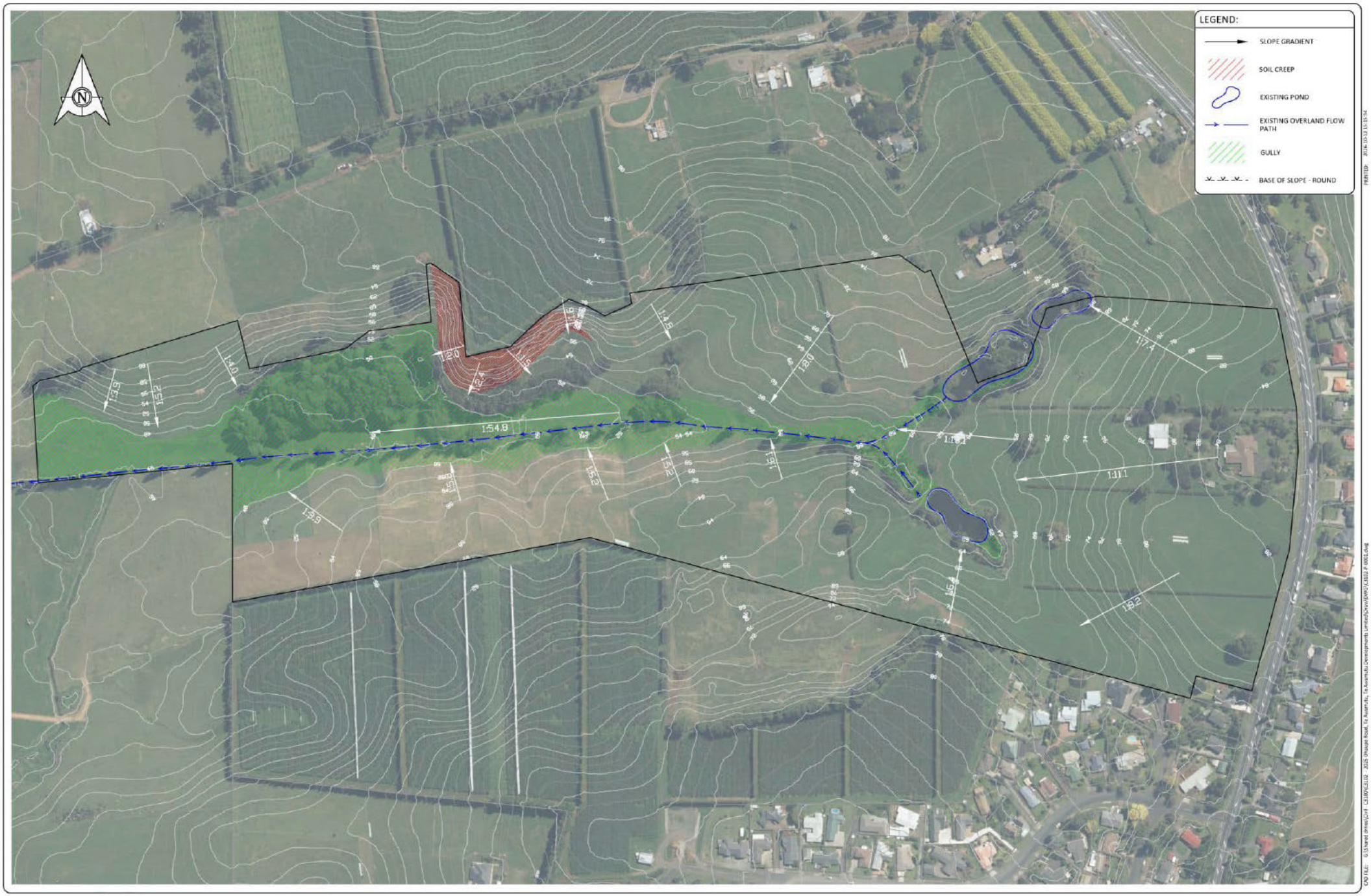
APPENDIX B – Geotechnical Investigation Plans



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C1/120 Hamilton Street,
Tauranga, 3110
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DESIGNED	CHECKED
LV	MH
DRAWN	APPROVED
LV	TR

CLIENT
TE AWAMUTU DEVELOPMENTS LIMITED

ULTIMATE GLOBAL

PROJECT
LIFESTYLE VILLAGE

2025 OHAUPO ROAD
TE AWAMUTU

DRAWING
GEOMORPHOLOGY PLAN

STATUS: N/A

DATE: 12/10/2026

SCALE (ORIGINAL SIZE A1): NTS

DRAWING NUMBER: c3102 - P - 0001

REVISION: A

PRINTED: 2026.10.12 15:15:54

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DESIGNED	CHECKED
LV	MH
DRAWN	APPROVED
LV	TR

CLIENT: TE AWAMUTU DEVELOPMENTS LIMITED

ULTIMATE GLOBAL

PROJECT: LIFESTYLE VILLAGE

2025 OHAUPO ROAD
TE AWAMUTU

DRAWING: GEOTECHNICAL INVESTIGATION PLAN

STATUS: N/A

DATE: 12/10/2026

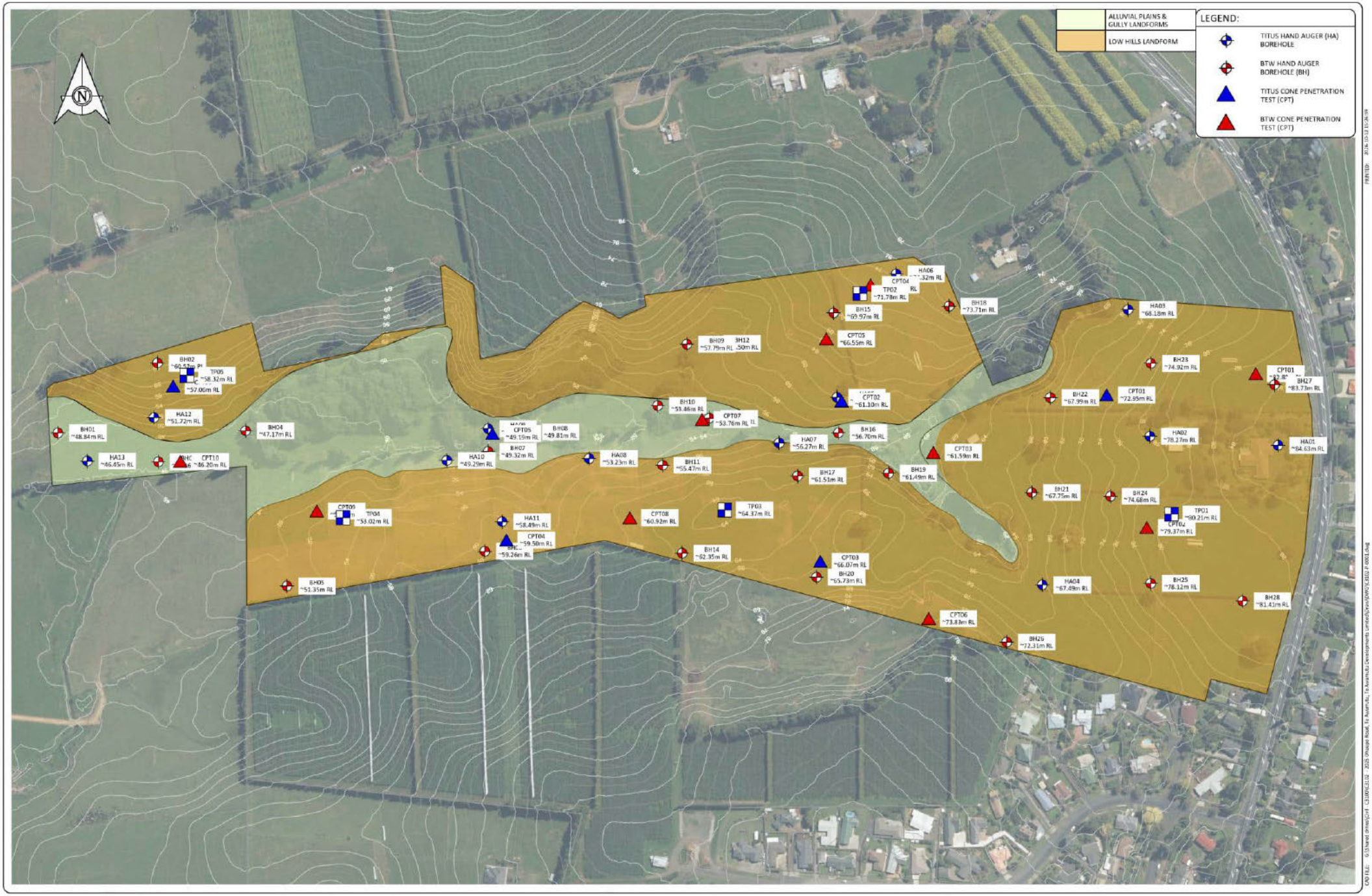
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DRAWING NUMBER: c3102 - P - 0001

REVISION: A

PRINTED: 2026-10-12 15:19:57

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LV	TR

CLIENT: TE AWAMUTU DEVELOPMENTS LIMITED

ULTIMATE GLOBAL

PROJECT: LIFESTYLE VILLAGE

2025 OHAUPO ROAD
TE AWAMUTU

DRAWING: GEOTECHNICAL INVESTIGATION PLAN

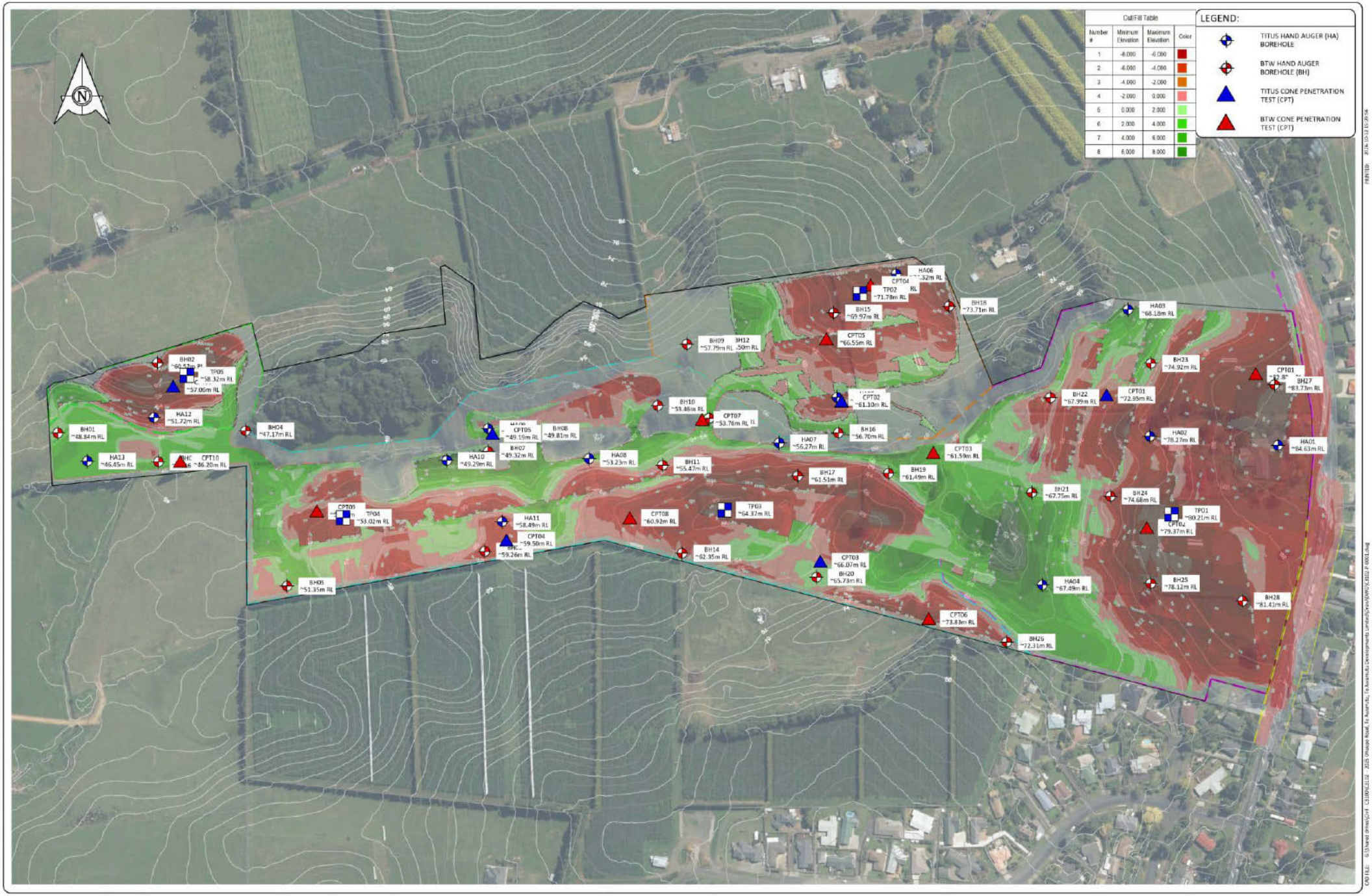
STATUS: N/A

DATE: 12/10/2026

SCALE (ORIGINAL SIZE A3): NTS

DRAWING NUMBER: c3102 - P - 0001

REVISION: A



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LV	TR

CLIENT: TE AWAMUTU DEVELOPMENTS LIMITED

ULTIMATE GLOBAL

PROJECT: LIFESTYLE VILLAGE

2025 OHAUPO ROAD
TE AWAMUTU

DRAWING: GEOTECHNICAL INVESTIGATION PLAN

STATUS: N/A

DATE: 12/10/2026

SCALE (ORIGINAL SIZE A1): NTS

DRAWING NUMBER: c3102 - P - 0001

REVISION: A

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DESIGNED	CHECKED
LV	MH
DRAWN	APPROVED
LV	TR

CLIENT: TE AWAMUTU DEVELOPMENTS LIMITED

ULTIMATE GLOBAL

PROJECT: LIFESTYLE VILLAGE

2025 OHAUPO ROAD
TE AWAMUTU

DRAWING: GEOTECHNICAL INVESTIGATION PLAN

STATUS	N/A
DATE: 13/10/2026	SCALE (ORIGINAL SIZE A1): NTS
DRAWING NUMBER: c3102 - P - 0001	REVISION: A

APPENDIX C – Geotechnical Investigation Data

TITUS CONSULTING ENGINEERS

Log: 1 of 1

HA01

Address: 2025 Ohaupo Road
Date: 06/05/2026
Testers: ArunK

Project №: C3102

Water Table:	Depth (mm):	Geology:	Graphic Log:	Material Description:	Blows /100mm: 2 4 6 8 10 12 14 16	Shear Strength (kPa): Undrained:	Remoulded:	Sensitivity:
Not Found	200	Topsoil		Topsoil				
	400	Hamilton Ash		SILT; brownish orange. Low plasticity; moist; stiff to very stiff		112	42	2.7
	600							
	800					100	40	2.5
	1000							
	1200					149	52	2.9
	1400			SILT; brownish grey. Low plasticity; moist; very stiff		146	37	3.9
	1600			SILT; dark brownish grey. Low plasticity; dry to moist; stiff				
	1800					132	37	3.5
	2000			SILT; brownish orange. Low plasticity; moist; very stiff				
	2200					186	52	3.6
	2400					189	54	3.5
	2600							
	2800					189	60	3.1
	3000			Clayey SILT; brownish orange. Low plasticity; moist; very stiff				
	3200					158	46	3.4
	3400							
	3600			Clayey SILT; light brownish orange. Low plasticity; moist; stiff		100	26	3.9
	3800							
	4000					89	26	3.4
				End of Borehole @4000mm				

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Log: 1 of 1

HA02

Address: 2025 Ohaupo Road
Date: 06/05/2026
Testers: ArunK

Project №: C3102

Water Table:	Depth (mm):	Geology:	Graphic Log:	Material Description:	Blows /100mm: 2 4 6 8 10 12 14 16	Shear Strength (kPa): Undrained:	Remoulded:	Sensitivity:
Not Found	200	Topsoil		Topsoil				
	400	Hamilton Ash		SILT; brownish orange. Low plasticity; moist; stiff		92	40	2.3
	600							
	800					109	37	2.9
	1000							
	1200			SILT; light brownish orange. Low plasticity; moist; stiff		112	32	3.5
	1400							
	1600			SILT; dark brownish grey. Low plasticity; dry to moist; stiff to very stiff		126	32	4
	1800							
	2000					143	32	4.5
	2200			SILT; light brownish orange. Low plasticity; moist; stiff to very stiff		135	37	3.6
	2400							
	2600					186	42	4.5
	2800							
	3000					99	30	3.3
	3200							
	3400							
	3600			Clayey SILT; light brownish orange. Low plasticity; moist; stiff		98	34	2.8
	3800							
	4000					92	32	2.9
				End of Borehole @4000mm				

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Log: 1 of 1

HA03

Address: 2025 Ohaupo Road
Date: 06/05/2026
Testers: ArunK

Project №: C3102

Water Table:	Depth (mm):	Geology:	Graphic Log:	Material Description:	Blows /100mm: 2 4 6 8 10 12 14 16	Shear Strength (kPa): Undrained:	Remoulded:	Sensitivity:
	200	Topsoil		Topsoil				
	400			SILT; brownish orange. Low plasticity; moist; stiff		100	34	2.9
	600							
	800					100	37	2.7
	1000			SILT; dark brownish grey. Low plasticity; moist; firm to stiff		83	32	2.6
	1200							
	1400					57	26	2.2
	1600							
	1800							
	2000	Hamilton Ash		SILT with minor clay; grey. Low plasticity; moist to wet; stiff		75	40	1.9
	2200							
	2400					92	34	2.7
	2600							
	2800			CLAY; grey, mixed orange. Low plasticity; moist to wet; stiff				
▼	3000					100	32	3.2
	3200			CLAY; grey, mixed orange. High plasticity; wet to saturated; stiff				
	3400							
	3600					89	23	3.9
	3800			*Borehole terminated due to non-retrieval @3700mm*				
	4000							

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Log: 1 of 1

HA04

Address: 2025 Ohaupo Road
Date: 06/05/2026
Testers: ArunK

Project №: C3102

Water Table:	Depth (mm):	Geology:	Graphic Log:	Material Description:	Blows /100mm: 2 4 6 8 10 12 14 16	Shear Strength (kPa): Undrained:	Remoulded:	Sensitivity:
Not Found	200	Topsoil		Topsoil				
	400	Hamilton Ash		SILT with minor organic silt; brownish orange. Low plasticity; moist				
	600							
	800			SILT; brownish orange. Low plasticity; moist; stiff		109	40	2.7
	1000					100	34	2.9
	1200			Clayey SILT; brownish grey. Low plasticity; moist; stiff to very stiff		158	37	4.2
	1400							
	1600					146	37	3.9
	1800							
	2000					118	52	2.3
	2200			SILT with minor clay; brownish grey. Low plasticity; moist; stiff				
	2400							
	2600					75	32	2.4
	2800							
	3000			Clayey SILT; dark brownish grey. Low plasticity; moist; stiff to very stiff		158	37	4.2
	3200							
	3400					75	30	2.5
	3600			Silty CLAY; dark brownish grey. High plasticity; moist; firm				
	3800					65	26	2.5
	4000							
				End of Borehole @4000mm				

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Log: 1 of 1

HA05

Address: 2025 Ohaupo Road
Date: 06/05/2026
Testers: MalikR

Project №: C3102

Water Table:	Depth (mm):	Geology:	Graphic Log:	Material Description:	Blows /100mm: 2 4 6 8 10 12 14 16	Shear Strength (kPa): Undrained:	Remoulded:	Sensitivity:
Not Found	200	Topsoil		Topsoil				
	400	Hamilton Ash		SILT with minor clay; brownish yellow. Low plasticity; moist; stiff		111	48	2.3
	600							
	800			CLAY with minor silt; brownish orange. High plasticity; moist; very stiff		222+	63	3.5
	1000					222+	63	3.5
	1200							
	1400					222+	63	3.5
	1600							
	1800			CLAY with some sand with minor silt; brownish grey. High plasticity; moist; stiff to very stiff		127	48	2.7
	2000					127	48	2.7
	2200					174	79	2.2
	2400							
	2600			Silty CLAY; greyish white, mixed orange. High plasticity; moist; very stiff		222+		
	2800					222+		
	3000							
	3200					222+		
	3400							
	3600					222+		
	3800							
	4000					222+	63	3.5
				End of Borehole @4000mm				

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Log: 1 of 1

HA06

Address: 2025 Ohaupo Road
Date: 06/05/2026
Testers: MalikR

Project №: C3102

Water Table:	Depth (mm):	Geology:	Graphic Log:	Material Description:	Blows /100mm: 2 4 6 8 10 12 14 16	Shear Strength (kPa): Undrained:	Remoulded:	Sensitivity:
Not Found	200	Topsoil		Topsoil				
	400	Alluvium		SILT with minor clay; brownish grey. Low plasticity; moist; stiff to very stiff		87	32	2.8
	600					159	63	2.5
	800					143	48	3
	1000			Clayey SILT; brownish grey. Low plasticity; moist; stiff to very stiff		127	32	4
	1200					222+		
	1400			CLAY; dark brownish grey. Low plasticity; moist; very stiff		222+		
	1600					222+		
	1800					222+		
	2000					222+		
	2200					222+		
	2400					222+		
	2600	Hamilton Ash		Silty CLAY; brownish grey. Low plasticity; moist; very stiff		222+		
	2800					222+		
	3000					222+		
	3200					222+		
	3400					222+		
	3600					222+		
	3800					222+		
	4000							
				End of Borehole @4000mm				

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Log: 1 of 1

HA07

Address: 2025 Ohaupo Road
Date: 06/05/2026 RL: 600m (NZVD2016)
Testers: MalikR

Project №: C3102

Water Table:	Depth (mm):	Geology:	Graphic Log:	Material Description:	Blows /100mm: 2 4 6 8 10 12 14 16	Shear Strength (kPa): Undrained:	Remoulded:	Sensitivity:
	200	Topsoil		Topsoil				
	400	Alluvium		SILT; black. Low plasticity; moist to wet to saturated; firm				
	600					63	19	3.3
	800							
	1000					63	16	4
	1200							
	1400			SILT with minor clay; greyish blue. High plasticity; saturated; stiff		79	16	5
	1600					95	32	3
	1800			*Borehole terminated due to non-retrieval @1600mm*				
	2000							
	2200							
	2400							
	2600							
	2800							
	3000							
	3200							
	3400							
	3600							
	3800							
	4000							

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Log: 1 of 1

HA08

Address: 2025 Ohaupo Road
Date: 06/05/2026
Testers: MalikR

Project №: C3102

Water Table:	Depth (mm):	Geology:	Graphic Log:	Material Description:	Blows /100mm: 2 4 6 8 10 12 14 16	Shear Strength (kPa): Undrained:	Remoulded:	Sensitivity:
	0	Topsoil		Topsoil				
	200	Hamilton Ash		SILT; greyish brown and orange. Low plasticity; firm				
	400					48	19	2.5
▼	600					63	16	4
	800			CLAY with minor silt; greyish white. High plasticity; saturated; stiff		127	32	4
	1000					111	32	3.5
	1200			*Borehole terminated due to non-retrieval @1100mm*				
	1400							
	1600							
	1800							
	2000							
	2200							
	2400							
	2600							
	2800							
	3000							
	3200							
	3400							
	3600							
	3800							
	4000							

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Log: 1 of 1

HA09

Address: 2025 Ohaupo Road
Date: 06/05/2026
Testers: ArunK

Project №: C3102

Water Table:	Depth (mm):	Geology:	Graphic Log:	Material Description:	Blows /100mm:		Shear Strength (kPa):		
							Undrained:	Remoulded:	Sensitivity:
	200	Topsoil		Topsoil	0	0			
	400	Alluvium		SILT; grey. Low plasticity; dry; very stiff	3	5	201+	43	4.7
	600			SILT; dark brown. Low plasticity; moist; stiff	5	3			
	800				1.5	1.5	89	29	3.1
	1000			Clayey SILT; grey. Low plasticity; moist	1	0.5			
	1200			Medium to coarse SAND; grey. Well graded; wet to saturated; loose to medium dense	0.5	2			
▼	1400				3	5			
	1600				5	3			
	1800				3	3			
	2000			CLAY; grey, mixed orange. High plasticity; wet to saturated; very stiff	3	2	158	32	5
	2200			Medium to coarse SAND; brownish grey. Well graded; saturated; loose	3	3			
	2400			*Borehole terminated due to non-retrieval @2400mm*	3	3			
	2600				5	5			
	2800				5	6			
	3000				6	5			
	3200				10	5			
	3400				13				
	3600								
	3800								
	4000								

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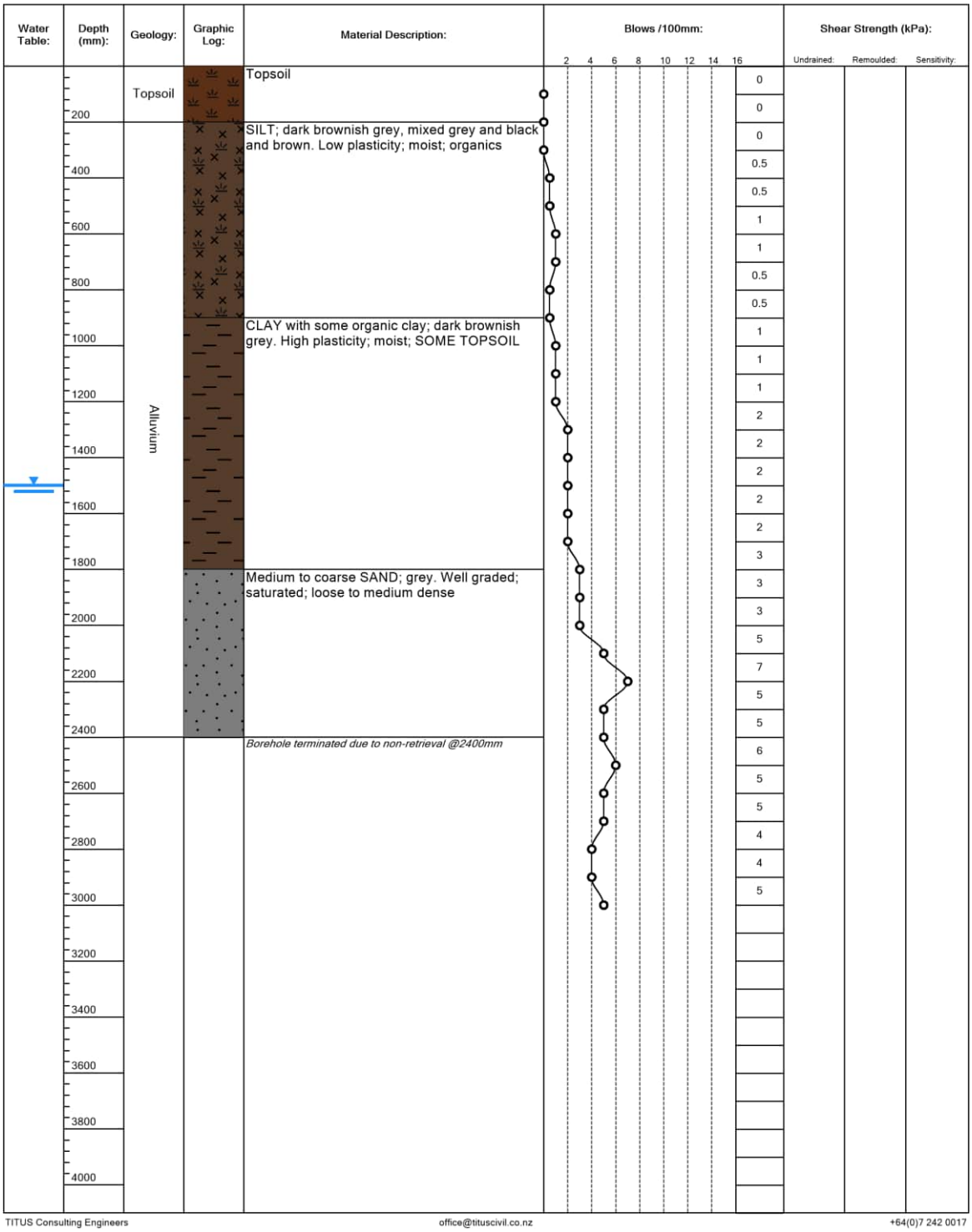
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Log: 1 of 1

HA10

Address: 2025 Ohaupo Road
Date: 06/05/2026
Testers: ArunK

Project №: C3102



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Log: 1 of 1

HA11

Address: 2025 Ohaupo Road
Date: 06/05/2026
Testers: MalikR

Project №: C3102

Water Table:	Depth (mm):	Geology:	Graphic Log:	Material Description:	Blows /100mm: 2 4 6 8 10 12 14 16	Shear Strength (kPa): Undrained:	Remoulded:	Sensitivity:
Not Found	200	Topsoil		Topsoil				
	400	Hamilton Ash		CLAY with minor silt; brownish grey. High plasticity; moist; stiff to very stiff		159	48	3.3
	600							
	800					127	35	3.6
	1000					127	32	4
	1200							
	1400					143	32	4.5
	1600							
	1800			SILT with minor clay; brownish grey, mixed black and grey. Low plasticity; moist; pumiceous; stiff		143	48	3
	2000							
	2200					146	57	2.6
	2400							
	2600			SILT with minor clay; brownish orange. Low plasticity; moist; manganese; pumiceous; stiff to very stiff		165	51	3.2
	2800							
	3000					155	44	3.5
	3200			SILT with some sand with minor clay; brownish orange. Low plasticity; moist; iron staining; pumiceous; stiff to very stiff		174	60	2.9
	3400							
	3600					146	5	30.7
	3800							
	4000					143	57	2.5
				End of Borehole @4000mm				

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Log: 1 of 1

HA12

Address: 2025 Ohaupo Road
Date: 06/05/2026
Testers: ArunK

Project №: C3102

Water Table:	Depth (mm):	Geology:	Graphic Log:	Material Description:	Blows /100mm: 2 4 6 8 10 12 14 16	Shear Strength (kPa): Undrained:	Remoulded:	Sensitivity:
Not Found	200	Topsoil		Topsoil				
	400	Hamilton Ash		SILT; brownish orange. Low plasticity; moist; stiff		75	40	1.9
	600			SILT; dark brownish grey. Low plasticity; moist; firm				
	800					66	32	2.1
	1000							
	1200			SILT; light brown. Low plasticity; moist; stiff		86	32	2.7
	1400			SILT; brownish grey. Low plasticity; moist				
	1600			SILT; brownish orange. Low plasticity; moist; stiff		103	46	2.2
	1800							
	2000			SILT with some sand with minor clay; brownish orange. Low plasticity; moist; stiff		75	37	2
	2200							
	2400							
	2600			Clayey SILT with some sand; light brownish grey. Low plasticity; moist to wet; pumiceous; stiff		103	46	2.2
	2800							
	3000					89	54	1.6
	3200							
	3400					129	43	3
	3600							
	3800			CLAY; light brownish grey. High plasticity; wet; pumiceous; stiff		106	37	2.8
	4000							
				End of Borehole @4000mm				

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Log: 1 of 1

HA13

Address: 2025 Ohaupo Road
Date: 06/05/2026
Testers: MalikR

Project №: C3102

Water Table:	Depth (mm):	Geology:	Graphic Log:	Material Description:	Blows /100mm: 2 4 6 8 10 12 14 16	Shear Strength (kPa): Undrained:	Remoulded:	Sensitivity:
	200	Topsoil		Topsoil				
	400	Alluvium		SILT with some clay; greyish white. Low plasticity; moist to wet; stiff to very stiff		143	48	3
	600					174	48	3.7
	800			CLAY with minor silt; greyish white, mottled orange and yellow. Low plasticity; moist to wet; very stiff		190	79	2.4
▼	1000							
	1200					222+	63	3.5
	1400							
	1600					222+	63	3.5
	1800							
	2000					222+	63	3.5
	2200			*Borehole terminated due to non-retrieval @2100mm*				
	2400							
	2600							
	2800							
	3000							
	3200							
	3400							
	3600							
	3800							
	4000							

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Log: 1 of 1

Address: 2025 Ohaupo Road
Date: 06/05/2026
Testers: LiamV

TP01

Project №: C3102

Water Table:	Depth (mm):	Geology:	Graphic Log:	Material Description:	Blows /100mm: 2 4 5 8	Shear Strength (kPa): Undrained: Remoulded:	Notes:
Not Found	200	Topsoil		Topsoil			
	400	Hamilton Ash		SILT; light brown. Low plasticity; moist			
	600						
	800			Silty CLAY; dark brown. High plasticity; moist			
	1000						
	1200						
	1400						
	1600						
	1800						
	2000						
	2200						
	2400						
	2600			Clayey SILT; light brownish grey. Low plasticity; moist to wet			
	2800						
	3000						
	3200						
	3400						
	3600						
	3800						
	4000						
	4200						
	4400						
	4600			CLAY; brownish grey. High plasticity; moist to wet			Soil sample collected @4500 mm
	4800						
	5000						
	5200	Rangitawa Tephra		CLAY with some sand and silt; grey. High plasticity; moist to wet; micaceous			
	5400	Walton Subgroup		Silty CLAY; light greyish brownish grey. High plasticity; moist; manganese			
	5600			Medium SAND; orange, mottled black and grey. Poorly graded; moist			Soil sample collected @5500 mm
	5800			CLAY; dark brownish grey, banded black. High plasticity; moist to wet; manganese			
	6000			*End of Borehole @6000mm*			
	6200						
	6400						
	6600						
	6800						
	7000						



TITUS CONSULTING ENGINEERS

Log: 1 of 1

Address: 2025 Ohaupo Road

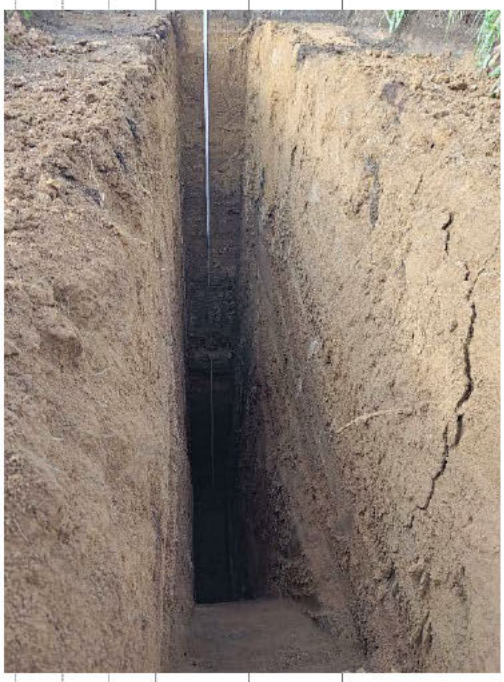
Date: 06/05/2026

Testers: LiamV

TP02

Project №: C3102

Water Table:	Depth (mm):	Geology:	Graphic Log:	Material Description:	Blows /100mm: 2 4 5 8	Shear Strength (kPa): Undrained:	Remoulded:	Notes:
Not Found	200	Topsoil		Topsoil				
	400	Hamilton Ash		SILT; light brown. Low plasticity; moist				
	600							
	800			Clayey SILT; brown, mottled orange. Low plasticity; moist to wet; manganese				
	1000							
	1200							
	1400							
	1600							
	1800			Silty CLAY; dark brown. High plasticity; dry to moist; manganese				
	2000							
	2200							
	2400			SILT with some clay; dark brown. Low plasticity; moist				
	2600							
	2800							
	3000							
	3200							Soil sample collected @3200 mm
	3400							
	3600							
	3800							
	4000							
	4200							
	4400			Clayey SILT; light brownish grey. Low plasticity; moist to wet				
	4600							
	4800							
	5000							
	5200							
	5400							
	5600			Medium to coarse SAND; orange. Well graded; moist				
	5800			Silty CLAY; brown. High plasticity; moist; pumiceous; Semi-welded, brittle, porous				
	6000	Rangitawa Tephra		Silty CLAY with minor sand; grey. High plasticity; moist to wet; micaceous				
	6200			*End of Borehole @6100mm*				
	6400							
	6600							
	6800							
	7000							



TITUS CONSULTING ENGINEERS

Log: 1 of 1

Address: 2025 Ohaupo Road
Date: 06/05/2026
Testers: LiamV

TP03

Project №: C3102

Water Table:	Depth (mm):	Geology:	Graphic Log:	Material Description:	Blows /100mm: 2 4 5 8	Shear Strength (kPa): Undrained: Remoulded:	Notes:
Not Found	200	Topsoil		Topsoil			
	400	Hamilton Ash		SILT; brown. Low plasticity; moist			
	600			Clayey SILT; dark brown. Low plasticity; moist to wet			
	800						
	1000						
	1200						
	1400						
	1600						
	1800			CLAY with some silt; brown. High plasticity; moist			
	2000						
	2200						Soil sample collected @2200 mm
	2400						
	2600			CLAY; light brown. High plasticity; moist			
	2800						
	3000	Rangitawa Tephra		Silty CLAY with some sand; grey. High plasticity; moist; micaceous			
	3200	Walton Subgroup		CLAY; brownish grey. High plasticity; moist			
	3400						
	3600						
	3800						
	4000			Medium SAND with some gravel and clay; reddish orange, speckled black. Well graded; moist; siliceous			
	4200						
	4400						
	4600			Sandy CLAY with some gravel; brownish grey, mottled white and black and yellow. High plasticity; moist			
	4800						
	5000						
	5200						
	5400						
	5600			*End of Borehole @5600mm*			
	5800						
	6000						
	6200						
	6400						
	6600						
	6800						
	7000						



TITUS CONSULTING ENGINEERS

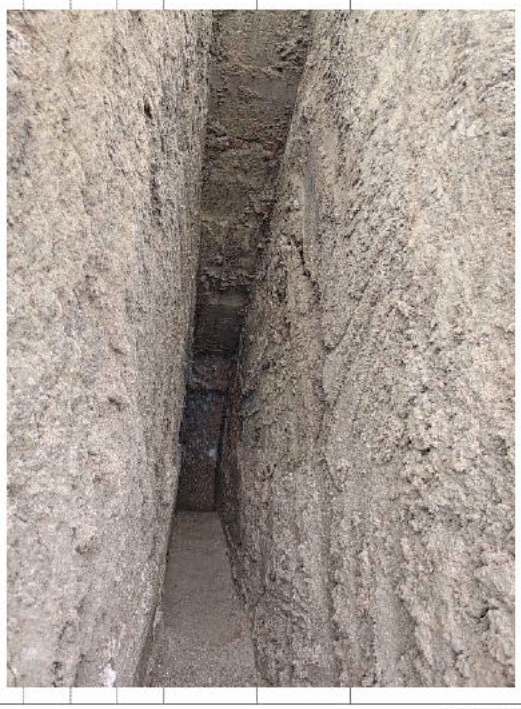
Log: 1 of 1

Address: 2025 Ohaupo Road
Date: 06/05/2026
Testers: LiamV

TP04

Project №: C3102

Water Table:	Depth (mm):	Geology:	Graphic Log:	Material Description:	Blows /100mm: 2 4 5 8	Shear Strength (kPa): Undrained: Remoulded:	Notes:
	200	Topsoil		Topsoil			
	400	Hamilton Ash		SILT; light brown. Low plasticity; moist			
	600						
	800			Clayey SILT; brown. Low plasticity; moist			
	1000						
	1200						
	1400						
	1600						
	1800						
	2000						
	2200	Waiton Subgroup		Silty CLAY with some gravel and sand; greyish white, mottled orange. High plasticity; moist to wet; siliceous; pumiceous			
	2400						
	2600						
	2800						
	3000						
	3200						
	3400						
	3600						
	3800						
	4000			Silty medium to coarse SAND with some gravel; brownish orange, mottled white and black. Well graded; wet; pumiceous			
▼	4200						
	4400						
	4600						
	4800						
	5000						
	5200						
	5400						
	5600						
	5800			Sandy SILT with some gravel; yellowish white, mottled black and orange. Low plasticity; wet; pumiceous			
	6000						
	6200						
	6400			*End of Borehole @6200mm*			
	6600						
	6800						
	7000						



TITUS CONSULTING ENGINEERS

Log: 1 of 1

Address: 2025 Ohaupo Road

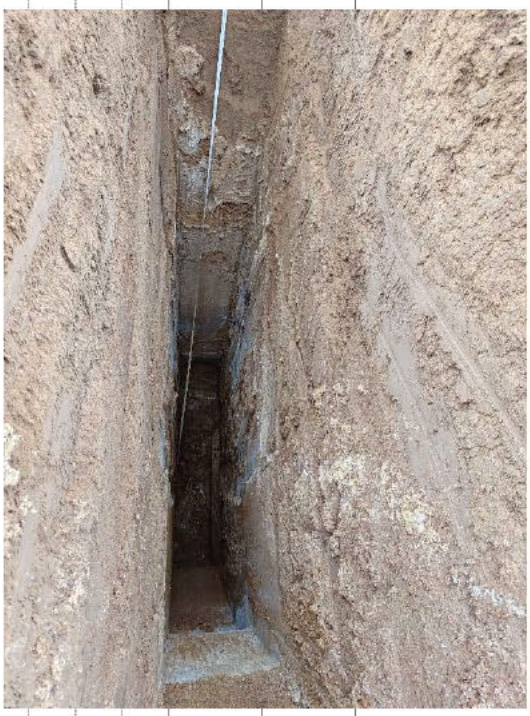
Date: 06/05/2026

Testers: LiamV

TP05

Project №: C3102

Water Table:	Depth (mm):	Geology:	Graphic Log:	Material Description:	Blows /100mm: 2 4 5 8	Shear Strength (kPa): Undrained: Remoulded:	Notes:
Not Found	0	Topsoil		Topsoil			
	200	Hamilton Ash		SILT; light brown. Low plasticity; moist			
	400			SILT; dark brown. Low plasticity; moist; Hard			
	600			SILT with some clay; brown. Low plasticity; moist			
	800						
	1000						
	1200						
	1400						
	1600						
	1800						
	2000			SILT with some clay; light brown. Low plasticity; moist			
	2200						
	2400						
	2600						
	2800						
	3000						
	3200						
	3400						
	3600						
	3800						
	4000			Clayey SILT; light brownish orange. Low plasticity; moist to wet			
	4200						
	4400			Silty CLAY; light brownish grey, speckled black. High plasticity; moist to wet; manganese			
	4600						
	4800						
	5000						Soil sample collected @5000 mm
	5200						
	5400						
	5600						
	5800						
	6000						
	6200	Rangitawa Tephra		Silty CLAY with some sand; grey. High plasticity; moist; micaceous			
	6400			*End of Borehole @6200mm*			
	6600						
	6800						
	7000						



BTWCOMPANY

INVESTIGATION LOG

HOLE NO.: BH 01

CLIENT: Te Awamutu Development Ltd
PROJECT: Proposed Private Plan Change - Geotechnical Suitability Report
JOB NO.: 211365

SITE LOCATION: 2025 Ohaupo Road, Te Awamutu
CO-ORDINATES: 1803422mE, 5792706mN
CONTRACTOR: BTW Co. Ltd. **RIG:** Hand Auger
ELEVATION: Ground
DRILLER: SJ & AM
START DATE: 22/07/2022
END DATE: 22/07/2022
LOGGED BY: Sam Jin

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 100mm)	VANE SHEAR STRENGTH (kPa) Vane: SV 2462	WATER
TOPSOIL.		0	TS	1	138	
Clayey SILT, with minor sand; brown . Very stiff; non-plastic; dry to moist; (HAMILTON ASH FORMATION).		0.2		2, 2, 2, 2	27, 106, 27	
Clayey SILT; light yellowish brown . Stiff to very stiff; low plasticity; dry to moist; (HAMILTON ASH FORMATION).		0.6		3, 2, 3, 3, 3	70, 27, 146, 35	22/07/2022
Sandy SILT; light grey. Very stiff; low plasticity; moist; sand, fine to medium; (WALTON SUBGROUP).		1.0		5, 5, 6	176, 24, 146	
Sandy SILT, with some iron staining, with minor clay; light grey mottled with light brown. Very stiff; low plasticity; moist; (WALTON SUBGROUP).		1.4		5, 5, 5	27, 152, 30	
Silty SAND; light brown. Medium dense; non-plastic; wet; sand, fine to coarse; (WALTON SUBGROUP).		1.6		6, 6, 5, 6	146, 27	
EOH: 2.00m		2.0				

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PHOTO(S)



REMARKS

WATER
- Standing Water Level
- Out flow
- In flow

INVESTIGATION TYPE
- [x] Hand Auger
- [ ] Test Pit

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BTWCOMPANY

INVESTIGATION LOG

HOLE NO.: BH 02

CLIENT: Te Awamutu Development Ltd
PROJECT: Proposed Private Plan Change - Geotechnical Suitability Report
JOB NO.: 211365

SITE LOCATION: 2025 Ohaupo Road, Te Awamutu
START DATE: 22/07/2022
CO-ORDINATES: 1803511mE, 5792766mN
ELEVATION: Ground
END DATE: 22/07/2022
CONTRACTOR: BTW Co. Ltd.
RIG: Hand Auger
DRILLER: SJ & AM
LOGGED BY: Sam Jin

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 100mm)	VANE SHEAR STRENGTH (kPa) Vane: SV 2462 Values	WATER
TOPSOIL.		0.0	TS	1	62	
Clayey SILT, with minor sand; dark brown. Firm to stiff; non-plastic; dry; sand, fine to coarse; (PEDOGENIC B HORIZON).		0.2		2, 1	16	
Clayey SILT; light brown. Stiff to very stiff; low plasticity; dry to moist; (HAMILTON ASH FORMATION).		0.4		2, 2	95	
		0.6		1, 2	16	
		0.8		2, 4	95	
		1.0		3, 6	16	
		1.2		10, 15	84	
		1.4		9, 12	16	Groundwater Not Encountered
		1.6		9, 8	84	
		1.8		6, 6	19	
EOH: 2.00m		2.0		5	54	
					16	
					87	
					19	
					100	
					22	
					103	
					27	
					187	
					27	

PHOTO(S)

REMARKS

WATER
- Standing Water Level
- Out flow
- In flow

INVESTIGATION TYPE
- [x] Hand Auger
- [ ] Test Pit

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BTWCOMPANY

INVESTIGATION LOG

HOLE NO.: BH 03

CLIENT: Te Awamutu Development Ltd
PROJECT: Proposed Private Plan Change - Geotechnical Suitability Report
JOB NO.: 211365

SITE LOCATION: 2025 Ohaupo Road, Te Awamutu
START DATE: 22/07/2022
CO-ORDINATES: 1803509mE, 5792678mN
ELEVATION: Ground
END DATE: 22/07/2022
CONTRACTOR: BTW Co. Ltd.
RIG: Hand Auger
DRILLER: SJ & AM
LOGGED BY: Sam Jin

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	DEPTH (m)	SCALA PENETROMETER (Blows / 100mm)	VANE SHEAR STRENGTH (kPa) Vane: SV 2462	WATER
TOPSOIL.	0	1	111	
Clayey SILT, with some sand; light yellowish brown. Very stiff; low plasticity; moist; sand, fine to medium; (HAMILTON ASH FORMATION).	0.2	1	27	
	0.4	1	43	
Clayey SILT, with minor sand; grey . Soft to firm; low plasticity; dry to moist; sand, fine; (WALTON SUBGROUP).		1	19	
	0.6	2	38	
Clayey SILT; dark brown. 0.6m - 0.7m: ROOTLETS. Soft to firm; low plasticity; wet; (WALTON SUBGROUP).			14	
	0.8		70	
		1	27	
1.0m: SATURATED.	1.0	2	60	22/07/2022
		1	14	
	1.2	2	84	
		1	19	
	1.4	2	65	
		2	24	
	1.6	1	51	
		2	16	
	1.8	1	51	
		1	19	
EOH: 2.00m	2.0	2	51	
	2.2	3	19	
		3		
		3		
	2.4	3		
		3		
	2.6	3		
		3		
	2.8	4		
		5		
	3.0			

