PanGEO
INCORPORATED
Geotechnical & Earthquake
Engineering Consultants

April 4, 2019
Revised August 5, 2019
File No. 14-128.200

Mr. Paul Maksimchuk
MAKSLAND LLC
223 SW 327th Place
Federal Way, WA 98023

Subject: **Response to Geotechnical Review Comments (Revised)**
Proposed Single-Family Residence
4634 E Mercer Way, Mercer Island, WA

Dear Mr. Maksinchuk,

As requested, we prepared this letter to provide a summary of our responses to the City of Mercer Island's Geotechnical review comments dated December 21, 2018 and Sub4 comments for the above project. This letter includes our responses in our letter dated April 24, 2019 and responses to the additional comment for the Sub4 review. Please note that our response to the latest comments is limited to the geotechnical aspect of the comments. Our engineering analyses and responses are based on the latest design plans.

1. Subsurface Conditions (Comment #1)

PanGEO drilled three (3) test borings at the site in 2014 as part of our geotechnical study for the proposed development. Our borings generally encountered approximately 5 feet of loose to medium dense sand overlying medium dense to very dense silty sand to at least 21½ feet below surface. Groundwater was not encountered within the drilling depths in the borings. The borings are generally located in the proposed building area, but no borings were drilled in the upper slope areas west of the proposed house and soldier pile walls. The approximate boring locations are shown on Figure 1. The Figure 1 includes the adjacent property to the west to show the existing borings. The summary boring logs are included in Appendix A for reference. Based on our current review, we may have incorrectly assigned geologic unit for medium dense sand below 4 feet in

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boring BH-1 and BH-2 as Colluvium. We believe that it is more appropriate to describe as Weathered Pre-Olympia Deposit).

During our current effort, we collected and reviewed the existing boring boring data on the adjacent property to the west (4630 East Mercer Way) competed by Agra Earth & Environmental in 1999. The existing exploration on 4630 E Mercer site consisted of three test borings and two hand borings. These existing borings generally encountered approximately 4 feet of loose to medium dense silty sand overlying medium dense to very dense silty sand and very stiff sandy silt that extended to a maximum exploration depth of about 11½ feet. Groundwater was not encountered within the drilling depths in the previous borings. The approximate locations of the previous borings and hand borings are also shown on Figure 1. The summary logs of the previous borings and hand borings are included in Appendix B for reference.

Based on the numbers of borings at the subject adjacent sites and consistent soil conditions encountered in the borings, it is our opinion that the available subsurface data is sufficient for additional geotechnical analysis, and additional borings are not necessary.

2. Overall Slope Stability analysis (Comment #2)

As requested, PanGEO performed slope stability analysis to evaluate the factor of safety against potential slope instability. Based on review of the subsurface data in the borings at the subject and west adjacent sites, it is our opinion that the the site soils may be divided into 3 engineering units for the purpose of our engineering analysis. The Engineering Unit 1 is the near-surface loose to medium dense sand to silty sand of approximately 4 to 5 feet thick. The Engineering Unit 2 is medium dense silty sand below Unit 1. The thickness of Unit 2 ranges from about a couple of feet at the west end to about 10 to 15 feet near the east property line. The Engineering Unit 3 is dense to very dense silty sand below Unit 2 that extended to a greater depth. The soil parameters for these soil units were assigned based on empirical correlations using field SPT blowcount values measured in the borings with necessary correction, and our experience with similar soil conditions and published literatures (Meyerhof, G. G., 1956 and 2015 WSDOT Geotechnical Design Manual). The soil and material parameters for these three Units are summarized in the Table 1 below, and are used in our slope stability analysis.

Table 1 – Soil Parameters for Slope Stability Analysis

Material Type	Unit Weight (pcf)	Cohesion (psf)	Friction Angles (degrees)
Unit 1 - Loose to medium dense sand	110	0	28
Unit 2 - Medium dense silty sand	125	0	35
Unit 3 – Dense to very dense silty sand	130	0	40

Two cross sections, A-A' and B-B, were created for the slope stability analysis. The approximate locations of the cross sections are shown on Figure 1. These two cross sections appear to be similar profile. As a result, the cross section A-A' was used for slope stability purpose, assuming a solider pile embedment depth of 14 feet (ie. soldier pile at B-B' condition).

Our slope stability analyses were performed using the computer program *Slide v6.008* (Rocscience, 2010). The seismic stability was analyzed using pseudo-static procedures, where the effect of earthquake ground shaking is represented by the use of a "seismic coefficient" in the stability calculations. In our pseudo-static stability analysis, one-half of the expected peak ground acceleration, or 0.284g, was used. The results of our analyses are shown in Figures 4 through 8.

As part of our current site stability evaluation, we also reviewed a memo prepared by Geotech Consultant Inc. (GCI) in 2007. The memo by GCI summarized their observations of the shallow slide occurred on 4630 property. Based on the memo, the slide affected one to 2 feet of fill that was placed on the slopes and was caused by saturation of the new fill due to uncontrolled, concentrated surface water. In our opinion, this condition does not and will not exist at the subject site, provided that the proposed project is properly constructed.

In summary, based on the results of our additional analysis and evaluation, it is our opinion that the site has the adequate factor of safety against potential failures under the static and seismic conditions, and will not likely have catastrophic slope failure that may threaten life safety of the occupants.

3. Passive Pressures for the Soldier Pile Wall (Comment #4)

We provided passive earth pressures in our 2017 geotechnical report. The recommended passive earth pressure of 300 pcf (allowable) assumes a level bench of at least 15 feet in front of the wall. Based on the current design plans, we understand that temporary excavations of approximately 1H:1V will be made to facilitate the west building basement wall construction (ie. between soldier piles L and Q). The temporary excavations will be backfilled after the basement walls are completed. Based on the soil conditions, it is our opinion that a passive earth pressure of 150 pcf (allowable) may be used to evaluate the soldier pile walls for this temporary condition, and 300 pcf may be used for the permanent backfilled condition.

4. Geotechnical Construction Monitoring (Comment #5)

The proposed does not have pin pile foundation. We agree with the comment that concur that "Monitor pin pile driving and testing" should be revised to "Monitor soldier pile installation."

5. Figure 2 in our Geotechnical Report dated September 11, 2017

Figure 2 in our September 11, 2017 report refers to the base map dated June 5, 2017. This is consistent with the current plan sheet A1.01 with the latest revision date of June 5, 2017, and is also consistent with the current Civil Plan Sheet 3 with the latest revision date of May 15, 2019 and current structural plan sheets. In our opinion, no revision is needed for this figure.

STATEMENT OF MINIMUM RISKS

We understand that the site is mapped as a geologic hazard area. Per Mercer Island City Code Section 19.07.060.D.2, development within geologic hazard areas and critical slopes may occur if the geotechnical engineer provides a statement of risk with supporting documentation indicating that one of the following conditions can be met:

a. The geologic hazard area will be modified, or the development has been designed so that the risk to the lot and adjacent property is eliminated or mitigated such that the site is determined to be safe;

b. Construction practices are proposed for the alteration that would render the development as safe as if it were not located in a geologic hazard area;

c. The alteration is so minor as not to pose a threat to the public health, safety, and welfare;

d. An evaluation of site-specific subsurface conditions demonstrates that the proposed development is not located in a geologic hazard area.

We reviewed the geotechnical engineering aspects of the current plans for the above-referenced project. Our review includes the following:

- Architectural plan Sheets G1.0 and G0.02, A1.01 through A9.04 last revised on June 5, 2017 by Studio 19 Architects,
- Civil Plan Sheets 1 through 6 last revised May 15, 2019 by Litchfield Engineering; and
- Structural plan sheets S1 through S11, and shoring calculations last revised on August 5, 2019 by Tecinstruct LLC.

In general, it is our opinion that the plans reviewed had incorporated all substantial geotechnical recommendations presented in our geotechnical report dated September 11, 2017 and in this letter.

Based on our additional analyses and our review of the current plans, it is our opinion that Criterion (b) can be met, provided that the project is properly constructed per the approved plans. We recommend that best management practices be implemented during construction, including the proper use of silt fence, minimize earthwork activities during periods heavy precipitations, minimized exposed areas in wet season, etc. Permanent erosion control measures including landscape and hardscape installations will effectively mitigate the risk of erosion in the long term.

