MC Squared, Inc.

Retaining Wall Foundation Investigation Report

Atlanta Beltline Inc. (ABI) Northeast Trail (Task C)
MC² Project No. A051707.058
Atlanta, Fulton County, Georgia

Prepared For: Mr. Sean Johnston, P.E.
Vice President
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Project No.: A051707.058
Prepared: March 2018

MC²
GEOTECHNICAL • ENVIRONMENTAL
MATERIALS TESTING

March 30, 2018

Mr. Sean Johnston, P.E.
Vice President
Kimley-Horn & Associates
817 W. Peachtree Street NW, The Biltmore Suite 601
Atlanta, GA 30308

Subject: **Retaining Wall Foundation Investigation Report**
Atlanta Beltline Inc. (ABI) Northeast Trail (Task C)
MC² Project No. A051707.058
Atlanta, Fulton County, Georgia

Dear Mr. Johnston:

MC Squared, Inc. (MC²) is pleased to present this Wall Foundation Investigation (WFI) Report for the proposed ABI Northeast Trail (Task C) in Atlanta, Fulton County, Georgia. This WFI was performed in general accordance with the latest GDOT guidance documents for WFI. The report summarizes our findings, the subsurface conditions we encountered and our conclusions and recommendations as they relate to the project design and construction.

Thank you for giving us the opportunity to work with **Kimley-Horn & Associates** for ABI. Please let us know if you have any comments or require additional information.

Respectfully submitted,
MC²

Amir Moussly
Staff Engineer

Prashanth Vaddu, P.E.
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Sam Moussly
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RETAINING WALL FOUNDATION REPORT
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1. Location

This report is for the design of six Soldier Pile walls (Wall No. 100B, 101D, 113A, 113B, 114A and 114B) and five Mechanically Stabilized Earth (MSE) walls (Wall No. 98, 99, 101A, 101B and 101D) for the construction of ABI Northeast Trail (Task C) from Westminster Drive Northeast to approximately 250 feet north of the Clear Creek pedestrian bridge. The trail improvement project begins at Station 93+19 and continues north to approximately Station 115+00 in Atlanta, Fulton County, Georgia. Information about the proposed walls is tabulated below:

Wall ID	Station to Station	Approx. Length (ft.)	Assumed Max Height (ft.)	Wall Type
Wall 98	98+16, 9' LT to 100+22, 9' LT	205	12	MSE
Wall 99	99+68, 13' RT to 100+41, 129' RT	168	16	MSE
Wall 100A	100+18, 28' RT to 100+38, 50' RT	-	<2.4	-
Wall 100B	100+40, 44' RT to 100+33, 18' RT	37	13	SOLDIER PILE
Wall 100C	100+03, 33' RT to 100+36, 62' RT	-	<2.4	-
Wall 100D	100+18, 28' RT to 101+14, 9' RT	-	<2.4	CIP CANTILEVER
Wall 101A	100+85, 9' LT to 103+75, 9' LT	289	12	MSE
Wall 101B	101+30, 9' RT to 102+51, 9' RT	122	10	MSE
Wall 101C	101+04, 23' RT to 102+16, 17' RT	113	16	MSE
Wall 101D	101+14, 9' RT to 101+20, 19' RT	16	8	SOLDIER PILE
Wall 113A	112+77, 9' LT to 113+00, 9' LT	23	10	SOLDIER PILE
Wall 113B	112+77, 9' RT to 113+00, 9' RT	23	10	SOLDIER PILE
Wall 114A	114+29, 9' LT to 115+01, 9' LT	73	11	SOLDIER PILE
Wall 114B	114+29, 9' RT to 115+01, 9' RT	71	11	SOLDIER PILE

Note: Wall details obtained from plans provided by KHA dated December 20, 2017.

Based on information provided by **KHA**, walls 100A, 100C and 100D are relatively short (29 inches or shorter) stairway walls. Accordingly, these walls have not been evaluated in this report.

2. Geology

This project will be geologically sited in a Biotitic Gneiss Undifferentiated rock type in the Georgia Piedmont Region.

3. Subsurface and Groundwater Information

Subsurface information for all walls were obtained from thirteen (13) Standard Penetration Test (SPT) Borings, as generally summarized in the table below:

Wall ID	Boring ID	Station / Offset	Existing Ground Elevation (ft.)	Boring Termination Elevation (ft.)	GWT Depth (ft.)	Soils Description
98	TC-WB-01	98+79, 7' LT	840.3	810.3	20	Track ballast to 2'. Alternating layers of firm to stiff CL and very loose to medium dense SM to 30'.
98	TC-WB-02	99+54, 10' LT	839.4	824.4	GNE	Track ballast with pieces of brick to 2'. Loose SC with gravel to 6'. Medium dense to very dense SM to 15'. Auger refusal at 15'.
99	TC-WB-03	99+60, 34' RT	840.1	811.6	19	Loose to medium dense SM with gravel to 8'. Stiff CL to 13.5'. Medium dense to very dense SM to 28.5'.
99	TC-WB-04	99+89, 111' RT	840.1	810.1	19	Track ballast to 2'. Loose to medium dense SM to 13.5'. Firm CL to 23.5'. PWR and very dense SM to 30'.
100B and 100D	TC-WB-05	100+04, 59' RT	840.2	815.2	13.5	Loose to very dense SM with gravel to 25'. Auger refusal at 25'.
100B and 100D	TC-WB-06	99+71, 64' RT	840.2	811.7	19	Loose to medium dense SM/SC to 13.5'. Stiff to very hard CL to 23.5'. Dense to very dense SM to 28.5'.

Wall ID	Boring ID	Station / Offset	Existing Ground Elevation (ft.)	Boring Termination Elevation (ft.)	GWT Depth (ft.)	Soils Description
100B and 100D	TC-WB-07	101+23, 14' RT	859.8	851.8	GNE	(Hand auger) SC to 1.5'. SM to 8'.
101A, 101B, 101C and 101D	TC-WB-08	101+99, 9'LT	838.7	826.2	9.5	Track ballast to 2'. Stiff CL to 4'. Firm ML to 8'. Very dense SM to 12.5'. Auger refusal at 12.5'.
101A, 101B, 101C and 101D	TC-WB-09	102+40, 13' RT	840.0	834.0	GNE	(Hand auger) SM to 1'. SC to 5'. SP-SM to 6'.
101A, 101B, 101C and 101D	TC-WB-10	102+99, 13' LT	837.4	824.4	GNE	Track ballast to 2'. Medium dense to very dense SM with gravel to 13'. Auger refusal at 13'.
101A, 101B, 101C and 101D	TC-WB-11	103+70, 10' LT	836.3	811.3	22	Track ballast to 2'. Firm CL to 4'. Firm to stiff ML to 8'. Loose SC to 10'. Hard CL to 18.5'. Medium dense to very dense SM to 25'. Auger refusal at 25'.
Wall 113A and 113B	TC-WB-12	112+66, 11' RT	836.3	821.3	GNE	Track ballast to 2'. Firm to stiff ML to 8'. Medium dense to very dense SM to 15'. Auger refusal at 15'.
Wall 114A and 114B	TC-WB-13	114+32, 11' RT	837.5	817.5	GNE	Track ballast to 4'. Medium dense SM to 6'. Stiff ML to 13.5'. Medium dense SM to 20'.

Refer to individual soil profiles (**Appendix I**) for details.

All surface waters should be properly drained away from walls during and post construction.

4. Pile Elevations Pile elevations for Soldier Pile walls have been summarized in the table below.

Wall ID	Assumed Max Height (ft.)	Pile Type	Estimated Embedment Depth (ft.)	Lateral Deflection at Top of Pile (in.)	Estimated Minimum Tip Elevation (ft.)
Wall 100B	12	HP 12x53	15	2.65	833.0
Wall 101D	8	HP 12x53	11	1.05	833.0
Wall 113A	10	HP 12x53	13	1.32	814.0
Wall 113B	10				
Wall 114A	11	HP 12x53	19	2.30	807.0
Wall 114B	11				

5. Soil Parameters The following soil design parameters are recommended for use for the proposed MSE walls:

Cohesion	C= 0 psf
Soil Unit Weight,	γ= 120 pcf
Angle of Internal Friction	ϕ= 30 °
Coefficient of Sliding Friction	μ= 0.4

6. Slopes Maximum 2:1 slopes will be safe for this project. Shoring may be required to construct the leveling pads at Walls 101B and 101C if the excavations cannot be performed safely.

7. Evaluations

MSE Walls

The maximum allowable soil bearing pressure is 2000 psf. Should the design pressure exceed the maximum allowable soil bearing pressure, a waiting period may be required to accommodate for consolidation of soils. Waiting periods will depend on structural settlement tolerances including any planned wall facing. Settlement monitoring points should be established for every 100 linear feet of wall length. Frequent settlement measurements should be taken until most of the undesired long-term settlement has occurred. Once the estimated future settlement is within the design tolerance limits, wall construction may be completed. Refer to the table summarizing our estimates in the Analyses and Assumptions section of this report.

All surface waters should be properly drained away from walls during and post construction.

Soldier Pile Walls

Very dense (auger refusal) material was encountered above the estimated minimum tip elevations at Walls 113A and 113B. Pre-drilling and/or pilot holes may be required to achieve the estimated minimum tip elevations to help advance piles through these dense layers. This elevation represents an embedment of 12 feet into very dense material and may be adjusted by the Engineer during construction. Temporary casing may also be required to prevent the collapse of the pilot holes prior to driving the piles. If pilot holes are used, a maximum pilot hole diameter of 24 inches is recommended.

8. Analyses and Assumptions

Analyses – MSE Walls

Stability against possible failure by bearing, sliding and overturning, as well as overall stability analyses were assessed for the proposed MSE Walls 98, 99, 101A, 101B and 101C using the "Preliminary Layout" dated January 2018 provided by **KHA**. Global stability was completed using GeoStudio Slope/W software, 2012. Potential failure surfaces were computed using limiting equilibrium method of analysis developed by Spencer. Stability analyses against bearing, sliding and overturning were completed in accordance with AASHTO Standard Specifications for Highway Bridges, 17th edition, 2002. Walls were analyzed using ASD methodology.

For MSE walls, strap lengths were assumed to be equal to 100% of the wall height, where failure slip surface initiation points are assumed to start past the strap length.

For Walls 101A, 101B and 101 C, four (4) different sections were analyzed for the worst case. See **Appendix III** for more details. Additionally, Walls 101B and 101C are assumed to be built on 2.5:1 slopes. Fill soil design parameters used in analysis can be found in Section 5 of this report. Where applicable, a live load of 250 psf was used to account for maintenance vehicles accessing the future trail. Based on our analysis, the minimum required (per AASHTO 2002) factors of safety, 1.5 (sliding and global stability), 2.0 (overturning in soil) and 3.0 (bearing capacity in soil) are achieved, as summarized in the tables below.

Wall ID	Assumed Max Height (ft.)	Wall Type	Global Stability (FS>1.5)	Estimated Settlement (in.)	Sliding (FS>=1.5)	Overturning (FS>=2)	Bearing Capacity (FS>=3)
Wall 98	12	MSE	2.1	1.5	2.0	9.0	5.0

Wall ID	Assumed Max Height (ft.)	Wall Type	Global Stability (FS>1.5)	Estimated Settlement (in.)	Sliding (FS>=1.5)	Overturning (FS>=2)	Bearing Capacity (FS>=3)
Wall 99	16	MSE	1.9	3.4 (2-in. immediate; 1.4-in. long term)	2.0	9.0	7.4
Wall 101A	12	MSE	SEE TABLE BELOW	SEE TABLE BELOW	SEE TABLE BELOW	SEE TABLE BELOW	SEE TABLE BELOW
Wall 101B	10	MSE					
Wall 101C	15	MSE					

Wall ID	Section	Station to Station	Global Stability (FS>1.5)	Settlement (in.)	Sliding (FS>=1.5)	Overturning (FS>=2)	Bearing Capacity (FS>=3)
Walls 101A + 101B + 101C	1	101+04 to 101+30	1.6	1.6	2.2	9	3.6
	2	101+30 to 101+64	1.9	1.6			
	3	101+64 to 102+15	1.6	1.6			
	4	102+15 to 102+51	2.6	0.7			

Analyses – Soldier Pile Walls

Lateral stability and global stability analyses were assessed for the proposed soldier pile retaining wall using the Preliminary Wall Layout dated May 2017. Global stability was completed using GeoStudio Slope/W software, 2012. Potential failure surfaces are computed using limiting equilibrium method of analysis developed by Spencer. Lateral stability was completed according to section 5.6 of AASHTO 17th edition, 2002. Earth pressures supported by each pile for lateral stability analysis were calculated based on spacing between piles of 5 feet. Soldier Pile wall results are tabulated below.

Wall ID	Assumed Max Height (ft.)	Pile Type	Estimated Embedment Depth (ft.)	Lateral Deflection at Top of Pile (in.)	Estimated Minimum Tip Elevation (ft.)	Global Stability (FS>1.5)
Wall 100B	12	HP 12x53	15	2.65	833.0	2.86
Wall 101D	8	HP 12x53	11	1.05	833.0	3.81
Wall 113A	10	HP 12x53	13	1.32	814.0	2.49

Wall ID	Assumed Max Height (ft.)	Pile Type	Estimated Embedment Depth (ft.)	Lateral Deflection at Top of Pile (in.)	Estimated Minimum Tip Elevation (ft.)	Global Stability (FS>1.5)
Wall 113B	10					
Wall 114A	11	HP 12x53	19	2.30	807.0	2.17
Wall 114B	11					

Pile type HP 12x53, with a spacing of 5 feet, was assumed based on information provided by KHA during a phone call on February 21, 2018. Where applicable, a live load of 250 psf was used to account for maintenance vehicles accessing the future trail. Walls 100B and 101D are assumed to be built on a 2.5:1 slope. Based on our analysis, the minimum required (per AASHTO 2002) factor of safety of 1.5 for global stability is achieved. Walls were analyzed using ASD methodology. Refer to Appendix IV for lateral stability analyses results.

Assumptions

MSE Wall 98
- Wall Height: 12 ft.
- Strap Length: 12 ft.
- Section Analyzed: Station 100+21

MSE Wall 99
- Wall Height: 16 ft.
- Strap Length: 16 ft.
- Section Analyzed: Station 100+14

Soldier Pile Wall 100B
- Wall Height: 12 ft.
- Spacing: 5 ft.
- Section Analyzed: Station 100+33

MSE Wall 101A
- Wall Height: 12 ft.
- Strap Length: 12 ft.
- Sections Analyzed: Various (see table under Analyses – MSE Walls in this section of the report)

MSE Wall 101B
- Wall Height: 10 ft.
- Strap Length: 10 ft.
- Sections Analyzed: Various (see table under Analyses – MSE Walls in this section of the report)

MSE Wall 101C
Wall Height: 15 ft.
Strap Length: 15 ft.
Sections Analyzed: Various (see table under Analyses – MSE Walls in this section of the report)

Soldier Pile Wall 101D
Wall Height: 8 ft.
Spacing: 5 ft.
Section Analyzed: Station 101+19

Soldier Pile Walls 113A and 113B
Wall Height: 10 ft.
Spacing: 5 ft.
Section Analyzed: Station 112+92

Soldier Pile Walls 114A and 114B
Wall Height: 11 ft.
Spacing: 5 ft.
Section Analyzed: Station 114+83

Applicable Design Standard/Guidance: AASHTO Standard Specifications for Highway Bridges, 17th edition, 2002.

9. Special Conditions

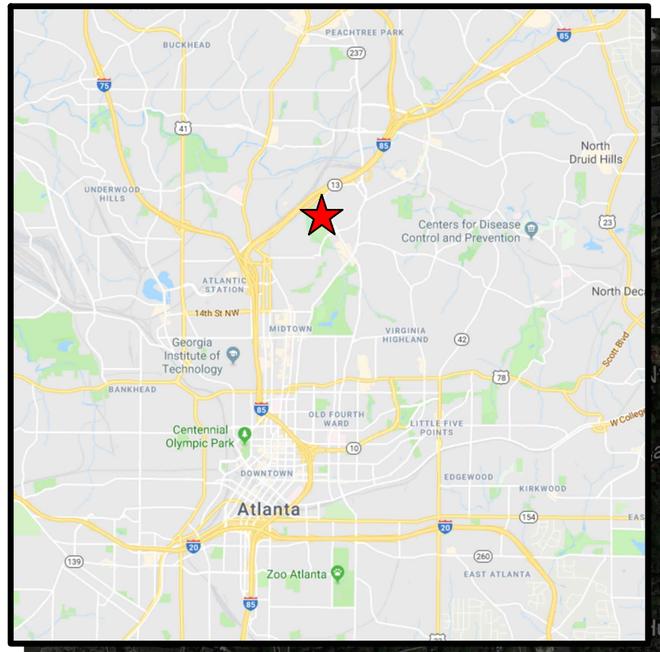
A. Numerous structures are located very close to the construction limits of this project. Vibration monitoring will be required due to vibrations from the construction activities which may cause some concern with property owners. GDOT Special Provision (SP) 154 may be used as a guideline to determine location of seismographs, crack gauges, etc. Pre- and post-construction crack survey reports recording observations of structural distresses shall be completed.

Prepared By: Amir Moussly
Akli Hibouche, Ph.D.

Reviewed By: Prashanth Vaddu, P.E.
Nicholas Diorio, P.E.

FIGURES

- Project Location Map
- Boring Location Plan



LEGEND:

★ Project Location

Source: Google Earth
Image Date: 3/31/17

0′ 1000′ 2000′

Graphic Scale (feet)

DATE	NAME	REVISION	APPROVED BY:

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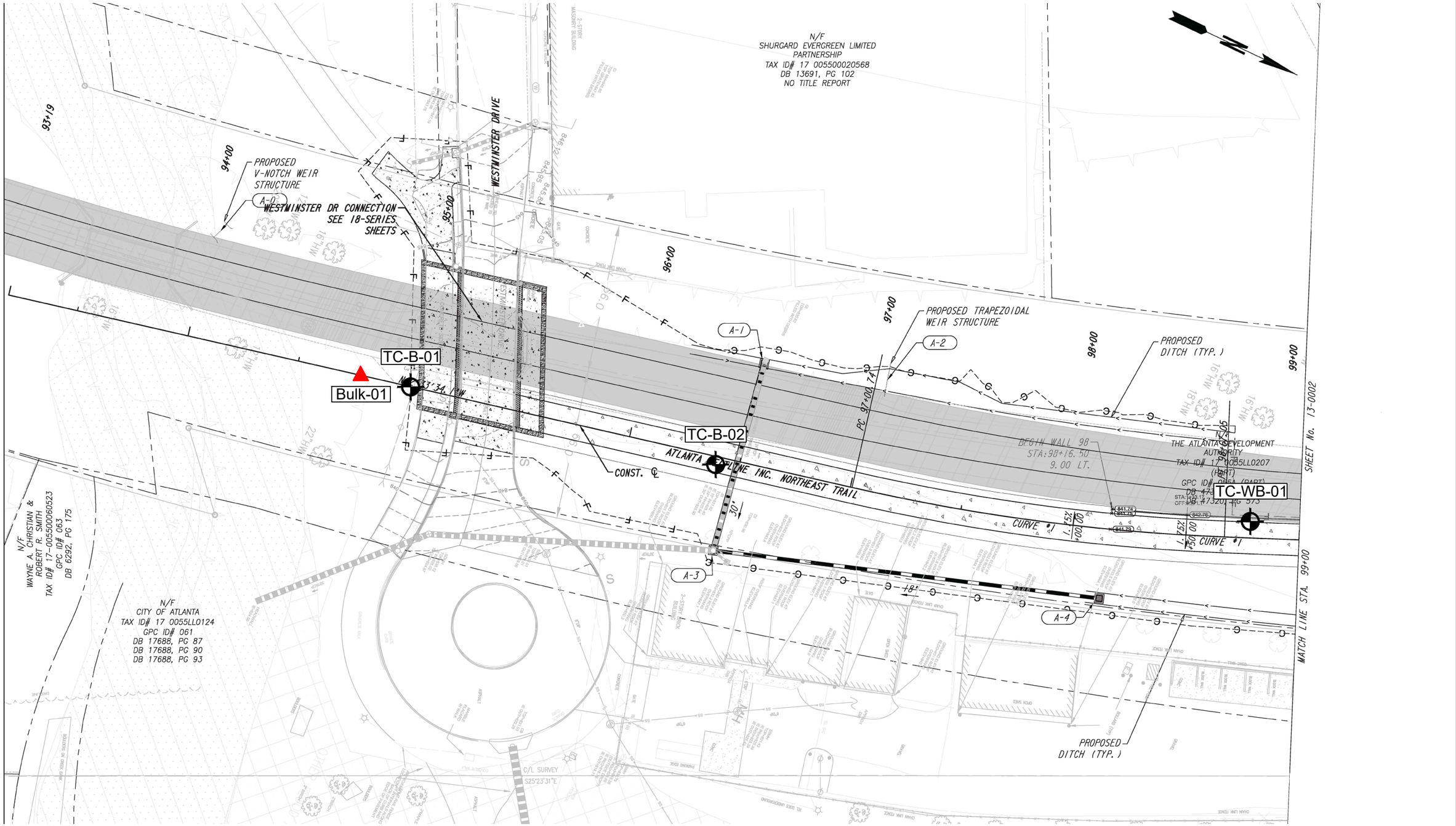
	NAME	DATE
DESIGNED BY:	TC	11/16/2017
DRAWN BY:	TC	12/12/2017
CHECKED BY:	JJ	12/15/2017
SUPERVISED BY:	PV	

Project Location Map

ABI NE Trail
Atlanta, Fulton County, Georgia

MC² PROJ. NO.: A051707.058

SHEET NO.: 1



LEGEND:

- Approximate Boring Location
- Approximate Infiltration Test Location
- Approximate Bulk Sample Retrieval Location

Source: Kimley-Horn & Associates
Date: 11/1/2017

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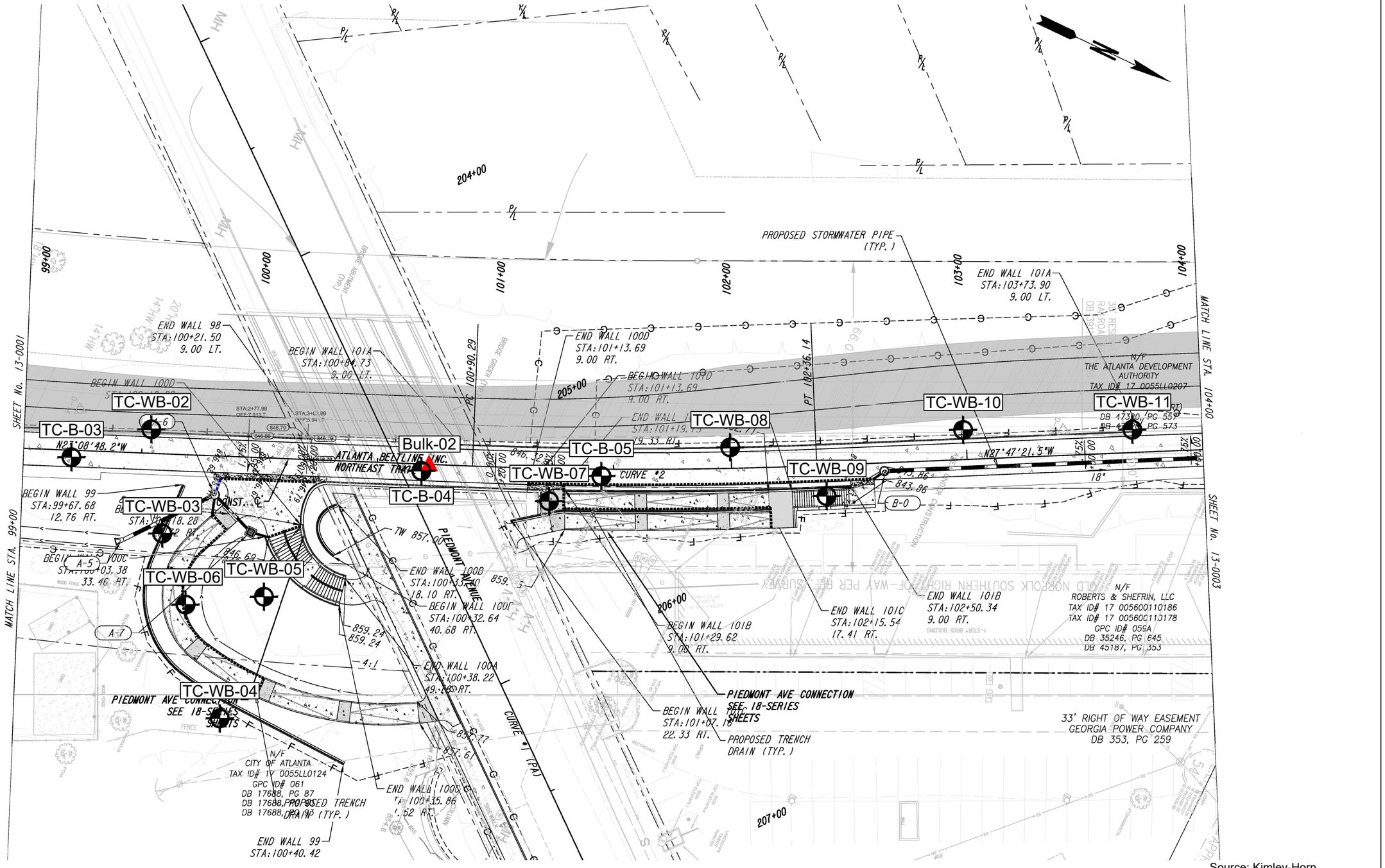
Boring Location Plan