PHOTO(S)

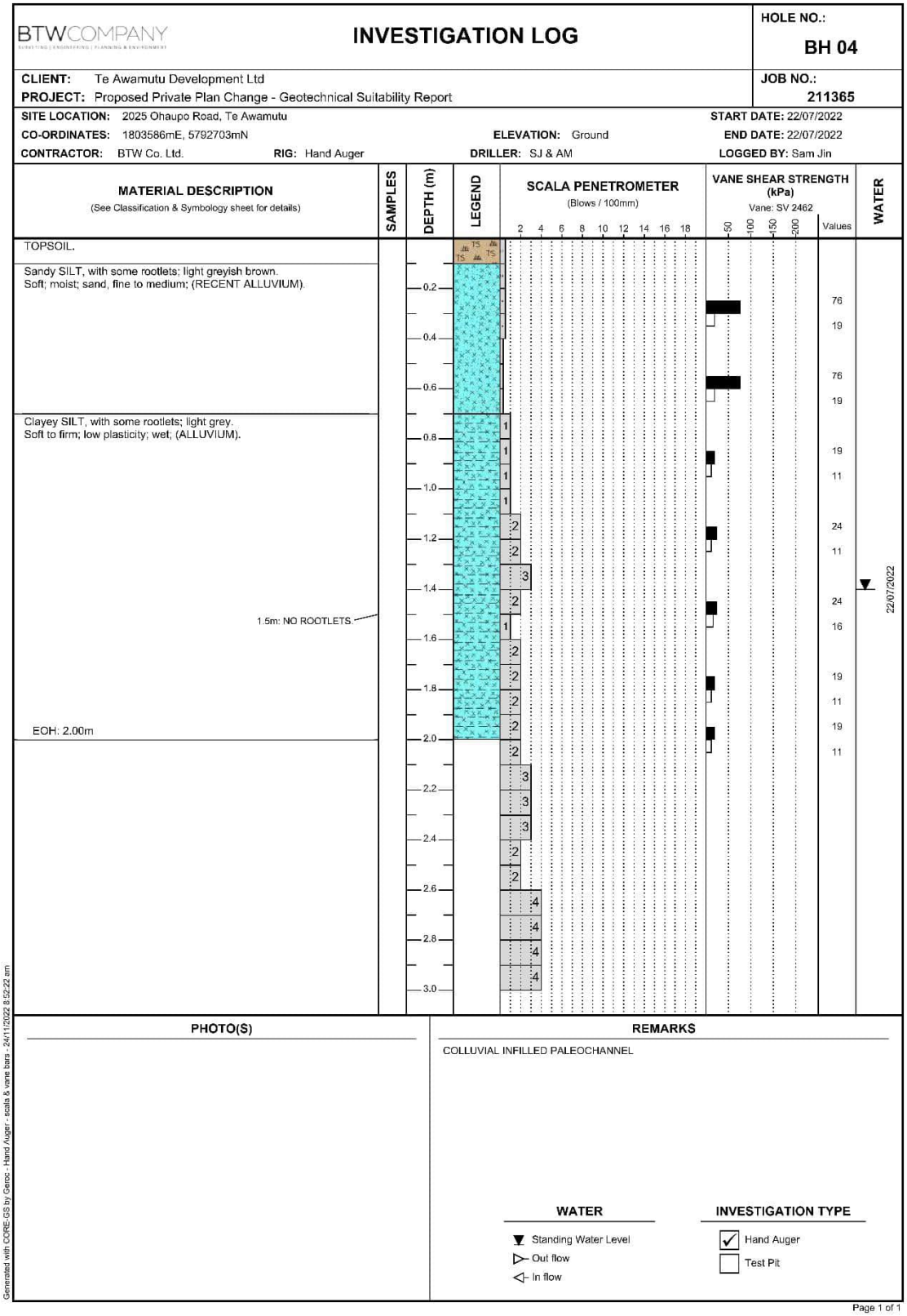
REMARKS

WATER
- Standing Water Level
- Out flow
- In flow

INVESTIGATION TYPE
- [x] Hand Auger
- [ ] Test Pit

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BTWCOMPANY
INVESTIGATION LOG
HOLE NO.: BH 04
CLIENT: Te Awamutu Development Ltd
PROJECT: Proposed Private Plan Change - Geotechnical Suitability Report
JOB NO.: 211365
SITE LOCATION: 2025 Ohaupo Road, Te Awamutu
CO-ORDINATES: 1803586mE, 5792703mN
CONTRACTOR: BTW Co. Ltd.
RIG: Hand Auger
ELEVATION: Ground
DRILLER: SJ & AM
START DATE: 22/07/2022
END DATE: 22/07/2022
LOGGED BY: Sam Jin
MATERIAL DESCRIPTION
(See Classification & Symbology sheet for details)
SAMPLES
DEPTH (m)
LEGEND
SCALA PENETROMETER
(Blows / 100mm)
VANE SHEAR STRENGTH (kPa)
Vane: SV 2462
Values
WATER
TOPSOIL.
Sandy SILT, with some rootlets; light greyish brown.
Soft; moist; sand, fine to medium; (RECENT ALLUVIUM).
Clayey SILT, with some rootlets; light grey.
Soft to firm; low plasticity; wet; (ALLUVIUM).
1.5m: NO ROOTLETS.
EOH: 2.00m
22/07/2022
PHOTO(S)
REMARKS
COLLUVIAL INFILLED PALEOCHANNEL
WATER
Standing Water Level
Out flow
In flow
INVESTIGATION TYPE
Hand Auger
Test Pit
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BTWCOMPANY

INVESTIGATION LOG

HOLE NO.: BH 05

CLIENT: Te Awamutu Development Ltd
PROJECT: Proposed Private Plan Change - Geotechnical Suitability Report
JOB NO.: 211365

SITE LOCATION: 2025 Ohaupo Road, Te Awamutu
START DATE: 22/07/2022
CO-ORDINATES: 1803620mE, 5792568mN
ELEVATION: Ground
END DATE: 22/07/2022
CONTRACTOR: BTW Co. Ltd.
RIG: Hand Auger
DRILLER: SJ & AM
LOGGED BY: Sam Jin

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 100mm)	VANE SHEAR STRENGTH (kPa) Vane: SV 2462 Values	WATER
TOPSOIL.		0.0	TS	1	133	
Clayey SILT; light brown. Very stiff; low plasticity; dry to moist; (HAMILTON ASH FORMATION).		0.2		2	43	
		0.4		3	119	
		0.6		3	41	
		0.8		2	149	
		1.0		3	32	
		1.2		2	138	
		1.4		2	32	
		1.6		2	133	
Clayey SILT, with minor sand; light brown. Low plasticity; dry to moist; sand, fine to medium; (WALTON SUBGROUP).		1.8		4	35	
		2.0		4	46	
				3	19	
				3	84	
				3	19	
				3	103	
				2	24	
				2	95	
				3	27	
EOH: 2.00m				2	92	
					22	

Groundwater Not Encountered

PHOTO(S)

REMARKS

WATER
- Standing Water Level
- Out flow
- In flow

INVESTIGATION TYPE
- [x] Hand Auger
- [ ] Test Pit

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BTWCOMPANY

INVESTIGATION LOG

HOLE NO.: BH 06

CLIENT: Te Awamutu Development Ltd
PROJECT: Proposed Private Plan Change - Geotechnical Suitability Report
JOB NO.: 211365

SITE LOCATION: 2025 Ohaupo Road, Te Awamutu
START DATE: 12/08/2022
CO-ORDINATES: 1803793mE, 5792594mN
ELEVATION: Ground
END DATE: 12/08/2022
CONTRACTOR: BTW Co. Ltd.
RIG: Hand Auger
DRILLER: Sam Jin
LOGGED BY: Sam Jin

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 100mm)	VANE SHEAR STRENGTH (kPa) Vane: SV 2195 Values	WATER
TOPSOIL.		0.0		2 2	110	
Clayey SILT, with minor sand; brown . Very stiff; low plasticity; dry; sand, fine; (HAMILTON ASH FORMATION).		0.2		2 2	27	
Clayey SILT, with minor manganese nodules; light brown. Very stiff; low plasticity; dry; (HAMILTON ASH FORMATION).		0.4		2 2	162	
		0.6		2 2	27	
		0.8		2 1 1	108	
Clayey SILT, with minor sand; brown . Stiff; high plasticity; dry to moist; sand, medium; (HAMILTON ASH FORMATION).		1.0		2 3	32	
		1.2		2 3	105	
		1.4		3 3	38	
Clayey SILT, with minor sand; light brown . Very stiff; low plasticity; dry to moist; sand, fine; (HAMILTON ASH FORMATION).		1.6		3 4	94	
		1.8		4 4	48	
		2.0		4 4	97	
EOH: 2.00m				5	40	
					162	
					51	
					148	
					40	
					170	
					40	
					170	
					46	

Groundwater Not Encountered

PHOTO(S)

REMARKS

WATER
- Standing Water Level
- Out flow
- In flow

INVESTIGATION TYPE
- [x] Hand Auger
- [ ] Test Pit

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BTWCOMPANY

INVESTIGATION LOG

HOLE NO.: BH 07

CLIENT: Te Awamutu Development Ltd
PROJECT: Proposed Private Plan Change - Geotechnical Suitability Report
JOB NO.: 211365

SITE LOCATION: 2025 Ohaupo Road, Te Awamutu
START DATE: 03/08/2022
CO-ORDINATES: 1803798mE, 5792682mN
ELEVATION: Ground
END DATE: 03/08/2022
CONTRACTOR: BTW Co. Ltd.
RIG: Hand Auger
DRILLER: Sam Jin
LOGGED BY: Sam Jin

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 100mm)	VANE SHEAR STRENGTH (kPa) Vane: SV 2195 Values	WATER
TOPSOIL.		0.0		3	86	
Clayey SILT, with some iron staining and manganese nodules, with minor sand; light brown . Stiff; low plasticity; dry; sand, fine to medium; (HAMILTON ASH FORMATION).		0.2		3	30	
Clayey SILT, with some iron staining; brown . Very stiff; low plasticity; dry to moist; (HAMILTON ASH FORMATION).		0.4		3	102	
SILT, with minor manganese nodules and clay and sand; dark grey. Very stiff; low plasticity; moist; sand, fine; (WALTON SUBGROUP).		0.6		3	24	
		0.8		1	94	
				2	27	
		1.0		2	132	
				2	38	
SILT, with minor manganese nodules and clay and sand; dark greyish brown. Very stiff; moist; sand, fine; (WALTON SUBGROUP).				2	121	
SILT, with minor clay and sand; dark grey. Firm to stiff; moist; sand, fine; (WALTON SUBGROUP).		1.2		2	24	
				3	46	
		1.4		2	13	
				3	51	
		1.6		2	19	
				3	43	
		1.8		2	19	
				2	51	
		2.0		2	27	
EOH: 2.00m					94	
					16	

Groundwater Not Encountered

PHOTO(S)

REMARKS

WATER
- Standing Water Level
- Out flow
- In flow

INVESTIGATION TYPE
- [x] Hand Auger
- [ ] Test Pit

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BTWCOMPANY

INVESTIGATION LOG

HOLE NO.: BH 08

CLIENT: Te Awamutu Development Ltd
PROJECT: Proposed Private Plan Change - Geotechnical Suitability Report
JOB NO.: 211365

SITE LOCATION: 2025 Ohaupo Road, Te Awamutu
START DATE: 03/08/2022
CO-ORDINATES: 1803832mE, 5792697mN
ELEVATION: Ground
END DATE: 03/08/2022
CONTRACTOR: BTW Co. Ltd.
RIG: Hand Auger
DRILLER: Sam Jin
LOGGED BY: Sam Jin

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 100mm)	VANE SHEAR STRENGTH (kPa) Vane: SV 2195 Values	WATER
TOPSOIL.		0.0		1	145	
Sandy SILT, with some iron staining; light grey. Very stiff to hard; dry to moist; sand, fine to medium; (WALTON SUBGROUP).		0.2		3, 7, 4	24, 188+	
		0.4		3	-	
		0.6		3, 2	108, 40	
Silty SAND, with some iron staining and manganese nodules; light grey. Firm to stiff; moist; sand, fine to coarse; (WALTON SUBGROUP).		0.8			54, 22	
Sandy SILT, with minor manganese nodules; light brown. Firm; moist; sand, fine to medium; (WALTON SUBGROUP).		1.0			43, 22	
		1.2			48, 24	
SILT, with minor sand; dark brown. Soft to very stiff; low plasticity; moist; sand, fine; (WALTON SUBGROUP).		1.4		3	135, 24	
		1.6		3, 2	62, 22	03/08/2022
Clayey SILT, with some sand; brown . Stiff; saturated; sand, fine to medium; (WALTON SUBGROUP).		1.8		3	81, 13	
EOH: 2.00m		2.0		3	86, 22	

PHOTO(S)

REMARKS

Tree Root encountered at 0.6 m BEGL.

WATER
- Standing Water Level
- Out flow
- In flow

INVESTIGATION TYPE
- [x] Hand Auger
- [ ] Test Pit

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BTWCOMPANY

INVESTIGATION LOG

HOLE NO.: BH 08.1

CLIENT: Te Awamutu Development Ltd
PROJECT: Proposed Private Plan Change - Geotechnical Suitability Report
JOB NO.: 211365

SITE LOCATION: 2025 Ohaupo Road, Te Awamutu
START DATE: 03/08/2022
CO-ORDINATES: 1803836mE, 5792698mN
ELEVATION: Ground
END DATE: 03/08/2022
CONTRACTOR: BTW Co. Ltd.
RIG: Hand Auger
DRILLER: Sam Jin
LOGGED BY: Sam Jin

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 0mm)	VANE SHEAR STRENGTH (kPa) Vane: SV 2195	WATER
TOPSOIL.		0.0	TS	2 4 6 8 10 12 14 16 18	50 100 150 200 Values	Groundwater Not Encountered
Sandy SILT, with some iron staining and manganese nodules; grey . Very stiff; dry to moist; sand, fine; (WALTON SUBGROUP).		0.2			137	
		0.4			35	
Silty SAND, with some iron staining and manganese nodules and minor rootlets; grey . Very stiff; dry to moist; (WALTON SUBGROUP)		0.6			156	
. EOH: 2.00m		0.8			40	
		1.0			UTP	
		1.2			-	
		1.4				
		1.6				
		1.8				
		2.0				

PHOTO(S)

REMARKS

WATER
- Standing Water Level
- Out flow
- In flow

INVESTIGATION TYPE
- [x] Hand Auger
- [ ] Test Pit

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BTWCOMPANY

INVESTIGATION LOG

HOLE NO.: BH 10

CLIENT: Te Awamutu Development Ltd
PROJECT: Proposed Private Plan Change - Geotechnical Suitability Report
JOB NO.: 211365

SITE LOCATION: 2025 Ohaupo Road, Te Awamutu
START DATE: 03/08/2022
CO-ORDINATES: 1803947mE, 5792719mN
ELEVATION: Ground
END DATE: 03/08/2022
CONTRACTOR: BTW Co. Ltd.
RIG: Hand Auger
DRILLER: Sam Jin
LOGGED BY: Sam Jin

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 100mm)	VANE SHEAR STRENGTH (kPa) Vane: SV 2195 Values	WATER
TOPSOIL.						
Clayey SILT, with some iron staining and minor manganese nodules; light yellowish brown. Very stiff; dry to moist; (WALTON SUBGROUP).		0.2			156	
Clayey SILT, with some iron staining, with minor sand; light brown mottled with some light grey. Stiff to very stiff; dry; sand, fine to medium; (WALTON SUBGROUP).		0.4			40 143 38	
Clayey SILT, with some iron staining and manganese nodules; dark brown. Stiff to hard; non-plastic; moist; (WALTON SUBGROUP).		0.6 0.8 1.0 1.2			83 30 97 27 132 24	03/08/2022
Clayey SILT, with minor manganese nodules, with trace sand; light greyish brown. Stiff to hard; saturated; sand, fine; (WALTON SUBGROUP).		1.4 1.6 1.8			188 - 188 - 105 16 75 27	
EOH: 2.00m		2.0			54 22	

PHOTO(S)

REMARKS

WATER
- Standing Water Level
- Out flow
- In flow

INVESTIGATION TYPE
- [x] Hand Auger
- [ ] Test Pit

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BTWCOMPANY

INVESTIGATION LOG

HOLE NO.: BH 11

CLIENT: Te Awamutu Development Ltd
PROJECT: Proposed Private Plan Change - Geotechnical Suitability Report
JOB NO.: 211365

SITE LOCATION: 2025 Ohaupo Road, Te Awamutu
CO-ORDINATES: 1803950mE, 5792667mN
CONTRACTOR: BTW Co. Ltd. **RIG:** Hand Auger
ELEVATION: Ground
DRILLER: Sam Jin
START DATE: 03/08/2022
END DATE: 03/08/2022
LOGGED BY: Sam Jin

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 100mm)	VANE SHEAR STRENGTH (kPa) Vane: SV 2195 Values	WATER
TOPSOIL.		0	TS	3		
Clayey SILT, with minor sand; dark brown . Very stiff; low plasticity; dry to moist; sand, fine to medium; (PEDOGENIC B HORIZON).		0.2		3 3 3	129 43	
Clayey SILT, with some manganese nodules; light yellowish brown. Stiff to very stiff; low plasticity; dry to moist; (WALTON SUBGROUP).		0.4		3 3 3	129 43 70	
Sandy SILT, with some manganese nodules, with minor clay; grey . Stiff; low plasticity; moist; sand, fine to medium; (WALTON SUBGROUP).		0.6		3 3 3	24 135	
Sandy SILT, with some iron staining; grey with low chroma blue hue. Very stiff; low plasticity; moist to wet; sand, fine to medium; (WALTON SUBGROUP).		0.8		2 3 2	24 188+ -	Groundwater Not Encountered
1.1m - 1.2m: Grey - with no bluish hue		1.0		3	188+	
Sandy SILT; light grey. Low plasticity; moist; sand, fine to medium; (WALTON SUBGROUP).		1.2		3 2	- 188+	
Clayey SILT, with some sand; grey with low chroma bluish hue. Hard; saturated; sand, fine; (WALTON SUBGROUP).		1.4		3 4	- 188+	
EOH: 1.60m		1.6		7 5	-	
		1.8		3 3		
		2.0				

PHOTO(S)

REMARKS

Unable to retrieve sample at 1.6 m BEGL.

WATER
- Standing Water Level
- Out flow
- In flow

INVESTIGATION TYPE
- [x] Hand Auger
- [ ] Test Pit

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BTWCOMPANY

INVESTIGATION LOG

HOLE NO.: BH 12

CLIENT: Te Awamutu Development Ltd
PROJECT: Proposed Private Plan Change - Geotechnical Suitability Report
JOB NO.: 211365

SITE LOCATION: 2025 Ohaupo Road, Te Awamutu
START DATE: 24/08/2022
CO-ORDINATES: 1803995mE, 5792772mN
ELEVATION: Ground
END DATE: 24/08/2022
CONTRACTOR: BTW Co. Ltd.
RIG: Hand Auger
DRILLER: Sam Jin
LOGGED BY: Sam Jin

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 100mm)	VANE SHEAR STRENGTH (kPa) Vane: SV 2195	Values	WATER
TOPSOIL.			TS	2			
Clayey SILT, with minor sand, with trace topsoil; dark brown. Soft; wet; sand, fine; (PEDOGENIC B HORIZON).		0.2		3, 3		38, 8	
Clayey SILT, with some sand; light brown with mottled grey. Stiff to very stiff; low plasticity; dry to moist; sand, fine; (UNCONTROLLED FILL).		0.4, 0.6				140, 40, 86, 13	24/08/2022
Clayey SILT, with some iron staining and minor manganese nodules, with trace sand; grey . Very stiff; moist to wet; sand, fine; (WALTON SUBGROUP).		0.8, 1.0, 1.2, 1.4		1, 2, 2, 2, 2, 3, 3, 3		UTP, -, 188+, -, 188+, -, 188+, -	
Clayey SILT, with some iron staining and minor manganese nodules and sand; grey . Soft to firm; low plasticity; wet; sand, fine to coarse; (WALTON SUBGROUP).		1.6, 1.8		2, 2, 2, 2, 2		48, 19, 38, 11, 27	
EOH: 2.00m		2.0				13	

PHOTO(S)

REMARKS

Large volume of surface water at borehole location. Test undertaken after heavy rain period.

WATER
- Standing Water Level
- Out flow
- In flow

INVESTIGATION TYPE
- [x] Hand Auger
- [ ] Test Pit

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BTWCOMPANY

INVESTIGATION LOG

HOLE NO.: BH 13

CLIENT: Te Awamutu Development Ltd
PROJECT: Proposed Private Plan Change - Geotechnical Suitability Report
JOB NO.: 211365

SITE LOCATION: 2025 Ohaupo Road, Te Awamutu
START DATE: 03/08/2022
CO-ORDINATES: 1803991mE, 5792707mN
ELEVATION: Ground
END DATE: 03/08/2022
CONTRACTOR: BTW Co. Ltd.
RIG: Hand Auger
DRILLER: Sam Jin
LOGGED BY: Sam Jin

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 100mm)	VANE SHEAR STRENGTH (kPa) Vane: SV 2195 Values	WATER
TOPSOIL.		0.0	TS	2, 3	59	
Clayey SILT, with minor iron staining and manganese nodules; light yellowish brown. Stiff to very stiff; low plasticity; dry; (HAMILTON ASH FORMATION).		0.2		2, 3	19	
		0.4		2, 3	86	
		0.6		3, 3	27	
0.6m: Higher clay content Higher iron staining present Higher plasticity		0.8		4, 2	105	
		1.0		2, 2	38	
Clayey SILT, with minor sand, with trace gravel; light yellowish grey. Stiff to very stiff; moist; sand, fine to coarse; gravel, fine; (WALTON SUBGROUP).		1.2		3, 2	83	
		1.4		3, 4	38	
Clayey SILT, with some sand, with trace gravel; greyish brown. Very stiff; low plasticity; moist; sand, fine to coarse; gravel, fine to medium; (WALTON SUBGROUP).		1.6		6, 6	57	
		1.8		8, 7	27	
EOH: 2.00m		2.0		7	94	Groundwater Not Encountered
					27	
					116	
					24	
					110	
					32	
					137	
					54	
					132	
					48	

PHOTO(S)

REMARKS

WATER
- Standing Water Level
- Out flow
- In flow

INVESTIGATION TYPE
- [x] Hand Auger
- [ ] Test Pit

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BTWCOMPANY

INVESTIGATION LOG

HOLE NO.: BH 14

CLIENT: Te Awamutu Development Ltd
PROJECT: Proposed Private Plan Change - Geotechnical Suitability Report
JOB NO.: 211365

SITE LOCATION: 2025 Ohaupo Road, Te Awamutu
START DATE: 12/08/2022
CO-ORDINATES: 1803965mE, 5792589mN
ELEVATION: Ground
END DATE: 12/08/2022
CONTRACTOR: BTW Co. Ltd.
RIG: Hand Auger
DRILLER: Sam Jin
LOGGED BY: Sam Jin

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 100mm)	VANE SHEAR STRENGTH (kPa) Vane: SV 2195 Values	WATER
TOPSOIL.		0.0	TS	3, 3	75	
Clayey SILT, with some sand; dark brown . Very stiff; non-plastic; dry to moist; sand, fine to medium; (HAMILTON ASH FORMATION).		0.2		2, 2	16	
Clayey SILT, with trace sand; light brown. Very stiff; low plasticity; moist; sand, fine; (HAMILTON ASH FORMATION).		0.4		2, 2	110	
		0.6		2, 2	16	
		0.8		2, 2	121	
				2, 2	24	
				2, 2	124	
Clayey SILT, with trace sand; light brown. Very stiff; high plasticity; moist; sand, fine; (HAMILTON ASH FORMATION).		1.0		2, 3	16	
		1.2		3, 3	127	
				3, 3	54	
		1.4		3, 3	162	
Clayey SILT, with trace sand; light yellowish brown. Very stiff to hard; low plasticity; moist; sand, fine; (HAMILTON ASH FORMATION).		1.6		3, 7	51	
				4, 4	162	
		1.8		4, 4	48	
EOH: 2.00m		2.0			188+	
					-	
					170	
					51	
					159	
					51	

Groundwater Not Encountered

PHOTO(S)

REMARKS

WATER
- Standing Water Level
- Out flow
- In flow

INVESTIGATION TYPE
- [x] Hand Auger
- [ ] Test Pit

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BTWCOMPANY

INVESTIGATION LOG

HOLE NO.: BH 15

CLIENT: Te Awamutu Development Ltd
PROJECT: Proposed Private Plan Change - Geotechnical Suitability Report
JOB NO.: 211365

SITE LOCATION: 2025 Ohaupo Road, Te Awamutu
START DATE: 24/08/2022
CO-ORDINATES: 1804102mE, 5792796mN
ELEVATION: Ground
END DATE: 24/08/2022
CONTRACTOR: BTW Co. Ltd.
RIG: Hand Auger
DRILLER: Sam Jin
LOGGED BY: Sam Jin

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 100mm)	VANE SHEAR STRENGTH (kPa) Vane: SV 2195 Values	WATER
TOPSOIL.		0.0	TS	2		
Clayey SILT, with some manganese nodules; brown . Very stiff; low plasticity; dry to moist; (HAMILTON ASH FORMATION).				2	110	
Clayey SILT, with minor manganese nodules; light yellowish brown. Very stiff; low plasticity; dry to moist; (HAMILTON ASH FORMATION).		0.2		3	27	
				2	127	
		0.4		2	27	
				2	132	
		0.6		2	27	
Clayey SILT, with minor manganese nodules; light brown. Stiff to hard; low plasticity; dry to moist; (HAMILTON ASH FORMATION).				1	75	
		0.8		1	30	
				1	188+	
Clayey SILT, with minor sand; brown . Very stiff to hard; high plasticity; dry to moist; sand, fine; (HAMILTON ASH FORMATION).		1.0		6	-	
				7	188+	
		1.2		6	-	
				5	143	
Clayey SILT, with minor sand; light brown. Very stiff; low plasticity; dry to moist; sand, fine to medium, pumiceous; (WALTON SUBGROUP).		1.4		4	43	
				4	151	
		1.6		4	51	
				4	186	
Clayey SILT, with some sand; light brown. Very stiff; low plasticity; moist; sand, fine to medium; (WALTON SUBGROUP).		1.8		5	48	
EOH: 2.00m		2.0		6	175	
					48	

Groundwater Not Encountered

PHOTO(S)

REMARKS

WATER
- Standing Water Level
- Out flow
- In flow

INVESTIGATION TYPE
- [x] Hand Auger
- [ ] Test Pit

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BTWCOMPANY

INVESTIGATION LOG

HOLE NO.: BH 16

CLIENT: Te Awamutu Development Ltd
PROJECT: Proposed Private Plan Change - Geotechnical Suitability Report
JOB NO.: 211365

SITE LOCATION: 2025 Ohaupo Road, Te Awamutu
START DATE: 03/08/2022
CO-ORDINATES: 1804103mE, 5792692mN
ELEVATION: Ground
END DATE: 03/08/2022
CONTRACTOR: BTW Co. Ltd.
RIG: Hand Auger
DRILLER: Sam Jin
LOGGED BY: Sam Jin

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 100mm)	VANE SHEAR STRENGTH (kPa) Vane: SV 2195 Values	WATER
TOPSOIL.		0.0	TS	2, 2	86	
Clayey SILT, with minor sand; dark brown. Stiff; non-plastic; dry to moist; sand, fine to coarse; (PEDOGENIC B HORIZON).		0.2		1	19	
Silty SAND; dark grey mottled with dark brown. Dense; moist to wet; sand, fine to medium; (WALTON SUBGROUP).		0.4			188+	
Sandy SILT, with minor clay; light grey. Firm to stiff; non-plastic; moist; sand, fine; (WALTON SUBGROUP).		0.6		1, 1, 1, 2	113, 40, 70, 13	
Silty SAND, with some manganese nodules; light brown. Medium dense; wet; sand, fine; (WALTON SUBGROUP).		1.0		1, 2	46, 22	
Sandy SILT; light brown. Stiff; saturated; sand, fine to medium; (WALTON SUBGROUP).		1.2		2, 3, 3, 3, 4, 3, 4, 4, 4	100, 13, 67, 16, 75, 13, 86, 22, 83	Groundwater Not Encountered
EOH: 2.00m		2.0			16	

PHOTO(S)

REMARKS

WATER
- Standing Water Level
- Out flow
- In flow

INVESTIGATION TYPE
- [x] Hand Auger
- [ ] Test Pit

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BTWCOMPANY

INVESTIGATION LOG

HOLE NO.: BH 17

CLIENT: Te Awamutu Development Ltd
PROJECT: Proposed Private Plan Change - Geotechnical Suitability Report
JOB NO.: 211365

SITE LOCATION: 2025 Ohaupo Road, Te Awamutu
START DATE: 12/08/2022
CO-ORDINATES: 1804067mE, 5792655mN
ELEVATION: Ground
END DATE: 12/08/2022
CONTRACTOR: BTW Co. Ltd.
RIG: Hand Auger
DRILLER: Sam Jin
LOGGED BY: Sam Jin

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 100mm)	VANE SHEAR STRENGTH (kPa) Vane: SV 2195 Values	WATER
TOPSOIL.		0.0		4		
Clayey SILT, with minor sand; dark brown. Very stiff; low plasticity; dry to moist; sand, fine; (HAMILTON ASH FORMATION).		0.2		4	148	
		0.4		4	40	
Clayey SILT; light brown. Stiff; high plasticity; dry to moist; (HAMILTON ASH FORMATION).		0.6		3	92	
		0.8		3	40	
Clayey SILT, with some sand; light brown. Very stiff to hard; low plasticity; dry to moist; sand, fine to medium; (HAMILTON ASH FORMATION).		1.0		2	100	
		1.2		2	35	
		1.4		2	105	
		1.6		3	30	
		1.8		4	132	
		2.0		4	35	
EOH: 2.00m				5	188+	
				5	-	
				5	140	
				5	40	
				5		
				5		
				5		
				4		
				4		
				5		

Groundwater Not Encountered

PHOTO(S)

REMARKS

WATER
- Standing Water Level
- Out flow
- In flow

INVESTIGATION TYPE
- [x] Hand Auger
- [ ] Test Pit

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BTWCOMPANY

INVESTIGATION LOG

HOLE NO.: BH 18

CLIENT: Te Awamutu Development Ltd
PROJECT: Proposed Private Plan Change - Geotechnical Suitability Report
JOB NO.: 211365

SITE LOCATION: 2025 Ohaupo Road, Te Awamutu
START DATE: 12/08/2022
CO-ORDINATES: 1804203mE, 5792800mN
ELEVATION: Ground
END DATE: 12/08/2022
CONTRACTOR: BTW Co. Ltd.
RIG: Hand Auger
DRILLER: Sam Jin
LOGGED BY: Sam Jin

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 100mm)	VANE SHEAR STRENGTH (kPa) Vane: SV 2195 Values	WATER
TOPSOIL.		0.0	TS	2, 2		
Clayey SILT, with minor sand; brown . Stiff; low plasticity; dry to moist; sand, fine to medium; (HAMILTON ASH FORMATION).		0.2		3	100	
Clayey SILT, with minor manganese nodules; light brown. Very stiff; low plasticity; dry to moist; (HAMILTON ASH FORMATION).		0.4		3, 3	22	
		0.6		2	124	
Clayey SILT; light brown. Stiff; high plasticity; dry to moist; (HAMILTON ASH FORMATION).		0.8		2, 2, 2, 2	24	
		1.0		2, 4	100	
Clayey SILT, with some manganese nodules; light brown. Stiff; high plasticity; moist; (HAMILTON ASH FORMATION).		1.2		3, 4	19	
		1.4		6, 6	86	
Clayey SILT, with some manganese nodules; light brown. Hard; non-plastic; dry to moist; (HAMILTON ASH FORMATION).		1.6		7, 7	35	
		1.8		6, 8, 8	188+	
EOH: 2.00m		2.0			-	
					188+	
					-	
					188+	
					-	Groundwater Not Encountered

PHOTO(S)

REMARKS

WATER
- Standing Water Level
- Out flow
- In flow

INVESTIGATION TYPE
- [x] Hand Auger
- [ ] Test Pit

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BTWCOMPANY

INVESTIGATION LOG

HOLE NO.: BH 19

CLIENT: Te Awamutu Development Ltd
PROJECT: Proposed Private Plan Change - Geotechnical Suitability Report
JOB NO.: 211365

SITE LOCATION: 2025 Ohaupo Road, Te Awamutu
START DATE: 12/08/2022
CO-ORDINATES: 1804147mE, 5792656mN
ELEVATION: Ground
END DATE: 12/08/2022
CONTRACTOR: BTW Co. Ltd.
RIG: Hand Auger
DRILLER: Sam Jin
LOGGED BY: Sam Jin

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 100mm)	VANE SHEAR STRENGTH (kPa) Vane: SV 2195	WATER
Topsoil SILT, with some gravel. Gravel, fine to medium; (TOPSOIL).		0.0	TS	3, 5, 3	UTP	
Clayey SILT, with trace sand; light brown. Stiff; low plasticity; moist; sand, fine; (HAMILTON ASH FORMATION) .		0.4		2, 2, 3, 3	92, 22	
		0.8		2, 2, 3, 3	97, 27	
Sandy SILT, with some clay; grey brown. Very stiff; low plasticity; moist to wet; (WALTON SUBGROUP).		1.2		6, 5, 5	188+	Groundwater Not Encountered
		1.6		3, 3, 3, 3, 3	183, 38, 135, 30	
EOH: 2.00m		2.0		4	132, 19	

PHOTO(S)

REMARKS

WATER
- Standing Water Level
- Out flow
- In flow

INVESTIGATION TYPE
- [x] Hand Auger
- [ ] Test Pit

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BTWCOMPANY

INVESTIGATION LOG

HOLE NO.: BH 21

CLIENT: Te Awamutu Development Ltd
PROJECT: Proposed Private Plan Change - Geotechnical Suitability Report
JOB NO.: 211365

SITE LOCATION: 2025 Ohaupo Road, Te Awamutu
START DATE: 24/08/2022
CO-ORDINATES: 1804272mE, 5792636mN
ELEVATION: Ground
END DATE: 24/08/2022
CONTRACTOR: BTW Co. Ltd.
RIG: Hand Auger
DRILLER: Sam Jin
LOGGED BY: Sam Jin

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 100mm)	VANE SHEAR STRENGTH (kPa) Vane: SV 2195 Values	WATER
TOPSOIL.		0.0	TS	3	100	
Clayey SILT, with minor manganese nodules; brown . Stiff; low plasticity; dry to moist; (HAMILTON ASH FORMATION).		0.2		4	30	
				4	108	
		0.4		3	27	
				3	92	
		0.6		3	22	
Clayey SILT, with some manganese nodules; light yellowish brown. Very stiff; low plasticity; moist; (HAMILTON ASH FORMATION).				6	170	
		0.8		4	43	
				4	178	
		1.0		5	54	
				4	162	
		1.2		5	38	
				4	167	
		1.4		4	35	
				4	UTP	
Clayey SILT, with minor sand; light brown. Stiff; low plasticity; moist; sand, fine to medium; (HAMILTON ASH FORMATION).		1.6		4	-	
				3	92	
		1.8		3	30	
				3	100	
EOH: 2.00m		2.0		3	24	

Groundwater Not Encountered

PHOTO(S)

REMARKS

WATER
- Standing Water Level
- Out flow
- In flow

INVESTIGATION TYPE
- [x] Hand Auger
- [ ] Test Pit

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BTWCOMPANY

INVESTIGATION LOG

HOLE NO.: BH 22

CLIENT: Te Awamutu Development Ltd
PROJECT: Proposed Private Plan Change - Geotechnical Suitability Report
JOB NO.: 211365

SITE LOCATION: 2025 Ohaupo Road, Te Awamutu
START DATE: 24/08/2022
CO-ORDINATES: 1804290mE, 5792719mN
ELEVATION: Ground
END DATE: 24/08/2022
CONTRACTOR: BTW Co. Ltd.
RIG: Hand Auger
DRILLER: Sam Jin
LOGGED BY: Sam Jin

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 100mm)	VANE SHEAR STRENGTH (kPa) Vane: SV 2195	94 Values	WATER
TOPSOIL.						-	
Clayey SILT, with trace sand; dark brown. Very stiff; non-plastic; moist; sand, fine; (PEDOGENIC B. HORIZON).		0.2				110	
Clayey SILT, with minor manganese nodules; light yellowish brown. Very stiff; low plasticity; dry to moist; (HAMILTON ASH FORMATION).		0.4				27	
		0.6				113	
		0.8				24	
Clayey SILT, with minor manganese nodules and sand; light brown. Firm to stiff; low plasticity; moist; sand, fine to medium, pumiceous sand; (HAMILTON ASH FORMATION).		1.0				110	
		1.2				30	
		1.4				73	
		1.6				24	
		1.8				65	
Clayey SILT, with minor sand; grey brown. Very stiff; low plasticity; moist; sand, fine to medium, pumiceous sand; (WALTON SUBGROUP).		2.0				22	
Sandy SILT, with some iron staining; grey . Very stiff; low plasticity; moist; sand, fine to coarse, pumiceous sand; (WALTON SUBGROUP) . EOH: 2.00m						48	
						16	
						67	
						22	
						94	
						27	
						148	
						38	
						148	
						38	

PHOTO(S)

REMARKS

Perched water encountered at 0.2 mm BEGL.

WATER
- Standing Water Level
- Out flow
- In flow

INVESTIGATION TYPE
- [x] Hand Auger
- [ ] Test Pit

Generated with CORE-GS by Geroc - Hand Auger - scala & vane bars - 24/11/2022 8:52:47 am

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BTWCOMPANY

INVESTIGATION LOG

HOLE NO.: BH 23

CLIENT: Te Awamutu Development Ltd
PROJECT: Proposed Private Plan Change - Geotechnical Suitability Report
JOB NO.: 211365

SITE LOCATION: 2025 Ohaupo Road, Te Awamutu
START DATE: 24/08/2022
CO-ORDINATES: 1804378mE, 5792750mN
ELEVATION: Ground
END DATE: 24/08/2022
CONTRACTOR: BTW Co. Ltd.
RIG: Hand Auger
DRILLER: Sam Jin
LOGGED BY: Sam Jin

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 100mm)	VANE SHEAR STRENGTH (kPa) Vane: SV 2195 Values	WATER
TOPSOIL.		0.0	TS	2		
Clayey SILT, with minor manganese nodules; light yellowish brown. Very stiff; low plasticity; dry to moist; (HAMILTON ASH FORMATION).		0.2		1, 1	159, 32	
		0.4		2, 2	162, 40	
		0.6		2, 1	137, 35	
		0.8		2, 2	113, 24	
		1.0		1, 3	105, 24	
Clayey SILT, with minor manganese nodules and sand; light brown. Stiff; low plasticity; moist; sand, fine; (HAMILTON ASH FORMATION).		1.2		3, 2	94, 27	
		1.4		3, 3	92, 24	
Sandy SILT, with minor iron staining. Stiff; low plasticity; moist; sand, fine to medium; (HAMILTON ASH FORMATION).		1.6		4, 13	188+, -	
Clayey SILT, with some sand, with minor manganese nodules and iron staining ; light brown. Hard; low plasticity; moist; sand, fine to medium; (HAMILTON ASH FORMATION).		1.8		11, 9	188+, -	
EOH: 2.00m		2.0		13	188+, -	Groundwater Not Encountered

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PHOTO(S)

REMARKS

WATER
- Standing Water Level
- Out flow
- In flow

INVESTIGATION TYPE
- [x] Hand Auger
- [ ] Test Pit

Page 1 of 1

BTWCOMPANY

INVESTIGATION LOG

HOLE NO.: BH 24

CLIENT: Te Awamutu Development Ltd
PROJECT: Proposed Private Plan Change - Geotechnical Suitability Report
JOB NO.: 211365

SITE LOCATION: 2025 Ohaupo Road, Te Awamutu
START DATE: 24/08/2022
CO-ORDINATES: 1804341mE, 5792631mN
ELEVATION: Ground
END DATE: 24/08/2022
CONTRACTOR: BTW Co. Ltd.
RIG: Hand Auger
DRILLER: Sam Jin
LOGGED BY: Sam Jin

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 100mm)	VANE SHEAR STRENGTH (kPa) Vane: SV 2195 Values	WATER
TOPSOIL.				2, 2	148	
Clayey SILT, with minor manganese nodules. Stiff; low plasticity; dry to moist; (HAMILTON ASH FORMATION).		0.2		2, 3	46	
		0.4		2, 2	83	
		0.6		2, 3	35	
		0.8		2, 2	92	
		1.0		3, 3	30	
		1.2		6, 10	81	
Clayey SILT, with some manganese nodules and iron staining, with trace sand; brown . Hard; low plasticity; dry to moist; sand, fine; (HAMILTON ASH FORMATION).				15	22	
Clayey SILT, with minor manganese nodules and iron staining, with trace sand; brown . Hard, low plasticity; dry; sand, fine; (PALEOSOL LAYER).		1.4		26 >>	86	
Clayey SILT, with minor manganese nodules and iron staining; light brown. Hard; dry; (HAMILTON ASH FORMATION).		1.6		10, 10	16	
		1.8		9, 8	188+	
EOH: 2.00m		2.0		9	188+	

Groundwater Not Encountered

PHOTO(S)

REMARKS

WATER
- Standing Water Level
- Out flow
- In flow

INVESTIGATION TYPE
- [x] Hand Auger
- [ ] Test Pit

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BTWCOMPANY

INVESTIGATION LOG

HOLE NO.: BH 25

CLIENT: Te Awamutu Development Ltd
PROJECT: Proposed Private Plan Change - Geotechnical Suitability Report
JOB NO.: 211365

SITE LOCATION: 2025 Ohaupo Road, Te Awamutu
START DATE: 24/08/2022
CO-ORDINATES: 1804375mE, 5792556mN
ELEVATION: Ground
END DATE: 24/08/2022
CONTRACTOR: BTW Co. Ltd.
RIG: Hand Auger
DRILLER: Sam Jin
LOGGED BY: Sam Jin

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 100mm)	VANE SHEAR STRENGTH (kPa) Vane: SV 2195 Values	WATER
TOPSOIL.		0	TS	2		
Clayey SILT, with some manganese nodules; dark brown. Very stiff; low plasticity; dry to moist; (HAMILTON ASH FORMATION).		0.2		3 3 3	121 24	
		0.4		2 3	175 38	
Clayey SILT, with minor manganese nodules; light brown. Very stiff; low plasticity; dry to moist; (HAMILTON ASH FORMATION).		0.6		2 2	164 43	
		0.8		3 4	151 30	
		1.0		5 6	143 24	
		1.2		9 12	116 32	
Clayey SILT, with some manganese nodules; brown . Hard; low plasticity; dry to moist; (HAMILTON ASH FORMATION).		1.4		9 8	188+ -	
		1.6		8 8	188+ -	
		1.8		8 8	188+ -	
EOH: 2.00m		2.0		9	188+ -	

Groundwater Not Encountered

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PHOTO(S)

REMARKS

WATER
- Standing Water Level
- Out flow
- In flow

INVESTIGATION TYPE
- [x] Hand Auger
- [ ] Test Pit

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BTWCOMPANY

INVESTIGATION LOG

HOLE NO.: BH 26

CLIENT: Te Awamutu Development Ltd
PROJECT: Proposed Private Plan Change - Geotechnical Suitability Report
JOB NO.: 211365

SITE LOCATION: 2025 Ohaupo Road, Te Awamutu
START DATE: 24/08/2022
CO-ORDINATES: 1804247mE, 5792507mN
ELEVATION: Ground
END DATE: 24/08/2022
CONTRACTOR: BTW Co. Ltd.
RIG: Hand Auger
DRILLER: Sam Jin
LOGGED BY: Sam Jin

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 100mm)	VANE SHEAR STRENGTH (kPa) Vane: SV 2195 Values	WATER
TOPSOIL.		0.0	TS	1		
Clayey SILT, with minor manganese nodules; light brown . Stiff to very stiff; low plasticity; dry to moist; (HAMILTON ASH FORMATION).		0.2		2, 1, 2	62, 22, 100	
		0.4		1, 2, 2	27, 121, 38	
		0.6		2, 2, 2	110, 27, 110	
		0.8		2, 2, 2	22, UTP, UTP	
		1.0		2, 3	UTP, -	
Clayey SILT, with trace sand; light brown. Hard; low plasticity; dry; sand, fine; (PALEOSOL LAYER).		1.2		13, 16		
EOH: 2.00m		1.4		11, 7		
		1.6		7, 7		
		1.8		7, 8		
		2.0		9		

Groundwater Not Encountered

PHOTO(S)

REMARKS

Unable to retrieve sample at 1.4 m BEGL.