CLOSURE

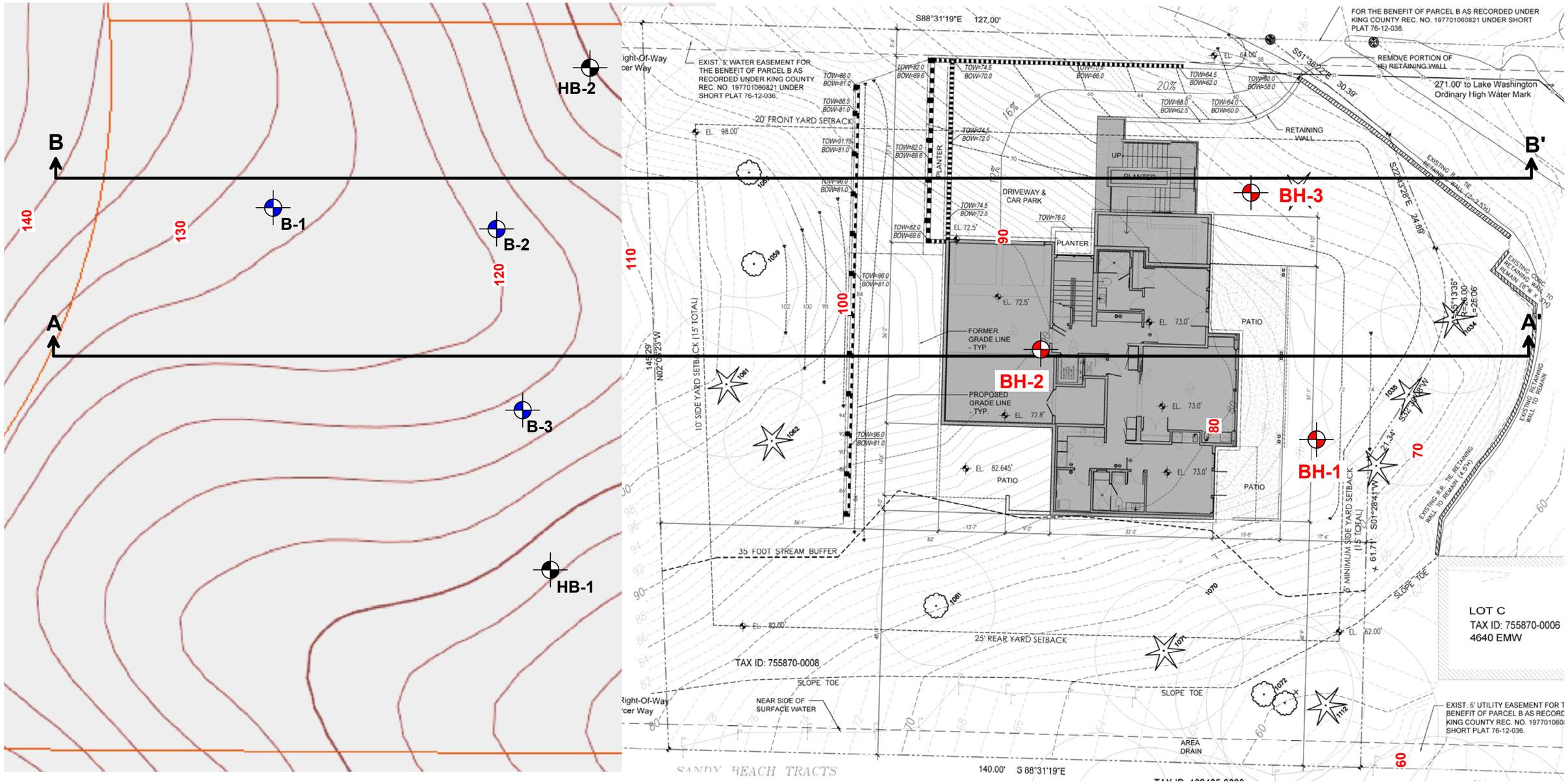
We trust that the information presented herein meets your need at this time. Please call if you have any questions.

Sincerely,

Michael H. Xue, P.E.
Senior Geotechnical Engineer

Attachments:

Figure 1	Site and Exploration Plan
Figure 2	Generalized Subsurface Profile – Section A-A’
Figure 3	Generalized Subsurface Profile – Section B-B’
Figures 4 - 8	Summary of Slope Stability Analyses
Appendix A	Summary Boring Logs (PanGEO, 2014)
Appendix B	Existing Boring Logs (Agra, 1999)



Legend:

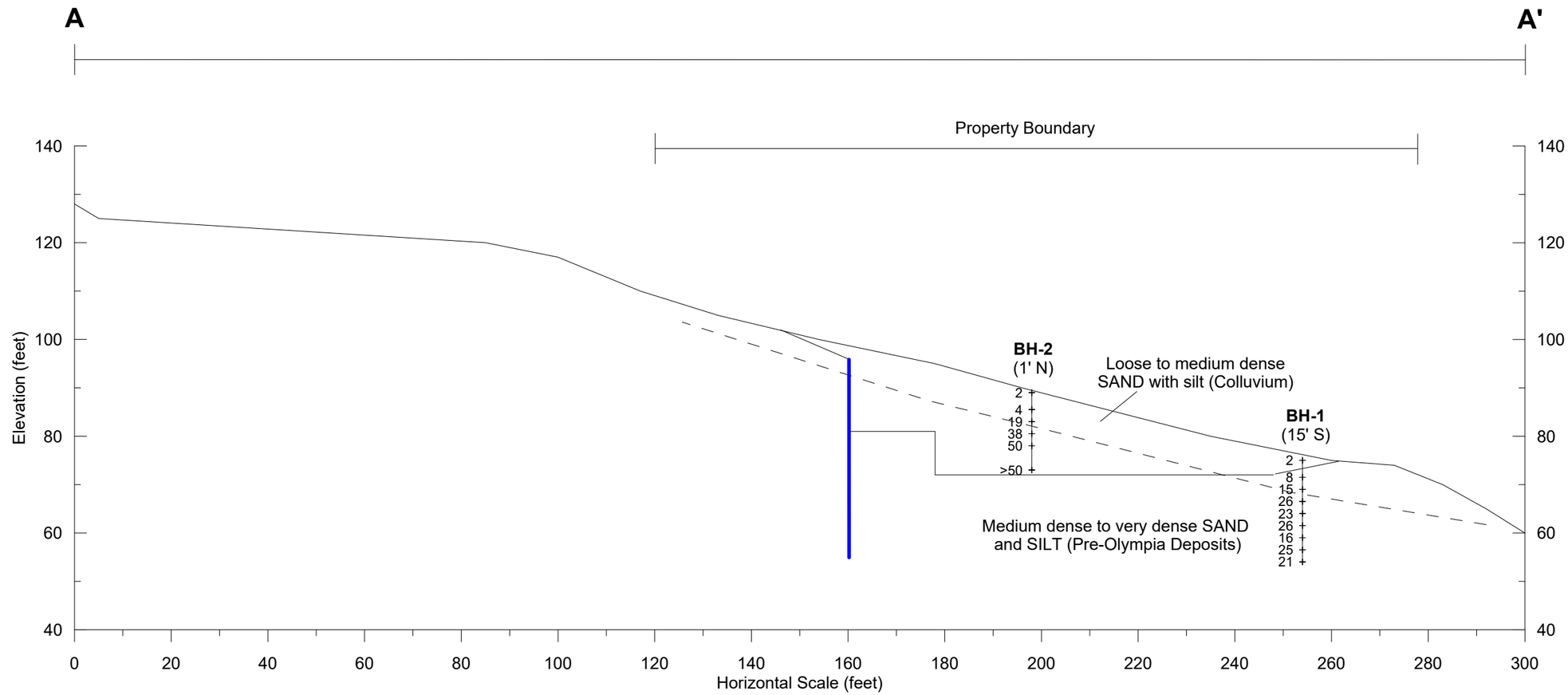
- **BH-1** Approx. Boring Location, PanGEO, 2014
- **B-3** Approx. Boring Location, AGRA, 1999
- **HB-1** Approx. Hand Boring Location, AGRA, 1999

Approx. Scale
1"=20"

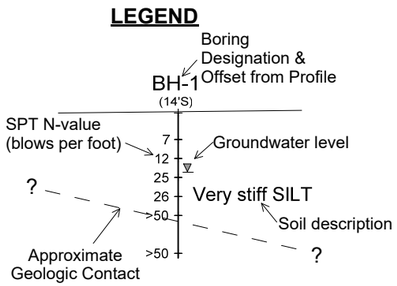
Basemap based on Site Plan by Studio 19 Architects dated June 5, 2017 and the King County iMap.

PanGEO INCORPORATED	Proposed Development 4634 E Mercer Way Mercer Island, Washington	SITE AND EXPLORATION PLAN	
		Project No. 14-128	Figure No. 1

12-095 Site Plan Fig 2.grf 4/4/19 (15:19) SHE



LEGEND



Notes:

1. Existing ground profile based on the Site Plan by Studio 19 Architects, dated June 5, 2017 and King County iMap, .
2. See Figure 2 for location of Section A.
3. See report text for a detailed explanation of the subsurface profile across the site.
4. The generalized soil profile is based on widely-spaced borings. Soil conditions may vary over a small distance, and the actual subsurface conditions may be different from the generalized soil profile depicted in this figure.

