Structural Stability Assessment
South Recycle Pond

Entergy -
White Bluff Steam Electric Station
White Bluff, Arkansas

November 19, 2020

ERM Project Number: 0558908

The business of sustainability

QUALIFIED PROFESSIONAL ENGINEER CERTIFICATION

I hereby certify, as a Professional Engineer in the State of Arkansas, that the information in this document was assembled under my direct supervisory control. This report is not intended or represented to be suitable for reuse by Entergy Arkansas, LLC, White Bluff Steam Electric Station or others without specific verification or adaptation by the Engineer.

This assessment has been prepared for the exclusive use of Entergy Arkansas, LLC, in accordance with the general engineering standards at the time the services were performed. This work has been performed for the sole purpose of assisting Entergy in evaluating the White Bluff South Recycle Pond's consistency with the FOS assessment provisions of 40 CFR 257.73(d).

The findings of the assessment, as represented within this report, must be viewed in recognition of certain limiting conditions. The scope of work commissioned for this project represents a reasonable engineering analysis, consistent with good commercial practice and subject to all of the limitations; both stated and unstated in the report as well as identified assumptions. In the course of this assessment, ERM has relied on information provided by Entergy, such as design drawings, regulatory correspondence, site inspection of the facility, interviews, and the project team's experience. ERM has made no independent investigation as to the validity, completeness, or accuracy of such information provided. For the purposes of this assessment, such information is assumed accurate unless contradictory evidence is noted, and ERM does not express or imply any warranty regarding information provided to us.

The findings and conclusions presented herein should reflect conditions as identified during ERM's site visit.

Wayne T. Sicora P.E., Arkansas

Seals

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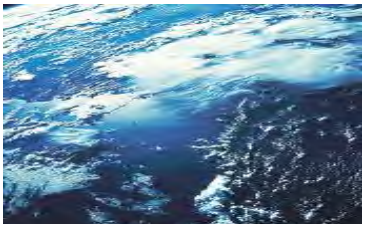

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1.0 PURPOSE AND SCOPE

The South Recycle Pond was used primarily, but not exclusively, for recycling bottom ash sluice water at the White Bluff Steam Electric Station. The South Recycle Pond ceased all waste receipt in October 2018. This sluice water may have contained filtrate deposits of bottom ash, which also present finer-grained particles intermixed with the bottom ash. For purposes of this assessment, ERM has assumed that the recycle pond is a coal combustion residuals (CCR) surface impoundment as defined by the *Hazardous and Solid Waste Management System, Disposal of Coal Combustion Residuals from Electric Utilities* (the "CCR Rule") in 40 CFR 257.2.

ERM has prepared this Initial Structural Stability Assessment for the South Recycle Pond at the White Bluff Steam Electric Station to ensure the South Recycle Pond is consistent with the requirements described in 40 CFR 257.73(d), which are part of the broader provisions of the 40 CFR 257.73, *Structural Integrity Criteria for existing CCR surface impoundments*.

2.0 SITE DESCRIPTION AND BACKGROUND

The White Bluff Steam Electric Station is located at 1100 White Bluff Road, in the City of Redfield, Arkansas. It is owned and operated by Entergy Arkansas, LLC. The site map is presented as Figure 1 and identifies two recycle ponds, the South Recycle Pond and the North Recycle Pond. While active, the South Recycle Pond was used primarily but not exclusively to recycle bottom ash sluice water, but Entergy posted notice of intent to close the South Recycle Pond on October 5, 2018, and has since ceased waste receipt and initiated closure of the pond.

A topographic survey (Appendix A) of the two recycle ponds was conducted by B&F Engineering, Inc. (B&F Engineering) on July 5 and 6, 2018. This survey depicts the approximate top of infill elevations, the elevations of the pond floors as designed (as reference), containment berms dimensions and other layout features. Similarly, a geophysical survey of both ponds was conducted by GeoView of St. Petersburg, FL in June 2018. This geophysical survey (Appendix B) mapped the elevations of the north and south pond floors through compressed high-intensity radiated pulse (CHIRP) sonar imaging. The geophysical survey indicated that the bottom elevation of the South Recycle Pond ranged from approximately 253.5 to 256 feet. A comparison of the top of infill survey and the pond floor survey indicate that the thickness of the infill in both ponds varied from approximately 0 to 3 feet near the edges to 6 to 13 feet in the middle portions.

3.0 STRUCTURAL STABILITY ASSESSMENT

3.1 Site Visit and Field Observations

An initial site inspection was conducted by ERM on March 14, 2019, to ensure that the South Recycle Pond is operating and maintained in accordance with generally accepted good engineering practices. During the inspection, ERM met with White Bluff plant personnel and discussed operations and maintenance of the pond. Photographs obtained during the March 14, 2019 site visit depicting the ponds conditions are included in Appendix E.

3.2 Foundations and Abutments

Section 257.73 (d)(1)(i) requires that the foundations and abutments of the pond to be stable.

No design reports or specifications are available for the South Recycle Pond. The South Recycle Pond has a constructed berm on its northern (shared berm) and southern perimeter (separating the South Recycle Pond from the lower lake).

Subsurface investigation was conducted in May and June 2018 by installing several soil borings around the pond (boring logs presented in Appendix C). The locations of the borings are shown on Figure 1. Based on the review of soil observed at depths corresponding to the pond depth, the pond bottom predominantly consists of clayey material (CH) with few locations exhibiting other fine-grained (SC, and SM) soils. The berms and abutments also consist of similar fine-grained cohesive soils exhibiting a high clay content, with intermediate lenses, pockets and/or thin layers of non-cohesive SM materials.

The soils were sampled in six locations at which undisturbed samples were obtained to conduct triaxial, consolidated-undrained shear strength tests with pore pressure measurements (tx/cu/pp tests) in a geotechnical laboratory in addition to classification and correlation tests. This data is summarized in Table 1, and as may be observed, the results of the strength testing indicates very similar results for the CL/CH and SC materials, with some variance for the SM materials. The complete laboratory data utilized is presented in Appendix D. These data were used in the stability evaluation of the South Recycle Pond containment berms/abatements as presented in the separate report entitled “Factor of Safety Assessment – South Recycle Pond” dated November 19, 2020. This analysis concluded that the slope of containment berms/abutments is stable in the existing configuration.

Table 1. Shear Strength Test Results Summary

Location	Depth (ft)	USCS	Effective Stress			Total Stress			Density (pcf)
			Angle of Friction (°)	Cohesion (psi)	Cohesion (psf)	Angle of Friction (°)	Cohesion (psi)	Cohesion (psf)	
B-1	8 to 10	CL	21.6	1.5	216.0	12.3	2.6	374.4	100.0
B-3	10 to 12	SC	32.5	0.0	0.0	23.6	0.0	0.0	100.0
B-3	20 to 22	SM	22.1	3.0	432.0	22.4	4.2	604.8	100.0
B-5	3 to 5	CL	29.6	2.5	360.0	26.1	1.5	216.0	95.4
B-7	5 to 7	SM	42.5	11.2	1612.8	31.7	12.2	1756.8	90.4
B-7	15 to 17	SC	25.4	0.9	129.6	16.9	0.0	0.0	100.0
RP-4	20 to 22	CL	24.3	0.9	129.6	12.5	2.2	316.8	93.0

Location	Depth (ft)	USCS	Effective Stress			Total Stress			Density (pcf)
			Angle of Friction (°)	Cohesion (psi)	Cohesion (psf)	Angle of Friction (°)	Cohesion (psi)	Cohesion (psf)	
		Average CL	25.2		235.2	17.0		302.4	96.1
		Average SC	29.0		64.8	20.3		0.0	100
		Average SM	32.3		1022.4	27.1		1180.8	95.2
		Bottom Ash[1]	38		0	38		0	100

Notes:

1. The infill material, or finer-grained particles intermixed with bottom ash, in the South Pond was not specifically sampled and analyzed. The strength parameters are derived from the typical range of industry-accepted direct shear test values surveyed by the Federal Highway Administration (FHWA) Research and Technology Program (FHWA-RD-97-148) entitled, User Guidelines for Waste and Byproduct Materials in Pavement Construction, 2008). The range of angle of internal friction from this source is 38 to 42 degrees; a conservative assignment of 38 degrees was applied to accommodate the potential for finer-grained particles being entrained in the bottom ash. Though ash can exhibit some apparent cohesion, none was applied as a conservative value.

Based on the findings of the subsurface investigations, the foundations materials and abutments are suitable for the South Recycle Pond.

3.3 Slope Protection

Section 257.73(d)(1)(ii) requires adequate slope protection against surface erosion, wave action, and adverse effects of sudden drawdown.

The containment berms are constructed with a minimum slope of 2.5H: 1V. As observed during the March 2019 initial site visit, the majority of the inboard slopes are covered by grass vegetation protecting against surface erosion, wave action, and adverse effects of sudden drawdown. No erosions or settlement of the slopes was observed during the March 2019 visit. The top of the berms have gravel access roads with adequate drainage slopes and are lined with grass on the shoulders.

A slope stability of containment berms presented elsewhere (see report entitled “Factor of Safety Assessment – South Recycle Pond” dated November 19, 2020) indicates the slopes of the constructed berms in the existing configuration are stable. Thus, the current condition of the grassed slopes and shoulders are adequate.

Operation and maintenance for these areas includes regular mowing of the grass vegetation. Any erosion or slips that may occur will be repaired within a timely manner.

3.4 Dike Construction

Section 257.73(d)(1)(iii) requires dikes to be mechanically compacted to a density sufficient to withstand the range of loading conditions in the CCR unit.

The dikes for the South Recycle Pond have a maximum design height of 24 feet on side slope of 2.5H: 1V. The elevation at the top of the dikes around the perimeter is approximately 281 feet, and the maximum storage water elevation is 278 feet. The original construction specifications are unavailable for the South Recycle Pond. However, as discussed in Section 3.2, borings through the dikes indicate that the material is generally consisted of fine-grained (CL, CH and SC) cohesive soils exhibiting a high clay content, with intermediate lenses, pockets and/or thin layers of non-cohesive SM material. The uppermost layer consists of silty clays of low to high plasticity, is variable in thickness and composition, and is reported to be fill materials obtained from a neighboring on-site borrow source during construction of the ponds. The boring logs indicates that majority of these materials

are dense, medium stiff-to-stiff representative of a compacted earthen material. A stability analysis of the diking system was also conducted which demonstrate that the dikes have a factor of safety greater than the minimum values required by the CCR rule.

3.5 Vegetation Control

Section 257.73(d)(1)(iv) requires that the vegetated slopes of dikes and surrounding areas not to exceed a height of six inches above the slope of the dike, except for slopes which have an alternate form or forms of slope protection.

During the March 2019 site visit vegetative grown on the dikes were observed to be less than 6 inches. The vegetative areas are moved to facilitate inspections and promote the growth of the vegetative layer. This is done also to prevent the growth of woody vegetation.

3.6 Spillway System

Section 257.73(d)(1)(v) requires that a single spillway or a combination of spillways must be designed, constructed, operated, and maintained to adequately manage peak flow as per hazard classification of the CCR surface impoundment.

The South Recycle Pond does not have a spillway system. Therefore, the spillway requirement in 40 CFR 257.73(d)(1)(v) is not applicable.

3.7 Hydraulic Structures

Section 257.73(d)(1)(vi) requires that hydraulic structures underlying the base of the CCR unit or passing through the dike of the CCR unit shall maintain structural integrity and are free of significant deterioration, deformation, distortion bedding deficiencies, sedimentation, and debris which may negatively affect the operation the hydraulic structure.

There are no hydraulic structures underlying the base of the South Recycle Pond or passing through the dikes of the South Recycle Pond. Thus Section 257.73(d)(1)(vi) is not applicable.

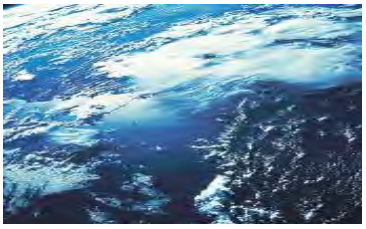
3.8 Sudden Drawdown of Adjacent Water Bodies

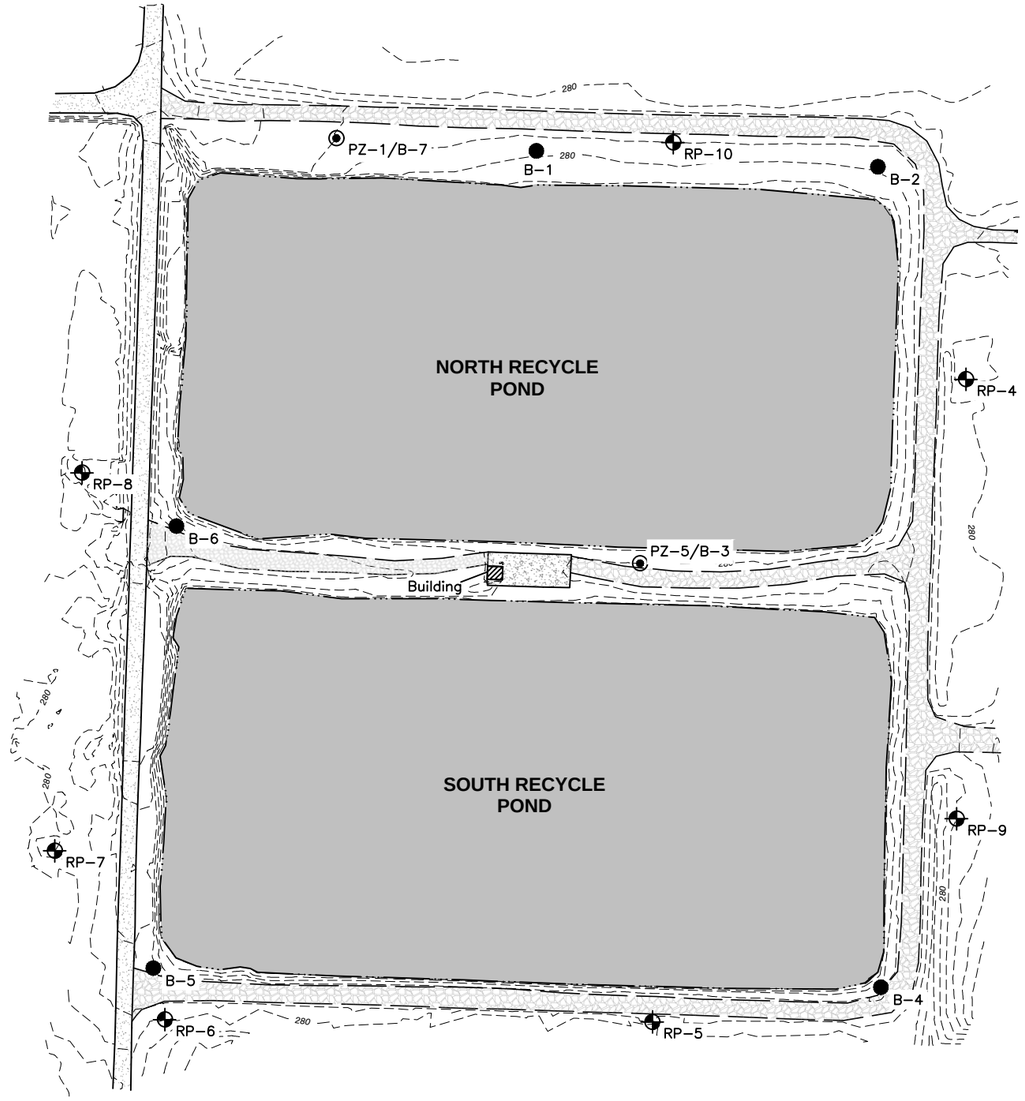
Section 257.73(d)(1)(vii) requires that for CCR units with downstream slopes which can be inundated by the pool of an adjacent water body, such as a river, stream or lake, maintains structural stability during sudden drawdown of the adjacent water body.

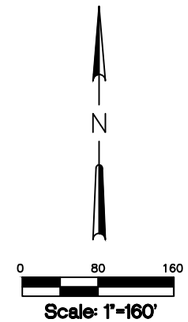
The South Recycle Pond is approximately 3,600 feet from the nearby Arkansas River. The pond is outside the limits of FEMA regulatory floodway. Based on the National Oceanic and Atmospheric Administration (NOAA), the highest water elevation in Arkansas River recorded in over 100 years at a Gauge Station in Pine Bluff was 214.9 feet (May 1943).

The downstream slope of the South Recycle Pond is not expected to be inundated from adjacent water bodies.

Figures







LEGEND

- 280 — 5-FT INDEX CONTOUR
- 1-FT INTERMEDIATE CONTOUR
- PAVED ROAD
- GRAVEL ROAD
- CONCRETE PAD
- B-1 SOIL BORING
- PZ-1 PIEZOMETER
- RP-6 MONITORING WELL
- EXTENT OF WATER, JUNE 2018
- EDGE OF WATER, JUNE 2018

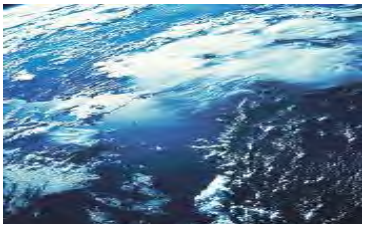
NOTES:

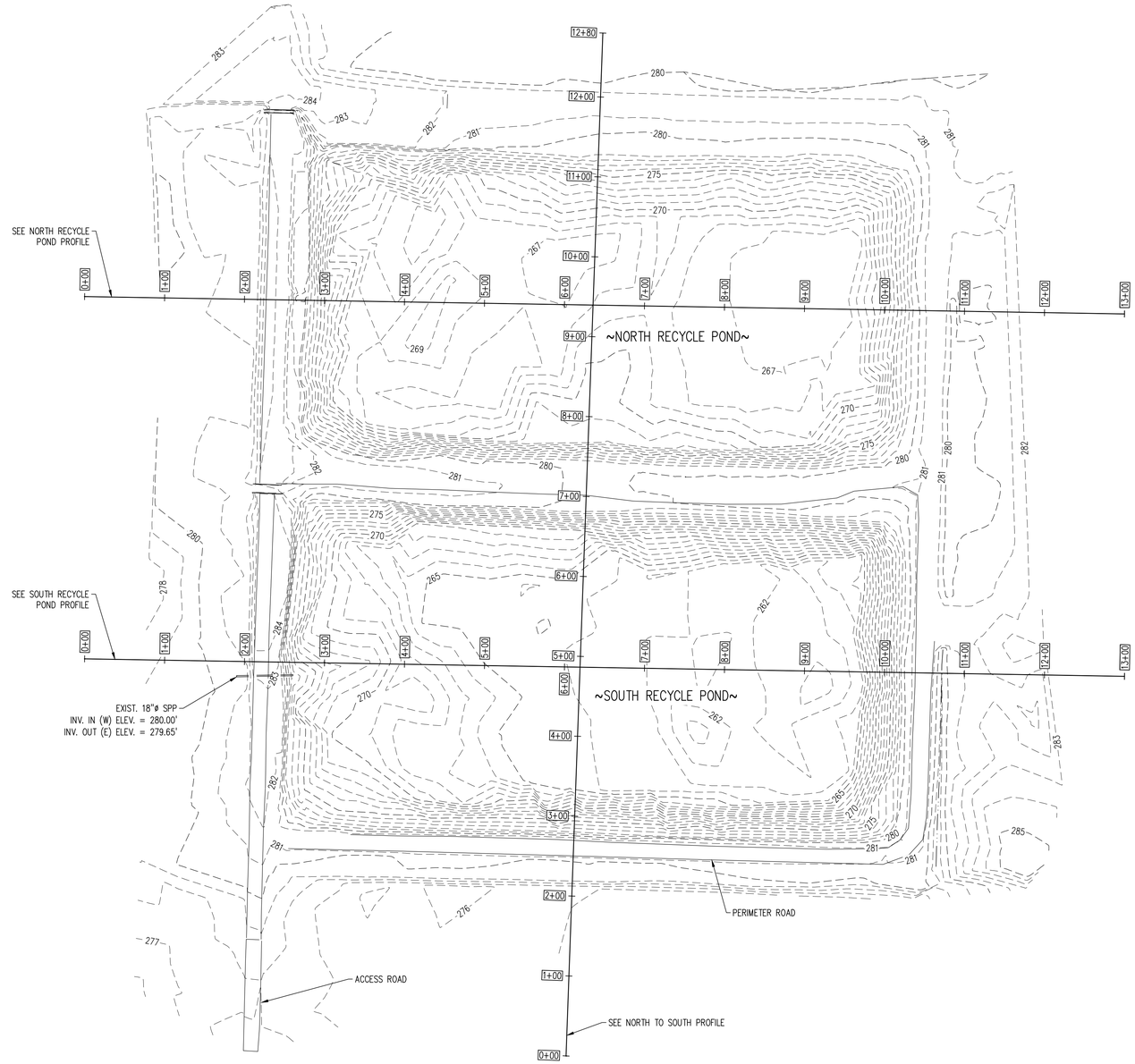
1. TOPOGRAPHIC INFORMATION IS FROM SURVEY PERFORMED BY HARMON SURVEYING, INC., JUNE 2018.
2. DRAWING IS BASED ON ARKANSAS STATE PLANE SYSTEM, NAD83, U.S. FEET.

R:\projects\07920-1845-001\cad\dwg\257-61 Wetlands\07920-1862-001-FG01.DWG

Figure 1. Site Map, Entergy White Bluff Recycle Ponds.

Appendix A
Topographic Survey





NOTE: TOPOGRAPHIC MAP BASED ON SURVEY BY B&F ENGINEERING ON JULY 5TH & 6TH, 2018 AND ELECTRONIC CAD FILE BY HARMON SURVEYING, INC. DATED 6/28/18.

LEGEND

235 — MAJOR CONTOUR INDEX

236 — MINOR CONTOUR

PRELIMINARY
FOR REFERENCE ONLY

80 80 60 20 0 40 80 160
SCALE: 1" = 80'

REV. #	REV. DATE	BY	REVISIONS
A	8/6/18	DBW	ISSUED FOR REVIEW

B&F ENGINEERING, INC.
928 AIRPORT ROAD
HOT SPRINGS, AR 71913
(PH) 501-767-2366
(FAX) 501-767-6859
(EMAIL) info@bnfeng.com

PRELIMINARY

WHITE BLUFF RECYCLE PONDS

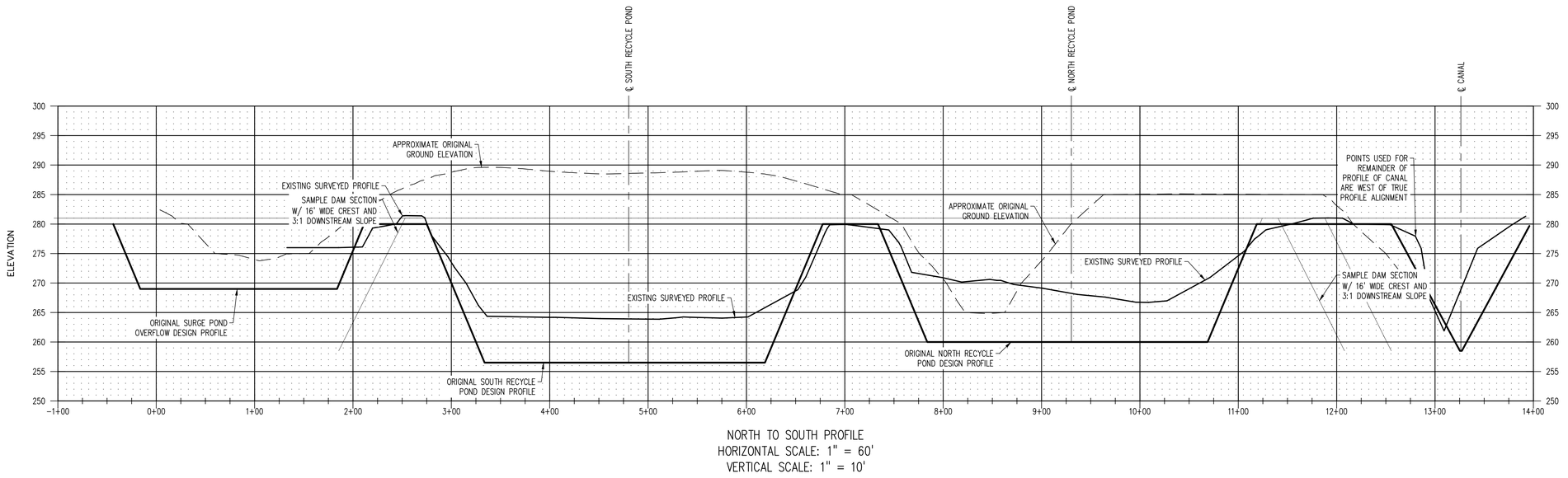
ENTERGY ARKANSAS
1100 WHITE BLUFF RD
REDFIELD, AR

	BY	DATE
Design	DMM	7/18
Drawn	DMM	7/18
Checked		
Survey	TAW	07/18
Fld.Bk. #	2177	
Rev. #		

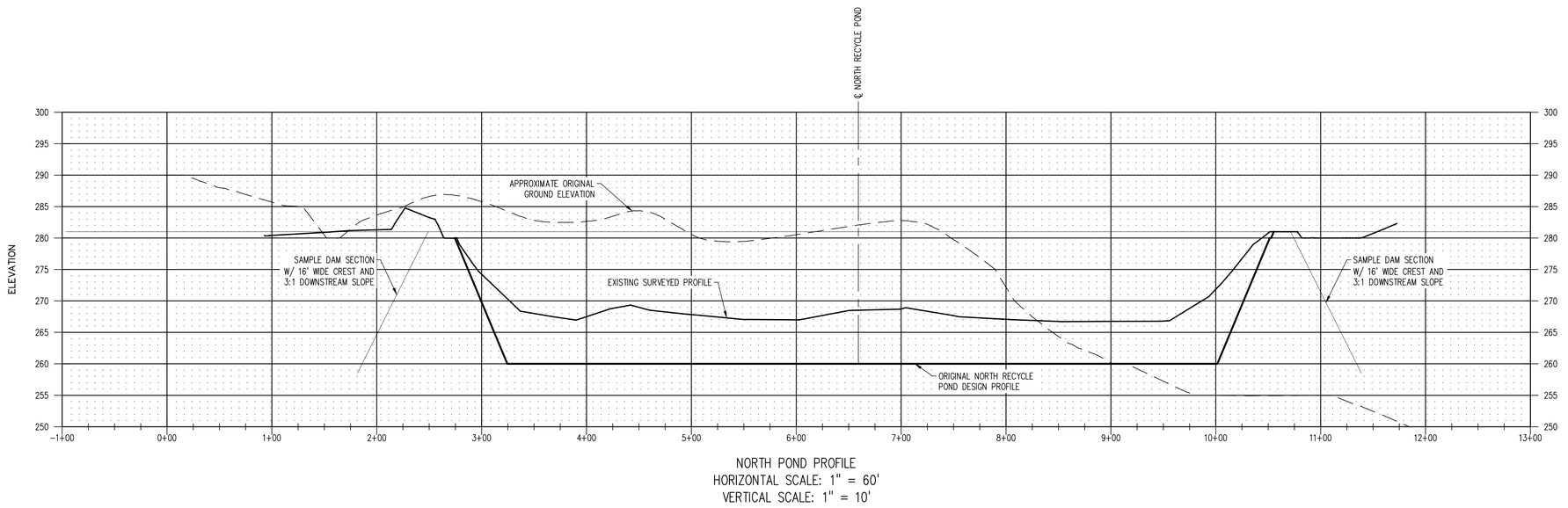
B&F PROJ. 7-4183-0201
FILE NAME: 002
ISSUE DATE: 8/6/18

RECYCLE PONDS PLAN VIEW

EX 1



NORTH TO SOUTH PROFILE
HORIZONTAL SCALE: 1" = 60'
VERTICAL SCALE: 1" = 10'



NORTH POND PROFILE
HORIZONTAL SCALE: 1" = 60'
VERTICAL SCALE: 1" = 10'

PRELIMINARY
FOR REFERENCE ONLY

10 8 6 4 2 0 5 10 20
SCALE: 1" = 10'

60 50 40 30 20 10 0 30 60 100
SCALE: 1" = 60'

REV. #	REV. DATE	BY	REVISIONS
A	8/6/18	DBW	ISSUED FOR REVIEW

B&F ENGINEERING, INC.
928 AIRPORT ROAD
HOT SPRINGS, AR 71913
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(EMAIL) info@bnfeng.com

PRELIMINARY

WHITE BLUFF RECYCLE PONDS

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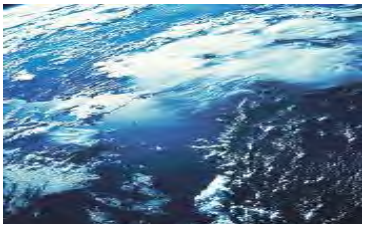
Survey	TAW	07/18
Fld.Bk. #	2177	
Rev. #		

B&F PROJ. 7-4183-0201
FILE NAME: 002
ISSUE DATE: 8/6/18

RECYCLE PONDS PROFILES

EX 2

Appendix B
Final Report for Geophysical Survey



FINAL REPORT
ASH POND SURVEY
WHITE BLUFF POWER PLANT
JEFFERSON COUNTY, ARKANSAS

Prepared for FTN Associates, Ltd.
Little Rock, Arkansas

Prepared by GeoView, Inc.
St. Petersburg, Florida

September 24, 2018

Ms. Dana Derrington, PE, PG
FTN Associates, Ltd.
3 Innwood Circle, Suite 220
Little Rock, AR 72211

Subject: Transmittal of Final Report for Geophysical Survey
White Bluff Steam Electric Station – Recycle Pond Survey
Jefferson County, Arkansas
GeoView Project Number 26897 Rev 2

Dear Ms. Derrington,

GeoView, Inc. (GeoView) is pleased to submit the final report which summarizes and presents the results of the geophysical survey conducted at the above referenced site. Sub-bottom profiling was used to map the bottom of the recycle ponds. GeoView appreciates the opportunity to have assisted you on this project. If you have any questions or comments about the report, please contact us.

Sincerely,
GEOVIEW, INC.

Chris Taylor, P.G.
Vice President
Florida Professional Geologist
Number 2256

Merritt McLean
Geophysicist

1.0 Introduction

A marine geophysical survey was conducted on two recycle ponds located at the White Bluff Steam Electric Station in Jefferson County, Arkansas. The purpose of the study was to map the bottom elevation of the recycle ponds. Each recycle pond was approximately 750 by 390 feet in size. The survey was conducted on June 14 and 15, 2018. The locations of the geophysical survey area are provided on Figures 1 and 2.

2.0 Description of Geophysical Investigation

The geophysical survey was conducted using a sub-bottom profiling towfish. The sub-bottom data was collected using an Edgetech 3100 system with a 216 towfish. The Edgetech system is a full Spectrum CHIRP imaging system. A frequency range of 2-16 kHz was used. During the survey, the towfish was situated 1.0 feet below the surface of the water. The high-power, low-frequency system was chosen to map the pond bottoms. The equipment was mounted to an unmanned, portable pontoon boat. The boat was pulled using ropes along each transect line. Photographs showing the equipment configuration are provided in Appendix 2.

Within each pond, data was collected on north/south oriented transects spaced approximately 50 feet apart. The positions of the geophysical transect lines were recorded using a differential Trimble Geo6000 Global Positioning System (GPS). Real time differential corrections were applied to the GPS positions.

The data was processed using Edgetech Discover software. The two way travel time distances to the pond bottom were digitized and depths/elevations were calculated using a velocity of 4,921 feet per second.

The digitized elevations were exported into an Excel spreadsheet and converted for use in Surfer. The coordinates were converted to Arkansas South State Plane, NAD2011 (US Survey feet) using Trimble Pathfinder and the elevations were converted to State Plane NAVD88 using a topographic site survey provided by FTN.

3.0 Survey Results

Results of the survey were able to provide accurate sub-bottom information for the elevation of the bottom of the recycle ponds. Contour maps showing the elevations of the bottom of the ponds are shown on Figure 1.

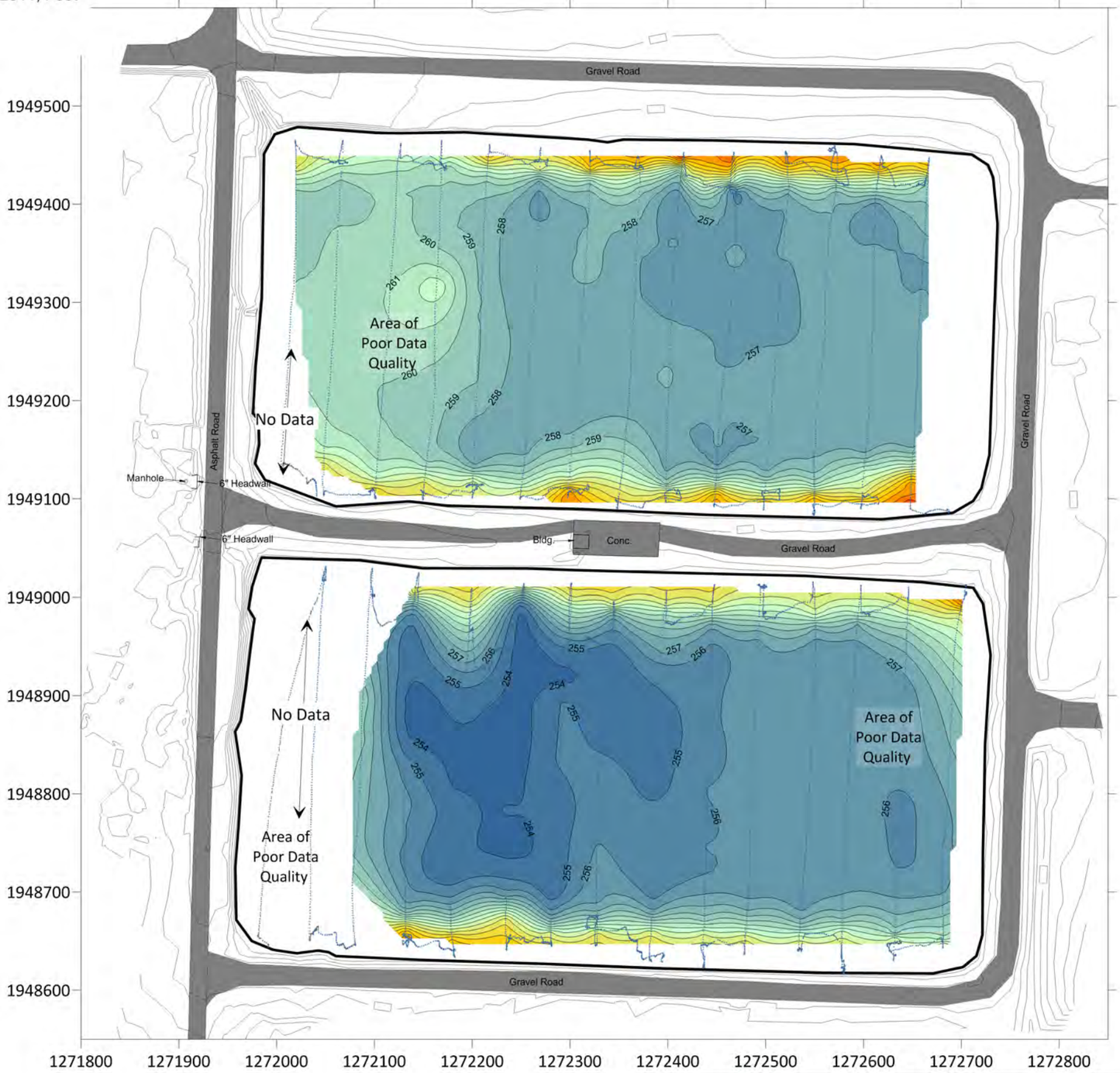
In general, the bottom elevation of the pond in the north pond ranged from approximately 256 to 260 feet. The bottom elevation of the pond in the south pond ranged from approximately 253.5 to 256 feet.

The data quality within the western portion of the north pond and the eastern and far western portions of the south pond was lower than in other portions of survey areas. In these areas, a shallower, intermediate reflector was present that partially obscured the bottom of the pond. In portions of the southern pond, the bottom of the pond was completely obscured and no valid data was able to be derived. These areas of poor quality are shown on the figure.

A discussion of the limitations of the geophysical methods used in this investigation is provided in Appendix 3.

APPENDIX 1
FIGURES

1. Coordinates: US State Plane, Arkansas South, NAD 2011, Feet
2. Vertical Datum: NAVD88, Feet
3. Elevation of Water at Time of Survey:
   277.75 Feet (North Pond)
   278.1 Feet (South Pond)
4. Towfish Located 1 foot Below Water Surface



275
274
273
272
271
270
269
268
267
266
265
264
263
262
261
260
259
258
257
256
255
254
253

Elevation of Pond Bottom
(NAVD 88, Feet)

NORTH

0 60 120

SCALE: 1"= 120'

EXPLANATION

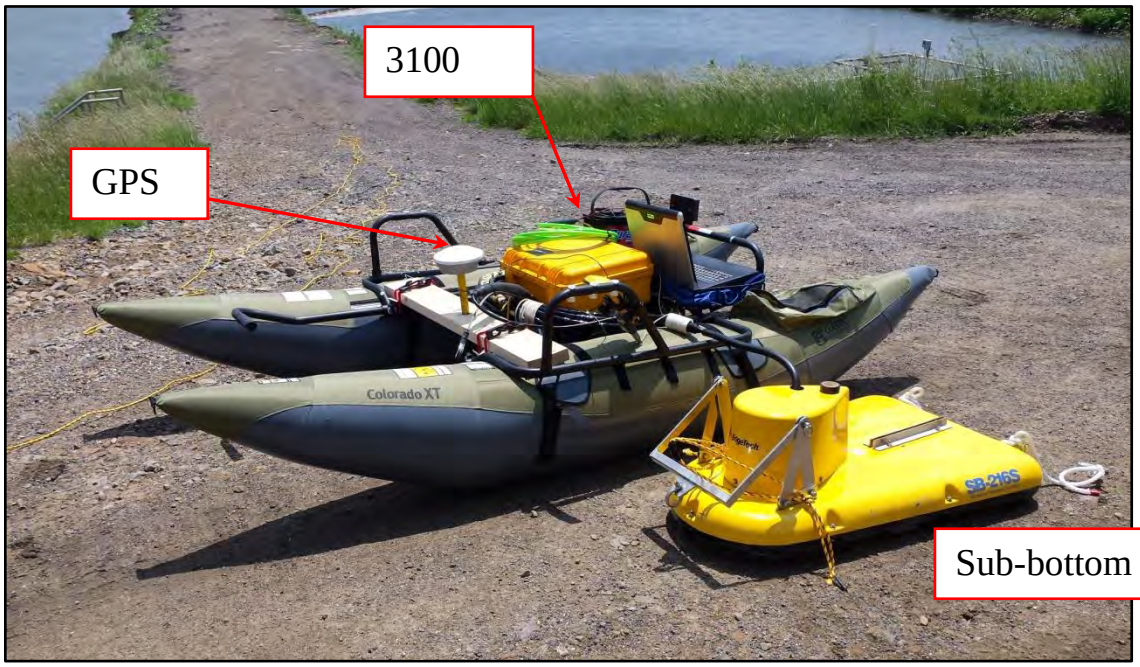
ELEVATION CONTOUR OF POND BOTTOM (FEET)

SUB-BOTTOM TRANECT LINES

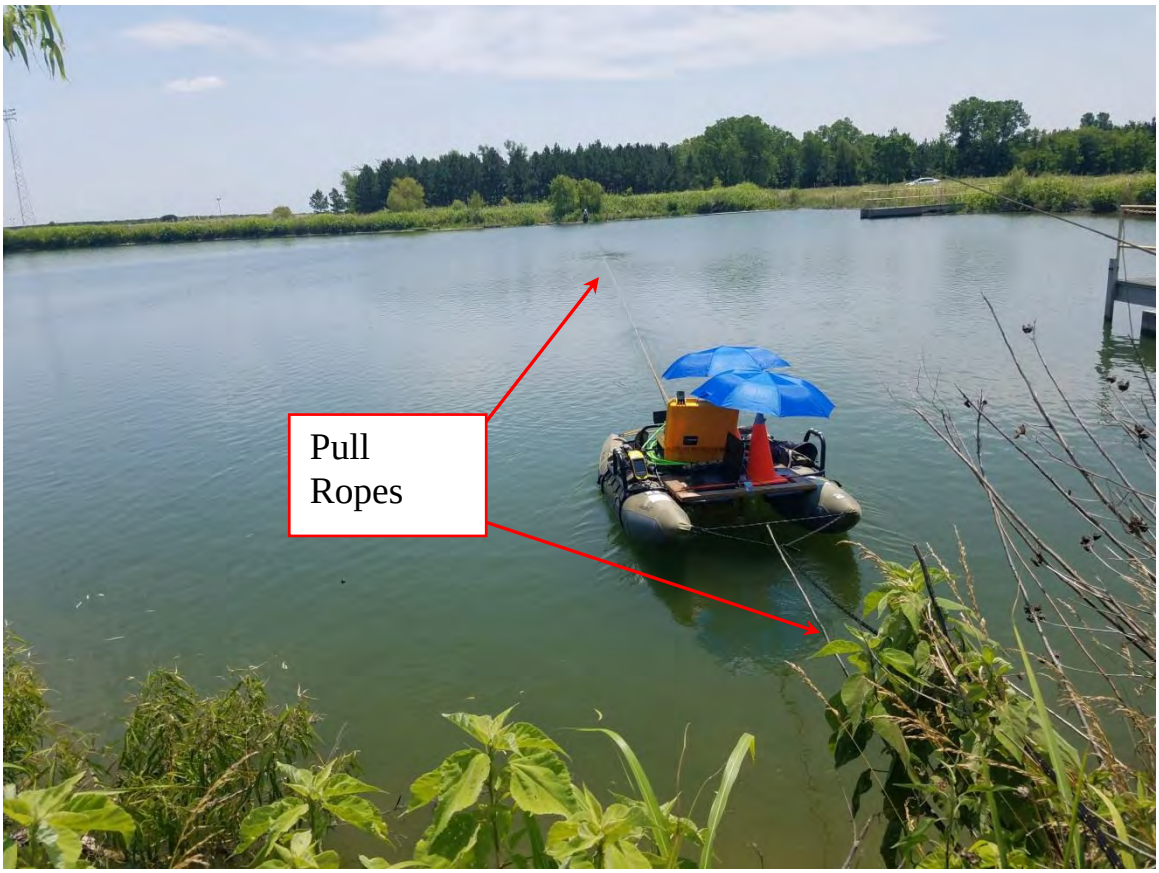
GeoView A geophysical services company

	FIGURE 1	WHITE BLUFF STEAM ELECTRIC STATION JEFFERSON COUNTY, ARKANSAS
	ELEVATION OF POND BOTTOM	FTN ASSOCIATES, LTD LITTLE ROCK, ARKANSAS
		PROJECT: 26897 DATE: 09/24/18

APPENDIX 2
PHOTOGRAPHS



Picture Showing the GPS, 3100 Topside Unit and 216 Sub-bottom Unit (towfish)



Data Collection

APPENDIX 3
LIMITATIONS

Edgetech 3100 XS system

The 3100- Sub-bottom Profiling System is a Full Spectrum CHIRP imaging system. It was used with a SB-216S towfish. The 3100- system uses specially designed transmitters with low Q wideband characteristics best suited for CHIRP transmissions. Two hydrophones are installed in the tow vehicle to reduce acoustic scattering from the sides. This results in a narrower across track beam pattern, enabling the 3100 to have both high resolution and ample depth of penetration. For this survey, GeoView mounted the fish directly under the center of the tow raft. A GPS antenna was mounted directly over the transducer.

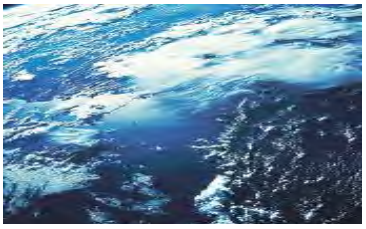
Limitations of geophysical data

The marine environment, together with its boundaries, forms a remarkably complex medium for the propagation of sound. Both signal loss and interference result from interactions with boundaries and components within the water column, causing the source to be delayed, distorted and weakened. The main components affecting sound propagation are spreading loss and attenuation loss.

The ability of geophysical to collect interpretable information at a project site is limited by the attenuation (absorption) of the geophysical signal by underlying earth materials. Once the geophysical signal has been attenuated at a particular depth, information regarding deeper geological conditions will not be obtained. Geophysical data can only resolve subsurface features that have a sufficient density contrast between the feature in question and surrounding earth materials. If an insufficient contrast is present, the subsurface feature will not be identified.

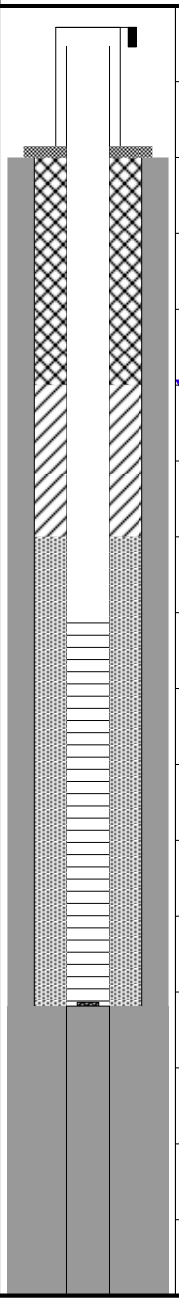
GeoView can make no warranties or representations of geological conditions that may be present beyond the depth of investigation or resolving capability of the geophysical equipment or in areas that were not accessible to the geophysical investigation.

Appendix C
Geotechnical Boring Logs



FTN Associates Ltd. water resources / environmental consultants	PROJECT: **Monitoring Well Installations**	BORING ID: **RP-1**	
	LOCATION: **Entergy White Bluff Plant**	WELL ID: **RP-1**	
	DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**	NORTHING: **1949807.4**	EASTING: **1273086.5**
	DRILLING EQUIPMENT: **Geoprobe 8150LS**	GROUND ELEVATION: **282.8 ft**	TOC ELEVATION: **285.72 ft**
FTN Project # R07920-1845-001	DRILLING METHOD: **Sonic with 4x6 core and case**	TOTAL WELL DEPTH: **25.3 ft below TOC**	DEPTH TO WATER: (7/17/2018) **8.97 ft below TOC**
LOGGED BY: **DLD**	SAMPLING METHOD: **Continuous with 10 ft 4 in diameter core barrel**	DATE STARTED: **6/13/2018**	DATE COMPLETED: **6/15/2018**

Depth (feet)	USCS	Description	% REC
-4			
0	CL	TOP SOIL	
		LEAN CLAY, light gray with reddish brown and orange mottles, stiff, moist.	
4			
			30
	CL		
8			
		@ 10 ft, SANDY LEAN CLAY, pinkish tan with dark pinkish tan clay lenses and orange and bright yellow mottling. Stiff, moist.	
12			
	SC	CLAYEY SAND, tan with orange and bright yellow mottles, dense, moist.	
			100
16			
	CL	SANDY LEAN CLAY, pinkish tan with dark pinkish tan clay lenses and orange and bright yellow mottling, stiff, moist.	
	SC	CLAYEY SAND, tan with orange and bright yellow mottles, dense, moist.	
20			
		FAT CLAY, dark pinkish tan, laminated with light gray silt, stiff, moist.	
24			
			100
	CH	@ 26 ft, color changes to olive gray.	
28			



Well Construction

-4 Above ground completion includes 3x3 ft concrete pad, four pipe bollards, and locking outer aluminum casing.

0 15.2 ft of 4 in Sch. 40 PVC including 2.9 ft of stickup (vented below cap)

Cement/bentonite grout from 0 to 6 ft bgs

4

8 Bentonite seal from 6.0 to 10.0 ft. bgs

12

Silica size 20/40 filter pack from 10.0 to 22.0 ft bgs

16

10 ft of 4 in dia. 0.010 in slot, Sch 40 PVC well screen

20

0.1 ft 4 in dia. Sch 40 PVC end cap

24

Slough from 22.0 ft to 30.0 ft in 4 in dia., borehole.

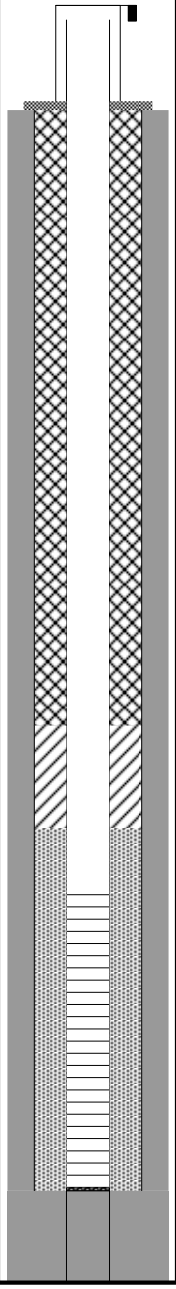
28

Drilling terminated at 30 ft bgs

NOTES: Horizontal and vertical data are based on the Harmon Surveying report dated July 13, 2018 (AR State Plane NAD83 South and NAVD88).

PROJECT: **Monitoring Well Installations**		BORING ID: **RP-2**	
LOCATION: **Entergy White Bluff Plant**		WELL ID: **RP-2**	
DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**		NORTHING: **1950042**	EASTING: **1274004**
DRILLING EQUIPMENT: **Geoprobe 8150LS**		GROUND ELEVATION: **288.9 ft**	TOC ELEVATION: **291.92 ft**
FTN Project # R07920-1845-001	DRILLING METHOD: **Sonic with 4x6 core and case**	TOTAL WELL DEPTH: **39.9 ft below TOC**	DEPTH TO WATER: (7/17/2018) **15.14 ft below TOC**
LOGGED BY: **DLD**	SAMPLING METHOD: **Continuous with 10 ft 4 in diameter core barrel**	DATE STARTED: **6/13/2018**	DATE COMPLETED: **6/15/2018**

Depth (feet)	USCS	Description	% REC
-4			
0	CL	TOP SOIL	
		LEAN CLAY, light gray with orange mottles and light gray silt lenses, stiff, dry.	30
4			
8	CL		
12		@ 14 ft, color changes to greenish gray with orange mottles.	
		FAT CLAY, pinkish tan with orange and some bright yellow mottles, blocky, very stiff, moist.	100
16			
20	CH	@ 20 ft, color to reddish light brown with few mottles.	
		@ 22.3 ft, FAT SANDY CLAY, silty, olive gray, fine-grained, increasing sand content with depth, very stiff.	
24			100
28		CLAYEY SAND, fine-grained, olive gray, dense, moist.	
32	SC		
36			100
		FAT SANDY CLAY, olive gray, very stiff, moist.	
40	CH		



Well Construction

-4 Above ground completion includes 3x3 ft concrete pad, four pipe bollards, and locking outer aluminum casing.

0

4 29.8 ft of 4 in Sch. 40 PVC including 3.0 ft of stickup (vented below cap)

8

12 ▼

16 Cement/bentonite grout from 0 to 21 ft bgs

20

Bentonite seal from 21.0 to 24.5 ft bgs

24

28 Silica size 20/40 filter pack from 24.5 to 37.0 ft bgs

10 ft of 4 in dia. 0.010 in slot, Sch 40 PVC well screen

32

36 0.1 ft 4 in dia. Sch 40 PVC end cap

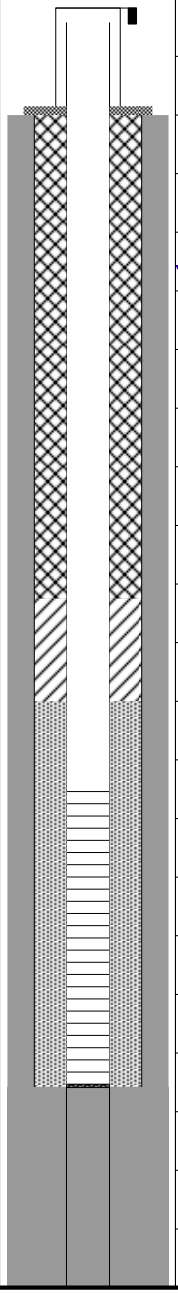
Slough from 37.0 ft to 40.0 ft in 4 in dia., borehole.

40 Drilling terminated at 40 ft bgs

NOTES: Horizontal and vertical data are based on the Harmon Surveying report dated July 13, 2018 (AR State Plane NAD83 South and NAVD88).

	PROJECT: **Monitoring Well Installations**	BORING ID: **RP-3**	
	LOCATION: **Entergy White Bluff Plant**	WELL ID: **RP-3**	
	DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**	NORTHING: **1949489.5**	EASTING: **1273729.9**
	DRILLING EQUIPMENT: **Geoprobe 8150LS**	GROUND ELEVATION: **281.0 ft**	TOC ELEVATION: **284.15 ft**
FTN Project # R07920-1845-001	DRILLING METHOD: **Sonic with 4x6 core and case**	TOTAL WELL DEPTH: **36.3 ft below TOC**	DEPTH TO WATER: (7/17/2018) **8.6 ft below TOC**
LOGGED BY: **DLD**	SAMPLING METHOD: **Continuous with 10 ft 4 in diameter core barrel**	DATE STARTED: **6/12/2018**	DATE COMPLETED: **6/15/2018**

Depth (feet)	USCS	Description	% REC
-4			
0		FAT CLAY, tan with yellowish orange mottles and some fine-grained sand, stiff, moist.	30
4			
8	CH		
12			100
16			
20		CLAYEY SAND, olive gray, stiff, moist.	
24	SC		100
28		POORLY GRADED SAND, fine-grained, clayey , olive gray, soft, moist.	
32	SP	LEAN CLAY, olive gray, laminated with light gray silt and very fine-grained sand, stiff, moist	
36	CL		
40			



Well Construction

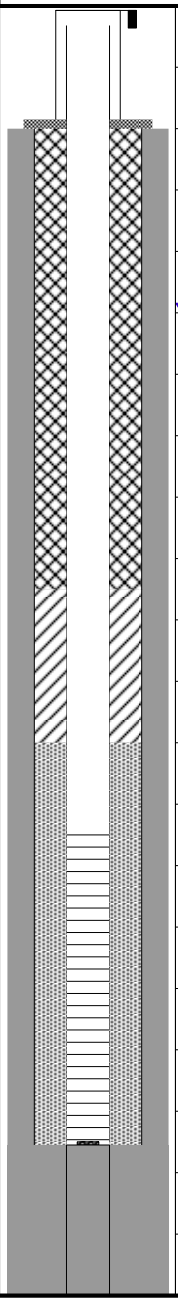
- Above ground completion includes 3x3 ft concrete pad, four pipe bollards, and locking outer aluminum casing.
- 26.2 ft of 4 in Sch. 40 PVC including 3.2 ft of stickup (vented below cap)
- Cement/bentonite grout from 0 to 16.5 ft bgs
- Bentonite seal from 16.5 to 20.0 ft bgs
- Silica size 20/40 filter pack from 20.0 to 33.0 ft bgs
- 10 ft of 4 in dia. 0.010 in slot, Sch 40 PVC well screen
- 0.1 ft 4 in dia. Sch 40 PVC end cap
- Slough from 33.0 ft to 40.0 ft in 4 in dia., borehole.
- Drilling terminated at 40 ft bgs

NOTES: Horizontal and vertical data are based on the Harmon Surveying report dated July 13, 2018 (AR State Plane NAD83 South and NAVD88).

PROJECT: **Monitoring Well Installations**		BORING ID: **RP-4**	
LOCATION: **Entergy White Bluff Plant**		WELL ID: **RP-4**	
DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**		NORTHING: **1949249.3**	EASTING: **1272808.4**
DRILLING EQUIPMENT: **Geoprobe 8150LS**		GROUND ELEVATION: **280.8 ft**	TOC ELEVATION: **284.17 ft**
FTN Project # R07920-1845-001	DRILLING METHOD: **Sonic with 4x6 core and case**	TOTAL WELL DEPTH: **36.5 ft below TOC**	DEPTH TO WATER: (7/17/2018) **9.34 ft below TOC**
LOGGED BY: **AJP**	SAMPLING METHOD: **Continuous with 10 ft 4 in diameter core barrel**	DATE STARTED: **6/6/2018**	DATE COMPLETED: **6/15/2018**

Depth (feet)	USCS	Description	% REC
0	CL	TOP SOIL FAT CLAY, yellowish orange with some fine-grained sand and small gravel, stiff, moist to dry.	
4	CH	@ 4-5.5 ft, FAT SANDY CLAY with some well-rounded gravel (< 2 inch) dia, tan, stiff, moist @ 6-6.3 ft, with clayey sand, red, medium to coarse grained sand, stiff.	100
8	CL	SILTY to SANDY CLAY, light gray to tan with some orange and red staining, fine-grained sand, stiff, moist.	
	CH	FAT CLAY, yellowish orange with some fine-grained sand and small gravel, stiff, moist to dry.	
12	ML	SILT, gray with black organic matter, sulfur smell.	
	CL/ML	LEAN CLAY to SILT with sand, gray, increasing sand content with depth, medium stiff, moist.	50
16	CH	FAT CLAY, yellowish orange, with orange mottles.	
	SC	CLAYEY SAND, fine-grained, red and light gray, medium stiff, moist.	
	SM	SILTY SAND, red to bright red, stiff.	
20	CH	FAT CLAY, light gray with some red mottles, soft to medium stiff, moist.	
24	ML/CL	CLAYEY SILT to LEAN CLAY, gray, sulfur smell.	
	CH	FAT SANDY CLAY, yellowish orange to olive green with some orange and red mottles. @ 26.2 - 26.5 ft, with silt laminations.	60
28	ML	SILT, light gray with lenses of olive gray clay, soft, moist. @ 27.2 - 27.3 ft, layer of organic matter.	
32	CH	FAT CLAY, laminated with lenses of white silt to fine-grained sand, stiff, moist.	100
36		@ 38 ft, decreasing silt and sand content with depth.	

Well Construction



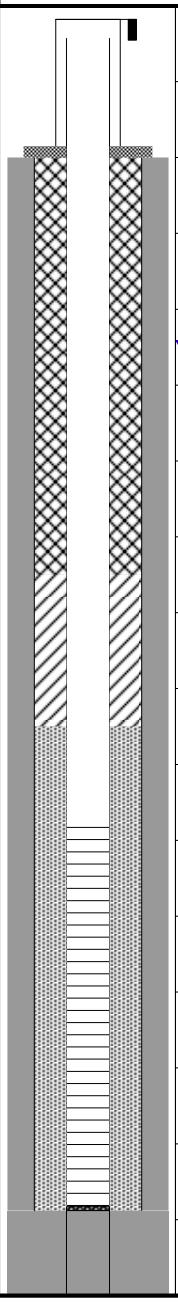
- Above ground completion includes 3x3 ft concrete pad, four pipe bollards, and locking outer aluminum casing.
- 26.4 ft of 4 in Sch. 40 PVC including 3.4 ft of stickup (vented below cap)
- Cement/benontite grout from 0 to 15.0 ft bgs
- Bentonite seal from 15.0 to 20.0 ft bgs
- Silica size 20/40 filter pack from 20.0 to 33.0 ft bgs
- 10 ft of 4 in dia. 0.010 in. slot, Sch 40 PVC well screen
- 0.1 ft 4 in dia. Sch 40 PVC end cap
- Slough from 33.0 ft to 38.0 ft in 4 in dia., borehole.
- Drilling terminated at 38 ft bgs

NOTES: Horizontal and vertical data are based on the Harmon Surveying report dated July 13, 2018 (AR State Plane NAD83 South and NAVD88).

PROJECT: **Monitoring Well Installations**		BORING ID: **RP-5**	
LOCATION: **Entergy White Bluff Plant**		WELL ID: **RP-5**	
DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**		NORTHING: **1948586.2**	EASTING: **1272475.8**
DRILLING EQUIPMENT: **Geoprobe 8150LS**		GROUND ELEVATION: **281.4 ft**	TOC ELEVATION: **284.57 ft**
FTN Project # R07920-1845-001	DRILLING METHOD: **Sonic with 4x6 core and case**	TOTAL WELL DEPTH: **30.9 ft below TOC**	DEPTH TO WATER: (7/17/2018) **8.23 ft below TOC**
LOGGED BY: **AJP**	SAMPLING METHOD: **Continuous with 10 ft 4 in diameter core barrel**	DATE STARTED: **6/5/2018**	DATE COMPLETED: **6/15/2018**

Depth (feet)	USCS	Description	% REC
-4			
0	FILL	FILL, consisting of nepheline syenite gravel.	
4		FAT CLAY, yellowish orange to tan with oxidized orange silt and sand lenses, medium stiff to stiff, moist.	20
8	CH		
12		@ 12 ft, FAT SANDY CLAY, increasing sand content with depth, yellow and orange silt and fine-grained sand lenses.	
	SC	CLAYEY SAND, yellow and orange silt lenses, decreasing clay content with depth, medium stiff, moist.	100
16	SC/SM	CLAYEY SAND to SILTY SAND, tan with orange oxidized staining that decreases with depth, increasing clay content with depth, soft to medium stiff to soft, wet.	
	CH	FAT SANDY CLAY, orange and yellow staining along silt and sand lenses.	
20	SC	CLAYEY SAND, fine-grained, olive gray, decreasing clay content with depth, loose to medium dense.	
24	SM	SILTY SAND, fine-grained, olive gray, medium dense, wet.	100
28	CH	FAT SANDY CLAY, olive gray, stiff, moist. @ 27.5 ft, FAT CLAY, laminated lenses of white silt to fine-grained sand with some greenish gray to green clay layers.	

