı	Re	Q	Sta N-V	Con-O	Мо	Liq	Pla	Pel	Re
BLANK CASIN OBTAINED	IG ADVANCEMENT	- NO SAMPLES		-	-										
	D LIMESTONE AND		37.0			RC									
moderately we	eathered and fracture	ed		-	1										RQD=38%
				40 -		RC									
					2										RQD=22%
				45	-		Ш								
				45	-	RC									
				-	3		Ш								RQD=0%
				-	Ŭ		Ш								
				50 -											
						RC									
44				-	4		Ш								RQD=8%
							Ш								
	nered, slightly to mo	derately fractured		55 -		RC									
	lored, slightly to mot			-											
- highly fractur	ed to about 59 feet			-	5										RQD=35%
							Ш								
				60 —	-	RC									
					~										
-⊥- - light gray, ch	аку			-	6										RQD=42%
			65.0	65 -											
B	oring Terminated at	65 feet													
		Denth to C	hurt												
<u>Sample Typ</u> SPT - Standard Per	<u>ee</u> ∩etration Test ● N	Depth to Ground oted on Drilling Too			ft.				ing Method						
SS - Driven Split S SH - Pressed She	Spoon 🛓 A	t Completion (in aug	lers)		ft.	CF	A - (Conti	w Stem Aug inuous Fligh		ers				
CA - Continuous F	Flight Auger 🙂 A	t Completion (open fter hours	-		•_ ft. • ft.	DC	; - C	Drivir	ng Casing Drilling	5-					
RC - Rock Core CU - Cuttings	T A	fter <u></u> hours			•_ n. •_ ft.	MF	I - N	Manu	ual Hammer						
CT - Continuous T		ave Depth	-		ft.	AH	- /	-UIOI	matic Hamn	ier				Pa	ge 2 of 2



		Power Corpora Ford Glendale 3		Tranam			BORING JOB#_			<u>DS</u> UG			
PROJECT NAME)
PROJECT LOCATIO	Glendale,						DRAWN APPROV						
							APPROV	ED B Ā					
	DRILLING and SA	AMPLING INFORMA	TION		[1	1	TES	T DA	TA		
Date Started	3/22/22	Hammer Wt.		140 lbs									
Date Completed	3/23/22	Hammer Drop		30 in.								n,	
Drill Foreman			DD	2 in.			est					Sieve	
	J. Semmer					(0	ion T oot	gth	%			200	
Boring Method	HSA, AH	Shelby Tube OD		3 in.		sampler Graphics Recovery Graphics Groundwater	Standard Penetration Test Blows per 6" [N-Value] blows/foot	Qu-tsf Unconfined Compressive Strength	tent %	(T	PL)	Percent Passing #200	
	SOIL CLASSIFICA				Sample Type	Sampler Gra Recovery Gra Groundwater	d Per er 6" e] <i>bl</i>	nconf	Moisture Content	Liquid Limit (LL)	Plastic Limit (PL)	Pass	Ø
SUF	FACE ELEVATION	(ft): 667.8 de (deg): -85.900735	oth	Depth Scale Sample	nple		ndar ws p Valu	sf Ui	sture	lid L	stic L	cent	Remarks
Latitude (deg):	37.659837, Longitu	de (deg): -85.900735		Depth Scale Sample	Sar	Gro Gro	Sta [∧	Qu-f Corr	Moi	Liqu	Pla	Per	Rer
TOPSOIL]	0.2	1	ss	\langle	3-3-8- [<i>11</i>]						PP=2.5 tsf
LEAN CLAY (CL), Brown, STIFF the fragments	to VERY STIFF] [
	5			2	ss		7-9-16- [25]						PP=4.5+ tsf
			5.0	5 —									Auger refusal at 5 feet.
	LIMESTONE, gray der or weathered lir				RC 1								RQD=0%
				-RC-	2 RC								RQD=0%
	RY - INTERPRETE		10.0	10 3	ss	Xo	4-3-3-						Boring advanced
	FRAGMENT LAYEF	२			-		[6]						using coring. Split spoon performed
													once refusal material
			15.0	15 —									penetrated. Core barrel advanced
	Auger Refusal at 1	5 feet	15.0	15									(by pushing) to 15 feet.
													Refusal at 15 feet. Unable to core
													due to skewed boring and auger
													bit run off at refusal.
Sample Typ		Depth to Ground				Bor	ing Method						
SS - Driven Split S	Spoon 🚊 /	Noted on Drilling Too At Completion (in aug		ft. ft.	HSA	- Hollo	w Stem Au	gers	ro				
SH - Pressed She CA - Continuous I	lby Tube	At Completion (open	hole)	ft.	DC	- Drivi	inuous Fligh ng Casing	n Auge	15				
RC - Rock Core CU - Cuttings	u u v	After <u></u> hours After hours		<u></u> ft. <u></u> ft.			Drilling ual Hammeı	r					
CT - Continuous		Cave Depth	-	n. ft.			matic Hamn					Pa	ge 1 of 1



CLIENT	Southeast F	Power Corpora	tion						BORING #	¥	OL	DS	TR	5 L	1-A
PROJECT NAME	LG&E-KU F	ord Glendale 3	45 kV	' Tran	smis	ssio	n		JOB#		LO	UG	E22	2043	8
PROJECT LOCATION	Hodgenville	e Road West							DRAWN E	3Y	Z. I	Nicl	nols	5	
	Glendale, K								APPROVE	ED BY	R . (Orti	z		
	DRILLING and SAM	MPLING INFORMA	TION		-						TES	T DA	TA		
Date Started	3/23/22	Hammer Wt.		140	lbs.										
Date Completed	3/23/22	Hammer Drop		30	in.										
Drill Foreman	M. Smith	Spoon Sampler C	DD	2	in.				est					Sieve	
Inspector	J. Semmer	Rock Core Dia.		2	in.				н Ч Ц	Ę	-			00 S	
Boring Method	HSA	Shelby Tube OD		3	in.		Sampler Graphics Recovery Graphics	_	Standard Penetration Test N-Value (blows/foot)	Qu-tsf Unconfined Compressive Strength	itent %	(TL)	(PL)	Percent Passing #200	
	SOIL CLASSIFICATI	ION	_			Sample Type	er Graj	Groundwater	rd Per e (blov	Inconf ssive	Moisture Content	Liquid Limit (LL)	Plastic Limit (PL)	t Pass	S
	ACE ELEVATION (Stratum Depth	Depth Scale	Sample No.	ample	ample	round	anda Value	I-tsf U mpre	oistur	quid L	astic	erceni	Remarks
	7.659823, Longitude		5 T T	۵ŏ	ΰž	ů	°ŏĕ ⊤⊤	Ū	5 5 2	<u> </u>	Ś		₫	Pe	
	RING- NO SAMPLES	5 OBTAINED		-											Offset 5 feet south from Boring STR 5 L1
A	Auger Refusal at 2.5	feet	2.5												
															Auger refusal at 2.5 feet. Unable to
															core due to auger bit run off at
															refusal.
Sample Type		Depth to Ground	lwater		1			_	<u> </u>			<u> </u>			
SPT - Standard Pen	etration Test 👤 No	oted on Drilling Tool	ls		ft.	ЦС			ing Method w Stem Aug	are					
SS - Driven Split S		Completion (in aug	lers)		ft.				inuous Fligh		rs				

- ed She
- CA Continuous Flight Auger RC Rock Core CU Cuttings CT Continuous Tube

- AH Automatic Hammer



Page 1 of 1

CLIENT_		Southeast	Power Corpora	tion						BORING #		OL	D S	TR	5 L	1-B
PROJEC	T NAME	LG&E-KU	Ford Glendale 3	45 kV	' Tran	smis	ssio	n		JOB #						3
PROJEC	T LOCATIO	N Hodgenvil	le Road West							DRAWN B					6	
		Glendale,	KY						_	APPROVE	DBY	R . (Orti	z		
		DRILLING and SA	AMPLING INFORMA	TION		Г	[TES	T DA	ТА		
	Started	3/23/22				-										
		3/23/22				-									е	
	oreman									Test					Siev	
		J. Semmer				-				ot) .	ngth	%			<i>‡</i> 200	
Boring	g Method	HSA	Shelby Tube OD		3	.in.		phics		netra ws/fo	fined	Itent	LL)	(PL)	sing #	
		SOIL CLASSIFICA					Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test N-Value (blows/foot)	Qu-tsf Unconfined Compressive Strength	Moisture Content %	Liquid Limit (LL)	Plastic Limit (PL)	Percent Passing #200 Sieve	S
	SUR	FACE ELEVATION	(ft): 667.8 de (deg): -85.900734	atum pth	Depth Scale	Sample No.	mple	mple	punc	value	tsf U npre	istur	uid L	istic I	rcent	Remarks
				De	δо С	Sa No	Sa	Real	Ğ	P_sts	So	Мо	Liq	Ъ	Ре	
	LANK AUGE	RING- NO SAMPLE	ES OBTAINED		-											Offset 5 feet south from Boring STR 5
1					-											L1-A
					-	-										Auger refusal at 7.5 feet. Unable to
-					5 -											core due to auger bit run off at
					-											refusal.
		Auger Refusal at 7.	5 feet	7.5		1										
		-														
	Sample Typ)e	Depth to Ground	water												
	Standard Pe	netration Test 👤	Noted on Drilling Too			ft.				ing Method	.					
SS -[Driven Split S Pressed She	Spoon 🛓 A	At Completion (in aug	lers)			CF	A - (Conti	w Stem Aug inuous Flight		rs				
CA - (Continuous F	Flight Auger 🙁 🤔 🖌	At Completion (open After hours			•_ ft. • ft.	DC MD	- C	Drivir	ng Casing Drilling	-					
CU - (Rock Core	¥ A	After hours			ft.	MH	I - N	Manu	ual Hammer matic Hamm	or					, · ·
CT - (Continuous 1	lube 🖂 🦉	Cave Denth			ft	АП	- F	านเป	mauc Hallim					Pa	be 1 of 1

--__ ft.

- RC Rock Core CU Cuttings CT Continuous Tube

🙇 Cave Depth



			Power Corporation		Tues					BORING #						<u>1-C</u>
			Ford Glendale 3							JOB #)
PF	ROJECT LOCATIO		e Road West							DRAWN B APPROVE	-				5	
		Glendale, I	NT MPLING INFORMA							APPROVE	D B I					
	Data Chartad	3/23/22	Hammer Wt.		140							120				
	Date Started Date Completed		Hammer Vvt Hammer Drop			- 1										
	Drill Foreman	M. Smith	Spoon Sampler C							st					Sieve	
	Inspector									n Te	£				00 Si	
	Boring Method	HSA	Shelby Tube OD		3	in.		hics phics		Standard Penetration Test N-Value (blows/foot)	Qu-tsf Unconfined Compressive Strength	ent %	()	٦L)	Percent Passing #200	
[SOIL CLASSIFICA					Sample Type	Sampler Graphics Recovery Graphics	Groundwater	d Pen (blow	nconfii ssive S	Moisture Content	Liquid Limit (LL)	Plastic Limit (PL)	Passi	S
	SUR	FACE ELEVATION	(ft): 667.7 de (deg): -85.900663	atum pth	Depth Scale	Sample No.	mple	mple	punc	value	tsf U npres	isture	uid L	istic I	rcent	Remarks
_				Str De	N De	Sal No	Saı	Real	Gre	Sta N-V	Sol	Mo	Liq	Pla	Pel	
-	BLANK AUGE	RING- NO SAMPLE	S OBTAINED		-											Offset 5 feet west from Boring STR 5
_					-											L4
-					-											
_					5 -											
-					-											
_																
					40											
-					10 -											
_		Gray, medium-grain	ed	12.0	-	RC-1	RC									RQD=0%
_		Gray, medium-grain			-		RC	H								
_					15 -											
-					-	RC-2										RQD=91%
_				18.0												Boring terminated
		Auger Refusal at 18	3 feet	10.0												at about 18 feet due to equipment
																failure during coring.
9	<u>Sample Typ</u> SPT - Standard Per		Depth to Ground loted on Drilling Tool			- ft.				ing Method						
:	SS - Driven Split S	Spoon 👲 A	t Completion (in aug	ers)		• ft.				w Stem Aug inuous Flight		rs				
(SH - Pressed She CA - Continuous F	-light Auger 😇 🖊	t Completion (open l			•_ ft.	DC	- [Drivir	ng Casing						
	RC - Rock Core CU - Cuttings		.fter <u></u> hours .fter hours			•_ ft. •_ ft.		- 1	Manu	Drilling Jal Hammer						
	CT - Continuous T		Cave Depth	-		• ft.	AH	- /	Autoi	matic Hamm	er				Pa	ge 1 of 1



CL	IENT	Southe	ast Power Corpora	tion						BORING #		OL	DS	TR	5 L	1-D
PR	OJECT NAME	LG&E-I	KU Ford Glendale	845 kV	Tran	smis	ssio	n		JOB #		LO	UG	E22	043	8
PROJECT LOCATION Hodgenville Road West									DRAWN B	Υ	Z. I	Nich	nols	5		
								APPROVE	D BY	R . (Orti	Z				
		DRILLING an	Nd SAMPLING INFORM	TION								TES	T DA	TA		1
	Date Started	3/24/22	Hammer Wt.		140	lbs.										
	Date Completed				30	in.									e	
	Drill Foreman	M. Smith								Test					Sieve	
	Inspector							" S		tion .	ngth	%			¥200	
_	Boring Method	пра	Shelby Tube OD		3	in.	e	Sampler Graphics Recovery Graphics		Standard Penetration Test N-Value (blows/foot)	Qu-tsf Unconfined Compressive Strength	Moisture Content %	(TT)	(PL)	Percent Passing #200	
		SOIL CLASSIF	ICATION			0	Sample Type	er Gra	Groundwater	ird Pe e (blc	Jncor	re Co	Liquid Limit (LL)	Plastic Limit (PL)	it Pas	s
		FACE ELEVAT		Stratum Depth	Depth Scale	Sample No.	ample	ample	round	anda -Valu	i-tsf L	oistuı	quid I	astic	ercen	Remarks
	,		ngitude (deg): -85.90080	2 2 2	Ğй	ΰž	ů	ഗ്ഷ്	Ũ	ty z	<u> </u>	Š	Lic	Ē	ď	
-	BLANK AUGE	RING- NO SAN	IPLES OBTAINED		-											Offset 5 feet east from STR 5 L2
_																
-					-											
-					5											Auger refusal at 8 feet. Unable to
					-											core due to auger bit run off at
+		Auger Refusal	at 8 feet	8.0	-	-										refusal.
		-														
Ľ	Sample Typ		Depth to Groun		•			<u> </u>	Bori	ng Method						J
	SPT - Standard Per SS - Driven Split S	•	 Noted on Drilling Too At Completion (in au) 			•_ ft. • ft.		A - H	Hollo	w Stem Aug						
S	SH - Pressed She CA - Continuous F	İby Tube	At Completion (in aug			•ft.				inuous Flight ng Casing	Auge	rs				
F	RC - Rock Core	ngni Auger	¥ After hour	s_		• ft.	MD) - N	Mud	Drilling Jal Hammer						
	CU - Cuttings CT - Continuous T		▼ After hour	s _		•_ ft. •_ ft.				matic Hamm	er				Pa	ge 1 of 1



CLIE	NT	Southeast	Power Corpora	tion				BORING	#	OL	D S	TR	5 L	1-E
PRO	JECT NAME	LG&E-KU	Ford Glendale 3	45 kV	/ Transm	issior	<u>1</u>	JOB #		LO	UG	E22	2043	3
PROJECT LOCATION Hodgenville Road West								DRAWN	BY	Z .	Nicl	hols	5	
										R.	Orti	iz		
		DRILLING and S	AMPLING INFORMA	TION		[TES	T DA	TA		
D	ate Started	3/28/22	Hammer Wt.		140 lbs									
D	ate Completed	3/28/22	Hammer Drop		30 in.								۵	
		J. Burdette						[est					Siev	
		P. Presnell						ot)	lgth	%			#200	
B	oring Method	пза, ап	Shelby Tube OD		3 in.	0	iphics aphic	netra ws/fo	fined	ntent	(LL)	(PL)	sing ∌	
		SOIL CLASSIFICA		_		No. IL Sample Type	Sampler Graphics Recovery Graphic Groundwater	Standard Penetration Test N-Value (blows/foot)	Qu-tsf Unconfined Compressive Strength	Moisture Content %	Liquid Limit (LL)	Plastic Limit (PL)	Percent Passing #200 Sieve	s
	SUF	RFACE ELEVATION	l (ft): 667.8 de (deg): -85.900735	pth	Depth Scale Sample	mple	imple scove	Value	-tsf U mpre	oistur	quid L	astic	rcen	Remarks
_				<u>n</u> gr	မီတိတီ:	Sa No	<u>ଜୁଙ୍କୁ</u> ନୁ	j ở ż	<u>Š</u> Š	Ň	Ľ	Ĕ	Pe	Re
	BLANK AUGE	ERING- NO SAMPLI	ES OBTAINED											Boring performed
														at the staked tower leg 1
				-										location
	E	Boring Terminated a	t 5 feet	5.0	5 —									Boring terminated due to
														encountered sewer.
	Comer la T		Dorth to Ores	huct										
SP	<u>Sample Ty</u> T - Standard Pe		<u>Depth to Ground</u> Noted on Drilling Too		ft			oring Method						
SS	- Driven Split	Spoon 🛓	At Completion (in aug	jers)	ft	HSA CFA	A - Cor	low Stem Au ntinuous Flig		ers				
CA	- Continuous I - Rock Core	Flight Auger 🛛 👻 🖊	At Completion (open After hours		ft. ft.	DC	- Driv - Mu	/ing Casing d Drilling	-					
CU	 Cuttings 	¥ /	After hours	-	ft	MH	- Ma	nual Hamme omatic Hami					_	4 . 4
CI	- Continuous	iuDe ⊠a(Cave Depth	-	ft	711	· Aut						Pa	ge 1 of 1

- RC Rock Core CU Cuttings CT Continuous Tube



	Southeast Power Corporation ROJECT NAME LG&E-KU Ford Glendale 345 kV Transmission ROJECT LOCATION Hodgenville Road West									BORING # OLD STR 5 L2 JOB # LOUGE22043						
PROJECT LOCATIO								_	DRAWN E					5		
	Glendale, K	Y						_	APPROVE	ED BY	R.	Orti	Z			
	DRILLING and SA	MPLING INFORMA	TION		г						TES	T DA	TA			
Date Started	3/22/22	Hammer Wt.		140	lbs.											
Date Completed	3/22/22	Hammer Drop		30	in.									0		
Drill Foreman	M. Smith	Spoon Sampler C	D	2	in.				Test					Sieve		
	J. Semmer	Rock Core Dia.			.		ŝ		ion T	gth	%			200		
Boring Method	HSA	Shelby Tube OD		3	in.		hics		letrat /s/foo	ned Stren	tent 9	(T)	PL)	# Buj		
	SOIL CLASSIFICAT	ION				ype	Sampler Graphics Recovery Graphics	ater	Standard Penetration N-Value (blows/foot)	Qu-tsf Unconfined Compressive Strength	Moisture Content %	Liquid Limit (LL)	Plastic Limit (PL)	Percent Passing #200		
	FACE ELEVATION (un d	e th	ple	Sample Type	pler	Groundwater	idard alue (oress	sture	id Lir	tic Li	ent F	Remarks	
	37.659763, Longitud		Stratum Depth	Depth Scale	Sample No.	Sam	Sam Reco	Grou	Stan N-Va	Qu-ts Comp	Mois	Liqui	Plas	Perc	Rem	
BLANK AUGE	RING- NO SAMPLE	S OBTAINED		-	-					00						
_				-												
				-												
				5 —												
				-												
-				_	-			<u>.</u>								
				-												
	Auger Refusal at 10	feet	10.0	10 —												
	Auger Neiusai at 10	leet														
							$\left \right $									
Sample Typ	<u>e</u>	Depth to Ground	water	L	1	L		Der!	na Mathad			1		II		
SPT - Standard Per SS - Driven Split S	netration Test 💂 No	-		7.6		HS	A - ⊢	lollo	ng Method w Stem Aug	ers						
SH - Pressed She	İby Tube 🖉 🗛	Completion (in aug Completion (open I			• ft. •ft.	CFA	4 - C	Conti	inuous Fligh ng Casing	t Auge	rs					
CA - Continuous F RC - Rock Core	Ilgrit Auger ⊈ Af	ter hours	_		ft.	MD	- N	/lud	Drilling							
CU - Cuttings CT - Continuous T		ter <u></u> hours ave Depth	-		•_ ft. • ft.				ual Hammer matic Hamm	er				Pag	ge 1 of 1	



Page 1 of 1

		st Power Corporat						BORING #		OL				
ROJECT NAME	LG&E-K	U Ford Glendale 34						JOB # LOUGE22043						
ROJECT LOCATIO	N Hodgen	ville Road West						DRAWN E					6	
	Glendal	e, KY						APPROVI	ED BY_	R . (Orti	Z		
	DRILLING and	SAMPLING INFORMAT	ΓΙΟΝ		[TES	T DA	TA		
Date Started	3/22/22	Hammer Wt		140 lbs.										
Date Completed	3/22/22	Hammer Drop		30 in.										
Drill Foreman	M. Smith	Spoon Sampler O	D	2 in.				est					Sieve	
Inspector	J. Semmer	Rock Core Dia		2 in.				on To Dot	gt	、 0			200 5	
Boring Method	HSA	Shelby Tube OD		3 in.		hics phics		etrati ws/fo	itreng	ent %	L)	۲)	;# ɓu	
	SOIL CLASSIFI				ype	Sampler Graphics Recovery Graphics	ater	Standard Penetration Test Blows per 6" [<i>N-Value</i>] <i>blows/foot</i>	Qu-tsf Unconfined Compressive Strength	Moisture Content %	Liquid Limit (LL)	Plastic Limit (PL)	Percent Passing #200 Sieve	
SU		ON (ft): 667.7	E _	he e e	ple T	pler (very	Groundwater	dard s pei <i>'alu</i> e	f Und	ture	d Lin	ic Lir	ent P	arks
Latitude (deg)	: 37.659693, Long	DN (ft): 667.7 itude (deg): -85.900728	Strat	Depth Scale Sample	Sample Type	Sam	Grou	Stan Blow [N-V	Somp	Mois	Liqui	Plast	Perc	Remarks
771	(CL), with silt				SS	X		2-4-6-						PP=1.0 tsf
								[10]						
- with limesto	ne fragments			2	ss	X		4-5-4- [9]						PP=1.5 tsf
//			5.1	5										
	Auger Refusal at	5.1 feet	0.1	3 3) ss			50/1" [<i>50/1"</i>]						PP=1.0 tsf
														
Sample Ty		Depth to Ground		-			Bori	ng Method						
PT - Standard Pe S - Driven Split	<u>~</u>	Noted on Drilling Tools		ft.	HS			w Stem Aug	gers					
H - Pressed Sh		At Completion (in auge		ft.	CF	A - C	Conti	nuous Fligh		rs				
A - Continuous	Flight Auger	At Completion (open h	ioie)	ft. ft.	DC ME			ng Casing Drilling						
RC - Rock Core	-	After hours	-	ft.				ial Hammer						
CT - Continuous		Cave Depth	-	n. ft.	AH	I - A	Autor	natic Hamm	ner				Pa	ge 1 of

--_ ft.

- CA Continuous Flight Auger RC Rock Core CU Cuttings CT Continuous Tube



CLIENT	Southeast	Power Corpora	tion						BORING #	ŧ	OL	DS	TR	5 L	4
PROJECT NAME	LG&E-KU	Ford Glendale 3	45 kV	Tran	smis	ssio	n		JOB #		LO	UG	E22	<u>.043</u>	8
PROJECT LOCATIC	N Hodgenvil	le Road West							DRAWN E	3Y	Z. I	Nicl	nols	\$	
	Glendale,								APPROVE	ED BY	R . (Orti	Z		
	DRILLING and S	AMPLING INFORMA	TION		г	r					TES	T DA	TA		
Date Started	3/22/22	Hammer Wt.		140	lbs.										
Date Completed	3/22/22	Hammer Drop		30	in.									σ	
Drill Foreman _									[est					Sieve	
Inspector		-			.		. s		tion ⁻ foot	ngth	%			#200	
Boring Method	HSA, AH	Shelby Tube OD		3	in.	0	Sampler Graphics Recovery Graphics		Standard Penetration Test Blows per 6" [<i>N-Value</i>] <i>blows/foot</i>	Qu-tsf Unconfined Compressive Strength	Moisture Content %	LL)	(PL)	Percent Passing #200	
	SOIL CLASSIFICA	TION				Sample Type	r Gra	Groundwater	-d Pe ber 6" <i>Je</i>] <i>b</i>	nconi ssive	e Cor	Liquid Limit (LL)	Plastic Limit (PL)	Pase	S
SUF	RFACE ELEVATION	l (ft): 667.7 de (deg): -85.900641	atum pth	Depth Scale	Sample No.	mple	mple	puno	andar ows p - <i>Valu</i>	-tsf U npre	oistun	luid L	astic I	rcent	Remarks
			De Str	പ്പ	S a		S a	Ģ		ğõ	M	Lic	Ъ	Ъе	
LEAN CLAY (CL), Brown, MEDIU ne fragments	M STIFF to STIFF,		-	1	SS	Д		3-7-5- [12]						PP=2.5 tsf
					2	SS			4-3-4-						PP=1.0 tsf
- trace organi	cs, with organic odo	r		-		r.	Α		[7]						
				5	3	SS	X		2-2-3- [5]						PP=1.5 tsf
- with limestor	ne fragments, wet			-											
	,			-	4	SS	Д		4-4-4- [8]						PP=1.0 tsf
				10 -											
				-											
- [///	Auger Refusal at 12	.5 feet	12.5												
Sample Ty	pe	Depth to Ground	water	I		l		Bori	ng Mothod			I	I		
SPT - Standard Pe SS - Driven Split	- -	Noted on Drilling Tool At Completion (in aug			•_ ft. • ft.		A - H	lollo	ng Method w Stem Aug						
SH - Pressed She CA - Continuous	elby Tube 🚡	At Completion (in aug			•_ n. •_ ft.				inuous Fligh ng Casing	t Auge	rs				
RC - Rock Core	Ŭ Ŭ Į /	After hours			ft.	ME MH) - N	∕lud	Drilling Jal Hammer						
CU - Cuttings CT - Continuous	T 1	After <u></u> hours Cave Depth	' – –		•_ ft. •_ ft.	AH			matic Hamm	er				Paç	ge 1 of 1



