



May 15, 2023

B & H Investments Properties, LLC  
110 West Jennings Lane  
Centerville, Utah 84014

Attention: Kevin Deppe EMAIL: [Crimsonridgeutah.kevin@gmail.com](mailto:Crimsonridgeutah.kevin@gmail.com)  
Steve Fenton EMAIL: [Crimsonridgeutah.steven@gmail.com](mailto:Crimsonridgeutah.steven@gmail.com)

Subject: Slope Stability Consultation - Eden View Lane  
Crimson Ridge Phase 2C  
5129 East Whispering Pines Lane  
Eden, Utah  
Project No. 1200541

Gentlemen,

Applied Geotechnical Engineering Consultants, Inc. (AGEC) was requested to conduct slope stability analysis and geotechnical consultation with respect to the roadway fill slopes for Eden View Lane to be constructed in Phase 2C of the Crimson Ridge development in Eden, Utah.

#### **PREVIOUS STUDIES**

The following geologic and geotechnical studies have been conducted for the area of Phases 2 and 3.

Geologic Hazards Evaluation, Crimson Ridge Phase 2 Subdivision, Western Geologic & Environmental, LLC, report dated May 15, 2020.

Geotechnical Investigation, Crimson Ridge Phase 2 Subdivision, Christensen Geotechnical Project No. 227-001, report dated May 26, 2020.

Geotechnical Investigation, Crimson Ridge Phases 2 and 3, Applied Geotech (AGEC) Project No. 1200541, report dated September 15, 2020.

Additional geotechnical consultation, percolation testing and other services provided by AGEC were reported under the same project number.

## PROPOSED CONSTRUCTION

We understand that Eden View Lane is planned to be constructed through Phase 2C. Up to approximately 20 feet of fill is planned to be placed as site grading fill for the roadway. The fill side slopes were originally planned to be constructed with at 3 horizontal to 1 vertical or flatter.

In late April 2023, we were notified that areas between Stations 15+00 and 19+00 would need to have slopes as steep as 2 horizontal to 1 vertical to prevent stream encroachment. The proposed slope modifications and profile information was provided by Gardner Engineering (see Figure 1).

We evaluated three proposed cross sections of the proposed roadway and fill slopes shown on the attached Figure 1. Profile 1-1' is located near Station 15+20, Profile 2-2' is near Station 17+00 and Profile 3-3' is near 18+20.

## MATERIAL PROPERTIES

Based on our prior experience at the site, subsurface conditions along this portion of Eden View Lane will likely consist of clay, gravel or potentially shallow-depth bedrock. Due to the uncertainty of varying subgrade conditions along this portion of the roadway alignment, we have assumed a clay subgrade for the stability evaluation.

We understand that imported granular fill will be used as the site grading fill for construction of the roadway and fill slopes.

Based on information presented in the above-referenced geotechnical reports and correspondence, our experience in the area and our understanding of the proposed construction, we have assumed the following soil strength parameters for the materials indicated:

Material	Unit Weight, pcf	Internal Friction Angle, degrees	Cohesion, psf
Fat Clay Subgrade	120	20	200
Imported Granular Fill	130	38	0

The following table presents the criteria for imported granular fill. Proposed fill materials should be submitted for review and approval prior to placement.

Fill	Recommendation
Imported Granular Fill	Non-expansive granular soil Passing No. 200 Sieve <15% Liquid Limit <30% Maximum size 6 inches Friction Angle $\geq 38^\circ$

### **SLOPE STABILITY**

Slope stability analysis was performed for the three cross sections described above. The analysis included static and seismic (pseudo static) conditions. The seismic condition was analyzed using a horizontal coefficient of 0.2g which assumes approximately 6 inches of deformation for a seismic event with a 2 percent probability of exceedance in a 50-year time period. This deformation in granular soils would likely consist of surface raveling or flattening of the slope.

Results of the slope stability analysis for slope profiles described above indicate the long-term stability of each configuration have safety factors of at least 1.5 under static conditions. Under seismic conditions, the results indicate that the slope profiles evaluated have safety factors on the order of 1.0 for the deformation indicated. Results of the analysis are attached.

### **ROADWAY AND FILL SLOPE CONSTRUCTION**

The following recommendations are given to facilitate fill placement and compaction.

1. Subgrade Preparation  
Vegetation, topsoil, organic material, unsuitable fill and other deleterious material should be removed from below the area of the proposed roadway and fill placement. Fill placed on slopes steeper than 5 horizontal to 1 vertical should be keyed or benched into the existing slope. A key or bench should be provided for every 2 feet of vertical rise. An engineer from AGEC should observe subgrade areas prior to placement of fill.
2. Fill Placement  
Material placed as site grading fill below the roadway and as slope fill should consist of imported non-expansive granular soil in accordance with the material properties described above. The granular fill should be placed in horizontal lifts of less than 1 foot and compacted to at least 90 percent of the maximum dry density as determined by ASTM D 1557. Fill placed for the project should be frequently tested for compaction.

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3. Erosion Protection

The construction fill slopes should be protected from erosion by revegetation or other methods.

