STRUCTURE GEOTECHNICAL REPORT
RETAINING WALL AT IL 31 AND PLUM STREET (SN 045-8302)
Project 62H02
SOUTH ELGIN
KANE COUNTY, ILLINOIS

Prepared on: 12/7/2021

INTERRA, INC.
600 Territorial Drive, Suite G, Bolingbrook, IL 60440
Phone: (630) 754-8700, Fax: (630) 754-8705
By: Sanjeev Bandi
Email: sbandi@interraservices.com
www.interraservices.com

Prepared for:

Bowman Consulting Group, Ltd.
1001 Warrenville Road, Ste. 110
Lisle, IL 60532

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1.0 INTRODUCTION

Interra, Inc. (INTERRA) was tasked by Bowman Consulting Group Ltd. based in Lisle, Illinois to conduct subsurface soil investigation and prepare the Structural Geotechnical Report (SGR) for the new retaining wall proposed at IL 31 and Plum Street, South Elgin. The proposed wall will retain the existing embankment material immediately east of IL 31. The proposed wall height varies between 5 feet and 13 feet (13 feet adjacent to culvert and 5 feet at the ends). The proposed retaining wall is approximately 112 feet long from Stn. 49+39.72 to Stn. 50+52.25.

2.0 PROJECT DESCRIPTION AND SCOPE

The project section is located within Village of South Elgin, Kane County. The site is within Elgin Township, defined as T41N R8E of the Third Principal Meridian. The project site is located approximately 250 feet south of Plum Street, crossing IL Route 31 in South Elgin, Illinois. The surface elevation of the borehole locations is estimated from existing plans to be between 724 feet and 721 feet. The proposed bottom of the retaining wall is at 707 feet.

INTERRA's scope of work included drilling two (2) geotechnical borings to a depth of 40 feet each, from existing ground surface; performing associated laboratory tests on collected soil samples; preparation of Structure Geotechnical Report in accordance with IDOT Geotechnical Manual 2020. However, bedrock was encountered at depths between 16 feet and 18.5 feet from surface. A third boring was drilled to confirm the presence of bedrock.

3.0 FIELD EXPLORATION

Three (3) soil borings RWB-01, RWB-02 and RWB-03 were drilled in the area of the proposed retaining wall. The location of the borings is presented in Appendix A. Prior to drilling, the drilling sub-contractor Geocon Professional Services (GEOCON) contacted the local one-call utility clearance service (JULIE) to clear underground utilities.

The borings were drilled with a track mounted drill rig Deidrich D-120. INTERRA's soils inspector was present during the drilling to collect and log the soil samples. The borings were drilled, and samples were collected in general accordance with the guidelines in the IDOT Geotechnical Manual. Soil sampling was performed per AASHTO T-206, "Penetration Test and Split Barrel Sampling of Soils". Soil sampling was performed at 2.5-foot intervals up to the exploration depth. Drilling was stopped upon encounter of the bedrock. RWB-01 was drilled to a depth of 18.5 feet below the ground surface. RWB-02 and RWB-03 were drilled to a depth of 16.0 feet. The soil samples were taken in conjunction with the Standard Penetration Test where a driving resistance to a standard 2" split-spoon samples indicate relative density of granular materials and consistency of cohesive soils. Soil specimens from the borings were visually identified in accordance with the AASHTO and IDOT textural classification systems. Also, unconfined compressive strength tests were performed on cohesive samples using an Illinois modified RIMAC tester. In addition to the split spoon samples, one (1) Shelby tube sample was collected from the borehole RWB-03. Water level readings were taken during drilling and immediately after the completion of drilling.

4.0 LABORATORY TESTING

All laboratory testing was performed in accordance with IDOT and/or AASHTO standard methods for testing. Moisture content tests were performed for all soil samples and Unconfined Compressive Strength tests, Grainsize analysis and Atterberg Limits were performed on selected samples.

Soil boring logs indicating the blow counts, moisture content and soil description have been prepared and included in Appendix A of this report. The boring logs include the laboratory test results. Laboratory test reports are presented in Appendix B.

5.0 SUBSURFACE CONDITIONS

Boring RWB-01 had 12 inches of topsoil, followed by hard brown to brown & reddish-brown clay loam fill up to 9.0 feet depth. Below this, was a 1.5 feet thick layer of medium dense reddish-brown sand. Very stiff brown and reddish-brown clay loam was encountered between 10.5 feet and 17 feet depth. This was followed by dense yellow limestone and light gray fractured rock up to a depth of 18.5'. Weathered bedrock was encountered at 18.5 feet depth, and the boring was terminated.

Boring RW-02 encountered 12 inches of topsoil, underlain by 2 feet of stiff black, and brown clay loam fill. This was followed by very stiff to hard brown and lightly black clay loam fill up to a depth of 13 feet. Medium dense sand was observed between 13 feet and 16 feet. Bedrock was encountered below this. Boring was terminated at 16.0 feet.

Boring RWB-03 had 12 inches of topsoil, followed by 3.5 feet of hard brown clay loam fill. This was underlain by stiff brown and reddish-brown clay loam fill up to 8 feet depth. Between 8 feet and 10.5 feet was medium stiff to very stiff brown and gray clay fill. Stiff brown clay loam fill was encountered between 10.5 feet and 16 feet. Bedrock was encountered and boring was terminated at 16.0 feet.

Groundwater Information

Groundwater elevations are usually recorded during drilling, and immediately after completion of drilling. Groundwater was not encountered in any of the three boreholes during or after completion of drilling. The boreholes were backfilled with auger cuttings and bentonite chips immediately after completion of drilling. Since the boreholes were backfilled immediately after drilling, the water levels reported may not represent the long-term groundwater levels. Changes in water levels should be expected due to seasonal variations and precipitation.

6.0 ANALYSIS AND RECOMMENDATIONS

The retaining wall totaling a length of approximately 110 feet is proposed on the east side of the

South La Fox Street and to the north and south sides of the proposed box culvert at Station 50+00 to retain the embankment material. Several possible wall types such as concrete cantilever wall, Mechanically Stabilized Earth (MSE) retaining wall, steel sheet pile wall and soldier pile wall are considered. Of these, the steel sheet pile wall and the soldier pile walls are normally used in cut condition and deflections caused by compaction could be significant. Selection of a wall type depends on several factors such as soil conditions, feasibility, cost and control of top of wall deflections. Because of the shallow bedrock, a sheet pile wall is not feasible. A soldier pile wall is feasible with drilled soldier piles set in bedrock. Although both MSE, Cast-in-Place (CIP) and drilled soldier pile retaining walls are feasible, a drilled soldier pile wall may be most cost effective as there will be no need for rock excavation or encounter issues associated with keeping the excavations dry for a CIP wall footing. We assume that the railroad tracks will be removed within the project limits of the retaining wall. If the Fox river trolley will be reconstructed behind the wall, then appropriate surcharge pressures should be considered in calculating the corresponding increase in lateral pressure on the retaining wall.

