

December 11, 2025

JN 25340

Wishwas Mohan
2441 – 66th Avenue S.E.
Mercer Island, Washington 98040
via email: gmwishwas@gmail.com

Subject: **Addendum to Updated Geotechnical Engineering Study**
Proposed Property Redevelopment
8203 Avalon Drive
Mercer Island, Washington

Reference: *Updated Geotechnical Engineering Study, same project*; Geotech Consultants, Inc.;
November 18, 2025.

Dear Mr. Mohan:

This *Addendum* to our previous *Updated Geotechnical Engineering Study* is intended to present additional geotechnical information related to potential differential movement (tilting) of the house foundation that could occur in the event of lateral spreading. We have also completed a slope stability analysis of the western steep slope.

In our previous *Updated Geotechnical Engineering Study*, we provided estimates for lateral ground movement (lateral spreading) that could occur under the site and the surrounding neighborhood in the event of soil liquefaction during the 1-in-2,475-year Maximum Considered Earthquake (MCE). In the event that lateral spreading occurs, the series of rigid grade beams, structural floor slab, and basement walls for the new house should result in the structure moving downhill with the surrounding ground. As a result of this, even though the grade beams would pull away from the piles, the potential for extreme tilting of the house foundation is low. As we have discussed with both your project team and the City of Mercer Island, there are no theoretical methods available to calculate how much tilting of the house could occur in this very unlikely event. However, from a practical standpoint, assuming that the house could tilt up to at least 10-percent seems reasonable. Based on an east-west dimension of approximately 33 feet for the house, this would result in a differential drop of about 3.3 feet across the foundation system in the downgradient direction. This deflection should occur relatively uniformly across the structure, due to the rigidity of the grade beam/structural slab/basement wall system. The magnitude of tilting the north-south direction, which is in the cross-slope direction, should be less.

We conducted a stability analysis of the steep slope located on the western portion of the property. Based on the results of the 1997 boring completed by Hart Crowser, and our observation of the surface conditions on the slope, it appears that all, or the majority, of the steep slope is comprised of silt colluvium. This is different than the sandier composition of the colluvium encountered by Nelson Geotechnical in their boring conducted below the steep slope. With the available information, we have developed an approximate geologic profile, which is contained in the attached results of our slope stability analyses. We have already assumed that the sandy colluvium could liquefy and flow laterally in the event of the MCE. Our slope stability analyses show that the steep slope could fail in the event of the MCE. Intuitively, this makes sense, as the silt colluvium has a low remolded strength.

As discussed in our previous report, the most likely failure mode for soil movement on the steep slope is a flow slide affecting the near-surface few feet of looser, heavily-weathered soil. In the less likely event of a large, deeper-seated landslide during an earthquake, the steep slope could translate toward the new development area.

We utilized SLAMMER, a program developed by the U.S. Geologic Survey, to assess the potential deflection of the slope during the MCE. This program performs a rigid-block sliding analysis to estimate how far the critical failure mass (static safety factor = 1.5) will deflect. We ran the analyses using several of the different methodologies incorporated into the program, and found that the maximum deflection calculated is approximately 4.4 inches. The results of the SLAMMER analysis are attached.

Based on the results of the SLAMMER analysis, the lateral deflection of the slope during a strong earthquake is unlikely to be large enough to pose a hazard to your new residence, which is at least 40 feet from the toe of the critical failure mass.

Please contact us if you have any questions regarding this letter, or if we can be of further assistance.

Respectfully submitted,

GEOTECH CONSULTANTS, INC.



12/11/2025

Marc R. McGinnis, P.E.
Principal

Attachments:

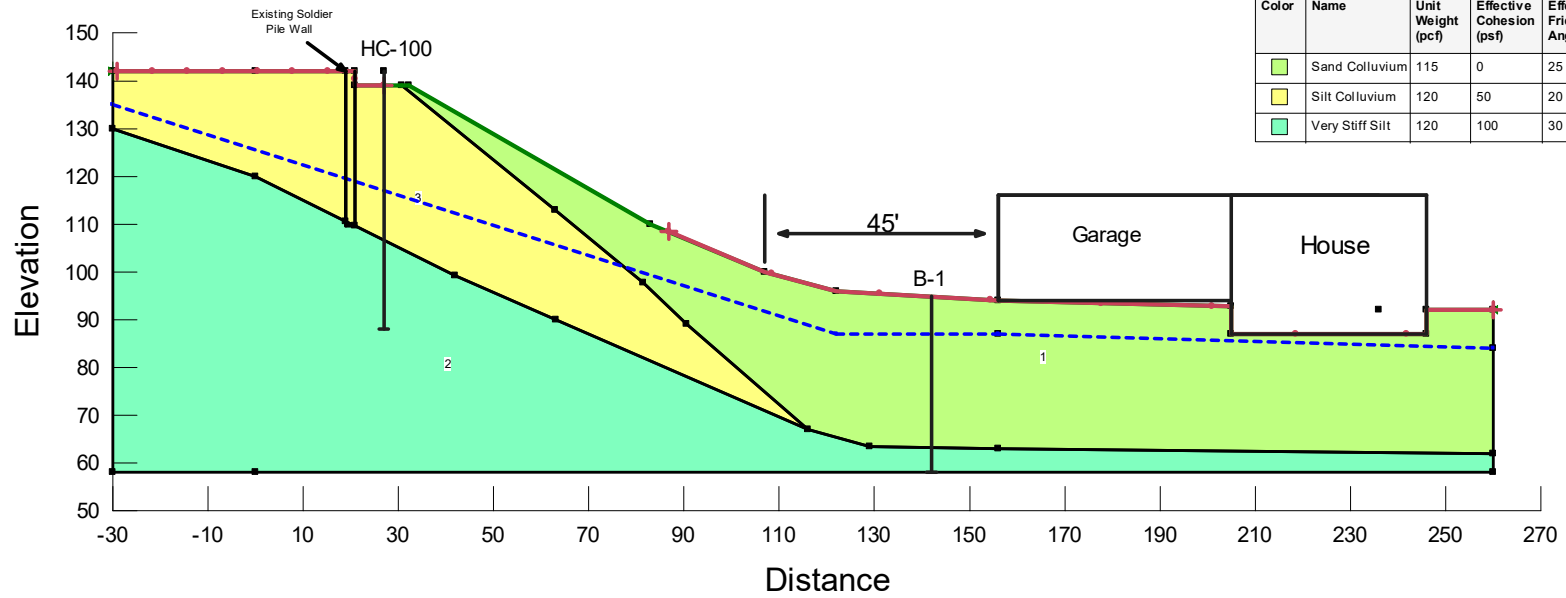
- Slope Stability Analyses
- SLAMMER Results

cc: **Atera Homes** – Paul Monsef
via email: paul@aterahomes.com

MRM:kg

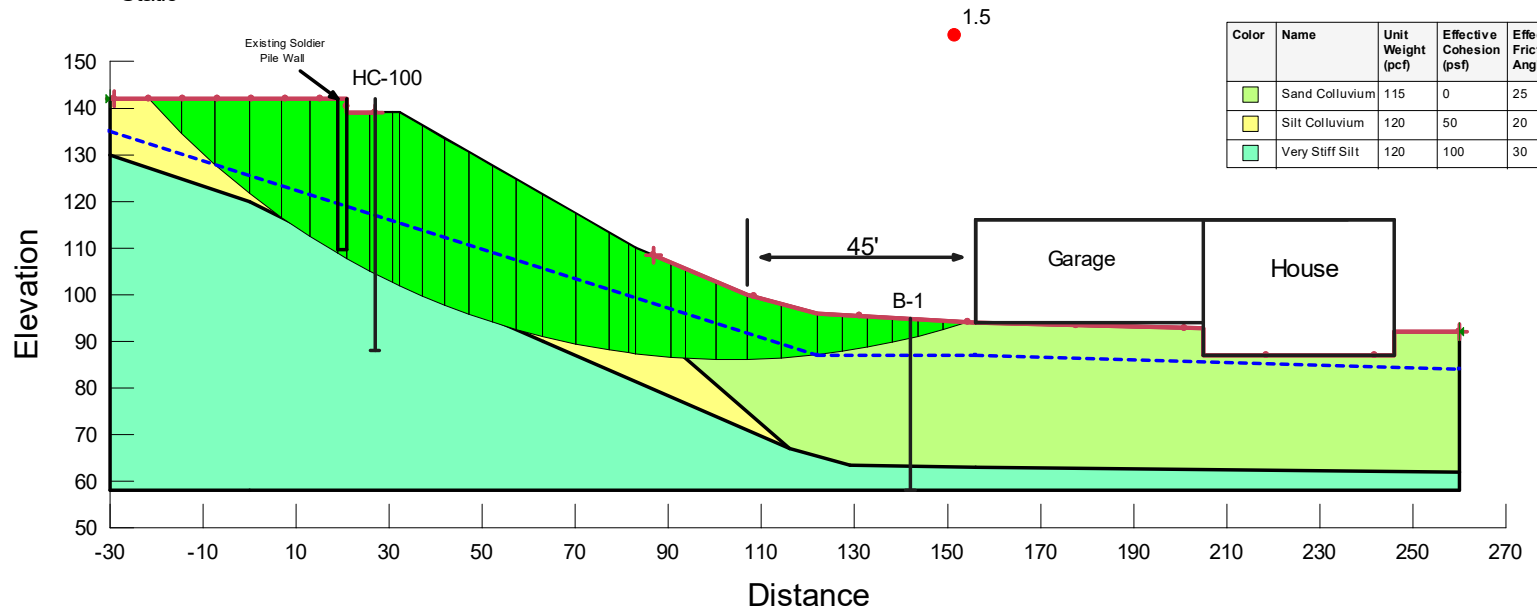
Appendix A
Slope Stability Analysis
JN 25340
Mohan