Well Construction

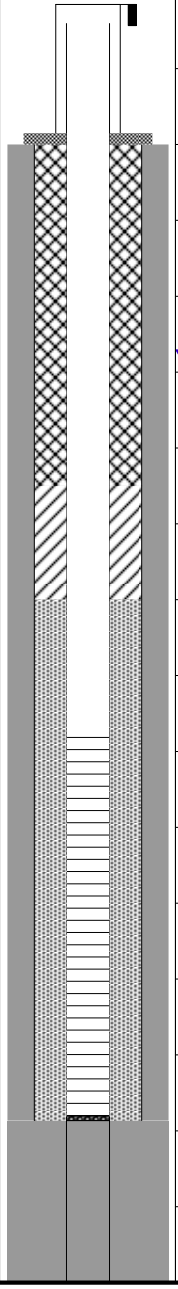


- -4: Above ground completion includes 3x3 ft concrete pad, four pipe bollards, and locking outer aluminum casing.
- 0
- 4: 20.8 ft of 4 in Sch 40 PVC including 3.2 ft of stickup (vented below cap)
- 8: Cement/benonite grout from 0 to 11 ft bgs
- 12: Bentonite seal from 11.0 to 15.0 ft bgs
- 16: Silica size 20/40 filter pack from 15.0 to 28.0 ft bgs
- 20
- 24: 10 ft of 4 in dia. 0.010 in slot, Sch 40 PVC well screen
- 28: 0.1 ft 4 in dia. Sch 40 PVC end cap
  Slough from 28.0 ft to 30.0 ft in 4 in dia., borehole.
  Drilling terminated at 30 ft bgs

NOTES: Horizontal and vertical data are based on the Harmon Surveying report dated July 13, 2018 (AR State Plane NAD83 South and NAVD88).

FTN Associates Ltd. water resources / environmental consultants	PROJECT: **Monitoring Well Installations**	BORING ID: **RP-6**	
	LOCATION: **Entergy White Bluff Plant**	WELL ID: **RP-6**	
	DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**	NORTHING: **1948590.9**	EASTING: **1271958.9**
	DRILLING EQUIPMENT: **Geoprobe 8150LS**	GROUND ELEVATION: **280.6 ft**	TOC ELEVATION: **283.81 ft**
FTN Project # R07920-1845-001	DRILLING METHOD: **Sonic with 4x6 core and case**	TOTAL WELL DEPTH: **28.9 ft below TOC**	DEPTH TO WATER: (7/17/2018) **8.82 ft below TOC**
LOGGED BY: **AJP**	SAMPLING METHOD: **Continuous with 10 ft 4 in diameter core barrel**	DATE STARTED: **6/5/2018**	DATE COMPLETED: **6/15/2018**

Depth (feet)	USCS	Description	% REC
-4			
0	CH	FAT CLAY, yellowish orange with some rootlets in upper 3 inches, medium stiff to stiff, moist.	
	ML	SILT, with layers of fine-grained sand, yellowish orange with oxidation along silt layers, dry to moist with moisture increasing with depth.	
4	CL	LEAN CLAY, yellowish orange, silt content decreases with depth, stiff, moist.	60
	CH	FAT CLAY, yellowish brown with yellow and orange silt lenses that decrease in frequency with depth, moist. @ 9.7 ft, color changes to olive gray. @ 10 ft, increasing fine-grained sand content with depth.	
8			
12	SC	CLAYEY SAND, fine-grained, olive gray, medium dense, moist.	
	CH	FAT SANDY CLAY, olive gray with lenses of fine-grained sand, stiff.	
	SC	CLAYEY SAND, fine-grained, olive gray, medium dense, moist.	8
16	CH	FAT SANDY CLAY, olive gray with lenses of fine-grained sand, stiff.	
20	SC	CLAYEY SAND, fine-grained, olive gray, decreasing sand content with depth, medium dense, moist.	
	SM	SILTY SAND, olive gray, medium dense. @ 23.8 ft, layer of organic matter.	100
24	SC	CLAYEY SAND, fine-grained, olive gray, increasing clay and lenses of white silt to fine-grained sand with depth, medium dense, moist.	
	CH	FAT CLAY, with laminated lenses of white silt to fine-grained sand, stiff, moist to dry. @ 25 ft, with greenish gray clay layers.	100
28			



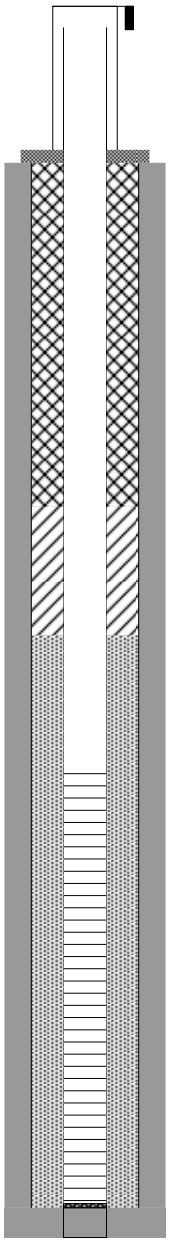
Well Construction

- Above ground completion includes 3x3 ft concrete pad, four pipe bollards, and locking outer aluminum casing.
- 18.8 ft of 4 in Sch 40 PVC including 3.2 ft of stickup (vented below cap)
- Cement/bentonite grout from 0 to 9.0 ft bgs
- Bentonite seal from 9.0 to 12.0 ft bgs
- Silica size 20/40 filter pack from 12.0 to 26.0 ft bgs
- 10 ft of 4 in dia. 0.010 in. slot, Sch 40 PVC well screen
- 0.1 ft 4 in dia. Sch 40 PVC end cap
- Slough from 26.0 ft to 30.0 ft in 4 in dia., borehole.
- Drilling terminated at 30 ft bgs

NOTES: Horizontal and vertical data are based on the Harmon Surveying report dated July 13, 2018 (AR State Plane NAD83 South and NAVD88).

ftn Associates Ltd. water resources / environmental consultants	PROJECT: **Monitoring Well Installations**	BORING ID: **RP-7**	
	LOCATION: **Entergy White Bluff Plant**	WELL ID: **RP-7**	
	DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**	NORTHING: **1948766.8**	EASTING: **1271839.4**
	DRILLING EQUIPMENT: **Geoprobe 8150LS**	GROUND ELEVATION: **281.3 ft**	TOC ELEVATION: **284.46 ft**
FTN Project # R07920-1845-001	DRILLING METHOD: **Sonic with 4x6 core and case**	TOTAL WELL DEPTH: **27.5 ft below TOC**	DEPTH TO WATER: (7/17/2018) **9.98 ft below TOC**
LOGGED BY: **AJP**	SAMPLING METHOD: **Continuous with 10 ft 4 in diameter core barrel**	DATE STARTED: **6/5/2018**	DATE COMPLETED: **6/15/2018**

Depth (feet)	USCS	Description	% REC
-4			
0	CL / CH	TOP SOIL and GRAVEL FAT SANDY CLAY, yellowish orange, rootlets, medium stiff, moist.	
	ML	SILT, with clayey fine-grained sand, yellowish orange, increasing clay content with depth, moist to dry.	
4	CL	LEAN CLAY, yellowish orange with lenses of oxidized silt to fine-grained sand, stiff, moist.	80
8	CH	FAT CLAY, olive gray with lenses of white silt to fine-grained sand, stiff, moist.	
12			
16	SC	CLAYEY SAND, fine-grained, medium dense, moist.	80
	CH	FAT SANDY CLAY, olive gray, medium stiff, moist.	
20	SC	CLAYEY SAND, fine-grained, medium dense, moist.	
	SM	SILTY SAND, fine-grained, olive gray, wet.	
	SC	CLAYEY SAND, fine-grained, medium dense, moist.	100
24	CH	FAT CLAY, with laminated lenses of white silt to fine-grained sand, very stiff, moisture decreases with depth.	



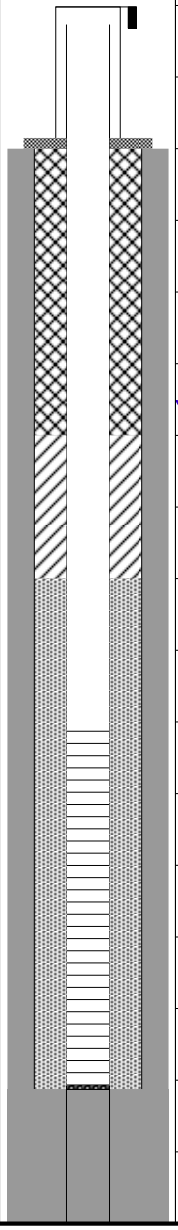
Well Construction

- Above ground completion includes 3x3 ft concrete pad, four pipe bollards, and locking outer aluminum casing.
- 17.4 ft of 4 in Sch 40 PVC including 3.2 ft stickup (vented below cap)
- Cement/bentonite grout from 0 to 8.0 ft bgs
- Bentonite seal from 8.0 to 11.0 ft bgs
- Silica size 20/40 filter pack from 11.0 to 24.0 ft bgs
- 10 ft of 4 in dia. 0.010 in slot, Sch 40 PVC well screen
- 0.1 ft 4 in dia. Sch 40 PVC end cap
- Slough from 24.0 ft to 25.0 ft in 4 in dia., borehole.
- Drilling terminated at 25 ft bgs

NOTES: Horizontal and vertical data are based on the Harmon Surveying report dated July 13, 2018 (AR State Plane NAD83 South and NAVD88).

	PROJECT: **Monitoring Well Installations**	BORING ID: **RP-8**	
	LOCATION: **Entergy White Bluff Plant**	WELL ID: **RP-8**	
	DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**	NORTHING: **1949162.5**	EASTING: **1271875.3**
	DRILLING EQUIPMENT: **Geoprobe 8150LS**	GROUND ELEVATION: **282.1 ft**	TOC ELEVATION: **285.60 ft**
FTN Project # R07920-1845-001	DRILLING METHOD: **Sonic with 4x6 core and case**	TOTAL WELL DEPTH: **29.7 ft below TOC**	DEPTH TO WATER: (7/17/2018) **10.75 ft below TOC**
LOGGED BY: **AJP**	SAMPLING METHOD: **Continuous with 10 ft 4 in diameter core barrel**	DATE STARTED: **6/4/2018**	DATE COMPLETED: **6/15/2018**

Depth (feet)	USCS	Description	% REC
-6			
-2	CH	FAT SANDY CLAY, yellowish orange, increasing sand and silt content with depth, medium stiff, moist.	
2	ML	SILT, with clayey fine-grained sand, tan to yellowish orange with lenses of clay, moist to dry.	
6	CH/CL	FAT SANDY CLAY to LEAN CLAY, orange oxidized lenses of silt within fat sandy clay, sand content increasing with depth, stiff.	80
10		@ 10 ft, medium stiff, increasing moisture with depth.	
14	SC	CLAYEY SAND, yellowish brown, loose to medium dense. @ 13.8 ft, color changes to olive gray.	80
18	CH	FAT SANDY CLAY, olive gray, medium stiff to stiff, moist.	
	SC	CLAYEY SAND, yellowish brown, loose to medium dense. @ 20 ft, decreasing clay content with depth.	
22	SM	SILTY SAND, fine-grained, olive gray, loose, moist.	
26	CH	FAT CLAY, with laminated lenses of white silt to fine-grained sand.	100
30			



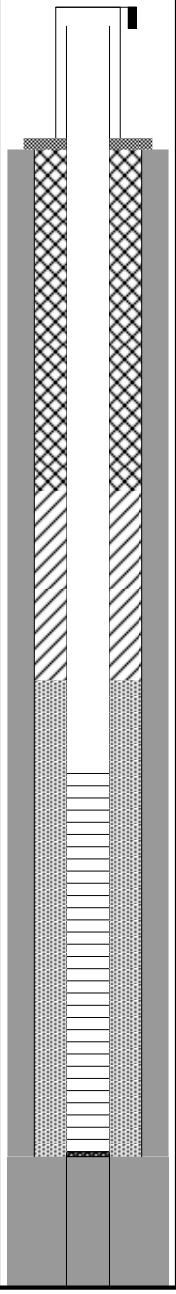
Well Construction

- Above ground completion includes 3x3 ft concrete pad, four pipe bollards, and locking outer aluminum casing.
- 19.6 ft of 4 in Sch 40 PVC including 3.5 ft stickup (vented below cap)
- Cement/bentonite grout from 0 to 8.0 ft bgs
- Bentonite seal from 8.0 to 12.0 ft bgs
- Silica size 20/40 filter pack from 12.0 to 26.3 ft bgs
- 10 ft of 4 in dia. 0.010 in slot, Sch 40 PVC well screen
- 0.1 ft 4 in dia. Sch 40 PVC end cap
- Slough from 26.3 ft to 30.0 ft in 4 in dia., borehole.
- Drilling terminated at 30 ft bgs

NOTES: Horizontal and vertical data are based on the Harmon Surveying report dated July 13, 2018 (AR State Plane NAD83 South and NAVD88).

PROJECT: **Monitoring Well Installations**		BORING ID: **RP-9**	
LOCATION: **Entergy White Bluff Plant**		WELL ID: **RP-9**	
DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**		NORTHING: **1948797.6**	EASTING: **1272803.3**
DRILLING EQUIPMENT: **Geoprobe 8150LS**		GROUND ELEVATION: **281.4 ft**	TOC ELEVATION: **284.68 ft**
FTN Project # R07920-1845-001	DRILLING METHOD: **Sonic with 4x6 core and case**	TOTAL WELL DEPTH: **29.8 ft below TOC**	DEPTH TO WATER: (7/17/2018) **8.35 ft below TOC**
LOGGED BY: **AJP**	SAMPLING METHOD: **Continuous with 10 ft 4 in diameter core barrel**	DATE STARTED: **6/6/2018**	DATE COMPLETED: **6/15/2018**

Depth (feet)	USCS	Description	% REC
-4			
0	CL	TOP SOIL	
	CH	FAT CLAY, yellowish orange to tan, rootlets in upper 1 ft, increasing silt with depth, hard, dry.	
4	ML	SILT, with fine-grained sand that increases with depth, tan, soft to medium stiff, moist.	
	SM	SILTY SAND, fine-grained, tan with orange oxide staining, medium stiff to stiff, moisture increases with depth.	100
	GC	CLAYEY GRAVEL with sand, well graded angular to subrounded sand with subrouneded to rounded gravel (<1 in), dry to moist.	
	SM	SILTY SAND, fine-grained, tan with orange oxide staining, medium stiff to stiff, moisture increases with depth.	
8	GM/SW	WELL GRADED SAND and GRAVEL, very fine-grained to coarse-grained, angular to subrounded sand and subangular to subrounded gravel (<2 in), dry to moist.	
	GW	WELL GRADED GRAVEL, angular to subrounded (<2 in).	
12	CH	FAT SANDY CLAY, tan with oxidized lenses of silt and fine-grained sand, sand content increases with depth, soft to medium stiff,	
	SC	CLAYEY SAND, light gray, soft, wet.	
	SM	SILTY SAND, light gray with some orange oxide staining, loose, wet.	100
16			
	CL/CH	LEAN SANDY CLAY to FAT SANDY CLAY, lenses of silt and sand, heavily oxidized, decreasing clay content with depth, soft, wet.	
	SM	SILTY SAND, fine-grained, tan to yellow, loose, wet.	
20			
24			
	CH	FAT CLAY, tan, stiff, moist.	100
28		@ 25 ft, color changes to olive gray.	



Well Construction

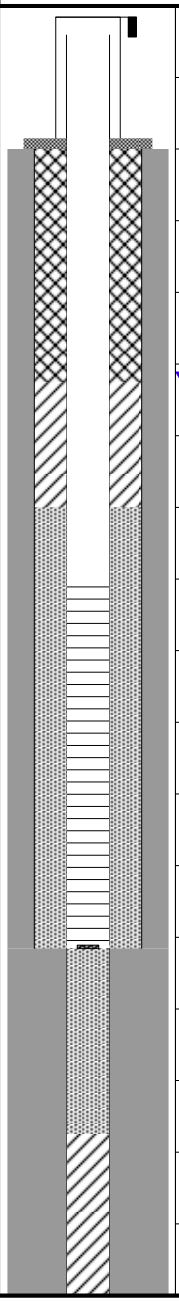
-4 / 0 / 4 / 8 / 12 / 16 / 20 / 24 / 28

- Above ground completion includes 3x3 ft concrete pad, four pipe bollards, and locking outer aluminum casing.
- 19.7 ft of 4 in Sch 40 PVC including 3.3 ft stickup (vented below cap)
- Cement/bentonite grout from 0 to 9.0 ft bgs
- Bentonite seal from 9.0 to 14.0 ft bgs
- Silica size 20/40 filter pack from 14.0 to 26.5 ft bgs
- 10 ft of 4 in dia. 0.010 in slot, Sch 40 PVC well screen
- 0.1 ft 4 in dia. Sch 40 PVC end cap
- Slough from 26.5 ft to 30.0 ft in 4 in dia., borehole.
- Drilling terminated at 30 ft bgs

NOTES: Horizontal and vertical data are based on the Harmon Surveying report dated July 13, 2018 (AR State Plane NAD83 South and NAVD88).

PROJECT: **Monitoring Well Installations**		BORING ID: **RP-10**	
LOCATION: **Entergy White Bluff Plant**		WELL ID: **RP-10**	
DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**		NORTHING: **1949510.5**	EASTING: **1272499**
DRILLING EQUIPMENT: **Geoprobe 8150LS**		GROUND ELEVATION: **280.5 ft**	TOC ELEVATION: **283.66 ft**
FTN Project # R07920-1845-001	DRILLING METHOD: **Sonic with 4x6 core and case**	TOTAL WELL DEPTH: **25.5 ft below TOC**	DEPTH TO WATER: (7/17/2018) **9.6 ft below TOC**
LOGGED BY: **DLD**	SAMPLING METHOD: **Continuous with 10 ft 4 in diameter core barrel**	DATE STARTED: **6/12/2018**	DATE COMPLETED: **6/15/2018**

Depth (feet)	USCS	Description	% REC
-4			
0	FILL	FILL, consisting of nepheline syenite gravel.	
4		FAT CLAY, tan with yellowish orange mottles, some fine-grained sand, stiff, moist.	40
8	CH		
12		@ 12 ft, SANDY FAT CLAY.	
	SC	CLAYEY SAND, fine-grained, gray with orange mottles, dense, moist.	
16	SP	POORLY GRADED SAND, fine-grained, silty, gray with orange mottles, wet.	100
20			
	CL	SILT and FAT CLAY, brownish tan clay with light gray silt, medium stiff, moist.	
24		FAT CLAY, dark gray with light gray laminated silt lenses, stiff, moist.	100
28	CH		
32			



Well Construction

- Above ground completion includes 3x3 ft concrete pad, four pipe bollards, and locking outer aluminum casing.
- 15.4 ft of 4 in Sch 40 PVC including 3.2 ft stickup (vented below cap)
- Cement/bentonite grout from 0 to 6.5 ft bgs
- Bentonite seal from 6.5 to 10.0 ft bgs
- Silica size 20/40 filter pack from 10.0 to 22.3 ft bgs
- 10 ft of 4 in dia. 0.010 in slot, Sch 40 PVC well screen
- 0.1 ft 4 in dia. Sch 40 PVC end cap
- Silica size 20/40 filter pack from 22.3 to 27.5 ft bgs in a 4 in dia. borehole
- Bentonite seal from 27.5 to 32.0 ft bgs in a 4 in dia. borehole
- Drilling terminated at 32 ft bgs

NOTES: Horizontal and vertical data are based on the Harmon Surveying report dated July 13, 2018 (AR State Plane NAD83 South and NAVD88).

PROJECT: **Monitoring Well Installations**		BORING ID: **B-1**	
LOCATION: **Entergy White Bluff Plant**		WELL ID: **N/A**	
DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**		NORTHING: **1949501.9**	EASTING: **1272354.9**
DRILLING EQUIPMENT: **Geoprobe 8150LS**		GROUND SURFACE ELEV.: **280.3 ft NAVD88**	
FTN Project # R07920-1845-001	DRILLING METHOD: **Sonic with 4 in diameter core**	TOTAL DEPTH: **10 ft bgs**	DEPTH TO WATER: **N/A**
LOGGED BY: **AJP**	SAMPLING METHOD: **Continuous with 10 ft 4 in diameter core barrel**	DATE STARTED: **5/16/2018**	DATE COMPLETED: **5/16/2018**

Depth (feet)	% REC	USCS	Graphic Log	Description
0		FILL		FILL
1	77	GW		WELL GRADED GRAVEL with sand, medium to coarse sand, fine to coarse-grained angular to round gravel, medium dense to loose, dry.
3	66	CH		FAT SANDY CLAY, tan with orange oxide staining, lenses of fine sand, stiff, moist.
8		CL		LEAN CLAY with fine-grained sand, silty yellowish brown and gray, moist.
10				Boring terminated at 10 ft bgs.

NOTES: Northings and eastings recorded using a Garmin eTrex30 and converted to AR State Plane NAD83 South
Borehole backfilled with bentonite to ground surface.

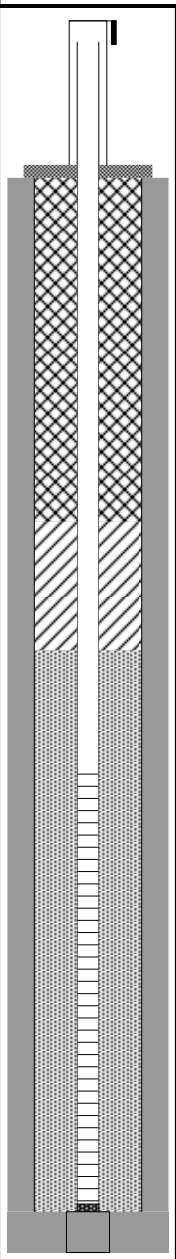
PROJECT: **Monitoring Well Installations**		BORING ID: **B-2**	
LOCATION: **Entergy White Bluff Plant**		WELL ID: **N/A**	
DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**		NORTHING: **1949485.1**	EASTING: **1272715.5**
DRILLING EQUIPMENT: **Geoprobe 8150LS**		GROUND SURFACE ELEV.: **280.2 ft NAVD88**	
FTN Project # R07920-1845-001	DRILLING METHOD: **Sonic with 4 in diameter core**	TOTAL DEPTH: **10 ft bgs**	DEPTH TO WATER: **N/A**
LOGGED BY: **AJP**	SAMPLING METHOD: **Continuous with 10 ft 4 in diameter core barrel**	DATE STARTED: **5/16/2018**	DATE COMPLETED: **5/16/2018**

Depth (feet)	% REC	USCS	Graphic Log	Description
0				FAT SANDY CLAY, light gray with orange and red oxide staining, fine grained sand, rootlets, very stiff, dry to moist.
1				
2				
	100			
3				
4				
5		CH		@ 4.6 ft FAT CLAY with sand and some rounded gravels, soft, moist. @ 5 ft FAT SANDY CLAY, light gray with orange and red oxide staining, fine grained sand, very stiff, dry to moist.
6				
7				
	50			
8				
9				
10				

NOTES: Northings and eastings recorded using a Garmin eTrex30 and converted to AR State Plane NAD83 South
Borehole backfilled with bentonite to ground surface.

FTN Associates Ltd. water resources / environmental consultants	PROJECT: **Monitoring Well Installations**	BORING ID: **B-3**	
	LOCATION: **Entergy White Bluff Plant**	WELL ID: **PZ-5**	
	DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**	NORTHING: **1949067.5**	EASTING: **1272460.6**
	DRILLING EQUIPMENT: **Geoprobe 8150LS**	GROUND ELEVATION: **279.9 ft**	TOC ELEVATION: **283.01 ft**
FTN Project # R07920-1845-001	DRILLING METHOD: **Sonic with 4x6 core and case**	TOTAL WELL DEPTH: **27.2 ft below TOC**	DEPTH TO WATER: (7/17/2018) **8.72 ft below TOC**
LOGGED BY: **AJP**	SAMPLING METHOD: **Continuous with 10 ft 4 in diameter core barrel**	DATE STARTED: **5/15/2018**	DATE COMPLETED: **6/15/2018**

Depth (feet)	USCS	Description	% REC
-4			
0	CH	FAT CLAY, light brown, stiff, moist.	50
		@ 4.8 ft, with rounded gravel.	
4		SANDY CLAY, light gray to tan with some iron stained lenses, soft, moist.	
8	CL		33
	SC	CLAYEY SAND, tan, soft, moist to wet.	
12	CL	LEAN SANDY CLAY, light gray to tan with some iron stained lenses, soft, moist to wet.	80
	CH	FAT SANDY CLAY, tan with lenses of fine-grained sand, stiff, moist.	
16	SC	CLAYEY SAND,fine-grained, tan with orange oxide staining, clay content decreasing with depth, loose, wet.	100
20	SM	SILTY SAND, tan with some oxide staining, loose, wet.	
		@ 20.8 - 21 ft layer of fat clay.	
		@ 22.9 - 23 ft, lenses of olive gray clay.	100
24	CH	FAT CLAY, olive gray, laminated with white silt to fine-grained sand, stiff, dry.	



Well Construction

- -4: Above ground completion includes 2x2 ft concrete pad, four pipe bollards, and locking outer aluminum casing.
- 0: 17.0 ft of 2 in Sch 40 PVC including 3.1 ft stickup (vented below cap)
- 4: Cement/bentonite grout from 0 to 8.0 ft bgs
- 8: Bentonite seal from 8.0 to 11.0 ft bgs
- 12: Silica size 20/40 filter pack from 11.0 to 24.0 ft bgs
- 16
- 20: 10 ft of 2 in dia. 0.010 in slot, Sch 40 PVC well screen
- 24: 0.18 ft 2 in dia. Sch 40 PVC end cap
  Slough from 24 ft bgs to 25 ft bgs
  Drilling terminated at 25 ft bgs

NOTES: Horizontal and vertical data are based on the Harmon Surveying report dated July 13, 2018 (AR State Plane NAD83 South and NAVD88).

PROJECT: **Monitoring Well Installations**		BORING ID: **B-4**	
LOCATION: **Entergy White Bluff Plant**		WELL ID: **N/A**	
DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**		NORTHING: **1948619**	EASTING: **1272718.6**
DRILLING EQUIPMENT: **Geoprobe 8150LS**		GROUND SURFACE ELEV.: **280.8 ft NAVD88**	
DRILLING METHOD: **Sonic with 4 in diameter core**		TOTAL DEPTH: **10 ft bgs**	DEPTH TO WATER: **N/A**
SAMPLING METHOD: **Continuous with 10 ft 4 in diameter core barrel**		DATE STARTED: **5/17/2018**	DATE COMPLETED: **5/17/2018**

FTN Project # R07920-1845-001

LOGGED BY: **AJP**

Depth (feet)	% REC	USCS	Graphic Log	Description
0		FILL		FILL
				FAT CLAY with sand, yellowish orange with orange to red oxide staining, sand content increasing with depth, stiff, moist.
1				@1.6-1.7 ft layer of white silt.
2				
3				
4	88			@ 4 ft FAT SANDY CLAY, light gray to olive gray, fine grained, sand content increases with depth, stiff, moist.
5		CH		@ 5-5.3 ft small gravel.
6				
7				
8				
9				
10				Boring terminated at 10 ft bgs.

NOTES: Northings and eastings recorded using a Garmin eTrex30 and converted to AR State Plane NAD83 South
Borehole backfilled with bentonite to ground surface.

PROJECT: **Monitoring Well Installations**		BORING ID: **B-5**	
LOCATION: **Entergy White Bluff Plant**		WELL ID: **N/A**	
DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**		NORTHING: **1948639.2**	EASTING: **1271950.5**
DRILLING EQUIPMENT: **Geoprobe 8150LS**		GROUND SURFACE ELEV.: **281.0 ft NAVD88**	
FTN Project # R07920-1845-001	DRILLING METHOD: **Sonic with 4 in diameter core**	TOTAL DEPTH: **12 ft bgs**	DEPTH TO WATER: **N/A**
LOGGED BY: **AJP**	SAMPLING METHOD: **Continuous with 10 ft 4 in diameter core barrel**	DATE STARTED: **5/17/2018**	DATE COMPLETED: **5/17/2018**

Depth (feet)	% REC	USCS	Graphic Log	Description
0				FILL
1				
2	66	FILL		
3				LEAN CLAY with sand, yellowish orange with yellow and orange staining, stiff, dry.
4				
5				
6		CL		
7	100			
8				
9				FAT CLAY with sand, stiff, moist.
10		CH		
11				LEAN CLAY, light brown, silty, some fine-grained sand, trace fine-grained gravel, moist.
12		CL		Boring terminated at 12 ft bgs.

NOTES: Northings and eastings recorded using a Garmin eTrex30 and converted to AR State Plane NAD83 South
Borehole backfilled with bentonite to ground surface.

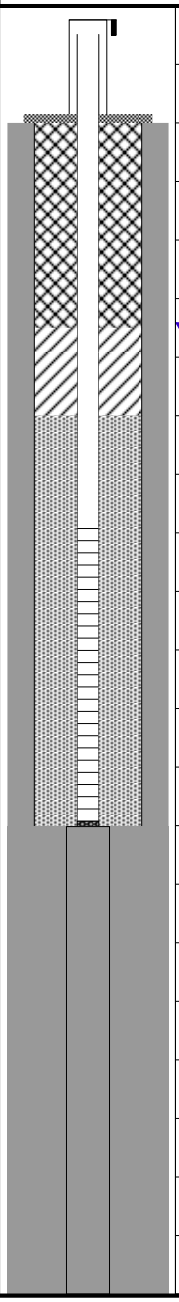
PROJECT: **Monitoring Well Installations**		BORING ID: **B-6**	
LOCATION: **Entergy White Bluff Plant**		WELL ID: **N/A**	
DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**		NORTHING: **1949105.8**	EASTING: **1271974.9**
DRILLING EQUIPMENT: **Geoprobe 8150LS**		GROUND SURFACE ELEV.: **281.9 ft NAVD88**	
FTN Project # R07920-1845-001	DRILLING METHOD: **Sonic with 4 in diameter core**	TOTAL DEPTH: **30 ft bgs**	DEPTH TO WATER: **N/A**
LOGGED BY: **AJP**	SAMPLING METHOD: **Continuous with 10 ft 4 in diameter core barrel**	DATE STARTED: **6/14/2018**	DATE COMPLETED: **6/14/2018**

Depth (feet)	% REC	USCS	Graphic Log	Description
0–2		FILL		FILL
2–10	25	CL		LEAN CLAY with sand, tan with lenses of sand and greenish gray silt, soft, wet.
10–16	100	SM		SILTY SAND, tan with lenses of orange to yellow oxidized sand. @ 15 ft color changes to tan and greenish gray, increasing clay content with depth.
16–18		CH		FAT SANDY CLAY, brown to tan with orange oxidation along sandy lenses, fine-grained sand, medium stiff, moist. @ 18 ft color changes to olive gray.
18–20		SC		CLAYEY SAND, olive gray, decreasing clay with depth, medium stiff, moist to wet.
20–26	100	SM		SILTY SAND, fine-grain, olive gray, medium stiff, saturated. @ 24-25 ft then lenses of dark gray clay.
26–30		CH		FAT CLAY with sand, olive gray to greenish gray clay with laminated lenses of white silt to fine-grained sand, stiff. Borehole terminated at 30 ft bgs.

NOTES: Northings and eastings recorded using a Garmin eTrex30 and converted to AR State Plane NAD83 South
Borehole backfilled with bentonite to ground surface.

PROJECT: **Monitoring Well Installations**		BORING ID: **B-7**	
LOCATION: **Entergy White Bluff Plant**		WELL ID: **PZ-1**	
DRILLING CONTRACTOR: **Walker-Hill Environmental, Inc.**		NORTHING: **1949513.9**	EASTING: **1272146.8**
DRILLING EQUIPMENT: **Geoprobe 8150LS**		GROUND ELEVATION: **281.9 ft**	TOC ELEVATION: **284.94 ft**
FTN Project # R07920-1845-001	DRILLING METHOD: **Sonic with 4x6 core and case**	TOTAL WELL DEPTH: **27.1 ft below TOC**	DEPTH TO WATER: (7/17/2018) **10.09 ft below TOC**
LOGGED BY: **AJP**	SAMPLING METHOD: **Continuous with 10 ft 4 in diameter core barrel**	DATE STARTED: **5/16/2018**	DATE COMPLETED: **6/15/2018**

Depth (feet)	USCS	Description	% REC
-4			
0	FILL	FILL	46
4	CH	FAT SANDY CLAY, tan with orang staining, decreasing clay content with depth, medium stiff, moist.	
8	SC	CLAYEY SAND, tan with oxide staining, loose, moist to wet.	100
12	CH	FAT SANDY CLAY, tan with oxide staining along sandy lenses, stiff, moist.	
	SC	SANDY CLAY, oxide stained, decreasing sand content with depth, medium stiff, moist.	
16	SM	SILTY SAND, fine-grain, tan with oxide staining in upper 1 ft, very loose, wet.	100
20	SC	CLAYEY SAND, tan to orange with lenses of light gray to olive gray clay, moisture increases with depth. @ 23.2 fine-grained olive gray sand, loose, wet.	100
24		FAT CLAY, with lenses of silt to very fine-grained sand, blocky, stiff to very stiff, moist. @ 25 ft laminations of white silt to fine-grained sand, blocky, stiff to hard, somewhat moist to dry.	
28			100
		@ 30 ft, silt and sand laminations decrease with depth.	
32	CH		
36			100
		@ 38 ft, with lenses of fine to medium-grained olive gray to greenish gray sand.	
40			

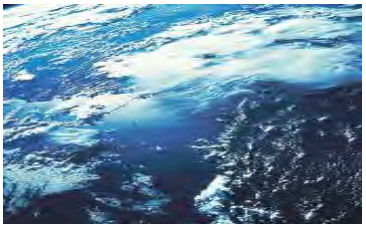


Well Construction

- -4: Above ground completion includes 2x2 ft concrete pad, four pipe bollards, and locking outer aluminum casing.
- 0: 16.9 ft of 2 in Sch 40 PVC including 3.0 ft stickup (vented below cap)
- 4: Cement/bentonite grout from 0 to 7 ft bgs
- 8: Bentonite seal from 7.0 to 10.0 ft bgs
- 12: Silica size 20/40 filter pack from 10.0 to 24.0 ft bgs
- 16: 10 ft of 2 in dia. 0.010 in slot, Sch 40 PVC well screen
- 20: 0.18 ft 2 in dia. Sch 40 PVC end cap
- 24: Slough from 24.0 ft to 40.0 ft in 4 in dia., borehole.
- 32
- 36
- 40: Drilling terminated at 40 ft bgs

NOTES: Horizontal and vertical data are based on the Harmon Surveying report dated July 13, 2018 (AR State Plane NAD83 South and NAVD88).

Appendix D
Geotechnical Laboratory Data



FTN/ENTERGY WHITE BLUFF/AR
SUMMARY OF SOIL DATA

Sample Identification	Sample Type	Sample Depth	Soil Classification	Natural Moisture %	Atterberg Limits				Grain Size Distribution			Compaction		Gs	Unit Weight		Permeability (cm/sec)	Additional Tests Conducted (See Notes)
					L.L.	P.L.	P.I.	L.I.	% Finer No. 4 Sieve	% Finer No. 200 Sieve	% Finer .005 mm	Maximum Dry Density (lb/cuft)	Optimum Moisture %		Moisture %	Dry (lb/cuft)		
B-1	UD	3.0-5.0'	CH	29.0	63	17	46	0.27	100.0	88.9	59.5	-	-	-	29.0	92.8	1.6E-08	-
B-1	UD	8.0-10.0'	CL	25.0	44	15	29	0.35	100.0	53.8	40.4	-	-	2.57	25.0	93.9	-	T-CU w/pp
B-3	UD	5.0-7.0'	CL	24.1	37	17	20	0.37	100.0	73.3	47.7	-	-	-	24.1	98.7	2.2E-08	-
B-3	UD	10.0-12.0'	SC	21.6	32	20	12	0.18	100.0	41.9	31.0	-	-	2.58	21.6	100.9	-	T-CU w/pp
B-3	UD	15.0-17.0'	SC	19.0	34	15	19	0.23	100.0	28.2	22.0	-	-	-	19.0	110.5	6.3E-06	-
B-3	UD	20.0-22.0'	SM	31.5	NP	NP	NP	NP	100.0	18.1	9.5	-	-	-	31.5	79.2	-	DS
B-4	UD	8.0-10.0'	CH	33.5	59	30	29	0.13	100.0	94.7	51.5	-	-	-	33.5	86.1	4.6E-08	-
B-5	UD	3.0-5.0'	CL	26.6	42	21	21	0.28	95.4	73.1	28.0	-	-	2.69	26.6	91.7	-	T-CU w/pp
B-5	UD	10.0-12.0'	CL	17.1	35	16	19	0.07	97.6	90.3	46.0	-	-	-	17.1	113.8	1.5E-08	-
B-7	UD	5.0-7.0'	SM	20.5	34	26	8	-0.73	90.4	40.0	21.1			2.66	20.5	104.7	-	T-CU w/pp
B-7	UD	7.0-9.0'	CL	21.8	34	20	14	0.13	100.0	52.7	34.5	-	-	-	21.8	98.1	6.7E-07	-
B-7	UD	15.0-17.0'	SC	21.9	28	19	9	0.36	100.0	36.5	24.0	-	-	2.62	21.9	102.2	-	T-CU w/pp
RP-4	UD	20.0-22.0'	CL	22.2	44	15	29	0.24	93.0	66.9	39.5	-	-	2.67	22.2	101.8	-	T-CU w/pp
RP-4	UD	30.0-32.0'	CH	37.1	54	21	33	0.47	100.0	96.3	57.4			-	37.1	80.2	3.5E-07	-
RP-9	UD	30.0-32.0'	CH	30.2	54	24	30	0.19	100.0	98.8	44.0	-	-	2.67	30.2	88.9	-	C

ABBREVIATIONS: LIQUID LIMIT (LL)
PLASTIC LIMIT (PL)
PLASTICITY INDEX (PI)
LIQUIDITY INDEX (LI)
SPECIFIC GRAVITY (Gs)
MOISTURE (Mc)

NOTES: T = TRIAXIAL TEST
U = UNCONFINED COMPRESSION TEST
C = CONSOLIDATION TEST
DS = DIRECT SHEAR TEST
O = ORGANIC CONTENT
P = pH

FTN/ENTERGY WHITE BLUFF/AR
SUMMARY OF SOIL DATA

Sample Identification	Sample Type	Sample Depth	Soil Classification	Natural Moisture %	Atterberg Limits				Grain Size Distribution			Compaction		Gs	Unit Weight		Permeability (cm/sec)	Additional Tests Conducted (See Notes)
					L.L.	P.L.	P.I.	L.I.	% Finer No. 4 Sieve	% Finer No. 200 Sieve	% Finer .005 mm	Maximum Dry Density (lb/cuft)	Optimum Moisture %		Moisture %	Dry (lb/cuft)		
B-2	Bag	5.0-7.5'	CH	24.7	52	21	31	0.13	100.0	86.0	55.0	-	-	-	-	-	-	-
B-3 (P2-5)	Bag	13.0-14.0'	CL	23.3	40	19	21	0.18	100.0	54.1	41.0	-	-	-	-	-	-	-
B-3 (P2-5)	Bag	23.0-24.0'	SM	30.0	NP	NP	NP	NP	100.0	28.1	16.5	-	-	-	-	-	-	-
B-5	Bag	4.0-6.0'	ML	27.4	46	30	16	-0.17	100.0	70.7	33.0	-	-	-	-	-	-	-
B-5	Bag	9.0-10.0'	ML	26.3	49	31	18	-0.27	100.0	89.1	45.0	-	-	-	-	-	-	-
B-6	Bag	11.0-12.0'	SM	12.4	NP	NP	NP	NP	100.0	27.6	20.0	-	-	-	-	-	-	-
B-6	Bag	16.0-17.0'	CL	21.3	36	23	13	-0.11	100.0	54.2	38.0	-	-	-	-	-	-	-
B-6	Bag	22.0-24.0'	SM	10.9	NP	NP	NP	NP	100.0	28.6	18.9	-	-	-	-	-	-	-
B-7	Bag	18.0-20.0'	SM	22.8	NP	NP	NP	NP	100.0	21.4	15.0	-	-	-	-	-	-	-
RP-3	Bag	18.0-20.0'	CH	27.1	56	27	29	0.02	100.0	95.6	44.0	-	-	-	-	-	-	-
RP-3	Bag	29.0-30.0'	SM	22.4	NP	NP	NP	NP	100.0	26.3	20.0	-	-	-	-	-	-	-
RP-4	Bag	8.0-9.0'	CL	13.4	30	16	14	-0.17	100.0	50.8	29.0	-	-	-	-	-	-	-
RP-4	Bag	25.0-26.0'	ML	37.7	48	30	18	0.40	100.0	98.7	43.0	-	-	-	-	-	-	-
RP-5	Bag	15.0-18.0'	SC-SM	24.4	28	22	6	0.51	100.0	34.0	25.9	-	-	-	-	-	-	-
RP-7	Bag	16.6-17.4'	SC	22.3	36	19	17	0.20	100.0	46.7	34.0	-	-	-	-	-	-	-

ABBREVIATIONS:
LIQUID LIMIT (LL)
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					L.L.	P.L.	P.I.	L.I.	% Finer No. 4 Sieve	% Finer No. 200 Sieve	% Finer .005 mm	Maximum Dry Density (lb/cuft)	Optimum Moisture %		Moisture %	Dry (lb/cuft)		
RP-9	Bag	9.0-10.0'	SC-SM	4.2	20	15	5	-2.35	67.7	16.4	9.5	-	-	-	-	-	-	-
RP-9	Bag	26.0-27.0'	CH	31.3	50	20	30	0.36	100.0	98.1	54.0	-	-	-	-	-	-	-

ABBREVIATIONS: LIQUID LIMIT (LL)
PLASTIC LIMIT (PL)
PLASTICITY INDEX (PI)
LIQUIDITY INDEX (LI)
SPECIFIC GRAVITY (Gs)
MOISTURE (Mc)

NOTES: T = TRIAXIAL TEST
U = UNCONFINED COMPRESSION TEST
C = CONSOLIDATION TEST
DS = DIRECT SHEAR TEST
O = ORGANIC CONTENT
P = pH

JUNE 2018

18103173

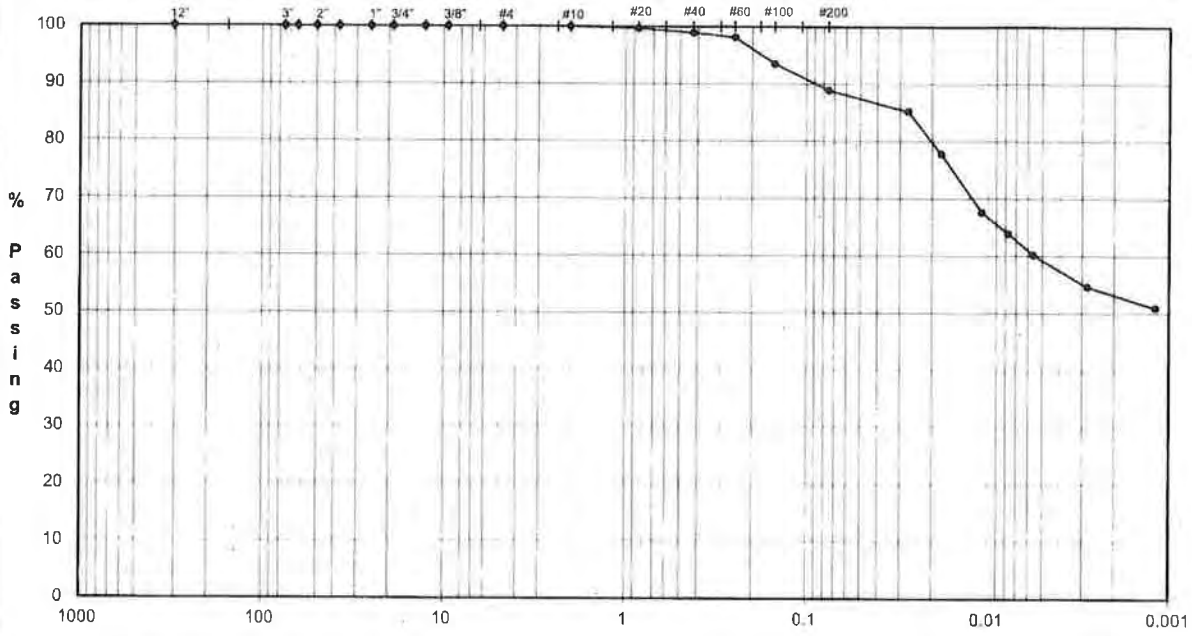
PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**

SAMPLE ID: **B-1** Depth: **3.0-5.0'**

TYPE: **UD**



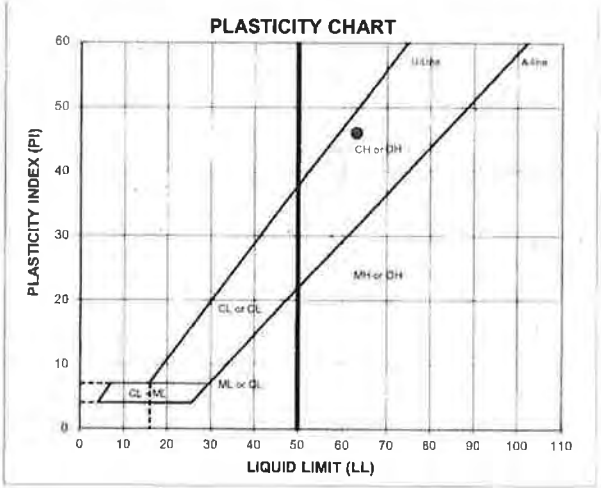
	Coarse	Fine	Coarse	Medium	Fine	
COBBLES	GRAVEL		SAND			Silt or Clay FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
3.0"	75.0	100.0	Cobbles	0.0
2.5"	63.5	100.0		
2.0"	50.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0		
0.75"	19.0	100.0	Coarse Gravel	0.0
0.50"	12.7	100.0		
0.375"	9.5	100.0		
#4	4.8	100.0	Fine Gravel	0.0
#10	2.00	100.0	Coarse Sand	0.0
#20	0.85	99.6		
#40	0.43	98.9	Medium Sand	1.1
#60	0.25	98.1		
#100	0.15	93.5		
#200	0.075	88.9	Fine Sand	10.0

Hydrometer Analysis

(mm)	%Finer		
0.027	85.2		
0.018	77.8		
0.011	67.6	Fines	
0.0078	63.9	Silt or Clay	88.9
0.0056	60.2		
0.0028	54.6		
0.0012	50.9		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
29.0	63	17	46	0.27

LL (oven-dried) / 0.75 ORGANIC (OL-OH)

DESCRIPTION: CLAY, some fine to medium sand; yellowish brown.

USCS: CH

TECH	TB
DATE	7/23/18
CHECK	
REVIEW	
APPROVE	

Golder Associates Inc.

FLEXIBLE WALL PERMEABILITY
ASTM D 5084
METHOD D, CONSTANT RATE OF FLOW

PROJECT TITLE	FTN/ENTERGY WHITE BLUFF/AR		Board #	12	COMMENTS
PROJECT NUMBER	18103173		Flow Pump	2	
SAMPLE ID	B-1	3.0-5.0'	Flow Pump Speed	11	
SAMPLE TYPE	UD		Technician	FT	

Sample Data, Initial				Sample Data, Final	
Height, inches	3.114	B-Value, f	0.97	Height, inches	3.142
Diameter, inches	2.836	Cell Pres.	88.0	Diameter, inches	2.858
Area, cm^2	40.75	Bot. Pres.	80.0	Area, cm^2	41.39
Volume, cm^3	322.35	Top Pres.	80.0	Volume, cm^3	330.31
Mass, g	618.40	Tot. B.P.	80.0	Mass, g	632.58
Moisture Content, %	29.04	Head, max.	137.16	Moisture Content, %	31.99
Dry Density, pcf	92.77	Head, min.	137.16	Dry Density, pcf	90.54
Spec. Gravity (assumed)	2.720	Max. Grad.	17.19	Volume Solids, cm^3	176.19
Volume Solids, cm^3	176.19	Min. Grad.	17.19	Volume Voids, cm^3	154.12
Volume Voids, cm^3	146.15			Void Ratio	0.87
Void Ratio	0.83			Saturation, %	99.5%
Saturation, %	95.2%				

WATER CONTENTS		Sample Initial	Sample Final
Wt Soil & Tare, i	g	618.40	715.61
Wt Soil & Tare, f	g	479.25	562.37
Wt Tare	g	0.00	83.41
Wt Moisture Lost	g	139.15	153.24
Wt Dry Soil	g	479.25	478.96
Water Content	%	29.04%	31.99%

DESCRIPTION: CLAY, some fine to medium sand; yellowish brown.

Flow Pump Rate: 1.18E-05 cm^3/sec

USCS: CH

TIME FUNCTIONS, SECONDS								dP				
DATE	DAY	HOUR	MIN	TEMP (°C)	dt (min)	dt,acc (min)	dt (sec)	dt,acc (sec)	Reading (psi)	Head (cm)	Gradient	Permeability (cm/sec)
07/23/18	43304	9	0	20.5	0	0	0	0	1.95	137.16	17.19	1.6E-08
07/23/18	43304	9	5	20.5	5	5	300	300	1.95	137.16	17.19	1.6E-08
07/23/18	43304	9	10	20.5	5	10	300	600	1.95	137.16	17.19	1.6E-08
07/23/18	43304	9	15	20.5	5	15	300	900	1.95	137.16	17.19	1.6E-08 *
07/23/18	43304	9	20	20.5	5	20	300	1200	1.95	137.16	17.19	1.6E-08 *
07/23/18	43304	9	25	20.5	5	25	300	1500	1.95	137.16	17.19	1.6E-08 *
07/23/18	43304	9	30	20.5	5	30	300	1800	1.95	137.16	17.19	1.6E-08 *

*TRANSCRIBED FROM ORIGINAL DATA SHEETS

PERMEABILITY REPORTED AS ** 1.6E-08 cm/sec **

DATE	7/23/18
CHECK	
REVIEW	
APPROVE	

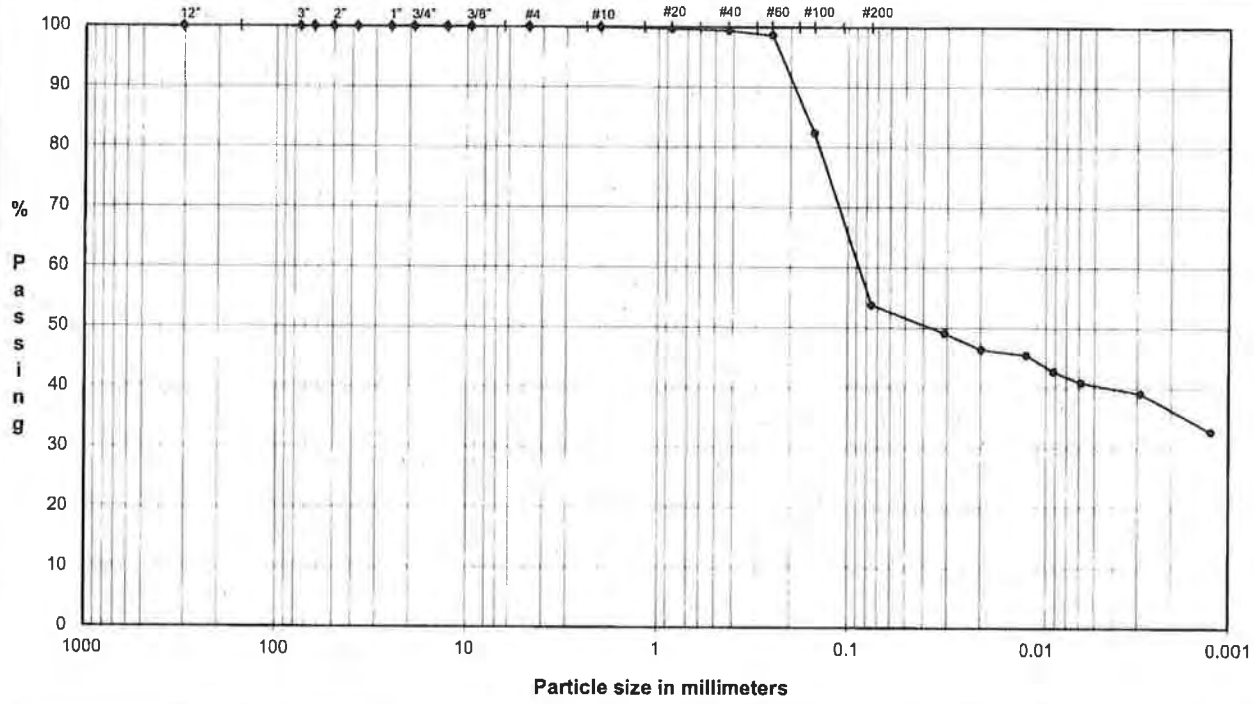
JULY 2018

18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**
SAMPLE ID: **B-1** Depth: **8.0-10.0'**
TYPE: **UD**



	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

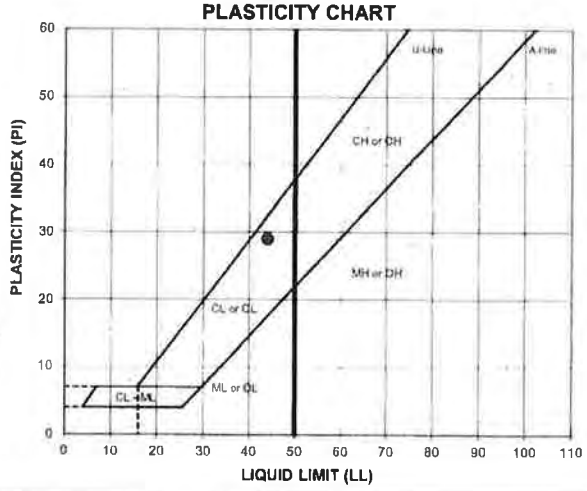
U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
3.0"	75.0	100.0	Cobbles	0.0
2.5"	63.5	100.0		
2.0"	50.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0		
0.75"	19.0	100.0	Coarse Gravel	0.0
0.50"	12.7	100.0		
0.375"	9.5	100.0		
#4	4.8	100.0	Fine Gravel	0.0
#10	2.00	99.9	Coarse Sand	0.1
#20	0.85	99.7		
#40	0.43	99.4	Medium Sand	0.5
#60	0.25	98.6		
#100	0.15	82.3		
#200	0.075	53.8	Fine Sand	45.6

Hydrometer Analysis

(mm)	%Finer		
0.031	49.1		
0.020	46.4		
0.011	45.5	Fines	
0.0082	42.8	Silt or Clay	53.8
0.0059	40.9		
0.0029	39.1		
0.0012	32.8		

PLASTICITY CHART



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
25.0	44	15	29	0.35

LL (oven-dried) / 0.75 ORGANK (OL/OH)

DESCRIPTION: SILTY CLAY and SAND, fine to coarse; yellowish brown and gray.