ABI NE Trail (Task C)
Atlanta, Fulton County, Georgia

MC² PROJ. NO.: A051707.058

SHEET NO.: 2



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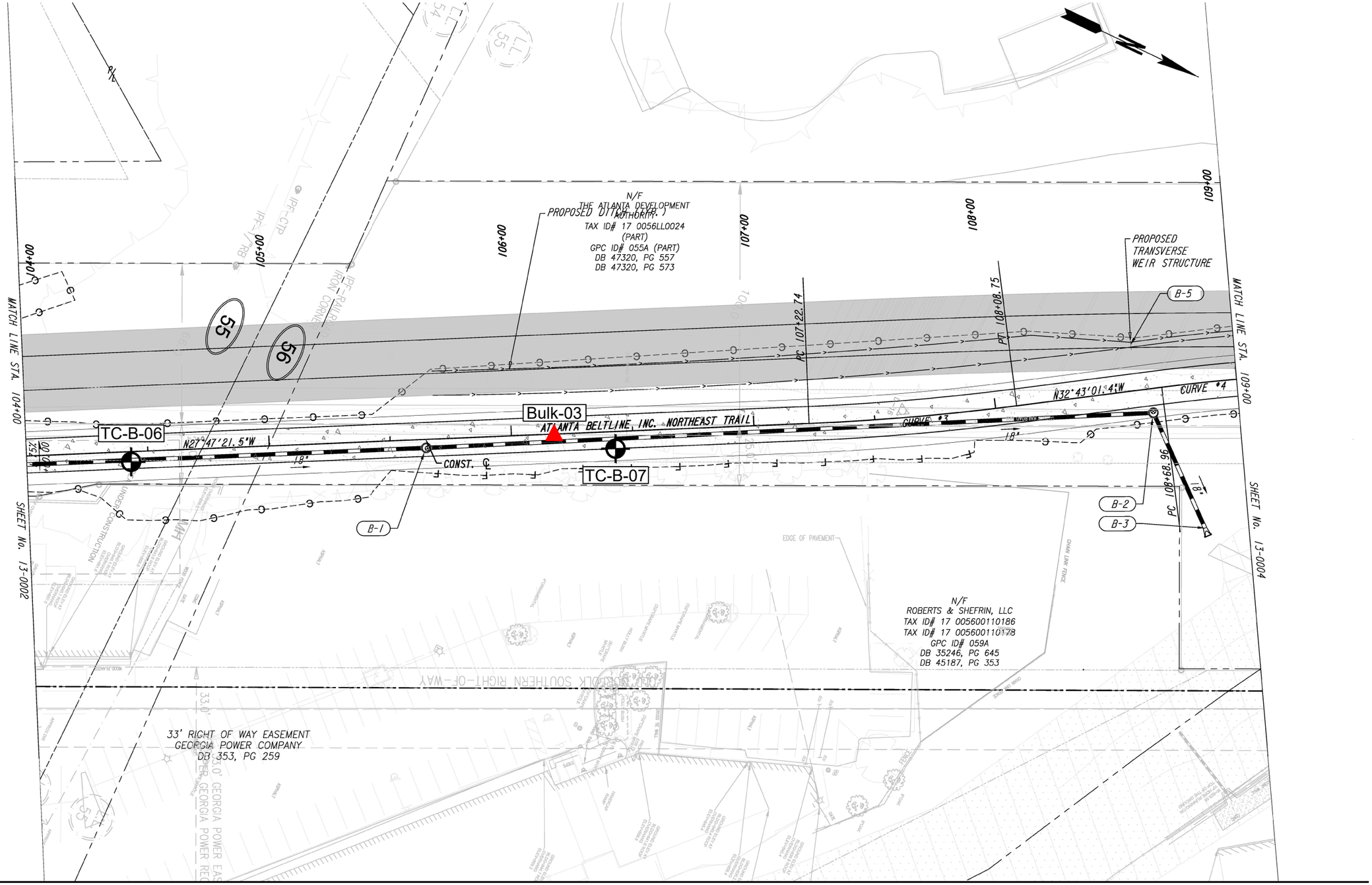

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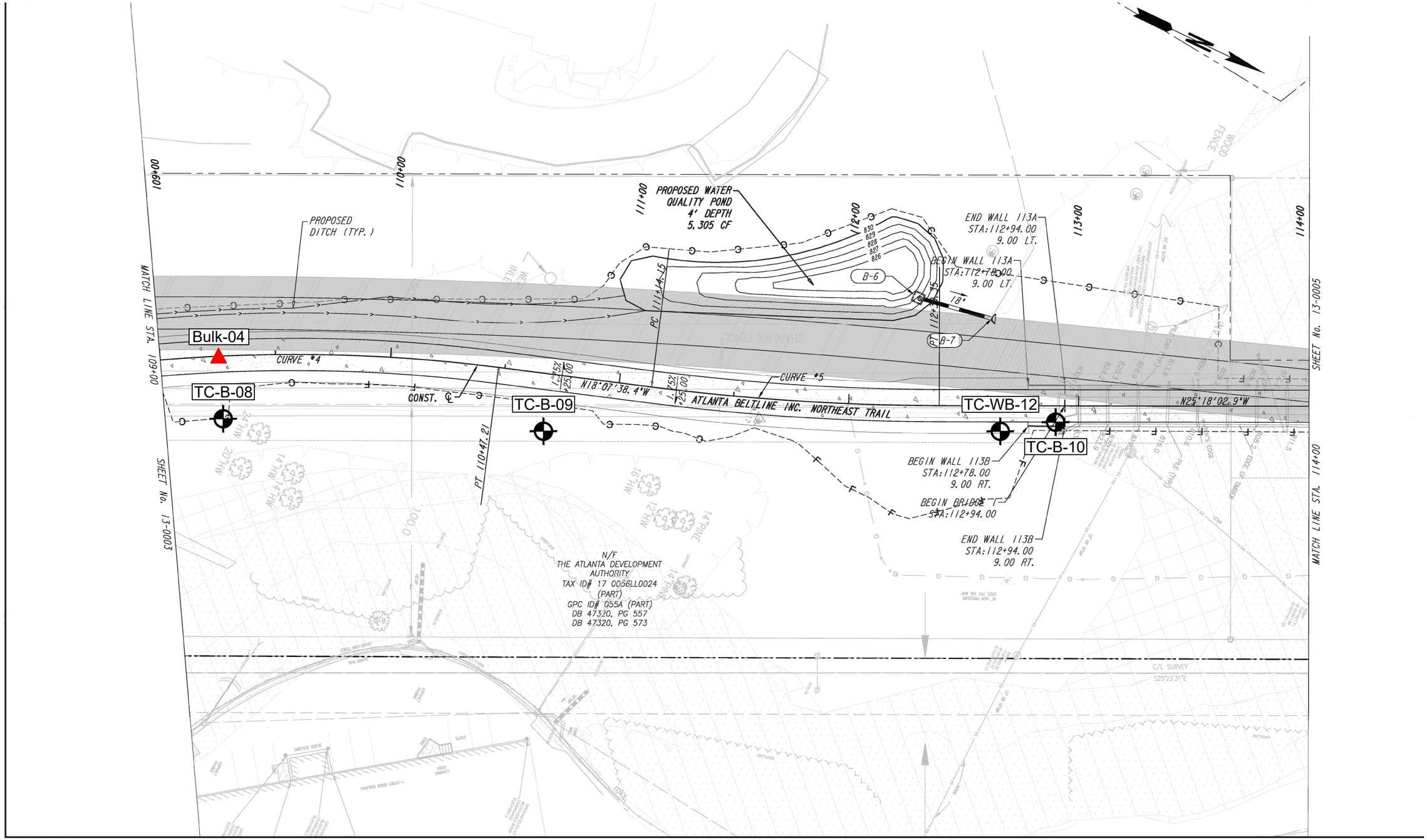
ABI NE Trail (Task C) Atlanta, Fulton County, Georgia	A051707.058	4



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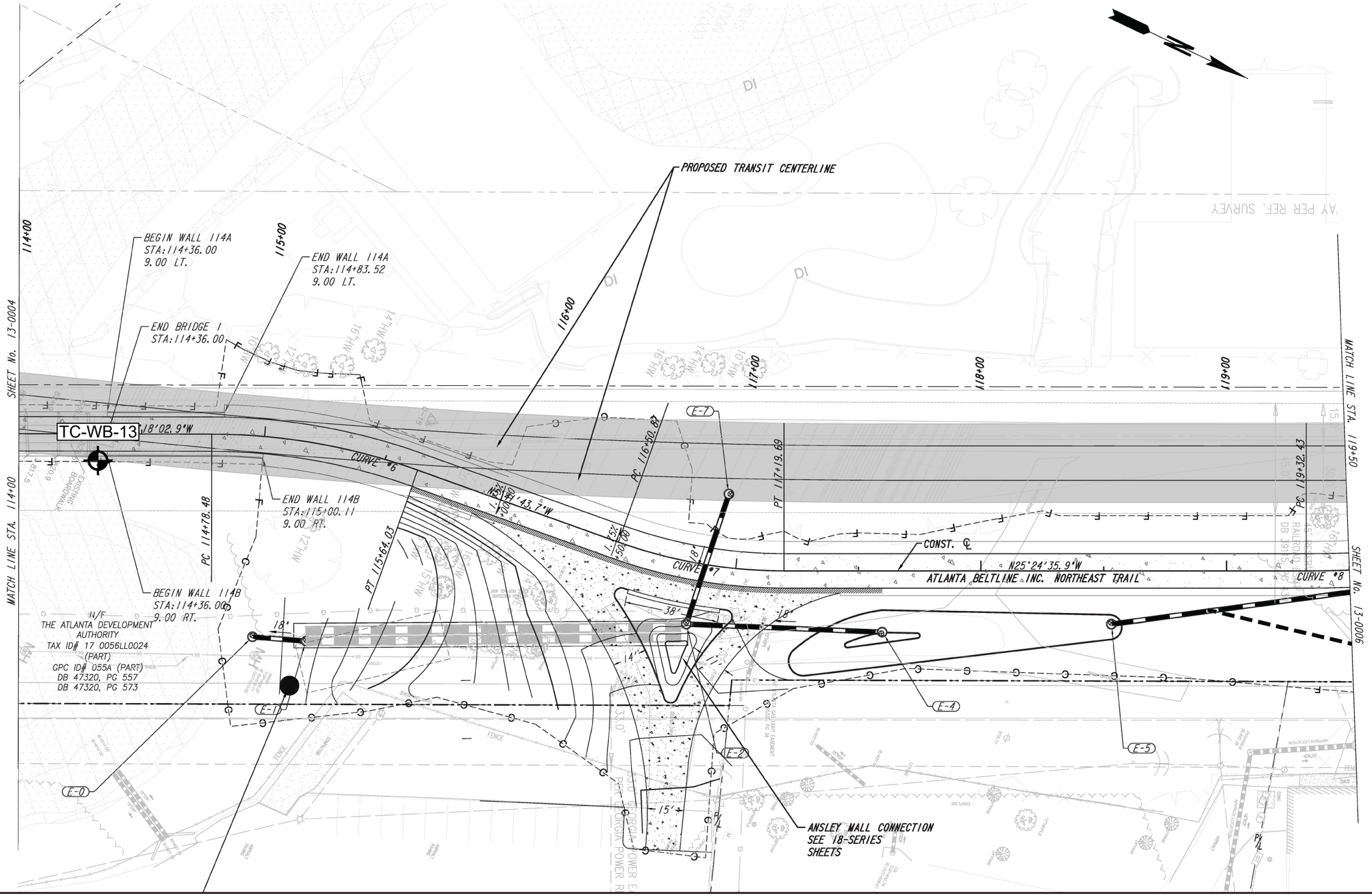
Boring Location Plan

ABI NE Trail (Task C)
Atlanta, Fulton County, Georgia

MC² PROJ. NO.: A051707.058

SHEET NO.: 5



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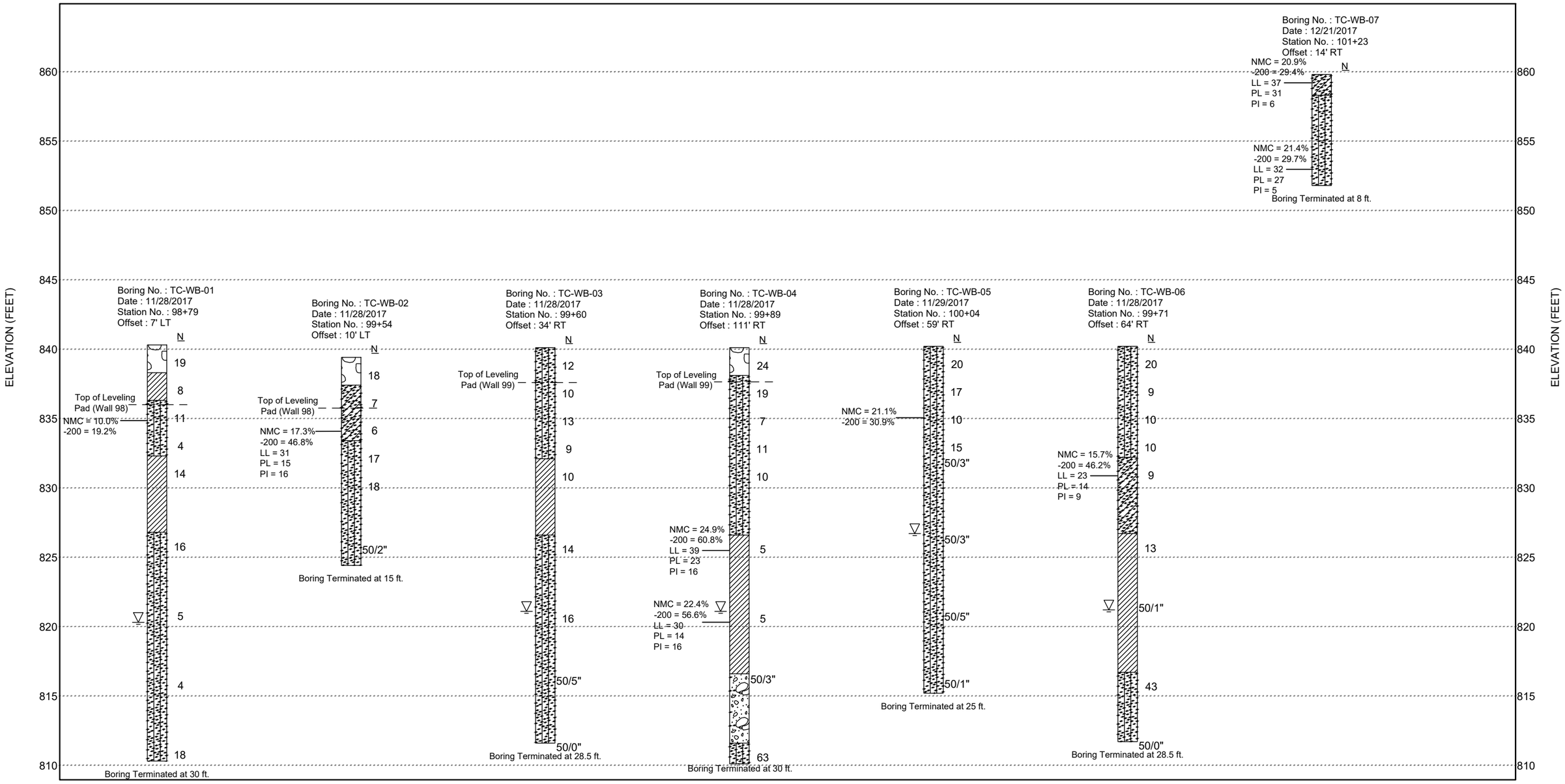
ABI NE Trail (Task C) Atlanta, Fulton County, Georgia	A051707.058	6

APPENDIX I

- Subsurface Boring Profiles
  - Legend
  - Soil Profiles (gINT)
- Summary of Laboratory Test Results
  - Atterberg Limits' Results
  - Grain Size Distribution



*N Values Drawn At Top Of Interval

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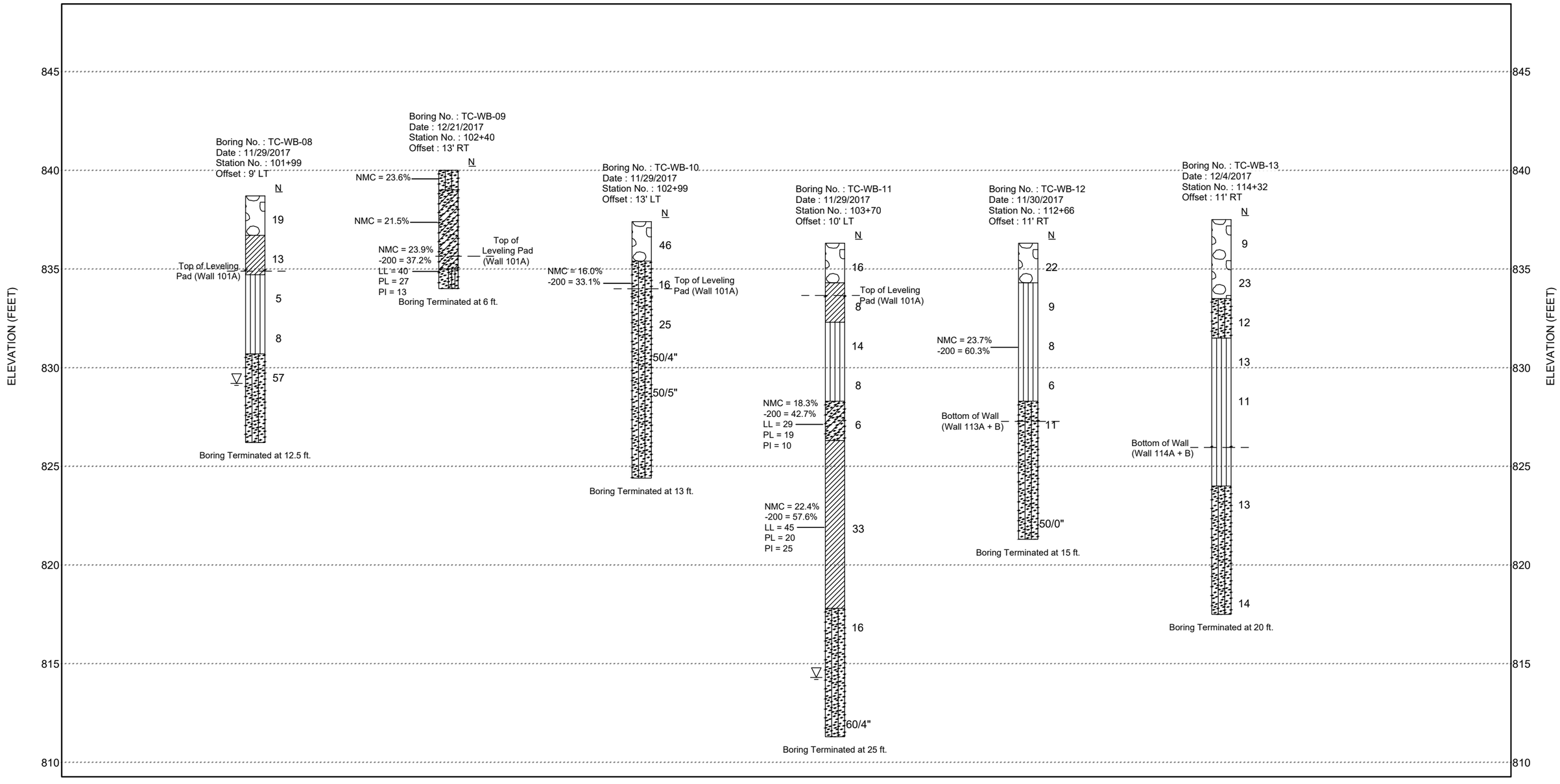
SUBSURFACE BORING PROFILES

ABI NE Trail (Task C)
Atlanta, Fulton County, Georgia

MC² PROJ. NO.: A051707.058

SHEET NO.: 7



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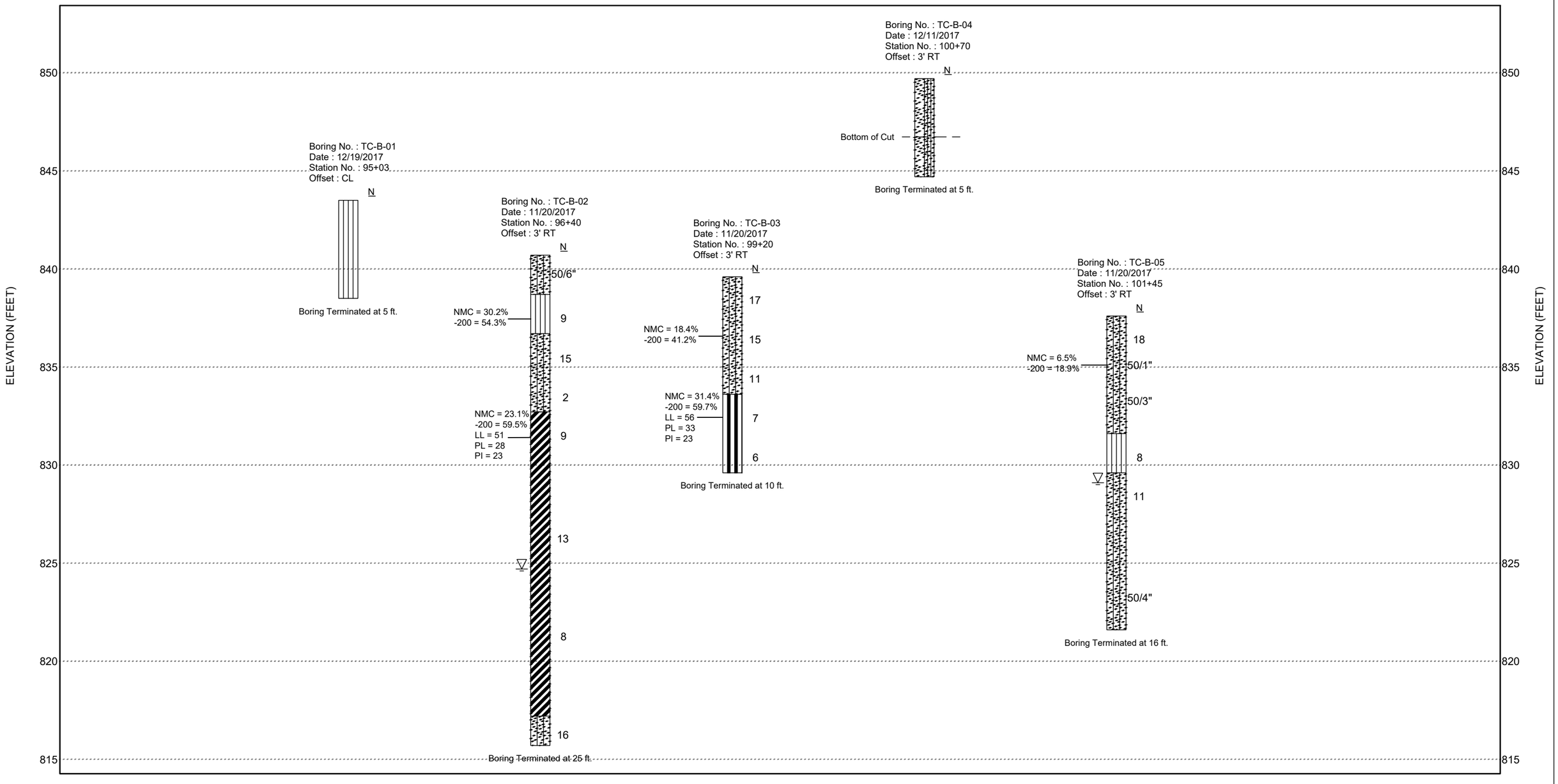
	NAME	DATE
DESIGNED BY:	TC	11/7/17
DRAWN BY:	KH	12/13/17
CHECKED BY:	AM	12/15/17
SUPERVISED BY:	PV	