WATER
- Standing Water Level
- Out flow
- In flow

INVESTIGATION TYPE
- [x] Hand Auger
- [ ] Test Pit

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BTWCOMPANY

INVESTIGATION LOG

HOLE NO.: BH 27

CLIENT: Te Awamutu Development Ltd
PROJECT: Proposed Private Plan Change - Geotechnical Suitability Report
JOB NO.: 211365

SITE LOCATION: 2025 Ohaupo Road, Te Awamutu
START DATE: 24/08/2022
CO-ORDINATES: 1804486mE, 5792726mN
ELEVATION: Ground
END DATE: 24/08/2022
CONTRACTOR: BTW Co. Ltd.
RIG: Hand Auger
DRILLER: Sam Jin
LOGGED BY: Sam Jin

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 100mm)	VANE SHEAR STRENGTH (kPa) Vane: SV 2195 Values	WATER
TOPSOIL.		0.0	TS	1	105	
Clayey SILT, with minor manganese nodules; light brown. Stiff to hard; low plasticity; dry to moist; (HAMILTON ASH FORMATION).		0.2		2, 3	24	
		0.4		3, 3	188+	
		0.6		3, 2	89	
		0.8		2, 2	30	
		1.0		2, 2	94	
Sandy SILT, with some iron staining; whitish grey. Low plasticity; dry to moist; sand, fine to medium, pumiceous sandy SILT; Halloysite Layer. (HAMILTON ASH FORMATION).				2, 2	32	
Clayey SILT, with minor manganese nodules; light brown. Stiff; low plasticity; dry to moist; (HAMILTON ASH FORMATION).		1.2		2, 4	62	
				4, 5	24	
Clayey SILT, with minor manganese nodules; brown . Hard; low plasticity; dry to moist; (HAMILTON ASH FORMATION).		1.4		8, 8	108	
		1.6		9, 8	30	
		1.8		9, 9	188	
EOH: 2.00m		2.0			51	
					188+	
					UTP	
					188+	

Groundwater Not Encountered

PHOTO(S)

REMARKS

WATER
- Standing Water Level
- Out flow
- In flow

INVESTIGATION TYPE
- [x] Hand Auger
- [ ] Test Pit

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BTWCOMPANY

INVESTIGATION LOG

HOLE NO.: BH 28

CLIENT: Te Awamutu Development Ltd
PROJECT: Proposed Private Plan Change - Geotechnical Suitability Report
JOB NO.: 211365

SITE LOCATION: 2025 Ohaupo Road, Te Awamutu
START DATE: 24/08/2022
CO-ORDINATES: 1804454mE, 5792538mN
ELEVATION: Ground
END DATE: 24/08/2022
CONTRACTOR: BTW Co. Ltd.
RIG: Hand Auger
DRILLER: Sam Jin
LOGGED BY: Sam Jin

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 100mm)	VANE SHEAR STRENGTH (kPa) Vane: SV 2195 Values	WATER
TOPSOIL.		0.0	TS	2, 2	70	
Clayey SILT, with minor manganese nodules; light brown . Very stiff; low plasticity; dry to moist; (HAMILTON ASH FORMATION).		0.2		3, 2, 2, 2, 2, 2, 2, 2, 2	22, 135, 32, 148, 27, 110, 35, 116, 38	
Clayey SILT, with minor manganese nodules; brown . Hard; low plasticity; dry to moist; (HAMILTON ASH FORMATION).		1.2		5, 4, 5, 4, 5, 5, 5, 7	170, 54, 188+, -, 188+, -, 188+, -, UTP, -	Groundwater Not Encountered
EOH: 2.00m		2.0				

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PHOTO(S)

REMARKS

WATER
- Standing Water Level
- Out flow
- In flow

INVESTIGATION TYPE
- [x] Hand Auger
- [ ] Test Pit

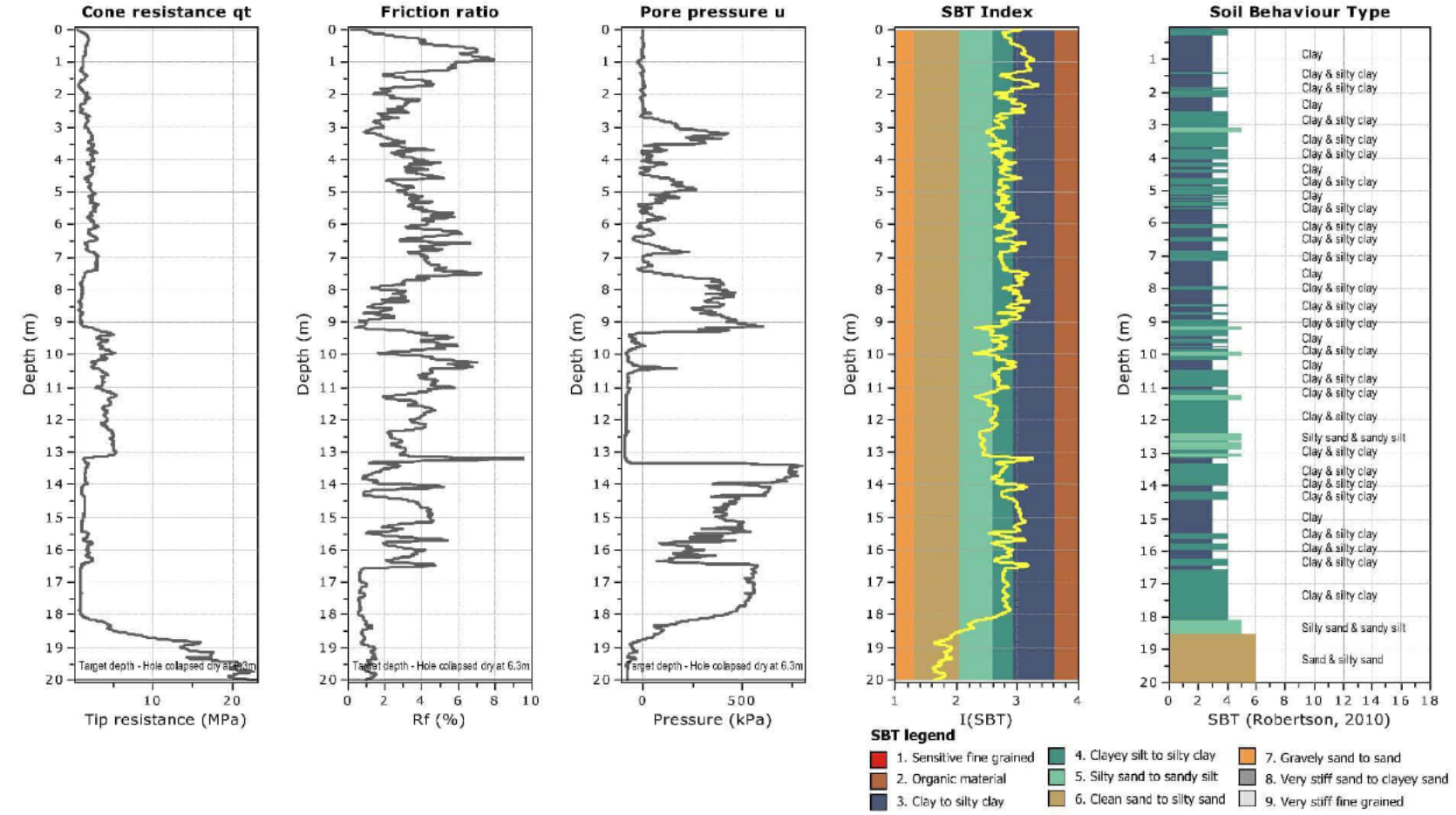
Page 1 of 1

GDS GEO DATA SOLUTIONS

Geo Data Solutions (GDS) NZ Ltd.
Email: [redacted]
www.gdsnz.co.nz

CPT: 01
Total depth: 20.01 m, Date: 5/05/2026
Coords: lat -37.990171° lon 175.326904°
Cone Type: DC10

Project: **Titus Consulting Engineers | C3102 | GDS NZ Ltd**
Location: **2025 Ohaupo Road, Te Awamutu | Holes dipped onsite using Dipmeter**

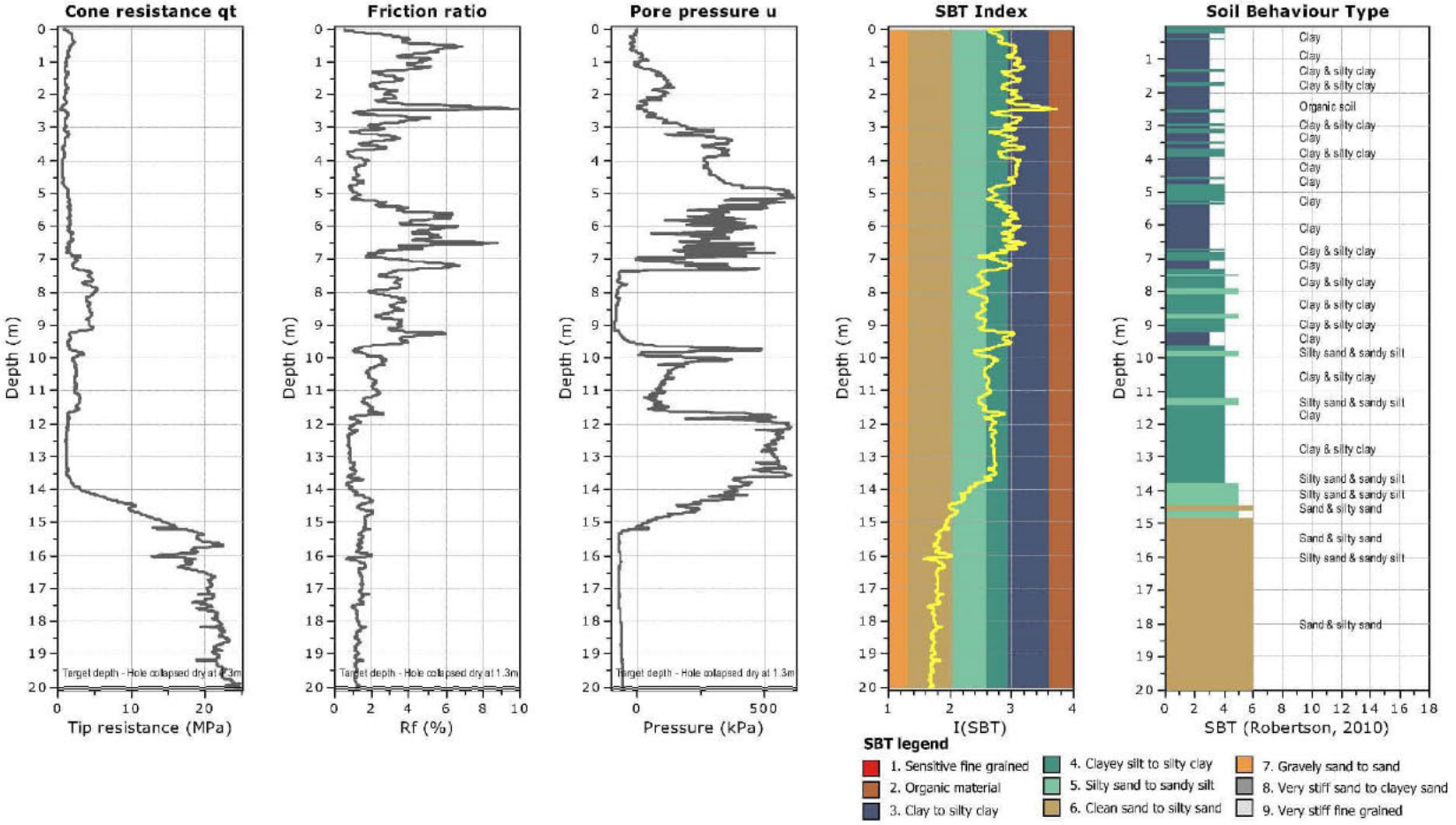


GDS
GEO DATA SOLUTIONS

Geo Data Solutions (GDS) NZ Ltd.
Email: [redacted]
www.gdsnz.co.nz

CPT: 02
Total depth: 20.02 m, Date: 5/05/2026
Coords: lat -37.990236° lon 175.324275°
Cone Type: DC10

Project: Titus Consulting Engineers | C3102 | GDS NZ Ltd
Location: 2025 Ohaupo Road, Te Awamutu | Holes dipped onsite using Dipmeter

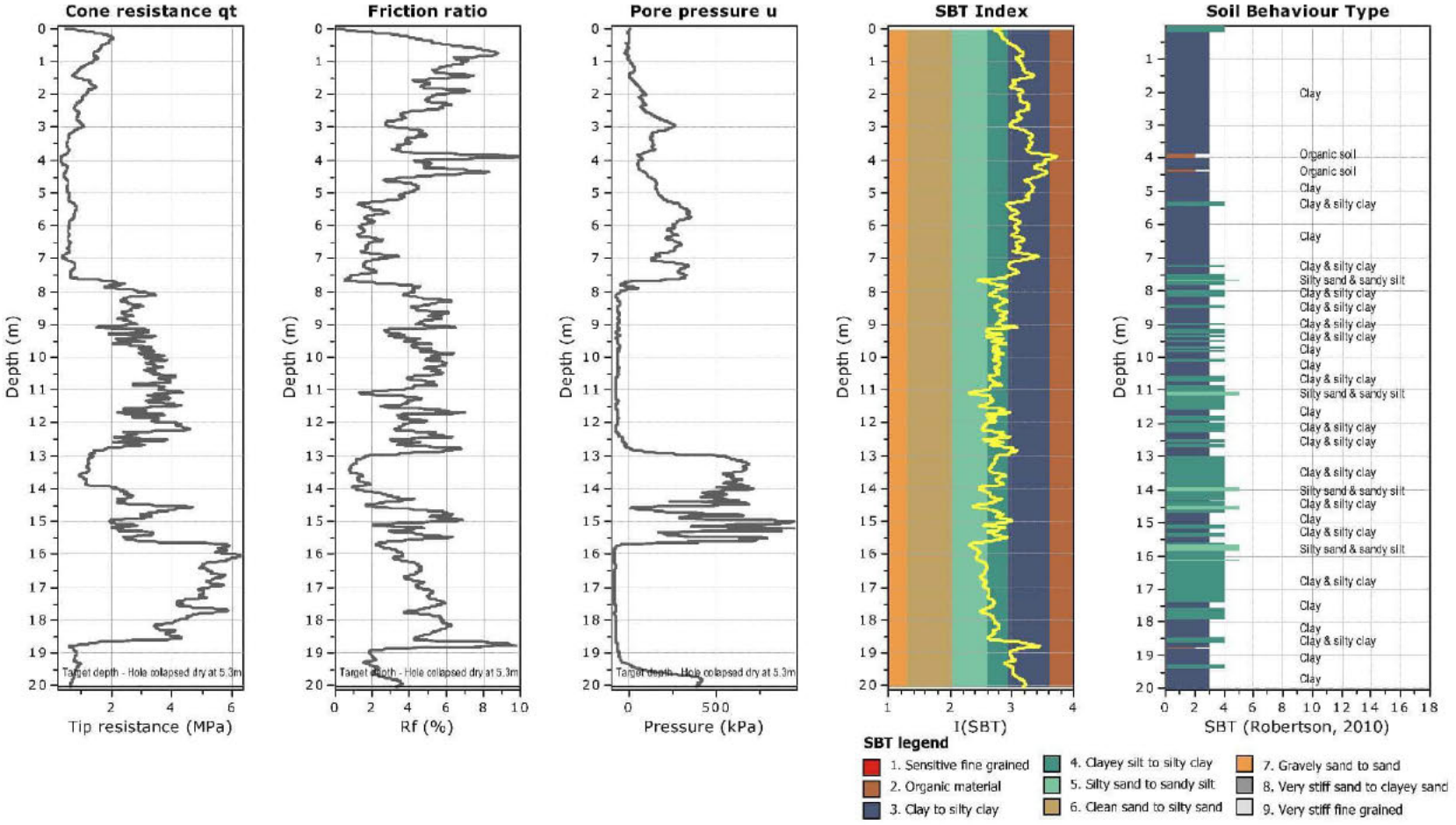


GDS
GEO DATA SOLUTIONS

Geo Data Solutions (GDS) NZ Ltd.
Email: [redacted]
www.gdsnz.co.nz

CPT: 03
Total depth: 20.03 m, Date: 5/05/2026
Coords: lat -37.991498° lon 175.324068°
Cone Type: DC10

Project: Titus Consulting Engineers | C3102 | GDS NZ Ltd
Location: 2025 Ohaupo Road, Te Awamutu | Holes dipped onsite using Dipmeter



CPeT-IT v.3.9.7.6 - CPTU data presentation & interpretation software - Report created on: 5/05/2026, 4:30:29 pm

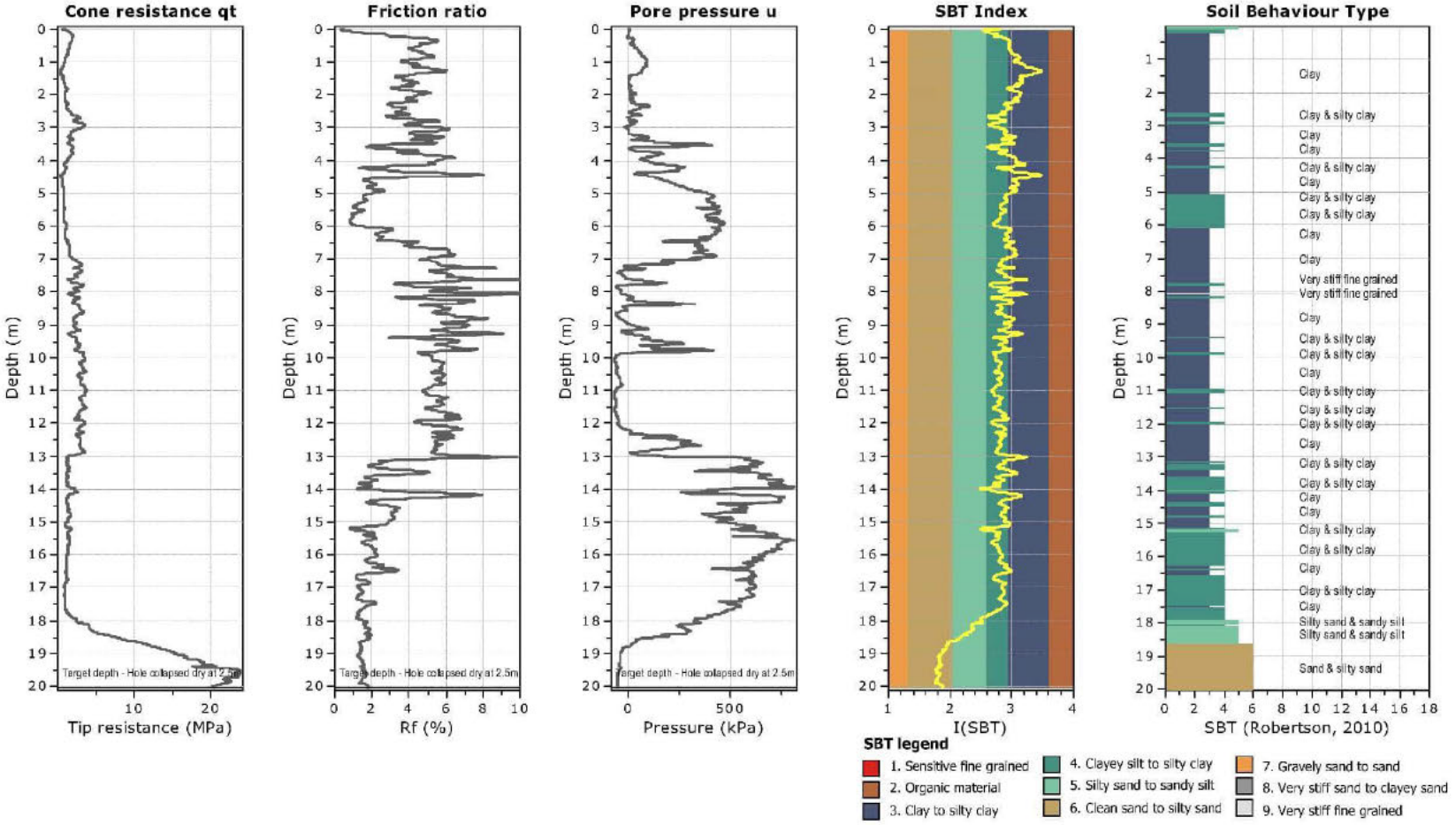
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GDS GEO DATA SOLUTIONS

Geo Data Solutions (GDS) NZ Ltd.
Email: [redacted]
www.gdsnz.co.nz

CPT: 04
Total depth: 20.04 m, Date: 5/05/2026
Coords: lat -37.991343° lon 175.320941°
Cone Type: DC10

Project: Titus Consulting Engineers | C3102 | GDS NZ Ltd
Location: 2025 Ohaupo Road, Te Awamutu | Holes dipped onsite using Dipmeter



CPeT-IT v.3.9.7.6 - CPTU data presentation & interpretation software - Report created on: 5/05/2026, 4:30:30 pm

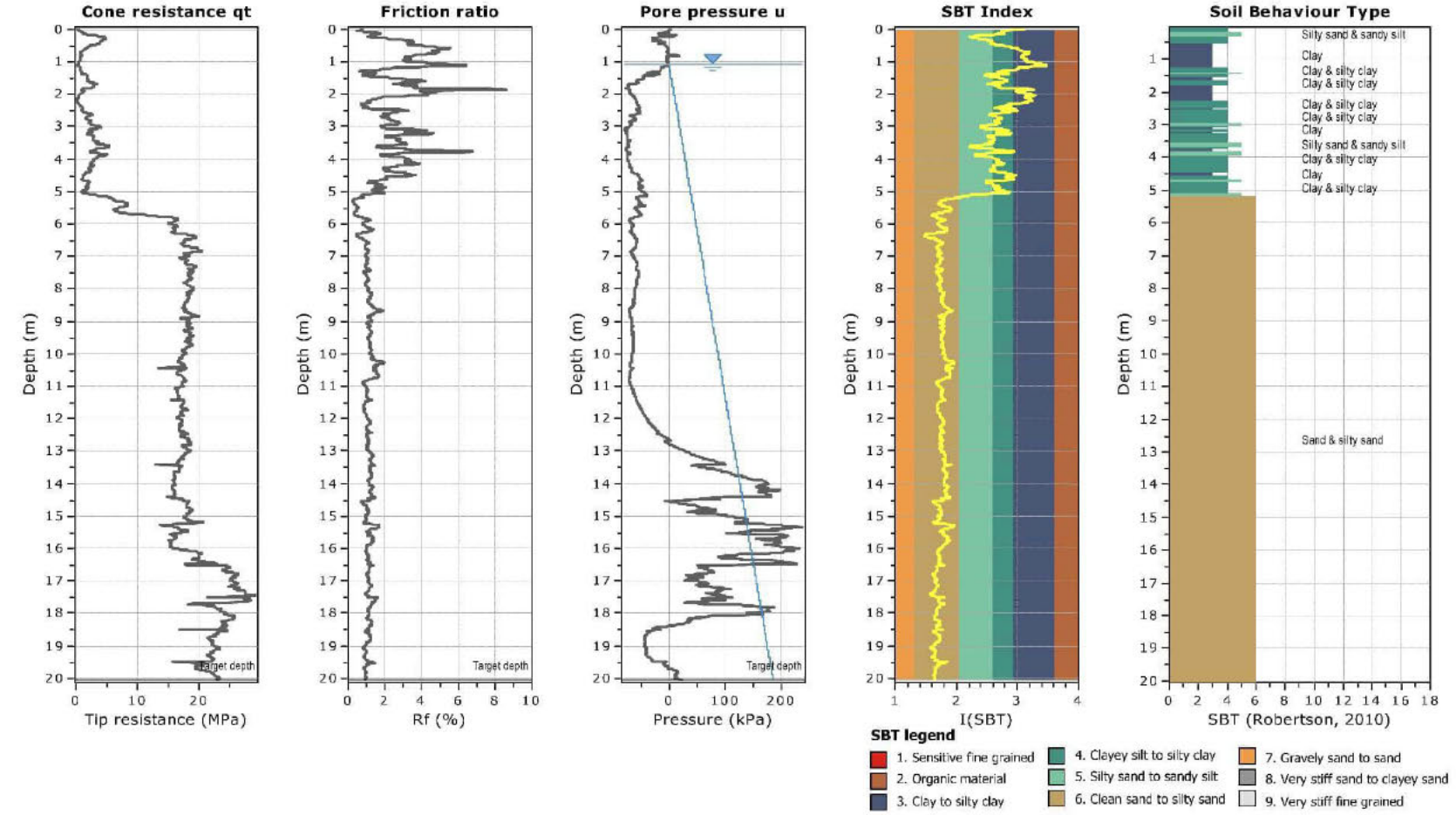
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GDS GEO DATA SOLUTIONS

Geo Data Solutions (GDS) NZ Ltd.
Email: [redacted]
www.gdsnz.co.nz

CPT: 05
Total depth: 20.05 m, Date: 5/05/2026
Coords: lat -37.990505° lon 175.320794°
Cone Type: DC10

Project: **Titus Consulting Engineers | C3102 | GDS NZ Ltd**
Location: **2025 Ohaupo Road, Te Awamutu | Holes dipped onsite using Dipmeter**

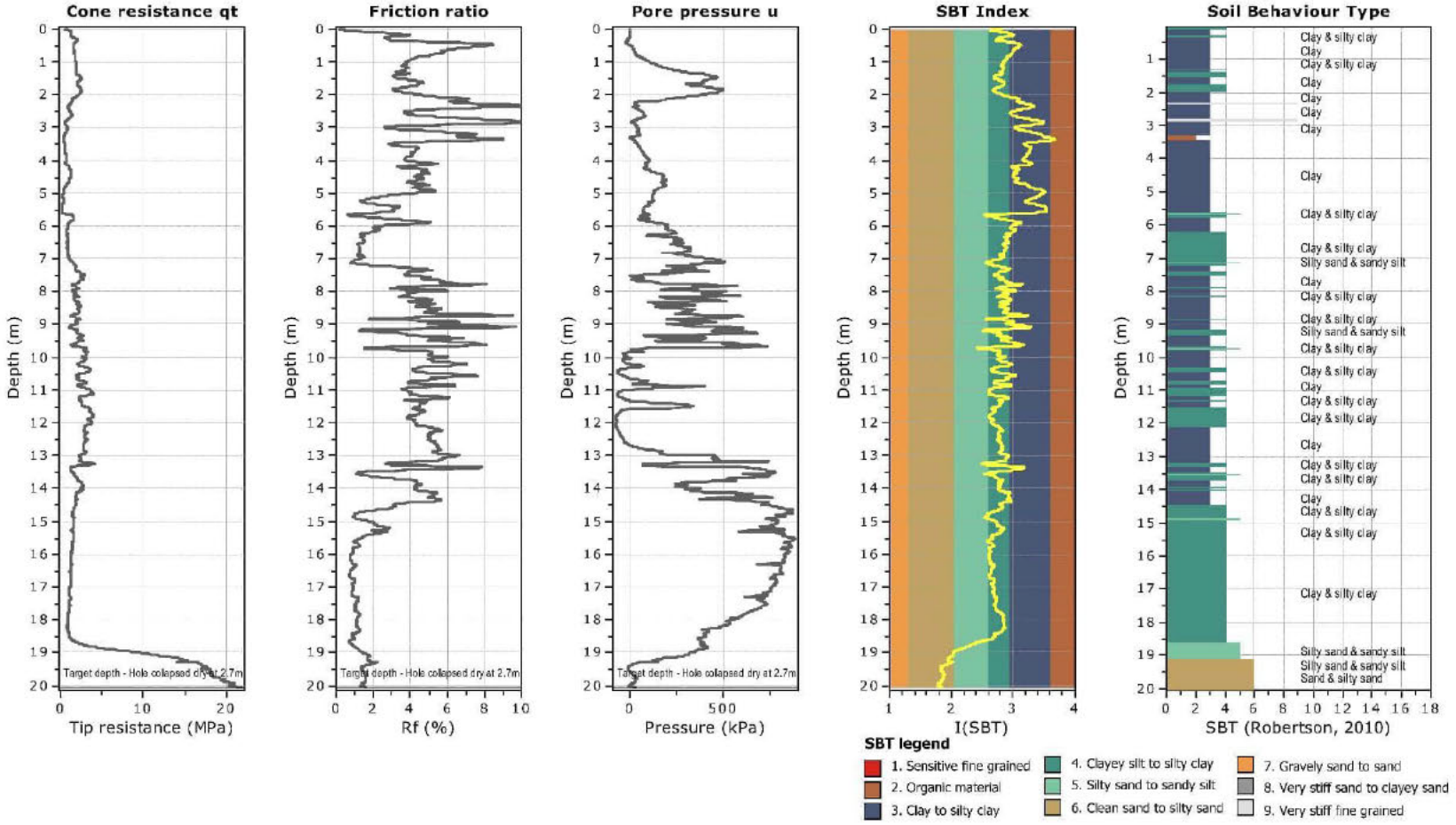


GDS GEO DATA SOLUTIONS

Geo Data Solutions (GDS) NZ Ltd.
Email: [redacted]
www.gdsnz.co.nz

CPT: 06
Total depth: 20.06 m, Date: 5/05/2026
Coords: lat -37.990064° lon 175.317676°
Cone Type: DC10

Project: Titus Consulting Engineers | C3102 | GDS NZ Ltd
Location: 2025 Ohaupo Road, Te Awamutu | Holes dipped onsite using Dipmeter

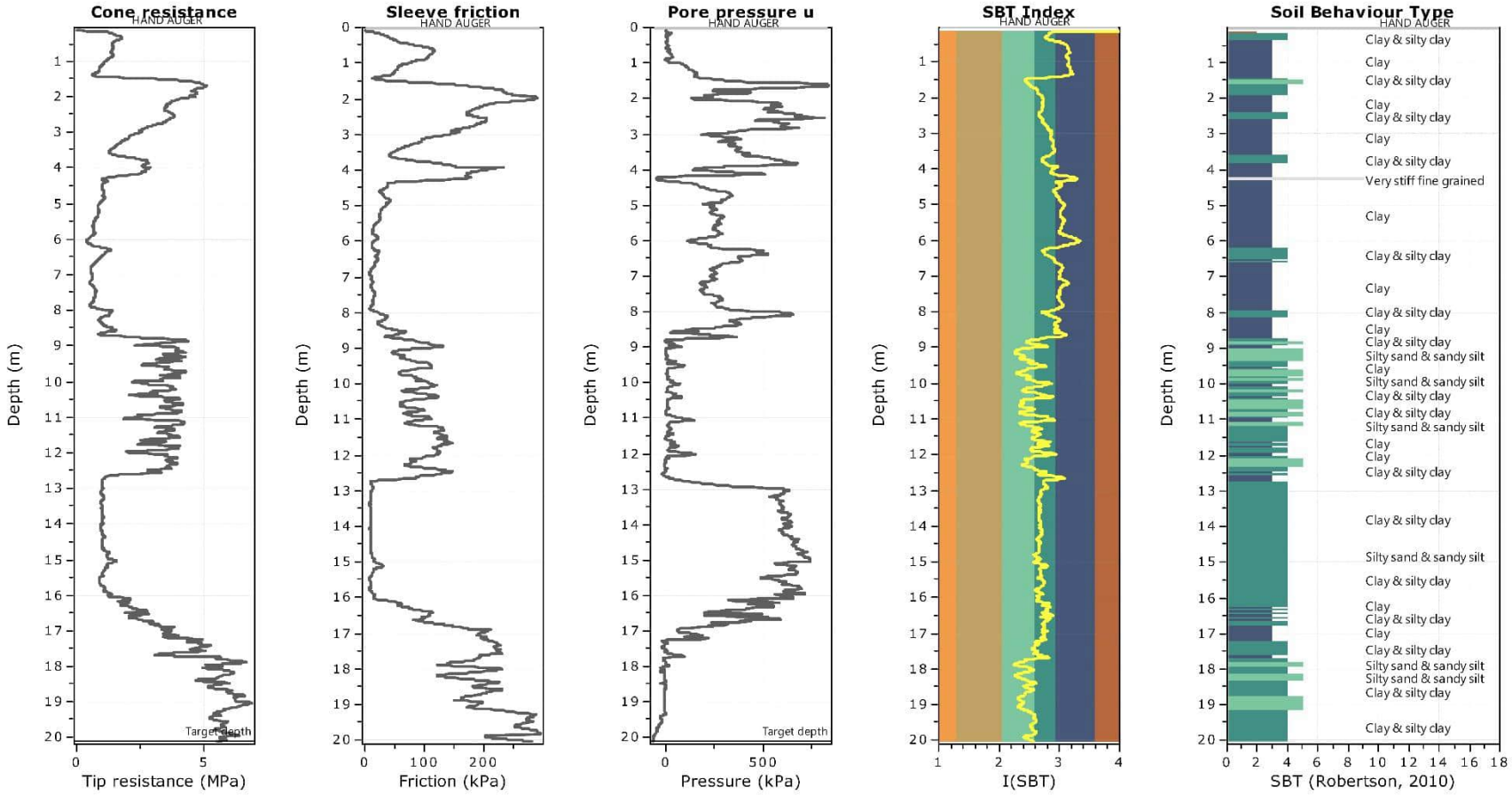


TITUS
CONSULTING ENGINEERS

Titus Consulting Engineers
169 London Street
Hamilton

CPT: CPT-01 BTW
Total depth: 20.10 m, Date: 28/06/2022
Surface Elevation: 0.00 m, Est. GWL: Collapsed dry 5.00m
Coords: X:449564.59, Y:676634.20
Cone Type:
Cone Operator: Topdrill

Project: C3102
Location: 2025 Ohaupo Road, Te Awamuutu



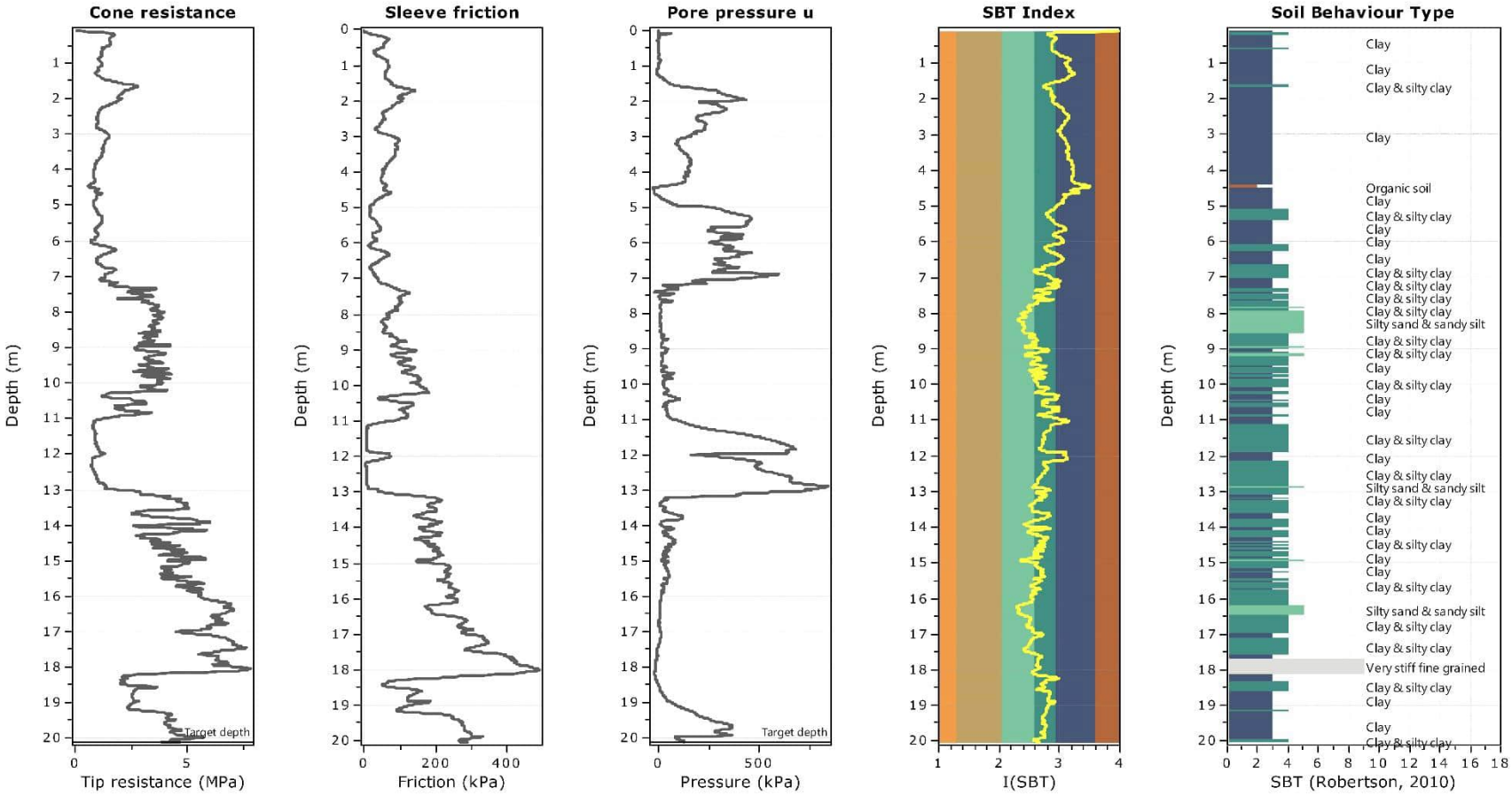
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0

Titus Consulting Engineers
169 London Street
Hamilton

CPT: CPT-02 BTW
Total depth: 20.10 m, Date: 28/06/2022
Surface Elevation: 0.00 m, Est. GWL: Collapsed dry 3.00m
Coords: X:449468.89, Y:676499.80
Cone Type:
Cone Operator: Topdrill

Project: C3102
Location: 2025 Ohaupo Road, Te Awamuutu



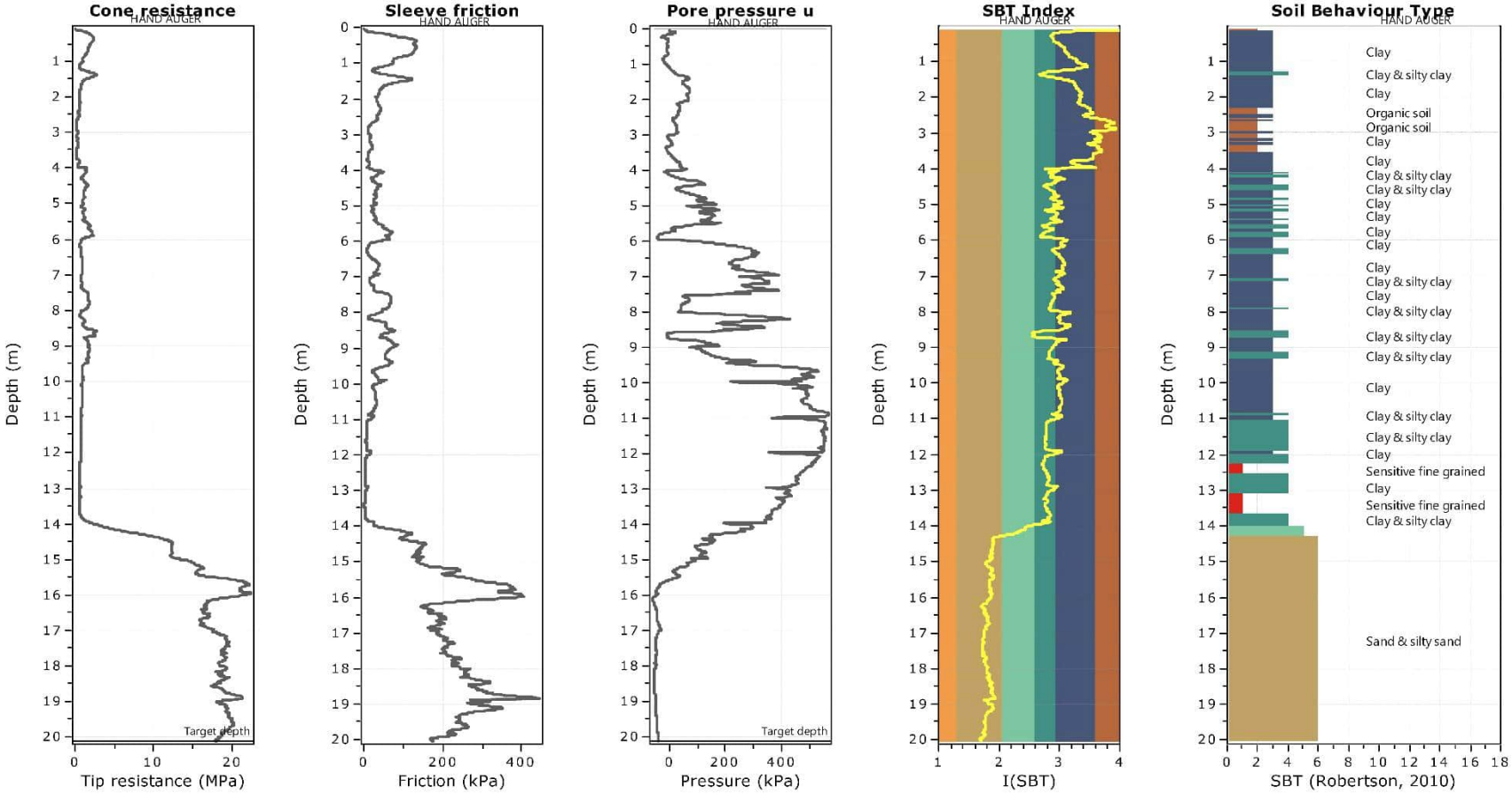
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Titus Consulting Engineers
169 London Street
Hamilton

CPT: CPT-03 BTW
Total depth: 20.10 m, Date: 28/06/2022
Surface Elevation: 0.00 m, Est. GWL: Collapsed dry 2.00m
Coords: X:449283.39, Y:676565.00
Cone Type:
Cone Operator: Topdrill

Project: C3102
Location: 2025 Ohaupo Road, Te Awamuutu



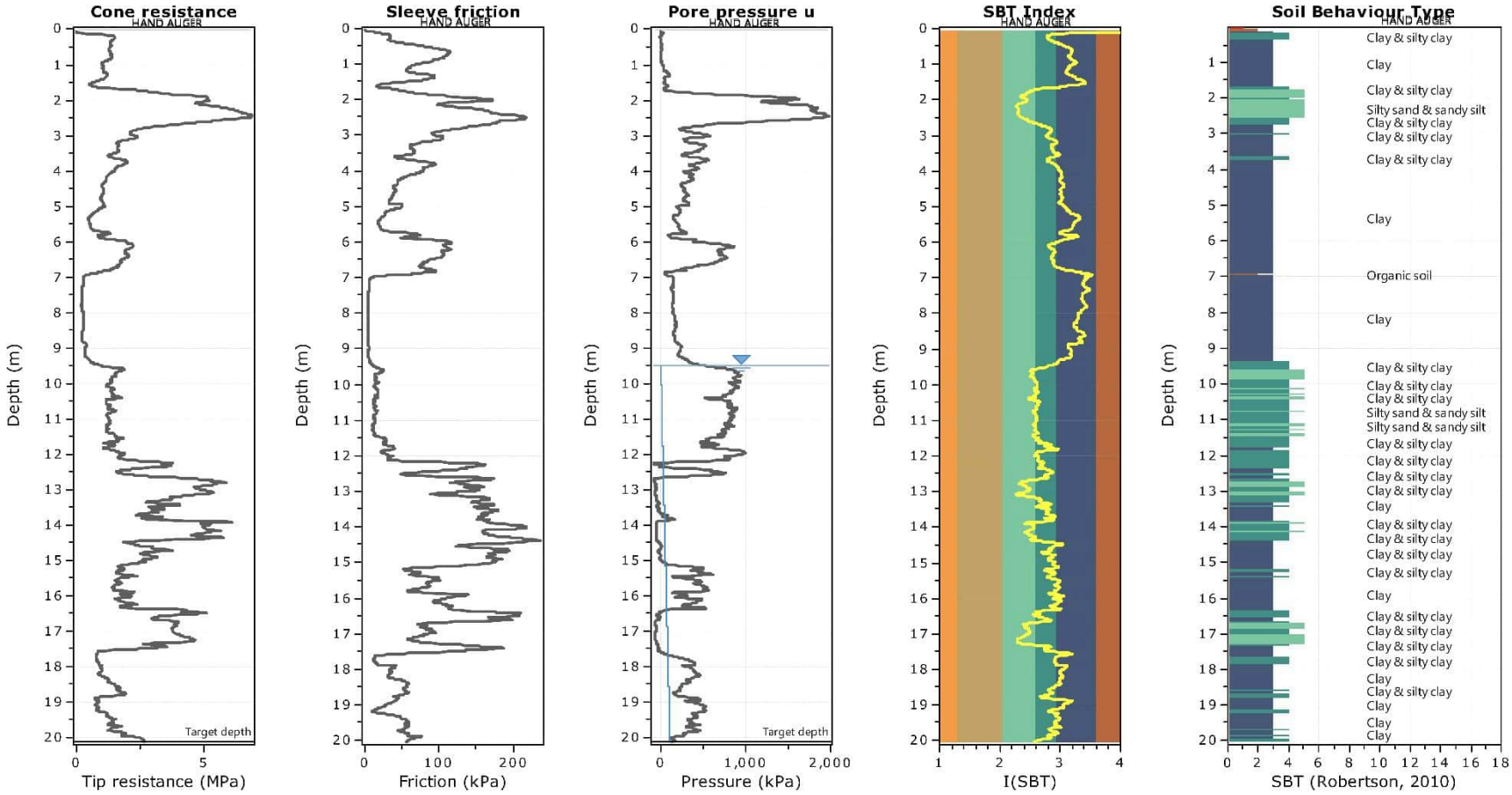
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Titus Consulting Engineers
169 London Street
Hamilton

CPT: CPT-04 BTW
Total depth: 20.10 m, Date: 28/06/2022
Surface Elevation: 0.00 m, Est. GWL: 9.50 m
Coords: X:449228.09, Y:676711.50
Cone Type:
Cone Operator: Topdrill

Project: C3102
Location: 2025 Ohaupo Road, Te Awamuutu



CPeT-IT v.3.9.7.3 - CPTU data presentation & interpretation software - Report created on: 20/05/2026, 9:55:46 am
Project file: G:\Shared drives\Civil - C3100\C3102 - 2025 Ohaupo Road, Te Awamutu, Te Awamutu Developments Limited\Des\Geo\Slope Stability\C3102-CPeT-BTW.cpt

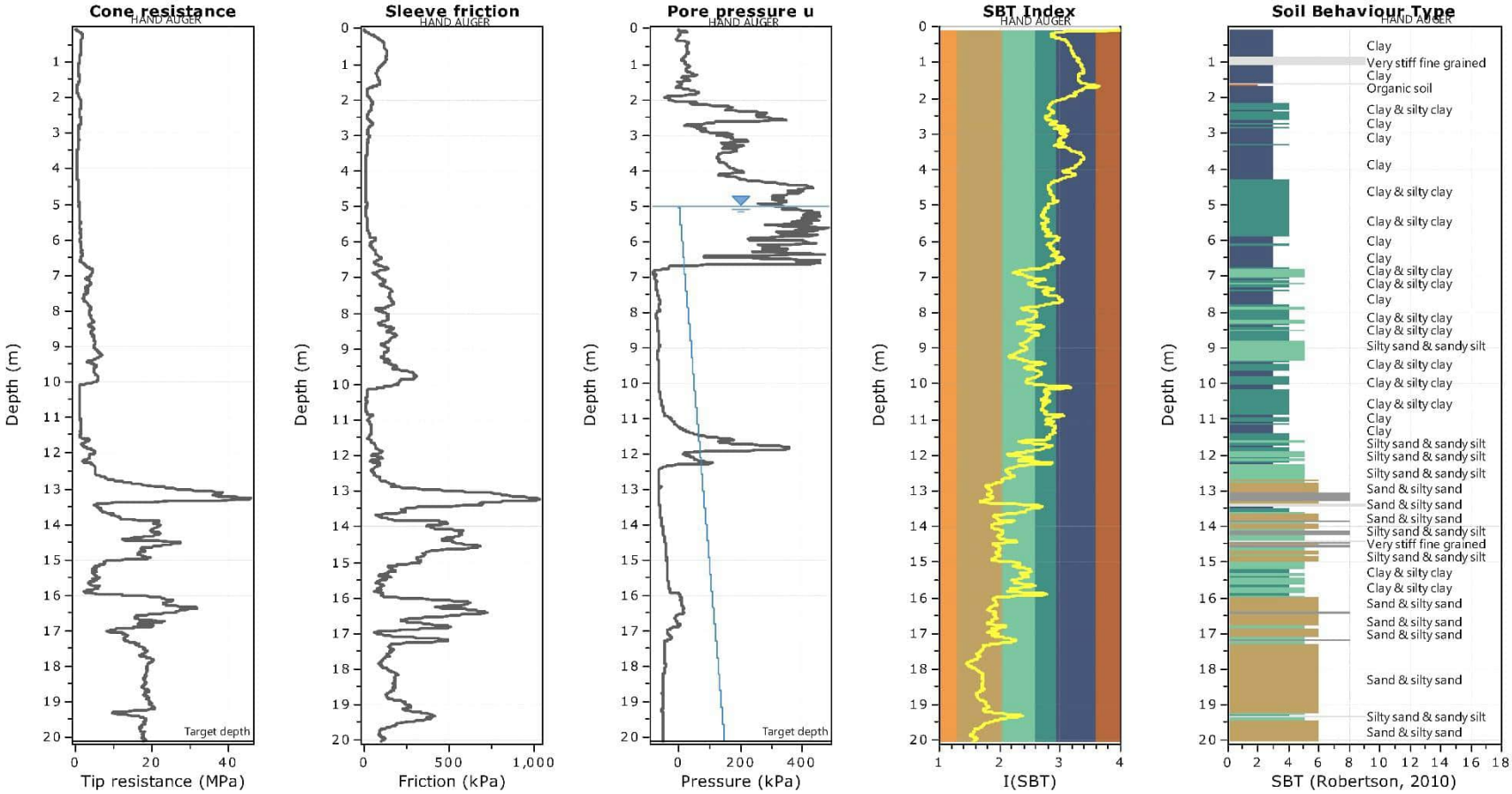
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TITUS CONSULTING ENGINEERS