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Static



Color	Name	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)	Piezometric Surface
Light Green	Sand Colluvium	115	0	25	1
Yellow	Silt Colluvium	120	50	20	1
Green	Very Stiff Silt	120	100	30	

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Static



Color	Name	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)	Piezometric Surface
Light Green	Sand Colluvium	115	0	25	1
Yellow	Silt Colluvium	120	50	20	1
Light Blue	Very Stiff Silt	120	100	30	

Static AA'

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File Information

File Version: 11.08
Product Version: 25.1.0.1058
Title: 25340 Mohan
Created By: Matt McGinnis
Last Edited By: Matt McGinnis
Revision Number: 15
Date: 12/10/2025
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File Name: 25340 Slope Stability.gsz
Directory: C:\Users\mcgin\Geotech Consultants\Shared Documents - Documents\2025 Jobs\25340 Mohan (Atera Homes) (MRM)\25340 Slope Stability\
Last Solved Date: 12/10/2025
Last Solved Time: 03:32:12 PM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

Static AA'

Kind: SLOPE/W

Analysis Type: Limit Equilibrium

Settings

Method: Morgenstern-Price

Side Function Settings

Side Function: Half-Sine

PWP Conditions from: Piezometric Surfaces

Apply Phreatic Correction: Yes

Staged Rapid Drawdown Analysis: No

Unit Weight of Water: 62.430189 pcf

Slip Surface

Slip Surface Settings

Search Method: Entry and Exit

Specify Radius Tangent Lines: No

Direction of Movement: Left to Right

Use Passive Mode: No

No. of Critical Slip Surfaces to Store: 1

Geometry Settings

Minimum Slip Surface Depth: 0.1 ft

Minimum Slip Surface Volume: 35.314667 ft³

Number of Columns: 30

Tension Crack Option: (none)

Optimization

Optimize Critical Slip Surface: No

Convergence

Factor of Safety Convergence Settings

Maximum Number of Iterations: 100

Tolerable Difference in F of S: 0.001

Under-Relaxation Criteria

Initial Rate: 1

Minimum Rate: 0.1

Rate Reduction Factor: 0.65

Reduction Frequency (iterations): 50

Solution Settings

Search Method: Root Finder

Tolerable difference between starting and converged F of S: 3

Maximum iterations to calculate converged lambda: 20

Maximum Absolute Lambda: 2

Materials

Silt Colluvium

Slope Stability Material Model: Mohr-Coulomb

Unit Weight: 120 pcf

Effective Cohesion: 50 psf

Effective Friction Angle: 20 °

Phi-B: 0 °

Pore Water Pressure

Piezometric Surface: 1

Sand Colluvium

Slope Stability Material Model: Mohr-Coulomb

Unit Weight: 115 pcf

Effective Cohesion: 0 psf

Effective Friction Angle: 25 °

Phi-B: 0 °

Pore Water Pressure

Piezometric Surface: 1

Very Stiff Silt

Slope Stability Material Model: Mohr-Coulomb

Unit Weight: 120 pcf

Effective Cohesion: 100 psf

Effective Friction Angle: 30 °

Phi-B: 0 °

Slip Surface Entry and Exit

Left Type: Range

Left-Zone Left Coordinate: (-29, 142) ft

Left-Zone Right Coordinate: (27, 139) ft

Left-Zone Increment: 8

Right Type: Range

Right-Zone Left Coordinate: (86.85488, 108.3938) ft

Right-Zone Right Coordinate: (260, 92) ft

Right-Zone Increment: 8

Radius Increments: 8

Slip Surface Limits

Left Coordinate: (-30, 142) ft

Right Coordinate: (260, 92) ft

Piezometric Surfaces

Piezometric Surface 1

Coordinates

	X	Y
Coordinate 1	-30 ft	135 ft
Coordinate 2	122 ft	87 ft
Coordinate 3	156 ft	87 ft
Coordinate 4	260 ft	84 ft

Geometry

Name: AA'

Settings

View: 2D

Element Thickness: 1 ft

Points

	X	Y
Point 1	0 ft	142 ft
Point 2	27 ft	142 ft
Point 3	83 ft	110 ft
Point 4	107 ft	100 ft
Point 5	122 ft	96 ft
Point 6	156 ft	94 ft
Point 7	236 ft	92 ft
Point 8	156 ft	87 ft
Point 9	156 ft	63 ft
Point 10	260 ft	92 ft
Point 11	260 ft	58 ft
Point 12	0 ft	58 ft
Point 13	260 ft	84 ft
Point 14	260 ft	62 ft
Point 15	63 ft	113 ft
Point 16	116 ft	67 ft
Point 17	81.40153 ft	97.66387 ft
Point 18	90.52547 ft	89.09854 ft
Point 19	129 ft	63.5 ft
Point 20	0 ft	120 ft