CLIEN	т	Southea	st Power Corpora	tion					BORING #	¥	ST	R 5	L1		
PROJE	ECT NAME	LG&E-K	U Ford Glendale 3	45 kV	Transmi	ssio	n		JOB #		LO	UG	E22	.043	3
PROJE	ECT LOCATIO	N Hodgen	ville Road West					_	DRAWN E	3Y	R. (Orti	Ζ		
		Glendale							APPROVE	ED BY	Т. /	4nd	res		
		DRILLING and	SAMPLING INFORMA	TION							TES	T DA	ТА		
Dat	e Started	4/12/22	Hammer Wt.		140 lbs.										
Dat	e Completed		Hammer Drop												
Dril	I Foreman	J. Burdette	Spoon Sampler C	D	2 in.				est					Sieve	
Insp	pector	Clouser/Nic	hols Rock Core Dia.		2 in.				on To oot	gth	.0				
Bor	ing Method	DC, AH	Shelby Tube OD		3 in.		hics phics		etrati ws/fc	ned Strenç	ent %	L)	۲)	;# Bu	
		SOIL CLASSIFIC	CATION			ype	Sampler Graphics Recovery Graphics	ater	Standard Penetration Test Blows per 6" [<i>N-Value</i>] <i>blows/foot</i>	Qu-tsf Unconfined Compressive Strength	Moisture Content	Liquid Limit (LL)	Plastic Limit (PL)	Percent Passing #200	
	SUE			un d	e je	Sample Type	pler (Groundwater	dard s pei /alue	f Und	ture	d Lin	tic Lii	ent F	Remarks
			gitude (deg): -85.9005	Stratum Depth	Depth Scale Sample No.	Sam	Sam Reco	Grou	Stan Blow [<i>N</i> -V	Qu-ts Comp	Mois	Liqui	Plas	Perc	Rem
	TOPSOIL			0.2	= 1	SS	X		1-1-2-		22.6				PP=0.3 tsf
	LEAN CLAY (CL), with silt, Brov	wn, SOFT to STIFF						[3]						
	- trace sand				2	SS	X		4-4-4- [8]		21.9				PP=1.5 tsf
					5	SS			4 6 40		01.0	20	10		PP=1.5 tsf
	- trace limesto	one fragments			3	33	ĂП		4-6-10- [<i>16</i>]		21.8	28	16		PP=1.5 ISI
	- with limestor	ne fragments													Difficult augering through limestone
															fragments, split spoon not
	FAT CLAY (C	H), with silt and s	and, Brown, MEDIUM	10.0		SH				0.98	35.2	66	17		attempted
	STIFF				5	SS	×		50/3"		44.1				PP=0.5 tsf
				13.5		00			[50/3"]		44.1				FF-0.5 tSi
WAE	WEATHEREL) LIMESTONE			15 —										
I RA															
	LIMESTONE,	Light gray, fine to	o medium grained,	17.0		RC									Auger Refusal at about 17 ft
	- high angle fr	to slightly weathe actures or beddin	red, ig at about 17.7 and		RC										RQD=100%
╢	18.2 ft				20 - 1										KQD-100%
1	- with shale st	reamers				RC									
															RQD=93%
					- RC 25 - 2										
山						RC									
田	- with a 2-inch	highly fractured l	aver		RC										RQD=98%
田					30 - 3										
						RC									
						-									RQD=55%
					- RC - 4										NQD-00 /0
000	Sample Typ		Depth to Ground				E	Bori	ng Method						
SS	- Driven Split S	Spoon 🚽	 Noted on Drilling Tool At Completion (in aug 		ft. ft.		- A - Ho	ollo	w Stem Aug		are				
CA	 Pressed She Continuous I 	elby Tube	At Completion (open	nole)	ft.	DC	- Di	rivir	nuous Fligh ng Casing	i Auge	:15				
RC	- Rock Core - Cuttings	Σ	After <u></u> hours After hours	_	<u></u> ft. ft.	MD MH	- M	anu	Drilling Ial Hammer						
	- Continuous		Cave Depth	_	ft.	AH	- Aı	utor	natic Hamm	ner				Pa	ge 1 of 2



TEST BORING LOG

CLIENT	Southeast	Power Corpora	tion					BORING #	ŧ	ST	R 5	L1			
PROJECT NAME		Ford Glendale 3	45 kV	' Transmi	ssio	n		JOB #		LO	UG	E22	2043	6	
PROJECT LOCATIC		le Road West						DRAWN E		_					
	Glendale,							APPROVE					;		
	DRILLING and SA	AMPLING INFORMA	TION							TES	T DA	ТА			
Date Started	4/12/22	Hammer Wt.		140 lbs.											
Date Completed	4/13/22	Hammer Drop		30 in.									0		
Drill Foreman								est					Sieve		
		S Rock Core Dia.				(0)		ion T <i>oot</i>	gth	<i>\</i>			200 \$		
Boring Method	DC, AH	Shelby Tube OD		3 in.		hics phics		ietrati ows/f	ned Stren	tent %	()	PL)	ing #		
	SOIL CLASSIFICA	TION			Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test Blows per 6" [<i>N-Value</i>] <i>blows/foot</i>	Qu-tsf Unconfined Compressive Strength	Moisture Content %	Liquid Limit (LL)	Plastic Limit (PL)	Percent Passing #200	(0	
	(continued)		Stratum Depth	Depth Scale Sample	Jple	npler	nudv	vs pe Valu	sf Ur	sture	lid Li	stic L	cent	Remarks	
Latitude (deg		ude (deg): -85.9005	Stra Dep	Depth Scale Sampl	San	San Rec	Gro	Star Blov [N-	Qu-t: Com	Moi	Liqu	Plas	Per	Ren	
			36.4	=											
Bo	oring Terminated at 3	36.4 feet	30.4			\square									
Sample Ty		Depth to Ground				F	 Bori	ng Method							
SPT - Standard Pe SS - Driven Split	•	Noted on Drilling Too At Completion (in aug		ft. ft.		- А - Н	ollo	w Stem Aug							
SH - Pressed She	elby Tube 🚡 ,	At Completion (in aug		n. ft.				inuous Fligh ng Casing	t Auge	ers					
CA - Continuous RC - Rock Core	-light Auger ⊻ A	After hours	s _	ft.	MD) - M	lud l	Drilling							
CU - Cuttings CT - Continuous		After <u></u> hours	- 3	<u></u> ft.				ual Hammer matic Hamm	er				Par	ge 2 of	2
CI - Continuous	inne ⊠a(Cave Depth	_	ft.	,	,,,	ator	natio Hami					Рас	ge Z of	2



	Southeast	Power Corpora	tion						BORING	#	STI	R 5	L3		
ROJECT NAME	LG&E-KU	Ford Glendale 3	45 kV	/ Tran	smis	ssio	n		JOB#		LO	UG	E22	2043	3
ROJECT LOCATIO	N Hodgenvil	le Road West							DRAWN E	3Y	R. (Orti	Z		
	Glendale, I	KY						_	APPROVI	ED BY	Т. /	And	lres	;	
	DRILLING and SA	AMPLING INFORMA	TION		Γ						TES	T DA	TA		
Date Started	4/13/22	Hammer Wt.		140	lbs.										
Date Completed		Hammer Drop												Ð	
Drill Foreman		Spoon Sampler C							Test					Sieve	
Inspector		Rock Core Dia.					<u>"</u> «		foot	ngth	%			#200	
Boring Method		Shelby Tube OD		3	in.	Ð	Sampler Graphics Recovery Graphics	- -	Standard Penetration Test Blows per 6" [<i>N-Value</i>] <i>blows/foot</i>	Qu-tsf Unconfined Compressive Strength	Moisture Content	(LL)	(PL)	Percent Passing #200	
	SOIL CLASSIFICA	TION	_		0	Sample Type	er Gra	Groundwater	rd Pe per 6' ue] b	Jncon ssive	ē Co	Liquid Limit (LL)	Plastic Limit (PL)	t Pas	s
	RFACE ELEVATION		Stratum Depth	Depth Scale	Sample No.	ample	ample	ouno.	anda ows p /- <i>Val</i> i	-tsf L mpre	oistur	l biup	astic	srcen	Remarks
	37.659894, Longitud	de (deg): -85.900492	ชีอี 0.2	۵ N			й М	ğ		gõ		Ľ	ä	ď	
TOPSOIL	CL), Dark brown, ME	/ EDIUM STIFF to			1	SS	Д		2-3-3- [6]		19.8				PP=0.5 tsf
STIFF				-	2	SS			3-4-5-		16.3				PP=1.5 tsf
			4.5		2	20	А		[9]						
POORLY GR	ADED SAND (SP), w NSE	vith gravel, Brown,	4.0	5	3	SS	\mathbf{X}		4-4-8-		10.5				PP=2.0 tsf
			7.0	=			\square		[12]						
with limestone	CL), with silt and sar e fragments	nd, Light brown,			4	SS	X		2-3-3- [6]		16.3				
				10 -				-	[0]						
					5	SH				0.39	34.9				
					6	SS	X		32-15-8-		54.1				
				-			\square		[22]						
			15.8	15 -	7	SS			15-50/4"		72.1				
	Auger Refusal at 15	.8 feet	15.0						[50/4"]						
SPT - Standard Pe		Depth to Ground loted on Drilling Too		9.0	ft			<u>Bori</u>	ing Method						
SS - Driven Split	Spoon 🛓 🛓	At Completion (in aug	jers)		ft.				w Stem Aug inuous Fligh		ers				
SH - Pressed She CA - Continuous I	Flight Auger 🙂 🦉	At Completion (open			ft. ft.	DC	; - [Drivir	ng Casing Drilling						
RC - Rock Core CU - Cuttings	T A	After <u></u> hours	-		_ n. _ ft.	MH	H - M	Manu	ual Hammer						
CT - Continuous	T 1	Cave Depth	-		ft.	AH	- <i>F</i>	Autor	matic Hamm	her				Pa	ge 1 of 1



IENT		Power Corpora						BORING #		STI				
ROJECT NAME	LG&E-KU	Ford Glendale 3	45 kV	Transmi	ssio	n		JOB #		LO			.043	3
ROJECT LOCATIO	N Hodgenvill	e Road West					_	DRAWN E		R . (
	Glendale, I	KY						APPROVE	D BY	Т. /	And	res	;	
	DRILLING and SA	AMPLING INFORMA	TION							TES	T DA	TA		
Date Started	4/1/22	Hammer Wt.												
Date Completed	4/1/22	Hammer Drop _		30 in.									a)	
Drill Foreman	J. Burdette	Spoon Sampler C	D	2 in.				Test					Sieve	
Inspector	P. Presnell	Rock Core Dia.		2 in.				on T	gth	%				
Boring Method _	HSA, AH	Shelby Tube OD		<u>3</u> in.		Sampler Graphics Recovery Graphics		Standard Penetration N-Value (blows/foot)	Qu-tsf Unconfined Compressive Strength	itent 9	(LL)	(PL)	Percent Passing #200	
	SOIL CLASSIFICA	TION			Sample Type	r Gra	Groundwater	rd Pei e (blov	nconf ssive	Moisture Content	Liquid Limit (LL)	Plastic Limit (PL)	t Pass	S
SUR	FACE ELEVATION	(ft): 748.0	Stratum Depth	Depth Scale Sample No.	mple	mple	ounc	value	tsf L npre	istur	uid l	Istic	rcen	Remarks
Latitude (deg):	37.63039, Longitud	e (deg): -85.862444		N S S De	Sa	Re Re	õ	Sta N-1	Cor Cor	Mo	Liq	Pla	Ре	Re
		ʃ	0.3	_ 1	SS	X		4-4-6- [10]		15.4				PP=4.0+ tsf
₩ FILL - FAT CL ₩ nodules	AY, Brown with blac	k oxidation]									
FILL - LEAN T		brown, with cinders	3.0	2	SS	Д		6-7-6- [<i>13</i>]		18.5				PP=4.0+ tsf
- with organic : fragments	soil, with an organic	odor, and wood		5 - 3	ss			3-4-5-		18.4				
×					-	Щ		[9]		10.1				
×				- 4	ss			4-5-50/5"-		19.6				
×						Ĥ		[50/5"]						
🗙 - with wood fra	gments, trace veiny	roots, light reddish			SH									
brown		-		_ 5										
\bigotimes				6	SS	X		7-7-9- [16]		17.6				PP=4.0+ tsf
\bigotimes			45.0											
FILL - LEAN C	LAY, Brown, with w	ood fragments	15.0	157	ss	X		5-6-8- [<i>14</i>]		20.6				
FAT CLAY (CI	H), Reddish brown, S	STIFF to VERY	17.0	_										
STIFF	,, , , , , , , , , , , , , , , , , , , ,													
				20					0.00	04 7	~~	00		
				8	SH				3.33	31.7	68	22		
				9	ss	Χ		6-6-7-		42.0				PP=4.0 tsf
				-				[13]						
- trace sand				25	SS			5-6-6-		31.4				PP=3.0 tsf
						Α		[12]						
				30 - 11	SH				0.31	35.9				
						7		E 7 7		20.0				
- yellowish bro	wn, with sand			12	SS	Д	Ŧ	5-7-7- [14]		29.9				PP=1.0 tsf
/														
Sample Typ		Depth to Ground					Bori	ng Method						
SPT - Standard Per		loted on Drilling Tool At Completion (in aug		<u>32.7</u> ft. ft.		A - ⊢	lollo	w Stem Aug						
H - Pressed She A - Continuous F	İby Tube 🖉 🖌	At Completion (open l		n. ft.				nuous Fligh ìg Casing	t Auge	rs				
C - Rock Core	A I	After <u></u> hours		ft.		- N	lud l	Drilling Ial Hammer						
U - Cuttings T - Continuous T		tter <u></u> hours Cave Depth	-	ft. ft.				natic Hamm	er				Pa	ge 1 of 2



TEST BORING LOG

_IENT	Southeas	t Power Corpora	tion					BORING #	ŧ	ST				
ROJECT NAME	LG&E-KU	Ford Glendale 3	45 kV	Transm	ssic	n		JOB #		LO			204:	3
ROJECT LOCAT	ON Hodgenvi	Ile Road West						DRAWN B	SY	R . (Orti	İZ		
	Glendale,	KY						APPROVE	D BY	Τ. /	And	Ires	;	
	DRILLING and S	AMPLING INFORMA	TION							TES	T DA	ТА		
Date Started	4/1/22	Hammer Wt.		140 lbs.										
- Date Completed														
	J. Burdette							st					Sieve	
Inspector	P. Presnell	Rock Core Dia.						L Te	£					
Boring Method	HSA, AH	Shelby Tube OD				ics hics		/foot	ed rengt	nt %			g #2(
<u>г</u>					be l	Sampler Graphics Recovery Graphics	er	Standard Penetration Test N-Value (blows/foot)	Qu-tsf Unconfined Compressive Strength	Moisture Content %	Liquid Limit (LL)	Plastic Limit (PL)	Percent Passing #200	
	SOIL CLASSIFICA	ATION	۶	Ð	Sample Type	er G ery (Groundwater	ard F le (b	Unco essiv	E C	Limi	Lim	nt Pa	sk
Latituda (da.	(continued)		Stratum Depth	Depth Scale Sample	ampl	ampl ecov	roun	-Valu	u-tsf mpr	loistu	quid	lastic	ercel	Remarks
	CH), Reddish brown	de (deg): -85.862444	ΩŌ		: ທັ SS	ν M	G	び之 6-9-10-	đŭ	≥ 33.9			م	Ľ.
STIFF				13	- 33	Д		[19]		33.9				
- dark browr	n to reddish brown													
				40 - 14	ss			2-3-WOH-	0.31	22.3				
					_ SH			[3]						
				15										
				=										
- with limest	one fragments			45 _ 16	ss	X		WOH-18-6-		41.0				
				-	-			[24]						
				-										
			50.0	50 - 19										
	ED LIMESTONE		50.0 51.0	50 <u>18</u> 17	SH SS			50/0" [<i>50/0"</i>]						
LIMESTONI	E, Light gray, fine gra	iined, slightly			RC			[00/0]						
- with a 4-ind	ch highly fractured la	yer		RC	1									RQD=68%
				55 —										
	ch moderately fractur ot moderately fractur	•			RC	H								
	or moderatery fracture													
					2									RQD=43%
H				60 _										
	Boring Terminated a	t 61 feet	61.0		1									
	U													
Sample T	уре	Depth to Ground	water		1						1	1	1	1
SPT - Standard F	Penetration Test	Noted on Drilling Tool	s	32.7 ft.	ц			<u>ing Method</u> w Stem Aug	ere					
SS - Driven Spli SH - Pressed Sl	nelby Tube	At Completion (in aug At Completion (open l		<u></u> ft. ft.	CF	A - C	Cont	inuous Flight		rs				
CA - Continuous RC - Rock Core		After hours	-	II. ft.	DC MI) - N	∕lud	ng Casing Drilling						
CU - Cuttings	-	After hours	_	ft.	MI	H - N	/lanı	ual Hammer matic Hamm						



IENT	Southeast	Power Corporat	tion					BORING #	¥	ST	R 1	7 L1	<u> </u>	
ROJECT NAME	LG&E-KU	Ford Glendale 3	45 kV	Transmis	ssio	า		JOB #		LO	UG	E22	:043	3
ROJECT LOCATIO	N Hodgenvil	le Road West						DRAWN E	BY	Z. 1	Nicł	nols	;	
	Glendale,	KY					_	APPROVE	ED BY	R . (Orti	Z		
	DRILLING and SA	AMPLING INFORMA	TION	Г						TES	T DA	TA		
Date Started	3/24/22	Hammer Wt.		140 lbs.										
Date Completed	3/24/22	Hammer Drop _		30 in.									0	
Drill Foreman	J. Burdette	Spoon Sampler C	D	2 in.				est					Sieve	
Inspector	P. Presnell	Rock Core Dia.		2 in.				on T	gth (. 0				
Boring Method _	HSA, AH	Shelby Tube OD		3 in.		Sampler Graphics Recovery Graphics		Standard Penetration Test Blows per 6" [<i>N-Value</i>] <i>blows/foot</i>	Qu-tsf Unconfined Compressive Strength	tent %	(T-	PL)	Percent Passing #200	
	SOIL CLASSIFICA	TION			Sample Type	- Grap	Groundwater	d Pen er 6" e] <i>bl</i> (sive \$	Moisture Content	Liquid Limit (LL)	Plastic Limit (PL)	Pass	ø
SUR	FACE ELEVATION	(ft): 745.2	th th	th le	alqr	over	hud	ular vs p valu	sf Ur pres	sture	id L	stic L	cent	Remarks
		de (deg): -85.860813	Stratum Depth	Depth Scale Sample No.	San	San Rec	Gro	Blov [N-	Qu-t; Com	Moi	Liqu	Plas	Perc	Ren
		~	0.9	<u> </u>	SS	M		3-4-5-		21.1				PP=4.5+ tsf
	LAY, Brown and Re	ddish brown, with	1.1	2	SS	\forall		[9] 7-8-11-		24.7				PP=3.0 tsf
TOPSOIL, with		ſ	2.5			μ		[19]		-				
	CL), Reddish brown	, VERY STIFF		<u>ہ</u> _ 3	SS	$\mathbf{\nabla}$		7-7-8-		21.2				PP=4.5+ tsf
				5 - 3		\square		[15]						
- transition to r	ed, with limestone f	ragments to 9 feet		4	SS	$\overline{\mathbf{X}}$		5-7-8-		23.0				PP=4.5 tsf
						\square		[15]						
- with black ox	idation nodules			10 - 5	SS	\mathbf{X}		4-5-10-		26.0				PP=4.5 tsf
					SH			[15]	0.80	21.6	32	18		
				_ 6					0.00	20				
FAT CLAY (CI	H) with sand Redd	ish brown, SOFT to	13.0	-										
STIFF	i), mir cana, ricua													
				157	SS	X		5-4-5-						PP=3.0 tsf
				-				[9]						
				-										
				20										
				20 8	SS	X		4-4-4-		31.8				PP=2.5 tsf
				9	SH			[8]	1.44	31.9				
				- 9										
				25										
- with limeston	e fragments			²³ = 10	SS	X		5-5-7- [12]		34.3				PP=1.5 tsf
				_				[12]						
				-										
				30		Ш								
					SS		•	3-1-2- [3]		57.1				PP=0.5 tsf
- groundwater	on spoon at about 3	31 feet						[]						
Sample Typ		Depth to Ground					Bori	ng Method						
PT - Standard Per S - Driven Split S		Noted on Drilling Tool At Completion (in aug		<u>31.0</u> ft. ft.		A - ⊢	lollo	w Stem Aug						
H - Pressed Shel	İby Tube 🚡 ,	At Completion (in aug		n. ft.				nuous Fligh ng Casing	t Auge	ers				
A - Continuous F C - Rock Core	night Auger <u>▼</u> A	After hours	· _	ft.	MD	- N	/lud	Drilling						
U - Cuttings T - Continuous T		After <u></u> hours Cave Depth	_	ft.				ial Hammer natic Hamm					Do	ge 1 of 2
	uvo 128 (ave Depiñ		ft									i di	

--_ ft.



TEST BORING LOG

CLIENT	Southeast	Power Corpora	tion				BORING	#	ST	<mark>R 1</mark>	7 L'	1	
PROJECT NAME	LG&E-KU	Ford Glendale 3	45 kV	[′] Transmi	ssion	1	JOB#_		LO	UG	E22	2043	3
PROJECT LOCATIO	N Hodgenvil	lle Road West					DRAWN	BY	Z. I	Nicl	hols	5	
	Glendale,	KY					APPROV	ED BY	R . (Orti	İZ		
	DRILLING and S	AMPLING INFORMA	TION				_		TES	T DA	TA		
Date Started	3/24/22	Hammer Wt.		140 lbs.									
Date Completed	3/24/22	Hammer Drop		30 in.									
Drill Foreman	J. Burdette	Spoon Sampler C	DD	2 in.			est					Sieve	
Inspector		Rock Core Dia.				s	ion T oot	gth	%			200	
Boring Method	HSA, AH	Shelby Tube OD		<u>3</u> in.		Sampler Graphics <u>Recovery Graphics</u> Groundwater	Standard Penetration Test Blows per 6" [N-Value] blows/foot	Qu-tsf Unconfined Compressive Strength	itent 6	(LL)	(PL)	Percent Passing #200	
	SOIL CLASSIFICA	TION	_		Sample Type	Sampler Gra Recovery Gra Groundwater	rd Per ber 6" <i>b</i>	ncont	Moisture Content	Liquid Limit (LL)	Plastic Limit (PL)	t Pass	S
	(continued)		Stratum Depth	Depth Scale Sample No.	mple .	mple cove	andai ows p	tsf U npre	istur	uid L	astic	rcent	Remarks
		Ide (deg): -85.860813	Bgr	N Sa Sa Da		S a c		<u>şş</u>		Lig	Ē	Ре	
STIFF	,	lish brown, SOFT to		12	SS	Х	WOH- WOH-		86.7				PP=0 tsf
- transition to	yellowish brown and	d reddish brown					WOH- [<i>WOH</i>]						
				40 _ 13	ss		1-50/1"		81.1				PP=0 tsf
SHALE, Dark	gray, clay stained		41.5]]			[50/1"]						
			43.4		RC								
	, Light gray, clay sta	ined to 47 feet		45 - RC-									RQD=72%
					RC								
	urn at 48 feet, mode	erately fractured											
from about 48	3 10 49 1661			50 - RC-2	2								RQD=73%
				-									
					RC								
				 	3								RQD=92%
				55									
					RC								
- with a 6-incl	n moderately fracture	ed layer											
				60 - RC- 4	1								RQD=85%
			62.0	-									
E	Boring Terminated at	t 62 feet	02.0										
Sert - Standard Pe	-	Depth to Ground Noted on Drilling Too		<u>31.0</u> ft.			oring Method						
SS - Driven Split SH - Pressed Sh	Spoon 🛓	At Completion (in aug	lers)	ft.			low Stem Aug ntinuous Fligh		ers				
CA - Continuous	Flight Auger 👻 '	At Completion (open After hours		ft. ft.	DC	- Driv	/ing Casing d Drilling						
RC - Rock Core CU - Cuttings	Ţ,	After <u></u> hours	_	<u> </u>	MH	- Ma	nual Hammei						_
CT - Continuous	Tube 📓	Cave Depth		ft.	AH	- Aut	omatic Hamn	ner				Pa	ge 2 of 2



PROJECT NAME LG&E-KU Ford Giendale 345 kV Transmission JOB # LOUGE22043 PROJECT LOCATION Hodgenville Read West DRAWN BY Z. Nichols Giendale, KY DRULLING and SAMPLING INFORMATION TEST DATA Date Started 3/28/22 Hammer Vic. 140 to. Diff. Foreman M. Smith Spongarder OD 2. in. in. Boring Method HSA Shelby Tube OD 3. in. in. SURCLASSFICATION (It): 74.5 Wigt Gig Big Big Big Big Big Big Big Big Big B	CLIE	NT	South	east P	ower Corpora	ation						BORING #	ŧ	ST	R 1 [.]	7 L2	2		
Glendale, KY DEPICUED BY R. Ortiz DETILLING and SAMPLING INFORMATION TEST DATA Date Completed 328/22 Hammer MV. 140 Iss Date Completed 328/22 Hammer MV. 140 Iss Date Completed 328/22 Hammer MV. 140 Iss Difl Foreman M. Smith Spoon Sampler OD 1. Iss Difl Foreman M.Smith Spoon Sampler OD 3. Iss Solit CLASSIFICATION Iss Iss Iss Iss Solit CLASSIFICATION Iss Iss Iss Iss Solit CLASSIFICATION Iss Iss Iss Iss Solit CLASSIFICATION Iss Iss Iss Iss Solit CLASSIFICATION Iss Iss Iss Iss Solit CLASSIFICATION Iss Iss Iss Iss BLANK AUGERING-NO SAMPLES OBTAINED Iss Iss Iss Iss Introductor Iss Iss Iss Iss Iss Introductor Iss Iss Iss Iss Iss Introductor Iss Iss Iss Iss Iss <td></td> <td></td> <td></td> <td></td> <td>-</td> <td></td> <td>/ Tran</td> <td>smis</td> <td>ssior</td> <td>ו</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>8</td> <td></td>					-		/ Tran	smis	ssior	ו								8	
TEST DATA TEST DATA TEST DATA Date Starled															Nicl	nols	5		
Date Started 3/28/22 Hammer Wt. 140 bs. Date Completed 3/28/22 Hammer Drop 30 in. Drill Foreman M. Smith Spoon Sampler OD 2 in. Boring Method HSA Shelty Tube OD 3 in. SOIL CLASSIFICATION Image to the started of			Glenda	ale, K	Y						_	APPROVE	ED BY_	R .	Orti	z			
Date Completed 3/28/22 Hammer Drop 30 in. Drill Foreman M. Smith Spoon Sampler OD 2 in. Boring Method HSA Shetby Tube OD 3 in. SURFACE ELEVATION (ft): 744.5 up to the second			DRILLING a	Ind SAN	IPLING INFORM	ATION								TES	T DA	TA			
Drill Foreman M. Smith Spoon Sampler OD 2 Inspector J. Semmer Rock Core Dia. 2 Boring Method HSA Shelby Tube OD 3 SOL CLASSIFICATION Image diagonal diagona diagonal diagonal diagona diagonal diagonal diagonal diag	D	ate Started	3/28/22		Hammer Wt.		140	lbs.											
BLANK AUGERING- NO SAMPLES OBTAINED 10 10 10 5 10 10 11 10 12 20 14 14 10 15 15 14 14 14 10 15 15 15 14 14 14 10 15 15 14 14 14 14 10 15 15 14 15 15 14 <	D	ate Completed	3/28/22		Hammer Drop		30	in.											
BLANK AUGERING- NO SAMPLES OBTAINED 10 10 10 5 10 10 115 10 15 12 20 14 14 10 15 115 15 120 14 130 15 140 15 15 16 16 17 17 18 18 19 19 10 10 15 115 15 120 14 130 15 14 14 15 14 15 15 16 16 17 16 18 16 19 16 10 16 10 16 115 16 120 16 130 16	D	rill Foreman	M. Smith		Spoon Sampler	OD	2	in.				est					Sieve		
BLANK AUGERING- NO SAMPLES OBTAINED 10 10 10 5 10 10 11 10 12 20 14 14 10 15 15 14 14 14 10 15 15 15 14 14 14 10 15 15 14 14 14 14 10 15 15 14 15 15 14 <												an T	gth	%			200		
BLANK AUGERING- NO SAMPLES OBTAINED 10 10 10 5 10 10 11 10 12 20 14 14 10 15 15 14 14 14 10 15 15 15 14 14 14 10 15 15 14 14 14 14 10 15 15 14 15 15 14 <	B	oring Method	HSA		Shelby Tube OD)	3	in.		ohics aphics		netrati vs/foc	Stren		(T	PL)	ing #		
BLANK AUGERING- NO SAMPLES OBTAINED 10 10 10 5 10 10 115 10 15 12 20 14 14 10 15 115 15 120 14 130 15 140 15 15 16 16 17 17 18 18 19 19 10 10 15 115 15 120 14 130 15 14 14 15 14 15 15 16 16 17 16 18 16 19 16 10 16 10 16 115 16 120 16 130 16									Type	y Grap	vater	d Pen (blow	sive \$	Con	mit (L	imit (Pass	(0	
BLANK AUGERING- NO SAMPLES OBTAINED 10 10 10 5 10 10 115 10 15 12 20 14 14 10 15 115 15 120 14 130 15 140 15 15 16 16 17 17 18 18 19 19 10 10 15 115 15 120 14 130 15 14 14 15 14 15 15 16 16 17 16 18 16 19 16 10 16 10 16 115 16 120 16 130 16		SUR	FACE ELEVA	TION (f	it): 744.5	th m	le th	nple	nple	npler	\pun	ndar (alue	sf Ur	sture	lid Li	stic L	cent	nark	
		Latitude (deg):	37.629256, Lo	ongitude	e (deg): -85.86070	Der Stra	Dep Sca	Sar No.	Sar	Rec	Gro	Sta N-V	Cort Cort	Moi	Liqu	Pla	Per	Rer	
		BLANK AUGE	RING- NO SA	MPLES	OBTAINED		-												ſ
							_												
							-												
							5 -												
							-												
							_												
							-												
							10 -												
	3						_												
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	3						_												
							-												
							20 -												
	_						_												
							-												
							25 -												
							_												
]						-												
	_						30 -												
	1		Augor Defus	l at 04 4	iaat	31.0													
			Auger Refusa	n at 31 f	eel														
Sample Type Depth to Groundwater Boring Method	~-			.				~			Bori	ing Method							
SPT - Standard Penetration Test Noted on Drilling Tools SS - Driven Split Spoon At Completion (in suggers) HSA - Hollow Stem Augers					-		-		HSA	۰ ۲ - H	lollo	w Stem Aug	lers						
SH - Pressed Shelby Tube CA - Continuous Flight Augers At Completion (open hole)ft. DC - Driving Casing	SH	I - Pressed She	İby Tube										t Auge	rs					
RC - Rock Core <u>V</u> After <u></u> hours <u></u> ft. MD - Mud Drilling	RC	C - Rock Core	iigint Augel	⊈ Aft	er hour	s _		_	MD	- N	1ud	Drilling							
			ube			s _		_					er				Pad	ge 1 of ¹	1