Titus Consulting Engineers
169 London Street
Hamilton

Project: C3102
Location: 2025 Ohaupo Road, Te Awamuutu

CPT: CPT-05 BTW
Total depth: 20.10 m, Date: 28/06/2022
Surface Elevation: 0.00 m, Est. GWL: 5.00 m
Coords: X:449189.39, Y:676664.40
Cone Type:
Cone Operator: Topdrill



CPeT-IT v.3.9.7.3 - CPTU data presentation & interpretation software - Report created on: 20/05/2026, 9:56:49 am
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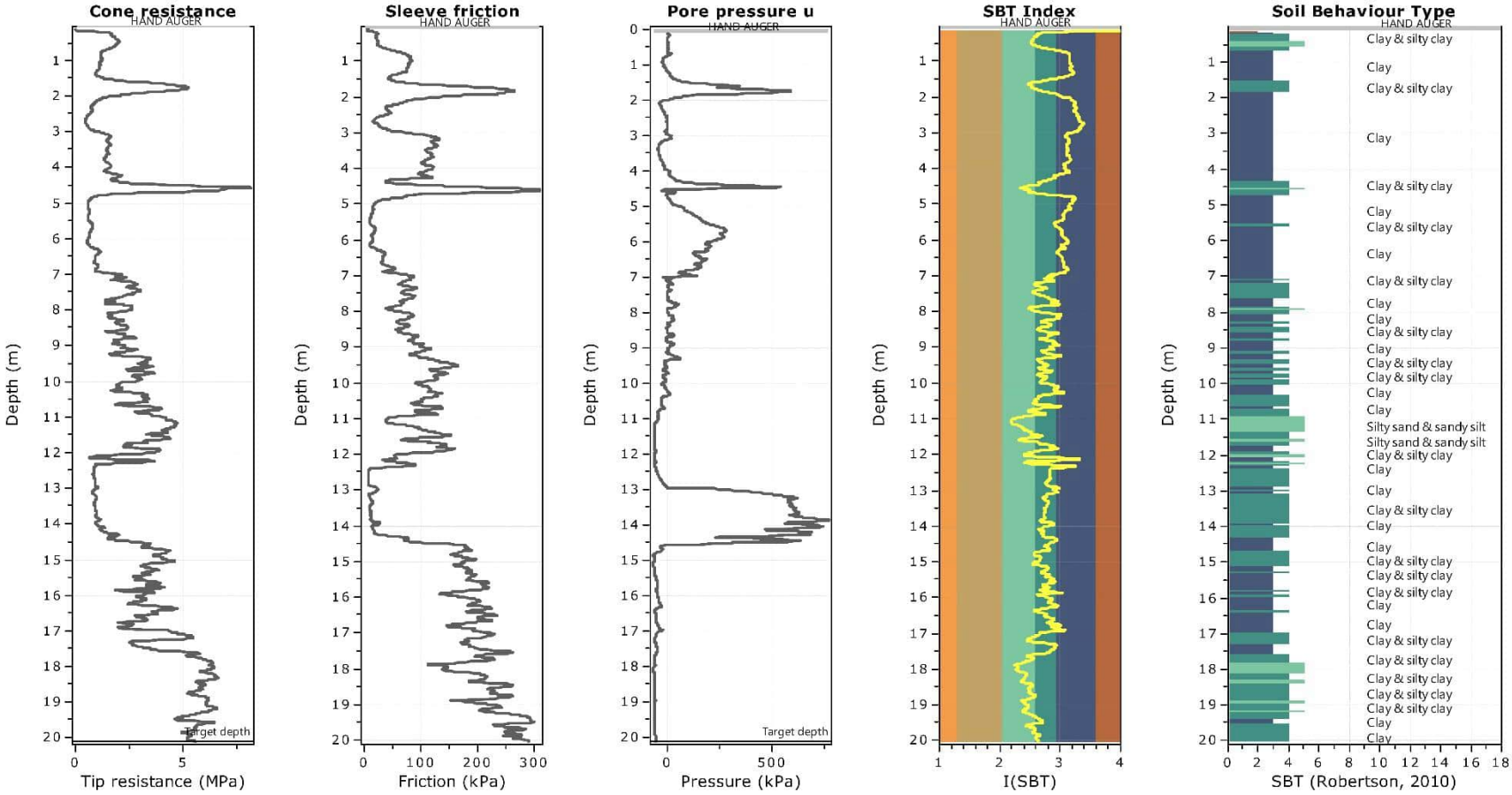
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TITUS CONSULTING ENGINEERS

Titus Consulting Engineers
169 London Street
Hamilton

CPT: CPT-06 BTW
Total depth: 20.10 m, Date: 28/06/2022
Surface Elevation: 0.00 m, Est. GWL: Collapsed dry 2.00m
Coords: X:449279.39, Y:676420.00
Cone Type:
Cone Operator: Topdrill

Project: C3102
Location: 2025 Ohaupo Road, Te Awamuutu



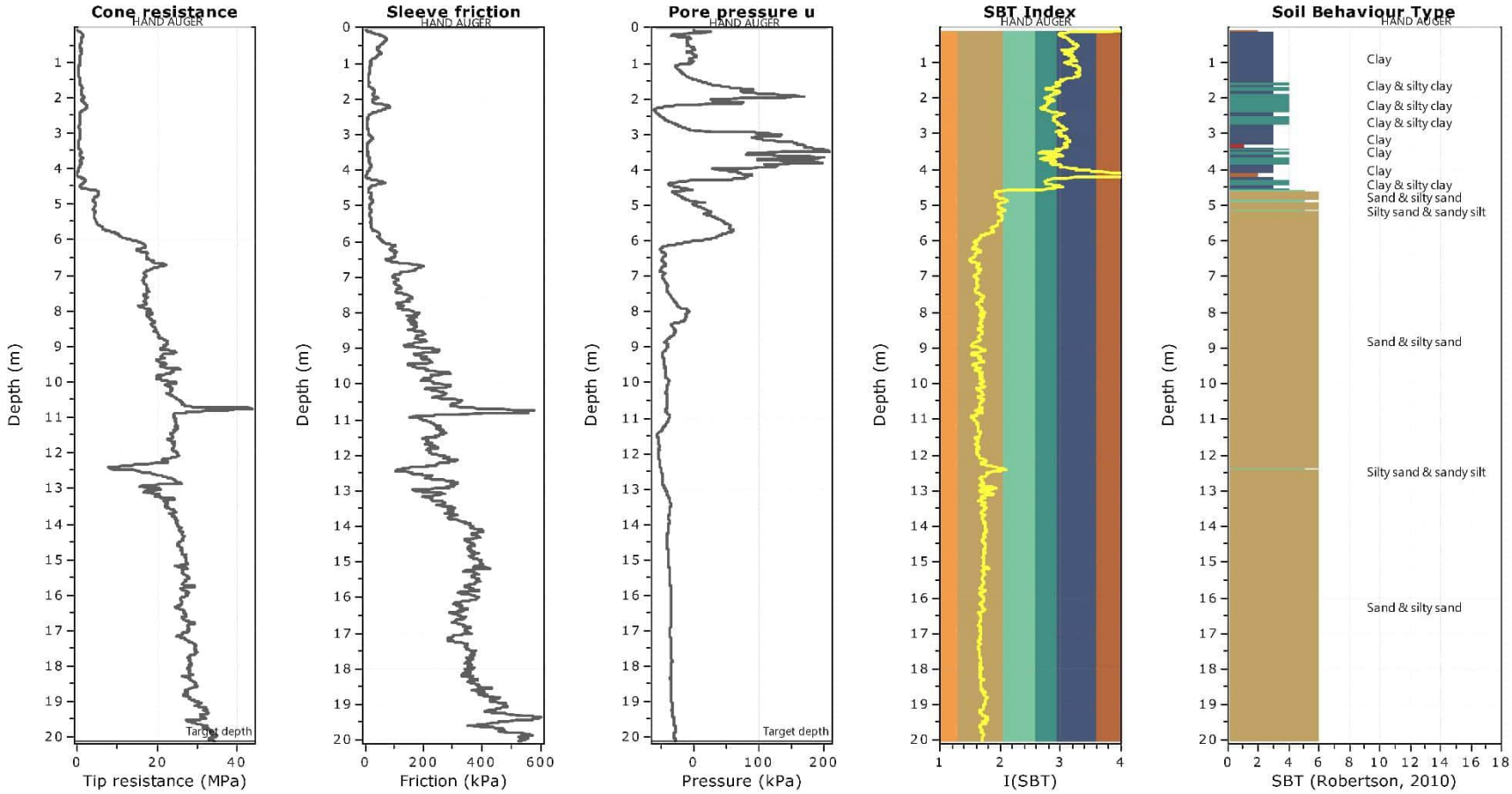
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0

Titus Consulting Engineers
169 London Street
Hamilton

CPT: CPT-07 BTW
Total depth: 20.10 m, Date: 28/06/2022
Surface Elevation: 0.00 m, Est. GWL: Artesian flow
Coords: X:449080.79, Y:676594.00
Cone Type:
Cone Operator: Topdrill

Project: C3102
Location: 2025 Ohaupo Road, Te Awamuutu



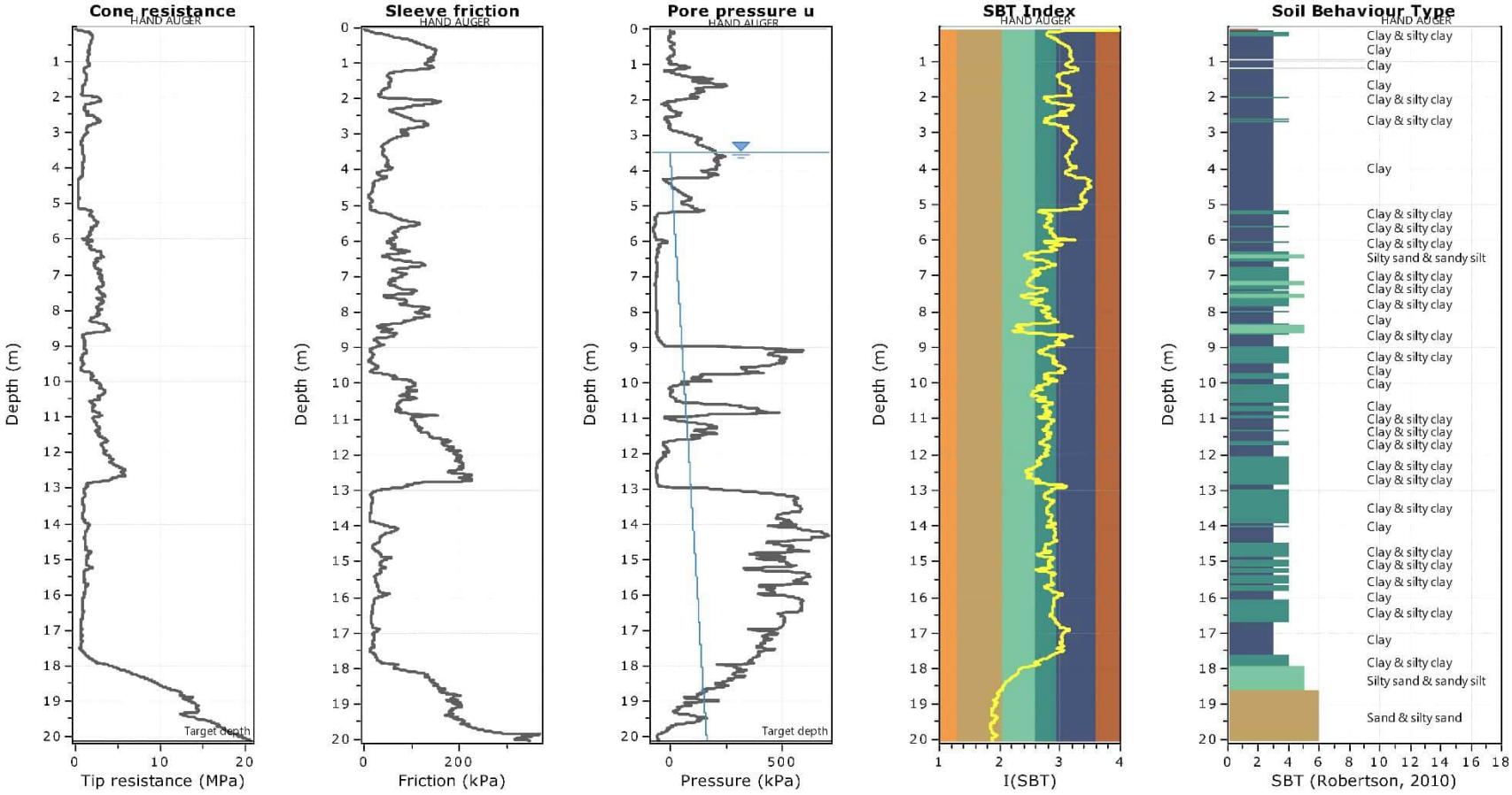
CPeT-IT v.3.9.7.3 - CPTU data presentation & interpretation software - Report created on: 20/05/2026, 10:01:42 am
Project file: G:\Shared drives\Civil - C3100\C3102 - 2025 Ohaupo Road, Te Awamutu, Te Awamutu Developments Limited\Des\Geo\Slope Stability\C3102-CPeT-BTW.cpt

0

Titus Consulting Engineers
169 London Street
Hamilton

CPT: CPT-08 BTW
Total depth: 20.10 m, Date: 28/06/2022
Surface Elevation: 0.00 m, Est. GWL: 3.50 m
Coords: X:449017.59, Y:676508.40
Cone Type:
Cone Operator: Topdrill

Project: C3102
Location: 2025 Ohaupo Road, Te Awamuutu



CPeT-IT v.3.9.7.3 - CPTU data presentation & interpretation software - Report created on: 20/05/2026, 10:02:52 am
Project file: G:\Shared drives\Civil - C3100\C3102 - 2025 Ohaupo Road, Te Awamutu, Te Awamutu Developments Limited\Des\Geo\Slope Stability\C3102-CPeT-BTW.cpt

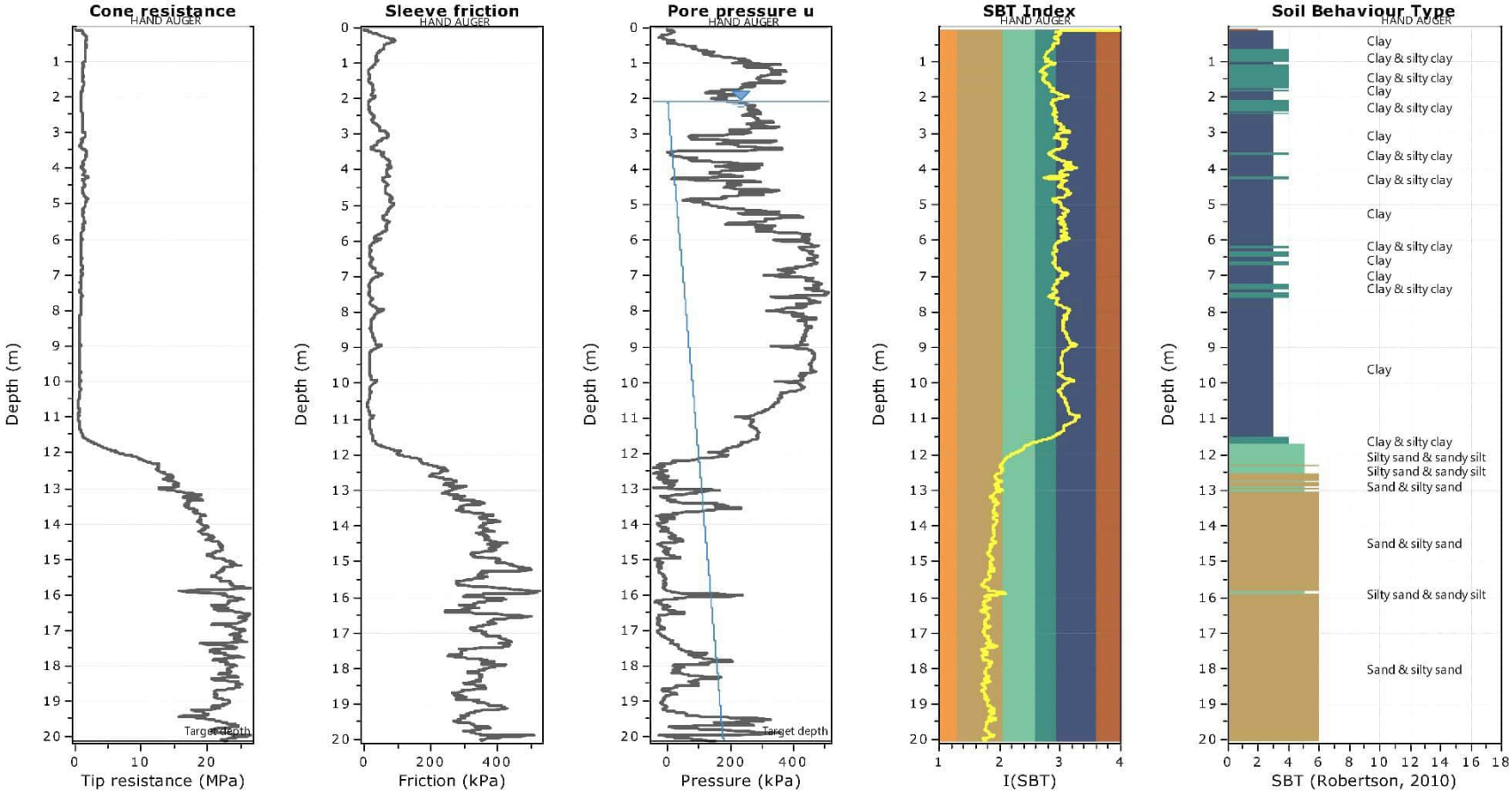
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TITUS CONSULTING ENGINEERS

Titus Consulting Engineers
169 London Street
Hamilton

CPT: CPT-09 BTW
Total depth: 20.10 m, Date: 28/06/2022
Surface Elevation: 0.00 m, Est. GWL: 2.08 m
Coords: X:448743.99, Y:676514.20
Cone Type:
Cone Operator: Topdrill

Project: C3102
Location: 2025 Ohaupo Road, Te Awamuutu



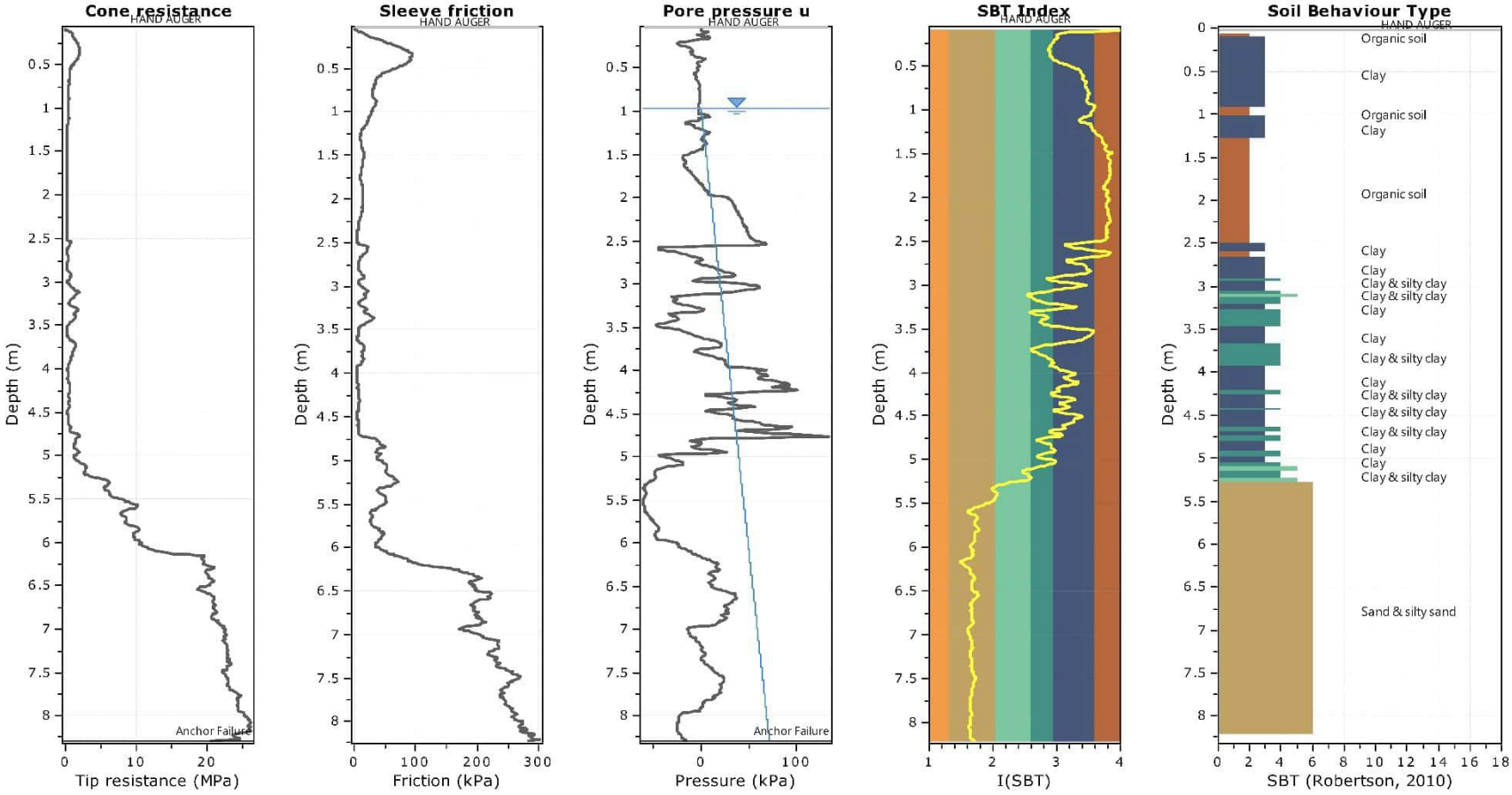
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0

Titus Consulting Engineers
169 London Street
Hamilton

CPT: CPT-10 BTW
Total depth: 8.29 m, Date: 28/06/2022
Surface Elevation: 0.00 m, Est. GWL: 0.97 m
Coords: X:448624.79, Y:676557.40
Cone Type:
Cone Operator: Topdrill

Project: C3102
Location: 2025 Ohaupo Road, Te Awamuutu



CPeT-IT v.3.9.7.3 - CPTU data presentation & interpretation software - Report created on: 20/05/2026, 10:20:58 am
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APPENDIX D – Historical Imagery




1958


1963
E/S
1559

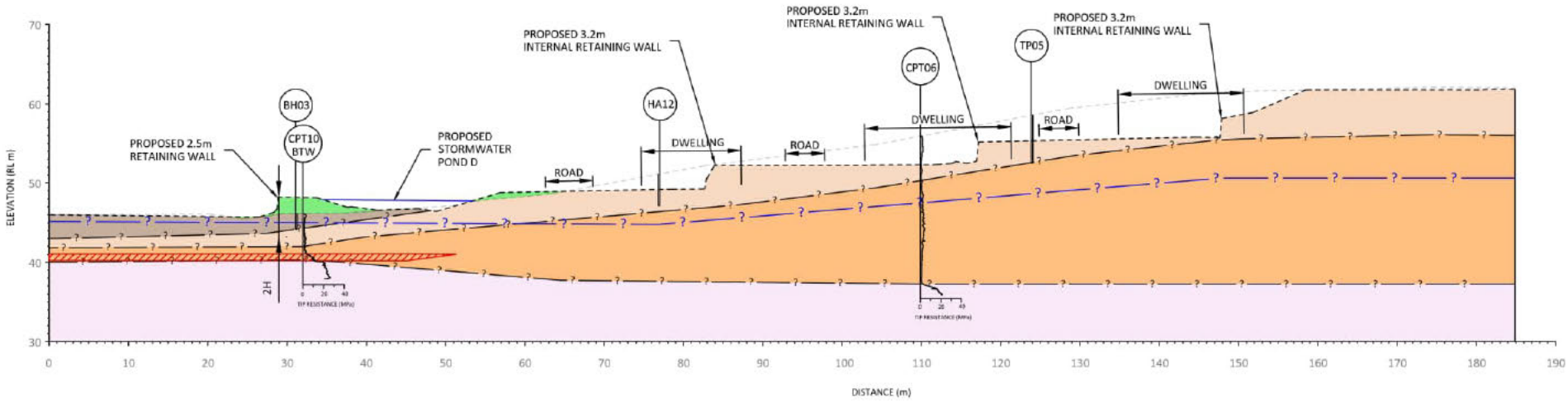

1974


1979


1986

APPENDIX E – Ground Models

CROSS SECTION A



1. CROSS SECTION IS INDICATIVE FOR CONCEPT DESIGN ONLY. NO MEASUREMENTS MAY BE TAKEN FROM DRAWING.
2. BACKGROUND INFORMATION, CONTOURS EXTRACTED FROM LINZ.
3. ALL DIMENSION AND LEVELS TO BE CHECKED ON SITE PRIOR TO THE COMMENCEMENT OF CONSTRUCTION. ANY DISCREPANCIES TO BE REPORTED TO THE ENGINEER.
4. ALL WORK TO BE DONE IN ACCORDANCE WITH THE RELEVANT STANDARDS AND MUST BE UNDERTAKEN IN ACCORDANCE WITH THE HEALTH AND SAFETY AT WORK ACT 2015.
5. TEST LOCATIONS ARE INDICATIVE ONLY.

TITUS CONSULTING ENGINEERS
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office@tituscivil.co.nz

DESIGNED	CHECKED
LV	MH
DRAWN	APPROVED
LV	TR

CLIENT: TE AWAMUTU DEVELOPMENTS LIMITED

ULTIMATE GLOBAL

PROJECT: SUBDIVISION

2025 OHAUPO ROAD
TE AWAMUTU

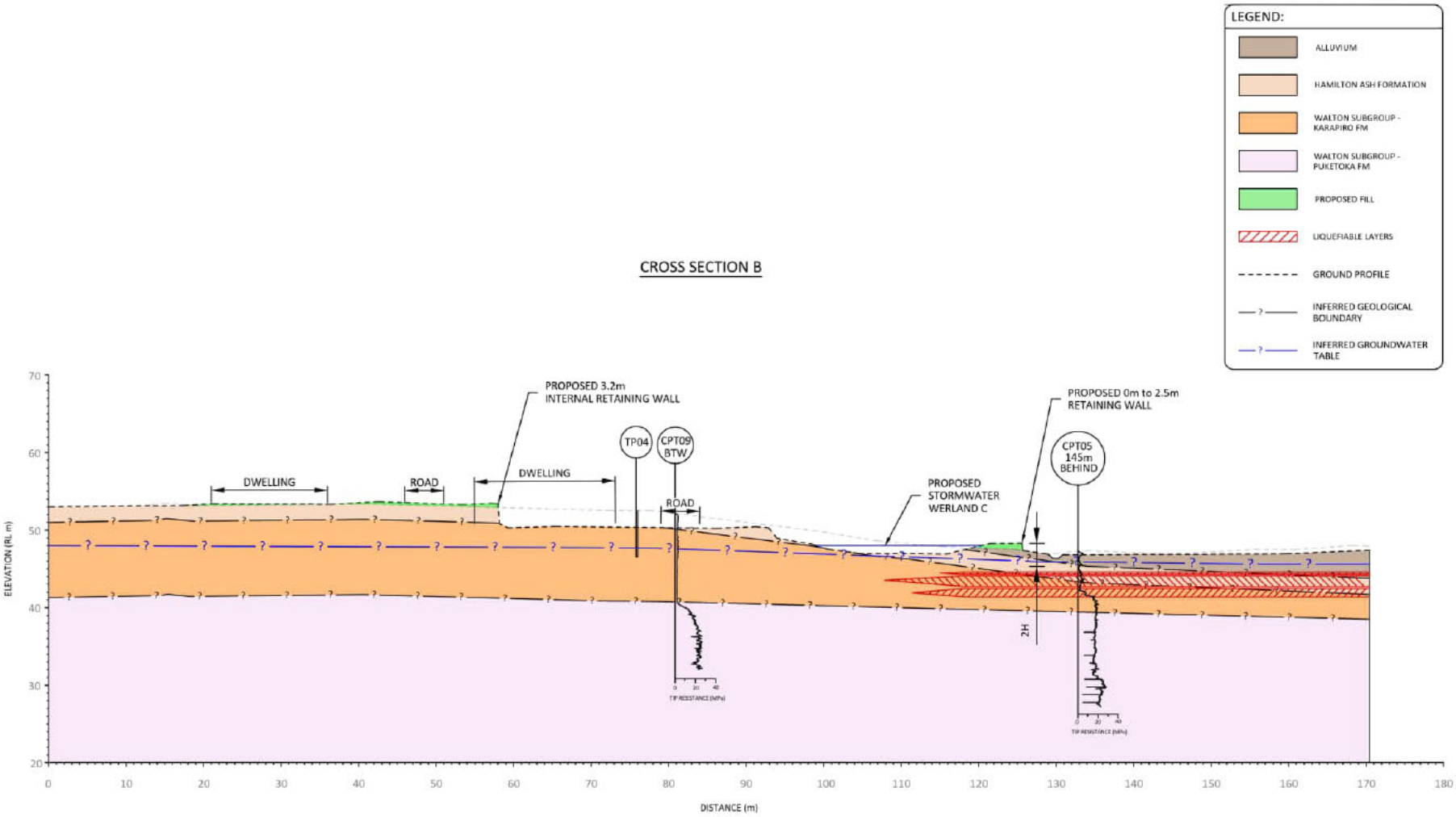
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CROSS SECTION A

STATUS	N/A
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DRAWING NUMBER: c3102 - GM - 0002	REVISION: A

PRINTED: 2026-10-09 13:38:53

CAD FILE: G:\Shared drives\Civil - C3100\C3102 - 2025 Ohaupo Road, Te Awamutu, Te Awamutu Developments Limited\Drawings\3000\C3102 P 0002.dwg

CROSS SECTION B



1. CROSS SECTION IS INDICATIVE FOR CONCEPT DESIGN ONLY. NO MEASUREMENTS MAY BE TAKEN FROM DRAWING.
2. BACKGROUND INFORMATION, CONTOURS EXTRACTED FROM LINZ.
3. ALL DIMENSION AND LEVELS TO BE CHECKED ON SITE PRIOR TO THE COMMENCEMENT OF CONSTRUCTION. ANY DISCREPANCIES TO BE REPORTED TO THE ENGINEER.
4. ALL WORK TO BE DONE IN ACCORDANCE WITH THE RELEVANT STANDARDS AND MUST BE UNDERTAKEN IN ACCORDANCE WITH THE HEALTH AND SAFETY AT WORK ACT 2015.
5. TEST LOCATIONS ARE INDICATIVE ONLY.

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LV	MH
DRAWN	APPROVED
LV	TR

CLIENT: TE AWAMUTU DEVELOPMENTS LIMITED

ULTIMATE GLOBAL

PROJECT: SUBDIVISION

2025 OHAUPO ROAD
TE AWAMUTU

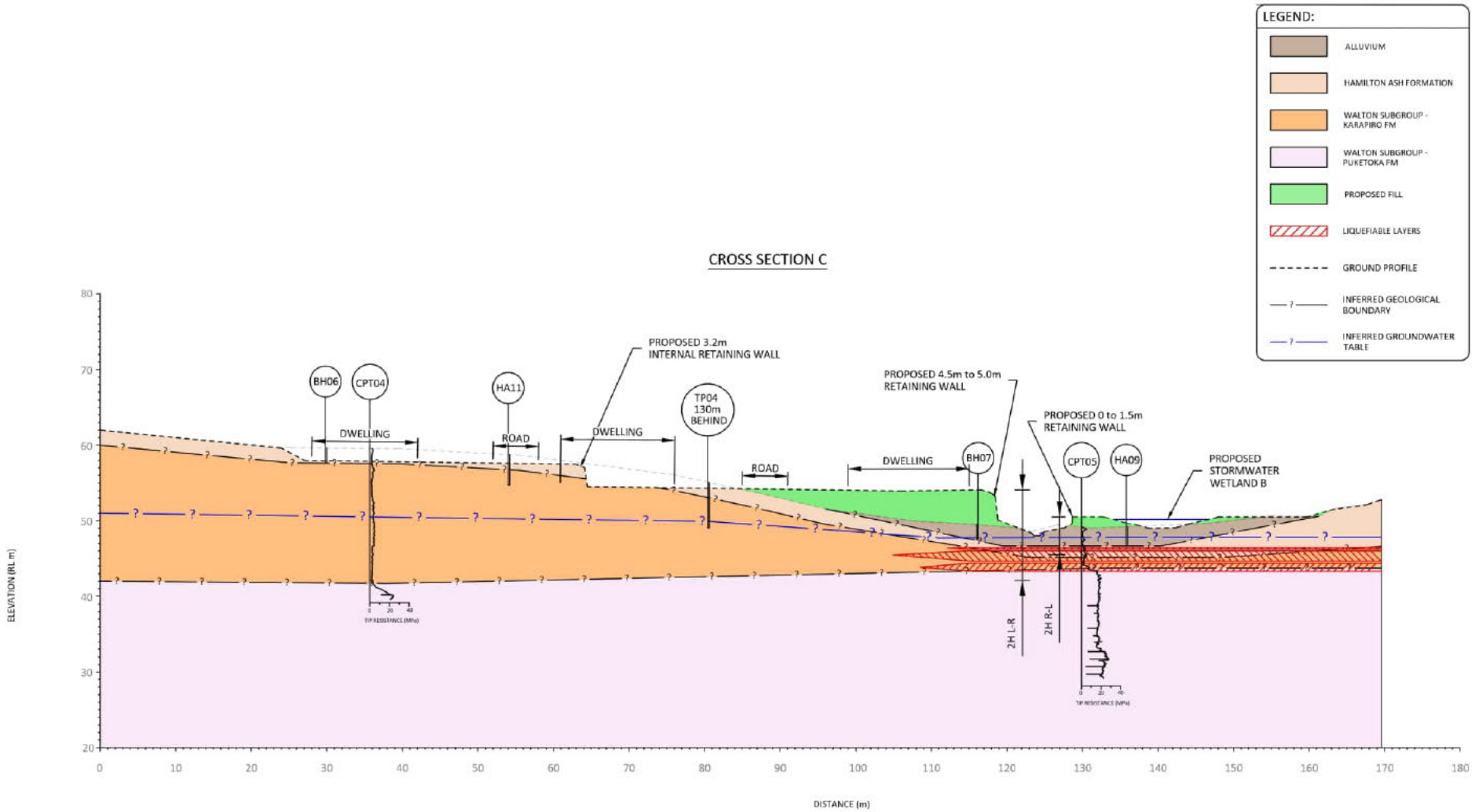
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CROSS SECTION B

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CROSS SECTION C



1. CROSS SECTION IS INDICATIVE FOR CONCEPT DESIGN ONLY. NO MEASUREMENTS MAY BE TAKEN FROM DRAWING.
2. BACKGROUND INFORMATION, CONTOURS EXTRACTED FROM LINZ.
3. ALL DIMENSION AND LEVELS TO BE CHECKED ON SITE PRIOR TO THE COMMENCEMENT OF CONSTRUCTION. ANY DISCREPANCIES TO BE REPORTED TO THE ENGINEER.
4. ALL WORK TO BE DONE IN ACCORDANCE WITH THE RELEVANT STANDARDS AND MUST BE UNDERTAKEN IN ACCORDANCE WITH THE HEALTH AND SAFETY AT WORK ACT 2015.
5. TEST LOCATIONS ARE INDICATIVE ONLY.

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DESIGNED	CHECKED
LV	MH
DRAWN	APPROVED
LV	TR

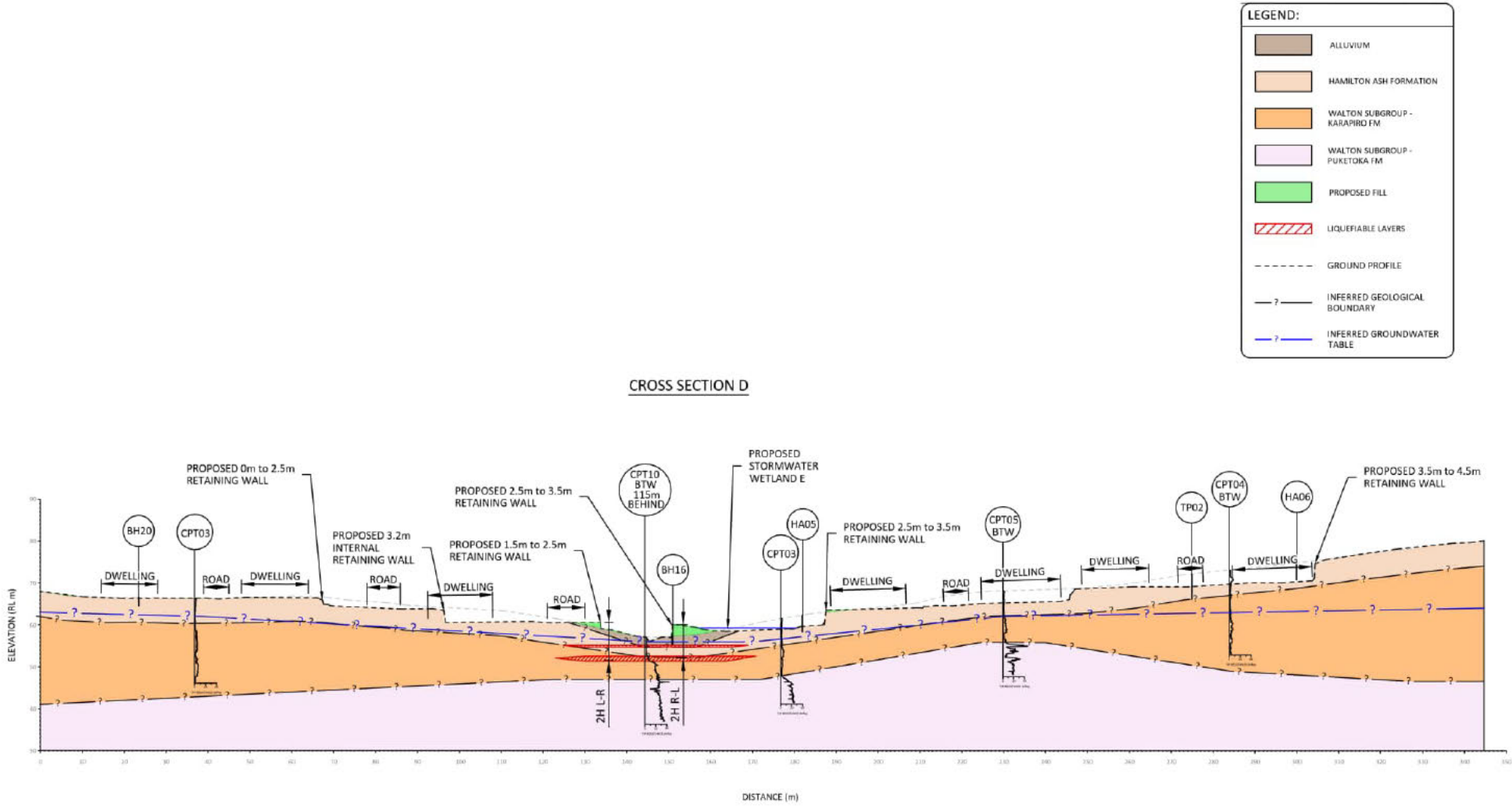
CLIENT: TE AWAMUTU DEVELOPMENTS LIMITED
ULTIMATE GLOBAL

PROJECT: SUBDIVISION
2025 OHAUPO ROAD
TE AWAMUTU

DRAWING: GROUND MODEL
CROSS SECTION C

STATUS: N/A
DATE: 09/10/2026
SCALE (ORIGINAL SIZE A3): NTS
DRAWING NUMBER: c3102 - GM - 0002
REVISION: A

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3. ALL DIMENSION AND LEVELS TO BE CHECKED ON SITE PRIOR TO THE COMMENCEMENT OF CONSTRUCTION. ANY DISCREPANCIES TO BE REPORTED TO THE ENGINEER.
4. ALL WORK TO BE DONE IN ACCORDANCE WITH THE RELEVANT STANDARDS AND MUST BE UNDERTAKEN IN ACCORDANCE WITH THE HEALTH AND SAFETY AT WORK ACT 2015.
5. TEST LOCATIONS ARE INDICATIVE ONLY.

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office@tituscivil.co.nz

DESIGNED	CHECKED
LV	MH
DRAWN	APPROVED
LV	TR

CLIENT: TE AWAMUTU DEVELOPMENTS LIMITED

ULTIMATE GLOBAL

PROJECT: SUBDIVISION

2025 OHAUPO ROAD
TE AWAMUTU

DRAWING: GROUND MODEL
CROSS SECTION D

STATUS: N/A

DATE: 09/10/2026

SCALE (ORIGINAL SIZE A3): NTS

DRAWING NUMBER: c3102 - GM - 0002

REVISION: A

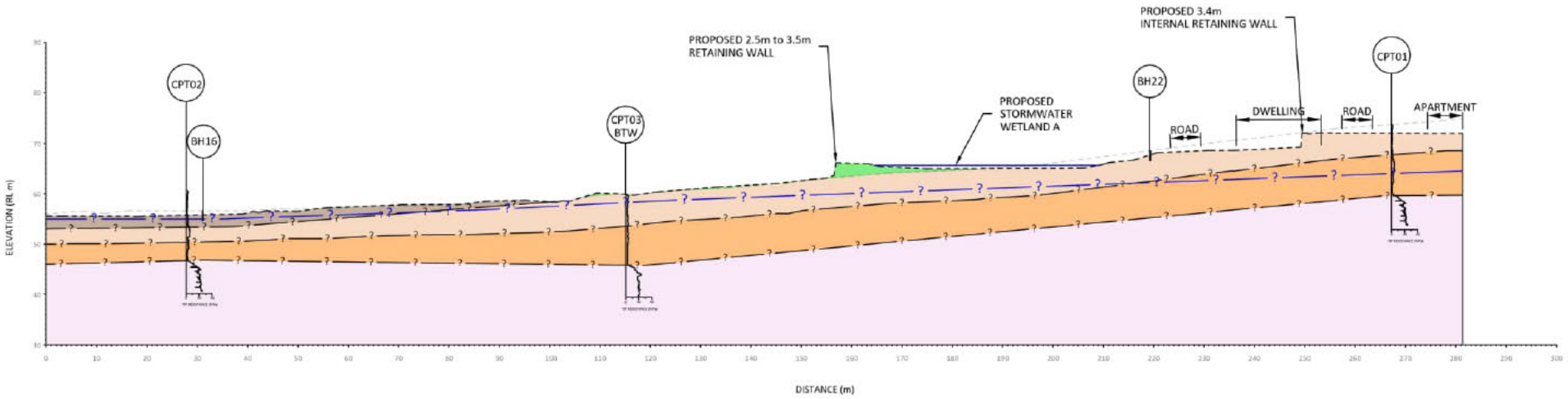
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LEGEND:

- ALLUVIUM
- HAMILTON ASH FORMATION
- WALTON SUBGROUP - KARAPIRO FM
- WALTON SUBGROUP - PUKETOKA FM
- PROPOSED FILL
- GROUND PROFILE
- INFERRED GEOLOGICAL BOUNDARY
- INFERRED GROUNDWATER TABLE

CROSS SECTION E



1. CROSS SECTION IS INDICATIVE FOR CONCEPT DESIGN ONLY. NO MEASUREMENTS MAY BE TAKEN FROM DRAWING.
2. BACKGROUND INFORMATION, CONTOURS EXTRACTED FROM LINZ.
3. ALL DIMENSION AND LEVELS TO BE CHECKED ON SITE PRIOR TO THE COMMENCEMENT OF CONSTRUCTION. ANY DISCREPANCIES TO BE REPORTED TO THE ENGINEER.
4. ALL WORK TO BE DONE IN ACCORDANCE WITH THE RELEVANT STANDARDS AND MUST BE UNDERTAKEN IN ACCORDANCE WITH THE HEALTH AND SAFETY AT WORK ACT 2015.
5. TEST LOCATIONS ARE INDICATIVE ONLY.