USCS: CL

TECH	TB/HH/BA
DATE	7/20/18
CHECK	
REVIEW	
APPROVE	

SPECIFIC GRAVITY OF SOILS
ASTM D-854
PYCNOMETER METHOD

PROJECT TITLE	**FTN/ENTERGY WHITE BLUFF/AR**		
PROJECT NUMBER	**18103173**	**SAMPLE ID**	**B-1**
		SAMPLE TYPE	**UD**
TESTED FOR	**Gs**	**SAMPLE DEPTH**	**8.0-10.0'**

MOISTURE CONTENT OF MATERIAL PASSING THE #4 SIEVE

Weight Soil and Tare, Initial (gm)	**203.53**
Weight Soil and Tare, Final (gm)	**203.11**
Weight Of Tare (gm)	**51.24**
Weight Of Moisture (gm)	**0.42**
Weight Of Dry Soil (gm)	**151.87**
Hygroscopic Moisture In (%)	**0.3%**

Test Method		**Method - B**
Pycnometer Number		**24**
Weight Pycnometer Empty (gm)		181.79
Volume of Pycnometer (gm)		499.61
Weight Pycnometer and Water (gm)		680.37
Mass of Pycnometer and Water at the test Temperture	(A)	679.99
Observed Temperature (Tb), for (Mb) In Degrees C		24.50
Weight of Soil, Water & Pycnometer (gm)	(B)	**710.61**
Temperature, C		**24.5**
Density of water @ tested temperature (g/ml)		1.00
Tare Number		-
Weight of Dry Soil Slurry plus Tare		**50.04**
Weight of Tare		**0.00**
Weight of Dry Soil (gm)	(C)	50.04
Temperature Coefficient		0.9990

SPECIFIC GRAVITY (G) **2.575**

G @ 20^0 C = [C/(A-(B - C))]*(K)

METHOD - A WET METHOD
METHOD - B OVEN-DRIED METHOD

METHOD OF AIR REMOVAL: VACUUM

Recommended Mass for Test Specimen

Soil Type	Specimen Dry Mass when using 500 ml Pycnometer
SP, SP-SM	100
SP-SC, SM , SC	75
SILT OR CLAY	50

TECH	TJ
DATE	7/20/18
CHECK	
REVIEW	
APPROVE	

Boring or Test Pit:	B-1		Boring or Test Pit:	B-1		Boring or Test Pit:	B-1	
Sample:	UD		Sample:	UD		Sample:	UD	
Depth:	8.0-10.0'	ft	Depth:	8.0-10.0'	ft	Depth:	8.0-10.0'	ft
Point No.:	1		Point No.:	2		Point No.:	3	
	Initial			**Initial**			**Initial**	
Length =	6.234	in	Length =	6.070	in	Length =	6.034	in
Diameter =	2.856	in	Diameter =	2.869	in	Diameter =	2.870	in
Wet Mass =	2.835	lb	Wet Mass =	2.565	lb	Wet Mass =	2.631	lb
Area =	6.406	in^2	Area =	6.465	in^2	Area =	6.469	in^2
Volume =	39.937	in^3	Volume =	39.241	in^3	Volume =	39.035	in^3
Specific Gravity =	2.57	(ASTM D854)	Specific Gravity =	2.57	(ASTM D854)	Specific Gravity =	2.57	(ASTM D854)
Dry Mass of Solids =	2.291	lb	Dry Mass of Solids =	2.079	lb	Dry Mass of Solids =	2.060	lb
Moisture Content =	23.8%		Moisture Content =	23.4%		Moisture Content =	27.7%	
Wet Unit Weight =	122.7	pcf	Wet Unit Weight =	112.9	pcf	Wet Unit Weight =	116.5	pcf
Dry Unit Weight =	99.1	pcf	Dry Unit Weight =	91.5	pcf	Dry Unit Weight =	91.2	pcf
Void Ratio =	0.62		Void Ratio =	0.75		Void Ratio =	0.76	
Percent Saturation =	99%		Percent Saturation =	80%		Percent Saturation =	94%	
	After Consolidation			**After Consolidation**			**After Consolidation**	
Length =	6.173	in	Length =	5.950	in	Length =	5.890	in
Diameter =	2.917	in	Diameter =	2.847	in	Diameter =	2.858	in
Area =	6.682	in^2 (Method B)	Area =	6.365	in^2 (Method B)	Area =	6.415	in^2 (Method B)
Volume =	41.249	in^3	Volume =	37.868	in^3	Volume =	37.784	in^3
Moisture Content =	26.1%		Moisture Content =	26.9%		Moisture Content =	27.3%	
Wet Unit Weight =	121.0	pcf	Wet Unit Weight =	120.3	pcf	Wet Unit Weight =	119.9	pcf
Dry Unit Weight =	96.0	pcf	Dry Unit Weight =	94.8	pcf	Dry Unit Weight =	94.2	pcf
Void Ratio =	0.67		Void Ratio =	0.69		Void Ratio =	0.70	
Percent Saturation =	100%		Percent Saturation =	100%		Percent Saturation =	100%	
B Parameter =	0.99		B Parameter =	1.00		B Parameter =	0.97	
Shear Rate =	0.012%	/min	Shear Rate =	0.012%	/min.	Shear Rate =	0.012%	/min.
t_{50} =	5.84	min.	t_{50} =	14.95	min.	t_{50} =	9.87	min.
Strain at Failure =	3.2%		Strain at Failure =	3.3%		Strain at Failure =	2.3%	
Cell Pressure =	89.0	psi	Cell Pressure =	98.0	psi	Cell Pressure =	107.0	psi
Back Pressure =	80.0	psi	Back Pressure =	80.0	psi	Back Pressure =	80.0	psi
Confining Pressure =	9.0	psi	Confining Pressure =	18.0	psi	Confining Pressure =	27.0	psi

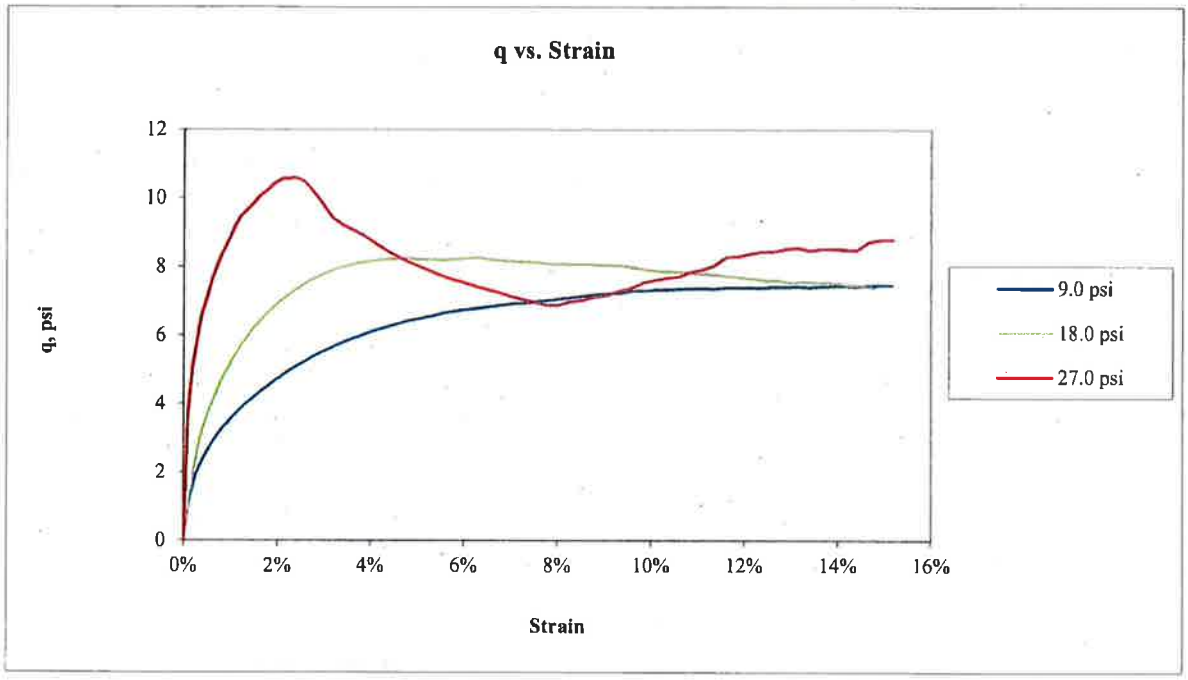
Notes: Sample description: (CL) SILTY CLAY and SAND, fine to coarse; yellowish brown and gray

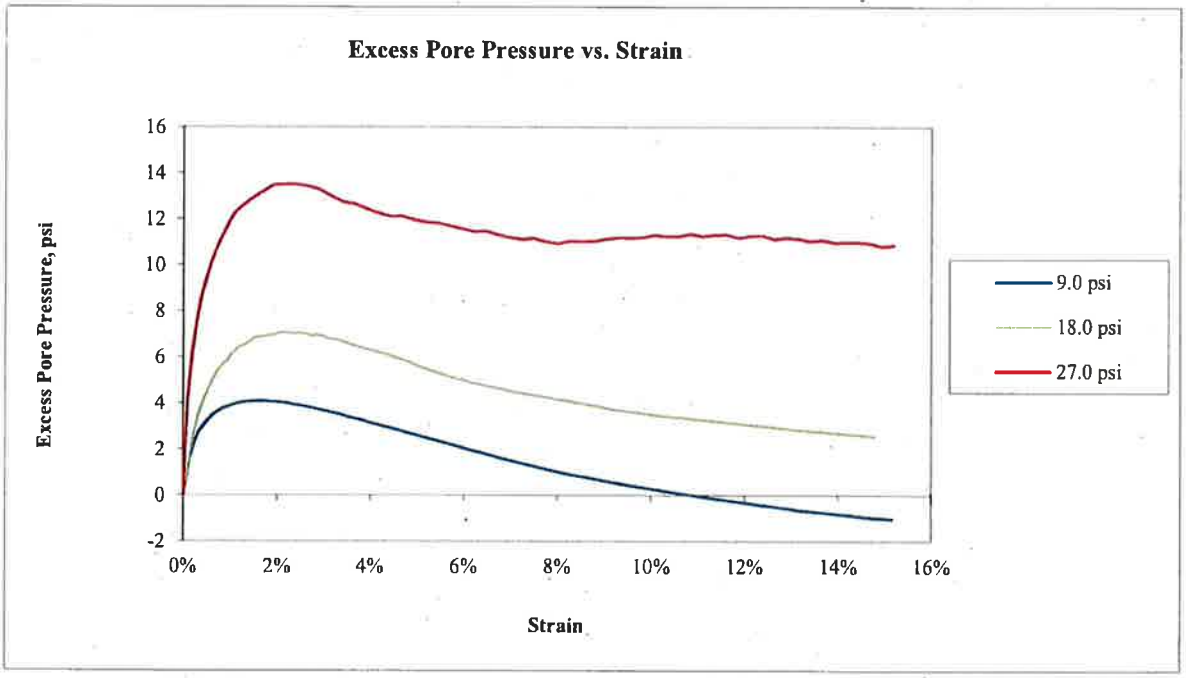
Atterberg limits: LL = 44 PL = 15 PI = 29 (ASTM D4318)

Percent finer: 3/4 in. = 100% No. 4 = 100% No. 200 = 54% (ASTM D422, refer to separate report for gradation curve)

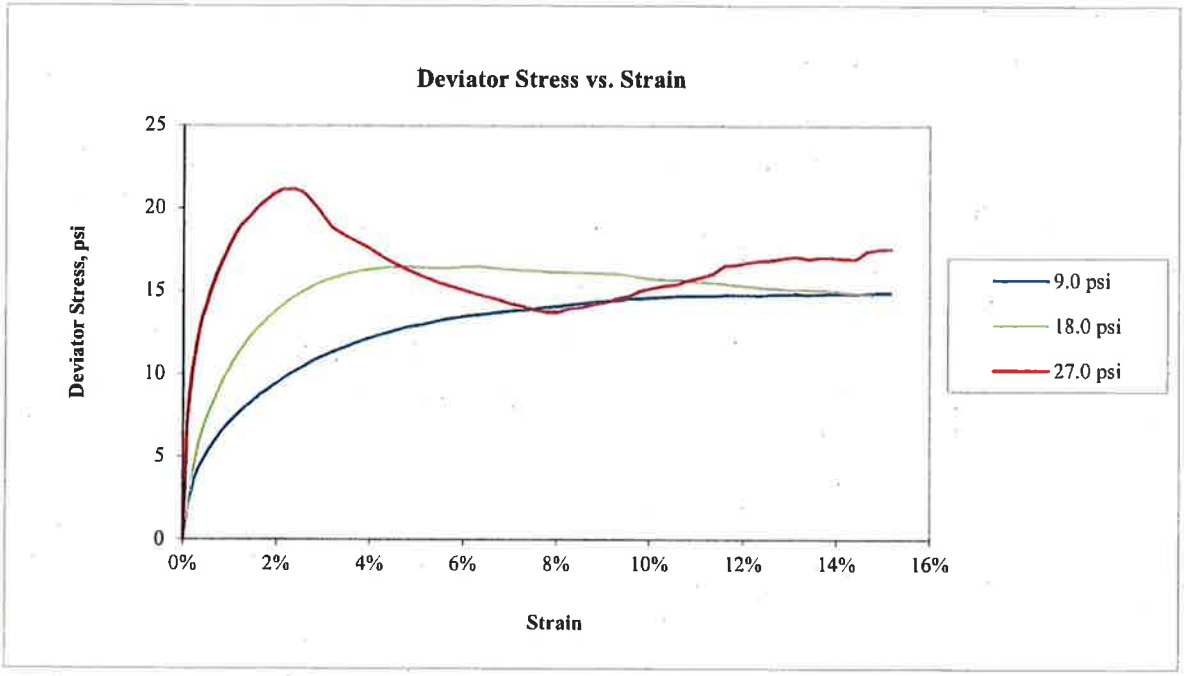
Specimen type:	X	Intact		Reconstituted	
Moisture from:		Cuttings	X	Entire specimen	
Saturation method:	X	Wet		Dry	
Failure criterion:	X	$(\sigma'_1/\sigma'_3)_{max}$		$(\sigma'_1-\sigma'_3)_{max}$	% strain
Membrane effect:	X	Corrected		Not Corrected	

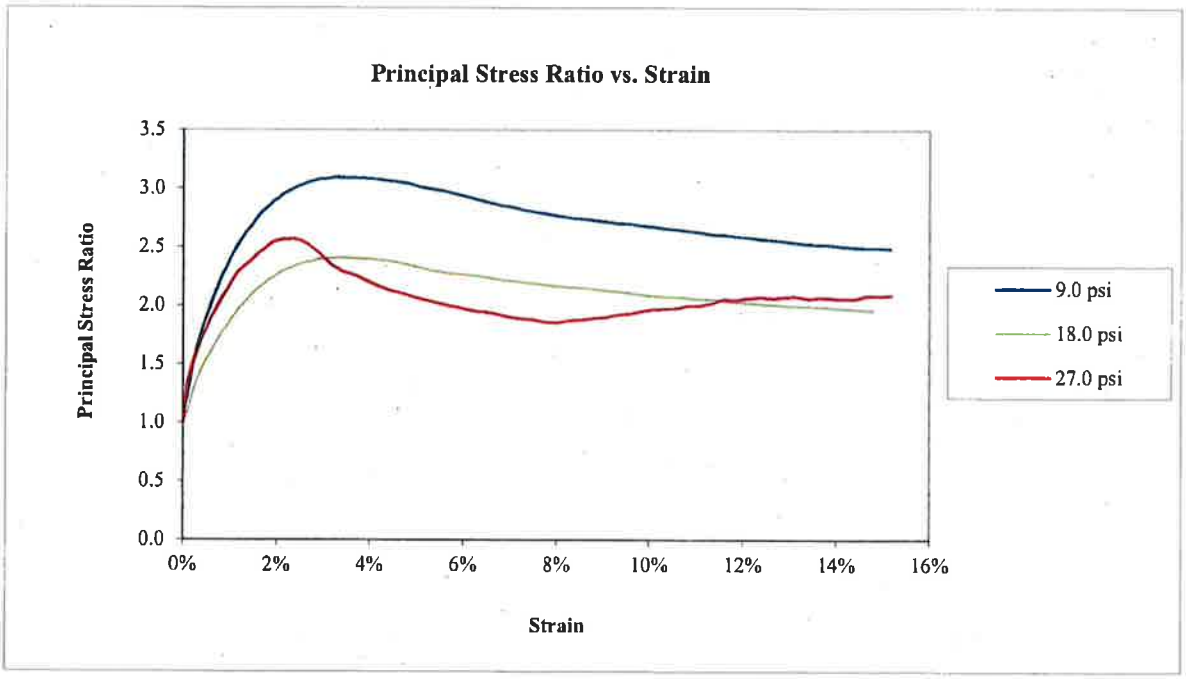
Golder Associates Inc. **Atlanta, Georgia**	**Title:** **ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **SAMPLE AND TEST DATA**			
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**				
Sample: **B-1 UD 8.0-10.0'**	**Technician:** **PWM/FT** **Checked:**	**Reviewed:** **Approved:**	**Start Date:** **7/17/2018**	**Job Number:** **18103173**	**Figure:** **1**





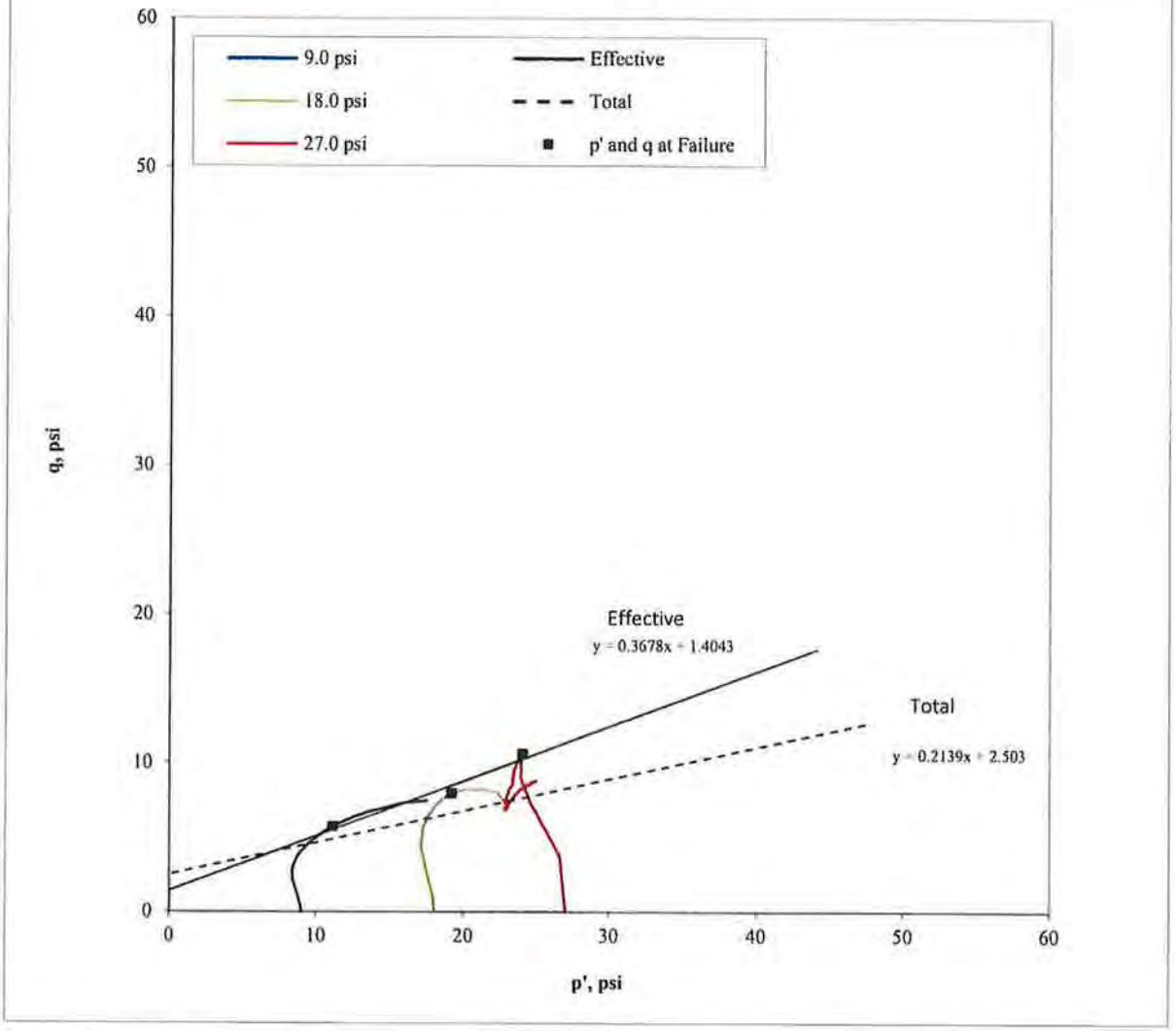
Golder Associates Inc. Atlanta, Georgia	Title: ASTM D4767 CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT q AND EXCESS PORE PRESSURE PLOTS				
Job Short Title: FTN/ENTERGY WHITE BLUFF/AR					
Sample: B-1 UD 8.0-10.0'	Technician: PWM/FT Check:	Reviewed: Approved:	Start Date: 7/17/2018	Job Number: 18103173	Figure: 2





Golder Associates Inc. Atlanta, Georgia	Title: ASTM D4767 CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT DEVIATOR STRESS AND PRINCIPAL STRESS RATIO PLOT				
Job Short Title: FTN/ENTERGY WHITE BLUFF/AR					
Sample: B-1 UD 8.0-10.0'	Technician: PWM/FT Check:	Reviewed: Approved:	Start Date: 7/17/2018	Job Number: 18103173	Figure: 3

Stress Path (p'-q) Plot



Confining Pressure (psi)	p at failure (psi)	p' at failure (psi)	q at failure (psi)
9.0	14.7	11.1	5.7
18.0	26.0	19.2	8.0
27.0	37.6	24.1	10.6

Effective

α ' =	20.2	degree
a' =	1.4	psi

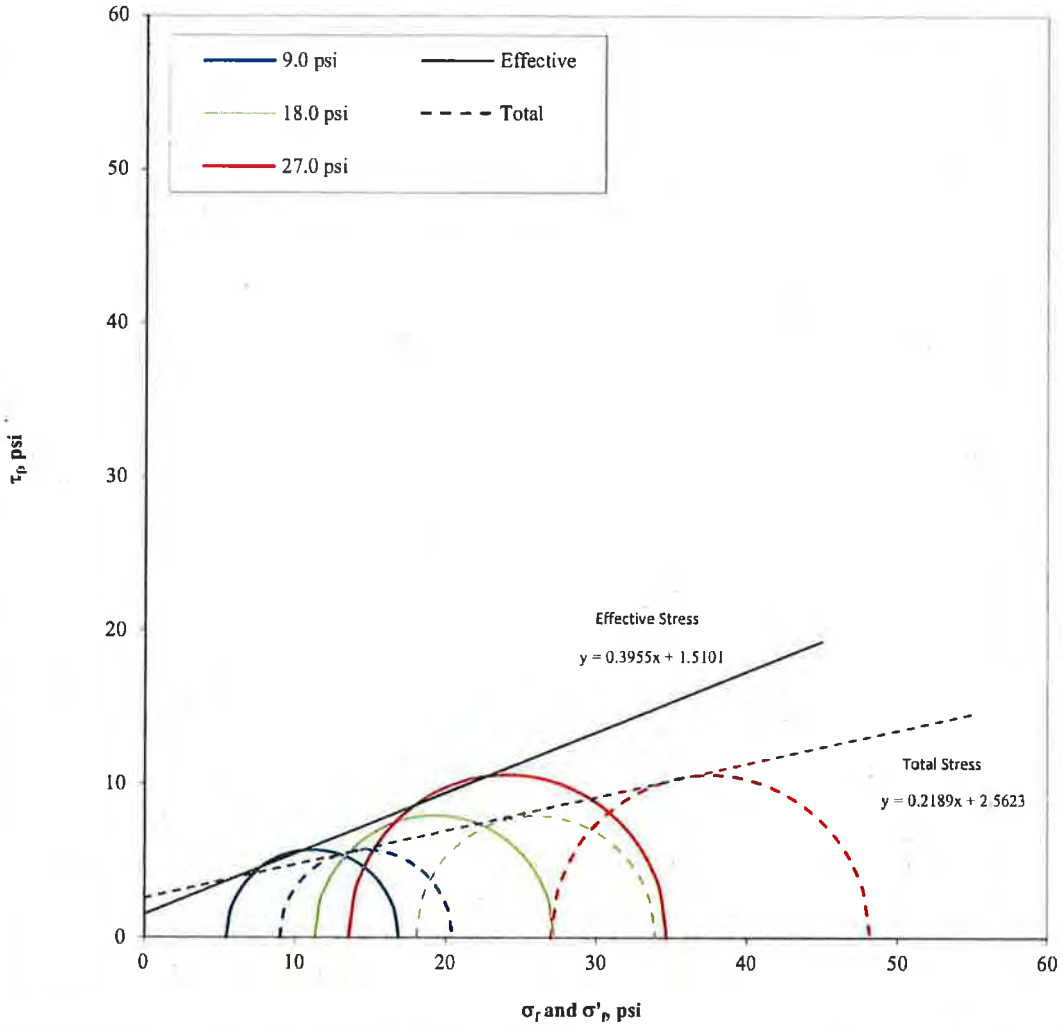
Total

α =	12.1	degree
a =	2.5	psi

Note: The laboratory testing relates only to the sample tested. GAI neither accepts responsibility for nor makes claims to the final use and purpose of the material.

Golder Associates Inc. Atlanta, Georgia	**Title:** ASTM D4767 CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT STRESS PATH PLOT				
Job Short Title: FTN/ENTERGY WHITE BLUFF/AR					
Sample: B-1 UD 8.0-10.0'	**Technician:** PWM/FT **Check:**	**Reviewed:** **Approved:**	**Start Date:** 7/17/2018	**Job Number:** 18103173	**Figure:** 4

Mohr's Circle Diagram



Confining Pressure (psi)	σ'_1 at failure (psi)	σ'_3 at failure (psi)	σ_1 at failure (psi)	σ_3 at failure (psi)
9.0	16.8	5.4	20.4	9.0
18.0	27.2	11.3	33.9	18.0
27.0	34.7	13.5	48.2	27.0

Effective

ϕ' =	21.6	degree
c' =	1.5	psi

Total

ϕ =	12.3	degree
c =	2.6	psi

Note: The laboratory testing relates only to the sample tested. GAI neither accepts responsibility for nor makes claims to the final use and purpose of the material.

Golder Associates Inc. **Atlanta, Georgia**	**Title:** **ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **MOHR'S CIRCLE DIAGRAM**
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**	

Sample:	Technician:	Reviewed:	Start Date:	Job Number:	Figure:
B-1 UD 8.0-10.0'	PWM/FT Check:	Approved:	7/17/2018	18103173	5

9.0 psi

18.0 psi

27.0 psi

NOTE: Pore pressure built up before shearing, adjusted results to initial backpressure.

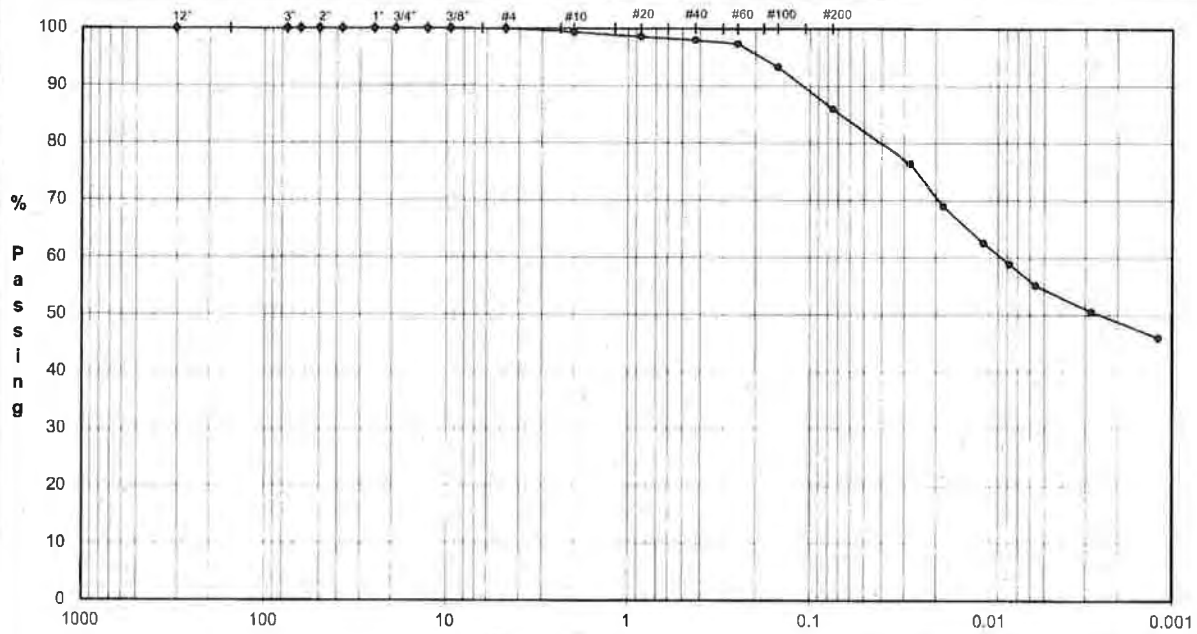
Golder Associates Inc. **Atlanta, Georgia**	**Title:** **ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **SPECIMENS PHOTOGRAPH - 9.0 / 18.0 / 27.0 psi**				
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**					
Sample: **B-1 UD 8.0-10.0'**	**Technician:** **PWM/FT** **Check:**	**Reviewed:** **Approved:**	**Start Date:** **7/17/2018**	**Job Number:** **18103173**	**Figure:** **6**

AUGUST 2018 18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**
SAMPLE ID: **B-2** Depth: **5.0-7.5'**
TYPE: **Bag**



COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

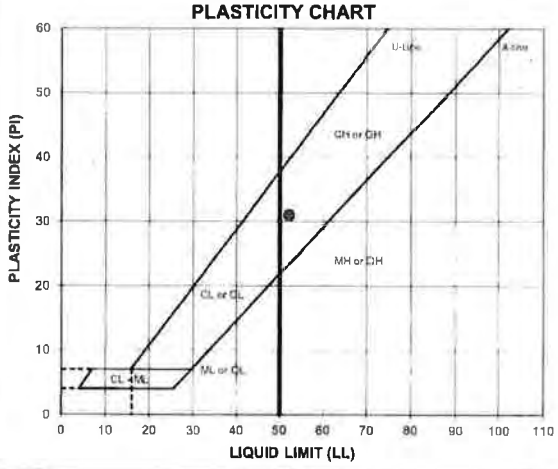
U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**100.0**		
0.375"	9.5	**100.0**		
#4	4.8	**100.0**	Fine Gravel	**0.0**
#10	2.00	**99.3**	Coarse Sand	**0.7**
#20	0.85	**98.5**		
#40	0.43	**97.9**	Medium Sand	**1.4**
#60	0.25	**97.4**		
#100	0.15	**93.2**		
#200	0.075	**86.0**	Fine Sand	**11.9**

Hydrometer Analysis

(mm)	%Finer		
0.028	**76.4**		
0.018	**69.0**		
0.011	**62.6**	Fines	
0.0078	**58.9**	Silt or Clay	**86.0**
0.0056	**55.2**		
0.0028	**50.6**		
0.0012	**46.0**		

PLASTICITY CHART



ATTERBERG LIMITS

Method -B (Dry preparation)

M,	LL	PL	PI	LI
24.7	52	21	31	0.13

LL (oven-dried) / 0.75 ORGANIC (OL OH)

DESCRIPTION: sandy CLAY, fine to coarse; yellowish brown

USCS: CH

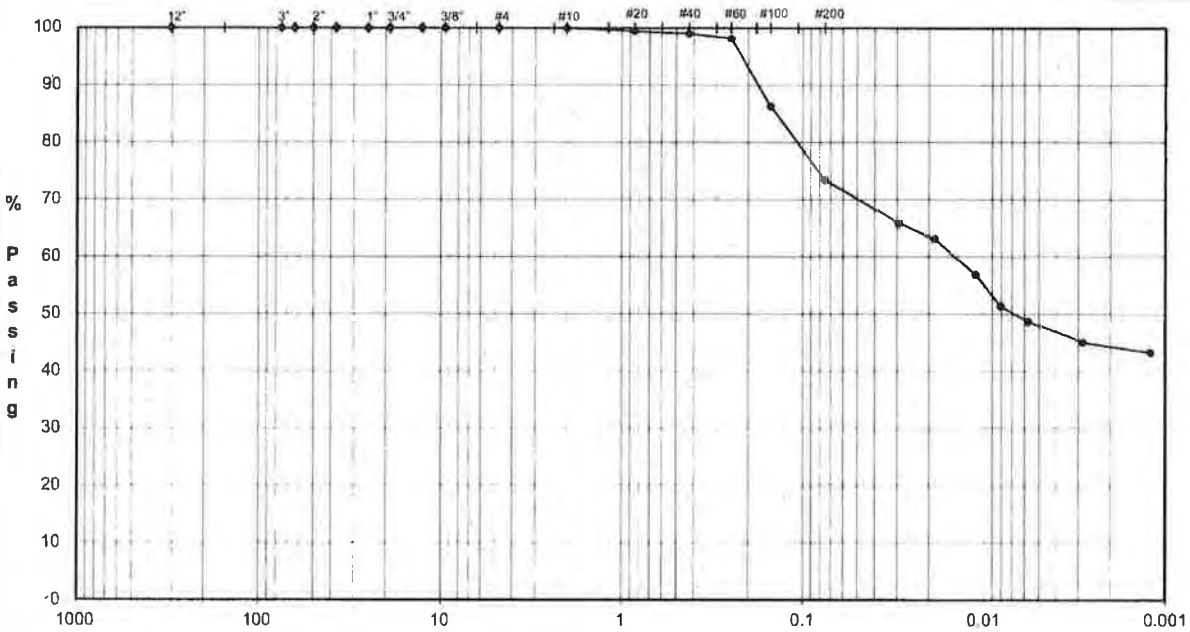
TECH	HH/BA/TB
DATE	8/1/18
CHECK	
REVIEW	
APPROVE	

JUNE 2018 | 18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**
SAMPLE ID: **B-3** Depth: **5.0-7.0'**
TYPE: **UD**



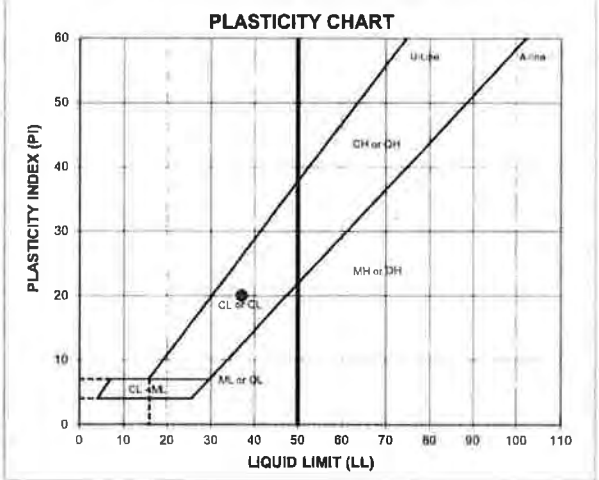
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
3.0"	75.0	100.0	Cobbles	0.0
2.5"	63.5	100.0		
2.0"	50.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0		
0.75"	19.0	100.0	Coarse Gravel	0.0
0.50"	12.7	100.0		
0.375"	9.5	100.0		
#4	4.8	100.0	Fine Gravel	0.0
#10	2.00	100.0	Coarse Sand	0.0
#20	0.85	99.4		
#40	0.43	99.0	Medium Sand	1.0
#60	0.25	98.1		
#100	0.15	86.3		
#200	0.075	73.3	Fine Sand	25.6

Hydrometer Analysis

(mm)	%Finer		
0.029	65.8		
0.019	63.1		
0.011	56.8	Fines	
0.0081	51.4	Silt or Clay	73.3
0.0057	48.7		
0.0029	45.1		
0.0012	43.3		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
24.1	37	17	20	0.37

LL (oven-dried) / 0.75 ORGANIC (OL/OH)

DESCRIPTION: sandy SILTY CLAY, fine to medium; yellowish brown, gray, and brown.

USCS: CL

TECH	BA/HH
DATE	7/26/18
CHECK	
REVIEW	
APPROVE	

Golder Associates Inc.

FLEXIBLE WALL PERMEABILITY
ASTM D 5084
METHOD D, CONSTANT RATE OF FLOW

PROJECT TITLE	FTN/ENTERGY WHITE BLUFF/AR		Board #	9	COMMENTS
PROJECT NUMBER	18103173		Flow Pump	2	
SAMPLE ID	B-3	5.0-7.0'	Flow Pump Speed	10	
SAMPLE TYPE	UD		Technician	FT	

Sample Data, Initial				Sample Data, Final	
Height, inches	3.147	B-Value, f	1.00	Height, inches	3.139
Diameter, inches	2.854	Cell Pres.	88.0	Diameter, inches	2.837
Area, cm²	41.27	Bot. Pres.	80.0	Area, cm²	40.78
Volume, cm³	329.91	Top Pres.	80.0	Volume, cm³	325.16
Mass, g	647.92	Tot. B.P.	80.0	Mass, g	656.52
Moisture Content, %	24.12	Head, max.	187.10	Moisture Content, %	25.76
Dry Density, pcf	98.74	Head, min.	187.10	Dry Density, pcf	100.18
Spec. Gravity (assumed)	2.750	Max. Grad.	23.47	Volume Solids, cm³	189.83
Volume Solids, cm³	189.83	Min. Grad.	23.47	Volume Voids, cm³	135.33
Volume Voids, cm³	140.08			Void Ratio	0.71
Void Ratio	0.74			Saturation, %	99.4%
Saturation, %	89.9%				

WATER CONTENTS		Sample Initial	Sample Final
Wt Soil & Tare, i	g	647.92	736.33
Wt Soil & Tare, f	g	522.03	601.84
Wt Tare	g	0.00	79.81
Wt Moisture Lost	g	125.89	134.49
Wt Dry Soil	g	522.03	522.03
Water Content	%	24.12%	25.76%

Flow Pump Rate: 2.25E-05 cm³/sec

USCS: CL

DESCRIPTION: sandy SILTY CLAY, fine to medium; yellowish brown, gray, and brown.

TIME FUNCTIONS, SECONDS								dP				
DATE	DAY	HOUR	MIN	TEMP (°C)	dt (min)	dt,acc (min)	dt (sec)	dt,acc (sec)	Reading (psi)	Head (cm)	Gradient	Permeability (cm/sec)
07/26/18	43307	13	0	22.3	0	0	0	0	2.66	187.10	23.47	2.2E-08
07/26/18	43307	13	5	22.3	5	5	300	300	2.66	187.10	23.47	2.2E-08
07/26/18	43307	13	10	22.3	5	10	300	600	2.66	187.10	23.47	2.2E-08
07/26/18	43307	13	15	22.3	5	15	300	900	2.66	187.10	23.47	2.2E-08 *
07/26/18	43307	13	20	22.3	5	20	300	1200	2.66	187.10	23.47	2.2E-08 *
07/26/18	43307	13	25	22.3	5	25	300	1500	2.66	187.10	23.47	2.2E-08 *
07/26/18	43307	13	30	22.3	5	30	300	1800	2.66	187.10	23.47	2.2E-08 *

*TRANSCRIBED FROM ORIGINAL DATA SHEETS

PERMEABILITY REPORTED AS ** 2.2E-08 cm/sec **

DATE	7/26/18
CHECK	
REVIEW	
APPROVE	

Boring or Test Pit:	B-3		Boring or Test Pit:	B-3		Boring or Test Pit:	B-3	
Sample:	UD		Sample:	UD		Sample:	UD	
Depth:	10.0-12.0 ft		Depth:	10.0-12.0 ft		Depth:	10.0-12.0 ft	
Point No.:	1		Point No.:	2		Point No.:	3	
	Initial			**Initial**			**Initial**	
Length =	6.001	in	Length =	5.995	in	Length =	5.996	in
Diameter =	2.829	in	Diameter =	2.871	in	Diameter =	2.858	in
Wet Mass =	2.610	lb	Wet Mass =	2.758	lb	Wet Mass =	2.793	lb
Area =	6.286	in^2	Area =	6.474	in^2	Area =	6.415	in^2
Volume =	37.721	in^3	Volume =	38.810	in^3	Volume =	38.466	in^3
Specific Gravity =	2.58	(ASTM D854)	Specific Gravity =	2.58	(ASTM D854)	Specific Gravity =	2.58	(ASTM D854)
Dry Mass of Solids =	2.117	lb	Dry Mass of Solids =	2.316	lb	Dry Mass of Solids =	2.285	lb
Moisture Content =	23.3%		Moisture Content =	19.1%		Moisture Content =	22.2%	
Wet Unit Weight =	119.6	pcf	Wet Unit Weight =	122.8	pcf	Wet Unit Weight =	125.5	pcf
Dry Unit Weight =	97.0	pcf	Dry Unit Weight =	103.1	pcf	Dry Unit Weight =	102.7	pcf
Void Ratio =	0.65		Void Ratio =	0.56		Void Ratio =	0.56	
Percent Saturation =	92%		Percent Saturation =	88%		Percent Saturation =	102%	
	After Consolidation			**After Consolidation**			**After Consolidation**	
Length =	5.941	in	Length =	5.957	in	Length =	5.930	in
Diameter =	2.844	in	Diameter =	2.884	in	Diameter =	2.879	in
Area =	6.353	in^2 (Method B)	Area =	6.533	in^2 (Method B)	Area =	6.508	in^2 (Method B)
Volume =	37.747	in^3	Volume =	38.920	in^3	Volume =	38.593	in^3
Moisture Content =	25.5%		Moisture Content =	21.8%		Moisture Content =	22.1%	
Wet Unit Weight =	121.6	pcf	Wet Unit Weight =	125.2	pcf	Wet Unit Weight =	124.9	pcf
Dry Unit Weight =	96.9	pcf	Dry Unit Weight =	102.8	pcf	Dry Unit Weight =	102.3	pcf
Void Ratio =	0.66		Void Ratio =	0.56		Void Ratio =	0.57	
Percent Saturation =	100%		Percent Saturation =	100%		Percent Saturation =	100%	
B Parameter =	0.97		B Parameter =	0.97		B Parameter =	0.99	
Shear Rate =	0.012%	/min.	Shear Rate =	0.090%	/min.	Shear Rate =	0.090%	/min.
t_{50} =	28.79	min.	t_{50} =	2.39	min.	t_{50} =	1.03	min.
Strain at Failure =	2.3%		Strain at Failure =	4.3%		Strain at Failure =	4.7%	
Cell Pressure =	90.0	psi	Cell Pressure =	100.0	psi	Cell Pressure =	110.0	psi
Back Pressure =	80.0	psi	Back Pressure =	80.0	psi	Back Pressure =	80.0	psi
Confining Pressure =	10.0	psi	Confining Pressure =	20.0	psi	Confining Pressure =	30.0	psi

Notes: Sample description: (SC) SAND and SILTY CLAY, fine to coarse; light gray and yellow.

Atterberg limits: LL = 32 PL = 20 PI = 12 (ASTM D4318)

Percent finer: 3/4 in. = 100% No. 4 = 100% No. 200 = 42% (ASTM D422, refer to separate report for gradation curve)

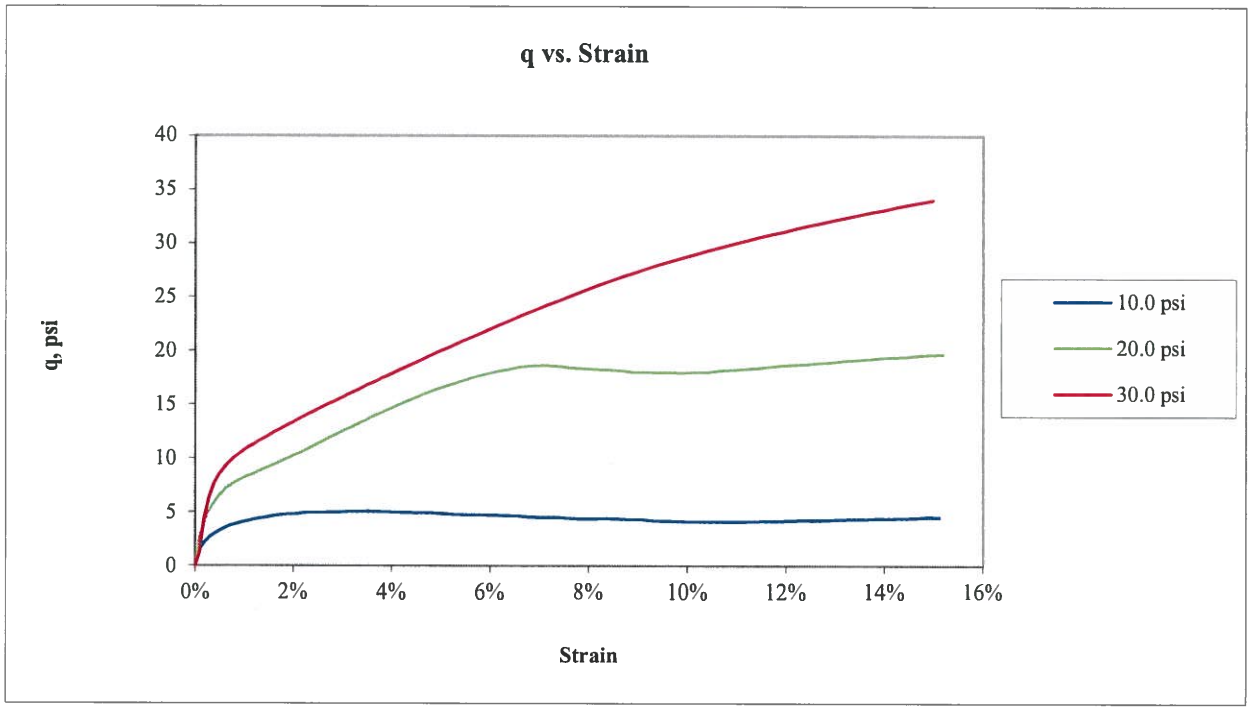
Specimen type:	X	Intact		Reconstituted
Moisture from:		Cuttings	X	Entire specimen
Saturation method:	X	Wet		Dry
Failure criterion:	X	$(\sigma'_1/\sigma'_3)_{max}$		$(\sigma'_1-\sigma'_3)_{max}$ ____ % strain
Membrane effect:	X	Corrected		Not Corrected

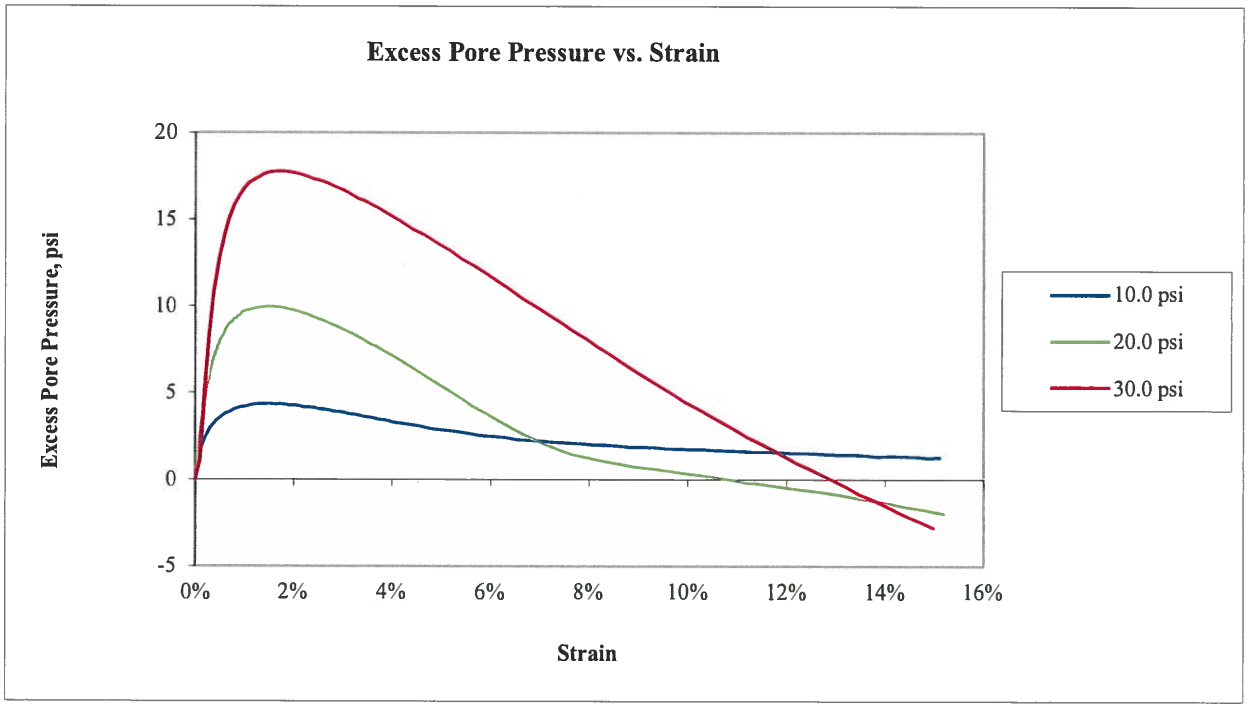
Golder Associates Inc.
Atlanta, Georgia

Title:
ASTM D4767
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT
SAMPLE AND TEST DATA

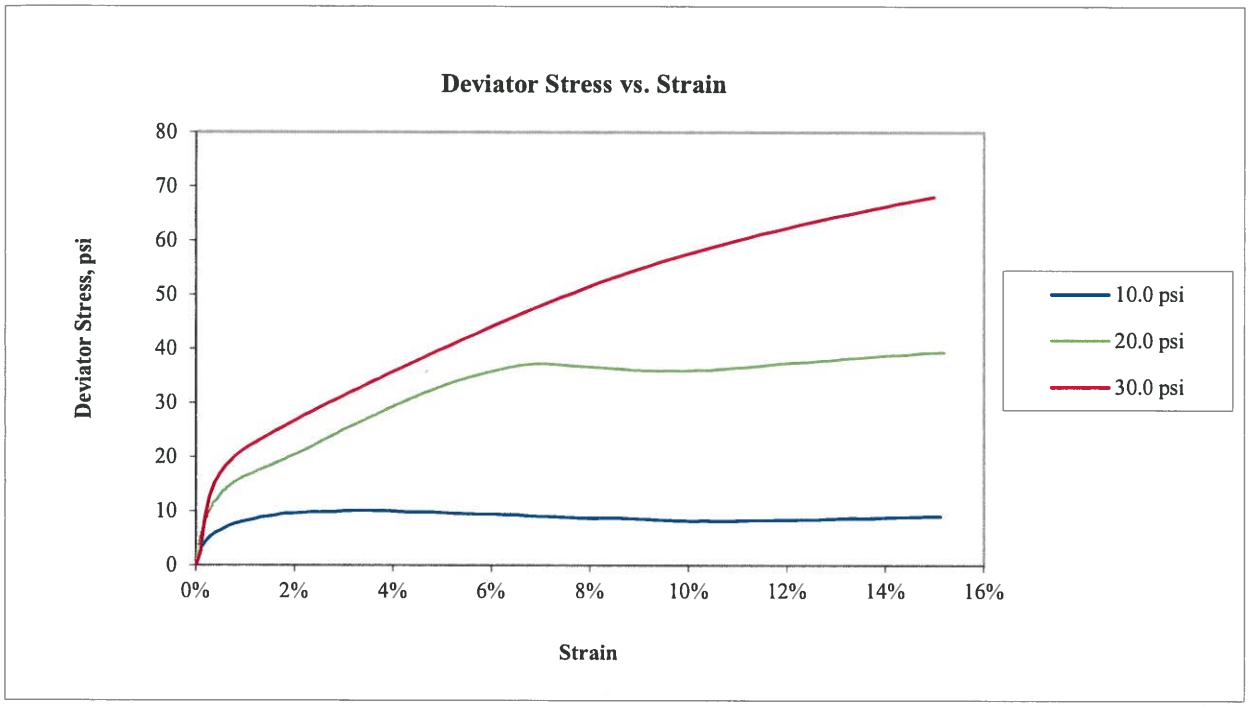
Job Short Title:
FTN/ENTERGY WHITE BLUFF/AR

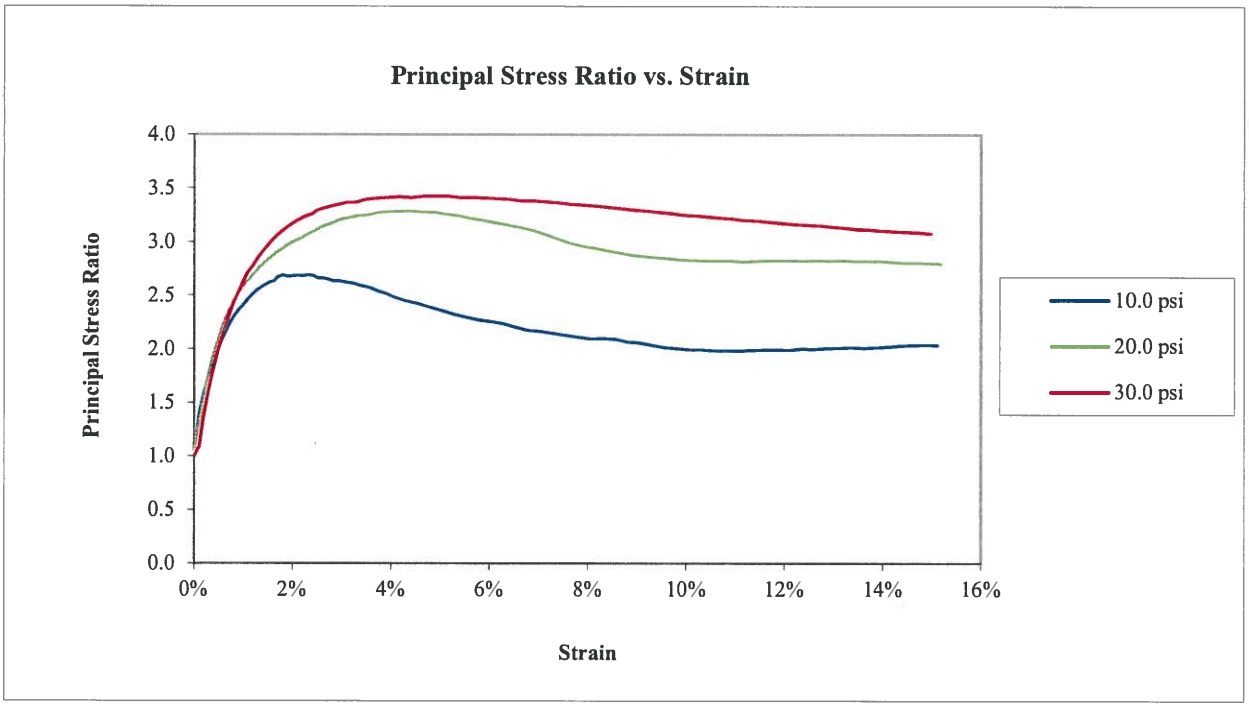
Sample:	Technician:	Reviewed:	Start Date:	Job Number:	Figure:
B-3 UD 10.0-12.0'	PWM/FT Check: PWM	Approved:	8/24/2018	18103173	1





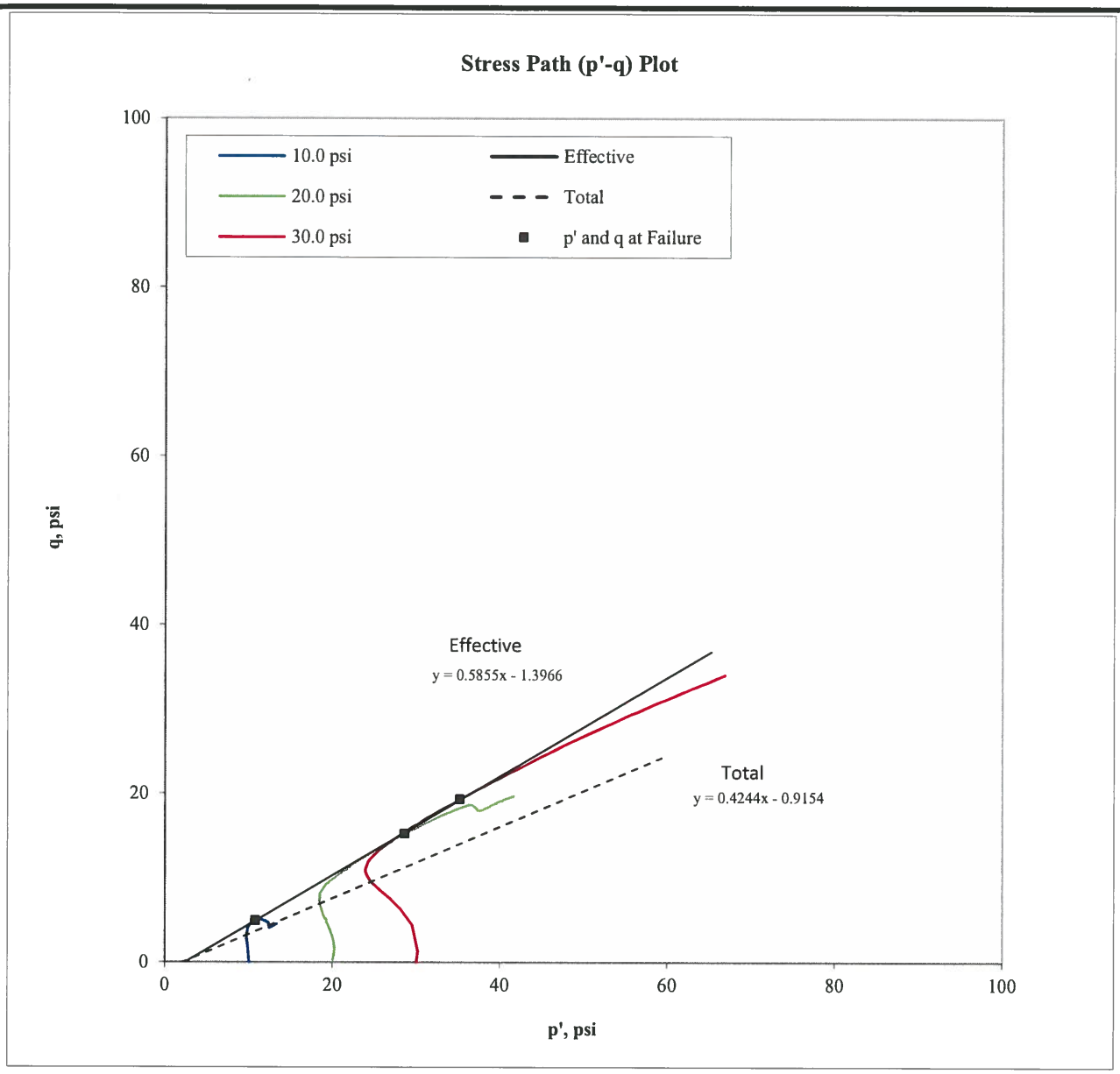
Golder Associates Inc. **Atlanta, Georgia**	**Title:** **ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **q AND EXCESS PORE PRESSURE PLOTS**				
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**					
Sample: **B-3 UD 10.0-12.0'**	**Technician:** **PWM/FT** **Check:**	**Reviewed:** **Approved:**	**Start Date:** **8/24/2018**	**Job Number:** **18103173**	**Figure:** **2**





Golder Associates Inc. Atlanta, Georgia	Title: ASTM D4767 CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT DEVIATOR STRESS AND PRINCIPAL STRESS RATIO PLOT				
Job Short Title: FTN/ENTERGY WHITE BLUFF/AR					
Sample: B-3 UD 10.0-12.0'	Technician: PWM/FT Check:	Reviewed: Approved:	Start Date: 8/24/2018	Job Number: 18103173	Figure: 3

Stress Path (p'-q) Plot



Confining Pressure (psi)	p at failure (psi)	p' at failure (psi)	q at failure (psi)
10.0	14.9	10.8	4.9
20.0	35.2	28.6	15.2
30.0	49.3	35.2	19.3

Effective

α ' =	28.3	degree
a' =	0.0	psi

Total

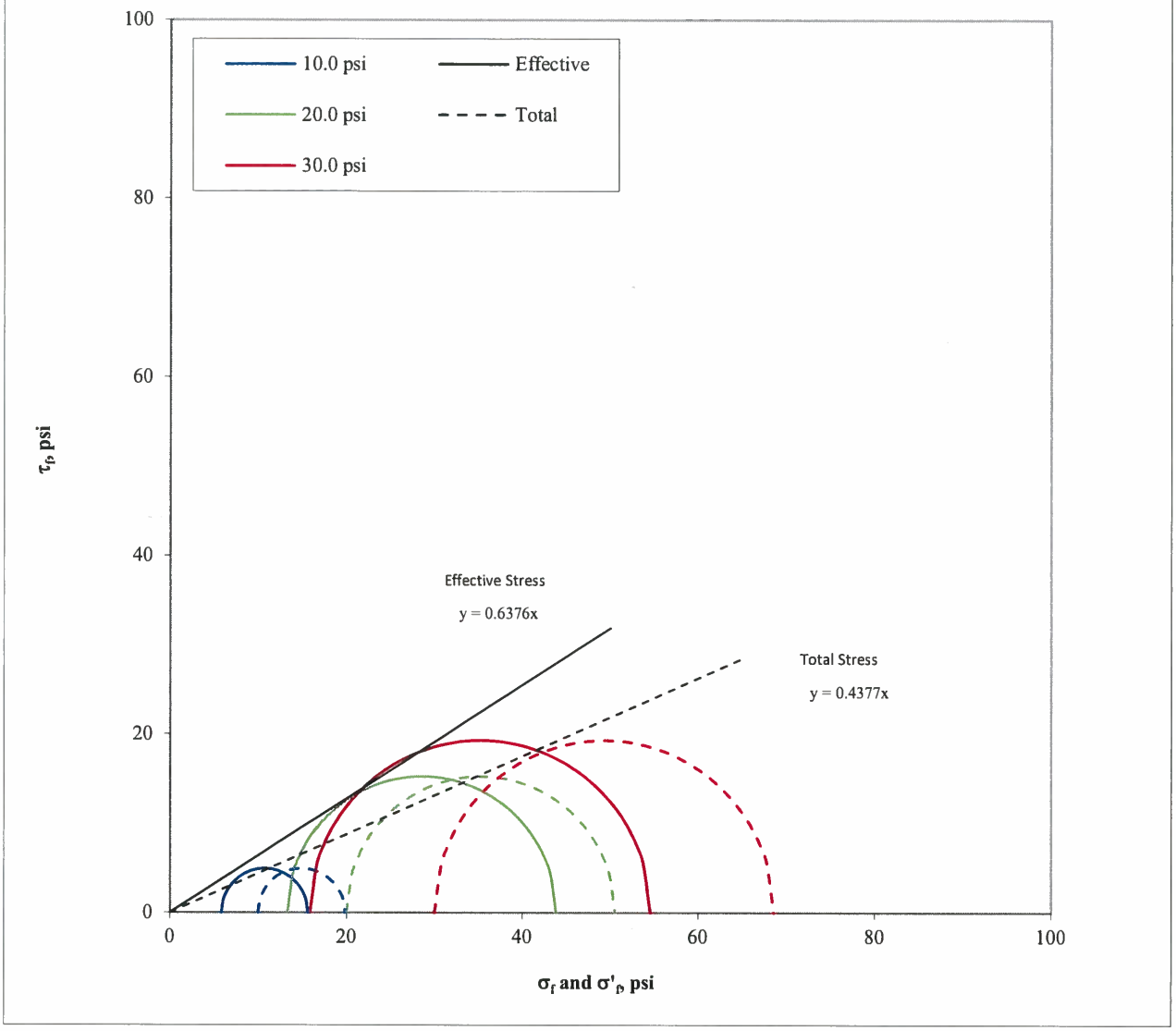
α =	21.9	degree
a =	0.0	psi

Note: The laboratory testing relates only to the sample tested. GAI neither accepts responsibility for nor makes claims to the final use and purpose of the material.

Golder Associates Inc. **Atlanta, Georgia**	**Title:** **ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **STRESS PATH PLOT**
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**	

Sample:	Technician:	Reviewed:	Start Date:	Job Number:	Figure:
B-3 UD 10.0-12.0'	PWM/FT Check:	Approved:	8/24/2018	18103173	4

Mohr's Circle Diagram



Confining Pressure (psi)	σ'_1 at failure (psi)	σ'_3 at failure (psi)	σ_1 at failure (psi)	σ_3 at failure (psi)
10.0	15.7	5.8	19.9	10.0
20.0	43.8	13.3	50.5	20.0
30.0	54.5	15.9	68.6	30.0

Effective

ϕ' =	32.5	degree
c' =	0.0	psi

Total

ϕ =	23.6	degree
c =	0.0	psi

Note: The laboratory testing relates only to the sample tested. GAI neither accepts responsibility for nor makes claims to the final use and purpose of the material.