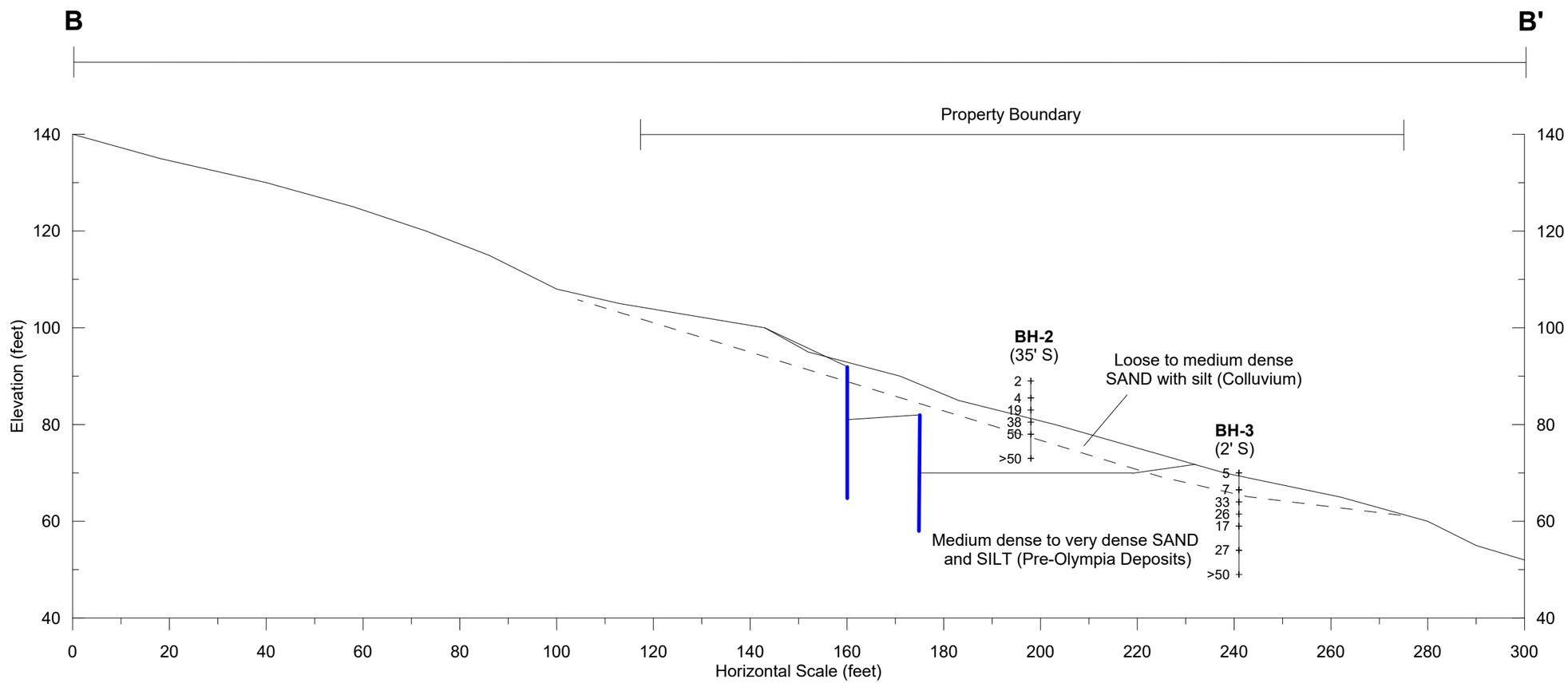
PanGEO INCORPORATED

Proposed Development
4634 E Mercer Way
Mercer Island, WA

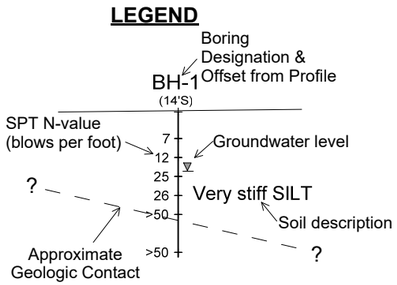
GENERALIZED SUBSURFACE PROFILE
SECTION A - A'

Project No. **14-128**

Figure No. **2**



LEGEND



Notes:
1. Existing ground profile based on the Site Plan by Studio 19 Architects, dated June 5, 2017 and King County iMap, .
2. See Figure 2 for location of Section B.
3. See report text for a detailed explanation of the subsurface profile across the site.
4. The generalized soil profile is based on widely-spaced borings. Soil conditions may vary over a small distance, and the actual subsurface conditions may be different from the generalized soil profile depicted in this figure.

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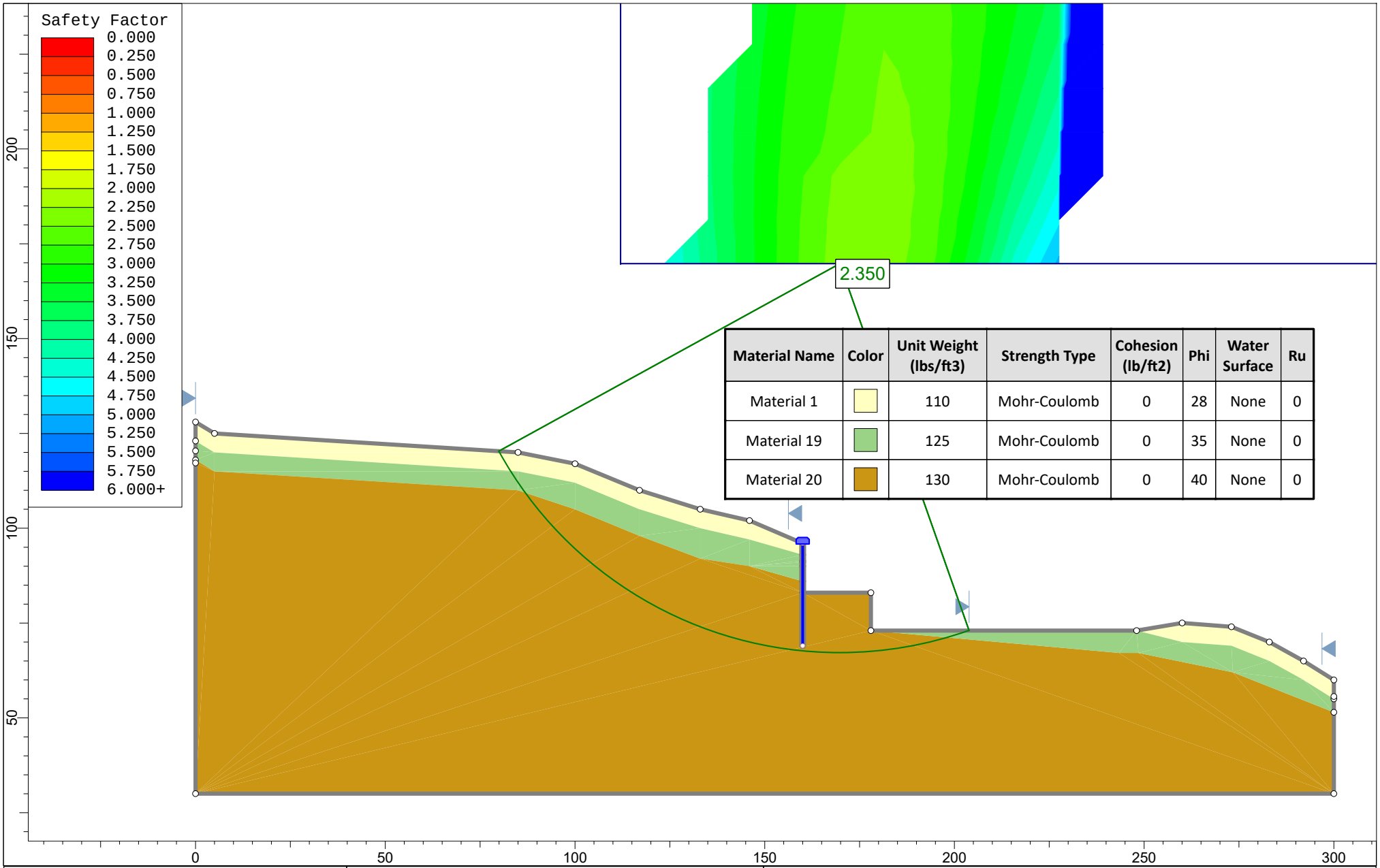
Proposed Development
4634 E Mercer Way
Mercer Island, WA

GENERALIZED SUBSURFACE PROFILE
SECTION B

Project No. **14-128**

Figure No. **3**



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (lb/ft2)	Phi	Water Surface	Ru
Material 1		110	Mohr-Coulomb	0	28	None	0
Material 19		125	Mohr-Coulomb	0	35	None	0
Material 20		130	Mohr-Coulomb	0	40	None	0