SUBSURFACE BORING PROFILES
ABI NE Trail (Task C)
Atlanta, Fulton County, Georgia

MC² PROJ. NO.: A051707.058

SHEET NO.: 8



*N Values Drawn At Top Of Interval

DATE	NAME	REVISION	APPROVED BY

MC SQUARED INC.
Geotechnical Consultants
1275 Shiloh Road, Suite 2620
Kennesaw, Georgia 30144
P - (770) 650 0873
F - (770) 650 7825

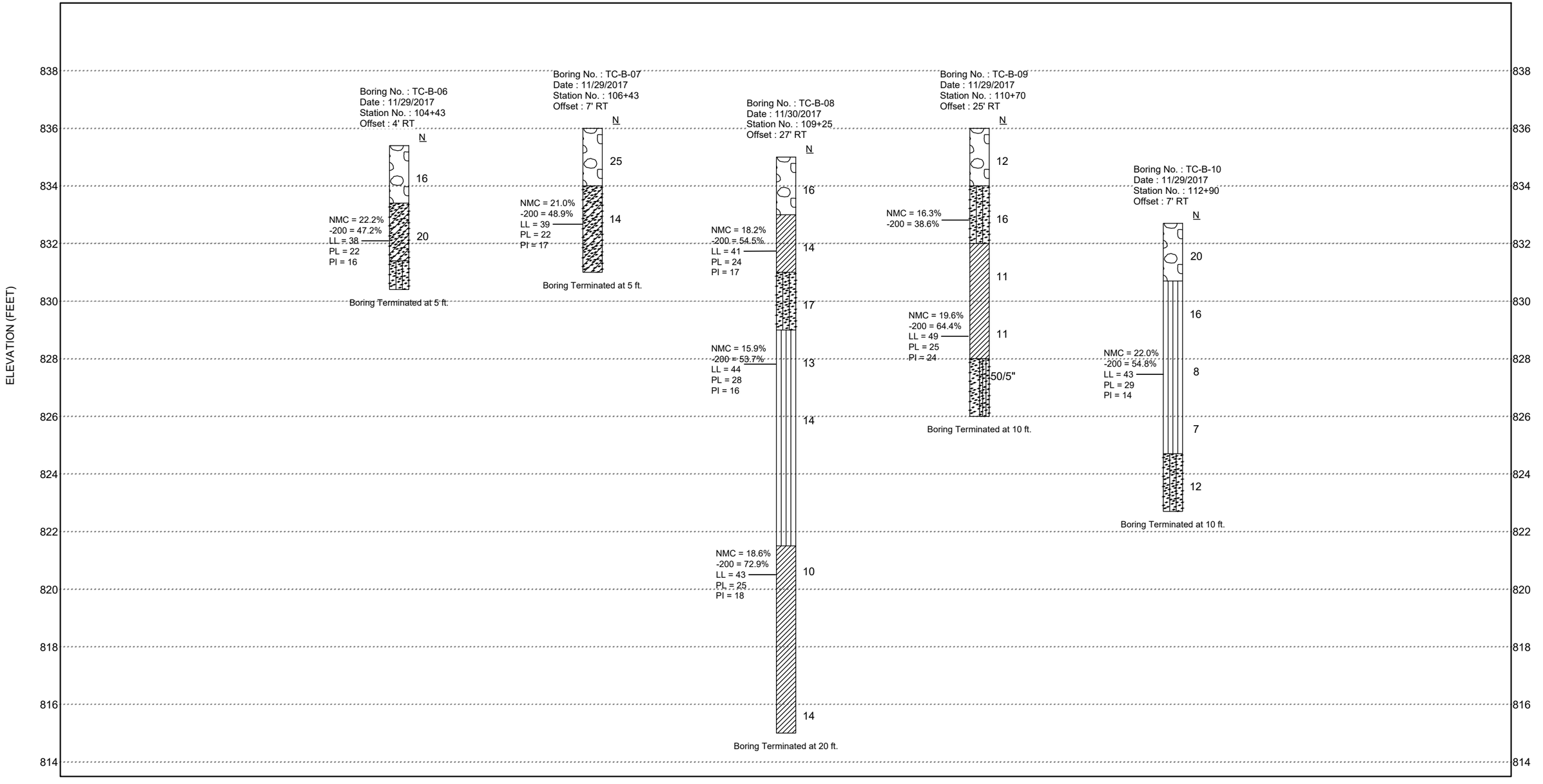
GEORGIA ENGINEERING CERTIFICATE OF AUTHORIZATION No. PEF004822
Prashanth Vaddu PE
GEORGIA LICENSE No. PE039820

	NAME	DATE
DESIGNED BY:	TC	11/7/17
DRAWN BY:	KH	12/13/17
CHECKED BY:	AM	12/15/17
SUPERVISED BY:	PV	

SUBSURFACE BORING PROFILES
ABI NE Trail (Task C)
Atlanta, Fulton County, Georgia

MC² PROJ. NO.: A051707.058

SHEET NO.: 9



*N Values Drawn At Top Of Interval

DATE	NAME	REVISION	APPROVED BY

MC SQUARED INC.
Geotechnical Consultants
1275 Shiloh Road, Suite 2620
Kennesaw, Georgia 30144
P - (770) 650 0873
F - (770) 650 7825

GEORGIA ENGINEERING CERTIFICATE OF AUTHORIZATION No. PEF004822
Prashanth Vaddu PE
GEORGIA LICENSE No. PE039820

	NAME	DATE
DESIGNED BY:	TC	11/7/17
DRAWN BY:	KH	12/13/17
CHECKED BY:	JJ	12/15/17
SUPERVISED BY:	PV	

SUBSURFACE BORING PROFILES
ABI NE Trail (Task C)
Atlanta, Fulton County, Georgia

MC² PROJ. NO.: A051707.058

SHEET NO.: 10

LEGEND

- Top Soil
- Asphalt
- Concrete
- (GAB) Graded Aggregate Base
- Limerock Base
- No. 57 Stone
- Soil Cement
- (SP) Poorly Graded Sand
- (SP-SM) Poorly Graded Sand With Silt
- (SP-SC) Poorly Graded Sand With Clay
- (SM) Silty Sand
- (SC) Clayey Sand
- (MH) Elastic Silt
- (ML) Silt
- (CL-ML) Silty Clay
- (CH) Fat Clay
- (CL) Lean Clay
- (OH) Organic Clay
- (OL) Organic Silt
- Peat
- Fill
- Bedrock
- Limestone
- (WLS) Weathered Limestone
- Track Ballast
- Granite
- Gneiss
- Schist

NOTES:

▽	Water Table At Time Of Drilling
▼	Water Table After 24 Hours
GNE	Groundwater Not Encountered
GNA	Groundwater Not Apparent
GNM	Groundwater Not Measured
CL	Center Line
RT	Right Of Center Line
LT	Left of Center Line
BGS	Below Ground Surface
HA	Hand Auger
PA	Power Auger
NMC	Natural Moisture Content (%)
-200	Fines Passing A No. 200 Sieve (%)
PI	Plasticity Index
NP	Non Plastic
LL	Liquid Limit
OC	Organic Content (%)

N	SPT N-Value
WOH	Weight-Of-Hammer
WOR	Weight-Of-Rod
CPT	Cone Penetrometer Test
SPT	Standard Penetration Test
DT	Dilatometer Test
LOC	Loss Of Circulation
ROC	Regain Of Circulation
REC	Rock Core Recovery(%)
RQD	Rock Quality Designation
ST	Shelby Tube Sample
q_u	Unconfined Compressive Strength From Pocket Penetrometer In tsf

GRANULAR MATERIALS- RELATIVE DENSITY	SPT (BLOWS/FT)
VERY LOOSE	≤ 4
LOOSE	5-10
MEDIUM	11-30
DENSE	31-50
VERY DENSE	GREATER THAN 50
SILTS AND CLAYS CONSISTENCY	**SPT (BLOWS/FT)**
VERY SOFT	≤ 2
SOFT	3-4
FIRM	5-8
STIFF	9-15
VERY STIFF	16-30
HARD	30-50
VERY HARD	GREATER THAN 50

SPT Spoon Inside Diameter 1 3/8"
SPT Spoon Outside Diameter 2"

ASTM Standard Drop Safety Hammer
Average Hammer Drop Height 30"
Hammer Weight 140 lbs

DATE	NAME	REVISION	APPROVED BY:

MC² GEOTECHNICAL • ENVIRONMENTAL MATERIALS TESTING

MC SQUARED, INC.
Geotechnical Consultants
1275 Shiloh Road NW
Suite 2620
Kennesaw, GA 30144
Ph:770-650-0873 Fax:770-650-7825

GEORGIA ENGINEERING CERTIFICATE OF AUTHORIZATION No. PEF00482
Prashanth Vaddu, P.E.
GEORGIA LICENSE No. PE039820

	NAME	DATE
DESIGNED BY:	TC	11/16/2017
DRAWN BY:	TC	12/12/2017
CHECKED BY:	JJ	12/15/2017
SUPERVISED BY:	PV	

Legend

ABI NE Trail (Task C)
Atlanta, Fulton County, Georgia

MC² PROJ. NO.: A051707.058

SHEET NO.: 11

Soil Profile

BORING ID: TC-B-01

MC² Geotechnical • Environmental Materials Testing

CLIENT Kimley - Horn & Associates
PROJECT NAME ABI NE Trail (Task C)
PROJECT NUMBER A051707.058
PROJECT LOCATION Atlanta, Fulton County, Georgia
DATE STARTED 12/19/17 **COMPLETED** 12/19/17
GROUND ELEVATION 843.5 ft **HOLE SIZE** 4 inches
DRILLING CONTRACTOR MC Squared, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Hand Auger
AT TIME OF DRILLING GNE
LOGGED BY A. Moussly **CHECKED BY** P. Vaddu
AT END OF DRILLING ---
NOTES Sta. 95+03, CL
AFTER DRILLING ---

DEPTH (ft)	ELEV. (ft)	GRAPHIC LOG	USCS Group Symbol	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)
0	842		ML	Brown, sandy SILT with gravel, micaceous	HA		
5	838			Bottom of hole at 5.0 feet.			
	836						
	834						
	832						
	830						
	828						
	826						
	824						
	822						
	820						
	818						
	816						
	814						

● SPT N VALUE ●
⊕ ORGANIC CONTENT % ⊕
PL MC LL
☐ FINES CONTENT (%) ☐
20 40 60 80

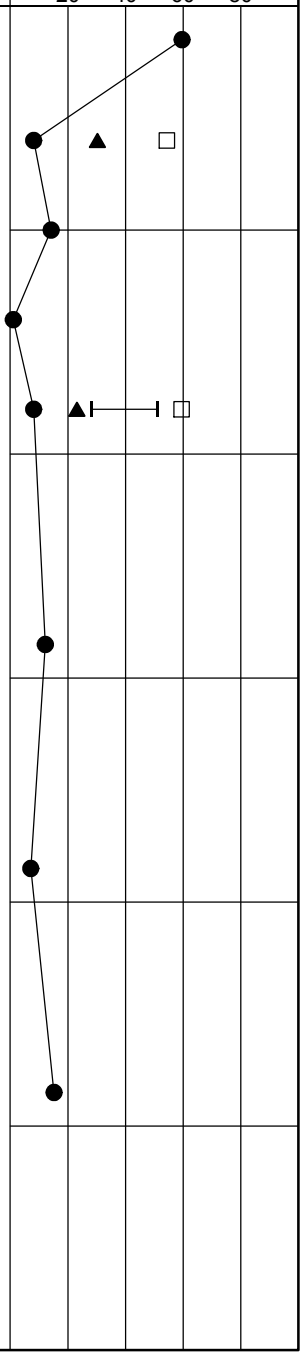
Soil Profile

BORING ID: TC-B-02

MC² Geotechnical • Environmental Materials Testing

CLIENT Kimley - Horn & Associates
PROJECT NAME ABI NE Trail (Task C)
PROJECT NUMBER A051707.058
PROJECT LOCATION Atlanta, Fulton County, Georgia
DATE STARTED 11/20/17 **COMPLETED** 11/20/17
GROUND ELEVATION 840.7 ft **HOLE SIZE** 4 inches
DRILLING CONTRACTOR Sunrise Drilling
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem
▽ **AT TIME OF DRILLING** 16.0 ft / Elev 824.7 ft
LOGGED BY A. Moussly **CHECKED BY** J. Jimenez
AT END OF DRILLING ---
NOTES Sta. 96+40, 3' RT
AFTER DRILLING ---

DEPTH (ft)	ELEV. (ft)	USCS Group Symbol	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)
0	840	SM	Very dense, dark brown, silty fine SAND with track ballast, micaceous	SS 1	5-10-50 (60)	
	838	ML	Stiff, brown, medium to fine sandy SILT, micaceous	SS 2	2-4-5-5 (9)	
5	836	SM	Very loose to medium dense, grayish brown, silty fine SAND	SS 3	3-3-12-0 (15)	
	834			SS 4	1-2-0-0 (2)	
	832	CH	Firm to stiff, brown, medium to fine sandy fat CLAY, micaceous	SS 5	13-5-4-6 (9)	
10	830					
	828					
	826			SS 6	3-4-9 (13)	
15	824		▽			
	822		No recovery from 18.5' to 20'	SS 7	2-3-5 (8)	
20	820		(Sample presumed same as previous sample)			
	818					
	816	SM	Medium dense, grayish brown, orange, silty fine SAND, micaceous	SS 8	4-6-10 (16)	
25	814		Bottom of hole at 25.0 feet.			
	812					



Soil Profile

BORING ID: TC-WB-01

MC² Geotechnical • Environmental Materials Testing

CLIENT Kimley - Horn & Associates
PROJECT NAME ABI NE Trail (Task C)
PROJECT NUMBER A051707.058
PROJECT LOCATION Atlanta, Fulton County, Georgia
DATE STARTED 11/28/17 **COMPLETED** 11/28/17
GROUND ELEVATION 840.3 ft **HOLE SIZE** 4 inches
DRILLING CONTRACTOR Sunrise Drilling
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem
▽ **AT TIME OF DRILLING** 20.0 ft / Elev 820.3 ft
LOGGED BY A. Moussly **CHECKED BY** J. Jimenez
AT END OF DRILLING ---
NOTES Sta. 98+79, 7' LT
AFTER DRILLING ---

DEPTH (ft)	ELEV. (ft)	USCS Group Symbol	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)
0	840	Gravel	Black, track ballast	SS 1	5-8-11-13 (19)	
	838	CL	Firm, reddish brown to dark brown, sandy CLAY with gravel	SS 2	9-3-5-5 (8)	
5	836	SM	Very loose to medium dense, gray, silty coarse to fine SAND with gravel, micaceous	SS 3	7-6-5-3 (11)	
	834		Top of Leveling Pad (Wall 98)	SS 4	2-2-2-2 (4)	
	832	CL	Stiff, brown to reddish brown, sandy CLAY	SS 5	4-7-7-9 (14)	
10	830					
	828					
	826	SM	Very loose to medium dense, grayish brown to gray, silty SAND, micaceous	SS 6	4-7-9 (16)	
15	824					
	822					
	820		▽	SS 7	2-2-3 (5)	
20	818					
	816			SS 8	2-2-2 (4)	
25	814					
	812			SS 9	6-9-9 (18)	
30	810		Bottom of hole at 30.0 feet.			
	808					
	806					

● SPT N VALUE ●
⊕ ORGANIC CONTENT % ⊕
PL MC LL
☐ FINES CONTENT (%) ☐
20 40 60 80

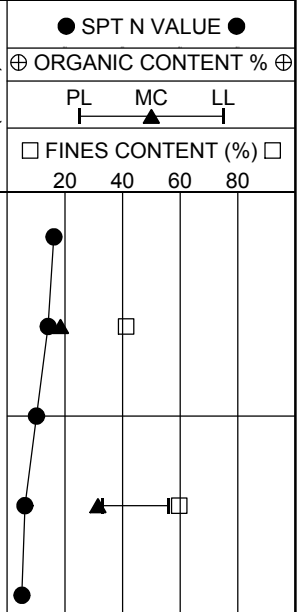
Soil Profile

BORING ID: TC-B-03

MC² Geotechnical • Environmental Materials Testing

CLIENT Kimley - Horn & Associates
PROJECT NAME ABI NE Trail (Task C)
PROJECT NUMBER A051707.058
PROJECT LOCATION Atlanta, Fulton County, Georgia
DATE STARTED 11/20/17 **COMPLETED** 11/20/17
GROUND ELEVATION 839.6 ft **HOLE SIZE** 4 inches
DRILLING CONTRACTOR Sunrise Drilling
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem
AT TIME OF DRILLING GNE
LOGGED BY A. Moussly **CHECKED BY** J. Jimenez
AT END OF DRILLING ---
NOTES Sta. 99+20, 3' RT
AFTER DRILLING ---

DEPTH (ft)	ELEV. (ft)	GRAPHIC LOG	USCS Group Symbol	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)
0	839.6						
	838		SM	Medium dense, dark gray, silty medium to fine SAND with track ballast, micaceous	SS 1	8-8-9-45 (17)	
	836				SS 2	9-8-7-7 (15)	
5					SS 3	3-4-7-8 (11)	
	834						
	832		MH	Firm, reddish brown, fine sandy elastic SILT, micaceous	SS 4	2-3-4-4 (7)	
10	830				SS 5	2-2-4-4 (6)	
	828			Bottom of hole at 10.0 feet.			
	826						
	824						
	822						
	820						
	818						
	816						
	814						
	812						
	810						



Soil Profile

BORING ID: TC-WB-02

MC² Geotechnical • Environmental Materials Testing

CLIENT Kimley - Horn & Associates
PROJECT NAME ABI NE Trail (Task C)
PROJECT NUMBER A051707.058
PROJECT LOCATION Atlanta, Fulton County, Georgia
DATE STARTED 11/28/17 **COMPLETED** 11/28/17
GROUND ELEVATION 839.4 ft **HOLE SIZE** 4 inches
DRILLING CONTRACTOR Sunrise Drilling
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem
AT TIME OF DRILLING GNE
LOGGED BY A. Moussly **CHECKED BY** J. Jimenez
AT END OF DRILLING ---
NOTES Sta. 99+54, 10' LT
AFTER DRILLING ---

DEPTH (ft)	ELEV. (ft)	USCS Group Symbol	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)
0	838	Gravel	Black, track ballast, with debris (brick)	SS 1	3-9-9-6 (18)	
	836	SC	Loose, light to dark brown, reddish brown, medium to fine clayey SAND with gravel	SS 2	3-3-4-4 (7)	
5	834		Top of Leveling Pad (Wall 98)	SS 3	2-3-3-3 (6)	
	832	SM	Medium dense to very dense, orange brown, grayish brown, silty SAND, micaceous	SS 4	5-7-10-5 (17)	
	830			SS 5	6-8-10-14 (18)	
10	828					
	826					
			Low recovery from 13.5' to 15'	SS 6	50/2"	
15	824		Auger refusal at 15 feet.			
	822		Bottom of hole at 15.0 feet.			
	820					
	818					
	816					
	814					
	812					
	810					
	808					
	806					

● SPT N VALUE ●
⊕ ORGANIC CONTENT % ⊕
PL MC LL
☐ FINES CONTENT (%) ☐
20 40 60 80
>>

Soil Profile

BORING ID: TC-WB-03

MC² Geotechnical • Environmental Materials Testing

CLIENT Kimley - Horn & Associates
PROJECT NAME ABI NE Trail (Task C)
PROJECT NUMBER A051707.058
PROJECT LOCATION Atlanta, Fulton County, Georgia
DATE STARTED 11/28/17 **COMPLETED** 11/28/17
GROUND ELEVATION 840.1 ft **HOLE SIZE** 4 inches
DRILLING CONTRACTOR Sunrise Drilling
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem
▽ **AT TIME OF DRILLING** 19.0 ft / Elev 821.1 ft
LOGGED BY A. Moussly **CHECKED BY** J. Jimenez
AT END OF DRILLING ---
NOTES Sta. 99+60, 34' RT
AFTER DRILLING ---

DEPTH (ft)	ELEV. (ft)	USCS Group Symbol	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)
0	840					
	838	SM	Loose to medium dense, reddish brown, light to dark brown, black, silty SAND, micaceous with gravel	SS 1	4-6-6-6 (12)	
			Top of Leveling Pad (Wall 99)	SS 2	3-4-6-7 (10)	
5	836			SS 3	3-6-7-6 (13)	
	834			SS 4	8-6-3-3 (9)	
	832	CL	Stiff, light brown, grayish brown, sandy CLAY with rocks	SS 5	3-4-6-5 (10)	
10	830					
	828					
	826	SM	Medium dense to very dense, gray, brown, white, silty SAND with rocks, micaceous	SS 6	5-7-7 (14)	
15	824					
	822		▽	SS 7	5-8-8 (16)	
20	820					
	818					
	816			SS 8	50/5"	
25	814					
	812		No sample recovered	SS 9	50/0"	
	810		Bottom of hole at 28.5 feet.			
	808					
	806					

● SPT N VALUE ●
⊕ ORGANIC CONTENT % ⊕
PL MC LL
☐ FINES CONTENT (%) ☐
20 40 60 80
>>
>>

Soil Profile

BORING ID: TC-WB-04

MC² Geotechnical • Environmental Materials Testing

CLIENT Kimley - Horn & Associates
PROJECT NAME ABI NE Trail (Task C)
PROJECT NUMBER A051707.058
PROJECT LOCATION Atlanta, Fulton County, Georgia
DATE STARTED 11/28/17 **COMPLETED** 11/28/17
GROUND ELEVATION 840.1 ft **HOLE SIZE** 4 inches
DRILLING CONTRACTOR Sunrise Drilling
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem
AT TIME OF DRILLING 19.0 ft / Elev 821.1 ft
LOGGED BY A. Moussly **CHECKED BY** J. Jimenez
AT END OF DRILLING ---
NOTES Sta. 99+89, 111' RT
AFTER DRILLING ---

DEPTH (ft)	ELEV. (ft)	USCS Group Symbol	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)
0	840	Gravel	Black, track ballast	SS 1	17-13-11-13 (24)	
	838					
		SM	Loose to medium dense, brown to reddish brown, dark gray, silty SAND with gravel, micaceous	SS 2	8-10-9-6 (19)	
	836		Top of Leveling Pad (Wall 99)			
5				SS 3	5-4-3-9 (7)	
	834					
				SS 4	3-3-8-14 (11)	
	832					
				SS 5	8-5-5-13 (10)	
10	830					
	828					
	826	CL	Firm, brown to dark gray, medium to fine sandy lean CLAY, micaceous	SS 6	1-2-3 (5)	
15						
	824					
	822		▽	SS 7	1-2-3 (5)	
20	820		During a second mobilization, a Shelby Tube sample was taken at 19' to 21'. Recovery was 83%. Strong odor			
	818					
	816	PWR	Partially weathered rock	SS 8	50/3"	
25						
	814					
	812					
		SM	Very dense, gray to white, silty SAND with PWR, micaceous	SS 9	20-45-18 (63)	
30	810		Bottom of hole at 30.0 feet.			
	808					
	806					

● SPT N VALUE ●
⊕ ORGANIC CONTENT % ⊕
PL MC LL
☐ FINES CONTENT (%) ☐
20 40 60 80
>>

Soil Profile

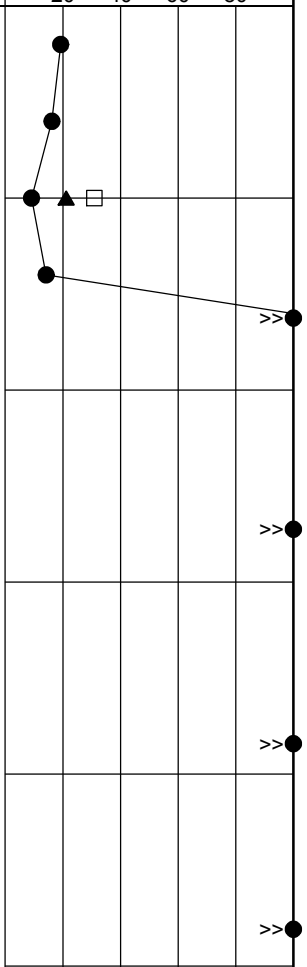
BORING ID: TC-WB-05

MC² Geotechnical • Environmental Materials Testing

CLIENT Kimley - Horn & Associates
PROJECT NAME ABI NE Trail (Task C)
PROJECT NUMBER A051707.058
PROJECT LOCATION Atlanta, Fulton County, Georgia
DATE STARTED 11/29/17 **COMPLETED** 11/29/17
GROUND ELEVATION 840.2 ft **HOLE SIZE** 4 inches
DRILLING CONTRACTOR Sunrise Drilling
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem
▽ **AT TIME OF DRILLING** 13.5 ft / Elev 826.7 ft
LOGGED BY A. Moussly **CHECKED BY** J. Jimenez
AT END OF DRILLING ---
NOTES Sta. 100+04, 59' RT
AFTER DRILLING ---