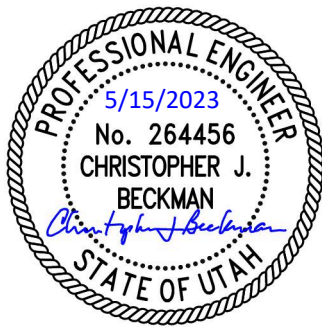
**LIMITATIONS**

This letter has been prepared in accordance with generally accepted soil and foundation engineering practices in the area for the use of the client.

If you have questions or we can be of further service, please call.

Sincerely,

APPLIED GEOTECHNICAL ENGINEERING CONSULTANTS, INC.



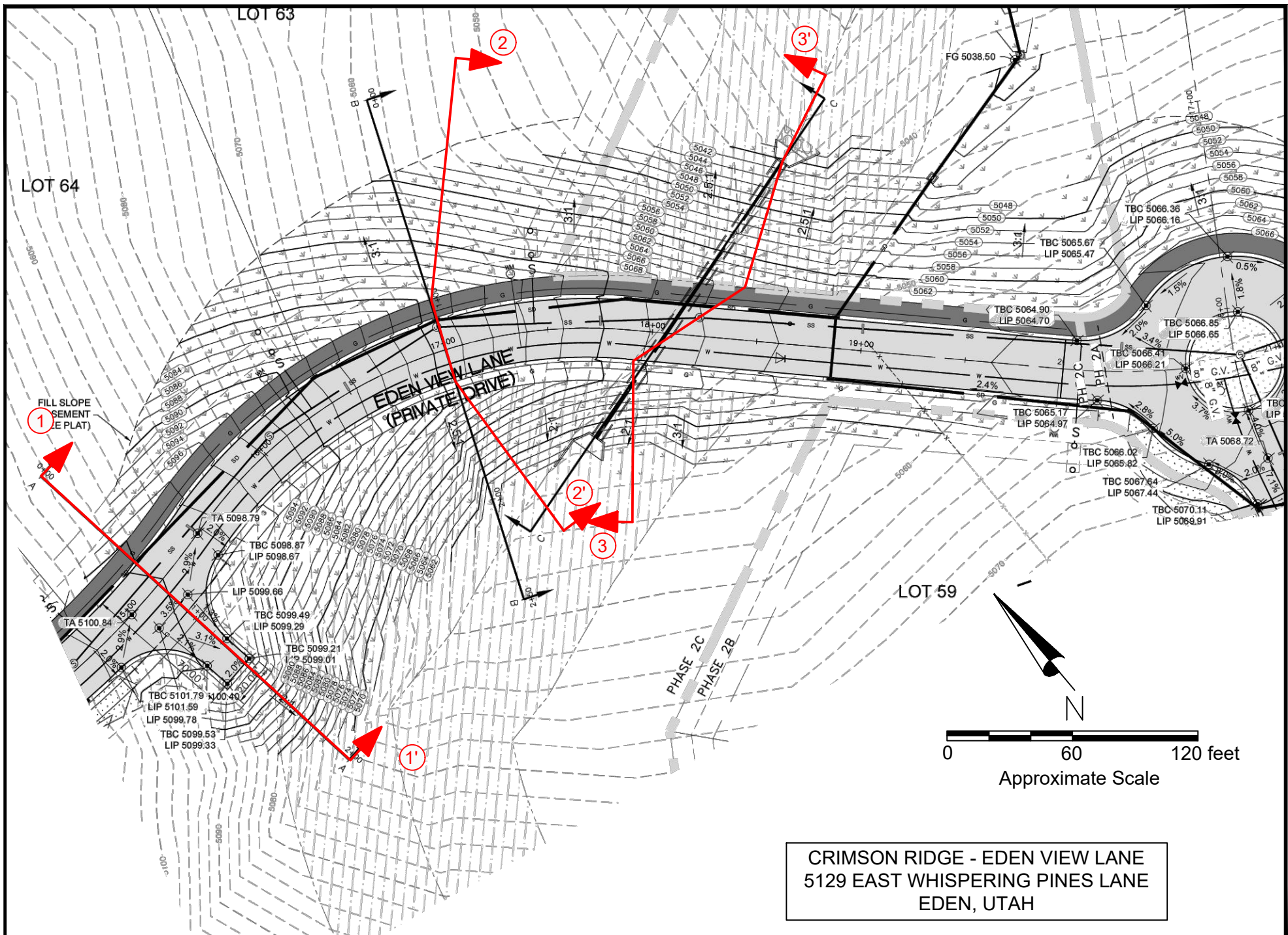
Christopher J. Beckman, P.E.

Reviewed by DRH, P.E., P.G.