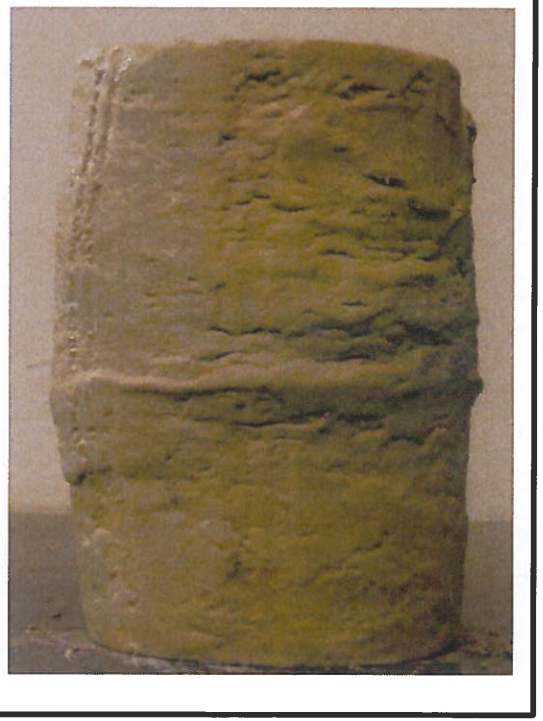
Golder Associates Inc. **Atlanta, Georgia**	**Title:** **ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **MOHR'S CIRCLE DIAGRAM**
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**	

Sample:	Technician:	Reviewed:	Start Date:	Job Number:	Figure:
B-3 UD 10.0-12.0'	PWM/FT Check: PWM	Approved:	8/24/2018	18103173	5

10.0 psi

20.0 psi

30.0 psi



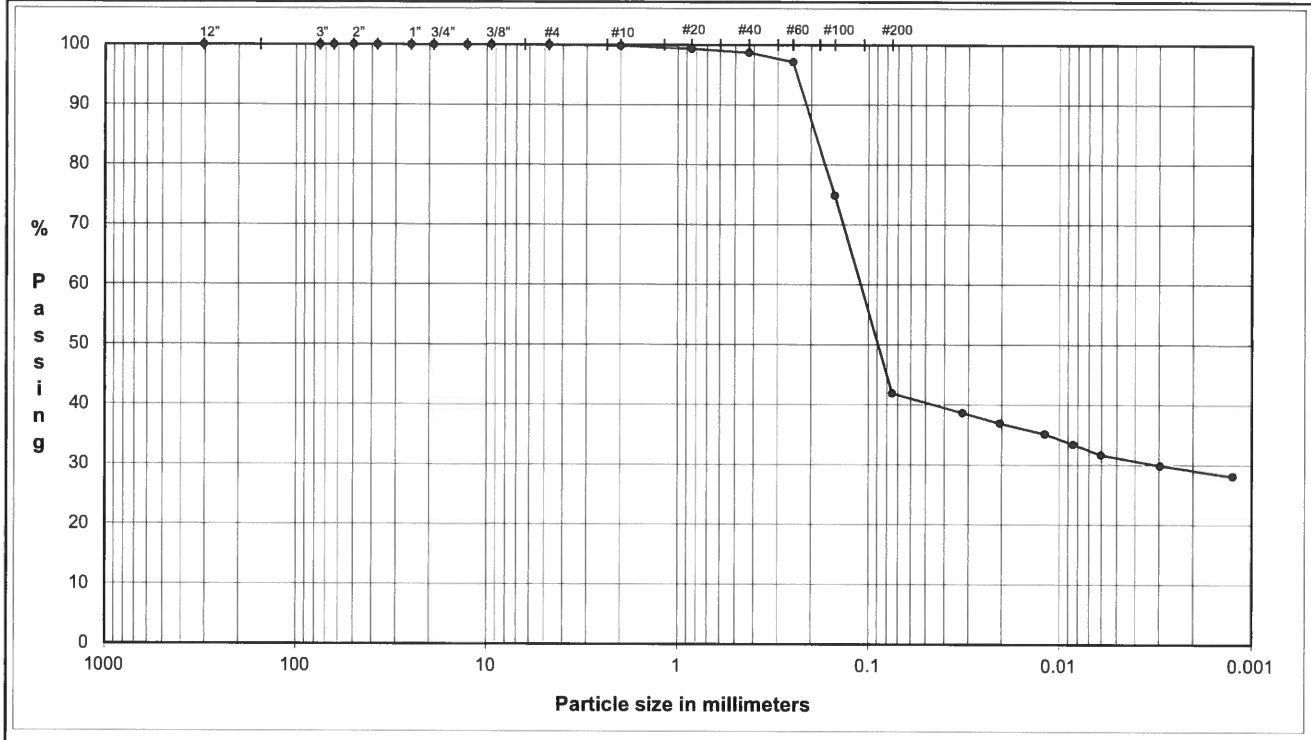
Golder Associates Inc. **Atlanta, Georgia**	**Title:** ASTM D4767 CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT SPECIMENS PHOTOGRAPH - 10.0 20.0 30.0 psi				
Job Short Title: FTN/ENTERGY WHITE BLUFF/AR					
Sample: B-3 UD 10.0-12.0'	**Technician:** PWM/FT **Check:**	**Reviewed:** **Approved:**	**Start Date:** 8/24/2018	**Job Number:** 18103173	**Figure:** 6

AUGUST 2018 | 18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**
SAMPLE ID: **B-3** Depth: **10.0-12.0'**
TYPE: **UD**



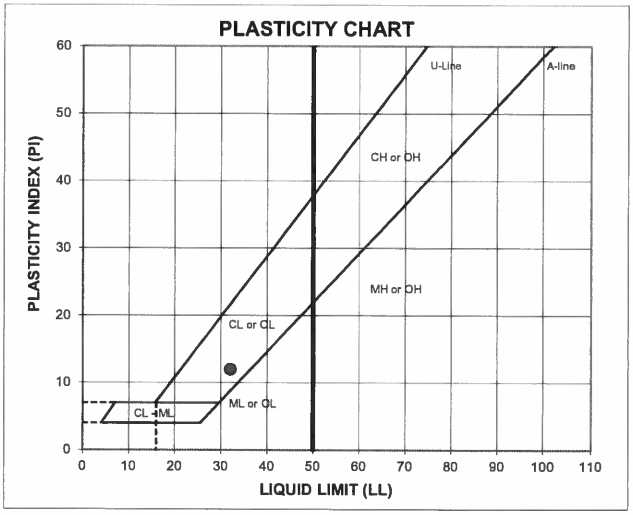
COBBLES	GRAVEL		SAND			FINES
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**100.0**		
0.375"	9.5	**100.0**		
#4	4.8	**100.0**	Fine Gravel	**0.0**
#10	2.00	**99.8**	Coarse Sand	**0.2**
#20	0.85	**99.3**		
#40	0.43	**98.7**	Medium Sand	**1.1**
#60	0.25	**97.1**		
#100	0.15	**74.9**		
#200	0.075	**41.9**	Fine Sand	**56.8**

Hydrometer Analysis

(mm)	%Finer		
0.032	**38.7**		
0.020	**36.9**		
0.012	**35.1**	Fines	
0.0085	**33.4**	Silt or Clay	**41.9**
0.0060	**31.6**		
0.0030	**29.9**		
0.0012	**28.1**		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
21.6	**32**	**20**	**12**	**0.18**

LL (oven-dried) / < 0.75 = ORGANIC (OL/OH)

DESCRIPTION: SAND and SILTY CLAY, fine to coarse; light gray and yellow.

USCS: SC

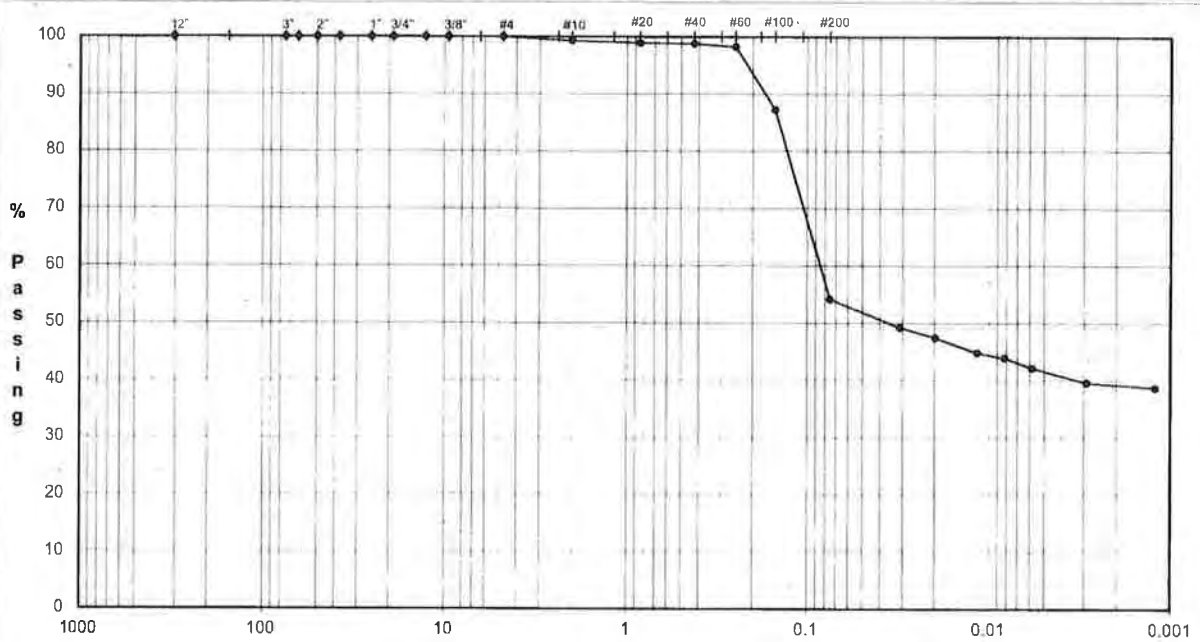
TECH	TJ/BA/HH
DATE	8/23/18
CHECK	
REVIEW	
APPROVE	

AUGUST 2018 | 18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**
SAMPLE ID: **B-3 (P2-5)** Depth: **13.0-14.0'**
TYPE: **Bag**



COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

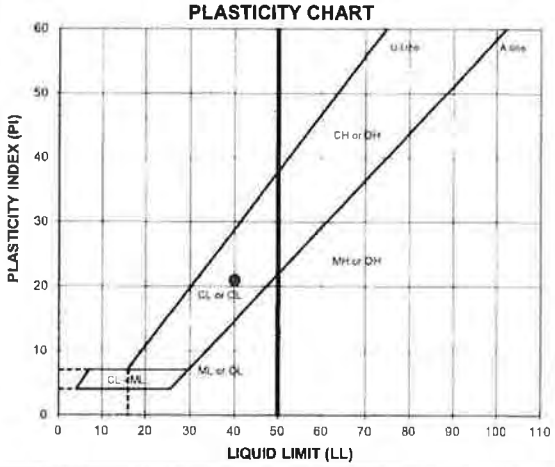
U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**100.0**		
0.375"	9.5	**100.0**		
#4	4.8	**100.0**	Fine Gravel	**0.0**
#10	2.00	**99.3**	Coarse Sand	**0.7**
#20	0.85	**98.9**		
#40	0.43	**98.8**	Medium Sand	**0.5**
#60	0.25	**98.2**		
#100	0.15	**87.2**		
#200	0.075	**54.1**	Fine Sand	**44.7**

Hydrometer Analysis

(mm)	%Finer		
0.031	**49.2**		
0.020	**47.4**		
0.012	**44.8**	Fines	
0.0082	**43.9**	Silt or Clay	**54.1**
0.0058	**42.2**		
0.0029	**39.5**		
0.0012	**38.7**		

PLASTICITY CHART



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
23.3	**40**	**19**	**21**	**0.18**

LL (oven-dried) / 0.75 ORGANIC (OL/OH)

DESCRIPTION: SILTY CLAY and SAND, fine to coarse; light gray.

USCS: CL

TECH	HH/BA/TJ
DATE	8/1/18
CHECK	
REVIEW	
APPROVE	

JUNE 2018

18103173

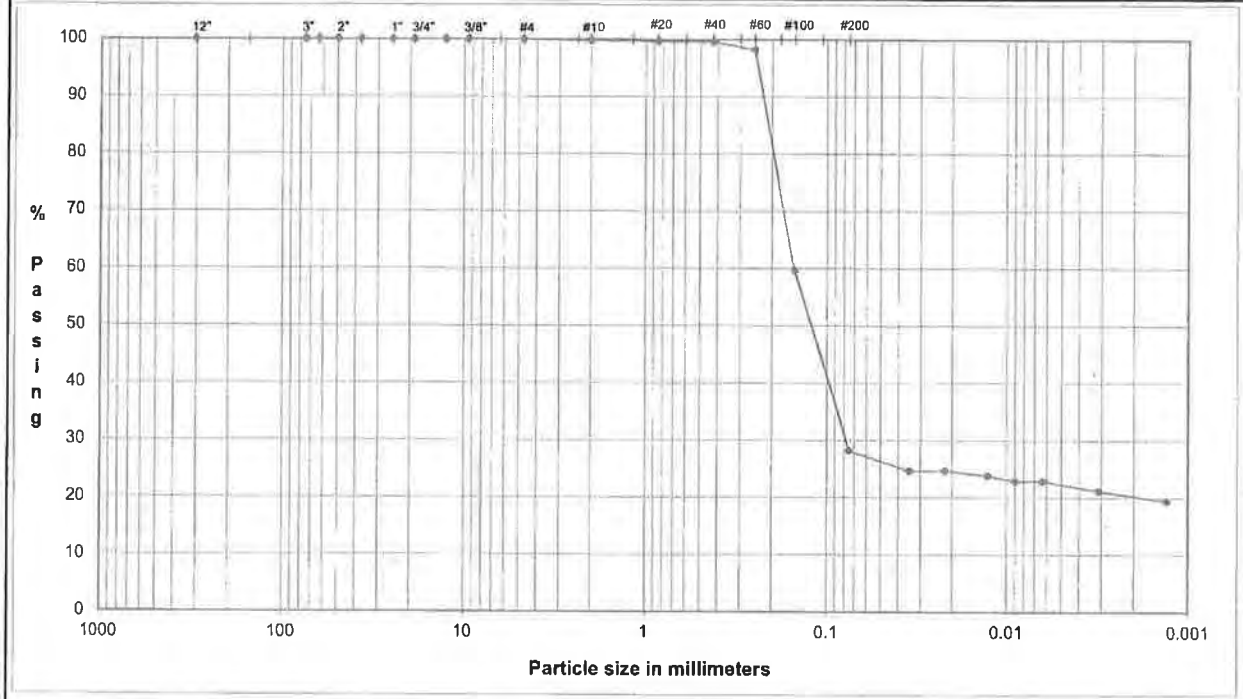
PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**

SAMPLE ID: **B-3** Depth: **15.0-17.0'**

TYPE: **UD**



	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
COBBLES	GRAVEL		SAND			FINES

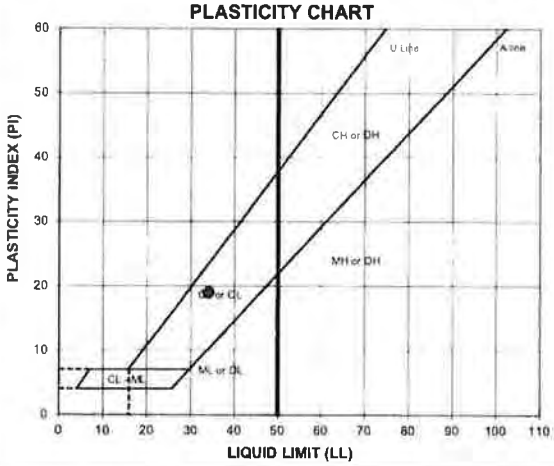
U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**100.0**		
0.375"	9.5	**100.0**		
#4	4.8	**100.0**	Fine Gravel	**0.0**
#10	2.00	**99.8**	Coarse Sand	**0.2**
#20	0.85	**99.6**		
#40	0.43	**99.6**	Medium Sand	**0.2**
#60	0.25	**98.1**		
#100	0.15	**59.6**		
#200	0.075	**28.2**	Fine Sand	**71.4**

Hydrometer Analysis

(mm)	%Finer		
0.035	**24.7**		
0.022	**24.7**		
0.013	**23.8**	Fines	
0.0090	**22.9**	Silt or Clay	**28.2**
0.0063	**22.9**		
0.0031	**21.1**		
0.0013	**19.4**		

PLASTICITY CHART



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
19.0	**34**	**15**	**19**	**0.23**

LL (oven-dried) / 0.75 ORGANIC (OL/OH)

DESCRIPTION: CLAYEY SAND, fine to coarse; light brown.

USCS: SC

TECH	TB/BA
DATE	6/19/18
CHECK	
REVIEW	
APPROVE	

FLEXIBLE WALL PERMEABILITY
ASTM D 5084
METHOD D, CONSTANT RATE OF FLOW

PROJECT TITLE	FTN/ENTERGY WHITE BLUFF/AR		Board #	5	COMMENTS
PROJECT NUMBER	18103173		Flow Pump	2	
SAMPLE ID	B-3	15.0-17.0'	Flow Pump Speed	5	
SAMPLE TYPE	UD		Technician	FT	

Sample Data, Initial				Sample Data, Final	
Height, inches	3.008	B-Value, f	0.99	Height, inches	3.009
Diameter, inches	2.839	Cell Pres.	88.0	Diameter, inches	2.848
Area, cm^2	40.84	Bot. Pres.	80.0	Area, cm^2	41.10
Volume, cm^3	312.03	Top Pres.	80.0	Volume, cm^3	314.12
Mass, g	657.54	Tot. B.P.	80.0	Mass, g	660.77
Moisture Content, %	19.00	Head, max.	33.76	Moisture Content, %	19.59
Dry Density, pcf	110.50	Head, min.	33.76	Dry Density, pcf	109.76
Spec. Gravity (assumed)	2.700	Max. Grad.	4.42	Volume Solids, cm^3	204.64
Volume Solids, cm^3	204.64	Min. Grad.	4.42	Volume Voids, cm^3	109.47
Volume Voids, cm^3	107.39			Void Ratio	0.53
Void Ratio	0.52			Saturation, %	98.9%
Saturation, %	97.8%				

WATER CONTENTS		Sample Initial	Sample Final
Wt Soil & Tare, i	g	657.54	742.00
Wt Soil & Tare, f	g	552.54	634.47
Wt Tare	g	0.00	85.52
Wt Moisture Lost	g	105.00	107.53
Wt Dry Soil	g	552.54	548.95
Water Content	%	19.00%	19.59%

DESCRIPTION: CLAYEY SAND, fine to coarse; light brown.

Flow Pump Rate: 1.17E-03 cm^3/sec USCS: SC

TIME FUNCTIONS, SECONDS								dP				
DATE	DAY	HOUR	MIN	TEMP (°C)	dt (min)	dt,acc (min)	dt (sec)	dt,acc (sec)	Reading (psi)	Head (cm)	Gradient	Permeability (cm/sec)
06/19/18	43270	10	0	20.9	0	0	0	0	0.48	33.76	4.42	6.3E-06
06/19/18	43270	10	5	20.9	5	5	300	300	0.48	33.76	4.42	6.3E-06
06/19/18	43270	10	10	20.9	5	10	300	600	0.48	33.76	4.42	6.3E-06
06/19/18	43270	10	15	20.9	5	15	300	900	0.48	33.76	4.42	6.3E-06 *
06/19/18	43270	10	20	20.9	5	20	300	1200	0.48	33.76	4.42	6.3E-06 *
06/19/18	43270	10	25	20.9	5	25	300	1500	0.48	33.76	4.42	6.3E-06 *
06/19/18	43270	10	30	20.9	5	30	300	1800	0.48	33.76	4.42	6.3E-06 *

*TRANSCRIBED FROM ORIGINAL DATA SHEETS

PERMEABILITY REPORTED AS ** 6.3E-06 cm/sec **

DATE	6/19/18
CHECK	
REVIEW	
APPROVE	

JULY 2018

18103173

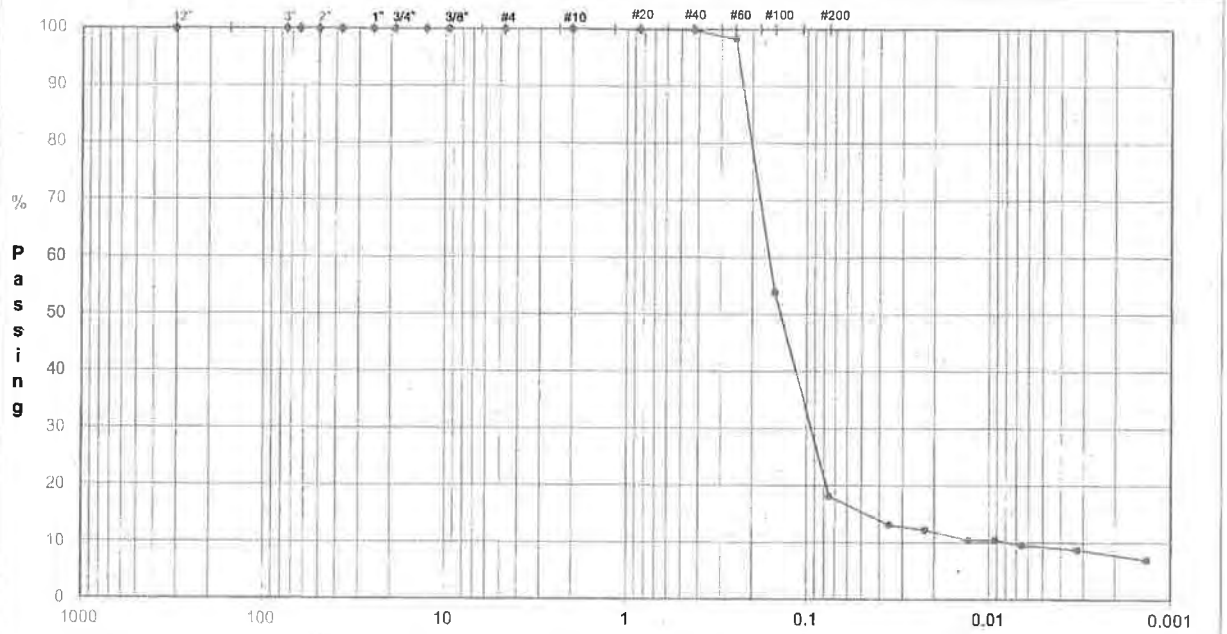
PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**

SAMPLE ID: **B-3** - Depth: **20.0-22.0'**

TYPE: **UD**



COBBLES	GRAVEL		SAND			FINES
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay

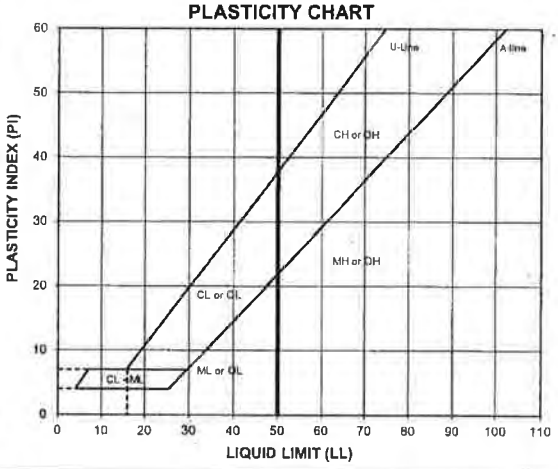
U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
3.0"	75.0	100.0	Cobbles	0.0
2.5"	63.5	100.0		
2.0"	50.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0		
0.75"	19.0	100.0	Coarse Gravel	0.0
0.50"	12.7	100.0		
0.375"	9.5	100.0		
#4	4.8	100.0	Fine Gravel	0.0
#10	2.00	100.0	Coarse Sand	0.0
#20	0.85	99.9		
#40	0.43	99.8	Medium Sand	0.2
#60	0.25	98.3		
#100	0.15	53.8		
#200	0.075	18.1	Fine Sand	81.7

Hydrometer Analysis

(mm)	%Finer		
0.036	13.1		
0.022	12.2		
0.013	10.5	Fines	
0.0092	10.5	Silt or Clay	18.1
0.0066	9.6		
0.0032	8.7		
0.0013	7.0		

PLASTICITY CHART



ATTERBERG LIMITS

Method -B (Dry preparation)

M_r	LL	PL	PI	LI
31.5	NP	NP	NP	NP

LL (oven-dried) / 0.75 ORGANIC (OL-OH)

DESCRIPTION: SILTY SAND, fine to medium; light yellowish brown.

USCS: SM

TECH	TB
DATE	7/13/18
CHECK	
REVIEW	
APPROVE	

Golder Associates Inc.

Boring or Test Pit:	B-3	Boring or Test Pit:	B-3	Boring or Test Pit:	B-3
Sample:	UD	Sample:	UD	Sample:	UD
Depth:	20.0-22.0'	Depth:	20.0-22.0'	Depth:	20.0-22.0'
Point No.:	1	Point No.:	2	Point No.:	3

Initial			**Initial**			**Initial**		
Thickness =	0.750	in	Thickness =	0.750	in	Thickness =	0.750	in
Diameter =	2.500	in	Diameter =	2.500	in	Diameter =	2.500	in
Wet Mass =	0.220	lb	Wet Mass =	0.211	lb	Wet Mass =	0.235	lb
Area =	4.909	in^2	Area =	4.909	in^2	Area =	4.909	in^2
Volume =	3.682	in^3	Volume =	3.682	in^3	Volume =	3.682	in^3
Specific Gravity =	2.67	(Assumed)	Specific Gravity =	2.67	(Assumed)	Specific Gravity =	2.67	(Assumed)
Dry Mass of Solids =	0.167	lb	Dry Mass of Solids =	0.160	lb	Dry Mass of Solids =	0.179	lb
Moisture Content =	31.5%		Moisture Content =	31.5%		Moisture Content =	31.5%	
Wet Unit Weight =	103.1	pcf	Wet Unit Weight =	99.0	pcf	Wet Unit Weight =	110.4	pcf
Dry Unit Weight =	78.4	pcf	Dry Unit Weight =	75.3	pcf	Dry Unit Weight =	83.9	pcf
Void Ratio =	1.12		Void Ratio =	1.21		Void Ratio =	0.98	
Percent Saturation =	75%		Percent Saturation =	70%		Percent Saturation =	86%	

Pre-Shear			**Pre-Shear**			**Pre-Shear**		
Thickness =	0.739	in	Thickness =	0.663	in	Thickness =	0.641	in
Diameter =	2.500	in	Diameter =	2.500	in	Diameter =	2.500	in
Area =	4.909	in^2	Area =	4.909	in^2	Area =	4.909	in^2
Volume =	3.628	in^3	Volume =	3.254	in^3	Volume =	3.147	in^3
Moisture Content =	35.1%		Moisture Content =	42.1%		Moisture Content =	28.2%	
Wet Unit Weight =	107.4	pcf	Wet Unit Weight =	121.0	pcf	Wet Unit Weight =	125.9	pcf
Dry Unit Weight =	79.5	pcf	Dry Unit Weight =	85.2	pcf	Dry Unit Weight =	98.2	pcf
Void Ratio =	1.09		Void Ratio =	0.95		Void Ratio =	0.70	
Percent Saturation =	100%		Percent Saturation =	100%		Percent Saturation =	100%	

Shear Rate =	0.001	in/min	Shear Rate =	0.001	in/min	Shear Rate =	0.001	in/min
Normal Stress =	18	psi	Normal Stress =	36	psi	Normal Stress =	54	psi

Notes:

Sample description: (SM) SILTY SAND, fine to medium; light yellowish brown.

Atterberg limit: LL = NP PL = NP PI = NP (ASTM D4318)

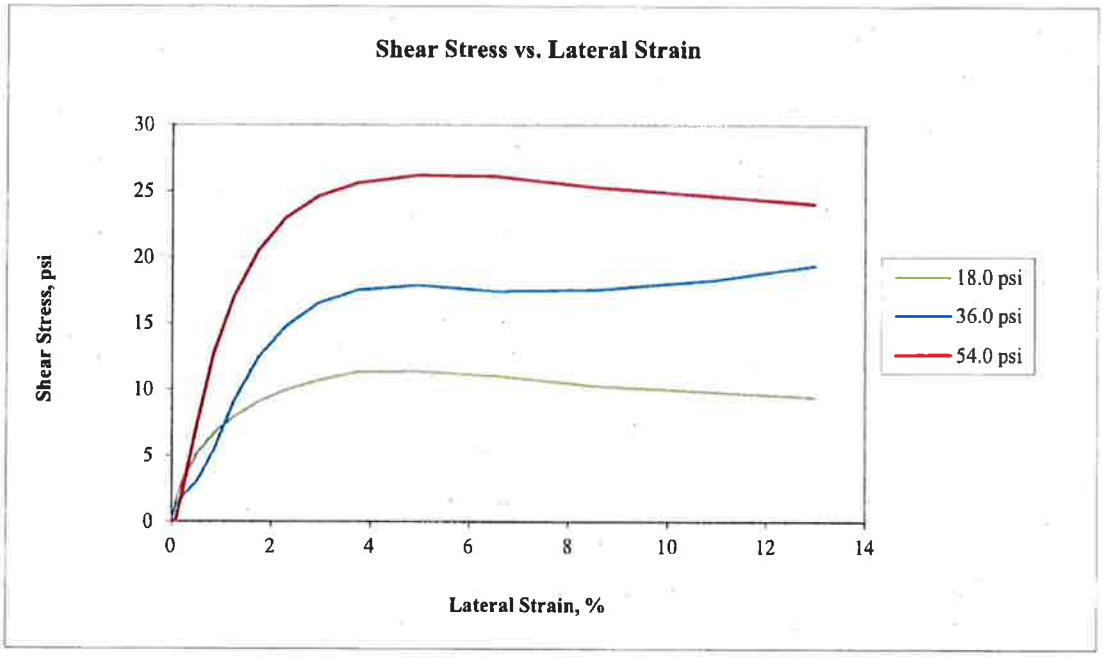
Percent finer: 3/4 in. = 100% No. 4 = 100% No. 200 = 18% (ASTM D422, refer to separate report)

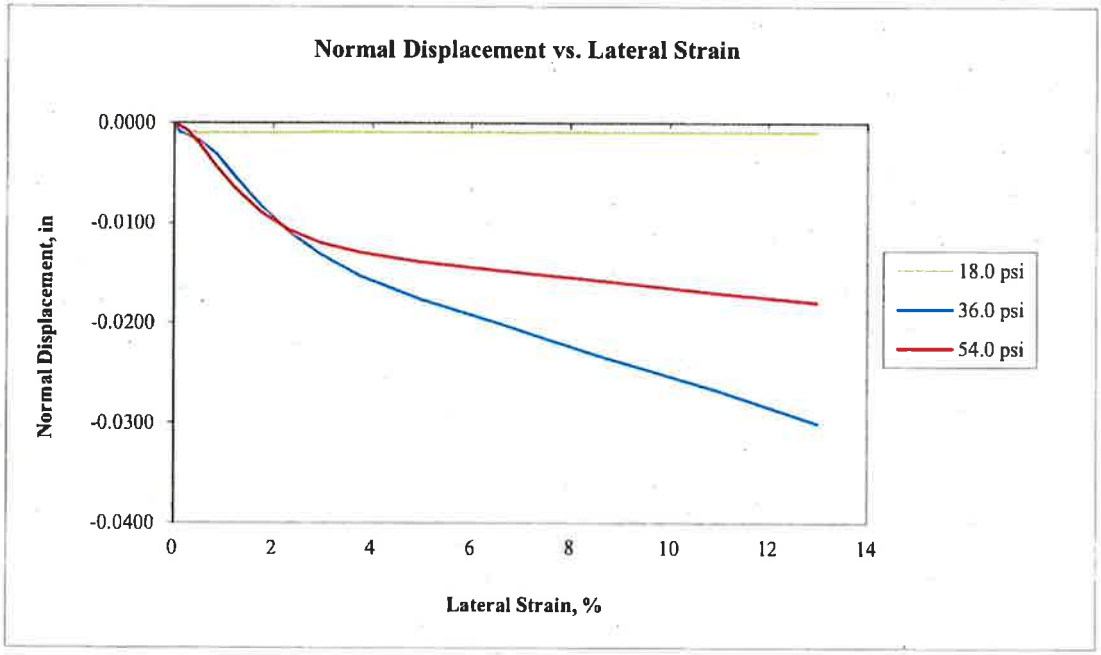
Specimen type: [X] Intact [ ] Reconstituted

Inundation: At seating load of approximately 100 psf

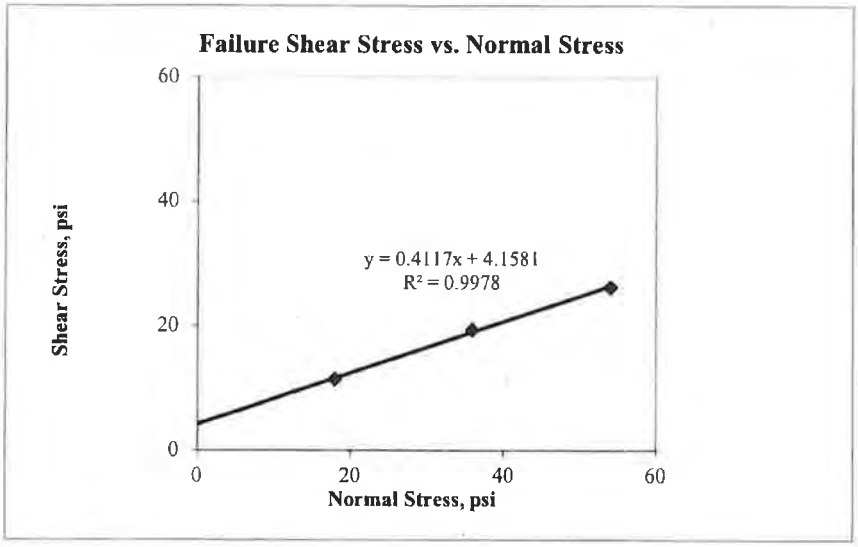
Apparatus: 2.5 -inch nominal diameter box, Humboldt Material Testing Software and Equipment.

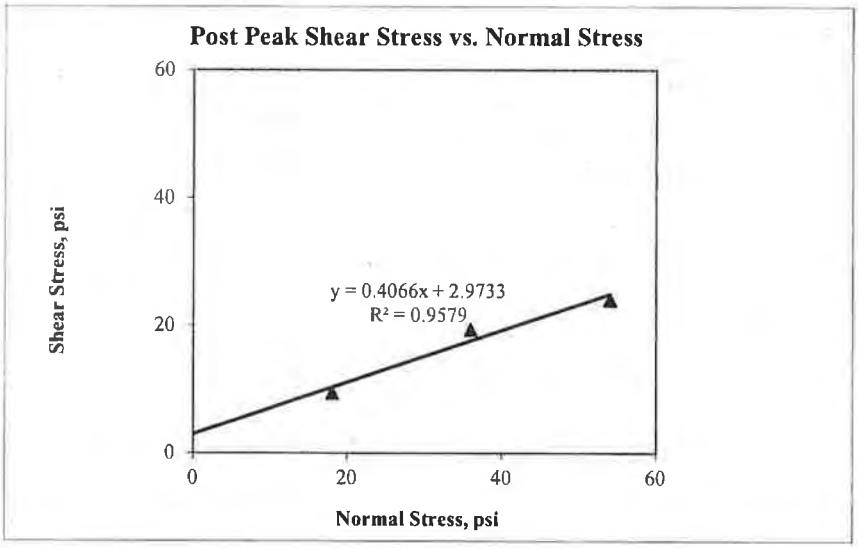
Golder Associates Inc. Atlanta, Georgia	**Title:** ASTM D3080 CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT SAMPLE AND TEST DATA				
Job Short Title: FTN/ENTERGY WHITE BLUFF/AR					
Sample: B-3 UD 20.0-22.0'	**Technician:** FT	**Checked:** PWL **Reviewed:** ST	**Date:** 7/16/2018	**Job Number:** 18103173	**Figure:** 1





Golder Associates Inc. **Atlanta, Georgia**	**Title:** **ASTM D3080** **CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT** **SHEAR STRESS AND NORMAL DISPLACEMENT PLOTS**				
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**					
Sample: **B-3 UD 20.0-22.0'**	**Technician:** **FT**	**Checked:** **Reviewed:**	**Date:** **7/16/2018**	**Job Number:** **18103173**	**Figure:** **2**





Normal Stress psi	Peak Shear Stress psi
18.0	11.4
36.0	19.4
54.0	26.2

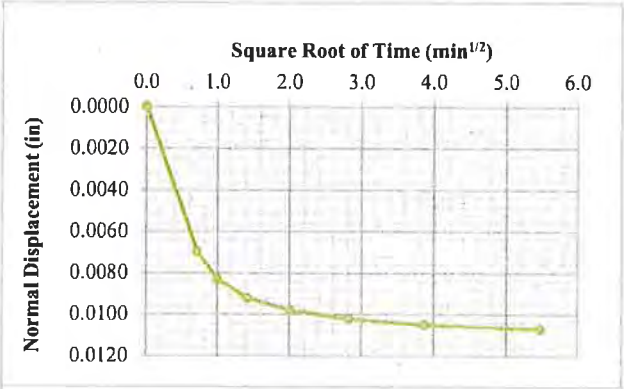
Normal Stress psi	Post Peak Shear Stress psi
18.0	9.4
36.0	19.4
54.0	24.0

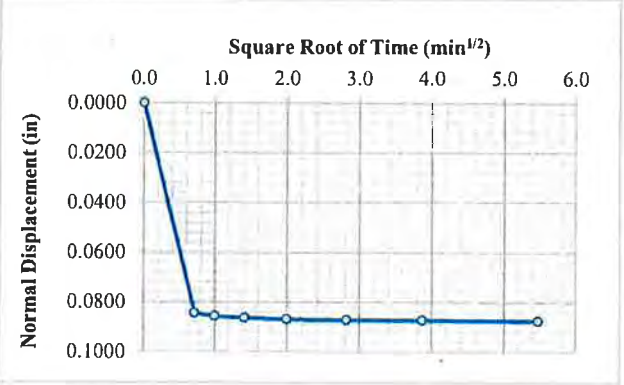
Failure	Post Peak
ϕ = 22.4 °	ϕ = 22.1 °
c = 4.2 psi	c = 3.0 psi

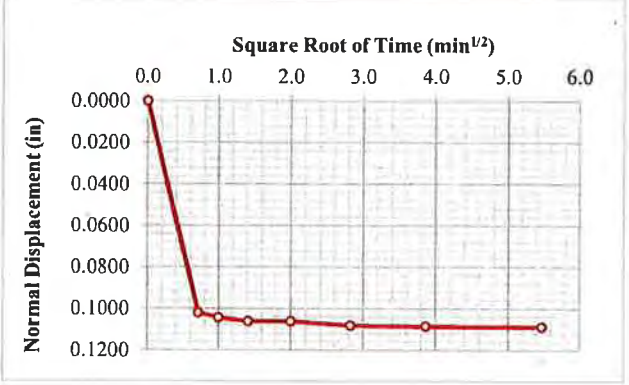
Golder Associates Inc. Atlanta, Georgia	**Title:** ASTM D3080 CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT FAILURE ENVELOPES				
Job Short Title: FTN/ENTERGY WHITE BLUFF/AR					
Sample: B-3 UD 20.0-22.0'	**Technician:** FT	**Checked/Reviewed:**	**Date:** 7/16/2018	**Job Number:** 18103173	**Figure:** 3

Golder Associates Inc. **Atlanta, Georgia**	**Title:** **ASTM D3080** **CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT** **SPECIMEN PHOTOGRAPH - 18 psi**				
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**					
Sample: **B-3 UD 20.0-22.0'**	**Technician:** **FT**	**Reviewed:**	**Date:** **7/16/2018**	**Job Number:** **18103173**	**Figure:** **4**

Consolidation Data Used to Determine Shear Rate







TIME, MIN	SQUARE ROOT OF TIME	DIAL READING
Point No. 1		
0.000	0.00	0.0000
0.50	0.71	0.0070
1.0	1.00	0.0083
2.0	1.41	0.0092
4.0	2.00	0.0098
8.0	2.83	0.0102
15.0	3.87	0.0105
30.0	5.48	0.0107
Point No. 2		
0.000	0.00	0.0000
0.50	0.71	0.0846
1.0	1.00	0.0858
2.0	1.41	0.0865
4.0	2.00	0.0870
8.0	2.83	0.0873
15.0	3.87	0.0874
30.0	5.48	0.0877
Point No. 3		
0.000	0.00	0.0000
0.50	0.71	0.1021
1.0	1.00	0.1044
2.0	1.41	0.1062
4.0	2.00	0.1062
8.0	2.83	0.1082
15.0	3.87	0.1086
30.0	5.48	0.1090

Golder Associates Inc. **Atlanta, Georgia**	Title: **ASTM D3080** **CONSOLIDATED DRAINED DIRECT SHEAR TEST REPORT** **CONSOLIDATION DATA**				
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**					
Sample: **B-3 UD 20.0-22.0'**	**Technician:** **FT**	**Reviewed:**	**Date:** **7/16/2018**	**Job Number:** **18103173**	**Figure:** **5**

AUGUST 2018

18103173

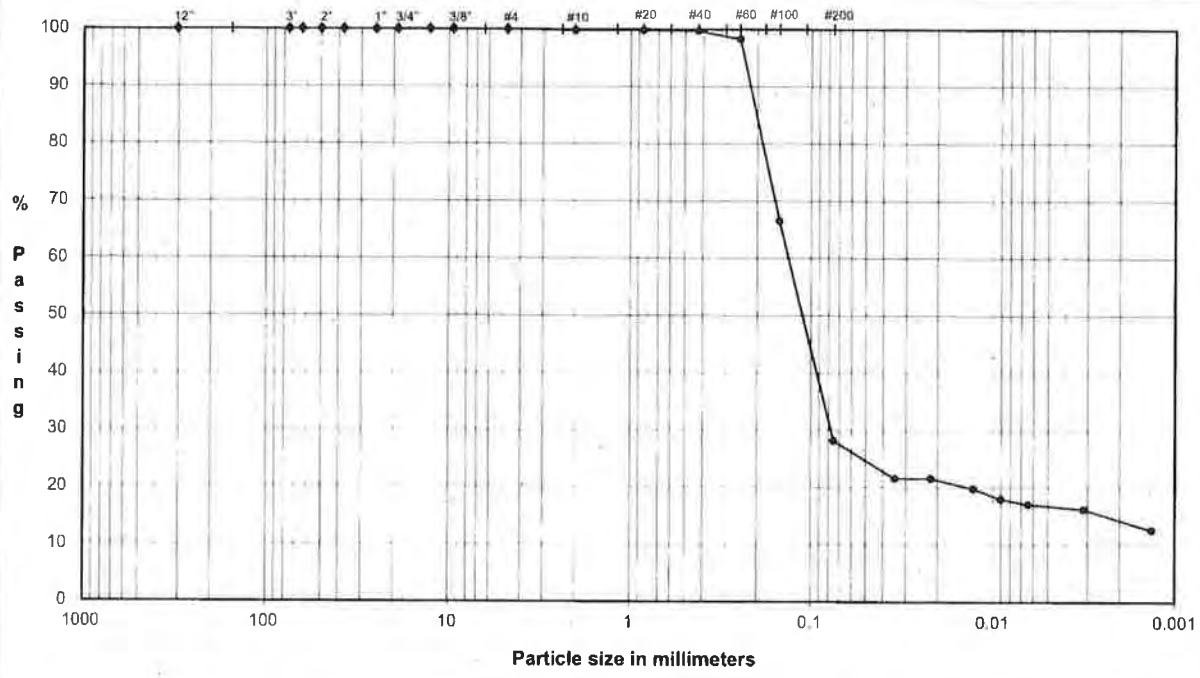
PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**

SAMPLE ID: **B-3 (P2-5)** Depth: **23.0-24.0'**

TYPE: **Bag**



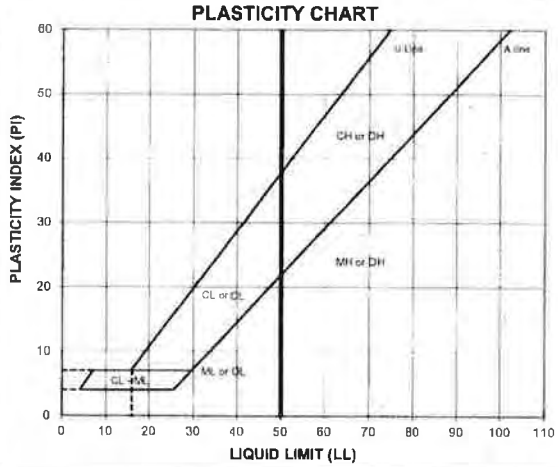
COBBLES	GRAVEL		SAND			FINES
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**100.0**		
0.375"	9.5	**100.0**		
#4	4.8	**100.0**	Fine Gravel	**0.0**
#10	2.00	**99.8**	Coarse Sand	**0.2**
#20	0.85	**99.8**		
#40	0.43	**99.7**	Medium Sand	**0.1**
#60	0.25	**98.3**		
#100	0.15	**66.5**		
#200	0.075	**28.1**	Fine Sand	**71.6**

Hydrometer Analysis

(mm)	%Finer		
0.035	**21.6**		
0.022	**21.6**		
0.013	**19.8**	Fines	
0.0090	**18.0**	Silt or Clay	**28.1**
0.0064	**17.1**		
0.0032	**16.2**		
0.0013	**12.6**		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
30.0	**NP**	**NP**	**NP**	**NP**

LL (oven-dried) / 0.75 ORGANIC (OL/OH)

DESCRIPTION: SILTY SAND, fine to coarse; brownish gray

USCS: SM

TECH	HH/BA
DATE	8/2/18
CHECK	
REVIEW	
APPROVE	

Golder Associates Inc.

JUNE 2018

18103173

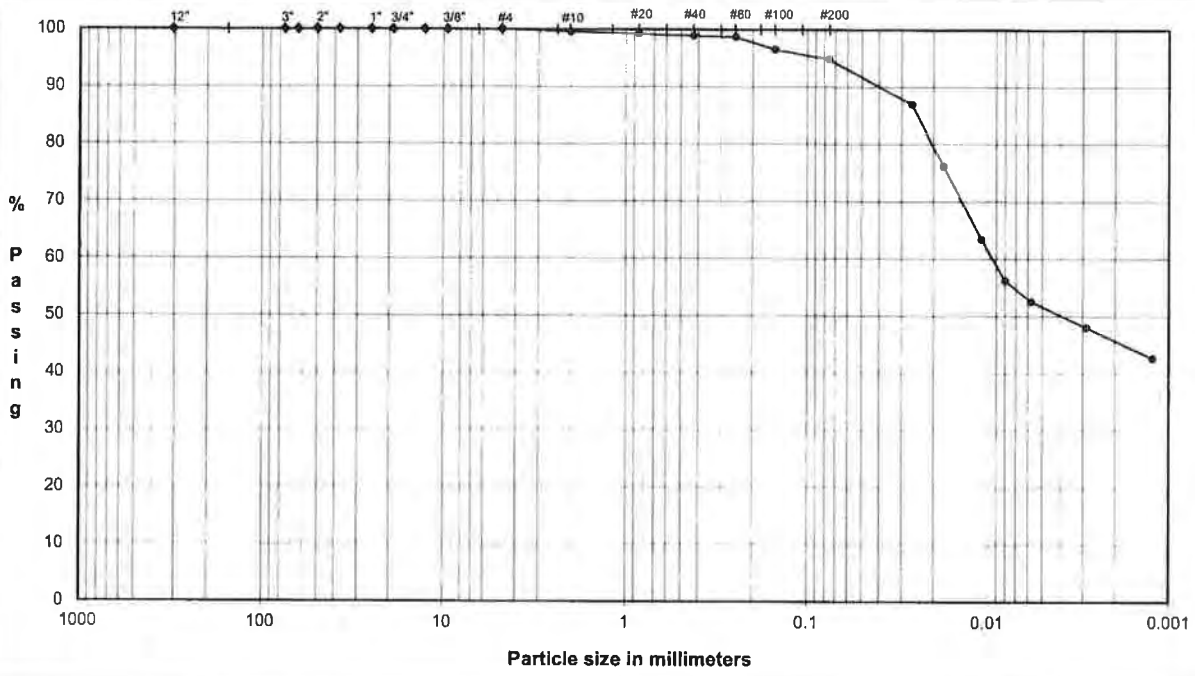
PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**

SAMPLE ID: **B-4** Depth: **8.0-10.0'**

TYPE: **UD**



COBBLES	GRAVEL		SAND			FINES
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay

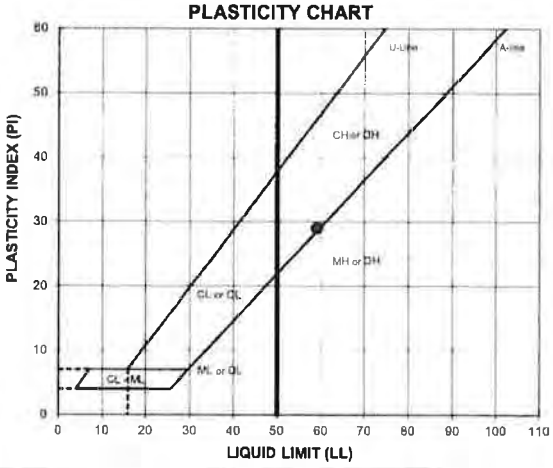
U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**100.0**		
0.375"	9.5	**100.0**		
#4	4.8	**100.0**	Fine Gravel	**0.0**
#10	2.00	**99.6**	Coarse Sand	**0.4**
#20	0.85	**99.2**		
#40	0.43	**98.9**	Medium Sand	**0.7**
#60	0.25	**98.7**		
#100	0.15	**96.5**		
#200	0.075	**94.7**	Fine Sand	**4.2**

Hydrometer Analysis

(mm)	%Finer		
0.026	**87.0**		
0.018	**76.1**		
0.011	**63.4**	Fines	
0.0080	**56.2**	Silt or Clay	**94.7**
0.0058	**52.6**		
0.0029	**48.0**		
0.0012	**42.6**		

PLASTICITY CHART



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
33.5	**59**	**30**	**29**	**0.13**

LL (oven-dried) / 0.75 ORGANIC (OL/OH)

DESCRIPTION: CLAY, some fine to coarse sand; yellowish brown.

USCS: CH

TECH	TJ/BA/TB
DATE	6/8/18
CHECK	
REVIEW	
APPROVE	

Golder Associates Inc.

FLEXIBLE WALL PERMEABILITY
ASTM D 5084
METHOD D, CONSTANT RATE OF FLOW

PROJECT TITLE	FTN/ENTERGY WHITE BLUFF/AR		Board #	2	COMMENTS
PROJECT NUMBER	18103173		Flow Pump	2	
SAMPLE ID	B-4	8.0-10.0'	Flow Pump Speed	9	
SAMPLE TYPE	UD		Technician	FT	

Sample Data, Initial				Sample Data, Final	
Height, inches	2.999	B-Value, f	0.99	Height, inches	3.002
Diameter, inches	2.869	Cell Pres.	88.0	Diameter, inches	2.899
Area, cm²	41.71	Bot. Pres.	80.0	Area, cm²	42.58
Volume, cm³	317.71	Top Pres.	80.0	Volume, cm³	324.71
Mass, g	585.31	Tot. B.P.	80.0	Mass, g	596.72
Moisture Content, %	33.46	Head, max.	162.49	Moisture Content, %	36.07
Dry Density, pcf	86.13	Head, min.	162.49	Dry Density, pcf	84.28
Spec. Gravity (assumed)	2.700	Max. Grad.	21.31	Volume Solids, cm³	162.43
Volume Solids, cm³	162.43	Min. Grad.	21.31	Volume Voids, cm³	162.29
Volume Voids, cm³	155.28			Void Ratio	1.00
Void Ratio	0.96			Saturation, %	97.5%
Saturation, %	94.5%				

WATER CONTENTS		Sample Initial	Sample Final
Wt Soil & Tare, i	g	585.31	686.79
Wt Soil & Tare, f	g	438.55	528.69
Wt Tare	g	0.00	90.33
Wt Moisture Lost	g	146.76	158.10
Wt Dry Soil	g	438.55	438.36
Water Content	%	33.46%	36.07%

Flow Pump Rate: 4.26E-05 cm³/sec

USCS: CH

DESCRIPTION: CLAY, some fine to coarse sand; yellowish brown.

TIME FUNCTIONS, SECONDS								dP				
DATE	DAY	HOUR	MIN	TEMP (°C)	dt (min)	dt,acc (min)	dt (sec)	dt,acc (sec)	Reading (psi)	Head (cm)	Gradient	Permeability (cm/sec)
06/08/18	43259	13	0	20.9	0	0	0	0	2.31	162.49	21.31	4.6E-08
06/08/18	43259	13	5	20.9	5	5	300	300	2.31	162.49	21.31	4.6E-08
06/08/18	43259	13	10	20.9	5	10	300	600	2.31	162.49	21.31	4.6E-08
06/08/18	43259	13	15	20.9	5	15	300	900	2.31	162.49	21.31	4.6E-08 *
06/08/18	43259	13	20	20.9	5	20	300	1200	2.31	162.49	21.31	4.6E-08 *
06/08/18	43259	13	25	20.9	5	25	300	1500	2.31	162.49	21.31	4.6E-08 *
06/08/18	43259	13	30	20.9	5	30	300	1800	2.31	162.49	21.31	4.6E-08 *

*TRANSCRIBED FROM ORIGINAL DATA SHEETS

PERMEABILITY REPORTED AS ** 4.6E-08 cm/sec **

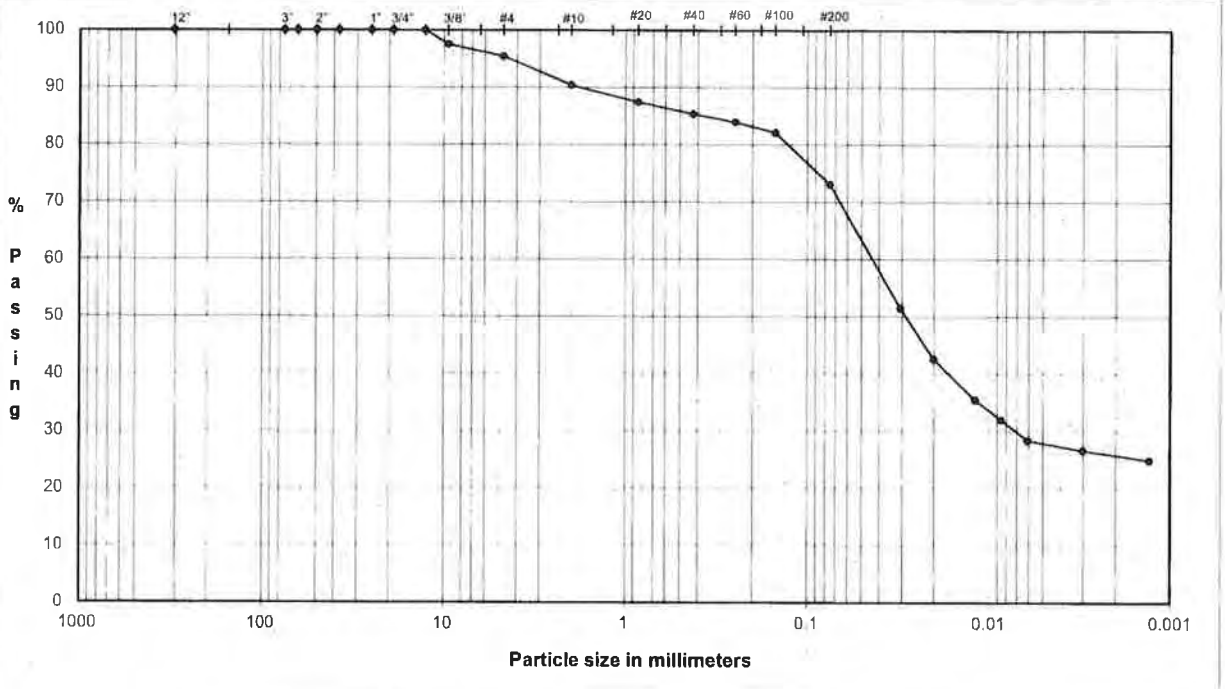
DATE	6/8/18
CHECK	
REVIEW	
APPROVE	

JUNE 2018 | 18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**
SAMPLE ID: **B-5** Depth: **3.0-5.0'**
TYPE: **UD**



COBBLES	Coarse GRAVEL	Fine GRAVEL	Coarse SAND	Medium SAND	Fine SAND	Silt or Clay FINES

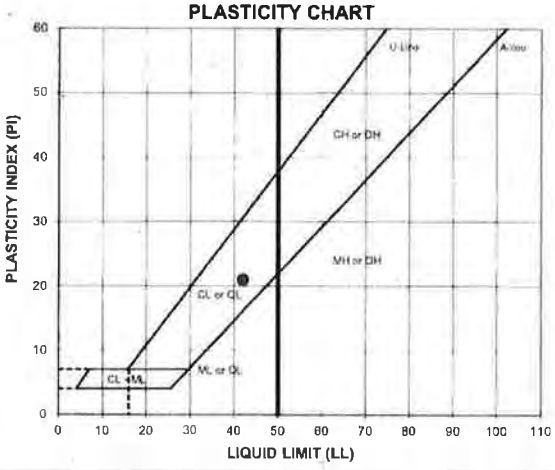
U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**100.0**		
0.375"	9.5	**97.5**		
#4	4.8	**95.4**	Fine Gravel	**4.6**
#10	2.00	**90.4**	Coarse Sand	**5.0**
#20	0.85	**87.4**		
#40	0.43	**85.4**	Medium Sand	**5.0**
#60	0.25	**84.0**		
#100	0.15	**82.1**		
#200	0.075	**73.1**	Fine Sand	**12.3**

Hydrometer Analysis

(mm)	%Finer		
0.031	**51.4**		
0.020	**42.6**		
0.012	**35.5**	Fines	
0.0085	**31.9**	Silt or Clay	**73.1**
0.0061	**28.4**		
0.0030	**26.6**		
0.0013	**24.8**		

PLASTICITY CHART



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
26.6	**42**	**21**	**21**	**0.28**

LL (oven-dried) / 0.75 ORGANIC (OL OH)

DESCRIPTION: SAND and SILTY CLAY, fine to medium; dark brown.

USCS: CL

TECH	TB/HH/TJ
DATE	6/25/18
CHECK	
REVIEW	
APPROVE	

Golder Associates Inc.

Boring or Test Pit:	B-5		Boring or Test Pit:			Boring or Test Pit:		
Sample:	I		Sample:			Sample:		
Depth:	3.0-5.0	ft	Depth:			Depth:		
Point No.:	1		Point No.:			Point No.:		
Initial								
Length =	6.012	in	Length =	6.009		Length =	5.925	
Diameter =	2.877	in	Diameter =	2.842		Diameter =	2.863	
Wet Mass =	2.625	lb	Wet Mass =			Wet Mass =		
Area =	6.501	in^2	Area =			Area =		
Volume =	39.083	in^3	Volume =			Volume =		
Specific Gravity =	2.69	(ASTM D854)	Specific Gravity =			Specific Gravity =		
Dry Mass of Solids =	2.073	lb	Dry Mass of Solids =			Dry Mass of Solids =		
Moisture Content =	26.6%		Moisture Content =			Moisture Content =		
Wet Unit Weight =	116.1	pcf	Wet Unit Weight =			Wet Unit Weight =		
Dry Unit Weight =	91.7	pcf	Dry Unit Weight =			Dry Unit Weight =		
Void Ratio =	0.83		Void Ratio =			Void Ratio =		
Percent Saturation =	86%		Percent Saturation =			Percent Saturation =		
After Consolidation			**After Consolidation**			**After Consolidation**		
Length =	6.009	in	Length =	5.925	in	Length =	5.849	in
Diameter =	2.842	in	Diameter =	2.863	in	Diameter =	2.881	in
Area =	6.345		Area =	6.436		Area =	6.519	in^2 (Method B)
Volume =	38.129		Volume =	38.129		Volume =	38.129	in^3
Moisture Content =			Moisture Content =			Moisture Content =	29.2%	
Wet Unit Weight =			Wet Unit Weight =			Wet Unit Weight =	121.4	pcf
Dry Unit Weight =			Dry Unit Weight =			Dry Unit Weight =	94.0	pcf
Void Ratio =			Void Ratio =			Void Ratio =	0.78	
Percent Saturation =			Percent Saturation =			Percent Saturation =	100%	
B Parameter =	0.99		B Parameter =	--		B Parameter =	--	
Shear Rate =	0.089%	/min.	Shear Rate =	0.099%	/min	Shear Rate =	0.092%	/min.
t_{50} =	0.3	min.	t_{50} =	0.6	min.	t_{50} =	0.1	min
Strain at Failure =	1.3%		Strain at Failure =	2.7%		Strain at Failure =	4.3%	
Cell Pressure =	74.0	psi	Cell Pressure =	80.0	psi	Cell Pressure =	85.0	psi
Back Pressure =	70.0	psi	Back Pressure =	70.0	psi	Back Pressure =	70.0	psi
Confining Pressure =	4.0	psi	Confining Pressure =	10.0	psi	Confining Pressure =	15.0	psi

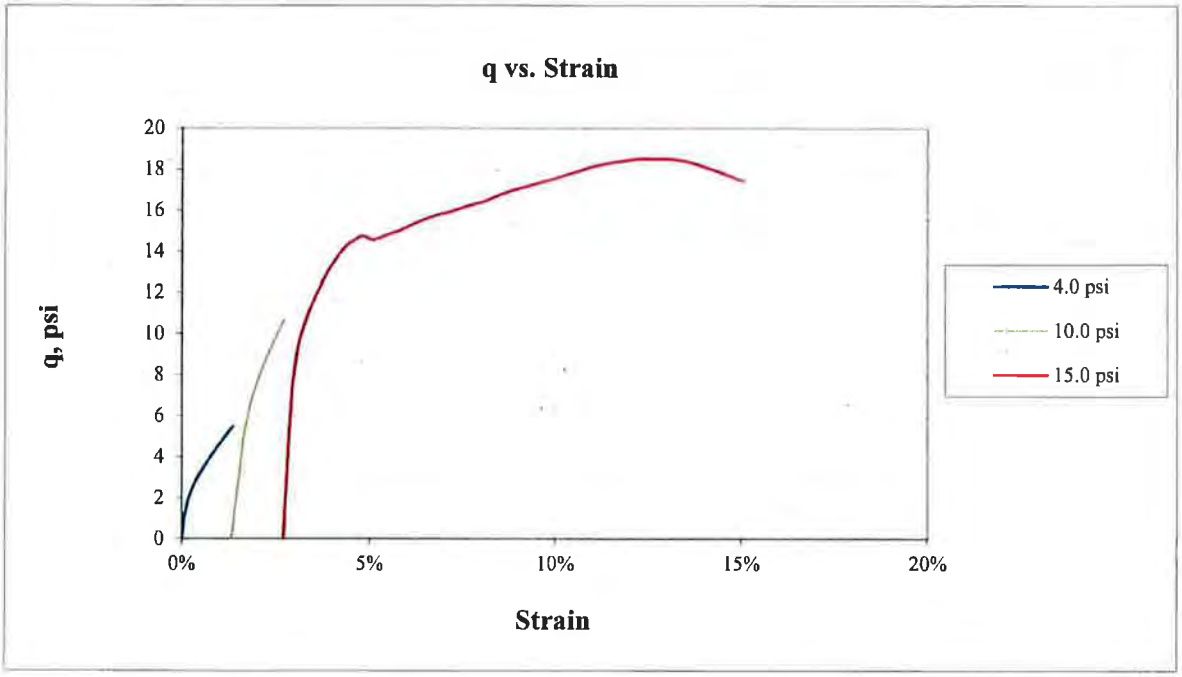
Notes: Sample description: (CL) SAND and SILTY CLAY, fine to medium; dark brown.

