

**GEOTECHNICAL
ENGINEERING
SERVICES REPORT**

For

**Proposed Water Main Replacement
on Rockbridge Road
from Memorial Drive to
Deshon Road
Stone Mountain, DeKalb County,
Georgia**

Prepared for:

**DeKalb County, Georgia
C/O AECOM
One Midtown Plaza
1360 Peachtree Street, Suite 500
Atlanta, GA 30309**

Prepared by:

**Professional Service Industries, Inc.
95 Chastain Road, Suite 301
Kennesaw, Georgia 30144**

PSI Project Number: 472451

November 21, 2016



November 21, 2016

DeKalb County, Georgia

C/O AECOM

One Midtown Plaza
1360 Peachtree Street, Suite 500
Atlanta, Georgia 30309

Attention: Moubin Al-Malla, PE.
Phone: 404 965 9600
Email: Moubin.al-malla@aecom.com

RE: Report of Geotechnical Subsurface Exploration
Proposed Rockbridge Road Water Main Replacement
Rockbridge Road from Memorial to Deshon Road
DeKalb County, Georgia
PSI Project No. 472451

Dear Maubin:

Professional Service Industries, Inc. (PSI) has completed a subsurface exploration program at the site of the above referenced project. The services were completed in general accordance with the Proposal for Geotechnical Engineering Services dated October 6, 2016, as authorized by Purchase Order 1032855,3. The following report presents the results of our study as well as opinions and recommendations pertaining to the geotechnical aspects of the project.

1 PROJECT INFORMATION

1.1 Site Location and Project Description

The project consists of replacement of about 40,000 linear feet of water main on Rockbridge Road from Memorial Drive to Deshon Road. The proposed water main will be located along the southern side of the right-of-way.

The recommendations provided in this report are based in part on the project information described above. If any of the noted information is incorrect or has changed, please inform PSI so that we may amend the recommendations presented in this report, if appropriate.

1.2 Scope of Geotechnical Services

The purpose of this exploration was to provide a geotechnical study for the primary purpose of evaluating excavation conditions at requested boring locations. The scope of work for this exploration included the following:

- We contacted the Georgia 811 Utilities Protection Center (UPC) to locate existing underground public utilities on-site. A subcontract utility locator was also engaged to check boring location for private utilities.
- We performed a site reconnaissance and located the borings in the field, based upon the provided site information.
- We performed forty-one Standard Penetration Test (SPT) soil borings and 3 associated offset borings at the approximate locations shown on the Boring Location Plan. Soil test borings were performed at this site using hollow-stem, continuous flight augers. At regular intervals, Standard Penetration Test and sampling operations were conducted in general compliance with the ASTM D1586 using an automatic hammer.
- We classified samples of soil obtained during the drilling operations and prepared boring logs for the test locations describing the types of soil encountered and other pertinent information in general accordance with the Unified Soil Classification System (USCS).
- We conducted a geotechnical engineering evaluation of the available data to develop conclusions and recommendations.
- We prepared this engineering report presenting PSI's boring logs, site observations and recommendations for development of the site.

2 SUBSURFACE CONDITIONS

2.1 Soil Test Boring Results

The following subsurface description is of a generalized nature and intended to highlight the major subsurface stratification features and material characteristics. The Boring Logs illustrated in the Appendix should be reviewed for specific information at individual boring locations. These records include soil descriptions, stratifications, and penetration resistances.

Underlying the existing groundcover many of the borings encountered up to 3 feet of fill. The fill generally consisted of loose to very dense clayey/silty SAND (SC/SM) or very stiff to hard sandy SILT (MH). The SPT N-values within the fill soils ranged from 10 to over 50 blows-per-foot (bpf). Higher penetration resistances were likely exaggerated by the sampler striking rock fragments.

Below the fill where encountered or below the existing groundcover in the remaining borings, residual soils typical of the Piedmont Physiographic Providence were encountered consisting of medium dense to very dense silty SAND (SM) as well as very

stiff to hard sandy SILT (ML). The SPT N-values within the residual soils ranged from 11 to over 50 blows-per-foot (bpf).

Partially weathered rock (PWR) was encountered in borings B-9, B-10, and B-40 at depths of 6 to 10 feet. A lens of PWR was encountered in borings B-1, B-9, B-14B and B-38 at varying depths ranging from 6 inches to 6 feet. Auger refusal occurred in boring B-14, B-14A, and B-14B at a depth of 3, 3, and 6 feet, respectively.

Groundwater was not encountered at the time of boring completion. Fluctuation of groundwater levels should be anticipated with seasonal changes in rainfall.

The stratifications shown on the Boring Logs represent the conditions only at the actual boring locations. Variations may occur and should be expected between boring locations. The stratifications represent the approximate boundary between subsurface materials and the actual transition may be gradual.

The stratification presented is based on visual examination of the recovered soil samples and the interpretation of field logs by a geotechnical engineer. Included on the logs are the Standard Penetration Test values (N-values) for the borings.

2.2 Laboratory Test Results

Laboratory testing was performed on six bulk soil samples of soil cuttings obtained during drilling. The laboratory tests included natural moisture content, percent fines, Atterberg Limits, and Moisture Density Relationships (Standard Proctors). Test on two additional samples are ongoing and the results will be submitted as an addendum. The laboratory test results are summarized in Table 1 and Table 2 below.

Table 1: Summary of Laboratory Test Results

Boring Number	Sample Depth (ft)	Moisture Content (%)	Percent Fines (%)	ATTERBERG LIMITS			USCS Soil Classification
				LL	PL	PI	
B-1	0 – 10	14	61	55	30	25	MH
B-6	0 – 10	8	41	33	21	12	SC
B-12	0 – 10	14	59	58	33	25	MH
B-22	0 – 10	14	48	60	30	30	SC
B-32	0 – 10	12	50	58	32	26	MH
B-38	0 – 10	6	29	26	19	7	SC-SM

Table 1: Summary of Laboratory Test Results - Continued

Boring Number	Sample Depth (ft)	Standard Proctor	
		Optimum Moisture	Maximum Dry Density
B-1	0 – 10	18.5	105.7
B-6	0 – 10	13	116.8
B-12	0 – 10	19	102.7
B-22	0 – 10	16	107.3
B-32	0 – 10	18	104.1
B-38	0 – 10	12	116.6

3 CONCLUSIONS AND RECOMMENDATIONS

3.1 General

The following geotechnical recommendations have been developed on the basis of the previously described project characteristics and subsurface conditions encountered. If there are any changes in these project criteria, a review should be made by PSI to determine if modifications to the recommendations are warranted.

3.2 Excavation Considerations

Moat borings encountered fill or residual soils from below surficial materials to boring termination depths at 10 feet. Our experience indicates these soils can typically be excavated with track mounted backhoes. At a few locations, partially weathered rock was penetrated that exhibited Standard Penetration Tests in excess of 100 blow per foot. In confined excavations, such as is anticipated for utility installation, most partially weathered rock can be excavated with large track mounted hydraulic excavators similar to a Caterpillar 300 series with the backhoe buckets equipped with hardened teeth. In some instances, the partially weathered rock was penetrated by the soil test augers but exhibited penetration resistances of 50 blows for less than 2 inches of penetration. In confined trench excavations, our experience indicates that the use of explosive will be required to excavate these rock-like Partially Weathered Rock zones. Such materials were encountered at boring B-14 below 2 feet and at B-40 below 6 feet.

3.8 Slope Considerations

Temporary excavations will be required for installation of the water main. Temporary slopes should be constructed in accordance with OSHA or other regulatory guidelines. The contractor is solely responsible for construction of safe excavations. Where site limitation prevents safe sloping, properly designed shoring in accordance with OSHA requirements should be installed.

3.3 Trench Fill

Trench fill should be placed in accordance with the requirement of the water authority.

4 REPORT LIMITATIONS

The geotechnical engineer warrants that the findings, recommendations, specifications, or professional advice contained herein have been made in accordance with generally accepted professional geotechnical engineering practices in the local area at the time of this report. No other warranties are implied or expressed.

The recommendations submitted are based on the available soil information obtained by PSI and information provided by DeKalb County. If there are any revisions to the plans for this project or if deviations from the subsurface conditions noted in this report are encountered during construction, PSI should be notified immediately to determine if changes in the recommendations are required.

Thank you for the opportunity to be of service on this project. Should you have any questions or if we can be of further assistance, please do not hesitate to contact our office.

Respectfully Submitted,
PROFESSIONAL SERVICE INDUSTRIES, INC


Christopher Coleman
Project Engineer


Richard L. Curtis, PE, D.GE
Senior Vice President


John H. Fiely, PE
Department Manager
Geotechnical Services



Attachments: Figures 1 through 7: Boring Location Plans
Boring Logs



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KENNESAW, GA 30144



Figure 1: Boring Location Plan

Proposed Rockbridge Road Water Main Replacement
Rockbridge Road from Memorial to Deshon Road
DeKalb County, Georgia

SCALE: None DATE: 11/21/16 PSI PROJECT NO.: 472451

DRAWN BY: C. Coleman

CHECKED BY: J. Fiely



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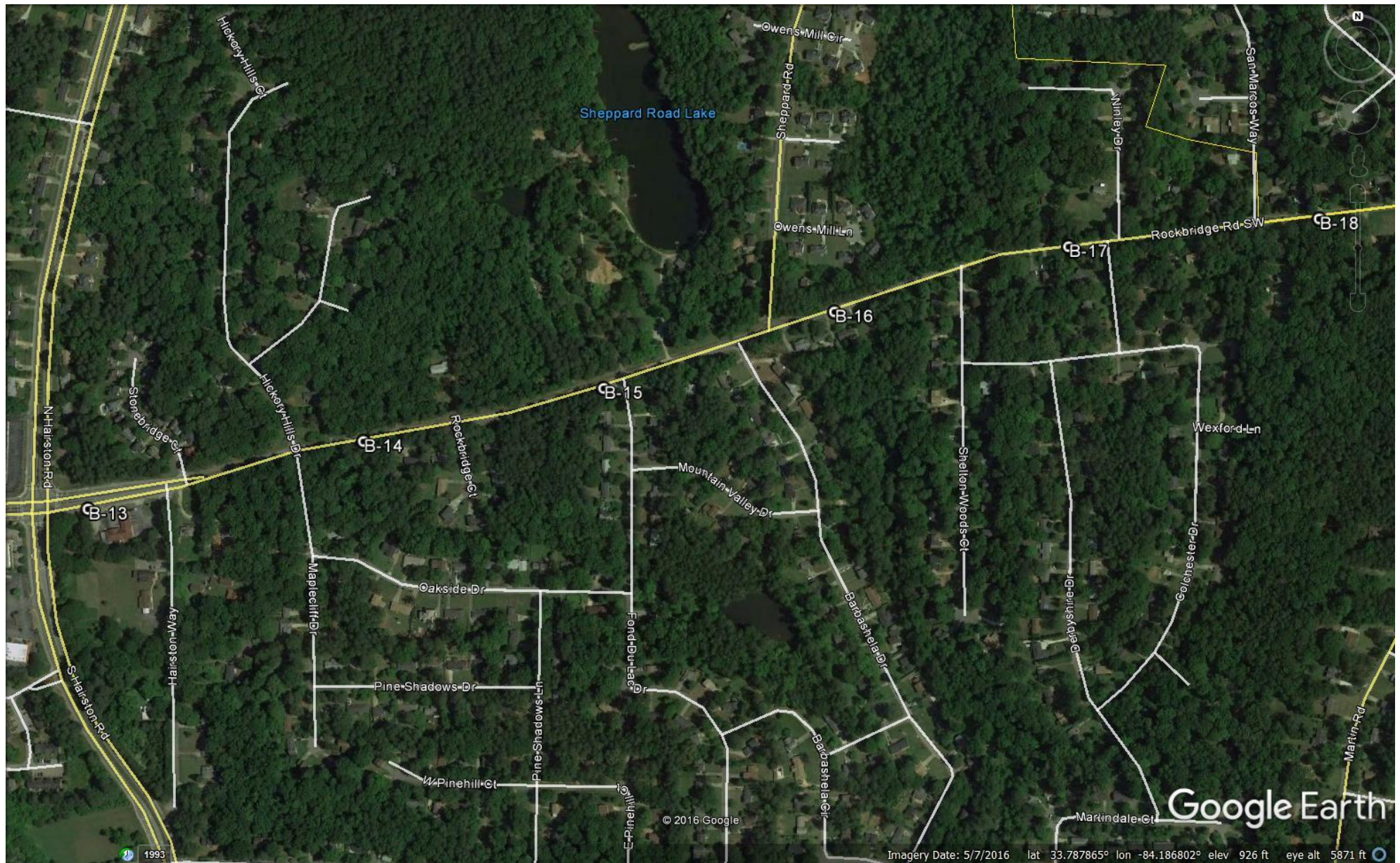
Figure 2: Boring Location Plan