CLIENT	Southeast	Power Corporat	tion				BORING	#	STI	R 17	7 L3	3	
PROJECT NAM	E LG&E-KU	-		Transmis	ssion		JOB #		LO	UG	E22	043	3
PROJECT LOCA	ATION Hodgenvil	le Road West					DRAWN E	3Y	Z. 1	Nicł	nols	5	
	Glendale,						APPROVI	ED BY	R. (<u>Orti</u>	Z		
	DRILLING and SA	AMPLING INFORMA	TION						TES	T DA	TA		
Date Started	3/24/22	Hammer Wt.		140 lbs.									
Date Comple	ted 3/25/22	Hammer Drop		30 in.									
Drill Foreman	J. Burdette	Spoon Sampler C	D	2 in.			est					Sieve	
Inspector	P. Presnell	Rock Core Dia.		2 in.			on T	jt	、 0			#200 9	
Boring Metho	d HSA, AH	Shelby Tube OD		<u>3</u> in.		sampler Graphics Recovery Graphics Groundwater	Standard Penetration Test Blows per 6" [N-Value] blows/foot	Qu-tsf Unconfined Compressive Strength	itent %	(TT)	(PL)	sing #2	
	SOIL CLASSIFICA	TION	_		Sample Type	Sampler Gra Recovery Gra Groundwater	rd Per ber 6" <i>Jbl</i>	nconf ssive	Moisture Content	Liquid Limit (LL)	Plastic Limit (PL)	t Passing	S
	SURFACE ELEVATION	(ft): 746.3	Stratum Depth	Depth Scale Sample No.	mple	ove cove	ws p -Valu	tsf U npre:	istun	uid L	stic	Percent	Remarks
Latitude (d	leg): 37.629339, Longitud	de (deg): -85.860626		No Sci Del	Sai	n n n n n n n n n n n n n n n n n n n	BSta	a d d	Mo	Liq	Pla	Pel	
	- AY (CL), Brown, MEDIUI		0.3		ss	X	2-3-4- [7]		25.2				PP=1.5 tsf
		พ จากร เขอปรร							10.4	20	10		DD-1.5 tof
-				2	ss	X	2-3-3- [6]		19.4	36	18		PP=1.5 tsf
- with red	dish brown and gray			$5 \frac{7}{3}$	ss		3-3-7-		18.7				PP=2.0 tsf
			7.0		Ľ		[10]						
FAT CLA	Y (CH), Reddish brown, '	VERY STIFF	-	4	ss	$\overline{\mathbf{X}}$	4-7-10-		22.5				PP=2.5 tsf
				10			[17]						
				- 5	SH			1.12	20.2				
LEAN CL	AY (CL), Reddish brown	, STIFF	13.0	-									
				15	ss		4-4-8-		30.6				PP=3.0 tsf
- transitio	n to light brown with shal	e fragments	47.0	6		X	[12]		30.0				FF = 3.0 tai
FAT CLA	Y (CH), Reddish brown a		17.0										
STIFF to	SHFF			-									
				207	SH			1.59	22.9				
				- '		./	0.05		04.7				
				- 8	ss	X	3-3-5- [8]		31.7				PP=2.0 tsf
				25									
				9	ss		2-2-3- [5]		27.8				PP=1.5 tsf
				-									
				30	SH			0.43	33.9				
				_ 10									
	n to brown with limestone ater at about 32 feet	e fragments,	33.5	11	ss	X	2-12-50/5"- [50/5"]		58.8				PP=1.0 tsf
	Auger Refusal at 33.	.5 feet	55.5										
Sample		Depth to Ground				Bo	ring Method						
SPT - Standar SS - Driven S		Noted on Drilling Tool At Completion (in aug		<u>32.0</u> ft. ft.		- Holl	ow Stem Aug						
SH - Pressed	Shelby Tube	At Completion (open I	nole)	ft.	DC	- Driv	tinuous Fligh ing Casing	it Auge	ers				
RC - Rock Co CU - Cuttings	ore 📱 A	After <u></u> hours		<u></u> ft. ft.	MD MH	- Muc - Mar	l Drilling Jual Hammer						
CT - Continue	- ·	Cave Depth	_	n. ft.	AH		omatic Hamn					Pa	ge 1 of 1



		t Power Corpora		· •••	•				BORING			R 1			•
OJECT NAME		Ford Glendale 3							JOB#_					2043	
OJECT LOCATIO	N Hodgenvi								DRAWN		<u>Z. I</u>			5	
	Glendale,	ΚΥ							APPROV	ED BY	K . (Urti	Z		
	DRILLING and S	AMPLING INFORMA	TION		٦						TES	T DA	TA	,	
Date Started	3/25/22	Hammer Wt.		140	lbs.										
Date Completed	3/25/22	Hammer Drop		30	in.										
Drill Foreman	J. Burdette	Spoon Sampler C	DD	2	in.				Test					Sieve	
nspector	P. Presnell	Rock Core Dia.		2	in.				t) Du Te	ft	. 0			00	
Boring Method	HSA	Shelby Tube OD		3	in.		nics phics		s/foo	ed trenç	ent %		Ĺ)	2# ɓu	
		TION				/pe	Sraph Grap	ter	Pene	onfin ve Si	Conte	it (LL	nit (P	assir	
	SOIL CLASSIFICA		Ε_	_	e	le T)	ler G /ery	dwa	lard I ue (t	Unc	nre O	Lim	c Lin	nt Pa	Irks
	RFACE ELEVATION	V (ft): 747.8 ude (deg): -85.86073	Stratum Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration N-Value (blows/foot)	Qu-tsf Unconfined Compressive Strength	Moisture Content %	Liquid Limit (LL)	Plastic Limit (PL)	Percent Passing #200	Remarks
	ERING- NO SAMPL		S D	<u>ہ ت</u>	ωŻ	S	ഗഷ 	U	σz	đŭ	2		₽		Ľ
	-NING- INO SAMPL			-											
				-											
				-											
				5 -											
				-											
				10 -											
				-											
				15 -											
				-											
				-											
				20 -											
				-											
				25 -											
				-											
				-											
				30 -											
				-											
				-											
				-											
Sample Typ	ne	Depth to Ground	Water				1			1					
PT - Standard Pe	netration Test 🚊	Noted on Drilling Too			ft.				ng Method						
S - Driven Split S H - Pressed She	Spoon 🛓	At Completion (in aug	lers)			HS. CF.	A - C	Conti	w Stem Au nuous Fligh	gers nt Auge	rs				
A - Continuous I	Flight Auger 🙂	At Completion (open After hours			•_ ft. • ft.	DC MD	- C	Drivir	ng Casing Drilling	Ŭ					
C - Rock Core J - Cuttings		After <u></u> hours After hours	_		• •ft.				ial Hamme	r					

- CT Continuous Tube

AH - Automatic Hammer



TEST BORING LOG

	IT		st Power Corpora U Ford Glendale 3		/ Tran					BORING # JOB #			<u>R 1</u> UG		4 2043	}
	ECT LOCATIO		ville Road West							DRAWN B						
		Glendale								APPROVE						
		DRILLING and	SAMPLING INFORMA	TION									T DA			
Da	te Started	3/25/22			140	lbs										
	te Completed		Hammer Drop			- 1										
	ll Foreman		Spoon Sampler (-				st					Sieve	
Ins	pector									n Te	Ļ				00 Si	
Во	ring Method	HSA	Shelby Tube OD		3	in.		lics hics		/foot	ed reng	int %	- -	Ê	g #2(
							/be	iraph Grap	ter	Dene	onfin ve St	conte	it (LL	iit (P	assin	
		SOIL CLASSIFIC		_ <u>و</u> _	_	ele	le Ty	verv (adwa	lard F ue (t	Unci ressiv	ure C	I Lim	c Lin	int P;	irks
	Latitude (dea):	continuec) 37 629405 Lonc	1) gitude (deg): -85.86073	Stratum Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test N-Value (blows/foot)	Qu-tsf Unconfined Compressive Strength	Moisture Content %	Liquid Limit (LL)	Plastic Limit (PL)	Percent Passing #200	Remarks
_		. 07.020400, Long				o ∠ -	0			02	σŭ	2		ш.	ш	Ľ
		Auger Refusal at	t 36 feet	36.0	-											
Ľ	Sample Typ	De	Depth to Groun	dwater	1		L						I			
	- Standard Pe	netration Test 🌘	Noted on Drilling Too		-	ft.	LC			ing Method w Stem Auge	ore					
	- Driven Split S - Pressed She	Jihu Tuba 🍧	At Completion (in au			•_ ft.	CF	A - (Conti	inuous Flight	Auge	rs				
CA	- Continuous I	-light Auger 🛛 😇	At Completion (open			• ft. • ft.	DC	; - [Drivir	ng Casing Drilling	Ŭ					
	- Rock Core - Cuttings		After <u></u> nours After <u></u> hours			_ π. _ ft.	MF	1 - N	Manu	ual Hammer						
	- Continuous		Cave Depth	-		• ft.	AH	- /	Auto	matic Hamme	er				Pa	ge 2 of 2



	Southeast	Power Corpora	tion					BORING	#	STI	R 2'	1 L'	1	
PROJECT NAME	LG&E-KU I	Ford Glendale 3	45 kV	Transm	issio	n		JOB#		LO	UG	E22	2043	3
PROJECT LOCATIO	DN Hodgenvill	e Road West						DRAWN E	3Y	R. (Orti	Z		
	Glendale, I							APPROVI	ED BY	Т. /	And	lres	;	
	DRILLING and SA	AMPLING INFORMA	TION		[1	TES	T DA	TA		
Date Started	4/19/22	Hammer Wt.		140 lbs	-									
Date Completed		Hammer Drop _		30 in.									a	
Drill Foreman _								ſest					Sieve	
Inspector		Rock Core Dia.				s		ion] oot	gth	%			200	
Boring Method	HSA, AH	Shelby Tube OD		<u>3</u> in.	e	Sampler Graphics Recovery Graphics	5	Standard Penetration Test Blows per 6" [<i>N-Value</i>] <i>blowsftoot</i>	Qu-tsf Unconfined Compressive Strength	Moisture Content	Liquid Limit (LL)	Plastic Limit (PL)	Passing #200	
	SOIL CLASSIFICAT	TION	c	0	No. IL Sample Type	er Gr	Groundwater	per 6 ber 6	Jncol	Б С	Limit	Limi	it Pa	ks
	RFACE ELEVATION		Stratum Depth	Depth Scale Sample	o. ample	ample	ouno.	anda ows V-Vai	-tsf L mpre	oistu	pind	astic	Percent	Remarks
	: 37.631827, Longitud	de (deg): -85.910614	ъъ	ວັິິ ຜູ້ທີ່	_	Ϋ́ М	Ū		88		Ľ	ä	ď	Re
			1.5		SS	Д		3-3-4- [7]		17.7				
- FAT CLAY (C	CH), with sand, Dark b lules, STIFF	prown with black			ss			4-5-7-		18.1				PP=4.0+ tsf
					_	Α		[12]						
	CH), Reddish brown,		5.0	53	ss	X		7-6-8-		23.4				PP=3.5 tsf
fragments	mestone fragments, t	trace chert		-				[14]						
				4	SS	X		4-6-7- [13]		24.9				PP=3.0 tsf
				10										
				5	SH				2.62	22.4	57	19		
- light reddisł	n brown			6	ss	X		7-7-7-		25.6				PP=4+ tsf
					_			[14]						
- with black o	xidation nodules			15 - 7	ss			6-7-7-		29.3				PP=3.5 tsf
					_	Α		[14]						
				20 —										
				8	SH				0.77	39.2				
- with limesto	ne fragments, trace c	chert		9	ss	X		7-7-6-		23.5				PP=3.5 tsf
				-	_	\square		[13]						
				25	ss			9-6-6-		33.3				
					, 	Α		[12]						
				30 - 4										
-			31.0	30 <u>-</u> 1′ - RC										
□ ├ ┌ │ grained, with		veathered, fine			RC RC									
- with a 6-inc	h thick clay seam				2									
	/0.0	Dorth to Original			_									RQD=55 %
	enetration Test 👤 N	<u>Depth to Ground</u> loted on Drilling Tool		ft	·			ng Method						
SS - Driven Split SH - Pressed Sh	Spoon 🛓 A	t Completion (in aug	ers)	ft	CF	A - C	Conti	w Stem Aug inuous Fligh		ers				
CA - Continuous RC - Rock Core	Flight Auger	At Completion (open l	,	ft ft	. ME) - N	∕lud	ng Casing Drilling						
CU - Cuttings CT - Continuous	▼ A	After hours		 ft	MH AH	1 - N	Λanι	ual Hammer matic Hamm					D -	a 1 -
GI - Continuous		Cave Depth	_	ft		•							Pa	ge 1 of 2



TEST BORING LOG

CLIENT		-							BORING			R 2			
PROJECT NAME									JOB#					2043	5
PROJECT LOCATIO	-							_	DRAWN I			Orti			
	Glendale,	КҮ							APPROV	ED BY	1.4	Anc	Ires	;	
	DRILLING and SA	AMPLING INFORMA	TION		Γ						TES	T DA	TA		
Date Started	4/19/22	Hammer Wt.		140	lbs.										
Date Completed	4/20/22	Hammer Drop		30	in.										
Drill Foreman			D	2	in.				est					Sieve	
Inspector		-					6		ion T <i>oot</i>	gth	%			200 \$	
Boring Method	HSA, AH	Shelby Tube OD		3	in.	e	Sampler Graphics Recovery Graphics	er	Standard Penetration Test Blows per 6" [<i>N-Value</i>] <i>blows/foot</i>	Qu-tsf Unconfined Compressive Strength	Moisture Content %	(LLL)	t (PL)	Percent Passing #200	
	SOIL CLASSIFICA	TION	c		0	e Typ	er Gr ery G	dwate	rrd Per per 6 lue].	Jncol ssive	re Co	Limit	Limi	it Pas	s
Latitude (deg):	(continued) 37 631827 Longitu	de (deg): -85.910614	Stratum Depth	Depth Scale	Sample No.	Sample Type	Sample	Groundwater	Standa Blows N-Val	u-tsf L ompre	doistu	Liquid Limit (LL)	Plastic Limit (PL)	ercen	Remarks
grained, with f - moderately to to 38.5 ft (diffie 	o slightly weathered cult coring)	l, with ooid crystials 46.5 ft, with a 1-inch	51.5	40	RC3	RC RC									RQD=33 % RQD=24% RQD=35 %
Server Standard Per SPT - Standard Per SS - Driven Split S SH - Pressed She CA - Continuous F RC - Rock Core CU - Cuttings CT - Continuous T	netration Test ♀ N Spoon ≰ / Iby Tube ऄ / Flight Auger ♀ / ♀ /	Depth to Ground Noted on Drilling Tool At Completion (in aug At Completion (open I After hours After hours Cave Depth	s ers) nole)		• ft. • ft. • ft. • ft. • ft. • ft.	CF. DC	A - H A - C - C - N I - N	Hollo Conti Drivir Aud Aanu	ng Method w Stem Aug inuous Fligh ng Casing Drilling ual Hammer matic Hamn	it Auge	rs			Pa	ge 2 of 2



CLIE	NT	Southeast	Power Corpora	tion					BORING	#	ST	R 2	<u>1 L:</u>	2	
PRO	JECT NAME		Ford Glendale 3	45 kV	' Tran	smis	ssion		JOB#					2043	•
PRO	JECT LOCATIO	N Hodgenvi	le Road West											5	
		Glendale,	KY						APPRO\	/ED BY	R.	Ort	İZ		
		DRILLING and S	AMPLING INFORMA	TION		Г			1		TES	T DA	TA		
Da	ate Started	4/4/22	Hammer Wt.		140	lbs.									
Da	ate Completed		Hammer Drop		30	in.								a	
Di	rill Foreman		Spoon Sampler C			. 11			est					Sieve	
	spector	-						s	ot)	igth	%			200	
Bo	oring Method	HSA	Shelby Tube OD		3	in.		phics aphic	netrat ws/fo	ined	Itent	(T	(PL)	sing #	
		SOIL CLASSIFICA		_			Sample Type	Sampler Graphics Recovery Graphics Groundwater	Standard Penetration Test N-Value (blows/foot)	Qu-tsf Unconfined Compressive Strength	Moisture Content	Liquid Limit (LL)	Plastic Limit (PL)	Percent Passing #200	S
	SUF	FACE ELEVATION	l (ft): 688.8 ide (deg): -85.910596	pth	Depth Scale	Sample No.	mple	mple cove	value	tsf U npre	istun	uid L	istic I	rcent	Remarks
				De Str	йĞ	Sa No	Sa	N N N	Sta Z-	Cor	Mo	Lia	Ъ	Ре	Re
	BLANK AUGE	RING- NO SAMPL	ES OBTAINED												
_															
\exists					-										
_					5 -										
					-										
						-									
_					10 —										
					15 —										
					-										
					_										
_					20 —	-									
					-										
-															
					-										
					25 —										
					-										
				31.0	30 —										
		Auger Refusal at 3	1 feet												
SP	<u>Sample Typ</u> T - Standard Pe		<u>Depth to Ground</u> Noted on Drilling Too			ft.			ring Method						
SS	- Driven Split	Spoon 🛓	At Completion (in aug	lers)		•ft.			ow Stem Au Itinuous Flig		ers				
CA	- Pressed She	Flight Auger 🛛 👻	At Completion (open			•_ ft.	DC	- Driv	ring Casing						
RC CU	- Rock Core - Cuttings	-	After <u></u> hours After <u></u> hours			•_ ft. • ft.		- Mar	d Drilling nual Hamme						
	- Continuous		Cave Depth	-		ft.	AH	- Aut	omatic Ham	mer				Pa	ge 1 of 1



	N Hodgenv			Tran				_	JOB # _ DRAWN	BY		Orti	Z		5
	Glendale	, KY						_	APPROV	ED BY	Т. /	And	res	;	
	DRILLING and S	SAMPLING INFORMATIC	ΟN		6						TES	T DA	TA		1
Date Started	4/5/21	Hammer Wt.		140	lbs.										
Date Completed	4/5/21	Hammer Drop		30	in.										
Drill Foreman	M. Smith	_ Spoon Sampler OD		2	in.				est					Sieve	
Inspector	J. Phillips								on T	gt	、 0			200	
Boring Method	HSA, AH	_ Shelby Tube OD		3	in.	Ð	aphics raphics	<u>ب</u>	enetrati	nfined Strenç	ntent %	(TT)	(PL)	sing #2	
	SOIL CLASSIFIC		_			Typ	9 2 2 2 2 2 2	wate	rd Pe (blc	ncor ssive	e Co	-imit	Limit	t Pas	S
	RFACE ELEVATIO : 37.631759, Longit	N (ft): 689.9 ude (deg): -85.910492	Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test N-Value (blows/foot)	Qu-tsf Unconfined Compressive Strength	Moisture Content %	Liquid Limit (LL)	Plastic Limit (PL)	Percent Passing #200	Remarks
TOPSOIL		0	0.2	-	1	SS	Χ		2-3-5-	00	16.8	31	15		PP=1.5 tsf
LEAN CLAY		rown to light reddish / 2	2.0	-					[8]						
FAT CLAY (C	CH), Reddish brown	to light reddish		-	2	SS	X		5-6-8- [<i>14</i>]		19.4	50	16		PP=3.0 tsf
brown, STIFF	to VERY STIFF			5 —											
				-	3	SS	X-		4-5-7- [12]		19.6				PP=2.5 tsf
				-		SS			6-7-11-		23.2				PP=3.0 tsf
- trace sand				-	4	00	ÅЧ		[18]		23.2				1 1 -0.0 เอเ
				10 -	_	SH				0.62	19.3				
- trace limest	one fragments			-	5										
				-	6	SS	Х		6-8-12- [20]		28.9				PP=2.5 tsf
- dark brown				15	7	SS	X		3-5-9- [<i>14</i>]		29.3	66	27		
LEAN CLAY	(CL), trace sand, D	ark brown to light	7.0	_					[14]						
	n, VERY STIFF			-											
				20 -		e11				1 00	20 5				
				-	8	SH				1.23	29.5				
				-	9	SS	X		6-7-9-		25.8				
		2	4.5	-					[16]						
	CH), trace sand, Da e limestone fragme	rk brown, VERY		25 —	10	SS			3-4-9-						
	indgino			-			H		[13]						
	Auger Refusal at	28 feet 28	8.0	-											
	J														
Sample Tu	200	Dopth to Croundwa	tor												
	enetration Test	Depth to Groundwa Noted on Drilling Tools		-	ft.				ng Method						
S - Driven Split H - Pressed Sh	Spoon 🛓	At Completion (in augers		-		CF	A - C	Conti	w Stem Aug nuous Fligh		ers				
CA - Continuous	Flight Auger	At Completion (open hole After hours	e) _		•_ ft. • ft.	DC ME	- D - N)rivir /lud	ng Casing Drilling						
C - Rock Core	-	After hours	_		 • ft.				ial Hammei	-					

- CT Continuous Tube
- A Cave Depth
- AH Automatic Hammer

-- ft.