DEPTH (ft)	ELEV. (ft)	GRAPHIC LOG	USCS Group Symbol	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)
0	840						
	838			Loose to very dense, light to dark brown, black, reddish brown, gray to grayish brown, silty medium to fine SAND with gravel, micaceous	SS 1	13-11-9-11 (20)	
	836				SS 2	10-9-8-6 (17)	
5					SS 3	5-4-6-11 (10)	
	834				SS 4	11-10-5-42 (15)	
	832				SS 5	50/3"	
10	830						
	828		SM				
	826			▽ Low recovery from 13.5' to 15'	SS 6	50/3"	
15							
	824						
	822				SS 7	9-28-50/5"	
20	820						
	818						
	816			Auger refusal at 25 feet.	SS 8	5-35-50/1"	
25				Bottom of hole at 25.0 feet.			
	814						
	812						
	810						
	808						
	806						

● SPT N VALUE ●
⊕ ORGANIC CONTENT % ⊕
PL MC LL
☐ FINES CONTENT (%) ☐
20 40 60 80



Soil Profile

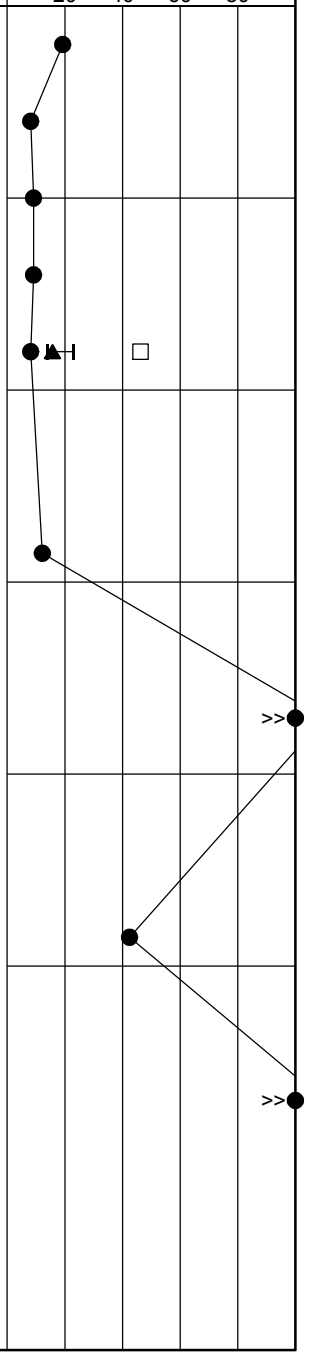
BORING ID: TC-WB-06

MC² Geotechnical • Environmental Materials Testing

CLIENT Kimley - Horn & Associates
PROJECT NAME ABI NE Trail (Task C)
PROJECT NUMBER A051707.058
PROJECT LOCATION Atlanta, Fulton County, Georgia
DATE STARTED 11/28/17 **COMPLETED** 11/28/17
GROUND ELEVATION 840.2 ft **HOLE SIZE** 4 inches
DRILLING CONTRACTOR Sunrise Drilling
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem
▽ **AT TIME OF DRILLING** 19.0 ft / Elev 821.2 ft
LOGGED BY A. Moussly **CHECKED BY** J. Jimenez
AT END OF DRILLING ---
NOTES Sta. 99+71, 64' RT
AFTER DRILLING ---

DEPTH (ft)	ELEV. (ft)	USCS Group Symbol	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)
0						
	838	SM	Loose to medium dense, brown to reddish brown, silty sand with gravel, micaceous	SS 1	9-10-10-9 (20)	
				SS 2	5-5-4-5 (9)	
5	836			SS 3	7-4-6-8 (10)	
	834			SS 4	6-6-4-5 (10)	
	832	SC	Loose, brown to reddish brown, clayey medium to fine SAND, micaceous	SS 5	7-6-3-4 (9)	
10	830					
	828					
	826	CL	Stiff to very hard, grayish brown, sandy CLAY, micaceous	SS 6	6-6-7 (13)	
15	824					
	822		▽	SS 7	50/1"	
20	820					
	818					
	816	SM	Dense to very dense, gray, silty SAND, micaceous	SS 8	32-24-19 (43)	
25	814					
	812		No recovery 28.5' to 30'	SS 9	50/0"	
			Bottom of hole at 28.5 feet.			
	810					
	808					
	806					

● SPT N VALUE ●
⊕ ORGANIC CONTENT % ⊕
PL MC LL
☐ FINES CONTENT (%) ☐
20 40 60 80



Soil Profile

BORING ID: TC-B-04

MC² Geotechnical • Environmental Materials Testing

CLIENT Kimley - Horn & Associates
PROJECT NAME ABI NE Trail (Task C)
PROJECT NUMBER A051707.058
PROJECT LOCATION Atlanta, Fulton County, Georgia
DATE STARTED 12/11/17 **COMPLETED** 12/11/17
GROUND ELEVATION 849.7 ft **HOLE SIZE** 4 inches
DRILLING CONTRACTOR MC Squared, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Hand Auger
AT TIME OF DRILLING GNE
LOGGED BY A. Moussly **CHECKED BY** J. Jimenez
AT END OF DRILLING ---
NOTES Sta. 100+70, 3' RT
AFTER DRILLING ---

DEPTH (ft)	ELEV. (ft)	GRAPHIC LOG	USCS Group Symbol	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)	● SPT N VALUE ● / ⊕ ORGANIC CONTENT % ⊕ / PL MC LL / ☐ FINES CONTENT (%) ☐ (20 40 60 80)
0	848		SP-SM	Tan brown to gray, SAND with silt and rocks	HA			
	846			Bottom of Cut				
5	844			Bottom of hole at 5.0 feet.				
	842							
	840							
	838							
	836							
	834							
	832							
	830							
	828							
	826							
	824							
	822							
	820							

Soil Profile

BORING ID: TC-WB-07

MC² Geotechnical • Environmental Materials Testing

CLIENT Kimley - Horn & Associates
PROJECT NAME ABI NE Trail (Task C)
PROJECT NUMBER A051707.058
PROJECT LOCATION Atlanta, Fulton County, Georgia
DATE STARTED 12/21/17 **COMPLETED** 12/21/17
GROUND ELEVATION 859.8 ft **HOLE SIZE** 4 inches
DRILLING CONTRACTOR MC Squared, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Hand Auger
AT TIME OF DRILLING GNE
LOGGED BY A. Wilson **CHECKED BY** J. Jimenez
AT END OF DRILLING ---
NOTES Sta. 101+23, 14' RT
AFTER DRILLING ---

DEPTH (ft)	ELEV. (ft)	GRAPHIC LOG	USCS Group Symbol	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)
0	858		SC	Reddish brown, clayey fine SAND with gravel			
5	856		SM	Dark gray, reddish brown to brown, silty fine SAND with rocks, micaceous	HA		
	854						
	852						
	850			Bottom of hole at 8.0 feet.			
	848						
	846						
	844						
	842						
	840						
	838						
	836						
	834						
	832						
	830						
	828						
	826						

● SPT N VALUE ●
⊕ ORGANIC CONTENT % ⊕
PL MC LL
☐ FINES CONTENT (%) ☐
20 40 60 80

Soil Profile

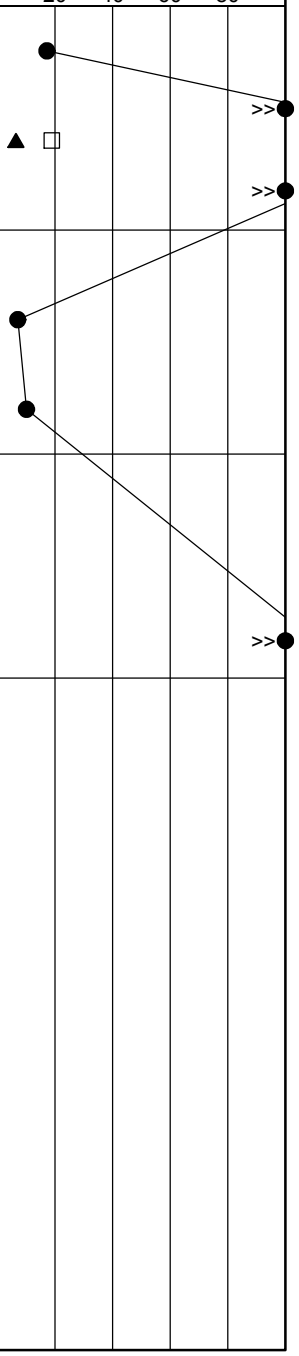
BORING ID: TC-B-05

MC² Geotechnical • Environmental Materials Testing

CLIENT Kimley - Horn & Associates
PROJECT NAME ABI NE Trail (Task C)
PROJECT NUMBER A051707.058
PROJECT LOCATION Atlanta, Fulton County, Georgia
DATE STARTED 11/20/17 **COMPLETED** 11/20/17
GROUND ELEVATION 837.6 ft **HOLE SIZE** 4 inches
DRILLING CONTRACTOR Sunrise Drilling
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem
▽ **AT TIME OF DRILLING** 8.5 ft / Elev 829.1 ft
LOGGED BY A. Moussly **CHECKED BY** J. Jimenez
AT END OF DRILLING ---
NOTES Sta. 101+45, 3' RT
AFTER DRILLING ---

DEPTH (ft)	ELEV. (ft)	USCS Group Symbol	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)
0	836	SM	Medium dense to very dense, dark to light gray, silty medium to fine SAND with track ballast, micaceous	SS 1	5-9-9-6 (18)	
				SS 2	32-50/1"	
	834					
5	832		Low recovery from 4' to 6'	SS 3	50/3"	
	830	ML	Firm, gray, sandy SILT, micaceous	SS 4	3-4-4-6 (8)	
	828	SM	▽ Medium dense to very dense, brownish gray to gray, silty fine SAND, micaceous	SS 5	2-4-7-15 (11)	
10			Water Table (cave-in at 8.5 feet)			
	826					
	824			SS 6	11-20-50/4"	
15	822		Auger refusal at 16 feet.			
			Bottom of hole at 16.0 feet.			
	820					
	818					
	816					
	814					
	812					
	810					
	808					

● SPT N VALUE ●
⊕ ORGANIC CONTENT % ⊕
PL MC LL
☐ FINES CONTENT (%) ☐
20 40 60 80



Soil Profile

BORING ID: TC-WB-08

MC² Geotechnical • Environmental Materials Testing

CLIENT Kimley - Horn & Associates
PROJECT NAME ABI NE Trail (Task C)
PROJECT NUMBER A051707.058
PROJECT LOCATION Atlanta, Fulton County, Georgia
DATE STARTED 11/29/17 **COMPLETED** 11/29/17
GROUND ELEVATION 838.7 ft **HOLE SIZE** 4 inches
DRILLING CONTRACTOR Sunrise Drilling
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem
▽ **AT TIME OF DRILLING** 9.5 ft / Elev 829.2 ft
LOGGED BY A. Moussly **CHECKED BY** J. Jimenez
AT END OF DRILLING ---
NOTES Sta. 101+99, 9' LT
AFTER DRILLING ---

DEPTH (ft)	ELEV. (ft)	GRAPHIC LOG	USCS Group Symbol	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)
0	838		Gravel	Black, track ballast	SS 1	8-9-10-12 (19)	
	836		CL	Stiff, brown to orange brown, sandy CLAY with rocks, micaceous	SS 2	9-8-5-5 (13)	
				Top of Leveling Pad (Wall 101A)			
5	834		ML	Firm, grayish brown to orange brown, sandy SILT with rocks, micaceous	SS 3	2-2-3-4 (5)	
	832				SS 4	2-1-7-10 (8)	
	830		SM	Very dense, gray, silty SAND with rocks	SS 5	13-32-25-42 (57)	
10				▽			
	828						
	826			Auger refusal at 12.5 feet.			
				Bottom of hole at 12.5 feet.			
	824						
	822						
	820						
	818						
	816						
	814						
	812						
	810						
	808						
	806						
	804						

● SPT N VALUE ●
⊕ ORGANIC CONTENT % ⊕
PL MC LL
☐ FINES CONTENT (%) ☐
20 40 60 80

Soil Profile

BORING ID: TC-WB-09

MC² Geotechnical • Environmental Materials Testing

CLIENT Kimley - Horn & Associates
PROJECT NAME ABI NE Trail (Task C)
PROJECT NUMBER A051707.058
PROJECT LOCATION Atlanta, Fulton County, Georgia
DATE STARTED 12/21/17 **COMPLETED** 12/21/17
GROUND ELEVATION 840.0 ft **HOLE SIZE** 4 inches
DRILLING CONTRACTOR MC Squared, Inc.
GROUND WATER LEVELS:
DRILLING METHOD Hand Auger
AT TIME OF DRILLING GNE
LOGGED BY A. Wilson **CHECKED BY** J. Jimenez
AT END OF DRILLING ---
NOTES Sta. 102+40, 13' RT
AFTER DRILLING ---

DEPTH (ft)	ELEV. (ft)	GRAPHIC LOG	USCS Group Symbol	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)
0			SM	Dark gray, silty fine SAND with rock			
	838		SC	Dark gray, light to reddish brown, clayey fine SAND with rocks	HA		
	836						
5							
	834		SP-SM	Gray to light gray, poorly-graded fine SAND with silt			
				Auger refusal at 6 feet			
	832			Top of Leveling Pad (Wall 101A)			
				Bottom of hole at 6.0 feet.			
	830						
	828						
	826						
	824						
	822						
	820						
	818						
	816						
	814						
	812						
	810						
	808						
	806						

● SPT N VALUE ●
⊕ ORGANIC CONTENT % ⊕
PL MC LL
☐ FINES CONTENT (%) ☐
20 40 60 80

Soil Profile

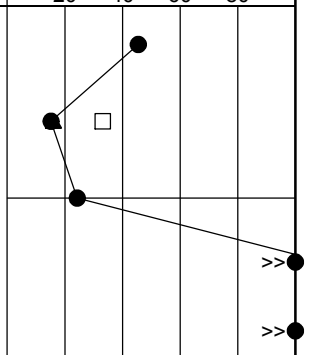
BORING ID: TC-WB-10

MC² Geotechnical • Environmental Materials Testing

CLIENT Kimley - Horn & Associates
PROJECT NAME ABI NE Trail (Task C)
PROJECT NUMBER A051707.058
PROJECT LOCATION Atlanta, Fulton County, Georgia
DATE STARTED 11/29/17 **COMPLETED** 11/29/17
GROUND ELEVATION 837.4 ft **HOLE SIZE** 4 inches
DRILLING CONTRACTOR Sunrise Drilling
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem
AT TIME OF DRILLING GNE
LOGGED BY A. Moussly **CHECKED BY** J. Jimenez
AT END OF DRILLING ---
NOTES Sta. 102+99, 13' LT
AFTER DRILLING ---

DEPTH (ft)	ELEV. (ft)	USCS Group Symbol	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)
0	836	Gravel	Black, track ballast	SS 1	10-21-25-15 (46)	
	834		Medium dense to very dense, dark to light gray, silty medium to fine SAND with gravel, micaceous	SS 2	5-8-8-6 (16)	
5	832		Top of Leveling Pad (Wall 101A)	SS 3	4-8-17-21 (25)	
	830	SM		SS 4	4-30-50/4"	
	828			SS 5	20-50/5"	
10	826		Auger refusal at 13 feet.			
	824		Bottom of hole at 13.0 feet.			
	822					
	820					
	818					
	816					
	814					
	812					
	810					
	808					
	806					
	804					

● SPT N VALUE ●
⊕ ORGANIC CONTENT % ⊕
PL MC LL
☐ FINES CONTENT (%) ☐
20 40 60 80



Soil Profile

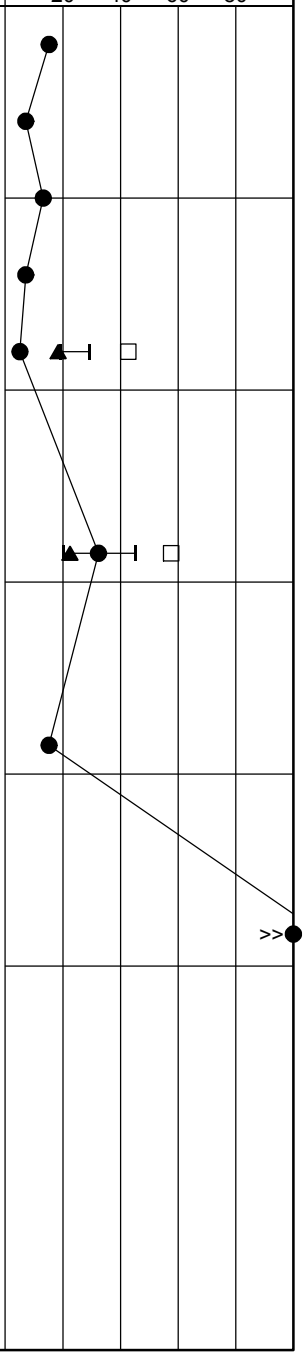
BORING ID: TC-WB-11

MC² Geotechnical • Environmental Materials Testing

CLIENT Kimley - Horn & Associates
PROJECT NAME ABI NE Trail (Task C)
PROJECT NUMBER A051707.058
PROJECT LOCATION Atlanta, Fulton County, Georgia
DATE STARTED 11/29/17 **COMPLETED** 11/29/17
GROUND ELEVATION 836.3 ft **HOLE SIZE** 4 inches
DRILLING CONTRACTOR Sunrise Drilling
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem
▽ **AT TIME OF DRILLING** 22.0 ft / Elev 814.3 ft
LOGGED BY A. Moussly **CHECKED BY** J. Jimenez
AT END OF DRILLING ---
NOTES Sta. 103+70, 10' LT
AFTER DRILLING ---

DEPTH (ft)	ELEV. (ft)	USCS Group Symbol	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)
0	836	Gravel	Black, track ballast	SS 1	6-6-10-11 (16)	
	834	CL	Firm, brown to reddish brown, CLAY, micaceous Top of Leveling Pad (Wall 101A)	SS 2	9-5-3-5 (8)	
5	832	ML	Firm to stiff, gray to dark gray, sandy SILT with rocks, micaceous	SS 3	6-5-9-11 (14)	
	830			SS 4	4-4-4-4 (8)	
	828	SC	Loose, dark gray, clayey medium to fine SAND, micaceous	SS 5	4-2-4-5 (6)	
10	826	CL	Hard, dark gray to grayish brown, medium to fine sandy lean CLAY, micaceous			
	824					
	822			SS 6	25-16-17 (33)	
15	820					
	818					
20	816	SM	Medium dense to very dense, light brown to grayish brown, black, silty SAND, micaceous	SS 7	9-8-8 (16)	
	814	▽				
	812		Auger refusal at 25 feet.	SS 8	3-10-50/4"	
25	810		Bottom of hole at 25.0 feet.			
	808					
	806					
	804					
	802					

● SPT N VALUE ●
⊕ ORGANIC CONTENT % ⊕
PL MC LL
□ FINES CONTENT (%) □
20 40 60 80



Soil Profile

BORING ID: TC-B-06

MC² Geotechnical • Environmental Materials Testing

CLIENT Kimley - Horn & Associates
PROJECT NAME ABI NE Trail (Task C)
PROJECT NUMBER A051707.058
PROJECT LOCATION Atlanta, Fulton County, Georgia
DATE STARTED 11/29/17 **COMPLETED** 11/29/17
GROUND ELEVATION 835.4 ft **HOLE SIZE** 4 inches
DRILLING CONTRACTOR Sunrise Drilling
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem
AT TIME OF DRILLING GNE
LOGGED BY A. Moussly **CHECKED BY** J. Jimenez
AT END OF DRILLING ---
NOTES Sta. 104+43, 4' RT
AFTER DRILLING ---

DEPTH (ft)	ELEV. (ft)	GRAPHIC LOG	USCS Group Symbol	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)
0	834		Gravel	Black, track ballast	SS 1	4-6-10-11 (16)	
	832		SC	Medium dense, reddish brown, clayey medium to fine SAND, micaceous	SS 2	12-13-7-6 (20)	
5	830		SM	Grayish brown, silty fine SAND, micaceous	HA 3		
				Bottom of hole at 5.0 feet.			
	828						
	826						
	824						
	822						
	820						
	818						
	816						
	814						
	812						
	810						
	808						
	806						

● SPT N VALUE ●
⊕ ORGANIC CONTENT % ⊕
PL MC LL
☐ FINES CONTENT (%) ☐
20 40 60 80

Soil Profile

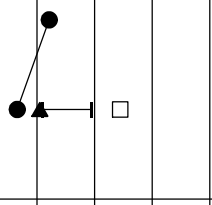
BORING ID: TC-B-07

MC² Geotechnical • Environmental Materials Testing

CLIENT Kimley - Horn & Associates
PROJECT NAME ABI NE Trail (Task C)
PROJECT NUMBER A051707.058
PROJECT LOCATION Atlanta, Fulton County, Georgia
DATE STARTED 11/29/17 **COMPLETED** 11/29/17
GROUND ELEVATION 836.0 ft **HOLE SIZE** 4 inches
DRILLING CONTRACTOR Sunrise Drilling
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem
AT TIME OF DRILLING GNE
LOGGED BY A. Moussly **CHECKED BY** J. Jimenez
AT END OF DRILLING ---
NOTES Sta. 106+43, 7' RT
AFTER DRILLING ---

DEPTH (ft)	ELEV. (ft)	GRAPHIC LOG	USCS Group Symbol	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)
0	836		Gravel	Black, track ballast	SS 1	8-14-11-11 (25)	
	834						
			SC	Medium dense, brown, clayey medium to fine SAND, micaceous	SS 2	6-8-6-3 (14)	
	832						
5					HA 3		
	830			Bottom of hole at 5.0 feet.			
	828						
	826						
	824						
	822						
	820						
	818						
	816						
	814						
	812						
	810						
	808						
	806						

● SPT N VALUE ●
⊕ ORGANIC CONTENT % ⊕
PL MC LL
☐ FINES CONTENT (%) ☐
20 40 60 80



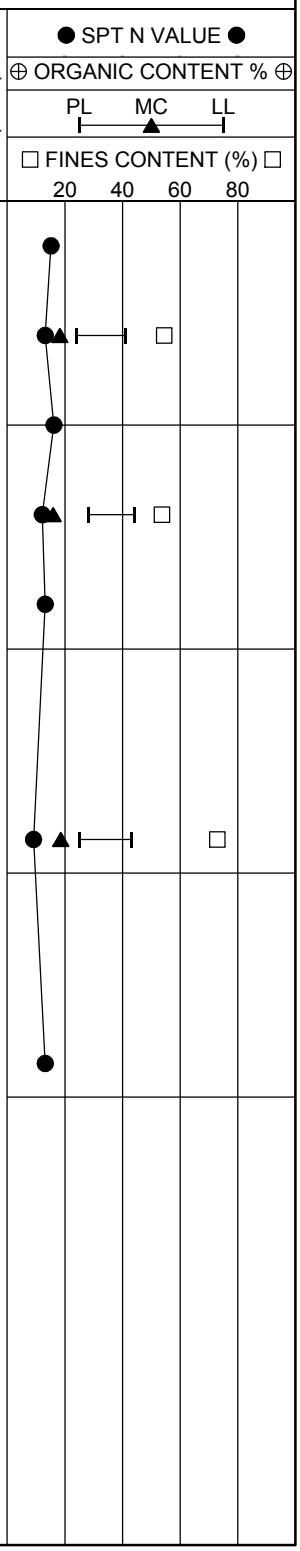
Soil Profile

BORING ID: TC-B-08

MC² Geotechnical • Environmental Materials Testing

CLIENT Kimley - Horn & Associates
PROJECT NAME ABI NE Trail (Task C)
PROJECT NUMBER A051707.058
PROJECT LOCATION Atlanta, Fulton County, Georgia
DATE STARTED 11/30/17 **COMPLETED** 11/30/17
GROUND ELEVATION 835.0 ft **HOLE SIZE** 4 inches
DRILLING CONTRACTOR Sunrise Drilling
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem
AT TIME OF DRILLING GNE
LOGGED BY A. Moussly **CHECKED BY** J. Jimenez
AT END OF DRILLING ---
NOTES Sta. 109+25, 27' RT
AFTER DRILLING ---