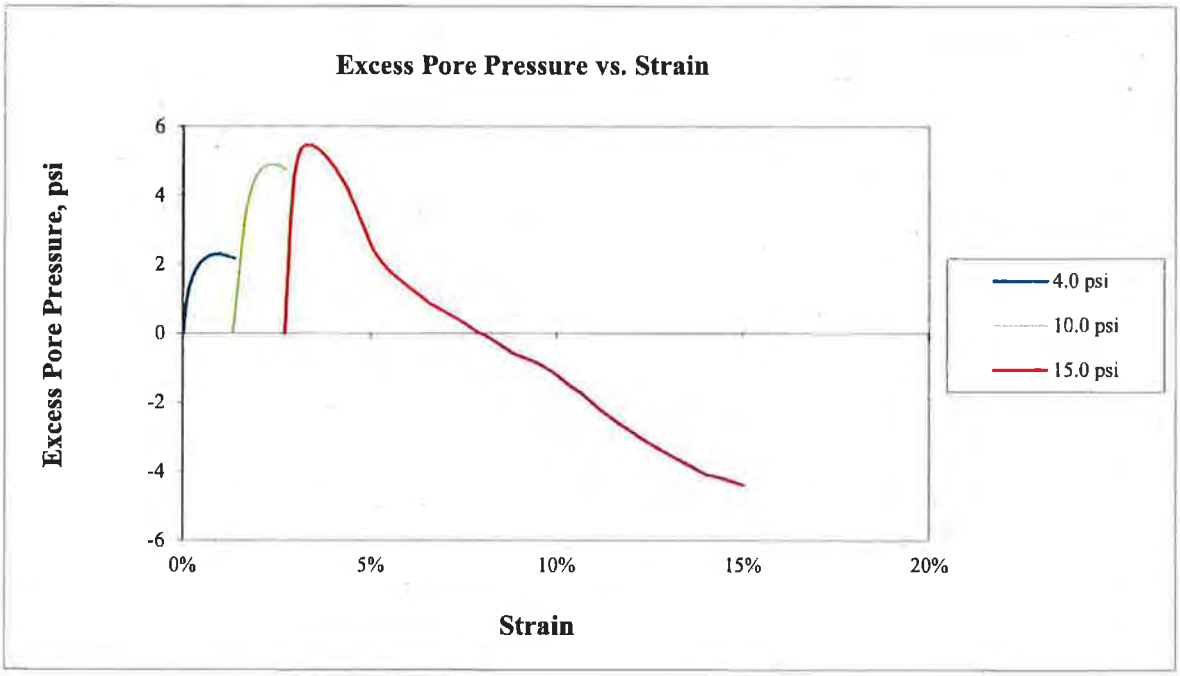
Atterberg limits: LL = 42 PL = 21 PI = 21 (ASTM D4318)

Percent finer: 3/4 in. = 100.0% No. 4 = 95.4% No. 200 = 73.1% (ASTM D422, refer to separate report for gradation curve)

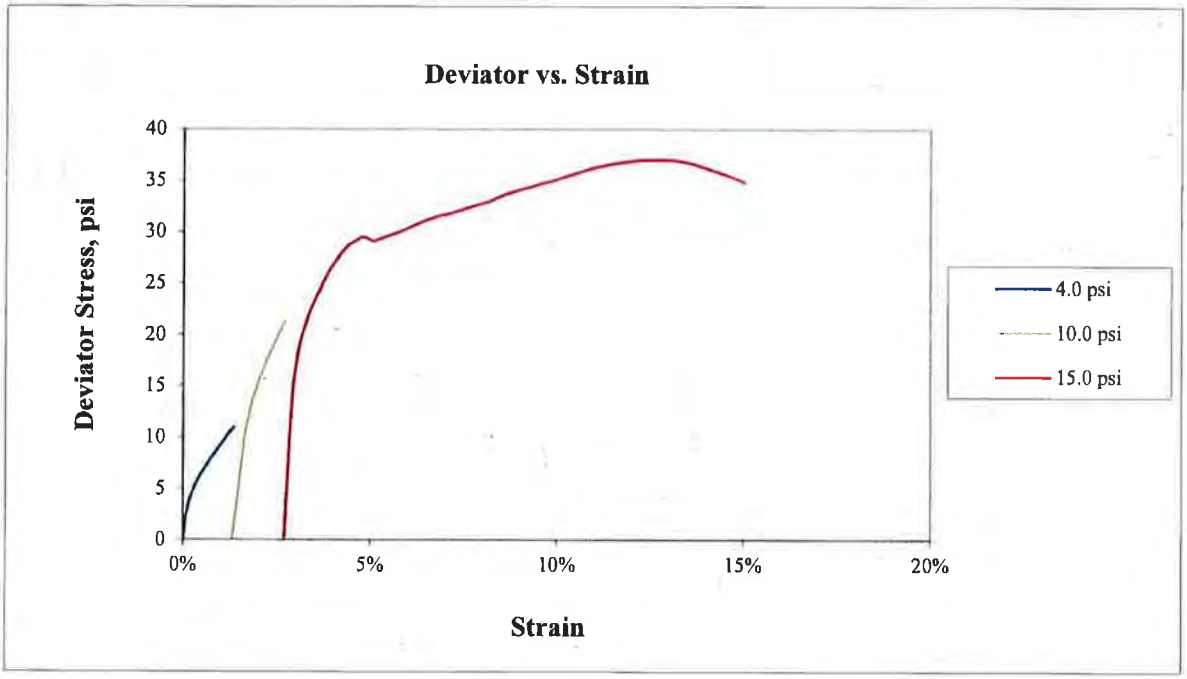
Specimen type:	X	Intact		Reconstituted
Moisture from:		Cuttings	X	Entire specimen
Saturation method:	X	Wet		Dry
Failure criterion:	X	$(\sigma'_1/\sigma'_3)_{max}$		$(\sigma'_1-\sigma'_3)_{max}$ ____ % strain
Membrane effect:	X	Corrected		Not Corrected

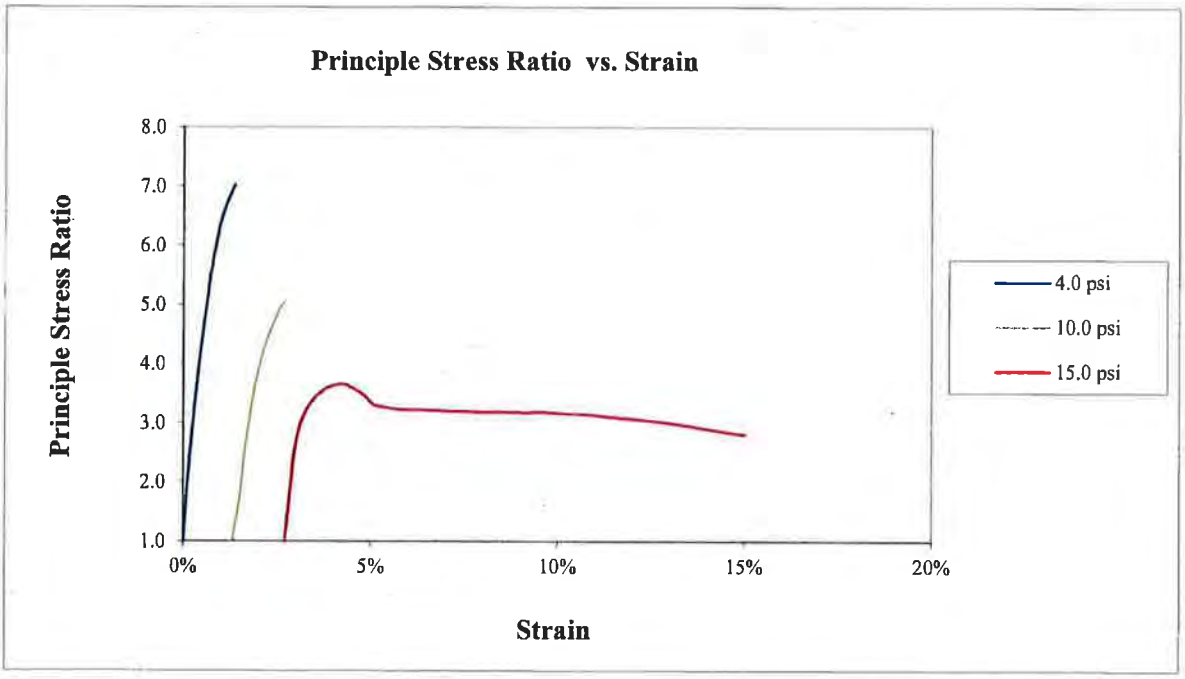
Golder Associates Inc. **Atlanta, Georgia**	**Title:** **MODIFIED (Multi-Stage) - ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **SAMPLE AND TEST DATA**				
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**					
Sample: **B-5 UD 3.0-5.0'**	**Technician:** **FT/PWM** **Checked:**	**Reviewed:** **Approved:**	**Start Date:** **7/10/2018**	**Job Number:** **18103173**	**Figure:** **1**





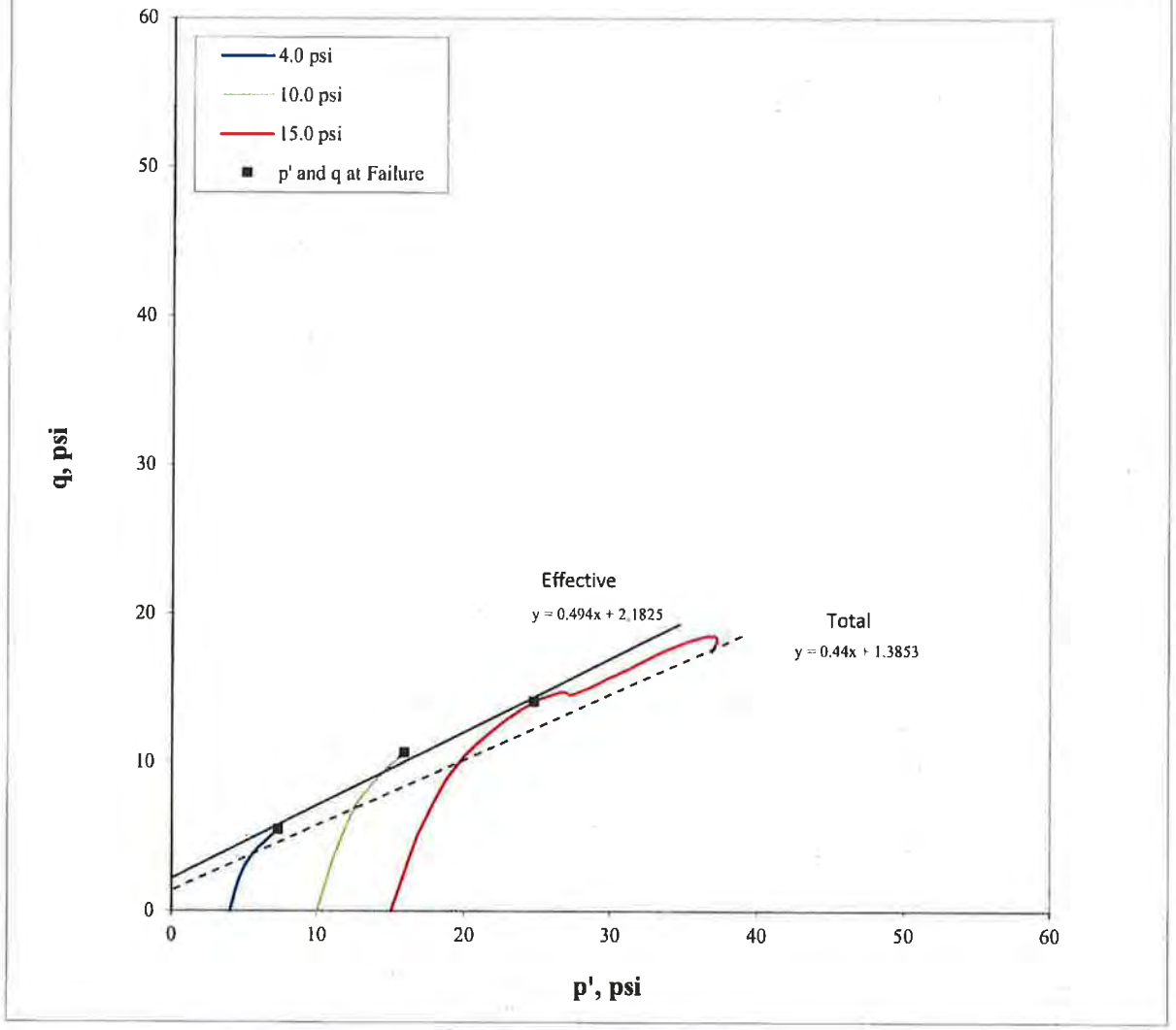
Golder Associates Inc. Atlanta, Georgia	Title: MODIFIED (Multi-Stage) - ASTM D4767 CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT q AND EXCESS PORE PRESSURE PLOTS				
Job Short Title: FTN/ENTERGY WHITE BLUFF/AR					
Sample: B-5 UD 3.0-5.0'	Technician: FT/PWM Check:	Reviewed: SK Approved:	Start Date: 7/10/2018	Job Number: 18103173	Figure: 2





Golder Associates Inc. Atlanta, Georgia	Title: MODIFIED (Multi-Stage) - ASTM D4767 CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT q AND EXCESS PORE PRESSURE PLOTS				
Job Short Title: FTN/ENTERGY WHITE BLUFF/AR					
Sample: B-5 UD 3.0-5.0'	Technician: FT/PWM Check:	Reviewed: Approved:	Start Date: 7/10/2018	Job Number: 18103173	Figure: 3

Stress Path (p'-q) Plot



Confining Pressure (psi)	p at failure (psi)	p' at failure (psi)	q at failure (psi)
4.0	9.5	7.3	5.5
10.0	20.6	15.9	10.6
15.0	29.1	24.7	14.1

Effective

α ' =	26.3	degree
a' =	2.2	psi

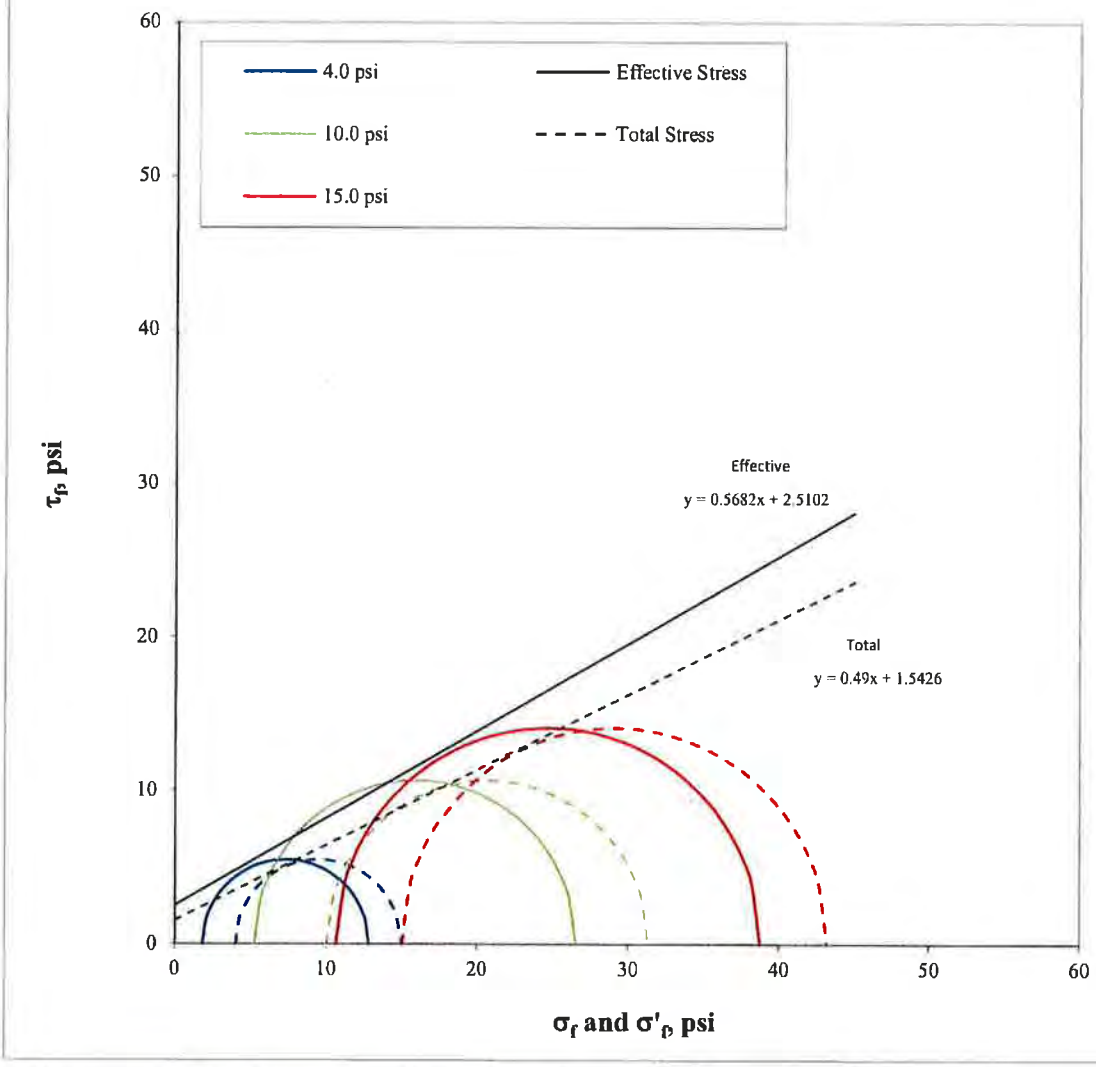
Total

α =	23.7	degree
a =	1.4	psi

Note: The laboratory testing relates only to the sample tested. GAI neither accepts responsibility for nor makes claims to the final use and purpose of the material.

Golder Associates Inc. Atlanta, Georgia	**Title:** MODIFIED (Multi-Stage) - ASTM D4767 CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT STRESS PATH PLOT				
Job Short Title: FTN/ENTERGY WHITE BLUFF/AR					
Sample: B-5 UD 3.0-5.0'	**Technician:** FT/PWM **Check:**	**Reviewed:** **Approved:**	**Start Date:** 7/10/2018	**Job Number:** 18103173	**Figure:** 4

Mohr's Circle Diagram



Confining Pressure (psi)	σ'_1 at failure (psi)	σ'_3 at failure (psi)	σ_1 at failure (psi)	σ_3 at failure (psi)
4.0	12.8	1.8	15.0	4.0
10.0	26.5	5.2	31.3	10.0
15.0	38.8	10.6	43.2	15.0

Effective

ϕ' = 29.6 degree

c' = 2.5 psi

Total

ϕ = 26.1 degree

c = 1.5 psi

Note: The laboratory testing relates only to the sample tested. GAI neither accepts responsibility for nor makes claims to the final use and purpose of the material.

Golder Associates Inc. Atlanta, Georgia	**Title:** MODIFIED (Multi-Stage) - ASTM D4767 CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT MOHR'S CIRCLE DIAGRAM				
Job Short Title: FTN/ENTERGY WHITE BLUFF/AR					
Sample: B-5 UD 3.0-5.0'	**Technician:** FT/PWM **Check:** JWM	**Reviewed:** **Approved:**	**Start Date:** 7/10/2018	**Job Number:** 18103173	**Figure:** 5

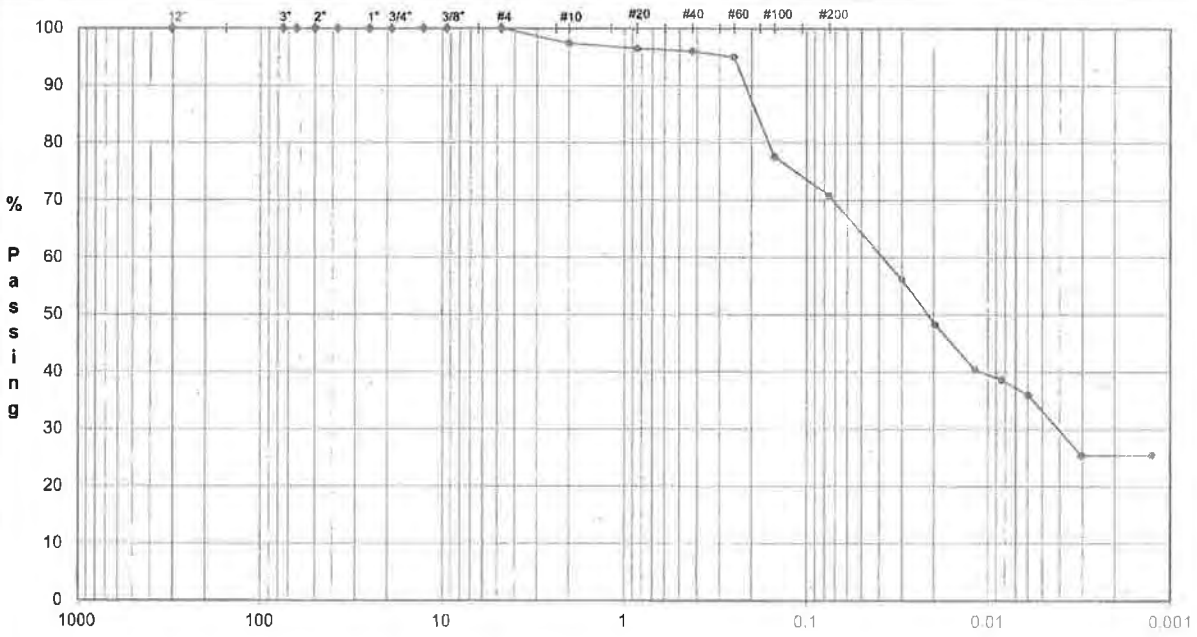
Golder Associates Inc. **Atlanta, Georgia**	**Title:** MODIFIED (Multi-Stage) - ASTM D4767 CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT SPECIMEN PHOTOGRAPH - Single Specimen				
Job Short Title: FTN/ENTERGY WHITE BLUFF/AR					
Sample: B-5 UD 3.0-5.0'	**Technician:** FT/PWM **Check:** tw	**Reviewed:** JC **Approved:**	**Start Date:** 7/10/2018	**Job Number:** 18103173	**Figure:** 6

AUGUST 2018 | 18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**
SAMPLE ID: **B-5** Depth: 4.0-6.0'
TYPE: **Bag**



COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**100.0**		
0.375"	9.5	**100.0**		
#4	4.8	**100.0**	Fine Gravel	**0.0**
#10	2.00	**97.4**	Coarse Sand	**2.6**
#20	0.85	**96.5**		
#40	0.43	**96.0**	Medium Sand	**1.4**
#60	0.25	**95.0**		
#100	0.15	**77.6**		
#200	0.075	**70.7**	Fine Sand	**25.3**

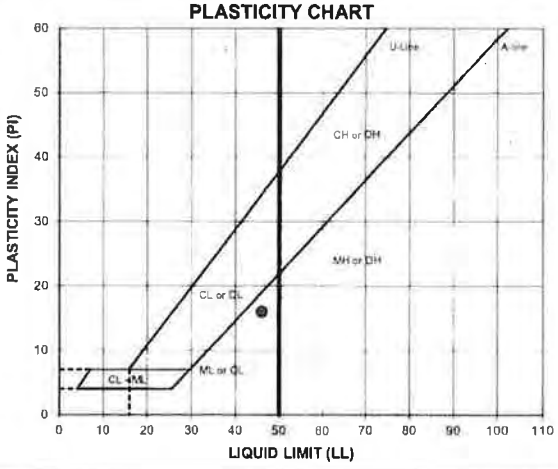
Hydrometer Analysis

(mm)	%Finer		
0.030	**56.1**		
0.020	**48.2**		
0.012	**40.3**	Fines	
0.0084	**38.6**	Silt or Clay	**70.7**
0.0060	**36.0**		
0.0030	**25.4**		
0.0013	**25.4**		

DESCRIPTION: sandy CLAYEY SILT, fine to coarse; yellowish brown.

USCS: ML

PLASTICITY CHART



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
27.4	**46**	**30**	**16**	**-0.17**

LL (oven-dried) / 0.75 | ORGANIC (OL/OH)

TECH	HH/BA/TJ
DATE	8/1/18
CHECK	
REVIEW	
APPROVE	

Golder Associates Inc.

AUGUST 2018

18103173

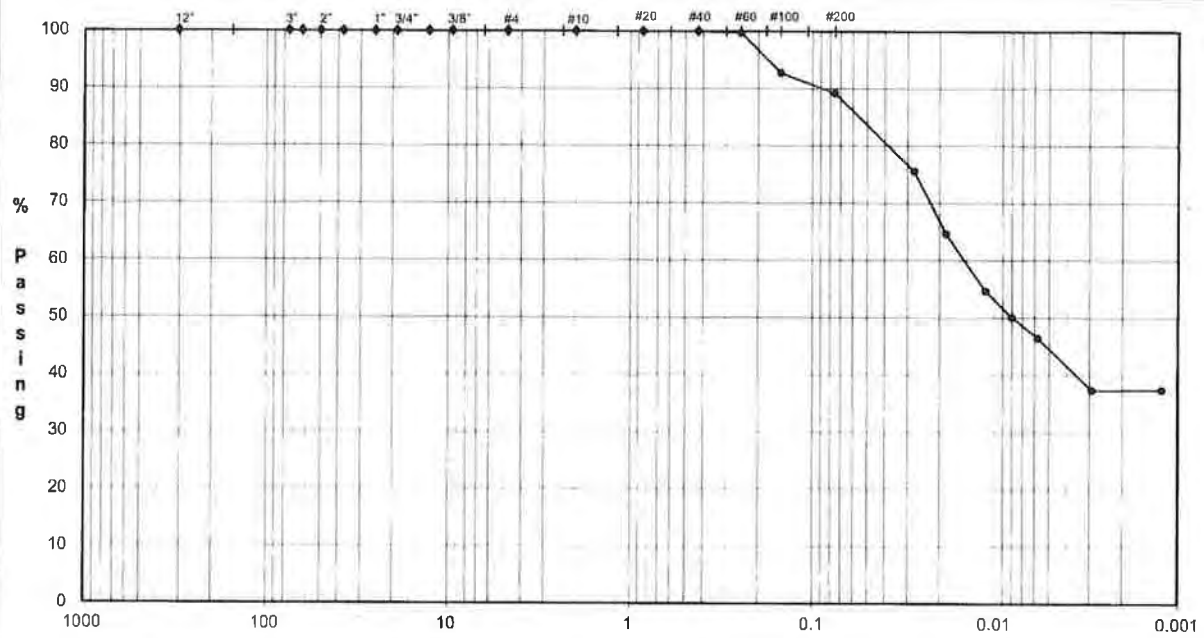
PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**

SAMPLE ID: **B-5** Depth: **9.0-10.0'**

TYPE: **Bag**



COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

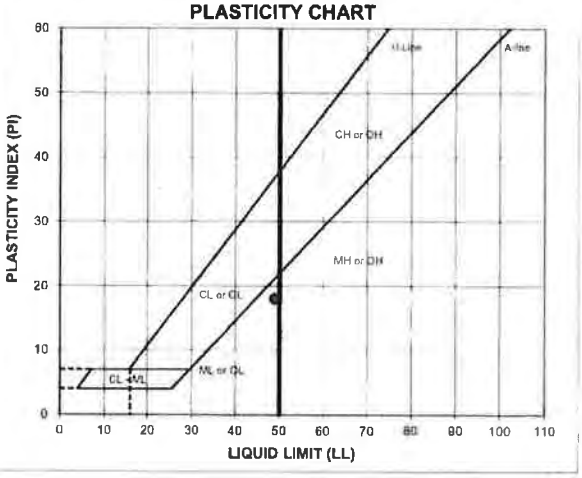
U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
3.0"	75.0	100.0	Cobbles	0.0
2.5"	63.5	100.0		
2.0"	50.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0		
0.75"	19.0	100.0	Coarse Gravel	0.0
0.50"	12.7	100.0		
0.375"	9.5	100.0		
#4	4.8	100.0	Fine Gravel	0.0
#10	2.00	100.0	Coarse Sand	0.0
#20	0.85	100.0		
#40	0.43	100.0	Medium Sand	0.0
#60	0.25	99.7		
#100	0.15	92.7		
#200	0.075	89.1	Fine Sand	10.9

Hydrometer Analysis

	(mm)	%Finer		
	0.028	75.6		
	0.018	64.6		
	0.011	54.6	Fines	
	0.0080	50.1	Silt or Clay	89.1
	0.0058	46.4		
	0.0029	37.3		
	0.0012	37.3		

PLASTICITY CHART



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
26.3	49	31	18	-0.27

LL (oven-dried) / 0.75 ORG \NK (OL/OH)

DESCRIPTION: CLAYEY SILT, some fine sand; dark gray.

USCS: ML

TECH	HH/BA/TJ
DATE	8/1/18
CHECK	
REVIEW	
APPROVE	

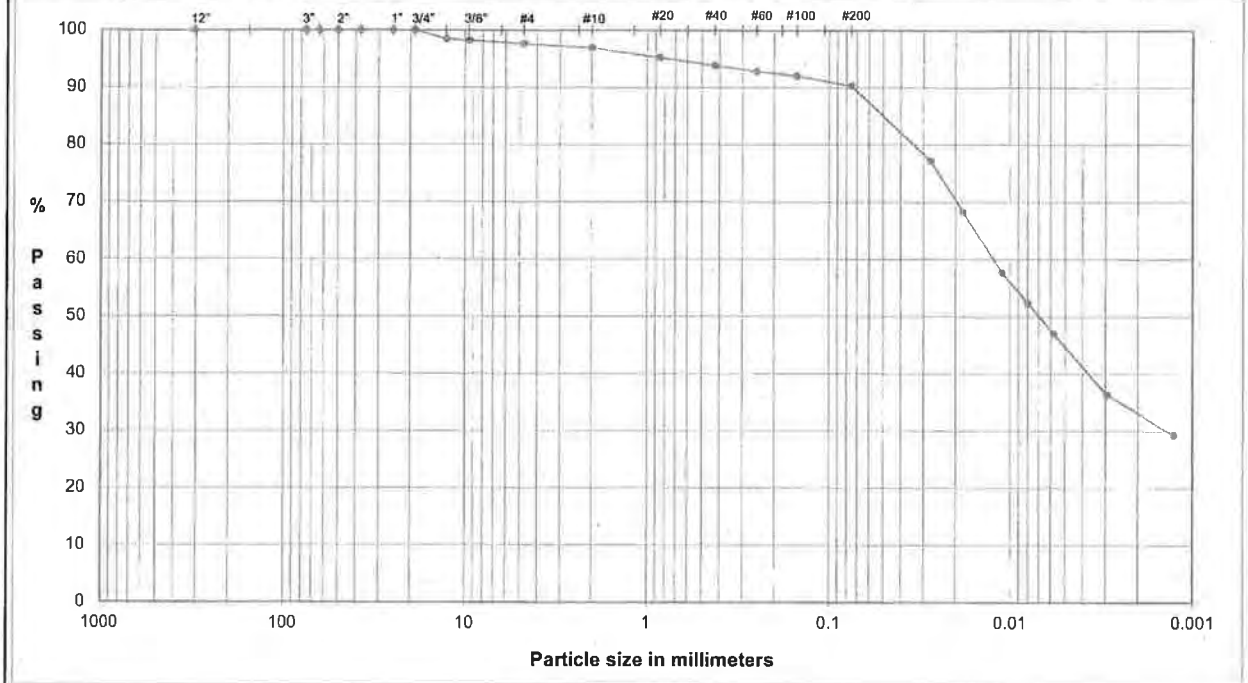
Golder Associates Inc.

JUNE 2018 | 18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**
SAMPLE ID: **B-5** Depth: **10.0-12.0'**
TYPE: **UD**



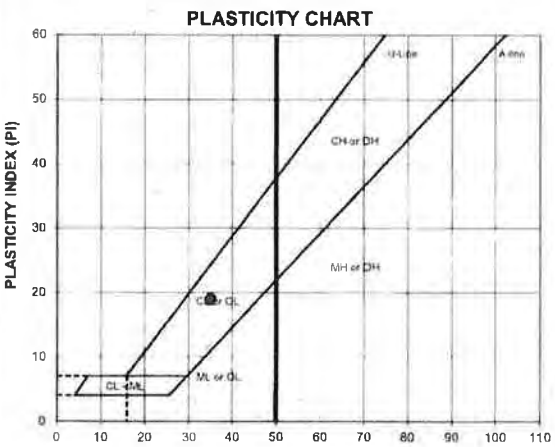
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**98.4**		
0.375"	9.5	**98.2**		
#4	4.8	**97.6**	Fine Gravel	**2.4**
#10	2.00	**96.9**	Coarse Sand	**0.7**
#20	0.85	**95.2**		
#40	0.43	**93.8**	Medium Sand	**3.1**
#60	0.25	**92.8**		
#100	0.15	**92.0**		
#200	0.075	**90.3**	Fine Sand	**3.5**

Hydrometer Analysis

(mm)	%Finer		
0.027	**77.2**		
0.018	**68.3**		
0.011	**57.7**	Fines	
0.0080	**52.3**	Silt or Clay	**90.3**
0.0058	**47.0**		
0.0030	**36.4**		
0.0013	**29.3**		



ATTERBERG LIMITS
Method -B (Dry preparation)

M,	LL	PL	PI	LI
17.1	**35**	**16**	**19**	**0.07**

LL (oven-dried) / 0.75 ORGANIC (OL/OH)

DESCRIPTION: SILTY CLAY, some fine to coarse sand, trace fine gravel; light brown.

USCS: CL

TECH	HH/TB
DATE	6/20/18
CHECK	
REVIEW	
APPROVE	

Golder Associates Inc.

FLEXIBLE WALL PERMEABILITY
ASTM D 5084
METHOD D, CONSTANT RATE OF FLOW

PROJECT TITLE	FTN/ENTERGY WHITE BLUFF/AR		Board #	8	COMMENTS
PROJECT NUMBER	18103173		Flow Pump	2	
SAMPLE ID	B-5	10.0-12.0'	Flow Pump Speed	11	
SAMPLE TYPE	UD		Technician	FT	

Sample Data, Initial				Sample Data, Final	
Height, inches	3.000	B-Value, f	1.00	Height, inches	3.004
Diameter, inches	2.836	Cell Pres.	88.0	Diameter, inches	2.898
Area, cm^2	40.75	Bot. Pres.	80.0	Area, cm^2	42.56
Volume, cm^3	310.55	Top Pres.	80.0	Volume, cm^3	324.70
Mass, g	663.16	Tot. B.P.	80.0	Mass, g	674.45
Moisture Content, %	17.07	Head, max.	135.05	Moisture Content, %	19.06
Dry Density, pcf	113.82	Head, min.	135.05	Dry Density, pcf	108.86
Spec. Gravity (assumed)	2.700	Max. Grad.	17.70	Volume Solids, cm^3	209.80
Volume Solids, cm^3	209.80	Min. Grad.	17.70	Volume Voids, cm^3	114.90
Volume Voids, cm^3	100.75			Void Ratio	0.55
Void Ratio	0.48			Saturation, %	94.0%
Saturation, %	96.0%				

WATER CONTENTS		Sample Initial	Sample Final
Wt Soil & Tare, i	g	663.16	756.65
Wt Soil & Tare, f	g	566.46	648.69
Wt Tare	g	0.00	82.40
Wt Moisture Lost	g	96.70	107.96
Wt Dry Soil	g	566.46	566.29
Water Content	%	17.07%	19.06%

Flow Pump Rate: 1.18E-05 cm^3/sec

USCS: CL

DESCRIPTION: SILTY CLAY, some fine to coarse sand, trace fine gravel; light brown.

TIME FUNCTIONS, SECONDS								dP				
DATE	DAY	HOUR	MIN	TEMP (°C)	dt (min)	dt,acc (min)	dt (sec)	dt,acc (sec)	Reading (psi)	Head (cm)	Gradient	Permeability (cm/sec)
06/25/18	43276	12	0	21.7	0	0	0	0	1.92	135.05	17.70	1.5E-08
06/25/18	43276	12	5	21.7	5	5	300	300	1.92	135.05	17.70	1.5E-08
06/25/18	43276	12	10	21.7	5	10	300	600	1.92	135.05	17.70	1.5E-08
06/25/18	43276	12	15	21.7	5	15	300	900	1.92	135.05	17.70	1.5E-08 *
06/25/18	43276	12	20	21.7	5	20	300	1200	1.92	135.05	17.70	1.5E-08 *
06/25/18	43276	12	25	21.7	5	25	300	1500	1.92	135.05	17.70	1.5E-08 *
06/25/18	43276	12	30	21.7	5	30	300	1800	1.92	135.05	17.70	1.5E-08 *

*TRANSCRIBED FROM ORIGINAL DATA SHEETS

PERMEABILITY REPORTED AS ** 1.5E-08 cm/sec **

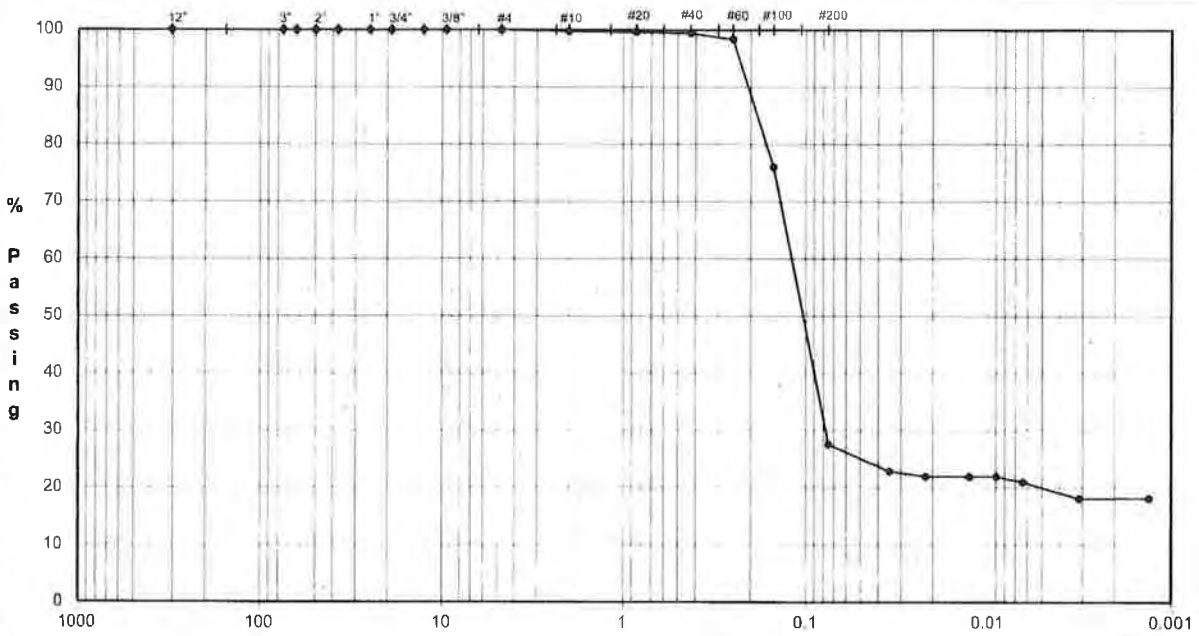
DATE	6/25/18
CHECK	
REVIEW	
APPROVE	

AUGUST 2018 | 18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**
SAMPLE ID: **B-6** Depth: **11.0-12.0'**
TYPE: **Bag**



COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

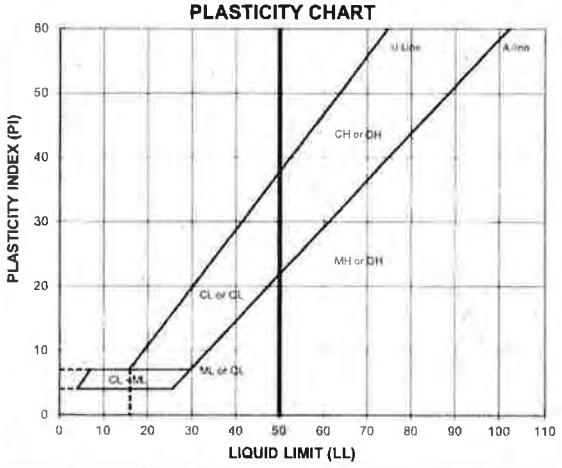
U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**100.0**		
0.375"	9.5	**100.0**		
#4	4.8	**100.0**	Fine Gravel	**0.0**
#10	2.00	**99.8**	Coarse Sand	**0.2**
#20	0.85	**99.6**		
#40	0.43	**99.4**	Medium Sand	**0.4**
#60	0.25	**98.3**		
#100	0.15	**76.0**		
#200	0.075	**27.6**	Fine Sand	**71.8**

Hydrometer Analysis

(mm)	%Finer		
0.035	**22.9**		
0.022	**21.9**		
0.013	**21.9**	Fines	
0.0089	**21.9**	Silt or Clay	**27.6**
0.0064	**21.0**		
0.0031	**18.1**		
0.0013	**18.1**		

PLASTICITY CHART



ATTERBERG LIMITS

Method -B (Dry preparation)

M,	LL	PL	PI	LI
12.4	**NP**	**NP**	**NP**	**NP**

LL (oven-dried) / 0.75 ORGANIC (OL OH)

DESCRIPTION: SILTY SAND, fine to coarse; yellowish brown.

USCS: SM

TECH	TJ/BA/HH
DATE	8/2/18
CHECK	
REVIEW	
APPROVE	

AUGUST 2018

18103173

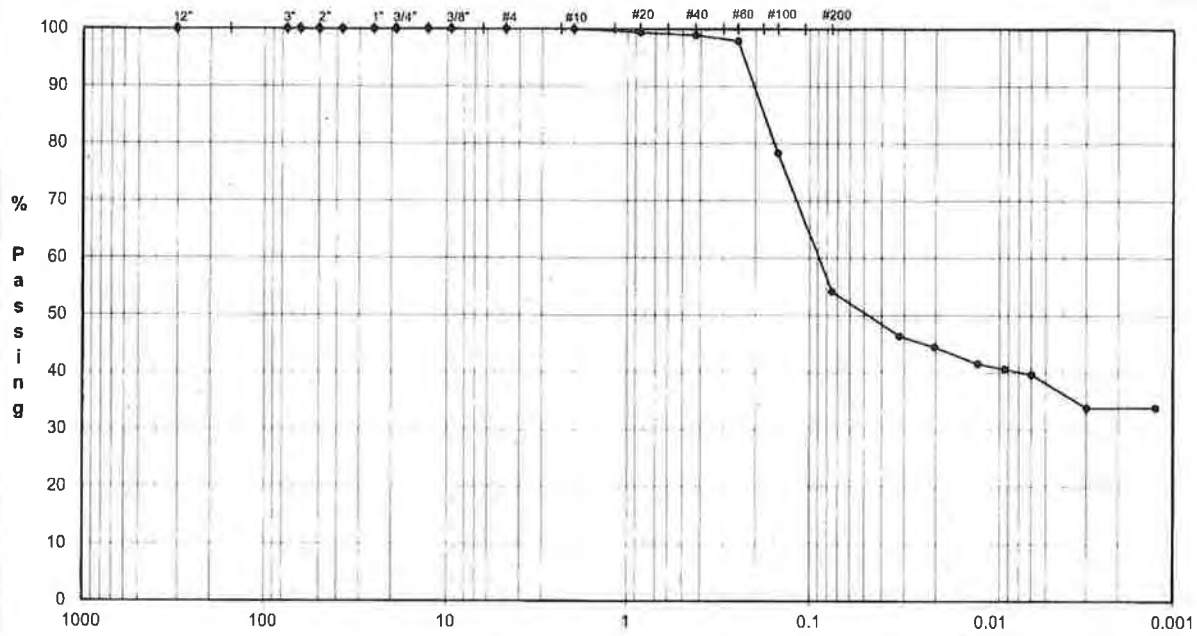
PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**

SAMPLE ID: **B-6** Depth: **16.0-17.0'**

TYPE: **Bag**



COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

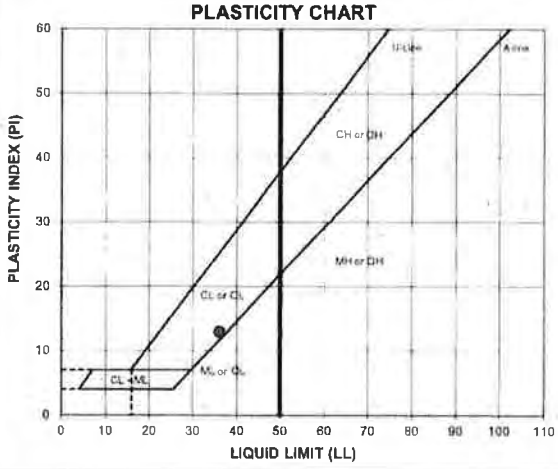
U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**100.0**		
0.375"	9.5	**100.0**		
#4	4.8	**100.0**	Fine Gravel	**0.0**
#10	2.00	**99.9**	Coarse Sand	**0.1**
#20	0.85	**99.4**		
#40	0.43	**98.9**	Medium Sand	**1.0**
#60	0.25	**97.9**		
#100	0.15	**78.3**		
#200	0.075	**54.2**	Fine Sand	**44.8**

Hydrometer Analysis

(mm)	%Finer		
0.032	**46.4**		
0.020	**44.5**		
0.012	**41.6**	Fines	
0.0084	**40.6**	Silt or Clay	**54.2**
0.0060	**39.6**		
0.0030	**33.8**		
0.0012	**33.8**		

PLASTICITY CHART



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
21.3	**36**	**23**	**13**	**-0.11**

LL (oven-dried)

0.75 ORGANIC (OL/OH)

DESCRIPTION: SILTY CLAY and SAND, fine to coarse; dark yellowish brown

USCS: CL

TECH	TJ/BA/HH
DATE	8/2/18
CHECK	
REVIEW	
APPROVE	

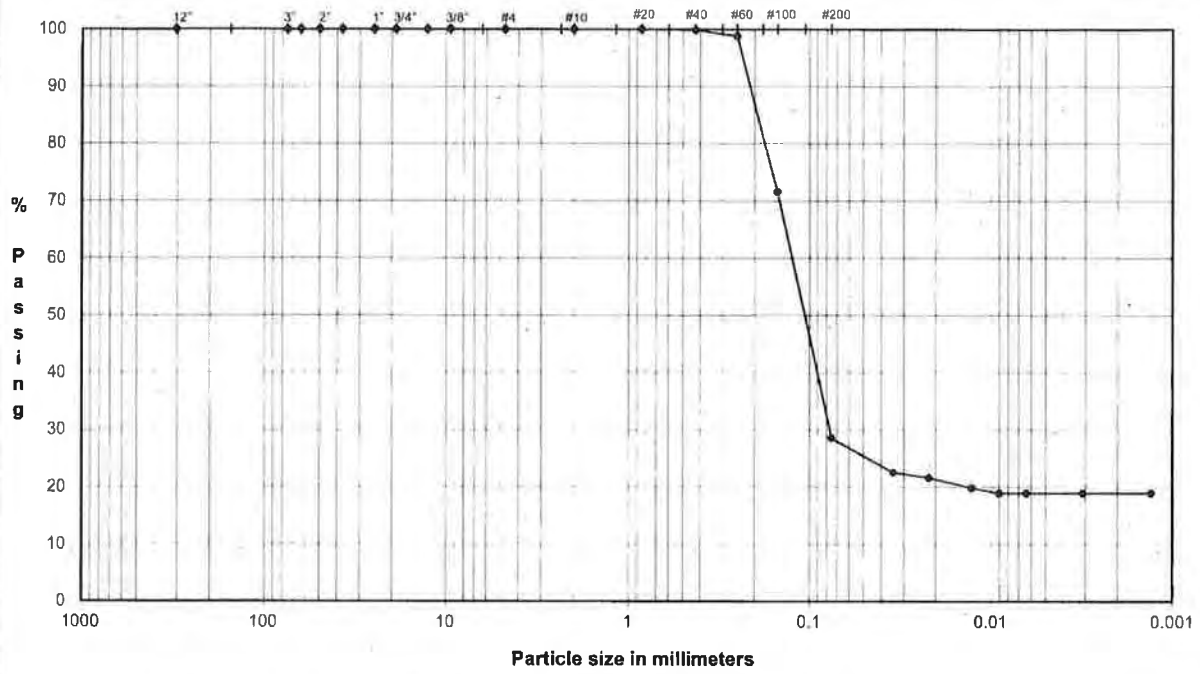
Golder Associates Inc.

AUGUST 2018 18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**
SAMPLE ID: **B-6** Depth: **22.0-24.0'**
TYPE: **Bag**



COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

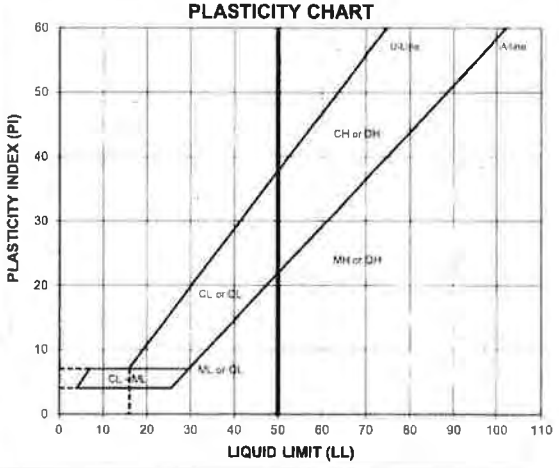
U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**100.0**		
0.375"	9.5	**100.0**		
#4	4.8	**100.0**	Fine Gravel	**0.0**
#10	2.00	**100.0**	Coarse Sand	**0.0**
#20	0.85	**100.0**		
#40	0.43	**99.9**	Medium Sand	**0.1**
#60	0.25	**98.8**		
#100	0.15	**71.5**		
#200	0.075	**28.6**	Fine Sand	**71.3**

Hydrometer Analysis

(mm)	%Finer		
0.034	**22.5**		
0.022	**21.6**		
0.013	**19.8**	Fines	
0.0090	**18.9**	Silt or Clay	**28.6**
0.0064	**18.9**		
0.0031	**18.9**		
0.0013	**18.9**		

PLASTICITY CHART



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
10.9	**NP**	**NP**	**NP**	**NP**

LL (oven-dried) / 0.75 ORGANIC (OL/OH)

DESCRIPTION: SILTY SAND, fine to medium; dark gray.

USCS: SM

TECH	TJ/BA/HH
DATE	8/2/18
CHECK	
REVIEW	
APPROVE	

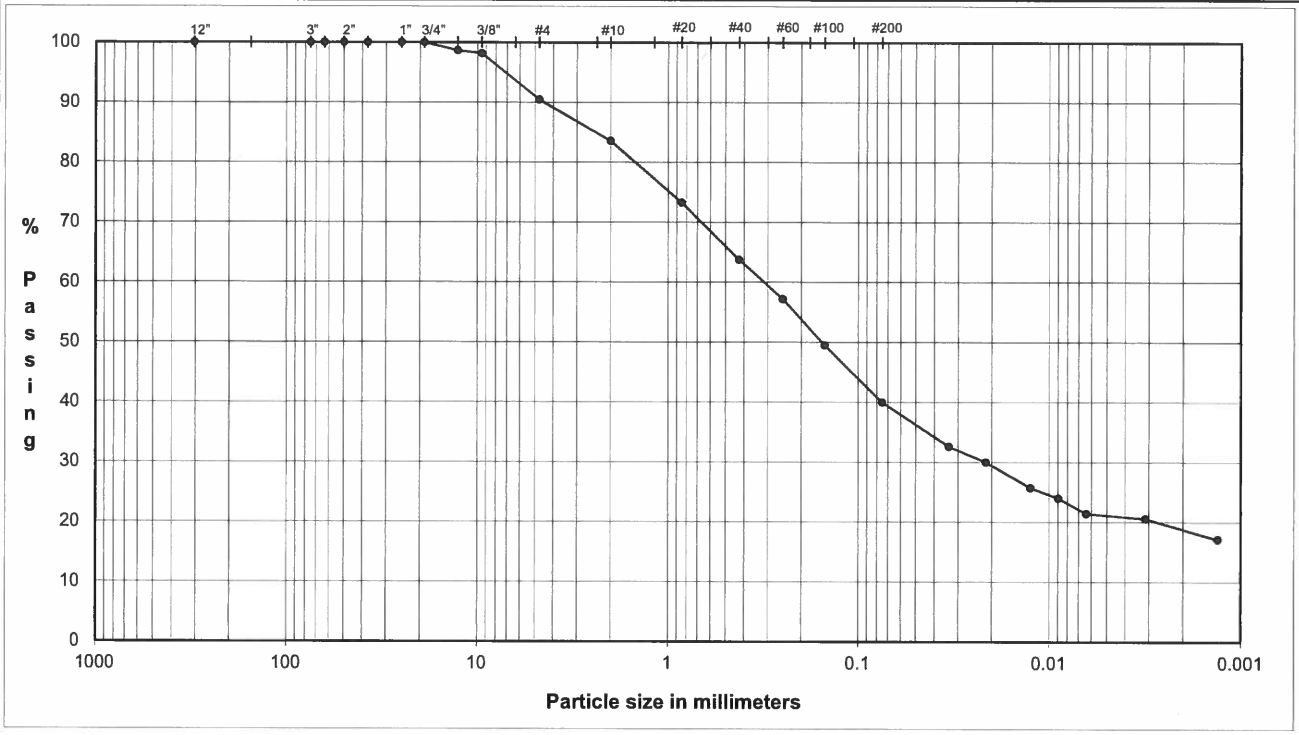
Golder Associates Inc.

AUGUST 2018 18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**
SAMPLE ID: **B-7** Depth: **5.0-7.0'**
TYPE: **UD**



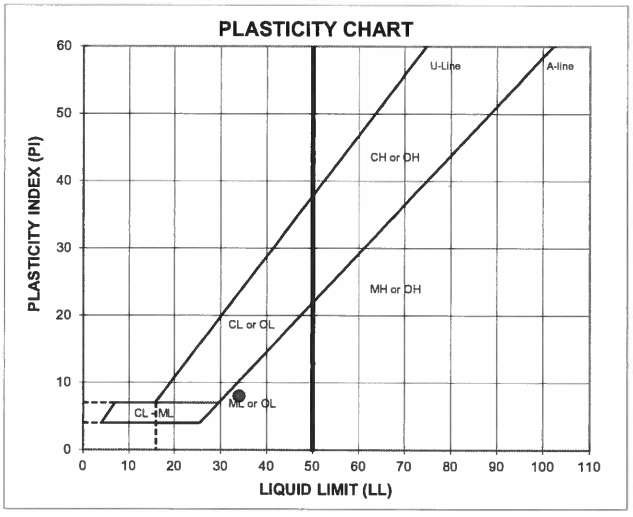
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**98.6**		
0.375"	9.5	**98.1**		
#4	4.8	**90.4**	Fine Gravel	**9.6**
#10	2.00	**83.6**	Coarse Sand	**6.9**
#20	0.85	**73.2**		
#40	0.43	**63.8**	Medium Sand	**19.8**
#60	0.25	**57.2**		
#100	0.15	**49.5**		
#200	0.075	**40.0**	Fine Sand	**23.8**

Hydrometer Analysis

(mm)	%Finer		
0.034	**32.6**		
0.021	**30.0**		
0.013	**25.7**	Fines	
0.0089	**24.0**	Silt or Clay	**40.0**
0.0064	**21.4**		
0.0031	**20.6**		
0.0013	**17.1**		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
20.5	**34**	**26**	**8**	**-0.73**

LL (oven-dried) / 0.75 = ORGANIC (OL/OH)

DESCRIPTION: SILTY SAND, fine to coarse, some fine gravel; gray.

USCS: SM

TECH	TJ/HH/BA
DATE	8/14/18
CHECK	
REVIEW	
APPROVE	

Boring or Test Pit:	B-7		Boring or Test Pit:			Boring or Test Pit:		
Sample:	1		Sample:			Sample:		
Depth:	5.0-7.0	ft	Depth:			Depth:		
Point No.:	1		Point No.:			Point No.:		
	Initial							
Length =	6.041	in	Length =	6.023		Length =	5.966	
Diameter =	2.848	in	Diameter =	2.883		Diameter =	2.897	
Wet Mass =	2.811	lb	Wet Mass =			Wet Mass =		
Area =	6.370	in^2	Area =			Area =		
Volume =	38.484	in^3	Volume =			Volume =		
Specific Gravity =	2.66	(ASTM D854)	Specific Gravity =			Specific Gravity =		
Dry Mass of Solids =	2.332	lb	Dry Mass of Solids =			Dry Mass of Solids =		
Moisture Content =	20.5%		Moisture Content =			Moisture Content =		
Wet Unit Weight =	126.2	pcf	Wet Unit Weight =			Wet Unit Weight =		
Dry Unit Weight =	104.7	pcf	Dry Unit Weight =			Dry Unit Weight =		
Void Ratio =	0.58		Void Ratio =			Void Ratio =		
Percent Saturation =	94%		Percent Saturation =			Percent Saturation =		
	After Consolidation			**After Consolidation**			**After Consolidation**	
Length =	6.023	in	Length =	5.966	in	Length =	5.920	in
Diameter =	2.883	in	Diameter =	2.897	in	Diameter =	2.908	in
Area =	6.529		Area =	6.592		Area =	6.643	in^2 (Method B)
Volume =	39.326		Volume =	39.326		Volume =	39.326	in^3
Moisture Content =			Moisture Content =			Moisture Content =	23.2%	
Wet Unit Weight =			Wet Unit Weight =			Wet Unit Weight =	126.3	pcf
Dry Unit Weight =			Dry Unit Weight =			Dry Unit Weight =	102.5	pcf
Void Ratio =			Void Ratio =			Void Ratio =	0.62	
Percent Saturation =			Percent Saturation =			Percent Saturation =	100%	
B Parameter =	0.96		B Parameter =	--		B Parameter =	--	
Shear Rate =	0.088%	/min.	Shear Rate =	0.087%	/min.	Shear Rate =	0.090%	/min.
t_{50} =	1.2	min.	t_{50} =	0.9	min.	t_{50} =	0.8	min.
Strain at Failure =	0.5%		Strain at Failure =	1.9%		Strain at Failure =	2.8%	
Cell Pressure =	66.0	psi	Cell Pressure =	72.0	psi	Cell Pressure =	78.0	psi
Back Pressure =	60.0	psi	Back Pressure =	60.0	psi	Back Pressure =	60.0	psi
Confining Pressure =	6.0	psi	Confining Pressure =	12.0	psi	Confining Pressure =	18.0	psi

Notes: Sample description: (SM) SILTY SAND, fine to coarse, some fine gravel; gray.