Proposed Rockbridge Road Water Main Replacement
Rockbridge Road from Memorial to Deshon Road
DeKalb County, Georgia

SCALE: None DATE: 11/21/16 PSI PROJECT NO.: 472451

DRAWN BY: C. Coleman

CHECKED BY: J. Fiely



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Figure 3: Boring Location Plan

Proposed Rockbridge Road Water Main Replacement

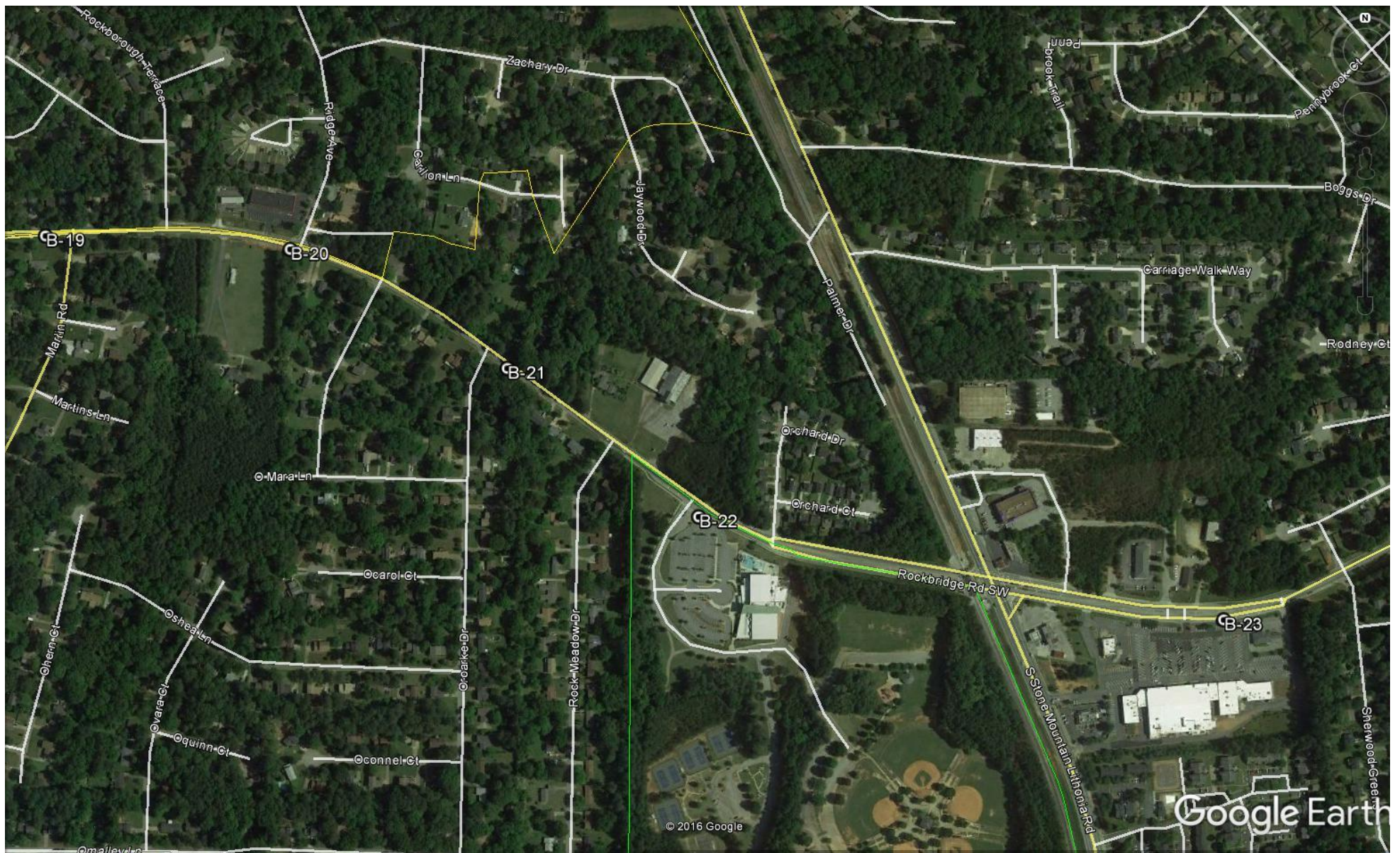
Rockbridge Road from Memorial to Deshon Road

DeKalb County, Georgia

SCALE: None DATE: 11/21/16 PSI PROJECT NO.: 472451

DRAWN BY: C. Coleman

CHECKED BY: J. Fiely



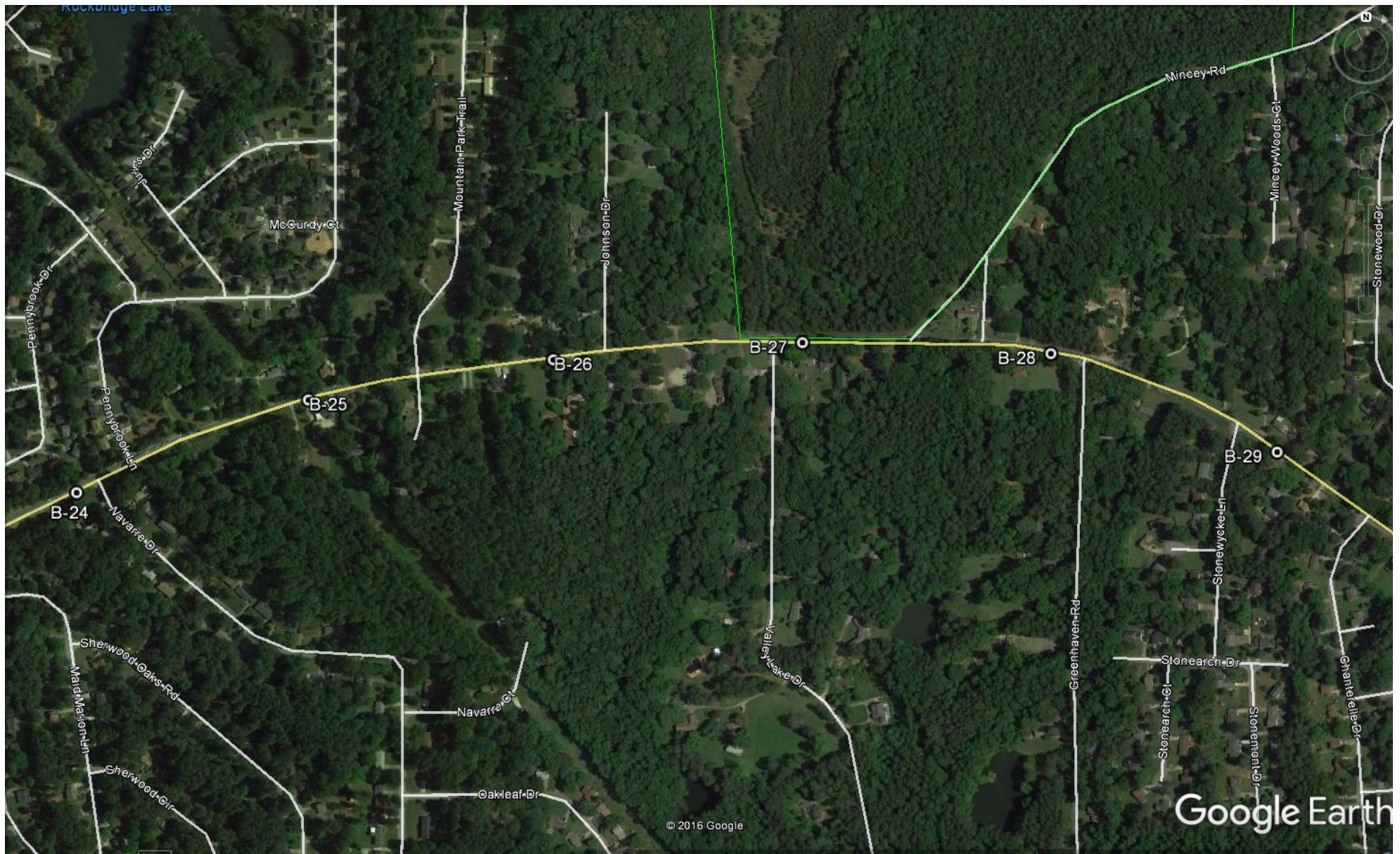
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Figure 4: Boring Location Plan

Proposed Rockbridge Road Water Main Replacement
Rockbridge Road from Memorial to Deshon Road
DeKalb County, Georgia

SCALE: None DATE: 11/21/16 PSI PROJECT NO.: 472451
DRAWN BY: C. Coleman CHECKED BY: J. Fiely