PanGEO INCORPORATED

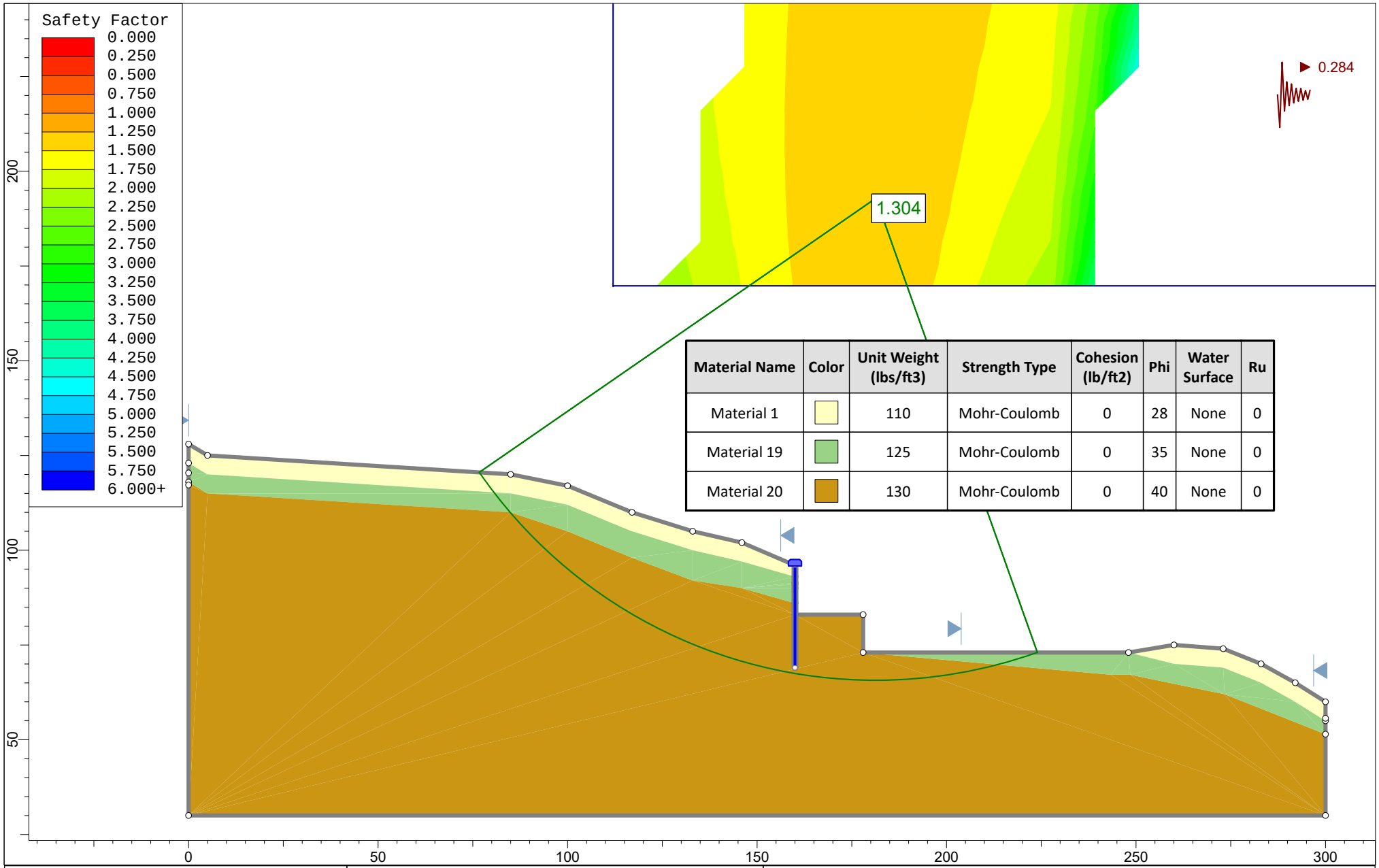
SLIDEINTERPRET 6.008

Proposed Development
4634 E Mercer Way
Mercer Island, Washington

Static Slope Stability Analysis
Post-Construction Condition

PROJECT NO. **14-128**

FIGURE NO. **4**



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (lb/ft2)	Phi	Water Surface	Ru
Material 1		110	Mohr-Coulomb	0	28	None	0
Material 19		125	Mohr-Coulomb	0	35	None	0
Material 20		130	Mohr-Coulomb	0	40	None	0

PanGEO INCORPORATED

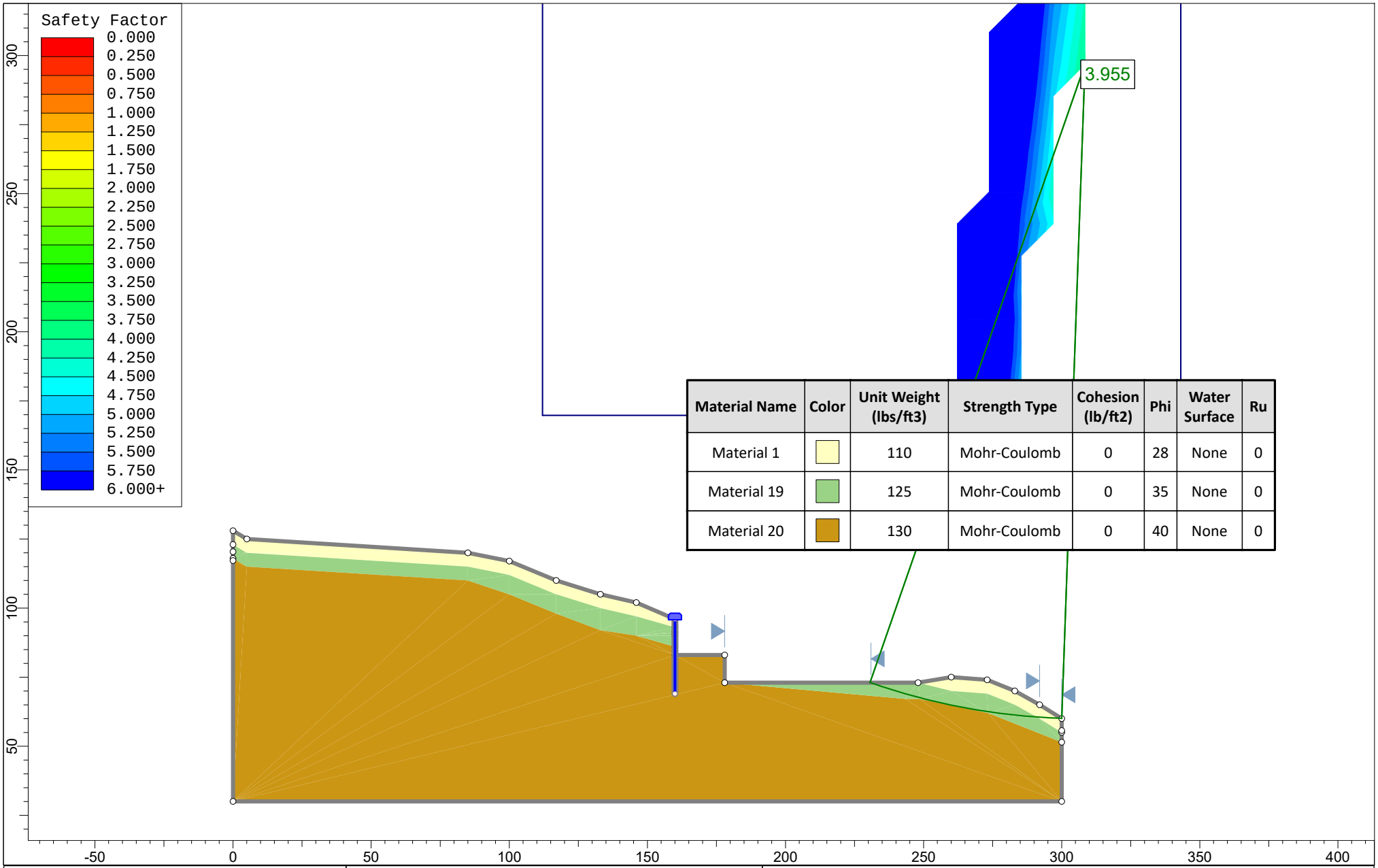
SLIDEINTERPRET 6.008

Proposed Development
4634 E Mercer Way
Mercer Island, Washington

Seismic Slope Stability Analysis
Post-Construction Condition

PROJECT NO. **14-128**

FIGURE NO. **5**



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (lb/ft2)	Phi	Water Surface	Ru
Material 1		110	Mohr-Coulomb	0	28	None	0
Material 19		125	Mohr-Coulomb	0	35	None	0
Material 20		130	Mohr-Coulomb	0	40	None	0