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office@titusciv.co.nz

DESIGNED	CHECKED
LV	MH
DRAWN	APPROVED
LV	TR

CLIENT: TE AWAMUTU DEVELOPMENTS LIMITED

ULTIMATE GLOBAL

PROJECT: SUBDIVISION

2025 OHAUPO ROAD
TE AWAMUTU

DRAWING: GROUND MODEL
CROSS SECTION E

STATUS: N/A

DATE: 09/10/2026

SCALE (ORIGINAL SIZE A3): NTS

DRAWING NUMBER: c3102 - GM - 0002

REVISION: A

PRINTED: 20.10.26 10:21:52

CAD FILE: G:\Shared drives\C+F - C3100\C3102 - 2025 Ohaupo Road, Te Awamutu, Te Awamutu Developments Limited\Docs\CAD\C3102 P 0002.dwg

APPENDIX F – Geotechnical Site Plans



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office@titusciv.co.nz

DESIGNED	CHECKED
LV	MH
DRAWN	APPROVED
LV	TR

CLIENT
TE AWAMUTU DEVELOPMENTS LIMITED

ULTIMATE GLOBAL

PROJECT
LIFESTYLE VILLAGE

2025 OHAUPO ROAD
TE AWAMUTU

DRAWING
SETTLEMENT PLAN

STATUS: N/A

DATE: 12/10/2026

SCALE (ORIGINAL SIZE A1): NTS

DRAWING NUMBER: c3102 - P - 0001

REVISION: A

PRINTED: 2026.10.12 15:48:14

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APPENDIX G – Laboratory Test Results

DRY DENSITY / WATER CONTENT RELATIONSHIP
STANDARD COMPACTION

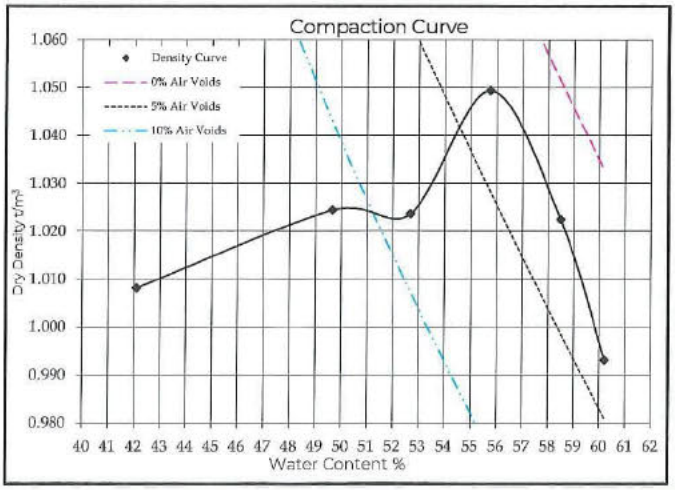
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Location :	2025 Ohaupo Road, Te Awamutu
Client :	Titus Civil Ltd
Contractor :	-
Sampled by :	Not Stated
Date sampled :	6/05/26
Sampling method :	Bulk Sample
Sample description :	SILT/CLAY
Sample condition :	As Received
Solid density :	2.73 t/m³ (Tested)
Source:	Test Pit 2 - 3.2 m

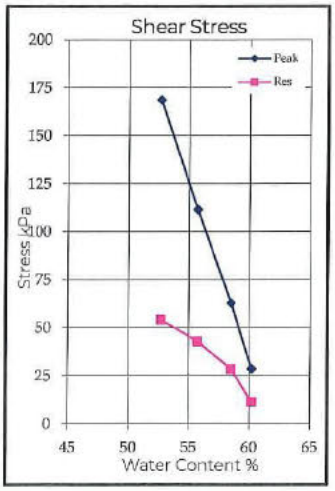
Project No :	2-68199.00
Lab Ref No :	HA16848_02_MDD
Client Ref No :	C3102

Test Results

Maximum dry density	1.05 t/m³	Natural water content	58.5 %
Optimum water content	56 %	Fraction tested	100% Passing 19mm

Sample ID		-240	-180	-120	-60	Nat	60	
Bulk density	t/m³	1.432	1.533	1.563	1.634	1.620	1.591	
Water content	%	42.1	49.7	52.7	55.7	58.5	60.2	
Dry density	t/m³	1.008	1.024	1.024	1.049	1.022	0.993	
Sample condition		Hard Moist - Dry	Very Stiff Moist	Very Stiff Moist	Stiff Moist	Firm Moist	Soft Wet	
Peak stress	kPa	UTP	>172	169	112	63	29	
Remoulded stress	kPa	-	-	54	43	29	11	





Test Methods	Notes
Compaction NZS 4402 : 1986 Test 4.1.1 (Standard)	All information supplied by Client
Shear Strength using a Hand Held Shear Vane, NZ Geotechnical Soc Inc 8/2001	

Date tested : 20/5 - 3/06/2026
Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.
Date reported : [redacted] ay only be reproduced in full

Approved Signator[redacted]

Designation : Senior Civil Engineering Technician
Date : 10/06/26

ACCREDITED IANZ TESTING LABORATORY

Test results indicated as not accredited are outside the scope of the laboratory's accreditation

PF-LAB-025 (19/01/2022) Page 1 of 1

WSP
Hamilton (Fox St)
Quality Management Systems Certified to ISO 9001
4 Fox Street
Private Bag 3057, Waikato Mail Centre,
3240, Hamilton, New Zealand
Telephone 07 856 2870
Website www.wsp.com/nz

DRY DENSITY / WATER CONTENT RELATIONSHIP
STANDARD COMPACTION

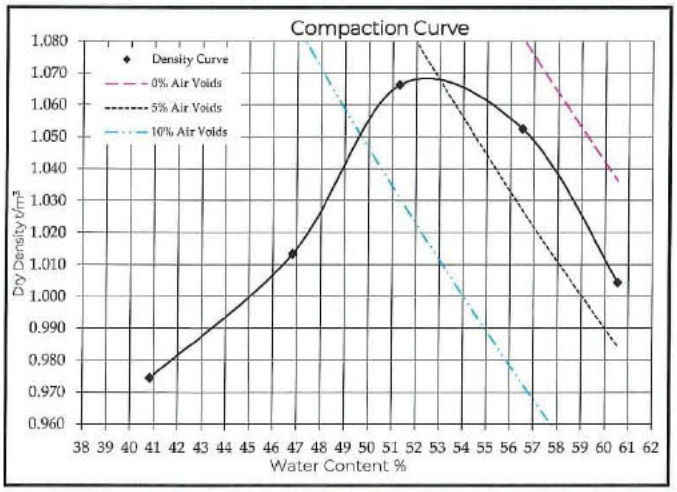
Project :	2025 Ohaupo Road, Te Awamutu
Location :	2025 Ohaupo Road, Te Awamutu
Client :	Titus Civil Ltd
Contractor :	-
Sampled by :	Not Stated
Date sampled :	6/05/26
Sampling method :	Bulk Sample
Sample description :	SILT/CLAY
Sample condition :	As Received
Solid density :	2.78 t/m³ (Tested)
Source:	Test Pit 3 - 2.2 m

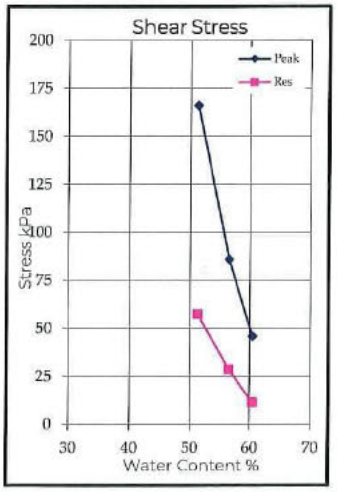
Project No :	2-68199.00
Lab Ref No :	HA16848_03_MDD
Client Ref No :	C3102

Test Results

Maximum dry density	1.07	t/m³	
Optimum water content	52	%	
Natural water content	56.5	%	
Fraction tested	100% Passing 19mm		

Sample ID		-180	-120	-60	Nat	60		
Bulk density	t/m³	1.372	1.488	1.613	1.647	1.612		
Water content	%	40.8	46.8	51.3	56.5	60.5		
Dry density	t/m³	0.974	1.013	1.066	1.052	1.004		
Sample condition		Hard Moist	Very Stiff Moist	Very Stiff Moist	Stiff Moist	Firm Wet		
Peak stress	kPa	UTP	UTP	166	86	46		
Remoulded stress	kPa	-	-	57	29	11		





Test Methods	Notes
Compaction NZS 4402 : 1986 Test 4.1.1 (Standard)	All information supplied by Client
Shear Strength using a Hand Held Shear Vane, NZ Geotechnical Soc Inc 8/2001	

Date tested : 20/05/26
Date reported : 04/06/26

Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.
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Approved Signatory [redacted]

Designation : *Senior Civil Engineering Technician*
Date : 04/06/26

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Hamilton (Fox St)
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4 Fox Street
Private Bag 3057, Waikato Mail Centre,
3240, Hamilton, New Zealand

Telephone 07 856 2870
Website www.wsp.com/nz

DRY DENSITY / WATER CONTENT RELATIONSHIP
STANDARD COMPACTION

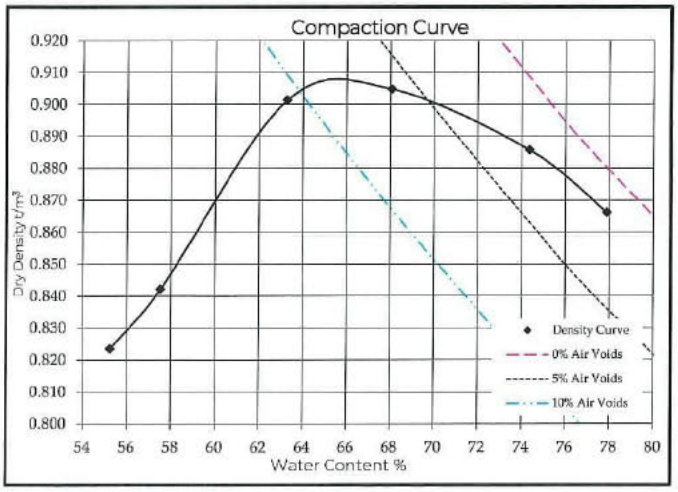
Project :	2025 Ohaupo Road, Te Awamutu
Location :	2025 Ohaupo Road, Te Awamutu
Client :	Titus Civil Ltd
Contractor :	-
Sampled by :	Not Stated
Date sampled :	6/05/26
Sampling method :	Bulk Sample
Sample description :	SILT/CLAY
Sample condition :	As Received
Solid density :	2.80 t/m³ (Tested)
Source:	Test Pit 5 - 5.0 m

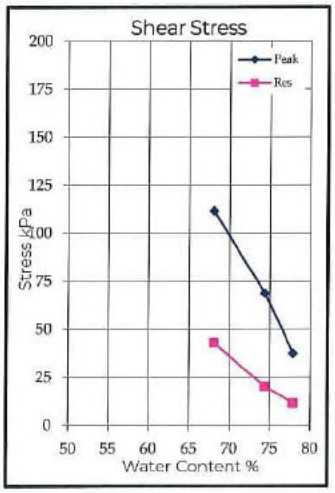
Project No :	2-68199.00
Lab Ref No :	HA16848_05_MDD
Client Ref No :	C3102

Test Results

Maximum dry density	0.91	t/m³	
Optimum water content	66	%	
Natural water content	89.3	%	
Fraction tested	100% Passing 19mm		

Sample ID		-390	-360	-300	-240	-180	-120	Nat
Bulk density	t/m³	1.278	1.327	1.472	1.521	1.544	1.541	-
Water content	%	55.2	57.5	63.3	68.1	74.3	77.9	89.3
Dry density	t/m³	0.824	0.842	0.901	0.905	0.886	0.866	-
Sample condition		Hard Dry	Hard Dry - Moist	Very Stiff Moist	Stiff Moist	Firm Moist - Wet	Soft Wet	
Peak stress	kPa	UTP	UTP	UTP	112	69	37	-
Remoulded stress	kPa	-	-	-	43	20	11	-





Test Methods	Notes
Compaction NZS 4402 : 1986 Test 4.1.1 (Standard) Shear Strength using a Hand Held Shear Vane, NZ Geotechnical Soc Inc 8/2001	All information supplied by Client

Date tested : 26/05/26
Date reported : 04/06/26

Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.
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Approved Signatory [redacted]

Designation : *Senior Civil Engineering Technician*
Date : 04/06/26

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3240, Hamilton, New Zealand

Telephone 07 856 2870
Website www.wsp.com/nz

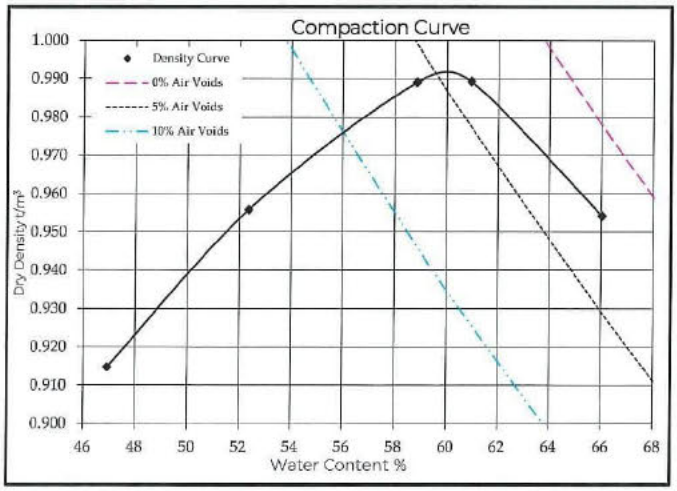
DRY DENSITY / WATER CONTENT RELATIONSHIP
STANDARD COMPACTION

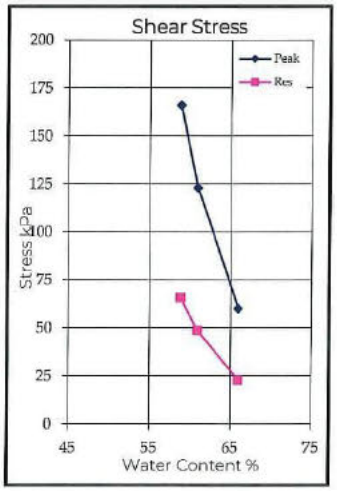
Project :	2025 Ohaupo Road, Te Awamutu
Location :	2025 Ohaupo Road, Te Awamutu
Client :	Titus Civil Ltd
Contractor :	-
Sampled by :	Not Stated
Date sampled :	6/05/26
Sampling method :	Bulk Sample
Sample description :	SILT/CLAY
Sample condition :	As Received
Solid density :	2.76 t/m³ (Tested)
Source:	Test Pit 1 - 4.5 m

Project No :	2-68199.00
Lab Ref No :	HA16848_01_MDD
Client Ref No :	C3102

Test Results

Maximum dry density	0.99 t/m³				Natural water content	69.2 %	
Optimum water content	60 %				Fraction tested	100% Passing 19mm	
Sample ID		-300	-240	-180	-120	-60	Nat
Bulk density	t/m³	1.344	1.456	1.571	1.592	1.584	-
Water content	%	46.9	52.4	58.8	60.9	66.0	69.2
Dry density	t/m³	0.915	0.956	0.989	0.989	0.954	-
Sample condition		Hard Dry-Moist	Hard Moist	V. Stiff Moist	Stiff Moist	Firm Moist - Wet	
Peak stress	kPa	UTP	UTP	166	123	60	-
Remoulded stress	kPa	-	-	66	49	23	-





Test Methods	Notes
Compaction NZS 4402 : 1986 Test 4.1.1 (Standard)	All information supplied by Client
Shear Strength using a Hand Held Shear Vane, NZ Geotechnical Soc Inc 6/2001	

Date tested : 26/05/26
Date reported : 04/06/26

Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.
This report may only be reproduced in full

Approved Signatory [redacted]

Designation : *Senior Civil Engineering Technician*
Date : 04/06/26

ACCREDITED IANZ TESTING LABORATORY

Test results indicated as not accredited are outside the scope of the laboratory's accreditation

PF-LAB-025 (19/01/2022) Page 1 of 1

DRY DENSITY / WATER CONTENT RELATIONSHIP
STANDARD COMPACTION

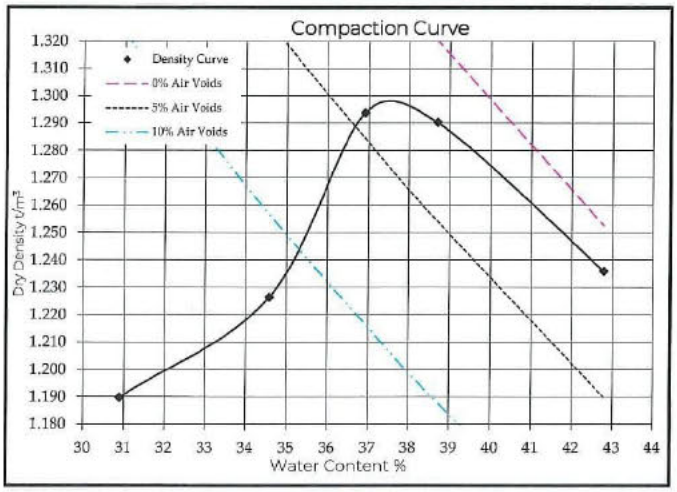
Project :	2025 Ohaupo Road, Te Awamutu
Location :	2025 Ohaupo Road, Te Awamutu
Client :	Titus Civil Ltd
Contractor :	-
Sampled by :	Not Stated
Date sampled :	6/05/26
Sampling method :	Bulk Sample
Sample description :	SILT/CLAY
Sample condition :	As Received
Solid density :	2.70 t/m³ (Tested)
Source:	Test Pit 1 - 5.5 m

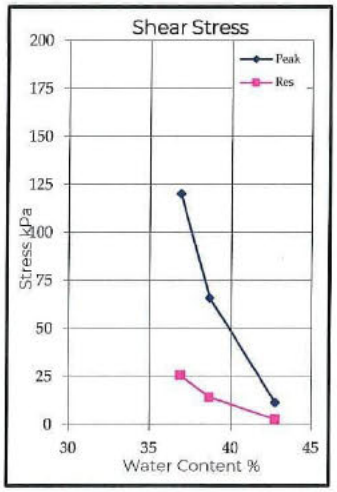
Project No :	2-68199.00
Lab Ref No :	HA16848_04_MDD
Client Ref No :	C3102

Test Results

Maximum dry density	1.29	t/m³	
Optimum water content	38	%	
Natural water content	38.7	%	
Fraction tested	100% Passing 19mm		

Sample ID		-120	-60	-30	Nat	60		
Bulk density	t/m³	1.557	1.650	1.771	1.790	1.765		
Water content	%	30.9	34.6	36.9	38.7	42.8		
Dry density	t/m³	1.190	1.226	1.294	1.290	1.236		
Sample condition		Hard Dry	Very Stiff Dry - Moist	Stiff Moist	Firm Moist	Soft Wet		
Peak stress	kPa	UTP	UTP	120	66	11		
Remoulded stress	kPa	-	-	26	14	3		





Test Methods	Notes
Compaction NZS 4402 : 1986 Test 4.1.1 (Standard)	All information supplied by Client
Shear Strength using a Hand Held Shear Vane, NZ Geotechnical Soc Inc 8/2001	

Date tested : 26/05/26
Date reported : 04/06/26

Sampling is not covered by IANZ Accreditation. Results apply only to sample tested.
This report may only be reproduced in full

Approved Signatory [redacted]

Designation : *Senior Civil Engineering Technician*
Date : 04/06/26

ACCREDITED IANZ TESTING LABORATORY

Test results indicated as not accredited are outside the scope of the laboratory's accreditation

PF-LAB-025 (19/01/2022) Page 1 of 1

WSP
Hamilton (Fox St)
Quality Management Systems Certified to ISO 9001

4 Fox Street
Private Bag 3057, Waikato Mail Centre,
3240, Hamilton, New Zealand

Telephone 07 856 2870
Website www.wsp.com/nz

APPENDIX H – Static Settlement Results

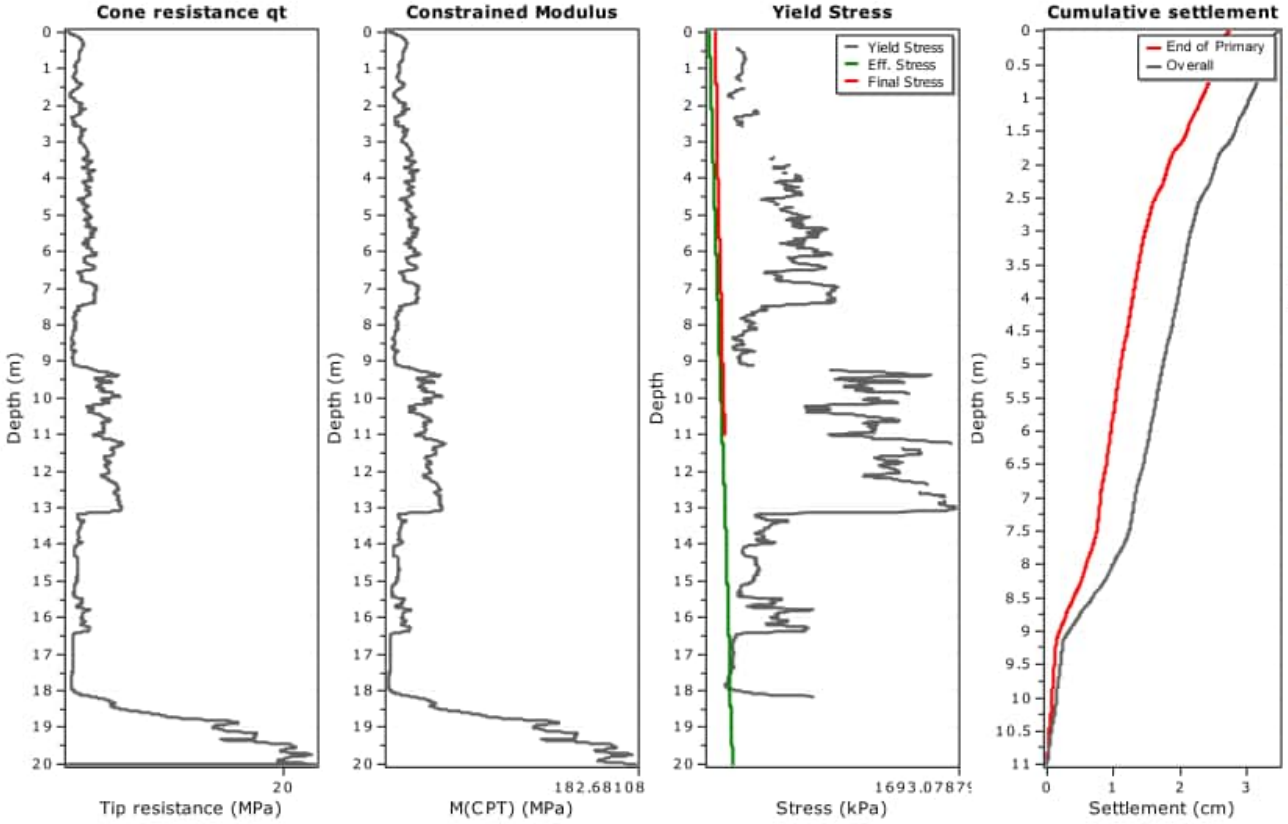
Area 1.

Titus Consulting Engineers
169 London Street
Hamilton

CPT: CPT-01
Total depth: 20.01 m, Date: 19/05/2026
Surface Elevation: 0.00 m, Est. GWL: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: C3102
Location: 2025 Ohaupo Road, Te Awamutu

Settlements calculation according to theory of elasticity*



Calculation properties

Footing type: Rectangular
Footing width: 12.00 (m)
L/B: 5.8
Footing pressure: 40.00 (kPa)
Embedment depth: 0.00 (m)
Footing is rigid: Yes
Remove excavation load: No
Apply 20% rule: Yes
Calculate secondary settlements: Yes
Time period for primary consolidation: 6 months
Time period for second. settlements: 600 months

* Primary settlement calculation is performed according to the following formula:

$$S = \sum \frac{\Delta\sigma_v}{M_{CPT}} \Delta z$$

* Secondary (creep) settlement calculation is performed according to the following formula:

where t_p is the duration of primary consolidation

CPeT-IT v.3.9.7.3 - CPTU data presentation & interpretation software - Report created on: 3/06/2026, 11:08:36 am
Project file: G:\Shared drives\Civil - C3100\C3102 - 2025 Ohaupo Road, Te Awamutu, Te Awamutu Developments Limited\Des\Geo\Slope Stability\C3102-CPeT-All.cpt

1

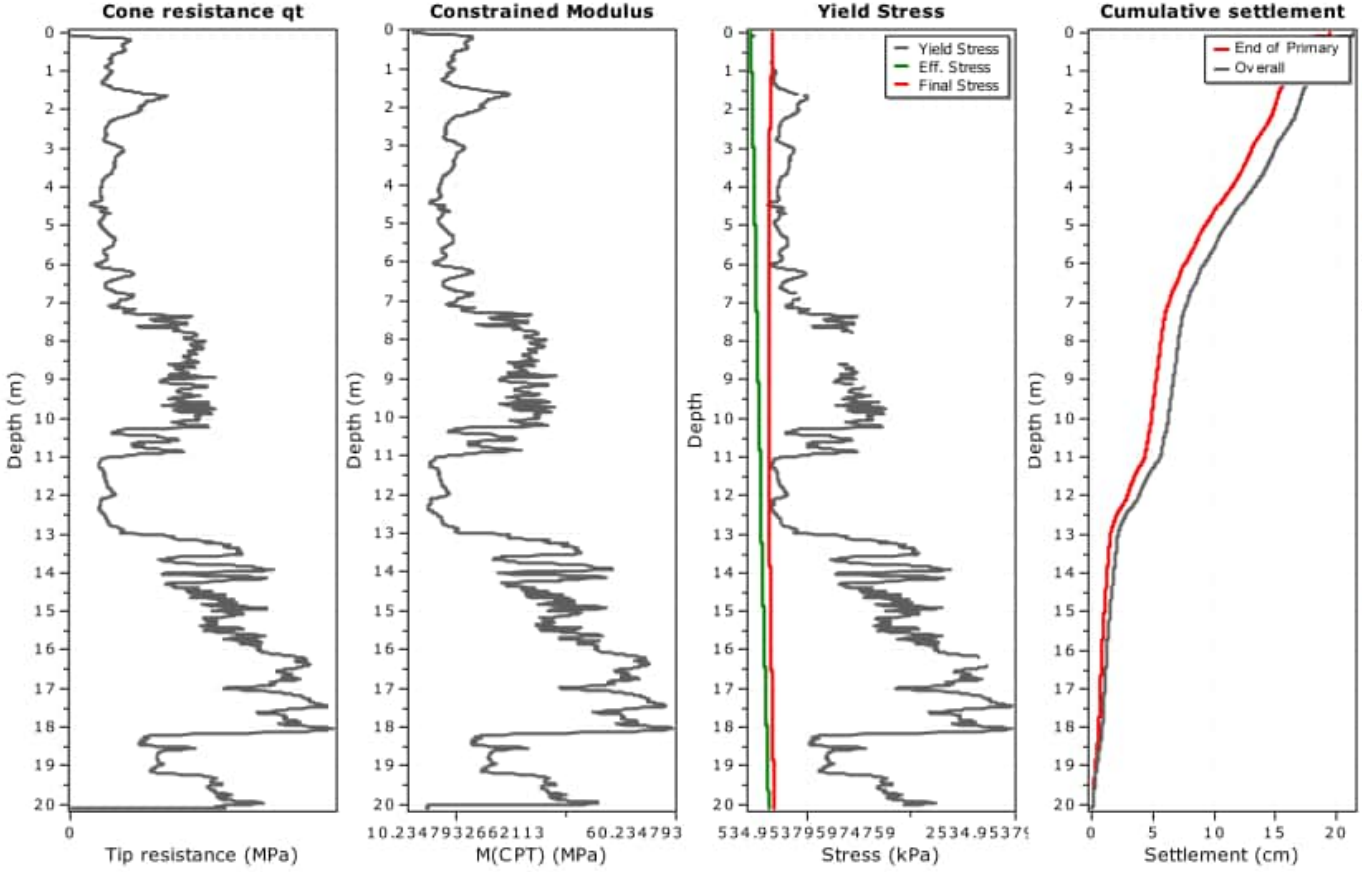
Area 2.

Titus Consulting Engineers
169 London Street
Hamilton

CPT: CPT-02 BTW
Total depth: 20.10 m, Date: 19/05/2026
Surface Elevation: 0.00 m, Est. GWL: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: C3102
Location: 2025 Ohaupo Road, Te Awamutu

Settlements calculation according to theory of elasticity*



Calculation properties

Footing type: Rectangular
Footing width: 12.00 (m)
L/B: 5.8
Footing pressure: 200.00 (kPa)
Embedment depth: 0.00 (m)
Footing is rigid: Yes
Remove excavation load: No
Apply 20% rule: Yes
Calculate secondary settlements: Yes
Time period for primary consolidation: 6 months
Time period for second. settlements: 600 months

* Primary settlement calculation is performed according to the following formula:

$$S = \sum \frac{\Delta\sigma_v}{M_{CPT}} \Delta z$$

* Secondary (creep) settlement calculation is performed according to the following formula:

where t_p is the duration of primary consolidation

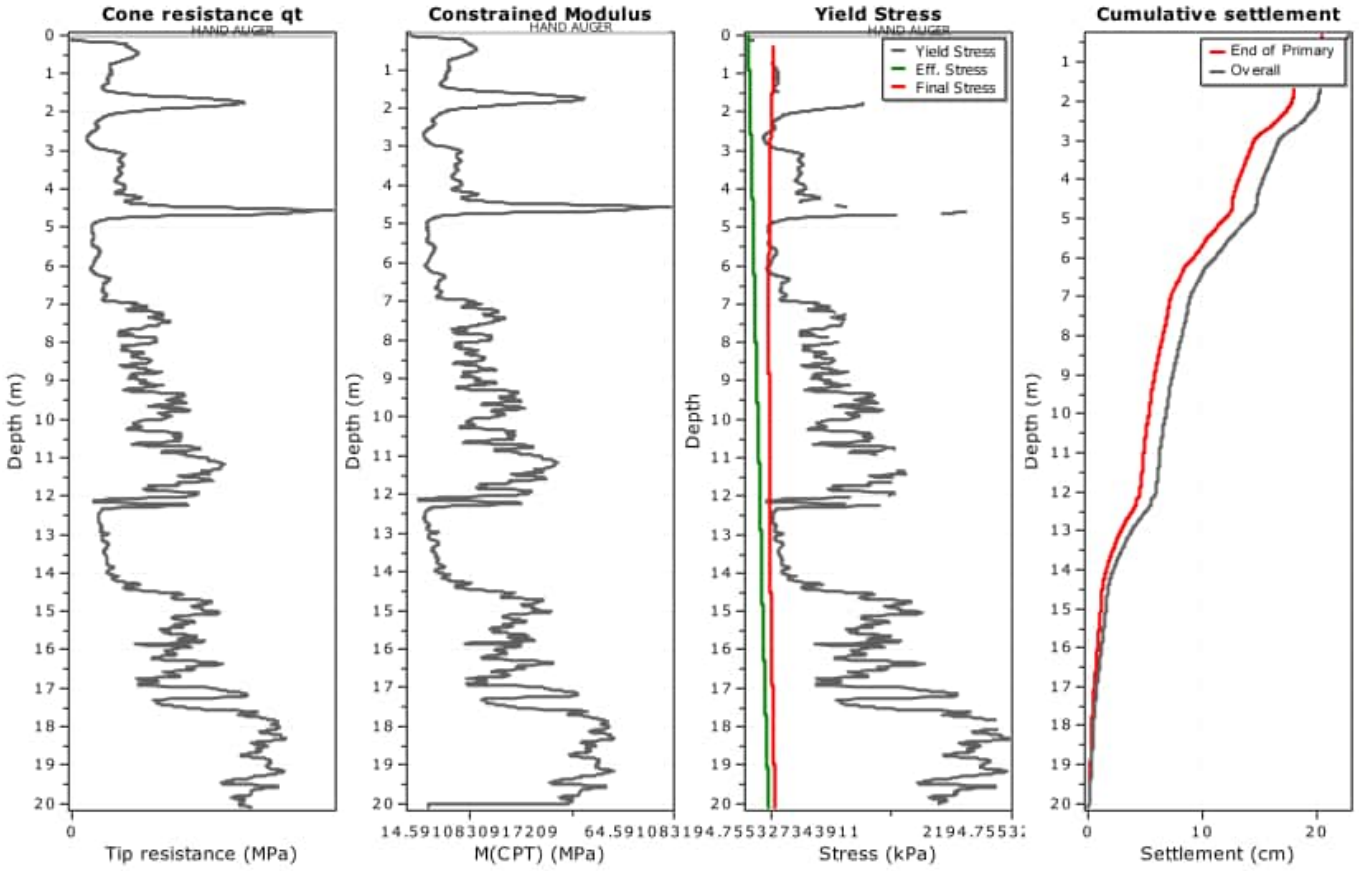
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Project file: G:\Shared drives\Civil - C3100\C3102 - 2025 Ohaupo Road, Te Awamutu, Te Awamutu Developments Limited\Des\Geo\Slope Stability\C3102-CPeT-All.cpt

Titus Consulting Engineers
169 London Street
Hamilton

CPT: CPT-06 BTW
Total depth: 20.10 m, Date: 19/05/2026
Surface Elevation: 0.00 m, Est. GWL: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: C3102
Location: 2025 Ohaupo Road, Te Awamutu

Settlements calculation according to theory of elasticity*



Calculation properties

Footing type: Rectangular
Footing width: 12.00 (m)
L/B: 5.8
Footing pressure: 200.00 (kPa)
Embedment depth: 0.30 (m)
Footing is rigid: Yes
Remove excavation load: No
Apply 20% rule: Yes
Calculate secondary settlements: Yes
Time period for primary consolidation: 6 months
Time period for second. settlements: 600 months

* Primary settlement calculation is performed according to the following formula:

$$S = \sum \frac{\Delta\sigma_v}{M_{CPT}} \Delta z$$

* Secondary (creep) settlement calculation is performed according to the following formula:

where t_p is the duration of primary consolidation

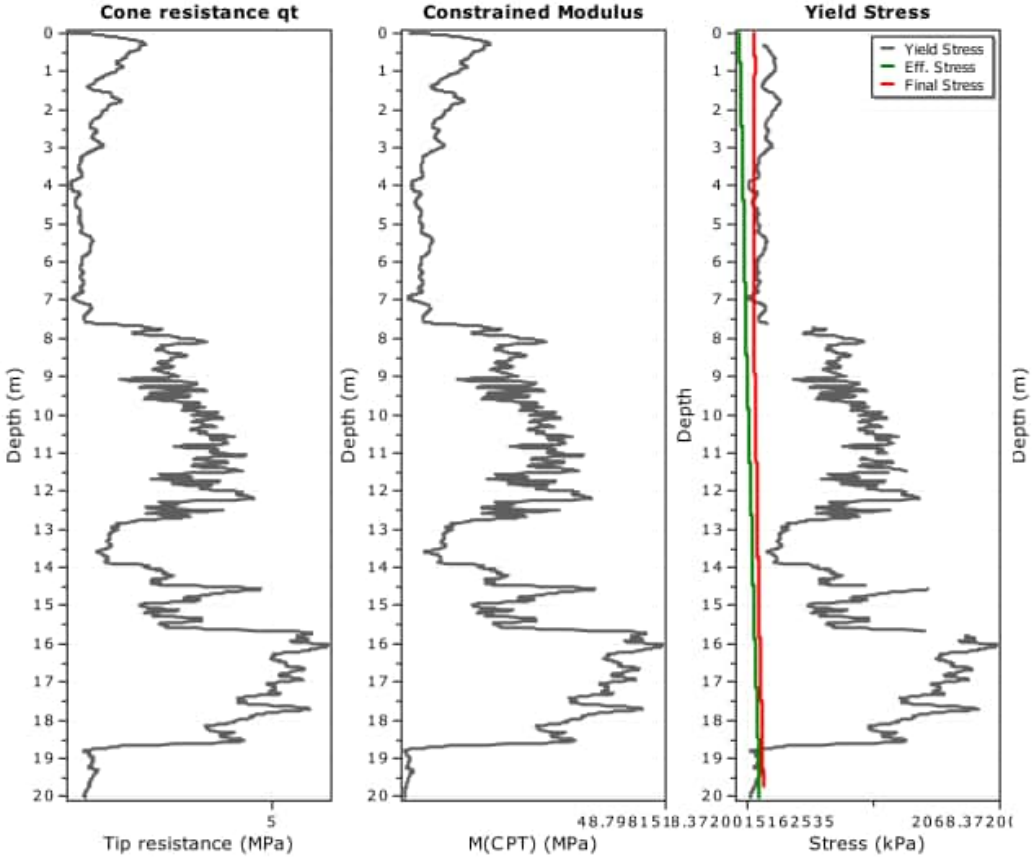
Area 3.

Titus Consulting Engineers
169 London Street
Hamilton

CPT: CPT-03
Total depth: 20.03 m, Date: 19/05/2026
Surface Elevation: 0.00 m, Est. GWL: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: C3102
Location: 2025 Ohaupo Road, Te Awamutu

Settlements calculation according to theory of elasticity*



Calculation properties

Footing type: Rectangular
Footing width: 12.00 (m)
L/B: 5.8
Footing pressure: 120.00 (kPa)
Embedment depth: 0.00 (m)
Footing is rigid: Yes
Remove excavation load: No
Apply 20% rule: Yes
Calculate secondary settlements: Yes
Time period for primary consolidation: 6 months
Time period for second. settlements: 600 months

* Primary settlement calculation is performed according to the following formula:

$$S = \sum \frac{\Delta\sigma_v}{M_{CPT}} \Delta z$$

* Secondary (creep) settlement calculation is performed according to the following formula:

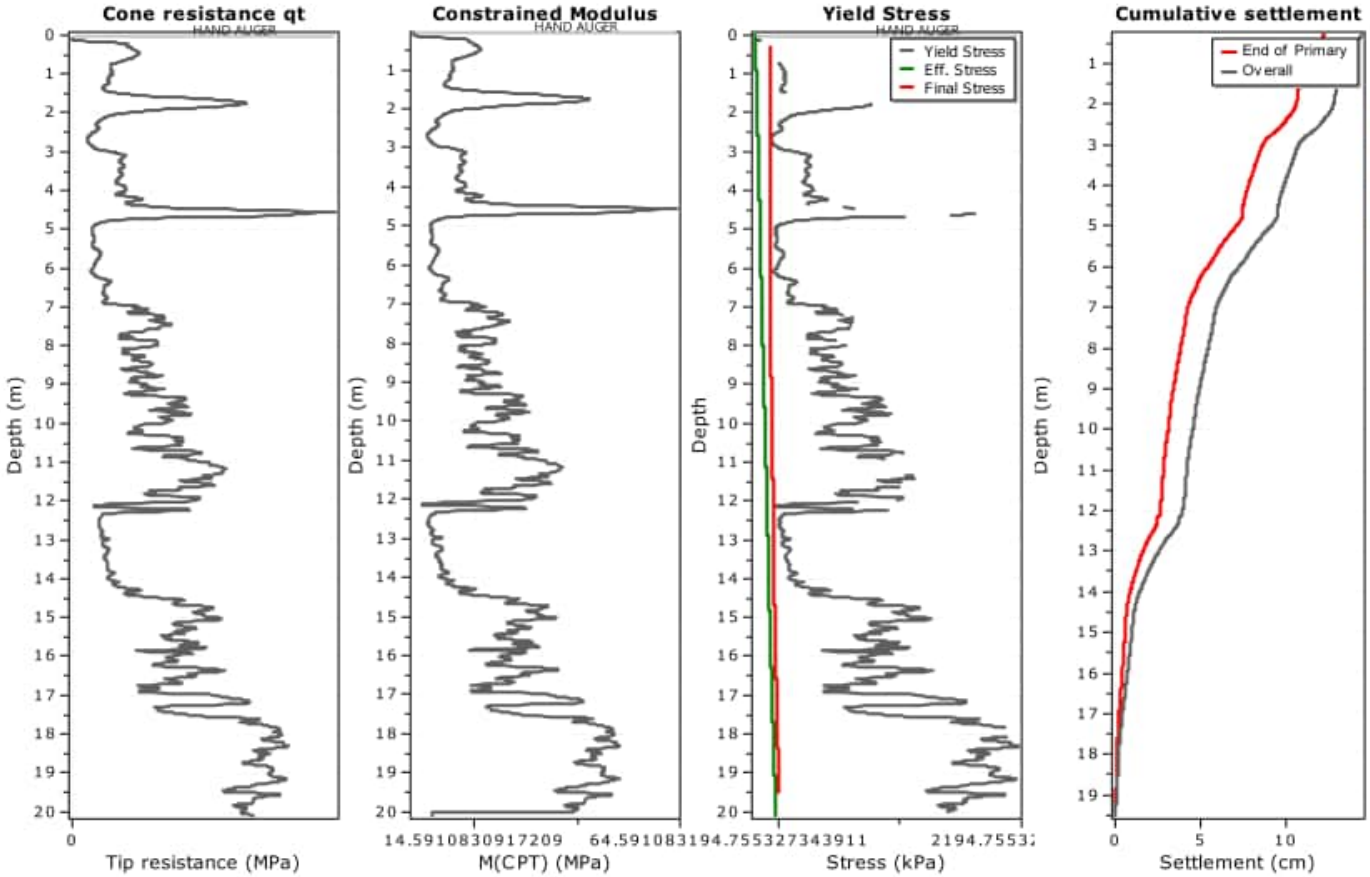
where t_p is the duration of primary consolidation

Titus Consulting Engineers
169 London Street
Hamilton

CPT: CPT-06 BTW
Total depth: 20.10 m, Date: 19/05/2026
Surface Elevation: 0.00 m, Est. GWL: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: C3102
Location: 2025 Ohaupo Road, Te Awamutu

Settlements calculation according to theory of elasticity*



Calculation properties

Footing type: Rectangular
Footing width: 12.00 (m)
L/B: 5.8
Footing pressure: 120.00 (kPa)
Embedment depth: 0.30 (m)
Footing is rigid: Yes
Remove excavation load: No
Apply 20% rule: Yes
Calculate secondary settlements: Yes
Time period for primary consolidation: 6 months
Time period for second. settlements: 600 months

* Primary settlement calculation is performed according to the following formula:

$$S = \sum \frac{\Delta\sigma_v}{M_{CPT}} \Delta z$$

* Secondary (creep) settlement calculation is performed according to the following formula:

where t_p is the duration of primary consolidation

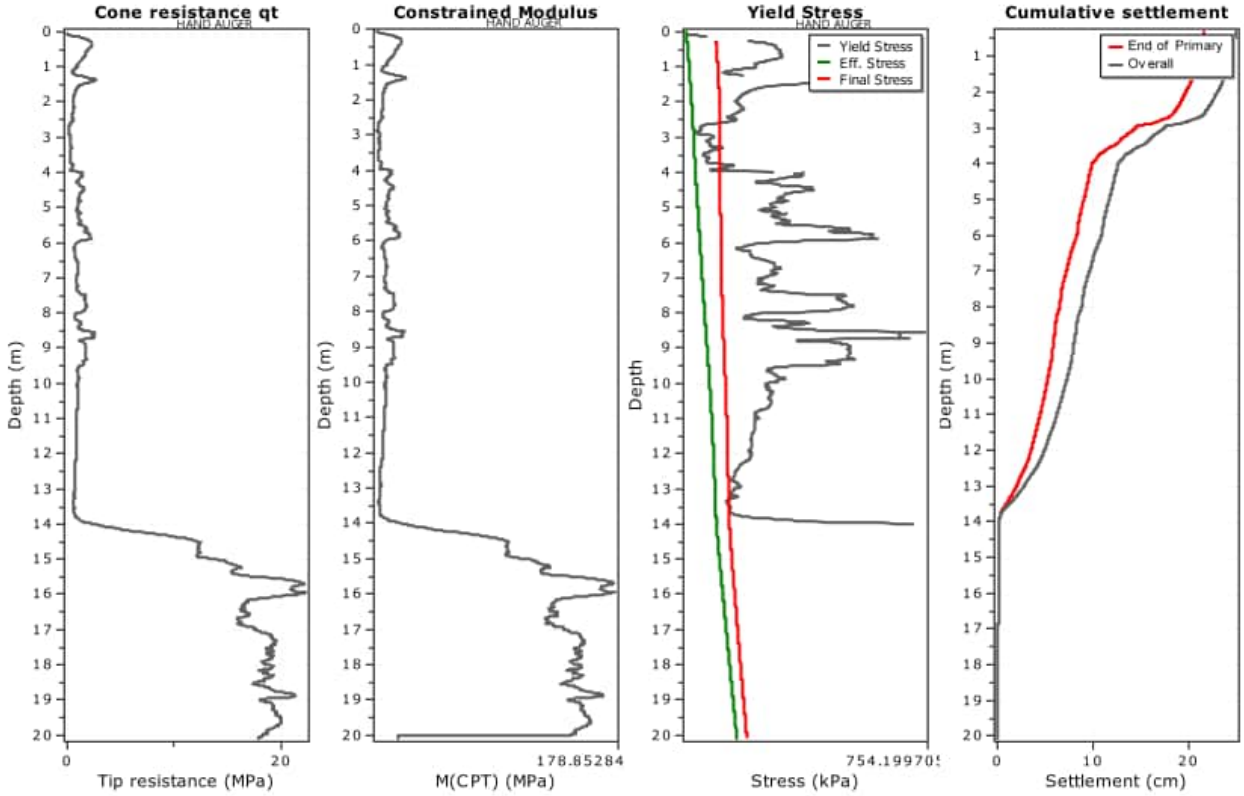
Area 4.

Titus Consulting Engineers
169 London Street
Hamilton

Project: C3102
Location: 2025 Ohaupo Road, Te Awamutu

CPT: CPT-03 BTW
Total depth: 20.10 m, Date: 19/05/2026
Surface Elevation: 0.00 m, Est. GWL: 0.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Settlements calculation according to theory of elasticity*



Calculation properties

Footing type: Rectangular
Footing width: 26.00 (m)
L/B: 1.5
Footing pressure: 90.00 (kPa)
Embedment depth: 0.30 (m)
Footing is rigid: Yes
Remove excavation load: No
Apply 20% rule: Yes
Calculate secondary settlements: Yes
Time period for primary consolidation: 6 months
Time period for second. settlements: 600 months

* Primary settlement calculation is performed according to the following formula:

$$S = \sum \frac{\Delta\sigma_v}{M_{CPT}} \Delta z$$

* Secondary (creep) settlement calculation is performed according to the following formula:

where t_p is the duration of primary consolidation

CPeT-IT v.3.9.7.3 - CPTU data presentation & interpretation software - Report created on: 17/09/2026, 9:53:13 am 1
Project file: G:\Shared drives\Civil - C3100\C3102 - 2025 Ohaupo Road, Te Awamutu, Te Awamutu Developments Limited\Des\Geo\Slope Stability\C3102-CPeT-All.cpt

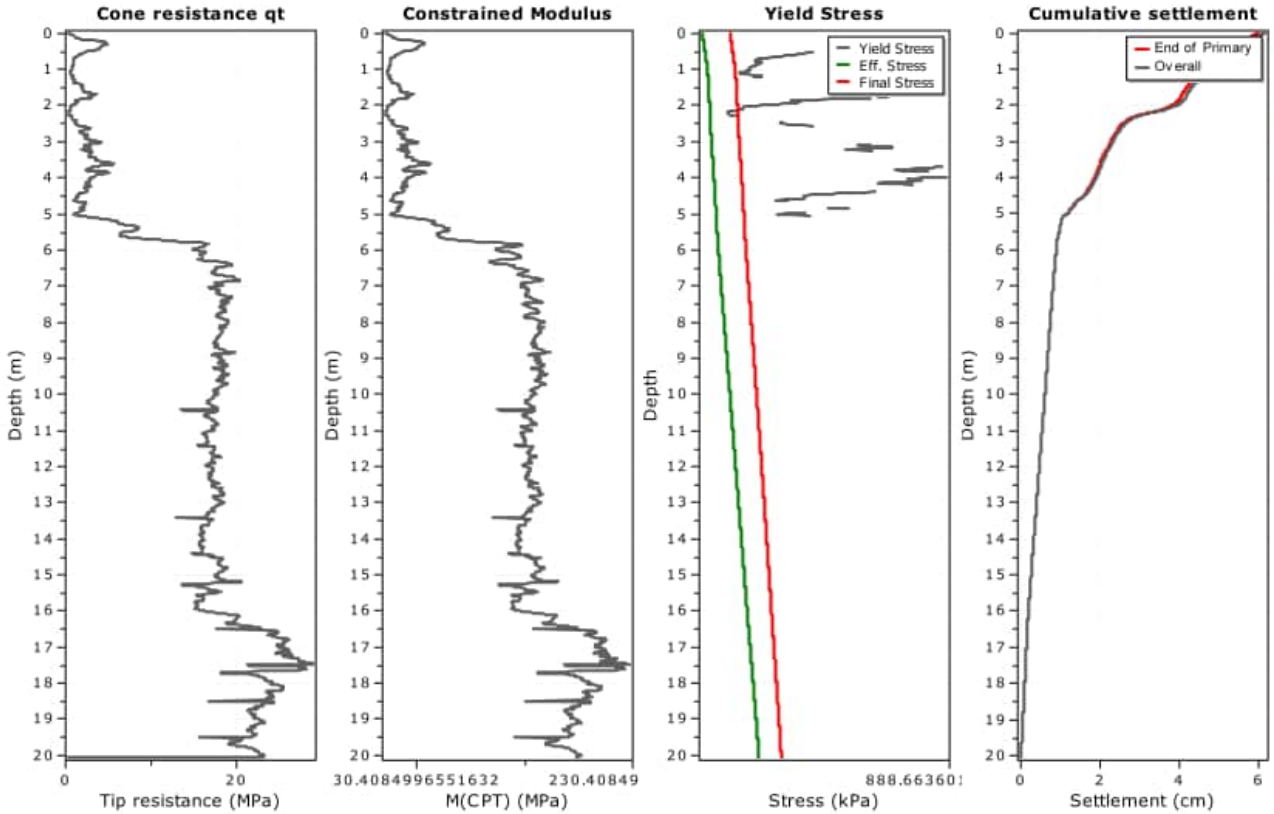
Area 5

Titus Consulting Engineers
169 London Street
Hamilton

CPT: CPT-05
Total depth: 20.05 m, Date: 19/05/2026
Surface Elevation: 0.00 m, Est. GWL: 1.10 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: C3102
Location: 2025 Ohaupo Road, Te Awamutu

Settlements calculation according to theory of elasticity*



Calculation properties

Footing type: Rectangular
Footing width: 50.00 (m)
L/B: 1.0
Footing pressure: 100.00 (kPa)
Embedment depth: 0.00 (m)
Footing is rigid: No
Remove excavation load: No
Apply 20% rule: Yes
Calculate secondary settlements: Yes
Time period for primary consolidation: 6 months
Time period for second. settlements: 600 months

* Primary settlement calculation is performed according to the following formula:

$$S = \sum \frac{\Delta\sigma_v}{M_{CPT}} \Delta z$$

* Secondary (creep) settlement calculation is performed according to the following formula:

where t_p is the duration of primary consolidation

CPeT-IT v.3.9.7.3 - CPTU data presentation & interpretation software - Report created on: 3/06/2026, 11:10:11 am
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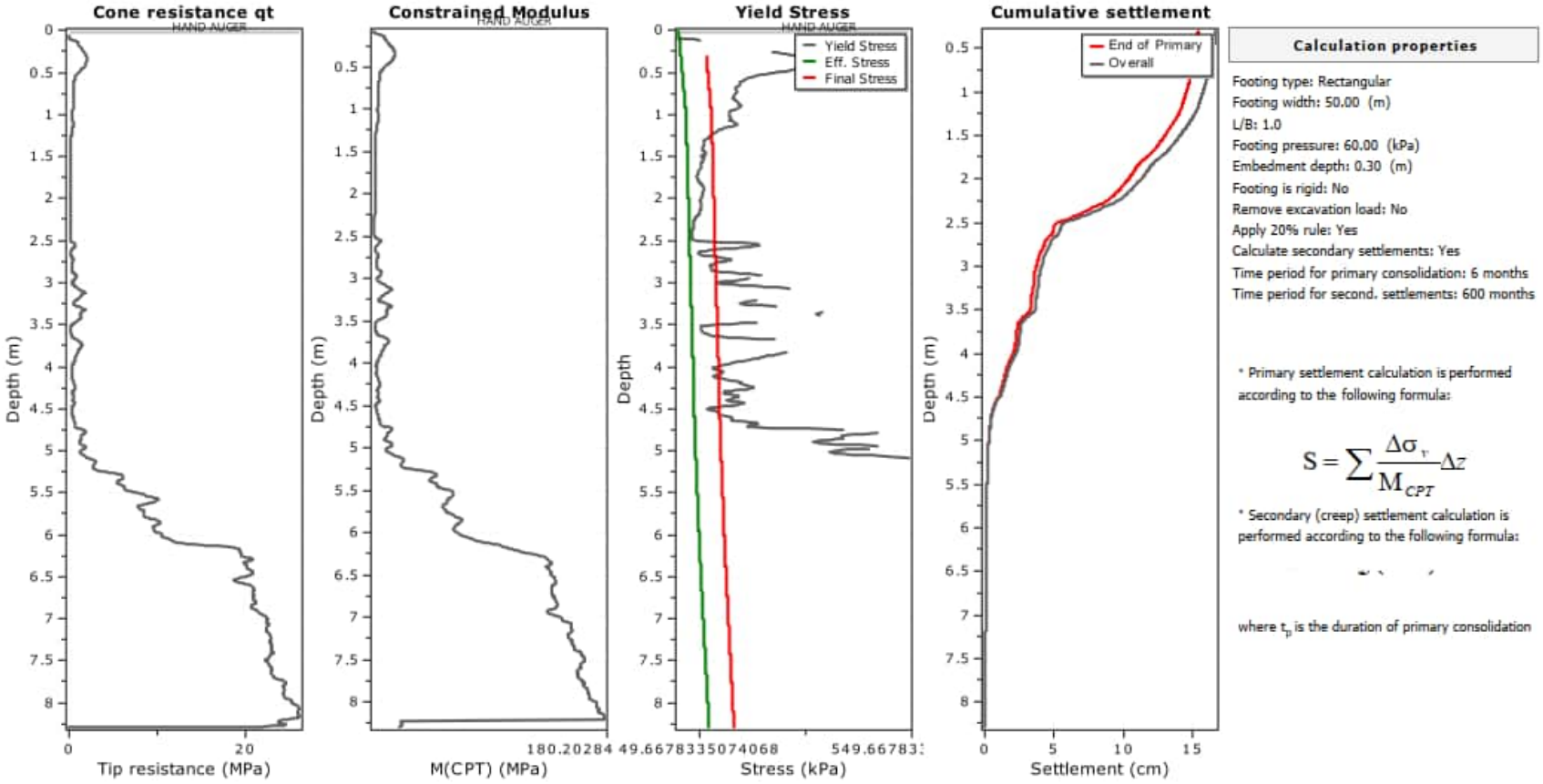
Area 6, 7, 8.