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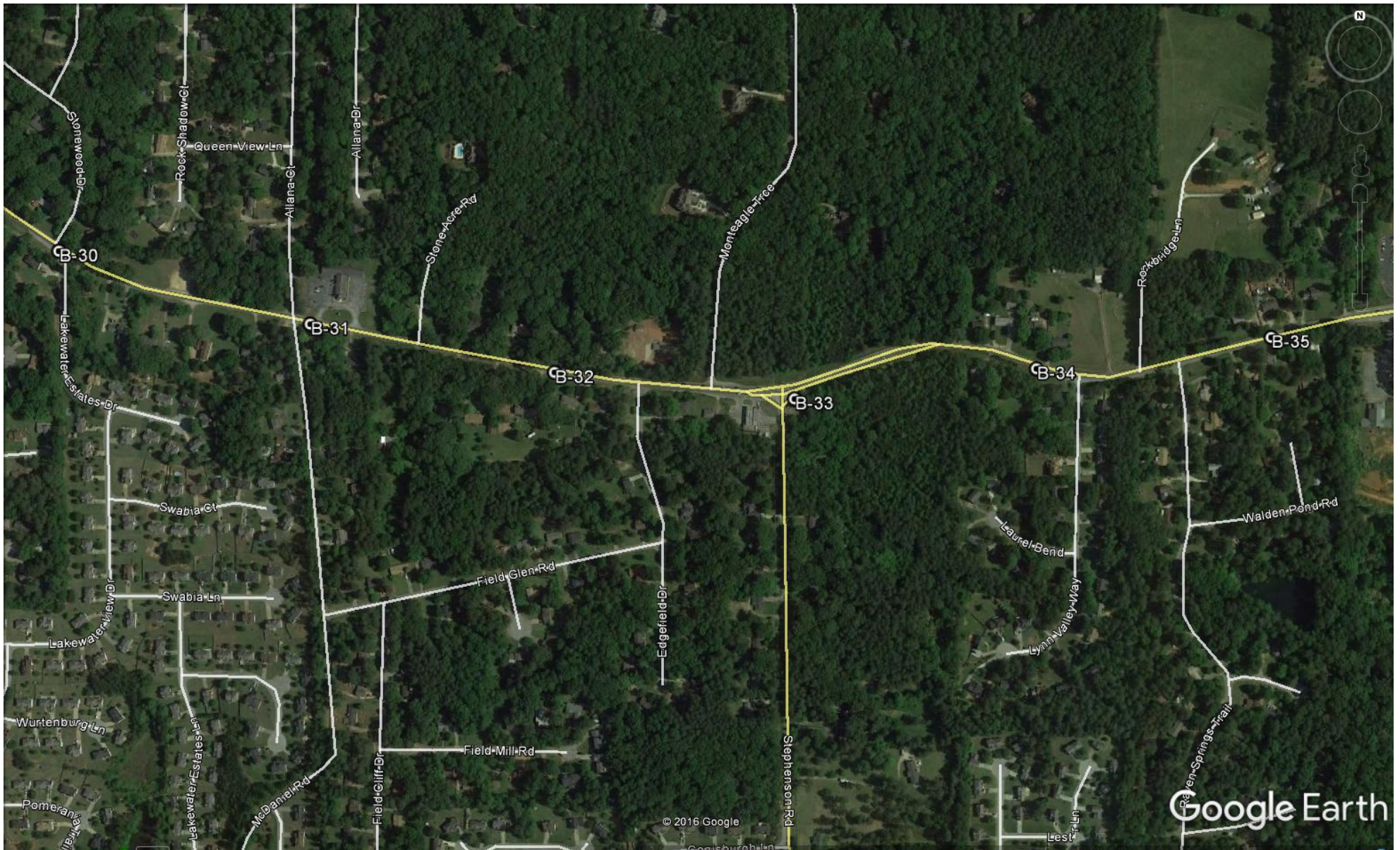
Figure 5: Boring Location Plan

Proposed Rockbridge Road Water Main Replacement
Rockbridge Road from Memorial to Deshon Road
DeKalb County, Georgia

SCALE: None DATE: 11/21/16 PSI PROJECT NO.: 472451

DRAWN BY: C. Coleman

CHECKED BY: J. Fiely



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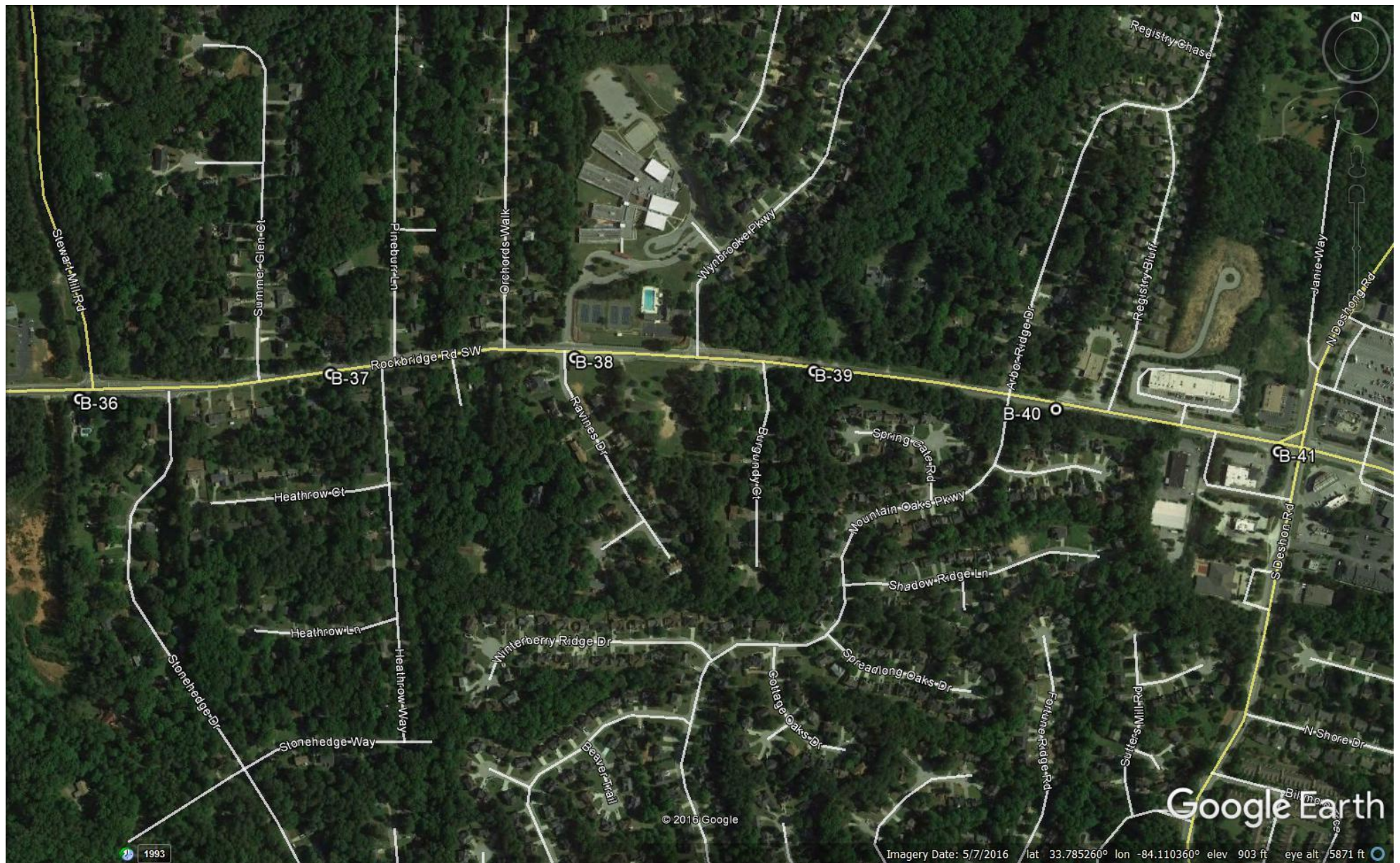
Figure 6: Boring Location Plan

Proposed Rockbridge Road Water Main Replacement
Rockbridge Road from Memorial to Deshon Road
DeKalb County, Georgia

SCALE: None DATE: 11/21/16 PSI PROJECT NO.: 472451

DRAWN BY: C. Coleman

CHECKED BY: J. Fiely



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Figure 7: Boring Location Plan

Proposed Rockbridge Road Water Main Replacement
Rockbridge Road from Memorial to Deshon Road
DeKalb County, Georgia

SCALE: None DATE: 11/21/16 PSI PROJECT NO.: 472451

DRAWN BY: C. Coleman

CHECKED BY: J. Fiely

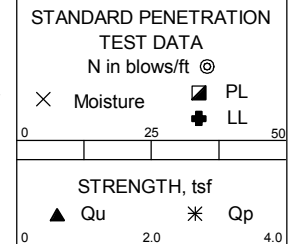
DATE STARTED: 11/10/16
 DATE COMPLETED: 11/10/16
 COMPLETION DEPTH: 10.0 ft
 BENCHMARK: N/A
 ELEVATION: N/A
 LATITUDE:
 LONGITUDE:
 STATION: N/A OFFSET: N/A
 REMARKS:

DRILL COMPANY: Drilling Solutions
 DRILLER: Jason LOGGED BY: C.Coleman
 DRILL RIG: D-50
 DRILLING METHOD: Hollow Stem Auger
 SAMPLING METHOD: SS
 HAMMER TYPE: Automatic
 EFFICIENCY: N/A
 REVIEWED BY: J. Fiely

BORING B-01		
Water	▽ While Drilling	N/A
	▼ Upon Completion	NONE
	▽ Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STRENGTH, tsf	Additional Remarks
0						FILL: Hard Moist Brown Tan Sandy SILT (MH), with rock fragments	MH	15-35-50/1"			
	5					RESIDUUM: Hard Moist Brown Red Sandy SILT (MH)	MH	10-18-19 N=37			
						Red		11-21-24 N=45			
	10					Moist Red Brown Sandy SILT (ML)	ML	10-14-20 N=34			
						Boring Terminated at 10 feet Groundwater Not Encountered Upon Drilling Completion					



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 Telephone: (770) 424-6200

PROJECT NO.: 472451
 PROJECT: Rockbridge Road
 LOCATION: Water Main Replacement
 Stone Mtn.
 DeKalb County, GA

DATE STARTED: 11/10/16
 DATE COMPLETED: 11/10/16
 COMPLETION DEPTH: 4.0 ft
 BENCHMARK: N/A
 ELEVATION: N/A
 LATITUDE:
 LONGITUDE:
 STATION: N/A OFFSET: N/A
 REMARKS:

DRILL COMPANY: Drilling Solutions
 DRILLER: Jason LOGGED BY: C.Coleman
 DRILL RIG: D-50
 DRILLING METHOD: Hollow Stem Auger
 SAMPLING METHOD: SS
 HAMMER TYPE: Automatic
 EFFICIENCY: N/A
 REVIEWED BY: J. Fiely

BORING B-02

Water	▽ While Drilling	N/A
	▼ Upon Completion	NONE
	▽ Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA		Additional Remarks
										N in blows/ft ⊙		
0						RESIDUUM: Medium Dense Moist Brown Red Silty SAND (SM)						
						Brown Red Tan	SM	7-11-16 N=27				
						Brown Red	SM	7-10-12 N=22				
						Loose Moist Gray Black Silty SAND (SM), trace clay	SM	4-6-6 N=12				
						Boring Terminated at 10 feet Groundwater Not Encountered Upon Drilling Completion		4-5-5 N=10				



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 Stone Mtn.
 DeKalb County, GA

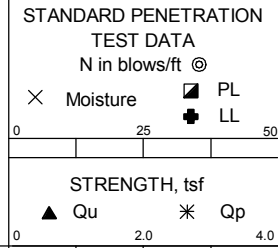
DATE STARTED: 11/14/16 **DRILL COMPANY:** Drilling Solutions
DATE COMPLETED: 11/14/16 **DRILLER:** Jason **LOGGED BY:** C.Coleman
COMPLETION DEPTH: 6.0 ft **DRILL RIG:** D-50
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** SS
LATITUDE: **HAMMER TYPE:** Automatic
LONGITUDE: **EFFICIENCY:** N/A
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** J. Fiely
REMARKS:

BORING B-03

Water	▽ While Drilling	N/A
	▼ Upon Completion	NONE
	▽ Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STRENGTH, tsf	Additional Remarks
0						RESIDUUM: Hard Moist Red Brown Sandy SILT (ML)	ML	11-15-22 N=37			
						Dense Moist Red Brown Tan Silty SAND (SM)	SM	10-15-18 N=33			
	5					Medium Dense Moist Red Brown Tan Silty SAND (SM)	SM	8-11-9 N=20			
						Tan Gray		6-9-9 N=18			
						Boring Terminated at 10 feet Groundwater Not Encountered Upon Drilling Completion					



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 Stone Mtn.
 DeKalb County, GA