Atterberg limits: LL = 34 PL = 26 PI = 8 (ASTM D4318)

Percent finer: 3/4 in. = 100.0% No. 4 = 90.4% No. 200 = 40.0% (ASTM D422, refer to separate report for gradation curve)

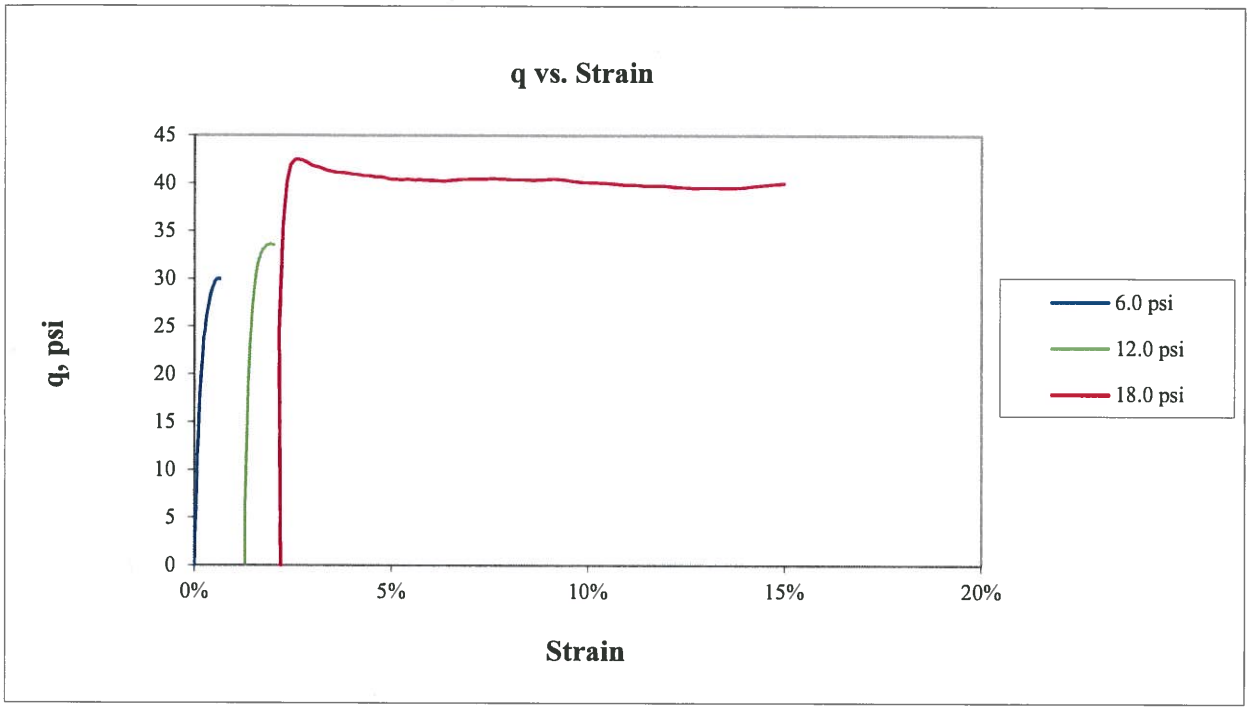
Specimen type:	X	Intact		Reconstituted
Moisture from:		Cuttings	X	Entire specimen
Saturation method:	X	Wet		Dry
Failure criterion:	X	$(\sigma'_1/\sigma'_3)_{max}$		$(\sigma'_1-\sigma'_3)_{max}$ % strain
Membrane effect:	X	Corrected		Not Corrected

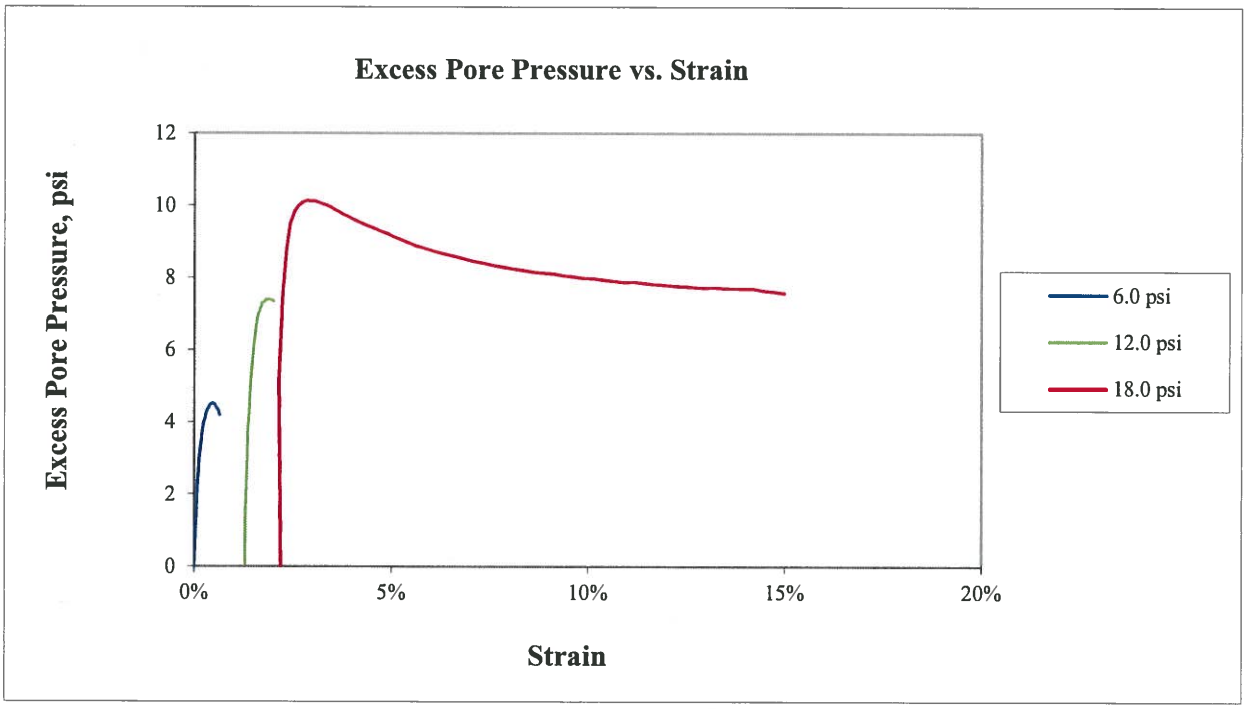
Golder Associates Inc.
Atlanta, Georgia

Title:
MODIFIED (Multi-Stage) - ASTM D4767
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT
SAMPLE AND TEST DATA

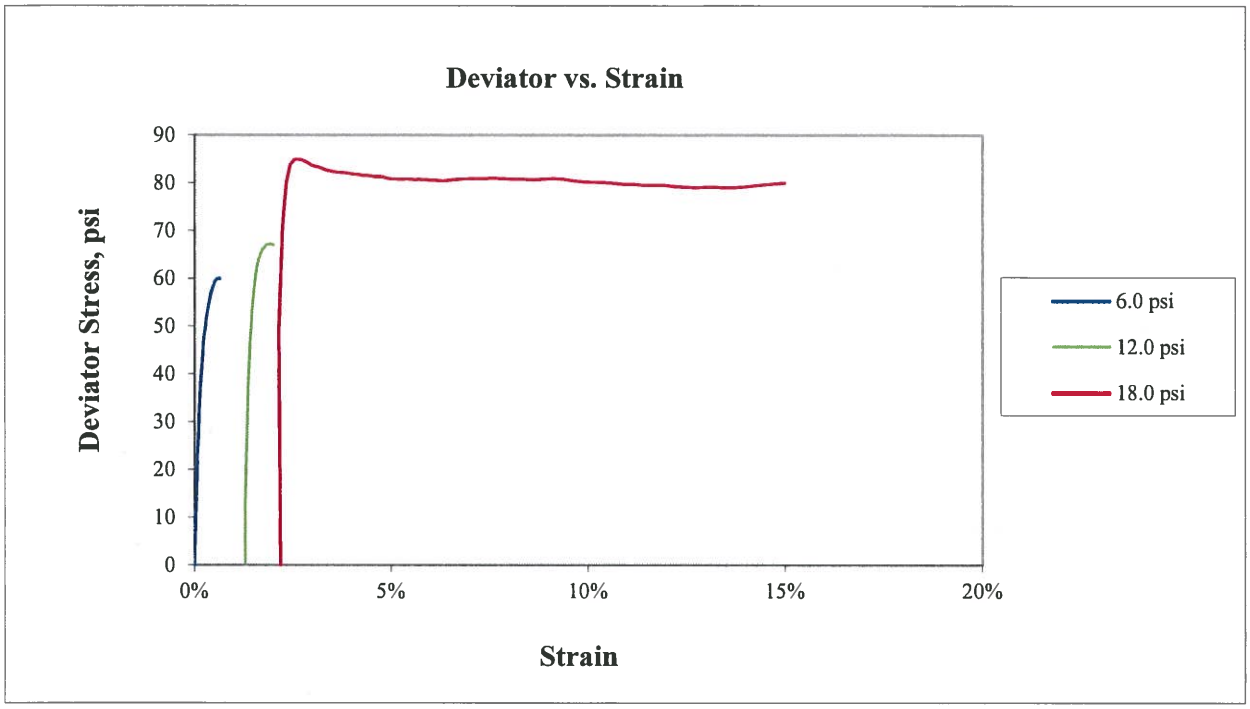
Job Short Title:
FTN/ENTERGY WHITE BLUFF/AR

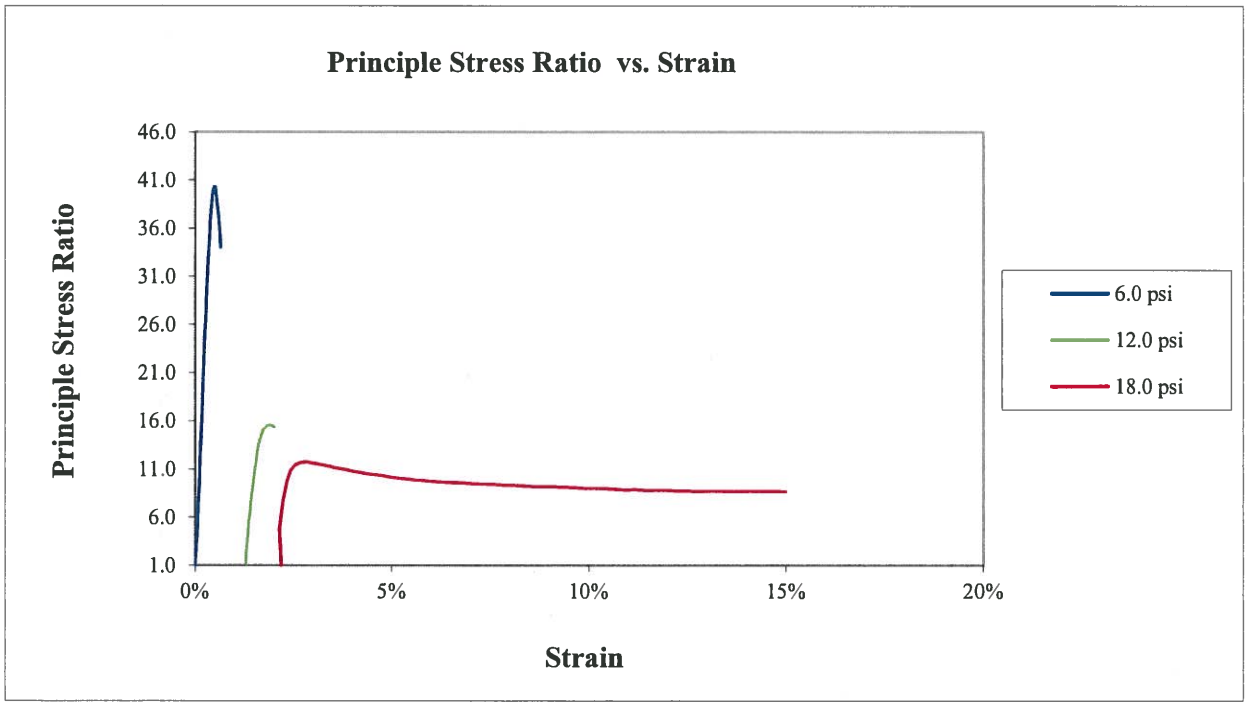
Sample:	Technician:	Reviewed:	Start Date:	Job Number:	Figure:
B-7 UD 5.0-7.0'	FT/PWM		8/29/2018	18103173	1
	Check: PWM	Approved:			





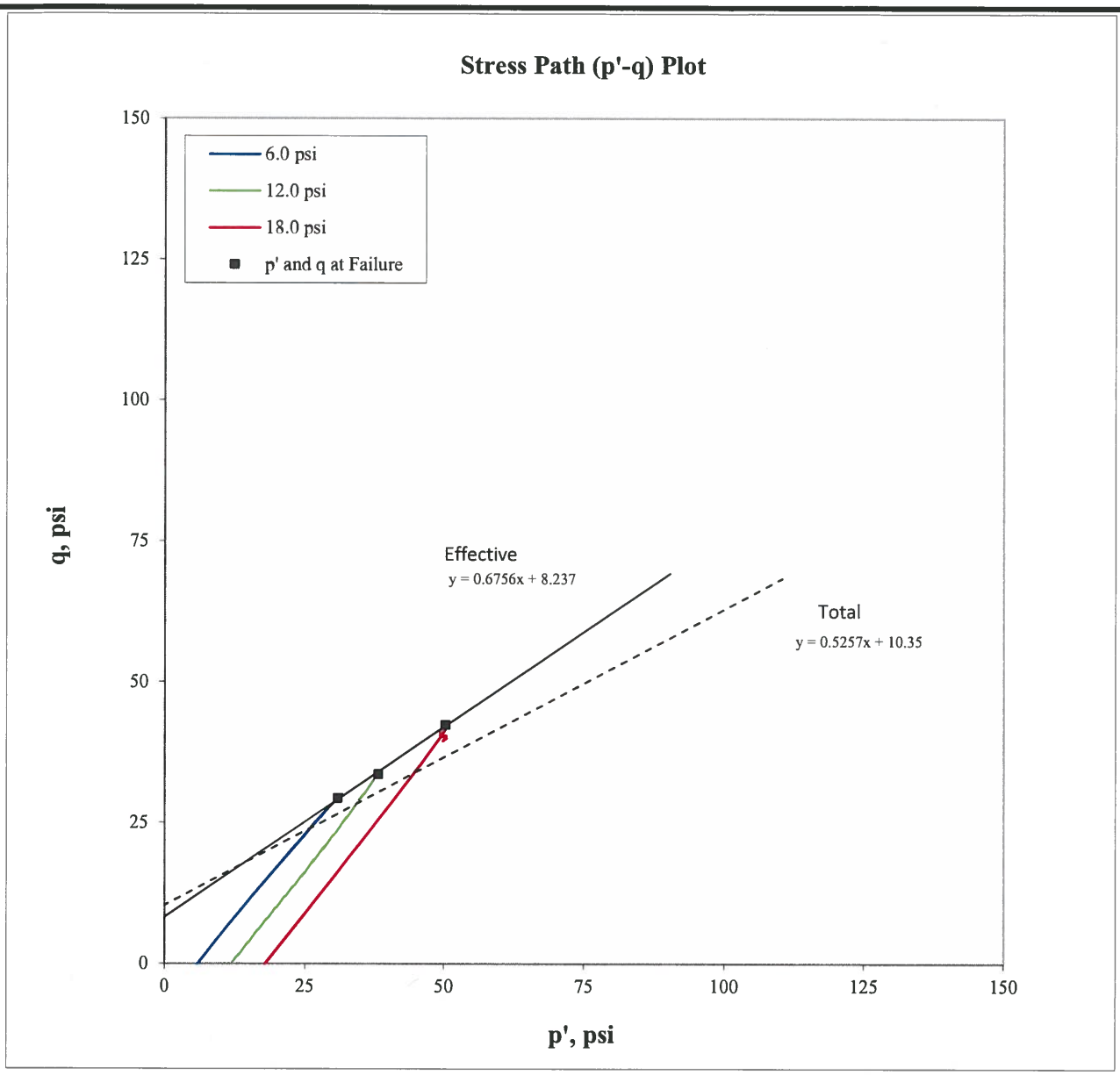
Golder Associates Inc. **Atlanta, Georgia**	**Title:** **MODIFIED (Multi-Stage) - ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **q AND EXCESS PORE PRESSURE PLOTS**				
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**					
Sample: **B-7 UD 5.0-7.0'**	**Technician:** **FT/PWM** **Check:**	**Reviewed:** **Approved:**	**Start Date:** **8/29/2018**	**Job Number:** **18103173**	**Figure:** **2**





Golder Associates Inc. **Atlanta, Georgia**	**Title:** **MODIFIED (Multi-Stage) - ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **q AND EXCESS PORE PRESSURE PLOTS**				
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**					
Sample: **B-7 UD 5.0-7.0'**	**Technician:** **FT/PWM** **Check:**	**Reviewed:** **Approved:**	**Start Date:** **8/29/2018**	**Job Number:** **18103173**	**Figure:** **3**

Stress Path (p'-q) Plot



Confining Pressure (psi)	p at failure (psi)	p' at failure (psi)	q at failure (psi)
6.0	35.4	30.9	29.4
12.0	45.6	38.2	33.6
18.0	60.4	50.3	42.4

Effective

α ' =	34.0	degree
a' =	8.2	psi

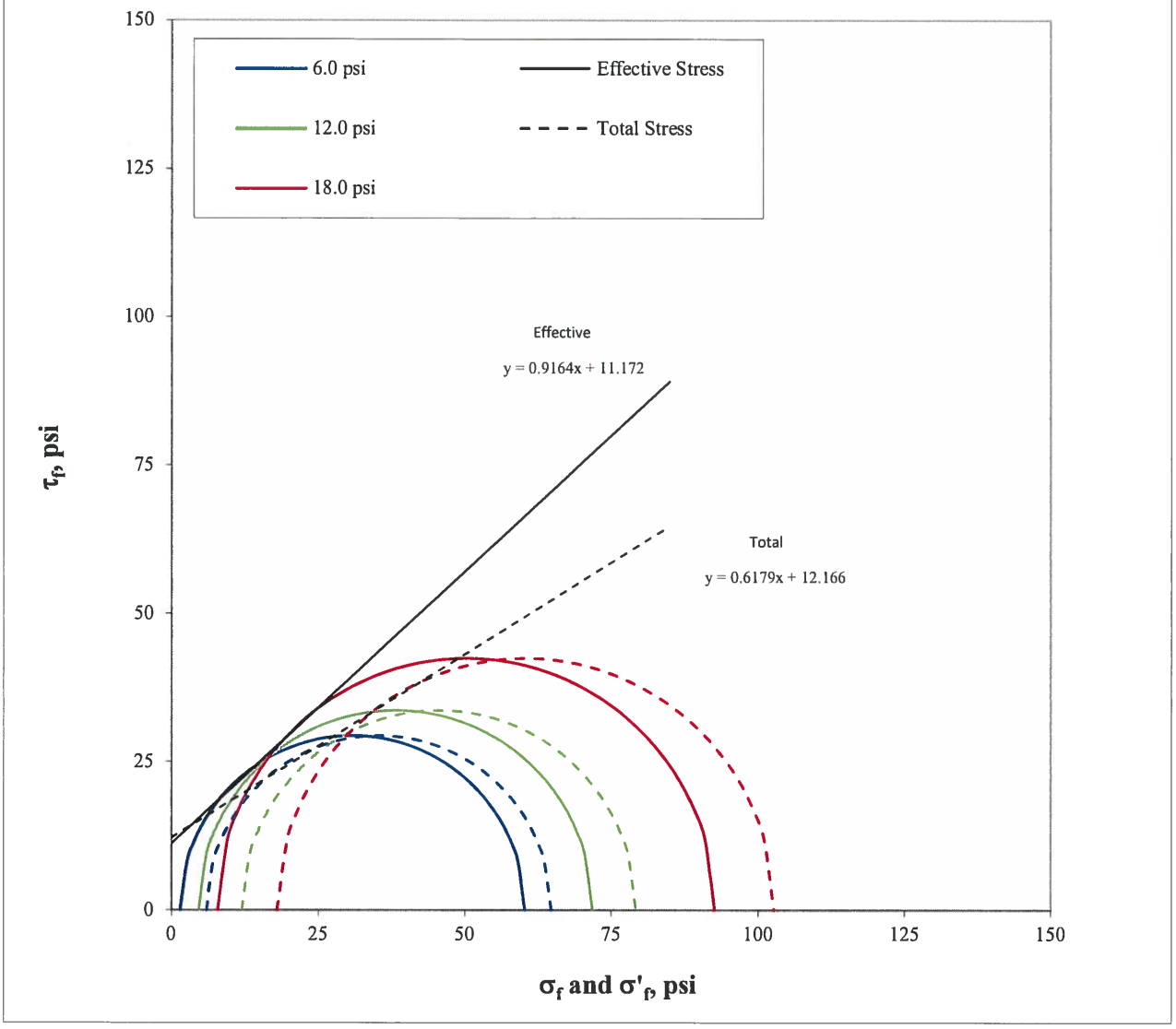
Total

α =	27.7	degree
a =	10.3	psi

Note: The laboratory testing relates only to the sample tested. GAI neither accepts responsibility for nor makes claims to the final use and purpose of the material.

Golder Associates Inc. Atlanta, Georgia	**Title:** MODIFIED (Multi-Stage) - ASTM D4767 CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT STRESS PATH PLOT				
Job Short Title: FTN/ENTERGY WHITE BLUFF/AR					
Sample: B-7 UD 5.0-7.0'	**Technician:** FT/PWM **Check:**	**Reviewed:** **Approved:**	**Start Date:** 8/29/2018	**Job Number:** 18103173	**Figure:** 4

Mohr's Circle Diagram



Confining Pressure (psi)	σ'_1 at failure (psi)	σ'_3 at failure (psi)	σ_1 at failure (psi)	σ_3 at failure (psi)
6.0	60.2	1.5	64.7	6.0
12.0	71.8	4.6	79.2	12.0
18.0	92.7	7.9	102.8	18.0

Effective

ϕ' =	42.5	degree
c' =	11.2	psi

Total

ϕ =	31.7	degree
c =	12.2	psi

Note: The laboratory testing relates only to the sample tested. GAI neither accepts responsibility for nor makes claims to the final use and purpose of the material.

Golder Associates Inc. Atlanta, Georgia	**Title:** MODIFIED (Multi-Stage) - ASTM D4767 CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT MOHR'S CIRCLE DIAGRAM				
Job Short Title: FTN/ENTERGY WHITE BLUFF/AR					
Sample: B-7 UD 5.0-7.0'	**Technician:** FT/PWM **Check:** MWH	**Reviewed:** **Approved:**	**Start Date:** 8/29/2018	**Job Number:** 18103173	**Figure:** 5

Golder Associates Inc. **Atlanta, Georgia**	**Title:** **MODIFIED (Multi-Stage) - ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **SPECIMEN PHOTOGRAPH - Single Specimen**				
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**					
Sample: **B-7 UD 5.0-7.0'**	**Technician:** **FT/PWM** **Check:**	**Reviewed:** **Approved:**	**Start Date:** **8/29/2018**	**Job Number:** **18103173**	**Figure:** **6**

JUNE 2018

18103173

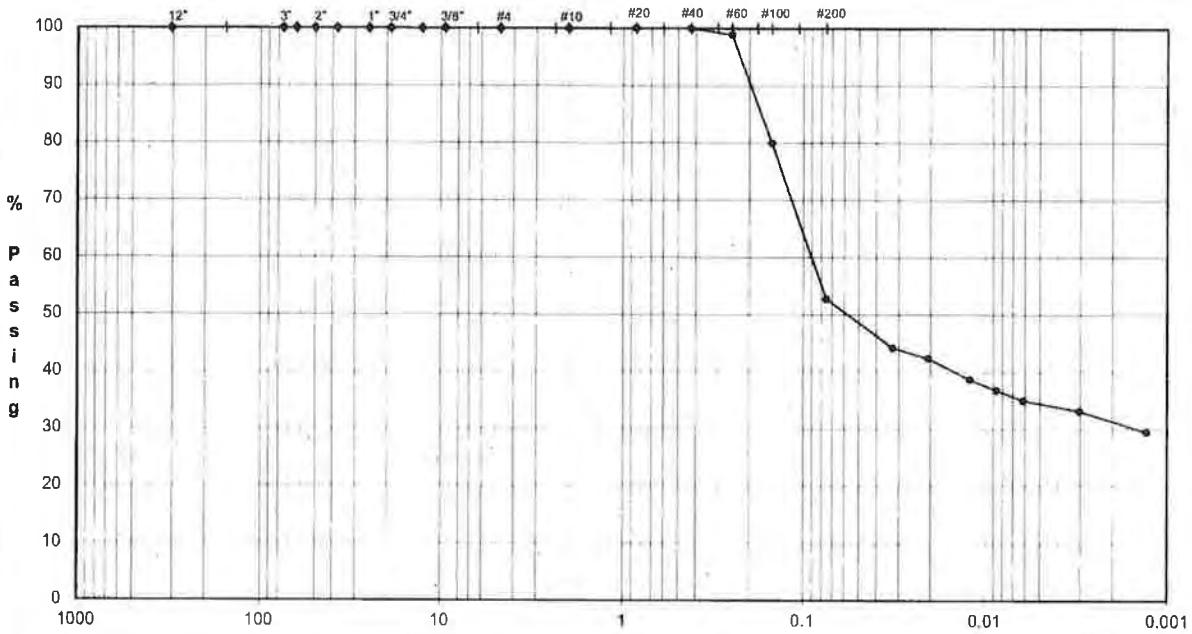
PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**

SAMPLE ID: **B-7** Depth: **7.0-9.0'**

TYPE: **UD**



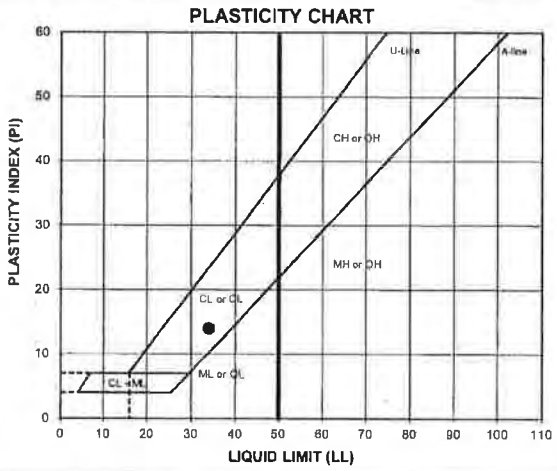
COBBLES	Coarse GRAVEL	Fine GRAVEL	Coarse SAND	Medium SAND	Fine SAND	Silt or Clay FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**100.0**		
0.375"	9.5	**100.0**		
#4	4.8	**100.0**	Fine Gravel	**0.0**
#10	2.00	**100.0**	Coarse Sand	**0.0**
#20	0.85	**100.0**		
#40	0.43	**100.0**	Medium Sand	**0.0**
#60	0.25	**98.9**		
#100	0.15	**79.9**		
#200	0.075	**52.7**	Fine Sand	**47.3**

Hydrometer Analysis

(mm)	%Finer		
0.033	**44.2**		
0.021	**42.4**		
0.012	**38.7**	Fines	
0.0086	**36.8**	Silt or Clay	**52.7**
0.0062	**35.0**		
0.0030	**33.2**		
0.0013	**29.5**		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
21.8	**34**	**20**	**14**	**0.13**

LL (oven-dried) / 0.75 ORGANIC (OL/OH)

DESCRIPTION: SILTY CLAY and SAND, fine to medium; yellowish brown.

USCS: CL

TECH	TJ
DATE	6/7/18
CHECK	
REVIEW	
APPROVE	

FLEXIBLE WALL PERMEABILITY
ASTM D 5084
METHOD D, CONSTANT RATE OF FLOW

PROJECT TITLE	FTN/ENTERGY WHITE BLUFF/AR		Board #	15	COMMENTS
PROJECT NUMBER	18103173		Flow Pump	2	
SAMPLE ID	B-7	7.0-9.0'	Flow Pump Speed	7	
SAMPLE TYPE	UD		Technician	FT	

Sample Data, Initial				Sample Data, Final	
Height, inches	3.000	B-Value, f	0.98	Height, inches	3.001
Diameter, inches	2.883	Cell Pres.	88.0	Diameter, inches	2.874
Area, cm²	42.12	Bot. Pres.	80.0	Area, cm²	41.85
Volume, cm³	320.92	Top Pres.	80.0	Volume, cm³	319.03
Mass, g	614.74	Tot. B.P.	80.0	Mass, g	632.69
Moisture Content, %	21.80	Head, max.	61.90	Moisture Content, %	25.36
Dry Density, pcf	98.14	Head, min.	61.90	Dry Density, pcf	98.72
Spec. Gravity (assumed)	2.700	Max. Grad.	8.12	Volume Solids, cm³	186.93
Volume Solids, cm³	186.93	Min. Grad.	8.12	Volume Voids, cm³	132.10
Volume Voids, cm³	133.99			Void Ratio	0.71
Void Ratio	0.72			Saturation, %	96.9%
Saturation, %	82.1%				

WATER CONTENTS		Sample Initial	Sample Final
Wt Soil & Tare, i	g	614.74	714.76
Wt Soil & Tare, f	g	504.72	586.83
Wt Tare	g	0.00	82.29
Wt Moisture Lost	g	110.02	127.93
Wt Dry Soil	g	504.72	504.54
Water Content	%	21.80%	25.36%

DESCRIPTION: SILTY CLAY and SAND, fine to medium; yellowish brown.

Flow Pump Rate: 2.38E-04 cm³/sec USCS: CL

TIME FUNCTIONS, SECONDS								dP				
DATE	DAY	HOUR	MIN	TEMP (°C)	dt (min)	dt,acc (min)	dt (sec)	dt,acc (sec)	Reading (psi)	Head (cm)	Gradient	Permeability (cm/sec)
06/08/18	43259	14	30	21.8	0	0	0	0	0.88	61.90	8.12	6.7E-07
06/08/18	43259	14	35	21.8	5	5	300	300	0.88	61.90	8.12	6.7E-07
06/08/18	43259	14	40	21.8	5	10	300	600	0.88	61.90	8.12	6.7E-07
06/08/18	43259	14	45	21.8	5	15	300	900	0.88	61.90	8.12	6.7E-07 *
06/08/18	43259	14	50	21.8	5	20	300	1200	0.88	61.90	8.12	6.7E-07 *
06/08/18	43259	14	55	21.8	5	25	300	1500	0.88	61.90	8.12	6.7E-07 *
06/08/18	43259	15	0	21.8	5	30	300	1800	0.88	61.90	8.12	6.7E-07 *

*TRANSCRIBED FROM ORIGINAL DATA SHEETS

PERMEABILITY REPORTED AS ** 6.7E-07 cm/sec **

DATE	6/8/18
CHECK	
REVIEW	
APPROVE	

JULY 2018

18103173

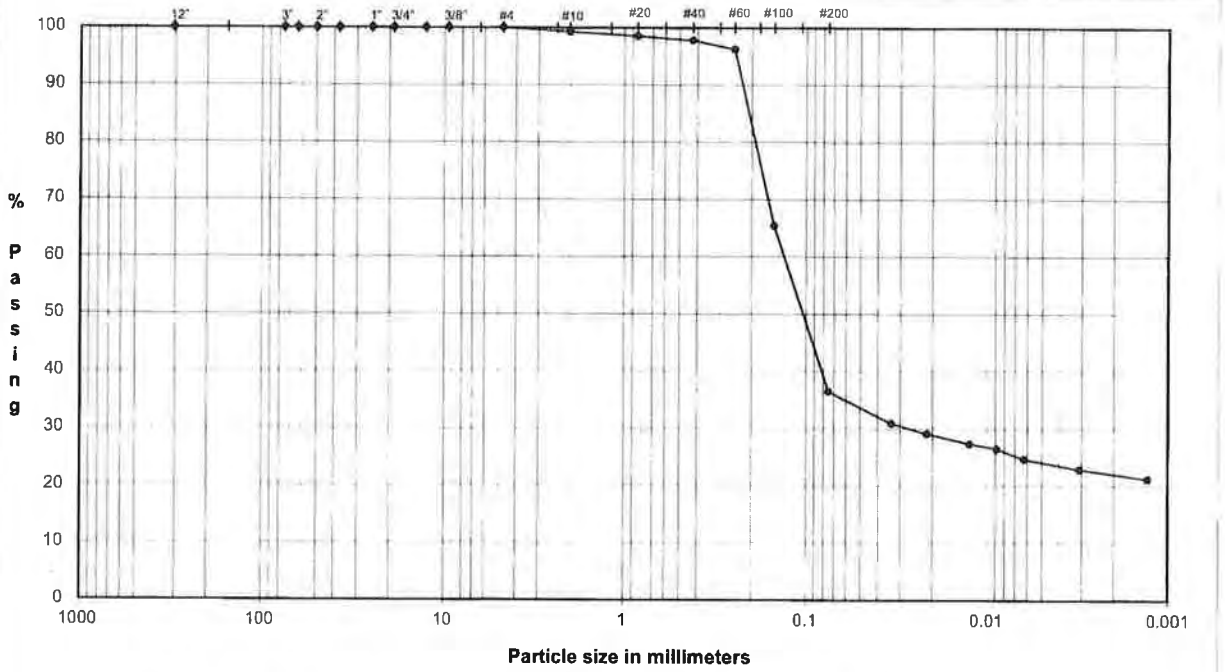
PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**

SAMPLE ID: **B-7** Depth: **15.0-17.0'**

TYPE: **UD**



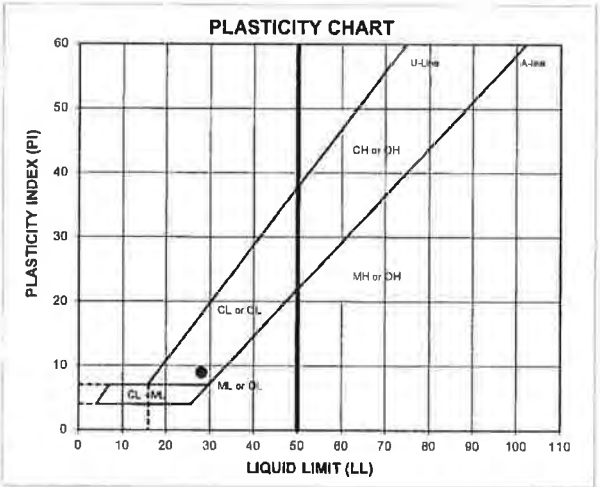
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**100.0**		
0.375"	9.5	**100.0**		
#4	4.8	**100.0**	Fine Gravel	**0.0**
#10	2.00	**99.3**	Coarse Sand	**0.7**
#20	0.85	**98.5**		
#40	0.43	**97.8**	Medium Sand	**1.5**
#60	0.25	**96.2**		
#100	0.15	**65.4**		
#200	0.075	**36.5**	Fine Sand	**61.3**

Hydrometer Analysis

(mm)	%Finer		
0.034	**30.9**		
0.021	**29.1**		
0.013	**27.4**	Fines	
0.0088	**26.5**	Silt or Clay	**36.5**
0.0063	**24.7**		
0.0031	**22.9**		
0.0013	**21.2**		



ATTERBERG LIMITS

Method -B (Dry preparation)

ML	LL	PL	PI	LI
21.9	28	19	9	0.36

LL (oven-dried) / 0.75 ORGANIC (OL/OH)

DESCRIPTION: SAND and SILTY CLAY, fine to coarse; grayish brown and yellow.

USCS: SC

TECH	HH/BA/TJ
DATE	7/27/18
CHECK	
REVIEW	
APPROVE	

Golder Associates Inc.

SPECIFIC GRAVITY OF SOILS
ASTM D-854
PYCNOMETER METHOD

PROJECT TITLE	**FTN/ENTERGY WHITE BLUFF/AR**		
PROJECT NUMBER	**18103173**	**SAMPLE ID**	**B-7**
		SAMPLE TYPE	**UD**
TESTED FOR	**Gs**	**SAMPLE DEPTH**	**15.0-17.0'**

MOISTURE CONTENT OF MATERIAL PASSING THE #4 SIEVE

Weight Soil and Tare, Initial (gm)	**166.24**
Weight Soil and Tare, Final (gm)	**165.14**
Weight Of Tare (gm)	**42.93**
Weight Of Moisture (gm)	**1.10**
Weight Of Dry Soil (gm)	**122.21**
Hygroscopic Moisture In (%)	**0.9%**

Test Method		**Method - B**
Pycnometer Number		**11**
Weight Pycnometer Empty (gm)		159.54
Volume of Pycnometer (gm)		499.57
Weight Pycnometer and Water (gm)		658.13
Mass of Pycnometer and Water at the test Temperture	(A)	657.81
Observed Temperature (Tb), for (Mb) In Degrees C		23.50
Weight of Soil, Water & Pycnometer (gm)	(B)	**688.66**
Temperature, C		**23.5**
Density of water @ tested temperature (g/ml)		1.00
Tare Number		-
Weight of Dry Soil Slurry plus Tare		**49.87**
Weight of Tare		**0.00**
Weight of Dry Soil (gm)	(C)	49.87
Temperature Coefficient		0.9992

SPECIFIC GRAVITY (G) **2.620**

$G @ 20^0 C = [C/(A-(B - C))]*(K)$

METHOD - A WET METHOD
METHOD - B OVEN-DRIED METHOD

METHOD OF AIR REMOVAL: VACUUM

Recommended Mass for Test Specimen

Soil Type	Specimen Dry Mass when using 500 ml Pycnometer
SP, SP-SM	100
SP-SC, SM , SC	75
SILT OR CLAY	50

TECH	FT
DATE	7/31/18
CHECK	
REVIEW	
APPROVE	

Boring or Test Pit:	B-7		Boring or Test Pit:			Boring or Test Pit:		
Sample:	1		Sample:			Sample:		
Depth:	15.0-17.0	ft	Depth:			Depth:		
Point No.:	1		Point No.:			Point No.:		
	Initial							
Length =	6.012	in	Length =	5.936		Length =	5.798	
Diameter =	2.877	in	Diameter =	2.889		Diameter =	2.923	
Wet Mass =	2.817	lb	Wet Mass =			Wet Mass =		
Area =	6.501	in^2	Area =			Area =		
Volume =	39.083	in^3	Volume =			Volume =		
Specific Gravity =	2.62	(ASTM D854)	Specific Gravity =			Specific Gravity =		
Dry Mass of Solids =	2.311	lb	Dry Mass of Solids =			Dry Mass of Solids =		
Moisture Content =	21.9%		Moisture Content =			Moisture Content =		
Wet Unit Weight =	124.5	pcf	Wet Unit Weight =			Wet Unit Weight =		
Dry Unit Weight =	102.2	pcf	Dry Unit Weight =			Dry Unit Weight =		
Void Ratio =	0.60		Void Ratio =			Void Ratio =		
Percent Saturation =	96%		Percent Saturation =			Percent Saturation =		
	After Consolidation			**After Consolidation**			**After Consolidation**	
Length =	5.936	in	Length =	5.798	in	Length =	5.704	in
Diameter =	2.889	in	Diameter =	2.923	in	Diameter =	2.947	in
Area =	6.556		Area =	6.712		Area =	6.822	in^2 (Method B)
Volume =	38.914		Volume =	38.914		Volume =	38.914	in^3
Moisture Content =			Moisture Content =			Moisture Content =	22.5%	
Wet Unit Weight =			Wet Unit Weight =			Wet Unit Weight =	125.8	pcf
Dry Unit Weight =			Dry Unit Weight =			Dry Unit Weight =	102.6	pcf
Void Ratio =			Void Ratio =			Void Ratio =	0.59	
Percent Saturation =			Percent Saturation =			Percent Saturation =	100%	
B Parameter =	1.00		B Parameter =	--		B Parameter =	--	
Shear Rate =	0.094%	/min.	Shear Rate =	0.100%	/min.	Shear Rate =	0.099%	/min.
t_{50} =	1.0	min.	t_{50} =	0.7	min.	t_{50} =	0.8	min.
Strain at Failure =	1.0%		Strain at Failure =	2.7%		Strain at Failure =	4.7%	
Cell Pressure =	64.0	psi	Cell Pressure =	78.0	psi	Cell Pressure =	92.0	psi
Back Pressure =	50.0	psi	Back Pressure =	50.0	psi	Back Pressure =	50.0	psi
Confining Pressure =	14.0	psi	Confining Pressure =	28.0	psi	Confining Pressure =	42.0	psi

Notes: Sample description: (SC) SAND and SILTY CLAY, fine to coarse; grayish brown and yellow.

Atterberg limits: LL = 28 PL = 19 PI = 9 (ASTM D4318)

Percent finer: 3/4 in. = 100.0% No. 4 = 100.0% No. 200 = 36.5% (ASTM D422, refer to separate report for gradation curve)

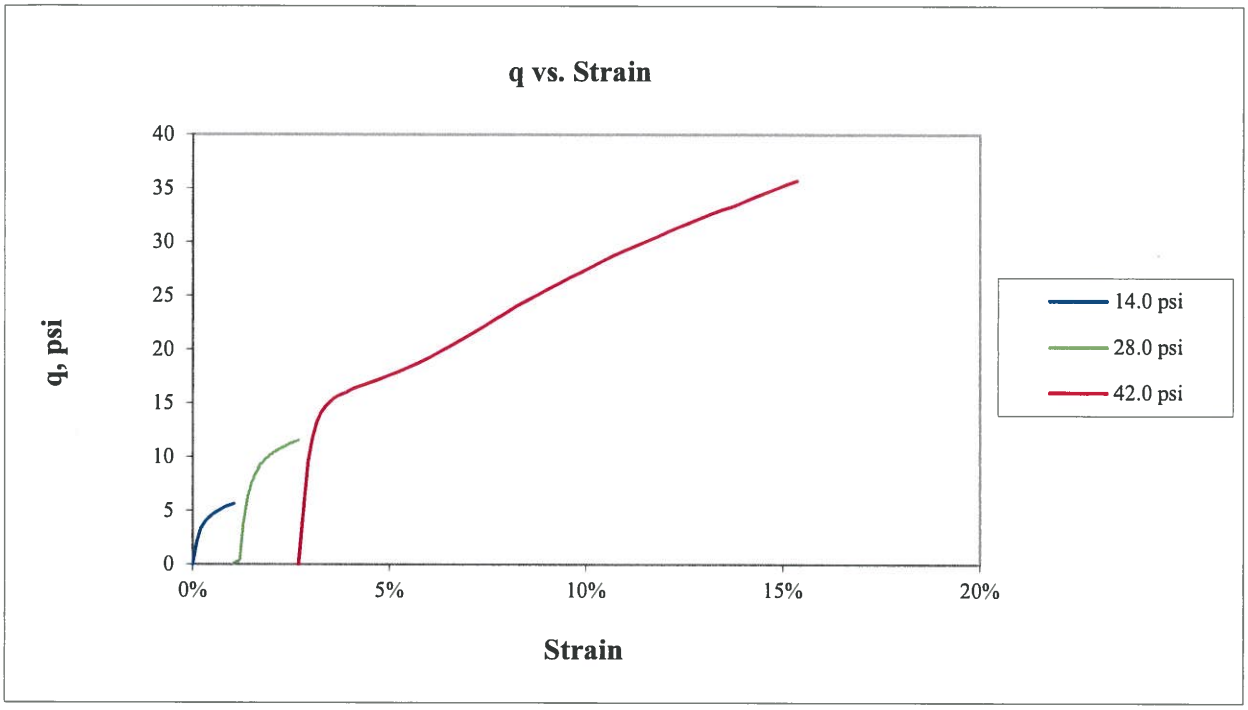
Specimen type:	X	Intact		Reconstituted
Moisture from:		Cuttings	X	Entire specimen
Saturation method:	X	Wet		Dry
Failure criterion:	X	$(\sigma'_1/\sigma'_3)_{max}$		$(\sigma'_1-\sigma'_3)_{max}$ [ ] % strain
Membrane effect:	X	Corrected		Not Corrected

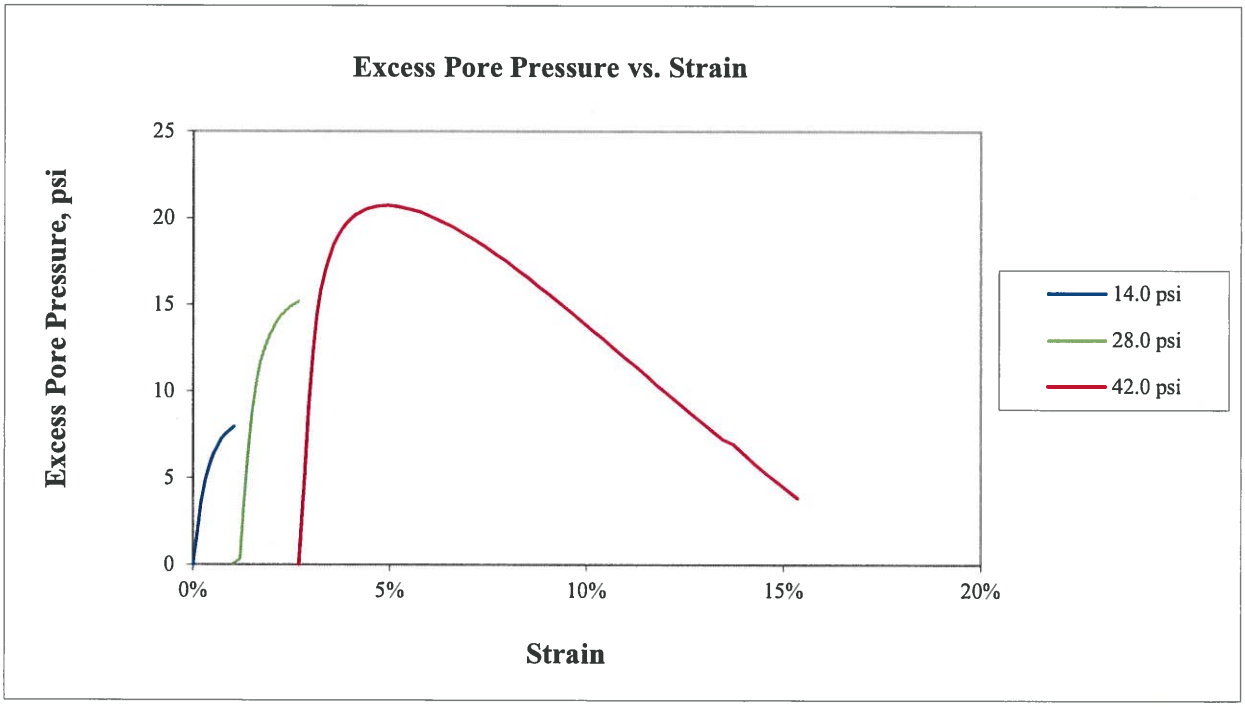
Golder Associates Inc.
Atlanta, Georgia

Title:
MODIFIED (Multi-Stage) - ASTM D4767
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT
SAMPLE AND TEST DATA

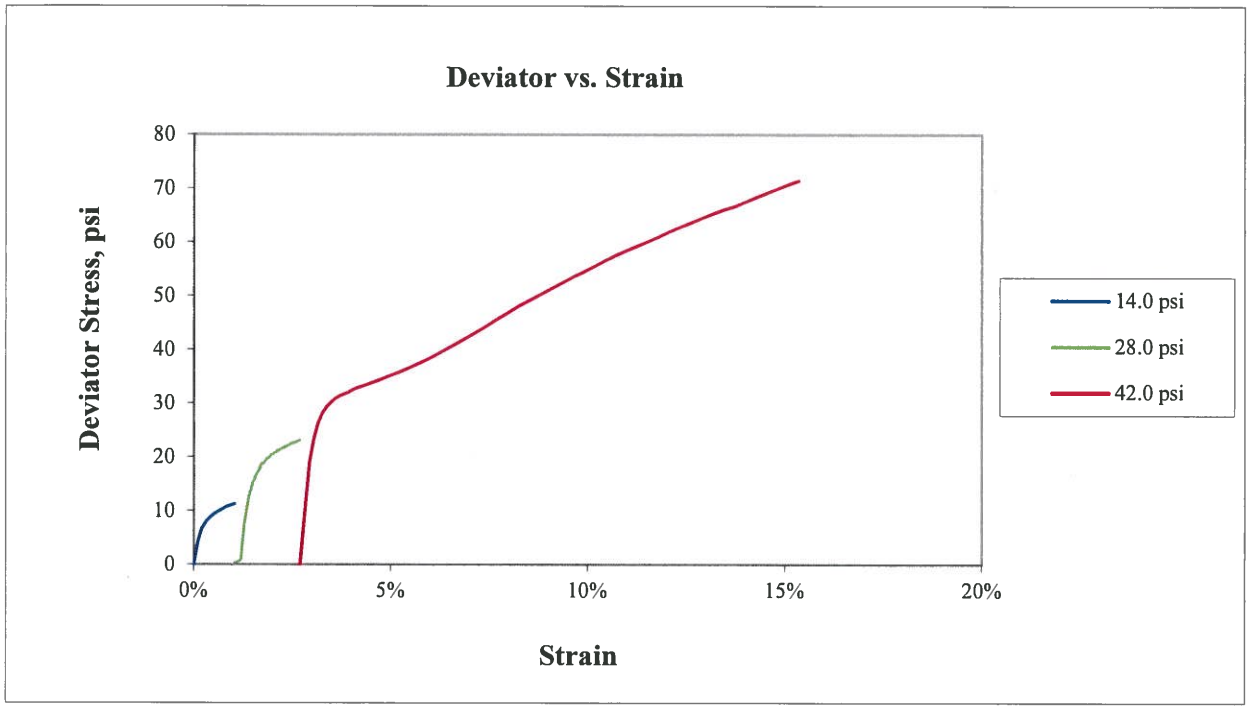
Job Short Title:
FTN/ENTERGY WHITE BLUFF/AR

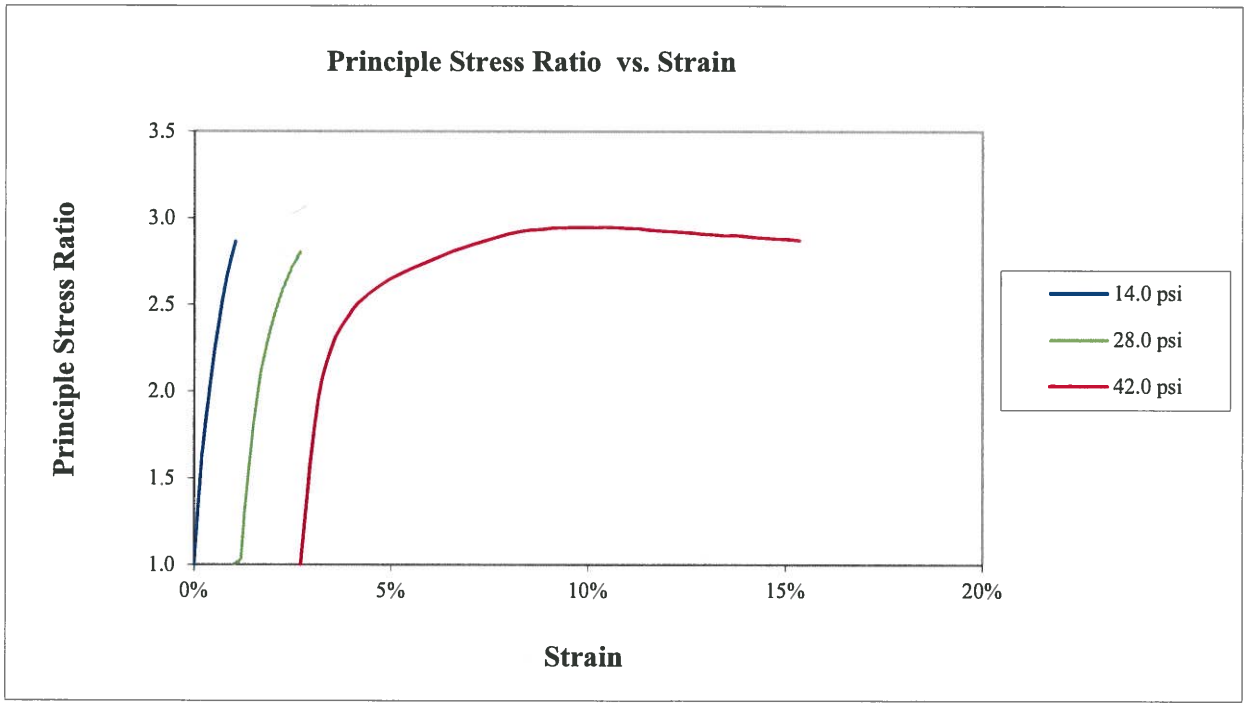
Sample:	Technician:	Reviewed:	Start Date:	Job Number:	Figure:
B-7 UD 15.0-17.0'	FT/PWM Check: JWL	Approved:	7/10/2018	18103173	1





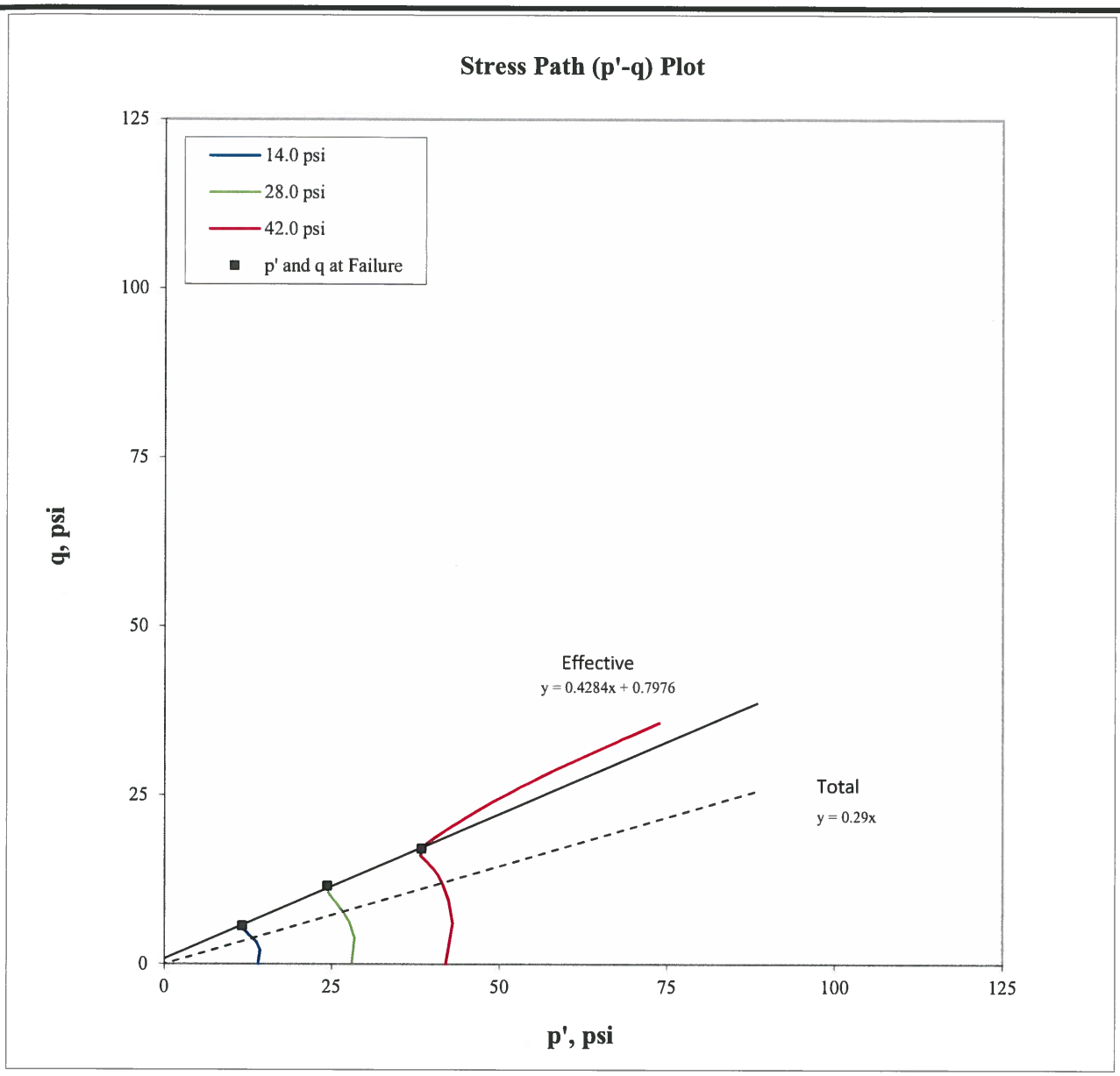
Golder Associates Inc. **Atlanta, Georgia**	**Title:** **MODIFIED (Multi-Stage) - ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **q AND EXCESS PORE PRESSURE PLOTS**				
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**					
Sample: **B-7 UD 15.0-17.0'**	**Technician:** **FT/PWM** **Check:** IWN	**Reviewed:** **Approved:**	**Start Date:** **7/10/2018**	**Job Number:** **18103173**	**Figure:** **2**





Golder Associates Inc. Atlanta, Georgia	Title: MODIFIED (Multi-Stage) - ASTM D4767 CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT q AND EXCESS PORE PRESSURE PLOTS				
Job Short Title: FTN/ENTERGY WHITE BLUFF/AR					
Sample: B-7 UD 15.0-17.0'	Technician: FT/PWM Check:	Reviewed: Approved:	Start Date: 7/10/2018	Job Number: 18103173	Figure: 3

Stress Path (p'-q) Plot



Confining Pressure (psi)	p at failure (psi)	p' at failure (psi)	q at failure (psi)
14.0	19.6	11.7	5.6
28.0	39.6	24.4	11.6
42.0	59.1	38.4	17.1

Effective

α ' =	23.2	degree
a' =	0.8	psi

Total

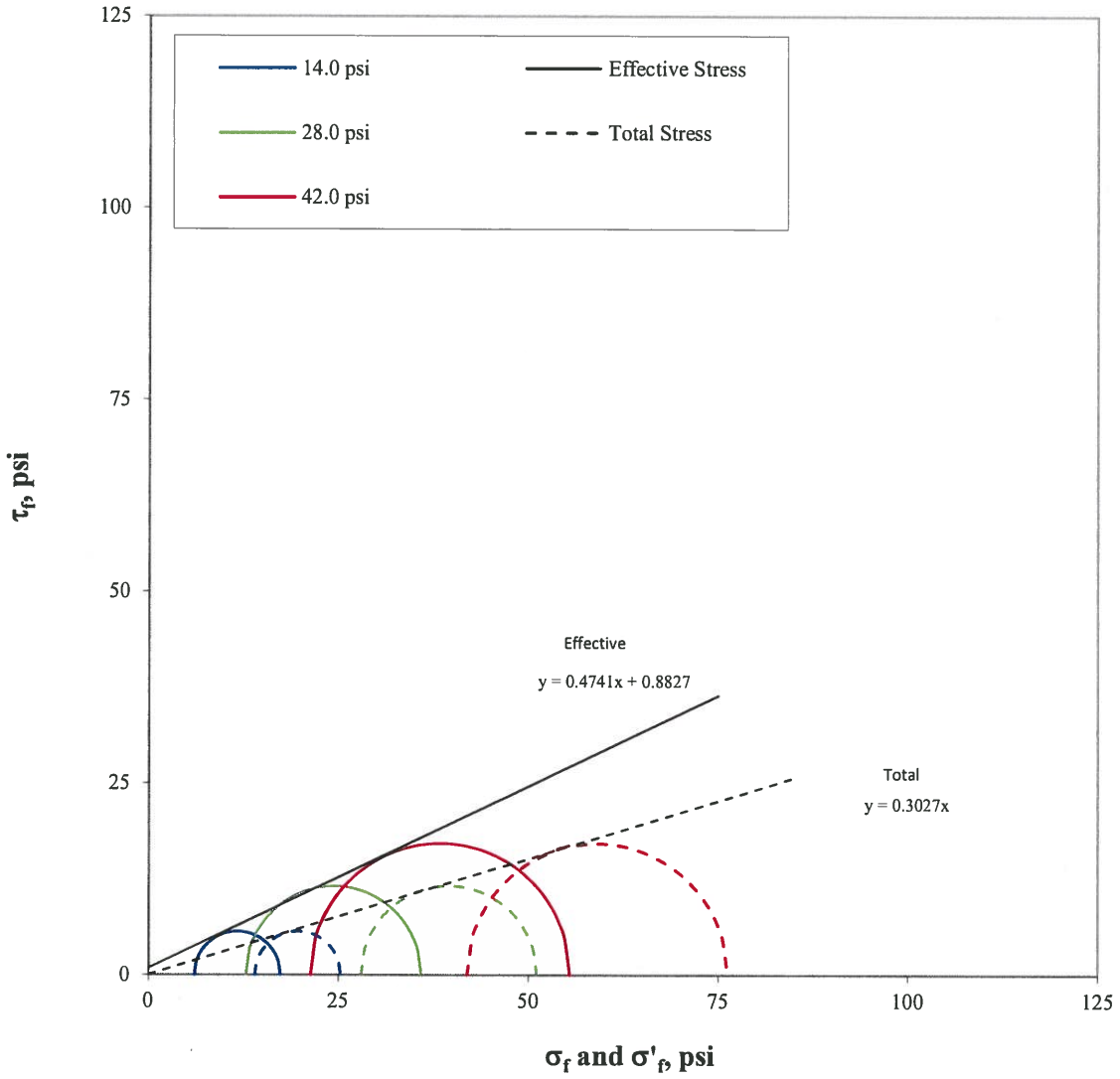
α =	16.2	degree
a =	0.0	psi

Note: The laboratory testing relates only to the sample tested. GAI neither accepts responsibility for nor makes claims to the final use and purpose of the material.