PanGEO INCORPORATED

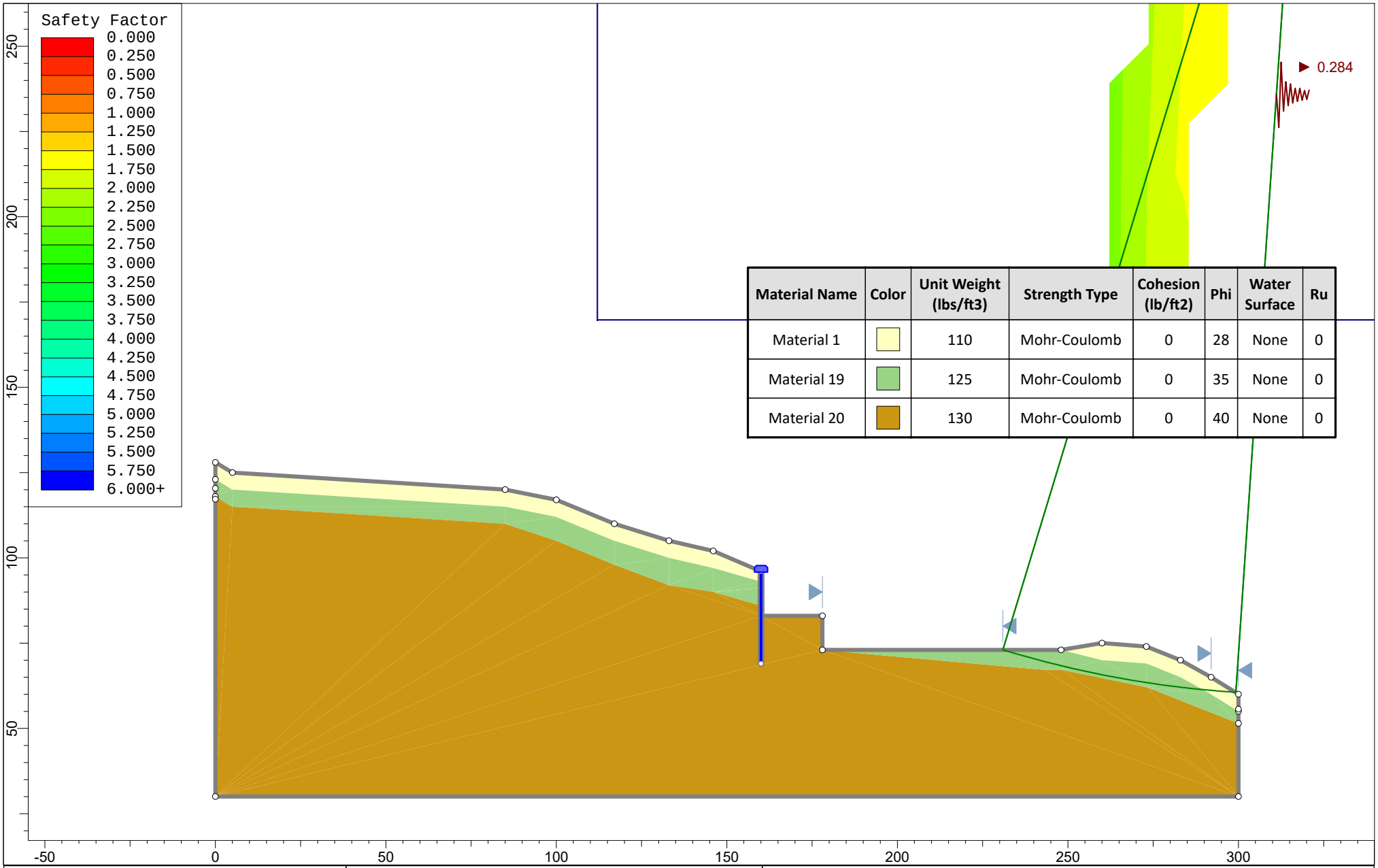
SLIDEINTERPRET 6.008

Proposed Development
4634 E Mercer Way
Mercer Island, Washington

Static Slope Stability Analysis
Lower Slope Condition

PROJECT NO. **14-128**

FIGURE NO. **6**



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (lb/ft2)	Phi	Water Surface	Ru
Material 1		110	Mohr-Coulomb	0	28	None	0
Material 19		125	Mohr-Coulomb	0	35	None	0
Material 20		130	Mohr-Coulomb	0	40	None	0

PanGEO INCORPORATED

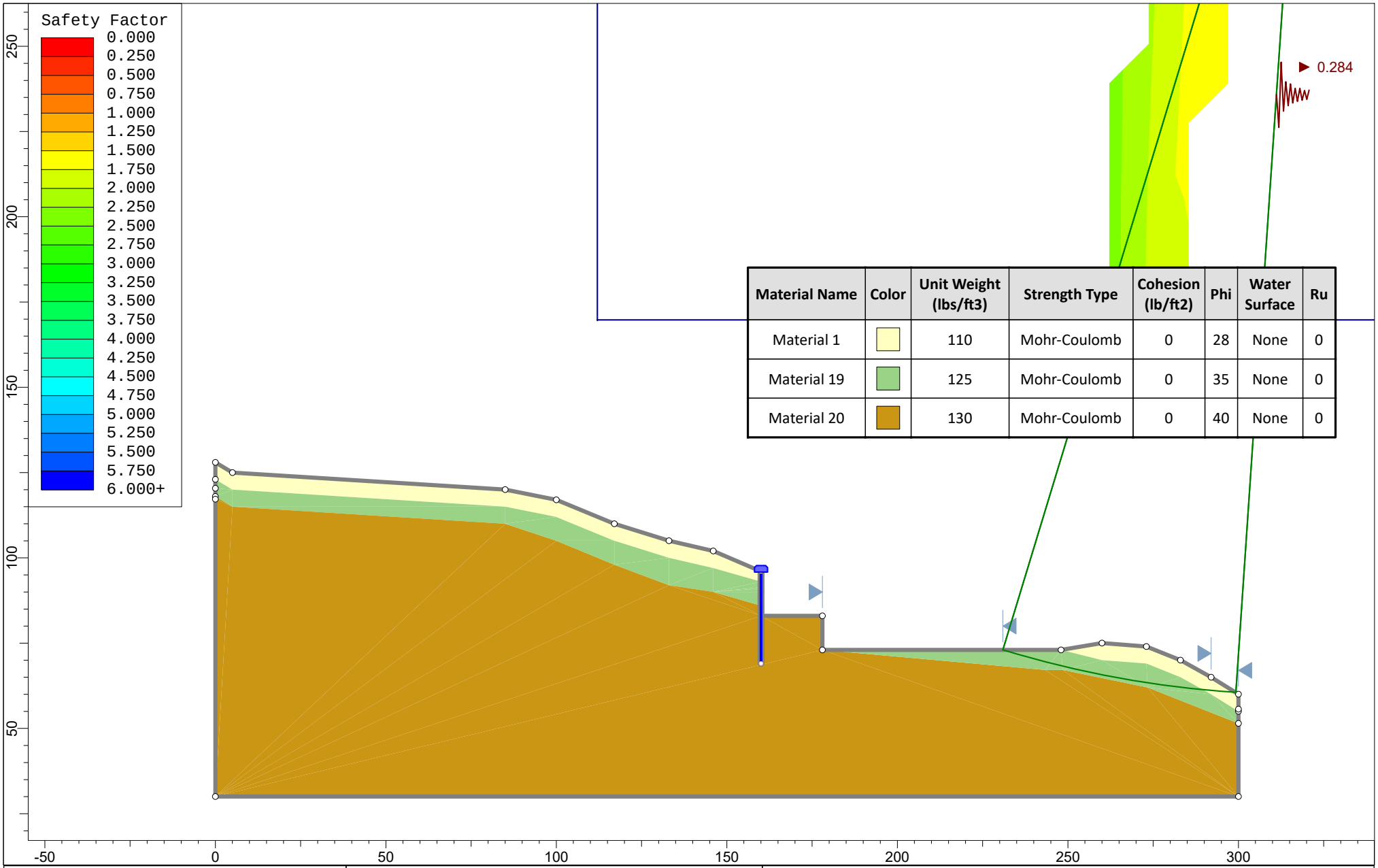
SLIDEINTERPRET 6.008

Proposed Development
4634 E Mercer Way
Mercer Island, Washington

Seismic Slope Stability Analysis
Lower Slope Condition

PROJECT NO. **14-128**

FIGURE NO. **7**



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (lb/ft2)	Phi	Water Surface	Ru
Material 1		110	Mohr-Coulomb	0	28	None	0
Material 19		125	Mohr-Coulomb	0	35	None	0
Material 20		130	Mohr-Coulomb	0	40	None	0