Point 21	42 ft	99.27869 ft
Point 22	63.11378 ft	89.97712 ft
Point 23	205 ft	92.775 ft
Point 24	205 ft	87 ft
Point 25	246 ft	87 ft
Point 26	246 ft	92 ft
Point 27	-30 ft	142 ft
Point 28	-30 ft	58 ft
Point 29	-30 ft	130 ft
Point 30	21 ft	142 ft
Point 31	21 ft	109.63934 ft
Point 32	19 ft	142 ft
Point 33	19 ft	110.62607 ft
Point 34	21 ft	139 ft
Point 35	32.25 ft	139 ft
Point 36	30.72414 ft	139 ft

Regions

	Material	Points	Area
Region 1	Sand Colluvium	10,26,25,24,23,6,5,4,3,35,36,15,17,18,16,19,9,14,13	5,280.2 ft ²
Region 2	Very Stiff Silt	33,20,29,28,12,11,14,9,19,16,22,21,31	6,739.8 ft ²
Region 3	Silt Colluvium	30,32,1,27,29,20,33,31,21,22,16,18,17,15,36,34	2,935.2 ft ²

Slip Results

Slip Surfaces Analysed: 580 of 729 converged

Current Slip Surface

Slip Surface: 112

Factor of Safety: 1.5

Volume: 3,562.9301 ft³

Weight: 422,044.89 lbf

Resisting Moment: 31,864,296 lbf-ft

Activating Moment: 21,724,059 lbf-ft

Resisting Force: 174,740.3 lbf

Activating Force: 119,151.6 lbf

Slip Rank: 245 of 729 slip surfaces

Exit: (154.41983, 94.092951) ft

Entry: (-21.625, 142) ft

Radius: 167.52753 ft

Center: (103.29329, 253.62837) ft

Slip Columns

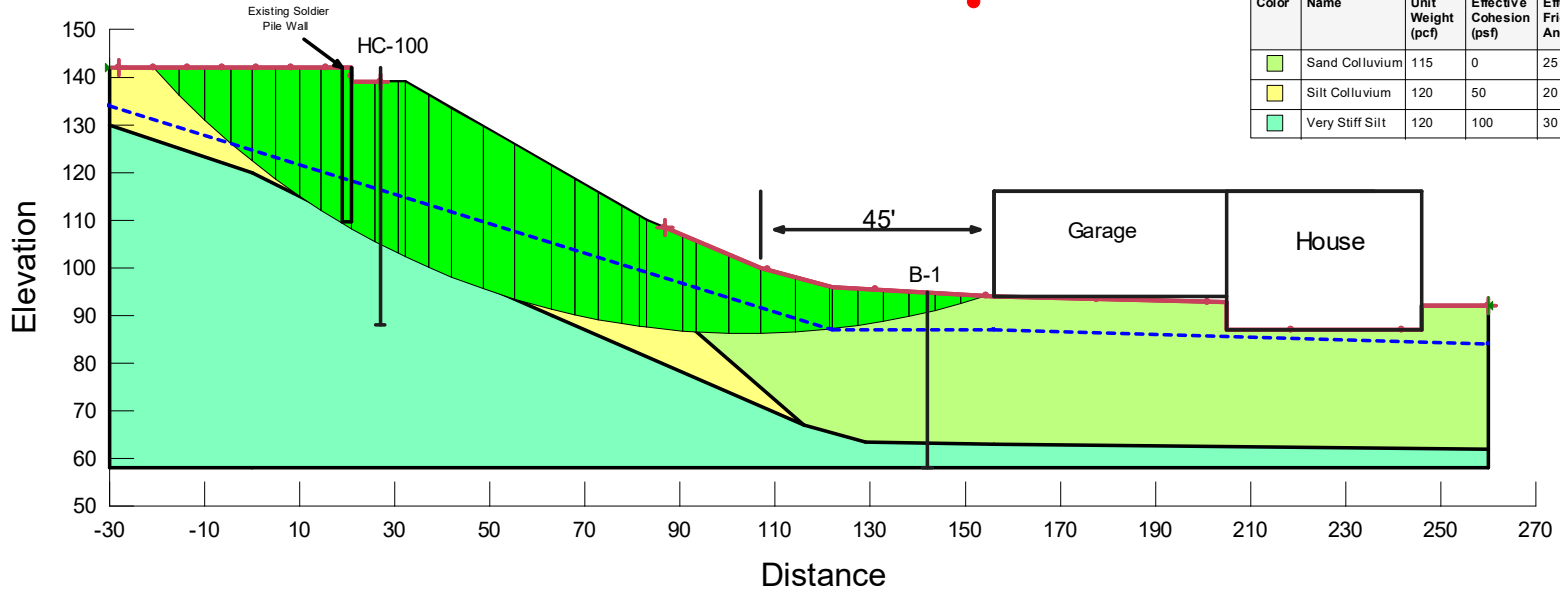
	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Column Base Material
Column 1	-18.06096 ft	138.25132 ft	-398.60628 psf	320.07636 psf	116.49827 psf	50 psf	0 psf	Silt Colluvium
Column 2	-10.93289 ft	131.17799 ft	-124.84519 psf	973.06186 psf	354.16555 psf	50 psf	0 psf	Silt Colluvium