Soldier Pile Wall

Soldier pile walls may be constructed as drilled into position because of shallow bedrock. Drilled soldier pile walls should be constructed in accordance with Section 522.08 IDOT Standard Specifications. For the drilled soldier piles, the drilling methods used to maintain the shaft excavation during the various phases of shaft excavation and concrete placement shall be according to the methods in Section 516 and appropriate for the site conditions encountered.

The retaining wall will be subjected to lateral earth pressures from the backfill as well as lateral pressures from live loads. While the soldier pile is considered a flexible wall and the lateral earth pressures causing movement are called active and those pressures resisting the movement are called passive pressure. Active pressures on the soldier piles above the bottom of the wall facing should be taken over an effective width equal to the center-to-center spacing of the soldier piles. Active pressures on the soldier piles below the bottom of the wall facing should be taken over an effective width equal to one times the element width of the soldier pile. The passive resistance offered by the soil below the bottom of wall facing should be taken over an effective width equal to three times the element width of the soldier pile. This width, however, shall not be greater than the center-to-center distance between piles. Coulomb's Passive resistance offered by the top 3.5 feet of soil in front of the wall should not be considered due soil disturbance, drainage system installation, weakening of soil due to cyclical frost-heave conditions. For a sloping final grade in front of the wall, the slope angle should be taken into consideration such that passive resistance offered by soil closer than 3.5 feet is ignored. Lagging should be designed for 100 percent of the lateral earth pressure. If live surcharge on the backfill soils is anticipated, it should be considered in the design of the lagging. We recommend that walls be designed based on AASHTO LRFD using long-term Coulomb active and passive earth pressures using the appropriate load and resistance factors. Recommended values of active and passive earth pressure coefficients for a backfill slope of 2H:1V and a level ground in front of the wall and an interface friction angle (δ) of 11 degrees are included in Table 6-1.

Table 6-1 Lateral Earth Pressure Parameters for Retaining Walls

Wall	Elevation	Soil Type	Total Unit Weight (pcf)	Active Earth Pressure Coeff, Ka		Passive Earth Pressure Coeff., Kp	Long-term Friction Angle, deg
				2H:1V Backslope	Level Backslope		
North and South	721-705	Stiff Cohesive Soil	125	0.62	0.33	2.77	28
	721-705	Granular Backfill	125	0.52	0.31	N/A	30

Traffic and other live surcharge loads are not anticipated on the surface of the backfill behind the wall.

It will be necessary to perform a lateral load capacity analysis of the soldier pile wall to ensure that wall deflections are within design limits. The analysis and design of the solider pile retaining wall can be accomplished with the use of software programs such as LPILE or PYWALL. Table 6-2 contains the recommended soil input parameters.

Table 6-2 Recommended Soil Input Parameters for Retaining Wall

Wall	Elevation	Soil Type	Total Unit Weight (pcf)	Active Earth Pressure Coeff, Ka (2H:1V back slope)	Passive Earth Pressure Coeff., Kp	Soil Modulus, k (pci)	Friction Angle	Epsilon 50 Strain
North and South	721-705	Stiff Cohesive Soil	125	0.62	2.77	500	N/A	0.007

For bedrock below elev 705, the following properties are recommended for LPILE analysis

Effective Unit Weight	75 pcf
RQD	25%
krm	0.0005
Uniaxial Comp. strength	500 psi
Young's Modulus	50000 psi

Cast-in-Place (CIP) concrete retaining Wall

Existing roadway elevation at these locations varied between 722 feet at the north end and 725 feet at the south end. The anticipated maximum retaining wall exposed height is 13.5 feet adjacent to the proposed box culvert. The bottom of the footing for the expected retaining walls is anticipated approximately at EL 706. With these elevations, the foundation materials consist of stiff to hard clay loam fill material, medium dense sand and weathered bedrock. We do not anticipate any undercuts based on the boring logs. If any unsuitable material is noted during construction, we recommend undercutting the unsuitable soils and replacing with coarse aggregate CA 1 or CA 2. A woven geotextile fabric (IDOT Section 1080.02) should be used below the aggregate subgrade improvement for ground stabilization. The aggregate subgrade shall be capped with a minimum 3 inches of CA 6 or CA 10.

Bearing Capacity and Settlement

A factored bearing resistance of 3000 psf, which includes an LRFD Resistance Factor of 0.55 is recommended. The bottom of the footings should be placed at minimum of four feet below final grade for frost protection. Based on the soil profile and the expected wall loads, settlement is estimated to be less than 1.0 inch.

Lateral Earth Pressures

We recommend the retaining walls be designed for an active earth pressure in accordance with Table 6-1 assuming granular backfill. Resistance to sliding may be calculated using a nominal sliding resistance of half of normal stress on the interface between the footing and the soil. The LRFD resistance factor for sliding should be taken as 1.0. Resistance offered by the passive pressures should be neglected. Lateral loads from traffic should be considered at a minimum surcharge pressure of 250 psf. If the Fox river trolley will be reconstructed behind the wall, then appropriate surcharge pressures should be considered in calculating the corresponding increase in lateral pressure on the retaining wall.

Drainage Considerations

Drainage behind the wall and underdrain should be in accordance with the 2012 IDOT Bridge Manual.

Stability Analyses

Global slope stability analyses were conducted for the critical cross-section assuming wall height of 15 feet and a 2H:1V backfill. The LRFD resistance factor considered is 0.65, which is equivalent to slope stability factor of safety of 1.54. Slope stability analyses were conducted using SLIDE V7.0. Analyses indicated that the global slope factors under short and long-term conditions exceed the minimum required value of 1.54. Appendix C contains the results of the slope stability analyses.

7.0 CONSTRUCTION CONSIDERATIONS

A coffer dam may be required if cast-in-place wall is selected for the wingwalls. Away from the culvert, the contractor can consider temporary ditches, sumps, granular drainage blankets and other methods to control surface water infiltration and ground water and provide a dry condition for construction.

8.0 LIMITATIONS

The analysis and recommendations submitted in this report are based upon the data obtained from three (3) soil boreholes performed at the locations indicated on the Borehole Location Plan, project information provided to INTERRA and from any other information discussed in this report. This report does not reflect any variations that may occur between these boreholes. In performing subsurface explorations, specific information is obtained at specific locations at specific times. It is a well-known fact that variations in soil and rock conditions exist on most sites between borehole locations. Also, groundwater levels vary from time to time. The nature and extent of variations may not become evident until the course of construction. If project characteristics change or if variations in the subsurface conditions appear evident, it will be necessary for a re-evaluation of the recommendations of this report.

We appreciate the opportunity to be of service to you. Should you need additional information or clarifications, please call us at (630) 754-8700.

Yours truly,

INTERRA, INC.

Ashok Guntaka, EI
Project Manager

4/13/22

Sanjeev Bandi, Ph.D., PE
Principal Engineer

STATE OF ILLINOIS
SANJEEVAREDDY BANDI
062-051187
LICENSED
PROFESSIONAL ENGINEER

REFERENCES

AASHTO 2020, LRFD Bridge Design Specifications, 9th Edition 2020, American Association of State Highway and Transportation Officials, Washington, DC.

IDOT 2020, Geotechnical Manual, Illinois Department of Transportation.