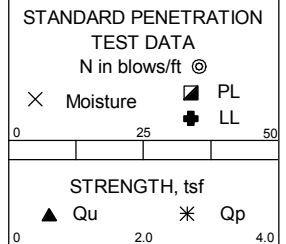
DATE STARTED: 11/10/16 **DRILL COMPANY:** Drilling Solutions
DATE COMPLETED: 11/10/16 **DRILLER:** Jason **LOGGED BY:** C.Coleman
COMPLETION DEPTH: 10.0 ft **DRILL RIG:** D-50
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** SS
LATITUDE: **HAMMER TYPE:** Automatic
LONGITUDE: **EFFICIENCY:** N/A
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** J. Fiely
REMARKS:

BORING B-04

Water	▽ While Drilling	N/A
	▼ Upon Completion	NONE
	▽ Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STRENGTH, tsf	Additional Remarks
0						FILL: Medium Dense Moist Gray Tan Silty SAND (SM)	SM	13-7-9 N=16			
						RESIDUUM: Dense Moist Tan Brown Red Black Silty SAND (SM), trace clay	SM	18-12-9 N=21			
	5					Gray Tan Brown, trace clay		5-11-14 N=25			
						Dense Moist Brown Black Tan Gray Silty SAND (SM)	SM	18-26-22 N=48			
	10					Boring Terminated at 10 feet Groundwater Not Encountered Upon Drilling Completion					



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PROJECT NO.: 472451
PROJECT: Rockbridge Road
LOCATION: Water Main Replacement
 Stone Mtn.
 DeKalb County, GA

DATE STARTED: 11/14/16 **DRILL COMPANY:** Drilling Solutions
DATE COMPLETED: 11/14/16 **DRILLER:** Jason **LOGGED BY:** C.Coleman
COMPLETION DEPTH: 7.0 ft **DRILL RIG:** D-50
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** SS
LATITUDE: **HAMMER TYPE:** Automatic
LONGITUDE: **EFFICIENCY:** N/A
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** J. Fiely

BORING B-05

Water	▽	While Drilling	N/A
	▼	Upon Completion	NONE
	▽	Delay	N/A

BORING LOCATION: _____

Elevation (feet)	Depth (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	Additional Remarks	
	0	[Cross-hatched pattern]				FILL: Dense Moist Red Brown Tan Silty SAND (SM), with mica	SM	11-20-21 N=41		X Moisture ◻ PL ◻ LL ▲ Qu * Qp		
	5	[Dotted pattern]				RESIDUUM: Dense Moist Red Brown Tan Silty SAND (SM), with mica	SM	6-17-24 N=41		0 25 50 0 2.0 4.0		
						Medium Dense Moist Red Brown Tan Silty SAND (SM), with mica	SM	13-16-15 N=31				
						Boring Terminated at 10 feet Groundwater Not Encountered Upon Drilling Completion		7-8-12 N=20				



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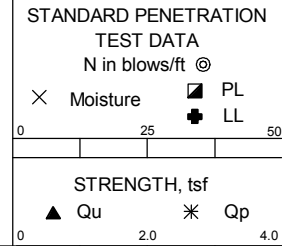
DATE STARTED: 11/10/16 **DRILL COMPANY:** Drilling Solutions
DATE COMPLETED: 11/10/16 **DRILLER:** Jason **LOGGED BY:** C.Coleman
COMPLETION DEPTH: 10.0 ft **DRILL RIG:** D-50
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** SS
LATITUDE: **HAMMER TYPE:** Automatic
LONGITUDE: **EFFICIENCY:** N/A
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** J. Fiely

BORING B-06

Water	▽ While Drilling	N/A
	▼ Upon Completion	NONE
	▽ Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STRENGTH, tsf	Additional Remarks
0						FILL: Medium Dense Moist Brown Red Clayey SAND (SC)	SC	9-10-12 N=22			
						RESIDUUM: Medium Dense Moist Brown Red Clayey SAND (SC)	SC	7-9-11 N=20			
	5					Brown Black		6-10-8 N=18			
						Dense Moist Brown Red Tan Black Silty SAND (SM)	SM	10-14-17 N=31			
	10					Boring Terminated at 10 feet Groundwater Not Encountered Upon Drilling Completion					



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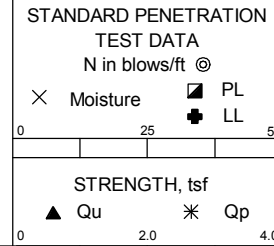
DATE STARTED: 11/10/16 **DRILL COMPANY:** Drilling Solutions
DATE COMPLETED: 11/10/16 **DRILLER:** Jason **LOGGED BY:** C.Coleman
COMPLETION DEPTH: 7.0 ft **DRILL RIG:** D-50
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** SS
LATITUDE: **HAMMER TYPE:** Automatic
LONGITUDE: **EFFICIENCY:** N/A
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** J. Fiely
REMARKS:

BORING B-08

Water	▽ While Drilling	N/A
	▼ Upon Completion	NONE
	▽ Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STRENGTH, tsf	Additional Remarks
0						FILL: Very Dense Moist Brown Red Silty SAND (SM)	SM	19-23-30 N=53			
						RESIDUUM: Medium Dense Moist Red Brown Silty SAND (SM)		11-13-16 N=29			
	5					White Red Brown, trace clay	SM	8-8-8 N=16			
						White Tan		7-8-8 N=16			
						Boring Terminated at 10 feet Groundwater Not Encountered Upon Drilling Completion					



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 Stone Mtn.
 DeKalb County, GA

DATE STARTED: 11/10/16 **DRILL COMPANY:** Drilling Solutions
DATE COMPLETED: 11/10/16 **DRILLER:** Jason **LOGGED BY:** C.Coleman
COMPLETION DEPTH: 25.0 ft **DRILL RIG:** D-50
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** SS
LATITUDE: **HAMMER TYPE:** Automatic
LONGITUDE: **EFFICIENCY:** N/A
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** J. Fiely

BORING B-09

Water	<input type="checkbox"/>	While Drilling	N/A
	<input type="checkbox"/>	Upon Completion	NONE
	<input type="checkbox"/>	Delay	N/A

BORING LOCATION: _____

Elevation (feet)	Depth (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	Additional Remarks
0						PARTIALLY WEATHERED ROCK: Sampled as Brown Silty SAND, with rock fragments		11-50/4		X Moisture <input type="checkbox"/> PL <input type="checkbox"/> LL	>>⊕
	5					RESIDUUM: Very Dense Moist Brown Silty SAND (SM)	SM	19-30-36 N=66			>>⊕
						No Recovery		50/6			>>⊕
	10					Boring Terminated at 10 feet Groundwater Not Encountered Upon Drilling Completion		25-36-60/3			>>⊕
	15										
	20										
	25										



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PROJECT NO.: 472451
PROJECT: Rockbridge Road
LOCATION: Water Main Replacement
 Stone Mtn.
 DeKalb County, GA

The stratification lines represent approximate boundaries. The transition may be gradual.

DATE STARTED: 11/13/16 **DRILL COMPANY:** Drilling Solutions
DATE COMPLETED: 11/13/16 **DRILLER:** Jason **LOGGED BY:** C.Coleman
COMPLETION DEPTH: 50.0 ft **DRILL RIG:** D-50
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** SS
LATITUDE: _____ **HAMMER TYPE:** Automatic
LONGITUDE: _____ **EFFICIENCY:** N/A
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** J. Fiely
REMARKS: _____

BORING B-10

Water	▽	While Drilling	N/A
	▼	Upon Completion	NONE
	▽	Delay	N/A

BORING LOCATION: _____

Elevation (feet)	Depth (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ⊙ × Moisture ◻ PL ⊕ LL	STRENGTH, tsf ▲ Qu * Qp	Additional Remarks	
0						RESIDUUM: Hard Moist Red Brown Sandy SILT (ML)	ML	13-13-19 N=32					
							Dense Moist Red Brown Tan Silty SAND (SM)	SM	10-21-22 N=43				
							PARTIALLY WEATHERED ROCK: Sampled as Gray White Silty SAND		50/5"			>> ⊙	
							Boring Terminated at 10 feet Groundwater Not Encountered Upon Drilling Completion		50/0"			>> ⊙	
10													
15													
20													
25													
30													
35													
40													



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PROJECT NO.: 472451
PROJECT: Rockbridge Road
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 DeKalb County, GA

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DATE STARTED: 11/10/16 **DRILL COMPANY:** Drilling Solutions
DATE COMPLETED: 11/10/16 **DRILLER:** Jason **LOGGED BY:** C.Coleman
COMPLETION DEPTH: 8.0 ft **DRILL RIG:** D-50
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** SS
LATITUDE: _____ **HAMMER TYPE:** Automatic
LONGITUDE: _____ **EFFICIENCY:** N/A
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** J. Fiely
REMARKS: _____

BORING B-11

Water	▽	While Drilling	N/A
	▼	Upon Completion	NONE
	▽	Delay	N/A

BORING LOCATION: _____

Elevation (feet)	Depth (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ⊙ × Moisture ⊠ PL ⊕ LL	STRENGTH, tsf ▲ Qu * Qp	Additional Remarks
	0	[Cross-hatched pattern]				FILL: Dense Moist Red Brown Micaceous Silty SAND (SM)	SM	9-17-32 N=49				
	5	[Dotted pattern]				RESIDUUM: Dense Moist Red Brown Micaceous Silty SAND (SM)	SM	12-18-24 N=42				
						Boring Terminated at 10 feet Groundwater Not Encountered Upon Drilling Completion		10-19-29 N=48				
								8-13-11 N=24				



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DATE STARTED: 11/10/16 **DRILL COMPANY:** Drilling Solutions
DATE COMPLETED: 11/10/16 **DRILLER:** Jason **LOGGED BY:** C.Coleman
COMPLETION DEPTH: 11.0 ft **DRILL RIG:** D-50
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** SS
LATITUDE: **HAMMER TYPE:** Automatic
LONGITUDE: **EFFICIENCY:** N/A
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** J. Fiely

BORING B-12

Water	▽	While Drilling	N/A
	▼	Upon Completion	NONE
	▽	Delay	N/A

BORING LOCATION: _____

Elevation (feet)	Depth (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ⊙ × Moisture ▣ PL ⊕ LL	STRENGTH, tsf ▲ Qu * Qp	Additional Remarks
0						RESIDUUM: Hard Moist Red Sandy SILT (MH), with rock fragments	MH	10-23-30 N=53				>> ⊙
	5						MH	10-20-26 N=46				⊙
							MH	18-26-36 N=62				>> ⊙
	10					Dense Moist Red Silty SAND (SM), with rock fragments	SM	11-16-18 N=34				⊙
						Boring Terminated at 10 feet Groundwater Not Encountered Upon Drilling Completion						



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 DeKalb County, GA

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DATE STARTED: 11/13/16 **DRILL COMPANY:** Drilling Solutions
DATE COMPLETED: 11/13/16 **DRILLER:** Jason **LOGGED BY:** C.Coleman
COMPLETION DEPTH: 6.0 ft **DRILL RIG:** D-50
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** SS
LATITUDE: **HAMMER TYPE:** Automatic
LONGITUDE: **EFFICIENCY:** N/A
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** J. Fiely
REMARKS:

BORING B-13

Water	▽	While Drilling	N/A
	▼	Upon Completion	NONE
	▽	Delay	N/A

BORING LOCATION: _____

Elevation (feet)	Depth (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ⊙ × Moisture ▣ PL ▣ LL	STRENGTH, tsf ▲ Qu * Qp	Additional Remarks
	0	[Cross-hatched pattern]				FILL: Medium Dense Moist Red Brown Silty SAND (SM), with rock fragments	SM	8-11-10 N=21		⊙		
	5	[Cross-hatched pattern]				FILL: Loose Moist Red Brown Silty SAND (SM), with rock fragments	SM	3-5-5 N=10		⊙		
		[Dotted pattern]				RESIDUUM: Medium Dense to Dense Moist Red Brown Tan Silty SAND (SM)	SM	6-8-15 N=23		⊙		
						Boring Terminated at 10 feet Groundwater Not Encountered Upon Drilling Completion Cave-in at 4 feet		6-10-20 N=30		⊙		



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 Stone Mtn.
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DATE STARTED: 11/13/16 **DRILL COMPANY:** Drilling Solutions
DATE COMPLETED: 11/13/16 **DRILLER:** Jason **LOGGED BY:** C.Coleman
COMPLETION DEPTH: 6.0 ft **DRILL RIG:** D-50
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** SS
LATITUDE: **HAMMER TYPE:** Automatic
LONGITUDE: **EFFICIENCY:** N/A
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** J. Fiely
REMARKS:

BORING B-14B

Water	▽	While Drilling	N/A
	▼	Upon Completion	NONE
	▽	Delay	N/A

BORING LOCATION: _____

Elevation (feet)	Depth (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	Additional Remarks
	0					Straight Augered to 3.5 feet				X Moisture □ PL + LL	
	5					PARTIALLY WEATHERED ROCK: Sampled as Gray Silty SAND, with mica *		50/1"			>>⊕
						Auger Refusal at 6 feet Groundwater Not Encountered Upon Drilling Completion Offset from Boring B-14 * Partially weathered rock is rock like and will likely require blasting to remove in a trench excavations.					



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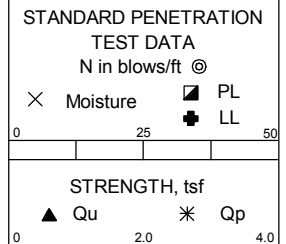
DATE STARTED: 11/11/16 **DRILL COMPANY:** Drilling Solutions
DATE COMPLETED: 11/11/16 **DRILLER:** Jason **LOGGED BY:** C.Coleman
COMPLETION DEPTH: 8.0 ft **DRILL RIG:** D-50
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** SS
LATITUDE: **HAMMER TYPE:** Automatic
LONGITUDE: **EFFICIENCY:** N/A
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** J. Fiely
REMARKS:

BORING B-15

Water	▽ While Drilling	N/A
	▼ Upon Completion	NONE
	▽ Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STRENGTH, tsf	Additional Remarks
0	0					RESIDUUM: Medium Dense Moist Red Silty SAND (SM)					
						Red Tan	SM	8-10-14 N=24			
	5							11-11-18 N=29			
								9-11-18 N=29			
						Boring Terminated at 10 feet Groundwater Not Encountered Upon Drilling Completion		8-12-15 N=27			



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DATE STARTED: 11/13/16 **DRILL COMPANY:** Drilling Solutions
DATE COMPLETED: 11/13/16 **DRILLER:** Jason **LOGGED BY:** C.Coleman
COMPLETION DEPTH: 3.0 ft **DRILL RIG:** D-50
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** SS
LATITUDE: **HAMMER TYPE:** Automatic
LONGITUDE: **EFFICIENCY:** N/A
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** J. Fiely
REMARKS:

BORING B-16

Water	▽ While Drilling	N/A
	▼ Upon Completion	NONE
	▽ Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	Additional Remarks
0						Asphalt Thickness = 6 inches FILL: Medium Dense Moist Red Brown Silty SAND (SM)	SM	5-7-11 N=18		X Moisture □ PL + LL 0 25 50	
						RESIDUUM: Medium Dense Moist Red Brown Tan Silty SAND (SM), with mica	SM	6-7-9 N=16			
								5-6-8 N=14			
								3-6-8 N=14			
						Boring Terminated at 10 feet Groundwater Not Encountered Upon Drilling Completion Cave-in at 4 feet					



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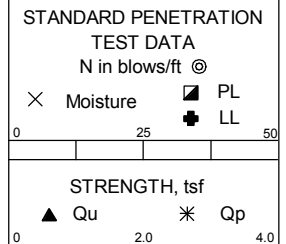
DATE STARTED: 11/13/16 **DRILL COMPANY:** Drilling Solutions
DATE COMPLETED: 11/13/16 **DRILLER:** Jason **LOGGED BY:** C.Coleman
COMPLETION DEPTH: 10.0 ft **DRILL RIG:** D-50
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** SS
LATITUDE: **HAMMER TYPE:** Automatic
LONGITUDE: **EFFICIENCY:** N/A
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** J. Fiely

BORING B-17

Water	▽ While Drilling	N/A
	▼ Upon Completion	NONE
	▽ Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STRENGTH, tsf	Additional Remarks
0	0					Asphalt Thickness = 8 inches	SM	3-11-15 N=26			
						FILL: Medium Dense Moist Red Brown Gray Silty SAND (SM), with asphalt fragments					
	5					RESIDUUM: Dense Moist Red Brown Gray Silty SAND (SM), with mica	SM	8-15-19 N=34			
								11-19-17 N=36			
	10					Boring Terminated at 10 feet Groundwater Not Encountered Upon Drilling Cave-in at 5 feet		15-18-21 N=39			



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PROJECT: Rockbridge Road
LOCATION: Water Main Replacement
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 DeKalb County, GA

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DATE STARTED: 11/15/16 **DRILL COMPANY:** Drilling Solutions
DATE COMPLETED: 11/15/16 **DRILLER:** Jason **LOGGED BY:** C.Coleman
COMPLETION DEPTH: 7.0 ft **DRILL RIG:** D-50
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** SS
LATITUDE: **HAMMER TYPE:** Automatic
LONGITUDE: **EFFICIENCY:** N/A
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** J. Fiely

BORING B-18

Water	▽	While Drilling	N/A
	▼	Upon Completion	NONE
	▽	Delay	N/A

BORING LOCATION: _____

Elevation (feet)	Depth (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ⊙ × Moisture ◼ PL ⊕ LL	Additional Remarks
										STRENGTH, tsf ▲ Qu * Qp	
0		[Asphalt]				Asphalt Thickness = 6 inches					
		[Silty Sand]				RESIDUUM: Medium Dense Moist Red Brown Tan Silty SAND (SM), with mica		11-12-15 N=27		⊙	
	5	[Tan Gray]				Tan Gray	SM	4-7-10 N=17		⊙	
								7-14-12 N=26		⊙	
								7-8-10 N=18		⊙	
						Boring Terminated at 10 feet Groundwater Not Encountered Upon Drilling Completion Cave-in at 4½ feet					



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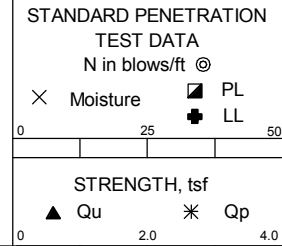
DATE STARTED: 11/15/16 **DRILL COMPANY:** Drilling Solutions
DATE COMPLETED: 11/15/16 **DRILLER:** Jason **LOGGED BY:** C.Coleman
COMPLETION DEPTH: 6.0 ft **DRILL RIG:** D-50
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** SS
LATITUDE: **HAMMER TYPE:** Automatic
LONGITUDE: **EFFICIENCY:** N/A
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** J. Fiely
REMARKS:

BORING B-19

Water	▽ While Drilling	N/A
	▼ Upon Completion	NONE
	▽ Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STRENGTH, tsf	Additional Remarks
0						Asphalt Thickness = 6 inches	ML	12-15-13 N=28			
						FILL: Very Stiff Moist Red Brown Sandy SILT (ML), with rock fragments	ML	10-14-14 N=28			
	5					RESIDUUM: Very Stiff Moist Red Brown Sandy SILT (ML)	ML	14-26-27 N=53			
						Hard Moist Red Brown Sandy SILT (ML)	ML	6-13-16 N=29			
						Boring Terminated at 10 feet Groundwater Not Encountered Upon Drilling Completion Cave-in at 6 feet					



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DATE STARTED: 11/15/16 **DRILL COMPANY:** Drilling Solutions
DATE COMPLETED: 11/15/16 **DRILLER:** Jason **LOGGED BY:** C.Coleman
COMPLETION DEPTH: 5.0 ft **DRILL RIG:** D-50
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** SS
LATITUDE: **HAMMER TYPE:** Automatic
LONGITUDE: **EFFICIENCY:** N/A
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** J. Fiely
REMARKS:

BORING B-20

Water	▽	While Drilling	N/A
	▼	Upon Completion	NONE
	▽	Delay	N/A

BORING LOCATION: _____

Elevation (feet)	Depth (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	Additional Remarks
0						RESIDUUM: Medium Dense Moist Red Brown Tan Silty SAND (SM), with mica	SM	5-10-12 N=22			
			Dense Moist Gray Tan Red Silty SAND (SM), with mica	SM	10-15-20 N=35						
5			Medium Dense Moist Gray Tan Red Silty SAND (SM), with mica	SM	5-9-12 N=21						
			Boring Terminated at 10 feet Groundwater Not Encountered Upon Drilling Completion		5-7-11 N=18						



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DATE STARTED: 11/11/16 **DRILL COMPANY:** Drilling Solutions
DATE COMPLETED: 11/11/16 **DRILLER:** Jason **LOGGED BY:** C.Coleman
COMPLETION DEPTH: 8.0 ft **DRILL RIG:** D-50
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** SS
LATITUDE: **HAMMER TYPE:** Automatic
LONGITUDE: **EFFICIENCY:** N/A
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** J. Fiely
REMARKS:

BORING B-21

Water	▽ While Drilling	N/A
	▼ Upon Completion	NONE
	▽ Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ⊙ × Moisture ⊠ PL ⊕ LL	STRENGTH, tsf ▲ Qu * Qp	Additional Remarks
0						FILL: Medium Dense Moist Red Tan Silty SAND (SM), with rock fragments	SM	10-10-10 N=20				
						No Recovery		15-14-16 N=30				
5						RESIDUUM: Dense Moist Red Tan Silty SAND (SM), trace clay and mica	SM	13-22-25 N=47				
						Medium Dense Moist Black Silty SAND (SM), trace clay and mica	SM	8-10-11 N=21				
						Boring Terminated at 10 feet Groundwater Not Encountered Upon Drilling Completion						



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DATE STARTED: 11/11/16 **DRILL COMPANY:** Drilling Solutions
DATE COMPLETED: 11/11/16 **DRILLER:** Jason **LOGGED BY:** C.Coleman
COMPLETION DEPTH: 7.0 ft **DRILL RIG:** D-50
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** SS
LATITUDE: **HAMMER TYPE:** Automatic
LONGITUDE: **EFFICIENCY:** N/A
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** J. Fiely
REMARKS:

BORING B-22

Water	▽	While Drilling	N/A
	▼	Upon Completion	NONE
	▽	Delay	N/A

BORING LOCATION: _____

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ⊙ × Moisture ◼ PL ◼ LL	Additional Remarks
										STRENGTH, tsf ▲ Qu * Qp	
	0	[Cross-hatched pattern]				FILL: Very Dense Moist Tan Clayey SAND (SC)	SC	18-50/6			
	5	[Diagonal lines pattern]				RESIDUUM: Dense Moist Red Tan Clayey SAND (SC), trace clay	SC	7-16-17 N=33			
		[Dotted pattern]				Medium Dense Moist Red Tan Silty SAND (SM), trace clay Micaceous	SM	10-11-14 N=25			
						Boring Terminated at 10 feet Groundwater Not Encountered Upon Drilling Completion		7-12-14 N=26			