Column 3	-3.68443 ft	124.79396 ft	107.62618 psf	1,571.6474 psf	532.86014 psf	50 psf	0 psf	Silt Colluvium
Column 4	3.48587 ft	119.14749 ft	299.6282 psf	2,113.3856 psf	660.1537 psf	50 psf	0 psf	Silt Colluvium
Column 5	9.97881 ft	114.54290 ft	0 psf	2,381.8985 psf	1,375.1897 psf	100 psf	0 psf	Very Stiff Silt
Column 6	15.99294 ft	110.68886 ft	0 psf	2,791.4669 psf	1,611.6542 psf	100 psf	0 psf	Very Stiff Silt
Column 7	20.00000 ft	108.27923 ft	0 psf	3,063.8667 psf	1,768.9243 psf	100 psf	0 psf	Very Stiff Silt
Column 8	23.43104 ft	106.38760 ft	0 psf	3,003.7007 psf	1,734.1874 psf	100 psf	0 psf	Very Stiff Silt
Column 9	28.29310 ft	103.85169 ft	0 psf	3,321.1968 psf	1,917.4939 psf	100 psf	0 psf	Very Stiff Silt
Column 10	31.48707 ft	102.27241 ft	0 psf	3,528.2846 psf	2,037.0561 psf	100 psf	0 psf	Very Stiff Silt
Column 11	34.68750 ft	100.81614 ft	0 psf	3,588.7455 psf	2,071.9632 psf	100 psf	0 psf	Very Stiff Silt
Column 12	39.56250 ft	98.71900 ft	0 psf	3,609.1678 psf	2,083.754 psf	100 psf	0 psf	Very Stiff Silt
Column 13	44.55032 ft	96.76117 ft	0 psf	3,613.748 psf	2,086.3984 psf	100 psf	0 psf	Very Stiff Silt
Column 14	49.65096 ft	94.94401 ft	0 psf	3,599.5084 psf	2,078.1771 psf	100 psf	0 psf	Very Stiff Silt
Column 15	54.75160 ft	93.30970 ft	0 psf	3,563.2011 psf	2,057.2151 psf	100 psf	0 psf	Very Stiff Silt
Column 16	60.15096 ft	91.77808 ft	837.52465 psf	3,427.1068 psf	942.53081 psf	50 psf	0 psf	Silt Colluvium
Column 17	66.55875 ft	90.21863 ft	811.17964 psf	3,276.6008 psf	897.33992 psf	50 psf	0 psf	Silt Colluvium
Column 18	73.67626 ft	88.77926 ft	765.29583 psf	3,066.1311 psf	837.43554 psf	50 psf	0 psf	Silt Colluvium
Column 19	79.31827 ft	87.83862 ft	717.54997 psf	2,864.93 psf	781.58239 psf	50 psf	0 psf	Silt Colluvium
Column 20	82.20076 ft	87.43592 ft	688.73612 psf	2,747.6295 psf	749.3759 psf	50 psf	0 psf	Silt Colluvium
Column 21	86.76273 ft	86.96129 ft	633.89802 psf	2,600.8977 psf	715.92934 psf	50 psf	0 psf	Silt Colluvium
Column 22	92.09358 ft	86.48302 ft	565.4827 psf	2,427.7472 psf	677.80886 psf	50 psf	0 psf	Silt Colluvium
Column 23	96.99627 ft	86.25249 ft	490.67869 psf	2,271.7308 psf	830.51825 psf	0 psf	0 psf	Sand Colluvium
Column 24	103.66542 ft	86.13445 ft	377.82168 psf	1,988.6573 psf	751.14497 psf	0 psf	0 psf	Sand Colluvium
Column 25	110.66305 ft	86.30319 ft	242.79529 psf	1,702.0199 psf	680.4476 psf	0 psf	0 psf	Sand Colluvium
Column 26	118.16305 ft	86.80654 ft	79.767918 psf	1,401.1873 psf	616.18799 psf	0 psf	0 psf	Sand Colluvium
Column 27	124.70165 ft	87.49669 ft	-31.00853 psf	1,157.3612 psf	539.68638 psf	0 psf	0 psf	Sand Colluvium
Column 28	130.10496 ft	88.28292 ft	-80.093196 psf	999.40095 psf	466.02832 psf	0 psf	0 psf	Sand Colluvium

Column 29	135.50826 ft	89.25048 ft	-140.49819 psf	814.31334 psf	379.72055 psf	0 psf	0 psf	Sand Colluvium
Column 30	140.91157 ft	90.40260 ft	-212.42506 psf	605.03869 psf	282.13417 psf	0 psf	0 psf	Sand Colluvium
Column 31	146.31487 ft	91.74322 ft	-296.12009 psf	374.85119 psf	174.79598 psf	0 psf	0 psf	Sand Colluvium
Column 32	151.71818 ft	93.27707 ft	-391.87881 psf	127.08296 psf	59.259757 psf	0 psf	0 psf	Sand Colluvium

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 Seismic, kh=0.34g

0.7



Seismic AA' (2)