PanGEO INCORPORATED

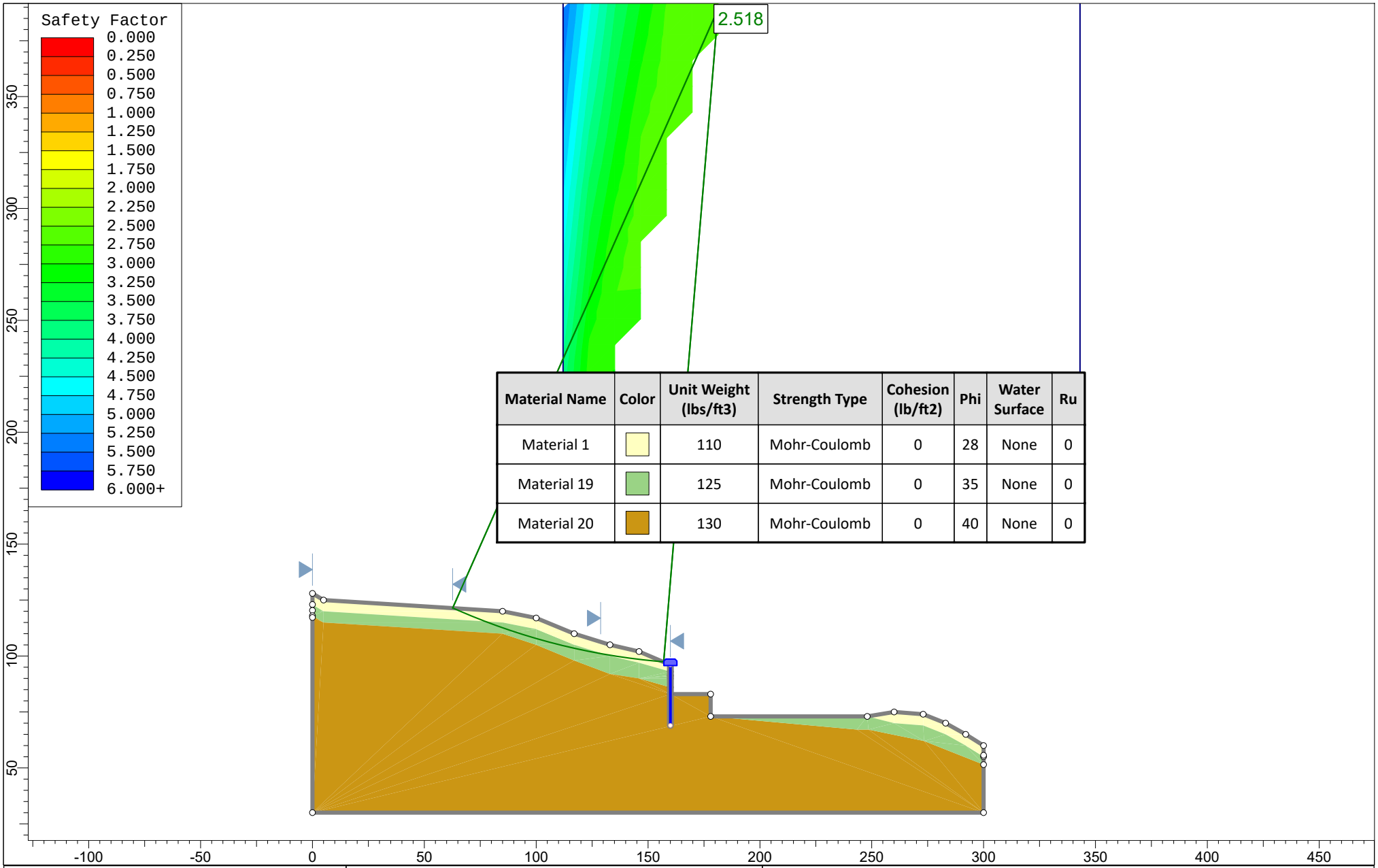
SLIDEINTERPRET 6.008

Proposed Development
4634 E Mercer Way
Mercer Island, Washington

Seismic Slope Stability Analysis
Lower Slope Condition

PROJECT NO. **14-128**

FIGURE NO. **7**



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (lb/ft2)	Phi	Water Surface	Ru
Material 1		110	Mohr-Coulomb	0	28	None	0
Material 19		125	Mohr-Coulomb	0	35	None	0
Material 20		130	Mohr-Coulomb	0	40	None	0

PanGEO INCORPORATED

SLIDEINTERPRET 6.008

Proposed Development
4634 E Mercer Way
Mercer Island, Washington

Static Slope Stability Analysis
Upper Slope Condition

PROJECT NO. **14-128**

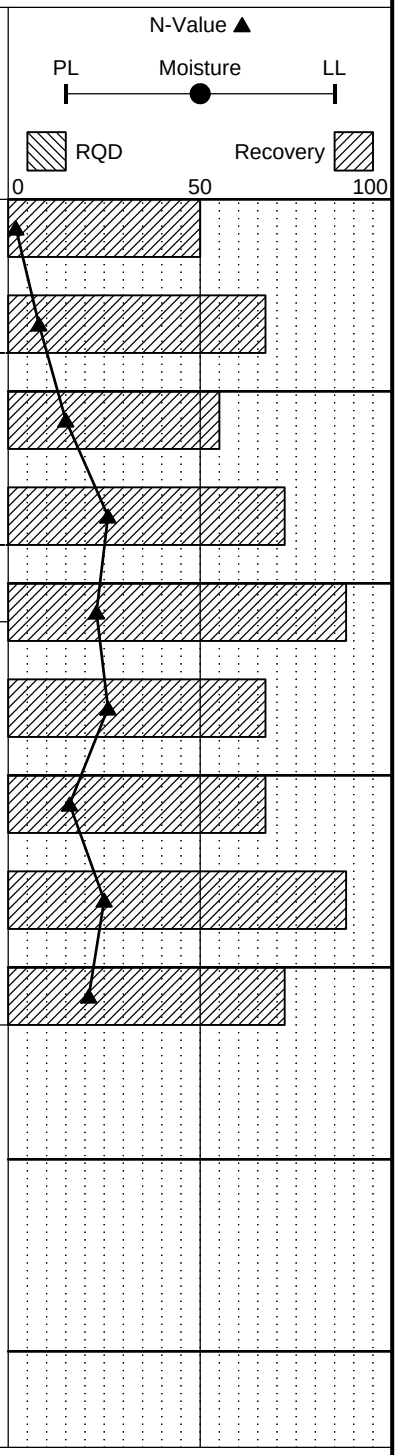
FIGURE NO. **8**

APPENDIX A

SUMMARY TEST BORING LOGS
(PANGEO, 2014)

Project:	Proposed Development	Surface Elevation:	75.0ft
Job Number:	14-128	Top of Casing Elev.:	
Location:	4632 East Mercer Way, Mercer Island, WA	Drilling Method:	HSA
Coordinates:	Northing: , Easting:	Sampling Method:	SPT

Depth, (ft)	Sample No.	Sample Type	Blows / 6 in.	Other Tests	Symbol	MATERIAL DESCRIPTION
0	S-1		1 1 1			Loose, reddish brown, fine to medium SAND with silt: moist, non-plastic fines, some fine gravel, massive, trace organics. (Colluvium).
	S-2		2 3 5			
5	S-3		3 6 9			Medium dense, brown, fine to coarse SAND: moist, trace silt, scattered gravel to with fine gravel, homogeneous, massive, occasional reddish mottles. (Colluvium).
	S-4		9 12 14			Grading to fine bedded with finer/coarser beds, gravelly beds.
10	S-5		5 9 14			Medium dense, brown gray, silty, fine to coarse SAND with gravel: moist, laminated, trace weathering, trace wood fragment, sharp contact with unit below. (Colluvium).
	S-6		12 12 14			Medium dense, brown-gray, slightly silty, fine SAND: moist, trace fine gravel, non-plastic fines, massive to laminated. (Pre-Olympia Deposit?). Laminated with finer/coarser laminae.
15	S-7		6 7 9			Grading to laminated SAND and SILT, non-plastic, dip 30°.
	S-8		9 11 14			Grading to slightly silty fine SAND with fine to medium SAND interbeds, dip 20°.
20	S-9		9 11 10			Interbedded fine to coarse SAND and brown SILT, very moist to wet, folded bedding with dips to 45°.
						Bottom of Boring.
25						
30						



Completion Depth:	21.5ft
Date Borehole Started:	5/16/14
Date Borehole Completed:	5/16/14
Logged By:	S.Evans
Drilling Company:	CN Drilling

Remarks:

PanGEO INCORPORATED

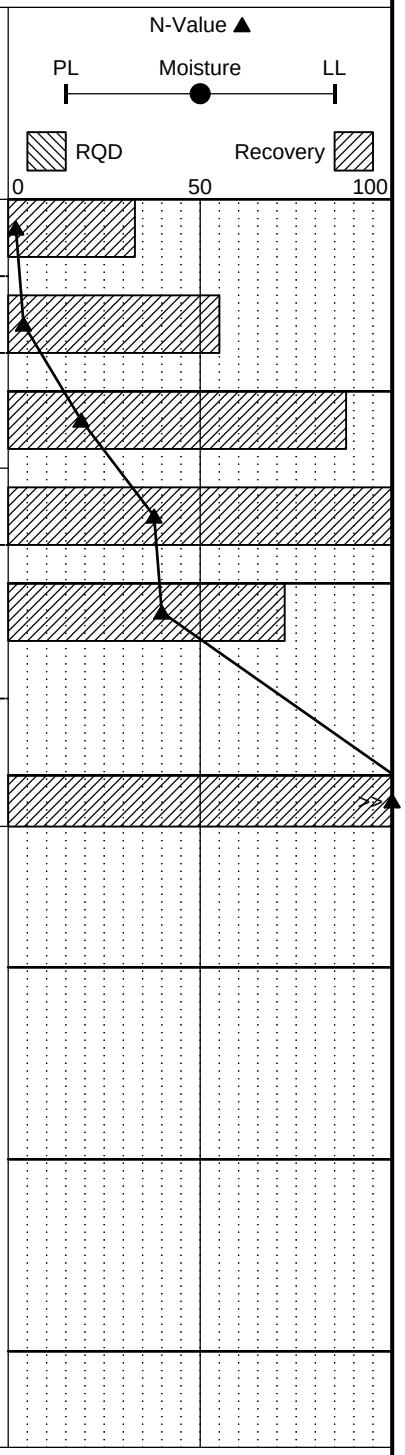
LOG OF TEST BORING BH-1

Figure A-2

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

Project:	Proposed Development	Surface Elevation:	89.0ft
Job Number:	14-128	Top of Casing Elev.:	
Location:	4632 East Mercer Way, Mercer Island, WA	Drilling Method:	HSA
Coordinates:	Northing: , Easting:	Sampling Method:	SPT