DEPTH (ft)	ELEV. (ft)	GRAPHIC LOG	USCS Group Symbol	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)
0	834		Gravel	Black, track ballast	SS 1	7-8-8-10 (16)	
	832		CL	Stiff, reddish brown to brown, sandy lean CLAY, micaceous	SS 2	7-6-8-7 (14)	
5	830		SM	Medium dense, grayish brown, silty SAND with stones, micaceous	SS 3	11-9-8-8 (17)	
	828			Stiff, light brown to brown, sandy SILT	SS 4	6-6-7-10 (13)	
	826				SS 5	8-7-7-11 (14)	
10			ML				
	824						
	822						
				Stiff, brown, lean CLAY with fine sand	SS 6	6-5-5 (10)	
15	820						
	818		CL				
	816				SS 7	4-6-8 (14)	
20				Bottom of hole at 20.0 feet.			
	814						
	812						
	810						
	808						
	806						



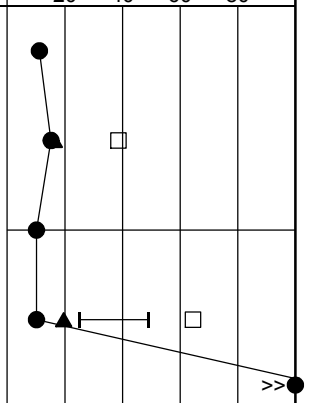
Soil Profile

BORING ID: TC-B-09

MC² Geotechnical • Environmental Materials Testing

CLIENT Kimley - Horn & Associates
PROJECT NAME ABI NE Trail (Task C)
PROJECT NUMBER A051707.058
PROJECT LOCATION Atlanta, Fulton County, Georgia
DATE STARTED 11/29/17 **COMPLETED** 11/29/17
GROUND ELEVATION 836.0 ft **HOLE SIZE** 4 inches
DRILLING CONTRACTOR Sunrise Drilling
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem
AT TIME OF DRILLING GNE
LOGGED BY A. Moussly **CHECKED BY** J. Jimenez
AT END OF DRILLING ---
NOTES Sta. 110+70, 25' RT
AFTER DRILLING ---

DEPTH (ft)	ELEV. (ft)	GRAPHIC LOG	USCS Group Symbol	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)
0	834		Gravel	Black, track ballast	SS 1	7-7-5-6 (12)	
	832		SM	Medium dense, dark gray, silty medium to fine SAND, micaceous	SS 2	15-11-5-5 (16)	
5	830		CL	Stiff, brown, medium to fine sandy lean CLAY, micaceous	SS 3	4-5-6-6 (11)	
	828				SS 4	5-6-5-8 (11)	
			SP-SM	Very dense, brownish gray, poorly-graded SAND with silt and rocks	SS 5	20-50/5"	
10	826			Bottom of hole at 10.0 feet.			
	824						
	822						
	820						
	818						
	816						
	814						
	812						
	810						
	808						
	806						



Soil Profile

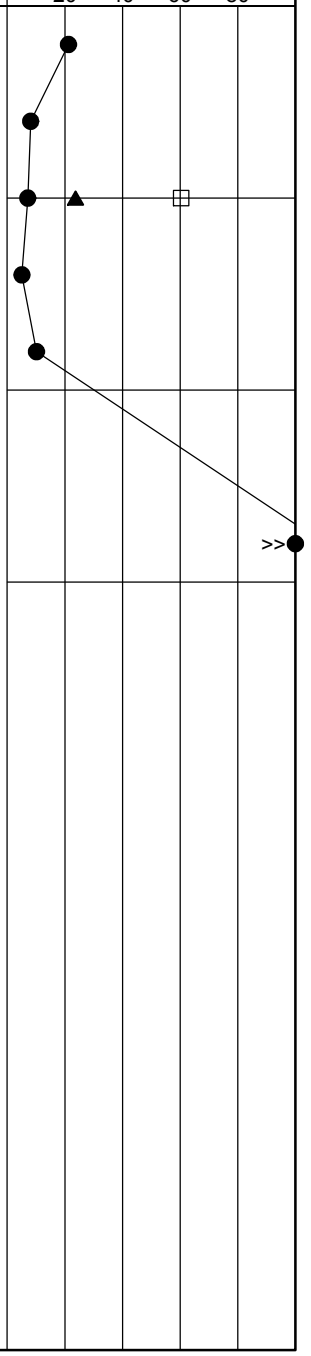
BORING ID: TC-WB-12

MC² Geotechnical • Environmental Materials Testing

CLIENT Kimley - Horn & Associates
PROJECT NAME ABI NE Trail (Task C)
PROJECT NUMBER A051707.058
PROJECT LOCATION Atlanta, Fulton County, Georgia
DATE STARTED 11/30/17 **COMPLETED** 11/30/17
GROUND ELEVATION 836.3 ft **HOLE SIZE** 4 inches
DRILLING CONTRACTOR Sunrise Drilling
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem
AT TIME OF DRILLING GNE
LOGGED BY A. Moussly **CHECKED BY** J. Jimenez
AT END OF DRILLING ---
NOTES Sta. 112+66, 11' RT
AFTER DRILLING ---

DEPTH (ft)	ELEV. (ft)	USCS Group Symbol	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)
0	836	Gravel	Black, track ballast	SS 1	7-8-14-14 (22)	
	834	ML	Firm to stiff, reddish brown to brown, sandy SILT with rocks, miaceous	SS 2	6-5-4-5 (9)	
5	832			SS 3	4-4-4-6 (8)	
	830			SS 4	3-3-3-3 (6)	
	828	SM	Medium dense to very dense, dark brown to brown, silty SAND, micaceous	SS 5	8-6-5-5 (11)	
10	826		Bottom of Wall (Wall 113A + B)			
	824					
	822		Auger refusal at 15 feet.	SS 6	11-17-50/0"	
15	820		Bottom of hole at 15.0 feet.			
	818					
	816					
	814					
	812					
	810					
	808					
	806					
	804					
	802					

● SPT N VALUE ●
⊕ ORGANIC CONTENT % ⊕
PL MC LL
☐ FINES CONTENT (%) ☐
20 40 60 80



Soil Profile

BORING ID: TC-WB-13

MC² Geotechnical • Environmental Materials Testing

CLIENT Kimley - Horn & Associates
PROJECT NAME ABI NE Trail (Task C)
PROJECT NUMBER A051707.058
PROJECT LOCATION Atlanta, Fulton County, Georgia
DATE STARTED 12/4/17 **COMPLETED** 12/4/17
GROUND ELEVATION 837.5 ft **HOLE SIZE** 4 inches
DRILLING CONTRACTOR Sunrise Drilling
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem
AT TIME OF DRILLING GNE
LOGGED BY A. Moussly **CHECKED BY** J. Jimenez
AT END OF DRILLING ---
NOTES Sta. 114+32, 11' RT
AFTER DRILLING ---

DEPTH (ft)	ELEV. (ft)	USCS Group Symbol	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)
0	836	Gravel	Black, track ballast	SS 1	5-4-5-5 (9)	
	834			SS 2	6-7-16-11 (23)	
5	832	SM	Medium dense, brown, silty SAND, micaceous	SS 3	10-7-5-9 (12)	
	830	ML	Stiff, brown to reddish brown, sandy SILT, micaceous	SS 4	5-6-7-8 (13)	
	828			SS 5	5-5-6-7 (11)	
10	826		Bottom of Wall (Wall 114A + B)			
	824	SM	Medium dense, brown, silty SAND with rocks, micaceous	SS 6	6-6-7 (13)	
15	822					
	820					
	818			SS 7	11-8-6 (14)	
20	816		Bottom of hole at 20.0 feet.			
	814					
	812					
	810					
	808					
	806					
	804					

● SPT N VALUE ●
⊕ ORGANIC CONTENT % ⊕
PL MC LL
☐ FINES CONTENT (%) ☐
20 40 60 80

SUMMARY OF LABORATORY RESULTS

MC Squared, Inc.
1275 Shiloh Road, Suite 2620
Kennesaw, GA 30144

CLIENT Kimley-Horn & Associates

PROJECT NAME ABI NE Trail (Task C)

PROJECT NUMBER A051707.058

PROJECT LOCATION Atlanta, Fulton County, Georgia

Sample No.	Station/ Offset (C/L)	Soil Description	GDOT Class	%< Finer Sieve						D75 (mm)	Clay Count %	NMC (%)	Total Volume Change %	Swell %	Shrinkage %	MDD pcf	OMC %	LL %	PL %	PI %	Erosion Index	Soil support Value
				1.5"	3/4"	#10	#40	#60	#200													
Bulk-1 (0-1 ft)	96+15, CL	Brown silty C to F SAND (micaceous)	SM		100.0	84.5	65.3	54.1	32.7	0.797	10.5		18.3	16.4	1.9	113.1	13.6				6.11	
Bulk-2 (0-1 ft)	100+72, CL	Light brown M to F sandy CLAY (micaceous)	CL		100.0	99.6	93.8	86.8	66.3	0.122	39.0		26.1	22.0	4.1	101.2	18.9				1.97	
Bulk-3 (0-1 ft)	106+18, CL	Brown M to F sandy SILT (micaceous)	ML		100.0	97.5	85.4	74.7	50.7	0.254	19.4		32.0	26.9	5.1	88.6	27.4				3.90	
Bulk-4 (0-1 ft)	109+25, CL	Reddish brown silty C to F SAND (micaceous)	SM		100.0	87.8	68.8	58.6	34.8	0.625	13.8		12.2	10.1	2.0	98.9	20.3				5.85	
TC-B-02 (2-4 ft)	96+40, 3' RT	Brown M to F sandy SILT (micaceous)	ML		100.0	99.4	91.0	83.5	54.3	0.171		30.2									3.45	
TC-B-02 (8-10 ft)	96+40, 3' RT	Brown M to F sandy fat CLAY (micaceous)	CH		100.0	95.2	88.9	82.1	59.5	0.163		23.1						51	28	23	2.81	
TC-B-03 (2-4 ft)	99+20, 3' RT	Dark brown silty M to F SAND (micaceous)	SM		100.0	91.0	78.6	67.4	41.2	0.358		18.4									5.06	
TC-B-03 (6-8 ft)	99+20, 3' RT	Reddish brown fine sandy elastic SILT (micaceous)	MH		100.0	98.9	94.4	87.9	59.7	0.132		31.4						56	33	23	2.79	
TC-B-05 (2-4 ft)	101+45, 3' RT	Light gray silty M to F SAND	SM		100.0	96.1	67.8	52.0	18.9	0.572		6.5									7.80	
TC-B-06 (2-4 ft)	104+43, 4' RT	Reddish brown clayey M to F SAND (micaceous)	SC		100.0	95.3	80.4	69.2	47.2	0.329		22.2						38	22	16	4.33	
TC-B-07 (2-4 ft)	106+43, 7' RT	Brown clayey M to F SAND (micaceous)	SC		100.0	96.3	79.2	69.3	48.9	0.34		21.0						39	22	17	4.11	
TC-B-08 (2-4 ft)	109+25, 27' RT	Brown M to F sandy lean CLAY (micaceous)	CL		100.0	98.4	85.4	76.9	54.5	0.227		18.2						41	24	17	3.42	
TC-B-08 (6-8 ft)	109+25, 27' RT	Brown M to F sandy SILT (micaceous)	ML		100.0	98.9	91.8	83.3	53.7	0.174		15.9						44	28	16	3.53	
TC-B-08 (13.5-15 ft)	109+25, 27' RT	Brown lean CLAY with fine sand (micaceous)	CL		100.0	99.8	98.4	96.4	72.9	0.082		18.6						43	25	18	1.16	
TC-B-09 (2-4 ft)	110+70, 25' RT	Dark gray silty M to F SAND (micaceous)	SM		100.0	90.4	68.7	58.0	38.6	0.607		16.3									5.38	
TC-B-09 (6-8 ft)	110+70, 25' RT	Brown M to F sandy lean CLAY (micaceous)	CL		100.0	98.3	92.3	84.7	64.4	0.139		19.6						49	25	24	2.21	
TC-B-10 (4-6 ft)	112+90, 7' RT	Reddish brown fine sandy SILT (micaceous)	ML		100.0	93.5	88.8	81.8	54.8	0.178		22.0						43	29	14	3.39	
TC-WB-01 (4-6 ft)	98+79, 7' LT	Brown silty C to F SAND	SM		100.0	78.1	54.5	43.8	19.2	1.593		10.0									7.77	
TC-WB-02 (4-6 ft)	99+54, 10' LT	Light brown clayey M to F SAND	SC		100.0	99.2	86.6	73.8	46.8	0.263		17.3						31	15	16	4.37	
TC-WB-04 (13.5-15 ft)	99+60, 34' RT	Brown M to F sandy lean CLAY (micaceous)	CL		100.0	99.3	92.3	84.4	60.8	0.151		24.9						39	23	16	2.65	
TC-WB-04 (19-21 ft)	99+89, 111' RT	Brown, gray M to F sandy lean CLAY (slightly micaceous)	CL		100.0	99.7	91.4	82.2	56.6	0.18	31.0	22.4						30	14	16	3.17	
TC-WB-05 (4-6 ft)	100+04, 59' RT	Tan silty M to F SAND (micaceous)	SM		100.0	96.2	81.5	68.1	30.9	0.329		21.1									6.33	
TC-WB-06 (8-10 ft)	99+71, 64' RT	Brown clayey M to F SAND (micaceous)	SC		100.0	96.3	86.8	76.2	46.2	0.238		15.7						23	14	9	4.45	
TC-WB-07 (0-1.5 ft)	101+23, 14' RT	Reddish brown silty SAND (micaceous)	SM						29.4			20.9						37	31	6	6.52	
TC-WB-07 (7.5-8 ft)	101+23, 14' RT	Reddish brown silty SAND (micaceous)	SM						29.7			21.4						32	27	5	6.48	
TC-WB-09 (0-1 ft)	102+40, 13' RT	Gray silty SAND (micaceous)	SM									23.6										
TC-WB-09 (1-3.5 ft)	102+40, 13' RT	Gray silty SAND (micaceous)	SM									21.5										
TC-WB-09 (3.5-5 ft)	102+40, 13' RT	Reddish brown silty SAND (micaceous)	SM						37.2			23.9						40	27	13	5.56	
TC-WB-10 (2-4 ft)	102+99, 13' LT	Dark gray silty M to F SAND (micaceous)	SM		100.0	90.9	75.3	64.1	33.1	0.419		16.0									6.06	
TC-WB-11 (8-10 ft)	103+70, 10' LT	Dark gray clayey M to F SAND (micaceous)	SC		100.0	97.5	84.4	72.7	42.7	0.278		18.3						29	19	10	4.88	

MC Squared, Inc.
1275 Shiloh Road, Suite 2620
Kennesaw, GA 30144

SUMMARY OF LABORATORY RESULTS

CLIENT Kimley-Horn & Associates

PROJECT NAME ABI NE Trail (Task C)

PROJECT NUMBER A051707.058

PROJECT LOCATION Atlanta, Fulton County, Georgia

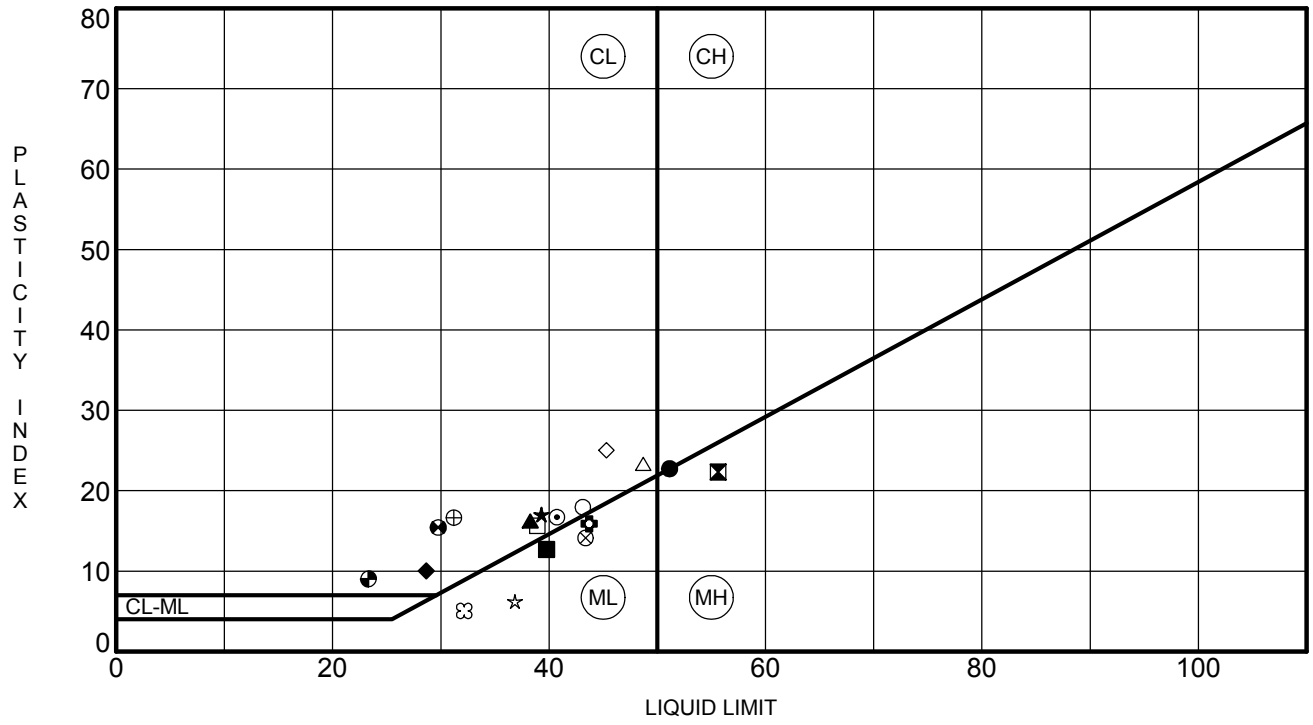
Sample No.	Station/ Offset (C/L)	Soil Description	GDOT Class	%< Finer Sieve						D75 (mm)	Clay Count %	NMC (%)	Total Volume Change %	Swell %	Shrinkage %	MDD pcf	OMC %	LL %	PL %	PI %	Erosion Index	Soil support Value
				1.5"	3/4"	#10	#40	#60	#200													
TC-WB-11 (13.5-15 ft)	103+70, 10' LT	Brown M to F sandy lean CLAY (micaceous)	CL		100.0	99.3	92.1	83.6	57.6	0.163		22.4						45	20	25	3.05	
TC-WB-12 (4-6 ft)	112+66, 11' RT	Reddish brown M to F sandy SILT (micaceous)	ML		100.0	99.2	93.6	86.6	60.3	0.141		23.7									2.71	

ATTERBERG LIMITS' RESULTS

MC Squared, Inc.
1275 Shiloh Road,Suite 2620
Kennesaw, GA 30144

CLIENT Kimley- Horn & Associates **PROJECT NAME** ABI NE Trail (Task C)

PROJECT NUMBER A051707.058 **PROJECT LOCATION** Atlata, Fulton County, Georgia



	Specimen Identification	LL	PL	PI	%Fines	Classification
●	TC-B-02 (8-10 ft)	51	28	23	60	Brown M to F sandy fat CLAY (micaceous)
⊠	TC-B-03 (6-8 ft)	56	33	23	60	Reddish brown fine sandy elastic SILT (micaceous)
▲	TC-B-06 (2-4 ft)	38	22	16	47	Reddish brown clayey M to F SAND (micaceous)
★	TC-B-07 (2-4 ft)	39	22	17	49	Brown clayey M to F SAND (micaceous)
⊙	TC-B-08 (2-4 ft)	41	24	17	54	Brown M to F sandy lean CLAY (micaceous)
✿	TC-B-08 (6-8 ft)	44	28	16	54	Brown M to F sandy SILT (micaceous)
○	TC-B-08 (13.5-15 ft)	43	25	18	73	Brown lean CLAY with fine sand (micaceous)
△	TC-B-09 (6-8 ft)	49	25	24	64	Brown M to F sandy lean CLAY (micaceous)
⊗	TC-B-10 (4-6 ft)	43	29	14	55	Reddish brown fine sandy SILT (micaceous)
⊕	TC-WB-02 (4-6 ft)	31	15	16	47	Light brown clayey M to F SAND
□	TC-WB-04 (13.5-15 ft)	39	23	16	61	Brown M to F sandy lean CLAY (micaceous)
⊠	TC-WB-04 (19-21 ft)	30	14	16	57	Brown, gray M to F sandy lean CLAY (slightly micaceous)
◕	TC-WB-06 (8-10 ft)	23	14	9	46	Brown clayey M to F SAND (micaceous)
☆	TC-WB-07 (0-1.5 ft)	37	31	6	29	Reddish brown silty SAND (micaceous)
⊠	TC-WB-07 (7.5-8 ft)	32	27	5	30	Reddish brown silty SAND (micaceous)
■	TC-WB-09 (3.5-5 ft)	40	27	13	37	Reddish brown silty SAND (micaceous)
◆	TC-WB-11 (8-10 ft)	29	19	10	43	Dark gray clayey M to F SAND (micaceous)
◇	TC-WB-11 (13.5-15 ft)	45	20	25	58	Brown M to F sandy lean CLAY (micaceous)

%Fines- % of total soil (by weight) passing U.S. No. 200 sieve

GRAIN SIZE DISTRIBUTION

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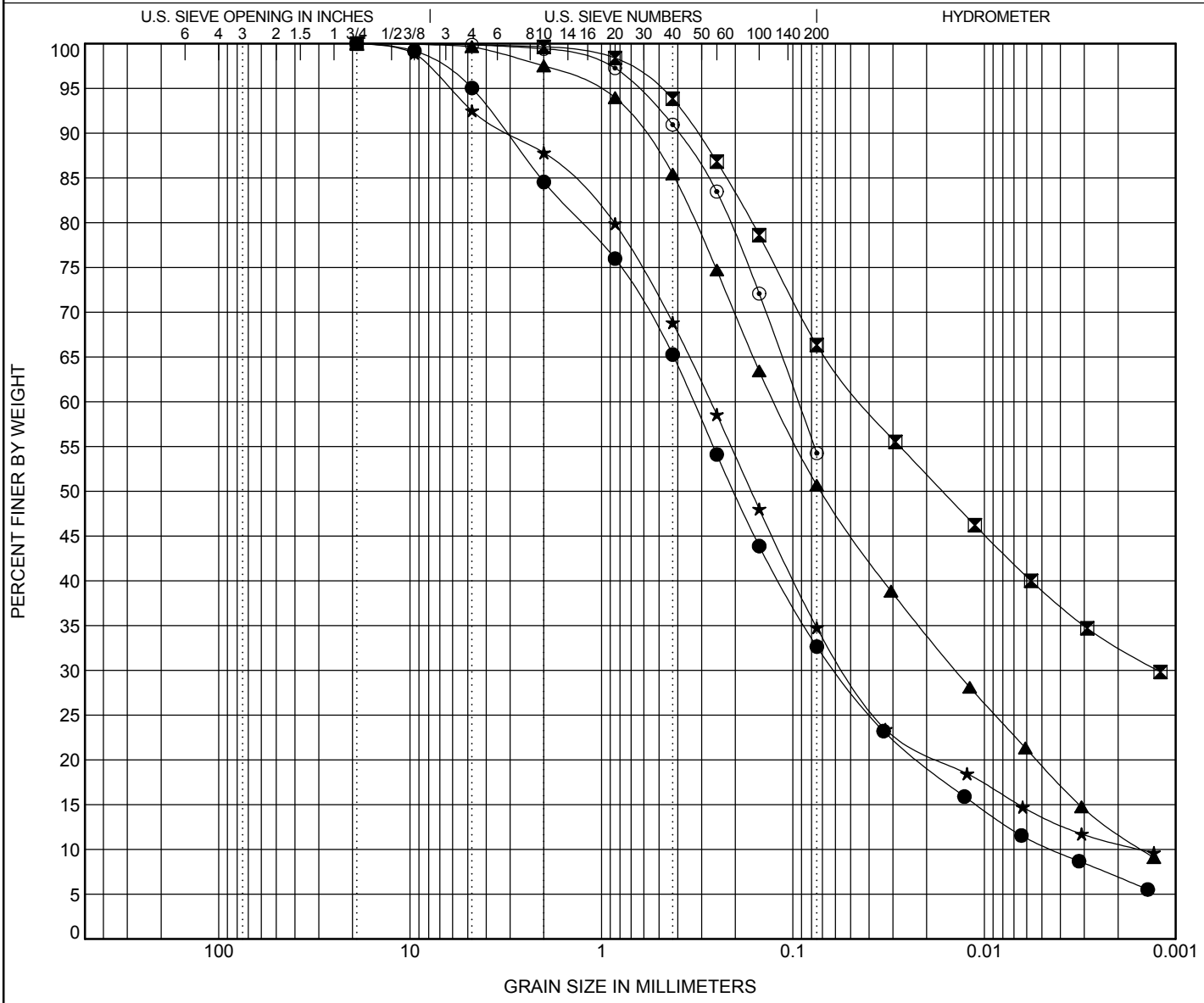
Kennesaw, GA 30144