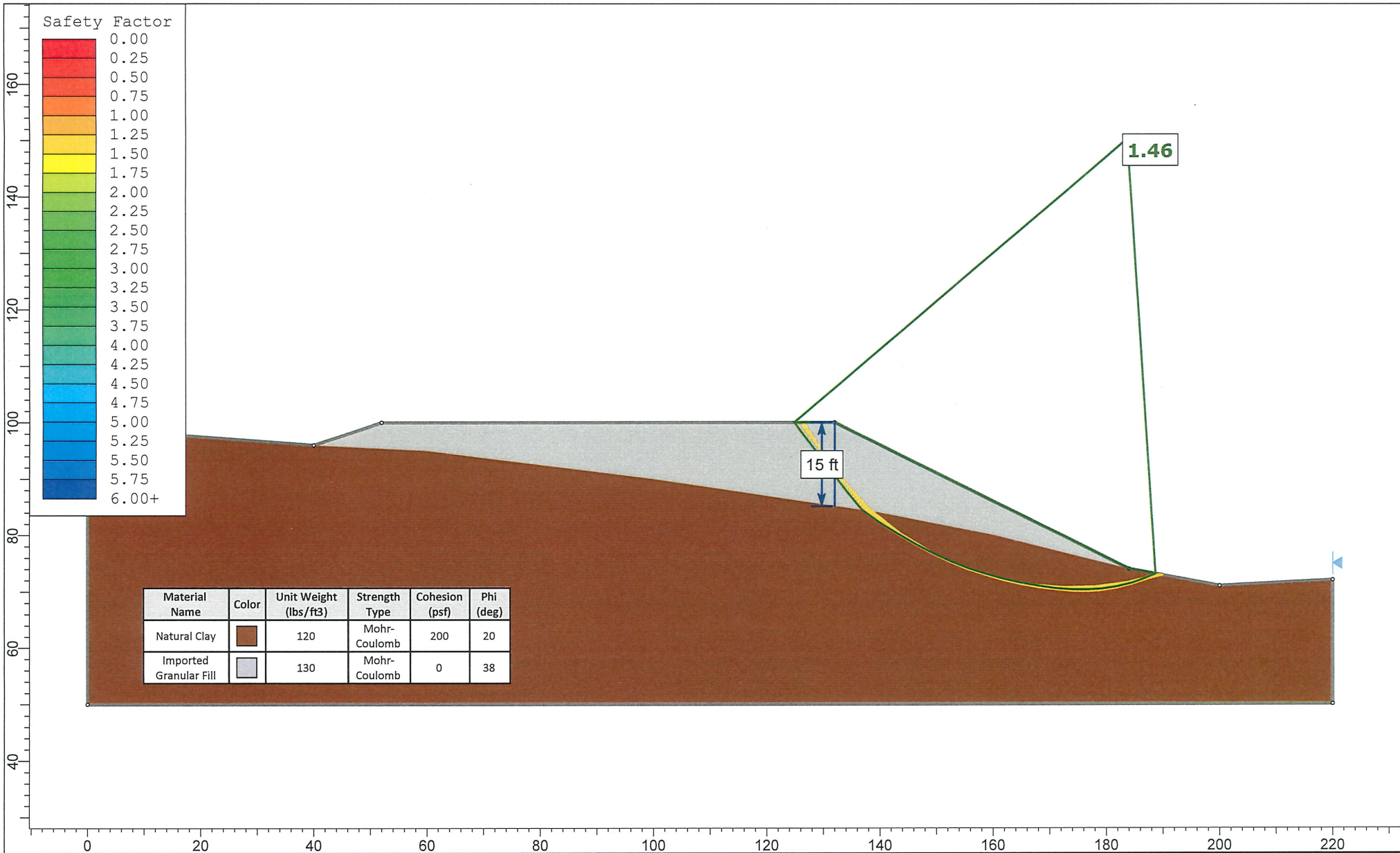
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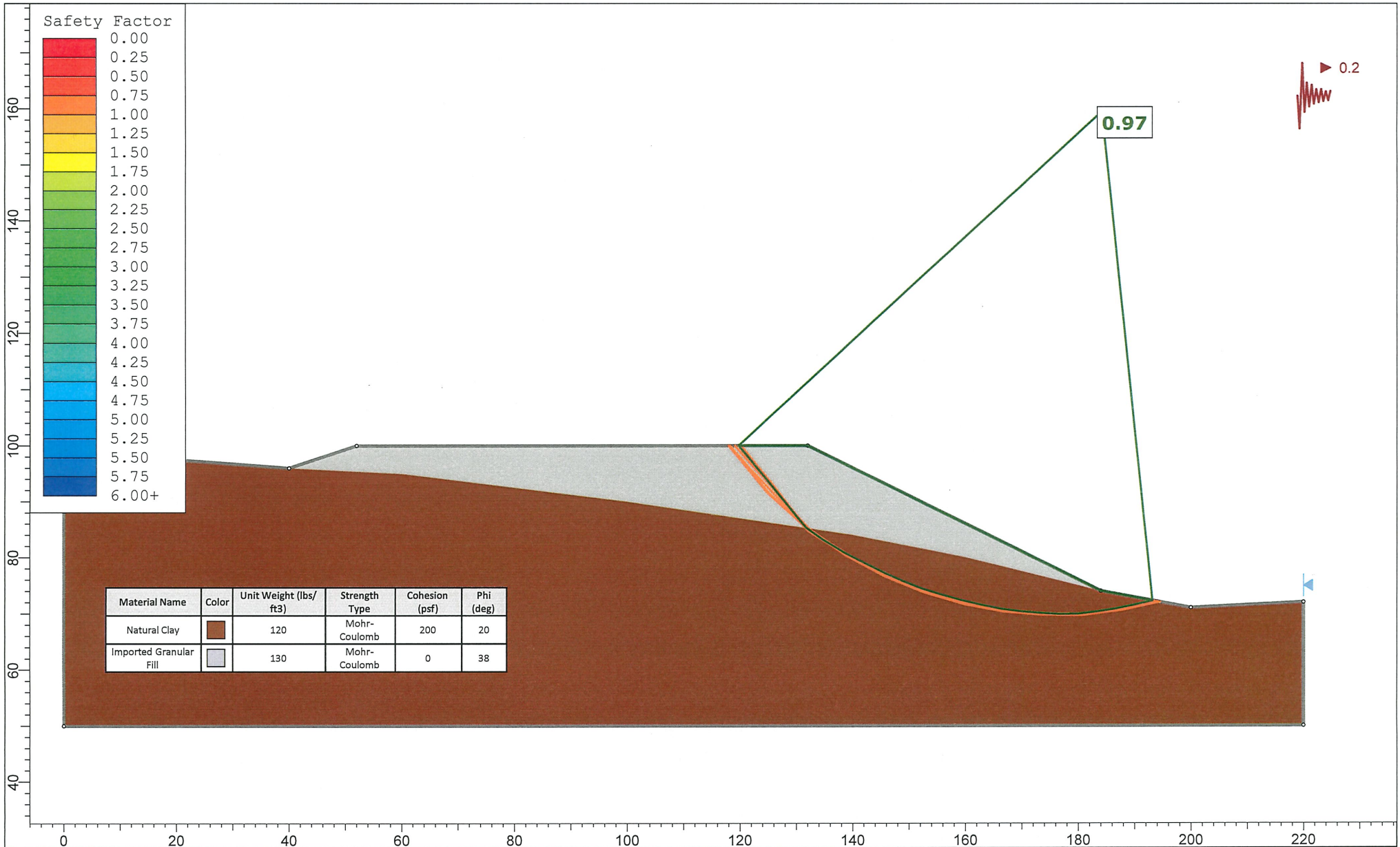
cc: Wes Stewart (Gardner Engineering, EMAIL: wes@gecivil.com)