Depth, (ft)	Sample No.	Sample Type	Blows / 6 in.	Other Tests	Symbol	MATERIAL DESCRIPTION
0	S-1		1 1 1			Loose, reddish brown, fine to medium SAND with silt: moist, non-plastic fines, homogeneous. (Colluvium).
	S-2		1 1 3			Loose, brown gray, fine to coarse SAND: very moist, trace silt and gravel, laminated with organic lens in middle of sample. (Colluvium).
5	S-3		6 9 10			Medium dense, brown-gray, silty fine SAND: moist, non-plastic, laminated with sandy lenses. (Colluvium).
	S-4		13 18 20			Dense, brown gray, silty, fine SAND: moist, non-plastic, some sub-rounded gravel, trace weathering, massive, till-like. (Pre-Olympia Deposit).
10	S-5		18 17 23			Dense, light gray, sandy SILT/Silty SAND: moist, non-plastic, well laminated with sandy laminae and occasional gravel lens, trace weathering. (Pre-Olympia Deposit).
15	S-6		34 30 20/4			Very dense, brown gray, silty SAND: moist, non-plastic, trace to some gravel, till-like texture with sand lenses, grading to silty sand. (Pre-Olympia Deposit).
						Bottom of Boring.
20						
25						
30						



Completion Depth:	16.3ft
Date Borehole Started:	5/16/14
Date Borehole Completed:	5/16/14
Logged By:	S.Evans
Drilling Company:	CN Drilling

Remarks:

PanGEO INCORPORATED

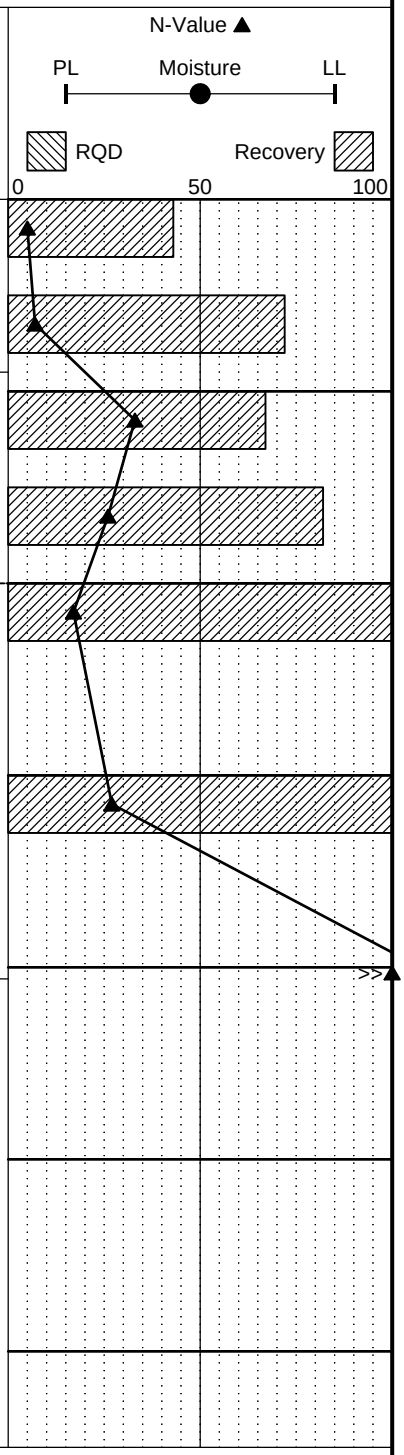
LOG OF TEST BORING BH-2

Figure A-3

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

Project:	Proposed Development	Surface Elevation:	70.0ft
Job Number:	14-128	Top of Casing Elev.:	
Location:	4632 East Mercer Way, Mercer Island, WA	Drilling Method:	HSA
Coordinates:	Northing: , Easting:	Sampling Method:	SPT

Depth, (ft)	Sample No.	Sample Type	Blows / 6 in.	Other Tests	Symbol	MATERIAL DESCRIPTION
0	S-1		1 2 3			Loose, brown, slightly silty SAND: moist, trace to some fine gravel, massive, trace organics near surafce. (Colluvium).
	S-2		1 3 4			-Becomes gray, medium SAND withe some gravel, trace silt, loose, moist.
5	S-3		10 16 17			Dense, gray, medium SAND: moist, trace to some silt, some gravel (Pre-Olympia Deposit?).
	S-4		9 12 14			-Becomes medium to coarse SAND woth trace to some gravel, medium dense.
10	S-5		9 7 10			Medium dense, gray, fine to coarse slight silty SAND: Very moist, trace gravel (Pre-Olympia Deposit).
15	S-6		10 12 15			Driller notes increasing gravel between 16'-17'.
20	S-7		50/3.5			No recovery. Gravel stuck in the sampler tip.
						Bottom of Boring.
25						
30						



Completion Depth:	20.3ft
Date Borehole Started:	6/2/14
Date Borehole Completed:	6/2/14
Logged By:	HMX
Drilling Company:	CN Drilling

Remarks:

PanGEO INCORPORATED

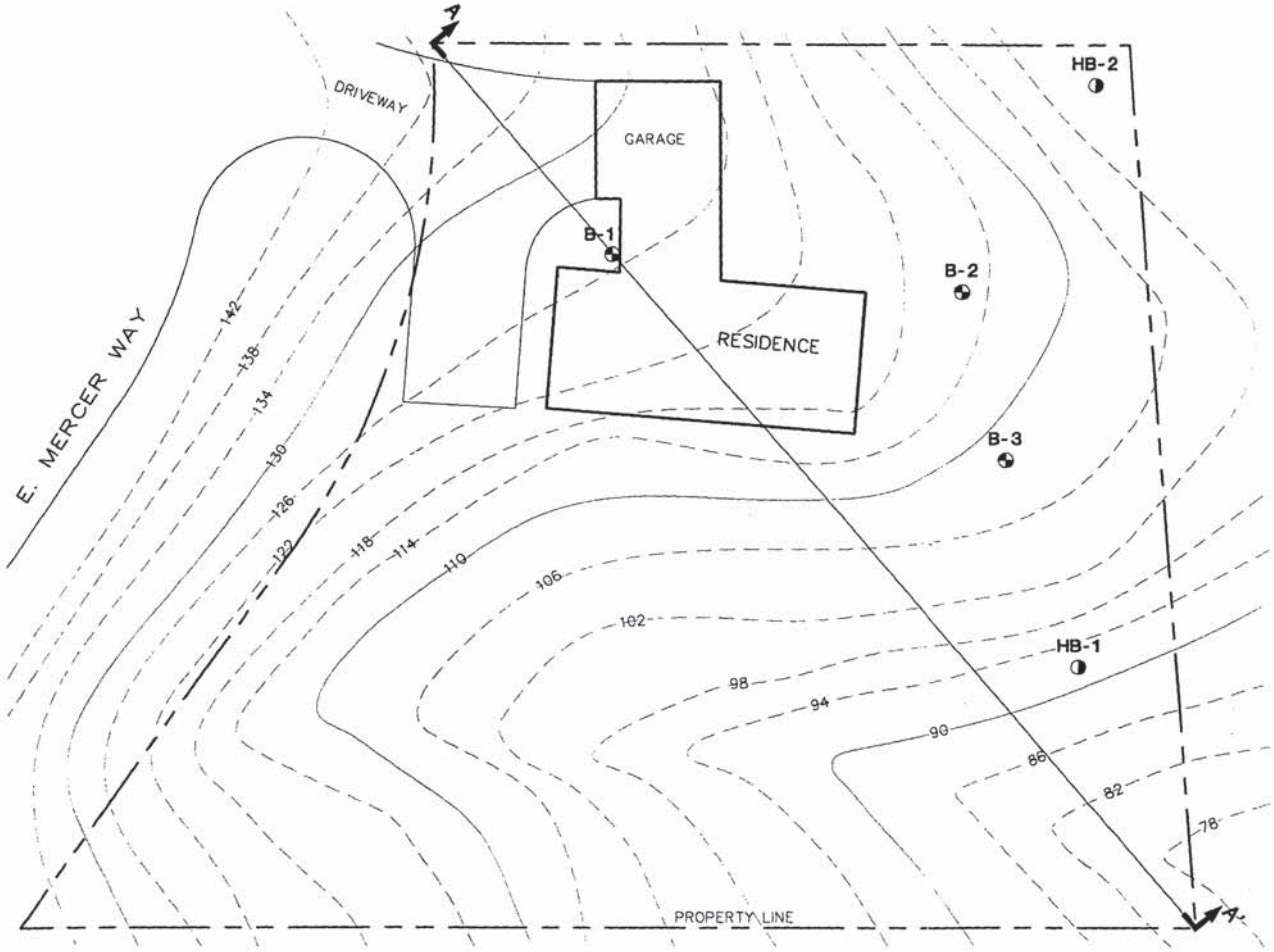
LOG OF TEST BORING BH-3

Figure A-4

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

APPENDIX B

EXISTING BORING LOGS
(AGRA, 1999)



LEGEND

B-3 — BORING NUMBER AND APPROXIMATE LOCATION

HB-2 — HAND BORING NUMBER AND APPROXIMATE LOCATION

A — A' GEOLOGIC CROSS-SECTION LOCATION AND DESIGNATION

N

0 20 40

SCALE IN FEET

AGRA
ENGINEERING GLOBAL SOLUTIONS
11335 N.E. 122nd Way, Suite 100
Kirkland, WA, U.S.A. 98034-6918