				Power Corpora		. .				BORING #_		ST				5	
			LG&E-KU F												2043)	
PF	κοι	ECT LOCATIO	N Hodgenvill							DRAWN BY							
			Glendale, H							APPROVE	D BY				•		
	_			MPLING INFORMA								TES	T DA				
		te Started	4/7/22														
		te Completed Il Foreman		Hammer Drop _ Spoon Sampler C						-					e Ve		
		pector		Rock Core Dia.						Tes	_				0 Sieve		
		ring Method						cs lics		foot)	d ength	nt %			#20		
ſ				-			_ e	Sampler Graphics Recoverv Graphics	er	Standard Penetration Test N-Value (blows/foot)	Qu-tsf Unconfined Compressive Strength	Moisture Content	Liquid Limit (LL)	Plastic Limit (PL)	Percent Passing #200		
			SOIL CLASSIFICAT		F	υ	Sample Type	er Gr	Groundwater	ard P le (bl	Unco essiv	ы С	Limit	Limi	nt Pa	sk	
			RFACE ELEVATION		Stratum Depth	Depth Scale Sample	ampl	ampl	roun	tanda I-Valu	u-tsf	loistu	iquid	lastic	ercel	Remarks	
_			37.631841, Longituc RING- NO SAMPLE	· • • •	<u>م</u>		z v	ഗമ 	0	ωz (đŏ	2			₽	R	
-																	
-																	
-																	
-						5											
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-																	
-						10											
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-						15											
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_																	
_						20 -											
-																	
_																	
-																	
_						25 -											
_																	
_																	
					29.0												
			Auger Refusal at 29	feet													
l		Sample Typ		Depth to Ground	water				<u> </u>								
		- Standard Per	netration Test 💂 N			ft.				ing Method							
:	SS	- Driven Split S - Pressed She	Spoon 🛓 A	t Completion (in aug	lers)	ft.	CF	A - (Cont	w Stem Auge inuous Flight		rs					
(CA	- Continuous F	Flight Auger 👻 🥂	t Completion (open fter hours		ft. ft.	DC) - I	Driviı	ng Casing Drilling	-						
(CU	 Rock Core Cuttings 	Ţ A	fter <u></u> hours	-	ft.	M	H - I	Manı	ual Hammer							
0	СТ	- Continuous 1	Tube ⊠a C	ave Depth	-	ft.	AF	/	-1010	matic Hamme	71				Pa	ge 1 of	1



PROJECT NAME LG&E-KU Ford Glendale 345 kV PROJECT LOCATION Hodgenville Road West Glendale, KY DRILLING and SAMPLING INFORMATION Date Started 3/30/22 Hammer Wt. Date Completed 3/31/22 Hammer Drop Drill Foreman J. Burdette Spoon Sampler OD Inspector P. Presnell Rock Core Dia. Boring Method HSA, AH Shelby Tube OD SURFACE ELEVATION (ft): 721.7 Latitude (deg): 37.626093, Longitude (deg): -85.863678 0.3	140 lbs. 30 in. 2 in. 2 in. 3 in.	6 Sample Type Sampler Graphics		Candard Penetration Test Candard Penetration Test Candard Penetration Test Candor (blows/foot)	3Y		Orti And	z res		3
Glendale, KY DRILLING and SAMPLING INFORMATION Date Started 3/30/22 Hammer Wt. Date Completed 3/31/22 Hammer Drop Drill Foreman J. Burdette Spoon Sampler OD Inspector P. Presnell Rock Core Dia. Boring Method HSA, AH Shelby Tube OD SURFACE ELEVATION (ft): 721.7 Image of the state of the s	140 lbs. 30 in. 2 in. 3 in. 3 in. 3 in. 1 1 1 1	Sample Type		APPROVI	ED BY	T. <i>I</i>	And r da ⁻	res TA		
DRILLING and SAMPLING INFORMATION Date Started 3/30/22 Hammer Wt. Date Completed 3/31/22 Hammer Drop Drill Foreman J. Burdette Spoon Sampler OD Inspector P. Presnell Rock Core Dia. Boring Method HSA, AH Shelby Tube OD SOIL CLASSIFICATION SURFACE ELEVATION (ft): 721.7 Inspector of the statitude (deg): 37.626093, Longitude (deg): -85.863678	30 in. 2 in. 2 in. 3 in. Scale No. 1 - 1	ss	Groundwater			TES ⁻	<u>r da</u>	ΓΑ		
Date Started 3/30/22 Hammer Wt. Date Completed 3/31/22 Hammer Drop Drill Foreman J. Burdette Spoon Sampler OD Inspector P. Presnell Rock Core Dia. Boring Method HSA, AH Shelby Tube OD SOIL CLASSIFICATION SURFACE ELEVATION (ft): 721.7 Inspector 200, 200, 200, 200, 200, 200, 200, 200	30 in. 2 in. 2 in. 3 in. Scale No. 1 - 1	ss	Groundwater	Standard Penetration Test N-Value (blows/foot)	sf Unconfined pressive Strength	%			ing #200 Sieve	
Date Completed 3/31/22 Hammer Drop Drill Foreman J. Burdette Spoon Sampler OD Inspector P. Presnell Rock Core Dia. Boring Method HSA, AH Shelby Tube OD SOIL CLASSIFICATION SURFACE ELEVATION (ft): 721.7 Latitude (deg): 37.626093, Longitude (deg): -85.863678 2	30 in. 2 in. 2 in. 3 in. Scale No. 1 - 1	ss	Groundwater	Standard Penetration Test N-Value (blows/foot)	sf Unconfined pressive Strength	e Content %	it (LL)	(PL)	ing #200 Sieve	
Drill Foreman J. Burdette Spoon Sampler OD Inspector P. Presnell Rock Core Dia. Boring Method HSA, AH Shelby Tube OD SOIL CLASSIFICATION SURFACE ELEVATION (ft): 721.7 Latitude (deg): 37.626093, Longitude (deg): -85.863678 Solution (ft): 721.7	2 in. 2 in. 3 in. Scale No. No. 1	ss	Groundwater	Standard Penetration Test N-Value (blows/foot)	sf Unconfined pressive Strength	e Content %	it (LL)	(PL)	ing #200 Sieve	
Inspector P. Presnell Rock Core Dia. Boring Method HSA, AH Shelby Tube OD SOIL CLASSIFICATION SURFACE ELEVATION (ft): 721.7 Latitude (deg): 37.626093, Longitude (deg): -85.863678	in. 3 in. 3 in. 2 Cebth Scale Vo. 1 - 1	ss	Groundwater	Standard Penetration Test N-Value (blows/foot)	sf Unconfined Ipressive Strength	e Content %	it (LL)	(PL)	ing #200 Sieve	
Boring Method HSA, AH Shelby Tube OD SOIL CLASSIFICATION SURFACE ELEVATION (ft): 721.7 Latitude (deg): 37.626093, Longitude (deg): -85.863678	and the second s	ss	Groundwater	Standard Penetration T N-Value (blows/foot)	sf Unconfined pressive Strength	e Content %	it (LL)	(PL)	ing #200 S	
SOIL CLASSIFICATION	Depth Depth Scale No.	ss	Groundwater	Standard Penetrati N-Value (blows/foo	sf Unconfined pressive Strenç	e Content %	it (LL)	(PL)	ing #2	
SURFACE ELEVATION (ft): 721.7		ss	Groundwater	Standard Per N-Value (blov	sf Unconfi	e Con	it (L	\sim		
		ss	Ground	Standar N-Value	sf Ur	ש ש	3	imit	Pass	ß
		ss	Gro	N-V		istur	uid Li	stic L	cent	Remarks
					Qu-1 Corr		Liqu	Pla	Per	Rer
				2-3-4- [7]		22.6				PP=3.0 tsf
LEAN CLAY (CL), with silt, Brown, STIFF to VERY STIFF						40.0				DD=2.0 t-f
		ss		5-6-7- [13]		13.8				PP=3.0 tsf
	$5 - \frac{-}{3}$	ss M		6-7-7-		19.5				PP=3.0 tsf
		+ A		[14]						
	_ 4	ss 🛛		6-7-9-		23.2				PP=3.0 tsf
				[16]						
- reddish brown	10 - 5	SH			1.63	22.6	45	20		
		ss V		6-6-9-		24.0				PP=3.0 tsf
	6	μĨ		[15]		27.0				
	15			0.7.0						
- with sand	7	ss 🛛		6-7-8- [<i>15</i>]		18.0				
										PP=1.5 tsf
	20	SH								
	- 8		•	:						
	_ 9	ss 🛛		5-5-6- [<i>11</i>]		20.9				PP=1.0 tsf
	25									
	10	ss 🛛		7-5-3- [8]		28.6				PP=1.0 tsf
	30 -	SH			0.68	31.4				
	- 11									
- with chert fragments	12	ss 🛛		7-7-50/5"- [<i>50/5"</i>]		29.4				
Sample Type Depth to Groundwater		<u> </u>		na Matheri						
SPT - Standard Penetration Test ● Noted on Drilling Tools SS - Driven Split Spoon	<u>22.0</u> ft.		Hollo	<u>ng Method</u> w Stem Aug						
CA - Continuous Flight Auger ▲ At Completion (in augers)	ft. ft.	CFA -	Cont	nuous Fligh ng Casing		ers				
CA - Continuous Flight Auger RC - Rock Core Y After CU - Cuttings Y After hours	ft. ft.		Mud	Drilling						

- CT Continuous Tube
- ▼ After ____ hours
 ☑ Cave Depth

AH - Automatic Hammer



TEST BORING LOG

CLIENT	Southeast	Power Corpora	tion						BORING	#	ST	R 2	3A	L1	
PROJECT NAME	LG&E-KU	Ford Glendale 3	45 kV	/ Tran	smis	ssio	n		JOB#		LO	UG	E22	2043	8
PROJECT LOCATIO	N Hodgenvil	le Road West							DRAWN E	3Y	R .	Orti	z		
	Glendale,	KY							APPROVI	ED BY	Τ. /	And	Ires	;	
	DRILLING and SA	AMPLING INFORMA	TION		6						TES	T DA	TA		
Date Started	3/30/22	Hammer Wt.		140	lbs.										
Date Completed	3/31/22	Hammer Drop		30	in.										
Drill Foreman	J. Burdette	Spoon Sampler C	DD	2	in.				est					Sieve	
Inspector	P. Presnell	Rock Core Dia.		2	in.				t)	jt	.0			5005	
Boring Method	HSA, AH	Shelby Tube OD		3	in.	Ð	Sampler Graphics Recovery Graphics	<u>ب</u>	Standard Penetration Test N-Value (blows/foot)	Qu-tsf Unconfined Compressive Strength	Moisture Content %	(TT)	(PL)	Percent Passing #200	
	SOIL CLASSIFICA	TION				Typ	n Gr Gr	wate	d Pe (blo	ncon ssive	e Co	imit	Limit	Pas	S
	(continued)		Stratum Depth	Depth Scale	Sample No.	Sample Type	mple	Groundwater	valu∈	tsf U npre:	istun	Liquid Limit (LL)	Plastic Limit (PL)	rcent	Remarks
Latitude (deg):	37.626093, Longitu	de (deg): -85.863678	De	s S D B C			Sa	Ģ		9 2 2 2 2	Mo	Liq	Ыа	Pe	Re
	Construction of Dischet on	and the state of t	36.0	-	13	SS RC			50/1" [<i>50/1"</i>]						
weathered and	fine grained, light g d fractured	ray, nigniy		-		RC									
															RQD=13%
				40 -	-										
	URE - INTERPRET		41.0	-		RC									
	INFILLED VOID, O			-		110									
			44.0	-											RQD=11%
LIMESTONE,	slightly weathered,	fine grained, light	1	45 -	-										
				-		RC									
				-											
															RQD=52%
				50 -											
	ered and fractured			-		RC									
			53.0	-											
	URE - INTERPRET INFILLED VOID, O		55.0	-	-										RQD=22%
	INFILLED VOID, O	R CLAT LATER		55 -											
				-	-	RC									
			58.0	-											RQD=0%
	highly weathered a	nd fractured	00.0	-		RC									
				60 -											RQD=10%
				-											
			63.0	-			Ц								
B	oring Terminated at	63 feet													
Sample Typ)e	Depth to Ground	water	1	L							<u> </u>	I	I	
SPT - Standard Per	netration Test 👲	Noted on Drilling Tool		22.0) ft.	ЦО			ng Method	nore					
SS - Driven Split S SH - Pressed She	lihu Tuba 🗮 (At Completion (in aug			•_ ft.	CF	A - C	Conti	w Stem Aug inuous Fligh		rs				
CA - Continuous F	-light Auger 🛛 👻 '	At Completion (open l After hours			•_ ft. • ft.		- C	Drivir	ng Casing Drilling	-					
RC - Rock Core CU - Cuttings	¥ A	After hours	-		ft.	MH	I - N	/lanu	ual Hammer						
CT - Continuous T	Tube 趨(Cave Depth	-	-	•_ ft.	AH	- A	NULO	matic Hamn	ier				Pa	ge 2 of 2



IENT		Power Corporat		Transmis	ssion		BORING JOB #			<u>R 2</u> 3 UG		<u>L2</u> 2043	}
	N Hodgenvil						DRAWN		Z.				
	Glendale,						APPRO\	-					
		AMPLING INFORMA					7411101			T DA			
Date Started	3/30/22			140 lbs.									
Date Started Date Completed		Hammer Wt Hammer Drop											
Drill Foreman		Spoon Sampler O					st					Sieve	
Inspector							n Test	ج				00 Si	
	HSA	Shelby Tube OD			1	cs Jics	ratio (foot)	engt	nt %		$\overline{}$	g #20	
					be	Sraph Grapt	enet	onfine e Str	ontei	t (LL)	it (PL	Issing	
	SOIL CLASSIFICA		E	٩	Sample Type	Sampler Graphics Recovery Graphics Groundwater	Standard Penetration N-Value (blows/foot)	Qu-tsf Unconfined Compressive Strength	Moisture Content	Liquid Limit (LL)	Plastic Limit (PL)	Percent Passing #200	rks
	RFACE ELEVATION		Stratum Depth	Depth Scale Sample No.	amp	ecov secov	Tand: -Valu	u-tsf ompr	loistı	iquid	lastic	erce	Remarks
	ERING- NO SAMPLI	le (deg): -85.863647 ES OBTAINED	SΟ	LO OZ	s c	<u>ארב כ</u>	ν oz	đŭ	2				Ľ
				5 —									
				-									
				10 —									
				-									
				15									
				-									
				20 —									
				-									
				_									
				25 —									
				-									
				-									
				30 —									
<u>Sample Ty</u> SPT - Standard Pe		<u>Depth to Ground</u> Noted on Drilling Tool		ft.			bring Method	-			<u> </u>	<u> </u>	
S - Driven Split	Spoon 🛓	At Completion (in aug	ers)	ft.			low Stem Au ntinuous Flig		rs				
H - Pressed She A - Continuous	Flight Auger 😁 '	At Completion (open I		ft.	DC	- Dri	ving Casing d Drilling						
RC - Rock Core		After <u></u> hours After <u></u> hours		<u></u> ft. ft.	MH	- Ma	nual Hamme						
- Continuous		Cave Denth	_		AH	- Aut	omatic Ham	mer				Par	ne 1 of 2

-- ft.

a Cave Depth



TEST BORING LOG

CLI	ENT	Southeas	t Power Corpora	tion						BORING #	ŧ	ST	R 2	3A	L2		
PR	OJECT NAME	LG&E-KU	Ford Glendale 3	45 kV	' Tran	smis	ssio	n		JOB #		LO	UG	E22	2043	3	
PR	OJECT LOCATIO	N Hodgenvi	lle Road West							DRAWN B	Y	Z .	Nicl	hols	5		
		Glendale,								APPROVE	DBY	R.	Orti	iz			
		DRILLING and S	AMPLING INFORMA	TION								TES	T DA	TA			
[Date Started	3/30/22	Hammer Wt.		140	lbs.											
[Date Completed	3/30/22	Hammer Drop		30	in.									0		
[Drill Foreman	M. Smith	Spoon Sampler C							est					Sieve		
	nspector	J. Semmer	Rock Core Dia.					Ś		of) 1	gth	%			200		
E	Boring Method	HSA	Shelby Tube OD		3	_in.	0	Sampler Graphics Recovery Graphics		Standard Penetration Test N-Value (blows/foot)	Qu-tsf Unconfined Compressive Strength	tent 6	(LL)	(PL)	Percent Passing #200 Sieve		
		SOIL CLASSIFICA	ATION	_			Sample Type	r Gra	Groundwater	rd Pe e (blo	ssive	Moisture Content	Liquid Limit (LL)	Plastic Limit (PL)	t Pas	S	
		(continued)		Stratum Depth	Depth Scale	Sample No.	mple	mple	puno	Value	-tsf U npre:	vistur	uid L	astic	rcent	Remarks	
	,	<u> </u>	de (deg): -85.863647	De	ъъ	S Sa	Sa	Real	ō	r, st	Cor	Mc	Lig	Ъ	Ре	Re	
Ξ	BLANK AUGE	RING- NO SAMPL	ES OBTAINED		-												
_					-												
					-												
					40 -												
_					-												
					-												
-					45 -	-											
-					45												
					:												
					-												
					-												
					50 -												
Ξ					-												
-					-	4											
					55 -												
					-												
					-	-											
					:												
		Assess Defended at 6	20.6	60.0	60 -	1											
		Auger Refusal at 6	ou leet														
	Sample Typ	<u> </u>	Depth to Ground	lwater					Bor	ing Method							
	PT - Standard Pe S - Driven Split \$	•	Noted on Drilling Too			•_ ft.	HS			w Stem Aug	ers						
S	H - Pressed She	İby Tube 🚡	At Completion (in aug At Completion (open			- ft. - ft.	CF	A - (Cont	inuous Flight		ers					
	A - Continuous I C - Rock Core	-liuni Auuei	After hours			- n. • ft.	ME) - N	Mud	ng Casing Drilling							
С	U - Cuttings	. . .	After hours	-		• ft.	MH	I - N	Manı	ual Hammer matic Hamm	or						-
С	T - Continuous	Tube 📓	Cave Depth	_	-	- _ ft.	AH	- /	-ul0	mauc namm	ei				Paę	ge 2 of	2



CLIENT	Southeas	t Power Corpora	tion				BORING	#	ST	R 2	3A	L3	
-		Ford Glendale 3					JOB #						3
PROJECT LOCATIC							_			Nicl	nols	5	
	Glendale,						APPROV	ED BY	R . (Orti	İZ		
	DRILLING and S	AMPLING INFORMA	TION						TES	T DA	ТА		
Date Started	3/29/22	Hammer Wt.		140 lbs.									
Date Completed	3/29/22												
Drill Foreman	M. Smith	Spoon Sampler C	D	2 in.			st					Sieve	
Inspector	J. Semmer	Rock Core Dia.		2 in.			of Te	t				#200 S	
Boring Method	HSA, AH	Shelby Tube OD		3 in.		hics	tratio vs/fo	ed reng	nt %			g #2	
					/be	sampler Graphics Recovery Graphics Groundwater	Standard Penetration Test Blows per 6" [<i>N-Value</i>] <i>blows/foot</i>	Qu-tsf Unconfined Compressive Strength	Moisture Content	Liquid Limit (LL)	Plastic Limit (PL)	Passing	
	SOIL CLASSIFICA		E	<u> </u>	Sample Type	sampler Gra Recovery Gra Groundwater	ard F per alue	Unce	are O	Lim	c Lin	nt Pa	rks
	RFACE ELEVATION	N (ft): 720.1 Jde (deg): -85.863744	Stratum Depth	Depth Scale Sample No.	amp		tand lows N-Va	u-tsf ompr	loistu	iquid	lasti	Percent F	Remarks
	57.020195, Longitt	(ueg)05.003744	0.3		ss		WOH-	đŭ	≥ 22.4		<u> </u>		PP=1.5 tsf
LEAN CLAY (CL), Light brown, S	OFT to VERY					WOH-3- [3]		22.7				11 1.0 101
STIFF, with o	rganics to 2 feet			2	ss		3-4-5-		17.6				PP=1.5 tsf
					+ F		[18]						
				53	ss	$\overline{\mathbf{X}}$	4-7-10-		16.5				PP=3.0 tsf
	reddish brown and	gray					[17]						
- trace limesto	one fragments			_ 4	ss	X	3-7-11-		20.1				PP=3.5 tsf
				10			[18]						
				- 5	SH			1.60	19.8	43	17		
	H) Light reddish br	own, VERY STIFF,	12.0		ss		4-5-9-		30.7				PP=3.5 tsf
trace limestor	ne fragments		14.0	6			[14]		00.7				
LEAN CLAY (CL), with sand, Bro	wn, STIFF	14.0	15									
					ss	X	4-5-7- [12]		25.5				PP=3.0 tsf
FAT CLAY (C	H), Light tan and G	ray, VERY SOFT to	17.0										
STIFF, with lin about 22 feet	mestone fragments,	, groundwater at											
				20	SH			1.82	20.3	50	19		
					011			1.02	20.0				
					ss		4-4-5- [9]		40.1				PP=1.0 tsf
					1 [
				25	ss	$\overline{\mathbf{X}}$	WOH-		20.8				PP=2.0 tsf
- with black o	xidation nodules						WOH- WOH-						
							[WOH]						
				30 -									
					SH			0.19	22.5				
					ss		1-1-1-						
	Auger Refusal at 33	3 5 feet	33.5	1		Ϋ́	[2]						
Sample Ty SPT - Standard Pe		Depth to Ground Noted on Drilling Too		22.0 ft.			ing Method						
SS - Driven Split	Spoon 🛓	At Completion (in aug	ers)	ft.			w Stem Aug inuous Fligh		ers				
SH - Pressed She CA - Continuous	Flight Auger 👻	At Completion (open	,	ft.	DC	- Drivi	ng Casing						
RC - Rock Core CU - Cuttings	-	After <u></u> hours After <u></u> hours		<u></u> ft. ft.	MH	- Man	Drilling ual Hammer						
CT - Continuous		Cave Depth	-	ft.	AH	- Auto	matic Hamn	ner				Pa	ge 1 of 1



LIENT		t Power Corpora							BORING			<u>R 2</u>			<u> </u>
		J Ford Glendale 3						_	JOB # _					2043	6
OJECT LOCATIC		ille Road West							DRAWN					5	
	Glendale	, ΚΥ						_	APPROV	ED BY	К.	ort	Z		
	DRILLING and	SAMPLING INFORMA	TION		Г						TES	T DA	TA	, , , , , , , , , , , , , , , , , , ,	
Date Started	3/30/22	Hammer Wt		140	lbs.										
Date Completed	3/30/22	_ Hammer Drop _		30	in.									n a	
Drill Foreman		_ Spoon Sampler C			- 11				est					Sieve	
Inspector		-					S		ot) T	gth	%			200	
Boring Method	HSA	_ Shelby Tube OD		3	in.		phics		ietrat vs/foo	ned Stren	tent 6	()	PL)	ing #	
	SOIL CLASSIFIC	ATION				Sample Type	Sampler Graphics Recovery Graphics	/ater	Standard Penetration Test N-Value (blows/foot)	confi sive \$	Moisture Content %	Liquid Limit (LL)	Plastic Limit (PL)	Percent Passing #200	
SUF	RFACE ELEVATIO	N (ft): 720.6	tr tr	e t	ple	- əldı	over	Groundwater	ndarc alue	sf Un pres	sture	id Li	tic L	cent I	Remarks
Latitude (deg):	37.626117, Longit	N (ft): 720.6 :ude (deg): -85.863775	Stra	Depth Scale	Sample No.	Sam	San Rec	Grot	Star N-V	Qu-tsf Unconfined Compressive Strength	Mois	Liqu	Plas	Perc	Ren
	ERING- NO SAMP			-											
				-											
				-	1										
				5 -]										
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				30 —]										
				-]										
				-	1										
				-	1										
Sample Ty		Depth to Ground	wator									L			
		Noted on Drilling Too			ft.				ing Method						
S - Driven Split	Spoon 🖌 🛃	At Completion (in aug			• ft.	HS	A - H	lollo	w Stem Au	gers					
H - Pressed She	elby Tube 📈	At Completion (open		-	• ft.		А-С -Г	>onti)rivir	inuous Fligh ng Casing	it Auge	ſS				
A - Continuous I C - Rock Core	Fliunt Auger	After hours			ft.	MD) - N	/lud	Drilling						
U - Cuttings		After hours	-		- ft	MH	I - N	lanu	ual Hammei	r					

- CT Continuous Tube
- a Cave Depth

-- ft.

AH - Automatic Hammer



TEST BORING LOG

CLIE	NT	Southea	ast Power Corpora	tion						BORING #	¥		R 2				
PRO	JECT NAME	LG&E-K	U Ford Glendale	845 kV	' Tran	smis	ssio	n		JOB #					2043	3	
PRO	JECT LOCATIO	N Hodgen	ville Road West							DRAWN E	3Y	Z .	Nicl	hols	5		
		Glendal	e, KY							APPROVE	ED BY	R.	Orti	iz			
		DRILLING and	SAMPLING INFORM	TION								TES	T DA	ТА			
D	ate Started	3/30/22	Hammer Wt.		140	_lbs.											
D	ate Completed	3/30/22	Hammer Drop		30	in.									۵		
D	rill Foreman	M. Smith	Spoon Sampler (fest					Sieve		
	spector	J. Semmer								ot)	ngth	%			£200		
B	oring Method	HSA	Shelby Tube OD		3	in.		phics aphic		netrai ws/fo	fined Strer	Itent	LL)	(PL)	sing #		
		SOIL CLASSIFI	CATION				Type	r Gra	water	d Pei	ncont ssive	e Cor	imit (imit	Pase	Ŋ	
		(continue	,	Stratum Depth	Depth Scale	Sample No.	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test N-Value (blows/foot)	Qu-tsf Unconfined Compressive Strength	Moisture Content	Liquid Limit (LL)	Plastic Limit (PL)	Percent Passing #200 Sieve	Remarks	
			gitude (deg): -85.86377	Del Str	N D S	Sa No	Sal	- Sai	ų	Sta N-V	Con-	Mo	Liq	Pla	Pe	Rei	
	BLANK AUGE	ERING- NO SAM	PLES OBTAINED		:												
					-												
					40 -												
_																	
					-	-											
_					45 -												
					-												
-																	
		Auger Refusal a	it 48 feet	48.0	-												
		, agoi i toracai e															
	Sample Typ)e	Depth to Groun	dwater	L												
	T - Standard Pe	netration Test	Noted on Drilling Tod			ft.				ing Method							
SS	- Driven Split S - Pressed She	Spoon	At Completion (in au	gers)		f t.				w Stem Aug inuous Fligh		ers					
CA	- Continuous I	=light Auger 🧧	At Completion (open	-		•_ ft.		; - [Drivir	ng Casing Drilling	5-						
	- Rock Core - Cuttings		After <u></u> hour After hour	-		- ft. - ft.	MF	1 - I	Manu	ual Hammer							
	- Continuous		Cave Depth	-		ft.	AH	- /	Auto	matic Hamm	er				Pa	ge 2 of	2



CLIENT		Power Corpora						BORING		STI				
	LG&E-KU		45 kV	⁷ Transmis	ssio	n		JOB # _		LO			043	3
PROJECT LOCATIO	N Hodgenvil	le Road West						DRAWN E	-	R . (
	Glendale,	KY					_	APPROVI	ED BY	Т. /	And	res		
	DRILLING and SA	AMPLING INFORMA	TION	٢						TES	T DA	TA		
Date Started	4/14/22	Hammer Wt.		140 lbs.										
Date Completed	4/14/22	Hammer Drop		30 in.									Ø	
Drill Foreman			DD	2 in.				est					Sieve	
Inspector	C. Clouser	Rock Core Dia.		2 in.		(0		on T <i>oot</i>	gth	%				
Boring Method	HSA	Shelby Tube OD		3 in.		hics phics		etrati w <i>s/</i> f	hed	ent %	L)	(Jc	₩ Bu	
	SOIL CLASSIFICA	TION			Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test Blows per 6" [<i>N-Value</i>] <i>blows/foot</i>	Qu-tsf Unconfined Compressive Strength	Moisture Content	Liquid Limit (LL)	Plastic Limit (PL)	Passing #200	(0
SU	RFACE ELEVATION	(ft): 663.5	Stratum Depth	Depth Scale Sample No.	ble	over	nndv	vs pe valur	sf Ur pres	sture	iid Li	stic L	Percent F	Remarks
Latitude (deg	: 37.62381, Longitud	le (deg): -85.906461	Stra Dep	Depth Scale Sample No.	San	San Rec	Gro	Star Blov	Com t	Moi	Liqu	Plas	Per	Ren
TOPSOIL			0.2	= 1	SS	X		3-2-3-		20.9				PP=1.3 tsf
	(CL), with silt, Tannis UM STIFF to HARD	sh brown with		-				[5]						
	ht brown, with sand			2	SS	X		4-5-6- [<i>11</i>]		68.8	22	14		PP=1.8 tsf
				5										
				_ 3	SS	Х		5-18-16- [34]		15.8				PP=4+ tsf
FAT CLAY (C	CH), with silt and sand	d, Gray, brown, and	7.0		SS			4-6-3-		25.9				PP=0.8 tsf
black, MEDIU	JM STIFF to STIFF			4	00	Å-		[9]		20.0				11 -0.0 (3)
				10	SH				0.38	25.1	29	17		
				- 5										
				6	SS	Xo		3-3-4- [7]						
- light brown														
				157	SS			3-2-2- [4]		27.4				PP=0.3 tsf
- with limesto	ne fragments			-				[4]						- tube not
	ne nagmento													attempted due to limestone
				20	r.									fragments
				8	SS	Д		8-3-8- [<i>11</i>]		37.6				PP=0.5 tsf
				25 - 9	SS			6-2-4-						
						Щ		[6]						
- with limesto	ne fragments													 tube not attempted due to
														limestone fragments
				30 10	SS			3-6-4-		36.8				PP=0.3 tsf
						\square		[10]						
				-										
Ser Standard P		Depth to Ground		т —			<u>Bori</u>	ng Method						
SS - Driven Split		At Completion (in aug		ft. ft.				w Stem Aug nuous Fligh		re				
SH - Pressed Sh CA - Continuous	elby Tube 🛛 🖉 A Flight Auger	At Completion (open	hole)	ft.	DC	- D)rivir	ng Casing	n Auge	15				
RC - Rock Core CU - Cuttings	¥ ¥	After <u></u> hours After hours		<u></u> ft. ft.	ME MF			Drilling Jal Hammer						
CT - Continuous	-	Cave Depth		<u></u> n. ft.				matic Hamm					Pa	ge 1 of 2