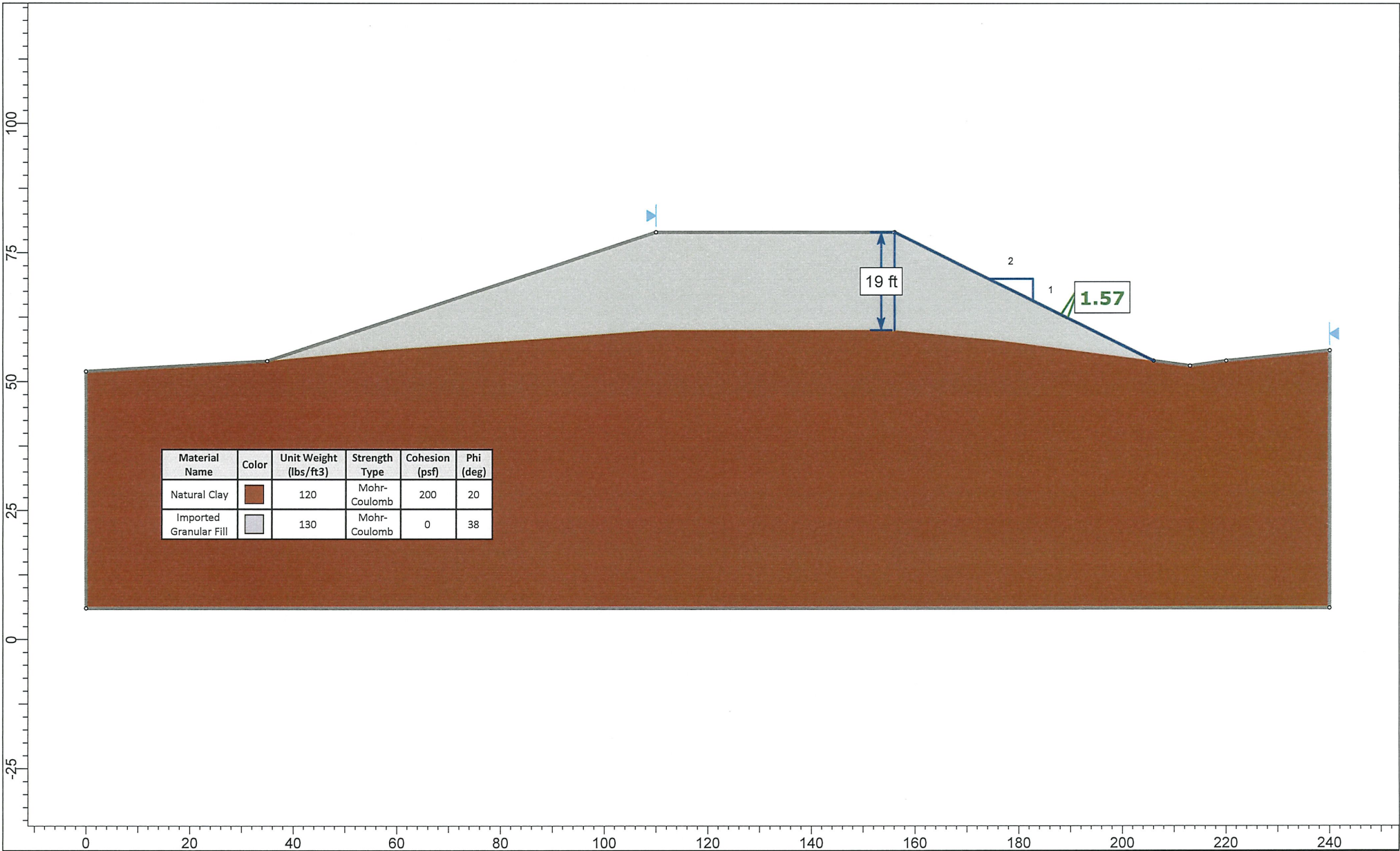


	Project		SLIDE - An Interactive Slope Stability Program	
	Group		Group 1	Scenario
	Drawn By			Company
	Date		5/10/2023, 10:44:56 AM	File Name
				Profile 1-1 static.slmd



<i>Project</i>		SLIDE - An Interactive Slope Stability Program	
<i>Group</i>	Group 1	<i>Scenario</i>	Master Scenario
<i>Drawn By</i>		<i>Company</i>	
<i>Date</i>	5/10/2023, 10:44:56 AM	<i>File Name</i>	Profile 1-1 seismic.slmd