IDOT 2016, Culvert Manual, Illinois Department of Transportation.

IDOT 2016, Standard Specifications for Road and Bridge Construction. Illinois Department of Transportation.

IDOT 2012, Bridge Manual, Bureau of Bridges and Structures, Illinois Department of Transportation.

U.S.G.S. 2014, National Seismic Hazard Maps. http://earthquake.usgs.gov/research/hazmaps/

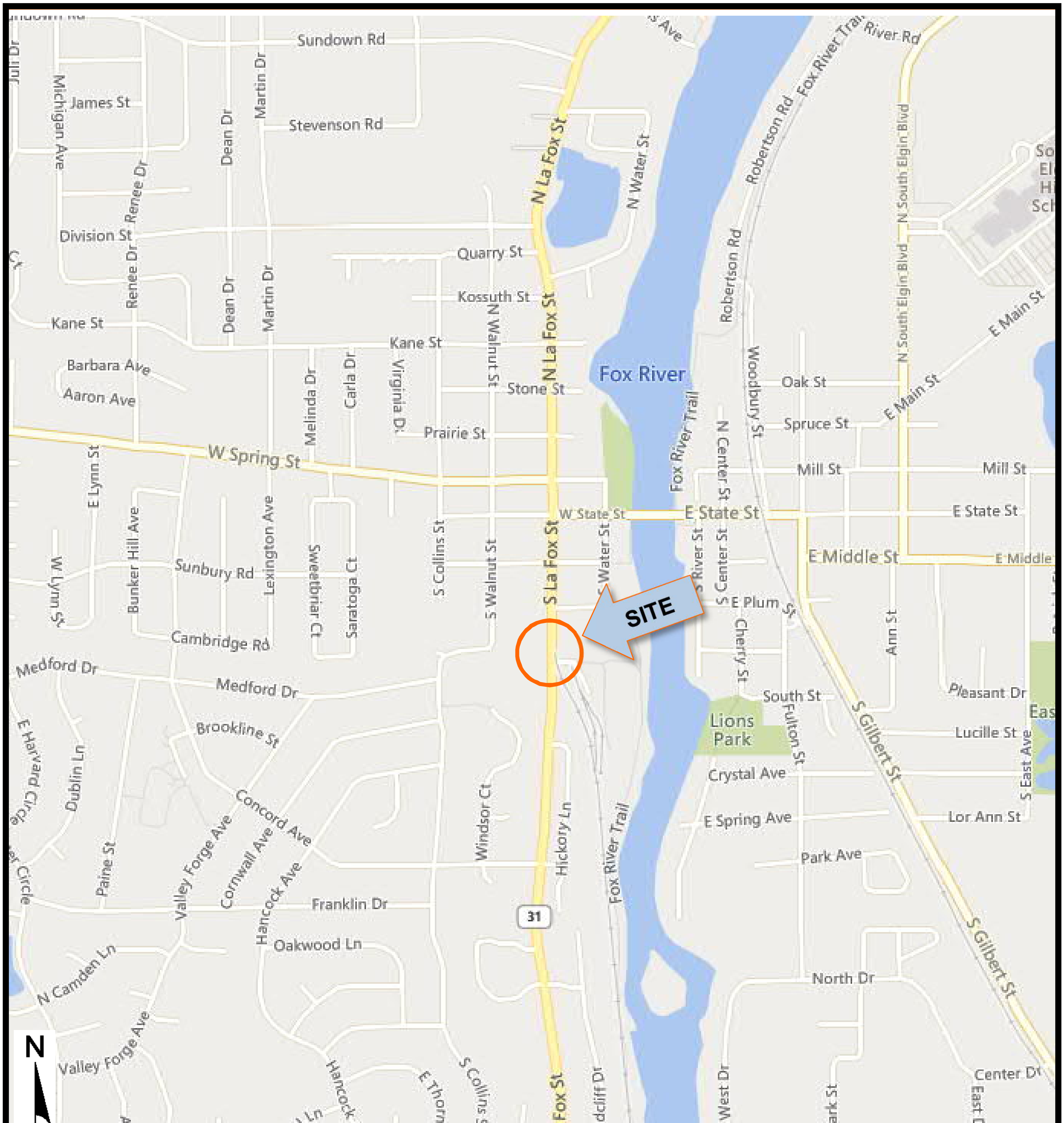
Coduto, Donald P., 1994, Foundation Design, Prentice Hall, Inc.