TEST BORING LOG

CLIEN	T	Southeast	Power Corpora	tion		,				BORING	#	ST	R 2	5 L′	1	
PROJE	ECT NAME	LG&E-KU	Ford Glendale 3	45 kV	' Trans	smis	ssio	n		JOB #		LO	UG	E22	2043	3
PROJE	ECT LOCATIO	N Hodgenvil	lle Road West							DRAWN E	3Y	R. (Orti	İZ		
		Glendale,	KY							APPROVI	ED BY	Т. /	And	Ires	;	
		DRILLING and S	AMPLING INFORMA	TION								TES	T DA	TA		
Date	e Started	4/14/22	Hammer Wt.		140	lbs.										
Date	e Completed	4/14/22	Hammer Drop		30	in.										
Drill	Foreman	J. Burdette	Spoon Sampler C	D	2	in.				est					Sieve	
Insp	ector	C. Clouser	Rock Core Dia.		2	in.				of Tc	Ę					
Bori	ing Method	HSA	Shelby Tube OD		3	in.	0	Sampler Graphics Recovery Graphics		Standard Penetration Test Blows per 6" [<i>N-Value</i>] <i>blows/foot</i>	Qu-tsf Unconfined Compressive Strength	Moisture Content %	(TL)	(PL)	Passing #200	
		SOIL CLASSIFICA	TION				Sample Type	, Gra	Groundwater	d Pe er 6" e] <i>b</i>	sive	Cor	Liquid Limit (LL)	Plastic Limit (PL)	Pas	ø
		(continued)		Stratum Depth	le th	Sample No.	aldr	over	\pun	vs pe vs pe Valu	sf Ur pres	sture	iid Li	stic L	Percent I	Remarks
ι	Latitude (deg):	37.62381, Longitud	de (deg): -85.906461	Stra Dep	Depth Scale	San No.	San	San Rec	Gro	Star Blov	Com Com	Moi	Liqu	Plas	Perc	Ren
	FAT CLAY (CI	H), with silt and san	id, Gray, brown, and		_	11	SS	X		5-7-8-		35.3				PP=0.5 tsf
	black, MEDIU	M STIFF to STIFF						Ĥ		[15]						
					-											
					40 -											
					40 -	12	SH				0.05	31.1				
					-		SS	∇		8-4-3-		20.0				PP=1.3 tsf
					-	13	33	Å		[7]		30.8				PP=1.3 ISI
	- with limeston	e fragments			45											
					-	14	SS	X		4-10-10- [20]		34.7				PP=0.5 tsf
					-			Π		[20]						
	LIMESTONE,	light gray, fine grair	ned, moderately to	48.0	-		RC									
	highly fracture	d, to 49 feet			50	RC										RQD=32%
	with a O in th			E1 E	-	1										
-H I'	L	moderately fracture	, , , , , , , , , , , , , , , , , , , ,	51.5			RC									
		INFILLED VOID, O		53.5	-	RC										RQD=25%
	LIMESTONE				55 -	2		н								
							RC									
	- with a 2-inch	diameter solution of	cavity				NO									
	- with a 6-inch	moderately facture	d and weathered			RC										RQD=50%
	layers	,			60 —	3										
\mathbb{H}		shaley limestone oring Terminated at	t 61 feet	61.0												
	10	oning reminated a	l o'i leel													
	Sample Typ		Depth to Ground	Wator												
	- Standard Per	netration Test 👤	Noted on Drilling Tool			_ft.				ng Method						
SS ·	- Driven Split S - Pressed She	Spoon 🛓	At Completion (in aug	ers)	-	ft.				w Stem Aug inuous Fligh		ers				
CA ·	- Continuous F	Flight Auger 🛛 🙁 '	At Completion (open l After hours	-		_ ft. ft.		; - C	Drivir	ng Casing Drilling	5					
	- Rock Core - Cuttings	-	After <u></u> hours After hours	-		_ n. ft.	MH	I - N	Λanι	ual Hammer						
	- Continuous 1		Cave Depth	_		ft.	AH	- A	Autor	matic Hamm	her				Pa	ge 2 of 2



CI	IEN	IT	Southea	ast Power Corpora	tion						BORING #		ST	R 2	5 L2	2		
PF	roj	ECT NAME	LG&E-K	U Ford Glendale 3	845 kV	/ Tran	smis	ssio	n	_	JOB #		LO	UG	E22	2043	3	
PF	SOJ	ECT LOCATIO	N Hodgen	ville Road West						_	DRAWN BY		<u>R. (</u>	Orti	Z			
			Glendal	e, KY						_	APPROVED	BY_	T. /	And	lres	;		
			DRILLING and	SAMPLING INFORMA	TION								TES	T DA	TA			1
	Da	te Started	4/12/22	Hammer Wt.		140	lbs.											
	Da	te Completed	4/12/22	Hammer Drop		30	in.											
	Dri	ll Foreman	J. Burdette	Spoon Sampler (DD	2	in.				est					Sieve		
		pector				2	in.				t)	gt	%			200 5		
	Bo	ring Method	HSA	Shelby Tube OD		3	in.		hics phics		etrati s/foc	itren		Ĺ)	۲)	;# Gu		
[SOIL CLASSIFI	CATION				ype	Sampler Graphics Recovery Graphics	ater	Standard Penetration Test N-Value (blows/foot) كu-tsf Unconfined	Compressive Strength	Moisture Content	Liquid Limit (LL)	Plastic Limit (PL)	Percent Passing #200		
		SUE	RFACE ELEVATI		E E	e e	ple	Sample Type	pler	Groundwater	dard alue (Dress	ture	d Lin	tic Li	ent F	Remarks	
				gitude (deg): -85.90638	Stratum Depth	Depth Scale	Sample No.	Sam	Sam Reco	Grot	Stan N-Vő Qu-ts		Mois	Liqu	Plas	Perc	Rem	
-		BLANK AUGE	RING- NO SAM	PLES OBTAINED		-	-											
_						-												
-						-	-											
_						5 -												
-						-	-											
_						-												
-																		
_						10 -	-											
-						-	-											
-						-												
_						15 -												
-						-												
_						-	-											
-						-												
_						20 -												
-						-												
_							-											
-						-												
-						25 —												
_						-												
-			Auger Refusal at	28.5 foot	28.5	-												
			nuyer nerusarar															
l		Sample Typ	<u>De</u>	Depth to Ground	dwater	1	1	L		Der!	ng Mathad				I	I		
			netration Test	Noted on Drilling Tool At Completion (in aug			•_ ft.	HS	A - H	lollo	ng Method w Stem Augers	s						
	SH	- Pressed She - Continuous I	lby Tube	At Completion (in aug At Completion (open)			•_ ft. •_ ft.	CF.	A - C	Conti	inuous Flight Ai ng Casing	uger	S					
	RC	- Rock Core		After hours	s _		• ft.	MD) - N	/lud	Drilling Jal Hammer							
		- Cuttings - Continuous		⊈ After <u></u> hours ₄ Cave Depth	5 _		•_ ft. • ft.				matic Hammer					Pag	ge 1 of	1
			-		-		_											



LIENT		t Power Corporation Ford Glendale 3		Transr				BORING JOB #		ST LO				
	N Hodgenvi			manor				DRAWN		-				
	Glendale,							APPROV					;	
		AMPLING INFORMA	TION						-	TES	T DA	ТА		
Date Started	4/12/22	Hammer Wt.		140 lb	s.									
Date Completed	4/12/22	Hammer Drop		30 in	.									
Drill Foreman	J. Burdette	Spoon Sampler C	D	2 in				st					ieve	
Inspector	D. Melvin	Rock Core Dia.		2 in	.			or Te	듚	_			S 00	
Boring Method	HSA, AH	Shelby Tube OD		3 in		ohics	eo III de	ietratic ows/fo	ined Streng	tent %	(T)	PL)	ing #2	
	SOIL CLASSIFICA	ATION				Type Grap	water	d Per er 6" <i>ie</i>] <i>bli</i>	nconfi ssive 3	e Con	imit (L	-imit (Pass	S
	RFACE ELEVATION	N (ft): 664.2 Jde (deg): -85.906282	Stratum Depth	Depth Scale Sample	No	Sample Type Sampler Graphics Becovery Graphics	Groundwater	Standard Penetration Test Blows per 6" [N-Value] blows/foot	Qu-tsf Unconfined Compressive Strength	Moisture Content	Liquid Limit (LL)	Plastic Limit (PL)	Percent Passing #200 Sieve	Remarks
			0.2			s		6-6-7-	00	17.5			-	¥
LEAN CLAY	(CL), with silt, Browr	n, VERY STIFF						[13]						
				-	2 5	ss 🛛		7-7-7- [14]		18.7				
SANDY FAT	CLAY (CH), Brown,		4.5	5										
					3 5	ss 🛛		5-10-14- [24]		18.4				
- with limesto	ne fragments				_									
	Ū				4	ss X		9-14-14- [28]		18.4				
				10		ан			0.09	35.4				
				-	5 `				0.09	55.4				
					6	ss 🛛		6-2-1-		19.8				
						Ĥ		[3]						
				15	7 \$	ss 🕅		2-2-5-		24.2				
						Α		[7]						
				20	8 5	вн			0.05	33.2				
						ss V		7-16-7-		29.2				
			04.0		<u> </u>	\square		[23]		29.2				
	Auger Refusal at 2	24 feet	24.0			ss 🗡		50/6" [<i>50/6"</i>]						
Sample Ty	<u>pe</u>	Depth to Ground	water					L	1					
SPT - Standard Pe	enetration Test 👲	Noted on Drilling Tool	s		ft.	HSA -		ing Method w Stem Au	ders					
SS - Driven Split SH - Pressed She	elby Tube 🚡	At Completion (in aug At Completion (open l		1	1. n	CFA -	Cont	inuous Fligh		ers				
CA - Continuous RC - Rock Core	FIIUIII AUUEI	After hours	-			DC - MD -	Mud	ng Casing Drilling						

- CU Cuttings CT Continuous Tube
- ▼ After _____ -- hours
- A Cave Depth

--_ ft.



	_IENT		Power Corporat					_	BORING #	!		R 2				
PF	ROJECT NAME	LG&E-KU F	Ford Glendale 3	45 kV	⁷ Transmi	ssior	<u>1</u>	_	JOB #					2043	8	
PF	ROJECT LOCATIO	N Hodgenvill	e Road West					_	DRAWN B	Υ	R.	Orti	İZ			
		Glendale, ł	۲Y					_	APPROVE	D BY	Τ. /	And	Ires	5		
		DRILLING and SA	MPLING INFORMA	TION							TES	T DA	TA			
	Date Started	4/12/22	Hammer Wt.		140 lbs.											
	Date Completed		• =											e		
	Drill Foreman	J. Burdette	Spoon Sampler C						Test					Sieve		
	Inspector		Rock Core Dia.						ot)	ngth	%			£200		
	Boring Method	HSA	Shelby Tube OD		<u> </u>		phics aphic		netra ws/fo	fined	Itent	LL)	(PL)	sing #		
		SOIL CLASSIFICAT				Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test N-Value (blows/foot)	Qu-tsf Unconfined Compressive Strength	Moisture Content %	Liquid Limit (LL)	Plastic Limit (PL)	Percent Passing #200	S	
	SUR	FACE ELEVATION	(ft): 663.8 de (deg): -85.906363	atum pth	Depth Scale Sample No.	mple	mple cove	pund	/alue	tsf U npre	istur	uid L	stic	rcent	Remarks	
_				De	N N N De	Sa	Real	ŏ	Sta N-V	Sou	Mo	Lid	Pla	Pe	Re	
	BLANK AUGE	RING- NO SAMPLE	S OBTAINED													
_																
-																
_					5 –											
-																
-																
-																
-					10											
-																
_																
-																
-					15 —											
_																
-																
_					20 -											
_				04 5												
		Auger Refusal at 21.	5 feet	21.5												
l	Sample Typ)e	Depth to Ground	water								I				
:	SPT - Standard Per	netration Test 💂 N	loted on Drilling Tool	s	ft.	ЦС			<u>ng Method</u> w Stem Aug	ore						
:	SS - Driven Split S SH - Pressed She	liku Tulka 👘 👘	t Completion (in aug		ft.	CFA	4 - Co	onti	nuous Flight	Auge	rs					
(CA - Continuous F RC - Rock Core	Flight Auger 👻 🦰	t Completion (open l .fter hours	-	ft. ft.	DC MD	- Dr - Mı	rivin ud [ng Casing Drilling							
(CU - Cuttings	_ ⊻ A	fter hours		 ft.	MH	- Ma	anu	ial Hammer	٥r				_		
	CT - Continuous 1	ube 📓 C	ave Depth	_	<u></u> ft.	АП	- Al	aton		CI				Paę	ge 1 of	1



		Power Corpora		T			-	BORING #		ST				
							-	JOB #					.043)
PROJECT LOCATIO								DRAWN E	-	<u>R. (</u>				
	Glendale, k	(Y					-	APPROVE	ED BY	1.4	۹nd	res		
	DRILLING and SA	MPLING INFORMA	TION	ſ						TES	۲ DA	ΤΑ		
Date Started	4/4/22	Hammer Wt.		140 lbs.										
Date Completed	4/4/22	Hammer Drop		30 in.									6	
Drill Foreman	J. Burdette	Spoon Sampler C	D	2 in.				Test					Sieve	
Inspector	P. Presnell	Rock Core Dia.		2 in.				⊢ €	gt	.0				
Boring Method	HSA, AH	Shelby Tube OD		3 in.	e	Sampler Graphics Recovery Graphics	-	Standard Penetration N-Value (blows/foot)	Qu-tsf Unconfined Compressive Strength	Moisture Content %	(TT)	Plastic Limit (PL)	Percent Passing #200	
	SOIL CLASSIFICAT	TION			Тур	9 2 0 2 0	wate	d Pe bld)	ncor ssive	e Co	imit	Limit	: Pas	S
SUR	FACE ELEVATION	(ft): 735.6	Stratum Depth	Depth Scale Sample No.	Sample Type	mple sove	Groundwater	indai ∕alu€	tsf U 1pre:	istur	Liquid Limit (LL)	stic	cent	Remarks
Latitude (deg):	37.62381, Longitude	e (deg): -85.906461	Str	Depth Scale Sample No.	Sar	Rec	รี	Sta N-V	Con-	Mo	Liq	Pla	Per	Rei
			0.7	- 1	SS		T	3-3-3-						
FAT CLAY (C with wood frag	H), Brown, MEDIUM	STIFF to STIFF,				ÉШ		[6]						
			4.5	2	SS	X		3-5-6- [<i>11</i>]		25.0				PP=3.0 tsf
SANDY FAT (and oxidation	CLAY (CH), with sand nodules, VERY STIF	d, Brown with black F		5 3	SS	X		7-8-8- [16]		14.4				PP=4.0+ tsf
				- 4	SS	X		7-11-14- [25]		16.4				PP=4.0+ tsf
				10 - 5	SH				1.46	22.6	66	21		
					SS	X		7-7-9-		12.2				PP=4.0+ tsf
				15				[16]						
- with sand, lig	jht gray			7	SS	Х		5-12-15- [27]		22.1				PP=3.0 tsf
				20 - 8	SH				0.25	20.8				
POORLY GRA	ADED SAND (SP), Li	ight brown,	22.0	9	SS		•	3-4-4- [8]		20.3				
FAT CLAY (C	H), with sand, Yellow	ish brown, STIFF	24.0	25										
-				10	SS	Х		4-3-5- [8]		36.7				PP=2.0 tsf
SANDY FAT (CLAY (CH), Light red	dish brown to	30.0	30 - 11	SH				0.73	24.9				
yellowish brov	vn, STIFF			12	SS	X		3-3-4-		20.5				
								[7]						
Sample Typ		Depth to Ground				R	orin	g Method						
SPT - Standard Pe SS - Driven Split S		oted on Drilling Too		<u>22.0</u> ft.		A - Ho	ollow	v Stem Aug						
SH - Pressed She	lby Tube 🖉 🗛	t Completion (in aug		n. ft.				uous Fligh a Casina	t Auge	rs				
RC - Rock Core	Ilght Auger ⊈ A	fter hours	· _	ft.	MD	- Mu	ud D	Drilling						
CU - Cuttings		fter <u></u> hours		ft.				al Hammer natic Hamm	er				Do	ne 1 of 2
SH - Pressed She CA - Continuous F RC - Rock Core	lby Tube Flight Auger ⊈ A ⊈ A	fter hours	hole)	ft.	CF/ DC MD MH	A - Co - Dr - Mu - Ma	ontin iving ud D anua	nuous Fligh g Casing)rilling al Hammer	t Auge	rs			Pa	ge 1 of



TEST BORING LOG

LIENT	Power Corpora	tion						BORING a	¥	ST	R 2	5A	L1		
ROJECT NAME	LG&E-KU	Ford Glendale 3	45 kV	Tran	smis	ssio	n		JOB #		LO	UG	E22	2043	3
ROJECT LOCATIO	N Hodgenvil	le Road West							DRAWN E	3Y	R. (Orti	z		
	Glendale,								APPROVI					;	
	DRILLING and SA	AMPLING INFORMA	TION		r						TES	T DA	TA		
Date Started	4/4/22	Hammer Wt.		140	lbs.										
Date Completed	4/4/22	Hammer Drop		30	in.									m	
									Fest					Sieve	
		Rock Core Dia.					" s		ot)	ngth	%			#200	
Boring Method	пза, ап	Shelby Tube OD		3	. in.	e	aphics	<u>ب</u>	enetra ws/fo	fined Stre	ntent	(LL)	(PL)	Passing #200	
	SOIL CLASSIFICA	TION	E		a)	Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test N-Value (blows/foot)	Qu-tsf Unconfined Compressive Strength	Moisture Content %	Liquid Limit (LL)	Plastic Limit (PL)	nt Pas	Š
	(continued)		Stratum Depth	Depth Scale	Sample No.	ample	ample	rounc	tanda -Valu	I-tsf L mpre	oistu	quid .	lastic	Percent I	Remarks
	37.62381, Longituc CLAY (CH), Light re	de (deg): -85.906461	۵	ŏĎ		ഗ് SS	ΰř M	Ō	がさ 3-3-4-	ရပ္ပ	₹ 32.2	Ē	₫	ď	کٹ PP=3.5 tsf
yellowish brow	n, STIFF			-	13	55	Δ		[7]		<u>.</u>				
				-											
				40 -											
				-	14	SH				0.46	19.9				
				-	15	SS	X		4-4-6- [10]		22.5				
				-	-				[,0]						
				45	16	SS	X		5-6-50/6"- [<i>50/6"</i>]		8.9				
				-	-				[00,0]						
				-											
	Light gray, slightly v	weathered	50.0 51.0	50 -	RC1	RC									
	URE - INTERPRET INFILLED VOID, O		52.0	-		RC									RQD=8%
- with a calcite	streamer			-		KC.									
weathered	Light gray, fine grai	ned, slightly		55 —	RC2										RQD=32%
				-											
				-		RC									
				60 —	RC3										RQD=87%
				-											
В	oring Terminated at	62 feet	62.0	-											
Sample Typ	e	Depth to Ground	water												
	netration Test 🖢 I	Noted on Drilling Tool	s	22.0		HS			ing Method w Stem Aug	iers					
SH - Pressed She CA - Continuous F	İby Tube 🚡	At Completion (in aug At Completion (open l	,		•_ ft. •_ ft.		A - C	Conti	inuous Fligh		rs				
RC - Rock Core CU - Cuttings	Tigrit Auger ⊻ A	After <u></u> hours After hours	_		 • ft. • ft.	ME) - N	∕lud	Drilling Jal Hammer						
CT - Continuous T		Cave Depth	_		•_ n. •_ ft.	AH			matic Hamm					Pa	ge 2 of 2



	ENT		Power Corpora							BORING #		ST				
			Ford Glendale 3							JOB #					2043	8
PRC	JECT LOCATIO	N Hodgenvil	le Road West							DRAWN B	Y	Z. I	Nich	nols	5	
		Glendale,	KY							APPROVE	D BY	R . (Orti	Z		
		DRILLING and SA	AMPLING INFORMA	TION		ſī						TES	T DA	TA	,,	
D	ate Started	3/29/22	Hammer Wt.		140	lbs.										
D	ate Completed	3/29/22	Hammer Drop		30	in.									0	
	orill Foreman	M. Smith	Spoon Sampler C	-		-				Test					Sieve	
	nspector					·		ŝ			lgth	%			¹ 200	
В	oring Method	HSA	Shelby Tube OD		3	in.	Ø	Sampler Graphics Recovery Graphics	_	Standard Penetration N-Value (blows/foot)	Qu-tsf Unconfined Compressive Strength	Moisture Content %	(LL)	(PL)	Percent Passing #200	
		SOIL CLASSIFICA	TION				Sample Type	er Gra	Groundwater	rd Pe e (blo	Jncon ssive	ê Col	Liquid Limit (LL)	Plastic Limit (PL)	t Pas	s
		RFACE ELEVATION		Stratum Depth	Depth Scale	Sample No.	ample	ample	round	tanda -Valu	u-tsf L	loistur	quid I	lastic	ercen	Remarks
_	,	ERING- NO SAMPLE	de (deg): -85.862759	ΩŌ	<u>م</u> D	ΰŻ	ũ	ώœ Π	G	ΰŻ	<u> </u>	Σ		Р	đ	Ŕ
	BEANTAOOL															
					-											
-					5											
					-											
					10 -											
					-											
					-											
					15 -											
					-											
					-											
					20 —											
					-											
-																
					-											
					25 –											
					-											
-					-											
_					30 —											
					-											
				22.0	-											
		Auger Refusal at 33	3 feet	33.0	-]										
	Sample Typ	<u>)e</u>	Depth to Ground	water										<u> </u>		
		netration Test 👲	Noted on Drilling Too	s		•_ ft.	НS			<u>ng Method</u> w Stem Aug	ers					
SF	I - Pressed She	lby Tube 🚡 🖌	At Completion (in aug At Completion (open			• ft. • ft.	CF	A - C	Conti	inuous Flight	Auge	rs				
RC	A - Continuous I C - Rock Core	Tigint Auger y A	After hours	_		ft.	MD) - N	∕lud	Drilling Jal Hammer						
CL CT	J - Cuttings F - Continuous ⁻		After <u></u> hours Cave Depth	-		•_ ft. • ft.	AH			ual Hammer matic Hamm	er				Pad	ge 1 of 1
		- End		-												-



OJECT NAME	Southeast Power Corp ECT NAME LG&E-KU Ford Glenda ECT LOCATION Hodgenville Road West				mis	sior		_	BORING # JOB #		LO	UG	E22	2043	3
OJECT LOCATION	-							_	DRAWN E		Z. N			<u>}</u>	
	Glendale, K	Y						_	APPROVE	ED BY	R. (Orti	Z		
	DRILLING and SA	MPLING INFORMA	TION		ſĒ						TES	T DA	TA		
Date Started	3/29/22	Hammer Wt.		140	bs.										
Date Completed	3/29/22	Hammer Drop		30 in	n. 📗									0	
	M. Smith	Spoon Sampler C	D	2 ii	n.				est					Sieve	
	J. Semmer	-			11		s		ion T oot	gth	%			200	
Boring Method	HSA, AH	Shelby Tube OD		<u>3</u> ir	n.		ohics aphic		ietrat ows/f	ned Stren		()	PL)	ing #	
	SOIL CLASSIFICAT	ION				Sample Type	Sampler Graphics Recovery Graphics	/ater	Standard Penetration Test Blows per 6" [<i>N-Value</i>] <i>blows/foot</i>	Qu-tsf Unconfined Compressive Strength	Moisture Content	Liquid Limit (LL)	Plastic Limit (PL)	Passing #200	
SUR	FACE ELEVATION (ft): 732.8	th tu	e t	bie	- əldı	over	Groundwater	ndarc vs pe Value	sf Un pres	sture	id Lir	tic L	Percent I	Remarks
	37.629913, Longitud	,	Stratum Depth	Depth Scale	oampie No.	San	San Rec	<u>G</u>	Star Blov [N-	Qu-ts Com	Mois	Liqu	Plas	Perc	Rem
TOPSOIL		ſ	0.3	_	1	SS	Χ		2-1-3- [<i>4</i>]		20.7				PP=1.5 tsf
	CL), Light brown, ME rganics to 2 feet	DIUM STIFF to							[7]						
	5			-	2	SS	X		4-5-8- [<i>13</i>]		13.9				PP=1.5 tsf
- transition to r	eddish brown and gr	ay, with sand		5 —		00			0.7.0		47.4				
	_	-			3	SS	Д		3-7-9- [16]		17.4				PP=2.5 tsf
					4	SS			11-14-14-		18.2				PP=4.0 tsf
					4		Д		[28]		10.2				
			11.0	10 _	5	SH				1.26	15.0	28	15		
FAT CLAY (CF with black oxid	H), Light brown, STIF	F to VERY STIFF,	11.0		5										
with black oxid	ation nodules				6	SS	Х		12-15-13- [28]		26.0				PP=4.0 tsf
				15											
					7	SS	X		3-5-7- [12]		29.2				PP=3.0 tsf
							\Box		[]						
- transition to c	lark gray and dark bi	rown													
				20		SH				1 70	27.4	62	22		
				-	8	эп				1.79	27.4	02	22		
	ight tannish brown to nd and limestone fra				9	SS	X		3-4-4- [8]		17.6				PP=2.0 tsf
DIOWII, WILLI SA	nu anu imestorie na	gments							[0]						
				25	10	SS	X	•	4-4-10-		36.1				PP=1.5 tsf
- groundwater	at about 26 feet								[14]						
- transition to b	prown														
				30 -											
				-	11	SH				0.45	39.6				
	Auger Refusal at 32	feet	32.0	$+$											
Sample Typ	e	Depth to Ground	water												
PT - Standard Per	netration Test 单 No	oted on Drilling Tool	s	26.0	ft.	це			ng Method	ore					
 S - Driven Split S H - Pressed Shel 	by Tube 🖉 🗛	Completion (in aug Completion (open l				CFA	4 - C	onti	w Stem Aug nuous Fligh		ers				
A - Continuous F C - Rock Core	light Auger 🙁 🖼	ter hours	,			MD	- M	ud l	ng Casing Drilling						
J - Cuttings T - Continuous T		ter hours ave Depth							ial Hammer natic Hamm					D.	ge 1 of ¹



CI		NT	Southeas	st Power Corpora	tion					BORING #		ST	R 2	5A	L4		
PF	ROJ	ECT NAME	LG&E-KI	U Ford Glendale 3	845 kV	/ Transmi	ssior	า		JOB #		LO	UG	E22	2043	3	
PF	ROJ	ECT LOCATIO	N Hodgenv	/ille Road West					_	DRAWN BY		Z. I	Nicl	nols	5		
			Glendale	e, KY					_	APPROVED	BY_	R . (Orti	Z			
			DRILLING and	SAMPLING INFORMA	TION							TES	T DA	TA			
	Da	te Started	3/28/22	Hammer Wt		140 lbs.											
	Da	te Completed	3/28/22	Hammer Drop		30 in.											
	Dri	II Foreman	M. Smith	Spoon Sampler (DD	2 in.				est					Sieve		
		pector						<i>"</i>		of) T	gth	%			200 \$		
	Во	ring Method	HSA	Shelby Tube OD		3 in.		hics		etrati /s/foc	Stren	tent %	(PL)	;# Gu		
			SOIL CLASSIFIC	CATION			Sample Type	Sampler Graphics Recovery Graphics	/ater	Standard Penetration Test N-Value (blows/foot) Nutsf Unconfined	Compressive Strength	Moisture Content	Liquid Limit (LL)	Plastic Limit (PL)	Percent Passing #200		
		SUR	FACE ELEVATIO		Stratum Depth	Depth Scale Sample No.	- əldı	over	Groundwater	alue	bres	sture	id Li	stic L	cent l	Remarks	
				gitude (deg): -85.86293	Stra Dep	Depth Scale Sampl	San	San Rec	Gro	Star N-V		Moi	Liqu	Plas	Per	Ren	
1 1		BLANK AUGE	RING- NO SAMP	PLES OBTAINED													
111																	
-						5 —											
1 1 1																	
-																	
1						10 -											
11																	
11						15											
-						_											
11																	
						20 -											
-																	
						25 –											
-																	
-						30											
F	SPT	<u>Sample Typ</u> - Standard Pe	<u>oe</u> netration Test ●	Depth to Ground		44.0 ft.				ing Method							
	SS	- Driven Split S - Pressed She	Spoon 🛓	At Completion (in aug	gers)	 ft.	CFA	A - C	onti	w Stem Augers inuous Flight A		rs					
	CA	- Continuous F	Flight Auger 🛛 👻	At Completion (open		ft. ft.		- D	rivir	ng Casing Drilling	-						
	CU	- Rock Core - Cuttings	. . ¥	After hours	-	 ft.	MH	- M	anı	ual Hammer matic Hammer							-
	СТ	- Continuous 1	lube 📓	Cave Depth	-	ft.	АП	- AI	uiUl						Pa	ge 1 of	2