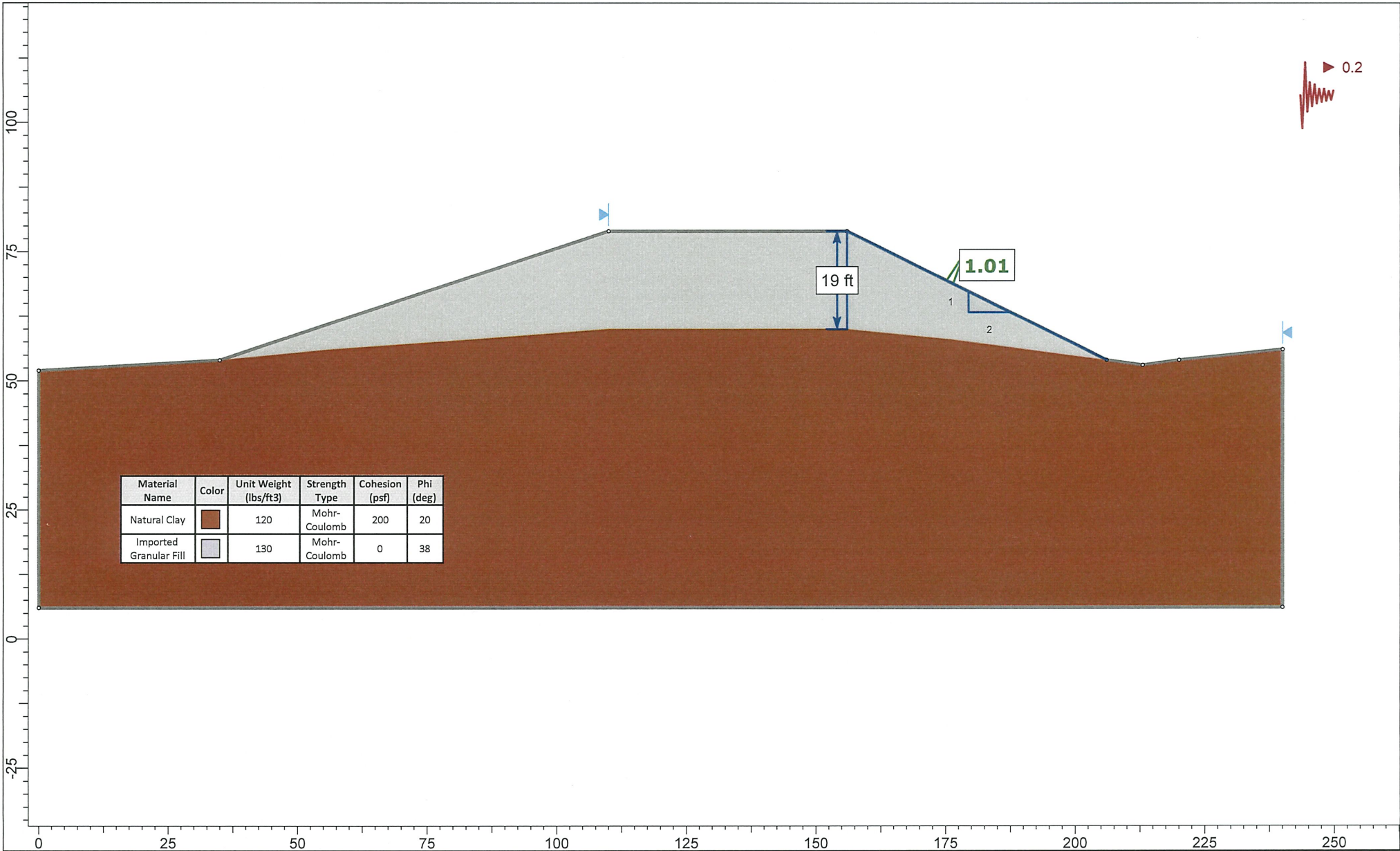



Material Name	Color	Unit Weight (lbs/ft <sup>3</sup> )	Strength Type	Cohesion (psf)	Phi (deg)
Natural Clay	<span style="color: brown;">■</span>	120	Mohr-Coulomb	200	20
Imported Granular Fill	<span style="color: grey;">■</span>	130	Mohr-Coulomb	0	38