Appendix A

Site Location Map

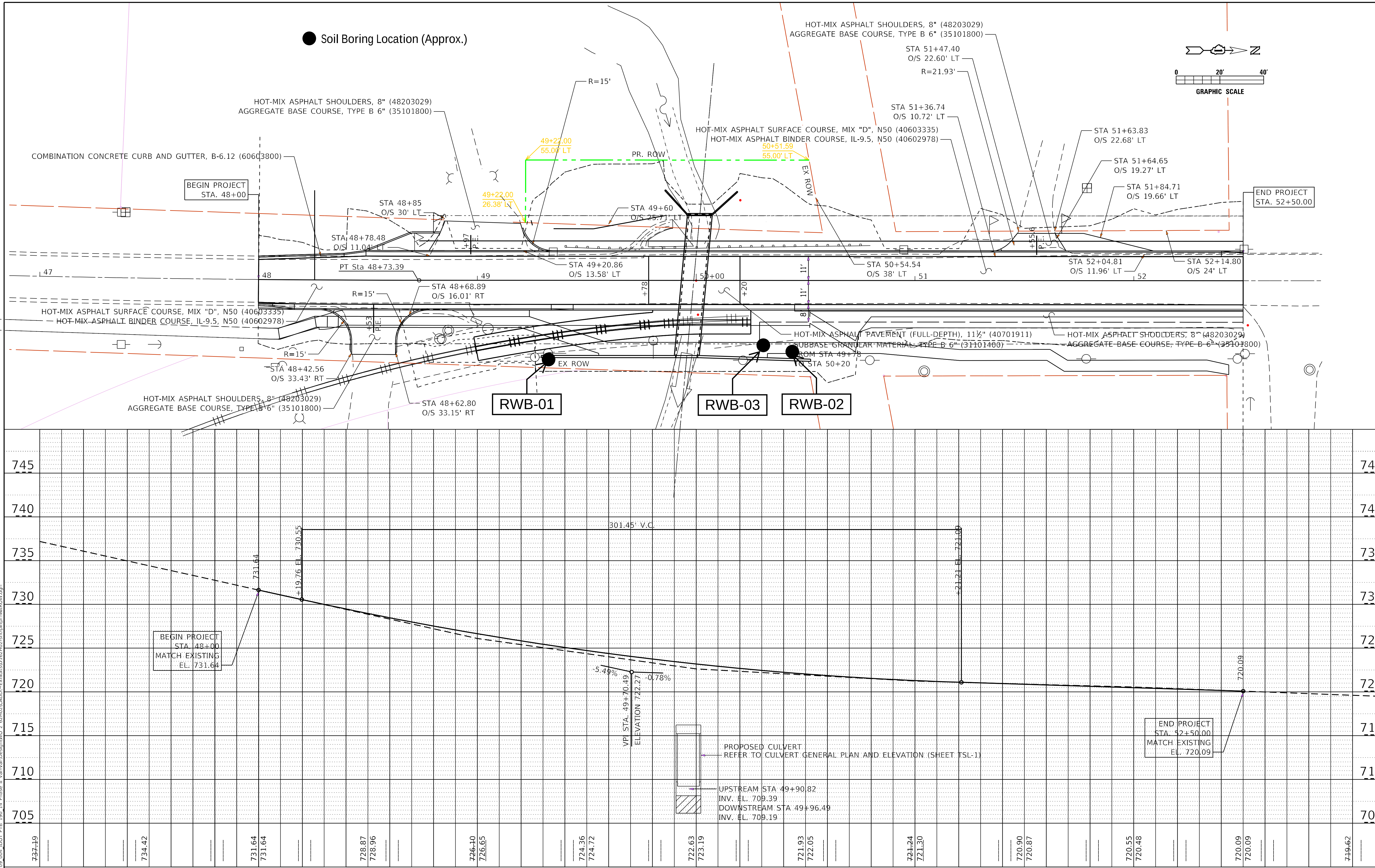
Borehole Location Plan

Soil Boring Logs



SITE LOCATION
IL 31 Retaining Wall South of Plum Street, South Elgin, Illinois
IDOT Contract No. 62H02
INTERRA Project No. 9024
Date: 11/5/2021

INTERRA
Engineering • Inspection • Testing



INTERRA Engineering • Inspection • Testing

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STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

ROADWAY PLAN AND PROFILE
IL 31 (LA FOX ST.)

SCALE: SHEET OF SHEETS STA. TO STA.

F.A.P RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
FAU	$SECTION$	$COUNTY$	1	1

CONTRACT NO. 62H26

ILLINOIS FED. AID PROJECT $FEDAIDPROJ$

Interra, Inc.
600 Territorial Drive, Suite G
Bolingbrook, IL 60440
www.interraservices.com

SOIL BORING LOG

Date 10/11/21

ROUTE IL 31 **DESCRIPTION** Retaining Wall at 250' South of IL 31 & Plum Street, IDOT Contract No. 62H02 **LOGGED BY** Abde Sellah

SECTION 2018-042-CR **LOCATION** 1939476.308, 994116.602

COUNTY Kane **DRILLING METHOD** Hollow Stem Auger **HAMMER TYPE** Auto

STRUCT. NO. 045-0218
Station 49+95.98

BORING NO. RWB-01
Station 49+39.72 to 50+52.25
Offset 35.30ft R
Ground Surface Elev. 723.00 ft

Surface Water Elev. ____ ft
Stream Bed Elev. ____ ft

Groundwater Elev.:
First Encounter Dry ft
Upon Completion Dry ft
After ____ **Hrs.** ____ ft

Description	Bottom Elev. (ft)
TOPSOIL(12")	722.00
Hard brown, CLAY LOAM FILL, trace grinding, concrete and crushed aggregate. Moist.	720.00
Hard, brown and reddish brown, CLAY LOAM FILL, trace grinding, concrete and crushed aggregate. Moist.	714.00
Medium dense, reddish brown SAND. Moist	712.50
Very stiff, brown and red CLAY LOAM , trace gravel and cobbles. Moist.	710.00
Very stiff, reddish brown CLAY LOAM, trace gravel and cobbles. Moist.	706.00
Dense yellow LIMESTONE and light gray crushed rock aggregate.	704.50
Very dense WEATHERED BEDROCK (yellow limestone and light gray crushed dolomite)	

BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
6, 8, 8	6.8 B	17.6
7, 7, 7	4.5 P	12.2
6, 10, 8	5.8 B	22.1
4, 5, 10		13.8
3, 3, 5	2.7 B	29.2
6, 7, 9	2.1 B	14.1
5, 9, 32	4.4 B	14.3
50/2"		

Depth (ft) scale: -5, -10, -15, -20, -25, -30, -35, -40

Auger refusal at 18.5' .
End of Boring @18.5'. Backfilled with soil cuttings and bentonite.

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)

Interra, Inc.
600 Territorial Drive, Suite G
Bolingbrook, IL 60440
www.interraservices.com

SOIL BORING LOG

Date 10/11/21

ROUTE IL 31 **DESCRIPTION** Retaining Wall at 250' South of IL 31 & Plum Street, IDOT Contract No. 62H02 **LOGGED BY** Abde Sellah

SECTION 2018-042-CR **LOCATION** 1939561.419, 994109.873

COUNTY Kane **DRILLING METHOD** Hollow Stem Auger **HAMMER TYPE** Auto

STRUCT. NO. 045-0218
Station 49+95.98

BORING NO. RWB-02
Station 49+39.72 to 50+52.25
Offset 35.30ft R
Ground Surface Elev. 721.00 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter Dry **ft**
Upon Completion Dry **ft**
After Hrs. **ft**

Description	Elev. (bottom)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
TOPSOIL(12")	720.00				
Stiff, black and brown CLAY LOAM FILL. Moist.	718.00		3 3 3	1.8 P	15.0
Very stiff, brown and lightly black CLAY LOAM FILL, trace gravel, brick and root. Moist.		-5	2 3 2	2.4 B	21.6
	713.50		2 2 2	4.1 B	20.2
Hard , brown and lightly black CLAY LOAM FILL, trace gravel, brick and root, trace cobbles. Moist.		-10	3 5 5	4.6 B	16.7
	708.00		3 7 5	5.3 B	14.4
Medium dense, SAND.	705.00	-15	5 9 10		
Very dense, weathered BEDROCK, consists of yellow limestone and trace of crushed light gray dolomite. Auger refusal at 16.0'. End of Boring @ 16.0'. Backfilled boring with soil cuttings and bentonite.		-20	50/2"		

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)

Interra, Inc.
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Bolingbrook, IL 60440
www.interraservices.com

SOIL BORING LOG

Date 10/11/21

ROUTE IL 31 **DESCRIPTION** Retaining Wall at 250' South of IL 31 & Plum Street, IDOT Contract No. 62H02 **LOGGED BY** Abde Sellah

SECTION 2018-042-CR **LOCATION** 1939549.652, 994109.886

COUNTY Kane **DRILLING METHOD** Hollow Stem Auger **HAMMER TYPE** Auto

STRUCT. NO. 045-0218
Station 49+95.98

BORING NO. RWB-03
Station 49+39.72 to 50+52.25
Offset 35.30ft R
Ground Surface Elev. 721.50 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter Dry ft
Upon Completion Dry ft
After Hrs. ft