TEST BORING LOG

			t Power Corpora Ford Glendale 3		Transn	nissio	on		BORING # JOB #		ST LO			L4 2043	3
PRC	JECT LOCATIO	N Hodgenvi	Ile Road West						DRAWN E					5	
		Glendale,	KY						APPROVE	D BY	R.	Ort	İZ		
		DRILLING and S	SAMPLING INFORMA	TION							TES	T DA	TA		
D	ate Started	3/28/22	Hammer Wt		140 lb:	s.									
D	ate Completed	3/28/22	_ Hammer Drop _		30 in										
D	rill Foreman _	M. Smith	_ Spoon Sampler C	D	2 in				est					Sieve	
	spector	J. Semmer	-				,	0	ot) T	gth	%			200 \$	
В	oring Method	HSA	_ Shelby Tube OD		3 in		phics		netrat ws/foo	ined Stren		(T	(PL)	ing #	
		SOIL CLASSIFICA	ATION			No. _ Sample Type	Sampler Graphics	Groundwater	Standard Penetration Test N-Value (blows/foot)	Qu-tsf Unconfined Compressive Strength	Moisture Content	Liquid Limit (LL)	Plastic Limit (PL)	Percent Passing #200	Ŋ
		(continued)		Stratum Depth	Depth Scale Sample	mple	mple	ound	andar Value	tsf U npre	isture	uid L	astic	rcent	Remarks
		_	tude (deg): -85.86293	De	S C De	Sal No	Sa	ξŪ	Sta N-V	Con Con	Mo	Lig	Pla	Pel	Re
	BLANK AUGE	RING- NO SAMPL	ES OBTAINED												
_															
					40 -										
					-										
					45			-							
╢		Auger Refusal at 5	50 feet	50.0	50 —										
		5													
	Sample Tur		Depth to Crouse	Water											
		netration Test 🌘	Depth to Ground Noted on Drilling Too		44.0 f	t. ,,	C A		ing Method	0.55					
	 Driven Split \$ Pressed She 	liby Tubo 🍧	At Completion (in aug	-	f	L C	FA -	Cont	w Stem Aug		ers				
CA	 Continuous F Rock Core 	Flight Auger	At Completion (open After hours	-	f f	t. M	D -	Mud	ng Casing Drilling						
	J - Cuttings	Ţ	After hours		 f	- Δ			ual Hammer matic Hamm	er				Do	ge 2 of 2
	Continuous	1.420 <u>N</u>	Cave Depth	-	f	ι.								гa	



CLIENT PROJECT NAME		-		Tran					BORING # JOB #		STI LO				2
								_			R. (.04.	•
PROJECT LOCATIO	Glendale, KY								DRAWN E APPROVE	-					
	DRILLING and SAMPLI							_	AFFROVE		TES				
Data Startad				140											
Date Started Date Completed		mmer Wt mmer Drop		<u>140</u> 30											
Drill Foreman		oon Sampler C			·				ţ.					eve	
Inspector	<u> </u>								Tes) Sieve	
Boring Method		elby Tube OD					s S		ation oot)	ïned Strength	t %			#200	
						Ō	aphic	5	enetra ows/f	nfineo Stre	nten	(TT)	(PL)	Passing :	
	SOIL CLASSIFICATION		_			Sample Type	Sampler Graphics Recovery Graphics	Groundwater	Standard Penetration Test N-Value (blows/foot)	Qu-tsf Unconfined Compressive Stre	Moisture Content	Liquid Limit (LL)	Plastic Limit (PL)	t Pas	S
SUF	RFACE ELEVATION (ft): 68	36.1	Stratum Depth	Depth Scale	Sample No.	mple	mple	punc	value	tsf U npre	istur	uid l	Istic	Percent	Remarks
	37.623237, Longitude (deg	g): -85.905332		De Sc	Sa No		Resa	Ğ		Cor-		Liq	Pla	Ре	Re
TOPSOIL	CL), with silt, Light reddish		0.5	-	1	SS	Х		3-2-4- [6]		22.8				PP=1.0 tsf
	F, (possible fill)	brown,	2.0	_		00			225		04.0				
FAT CLAY (C	H), with silt, Reddish brow	n, STIFF,		-	2	SS	А		3-3-5- [8]		21.9				PP=1.5 tsf
LEAN CLAY (CL), with silt, Light brown v		4.5	5 —	3	SS			4-5-4-		21.5				PP=0.3 tsf
brown, with or	ganic soil and an organic o	odor	7.0		3		А	•	[9]						
FAT CLAY (C	H), trace sand, Reddish br	own, STIFF	1.0		4	SS	$\overline{\mathbf{A}}$		4-5-4-		160.2				PP=0.8 tsf
				-			\square		[9]						
				10 —	5	SH				0.92	19.4				
				-	-	00			4.5.0		04.0				
				-	6	SS	Х		4-5-6- [<i>11</i>]		21.0				PP=1.3 tsf
LEAN CLAY (CL), Brown, STIFF		14.0	 15 —											
				-	7	SS	X		5-5-7- [12]		26.1	49	15		PP=1.5 tsf
				_											
			20.0	20 —		SH				1.00	22.0				
SOFT to STIF	H), with silt, Reddish brown F, with limestone fragment	is VERY		-	8	эп				1.23	23.8				
					9	SS	X		3-3-5-		41.0				PP=2.3 tsf
									[8]						
				25 —	10	SS			4-4-4-		36.4				PP=0.5 tsf
				-			\cap		[8]						
				30 —											
				30	11	SH				0.72	36.6				
				-	10	SS	\vee		3-3-3-		38.3				PP=0.5 tsf
					12		A		[6]						
				_											
Semple Type SPT - Standard Pe		epth to Ground on Drilling Too		7.0	ft				ng Method						
SS - Driven Split S SH - Pressed She	Spoon 🛓 At Com	pletion (in aug	jers)		ft.	HS/ CF/	A - ⊢ A - C	lollo Conti	w Stem Aug nuous Fligh	jers t Auge	rs				
CA - Continuous I		pletion (open hours		-	ft. ft.		- D	Drivir	ng Casing Drilling	0-					
RC - Rock Core CU - Cuttings	Ţ After	hours			_ ft.	MH	- N	/lanu	al Hammer						
CT - Continuous	Tube 🛛 🖉 Cave D	epth	_		ft.	AH	- A	utor	matic Hamm	ier				Pa	ge 1 of 2



TEST BORING LOG

(Continued)

CLIENT		Power Corpora							BORING						
	LG&E-KU F								JOB #					.04.)
PROJECT LOCATIC									DRAWN E	-					
	<u> </u>	Y							APPROVI	=D BĀ	1.7	4110	ires)	
	DRILLING and SAM	IPLING INFORMA	TION		٦						TES	T DA	TA		
Date Started	4/15/22	Hammer Wt.		140	lbs.										
Date Completed	4/18/22	Hammer Drop		30	in.									a)	
Drill Foreman									est					Sieve	
	Clouser/Januzz						(0		t ug	gth	\$			200 (
Boring Method	HSA	Shelby Tube OD		3	in.		Sampler Graphics Recovery Graphics		Standard Penetration Test N-Value (blows/foot)	Qu-tsf Unconfined Compressive Strength	Moisture Content %	L	۲)	Percent Passing #200	
	SOIL CLASSIFICATI					ype	Grap	ater	Pene	confir ive S	Cont	Liquid Limit (LL)	Plastic Limit (PL)	assi	
			Ę	5	e	ole T	very	mdw	dard lue (f Und	iure	d Lin	ic Lir	ent P	arks
Latitude (deg):	(continued) 37.623237, Longitude	e (dea): -85.905332	Stratu	Depth Scale	Sample No.	Sample Type	Sam	Groundwater	Stand N-Va	u-tsi omp	Moist	-iqui	Jast	Perce	Remarks
- FAT CLAY (C	H) with silt Reddish b	prown VERY	0.0		13	SS	M	0	WOH-	00	39.2		-	-	PP=0.5 tsf
SOFT to STIF	F, with limestone fragi kidation nodules	ments			13		Α		WOH-2- [2]						
	lidation nodules								1						
-				40 -	14	SH				0.32	43.2				
			42.0		14										
FAT CLAY (C	H), Light brown, SOFT	Γ to MEDIUM			15	SS	Х		5-6-8- [<i>14</i>]						PP=0.5 tsf
- with limestor	ne fragments														
				45 _	16	SS	X		20-15-12-						PP=0.0 tsf
							\square		[27]						
				50	17	SH									
					18	SS	∇		18-16-12-						
					10		Α		[28]						PP=0.5 tsf
				55 -											PP=0.0 tsf
					19	SS	X		18-50/3"						
									[50/3"]						
				-											
				60											
				-											
			64.7	-											
	Auger Refusal at 64.7	feet													
Sample Ty	<u>be</u>	Depth to Ground	lwater	II						1		1	1		
SPT - Standard Pe	netration Test 🏚 No	ted on Drilling Too	ls	7.0	_	ня			ing Method w Stem Auc	iers					
SS - Driven Split SH - Pressed She	elby Tube	Completion (in aug Completion (open			_ ft. ft.	CF	A - C	Conti	inuous Fligh		ers				
CA - Continuous RC - Rock Core				-	_ n. ft.	DC ME			ng Casing Drilling						
CU - Cuttings	Ţ Aft		_		ft.	MH	I - N	Λanι	ual Hammer						• -
CT - Continuous	iube 🙇 Ca	ve Depth	-		_ ft.	АП	- /	านเป						Pa	ge 2 of 2



				ver Corporat		Tran	smi	sein			BORING #		ST				<u> </u>
PROJECT NAME LG&E-KU Ford Glendale 345 kV Transmission JOB # LOUGE22043 PROJECT LOCATION Hodgenville Road West DRULLING and SAMPLING INFORMATION DRULLING and SAMPLING INFORMATION TEST DATA Date Started 4/11/22 Hammer Wt. 140 Ibs. Image: Started st		,															
NOC																;	
				ING INFORMA	TION											<u> </u>	
Glendale, KY APPROVED BY T. Andres DRILLING and SAMPLING INFORMATION TEST DATA Date Started 4/11/22 Hammer Wt. 140 lbs. Date Completed 4/11/22 Hammer VD 2 in. Drill Foreman J. Burdette Spoon Sampler OD 2 in. Boring Method HSA Shelby Tube OD 3 in. SOIL CLASSIFICATION Integrade 90 90 90 SURFACE ELEVATION (ff): 687.0 Integrade 90 90 90 SURFACE ELEVATION (ff): 687.0 Integrade 90 90 90 BLANK AUGERING- NO SAMPLES OBTAINED 1 1 1 1 1																	
							.				st					eve	
Ins												ţ				00 Si	
Bo	oring Method	HSA	Sł	elby Tube OD		3	in.		nics ohics		etratic s/foot	treng	ent %		L)	1g #2	
								ype	Graph	ater	Pene	confin ive S	Conte	nit (LI	mit (P	assir	
					un d	د ہ	ple	ple T	pler (mdw	dard alue (f Und press	ture	d Lin	tic Lir	ent P	arks
	Latitude (deg): 3	37.623156, Lon	gitude (de	eg): -85.905275	Strat Dept	Dept Scal	Sam No.	Sam	Sam Recc	Grou	Stan N-Va	Qu-ts Comp	Mois	Liqui	Plas	Perc	Rem
						-						55					
_						-											
						-											
Date Started 4/11/22 Hammer Wt. 140 lbs. Date Completed 4/11/22 Hammer Drop 30 in. Drill Foreman J. Burdette Spoon Sampler OD 2 in. Inspector D. Melvin Rock Core Dia. 2 in. Boring Method HSA Shelby Tube OD 3 in. SOIL CLASSIFICATION untit data edge of all																	
						-	-										
						-											
						-	-										
-						10 -											
							-										
_						-											
						-	-										
_						15											
						-	-										
_	Drill Foreman J. Burdette Spoon Sampler OD 2 in. Inspector D. Melvin Rock Core Dia. 2 in. Boring Method HSA Shelby Tube OD 3 in. SOIL CLASSIFICATION Impediate of the second secon																
BLANK AUGERING- NO SAMPLES OBTAINED 5- -																	
BLANK AUGERING- NO SAMPLES OBTAINED 5 10																	
						20 -	-										
-						-											
						-	-										
						25											
						-	-										
						-											
						-											
						30 -											
						-											
						_											
						-											
	Image: Sample Type Depth to Groundwater Sample Type Depth to Groundwater Boint Method																
SD							ft.			<u>Bori</u>	ing Method						
SS	- Driven Split S	poon		npletion (in aug				HS	A - H		w Stem Aug inuous Flight	ers	re				
	- Pressed Shel - Continuous F	by Tube	At Cor	mpletion (open l	nole)		ft.	DC	- [Drivir	ng Casing	. Auge	15				
RC	- Rock Core - Cuttings		⊈ After _. ⊈ After				• ft. •ft.	MD MH			Drilling Jal Hammer						
	- Continuous T		I Anter I Cave I		_		_ n. _ ft.				matic Hamm	er				Pa	ge 1 of 2



TEST BORING LOG

(Continued)

Gendale, KY DPRICUE BY T. Andres DRILLING and SAMPLING INFORMATION TEST DATA Date Started 411122 Hammer Vit. 140 Diff Foreman J. Burdetto Song Method HSA Soll CLASSIFICATION 9000 Started (continued) 9000 Started (continued) 9000 Started (continued) 9000 Started (continued) 9000 Started (continued) 9000 Started (continued) 9000 Started (continued) 9000 Started (continued) 9000 Started 45.0 45.0 45.0 45.0 45.0 45.0 45.0 45.0 45.0 45.0 45.0 45.0 45.0 45.0 45.0 45.0 45.0 45.0 45.0 45.0 45.0 45.0 45.0 45.0 45.0 45.0 45.0 45.0 45.0 45.0 45.0 <th>CLI</th> <th>ENT</th> <th>Southeas</th> <th>t Power Corpora</th> <th>tion</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>BORING #_</th> <th></th> <th>ST</th> <th></th> <th></th> <th></th> <th></th> <th></th>	CLI	ENT	Southeas	t Power Corpora	tion						BORING #_		ST					
Gendale, KY DPROVED by T. Andres DRILLING and SAMPLING INFORMATION TEST DATA Date Started 4111/22 Hammer Vit. 140 tis. Diff Greenen J. Burdette Spoon Sampler OD 2. in. in. Diff Greenen J. Burdette Spoon Sampler OD 3. in. in. in. Solit CLASSIFICATION Gendale, KY Rock Core Dia. 2. in. <	PROJECT LOCATION Hodgenville Road West Glendale, KY DRILLING and SAMPLING INFORMATION						ssio	n		JOB #					2043	8		
DRILLING and SAMPLING INFORMATION TEST DATA Date Started 4/11/22 Hammer Wit 140 hs. Date Started 4/11/22 Hammer Drop 30 in. Dinit Forema J. Burdeth Spons Sampler CD 2 in. Bring Method HSA Shotby Tube CD 3 in. SOIL CLASSIFICATION Wig to go go go go go go go go go go go go go	PR	OJECT LOCATIO	N Hodgenvi	Ile Road West							DRAWN BY	(R . (Orti	Z			
Dete Started 4/11/22 Hammer Wt. 140 bbs. Date Completed 4/11/22 Hammer Drop 30 in. Drill Foreman J. Burdette Spoon Sampler OD 2 in. Imapactor D. Melvin Rock Coro Dia. 2 in. Boring Method HSA Shelby Tube OD 3 in. SOL CLASSIFICATION uig dialog			Glendale,	KY							APPROVE	D BY_	Τ. /	And	lres	;		
Date Completed 4/11/22 Hammer Drop 30 In. Drif Foreman J. Burdette Spoon Sampler DO 2 In. Inspector D. Melvin Rock Core Dia 2 In. Boring Method HSA Shelby Tube OD 3 In. SOLI CLASSIFICATION Use OD 3 In. SOLI CLASSIFICATION I State of the second state of the seco			DRILLING and S	SAMPLING INFORMA	TION								TES	T DA	TA			
Drill Foreman J. Burdette Spoon Sampler OD 2 in. Boring Method HSA Shelby Tube OD 3 in. SOIL CLASSIFICATION wittig of each grad state of eac	I	Date Started	4/11/22	Hammer Wt.		140	lbs.											
Inspector Method HSA Shelby Tube OD In. Boring Method HSA Shelby Tube OD In. SOIL CLASSIFICATION (continued)	I	Date Completed	4/11/22	Hammer Drop		30	in.											
Inspector Method HSA Shelby Tube OD In. Boring Method HSA Shelby Tube OD In. SOIL CLASSIFICATION (continued)	I	Drill Foreman	J. Burdette	Spoon Sampler C	DD	2	in.				est					Sieve		
BLANK AUGERING- NO SAMPLES OBTAINED 40 40 40 40 45 Auger Refusal at 45 feet 45.0 45 45 Sample Type Depth to Groundwater Sample Type Depth to Groundwater Sample Type Depth to Groundwater Sample Type Depth to Groundwater	I	Inspector		-			-		~		at) T	gth	%			200 9		
BLANK AUGERING- NO SAMPLES OBTAINED 40 40 40 40 45 Auger Refusal at 45 feet 45.0 45 45 Sample Type Depth to Groundwater Sample Type Depth to Groundwater Sample Type Depth to Groundwater Sample Type Depth to Groundwater	I	Boring Method	HSA	Shelby Tube OD		3	in.		hics		etrati /s/foc	Stren	tent %	(T	PL)	# bu		
BLANK AUGERING- NO SAMPLES OBTAINED 40 40 40 40 45 Auger Refusal at 45 feet 45.0 45 45 Sample Type Depth to Groundwater Sample Type Depth to Groundwater Sample Type Depth to Groundwater Sample Type Depth to Groundwater	Γ		SOIL CLASSIFICA	ATION				Lype	Grap / Gra	/ater	l Pen (blow	confi sive S	Cont	nit (L	imit (I	Dassi		
BLANK AUGERING- NO SAMPLES OBTAINED 40 40 40 40 45 Auger Refusal at 45 feet 45.0 45 45 Sample Type Depth to Groundwater Sample Type Depth to Groundwater Sample Type Depth to Groundwater Sample Type Depth to Groundwater	╞		(continued)		t t	e t	aldı	- əldı	over	Mpun	alue	sf Un pres	sture	id Li	stic L	cent	Jarks	
Auger Refusal at 45 feet 45.0 45 - 45.0 45 - 45.0 45 - 45.0 45 - 45.0 45 - 45.0 45 - 45.0 45 - 45.0 45 - 45.0 45 - 45.0 45 - 45.0 45 - 45.0 45 - 45.0 45 - 45.0 45.0 45.0 45.0 45.0 45.0 45.0 45.0		Latitude (deg):	37.623156, Longitu	ude (deg): -85.905275	Stra	Dep Scal	San No.	San	San Rec	Gro	N-V	Con-ts	Mois	Liqu	Plas	Perc	Ren	
Auger Refusal at 45 feet Auger Refusal at 45 feet Auger Refusal at 45 feet Sample Type Sample Type Sample Type Depth to Groundwater ST - Standard Penetration Test Noted on Drilling Tool The back below Stem Auger	-	BLANK AUGE	ERING- NO SAMPL	ES OBTAINED		-												
Auger Refusal at 45 feet Auger Refusal at 45 feet Auger Refusal at 45 feet Sample Type Sample Type Sample Type Depth to Groundwater ST - Standard Penetration Test Noted on Drilling Tool The back below Stem Auger						-												
Auger Refusal at 45 feet Auger Refusal at 45 feet Auger Refusal at 45 feet Sample Type Sample Type Depth to Groundwater Sample Type Sample Type Depth to Groundwater Start - Standard Penetration Test Noted on Drilling Tools ft Borng Method Hoto - Hoto Start Auger																		
Auger Refusal at 45 feet Auger Refusal at 45 feet Sample Type Sample Type Depth to Groundwater SPT - Standard Penetration Test Noted on Drilling Tools ft HSA Hollow Star Auger						40 -												
Auger Refusal at 45 feet Auger Refusal at 45 feet Sample Type Sample Type Depth to Groundwater SPT - Standard Penetration Test Noted on Drilling Tools ft HSA Hollow Star Auger						-												
Auger Refusal at 45 feet Auger Refusal at 45 feet Sample Type Sample Type Depth to Groundwater SPT - Standard Penetration Test Noted on Drilling Tools ft HSA Hollow Star Auger							-											
Auger Refusal at 45 feet Auger Refusal at 45 feet Sample Type Sample Type Depth to Groundwater SPT - Standard Penetration Test Noted on Drilling Tools ft HSA Hollow Star Auger	\exists				45.0	45												
SPT - Standard Penetration Test • Noted on Drilling Toolsft. Boring Method			Auger Refusal at 4	15 feet	45.0	45 -												
SPT - Standard Penetration Test • Noted on Drilling Toolsft. Boring Method																		
SPT - Standard Penetration Test • Noted on Drilling Toolsft. Boring Method																		
SPT - Standard Penetration Test • Noted on Drilling Toolsft. Boring Method																		
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SPT - Standard Penetration Test • Noted on Drilling Toolsft. Boring Method																		
SPT - Standard Penetration Test • Noted on Drilling Toolsft. Boring Method																		
SPT - Standard Penetration Test 📮 Noted on Drining Tools HSA - Hollow Stem Augers	Ľ					•				Bori	ing Method	1			•	. <u> </u>		
		PT - Standard Pe S - Driven Split S	•	-					A - H	Hollo	w Stem Auge							
SH - Pressed Shelby Tube At Completion (in degree) ——— R. CFA - Continuous Flight Augers	S	H - Pressed She	elby Tube	At Completion (open	hole)	-	• ft.		; - [Drivir	ng Casing	Auge	rs					
RC - Rock Core ⊈ After hours ft. MD - Mud Drilling CU - Cuttings ⊈ After hours ft. MH - Manual Hammer	R	C - Rock Core	Σ Į		-) - (Mud	Drilling							
CT - Continuous Tube Acte Cave Depth ft. AH - Automatic Hammer Page 2 of			T 1		' - -							er				Pag	ge 2 of	2



CLIENT South	•		.				BORING		ST				
PROJECT NAME LG&E							JOB # _					.04	<u>></u>
PROJECT LOCATION Hodg							DRAWN E						
Glend	dale, KY						APPROVI	ED BY	1./	And	res	i	
DRILLING	and SAMPLING INFORMA	TION							TES	T DA	ΤA		
Date Started 4/8/22	Hammer Wt			11									
Date Completed 4/8/22	Hammer Drop		30 ii	n.								e	
Drill Foreman J. Burdet	· ·						[est					Sieve	
Inspector D. Melvin					v		ot)]	igth	%			200	
Boring Method HSA, AH	Shelby Tube OD		<u>3</u> ii		Sample Type Sampler Graphics Recovery Graphics	er de	Standard Penetration Test N-Value (blows/foot)	Qu-tsf Unconfined Compressive Strength	Moisture Content	(TT)	(PL)	Percent Passing #200	
SOIL CLASS	SIFICATION			1	er Gra	lwate	rd Pe e (blc	Incor	e Co	-imit	Limit	t Pas	Ş
SURFACE ELEV	()	Stratum Depth	Depth Scale	odimpie No.	Sample Type Sampler Grap	Groundwater	anda Valu	-tsf L mpre	oistur	Liquid Limit (LL)	Plastic Limit (PL)	ircen	Remarks
Latitude (deg): 37.623202, L	ongitude (deg): -85.90517	-	ŭ õ ŭ			ڻ ا		gõ		Lic	Ĩ	Pe	
LEAN CLAY (CL), with silt,	Brown MEDILIM STIFF to	0.5			ss X		2-2-3- [5]		23.2				PP=1.0 tsf
STIFF					ss V		3-5-6-		20.8				PP=1.5 tsf
		4.5			Т		[11]		20.0				
FAT CLAY (CH), with sand VERY STIFF	, Reddish brown, STIFF to	4.5	5		ss 🛛		4-4-6-		23.2				
					Ĥ		[10]						
- with limestone fragments					ss 🛛		5-8-11-		16.7				PP=2.0 tsf
			10 -				[19]						
				-	SH			1.16	38.1	76	29		
LEAN CLAY (CL), with silt,	Reddish brown. STIFF to	12.0			ss 🛛		5-7-9-		32.9				PP=3.5 tsf
VERY STIFF	,				Α		[16]						
			15 _		ss M		3-3-5-		30.5				PP=2.0 tsf
					Å		[8]		30.5				FF-2.0 (5)
						۰							
			20	;	SH			1.17	27.9				
	Deddiele brown	22.0			ss 17		0.0.1		20.0				
FAT CLAY (CH), with sand MEDIUM STIFF to STIFF	, Reaalsn brown,				ss X		9-6-4- [10]		28.3				PP=2.0 tsf
- with limestone fragments			25 —										
					ss X		2-3-2- [5]		38.4				
							-						
			30		SH			0.50	39.1				
					ss 🛛		W-O-H- [<i>WOH</i>]		29.7				
- gray and reddish brown													
Sample Type	Depth to Ground			I		Bori	ing Method						
SPT - Standard Penetration Tes SS - Driven Split Spoon	t Noted on Drilling Too At Completion (in aug		<u>18.0</u> 	ft		Hollo	w Stem Aug						
SH - Pressed Shelby Tube CA - Continuous Flight Auger	At Completion (open	hole)		ft.	DC -	Drivi	inuous Fligh ng Casing	nt Auge	ers				
RC - Rock Core CU - Cuttings	⊻ After <u></u> hour: ▼ After hour:			ft.	MD -	Mud	Ďrilling Jal Hammer						
CT - Continuous Tube	⊈ Alter nous	• _ _		п.			matic Hamn					Pa	ge 1 of 2



TEST BORING LOG

(Continued)