CLIENT Kimley-Horn & Associates **PROJECT NAME** ABI NE Trail (Task C)

PROJECT NUMBER A051707.058 **PROJECT LOCATION** Atlanta, Fulton County, Georgia



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● Bulk-1 (0-1 ft)	Brown silty C to F SAND (micaceous)				2.46	75.26
⊠ Bulk-2 (0-1 ft)	Light brown M to F sandy CLAY (micaceous)					
▲ Bulk-3 (0-1 ft)	Brown M to F sandy SILT (micaceous)				1.06	83.24
★ Bulk-4 (0-1 ft)	Reddish brown silty C to F SAND (micaceous)				6.92	177.94
⊙ TC-B-02 (2-4 ft)	Brown M to F sandy SILT (micaceous)					

Specimen Identification	D100	D60	D30	D10	NMC	%Gravel	%Sand	%Silt	%Clay
● Bulk-1 (0-1 ft)	19	0.331	0.06	0.004		5.0	62.4	22.1	10.5
⊠ Bulk-2 (0-1 ft)	19	0.043	0.001			0.2	33.5	27.3	39.0
▲ Bulk-3 (0-1 ft)	19	0.124	0.014	0.001		0.3	49.0	31.3	19.4
★ Bulk-4 (0-1 ft)	19	0.269	0.053	0.002		7.5	57.7	21.0	13.8
⊙ TC-B-02 (2-4 ft)	19	0.094			30.2	0.1	45.6	54.3	

Note-Sample soaked for 16 hrs (+/- 10 min)

GRAIN SIZE DISTRIBUTION

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Kennesaw, GA 30144

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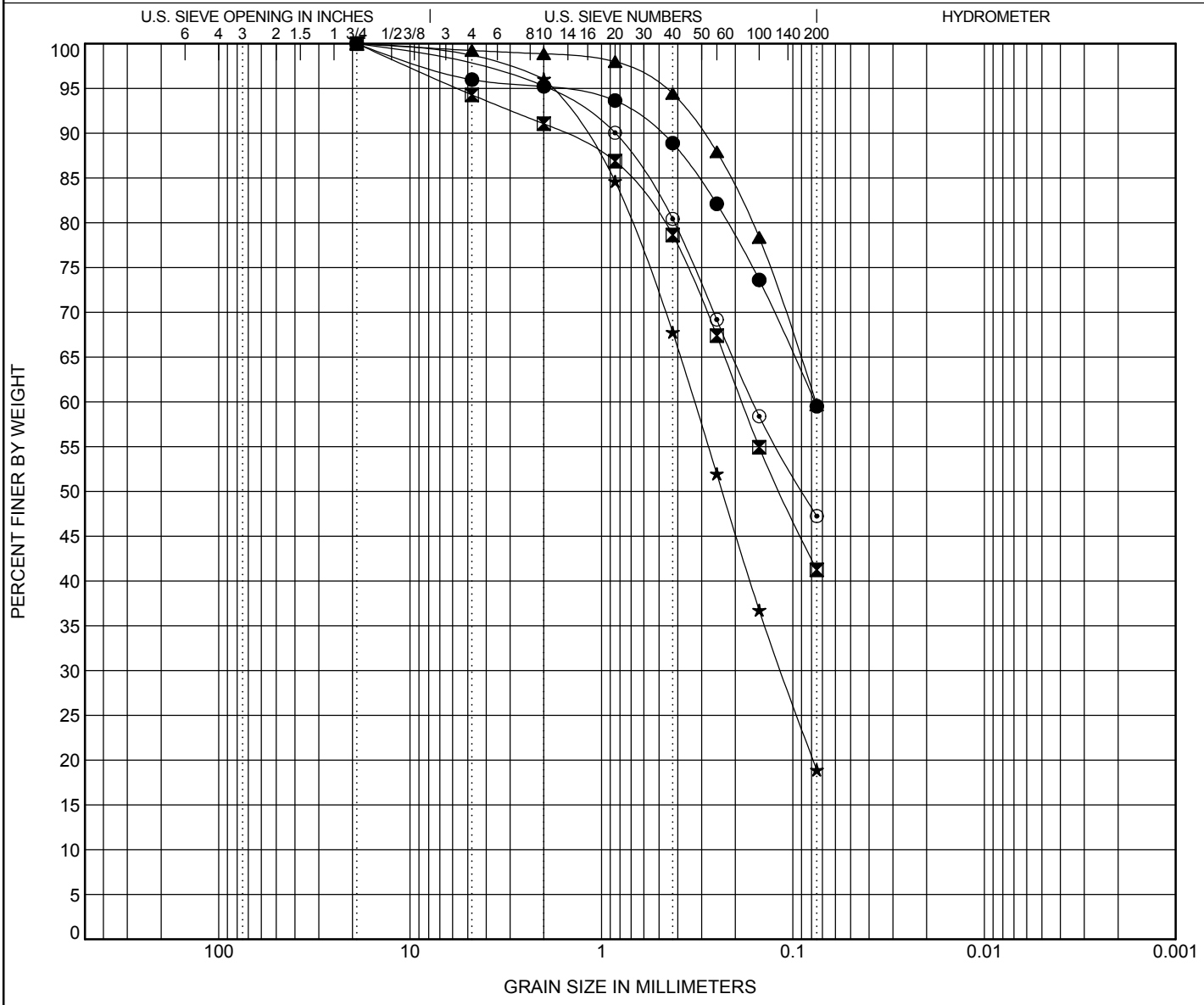

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● TC-B-02 (8-10 ft)	Brown M to F sandy fat CLAY (micaceous)	51	28	23		
⊠ TC-B-03 (2-4 ft)	Dark brown silty M to F SAND (micaceous)					
▲ TC-B-03 (6-8 ft)	Reddish brown fine sandy elastic SILT (micaceous)	56	33	23		
★ TC-B-05 (2-4 ft)	Light gray silty M to F SAND					
⊙ TC-B-06 (2-4 ft)	Reddish brown clayey M to F SAND (micaceous)	38	22	16		

Specimen Identification	D100	D60	D30	D10	NMC	%Gravel	%Sand	%Silt	%Clay
● TC-B-02 (8-10 ft)	19	0.077			23.1	4.0	36.5	59.5	
⊠ TC-B-03 (2-4 ft)	19	0.185			18.4	5.7	53.0	41.2	
▲ TC-B-03 (6-8 ft)	19	0.076			31.4	0.8	39.6	59.7	
★ TC-B-05 (2-4 ft)	19	0.327	0.115		6.5	2.4	78.7	18.9	
⊙ TC-B-06 (2-4 ft)	19	0.162			22.2	2.9	49.8	47.2	

Note-Sample soaked for 16 hrs (+/- 10 min)

GRAIN SIZE DISTRIBUTION

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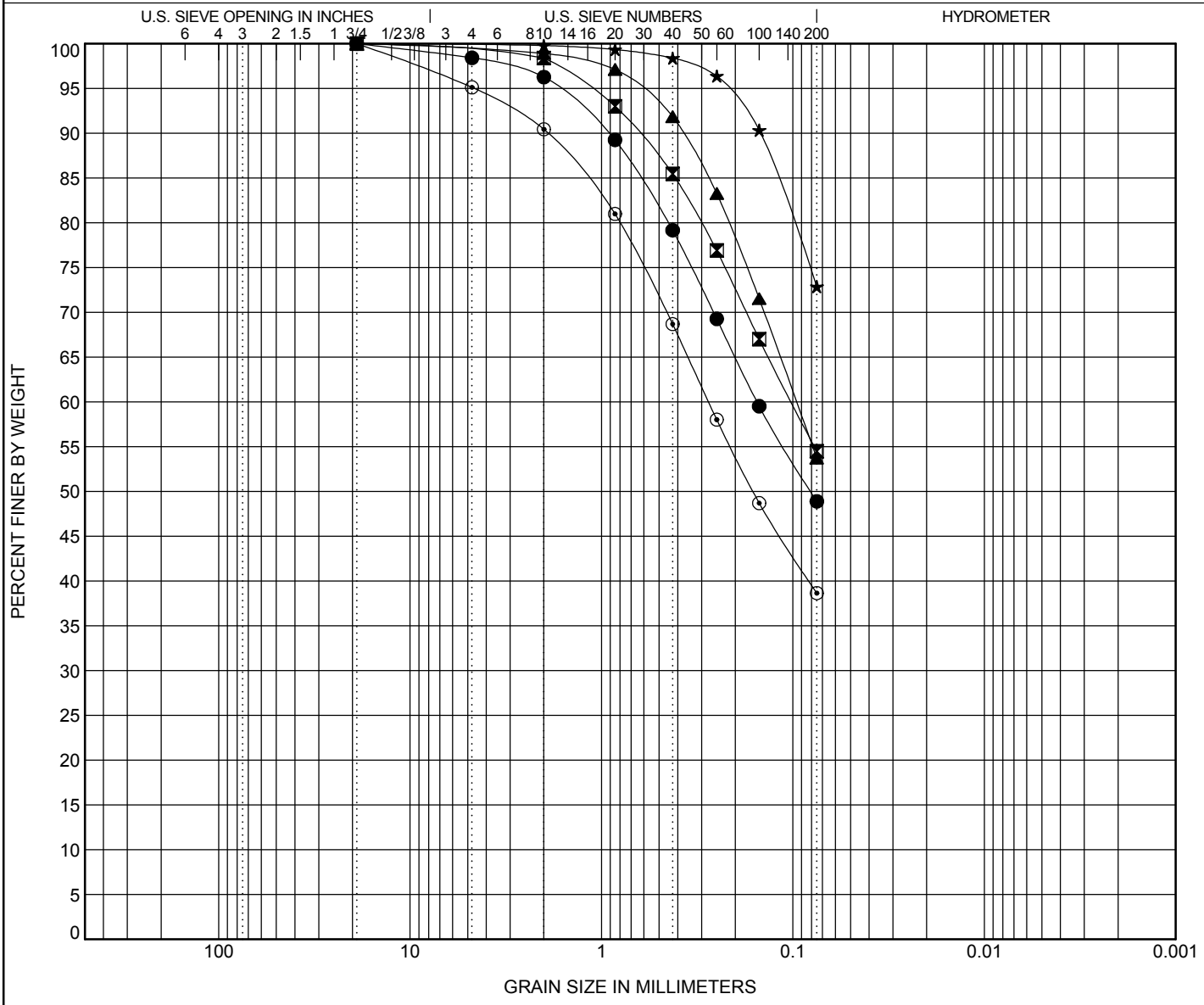

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	LL	PL	PI	Cc	Cu
●	**TC-B-07 (2-4 ft)**	**Brown clayey M to F SAND (micaceous)**	**39**	**22**	**17**		
⊠	**TC-B-08 (2-4 ft)**	**Brown M to F sandy lean CLAY (micaceous)**	**41**	**24**	**17**		
▲	**TC-B-08 (6-8 ft)**	**Brown M to F sandy SILT (micaceous)**	**44**	**28**	**16**		
★	**TC-B-08 (13.5-15 ft)**	**Brown lean CLAY with fine sand (micaceous)**	**43**	**25**	**18**		
⊙	**TC-B-09 (2-4 ft)**	**Dark gray silty M to F SAND (micaceous)**					

	Specimen Identification	D100	D60	D30	D10	NMC	%Gravel	%Sand	%Silt	%Clay
●	**TC-B-07 (2-4 ft)**	**19**	**0.154**			**21.0**	**1.6**	**49.5**	**48.9**	
⊠	**TC-B-08 (2-4 ft)**	**19**	**0.102**			**18.2**	**1.0**	**44.5**	**54.5**	
▲	**TC-B-08 (6-8 ft)**	**19**	**0.096**			**15.9**	**0.7**	**45.6**	**53.7**	
★	**TC-B-08 (13.5-15 ft)**	**19**				**18.6**	**0.1**	**27.0**	**72.9**	
⊙	**TC-B-09 (2-4 ft)**	**19**	**0.276**			**16.3**	**4.9**	**56.5**	**38.6**	

Note-Sample soaked for 16 hrs (+/- 10 min)

GRAIN SIZE DISTRIBUTION

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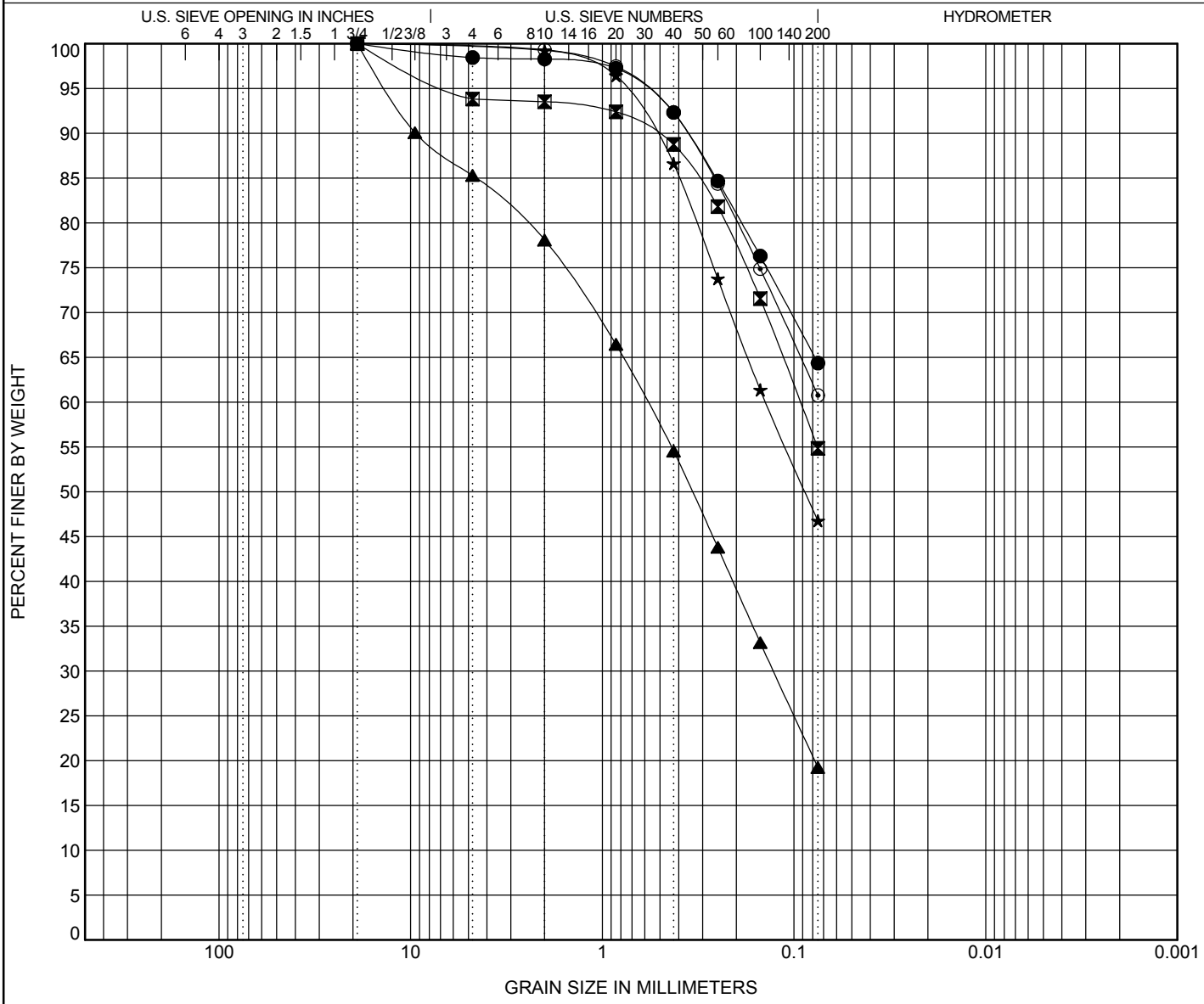

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● TC-B-09 (6-8 ft)	Brown M to F sandy lean CLAY (micaceous)	49	25	24		
⊠ TC-B-10 (4-6 ft)	Reddish brown fine sandy SILT (micaceous)	43	29	14		
▲ TC-WB-01 (4-6 ft)	Brown silty C to F SAND					
★ TC-WB-02 (4-6 ft)	Light brown clayey M to F SAND	31	15	16		
⊙ TC-WB-04 (13.5-15 ft)	Brown M to F sandy lean CLAY (micaceous)	39	23	16		

Specimen Identification	D100	D60	D30	D10	NMC	%Gravel	%Sand	%Silt	%Clay
● TC-B-09 (6-8 ft)	19				19.6	1.5	34.1	64.4	
⊠ TC-B-10 (4-6 ft)	19	0.093			22.0	6.2	39.0	54.8	
▲ TC-WB-01 (4-6 ft)	19	0.584	0.128		10.0	14.7	66.1	19.2	
★ TC-WB-02 (4-6 ft)	19	0.141			17.3	0.5	52.8	46.8	
⊙ TC-WB-04 (13.5-15 ft)	19				24.9	0.4	38.8	60.8	

Note-Sample soaked for 16 hrs (+/- 10 min)

GRAIN SIZE DISTRIBUTION

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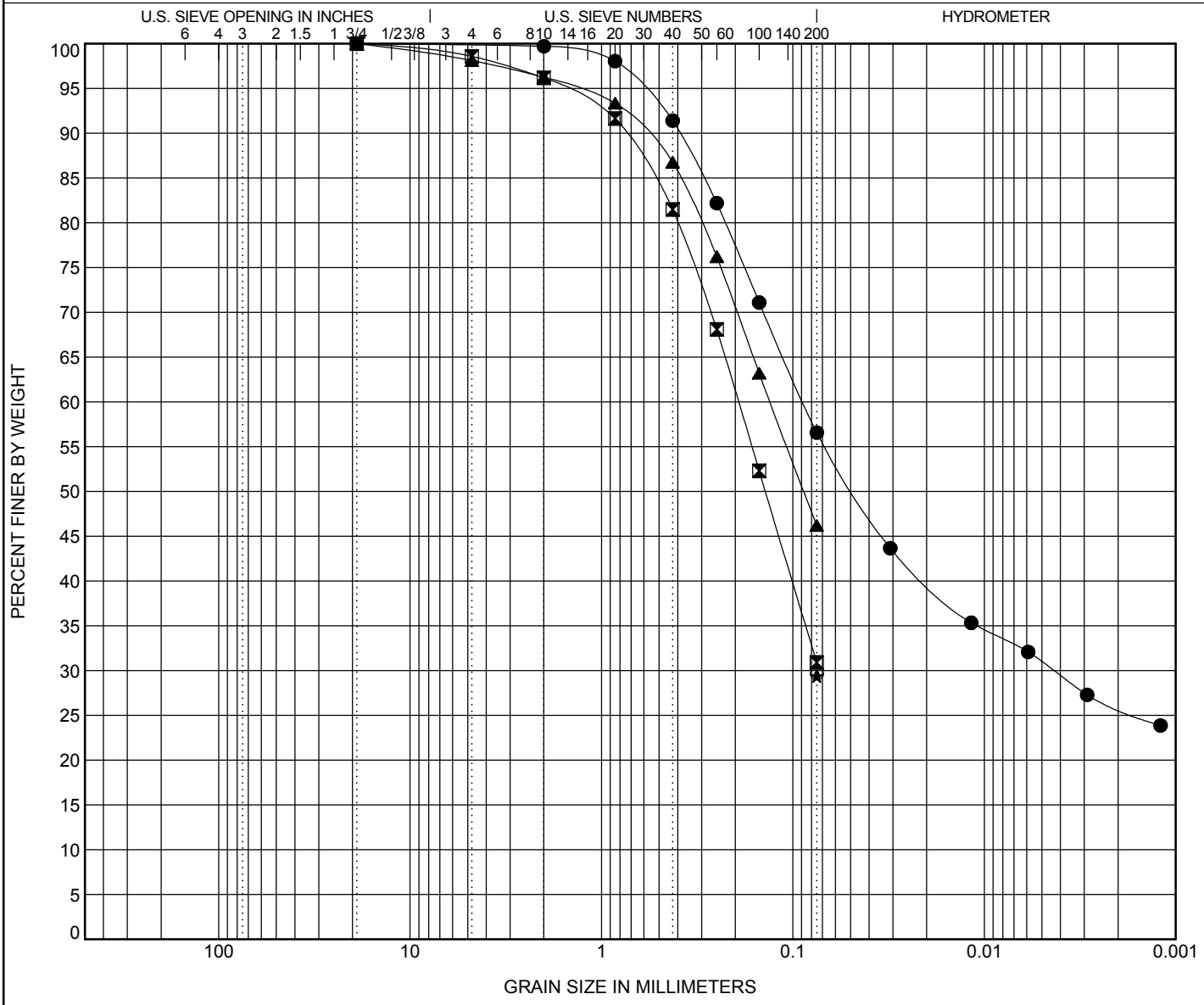

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● TC-WB-04 (19-21 ft)	Brown, gray M to F sandy lean CLAY (slightly micaceous)	30	14	16		
⊠ TC-WB-05 (4-6 ft)	Tan silty M to F SAND (micaceous)					
▲ TC-WB-06 (8-10 ft)	Brown clayey M to F SAND (micaceous)	23	14	9		
★ TC-WB-07 (0-1.5 ft)	Reddish brown silty SAND (micaceous)	37	31	6		
⊙ TC-WB-07 (7.5-8 ft)	Reddish brown silty SAND (micaceous)	32	27	5		

Specimen Identification	D100	D60	D30	D10	NMC	%Gravel	%Sand	%Silt	%Clay
● TC-WB-04 (19-21 ft)	19	0.088	0.004		22.4	0.2	43.3	25.6	31.0
⊠ TC-WB-05 (4-6 ft)	19	0.193			21.1	1.4	67.7	30.9	
▲ TC-WB-06 (8-10 ft)	19	0.132			15.7	1.9	51.9	46.2	
★ TC-WB-07 (0-1.5 ft)	0.075				20.9			29.4	
⊙ TC-WB-07 (7.5-8 ft)	0.075				21.4			29.7	

Note-Sample soaked for 16 hrs (+/- 10 min)

GRAIN SIZE DISTRIBUTION

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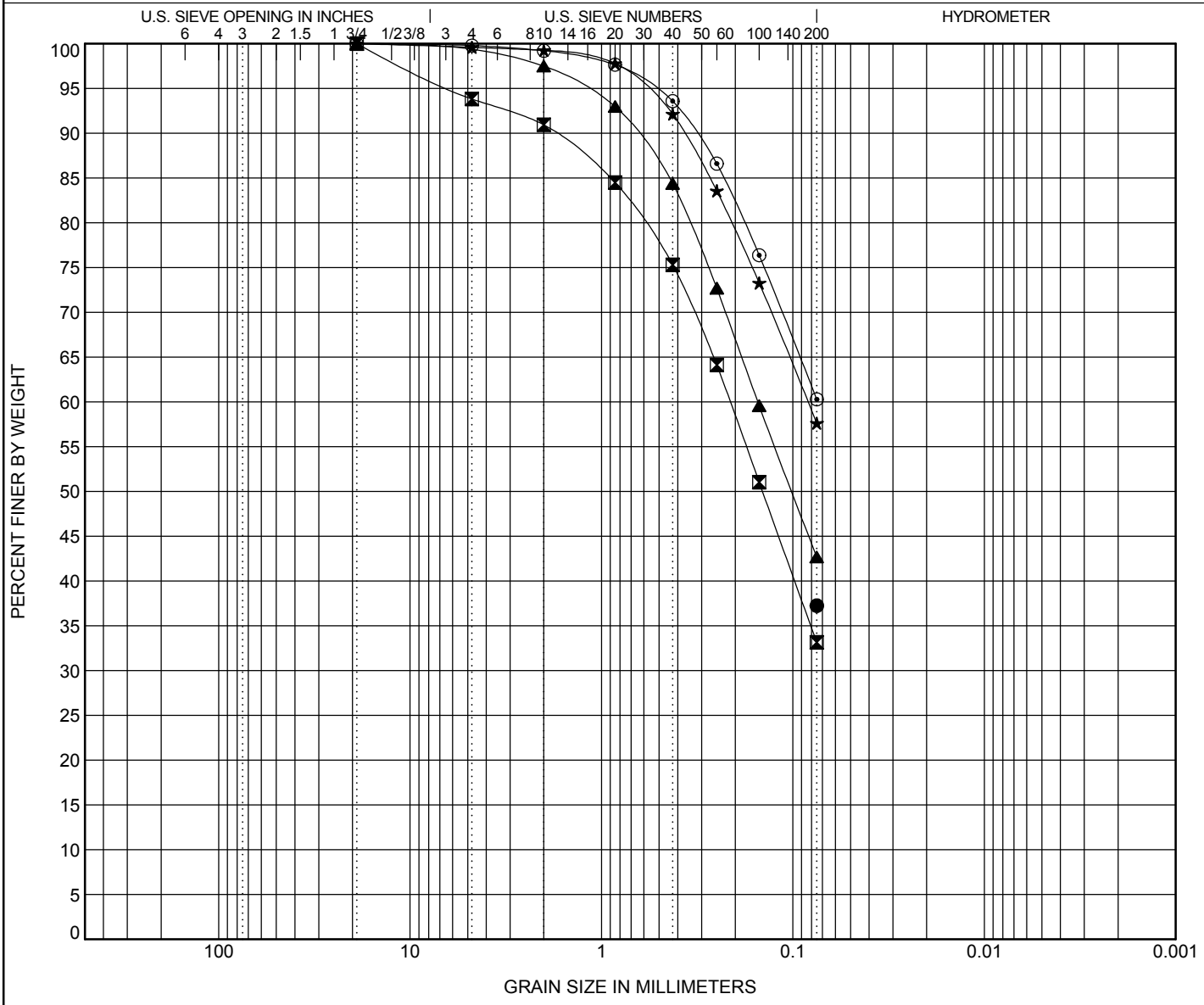


COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● TC-WB-09 (3.5-5 ft)	Reddish brown silty SAND (micaceous)	40	27	13		
⊠ TC-WB-10 (2-4 ft)	Dark gray silty M to F SAND (micaceous)					
▲ TC-WB-11 (8-10 ft)	Dark gray clayey M to F SAND (micaceous)	29	19	10		
★ TC-WB-11 (13.5-15 ft)	Brown M to F sandy lean CLAY (micaceous)	45	20	25		
⊙ TC-WB-12 (4-6 ft)	Reddish brown M to F sandy SILT (micaceous)					

Specimen Identification	D100	D60	D30	D10	NMC	%Gravel	%Sand	%Silt	%Clay
● TC-WB-09 (3.5-5 ft)	0.075				23.9			37.2	
⊠ TC-WB-10 (2-4 ft)	19	0.213			16.0	6.2	60.7	33.1	
▲ TC-WB-11 (8-10 ft)	19	0.153			18.3	1.5	55.8	42.7	
★ TC-WB-11 (13.5-15 ft)	19	0.083			22.4	0.4	42.0	57.6	
⊙ TC-WB-12 (4-6 ft)	19				23.7	0.2	39.5	60.3	

Note-Sample soaked for 16 hrs (+/- 10 min)

APPENDIX II

- Special Provision 520 Piling – Pilot Holes

GDOT Provision
Revised January 24, 2008

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

SPECIAL PROVISION

ABI Northeast Trail (Task C)
MC Squared Project No. A051707.058
Atlanta, Fulton County, Georgia

SECTION 520—PILING

Delete Sub-Section 520.3.05.B and substitute the following:

520.3.05.B. Drill Pilot Holes
When pilot holes are required, drill them to the diameter and approximate depth specified on the Plans.