Description	Bottom Elev.	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
TOPSOIL(12")	720.50				
Hard, brown CLAY LOAM FILL, trace gravel, cobbles, rootlets and pieces of grinding. Moist.			7 7 5	4.5 P	14.1
		-5	3 5 4	4.3 B	17.4
	716.00				
Stiff, brown and reddish brown CLAY LOAM FILL, trace gravel, cobbles. Moist.	713.50		3 3 3	1.5 B	18.8
Medium stiff to very stiff, brown and gray CLAY FILL, tarce gravel and cobbles. Moist.					17.5
	711.00	-10			
Stiff, brown CLAY LOAM FILL, trace gravel and cobbles. Moist.	708.50		2 3 2	1.8 P	17.7
Stiff, brown CLAY LOAM FILL, trace gravel and cobbles. Light gray crushed rock aggregate at the bottom. Moist.		-15	3 3 5	1.7 B	19.6
	705.50				
Very dense weathered BEDROCK, consists of yellow limestone and light gray dolomite rock. Auger refusal at 16.0'. End of boring at 16.0'. Backfilled with soil cuttings and bentonite.			50/4"		
		-20			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)

Appendix B

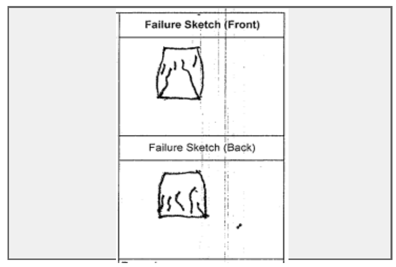
Laboratory Test Reports

UNCONFINED COMPRESSIVE STRENGTH (ASTM D 2166)

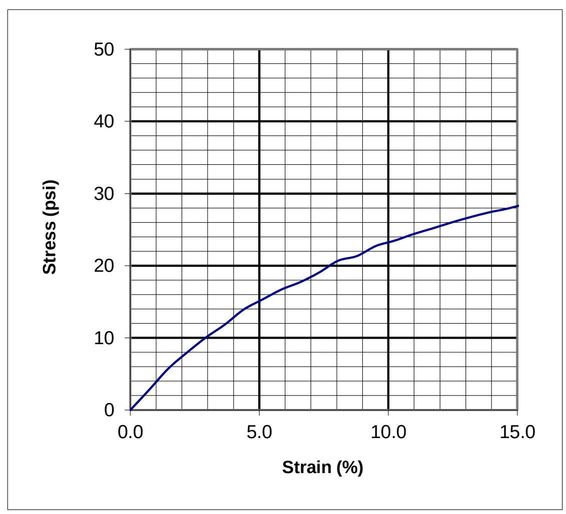
Project	Geotechnical Investigation Retaining Wall IDOT 62H02, IL 31 & Plum Street, South Elgin						
Client	Bowman Consulting, 1001 Warrenville Road, Ste. 110, Lisle, IL 60532						
File No.	9024	**Sample No.**	RWB-01 SS06	**Date Tested**	10/12/21	**Tested By**	DG
						QC By	RC

Date Sample Received	10/11/21
Description of Soil	Reddish brown silty clay, trace sand and gravel
Location	13.5'-15'

Type of Sample	SS	
Average Height =	6.94	cm
Average Diameter =	3.45	cm
Height/Diameter Ratio =	2.01	
Wet Sample Weight=	143.92	g
Wet Density =	2.22	g/cc
Moisture Content =	13.0	%
Dry Density =	1.96	g/cc
Strain Rate =	1.00	%/min



Failure Image



Unconfined Compressive Strength =	28.62	psi
	2.06	**tsf**
Shear Strength =	14.31	psi
	1.03	tsf
Strain at Failure =	15.4	%

Remarks:

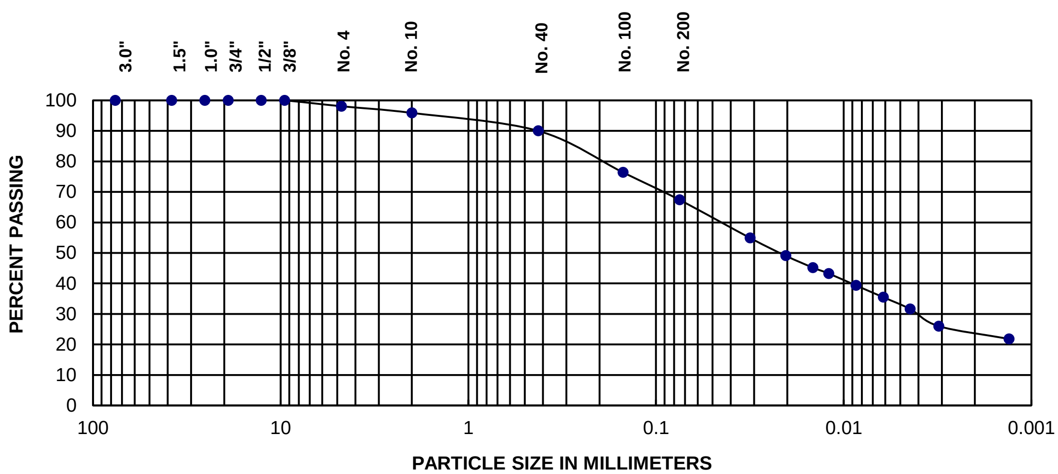
www.interraservices.com

Test ID	66222

	GRAIN SIZE ANALYSIS AASHTO T 88

Project	Geotechnical Investigation Retaining Wall IDOT 62H02, IL 31 & Plum Street, South Elgin						
Client	Bowman Consulting, 1001 Warrenville Road, Ste. 110, Lisle, IL 60532						
File No.	9024	**Sample #**	RWB-01SS06	**Date Tested**	10/15/2021	**Tested by**	DG
						Qc by	RC

Date Sample Received:	10/11/2021
Sample Location	13.5'-15'
Sample Description	Reddish brown silty clay, trace gravel



			Fines	
% + 3"	**% Gravel**	**% Sand**	**% Silt**	**% Clay**
0.0	4.1	28.5	42.5	24.9

For coarse-grained soils with <12% Fines	D60(mm)	D30(mm)	D10(mm)	Cu	Cc

Sieve Size	Percent Passing
3.0"	100.0
1.5"	100.0
1.0"	100.0
3/4"	100.0
1/2"	100.0
3/8"	100.0
No. 4	98.1
No. 10	95.9
No. 40	90.0
No. 100	76.4
No. 200	67.4

Liquid Limit, L_L	Plastic Limit, PL	Plasticity Index, PI
25	14	11

AASHTO Classification:	A-6(5)
IDH Classification:	Clay Loam

Remarks:

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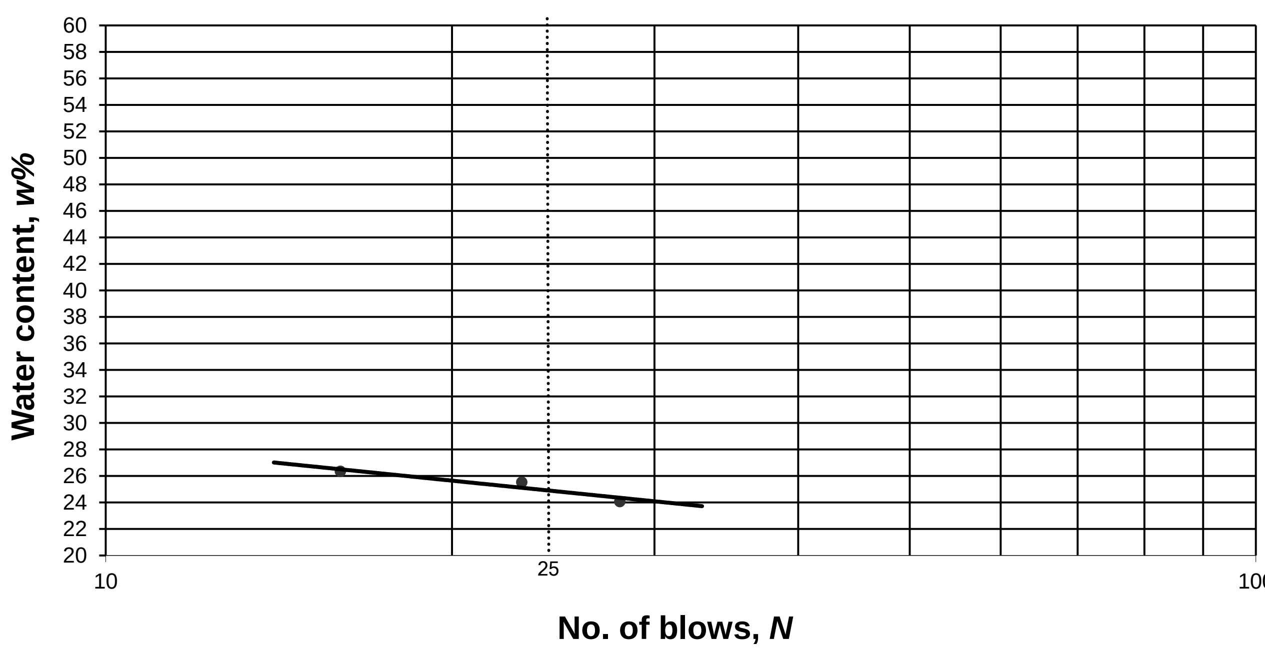
Test ID	66221

INTERRA Engineering • Inspection • Testing	Atterberg Limits AAASHTO T 89,90

Project	Geotechnical Investigation Retaining Wall IDOT 62H02, IL 31 & Plum Street, South Elgin						
Client	Bowman Consulting, 1001 Warrenville Road, Ste. 110, Lisle, IL 60532						
File No.	9024	**Sample #**	RWB-01SS06	**Date Tested**	10/15/2021	**Tested By**	DG
						Qc By	RC

Date Sample Recd.	10/11/2021
Sample Location	13.5'-15'
Sample Description	Reddish brown silty clay, trace gravel

LIQUID LIMIT DETERMINATION



Results

Liquid Limit, LL	**25**	**Plastic Limit, PL**	**14**	**Plasticity Index, PI**	**11**

Remarks

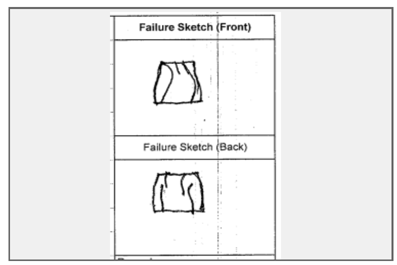
Test ID	66220

UNCONFINED COMPRESSIVE STRENGTH (ASTM D 2166)

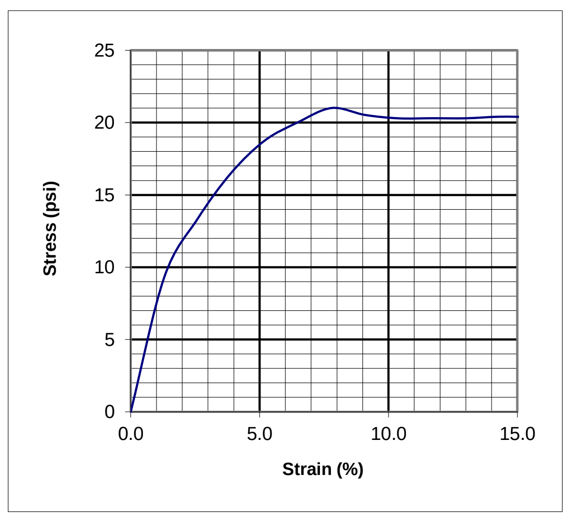
Project	Geotechnical Investigation Retaining Wall IDOT 62H02, IL 31 & Plum Street, South Elgin						
Client	Bowman Consulting, 1001 Warrenville Road, Ste. 110, Lisle, IL 60532						
File No.	9024	**Sample No.**	RWB-03SS03	**Date Tested**	10/12/21	**Tested By**	DG
						QC By	RC

Date Sample Received	10/11/21
Description of Soil	Brown and reddish brown clay loam, trace gravel
Location	6'-7.5'

Type of Sample	SS	
Average Height =	3.91	cm
Average Diameter =	3.47	cm
Height/Diameter Ratio =	1.13	
Wet Sample Weight=	69.39	g
Wet Density =	1.88	g/cc
Moisture Content =	17.5	%
Dry Density =	1.60	g/cc
Strain Rate =	1.00	%/min



Failure Image



Unconfined Compressive Strength =	21.01	psi
	1.51	**tsf**
Shear Strength =	10.50	psi
	0.76	tsf
Strain at Failure =	7.8	%

Remarks:

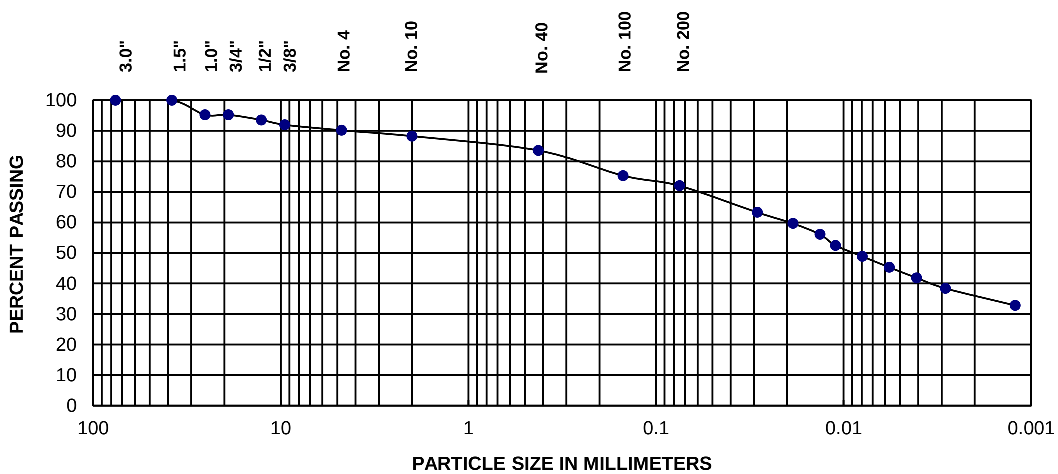
www.interraservices.com

Test ID	66223

	GRAIN SIZE ANALYSIS AASHTO T 88

Project	Geotechnical Investigation Retaining Wall IDOT 62H02, IL 31 & Plum Street, South Elgin						
Client	Bowman Consulting, 1001 Warrenville Road, Ste. 110, Lisle, IL 60532						
File No.	9024	**Sample #**	RWB-03 ST	**Date Tested**	10/18/2021	**Tested by**	DG
						Qc by	RC