Golder Associates Inc. **Atlanta, Georgia**	**Title:** **MODIFIED (Multi-Stage) - ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **STRESS PATH PLOT**
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**	

Sample:	Technician:	Reviewed:	Start Date:	Job Number:	Figure:
B-7 UD 15.0-17.0'	FT/PWM Check:	Approved:	7/10/2018	18103173	4

Mohr's Circle Diagram



Confining Pressure (psi)	σ'_1 at failure (psi)	σ'_3 at failure (psi)	σ_1 at failure (psi)	σ_3 at failure (psi)
14.0	17.3	6.0	25.3	14.0
28.0	35.9	12.8	51.1	28.0
42.0	55.5	21.3	76.2	42.0

Effective

ϕ' =	25.4	degree
c' =	0.9	psi

Total

ϕ =	16.9	degree
c =	0.0	psi

Note: The laboratory testing relates only to the sample tested. GAI neither accepts responsibility for nor makes claims to the final use and purpose of the material.

Golder Associates Inc. Atlanta, Georgia	**Title:** MODIFIED (Multi-Stage) - ASTM D4767 CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT MOHR'S CIRCLE DIAGRAM				
Job Short Title: FTN/ENTERGY WHITE BLUFF/AR					
Sample: B-7 UD 15.0-17.0'	**Technician:** FT/PWM **Check:** MW	**Reviewed:** **Approved:**	**Start Date:** 7/10/2018	**Job Number:** 18103173	**Figure:** 5

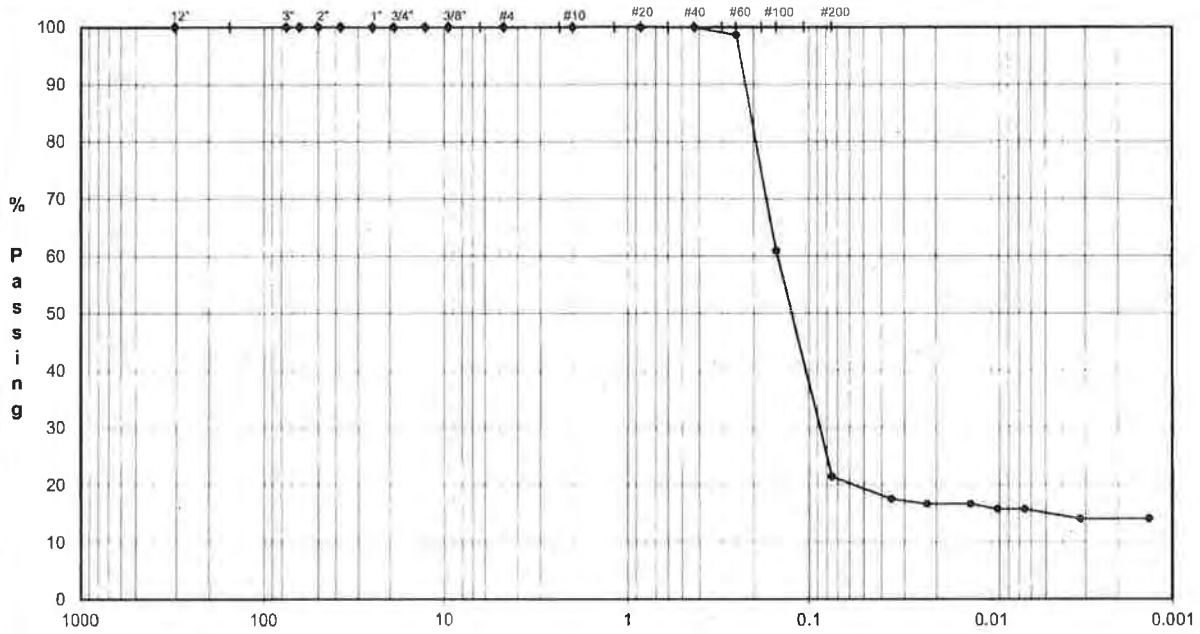
Golder Associates Inc. **Atlanta, Georgia**	**Title:** **MODIFIED (Multi-Stage) - ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **SPECIMEN PHOTOGRAPH - Single Specimen**				
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**					
Sample: **B-7 UD 15.0-17.0'**	**Technician:** **FT/PWM** **Check:**	**Reviewed:** **Approved:**	**Start Date:** **7/10/2018**	**Job Number:** **18103173**	**Figure:** **6**

AUGUST 2018 18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**
SAMPLE ID: **B-7** Depth: **18.0-20.0'**
TYPE: **Bag**



COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

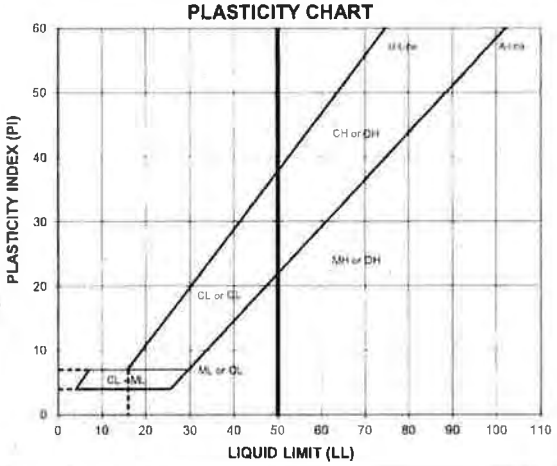
U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**100.0**		
0.375"	9.5	**100.0**		
#4	4.8	**100.0**	Fine Gravel	**0.0**
#10	2.00	**100.0**	Coarse Sand	**0.0**
#20	0.85	**100.0**		
#40	0.43	**100.0**	Medium Sand	**0.0**
#60	0.25	**98.5**		
#100	0.15	**60.9**		
#200	0.075	**21.4**	Fine Sand	**78.5**

Hydrometer Analysis

(mm)	%Finer		
0.035	**17.5**		
0.023	**16.6**		
0.013	**16.6**	Fines	
0.0092	**15.8**	Silt or Clay	**21.4**
0.0065	**15.8**		
0.0032	**14.0**		
0.0013	**14.0**		

PLASTICITY CHART



ATTERBERG LIMITS
Method -B (Dry preparation)

M_c	LL	PL	PI	LI
22.8	**NP**	**NP**	**NP**	**NP**

LL (oven-dried) / 0.75 ORGANIC (OL OH)

DESCRIPTION: SILTY SAND, fine; light gray

USCS: SM

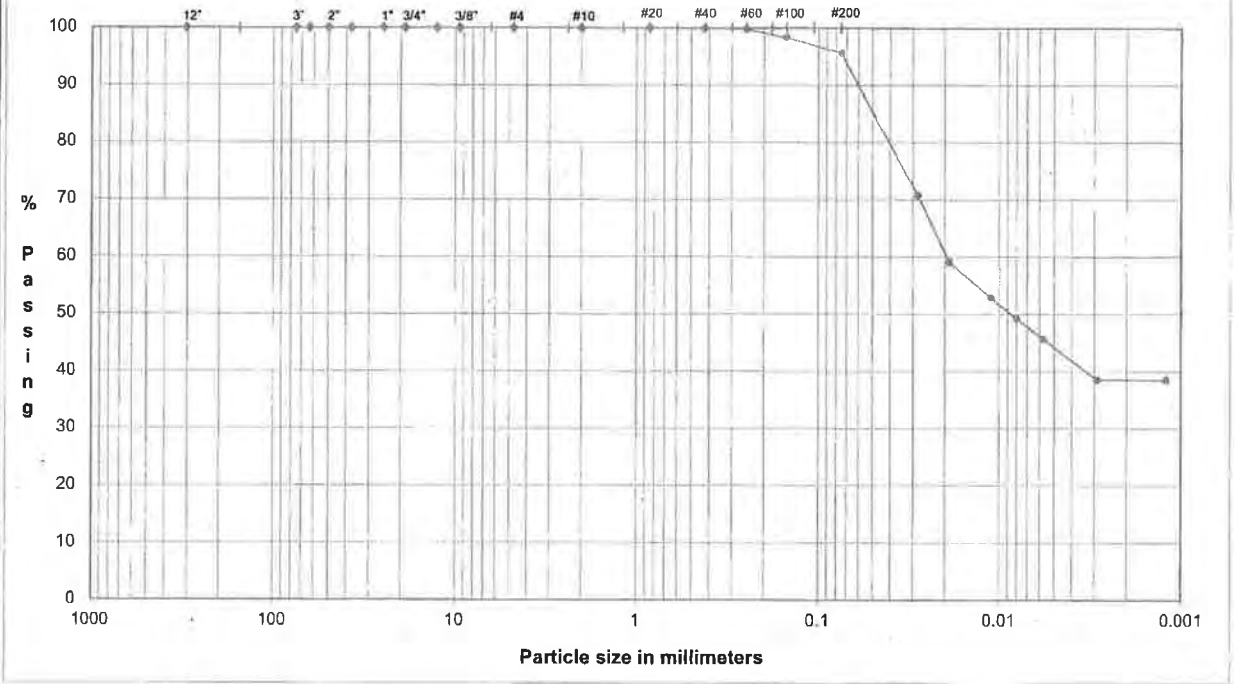
TECH	TJ/BA/HH
DATE	8/2/18
CHECK	
REVIEW	
APPROVE	

AUGUST 2018 18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**
SAMPLE ID: **RP-3** Depth: **18.0-20.0'**
TYPE: **Bag**



COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

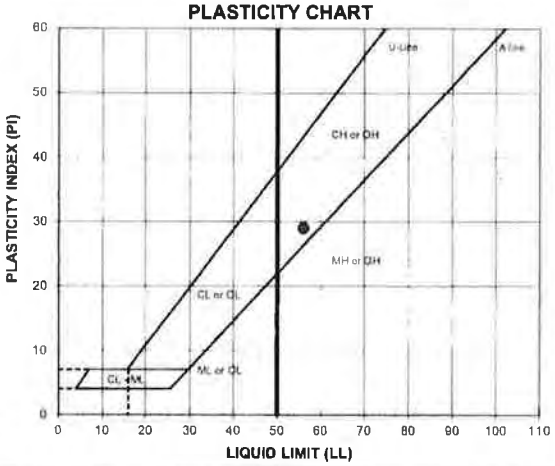
U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**100.0**		
0.375"	9.5	**100.0**		
#4	4.8	**100.0**	Fine Gravel	**0.0**
#10	2.00	**100.0**	Coarse Sand	**0.0**
#20	0.85	**100.0**		
#40	0.43	**99.9**	Medium Sand	**0.1**
#60	0.25	**99.8**		
#100	0.15	**98.2**		
#200	0.075	**95.6**	Fine Sand	**4.3**

Hydrometer Analysis

(mm)	%Finer		
0.028	**70.8**		
0.019	**59.1**		
0.011	**52.8**	Fines	
0.0080	**49.3**	Silt or Clay	**95.6**
0.0058	**45.7**		
0.0029	**38.5**		
0.0012	**38.5**		

PLASTICITY CHART



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
27.1	**56**	**27**	**29**	**0.02**

LL (oven-dried) / 0.75 ORGANIC (OL/OH)

DESCRIPTION: CLAY, trace fine to medium sand; dark gray.

USCS: CH

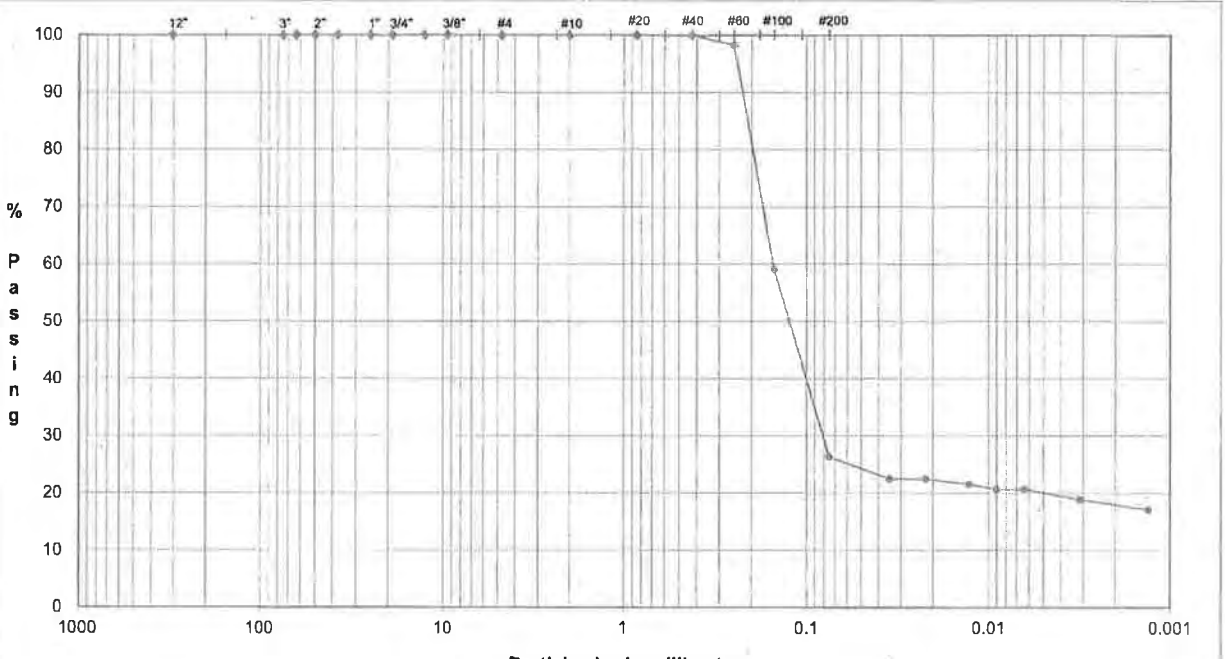
TECH	HH/BA/TJ
DATE	8/1/18
CHECK	
REVIEW	
APPROVE	

AUGUST 2018 | 18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**
SAMPLE ID: **RP-3** Depth: **29.0-30.0'**
TYPE: **UD**



COBBLES	GRAVEL		SAND			FINES
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay

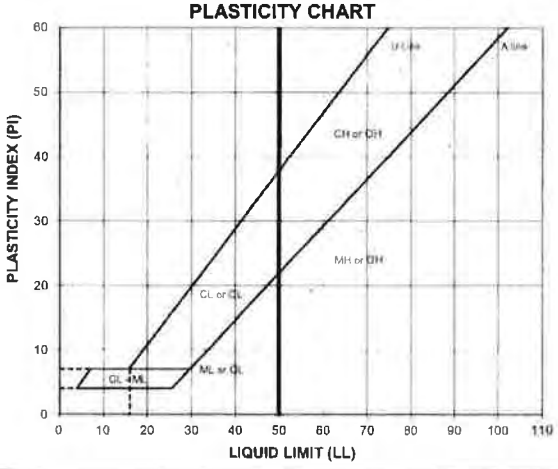
U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**100.0**		
0.375"	9.5	**100.0**		
#4	4.8	**100.0**	Fine Gravel	**0.0**
#10	2.00	**100.0**	Coarse Sand	**0.0**
#20	0.85	**100.0**		
#40	0.43	**100.0**	Medium Sand	**0.0**
#60	0.25	**98.2**		
#100	0.15	**58.9**		
#200	0.075	**26.3**	Fine Sand	**73.7**

Hydrometer Analysis

(mm)	%Finer		
0.035	**22.4**		
0.022	**22.4**		
0.013	**21.5**	Fines	
0.0090	**20.6**	Silt or Clay	**26.3**
0.0064	**20.6**		
0.0032	**18.8**		
0.0013	**17.1**		

PLASTICITY CHART



ATTERBERG LIMITS

Method -B (Dry preparation)

M,	LL	PL	PI	LI
22.4	NP	NP	NP	NP

LL (oven-dried) / 0.75 OROANIC (OL/OH)

DESCRIPTION: SILTY SAND, fine; dark gray.

USCS: SM

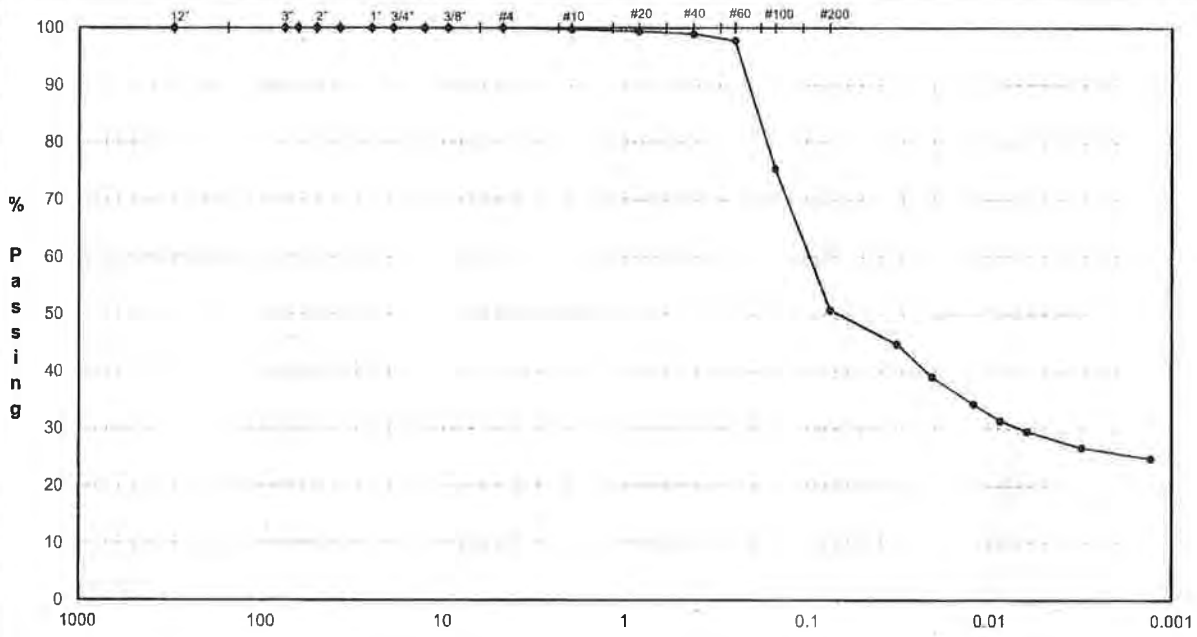
TECH	HH/TJ
DATE	8/2/18
CHECK	
REVIEW	
APPROVE	

AUGUST 2018 18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**
SAMPLE ID: **RP-4** Depth: **8.0-9.0'**
TYPE: **Bag**



COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

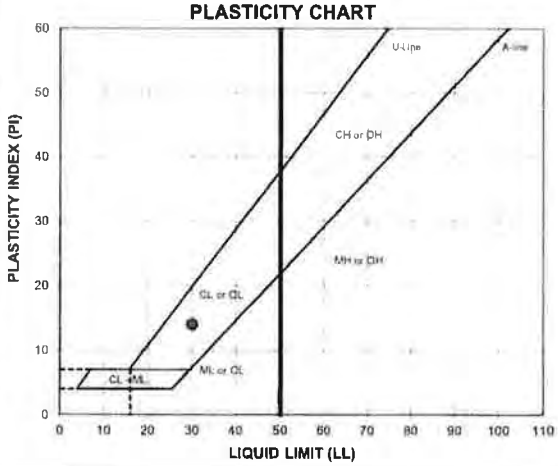
U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**100.0**		
0.375"	9.5	**100.0**		
#4	4.8	**100.0**	Fine Gravel	**0.0**
#10	2.00	**99.8**	Coarse Sand	**0.2**
#20	0.85	**99.4**		
#40	0.43	**99.0**	Medium Sand	**0.8**
#60	0.25	**97.8**		
#100	0.15	**75.4**		
#200	0.075	**50.8**	Fine Sand	**48.2**

Hydrometer Analysis

(mm)	%Finer		
0.032	**44.7**		
0.021	**39.0**		
0.012	**34.3**	Fines	
0.0088	**31.4**	Silt or Clay	**50.8**
0.0063	**29.5**		
0.0031	**26.7**		
0.0013	**24.8**		

PLASTICITY CHART



ATTERBERG LIMITS

Method -B (Dry preparation)

M	LL	PL	PI	LI
13.4	**30**	**16**	**14**	**-0.17**

LL (oven-dried) / 0.75 ORGANIC (OL,OH)

DESCRIPTION: SILTY CLAY and SAND, fine to coarse; brown

USCS: CL

TECH	TJ/HH/HEH
DATE	8/2/18
CHECK	
REVIEW	
APPROVE	

Golder Associates Inc.

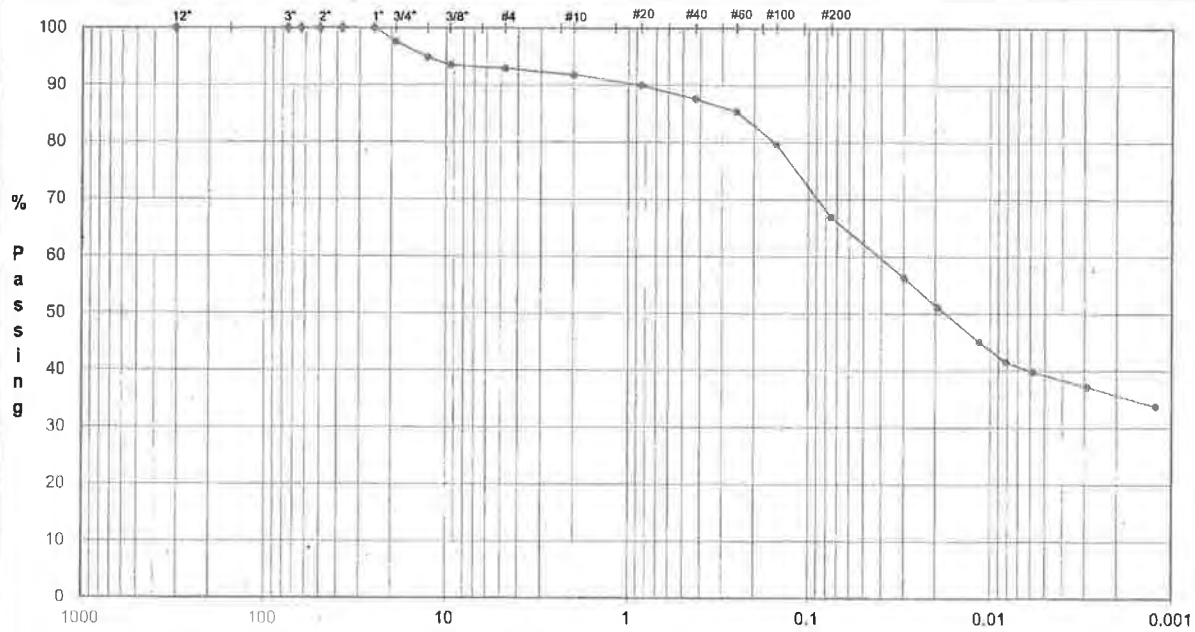
JULY 2018

18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**
SAMPLE ID: **RP-4** - Depth: **20.0-22.0'**
TYPE: **UD**



COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

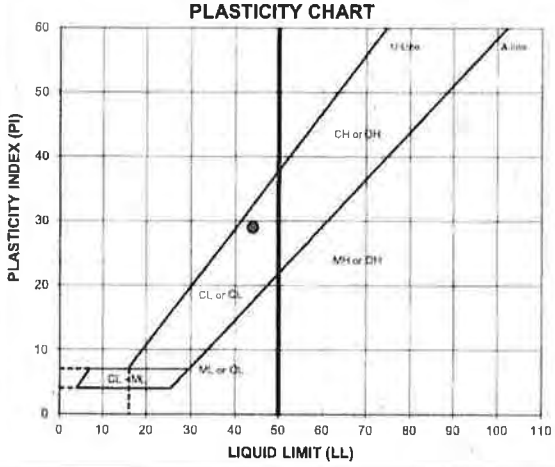
U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**97.6**	Coarse Gravel	**2.4**
0.50"	12.7	**94.9**		
0.375"	9.5	**93.5**		
#4	4.8	**93.0**	Fine Gravel	**4.7**
#10	2.00	**91.8**	Coarse Sand	**1.2**
#20	0.85	**90.0**		
#40	0.43	**87.6**	Medium Sand	**4.2**
#60	0.25	**85.4**		
#100	0.15	**79.6**		
#200	0.075	**66.9**	Fine Sand	**20.7**

Hydrometer Analysis

(mm)	%Finer		
0.030	**56.3**		
0.019	**51.1**		
0.011	**45.0**	Fines	
0.0082	**41.6**	Silt or Clay	**66.9**
0.0058	**39.8**		
0.0029	**37.2**		
0.0012	**33.8**		

PLASTICITY CHART



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
22.2	44	15	29	0.24

LL (oven-dried) / 0.75 ORGANIC (OL/OH)

DESCRIPTION: sandy SILTY CLAY, fine to coarse, some fine to coarse gravel; yellowish brown.

USCS: CL

TECH	TB/HH/BA
DATE	7/17/18
CHECK	
REVIEW	
APPROVE	

Golder Associates Inc.

SPECIFIC GRAVITY OF SOILS
ASTM D-854
PYCNOMETER METHOD

PROJECT TITLE	**FTN/ENTERGY WHITE BLUFF/AR**		
PROJECT NUMBER	**18103173**	**SAMPLE ID**	**RP-4**
		SAMPLE TYPE	**UD**
TESTED FOR	**Gs**	**SAMPLE DEPTH**	**20.0-22.0'**

MOISTURE CONTENT OF MATERIAL PASSING THE #4 SIEVE

Weight Soil and Tare, Initial (gm)	**196.37**
Weight Soil and Tare, Final (gm)	**192.05**
Weight Of Tare (gm)	**51.66**
Weight Of Moisture (gm)	**4.32**
Weight Of Dry Soil (gm)	**140.39**
Hygroscopic Moisture In (%)	**3.1%**

Test Method		**Method - B**
Pycnometer Number		**14**
Weight Pycnometer Empty (gm)		185.81
Volume of Pycnometer (gm)		499.41
Weight Pycnometer and Water (gm)		684.20
Mass of Pycnometer and Water at the test Temperture	(A)	683.75
Observed Temperature (Tb), for (Mb) In Degrees C		25.00
Weight of Soil, Water & Pycnometer (gm)	(B)	**714.40**
Temperature, C		**25.0**
Density of water @ tested temperature (g/ml)		1.00
Tare Number		-
Weight of Dry Soil Slurry plus Tare		**48.92**
Weight of Tare		**0.00**
Weight of Dry Soil (gm)	(C)	48.92
Temperature Coefficient		0.9988

SPECIFIC GRAVITY (G) **2.674**

$G @ 20^0 C = [C/(A-(B - C))]*(K)$

METHOD - A WET METHOD
METHOD - B OVEN-DRIED METHOD

METHOD OF AIR REMOVAL: VACUUM

Recommended Mass for Test Specimen

Soil Type	Specimen Dry Mass when using 500 ml Pycnometer
SP, SP-SM	100
SP-SC, SM , SC	75
SILT OR CLAY	50

TECH	BA
DATE	7/18/18
CHECK	
REVIEW	
APPROVE	

Boring or Test Pit:	RP-4		Boring or Test Pit:	RP-4		Boring or Test Pit:	RP-4	
Sample:	UD		Sample:	UD		Sample:	UD	
Depth:	20.0-22.0 ft		Depth:	20.0-22.0 ft		Depth:	20.0-22.0 ft	
Point No.:	1		Point No.:	2		Point No.:	3	
Initial			**Initial**			**Initial**		
Length =	5.901	in	Length =	6.114	in	Length =	6.178	in
Diameter =	2.881	in	Diameter =	2.863	in	Diameter =	2.819	in
Wet Mass =	2.777	lb	Wet Mass =	2.837	lb	Wet Mass =	2.765	lb
Area =	6.519	in^2	Area =	6.438	in^2	Area =	6.241	in^2
Volume =	38.468	in^3	Volume =	39.360	in^3	Volume =	38.559	in^3
Specific Gravity =	2.67	(ASTM D854)	Specific Gravity =	2.67	(ASTM D854)	Specific Gravity =	2.67	(ASTM D854)
Dry Mass of Solids =	2.261	lb	Dry Mass of Solids =	2.346	lb	Dry Mass of Solids =	2.253	lb
Moisture Content =	22.9%		Moisture Content =	20.9%		Moisture Content =	22.7%	
Wet Unit Weight =	124.8	pcf	Wet Unit Weight =	124.5	pcf	Wet Unit Weight =	123.9	pcf
Dry Unit Weight =	101.5	pcf	Dry Unit Weight =	103.0	pcf	Dry Unit Weight =	100.9	pcf
Void Ratio =	0.64		Void Ratio =	0.62		Void Ratio =	0.65	
Percent Saturation =	95%		Percent Saturation =	91%		Percent Saturation =	93%	
After Consolidation			**After Consolidation**			**After Consolidation**		
Length =	5.819	in	Length =	6.040	in	Length =	6.119	in
Diameter =	2.862	in	Diameter =	2.841	in	Diameter =	2.814	in
Area =	6.431	in^2 (Method B)	Area =	6.341	in^2 (Method B)	Area =	6.219	in^2 (Method B)
Volume =	37.424	in^3	Volume =	38.298	in^3	Volume =	38.050	in^3
Moisture Content =	22.3%		Moisture Content =	21.5%		Moisture Content =	23.5%	
Wet Unit Weight =	127.7	pcf	Wet Unit Weight =	128.6	pcf	Wet Unit Weight =	126.4	pcf
Dry Unit Weight =	104.4	pcf	Dry Unit Weight =	105.8	pcf	Dry Unit Weight =	102.3	pcf
Void Ratio =	0.60		Void Ratio =	0.57		Void Ratio =	0.63	
Percent Saturation =	100%		Percent Saturation =	100%		Percent Saturation =	100%	
B Parameter =	0.96		B Parameter =	0.98		B Parameter =	0.98	
Shear Rate =	0.009%	/min.	Shear Rate =	0.009%	/min.	Shear Rate =	0.008%	/min.
t_{50} =	6.94	min.	t_{50} =	37.68	min.	t_{50} =	30.90	min.
Strain at Failure =	4.9%		Strain at Failure =	3.5%		Strain at Failure =	10.5%	
Cell Pressure =	68.0	psi	Cell Pressure =	86.0	psi	Cell Pressure =	104.0	psi
Back Pressure =	50.0	psi	Back Pressure =	50.0	psi	Back Pressure =	50.0	psi
Confining Pressure =	18.0	psi	Confining Pressure =	36.0	psi	Confining Pressure =	54.0	psi

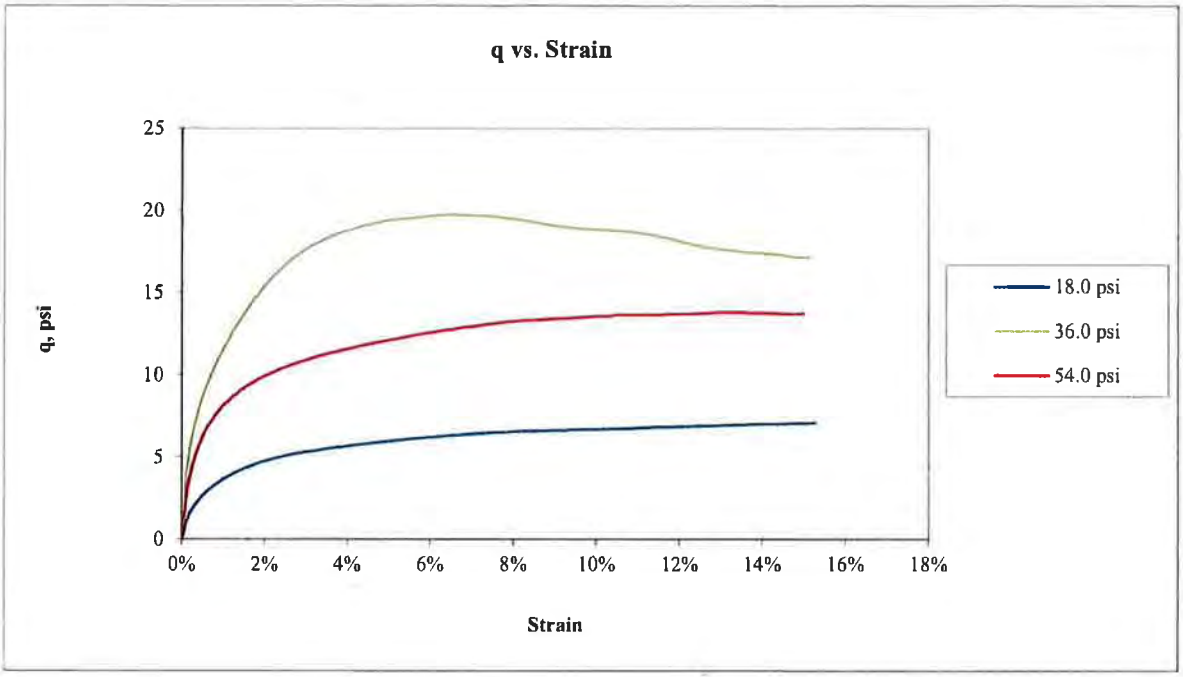
Notes: Sample description: (CL) sandy SILTY CLAY, fine to coarse, some fine to coarse gravel; yellowish brown.

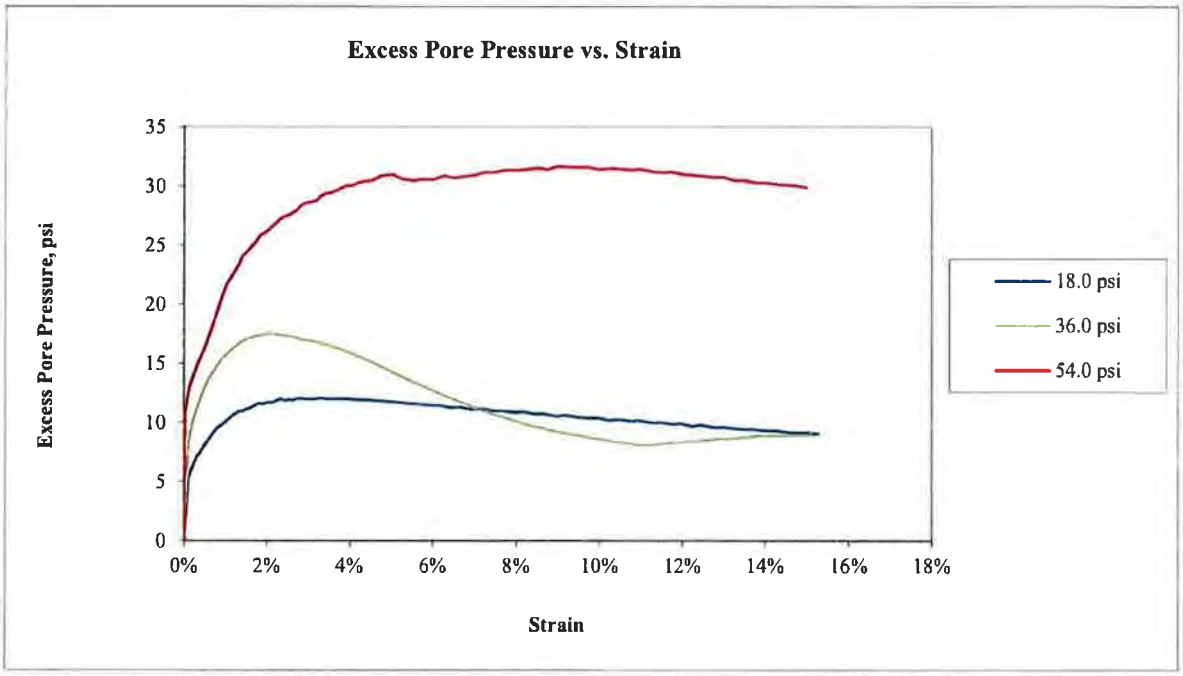
Atterberg limits: LL = 44 PL = 15 PI = 29 (ASTM D4318)

Percent finer: 3/4 in. = 100% No. 4 = 93% No. 200 = 67% (ASTM D422, refer to separate report for gradation curve)

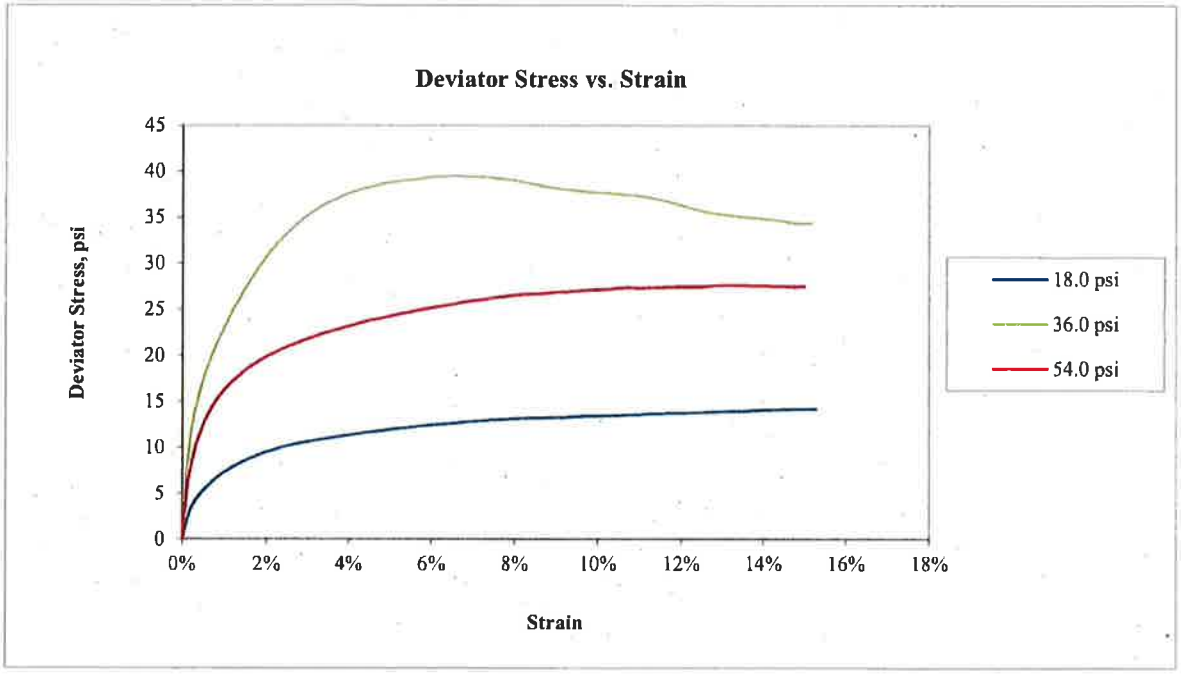
Specimen type:	X	Intact		Reconstituted
Moisture from:		Cuttings	X	Entire specimen
Saturation method:	X	Wet		Dry
Failure criterion:	X	$(\sigma'_1/\sigma'_3)_{max}$		$(\sigma'_1-\sigma'_3)_{max}$ ____ % strain
Membrane effect:	X	Corrected		Not Corrected

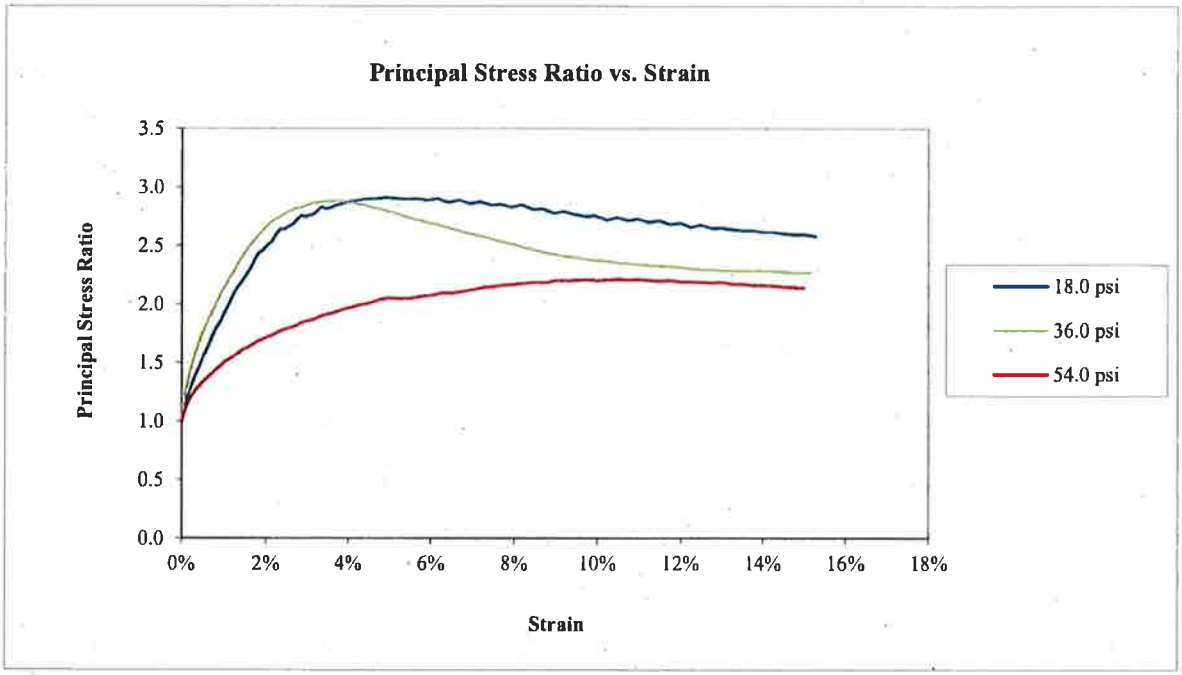
Golder Associates Inc. **Atlanta, Georgia**	**Title:** **ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **SAMPLE AND TEST DATA**				
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**					
Sample: **RP-4 UD 20.0-22.0'**	**Technician:** **PWM/FT** **Check:**	**Reviewed:** **Approved:**	**Start Date:** **7/17/2018**	**Job Number:** **18103173**	**Figure:** **1**





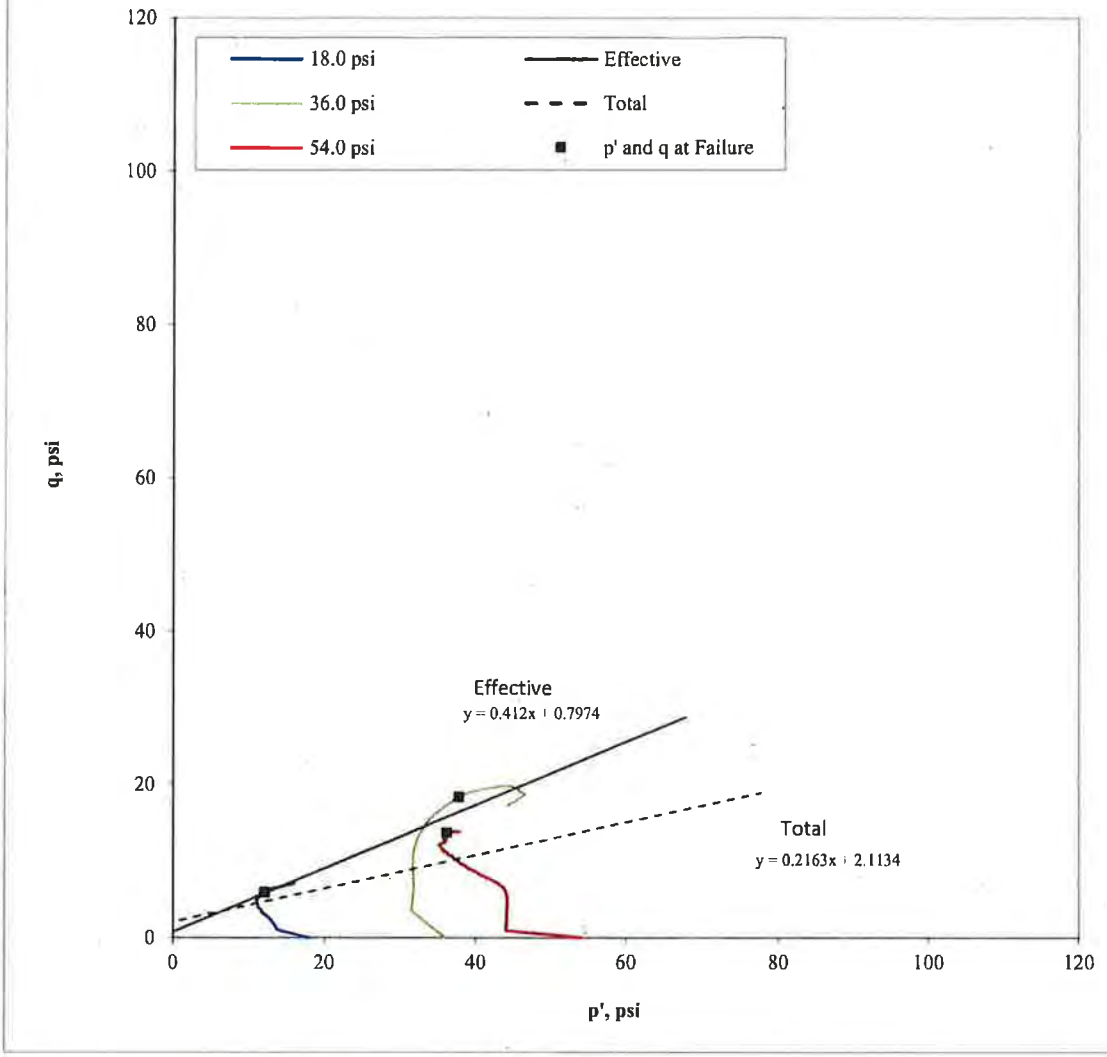
Golder Associates Inc. Atlanta, Georgia	Title: ASTM D4767 CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT q AND EXCESS PORE PRESSURE PLOTS				
Job Short Title: FTN/ENTERGY WHITE BLUFF/AR					
Sample:	Technician: PWM/FT	Reviewed: SP	Start Date:	Job Number:	Figure:
RP-4 UD 20.0-22.0'	Check: MWM	Approved:	7/17/2018	18103173	2





Golder Associates Inc. Atlanta, Georgia	Title: ASTM D4767 CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT DEVIATOR STRESS AND PRINCIPAL STRESS RATIO PLOT				
Job Short Title: FTN/ENTERGY WHITE BLUFF/AR					
Sample: RP-4 UD 20.0-22.0'	Technician: PWM/FT Check:	Reviewed: Approved:	Start Date: 7/17/2018	Job Number: 18103173	Figure: 3

Stress Path (p'-q) Plot



Confining Pressure (psi)	p at failure (psi)	p' at failure (psi)	q at failure (psi)
18.0	23.9	12.2	5.9
36.0	54.3	37.8	18.3
54.0	67.7	36.2	13.7

Effective

α ' =	22.4	degree
a' =	0.8	psi

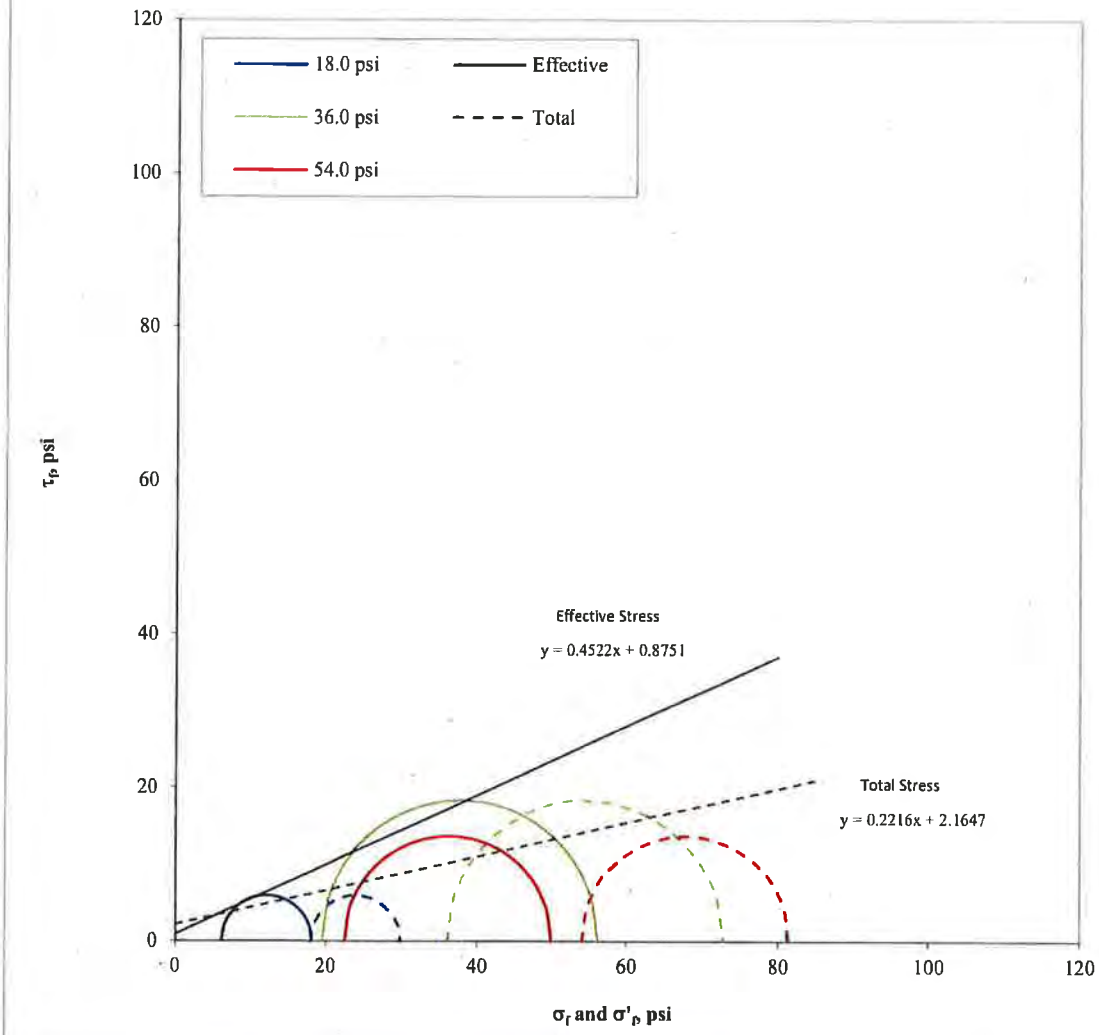
Total

α =	12.2	degree
a =	2.1	psi

Note: The laboratory testing relates only to the sample tested. GAI neither accepts responsibility for nor makes claims to the final use and purpose of the material.

Golder Associates Inc. Atlanta, Georgia	**Title:** ASTM D4767 CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT STRESS PATH PLOT				
Job Short Title: FTN/ENTERGY WHITE BLUFF/AR					
Sample: RP-4 UD 20.0-22.0'	**Technician:** PWM/FT **Check:** JWM	**Reviewed:** **Approved:**	**Start Date:** 7/17/2018	**Job Number:** 18103173	**Figure:** 4

Mohr's Circle Diagram



Confining Pressure (psi)	σ'_1 at failure (psi)	σ'_3 at failure (psi)	σ_1 at failure (psi)	σ_3 at failure (psi)
18.0	18.1	6.2	29.9	18.0
36.0	56.1	19.5	72.6	36.0
54.0	49.9	22.6	81.3	54.0

Effective

ϕ' =	24.3	degree
c' =	0.9	psi

Total

ϕ =	12.5	degree
c =	2.2	psi

Note: The laboratory testing relates only to the sample tested. GAI neither accepts responsibility for nor makes claims to the final use and purpose of the material.

Golder Associates Inc.
Atlanta, Georgia

Title:
ASTM D4767
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT
MOHR'S CIRCLE DIAGRAM

Job Short Title: FTN/ENTERGY WHITE BLUFF/AR

Sample:	Technician: PWM/FT	Reviewed:	Start Date:	Job Number:	Figure:
RP-4 UD 20.0-22.0'	Check:	Approved:	7/17/2018	18103173	5

18.0 psi

36.0 psi

54.0 psi

NOTE: Pore pressure built up before shearing, adjusted results to initial backpressure.

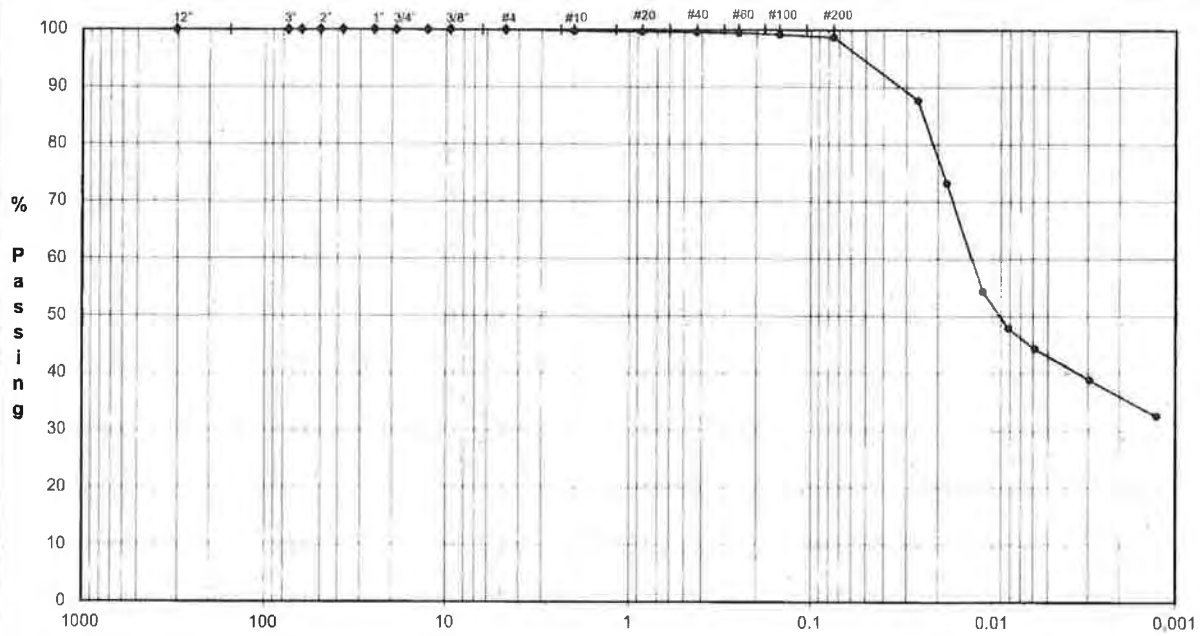
Golder Associates Inc. **Atlanta, Georgia**	**Title:** **ASTM D4767** **CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST REPORT** **SPECIMENS PHOTOGRAPH - 18.0 36.0 54.0 psi**				
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**					
Sample: **RP-4 UD 20.0-22.0'**	**Technician:** **PWM/FT** **Check:** PWM	**Reviewed:** SK **Approved:**	**Start Date:** **7/17/2018**	**Job Number:** **18103173**	**Figure:** **6**

AUGUST 2018 | 18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**
SAMPLE ID: **RP-4** Depth: **25.0-26.0'**
TYPE: **Bag**



COBBLES	GRAVEL		SAND			FINES
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay

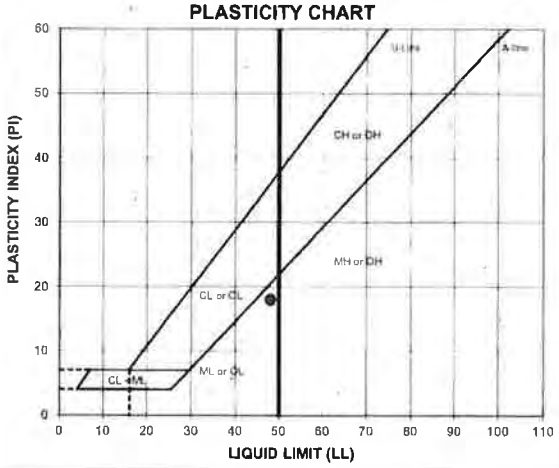
U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**100.0**		
0.375"	9.5	**100.0**		
#4	4.8	**100.0**	Fine Gravel	**0.0**
#10	2.00	**99.8**	Coarse Sand	**0.2**
#20	0.85	**99.7**		
#40	0.43	**99.6**	Medium Sand	**0.2**
#60	0.25	**99.5**		
#100	0.15	**99.2**		
#200	0.075	**98.7**	Fine Sand	**0.9**

Hydrometer Analysis

(mm)	%Finer		
0.026	**87.7**		
0.018	**73.2**		
0.011	**54.2**	Fines	
0.0082	**47.9**	Silt or Clay	**98.7**
0.0059	**44.3**		
0.0029	**38.9**		
0.0013	**32.5**		

PLASTICITY CHART



ATTERBERG LIMITS

Method -B (Dry preparation)

NL	LL	PL	PI	LI
37.7	**48**	**30**	**18**	**0.40**

LL (oven-dried) / 0.75 ORGANIC (OL OH)

DESCRIPTION: CLAYEY SILT, trace fine to coarse sand; dark yellowish brown.

USCS: ML

TECH	HH/HEH/TJ
DATE	8/1/18
CHECK	
REVIEW	
APPROVE	

AUGUST 2018

18103173

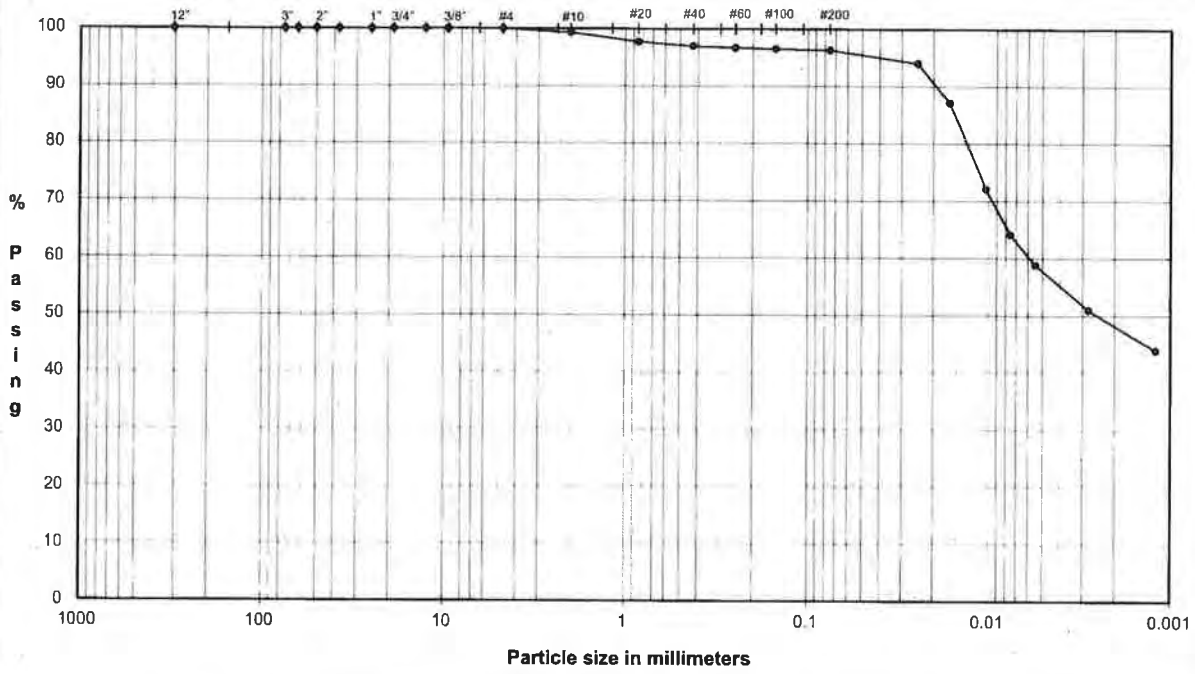
PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**

SAMPLE ID: **RP-4** Depth: **30.0-32.0'**

TYPE: **UD**



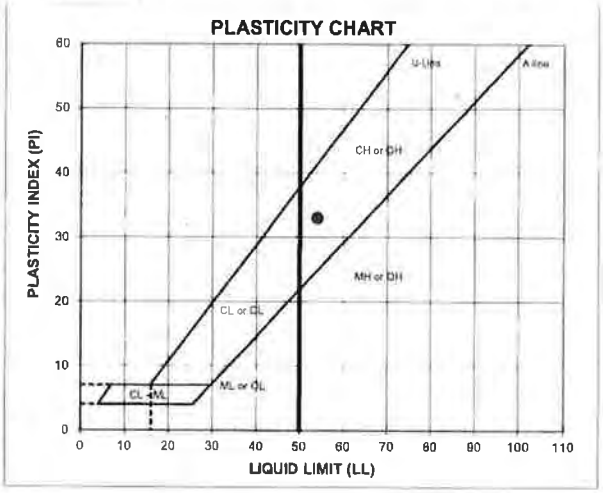
COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**100.0**		
0.375"	9.5	**100.0**		
#4	4.8	**100.0**	Fine Gravel	**0.0**
#10	2.00	**99.3**	Coarse Sand	**0.7**
#20	0.85	**97.8**		
#40	0.43	**97.0**	Medium Sand	**2.3**
#60	0.25	**96.7**		
#100	0.15	**96.5**		
#200	0.075	**96.3**	Fine Sand	**0.7**

Hydrometer Analysis

(mm)	%Finer		
0.024	**94.0**		
0.016	**87.0**		
0.010	**72.1**	Fines	
0.0075	**64.2**	Silt or Clay	**96.3**
0.0055	**58.9**		
0.0028	**51.0**		
0.0012	**43.9**		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
37.1	**54**	**21**	**33**	**0.47**

LL (oven-dried) / 0.75 = ORGANIC (OL OH)

DESCRIPTION: CLAY, trace fine to coarse sand; brown, yellow, and gray.