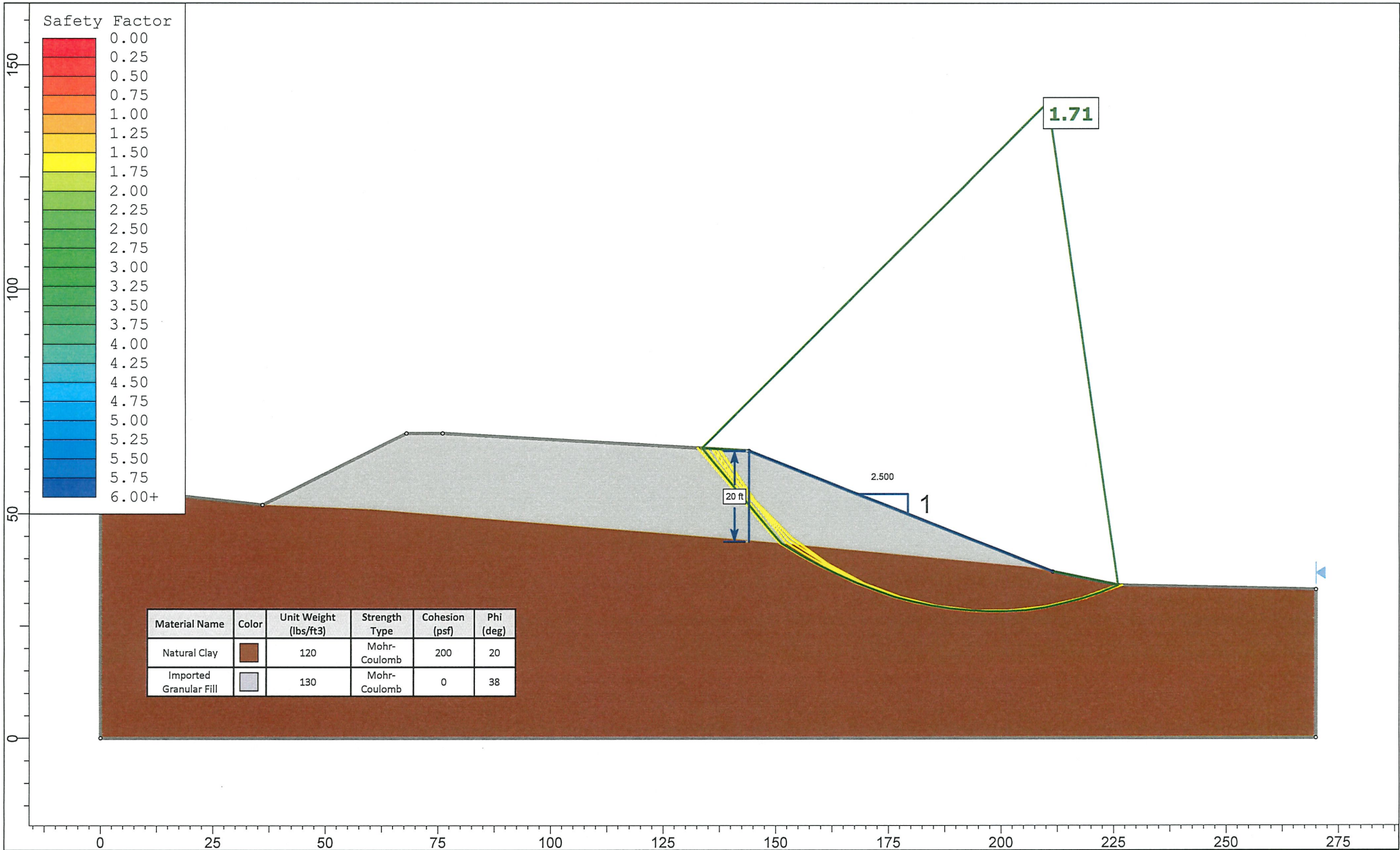


<i>Project</i>		SLIDE - An Interactive Slope Stability Program	
<i>Group</i>	Group 1	<i>Scenario</i>	Master Scenario
<i>Drawn By</i>		<i>Company</i>	
<i>Date</i>	5/10/2023, 10:51:38 AM	<i>File Name</i>	Profile 2-2 static.slmd