Backfill voids and holes with Class A or better concrete. Furnishing and placing backfill concrete is an incidental part of the work.

The following are not considered pilot holes:

- Holes created by spudding (punching)
- Holes dug to drive piling that is too long to fit leads
- Holes dug to replace a template (if permitted)

Where pilot holes are required in granular material and the material cannot be sealed off using "mudding" drilling methods, drill the pilot hole as follows:

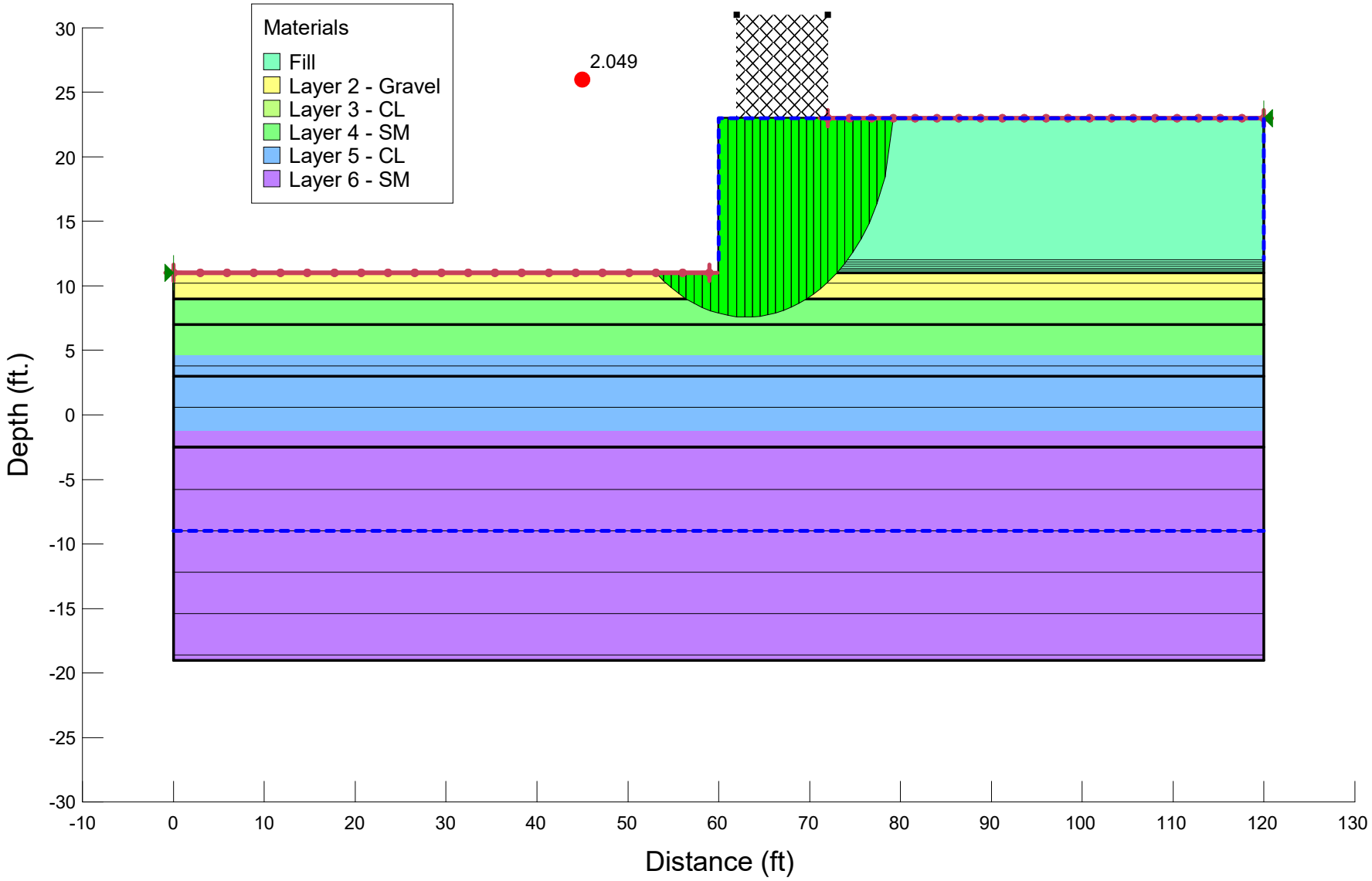
1. Place a casing pipe with a large enough diameter around the boring device.
2. Hold the casing in position until the pilot hole is completed and the pile driving progresses deep enough into the hard material to keep loose material out of the pilot hole.

The use of casing is incidental to the work.

Office of Materials and Testing

APPENDIX III (MSE WALLS)

- Global Stability Analysis – Wall 98
- Global Stability Analysis – Wall 99
- Global Stability Analysis – Walls 101A thru C (Section 1)
- Global Stability Analysis – Walls 101A thru C (Section 2)
- Global Stability Analysis – Walls 101A thru C (Section 3)
- Global Stability Analysis – Walls 101A thru C (Section 4)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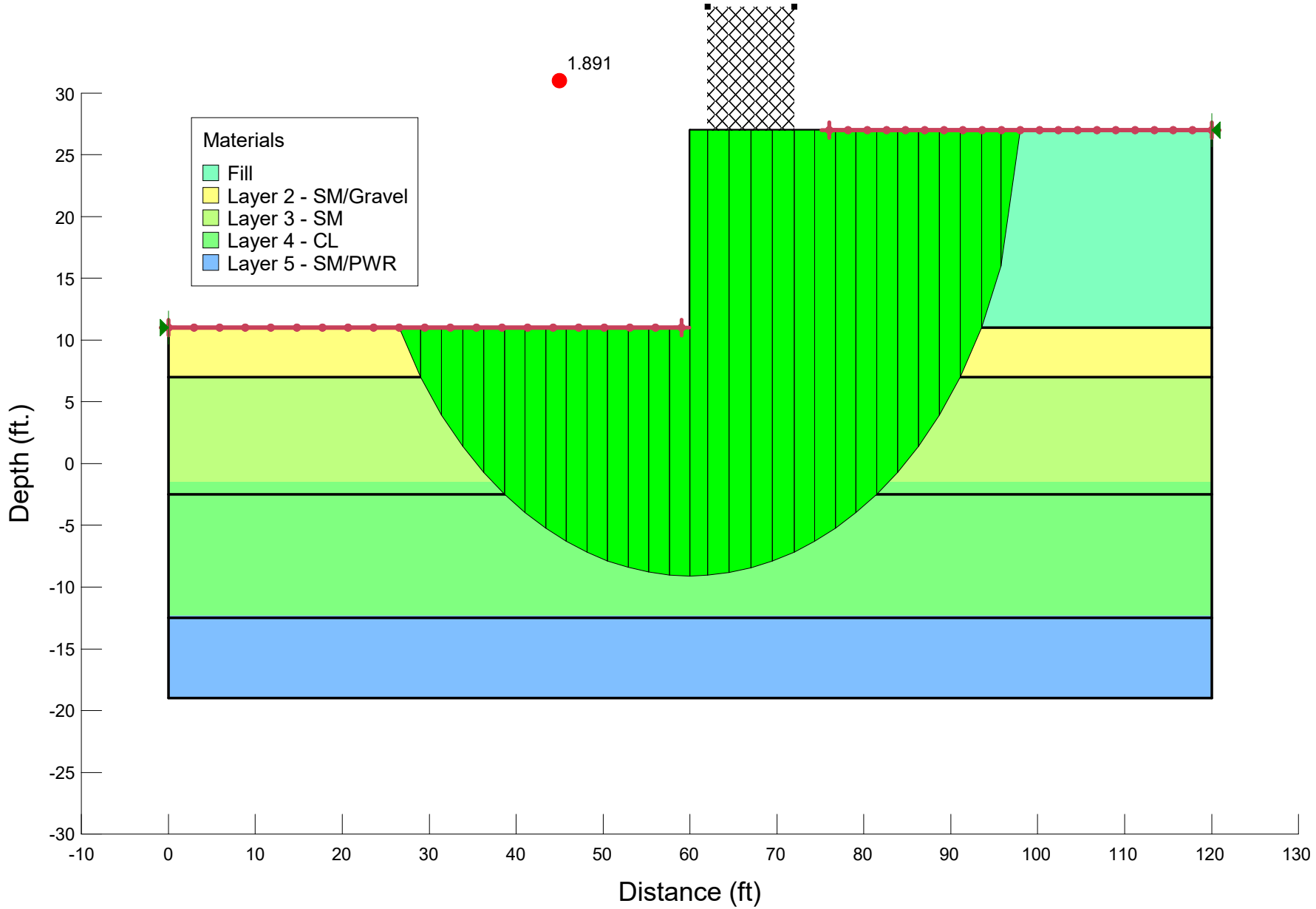
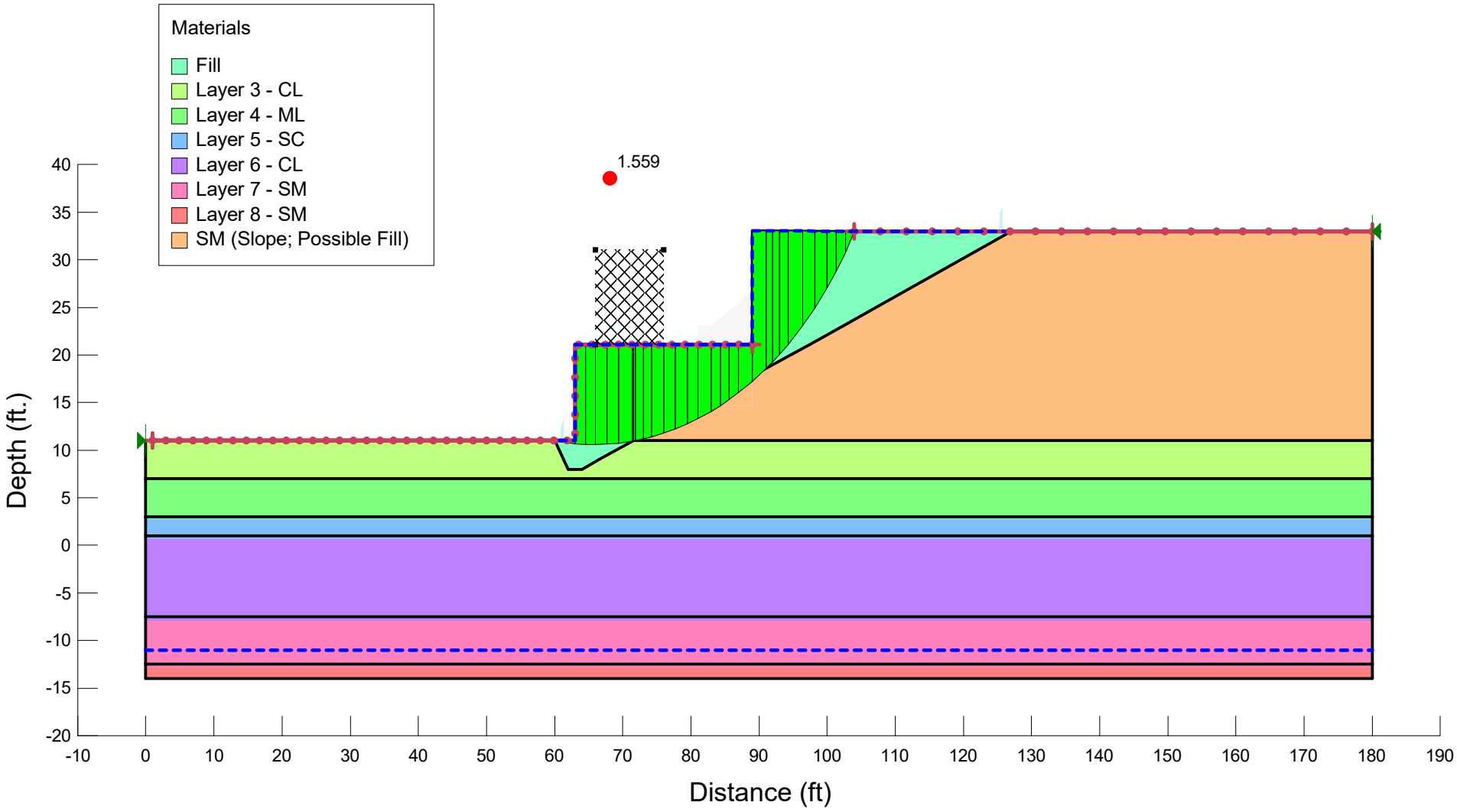
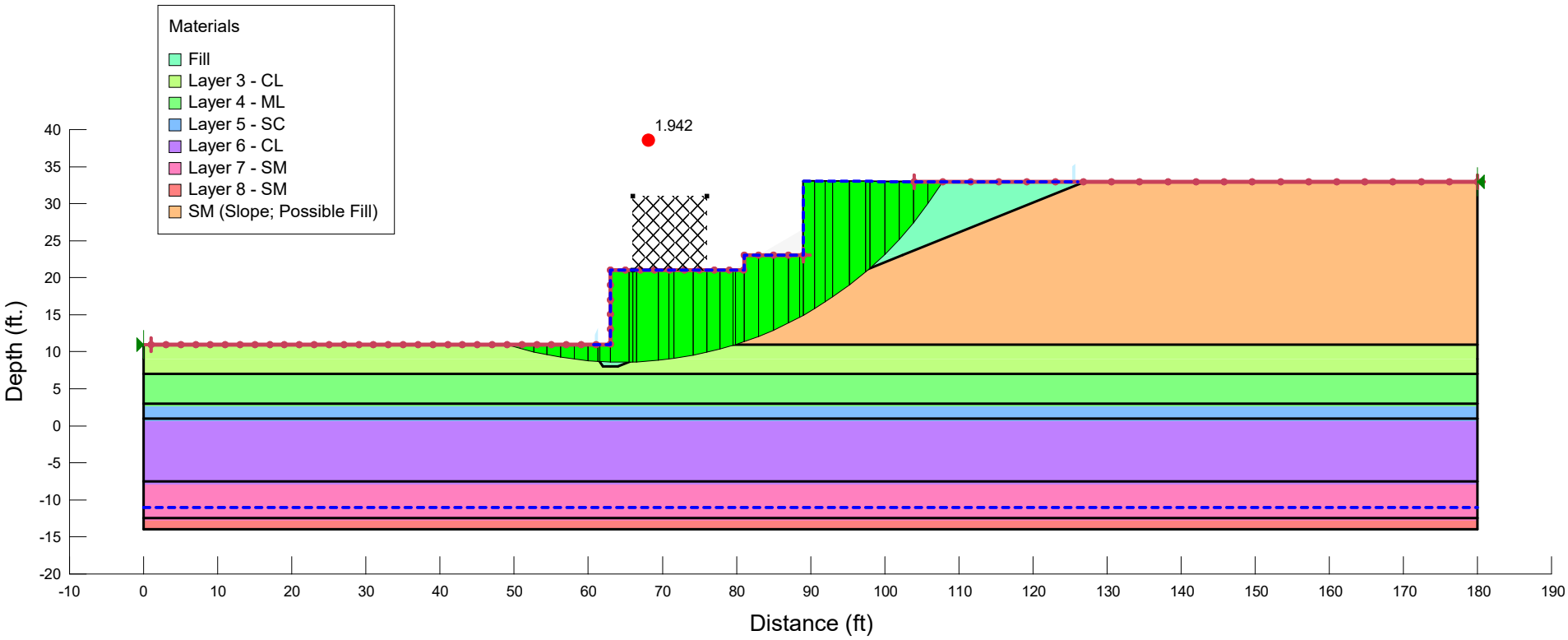
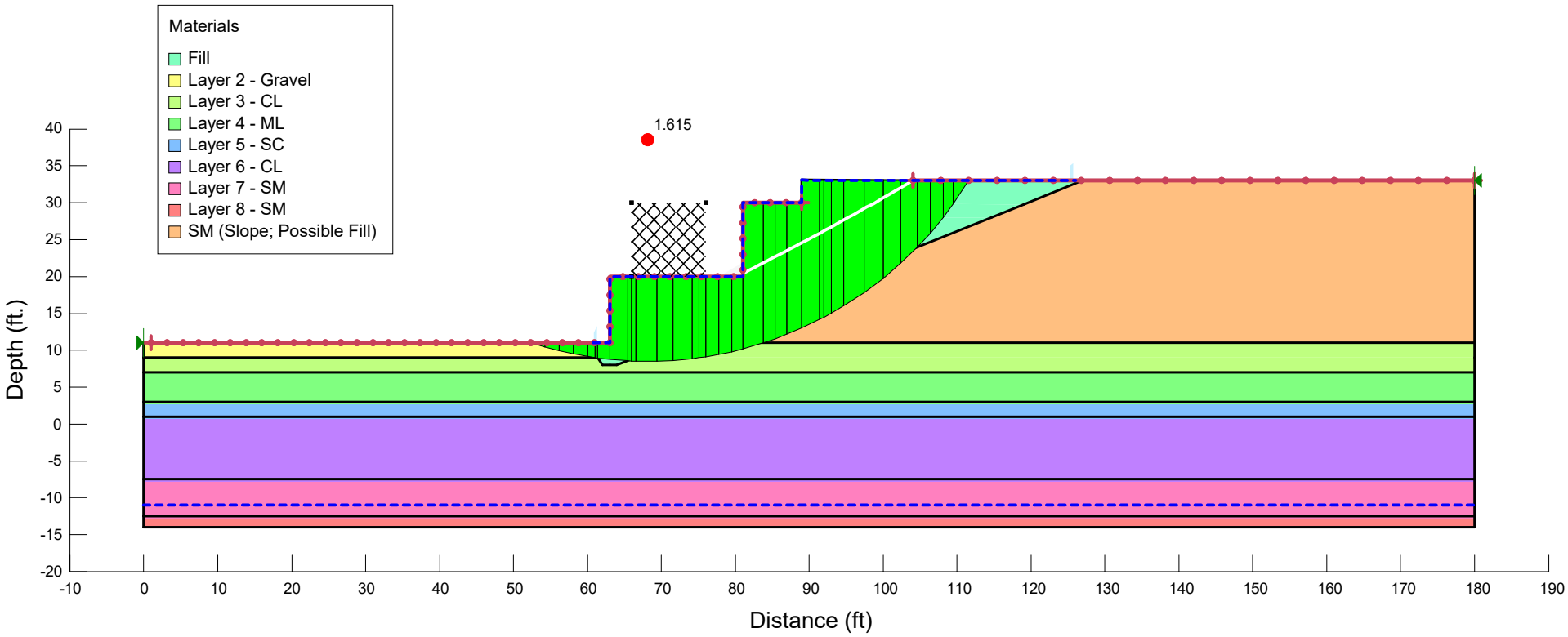
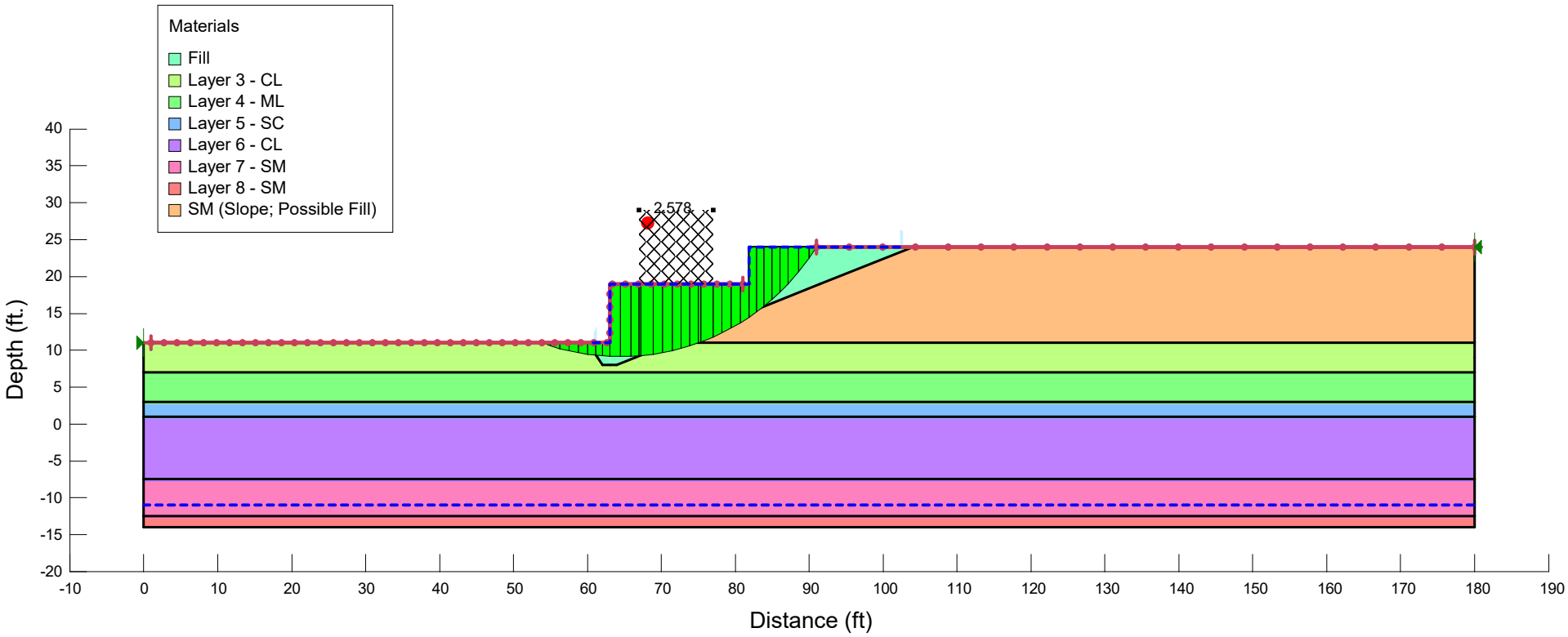
Fill
Layer 2 - Gravel
Layer 3 - CL
Layer 4 - SM
Layer 5 - CL
Layer 6 - SM
2.049
Depth (ft.)
Distance (ft)
30
25
20
15
10
5
0
-5
-10
-15
-20
-25
-30
-10
0
10
20
30
40
50
60
70
80
90
100
110
120
130


1.891
Materials
Fill
Layer 2 - SM/Gravel
Layer 3 - SM
Layer 4 - CL
Layer 5 - SM/PWR
Depth (ft.)
30
25
20
15
10
5
0
-5
-10
-15
-20
-25
-30
-10
0
10
20
30
40
50
60
70
80
90
100
110
120
130
Distance (ft)


Materials
Fill
Layer 3 - CL
Layer 4 - ML
Layer 5 - SC
Layer 6 - CL
Layer 7 - SM
Layer 8 - SM
SM (Slope; Possible Fill)
1.559
Depth (ft.)
Distance (ft)
40
35
30
25
20
15
10
5
0
-5
-10
-15
-20
-10
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190


Materials
Fill
Layer 3 - CL
Layer 4 - ML
Layer 5 - SC
Layer 6 - CL
Layer 7 - SM
Layer 8 - SM
SM (Slope; Possible Fill)
1.942
Depth (ft.)
Distance (ft)
40
35
30
25
20
15
10
5
0
-5
-10
-15
-20
-10
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190


Materials
Fill
Layer 2 - Gravel
Layer 3 - CL
Layer 4 - ML
Layer 5 - SC
Layer 6 - CL
Layer 7 - SM
Layer 8 - SM
SM (Slope; Possible Fill)
1.615
Depth (ft.)
Distance (ft)
40
35
30
25
20
15
10
5
0
-5
-10
-15
-20
-10
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190


Materials
Fill
Layer 3 - CL
Layer 4 - ML
Layer 5 - SC
Layer 6 - CL
Layer 7 - SM
Layer 8 - SM
SM (Slope; Possible Fill)
2.578
Depth (ft.)
Distance (ft)
40
35
30
25
20
15
10
5
0
-5
-10
-15
-20
-10
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190

APPENDIX IV (SOLDIER PILE WALLS)

- Lateral Stability Analysis Summary
- Global Stability Analysis – Wall 100B
- Global Stability Analysis – Wall 101D
- Global Stability Analysis – Wall 113A+B
- Global Stability Analysis – 114A+B
- AASHTO Lateral Stability References

Lateral Stability Analysis Summary

1. Analysis assumptions:

Lateral stability of the soldier pile wall was completed according to section 5.6 of AASHTO 17th edition, 2002. The simplified earth pressure distribution for permanent flexible cantilevered walls with discrete vertical wall elements in granular soils, known as **Case a. Embedment in Soil** in Figure 5.6.2A (attached, see **Appendix IV (Soldier Pile Walls)**), was used for the analysis. The pile type used for the analysis is the 14-inch steel H-pile. The spacing center to center between piles was assumed to be 5 feet. The resultant net passive resistance of the pile was assumed to be mobilized across a maximum of three times the pile flange width. A portion of 2 feet of the embedment depth below finished grade was assumed ineffective in providing passive lateral support.