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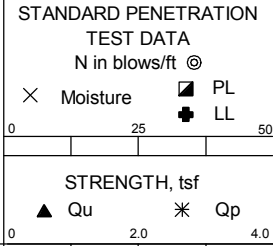
DATE STARTED: 11/11/16 **DRILL COMPANY:** Drilling Solutions
DATE COMPLETED: 11/11/16 **DRILLER:** Jason **LOGGED BY:** C.Coleman
COMPLETION DEPTH: 6.0 ft **DRILL RIG:** D-50
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** SS
LATITUDE: **HAMMER TYPE:** Automatic
LONGITUDE: **EFFICIENCY:** N/A
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** J. Fiely
REMARKS:

BORING B-23

Water	▽ While Drilling	N/A
	▼ Upon Completion	NONE
	▽ Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STRENGTH, tsf	Additional Remarks	
0						FILL: Medium Dense Brown Silty SAND (SM) with traces of clay and rock fragments	SM	9-8-7 N=15				
	5					RESIDUUM: Medium Dense Red Silty SAND (SM) with traces of clay	SM	5-7-7 N=14				
									4-5-6 N=11			
									6-7-8 N=15			
						Boring Terminated at 10 feet Groundwater Not Encountered Upon Drilling Completion Cave-in at 2 Feet						



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 Stone Mtn.
 DeKalb County, GA

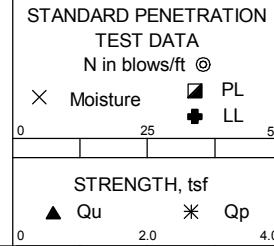
DATE STARTED: 11/11/16 **DRILL COMPANY:** Drilling Solutions
DATE COMPLETED: 11/11/16 **DRILLER:** Jason **LOGGED BY:** C.Coleman
COMPLETION DEPTH: 8.0 ft **DRILL RIG:** D-50
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** SS
LATITUDE: **HAMMER TYPE:** Automatic
LONGITUDE: **EFFICIENCY:** N/A
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** J. Fiely

BORING B-24

Water	▽ While Drilling	N/A
	▼ Upon Completion	NONE
	▽ Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STRENGTH, tsf	Additional Remarks
0						Asphalt Thickness = 6 inches FILL: Very Dense Brown, Red Silty SAND (SM) with rock fragments	SM	11-35-15 N=50			
	5					RESIDUUM: Dense Red, Brown Silty SAND (SM)	SM	9-18-28 N=46			
						Light Red, Gray		13-19-19 N=38			
						Medium Dense Light Red, Gray Silty SAND (SM)	SM	8-9-12 N=21			
						Boring Terminated at 10 feet Groundwater Not Encountered Upon Drilling Completion Cave-in at 6 Feet					



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PROJECT NO.: 472451
PROJECT: Rockbridge Road
LOCATION: Water Main Replacement
 Stone Mtn.
 DeKalb County, GA

DATE STARTED: 11/15/16 **DRILL COMPANY:** Drilling Solutions
DATE COMPLETED: 11/15/16 **DRILLER:** Jason **LOGGED BY:** C.Coleman
COMPLETION DEPTH: 9.0 ft **DRILL RIG:** D-50
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** SS
LATITUDE: **HAMMER TYPE:** Automatic
LONGITUDE: **EFFICIENCY:** N/A
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** J. Fiely

BORING B-25

Water
 ∇ While Drilling N/A
 ▼ Upon Completion NONE
 ▽ Delay N/A

BORING LOCATION:

Elevation (feet)	Depth (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ⊙ × Moisture ⊠ PL ⊕ LL	STRENGTH, tsf ▲ Qu * Qp	Additional Remarks
0						Asphalt Thickness = 7 inches	SM	20-12-9 N=21				
						FILL: Medium Dense Black, Red, Brown Silty SAND (SM) with rock fragments						
	5					RESIDUUM: Medium Dense Red, Brown, Tan Silty SAND (SM) with rock fragments	SM	9-13-16 N=29				
								9-14-16 N=30				
								9-13-17 N=30				
						Boring Terminated at 10 feet Groundwater Not Encountered Upon Drilling Completion						
						Cave-in at 4 Feet						



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PROJECT NO.: 472451
PROJECT: Rockbridge Road
LOCATION: Water Main Replacement
 Stone Mtn.
 DeKalb County, GA

DATE STARTED: 11/15/16
DATE COMPLETED: 11/15/16
COMPLETION DEPTH: 5.0 ft
BENCHMARK: N/A
ELEVATION: N/A
LATITUDE:
LONGITUDE:
STATION: N/A **OFFSET:** N/A
REMARKS:

DRILL COMPANY: Drilling Solutions
DRILLER: Jason **LOGGED BY:** C.Coleman
DRILL RIG: D-50
DRILLING METHOD: Hollow Stem Auger
SAMPLING METHOD: SS
HAMMER TYPE: Automatic
EFFICIENCY: N/A
REVIEWED BY: J. Fiely

BORING B-26

Water	▽	While Drilling	N/A
	▼	Upon Completion	NONE
	▽	Delay	N/A

BORING LOCATION: _____

Elevation (feet)	Depth (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ⊙ × Moisture ◻ PL + LL	Additional Remarks	
0						Asphalt Thickness = 5 inches FILL: Dense Tan, Red, Brown, Black Silty SAND (SM) with rock fragments	SM	12-21-14 N=35				
	5					RESIDUUM: Medium Dense Red, Brown Silty SAND (SM) with mica Red, Brown, Tan	SM	4-7-9 N=16 5-8-11 N=19 5-8-11 N=19	0	25	50	
						Boring Terminated at 10 feet Groundwater Not Encountered Upon Drilling Completion Cave-in at 5 Feet				0	2.0	4.0



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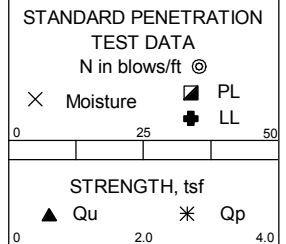
DATE STARTED: 11/15/16 **DRILL COMPANY:** Drilling Solutions
DATE COMPLETED: 11/15/16 **DRILLER:** Jason **LOGGED BY:** C.Coleman
COMPLETION DEPTH: 8.0 ft **DRILL RIG:** D-50
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** SS
LATITUDE: **HAMMER TYPE:** Automatic
LONGITUDE: **EFFICIENCY:** N/A
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** J. Fiely

BORING B-27

Water	▽ While Drilling	N/A
	▼ Upon Completion	NONE
	▽ Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STRENGTH, tsf	Additional Remarks
0						Asphalt Thickness = 6 inches	SM	8-20-20 N=40			
						FILL: Dense Brown Silty SAND (SM)	SM	13-26-25 N=51			
	5					RESIDUUM: Very Dense Red, Brown, Tan Silty SAND (SM) with mica	SM	9-13-13 N=26			
						Medium Dense Red, Brown, Tan Silty SAND (SM) with mica	SM	8-9-11 N=20			
						Boring Terminated at 10 feet Groundwater Not Encountered Upon Drilling Completion					
						Cave-in at 7 Feet					



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 DeKalb County, GA

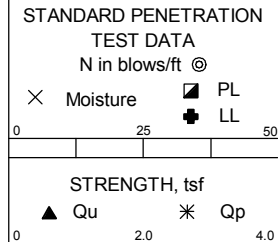
DATE STARTED: 11/15/16 **DRILL COMPANY:** Drilling Solutions
DATE COMPLETED: 11/15/16 **DRILLER:** Jason **LOGGED BY:** C.Coleman
COMPLETION DEPTH: 21.0 ft **DRILL RIG:** D-50
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** SS
LATITUDE: **HAMMER TYPE:** Automatic
LONGITUDE: **EFFICIENCY:** N/A
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** J. Fiely

BORING B-28

Water	▽ While Drilling	N/A
	▼ Upon Completion	NONE
	▽ Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STRENGTH, tsf	Additional Remarks
0		Asphalt				Asphalt Thickness = 6 inches FILL: Dense Brown, Gray Silty SAND (SM) with rock fragments	SM	19-14-16 N=30			
5						RESIDUUM: Medium Dense Red, Brown, Tan Silty SAND (SM) with mica	SM	9-11-14 N=25			
10						Dense Red, Brown, Tan Silty SAND (SM) with mica	SM	8-12-8 N=20			
10						Boring Terminated at 10 feet Groundwater Not Encountered Upon Drilling Completion		21-13-17 N=30			
						Cave-in at 7 Feet					



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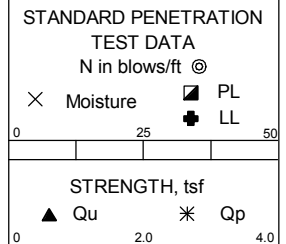
DATE STARTED: 11/15/16 **DRILL COMPANY:** Drilling Solutions
DATE COMPLETED: 11/15/16 **DRILLER:** Jason **LOGGED BY:** C.Coleman
COMPLETION DEPTH: 8.0 ft **DRILL RIG:** D-50
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** SS
LATITUDE: **HAMMER TYPE:** Automatic
LONGITUDE: **EFFICIENCY:** N/A
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** J. Fiely

BORING B-29

Water	▽ While Drilling	N/A
	▼ Upon Completion	NONE
	▽ Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STRENGTH, tsf	Additional Remarks
0	0					Asphalt Thickness = 6 inches	SM	14-26-27 N=53			
	5					FILL: Very Dense Red, Brown, Gray Silty SAND (SM) with rock fragments RESIDUUM: Dense Purple, Tan, Gray Silty SAND (SM) with mica	SM	13-14-22 N=36 12-16-23 N=39 8-13-18 N=31			
						Boring Terminated at 10 feet Groundwater Not Encountered Upon Drilling Completion Cave-in at 6 Feet					



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DATE STARTED: 11/15/16 **DRILL COMPANY:** Drilling Solutions
DATE COMPLETED: 11/15/16 **DRILLER:** Jason **LOGGED BY:** C.Coleman
COMPLETION DEPTH: 10.0 ft **DRILL RIG:** D-50
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** SS
LATITUDE: _____ **HAMMER TYPE:** Automatic
LONGITUDE: _____ **EFFICIENCY:** N/A
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** J. Fiely

BORING B-30

Water	▽	While Drilling	N/A
	▼	Upon Completion	NONE
	▽	Delay	N/A

BORING LOCATION: _____

Elevation (feet)	Depth (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ⊙	Additional Remarks
0		[Asphalt Layer]				Asphalt Thickness = 5 inches					
		[Silty Sand]				RESIDUUM: Dense Red, Brown, Tan Silty SAND (SM) with rock fragments	SM	12-13-20 N=33	X	⊙	
	5	[Silty Sand]				Medium Dense Red, Brown, Tan Silty SAND (SM) with rock fragments	SM	11-23-24 N=47	□	⊙	
		[Silty Sand]					SM	11-17-10 N=27	+	⊙	
	10	[Silty Sand]				Boring Terminated at 10 feet Groundwater Not Encountered Upon Drilling Completion		10-12-11 N=23	△	⊙	
						Cave-in at 7 Feet				*	