Date Sample Received:	10/11/2021
Sample Location	8'-10'
Sample Description	Brown and gray silty clay, trace gravel



			Fines	
% + 3"	**% Gravel**	**% Sand**	**% Silt**	**% Clay**
0.0	11.7	16.3	35.5	36.5

For coarse-grained soils with <12% Fines	D60(mm)	D30(mm)	D10(mm)	Cu	Cc

Sieve Size	Percent Passing
3.0"	100.0
1.5"	100.0
1.0"	95.2
3/4"	95.2
1/2"	93.6
3/8"	92.0
No. 4	90.2
No. 10	88.3
No. 40	83.6
No. 100	75.3
No. 200	72.0

Liquid Limit, L_L	Plastic Limit, PL	Plasticity Index, PI
44	20	24

AASHTO Classification:	A-7(6)
IDH Classification:	Clay

Remarks:

www.interraservices.com

Test ID	66219

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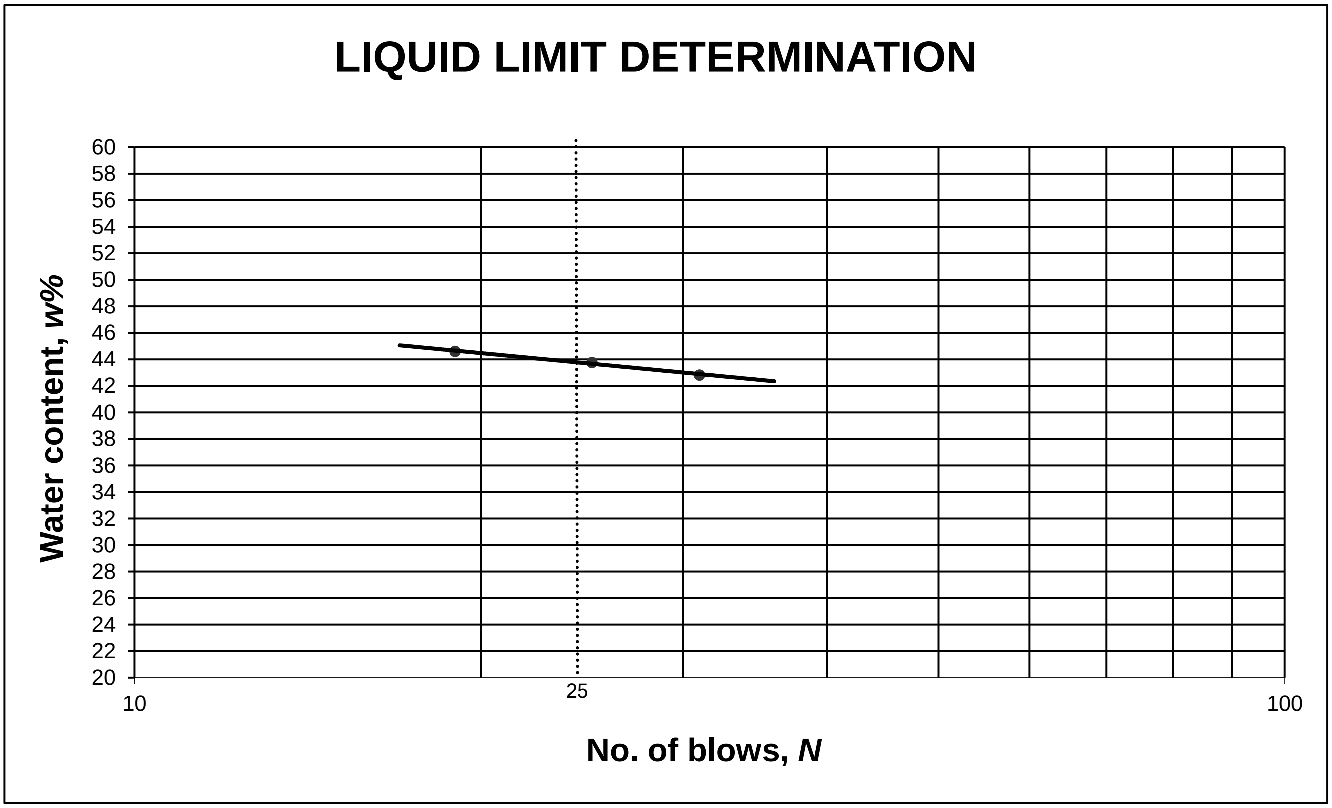
Engineering • Inspection • Testing

Atterberg Limits

AASHTO T 89,90

Project	Geotechnical Investigation Retaining Wall IDOT 62H02, IL 31 & Plum Street, South Elgin						
Client	Bowman Consulting, 1001 Warrenville Road, Ste. 110, Lisle, IL 60532						
File No.	9024	**Sample #**	RWB-03 ST	**Date Tested**	10/18/2021	**Tested By**	DG
						Qc By	RC

Date Sample Recd.	10/11/2021
Sample Location	8'-10'
Sample Description	Brown and gray silty clay, trace gravel