CLIEN	Т	Southeas	t Power Corpora	tion						BORING	#	ST	<u>R 2</u>	<u>6 L</u> :	3		
PROJE	ECT NAME	LG&E-KU	Ford Glendale 3	45 kV	' Tran	smi	ssio	n		JOB # _		LO	UG	E22	2043	3	
PROJE	ECT LOCATIO	N Hodgenvi	lle Road West							DRAWN I	3Y	R . (Orti	z			
												Т. /	And	Ires	;		
		DRILLING and S	SAMPLING INFORMA	TION		-						TES	T DA	ТА			
Date	e Started	4/8/22	Hammer Wt.		140	lbs.											
	DROJECT NAME LG&E-KU Ford Glendale 345 kV Transmission JOB # LOUGE22043																
		J. Burdette	Spoon Sampler C	D	2	in.				st					ieve		
Gendale, KY APPROVED BY T. Andres: DRILLING and SAMPLING INFORMATION TEST DATA Date Started4/8/22 Hammer Wt140 _ lbs: Image: Colspan="2">Test DATA Date Started4/8/22 Hammer Drop30 in. Test DATA Date Completed4/8/22 Hammer Drop30 in. Test Data Drill Foreman J. Burdette Spoon Sampler OD in. started																	
Bori	APPROVED BY T. Andres DRILLING and SAMPLING INFORMATION TEST DATA Date Started 4/8/22 Hammer Wt. 140 Its. Date Completed 4/8/22 Hammer Drop 30 in. Drill Foreman J. Burdette Spoon Sampler OD 2 in. Boring Method HSA, AH Shelby Tube OD 3 in. Stidler Started (continued) Latitude (deg): -85.905174 Stidler Started (deg): -85.905174 Stidler Started (deg): -85.905174 Stidler Started (deg): -85.905174 Stidler Started (deg): -85.905174 Stidler Started (deg): -85.905174 Stidler Started (deg): -85.905174 Stidler Started (deg): -85.905174 Stidler Started (deg): -85.905174 Stidler Started (deg): -85.905174 Stidler Started (deg): -85.905174 Stidler Started (deg): -85.905174 Stidler Started (deg): -85.905174 Stidler Started (deg): -85.905174 Stidler Started (deg): -85.905174 Stidler Started (deg): -85.905174 Stidler Started (deg): -35.905174 Stidler Started (de																
							ype	Graph	ater	Pene blows	confin ive S	Conte	it (LI	nit (P	assir		
APPROVED BY T. Andres DRILLING and SAMPLING INFORMATION TEST DATA Date Started 4/8/22 Hammer Wt. 140 lbs. Date Completed 4/8/22 Hammer Drop 30 in. Drill Foreman J. Burdette Spoon Sampler OD 2 in. Boring Method HSA, AH Shelby Tube OD 3 in. stight of the started																	
L L	atitude (deg):	37.623202, Longitu	ude (deg): -85.905174	Strati Deptl	Dept	Sam No.	Sam	Saml Reco	Grou	Stano N-Va	Qu-tsi Comp	Mois	Liqui	Plast	Perc	Rem	
-0	FAT CLAY (C	H), with sand, Redo						Ň	-	4-3-2-	00				_		
	MEDIUM STI	FF to STIFF					-	Ĥ		[5]							
					40 -												
							SH				0.16	39.7					
-1					-	-	ss	X				15.7					
						-	-	\square		[27]							
					45 -	-	ss			3-3-1-		42.5					
					-		-	А				-					
				18 5													
		Auger Refusal at 48	8.5 feet	40.0													
FAT CLAY (CH), with sand, Reddish brown, SS 4-3-2- 50.5 MEDIUM STIFF to STIFF SS 15-20-27- 15.7 40 SS 15-20-27- 15.7 45 SS 3-3-1- 42.5																	
SDT	<u>Sample Typ</u>		Depth to Ground Noted on Drilling Too		18.0	fi fi			<u>Bori</u>	ing Method							
SS ·	- Driven Split S	Spoon 🖌 🛓	At Completion (in aug			•_ ft.	HS CE	A - H	Hollo Conti	w Stem Aug inuous Fligh	gers	ers					
CA ·	 Pressed She Continuous F 	Flight Auger 👻	At Completion (open	-		ft.	DC	; - [Drivir	ng Casing	n Auge						
RC ·	- Rock Core - Cuttings	Ϋ́	After <u></u> hours	_		•_ ft. • ft.	MF	1 - I	Manu	Drilling ual Hammer							
	- Continuous 1		Cave Depth	-		ft.	AH	- /	Auto	matic Hamn	ner				Pa	ge 2 of	2



CLIEN	νT	Southeast	t Power Corpora	tion						BORING #	£	STI	R 20	6 L4	1	
	-				Trans	smis	ssio	n								6
PROJ	ECT LOCATIO	N Hodgenvil	lle Road West							DRAWN B	Y	R. (Orti	Z		
		Glendale,	KY							APPROVE	D BY	Т. /	And	res		
		DRILLING and S	AMPLING INFORMA	TION								TES	T DA	ТА		
Da	te Started	4/7/22	Hammer Wt.		140	lbs.										
			• •							st					eve	
Ins	pector	D. Melvin	Rock Core Dia.		2	in.				n Te	£				00 S	
Во	ring Method	HSA	Shelby Tube OD		3	in.		ics hics		/foot	ed reng	nt %	(L)	g #2(
				1			be	Grap	ter	enei	onfine /e St	onte	t (LL	lit (PI	assin	
				E		e	le Ty	ler G	dwat	ard F Je (b	Unco essiv	ure C	Limi	c Lim	nt Pa	ks
				tratu	epth cale	amp o.	amp	amplecov	roun	-Valu	u-tsf	loistu	iquid	lastic	erce	ema
_				ΩΩ	00	νz	S	ഗഷ ∏	0	ΰZ	ਰੱਹੱ	Σ	E	Р	٩	<u>۲</u>
	Solution Solution <th< td=""><td>Boring Offset 5 ft</td></th<>			Boring Offset 5 ft												
-																northeast towards tower center
					-											
-					5 -											
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-1																
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					20 -											
					-											
3																
					25 –											
		Auger Refusal at 2	9 feet	29.0												
		Auger Neiusai al 2														
	Sample Typ		Depth to Ground	water												
SPT			Noted on Drilling Too			ft.				ing Method						
SS	- Driven Split S - Pressed She	Spoon 🛓	At Completion (in aug	jers)						w Stem Aug inuous Flight		rs				
CA	- Continuous F	Flight Auger 😁 '	At Completion (open			_ft.	DC	- [Drivir	ng Casing	30					
	- Rock Core - Cuttings		After <u></u> hours After hours			_ ft. ft.	MD MH	- 1	Manu	Drilling Jal Hammer						
	- Continuous 1		Cave Depth	· _		_ n. _ ft.	AH	- /	Auto	matic Hamm	er				Pag	ge 1 of 1
				_												

Borehole	Depth	Sample Type	Liquid Limit	Plastic Limit	Plasticity Index	Class- ification	Water Content (%)	Unconfined Compressive Strength (psi)	Dry Density (pcf)	Wet Density (pcf)	Max. Dry Density (pcf)	Opt. Water Content (%)	CBR	Swell (%)	RQD	Percent Recovery	Сс	Cr	p⊢
STR 16	0.0	SS					15.4												
STR 16	2.5	SS					18.5												
STR 16	5.0	SS					18.4												
STR 16	7.5	SS					19.6												
STR 16		SS					17.6												
STR 16	15.0	SS					20.6												
STR 16		SH	68	22	46	СН	31.7	3.33	85.3	112.3									
STR 16		SS					42.0												
STR 16	25.0	SS					31.4												
STR 16		SH					35.9	0.31	85.4	116.0									
STR 16		SS					29.9												
STR 16		SS					33.9												
STR 16		SS					22.3	0.31	70.5	106.5									
STR 16		SS					41.0												
TR 17 L		SS					21.1												
TR 17 L	1 1.5	SS					24.7												
TR 17 L	1 4.0	SS					21.2												
TR 17 L	1 6.5	SS					23.0												
TR 17 L	1 9.0	SS					26.0												
TR 17 L	1 10.5	SH	32	18	14	CL	21.6	0.80	101.1	122.9									
TR 17 L	1 20.0	SS					31.8												
TR 17 L		SH					31.9	1.44	87.6	115.5									
TR 17 L		SS					34.3												
TR 17 L		SS					57.1												
TR 17 L		SS					86.7												
TR 17 L	1 40.0	SS					81.1												
	A 5		LC									S	Sumr	nary	of Lab	orato	ry R	esult	ts
	ATC G 2724 R Louisvi	roup Ser iver Gree lle, KY 4 (502) 722	vices, L en Circle 0206									Project:	: LG&I n: Hoo	E-KU Fo dgenville	e Road \	dale 345	kV Tr	ansmis	ssio

ATC Group Services, LLC 2724 River Green Circle Louisville, KY 40206 phone (502) 722-1401 Fax (502) 267-4072

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Project: LG&E-KU Ford Glendale 345 kV Transmission Location: Hodgenville Road West City, State: Glendale, KY Number: LOUGE22043 Date: 6/15/2022

									_									Sheet 2	of 7
Borehole	Depth	Sample Type	Liquid Limit	Plastic Limit	Plasticity Index	Class- ification	Water Content (%)	Unconfined Compressive Strength (psi)	Dry Density (pcf)	Wet Density (pcf)	Max. Dry Density (pcf)	Opt. Water Content (%)	CBR	Swell (%)	RQD	Percent Recovery	Сс	Cr	pł
TR 17 L	3 0.0	SS					25.2												
TR 17 L	3 2.5	SS	36	18	18	CL	19.4												
TR 17 L	3 5.0	SS					18.7												
TR 17 L	3 7.5	SS					22.5												
TR 17 L	3 10.0	SH					20.2	1.12	105.8	127.3									
TR 17 L	3 15.0	SS					30.6												
TR 17 L	3 20.0	SH					22.9	1.59	101.6	124.8									
TR 17 L	3 22.0	SS					31.7												
TR 17 L	3 25.0	SS					27.8												
TR 17 L	3 30.0	SH					33.9	0.43	85.8	114.9									
TR 17 L	3 32.0	SS					58.8												
TR 21 L	1 0.0	SS					17.7												
TR 21 L	1 2.5	SS					18.1												
TR 21 L	1 5.0	SS					23.4												
TR 21 L	1 7.5	SS					24.9												
TR 21 L	1 10.0	SH	57	19	38	СН	22.4	2.62	101.4	124.2									
TR 21 L	1 12.0	SS					25.6												
TR 21 L	1 15.0	SS					29.3												
TR 21 L	1 20.0	SH					39.2	0.77	81.6	113.6									
TR 21 L	1 22.0	SS					23.5												
TR 21 L	1 25.0	SS					33.3												
TR 21 L	3 0.0	SS	31	15	16	CL	16.8												
TR 21 L	3 2.5	SS	50	16	34	СН	19.4												
TR 21 L		SS					19.6												
TR 21 L		SS					23.2												
TR 21 L	3 10.0	SH					19.3	0.62	96.9	115.6									
	4-		AS													oorato	ry R	esuli	IS
															ver Corp				
		roup Ser liver Gre										-				dale 345	kV Tr	ansmis	ssio
	Louisvi	lle, KY 4	10206	-										-	e Road \	West			
	phone	(502) 72	2-1401											lendale,			_		
	rax (50)2) 2 [′] 67-4	1072									Numbe	r: LOl	JGE220	43		Date	: 6/15/	202



Summary of Laborato

Image Limit Limit Index <th< th=""><th>RQD</th><th>Swell (%)</th><th></th><th></th><th>RQD Pero</th><th>rcent overy Cc</th><th>Cr</th><th><u>3 of 7</u> pH</th></th<>	RQD	Swell (%)			RQD Pero	rcent overy Cc	Cr	<u>3 of 7</u> pH
TR 21 L3 20.0 SH Image: constraint of the second seco								
TR 21L 3 22.0 SS Image: style								
TR 23A 10.0 SS Image: Constraint of the state of								
TR 23A 12.5 SS Image: SS								
R 23A 15.0 SS Image: second sec								
IR 23A 17.5 SS Image: Constraint of the state								
ITR 23A 110.0 SH 45 20 25 CL 22.6 1.63 104.1 127.6 Image: Constraint of the state								
IR 23A 112.0 SS Image: Constraint of the state								
TR 23A 115.0 SS Image: SS Imag								
R 23A 122.0 SS Image: second se								
TR 23A 125.0 SS Image: style sty								
R 23A 130.0 SH Image: second se								
TR 23A 132.0 SS Image: second s								
IR 23A 30.0 SS Image: SS								
IR 23A 32.5 SS Image: SS								
IR 23A 35.0 SS Image: SS Image: Image: SS Image: Image: Image: SS Image: Image: Image: SS Image: Image: Image: SS Image: Image: Image: SS Image: Image: Image: SS Image: Image: Image: SS Image: Image: Image: SS Image: Image: Image: Image: SS Image: Image: Image: SS Image: Image: Image: SS Image: Image: Image: Image: SS Image: Image: Image: Image: Image: SS Image: Im								
IR 23A 37.5 SS Image: SS <thimage: ss<="" th=""> Image: SS Image:</thimage:>								
IR 23A 310.0 SH 43 17 26 CL 19.8 1.60 106.5 127.6 Image: Constraint of the state o								
IR 23A 312.0 SS Image: SS state of the state of								
IR 23A L315.0 SS								
Image: TR 23A L320.0 SH 50 19 31 CH 20.3 1.82 103.8 124.8 Image: Comparison of the comparison of the								
TR 23A L322.0 SS 40.1 40.1								
TR 23A L330.0 SH 22.5 0.19 102.2 125.3								
Summary of	of Lab	nary c	nary o	ry of La	Labora	atory F	Resul	ts
ATC Group Services, LLC 2724 River Green Circle Louisville, KY 40206 phone (502) 722-1401 Fax (502) 267-4072	er Corp rd Glen Road V <y< td=""><td>ast Pow E-KU Fo Igenville endale,</td><td>ast Powe -KU For genville endale, ł</td><td>Power Co U Ford Gl nville Road lale, KY</td><td>Corporati Glendale load West</td><td>ion 345 kV 1</td><td></td><td></td></y<>	ast Pow E-KU Fo Igenville endale,	ast Powe -KU For genville endale, ł	Power Co U Ford Gl nville Road lale, KY	Corporati Glendale load West	ion 345 kV 1		

																		Sheet 4	of 7
Borehole	Depth	Sample Type	Liquid Limit	Plastic Limit	Plasticity Index	Class- ification	Water Content (%)	Unconfined Compressive Strength (psi)	Dry Density (pcf)	Wet Density (pcf)	Max. Dry Density (pcf)	Opt. Water Content (%)	CBR	Swell (%)	RQD	Percent Recovery	Сс	Cr	рН
STR 25 L	1 0.0	SS					20.9												
STR 25 L	1 2.5	SS	22	14	8	CL	68.8												
STR 25 L	1 5.0	SS					15.8												
STR 25 L	1 7.5	SS					25.9												
6TR 25 L	1 10.0	SH	29	17	12	CL	25.1	0.38	100.4	125.6									
STR 25 L	1 15.0	SS					27.4												
STR 25 L	1 20.0	SS					37.6												
STR 25 L	1 30.0	SS					36.8												
6TR 25 L	1 35.0	SS					35.3												
5TR 25 L	1 40.0	SH					31.1	0.05	90.1	118.1									
STR 25 L	1 42.0	SS					30.8												
6TR 25 L		SS					34.7												
5TR 25 L		SS					17.5												
STR 25 L	3 2.5	SS					18.7												
5TR 25 L		SS					18.4												
5 5 5 7 7 7 7 7 8 7 8 7 8 7 8 7 8 7 8 7	3 7.5	SS					18.4												
5TR 25 L	3 10.0	SH					35.4	0.09	87.8	119.0									
STR 25 L	3 12.0	SS					19.8												
5TR 25 L	3 15.0	SS					24.2												
STR 25 L	3 20.0	SH					33.2	0.05	88.8	118.3									
5TR 25 L	3 22.0	SS					29.2												
TR 25A	L10.0	SS					24.0												
TR 25A	L12.5	SS					25.0												
TR 25A	L1 5.0	SS					14.4												
TR 25A	L17.5	SS					16.4												
TR 25A	L110.0	SH	66	21	45	СН	22.6	1.46	99.4	121.8									
р Ц												[
1904	A 5	-	AC									S	Sumr	nary o	of Lab	oorato	ry R	esult	S
												Client:	Southe	east Pov	ver Corp	oration			
		roup Ser										Project	LG&	E-KU Fo	ord Glen	dale 345	kV Tr	ansmis	sion
		liver Gre		е								Locatio	n: Ho	dgenville	e Road V	West			
	phone	(502) 72	2-1401									-		lendale,					
2	Fax (50)2) 267-4	4072									Numbe	r: LOl	JGE220	43		Date	: 6/15/	2022

pl	Cr	Сс	Percent Recovery	RQD	Swell (%)	CBR	Opt. Water Content (%)	Max. Dry Density (pcf)	Wet Density (pcf)	Dry Density (pcf)	Unconfined Compressive Strength (psi)	Water Content (%)	Class- ification	Plasticity Index	Plastic Limit	Liquid Limit	Sample Type	Depth	Borehole
												12.2					SS	L112.0	R 25A
												22.1					SS	_115.0	R 25A
		Ĩ							125.6	104.0	0.25	20.8					SH	_120.0	R 25A
												20.3					SS	_122.0	R 25A
												36.7					SS	_125.0	R 25A
									115.3	92.3	0.73	24.9					SH	_130.0	R 25A
												20.5					SS	_132.0	R 25A
												32.2					SS	_135.0	R 25A
									120.3	100.4	0.46	19.9					SH	140.0	R 25A
												22.5					SS		R 25A
												8.9					SS	-	R 25A
												20.7					SS		R 25A
												13.9					SS		R 25A
												17.4					SS		R 25A
												18.2					SS	37.5	R 25A
									129.2	112.3	1.26	15.0	CL	13	15	28	SH		R 25A
									120.2			26.0					SS	312.0	R 25A
												29.2					SS	315.0	R 25A
									123.1	96.7	1.79	27.4	СН	40	22	62	SH		R 25A
			+ +						120.1	00.1	1.70	17.6	011	10			SS		R 25A
			+									36.1					SS		R 25A
			+						113.3	81.1	0.45	39.6					SH		R 25A
			+						110.0	01.1	0.70	22.8					SS		TR 26 L
			+									22.0					SS		TR 26 L
			+									21.5					SS		TR 26 L
			+									160.2					SS		TR 26 L



LAB-SUMMARY LAND

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ATC Group Services, LLC 2724 River Green Circle Louisville, KY 40206 phone (502) 722-1401 Fax (502) 267-4072

Client: Southeast Power Corporation Project: LG&E-KU Ford Glendale 345 kV Transmission Location: Hodgenville Road West City, State: Glendale, KY Number: LOUGE22043 Date: 6/15/2022

Borehole	Depth	Sample Type	Liquid Limit	Plastic Limit	Plasticity Index	Class- ification	Water Content (%)	Unconfined Compressive Strength (psi)	Dry Density (pcf)	Wet Density (pcf)	Max. Dry Density (pcf)	Opt. Water Content (%)	CBR	Swell (%)	RQD	Percent Recovery	Сс	Cr	pН
TR 26 L	1 10.0	SH					19.4	0.92	108.8	129.9									
5TR 26 L	1 12.0	SS					21.0												
TR 26 L	1 15.0	SS	49	15	34	CL	26.1												
TR 26 L	1 20.0	SH					23.8	1.23	102.0	126.3									
TR 26 L	1 22.0	SS					41.0												
TR 26 L	1 25.0	SS					36.4												
TR 26 L	1 30.0	SH					36.6	0.72	84.5	115.4									
TR 26 L	1 32.0	SS					38.3												
TR 26 L		SS					39.2												
TR 26 L	1 40.0	SH					43.2	0.32	77.9	111.6									
TR 26 L		SS					23.2												
TR 26 L		SS					20.8												
5TR 26 L		SS					23.2												
TR 26 L	3 7.5	SS					16.7												
TR 26 L	3 10.0	SH	76	29	47		38.1	1.16	81.4	112.3									
TR 26 L	3 12.0	SS					32.9												
5TR 26 L	3 15.0	SS					30.5												
TR 26 L	3 20.0	SH					27.9	1.17	92.1	117.8									
TR 26 L	3 22.0	SS					28.3												
TR 26 L	3 25.0	SS					38.4												
TR 26 L	3 30.0	SH					39.1	0.50	81.9	114.0									
5TR 26 L	3 32.0	SS					29.7												
TR 26 L		SS					50.5												
TR 26 L	3 40.0	SH					39.7	0.16	81.3	113.6									
5TR 26 L	3 42.0	SS					15.7												
TR 26 L	3 45.0	SS					42.5												



ATC Group Services, LLC 2724 River Green Circle Louisville, KY 40206 phone (502) 722-1401 Fax (502) 267-4072

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Summary of Laboratory Results

Client: Southeast Power Corporation Project: LG&E-KU Ford Glendale 345 kV Transmission Location: Hodgenville Road West City, State: Glendale, KY Number: LOUGE22043 Date: 6/15/2022

Depth	Sample Type	Liquid Limit	Plastic Limit	Plasticity Index	Class- ification	Water Content (%)	Unconfined Compressive Strength (psi)	Dry Density (pcf)	Wet Density (pcf)	Max. Dry Density (pcf)	Opt. Water Content (%)	CBR	Swell (%)	RQD	Percent Recovery	Сс	Cr	рH
0.0	SS					21.1												
1.5	SS					19.5												
4.0	SS					16.2												
6.5	SS					29.1												
10.5	SH	34	19	15	CL	20.2	0.85	103.6	124.6									
15.0	SS					33.2												
20.0	SS					36.9												
25.0	SS					61.9												
30.0	SS					57.3												
0.0	SS					22.6												
2.5	SS					21.9												
5.0	SS	28	16	12	CL	21.8												
10.0	SH	66	17	49	СН	35.2	0.98	86.4	116.8									
12.0	SS					44.1												
0.0	SS					19.8												
2.5	SS					16.3												
5.0	SS					10.5												
7.5	SS					16.3												
10.0	SH					34.9	0.39	85.0	114.6									
12.0	SS					54.1												
15.0	SS					72.1												
	0.0 1.5 4.0 6.5 10.5 15.0 20.0 25.0 30.0 0.0 2.5 5.0 10.0 12.0 0.0 2.5 5.0 10.0 12.0 10.0 12.0 10.0 12.0 10.0 12.0 10.0 12.0 10.0 12.0 10.0 12.0 10.0 12.0 10.0 12.0 10.0 12.0 10.0 12.0 10.0 12.0 10.0	Depuil Type 0.0 SS 1.5 SS 4.0 SS 6.5 SS 10.5 SH 15.0 SS 20.0 SS 20.0 SS 30.0 SS 0.0 SS 5.0 SS 10.0 SH 12.0 SS 5.0 SS 5.0 SS 10.0 SH 12.0 SS 5.0 SS 5.0 SS 10.0 SH 12.0 SS 10.0 SH 12.0 SS 10.0 SH 12.0 SS	Deptil Type Limit 0.0 SS 1.5 1.5 SS 1.5 4.0 SS 1.5 6.5 SS 1.5 10.5 SH 34 15.0 SS 1.5 20.0 SS 1.5 20.0 SS 1.5 20.0 SS 1.5 20.0 SS 1.5 20.0 SS 1.5 20.0 SS 1.5 20.0 SS 1.5 30.0 SS 1.5 30.0 SS 1.5 5.0 SS 2.8 10.0 SH 66 12.0 SS 1.5 5.0 SS 1.5 5.0 SS 1.5 5.0 SS 1.5 5.0 SS 1.5 10.0 SH 1.5 10.0 SH 1.5	Deptil Type Limit Limit 0.0 SS	Deptit Type Limit Limit Index 0.0 SS - - - 1.5 SS - - - 4.0 SS - - - 6.5 SS - - - 10.5 SH 34 19 15 15.0 SS - - - 20.0 SS - - - 20.0 SS - - - 20.0 SS - - - 20.0 SS - - - 20.0 SS - - - 20.0 SS - - - 30.0 SS - - - 2.5 SS 28 16 12 10.0 SH 66 17 49 12.0 SS - - - <	Deptit Type Limit Limit Index ification 0.0 SS 1.5 SS 4.0 SS 4.0 SS 6.5 SS 10.5 SH 34 19 15 CL 15.0 SS 20.0 SS 21.0 SS 20.0 SS 30.0 SS 2.5 SS 28 16 12 CL 10.0	Depth Sample Type Liquid Limit Plastic Mindex Plastic ification Class- ification Content (%) 0.0 SS 21.1 1.5 SS 19.5 4.0 SS 19.5 4.0 SS 16.2 6.5 SS 29.1 10.5 SH 34 19 15 CL 20.2 15.0 SS 33.2 20.0 SS 36.9 25.0 SS 36.9 25.0 SS 57.3 0.0 SS 21.9 30.0 SS 28 16 12 CL 21.8 10.0 SS 28 16 12	Depth Sample Type Liquid Limit Plastic Limit Plastic Index Class- ification Content (%) Compressive Strength (psi) 0.0 SS 1 1 21.1 1 1.5 SS 1 1 19.5 1 4.0 SS 1 1 16.2 1 6.5 SS 1 1 29.1 1 10.5 SH 34 19 15 CL 20.2 0.85 15.0 SS 1 1 33.2 1 1 1 20.0 SS 1 1 1 33.2 1 1 20.0 SS 1 1 1 33.2 1 1 1 30.0 SS 1 1 1 1 1 1 30.0 SS 28 16 12 CL 21.8 1 10.0 SS 28 16 12	Depth Sample Type Liquid Limit Plasuci Limit Plasuci Index Colass- ification Content (%) Compressive Strength (psi) Density (pcf) 0.0 SS 21.1 1.5 SS 19.5 4.0 SS 16.2 4.0 SS 29.1 6.5 SS 29.1 10.5 SH 34 19 15 CL 20.2 0.85 103.6 15.0 SS 36.9 20.0 SS 61.9 30.0 SS 57.3	Depth Sample Type Liquid Limit Plastic Index Class-ifcation Content (%) Compressive Density (pcf) Density (pcf) 0.0 SS 21.1 1.5 SS 19.5 4.0 SS 16.2 4.0 SS 29.1 6.5 SS 29.1 10.5 SH 34 19 15 CL 20.2 0.85 103.6 124.6 15.0 SS 33.2 20.0 SS 33.2 20.0 SS	Depth Sample Type Liquid Limit Plasticity index Class-iffcation Content (%) Compressive Strength (ps) Density (pcf) Dens	Depth TypeSample LimitLiquid IndexPlasticity IndexContent (%)Compressive Strength (ps)Density (pcf) <td>Depth Sample Type Liquid Limit Plastic Index Plastic iffication Content (%) Compressive Strength (psi) Density (pcf) Density (pcf) Density (pcf) Content (%) Content (%) Content (%) Content (%) Content (%) Content (%) Content (%) Content (%) Content (%) Density (pcf) Density (pcf) Density (pcf) Content (%) Content (%) Content (%) Content (%) Content (%) Content (%) Content (%) Content (%) Content (%) Content (%) Content (%) Density (pcf) Density (pcf) Density (pcf) Content (%)<td>Depth Sample Liquid Type Liquid Liquid Type Plastic Index Plastic Tipe Content field Compressive Strength (pcf) Density (pcf) Density (pcf) Content (%) Content (%) Swell (%) 0.0 SS I I I 21.1 Image: Strength (psi) Density (pcf) Density (pcf) Density (pcf) Content (%) Image: Strength (psi) 1.5 SS Image: Strength (psi) Image: Strength (psi) Image: Strength (psi) Density (pcf) Density (pcf) Density (pcf) Content (%) Image: Strength (psi) 1.5 SS Image: Strength (psi) Image: Strength (psi) Image: Strength (psi) Image: Strength (psi) Density (pcf) Density</td><td>Depth Sample Type Liquid Limit Plasticity Index Content (%) Compressive Strength (ps) Density (pcf) Density (pcf) Content (pcf) CBR Swell (%) RQD 0.0 SS I I I 21.1 I <tdi< td=""> I I</tdi<></td><td>Depth Sampe Light Plastic index Plastic index Content (%) Compressive Strengt(psi) Density (pcf) Density (pcf) Content (%) CBR SWeil (%) ROD Plastic Plastic) 0.0 SS - - 21.1 -</td><td>Depth Sample Lindia Plastici ndex Colass- infection Compressive Strength (ps) Density (pcf) Density (pcf) Density (pcf) Density (pcf) Content (%) CBR Swent W(%) RQD Perferen Recovery Cc 0.0 SS I I I 21.1 Image: Strength (ps) Image: Strenge: Stre</td><td>Depth Sample Linuit Plasticity Colass- index Compressive Strength Density (pcf) Density (pcf) Density (pcf) Density (pcf) Content (%) CBR Weil (%) ROD Percent Recover Cc Cr 0.0 SS I</td></td>	Depth Sample Type Liquid Limit Plastic Index Plastic iffication Content (%) Compressive Strength (psi) Density (pcf) Density (pcf) Density (pcf) Content (%) Content (%) Content (%) Content (%) Content (%) Content (%) Content (%) Content (%) Content (%) Density (pcf) Density (pcf) Density (pcf) Content (%) Content (%) Content (%) Content (%) Content (%) Content (%) Content (%) Content (%) Content (%) Content (%) Content (%) Density (pcf) Density (pcf) Density (pcf) Content (%) <td>Depth Sample Liquid Type Liquid Liquid Type Plastic Index Plastic Tipe Content field Compressive Strength (pcf) Density (pcf) Density (pcf) Content (%) Content (%) Swell (%) 0.0 SS I I I 21.1 Image: Strength (psi) Density (pcf) Density (pcf) Density (pcf) Content (%) Image: Strength (psi) 1.5 SS Image: Strength (psi) Image: Strength (psi) Image: Strength (psi) Density (pcf) Density (pcf) Density (pcf) Content (%) Image: Strength (psi) 1.5 SS Image: Strength (psi) Image: Strength (psi) Image: Strength (psi) Image: Strength (psi) Density (pcf) Density</td> <td>Depth Sample Type Liquid Limit Plasticity Index Content (%) Compressive Strength (ps) Density (pcf) Density (pcf) Content (pcf) CBR Swell (%) RQD 0.0 SS I I I 21.1 I <tdi< td=""> I I</tdi<></td> <td>Depth Sampe Light Plastic index Plastic index Content (%) Compressive Strengt(psi) Density (pcf) Density (pcf) Content (%) CBR SWeil (%) ROD Plastic Plastic) 0.0 SS - - 21.1 -</td> <td>Depth Sample Lindia Plastici ndex Colass- infection Compressive Strength (ps) Density (pcf) Density (pcf) Density (pcf) Density (pcf) Content (%) CBR Swent W(%) RQD Perferen Recovery Cc 0.0 SS I I I 21.1 Image: Strength (ps) Image: Strenge: Stre</td> <td>Depth Sample Linuit Plasticity Colass- index Compressive Strength Density (pcf) Density (pcf) Density (pcf) Density (pcf) Content (%) CBR Weil (%) ROD Percent Recover Cc Cr 0.0 SS I</td>	Depth Sample Liquid Type Liquid Liquid Type Plastic Index Plastic Tipe Content field Compressive Strength (pcf) Density (pcf) Density (pcf) Content (%) Content (%) Swell (%) 0.0 SS I I I 21.1 Image: Strength (psi) Density (pcf) Density (pcf) Density (pcf) Content (%) Image: Strength (psi) 1.5 SS Image: Strength (psi) Image: Strength (psi) Image: Strength (psi) Density (pcf) Density (pcf) Density (pcf) Content (%) Image: Strength (psi) 1.5 SS Image: Strength (psi) Image: Strength (psi) Image: Strength (psi) Image: Strength (psi) Density (pcf) Density	Depth Sample Type Liquid Limit Plasticity Index Content (%) Compressive Strength (ps) Density (pcf) Density (pcf) Content (pcf) CBR Swell (%) RQD 0.0 SS I I I 21.1 I <tdi< td=""> I I</tdi<>	Depth Sampe Light Plastic index Plastic index Content (%) Compressive Strengt(psi) Density (pcf) Density (pcf) Content (%) CBR SWeil (%) ROD Plastic Plastic) 0.0 SS - - 21.1 -	Depth Sample Lindia Plastici ndex Colass- infection Compressive Strength (ps) Density (pcf) Density (pcf) Density (pcf) Density (pcf) Content (%) CBR Swent W(%) RQD Perferen Recovery Cc 0.0 SS I I I 21.1 Image: Strength (ps) Image: Strenge: Stre	Depth Sample Linuit Plasticity Colass- index Compressive Strength Density (pcf) Density (pcf) Density (pcf) Density (pcf) Content (%) CBR Weil (%) ROD Percent Recover Cc Cr 0.0 SS I