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File Information

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Title: 25340 Mohan

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Last Edited By: Matt McGinnis

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Directory: C:\Users\mcgin\Geotech Consultants\Shared Documents - Documents\2025 Jobs\25340 Mohan (Atera Homes) (MRM)\25340 Slope Stability\

Last Solved Date: 12/10/2025

Last Solved Time: 03:32:12 PM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

Seismic AA' (2)

Kind: SLOPE/W

Analysis Type: Limit Equilibrium

Settings

Method: Morgenstern-Price

Side Function Settings

Side Function: Half-Sine

PWP Conditions from: Piezometric Surfaces

Apply Phreatic Correction: Yes

Staged Rapid Drawdown Analysis: No

Unit Weight of Water: 62.430189 pcf

Slip Surface

Slip Surface Settings

Search Method: Entry and Exit

Specify Radius Tangent Lines: No

Direction of Movement: Left to Right

Use Passive Mode: No

No. of Critical Slip Surfaces to Store: 1

Geometry Settings

Minimum Slip Surface Depth: 0.1 ft

Minimum Slip Surface Volume: 35.314667 ft³

Number of Columns: 30

Tension Crack Option: (none)

Optimization

Optimize Critical Slip Surface: No

Convergence

Factor of Safety Convergence Settings

Maximum Number of Iterations: 100

Tolerable Difference in F of S: 0.001

Under-Relaxation Criteria

Initial Rate: 1

Minimum Rate: 0.1

Rate Reduction Factor: 0.65

Reduction Frequency (iterations): 50

Solution Settings

Search Method: Root Finder

Tolerable difference between starting and converged F of S: 3

Maximum iterations to calculate converged lambda: 20

Maximum Absolute Lambda: 2

Materials

Silt Colluvium

Slope Stability Material Model: Mohr-Coulomb

Unit Weight: 120 pcf

Effective Cohesion: 50 psf

Effective Friction Angle: 20 °

Phi-B: 0 °

Pore Water Pressure

Piezometric Surface: 1

Sand Colluvium

Slope Stability Material Model: Mohr-Coulomb

Unit Weight: 115 pcf

Effective Cohesion: 0 psf

Effective Friction Angle: 25 °

Phi-B: 0 °

Pore Water Pressure

Piezometric Surface: 1

Very Stiff Silt

Slope Stability Material Model: Mohr-Coulomb

Unit Weight: 120 pcf

Effective Cohesion: 100 psf

Effective Friction Angle: 30 °

Phi-B: 0 °

Slip Surface Entry and Exit

Left Type: Range

Left-Zone Left Coordinate: (-28, 142) ft

Left-Zone Right Coordinate: (27, 139) ft

Left-Zone Increment: 8

Right Type: Range

Right-Zone Left Coordinate: (86.85488, 108.3938) ft

Right-Zone Right Coordinate: (260, 92) ft

Right-Zone Increment: 8

Radius Increments: 8

Slip Surface Limits

Left Coordinate: (-30, 142) ft

Right Coordinate: (260, 92) ft

Piezometric Surfaces

Piezometric Surface 1

Coordinates

	X	Y
Coordinate 1	-30 ft	134 ft
Coordinate 2	122 ft	87 ft
Coordinate 3	156 ft	87 ft
Coordinate 4	260 ft	84 ft

Seismic Coefficients

Horz Seismic Coef.: 0.34

Geometry

Name: AA'

Settings

View: 2D

Element Thickness: 1 ft

Points

	X	Y
Point 1	0 ft	142 ft
Point 2	27 ft	142 ft
Point 3	83 ft	110 ft
Point 4	107 ft	100 ft
Point 5	122 ft	96 ft
Point 6	156 ft	94 ft
Point 7	236 ft	92 ft
Point 8	156 ft	87 ft
Point 9	156 ft	63 ft
Point 10	260 ft	92 ft
Point 11	260 ft	58 ft
Point 12	0 ft	58 ft
Point 13	260 ft	84 ft
Point 14	260 ft	62 ft
Point 15	63 ft	113 ft
Point 16	116 ft	67 ft

Point 17	81.40153 ft	97.66387 ft
Point 18	90.52547 ft	89.09854 ft
Point 19	129 ft	63.5 ft
Point 20	0 ft	120 ft
Point 21	42 ft	99.27869 ft
Point 22	63.11378 ft	89.97712 ft
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Point 25	246 ft	87 ft
Point 26	246 ft	92 ft
Point 27	-30 ft	142 ft
Point 28	-30 ft	58 ft
Point 29	-30 ft	130 ft
Point 30	21 ft	142 ft
Point 31	21 ft	109.63934 ft
Point 32	19 ft	142 ft
Point 33	19 ft	110.62607 ft
Point 34	21 ft	139 ft
Point 35	32.25 ft	139 ft
Point 36	30.72414 ft	139 ft