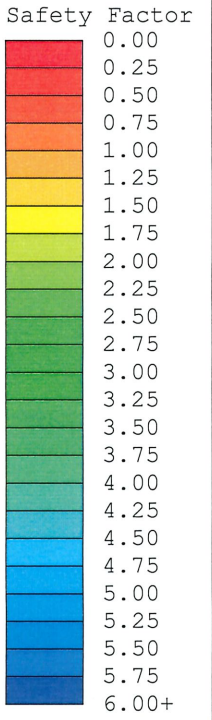
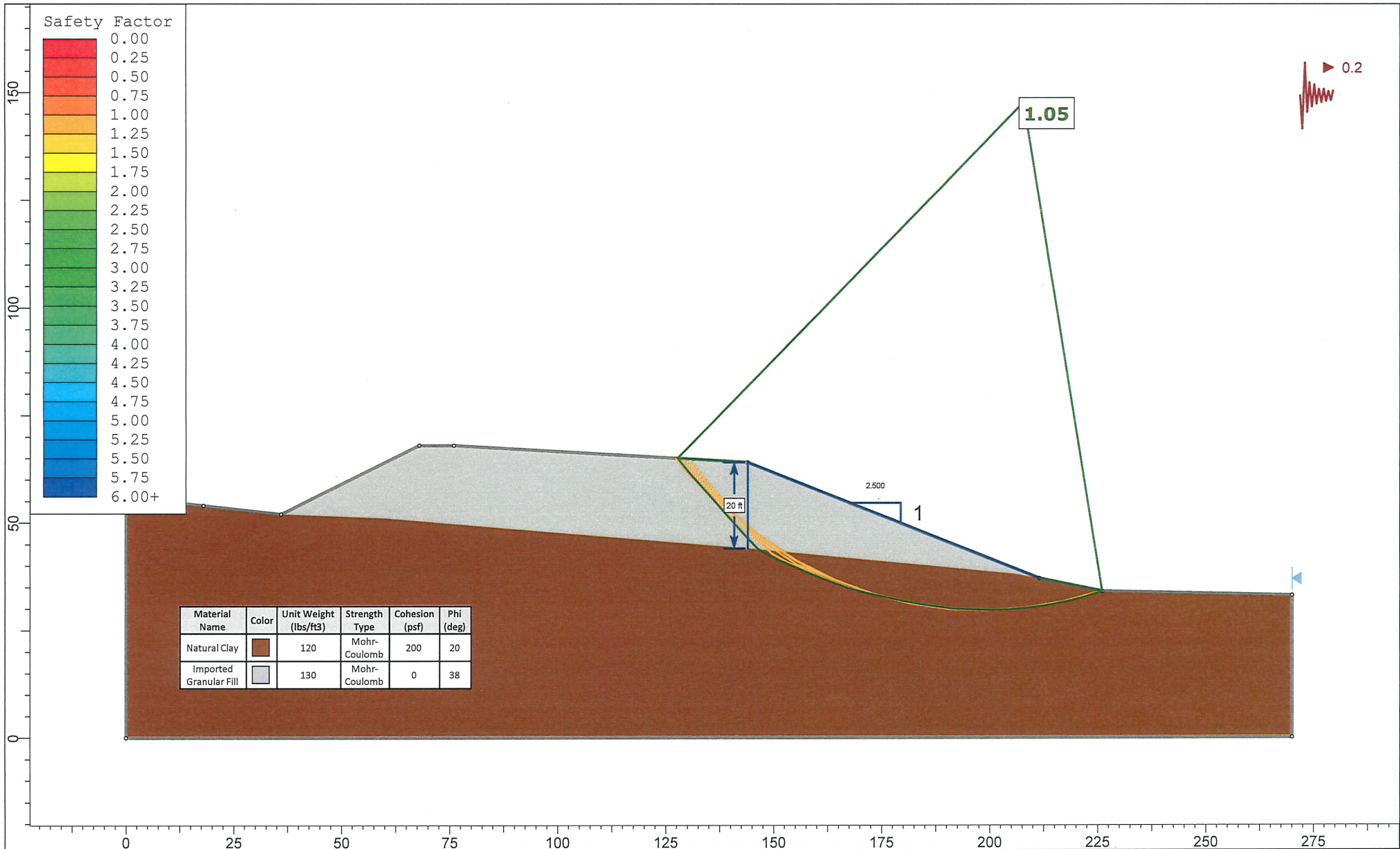


	Project SLIDE - An Interactive Slope Stability Program	
	Group Group 1	Scenario Master Scenario
	Drawn By	Company
	Date 5/10/2023, 10:51:38 AM	File Name Profile 2-2 seismic.slmd



<i>Project</i>		SLIDE - An Interactive Slope Stability Program	
<i>Group</i>	Group 1	<i>Scenario</i>	Master Scenario
<i>Drawn By</i>		<i>Company</i>	
<i>Date</i>	5/10/2023, 10:59:04 AM	<i>File Name</i>	Profile 3-3 seismic.slmd