2. Analysis results

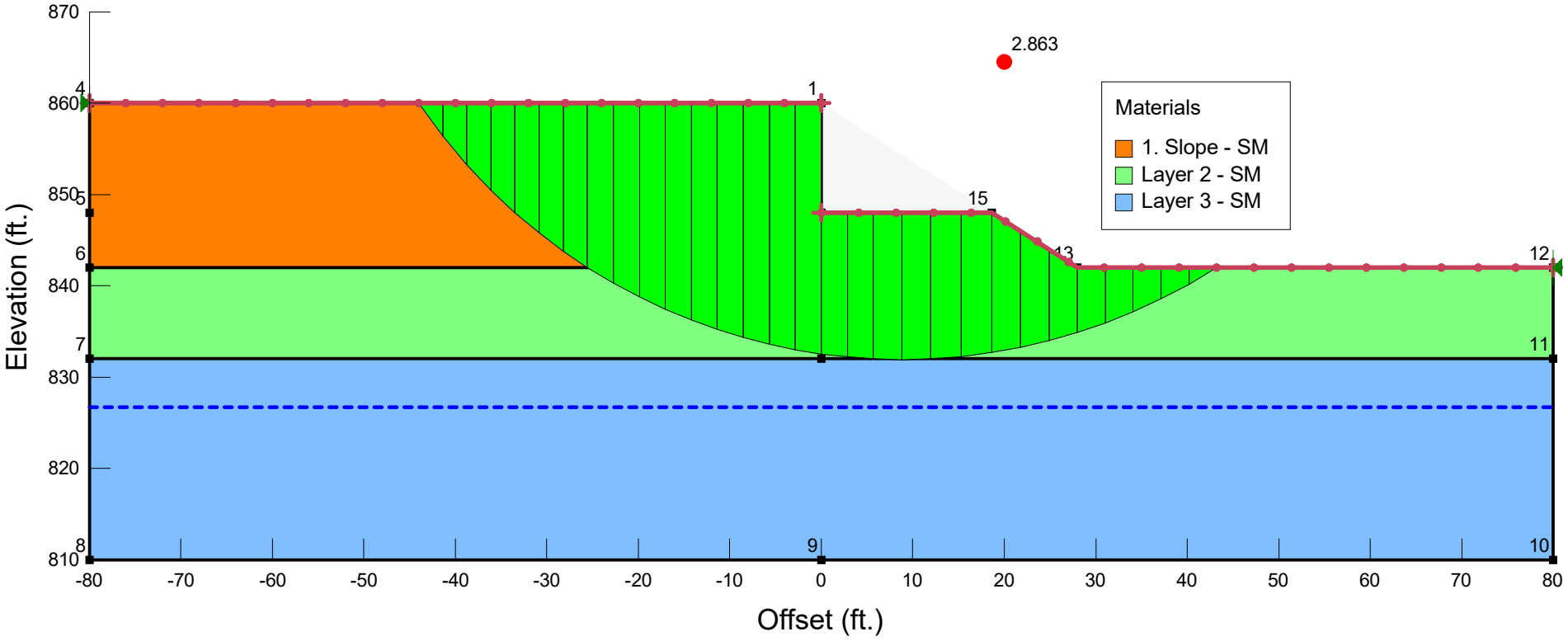
A summary of the analysis parameters and results for all Soldier Pile walls is presented in **Table 1**.

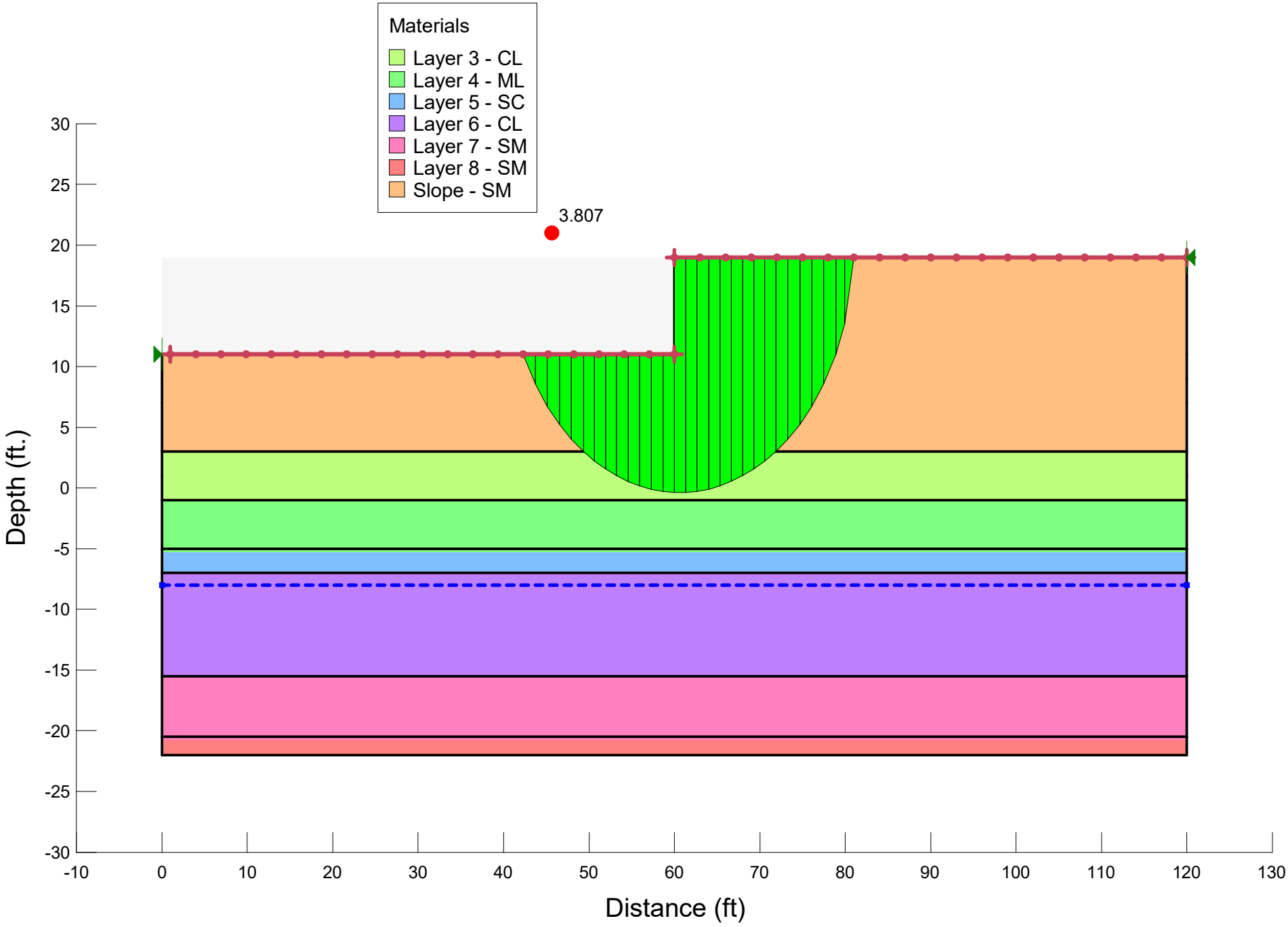
The analysis parameters are presented in Figures 5.6.2A and Table 5.6.2A in AASHTO 17th edition, 2002. The figure and table are shown in **Appendix IV (Soldier Pile Walls)** under the "AASHTO Lateral Stability References" section.

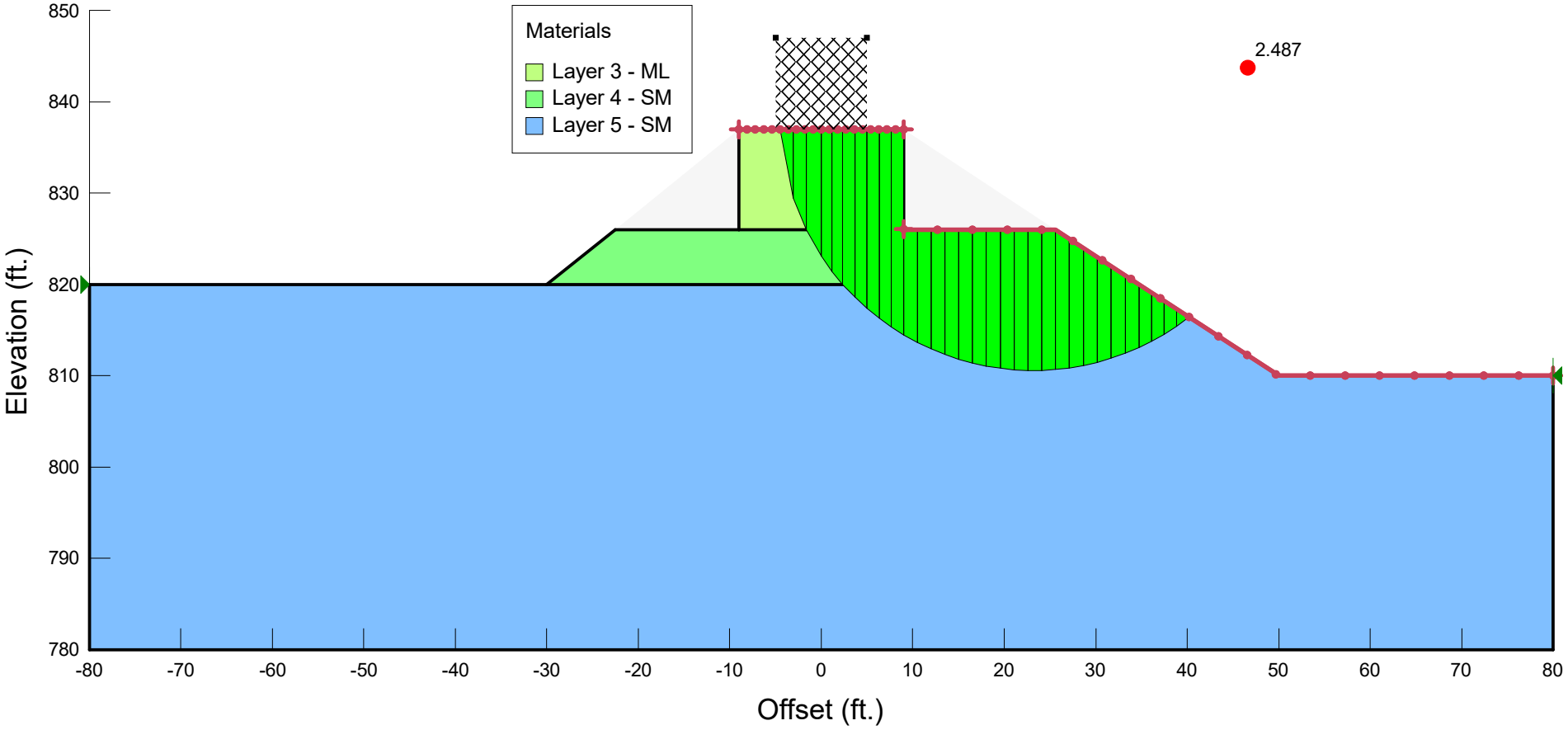
Table 1. Summary of Lateral Stability Analysis

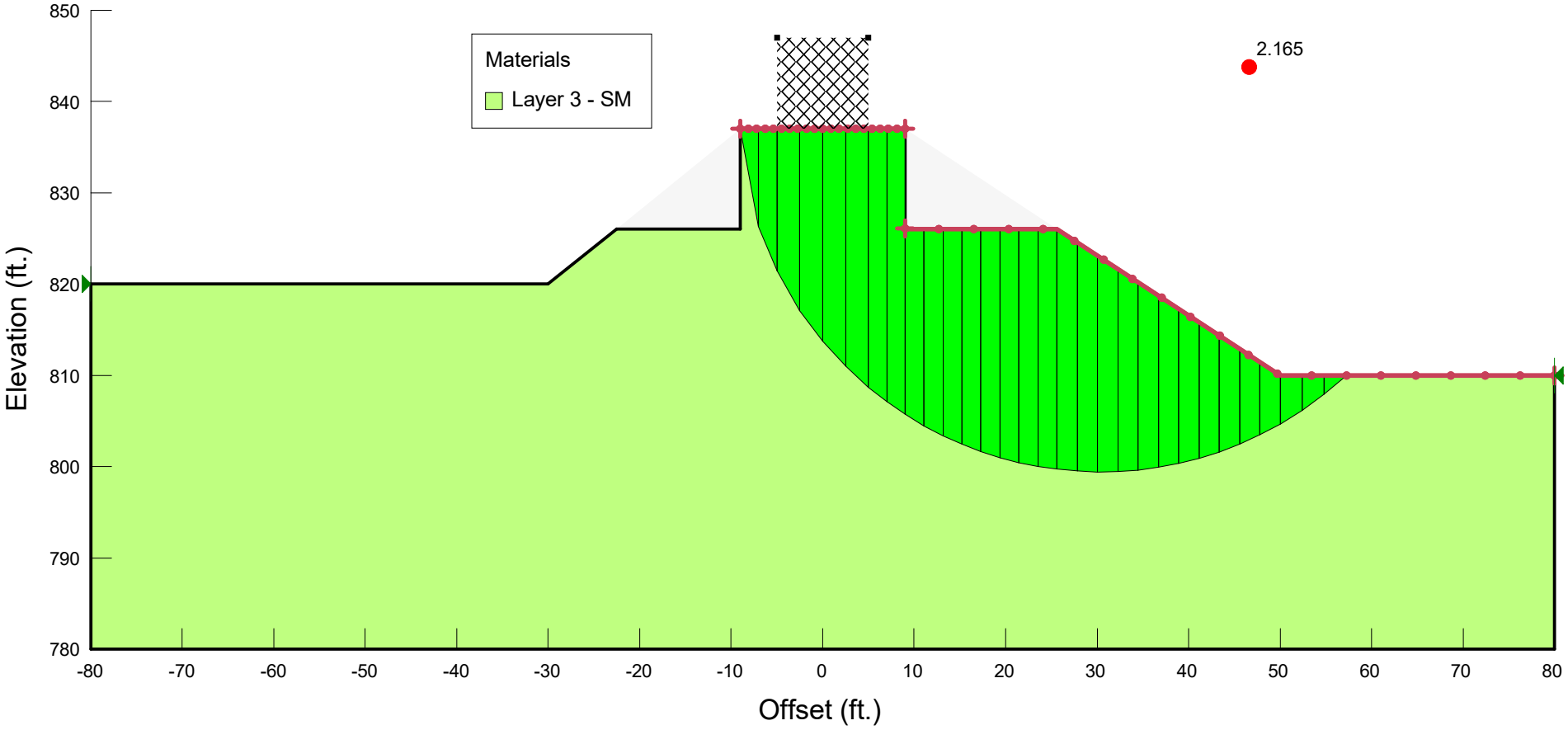
Wall ID	$\gamma'1$ (pcf)	$\gamma'2$ (pcf)	$\varphi'1$ (°)	$\varphi'2$ (°)	H (ft.)	ℓ (ft.)	b (ft.)	β (°)	β' (°)	K_{a1}	K_{a2}	K_{p2}	P_{a1} (psf)	P_{a2} (psf)	P_p (psf)	D (ft.)	Minimum Tip Elevation (ft)
100B	110	120	30	35	12	5	3	0	0	0.333	0.271	3.000	13200	81216	334125	15	833.30
101D	110	110	30	30	8	5	3	0	0	0.333	0.333	3.000	5867	49005	179685	11	833.10
113A + B	115	115	28	28	10	5	3	0	0	0.361	0.361	2.770	10380	80152	242242	13	814.00
114A + B	115	130	28	40	11	5	3	0	0	0.361	0.217	2.770	10380	88681	517452	19	807.00

Refer to the Appendix for parameters descriptions.


2.863
Materials
1. Slope - SM
Layer 2 - SM
Layer 3 - SM
Elevation (ft.)
Offset (ft.)
870
860
850
840
830
820
810
-80
-70
-60
-50
-40
-30
-20
-10
0
10
20
30
40
50
60
70
80
1
4
5
6
7
8
9
10
11
12
13
15


Materials
Layer 3 - CL
Layer 4 - ML
Layer 5 - SC
Layer 6 - CL
Layer 7 - SM
Layer 8 - SM
Slope - SM
3.807
Depth (ft.)
Distance (ft)
30
25
20
15
10
5
0
-5
-10
-15
-20
-25
-30
-10
0
10
20
30
40
50
60
70
80
90
100
110
120
130


Materials
Layer 3 - ML
Layer 4 - SM
Layer 5 - SM
2.487
Elevation (ft.)
850
840
830
820
810
800
790
780
-80
-70
-60
-50
-40
-30
-20
-10
0
10
20
30
40
50
60
70
80
Offset (ft.)


Materials
Layer 3 - SM
2.165
Elevation (ft.)
Offset (ft.)
850
840
830
820
810
800
790
780
-80
-70
-60
-50
-40
-30
-20
-10
0
10
20
30
40
50
60
70
80

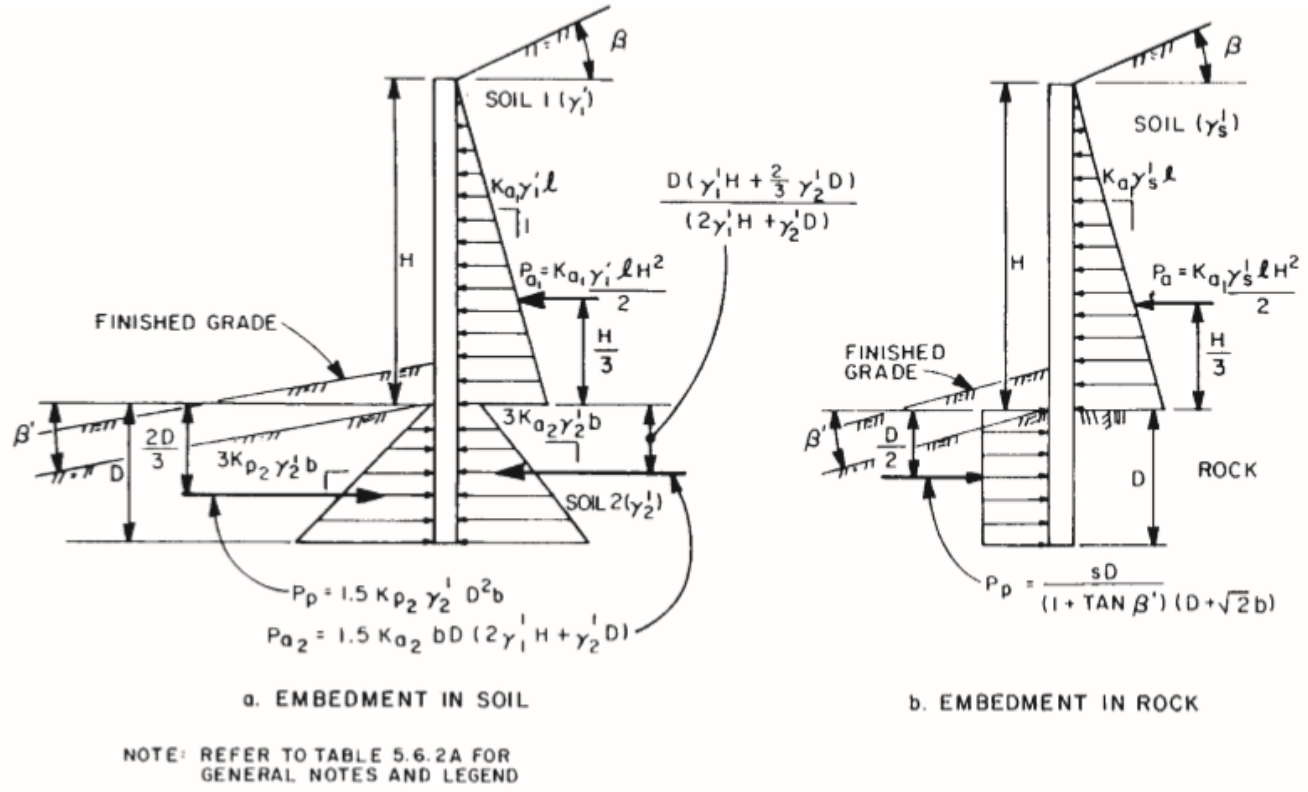


FIGURE 5.6.2A Simplified Earth Pressure Distributions for Permanent Flexible Cantilevered Walls With Discrete Vertical Wall Elements

Reference AASHTO 17th edition, 2002.

TABLE 5.6.2A General Notes and Legend Simplified Earth Pressure Distributions for Permanent and Temporary Flexible Cantilevered Walls with Discrete Vertical Wall Elements

LEGEND:

γ'	=	Effective unit weight of soil
b	=	Vertical element width
ℓ	=	Spacing between vertical wall elements (c/c)
S_u	=	Undrained shear strength of cohesive soil
s	=	Shear strength of rock mass
P_p	=	Passive resistance per vertical wall element
P_a	=	Active earth pressure per vertical wall element
β	=	Ground surface slope behind wall { + for slope up from wall; − for slope down from wall }
β'	=	Ground surface slope in front of wall
K_a	=	Active earth pressure coefficient; Refer to Figure 5.5.2A
K_p	=	Passive earth pressure coefficient; Refer to Figures 5.5.2C and 5.5.2D
ϕ'	=	Effective angle of soil friction

NOTES:

(1) For temporary walls embedded in granular soil or rock, refer to Figure 5.6.2A to determine passive resistance and use diagrams on Figure 5.6.2C to determine active earth pressure of retained soil.

(2) Surcharge and water pressures must be added to the indicated earth pressures.

(3) Forces shown are per vertical wall element.

(4) Pressure distributions below the exposed portion of the wall are based on an effective element width of 3b, which is valid for $\geq$ 5b. For $<$ 5b, refer to Figures 5.6.2B and 5.6.2D for continuous wall elements to determine pressure distributions on embedded portions of the wall.

Reference AASHTO 17th edition, 2002.