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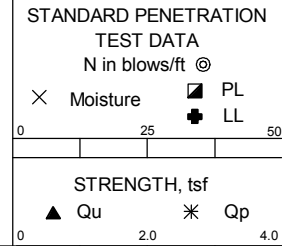
DATE STARTED: 11/16/16 **DRILL COMPANY:** Drilling Solutions
DATE COMPLETED: 11/16/16 **DRILLER:** Jason **LOGGED BY:** C.Coleman
COMPLETION DEPTH: 9.0 ft **DRILL RIG:** D-50
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** SS
LATITUDE: **HAMMER TYPE:** Automatic
LONGITUDE: **EFFICIENCY:** N/A
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** J. Fiely

BORING B-31

Water	▽ While Drilling	N/A
	▼ Upon Completion	NONE
	▽ Delay	N/A

BORING LOCATION: _____

Elevation (feet)	Depth (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	Additional Remarks
0						Asphalt Thickness = 6 inches FILL: Dense Red, Brown, Tan Silty SAND (SM)	SM	11-13-20 N=33			
	5					RESIDUUM: Very Dense Red, Brown, Tan Silty SAND (SM)	SM	11-16-37 N=53			
						Dense Red, Brown, Tan, Gray Silty SAND (SM)	SM	10-10-20 N=30			
						Medium Dense Red, Brown Tan, Gray Silty SAND (SM)	SM	9-9-17 N=26			
						Boring Terminated at 10 feet Groundwater Not Encountered Upon Drilling Completion Cave-in at 4 Feet					



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PROJECT: Rockbridge Road
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DATE STARTED: 11/16/16 **DRILL COMPANY:** Drilling Solutions
DATE COMPLETED: 11/16/16 **DRILLER:** Jason **LOGGED BY:** C.Coleman
COMPLETION DEPTH: 8.0 ft **DRILL RIG:** D-50
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** SS
LATITUDE: **HAMMER TYPE:** Automatic
LONGITUDE: **EFFICIENCY:** N/A
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** J. Fiely

BORING B-32

Water	▽ While Drilling	N/A
	▼ Upon Completion	NONE
	▽ Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STRENGTH, tsf	Additional Remarks
0						Asphalt Thickness = 6 inches					
						RESIDUUM: Hard Red, Brown Sandy SILT (MH), with mica	MH	10-25-15 N=40			
	5					Tan, Red, Brown		8-13-19 N=32			
						Medium Dense Tan, Red, Brown Silty SAND (SM)	SM	9-10-14 N=24			
						Boring Terminated at 10 feet Groundwater Not Encountered Upon Drilling Completion		8-10-11 N=21			
						Cave-in at 7 Feet					



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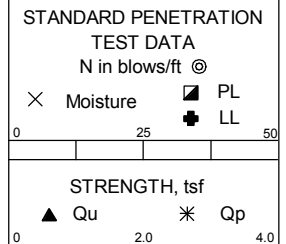
DATE STARTED: 11/16/16 **DRILL COMPANY:** Drilling Solutions
DATE COMPLETED: 11/16/16 **DRILLER:** Jason **LOGGED BY:** C.Coleman
COMPLETION DEPTH: 6.0 ft **DRILL RIG:** D-50
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** SS
LATITUDE: **HAMMER TYPE:** Automatic
LONGITUDE: **EFFICIENCY:** N/A
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** J. Fiely
REMARKS:

BORING B-33

Water	▽ While Drilling	N/A
	▼ Upon Completion	NONE
	▽ Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STRENGTH, tsf	Additional Remarks
0						FILL: Dense Red Silty SAND (SM) with rock fragments	SM	20-7-25 N=32			
	5					RESIDUUM: Very Dense Red Silty SAND (SM) with rock fragments	SM	28-30-45 N=75			
						Medium Dense Black Silty SAND (SM) Brown, Tan, Black	SM	7-12-13 N=25			
						Boring Terminated at 10 feet Groundwater Not Encountered Upon Drilling Completion Cave-in at 4 Feet		6-6-6 N=12			



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DATE STARTED: 11/11/16 **DRILL COMPANY:** Drilling Solutions
DATE COMPLETED: 11/11/16 **DRILLER:** Jason **LOGGED BY:** C.Coleman
COMPLETION DEPTH: 13.0 ft **DRILL RIG:** D-50
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** SS
LATITUDE: **HAMMER TYPE:** Automatic
LONGITUDE: **EFFICIENCY:** N/A
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** J. Fiely
REMARKS:

BORING B-34

Water	▽ While Drilling	N/A
	▼ Upon Completion	NONE
	▽ Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ⊙	Additional Remarks
0	0					Asphalt Thickness = 8 inches	SM				
						FILL Thickness = 6 inches	SM	13-26-26 N=52			
						RESIDUUM: Very Dense Tan, Black Silty SAND (SM) with mica	SM	7-11-17 N=28			
	5					Medium Dense Tan, Black, Gray Silty SAND (SM)	SM				
						No Sample Obtained					
						Dense Tan, Black, Gray Silty SAND (SM)	SM	13-19-19 N=38			
	10					Boring Terminated at 10 feet Groundwater Not Encountered Upon Drilling Completion					
						Cave-in at 5 Feet					



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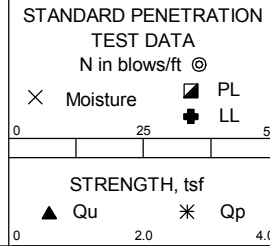
DATE STARTED: 11/16/16 **DRILL COMPANY:** Drilling Solutions
DATE COMPLETED: 11/16/16 **DRILLER:** Jason **LOGGED BY:** C.Coleman
COMPLETION DEPTH: 4.0 ft **DRILL RIG:** D-50
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** SS
LATITUDE: **HAMMER TYPE:** Automatic
LONGITUDE: **EFFICIENCY:** N/A
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** J. Fiely
REMARKS:

BORING B-35

Water	▽ While Drilling	N/A
	▼ Upon Completion	NONE
	▽ Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STRENGTH, tsf	Additional Remarks
0						Asphalt Thickness = 8 inches FILL: Very Dense Black, Brown Silty SAND (SM) with rock fragments	SM	16-20-30 N=50			
						RESIDUUM: Medium Dense Tan, Red, Brown Silty SAND (SM)	SM	6-9-11 N=20			
						Tan. Light Pink, Gray	SM	5-8-9 N=17			
						Boring Terminated at 10 feet Groundwater Not Encountered Upon Drilling Completion Cave-in at 4 Feet		4-8-8 N=16			



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DATE STARTED: 11/16/16 **DRILL COMPANY:** Drilling Solutions
DATE COMPLETED: 11/16/16 **DRILLER:** Jason **LOGGED BY:** C.Coleman
COMPLETION DEPTH: 5.0 ft **DRILL RIG:** D-50
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** SS
LATITUDE: **HAMMER TYPE:** Automatic
LONGITUDE: **EFFICIENCY:** N/A
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** J. Fiely
REMARKS:

BORING B-36

Water	▽ While Drilling	N/A
	▼ Upon Completion	NONE
	▽ Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @	Additional Remarks
0						Asphalt Thickness = 8 inches FILL Thickness = 6 inches RESIDUUM: Medium Dense Tan, Brown Silty SAND (SM)	SM	11-13-13 N=26		X Moisture ◻ PL ◻ LL	
	5					Tan, Gray, Black	SM	8-8-10 N=18		▲ Qu * Qp	
						Boring Terminated at 10 feet Groundwater Not Encountered Upon Drilling Completion Cave-in at 5 Feet		7-8-8 N=16 5-8-9 N=17			



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DATE STARTED: 11/16/16 **DRILL COMPANY:** Drilling Solutions
DATE COMPLETED: 11/16/16 **DRILLER:** Jason **LOGGED BY:** C.Coleman
COMPLETION DEPTH: 4.0 ft **DRILL RIG:** D-50
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** SS
LATITUDE: **HAMMER TYPE:** Automatic
LONGITUDE: **EFFICIENCY:** N/A
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** J. Fiely

BORING B-37

Water	▽ While Drilling	N/A
	▼ Upon Completion	NONE
	▽ Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ⊙ × Moisture ⊠ PL ⊕ LL	STRENGTH, tsf ▲ Qu * Qp	Additional Remarks
0						Asphalt Thickness = 7 inches FILL: Dense Brown Silty SAND (SM)	SM	11-10-24 N=34				
						RESIDUUM: Medium Dense Red, Brown Silty SAND (SM)	SM	7-10-11 N=21				
						Dense Red, Brown Silty SAND (SM)	SM	8-17-14 N=31				
						Medium Dense Gray, Red, Brown Silty SAND (SM)	SM	4-12-10 N=22				
						Boring Terminated at 10 feet Groundwater Not Encountered Upon Drilling Completion Cave-in at 5 Feet						



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 DeKalb County, GA

The stratification lines represent approximate boundaries. The transition may be gradual.

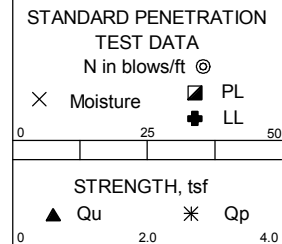
DATE STARTED: 11/16/16 **DRILL COMPANY:** Drilling Solutions
DATE COMPLETED: 11/16/16 **DRILLER:** Jason **LOGGED BY:** C.Coleman
COMPLETION DEPTH: 4.0 ft **DRILL RIG:** D-50
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** SS
LATITUDE: **HAMMER TYPE:** Automatic
LONGITUDE: **EFFICIENCY:** N/A
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** J. Fiely

BORING B-38

Water	▽ While Drilling	N/A
	▼ Upon Completion	NONE
	▽ Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STRENGTH, tsf	Additional Remarks
0						PARTIALLY WEATHERED ROCK: Sampled as Gray Sand		11-50/2			
						RESIDUUM: Loose Red, Brown Silty SAND (SM)	SM	4-4-6 N=10			
						Medium Dense Brown Silty SAND (SM) with rocks fragments	SM	4-7-9 N=16			
						Boring Terminated at 10 feet Groundwater Not Encountered Upon Drilling Completion					
						Cave-in at 4 Feet					



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 95 Chastain Road NW, Suite 301
 Kennesaw, GA 30144
 Telephone: (770) 424-6200

PROJECT NO.: 472451
PROJECT: Rockbridge Road
LOCATION: Water Main Replacement
 Stone Mtn.
 DeKalb County, GA

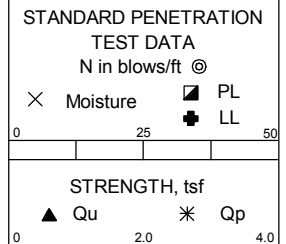
DATE STARTED: 11/11/16 **DRILL COMPANY:** Drilling Solutions
DATE COMPLETED: 11/11/16 **DRILLER:** Jason **LOGGED BY:** C.Coleman
COMPLETION DEPTH: 6.0 ft **DRILL RIG:** D-50
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** SS
LATITUDE: **HAMMER TYPE:** Automatic
LONGITUDE: **EFFICIENCY:** N/A
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** J. Fiely
REMARKS:

BORING B-39

Water	▽ While Drilling	N/A
	▼ Upon Completion	NONE
	▽ Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STRENGTH, tsf	Additional Remarks
0	0					Asphalt Thickness = 6 inches	SM	14-15-12 N=27			
	5					FILL: Medium Dense Red, Brown, Gray Silty SAND (SM) with rock fragments	SM	9-16-17 N=33			
						RESIDUUM: Dense Dark Gray, Red, Brown Silty SAND (SM)	SM	9-10-13 N=23			
						Medium Dense Tan, Red, Brown Silty SAND (SM)	SM	6-12-16 N=28			
						Boring Terminated at 10 feet Groundwater Not Encountered Upon Drilling Completion					
						Cave-in at 5 Feet					