Regions

	Material	Points	Area
Region 1	Sand Colluvium	10,26,25,24,23,6,5,4,3,35,36,15,17,18,16,19,9,14,13	5,280.2 ft ²
Region 2	Very Stiff Silt	33,20,29,28,12,11,14,9,19,16,22,21,31	6,739.8 ft ²
Region 3	Silt Colluvium	30,32,1,27,29,20,33,31,21,22,16,18,17,15,36,34	2,935.2 ft ²

Slip Results

Slip Surfaces Analysed: 566 of 729 converged

Current Slip Surface

Slip Surface: 112

Factor of Safety: 0.7

Volume: 3,507.5761 ft³

Weight: 415,424.99 lbf

Resisting Moment: 28,028,080 lbf·ft

Activating Moment: 41,296,040 lbf·ft

Resisting Force: 156,235.49 lbf

Activating Force: 230,184.14 lbf

Slip Rank: 250 of 729 slip surfaces

Exit: (154.41983, 94.092951) ft

Entry: (-20.75, 142) ft

Radius: 166.93597 ft

Center: (103.78851, 253.16554) ft

Slip Columns

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Column Base Material

Column 1	-18.04095 ft	139.10640 ft	-501.68507 psf	164.6105 psf	59.913322 psf	50 psf	0 psf	Silt Colluvium
Column 2	-12.62286 ft	133.57575 ft	-282.00123 psf	560.70757 psf	204.08087 psf	50 psf	0 psf	Silt Colluvium
Column 3	-7.20477 ft	128.52626 ft	-89.734409 psf	899.7176 psf	327.47042 psf	50 psf	0 psf	Silt Colluvium
Column 4	-2.24786 ft	124.26467 ft	65.761492 psf	1,185.9789 psf	407.72579 psf	50 psf	0 psf	Silt Colluvium
Column 5	2.50025 ft	120.50654 ft	196.24877 psf	1,436.514 psf	451.41963 psf	50 psf	0 psf	Silt Colluvium
Column 6	7.50076 ft	116.83169 ft	317.54269 psf	1,667.2203 psf	491.24249 psf	50 psf	0 psf	Silt Colluvium
Column 7	12.25076 ft	113.59040 ft	0 psf	1,742.7614 psf	1,006.1837 psf	100 psf	0 psf	Very Stiff Silt
Column 8	16.75025 ft	110.74009 ft	0 psf	1,990.8068 psf	1,149.3928 psf	100 psf	0 psf	Very Stiff Silt
Column 9	20.00000 ft	108.78491 ft	0 psf	2,177.7769 psf	1,257.3401 psf	100 psf	0 psf	Very Stiff Silt
Column 10	23.43104 ft	106.86926 ft	0 psf	2,156.9099 psf	1,245.2925 psf	100 psf	0 psf	Very Stiff Silt
Column 11	28.29310 ft	104.30106 ft	0 psf	2,458.5272 psf	1,419.4313 psf	100 psf	0 psf	Very Stiff Silt
Column 12	31.48707 ft	102.70158 ft	0 psf	2,669.7976 psf	1,541.4084 psf	100 psf	0 psf	Very Stiff Silt
Column 13	34.68750 ft	101.22641 ft	0 psf	2,774.9285 psf	1,602.1057 psf	100 psf	0 psf	Very Stiff Silt
Column 14	39.56250 ft	99.10171 ft	0 psf	2,895.3989 psf	1,671.6593 psf	100 psf	0 psf	Very Stiff Silt
Column 15	45.31166 ft	96.84672 ft	0 psf	3,050.1915 psf	1,761.0289 psf	100 psf	0 psf	Very Stiff Silt
Column 16	51.93497 ft	94.52541 ft	0 psf	3,242.8702 psf	1,872.272 psf	100 psf	0 psf	Very Stiff Silt
Column 17	59.12331 ft	92.36613 ft	802.07983 psf	2,636.3407 psf	667.61635 psf	50 psf	0 psf	Silt Colluvium
Column 18	65.46614 ft	90.70756 ft	784.83122 psf	2,641.0129 psf	675.59487 psf	50 psf	0 psf	Silt Colluvium
Column 19	70.39841 ft	89.62232 ft	759.76661 psf	2,646.0407 psf	686.54761 psf	50 psf	0 psf	Silt Colluvium
Column 20	75.33069 ft	88.69212 ft	725.86755 psf	2,646.1534 psf	698.92688 psf	50 psf	0 psf	Silt Colluvium
Column 21	79.59918 ft	88.00145 ft	690.01471 psf	2,636.5188 psf	708.46956 psf	50 psf	0 psf	Silt Colluvium
Column 22	82.20076 ft	87.63325 ft	665.15683 psf	2,622.8466 psf	712.54079 psf	50 psf	0 psf	Silt Colluvium
Column 23	86.76273 ft	87.14315 ft	612.70455 psf	2,637.0384 psf	736.79725 psf	50 psf	0 psf	Silt Colluvium
Column 24	91.99492 ft	86.65320 ft	548.43469 psf	2,647.434 psf	763.97325 psf	50 psf	0 psf	Silt Colluvium
Column 25	96.84827 ft	86.40829 ft	476.87675 psf	2,853.6402 psf	1,108.303 psf	0 psf	0 psf	Sand Colluvium
Column 26	103.61609 ft	86.26396 ft	365.8557 psf	2,700.5425 psf	1,088.6823 psf	0 psf	0 psf	Sand Colluvium