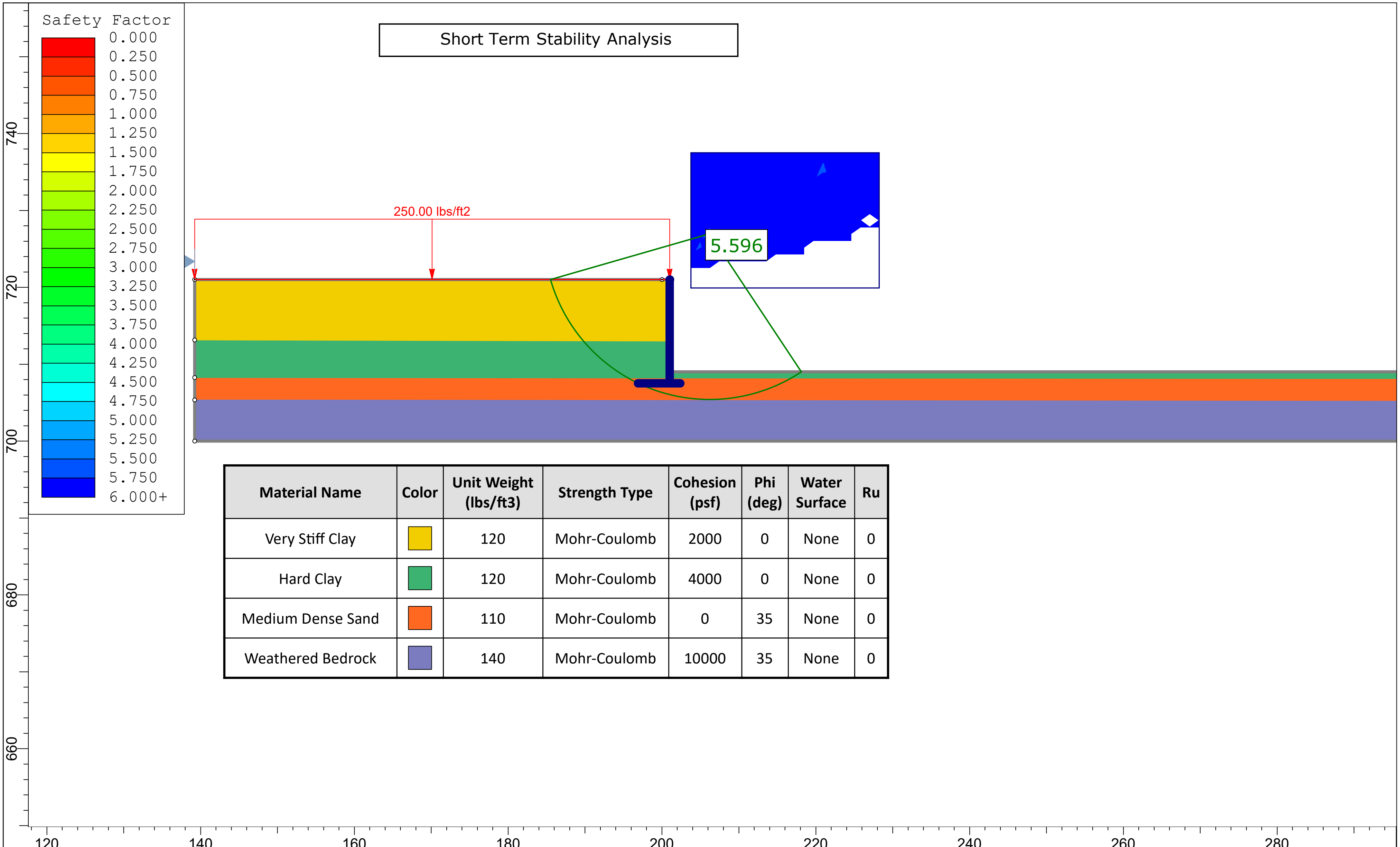
Results

Liquid Limit, LL	**44**	**Plastic Limit, PL**	**20**	**Plasticity Index, PI**	**24**

Remarks

Appendix C

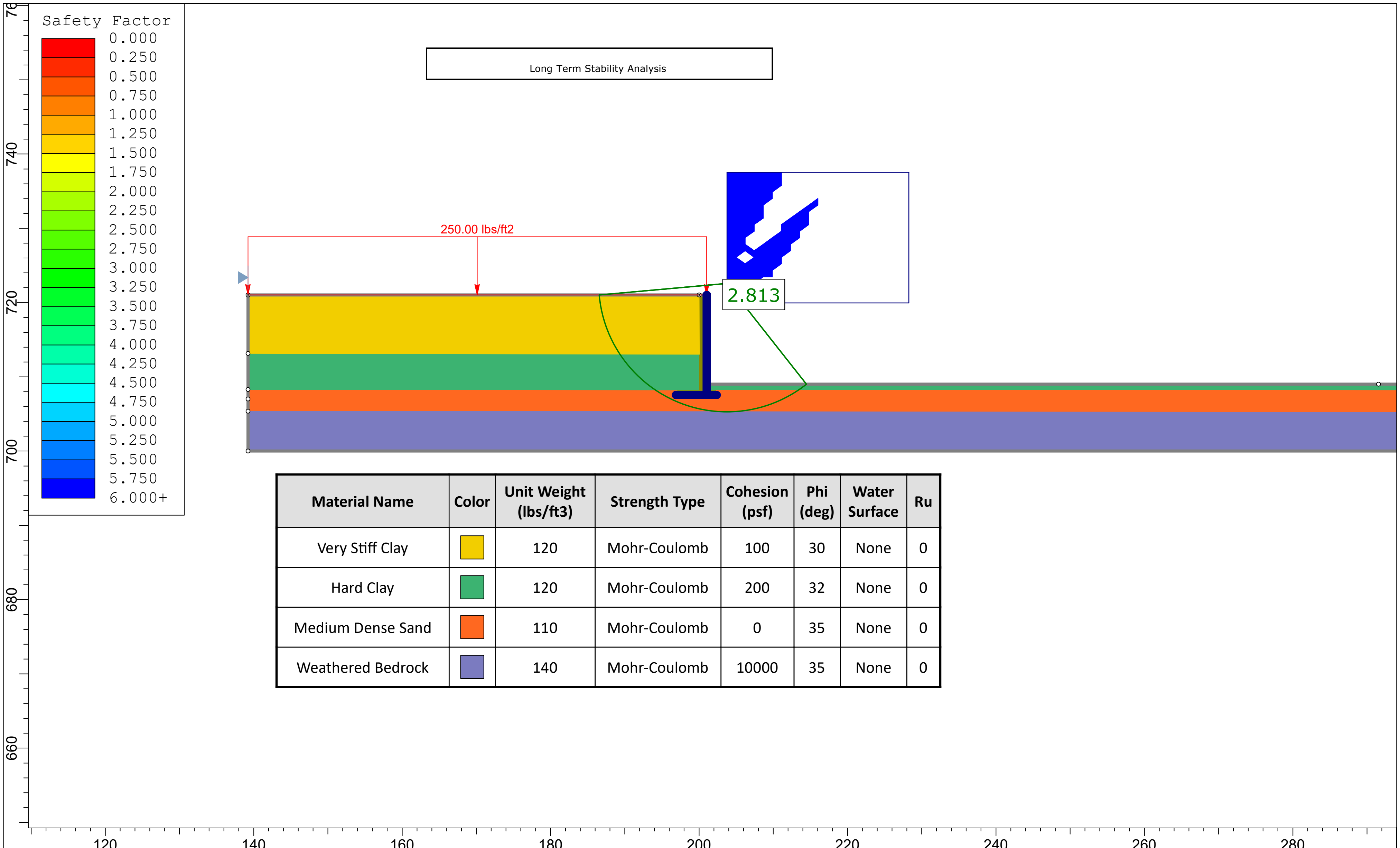
Slope Stability Analysis



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Ru
Very Stiff Clay		120	Mohr-Coulomb	2000	0	None	0
Hard Clay		120	Mohr-Coulomb	4000	0	None	0
Medium Dense Sand		110	Mohr-Coulomb	0	35	None	0
Weathered Bedrock		140	Mohr-Coulomb	10000	35	None	0

Project	Retaining Wall at IL 31 and Plum Street
Analysis Description	
Drawn By	
Scale	1:207
Company	INTERRA, INC.
Date	12/7/2021
File Name	Retaining Wall-Short-Term Stability.slim

SLIDEINTERPRET 7.038



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Ru
Very Stiff Clay		120	Mohr-Coulomb	100	30	None	0
Hard Clay		120	Mohr-Coulomb	200	32	None	0
Medium Dense Sand		110	Mohr-Coulomb	0	35	None	0
Weathered Bedrock		140	Mohr-Coulomb	10000	35	None	0

SLIDEINTERPRET 7.038

Project	Retaining Wall at IL 31 and Plum Street		
Analysis Description			
Drawn By		*Scale* 1:215	*Company* INTERRA, INC.
Date 12/7/2021		*File Name* Retaining Wall-Logng-Term Stability.slim	