Titus Consulting Engineers
169 London Street
Hamilton

CPT: CPT-10 BTW
Total depth: 8.29 m, Date: 19/05/2026
Surface Elevation: 0.00 m, Est. GWL: 1.00 m
Coords: X:0.00, Y:0.00
Cone Type:
Cone Operator:

Project: C3102
Location: 2025 Ohaupo Road, Te Awamutu

Settlements calculation according to theory of elasticity*



Calculation properties

Footing type: Rectangular
Footing width: 50.00 (m)
L/B: 1.0
Footing pressure: 60.00 (kPa)
Embedment depth: 0.30 (m)
Footing is rigid: No
Remove excavation load: No
Apply 20% rule: Yes
Calculate secondary settlements: Yes
Time period for primary consolidation: 6 months
Time period for second. settlements: 600 months

* Primary settlement calculation is performed according to the following formula:

$$S = \sum \frac{\Delta \sigma_v}{M_{CPT}} \Delta z$$

* Secondary (creep) settlement calculation is performed according to the following formula:

where t_p is the duration of primary consolidation

CPeT-IT v.3.9.7.3 - CPTU data presentation & interpretation software - Report created on: 3/06/2026, 11:11:09 am
Project file: G:\Shared drives\Civil - C3100\C3102 - 2025 Ohaupo Road, Te Awamutu, Te Awamutu Developments Limited\Des\Geo\Slope Stability\C3102-CPeT-All.cpt

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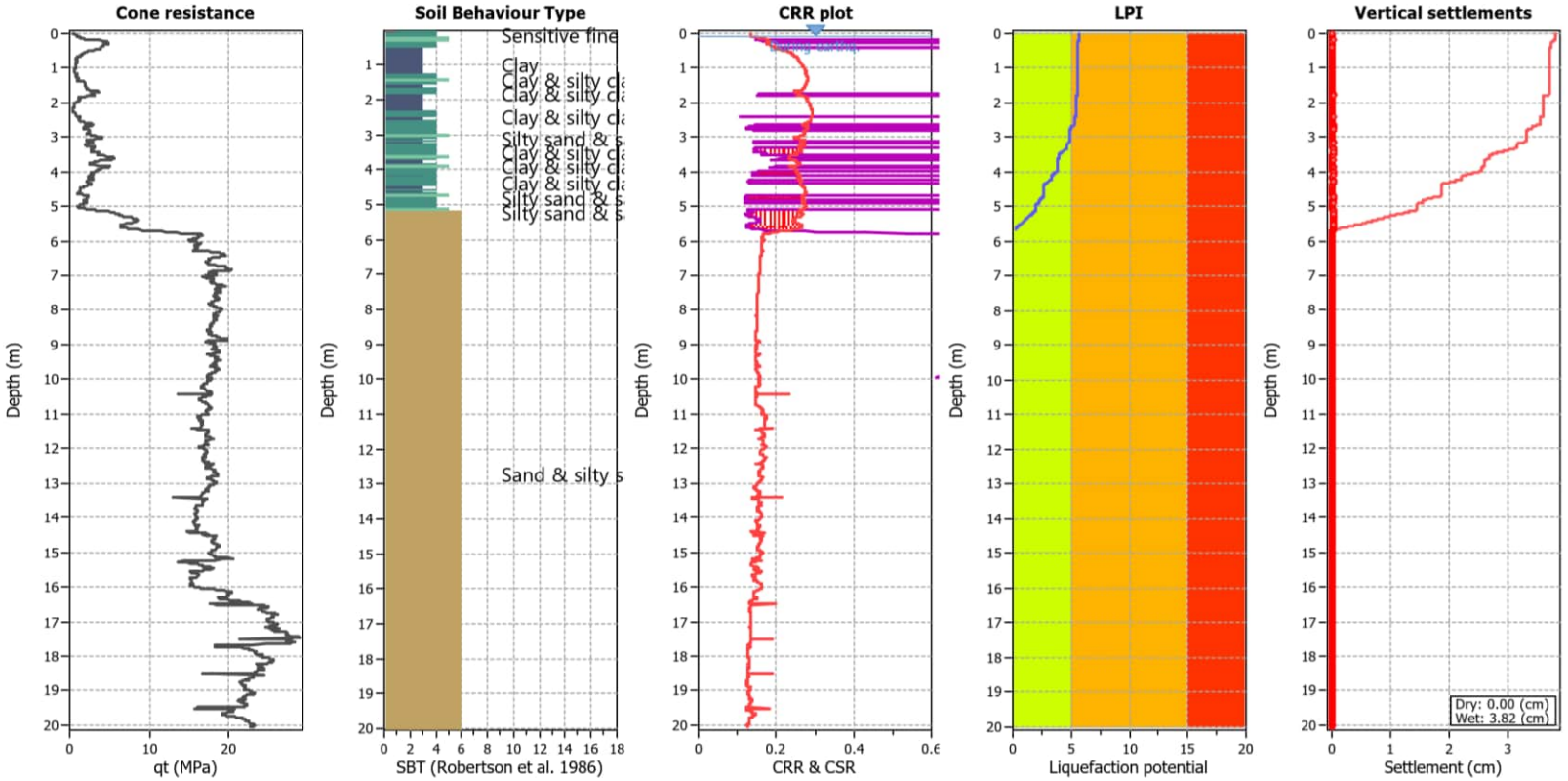
APPENDIX I – Liquefaction Results

IL2 Results

Titus Consulting Engineers
169 London Street
Hamilton

Project: C3102
Location: 2025 Ohaupo Road, Te Awamutu

CPT: CPT-05
Total depth: 20.05 m



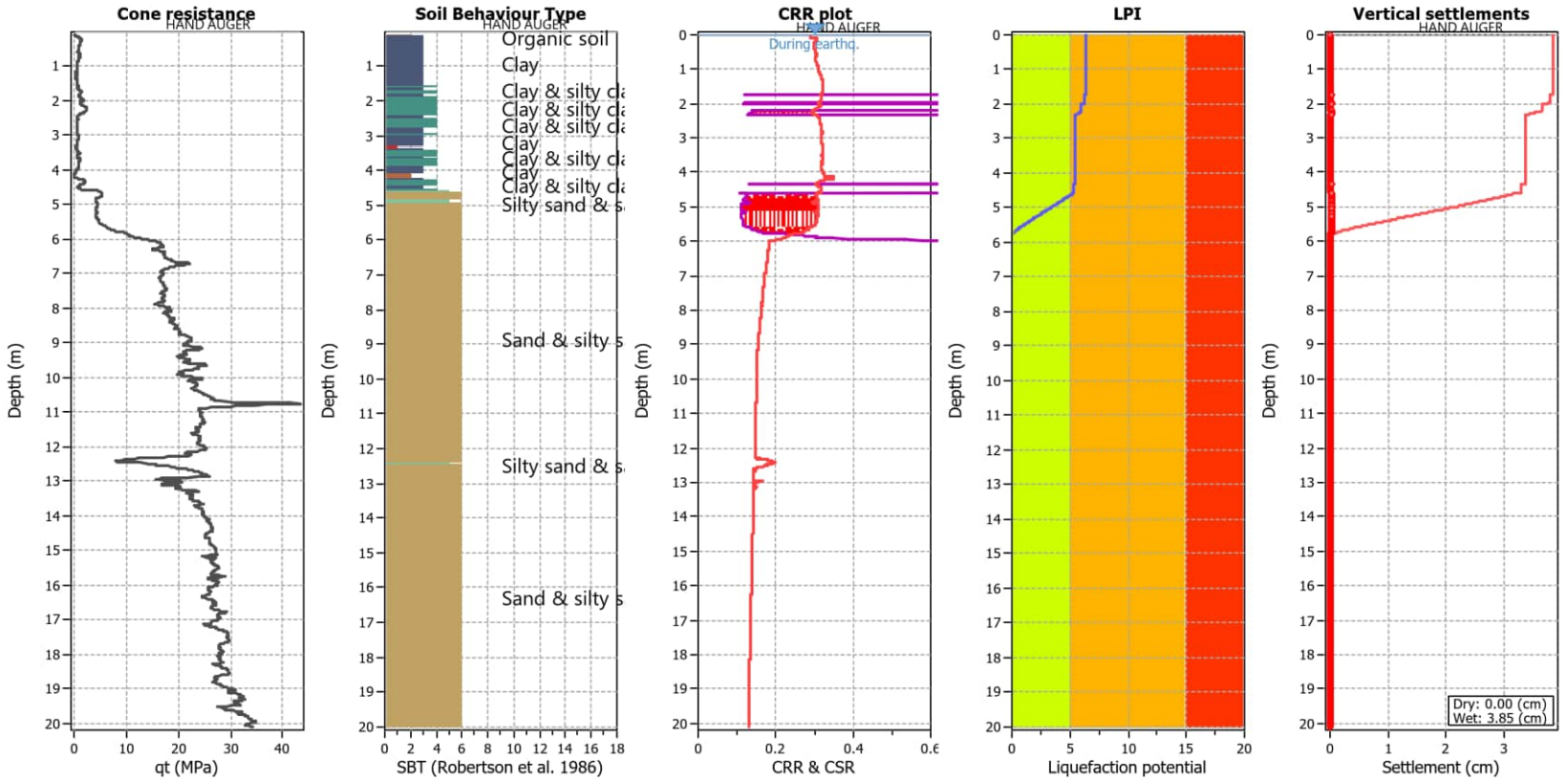
Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.10 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	0.10 m	Fill height:	N/A	Limit depth applied:	Yes
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	10.00 m
Earthquake magnitude M_w:	5.90	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.25	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

CLiq v.3.5.4.2 - CPTU data presentation & interpretation software - Report created on: 9/10/2026, 11:19:01 am 0
Project file: G:\Shared drives\Civil - C3100\C3102 - 2025 Ohaupo Road, Te Awamutu, Te Awamutu Developments Limited\Des\Geo\Liquefaction\C3102-CLiq-Alluvial plain CPT.clq

Titus Consulting Engineers
169 London Street
Hamilton

Project: C3102
Location: 2025 Ohaupo Road, Te Awamutu

CPT: CPT-07 BTW
Total depth: 20.10 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	0.00 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	0.00 m	Fill height:	N/A		
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	Yes
Earthquake magnitude M_w:	5.90	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	Limit depth:	10.00 m
Peak ground acceleration:	0.25	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based

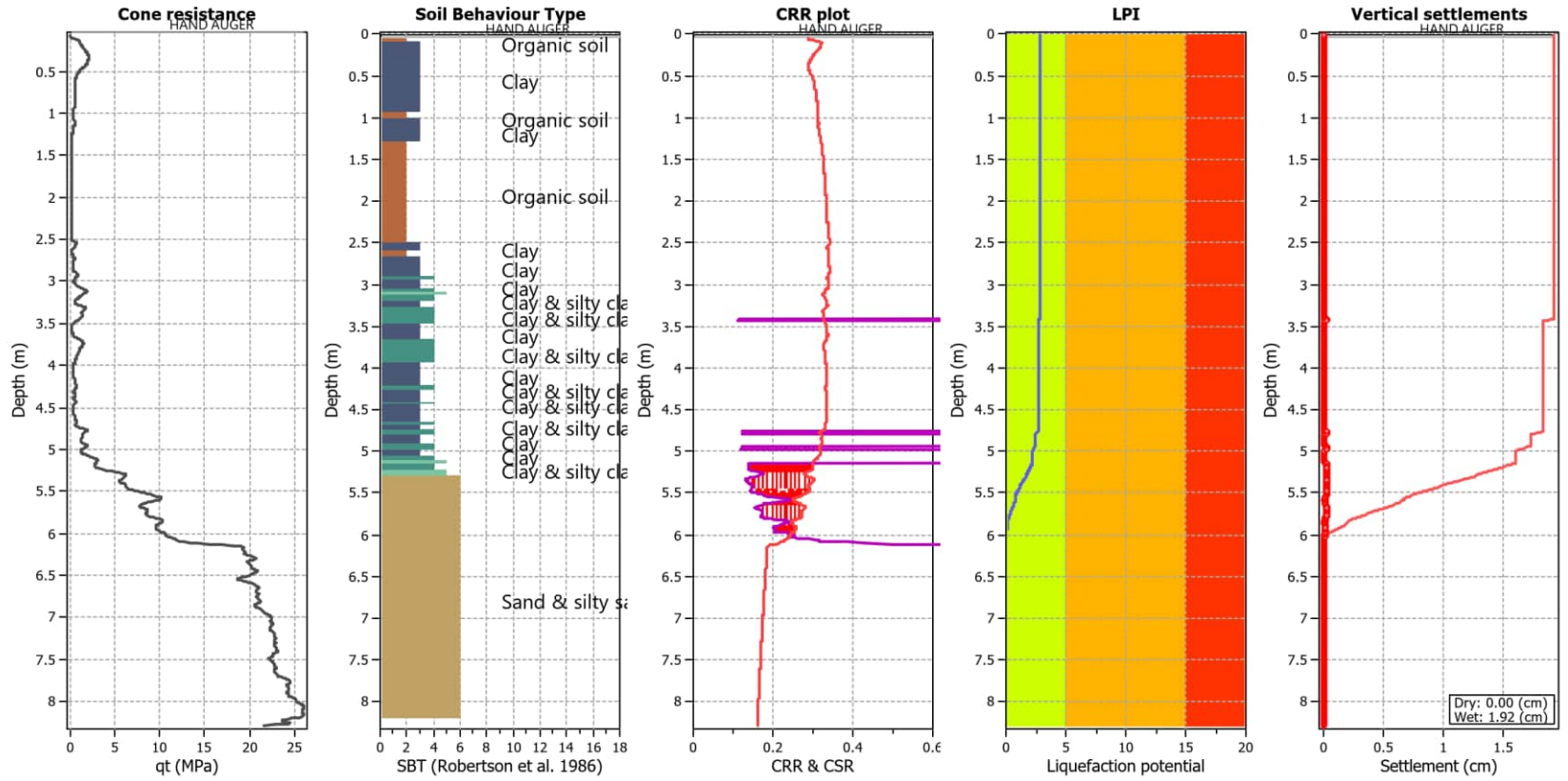
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0

Titus Consulting Engineers
169 London Street
Hamilton

Project: C3102
Location: 2025 Ohaupo Road, Te Awamutu

CPT: CPT-10 BTW
Total depth: 8.29 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.00 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	0.00 m	Fill height:	N/A		
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	Yes
Earthquake magnitude M_w:	5.90	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	Limit depth:	10.00 m
Peak ground acceleration:	0.25	Unit weight calculation:	Based on SBT	K_α applied:	Yes	MSF method:	Method based

CLiq v.3.5.4.2 - CPTU data presentation & interpretation software - Report created on: 9/10/2026, 11:25:23 am
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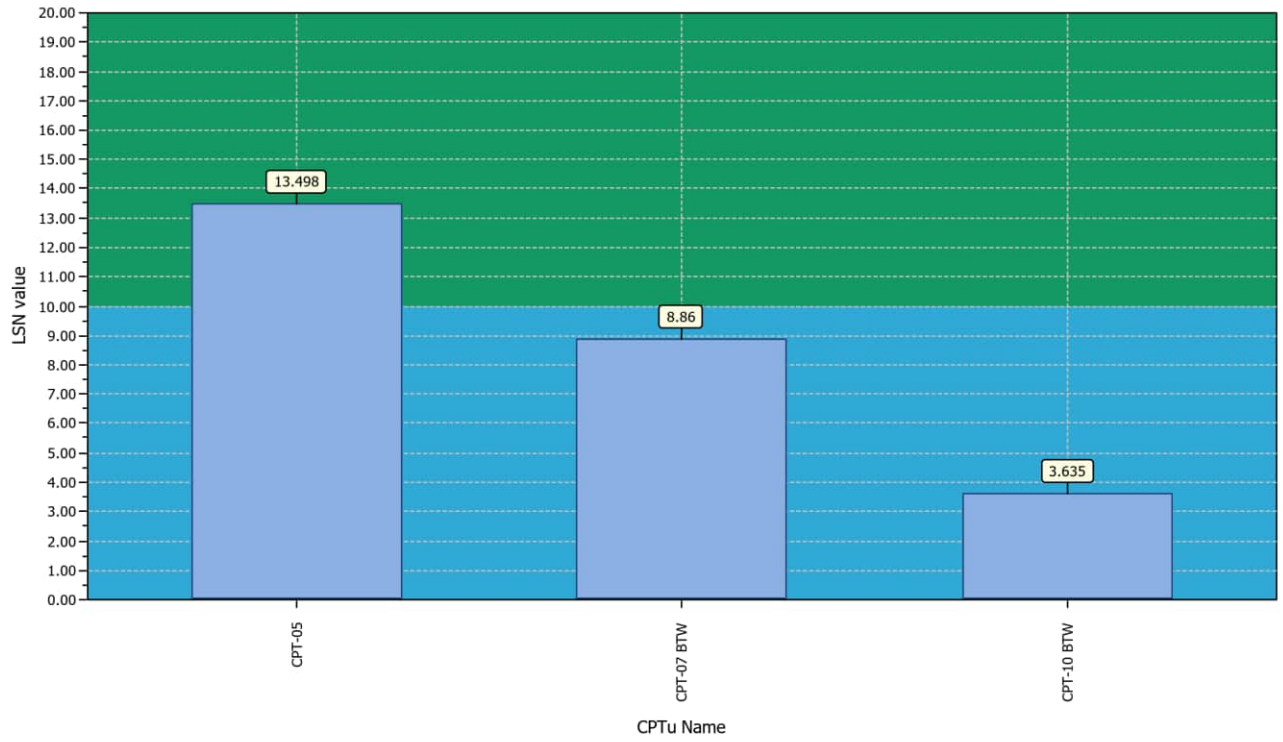
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Titus Consulting Engineers
169 London Street
Hamilton

Project title : C3102

Location : 2025 Ohaupo Road, Te Awamutu

Overall Liquefaction Severity Number report



LSN color scheme

- Severe damage
- Major expression of liquefaction
- Moderate to severe exp. of liquefaction
- Moderate expression of liquefaction
- Minor expression of liquefaction
- Little to no expression of liquefaction

Basic statistics

Total CPT number: 3

67% little liquefaction

33% minor liquefaction

0% moderate liquefaction

0% moderate to major liquefaction

0% major liquefaction

0% severe liquefaction

CLiq v.3.5.4.2 - CPT Liquefaction Assessment Software

Project file: G:\Shared drives\Civil - C3100\C3102 - 2025 Ohaupo Road, Te Awamutu, Te Awamutu Developments Limited\Des\Geo\Liquefaction\C3102-CLiq-Alluvial plain CPT.clq

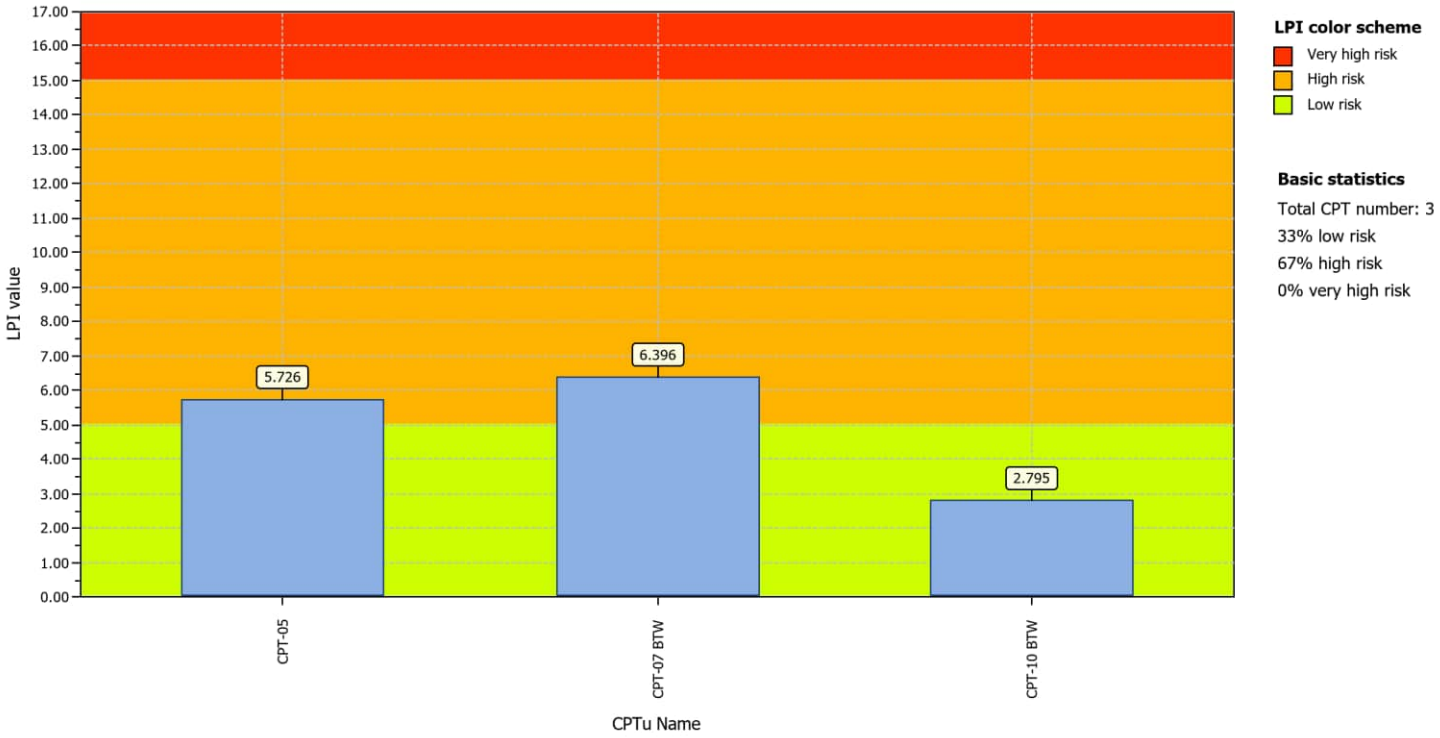
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Titus Consulting Engineers
169 London Street
Hamilton

Project title : C3102

Location : 2025 Ohaupo Road, Te Awamutu

Overall Liquefaction Potential Index report

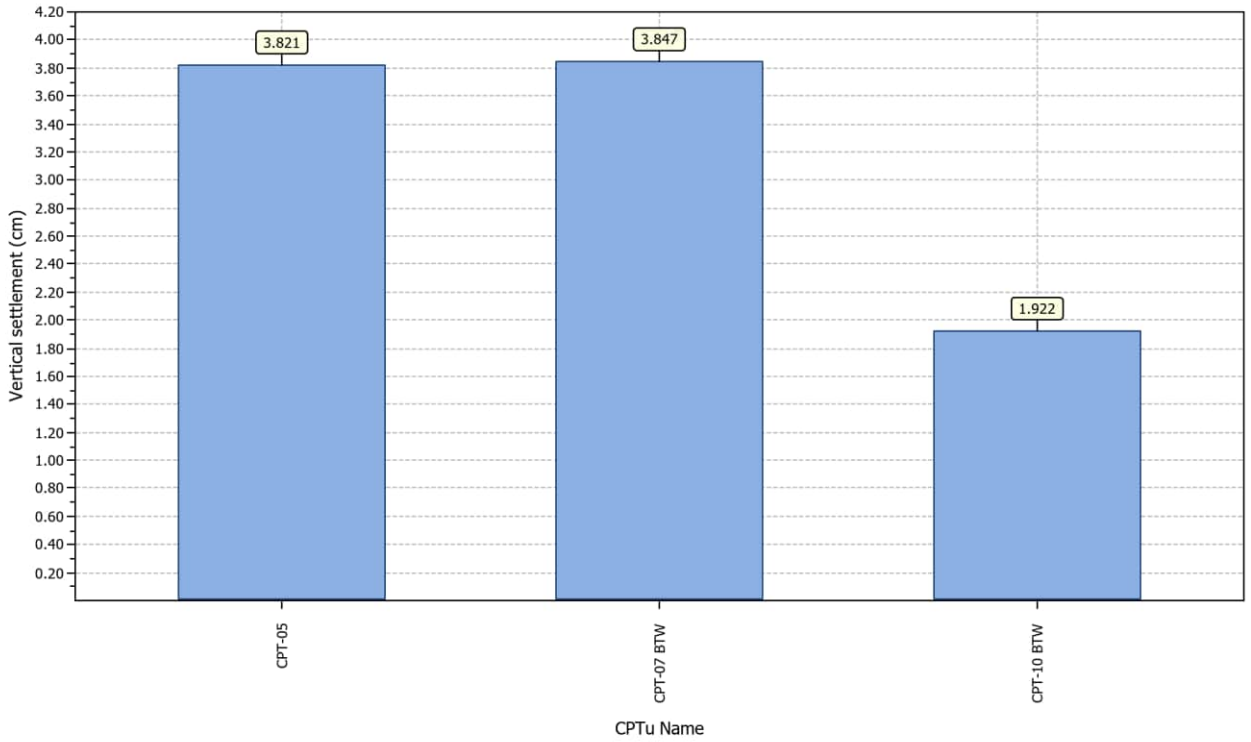


Titus Consulting Engineers
169 London Street
Hamilton

Project title : C3102

Location : 2025 Ohaupo Road, Te Awamutu

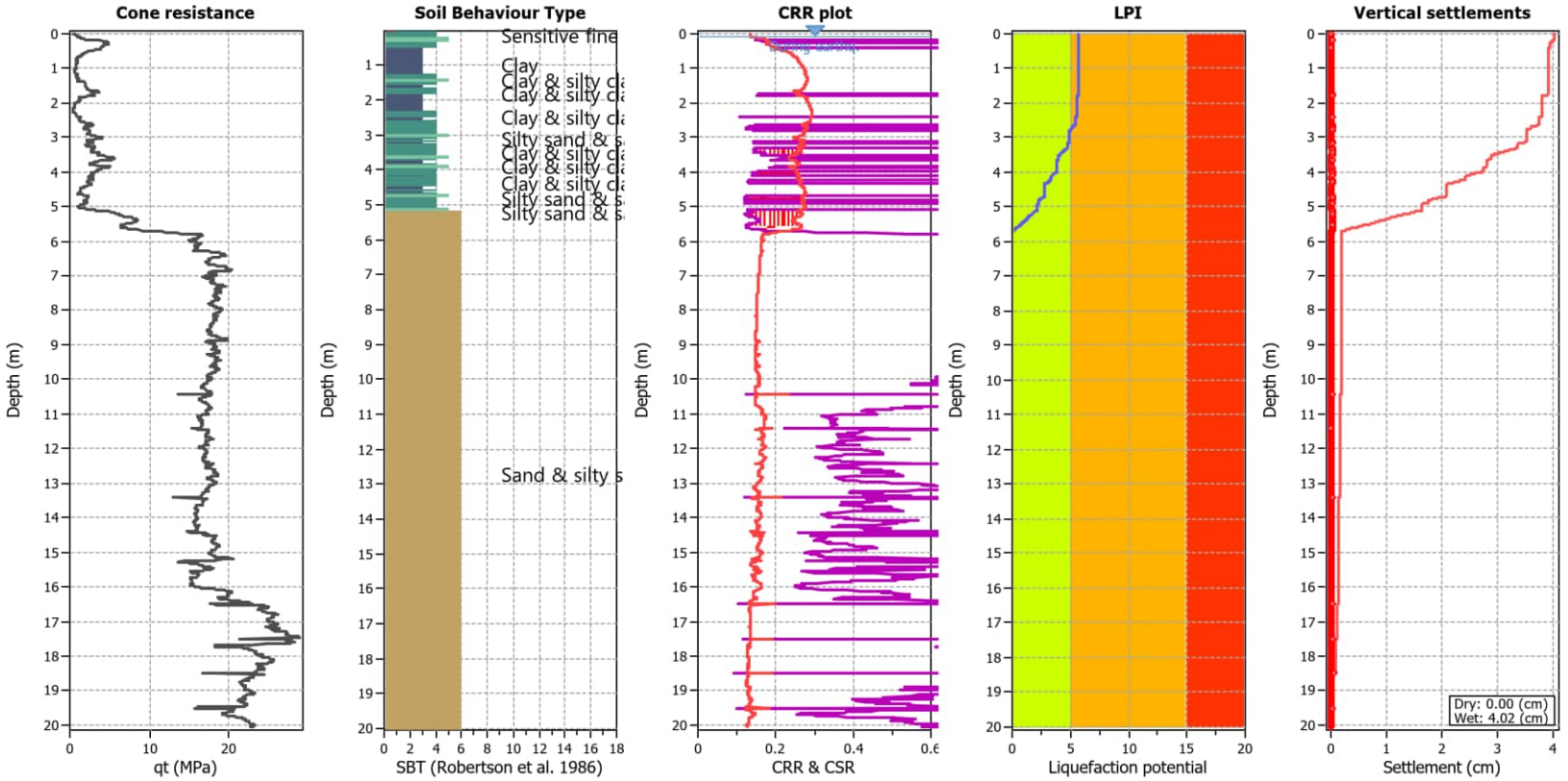
Overall vertical settlements report



Titus Consulting Engineers
169 London Street
Hamilton

Project: C3102
Location: 2025 Ohaupo Road, Te Awamutu

CPT: CPT-05
Total depth: 20.05 m



Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.10 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	0.10 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	5.90	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.25	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

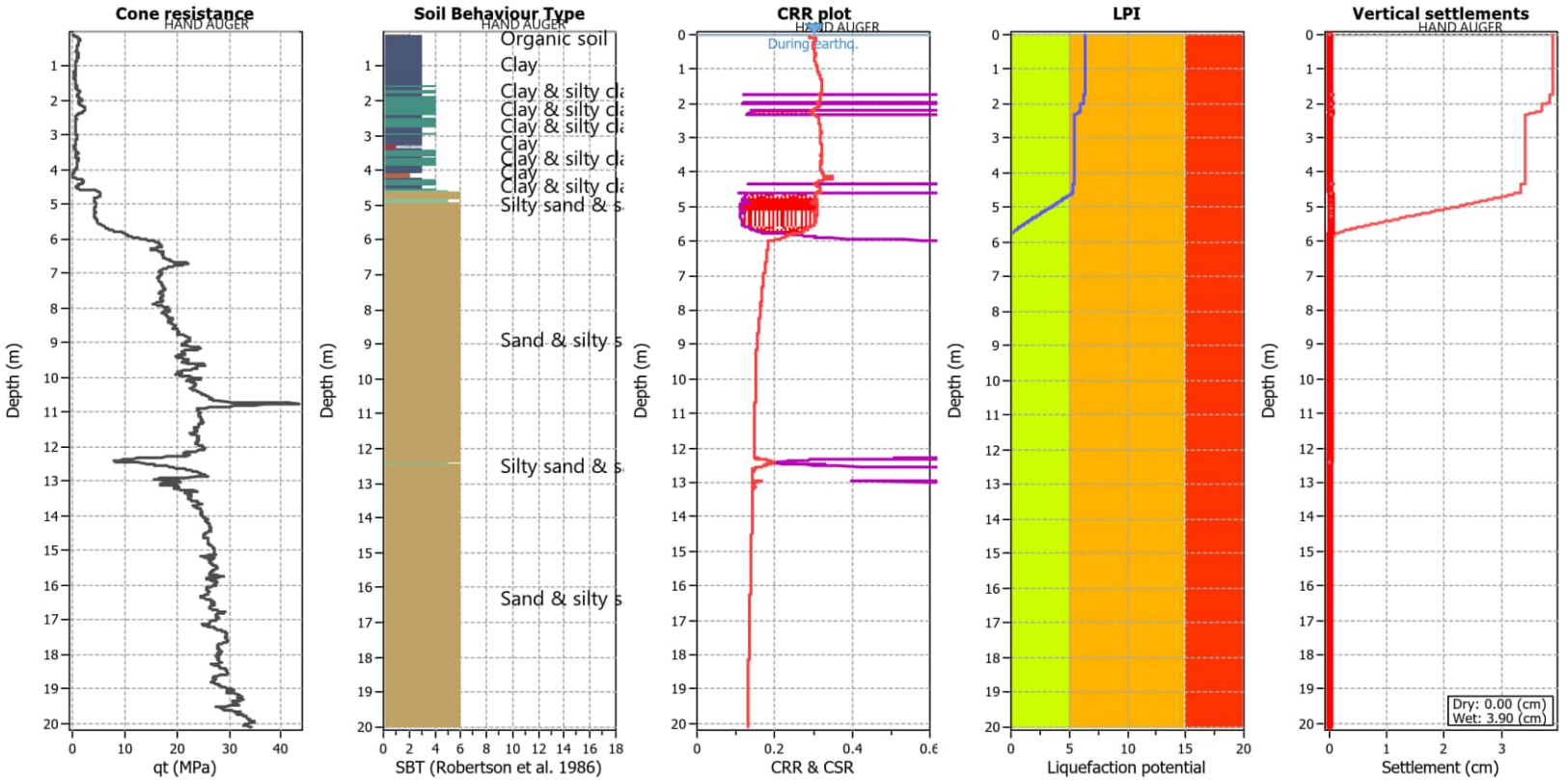
CLiq v.3.5.4.2 - CPTU data presentation & interpretation software - Report created on: 9/10/2026, 11:27:07 am
Project file: G:\Shared drives\Civil - C3100\C3102 - 2025 Ohaupo Road, Te Awamutu, Te Awamutu Developments Limited\Des\Geo\Liquefaction\C3102-CLiq-Alluvial plain CPT.clq

0

Titus Consulting Engineers
169 London Street
Hamilton

Project: C3102
Location: 2025 Ohaupo Road, Te Awamutu

CPT: CPT-07 BTW
Total depth: 20.10 m



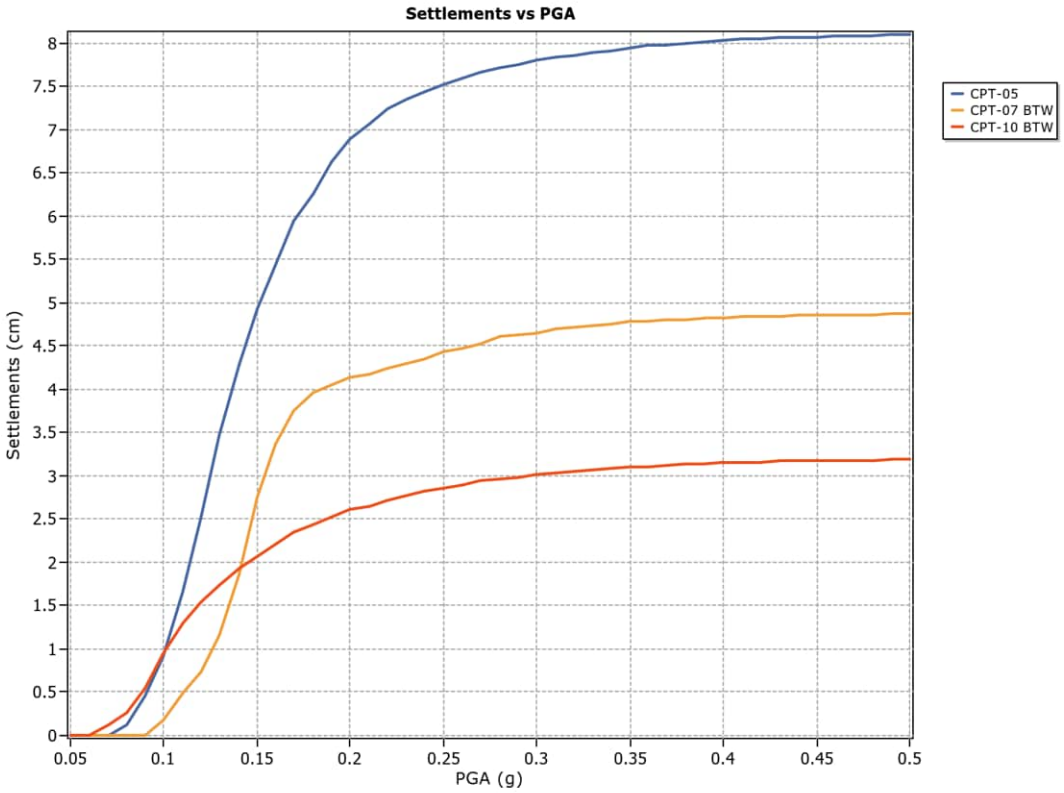
Analysis method:	B&I (2014)	G.W.T. (in-situ):	0.00 m	Use fill:	No	Clay like behavior applied:	.
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	0.00 m	Fill height:	N/A		
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w:	5.90	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	Limit depth:	N/A
Peak ground acceleration:	0.25	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based

CLiq v.3.5.4.2 - CPTU data presentation & interpretation software - Report created on: 9/10/2026, 11:27:26 am
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Titus Consulting Engineers
169 London Street
Hamilton

PGA Based Parametric Analysis



:: CPT main liquefaction parameters details ::

CPT Name	Assesment method	Earthquake Mag.	GWT in situ (m)	GWT earthq. (m)
CPT-05	Boulanger & Idriss (2014)	5.90	1.10	0.10
CPT-07 BTW	Boulanger & Idriss (2014)	5.90	2.90	1.90
CPT-10 BTW	Boulanger & Idriss (2014)	5.90	1.00	0.00

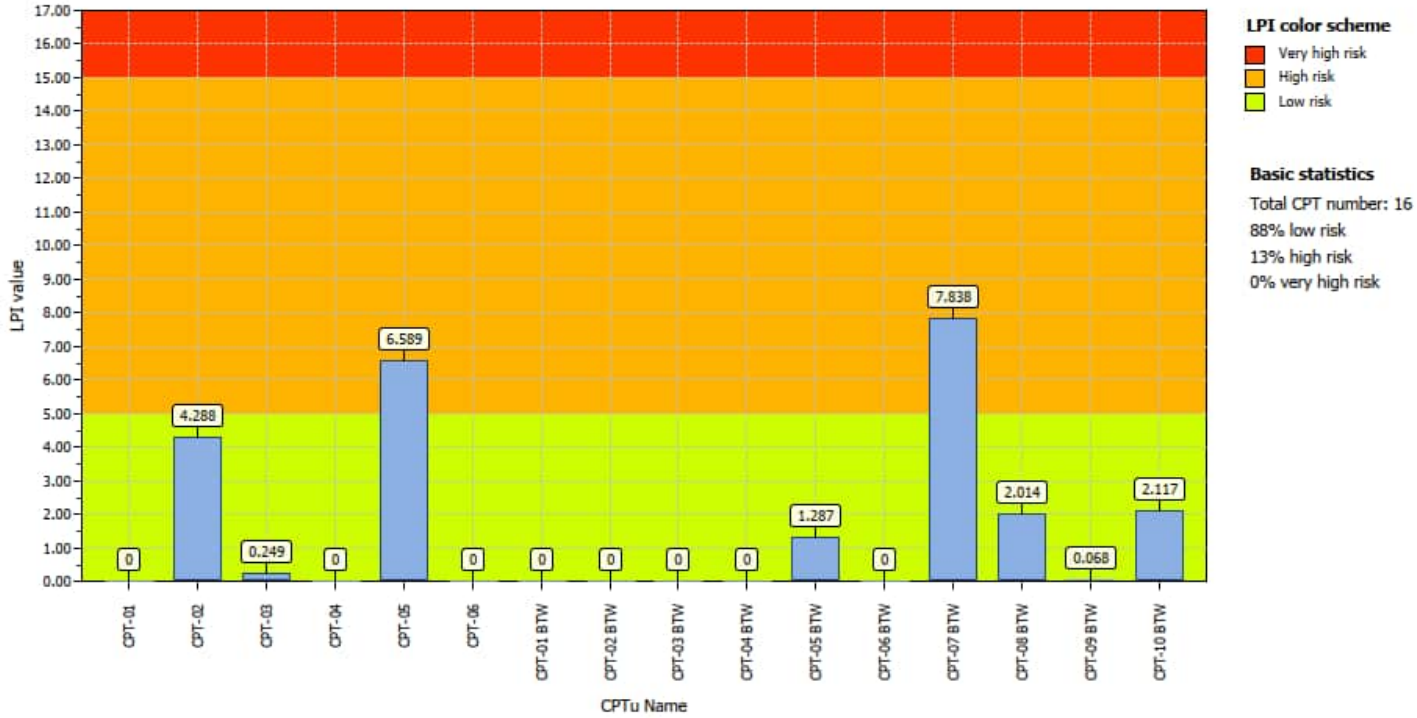
IL3 Results

Titus Consulting Engineers
169 London Street
Hamilton

Project title : C3102

Location : 2025 Ohaupo Road, Te Awamutu

Overall Liquefaction Potential Index report



CLiq v.3.5.4.2 - CPT Liquefaction Assessment Software
Project file: G:\Shared drives\Civil - C3100\C3102 - 2025 Ohaupo Road, Te Awamutu, Te Awamutu Developments Limited\Des\Geo\Liquefaction\C3102-CLiq-All CPT.clq

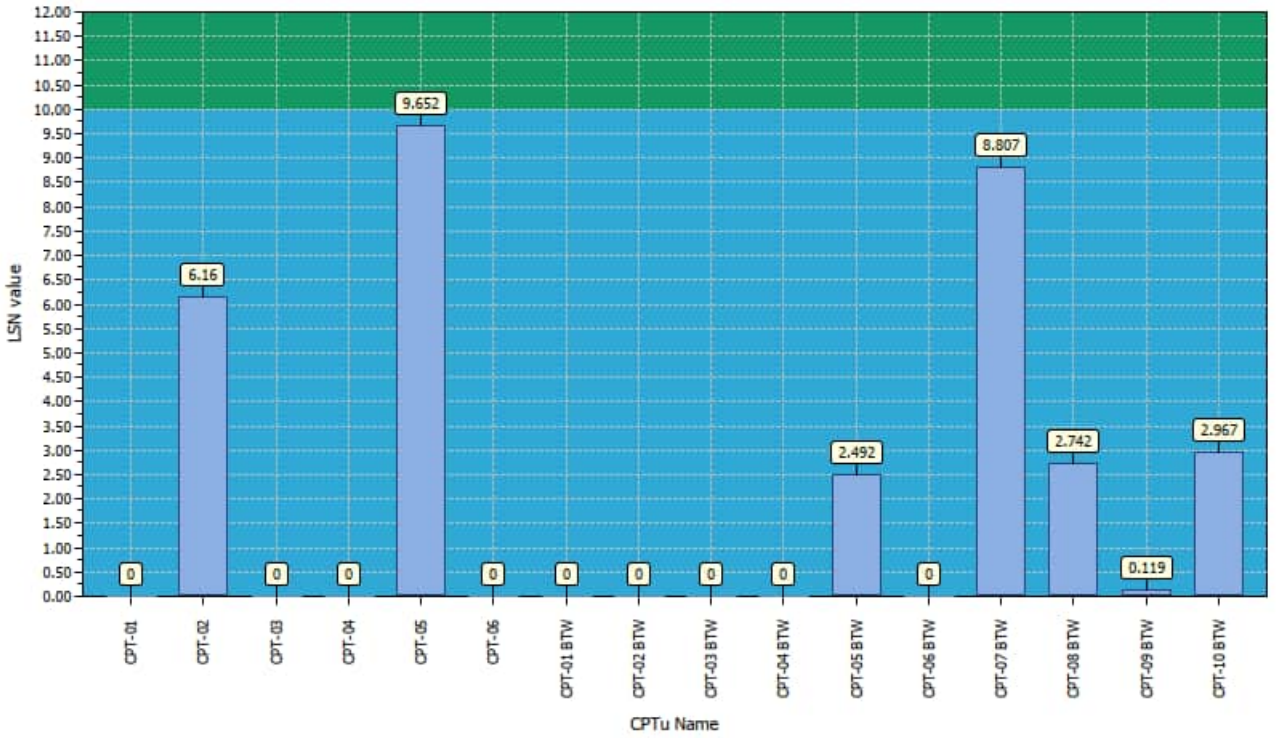
1

Titus Consulting Engineers
169 London Street
Hamilton

Project title : C3102

Location : 2025 Ohaupo Road, Te Awamutu

Overall Liquefaction Severity Number report



LSN color scheme

- Severe damage
- Major expression of liquefaction
- Moderate to severe exp. of liquefaction
- Moderate expression of liquefaction
- Minor expression of liquefaction
- Little to no expression of liquefaction