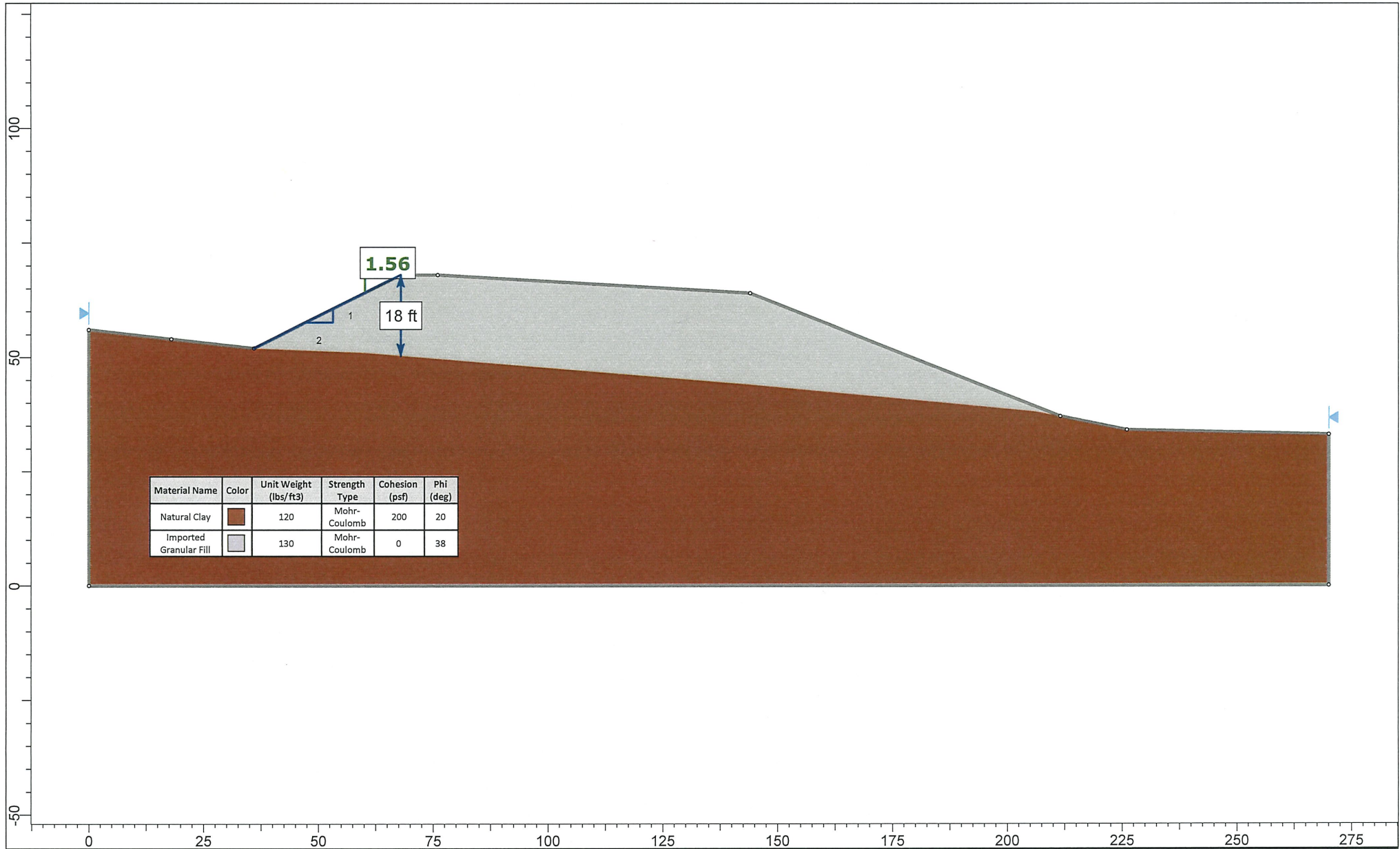


Material Name	Color	Unit Weight (lbs/ft <sup>3</sup> )	Strength Type	Cohesion (psf)	Phi (deg)
Natural Clay	<span style="display:inline-block; width:10px; height:10px; background-color: #8B4513;"></span>	120	Mohr-Coulomb	200	20
Imported Granular Fill	<span style="display:inline-block; width:10px; height:10px; background-color: #A9A9A9;"></span>	130	Mohr-Coulomb	0	38



SLIDEINTERPRET 9.012

Project		SLIDE - An Interactive Slope Stability Program	
Group	Group 1	Scenario	Master Scenario
Drawn By		Company	
Date	5/10/2023, 10:59:04 AM	File Name	Profile 3-3 seismic.slmd



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Natural Clay	<span style="display:inline-block; width:10px; height:10px; background-color:brown;"></span>	120	Mohr-Coulomb	200	20
Imported Granular Fill	<span style="display:inline-block; width:10px; height:10px; background-color:lightgrey;"></span>	130	Mohr-Coulomb	0	38



SLIDEINTERPRET 9.012

Project		SLIDE - An Interactive Slope Stability Program	
Group	Group 1	Scenario	Master Scenario
Drawn By		Company	
Date	5/10/2023, 10:59:04 AM	File Name	Profile 3-3 static RtoL.slm