Column 27	110.61466 ft	86.40843 ft	234.31254 psf	2,463.5916 psf	1,039.5299 psf	0 psf	0 psf	Sand Colluvium
Column 28	117.84399 ft	86.86189 ft	81.096403 psf	2,135.0656 psf	957.78155 psf	0 psf	0 psf	Sand Colluvium
Column 29	121.72932 ft	87.19665 ft	-6.4364238 psf	1,897.5041 psf	884.82069 psf	0 psf	0 psf	Sand Colluvium
Column 30	124.70165 ft	87.56710 ft	-35.404005 psf	1,738.5269 psf	810.68839 psf	0 psf	0 psf	Sand Colluvium
Column 31	130.10496 ft	88.33964 ft	-83.633726 psf	1,440.5031 psf	671.71762 psf	0 psf	0 psf	Sand Colluvium
Column 32	135.50826 ft	89.29393 ft	-143.2106 psf	1,118.0332 psf	521.34746 psf	0 psf	0 psf	Sand Colluvium
Column 33	140.91157 ft	90.43319 ft	-214.33447 psf	788.59081 psf	367.72593 psf	0 psf	0 psf	Sand Colluvium
Column 34	146.31487 ft	91.76132 ft	-297.25016 psf	464.0353 psf	216.38321 psf	0 psf	0 psf	Sand Colluvium
Column 35	151.71818 ft	93.28305 ft	-392.25188 psf	150.62306 psf	70.236686 psf	0 psf	0 psf	Sand Colluvium

SLAMMER RESULTS

JN 25340/Mohan

Mercer Island, Washington

Introduction

SLAMMER is intended to facilitate performing a variety of sliding-block analyses to evaluate seismic slope performance. Programs include both rigorous and simplified rigid-block (Newmark) analysis, decoupled analysis of flexible sliding blocks, and fully coupled analysis of flexible sliding blocks. Rigorous analyses calculate displacement based on user-specified ground motions, while simplified analyses use empirical regression relationships to predict displacement based on ground-motion parameters (for example, peak ground acceleration). Several other programs are provided to assist users in determining important properties of strong-motion records and in preparing digital strong-motion files for use in the SLAMMER program. SLAMMER supersedes Jibson and Jibson (2003) and its predecessors.

Users should be completely familiar with the details of each sliding-block method before using SLAMMER. Jibson (2011) provided a useful overview of various types of sliding-block analysis and how to apply them. The reference list contains references to all of the methods used, and users should familiarize themselves with the details of a specific method before applying it to a particular problem.

The "Definition of Terms" section of the User Guide contains many useful definitions of terms used elsewhere. Users should check this section if they are uncertain about the meaning of any terms.



Select analysis:

- Rathje and Saygili (2009) Critical acceleration ratio, peak acceleration, and magnitude
- Saygili and Rathje (2008) Critical acceleration ratio and peak acceleration
- Saygili and Rathje (2008) Critical acceleration ratio, peak acceleration, peak velocity
- Saygili and Rathje (2008) Critical acceleration ratio, peak acceleration, peak velocity, Arias intensity
- Jibson (2007) Critical acceleration ratio
- Jibson (2007) Critical acceleration ratio and magnitude
- Jibson (2007) Arias intensity and critical acceleration
- Jibson (2007) Arias intensity and critical acceleration ratio
- Jibson and others (1999, 2000)
- Jibson (1993)
- Antrasseri and Menz (1998)

Input parameters:

Critical (yield) acceleration, a_c or k_y (g): See Definition of terms in the User Guide for definitions of input parameters and for guidance in estimating appropriate input values.

Peak ground acceleration, PGA (g):

Peak ground velocity, PGV (cm/s):

Arias intensity, I_a (m/s):

Earthquake magnitude, M:

Results:

Estimated Newmark displacement (cm):

Estimated Newmark displacement (in.):

This program estimates rigid-block Newmark displacement as a function of critical acceleration ratio, peak acceleration, and moment magnitude as explained in Rathje and Saygili (2009). The estimate is made using the following regression equation:

$$\ln D_n = 4.89 - 4.95 \left(\frac{a_c}{a_{max}} \right) + 19.64 \left(\frac{a_c}{a_{max}} \right)^2 + 42.49 \left(\frac{a_c}{a_{max}} \right)^3 - 29.06 \left(\frac{a_c}{a_{max}} \right)^4 + 0.72 \ln a_{max} + 0.89 (M - 6)$$

where D_n is Newmark displacement in centimeters, a_c is critical acceleration in g's, a_{max} is horizontal peak ground acceleration (PGA) in g's, and M is moment magnitude. This equation was developed by conducting rigorous Newmark integrations on more than 2000 single-component strong-motion records for several discrete values of critical acceleration. The standard deviation of the model is 0.95.