Basic statistics

Total CPT number: 16
100% little liquefaction
0% minor liquefaction
0% moderate liquefaction
0% moderate to major liquefaction
0% major liquefaction
0% severe liquefaction

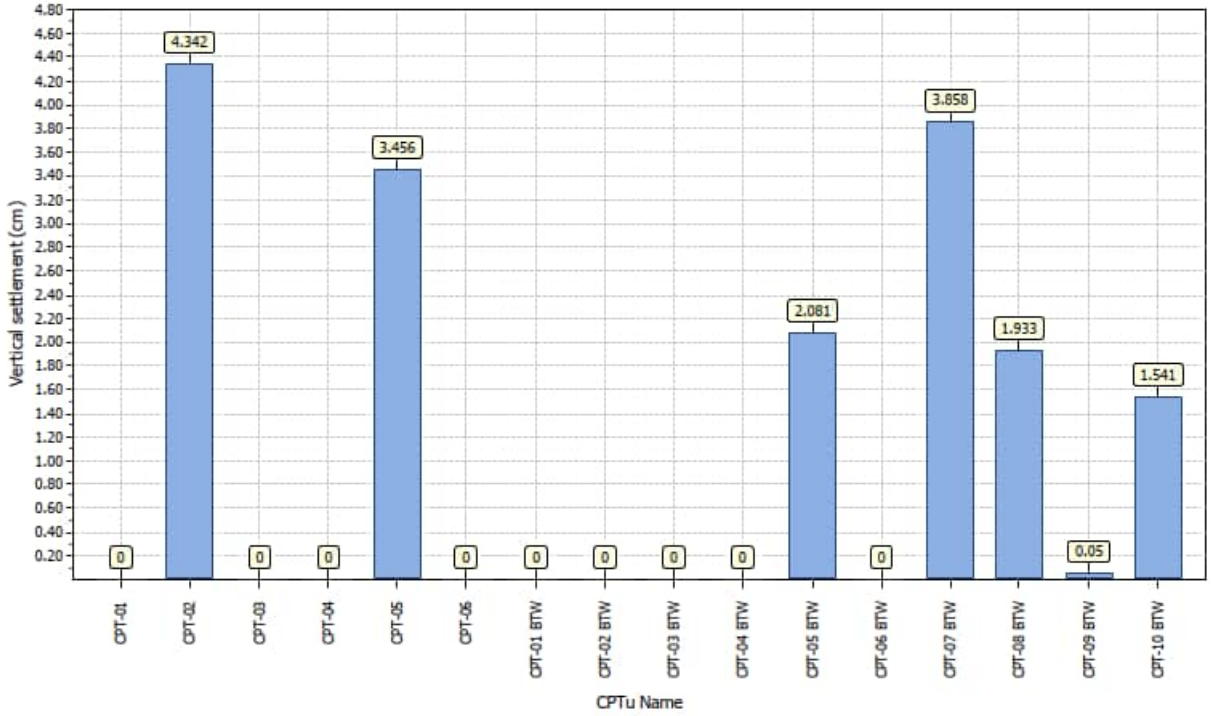
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Titus Consulting Engineers
169 London Street
Hamilton

Project title : C3102

Location : 2025 Ohaupo Road, Te Awamutu

Overall vertical settlements report

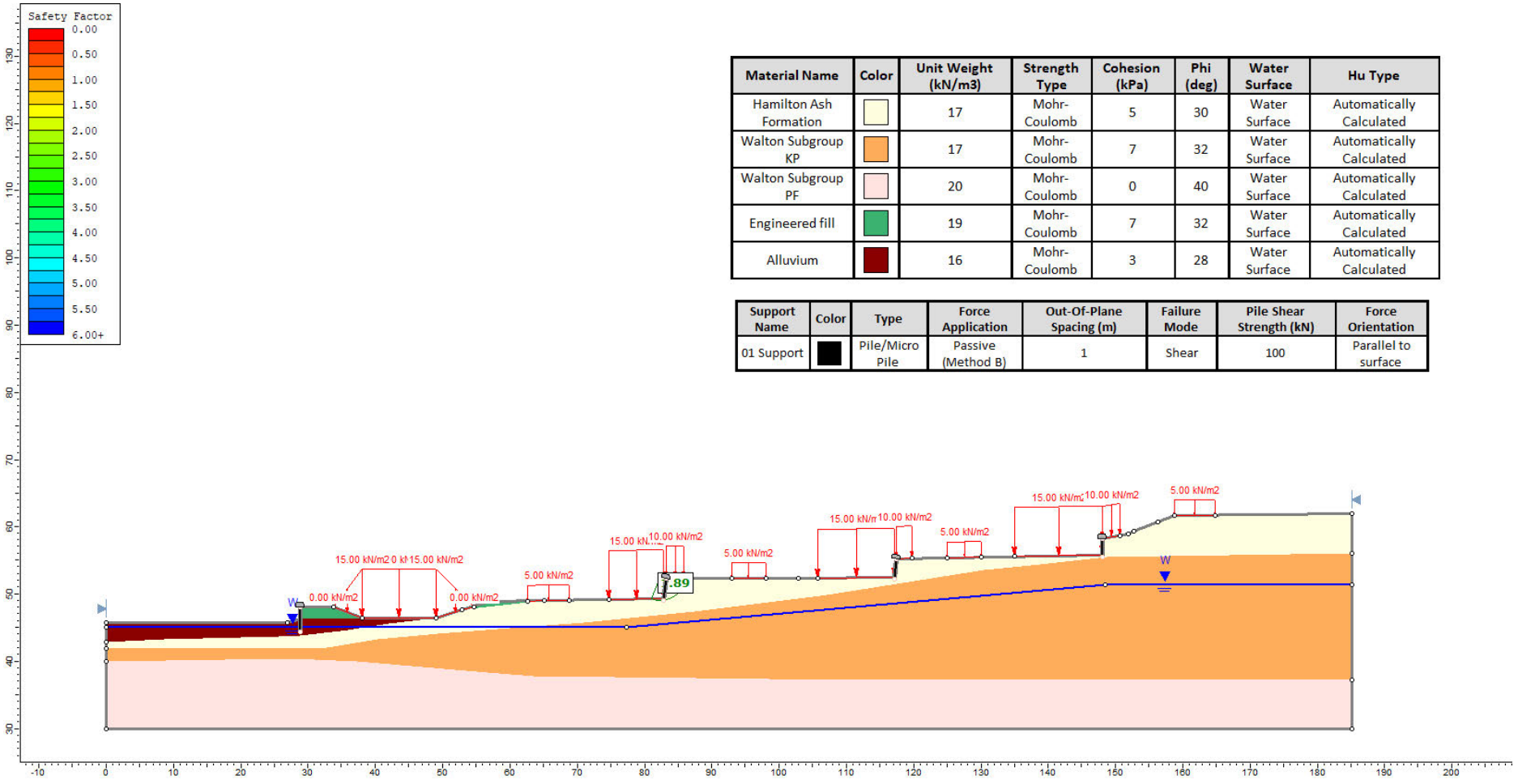


APPENDIX J – Slope Stability Results

Cross Section A

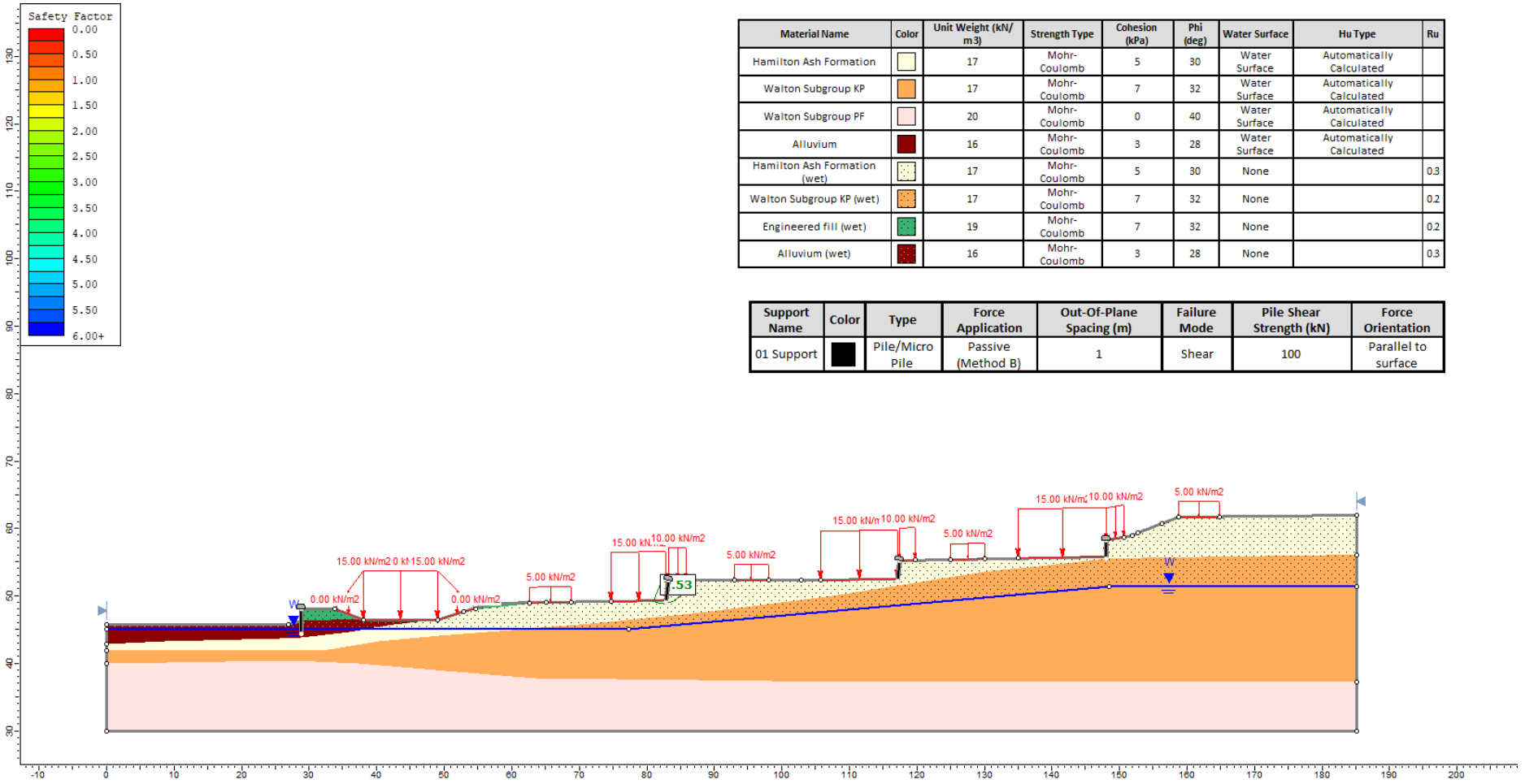
Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Water Surface	Hu Type
Hamilton Ash Formation		17	Mohr-Coulomb	5	30	Water Surface	Automatically Calculated
Walton Subgroup KP		17	Mohr-Coulomb	7	32	Water Surface	Automatically Calculated
Walton Subgroup PF		20	Mohr-Coulomb	0	40	Water Surface	Automatically Calculated
Engineered fill		19	Mohr-Coulomb	7	32	Water Surface	Automatically Calculated
Alluvium		16	Mohr-Coulomb	3	28	Water Surface	Automatically Calculated

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Failure Mode	Pile Shear Strength (kN)	Force Orientation
01 Support		Pile/Micro Pile	Passive (Method B)	1	Shear	100	Parallel to surface



Slide2 model - Static condition (normal groundwater table) – FoS required: 1.5

Failure Arcs limited to <1.5

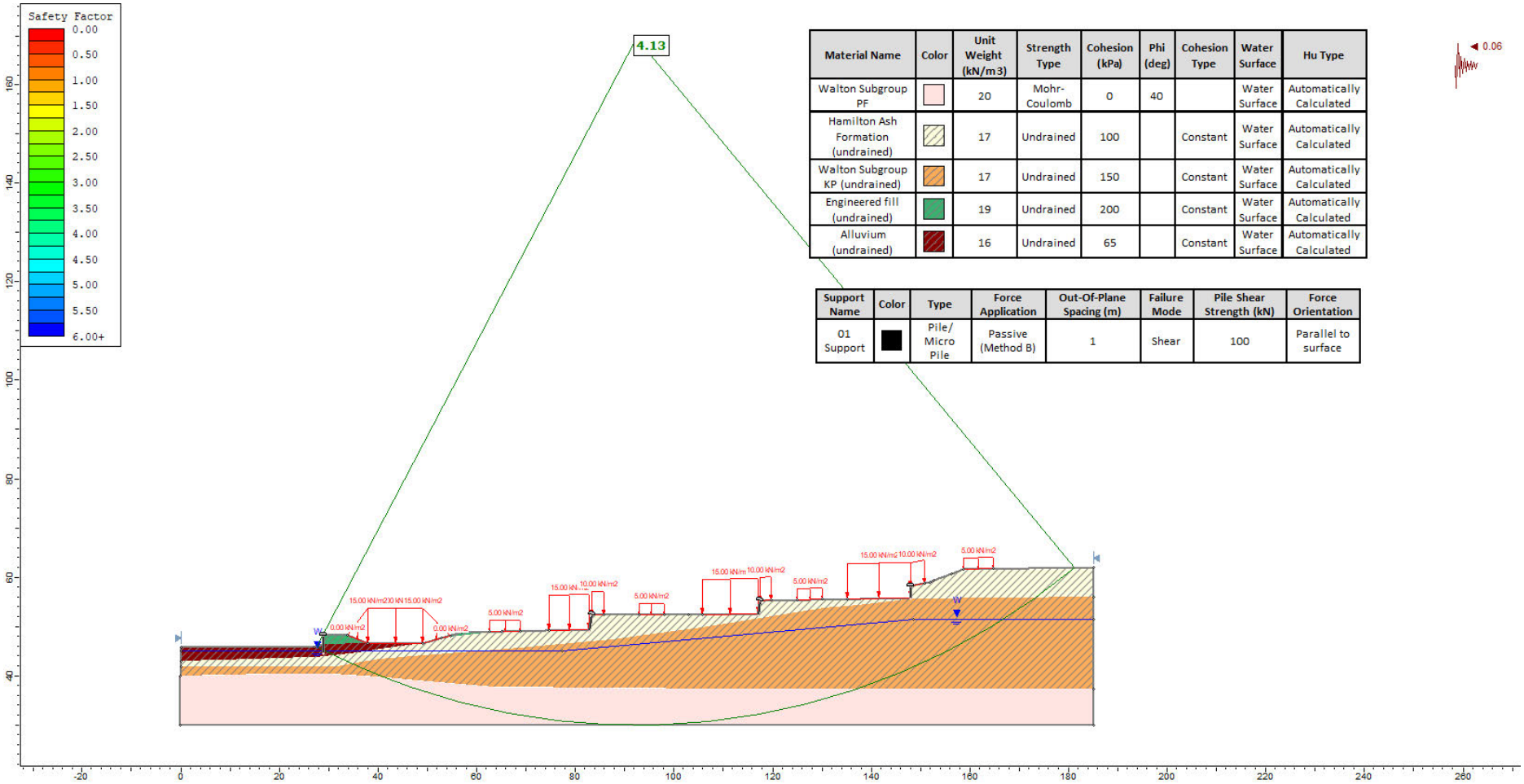


Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Water Surface	Hu Type	Ru
Hamilton Ash Formation		17	Mohr-Coulomb	5	30	Water Surface	Automatically Calculated	
Walton Subgroup KP		17	Mohr-Coulomb	7	32	Water Surface	Automatically Calculated	
Walton Subgroup PF		20	Mohr-Coulomb	0	40	Water Surface	Automatically Calculated	
Alluvium		16	Mohr-Coulomb	3	28	Water Surface	Automatically Calculated	
Hamilton Ash Formation (wet)		17	Mohr-Coulomb	5	30	None		0.3
Walton Subgroup KP (wet)		17	Mohr-Coulomb	7	32	None		0.2
Engineered fill (wet)		19	Mohr-Coulomb	7	32	None		0.2
Alluvium (wet)		16	Mohr-Coulomb	3	28	None		0.3

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Failure Mode	Pile Shear Strength (kN)	Force Orientation
01 Support		Pile/Micro Pile	Passive (Method B)	1	Shear	100	Parallel to surface

Slide2 model - Static condition (intense rainfall event) – FoS required: 1.3

Failure Arcs limited to <1.3

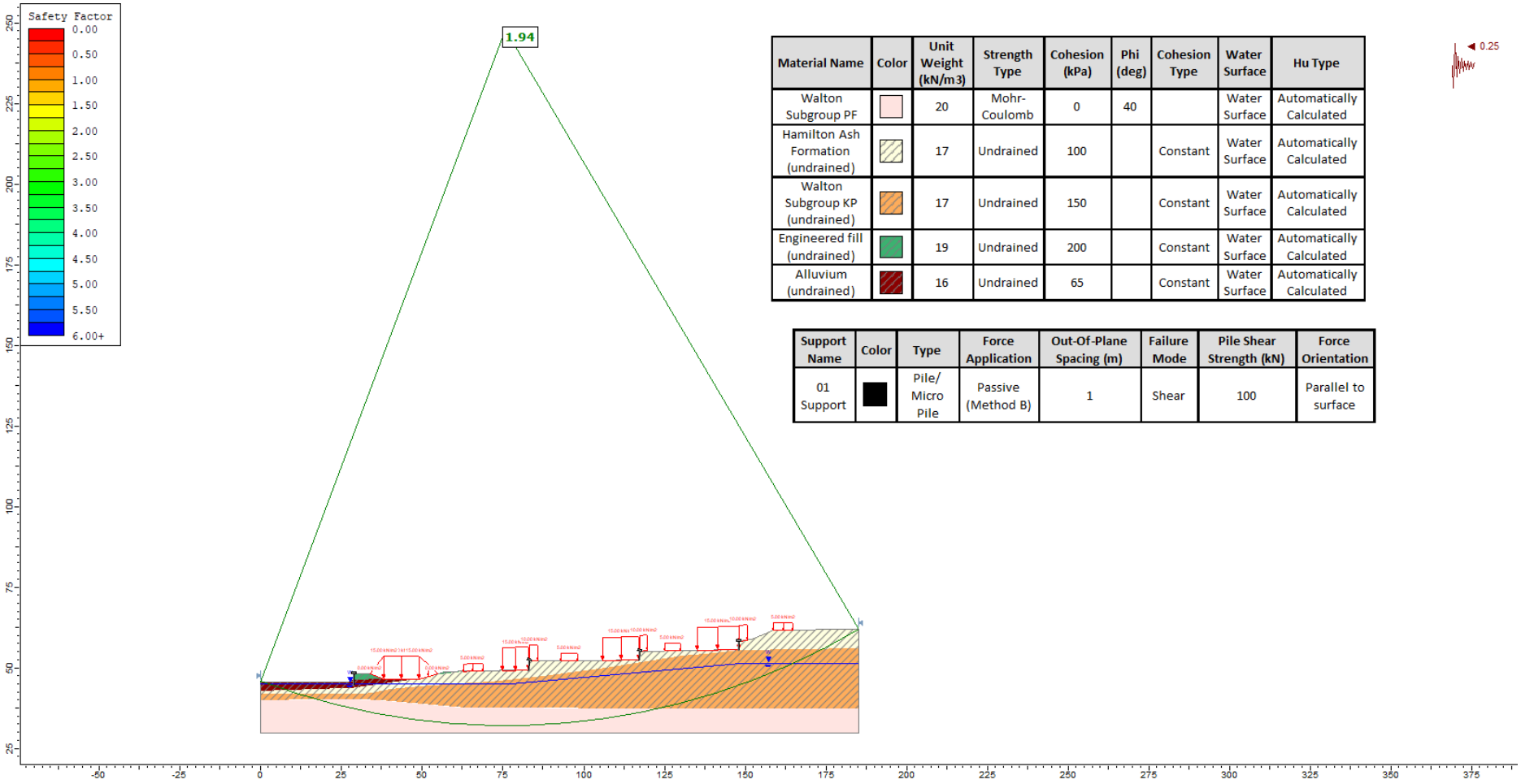


Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Cohesion Type	Water Surface	Hu Type
Walton Subgroup PF		20	Mohr-Coulomb	0	40		Water Surface	Automatically Calculated
Hamilton Ash Formation (undrained)		17	Undrained	100		Constant	Water Surface	Automatically Calculated
Walton Subgroup KP (undrained)		17	Undrained	150		Constant	Water Surface	Automatically Calculated
Engineered fill (undrained)		19	Undrained	200		Constant	Water Surface	Automatically Calculated
Alluvium (undrained)		16	Undrained	65		Constant	Water Surface	Automatically Calculated

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Failure Mode	Pile Shear Strength (kN)	Force Orientation
01 Support		Pile/ Micro Pile	Passive (Method B)	1	Shear	100	Parallel to surface

Slide2 model - Seismic condition SLS – FoS required: 1.3

Failure Arcs limited to <1.3



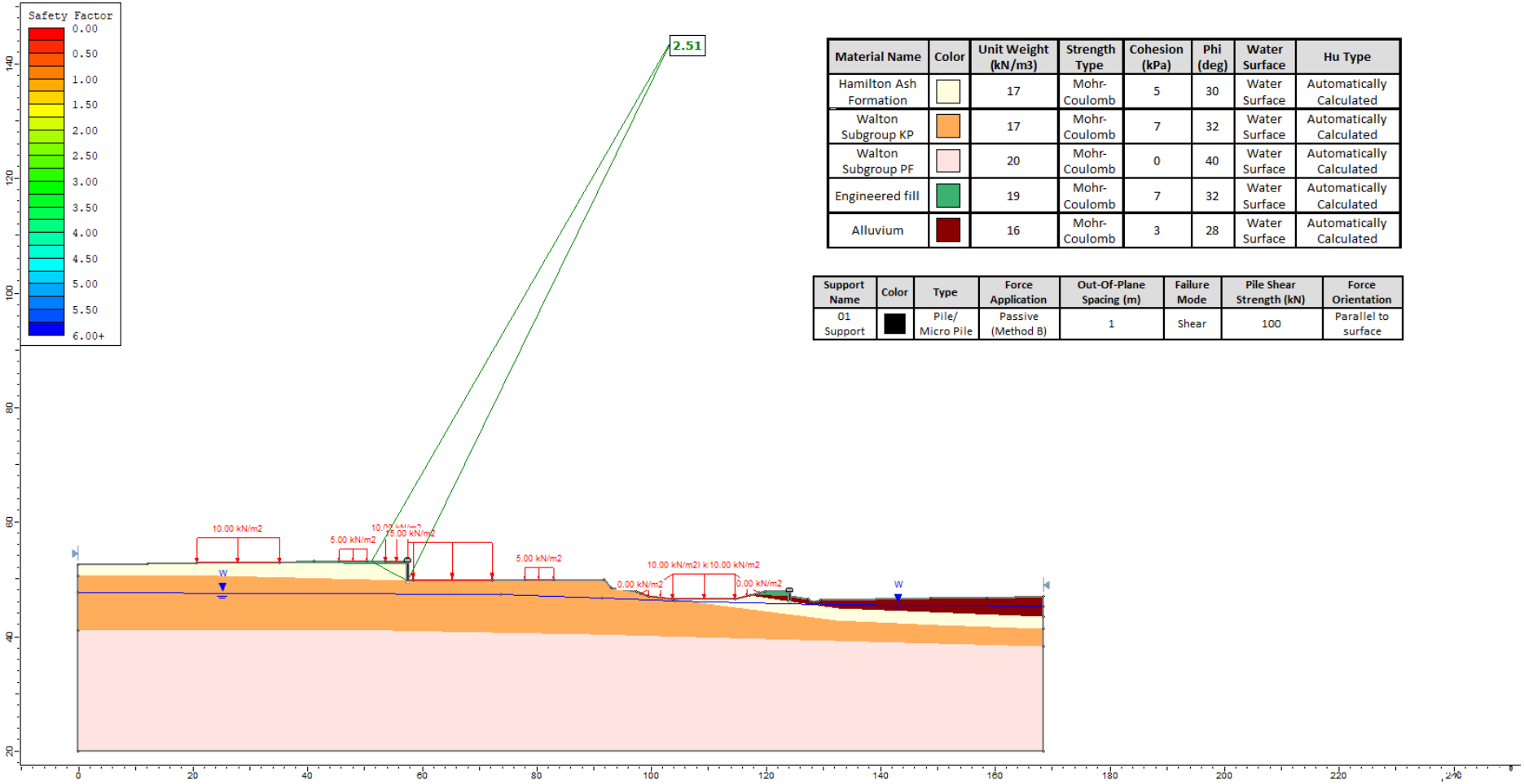
Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Cohesion Type	Water Surface	Hu Type
Walton Subgroup PF		20	Mohr-Coulomb	0	40		Water Surface	Automatically Calculated
Hamilton Ash Formation (undrained)		17	Undrained	100		Constant	Water Surface	Automatically Calculated
Walton Subgroup KP (undrained)		17	Undrained	150		Constant	Water Surface	Automatically Calculated
Engineered fill (undrained)		19	Undrained	200		Constant	Water Surface	Automatically Calculated
Alluvium (undrained)		16	Undrained	65		Constant	Water Surface	Automatically Calculated

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Failure Mode	Pile Shear Strength (kN)	Force Orientation
01 Support		Pile/ Micro Pile	Passive (Method B)	1	Shear	100	Parallel to surface

Slide2 model - Seismic condition ULS – FoS required: 1.0

Failure Arcs limited to <1.0

Cross Section B

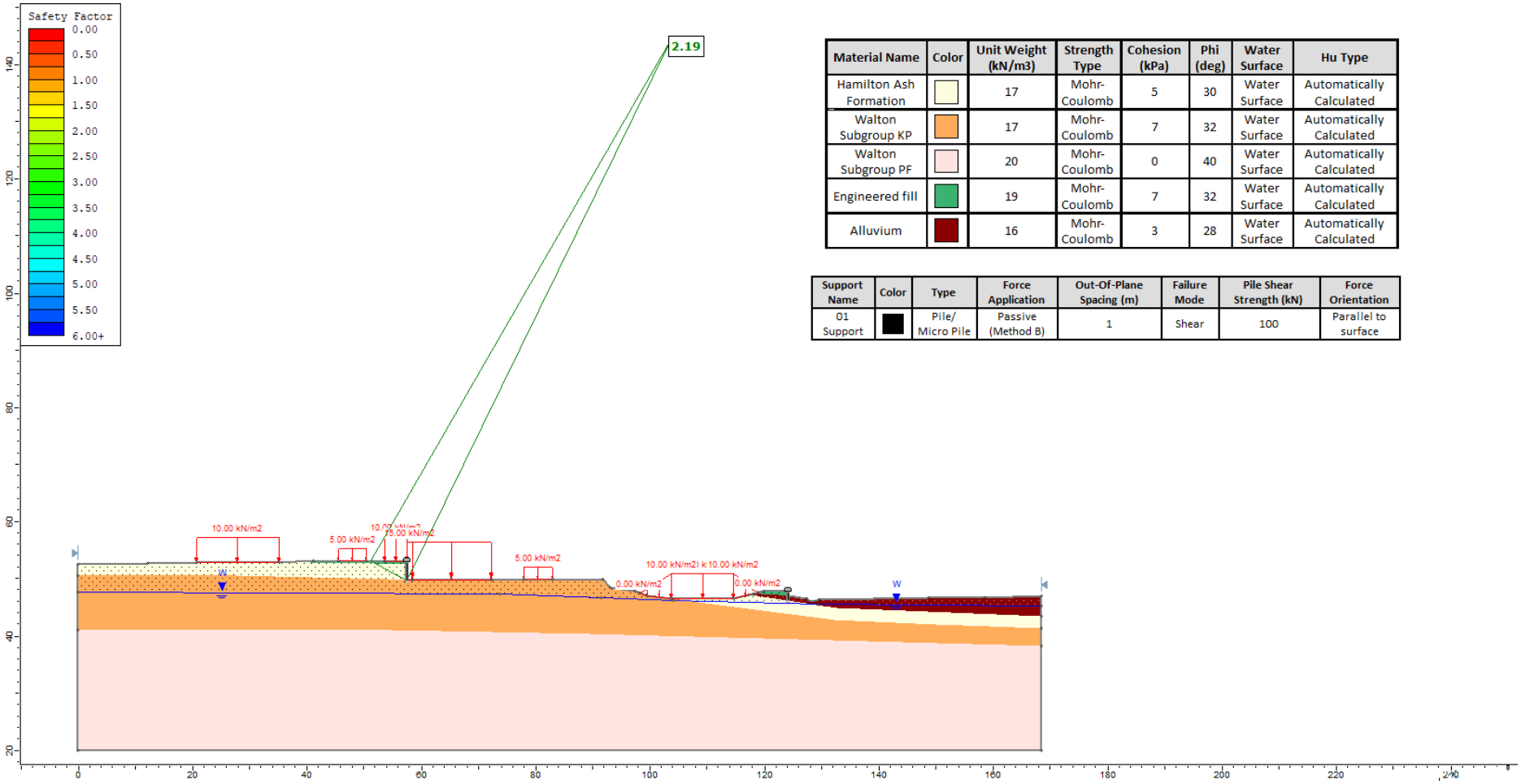


Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Water Surface	Hu Type
Hamilton Ash Formation		17	Mohr-Coulomb	5	30	Water Surface	Automatically Calculated
Walton Subgroup KP		17	Mohr-Coulomb	7	32	Water Surface	Automatically Calculated
Walton Subgroup PF		20	Mohr-Coulomb	0	40	Water Surface	Automatically Calculated
Engineered fill		19	Mohr-Coulomb	7	32	Water Surface	Automatically Calculated
Alluvium		16	Mohr-Coulomb	3	28	Water Surface	Automatically Calculated

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Failure Mode	Pile Shear Strength (kN)	Force Orientation
01 Support		Pile/ Micro Pile	Passive (Method B)	1	Shear	100	Parallel to surface

Slide2 model - Static condition (normal groundwater table) – FoS required: 1.5

Failure Arcs limited to <1.5

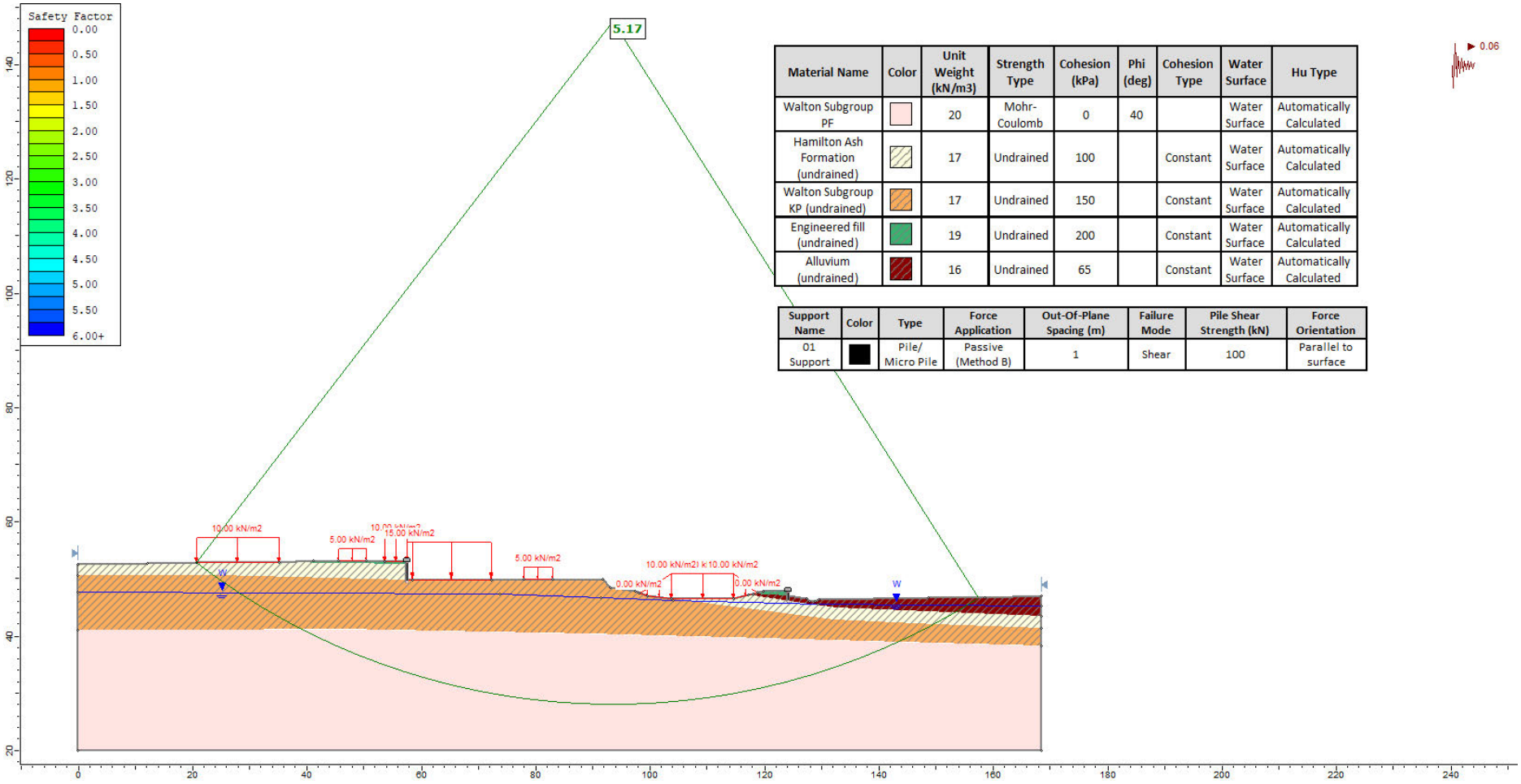


Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Water Surface	Hu Type
Hamilton Ash Formation		17	Mohr-Coulomb	5	30	Water Surface	Automatically Calculated
Walton Subgroup KP		17	Mohr-Coulomb	7	32	Water Surface	Automatically Calculated
Walton Subgroup PF		20	Mohr-Coulomb	0	40	Water Surface	Automatically Calculated
Engineered fill		19	Mohr-Coulomb	7	32	Water Surface	Automatically Calculated
Alluvium		16	Mohr-Coulomb	3	28	Water Surface	Automatically Calculated

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Failure Mode	Pile Shear Strength (kN)	Force Orientation
01 Support		Pile/ Micro Pile	Passive (Method B)	1	Shear	100	Parallel to surface

Slide2 model - Static condition (intense rainfall event) – FoS required: 1.3

Failure Arcs limited to <1.3

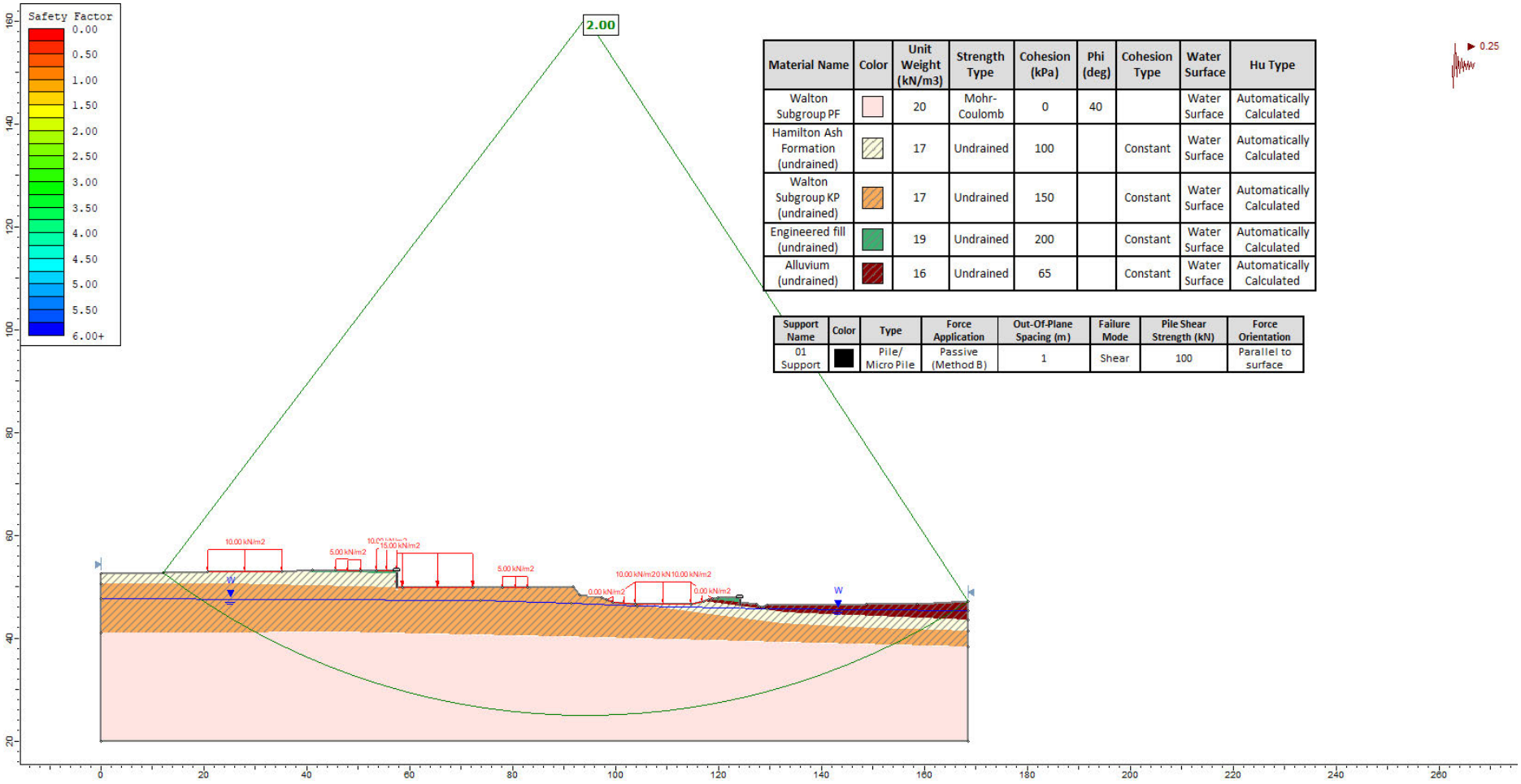


Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Cohesion Type	Water Surface	Hu Type
Walton Subgroup PF		20	Mohr-Coulomb	0	40		Water Surface	Automatically Calculated
Hamilton Ash Formation (undrained)		17	Undrained	100		Constant	Water Surface	Automatically Calculated
Walton Subgroup KP (undrained)		17	Undrained	150		Constant	Water Surface	Automatically Calculated
Engineered fill (undrained)		19	Undrained	200		Constant	Water Surface	Automatically Calculated
Alluvium (undrained)		16	Undrained	65		Constant	Water Surface	Automatically Calculated

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Failure Mode	Pile Shear Strength (kN)	Force Orientation
01 Support		Pile/ Micro Pile	Passive (Method B)	1	Shear	100	Parallel to surface

Slide2 model - Seismic condition SLS – FoS required: 1.3

Failure Arcs limited to <1.3



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Cohesion Type	Water Surface	Hu Type
Walton Subgroup PF		20	Mohr-Coulomb	0	40		Water Surface	Automatically Calculated
Hamilton Ash Formation (undrained)		17	Undrained	100		Constant	Water Surface	Automatically Calculated
Walton Subgroup KP (undrained)		17	Undrained	150		Constant	Water Surface	Automatically Calculated
Engineered fill (undrained)		19	Undrained	200		Constant	Water Surface	Automatically Calculated
Alluvium (undrained)		16	Undrained	65		Constant	Water Surface	Automatically Calculated

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Failure Mode	Pile Shear Strength (kN)	Force Orientation
01 Support		Pile/ Micro Pile	Passive (Method B)	1	Shear	100	Parallel to surface

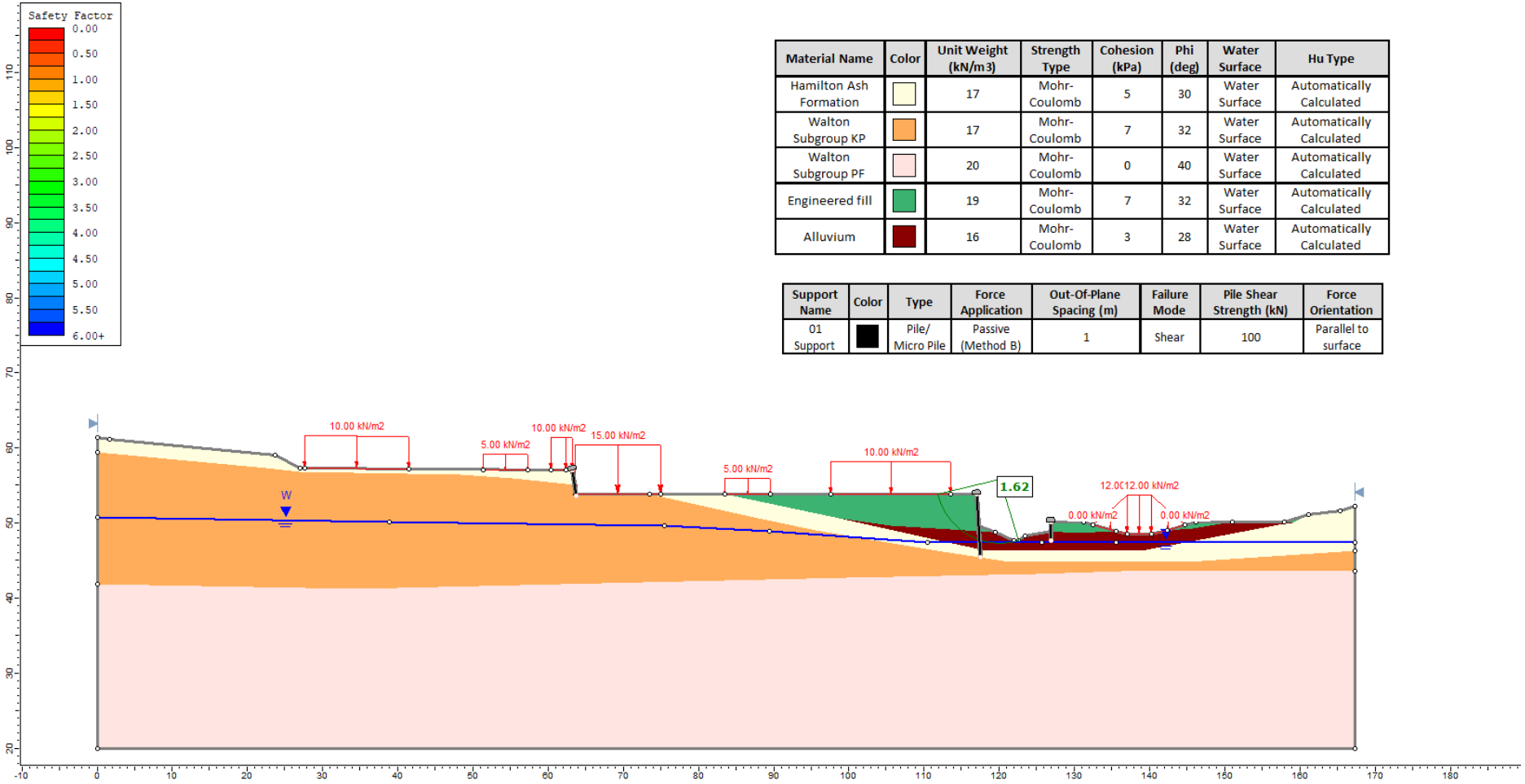
Slide2 model - Seismic condition ULS – FoS required: 1.0

Failure Arcs limited to <1.0

Cross Section C – Left to Right

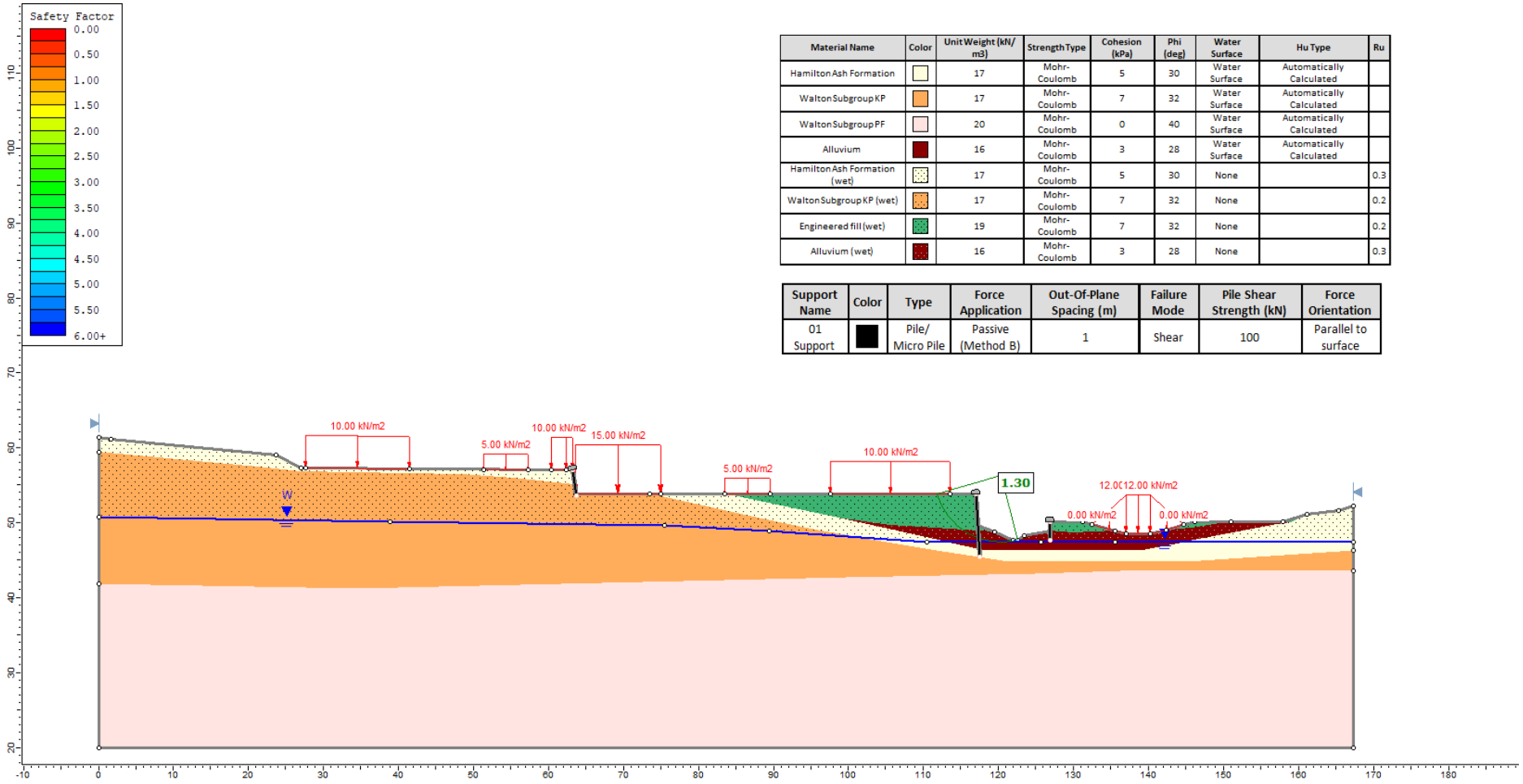
Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Water Surface	Hu Type
Hamilton Ash Formation		17	Mohr-Coulomb	5	30	Water Surface	Automatically Calculated
Walton Subgroup KP		17	Mohr-Coulomb	7	32	Water Surface	Automatically Calculated
Walton Subgroup PF		20	Mohr-Coulomb	0	40	Water Surface	Automatically Calculated
Engineered fill		19	Mohr-Coulomb	7	32	Water Surface	Automatically Calculated
Alluvium		16	Mohr-Coulomb	3	28	Water Surface	Automatically Calculated