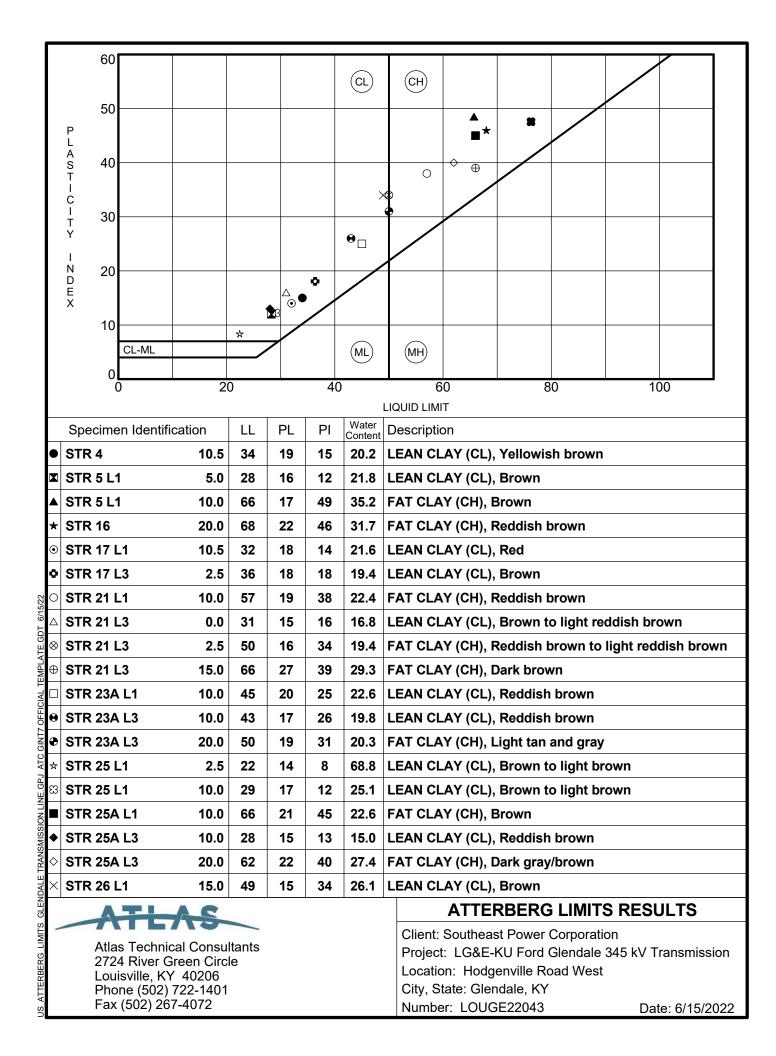


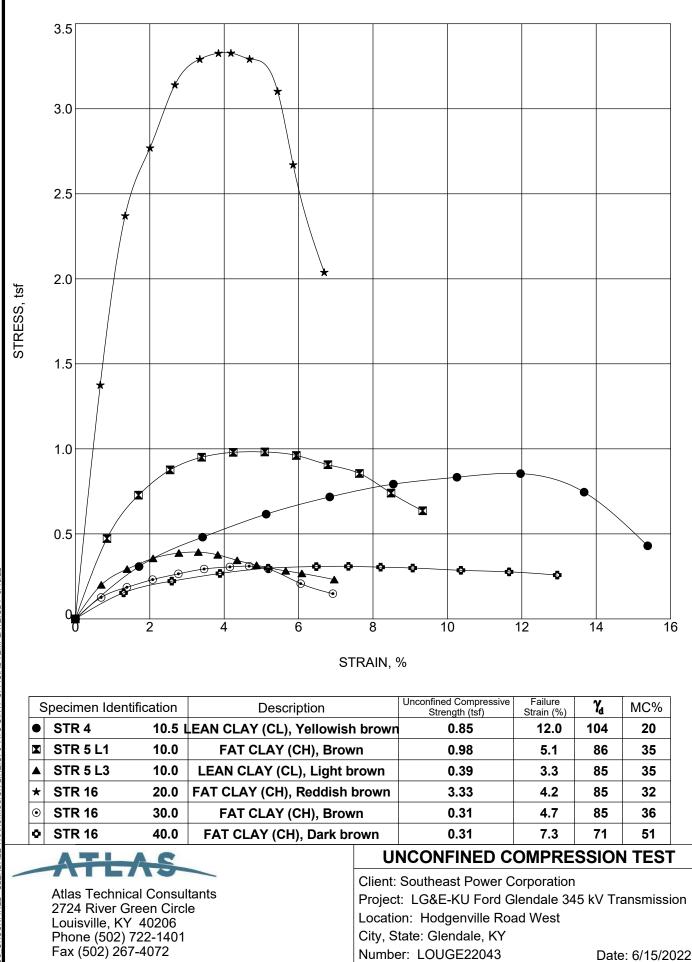
ATC Group Services, LLC 2724 River Green Circle Louisville, KY 40206 phone (502) 722-1401 Fax (502) 267-4072

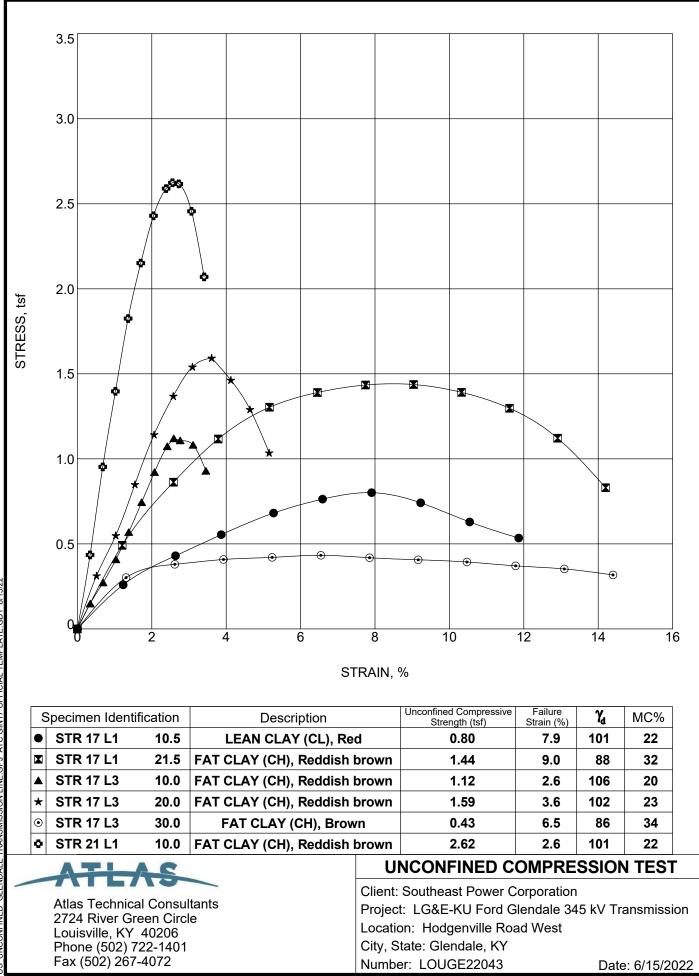
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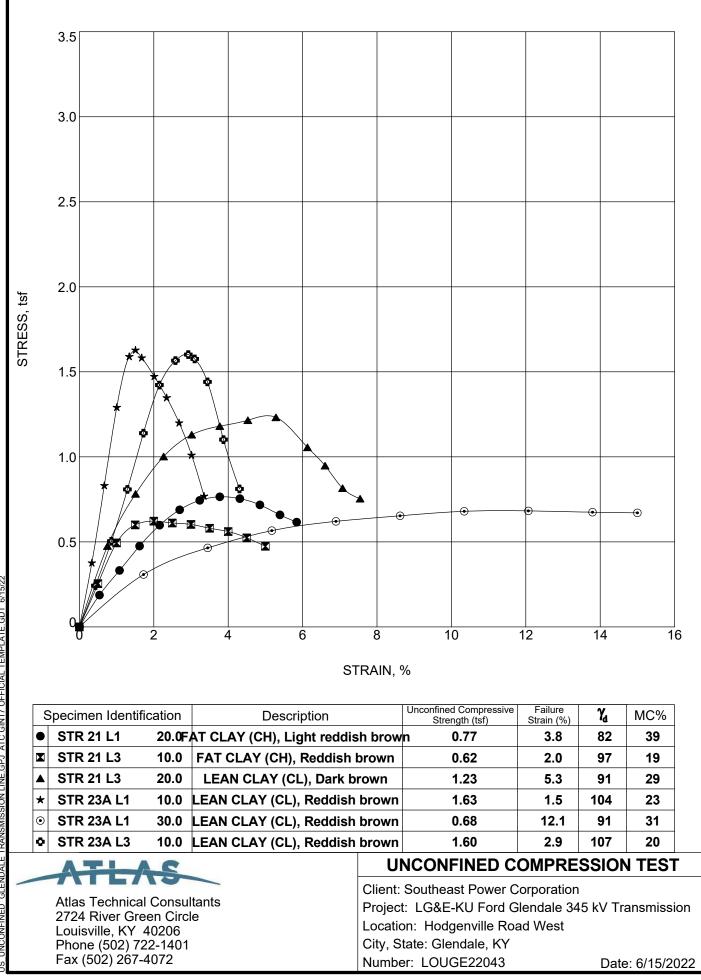
Summary of Laboratory Results

Client: Southeast Power Corporation Project: LG&E-KU Ford Glendale 345 kV Transmission Location: Hodgenville Road West City, State: Glendale, KY Number: LOUGE22043 Date: 6/15/2022

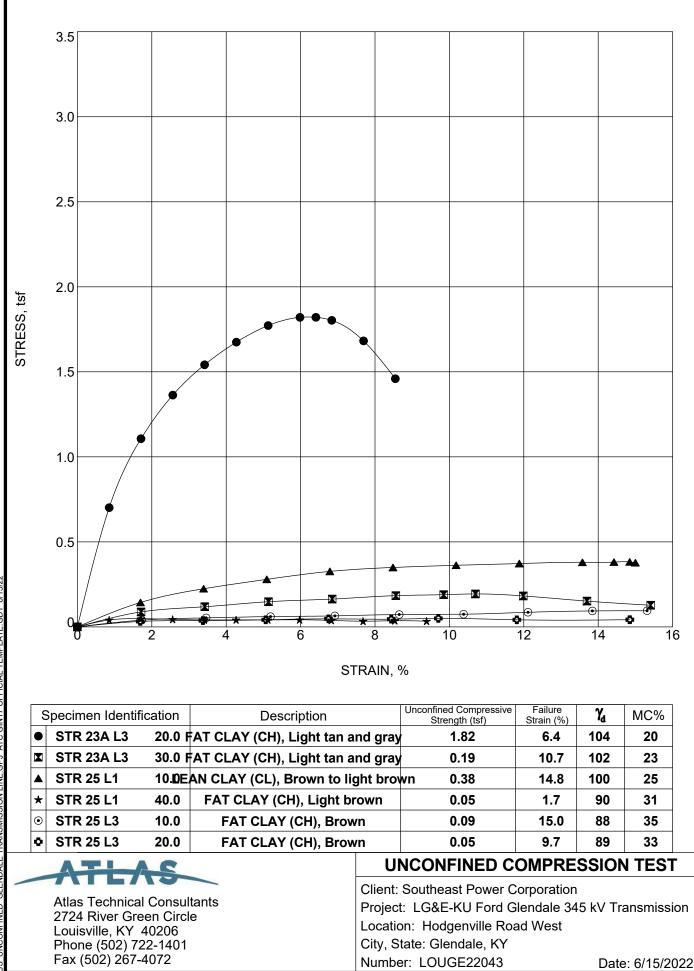




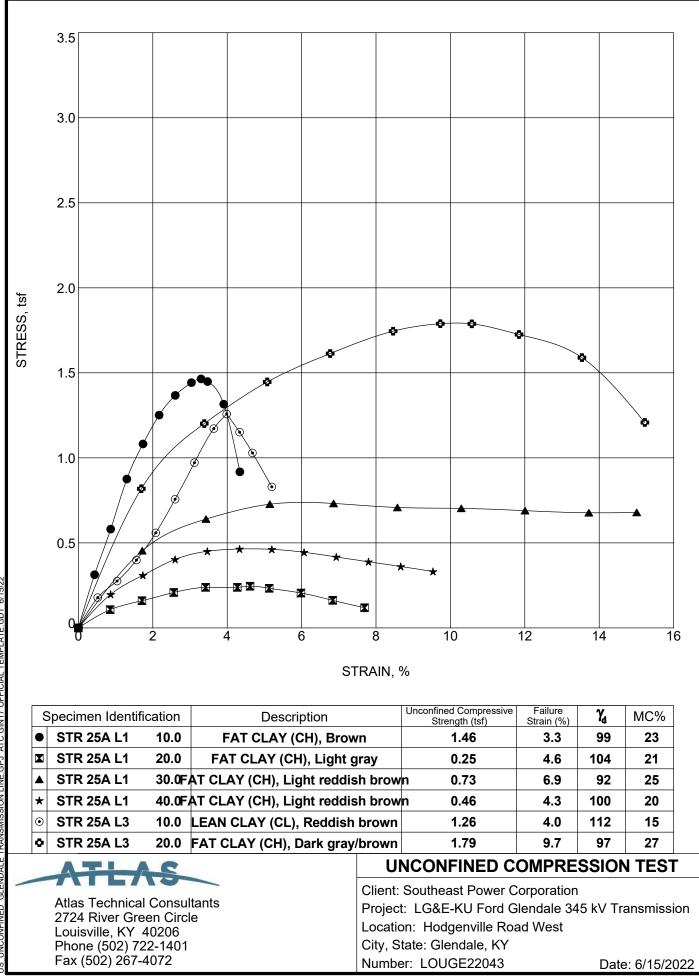




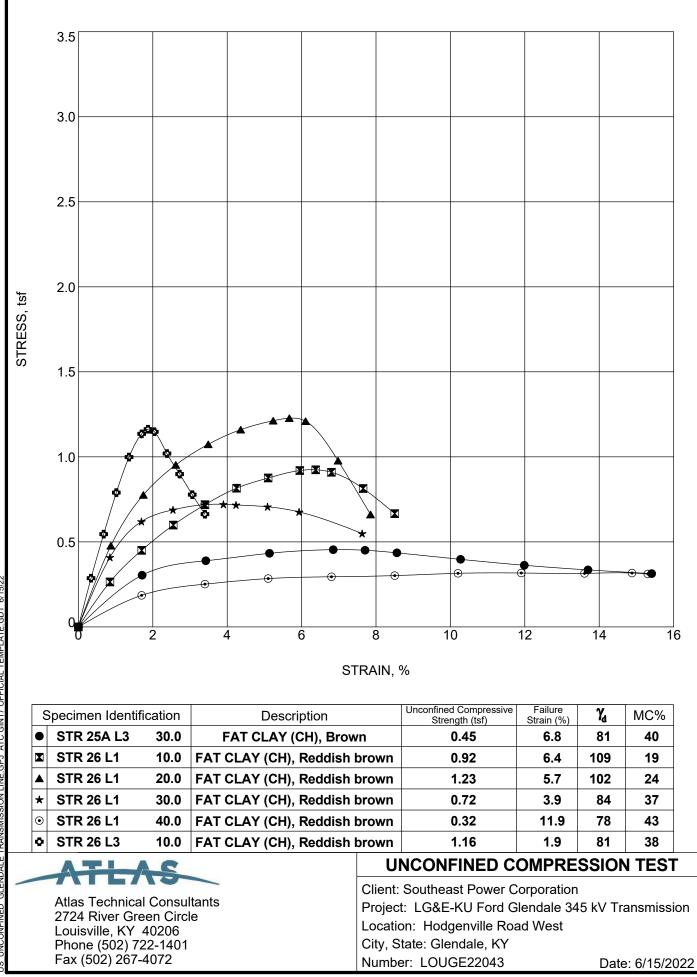
JS UNCONFINED GLENDALE TRANSMISSION LINE.GPJ ATC GINT7 OFFICIAL TEMPLATE.GDT 6/15/22

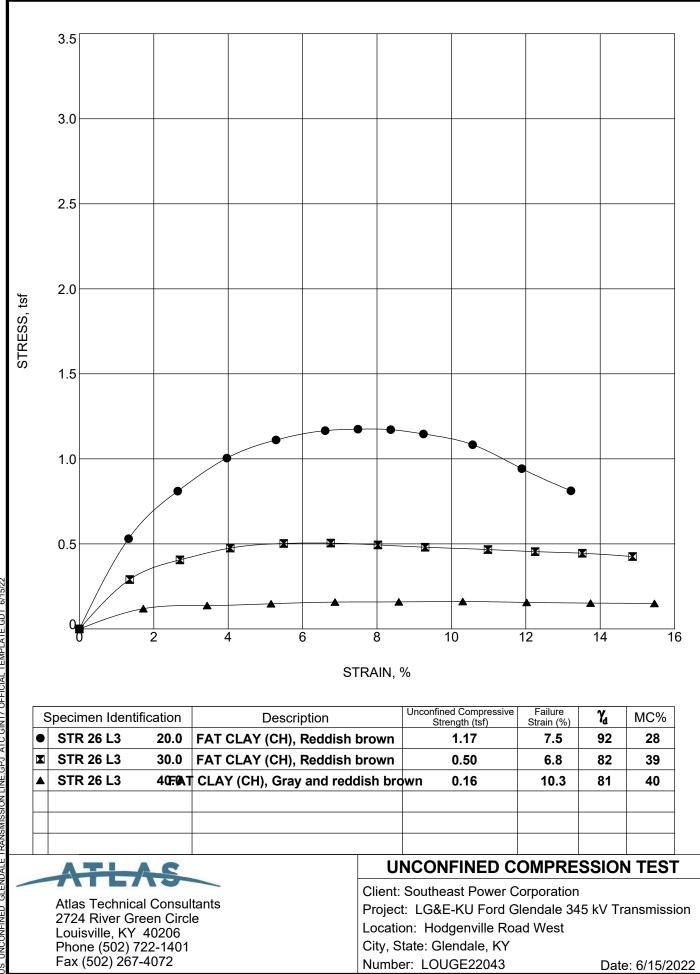


US_UNCONFINED_GLENDALE TRANSMISSION LINE.GPJ_ATC GINT7_OFFICIAL TEMPLATE.GDT_6/15/22



UNCONFINED GLENDALE TRANSMISSION LINE.GPJ ATC GINT7 OFFICIAL TEMPLATE.GDT 6/15/22





US UNCONFINED GLENDALE TRANSMISSION LINE.GPJ ATC GINT7 OFFICIAL TEMPLATE.GDT 6/15/22



Project:	LG&E-KU Ford Glendale 345 kV Transmission					
Project No.:	LOUGE22043					
By:	ZN/JK	Date:	05/20/22			
Checked By:	RCO	Date:	05/23/22			

Unconfined Compression Test on Rock Cores ASTM D7012 Standard Test Methods for Compressive Strength and Elastic Moduli of Intact Rock Core Specimens

Equipment Usage: **Calipers, Scale, Compression Machine**

Compression Test Results

Core ID	Depth (feet)	Diameter (inches)	Area (in ²)	Length after Capping (inches)	L/D Ratio	Maximum Test Load (lbs)	Compressive Strength (psi)	Strength Correction Factor	Corrected Compressive Strength (psi)
STR4	51.9	1.98	3.09	4.24	2.14	15,790	5,120	1.00	5,120
STR4-E	56	1.98	3.07	4.30	2.18	18,735	6,100	1.00	6,100
STR5L1	21.4	1.83	2.62	4.11	2.25	17,893	6,830	1.00	6,830
STR16	51.5	1.97	3.05	3.78	1.92	10,975	3,600	0.99	3,560
STR17L1	42	1.96	3.00	3.67	1.88	10,040	3,340	0.99	3,310
STR17L1	52.3	1.97	3.06	3.65	1.85	10,340	3,380	0.99	3,350
STR21L1	41.7	1.96	3.03	4.01	2.04	10,567	3,490	1.00	3,490
STR23AL1	55.5	1.97	3.05	3.15	1.60	6,265	2,060	0.97	2,000

Unit Weight Determination

Core ID	Depth (feet)	Core Description	Diameter (inches)	Initial Length as Received (inches)	Length before Capping (inches)	Weight (grams)	Unit Weight (pcf)
STR4	51.9	LIMESTONE	1.98	11.00	4.24	460.58	134.3
STR4-E	56	LIMESTONE	1.98	16.00	4.30	566.78	163.3
STR5L1	21.4	LIMESTONE	1.83	35.00	4.11	544.01	192.6
STR16	51.5	LIMESTONE	1.97	7.00	3.78	481.8	159.4
STR17L1	42	LIMESTONE	1.96	15.00	3.67	502.3	173.6
STR17L1	52.3	LIMESTONE	1.97	7.00	3.65	529.9	180.9
STR21L1	41.7	LIMESTONE	1.96	9.00	4.01	491.5	154.2
STR23AL1	55.5	LIMESTONE	1.97	10.00	3.15	417.2	165.5

Specimens not prepared in accordance with ASTM D4543

Specimens are tested at the "as received" mositure condition.

Rate of loading: $100psi/s \pm 10\%$ or $100 x area(in) lbs/s \pm 10\%$

Length-to- Diameter Ratio	Strength Correction Factor
1.00	0.87
1.25	0.93
1.50	0.96
1.75	0.98
2.00-2.50	1.00



Project:	LG&E-KU Ford Glendale 345 kV Transmission					
Project No.:	LOUGE22043					
By:	ZN/JK	Date:	05/20/22			
Checked By:	RCO	Date:	05/23/22			

Unconfined Compression Test on Rock Cores ASTM D7012 Standard Test Methods for Compressive Strength and Elastic Moduli of Intact Rock Core Specimens

Equipment Usage: **Calipers, Scale, Compression Machine**

Compression Test Results

Core ID	Depth (feet)	Diameter (inches)	Area (in ²)	Length after Capping (inches)	L/D Ratio	Maximum Test Load (lbs)	Compressive Strength (psi)	Strength Correction Factor	Corrected Compressive Strength (psi)
STR25AL1	53.0	1.98	3.07	4.37	2.21	11,820	3,850	1.00	3,850
SR25L1	51.7	1.97	3.05	4.16	2.11	12,115	3,970	1.00	3,970

Unit Weight Determination

Core ID	Depth (feet)	Core Description	Diameter (inches)	Initial Length as Received (inches)	Length before Capping (inches)	Weight (grams)	Unit Weight (pcf)
STR25AL1	53.0	LIMESTONE	1.98	7.00	4.37	583.94	165.8
SR25L1	51.7	LIMESTONE	1.97	8.00	4.16	503.37	151.2

Specimens not prepared in accordance with ASTM D4543

Specimens are tested at the "as received" mositure condition.

Rate of loading: $100psi/s \pm 10\%$ or $100 x area(in) lbs/s \pm 10\%$

Length-to- Diameter Ratio	Strength Correction Factor
1.00	0.87
1.25	0.93
1.50	0.96
1.75	0.98
2.00-2.50	1.00