USCS: CH

TECH	TB/HH/HEH
DATE	8/1/18
CHECK	
REVIEW	
APPROVE	

Golder Associates Inc.

FLEXIBLE WALL PERMEABILITY
ASTM D 5084
METHOD D, CONSTANT RATE OF FLOW

PROJECT TITLE	FTN/ENTERGY WHITE BLUFF/AR		Board #	7	COMMENTS
PROJECT NUMBER	18103173		Flow Pump	2	
SAMPLE ID	RP-4	30.0-32.0'	Flow Pump Speed	7	
SAMPLE TYPE	UD		Technician	FT	

Sample Data, Initial				Sample Data, Final	
Height, inches	3.137	B-Value, f	1.00	Height, inches	3.135
Diameter, inches	2.879	Cell Pres.	90.0	Diameter, inches	2.878
Area, cm^2	42.00	Bot. Pres.	80.0	Area, cm^2	41.97
Volume, cm^3	334.65	Top Pres.	80.0	Volume, cm^3	334.20
Mass, g	589.95	Tot. B.P.	80.0	Mass, g	596.75
Moisture Content, %	37.08	Head, max.	123.80	Moisture Content, %	38.66
Dry Density, pcf	80.25	Head, min.	123.80	Dry Density, pcf	80.36
Spec. Gravity (assumed)	2.700	Max. Grad.	15.55	Volume Solids, cm^3	159.40
Volume Solids, cm^3	159.40	Min. Grad.	15.55	Volume Voids, cm^3	174.81
Volume Voids, cm^3	175.25			Void Ratio	1.10
Void Ratio	1.10			Saturation, %	95.2%
Saturation, %	91.1%				

WATER CONTENTS		Sample Initial	Sample Final
Wt Soil & Tare, i	g	589.95	711.15
Wt Soil & Tare, f	g	430.37	544.79
Wt Tare	g	0.00	114.47
Wt Moisture Lost	g	159.58	166.36
Wt Dry Soil	g	430.37	430.32
Water Content	%	37.08%	38.66%

Flow Pump Rate: 2.38E-04 cm^3/sec

USCS: CH

DESCRIPTION: CLAY, trace fine to coarse sand; brown, yellow, and gray.

TIME FUNCTIONS, SECONDS								dP				
DATE	DAY	HOUR	MIN	TEMP (°C)	dt (min)	dt,acc (min)	dt (sec)	dt,acc (sec)	Reading (psi)	Head (cm)	Gradient	Permeability (cm/sec)
08/02/18	43314	10	0	21.4	0	0	0	0	1.76	123.80	15.55	3.5E-07
08/02/18	43314	10	5	21.4	5	5	300	300	1.76	123.80	15.55	3.5E-07
08/02/18	43314	10	10	21.4	5	10	300	600	1.76	123.80	15.55	3.5E-07
08/02/18	43314	10	15	21.4	5	15	300	900	1.76	123.80	15.55	3.5E-07 *
08/02/18	43314	10	20	21.4	5	20	300	1200	1.76	123.80	15.55	3.5E-07 *
08/02/18	43314	10	25	21.4	5	25	300	1500	1.76	123.80	15.55	3.5E-07 *
08/02/18	43314	10	30	21.4	5	30	300	1800	1.76	123.80	15.55	3.5E-07 *

*TRANSCRIBED FROM ORIGINAL DATA SHEETS

PERMEABILITY REPORTED AS ** 3.5E-07 cm/sec **

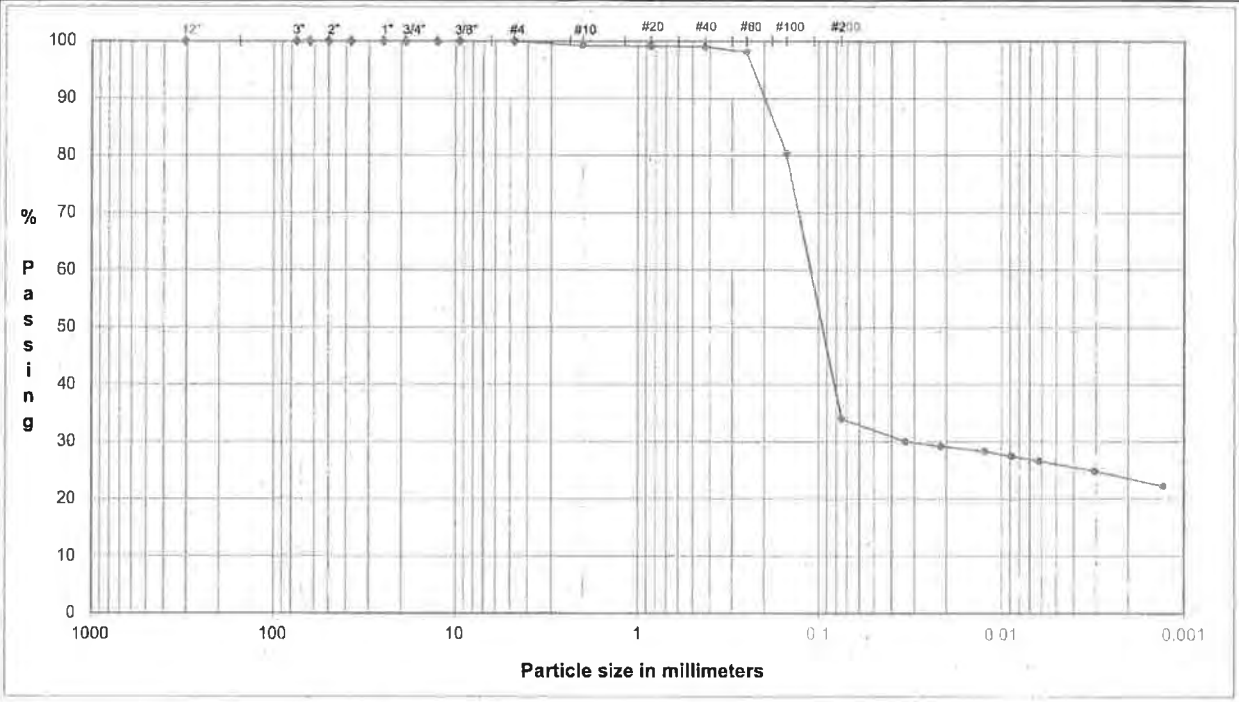
DATE	8/2/18
CHECK	
REVIEW	
APPROVE	

AUGUST 2018 | 18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**
SAMPLE ID: **RP-5** Depth: **15.0-18.0'**
TYPE: **Bag**



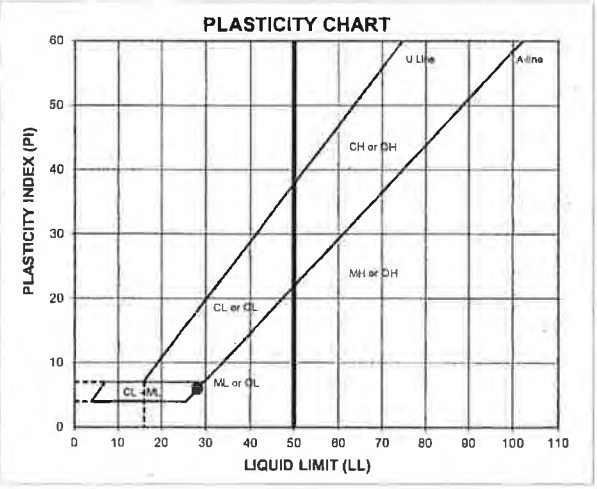
COBBLES	GRAVEL		SAND			FINES
	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**100.0**		
0.375"	9.5	**100.0**		
#4	4.8	**100.0**	Fine Gravel	**0.0**
#10	2.00	**99.2**	Coarse Sand	**0.8**
#20	0.85	**99.1**		
#40	0.43	**99.0**	Medium Sand	**0.2**
#60	0.25	**98.0**		
#100	0.15	**80.3**		
#200	0.075	**34.0**	Fine Sand	**65.0**

Hydrometer Analysis

(mm)	%Finer		
0.034	**30.0**		
0.021	**29.2**		
0.012	**28.3**	Fines	
0.0088	**27.5**	Silt or Clay	**34.0**
0.0063	**26.6**		
0.0031	**24.9**		
0.0013	**22.3**		



ATTERBERG LIMITS
Method -B (Dry preparation)

M_c	LL	PL	PI	LI
24.4	**28**	**22**	**6**	**0.51**

LL (oven-dried) / 0.75 · ORGANIC (OL/OH)

DESCRIPTION: CLAYEY SAND to SILTY SAND, fine to coarse; yellowish brown.

USCS: SC-SM

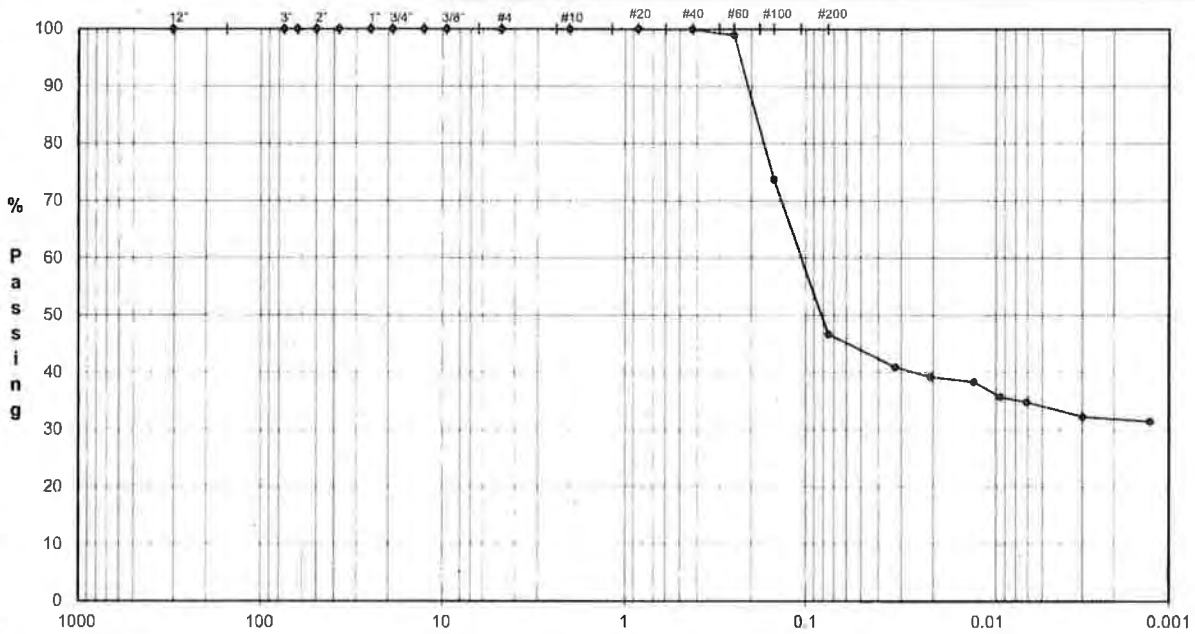
TECH	HH/HEH/TJ
DATE	8/1/18
CHECK	
REVIEW	
APPROVE	

AUGUST 2018 | 18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**
SAMPLE ID: **RP-7** Depth: **16.6-17.4'**
TYPE: **Bag**



COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

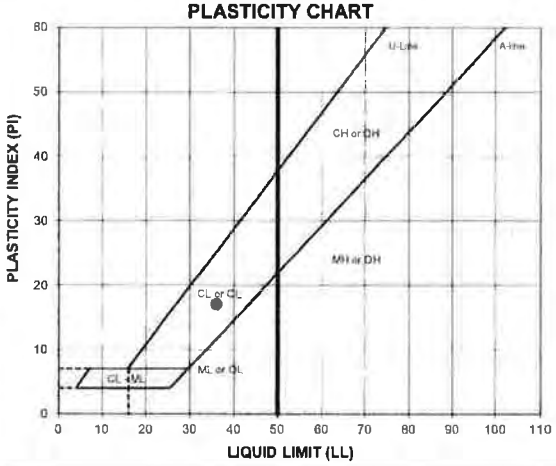
U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**100.0**		
0.375"	9.5	**100.0**		
#4	4.8	**100.0**	Fine Gravel	**0.0**
#10	2.00	**100.0**	Coarse Sand	**0.0**
#20	0.85	**100.0**		
#40	0.43	**99.9**	Medium Sand	**0.1**
#60	0.25	**98.9**		
#100	0.15	**73.6**		
#200	0.075	**46.7**	Fine Sand	**53.3**

Hydrometer Analysis

(mm)	%Finer		
0.032	**40.9**		
0.021	**39.2**		
0.012	**38.3**	Fines	
0.0085	**35.7**	Silt or Clay	**46.7**
0.0061	**34.8**		
0.0030	**32.2**		
0.0013	**31.4**		

PLASTICITY CHART



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
22.3	**36**	**19**	**17**	**0.20**

LL (oven-dried) / 0.75 ORGANIC (OL OH)

DESCRIPTION: SAND and SILTY CLAY, fine to medium; dark gray.

USCS: SC

TECH	HH/HEH/TJ
DATE	8/2/18
CHECK	
REVIEW	
APPROVE	

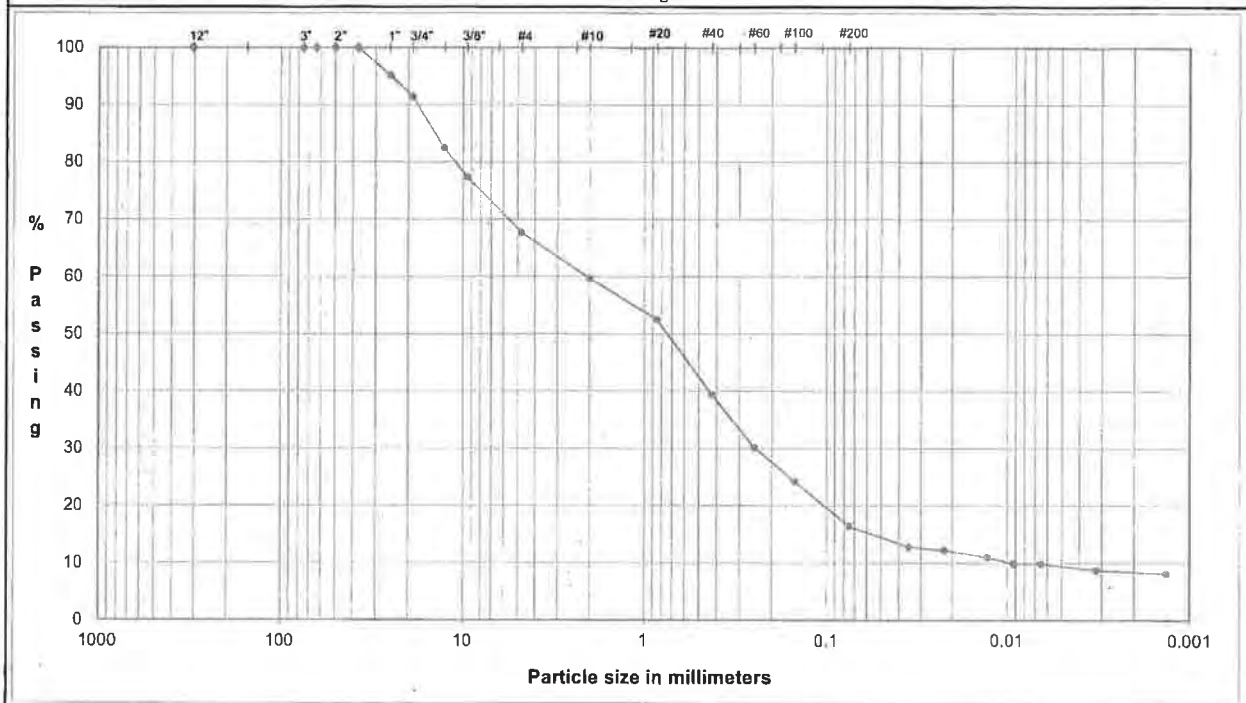
Golder Associates Inc.

AUGUST 2018 18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**
SAMPLE ID: **RP-9** Depth: **9.0-10.0'**
TYPE: **Bag**



COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

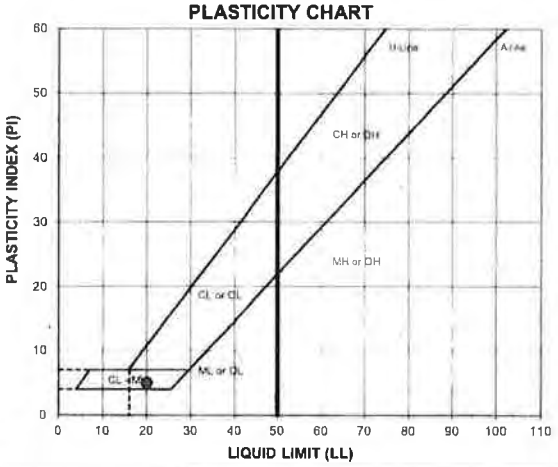
U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**95.1**		
0.75"	19.0	**91.4**	Coarse Gravel	**8.6**
0.50"	12.7	**82.4**		
0.375"	9.5	**77.3**		
#4	4.8	**67.7**	Fine Gravel	**23.7**
#10	2.00	**59.7**	Coarse Sand	**8.0**
#20	0.85	**52.5**		
#40	0.43	**39.4**	Medium Sand	**20.3**
#60	0.25	**30.2**		
#100	0.15	**24.2**		
#200	0.075	**16.4**	Fine Sand	**23.0**

Hydrometer Analysis

(mm)	%Finer		
0.035	**12.8**		
0.022	**12.2**		
0.013	**11.0**	Fines Silt or Clay	**16.4**
0.0092	**9.9**		
0.0065	**9.9**		
0.0032	**8.7**		
0.0013	**8.1**		

PLASTICITY CHART



ATTERBERG LIMITS
Method -B (Dry preparation)

MI	LL	PL	PI	LI
4.2	**20**	**15**	**5**	**-2.35**

LL (oven-dried) / 0.75 ORGANIC (OL/OH)

DESCRIPTION: gravelly CLAYEY SAND to SILTY SAND, fine to coarse, fine to coarse gravel; reddish brown.

USCS: SC-SM

TECH	HH/HEH/TJ
DATE	8/1/18
CHECK	
REVIEW	
APPROVE	

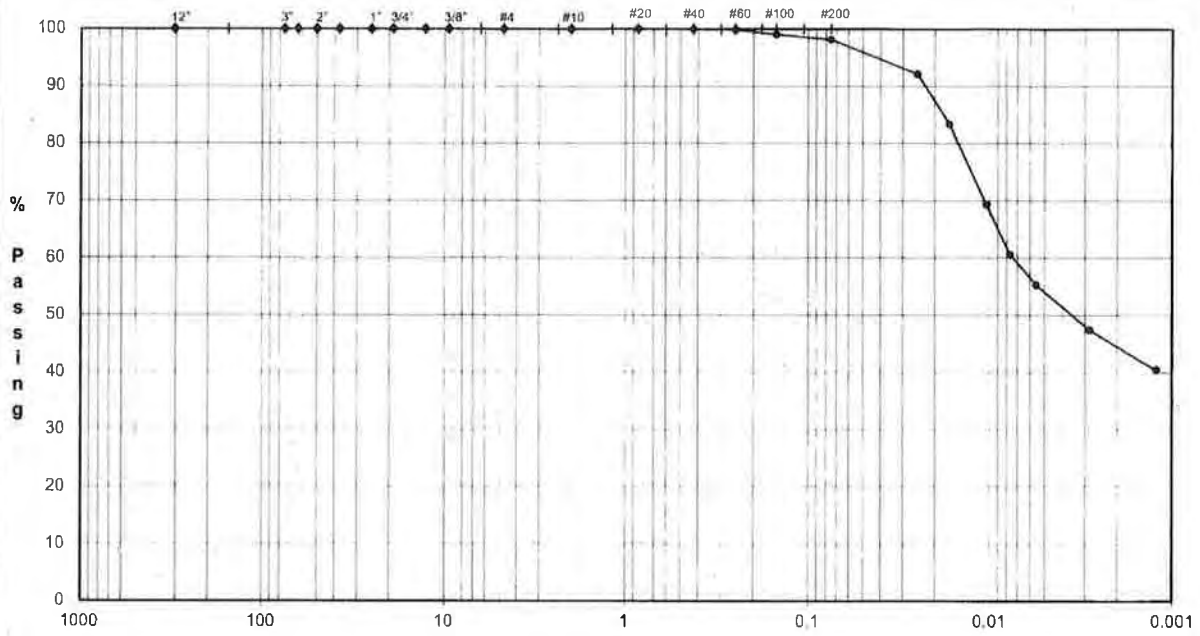
NOTE: Insufficient sample received to perform in accordance with ASTM Standards

AUGUST 2018 | 18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**
SAMPLE ID: **RP-9** Depth: **26.0-27.0'**
TYPE: **Bag**



COBBLES	Coarse	Fine	Coarse	Medium	Fine	Silt or Clay
	GRAVEL		SAND			FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	**100.0**		
3.0"	75.0	**100.0**	Cobbles	**0.0**
2.5"	63.5	**100.0**		
2.0"	50.0	**100.0**		
1.5"	37.5	**100.0**		
1.0"	25.0	**100.0**		
0.75"	19.0	**100.0**	Coarse Gravel	**0.0**
0.50"	12.7	**100.0**		
0.375"	9.5	**100.0**		
#4	4.8	**100.0**	Fine Gravel	**0.0**
#10	2.00	**100.0**	Coarse Sand	**0.0**
#20	0.85	**100.0**		
#40	0.43	**100.0**	Medium Sand	**0.0**
#60	0.25	**99.9**		
#100	0.15	**99.0**		
#200	0.075	**98.1**	Fine Sand	**1.8**

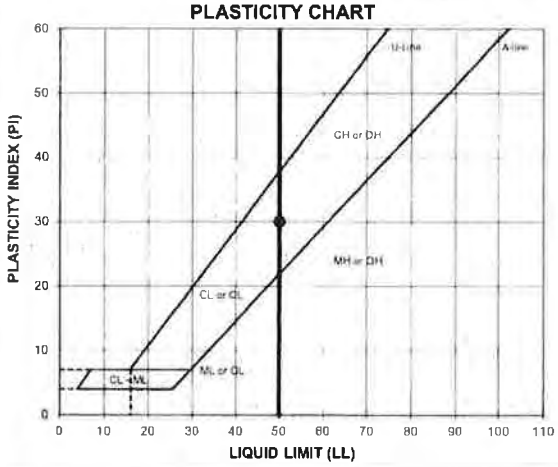
Hydrometer Analysis

(mm)	%Finer		
0.025	**92.1**		
0.017	**83.4**		
0.010	**69.3**	Fines	
0.0077	**60.6**	Silt or Clay	**98.1**
0.0056	**55.3**		
0.0028	**47.4**		
0.0012	**40.4**		

DESCRIPTION: CLAY, trace fine sand; gray.

USCS: CH

PLASTICITY CHART



ATTERBERG LIMITS

Method -B (Dry preparation)

NL	LL	PL	PI	LI
31.3	**50**	**20**	**30**	**0.36**

LL (oven-dried) / 0.75 ORGANIC / OL OH

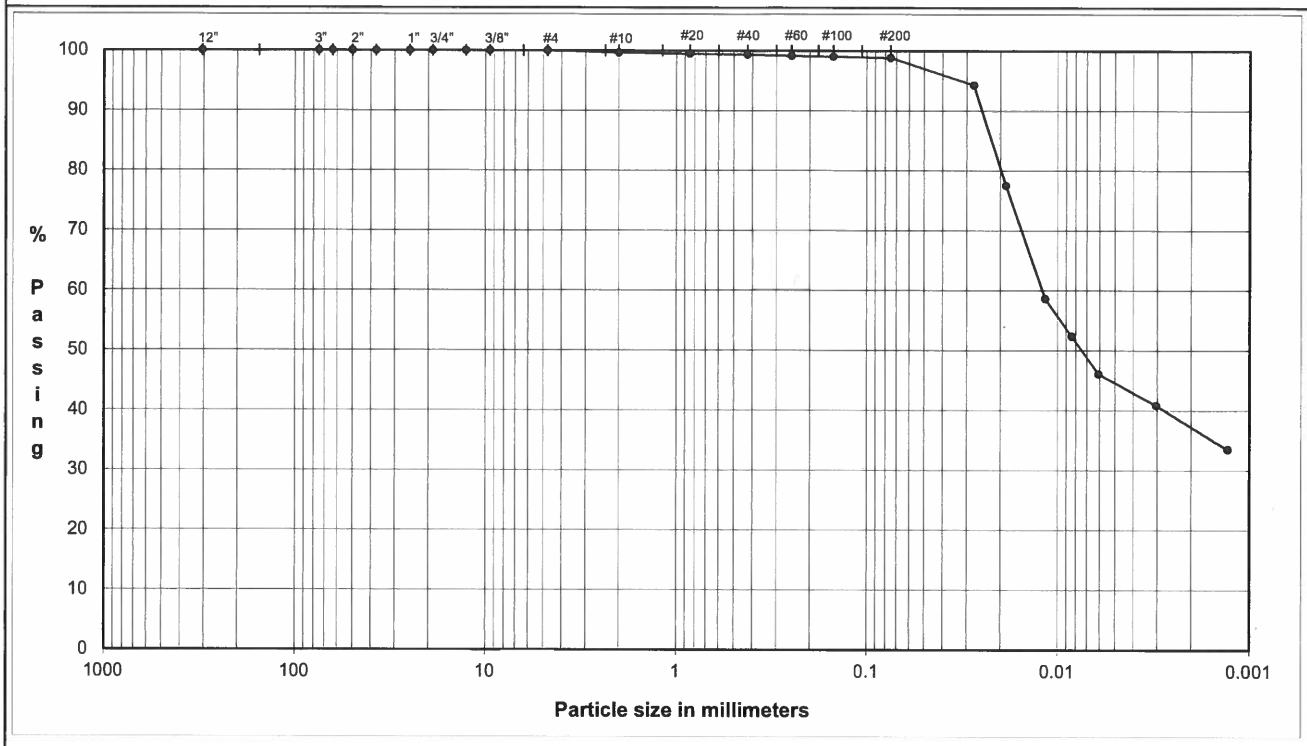
TECH	HH/HEH/TB
DATE	8/1/18
CHECK	
REVIEW	
APPROVE	

AUGUST 2018 18103173

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS

ASTM D421, D422, D4318

PROJECT NAME: **FTN/ENTERGY WHITE BLUFF/AR**
SAMPLE ID: **RP-9** Depth: **30.0-32.0'**
TYPE: **UD**



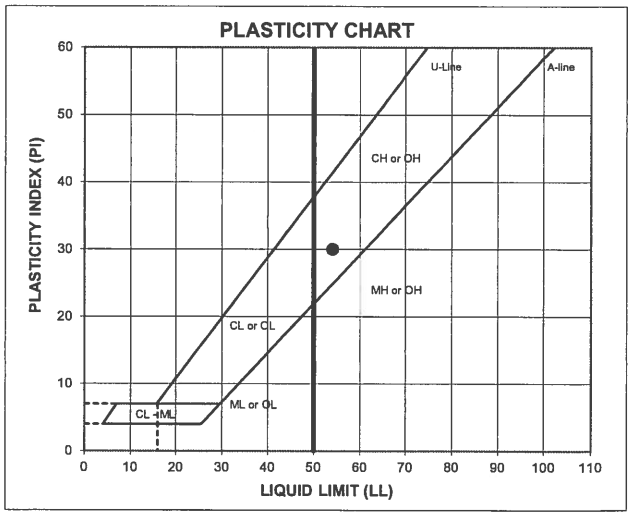
COBBLES	Coarse GRAVEL	Fine GRAVEL	Coarse SAND	Medium SAND	Fine SAND	Silt or Clay FINES

U.S. Standard Sieves Sizes and Numbers

	Particle Size (mm)	% Passing	Particle Size Classification	Percentage
12.0"	304.8	100.0		
3.0"	75.0	100.0	Cobbles	0.0
2.5"	63.5	100.0		
2.0"	50.0	100.0		
1.5"	37.5	100.0		
1.0"	25.0	100.0		
0.75"	19.0	100.0	Coarse Gravel	0.0
0.50"	12.7	100.0		
0.375"	9.5	100.0		
#4	4.8	100.0	Fine Gravel	0.0
#10	2.00	99.6	Coarse Sand	0.4
#20	0.85	99.5		
#40	0.43	99.3	Medium Sand	0.3
#60	0.25	99.2		
#100	0.15	99.0		
#200	0.075	98.8	Fine Sand	0.5

Hydrometer Analysis

(mm)	%Finer		
0.027	94.3		
0.019	77.5		
0.012	58.7	Fines	
0.0084	52.4	Silt or Clay	98.8
0.0061	46.1		
0.0030	40.9		
0.0013	33.5		



ATTERBERG LIMITS

Method -B (Dry preparation)

M_c	LL	PL	PI	LI
30.2	54	24	30	0.19

LL (oven-dried) / 0.75 = ORGANIC (OL/OH)

DESCRIPTION: CLAY, trace fine to coarse sand; olive gray.

USCS: CH

TECH	HEH/HH/HB/TJ
DATE	8/27/18
CHECK	
REVIEW	
APPROVE	

	Initial		Final		Notes
Height =	1.000	in	0.988	in	Visual description (Golder procedure): (CH) CLAY, trace fine to coarse sand; olive gray.
Diameter =	2.500	in	2.500	in	Atterberg Limits (ASTM D4318): LL = 54 PL = 24 PI = 30
Area =	4.909	in^2	4.909	in^2	Percent Finer (ASTM D422): 3/4 in. = 100% No. 4 = 100% No. 200 = 99%
Volume =	4.909	in^3	4.848	in^3	Specimen Type: [X] Intact [ ] Reconstituted
Water Content =	30.2%		34.0%		Remold Targets:
Specific Gravity =	2.67	(ASTM D854)	2.67	(ASTM D854)	Water Content of Trimmings (ASTM D2216): -
Height of Solids =	0.5345	in	0.5345	in	Trimming Procedure: Trimming ring
Void Ratio =	0.871		0.848		Inundation: [ ] Not inundated [X] Inundated at 1.70 ksf
Degree of Saturation =	92.5%		100.0%		Test Method: [ ] A [X] B
Wet Mass =	0.329	lb	0.338	lb	Apparatus: GeoTac automated consolidometer
Dry Mass =	0.253	lb	0.253	lb	Final Water Content Specimen: [X] Entire [ ] Partial
Wet Unit Weight =	115.7	pcf	120.6	pcf	Final Differential Height: 0.0000 in
Dry Unit Weight =	88.9	pcf	90.0	pcf	Estimated Preconsolidation Stress: ksf

			At End of Primary Consolidation				At End of Load Duration							
	Axial Stress (ksf)	Load Duration (min)	Deformation (in)	Specimen Height (in)	Axial Strain (%)	Void Ratio	Deformation (in)	Specimen Height (in)	Axial Strain (%)	Void Ratio	Time Deformation Method	Average Void Ratio	Coefficient of Consolidation (ft^2/day)	Time to 50% Consolidation (min)
Seating*	1.70	60					0.0000	0.9925	0.00	0.857				
1	3.7	60					0.0082	0.9843	0.82	0.842				
2	1.0	60					0.0047	0.9877	0.47	0.848				
3	0.3	17					-0.0028	0.9953	-0.28	0.862				
4	0.5	60					-0.0029	0.9953	-0.29	0.862				
5	1.0	60					-0.0028	0.9953	-0.28	0.862				
6	2.0	60					0.0003	0.9922	0.03	0.856				
7	4.0	60					0.0080	0.9845	0.80	0.842				
8	8.0	240	0.0221	0.9704	2.21	0.816	0.0230	0.9695	2.30	0.814	2 (Root time)	0.822	0.322	1.3
9	16.0	240	0.0429	0.9496	4.29	0.777	0.0468	0.9457	4.68	0.769	2 (Root time)	0.790	0.247	1.8
10	4.0	240					0.0327	0.9597	3.27	0.796				
11	1.0	120					0.0147	0.9777	1.47	0.829				
12	0.3	27					0.0048	0.9877	0.48	0.848				

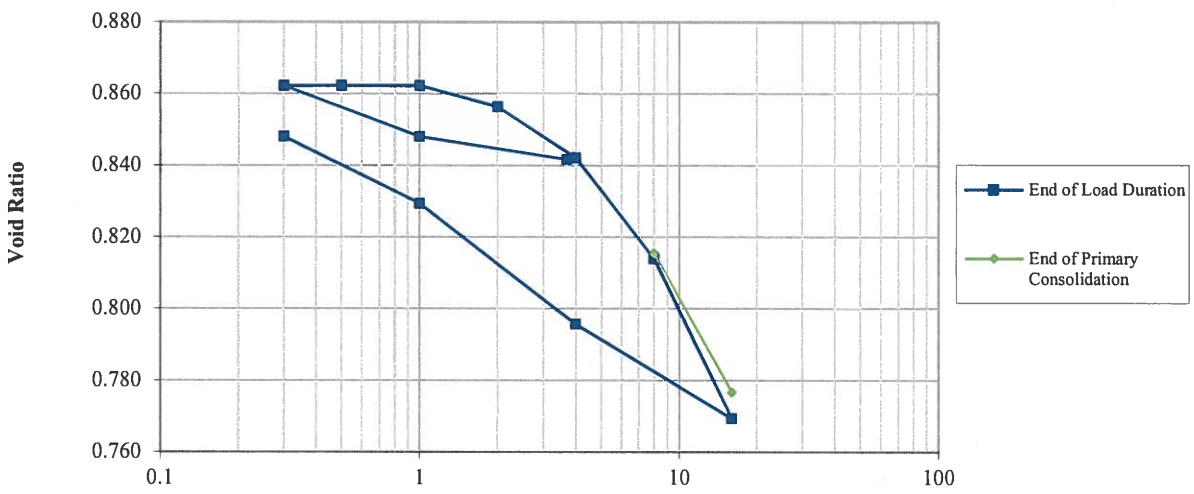
Golder Associates Inc.
Atlanta, Georgia

Title:
ASTM D2435
ONE-DIMENSIONAL CONSOLIDATION TEST REPORT
SPECIMEN AND SUMMARY DATA

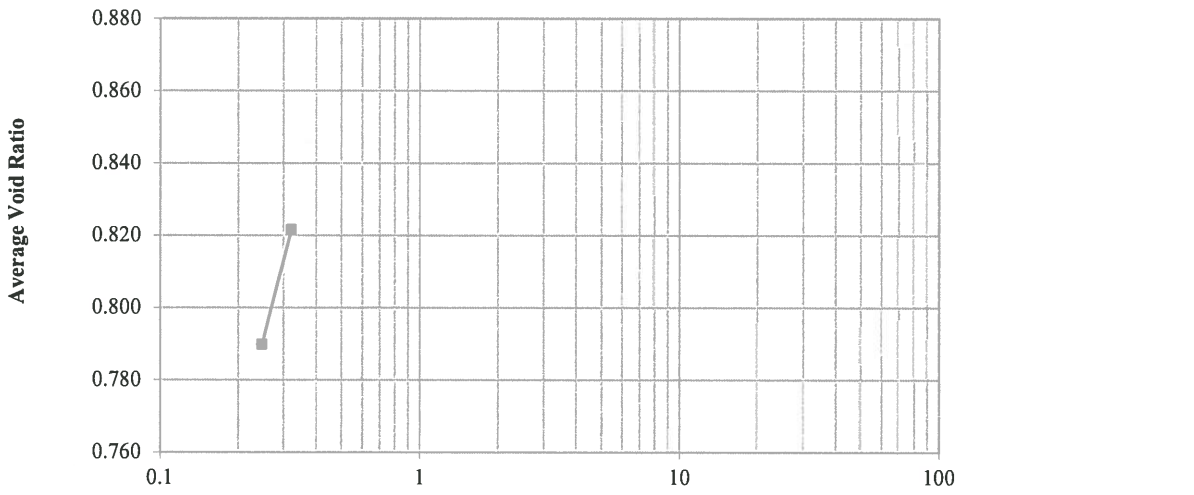
Job Short Title: FTN/ENTERGY WHITE BLUFF/AR

Sample:	Technician:	Checked:	Reviewed:	Approved:	Start Date:	Job Number:	Figure:
RP-9 UD 30.0-32.0'	PWM/FT	PWM			8/28/2018	18103173	1

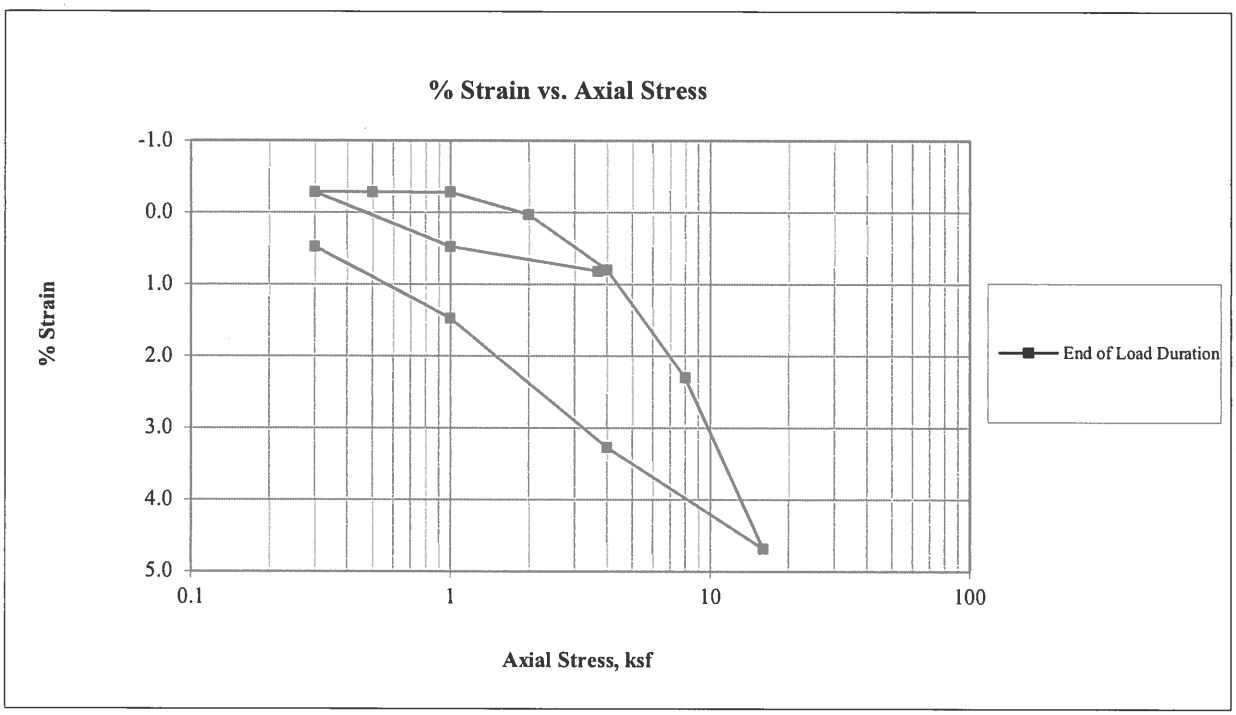
Void Ratio vs. Axial Stress

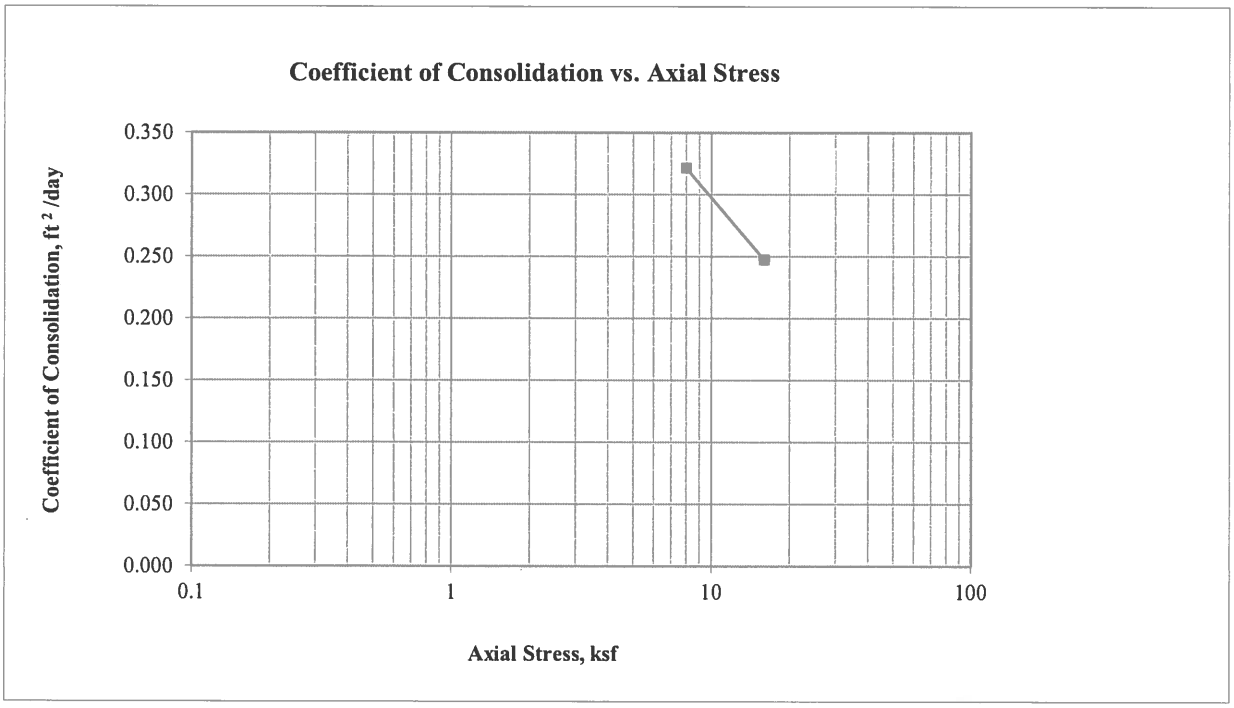


Average Void Ratio vs. Coefficient of Consolidation



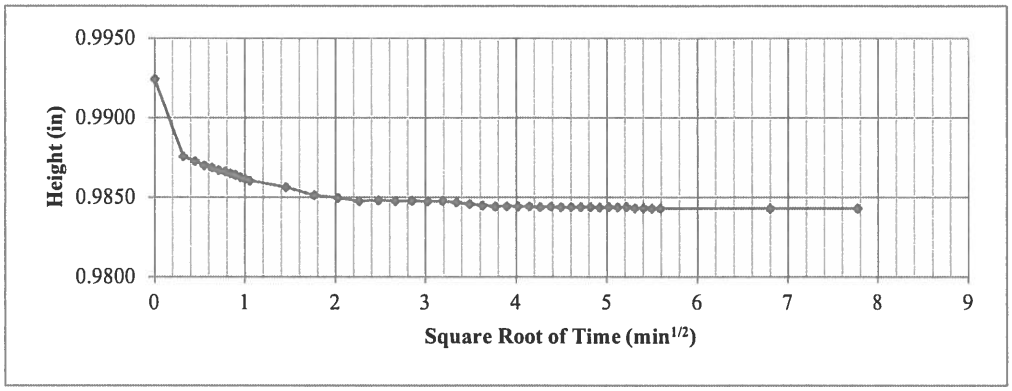
Golder Associates Inc. **Atlanta, Georgia**	**Title:** **ASTM D2435** **ONE-DIMENSIONAL CONSOLIDATION TEST REPORT** **CONSOLIDATION PLOTS**				
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**					
Sample: **RP-9 UD 30.0-32.0'**	**Technician:** **PWM/FT**	**Reviewed:**	**Start Date:** **8/28/2018**	**Job Number:** **18103173**	**Figure:** **2**



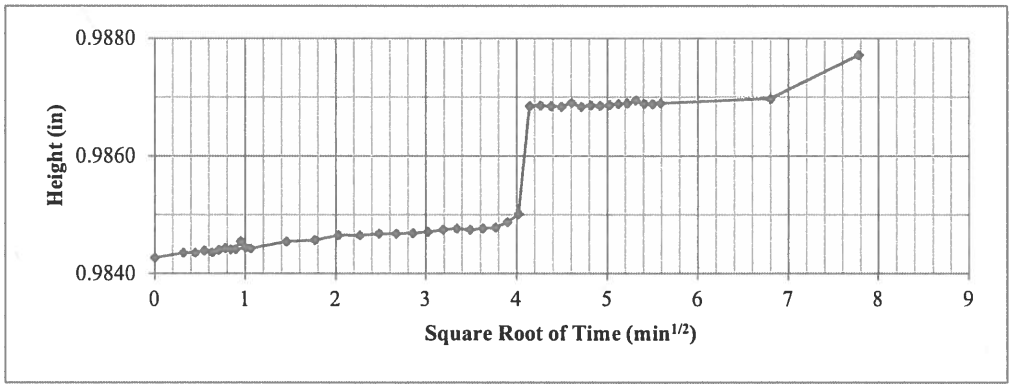


Golder Associates Inc. Atlanta, Georgia	Title: ASTM D2435 ONE-DIMENSIONAL CONSOLIDATION TEST REPORT CONSOLIDATION PLOTS				
Job Short Title: FTN/ENTERGY WHITE BLUFF/AR					
Sample: RP-9 UD 30.0-32.0'	Technician: PWM/FT	Reviewed:	Start Date: 8/28/2018	Job Number: 18103173	Figure: 2A

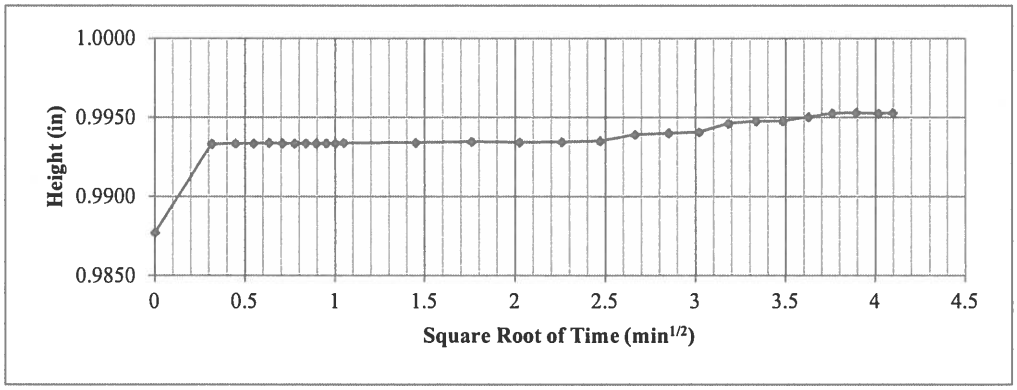
3.7 ksf



1.0 ksf

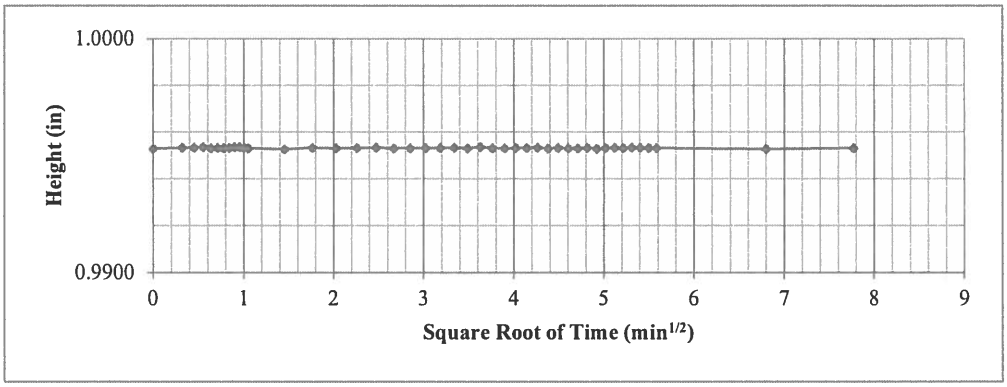


0.3 ksf

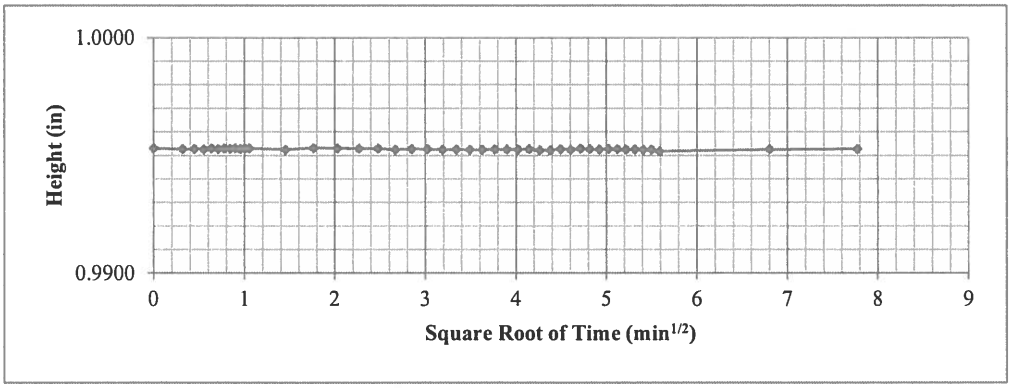


Golder Associates Inc. Atlanta, Georgia	Title: ASTM D2435 ONE-DIMENSIONAL CONSOLIDATION TEST REPORT TIME-DEFORMATION PLOTS (1)				
Job Short Title: FTN/ENTERGY WHITE BLUFF/AR					
Sample: RP-9 UD 30.0-32.0'	Technician: PWM/FT	Reviewed:	Start Date: 8/28/2018	Job Number: 18103173	Figure: 3

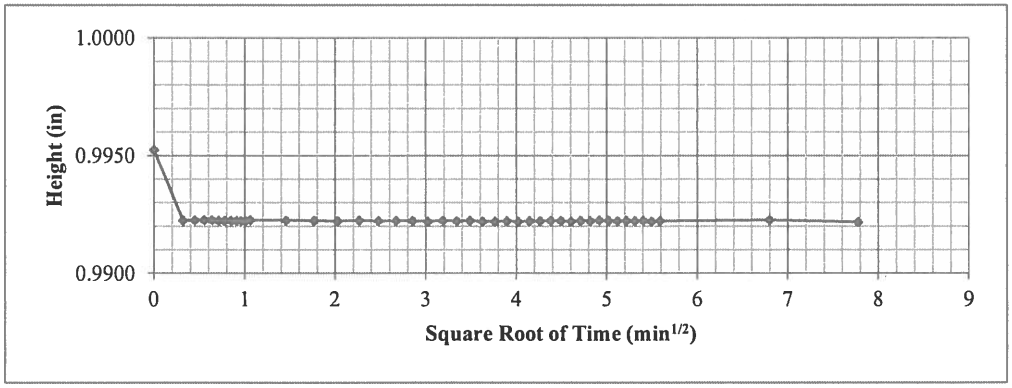
0.5 ksf



1.0 ksf

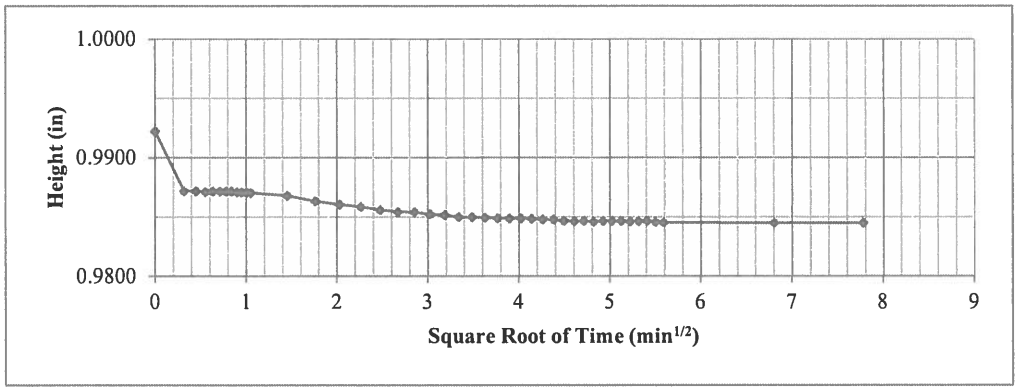


2.0 ksf

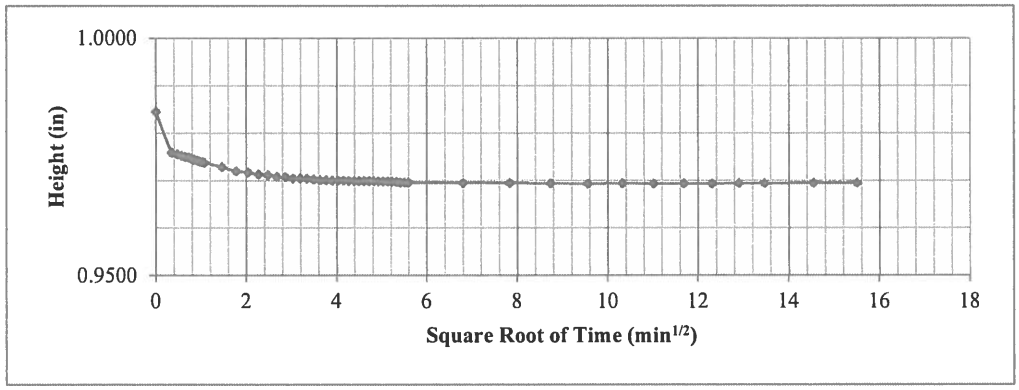


Golder Associates Inc. Atlanta, Georgia	Title: ASTM D2435 ONE-DIMENSIONAL CONSOLIDATION TEST REPORT TIME-DEFORMATION PLOTS (2)				
Job Short Title: FTN/ENTERGY WHITE BLUFF/AR					
Sample: RP-9 UD 30.0-32.0'	Technician: PWM/FT	Reviewed:	Start Date: 8/28/2018	Job Number: 18103173	Figure: 4

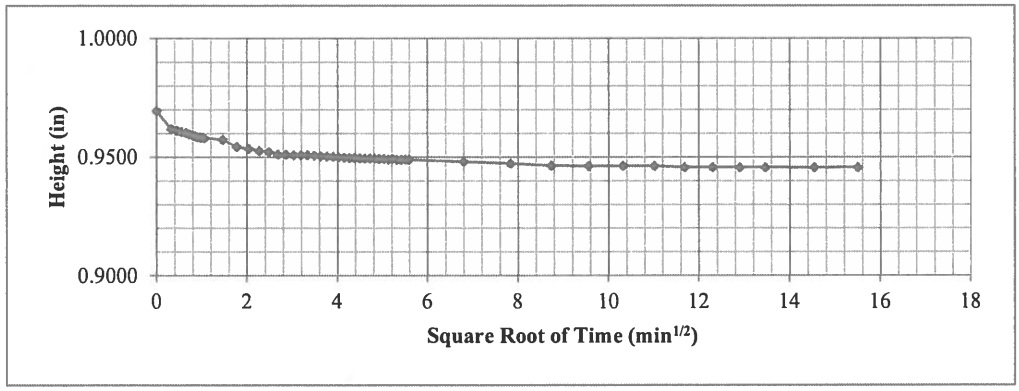
4.0 ksf



8.0 ksf

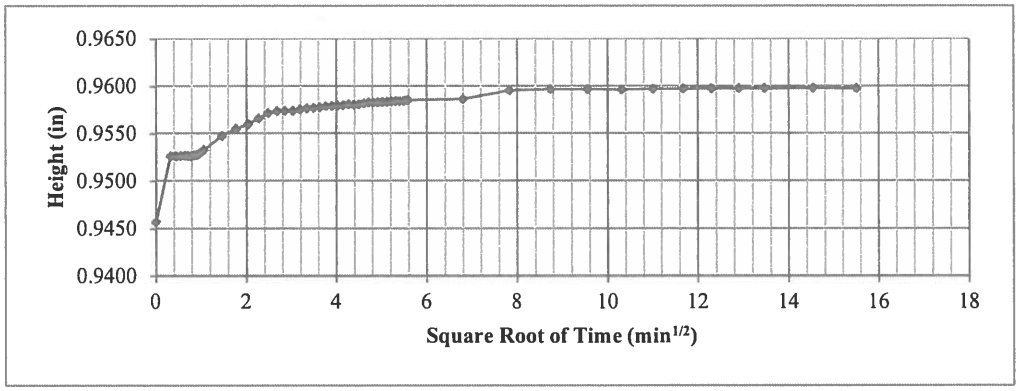


16.0 ksf

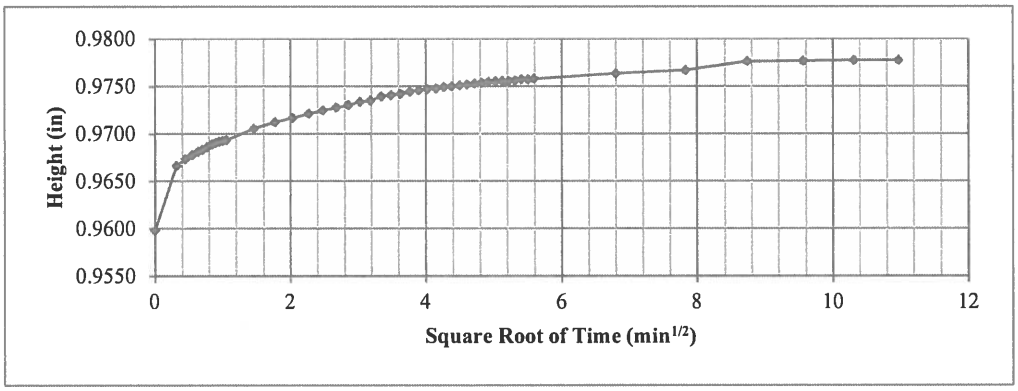


Golder Associates Inc. **Atlanta, Georgia**	**Title:** **ASTM D2435** **ONE-DIMENSIONAL CONSOLIDATION TEST REPORT** **TIME-DEFORMATION PLOTS (3)**				
Job Short Title: **FTN/ENTERGY WHITE BLUFF/AR**					
Sample: **RP-9 UD 30.0-32.0'**	**Technician:** **PWM/FT**	**Reviewed:**	**Start Date:** **8/28/2018**	**Job Number:** **18103173**	**Figure:** **5**

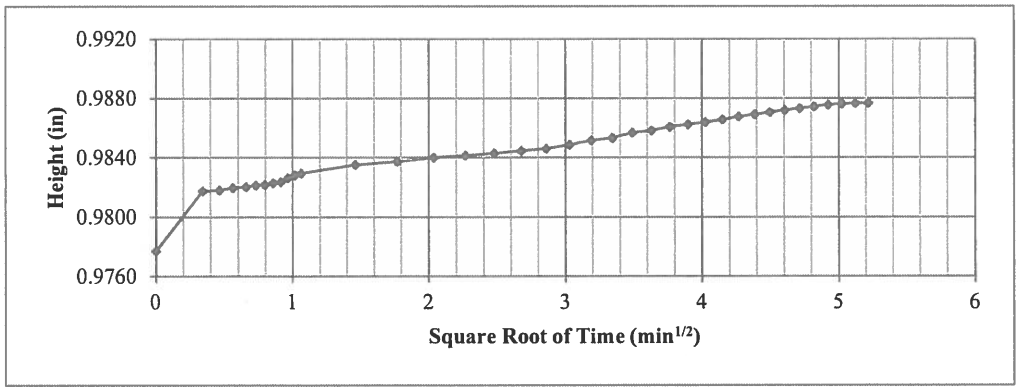
4.0 ksf



1.0 ksf

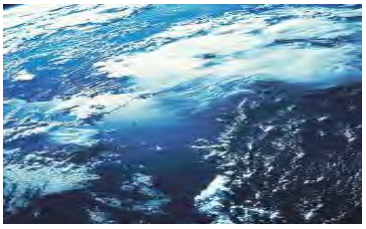


0.3 ksf



Golder Associates Inc. Atlanta, Georgia	Title: ASTM D2435 ONE-DIMENSIONAL CONSOLIDATION TEST REPORT TIME-DEFORMATION PLOTS (4)				
Job Short Title: FTN/ENTERGY WHITE BLUFF/AR					
Sample: RP-9 UD 30.0-32.0'	Technician: PWM/FT	Reviewed:	Start Date: 8/28/2018	Job Number: 18103173	Figure: 6

Appendix E
Site Photographs



Photograph 1

Photograph 2

Photograph 3

Photograph 4

Photograph 5

Photograph 6

Photograph 7

Photograph 8

Photograph 9

Photograph 10

Photograph 11

Photograph: 12	Site building taken from …insert caption