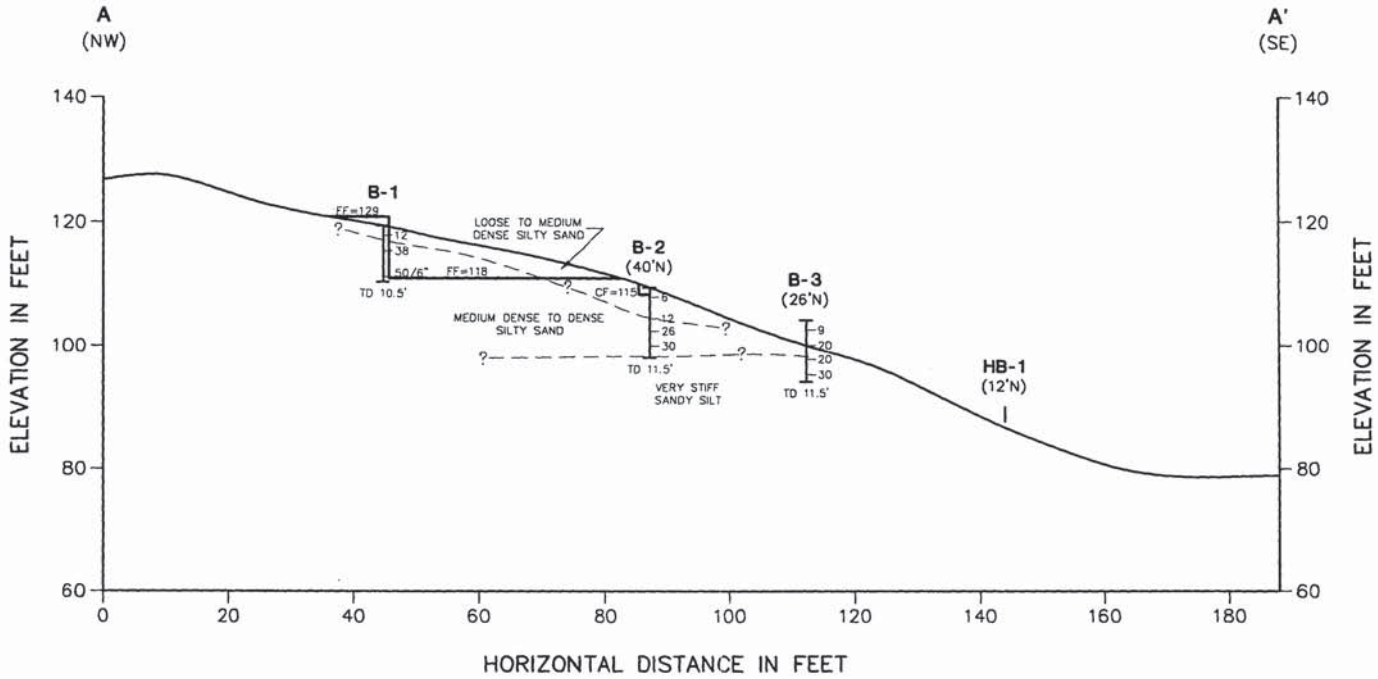
SITE & EXPLORATION PLAN

WEGNER RESIDENCE

MERCER ISLAND, WASHINGTON

FIGURE 2

JOB NO.: 9-91M-12161-0 | DWG DATE: 05-10-99 | SCALE: 1"=20' | DESIGN BY: KSS | FILE NAME: SITE.DWG



LEGEND

B-3	BORING NUMBER AND APPROXIMATE LOCATION
HB-2	HAND BORING NUMBER AND APPROXIMATE LOCATION
(26'RT)	OFFSET FROM SECTION LINE
20	STANDARD PENETRATION RESISTANCE IN BLOWS PER FOOT
TD 11.5'	TOTAL DEPTH OF BORING
FF=129	FINISHED FLOOR ELEVATION
CF=115	COLUMN FOOTING ELEVATION

NOTES:

THE STRATA ARE BASED UPON INTERPOLATION BETWEEN EXPLORATIONS AND MAY NOT REPRESENT ACTUAL SUBSURFACE CONDITIONS.

SIMPLIFIED NAMES ARE SHOWN FOR SOIL DEPOSITS, BASED ON GENERALIZATIONS OF SOIL DESCRIPTIONS. SEE EXPLORATION LOGS AND REPORT TEXT FOR COMPLETE SOIL DESCRIPTIONS.

0 20 40
SCALE IN FEET

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GEOLOGIC CROSS SECTION A–A'

WEGNER RESIDENCE

MERCER ISLAND, WASHINGTON

FIGURE 3

JOB NO.: 9-91M-12161-0 | DWG DATE: 03-10-99 | SCALE: 1"=20' | DESIGN BY: KSS | FILE NAME: SECTION A.DWG

PROJECT: *Wegner Residence*

BORING NO. *B-1*

DEPTH (feet)	SOIL DESCRIPTION Location: *West side of building pad* Approximate ground surface elevation: *126 Feet*	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER	PENETRATION RESISTANCE ▲ Standard ◬ Other Blows per foot 0 10 20 30 40 50	Page 1 of 1 TESTING
0	*Forest Duff*			*N/E*		
	Medium dense, moist, tan, silty fine SAND with trace silt					
			S-1		▲	
5	*Becomes dense; 1" sand lense at 6.2'*					
			S-2		▲	
10	*Becomes very dense*		*S-3*		50/6" ▲	
	Boring terminated at approximately 10.5 feet					
15						
20						
25						
30						

MOISTURE CONTENT

0 20 40 60 80 100

Plastic limit — Natural — Liquid limit

LEGEND

I 2.00-inch O.D. split spoon sample

N/E No groundwater encountered

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JOB NO.: 8-91M-12161-0 | DWG DATE: 05-10-99 | FILE NAME: B-01.DS4

Drilling method: *HSA* Hammer type: *Cathead* Date drilled: *March 19, 1998* Logged by: *KSS*

PROJECT: *Wegner Residence*

BORING NO. *B-2*

DEPTH (feet)	SOIL DESCRIPTION Location: *N.E. corner of building pad* Approximate ground surface elevation: *115 Feet*	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER	PENETRATION RESISTANCE (▲ Standard, △ Other; Blows per foot)	Page 1 of 1 TESTING
0	*Forest Duff*			*N/E*		
	Loose, moist, tan, silty SAND with some gravel					
			S-1			
5	*Becomes medium dense*					
			S-2			
			S-3			
10			*S-4*			
	Boring terminated at approximately 11.5 feet					
15						
20						
25						
30						

Penetration resistance scale: 0, 10, 20, 30, 40, 50

MOISTURE CONTENT: 0, 20, 40, 60, 80, 100

Plastic limit — Natural — Liquid limit

LEGEND

I 2.00-inch O.D. split spoon sample

N/E No groundwater encountered

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JOB NO.: 8-91M-12161-0 | DWG DATE: 05-10-99 | FILE NAME: B-02.DS4

Drilling method: *HSA* Hammer type: *Cathead* Date drilled: *March 19, 1998* Logged by: *KSS*

PROJECT: *Wegner Residence*

BORING NO. *B-3*

DEPTH (feet)	SOIL DESCRIPTION Location: *S.E. corner of building pad* Approximate ground surface elevation: *110 Feet*	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER	PENETRATION RESISTANCE ▲ Standard △ Other Blows per foot (0, 10, 20, 30, 40, 50)	Page 1 of 1 TESTING
0	*Topsoil*			*N/E*		
	Loose, wet, tan, silty SAND with some gravel					
			S-1		▲	
5	*Very stiff, damp, tan, fine sandy SILT*					
			S-2		▲	
			S-3		▲	
10			*S-4*		▲	
	Boring terminated at approximately 11.5 feet					
15						
20						
25						
30						

MOISTURE CONTENT (0, 20, 40, 60, 80, 100)

Plastic limit — Natural — Liquid limit

LEGEND

I 2.00-inch O.D. split spoon sample

N/E No groundwater encountered

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JOB NO.: 8-91M-12161-0 | DWG DATE: 05-10-99 | FILE NAME: B-03.DS4

Drilling method: *HSA* Hammer type: *Cathead* Date drilled: *March 19, 1998* Logged by: *KSS*

TEST HOLE LOGS

8-91M-12161-0

Depth (feet)	Material Description	Sample No.
	Test Hole TH-1	
	Location: Southeast corner of lot	
	Approximate ground surface elevation: 92 feet	
0.0 - 1.0	Forest Duff	
1.0 - 3.0	Medium dense, moist, tan silty fine SAND, some roots	S-1
3.0 - 7.0	Medium dense, moist, tan silty fine SAND, some gravel.	S-2
	Becomes wet at 6 feet.	S-3
	Test hole terminated at approximately 7.0 feet	
	No caving observed	
	No seepage observed	
	Test Hole TH-2	
	Location: Northeast corner of lot	
	Approximate ground surface elevation: 98 feet	
0.0 - 0.5	Forest Duff	
0.5 - 4.0	Loose, moist, tan silty SAND, some gravel, roots	
4.0 - 6.5	Medium dense, moist, tan silty SAND, some gravel	S-1
	Test hole terminated at approximately 6.5 feet	
	No caving observed	
	No seepage observed	

Date excavated: March 19, 1998

Logged by: KSS