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 Stone Mtn.
 DeKalb County, GA

DATE STARTED: 11/16/16 **DRILL COMPANY:** Drilling Solutions
DATE COMPLETED: 11/16/16 **DRILLER:** Jason **LOGGED BY:** C.Coleman
COMPLETION DEPTH: 50.0 ft **DRILL RIG:** D-50
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** SS
LATITUDE: **HAMMER TYPE:** Automatic
LONGITUDE: **EFFICIENCY:** N/A
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** J. Fiely
REMARKS:

BORING B-40

Water	▽ While Drilling	N/A
	▼ Upon Completion	NONE
	▽ Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ⊙ × Moisture ◻ PL + LL STRENGTH, tsf ▲ Qu * Qp	Additional Remarks
0						FILL: Medium Dense Brown Silty SAND (SM)	SM	12-16-12 N=28			
						RESIDUUM: Very Dense Gray Silty SAND (SM)	SM	4-15-43 N=58			>> ⊙
						PARTIALLY WEATHERED ROCK: Sampled as Gray Silty SAND *		50/3			>> ⊙
10						Boring Terminated at 10 feet Groundwater Not Encountered Upon Drilling Completion		50/0			>> ⊙
15						* Partially weathered rock is rock like and will likely require blasting to remove in a trench excavations.					
20											
25											
30											
35											
40											



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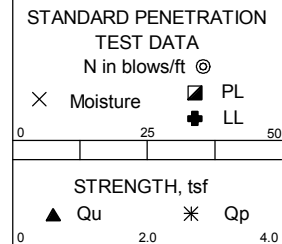
DATE STARTED: 11/16/16 **DRILL COMPANY:** Drilling Solutions
DATE COMPLETED: 11/16/16 **DRILLER:** Jason **LOGGED BY:** C.Coleman
COMPLETION DEPTH: 10.0 ft **DRILL RIG:** D-50
BENCHMARK: N/A **DRILLING METHOD:** Hollow Stem Auger
ELEVATION: N/A **SAMPLING METHOD:** SS
LATITUDE: **HAMMER TYPE:** Automatic
LONGITUDE: **EFFICIENCY:** N/A
STATION: N/A **OFFSET:** N/A **REVIEWED BY:** J. Fiely

BORING B-41

Water	▽ While Drilling	N/A
	▼ Upon Completion	NONE
	▽ Delay	N/A

BORING LOCATION:

Elevation (feet)	Depth (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STRENGTH, tsf	Additional Remarks
0	0					Asphalt Thickness = 5 inches	SM	21-14-15 N=29			
						FILL: Medium Dense Gray Silty SAND (SM) with rock fragments	SM	8-13-21 N=34			
	5					RESIDUUM: Dense Red, Brown Silty SAND (SM)	SM	10-12-16 N=28			
						Medium Dense Red, Brown Silty SAND (SM)	SM	10-12-14 N=26			
	10					Boring Terminated at 10 feet Groundwater Not Encountered Upon Drilling Completion					
						Cave-in at 5 Feet					



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GENERAL NOTES

SAMPLE IDENTIFICATION

The Unified Soil Classification System (USCS), AASHTO 1988 and ASTM designations D2487 and D-2488 are used to identify the encountered materials unless otherwise noted. Coarse-grained soils are defined as having more than 50% of their dry weight retained on a #200 sieve (0.075mm); they are described as: boulders, cobbles, gravel or sand. Fine-grained soils have less than 50% of their dry weight retained on a #200 sieve; they are defined as silts or clay depending on their Atterberg Limit attributes. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size.

DRILLING AND SAMPLING SYMBOLS

- SFA: Solid Flight Auger - typically 4" diameter flights, except where noted.
- HSA: Hollow Stem Auger - typically 3¼" or 4¼ I.D. openings, except where noted.
- M.R.: Mud Rotary - Uses a rotary head with Bentonite or Polymer Slurry
- R.C.: Diamond Bit Core Sampler
- H.A.: Hand Auger
- P.A.: Power Auger - Handheld motorized auger
- ☒ SS: Split-Spoon - 1 3/8" I.D., 2" O.D., except where noted.
- ST: Shelby Tube - 3" O.D., except where noted.
- ▮ RC: Rock Core
- ⬇ TC: Texas Cone
- ☞ BS: Bulk Sample
- ☒ PM: Pressuremeter
- CPT-U: Cone Penetrometer Testing with Pore-Pressure Readings

SOIL PROPERTY SYMBOLS

- N: Standard "N" penetration: Blows per foot of a 140 pound hammer falling 30 inches on a 2-inch O.D. Split-Spoon.
- N₆₀: A "N" penetration value corrected to an equivalent 60% hammer energy transfer efficiency (ETR)
- Q_u: Unconfined compressive strength, TSF
- Q_p: Pocket penetrometer value, unconfined compressive strength, TSF
- w%: Moisture/water content, %
- LL: Liquid Limit, %
- PL: Plastic Limit, %
- PI: Plasticity Index = (LL-PL),%
- DD: Dry unit weight, pcf
- ▼, ▽, ▾ Apparent groundwater level at time noted

RELATIVE DENSITY OF COARSE-GRAINED SOILS ANGULARITY OF COARSE-GRAINED PARTICLES

Relative Density	N - Blows/foot
Very Loose	0 - 4
Loose	4 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	50 - 80
Extremely Dense	80+

Description	Criteria
Angular:	Particles have sharp edges and relatively plane sides with unpolished surfaces
Subangular:	Particles are similar to angular description, but have rounded edges
Subrounded:	Particles have nearly plane sides, but have well-rounded corners and edges
Rounded:	Particles have smoothly curved sides and no edges

GRAIN-SIZE TERMINOLOGY

Component	Size Range
Boulders:	Over 300 mm (>12 in.)
Cobbles:	75 mm to 300 mm (3 in. to 12 in.)
Coarse-Grained Gravel:	19 mm to 75 mm (¾ in. to 3 in.)
Fine-Grained Gravel:	4.75 mm to 19 mm (No.4 to ¾ in.)
Coarse-Grained Sand:	2 mm to 4.75 mm (No.10 to No.4)
Medium-Grained Sand:	0.42 mm to 2 mm (No.40 to No.10)
Fine-Grained Sand:	0.075 mm to 0.42 mm (No. 200 to No.40)
Silt:	0.005 mm to 0.075 mm
Clay:	<0.005 mm

PARTICLE SHAPE

Description	Criteria
Flat:	Particles with width/thickness ratio > 3
Elongated:	Particles with length/width ratio > 3
Flat & Elongated:	Particles meet criteria for both flat and elongated

RELATIVE PROPORTIONS OF FINES

Descriptive Term	% Dry Weight
Trace:	< 5%
With:	5% to 12%
Modifier:	>12%



GENERAL NOTES

(Continued)

CONSISTENCY OF FINE-GRAINED SOILS

<u>Q_u - TSF</u>	<u>N - Blows/foot</u>	<u>Consistency</u>
0 - 0.25	0 - 2	Very Soft
0.25 - 0.50	2 - 4	Soft
0.50 - 1.00	4 - 8	Firm (Medium Stiff)
1.00 - 2.00	8 - 15	Stiff
2.00 - 4.00	15 - 30	Very Stiff
4.00 - 8.00	30 - 50	Hard
8.00+	50+	Very Hard

MOISTURE CONDITION DESCRIPTION

<u>Description</u>	<u>Criteria</u>
Dry:	Absence of moisture, dusty, dry to the touch
Moist:	Damp but no visible water
Wet:	Visible free water, usually soil is below water table

RELATIVE PROPORTIONS OF SAND AND GRAVEL

<u>Descriptive Term</u>	<u>% Dry Weight</u>
Trace:	< 15%
With:	15% to 30%
Modifier:	>30%

STRUCTURE DESCRIPTION

<u>Description</u>	<u>Criteria</u>	<u>Description</u>	<u>Criteria</u>
Stratified:	Alternating layers of varying material or color with layers at least ¼-inch (6 mm) thick	Blocky:	Cohesive soil that can be broken down into small angular lumps which resist further breakdown
Laminated:	Alternating layers of varying material or color with layers less than ¼-inch (6 mm) thick	Lensed:	Inclusion of small pockets of different soils
Fissured:	Breaks along definite planes of fracture with little resistance to fracturing	Layer:	Inclusion greater than 3 inches thick (75 mm)
Slickensided:	Fracture planes appear polished or glossy, sometimes striated	Seam:	Inclusion 1/8-inch to 3 inches (3 to 75 mm) thick extending through the sample
		Parting:	Inclusion less than 1/8-inch (3 mm) thick

SCALE OF RELATIVE ROCK HARDNESS

<u>Q_u - TSF</u>	<u>Consistency</u>
2.5 - 10	Extremely Soft
10 - 50	Very Soft
50 - 250	Soft
250 - 525	Medium Hard
525 - 1,050	Moderately Hard
1,050 - 2,600	Hard
>2,600	Very Hard

ROCK BEDDING THICKNESSES

<u>Description</u>	<u>Criteria</u>
Very Thick Bedded	Greater than 3-foot (>1.0 m)
Thick Bedded	1-foot to 3-foot (0.3 m to 1.0 m)
Medium Bedded	4-inch to 1-foot (0.1 m to 0.3 m)
Thin Bedded	1¼-inch to 4-inch (30 mm to 100 mm)
Very Thin Bedded	½-inch to 1¼-inch (10 mm to 30 mm)
Thickly Laminated	1/8-inch to ½-inch (3 mm to 10 mm)
Thinly Laminated	1/8-inch or less "paper thin" (<3 mm)

ROCK VOIDS

<u>Voids</u>	<u>Void Diameter</u>
Pit	<6 mm (<0.25 in)
Vug	6 mm to 50 mm (0.25 in to 2 in)
Cavity	50 mm to 600 mm (2 in to 24 in)
Cave	>600 mm (>24 in)

GRAIN-SIZED TERMINOLOGY

(Typically Sedimentary Rock)

<u>Component</u>	<u>Size Range</u>
Very Coarse Grained	>4.76 mm
Coarse Grained	2.0 mm - 4.76 mm
Medium Grained	0.42 mm - 2.0 mm
Fine Grained	0.075 mm - 0.42 mm
Very Fine Grained	<0.075 mm

ROCK QUALITY DESCRIPTION

<u>Rock Mass Description</u>	<u>RQD Value</u>
Excellent	90 - 100
Good	75 - 90
Fair	50 - 75
Poor	25 - 50
Very Poor	Less than 25

DEGREE OF WEATHERING

Slightly Weathered:	Rock generally fresh, joints stained and discoloration extends into rock up to 25 mm (1 in), open joints may contain clay, core rings under hammer impact.
Weathered:	Rock mass is decomposed 50% or less, significant portions of the rock show discoloration and weathering effects, cores cannot be broken by hand or scraped by knife.
Highly Weathered:	Rock mass is more than 50% decomposed, complete discoloration of rock fabric, core may be extremely broken and gives clunk sound when struck by hammer, may be shaved with a knife.

SOIL CLASSIFICATION CHART

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS			
			GRAPH	LETTER				
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES			
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES			
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES			
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES		
		SAND AND SANDY SOILS	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES		
					SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES		
	MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	SAND AND SANDY SOILS	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES		
					SC	CLAYEY SANDS, SAND - CLAY MIXTURES		
			FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
							CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
	OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY						
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50			MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS		
					CH	INORGANIC CLAYS OF HIGH PLASTICITY		
					OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS		
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS			