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Failure Mode	Pile Shear Strength (kN)	Force Orientation
01 Support		Pile/ Micro Pile	Passive (Method B)	1	Shear	100	Parallel to surface



Slide2 model - Static condition (normal groundwater table) – FoS required: 1.5

Failure Arcs limited to <1.5

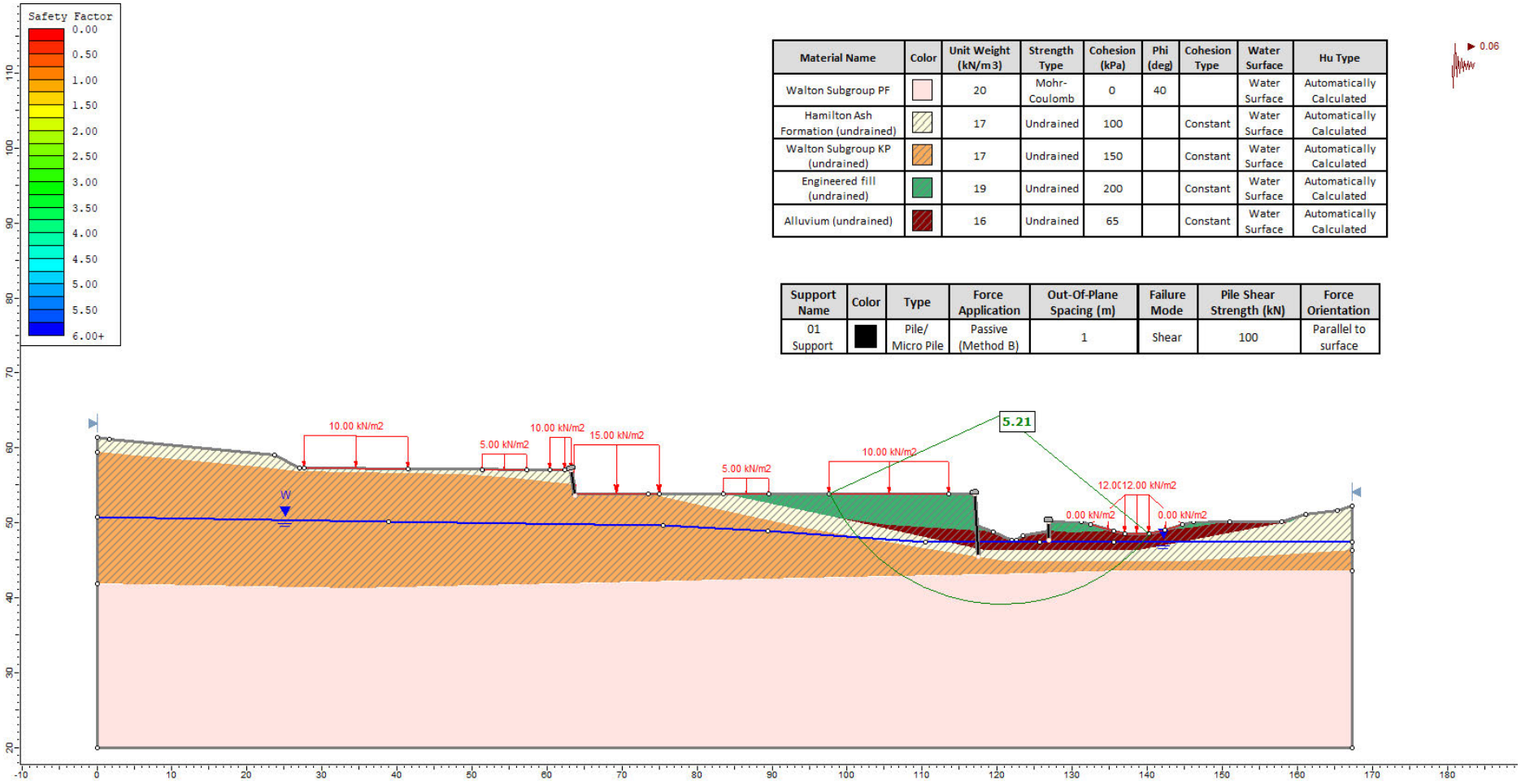


Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Water Surface	Hu Type	Ru
Hamilton Ash Formation		17	Mohr-Coulomb	5	30	Water Surface	Automatically Calculated	
Walton Subgroup KP		17	Mohr-Coulomb	7	32	Water Surface	Automatically Calculated	
Walton Subgroup PF		20	Mohr-Coulomb	0	40	Water Surface	Automatically Calculated	
Alluvium		16	Mohr-Coulomb	3	28	Water Surface	Automatically Calculated	
Hamilton Ash Formation (wet)		17	Mohr-Coulomb	5	30	None		0.3
Walton Subgroup KP (wet)		17	Mohr-Coulomb	7	32	None		0.2
Engineered fill (wet)		19	Mohr-Coulomb	7	32	None		0.2
Alluvium (wet)		16	Mohr-Coulomb	3	28	None		0.3

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Failure Mode	Pile Shear Strength (kN)	Force Orientation
01 Support		Pile/ Micro Pile	Passive (Method B)	1	Shear	100	Parallel to surface

Slide2 model - Static condition (intense rainfall event) – FoS required: 1.3

Failure Arcs limited to <1.3

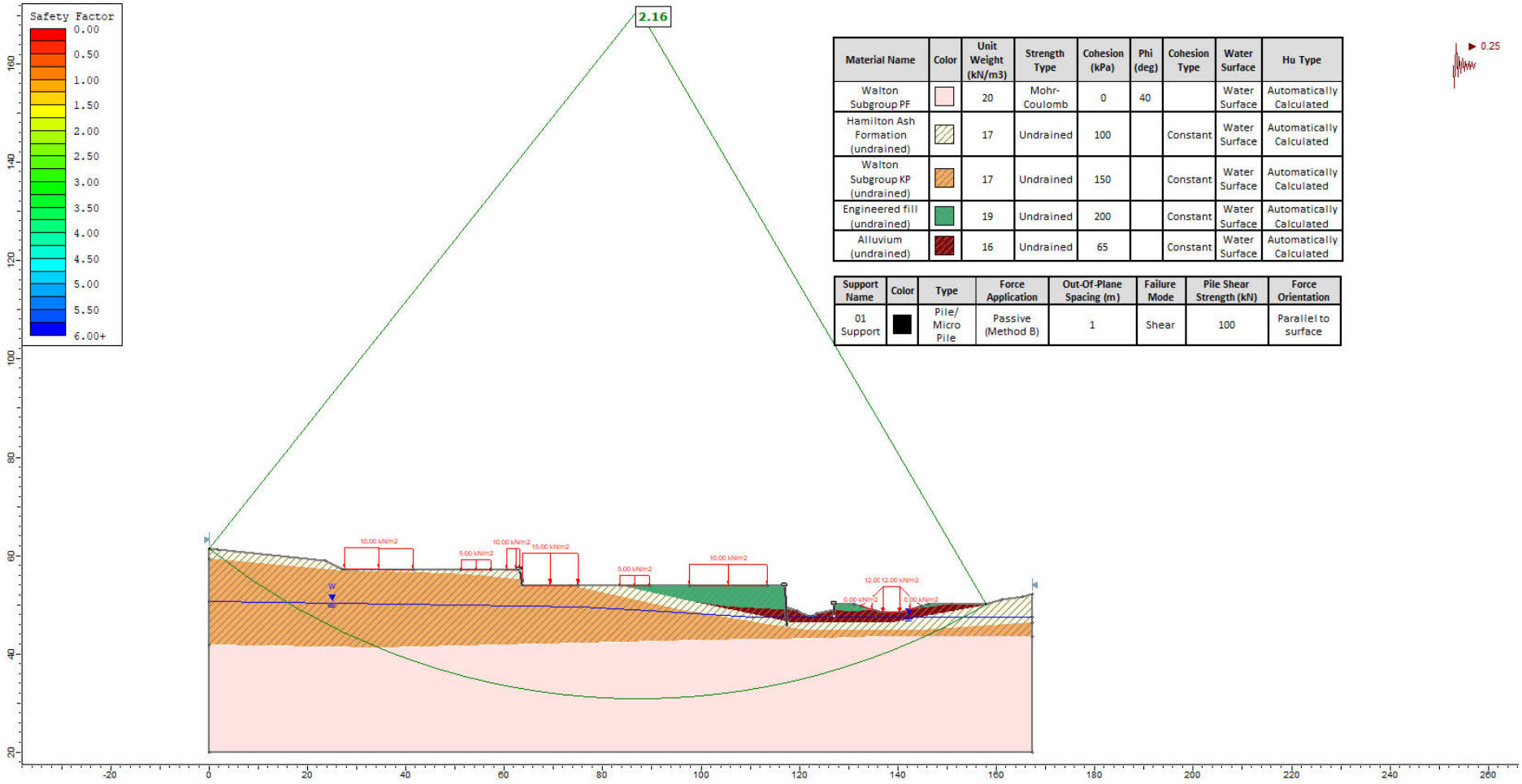


Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Cohesion Type	Water Surface	Hu Type
Walton Subgroup PF		20	Mohr-Coulomb	0	40		Water Surface	Automatically Calculated
Hamilton Ash Formation (undrained)		17	Undrained	100		Constant	Water Surface	Automatically Calculated
Walton Subgroup KP (undrained)		17	Undrained	150		Constant	Water Surface	Automatically Calculated
Engineered fill (undrained)		19	Undrained	200		Constant	Water Surface	Automatically Calculated
Alluvium (undrained)		16	Undrained	65		Constant	Water Surface	Automatically Calculated

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Failure Mode	Pile Shear Strength (kN)	Force Orientation
01 Support		Pile/ Micro Pile	Passive (Method B)	1	Shear	100	Parallel to surface

Slide2 model - Seismic condition SLS – FoS required: 1.3

Failure Arcs limited to <1.3

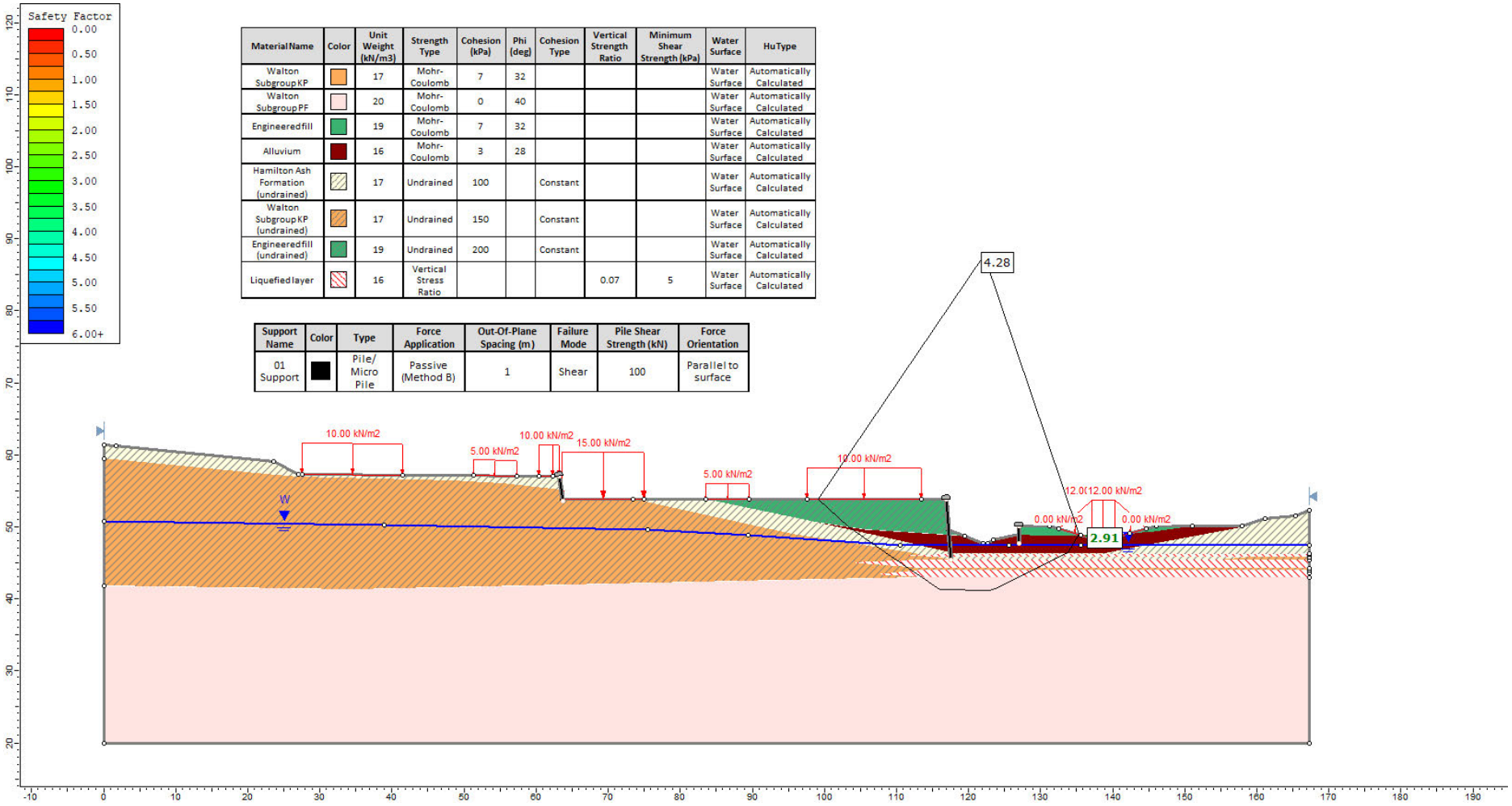


Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Cohesion Type	Water Surface	Hu Type
Walton Subgroup PF		20	Mohr-Coulomb	0	40		Water Surface	Automatically Calculated
Hamilton Ash Formation (undrained)		17	Undrained	100		Constant	Water Surface	Automatically Calculated
Walton Subgroup KP (undrained)		17	Undrained	150		Constant	Water Surface	Automatically Calculated
Engineered fill (undrained)		19	Undrained	200		Constant	Water Surface	Automatically Calculated
Alluvium (undrained)		16	Undrained	65		Constant	Water Surface	Automatically Calculated

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Failure Mode	Pile Shear Strength (kN)	Force Orientation
01 Support		Pile/ Micro Pile	Passive (Method B)	1	Shear	100	Parallel to surface

Slide2 model - Seismic condition ULS – FoS required: 1.0

Failure Arcs limited to <1.0



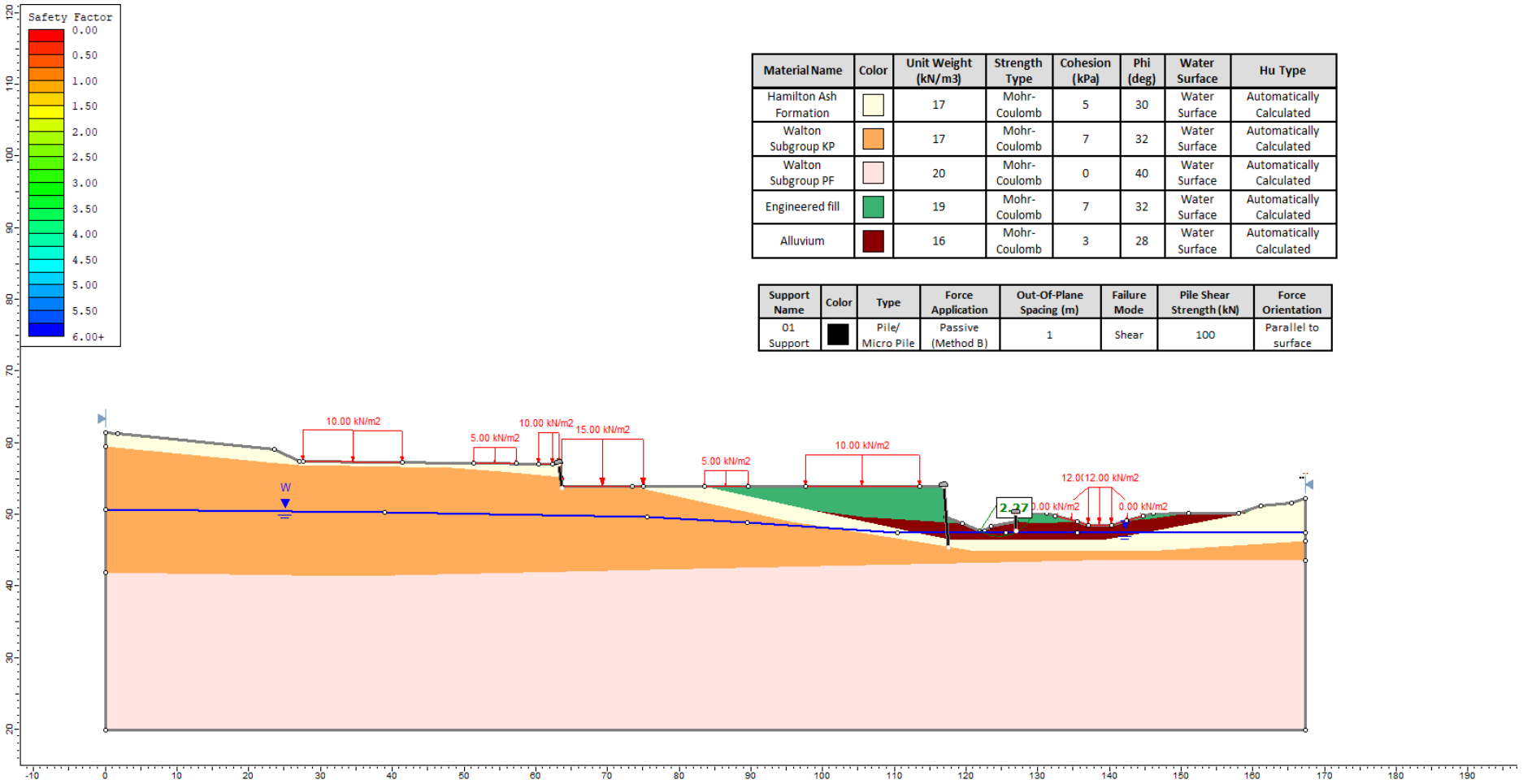
Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Cohesion Type	Vertical Strength Ratio	Minimum Shear Strength (kPa)	Water Surface	Hu Type
Walton Subgroup KP		17	Mohr-Coulomb	7	32				Water Surface	Automatically Calculated
Walton Subgroup PF		20	Mohr-Coulomb	0	40				Water Surface	Automatically Calculated
Engineered fill		19	Mohr-Coulomb	7	32				Water Surface	Automatically Calculated
Alluvium		16	Mohr-Coulomb	3	28				Water Surface	Automatically Calculated
Hamilton Ash Formation (undrained)		17	Undrained	100		Constant			Water Surface	Automatically Calculated
Walton Subgroup KP (undrained)		17	Undrained	150		Constant			Water Surface	Automatically Calculated
Engineered fill (undrained)		19	Undrained	200		Constant			Water Surface	Automatically Calculated
Liquefied layer		16	Vertical Stress Ratio				0.07	5	Water Surface	Automatically Calculated

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Failure Mode	Pile Shear Strength (kN)	Force Orientation
01 Support		Pile/ Micro Pile	Passive (Method B)	1	Shear	100	Parallel to surface

Slide2 model – Post seismic condition – FoS required: 1.0

Failure Arcs limited to <1.0

Cross Section C – Right to Left

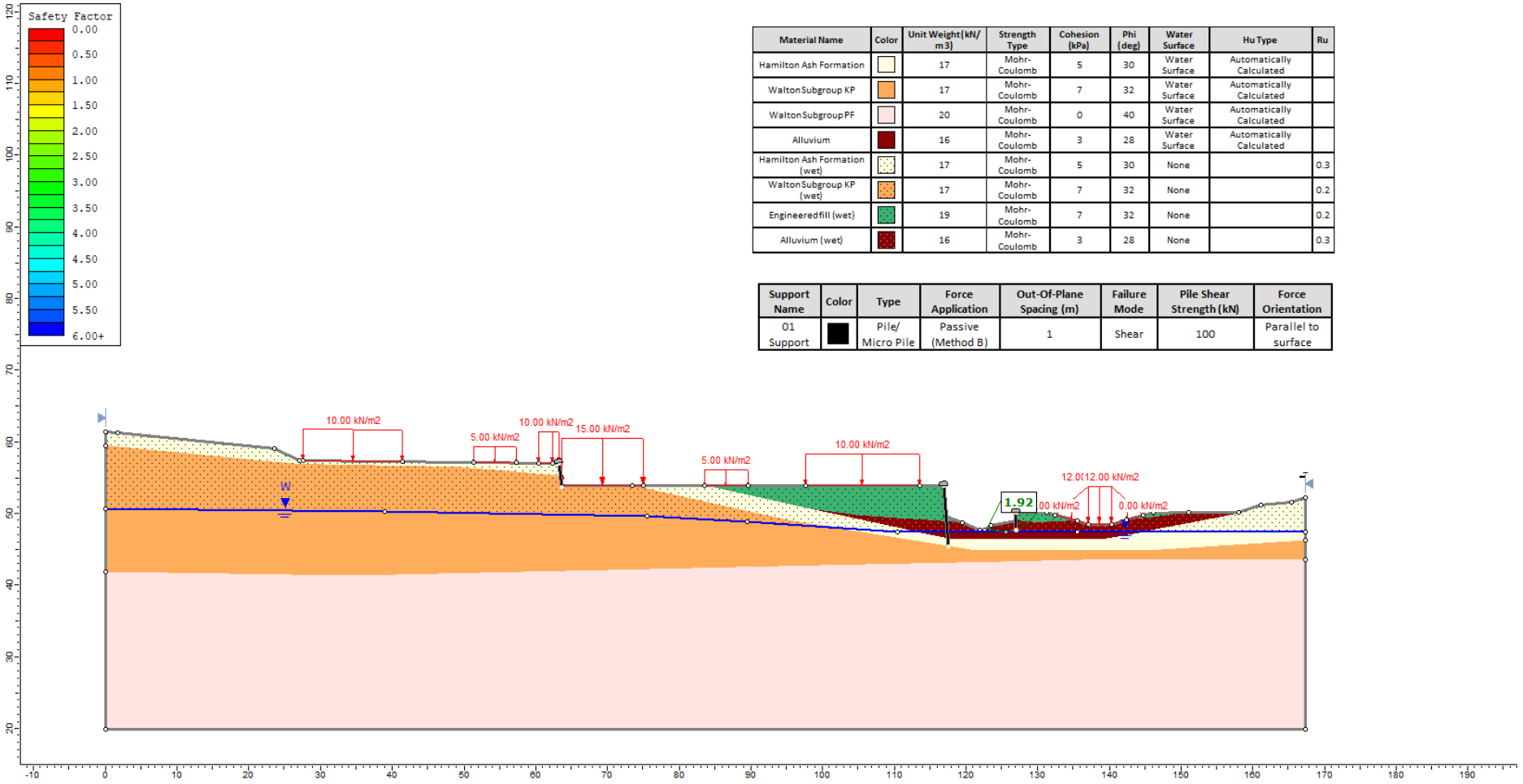


Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Water Surface	Hu Type
Hamilton Ash Formation		17	Mohr-Coulomb	5	30	Water Surface	Automatically Calculated
Walton Subgroup KP		17	Mohr-Coulomb	7	32	Water Surface	Automatically Calculated
Walton Subgroup PF		20	Mohr-Coulomb	0	40	Water Surface	Automatically Calculated
Engineered fill		19	Mohr-Coulomb	7	32	Water Surface	Automatically Calculated
Alluvium		16	Mohr-Coulomb	3	28	Water Surface	Automatically Calculated

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Failure Mode	Pile Shear Strength (kN)	Force Orientation
01 Support		Pile/ Micro Pile	Passive (Method B)	1	Shear	100	Parallel to surface

Slide2 model - Static condition (normal groundwater table) – FoS required: 1.5

Failure Arcs limited to <1.5

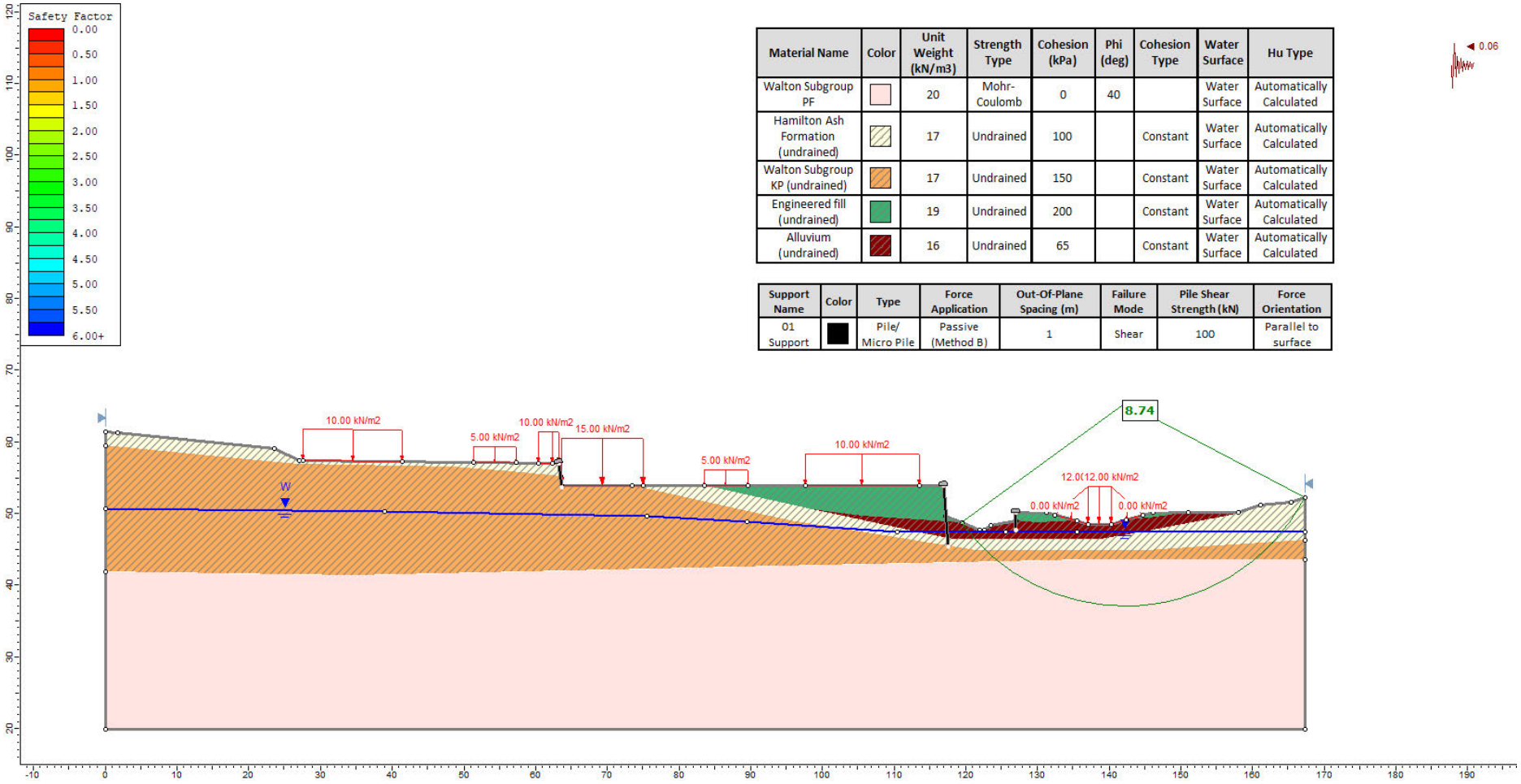


Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Water Surface	Hu Type	Ru
Hamilton Ash Formation		17	Mohr-Coulomb	5	30	Water Surface	Automatically Calculated	
Walton Subgroup KP		17	Mohr-Coulomb	7	32	Water Surface	Automatically Calculated	
Walton Subgroup PF		20	Mohr-Coulomb	0	40	Water Surface	Automatically Calculated	
Alluvium		16	Mohr-Coulomb	3	28	Water Surface	Automatically Calculated	
Hamilton Ash Formation (wet)		17	Mohr-Coulomb	5	30	None		0.3
Walton Subgroup KP (wet)		17	Mohr-Coulomb	7	32	None		0.2
Engineered fill (wet)		19	Mohr-Coulomb	7	32	None		0.2
Alluvium (wet)		16	Mohr-Coulomb	3	28	None		0.3

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Failure Mode	Pile Shear Strength (kN)	Force Orientation
01 Support		Pile/ Micro Pile	Passive (Method B)	1	Shear	100	Parallel to surface

Slide2 model - Static condition (intense rainfall event) – FoS required: 1.3

Failure Arcs limited to <1.3

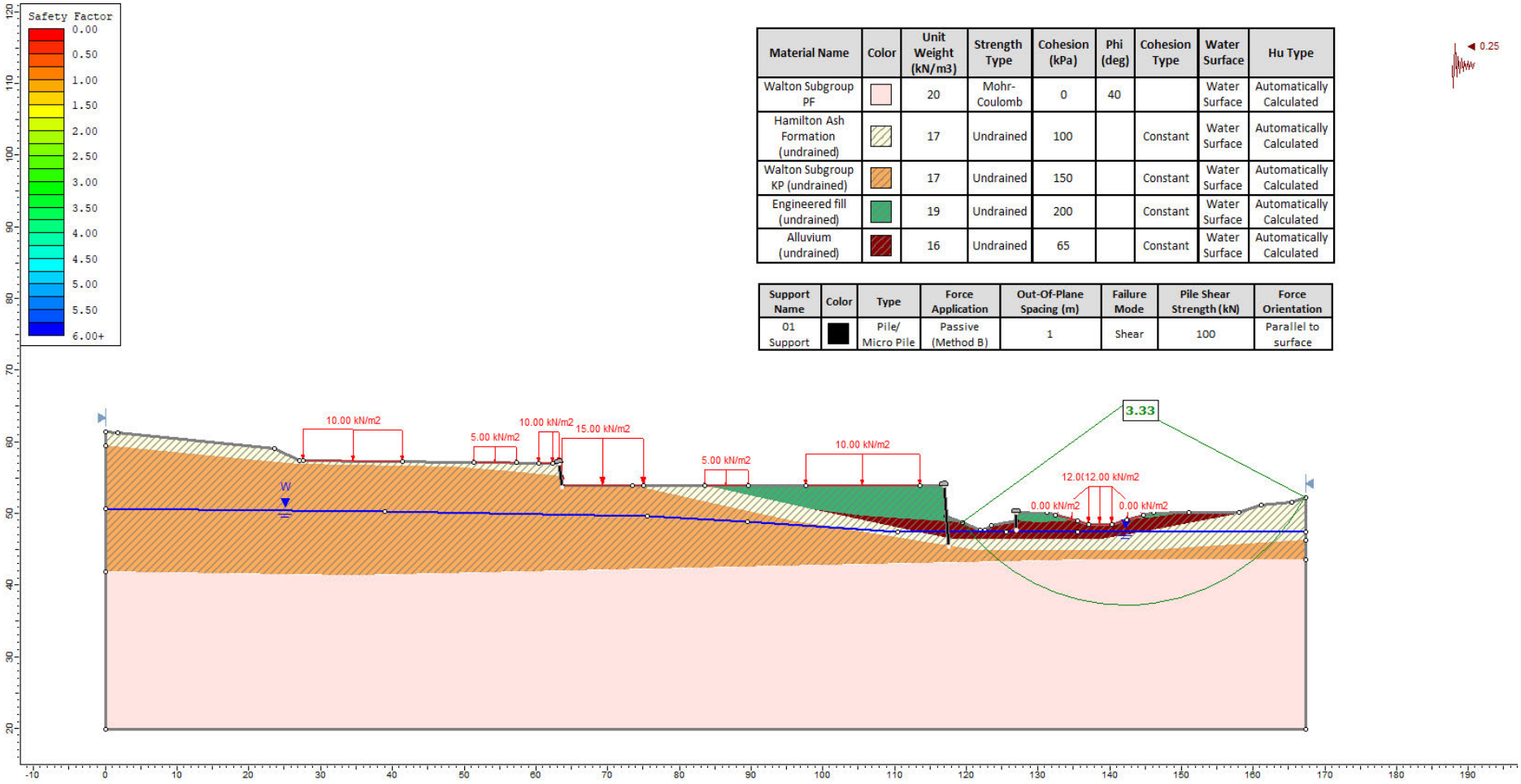


Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Cohesion Type	Water Surface	Hu Type
Walton Subgroup PF		20	Mohr-Coulomb	0	40		Water Surface	Automatically Calculated
Hamilton Ash Formation (undrained)		17	Undrained	100		Constant	Water Surface	Automatically Calculated
Walton Subgroup KP (undrained)		17	Undrained	150		Constant	Water Surface	Automatically Calculated
Engineered fill (undrained)		19	Undrained	200		Constant	Water Surface	Automatically Calculated
Alluvium (undrained)		16	Undrained	65		Constant	Water Surface	Automatically Calculated

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Failure Mode	Pile Shear Strength (kN)	Force Orientation
01 Support		Pile/ Micro Pile	Passive (Method B)	1	Shear	100	Parallel to surface

Slide2 model - Seismic condition SLS – FoS required: 1.3

Failure Arcs limited to <1.3

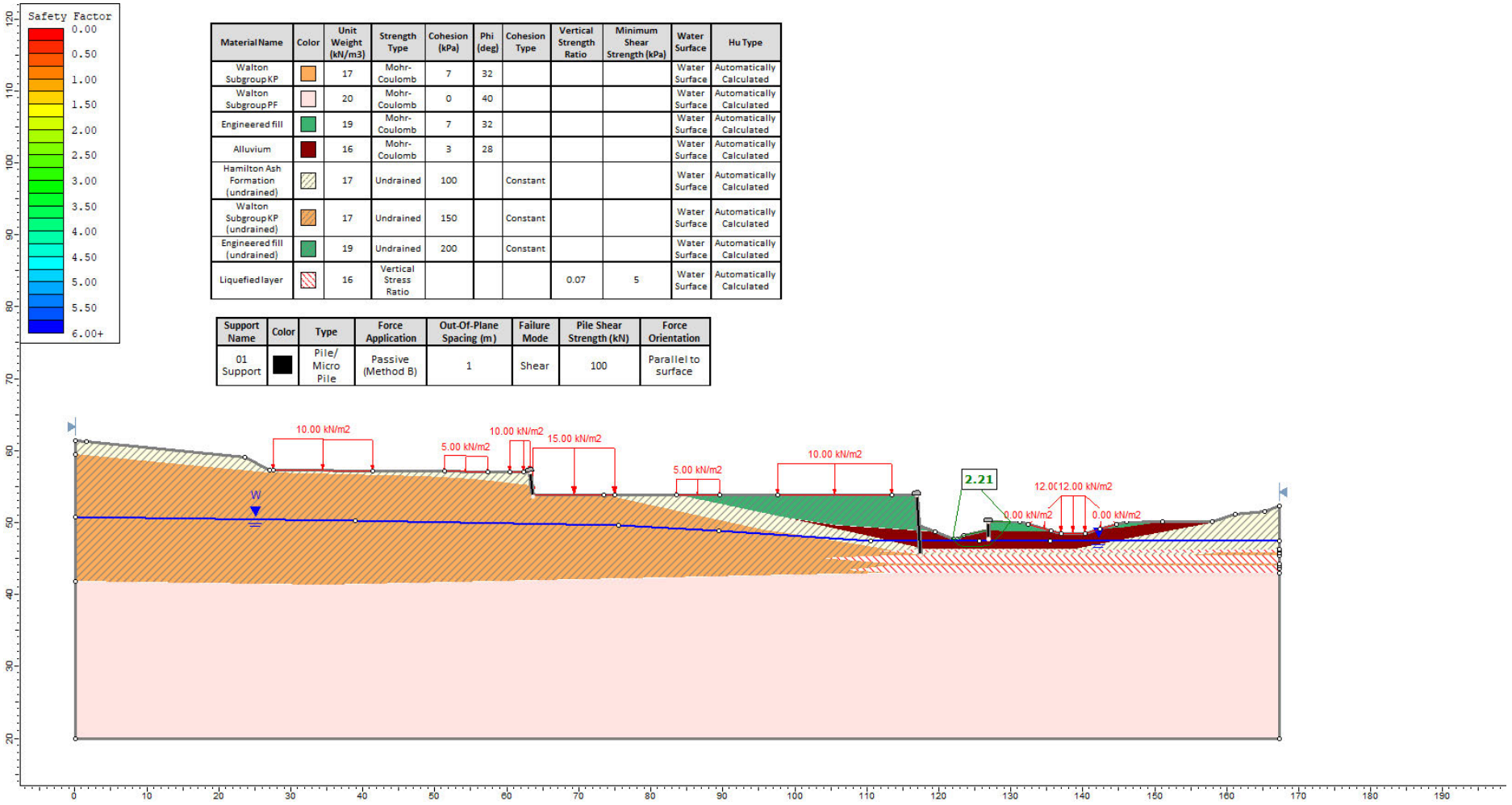


Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Cohesion Type	Water Surface	Hu Type
Walton Subgroup PF		20	Mohr-Coulomb	0	40		Water Surface	Automatically Calculated
Hamilton Ash Formation (undrained)		17	Undrained	100		Constant	Water Surface	Automatically Calculated
Walton Subgroup KP (undrained)		17	Undrained	150		Constant	Water Surface	Automatically Calculated
Engineered fill (undrained)		19	Undrained	200		Constant	Water Surface	Automatically Calculated
Alluvium (undrained)		16	Undrained	65		Constant	Water Surface	Automatically Calculated

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Failure Mode	Pile Shear Strength (kN)	Force Orientation
01 Support		Pile/ Micro Pile	Passive (Method B)	1	Shear	100	Parallel to surface

Slide2 model - Seismic condition ULS – FoS required: 1.0

Failure Arcs limited to <1.0



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Cohesion Type	Vertical Strength Ratio	Minimum Shear Strength (kPa)	Water Surface	Hu Type
Walton Subgroup KP		17	Mohr-Coulomb	7	32				Water Surface	Automatically Calculated
Walton Subgroup PF		20	Mohr-Coulomb	0	40				Water Surface	Automatically Calculated
Engineered fill		19	Mohr-Coulomb	7	32				Water Surface	Automatically Calculated
Alluvium		16	Mohr-Coulomb	3	28				Water Surface	Automatically Calculated
Hamilton Ash Formation (undrained)		17	Undrained	100		Constant			Water Surface	Automatically Calculated
Walton Subgroup KP (undrained)		17	Undrained	150		Constant			Water Surface	Automatically Calculated
Engineered fill (undrained)		19	Undrained	200		Constant			Water Surface	Automatically Calculated
Liquefied layer		16	Vertical Stress Ratio				0.07	5	Water Surface	Automatically Calculated

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Failure Mode	Pile Shear Strength (kN)	Force Orientation
01 Support		Pile/ Micro Pile	Passive (Method B)	1	Shear	100	Parallel to surface

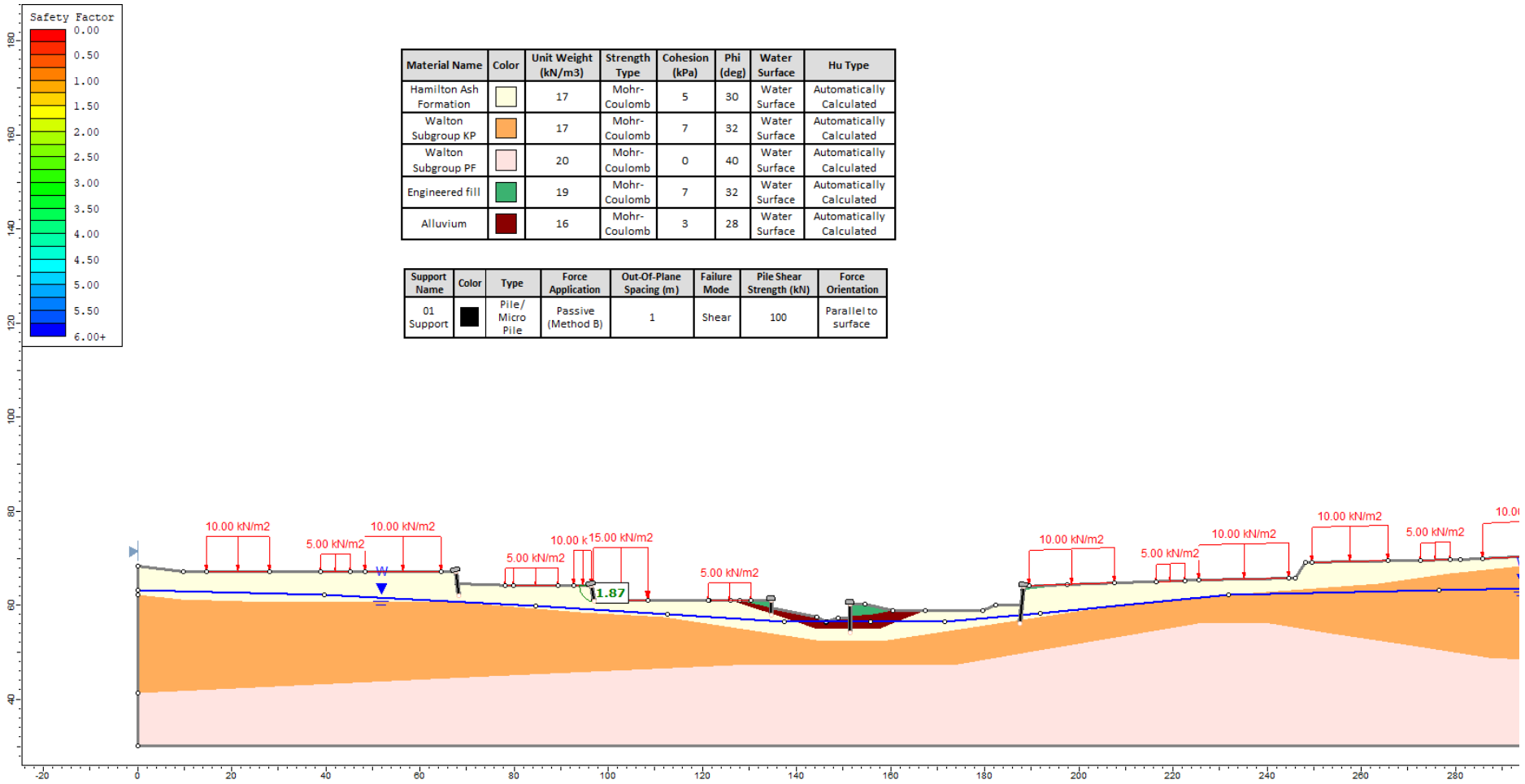
Slide2 model – Post seismic condition – FoS required: 1.0

Failure Arcs limited to <1.0

Cross Section D – Left to Right

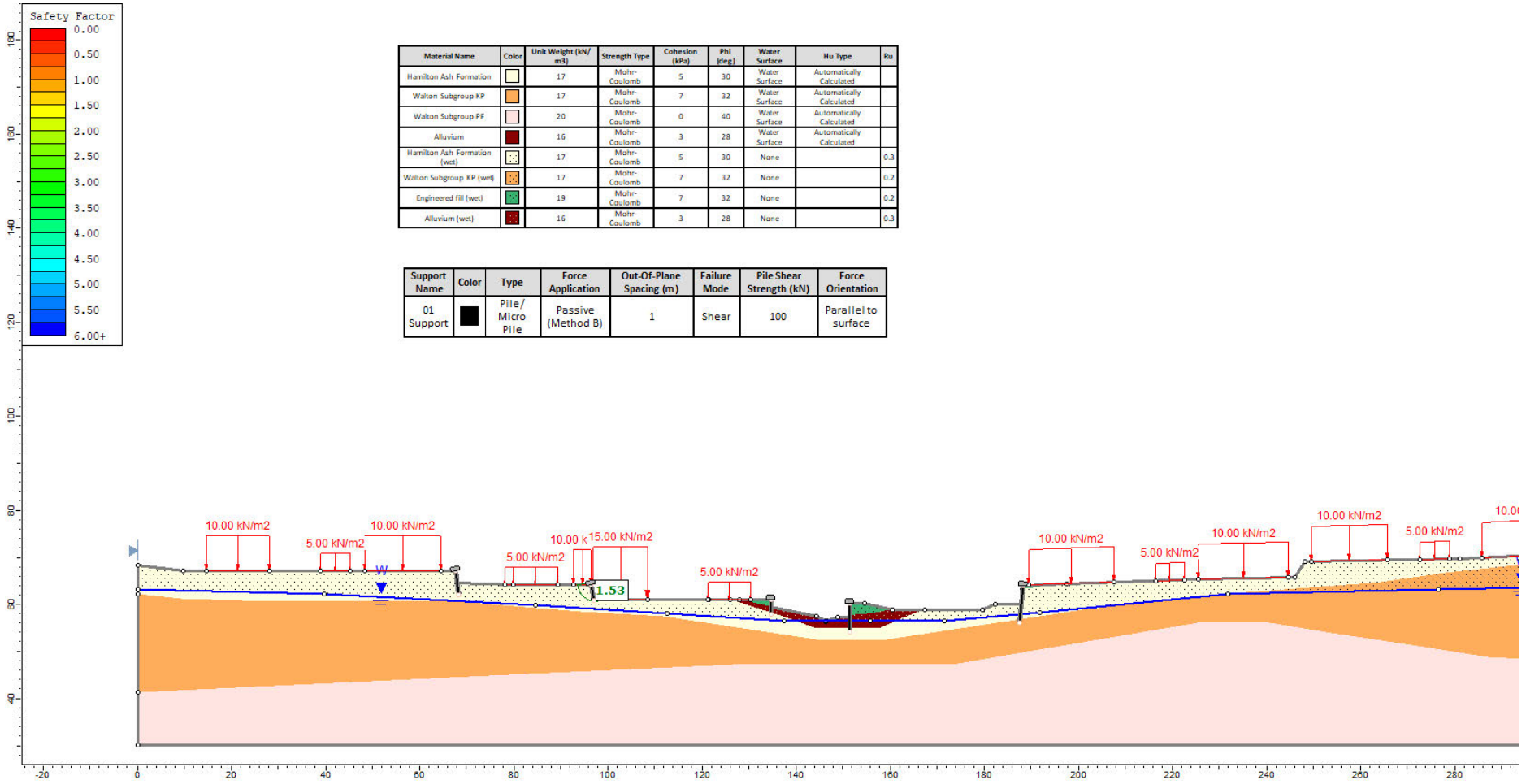
Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Water Surface	Hu Type
Hamilton Ash Formation		17	Mohr-Coulomb	5	30	Water Surface	Automatically Calculated
Walton Subgroup KP		17	Mohr-Coulomb	7	32	Water Surface	Automatically Calculated
Walton Subgroup PF		20	Mohr-Coulomb	0	40	Water Surface	Automatically Calculated
Engineered fill		19	Mohr-Coulomb	7	32	Water Surface	Automatically Calculated
Alluvium		16	Mohr-Coulomb	3	28	Water Surface	Automatically Calculated

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Failure Mode	Pile Shear Strength (kN)	Force Orientation
01 Support		Pile/ Micro Pile	Passive (Method B)	1	Shear	100	Parallel to surface



Slide2 model - Static condition (normal groundwater table) – FoS required: 1.5

Failure Arcs limited to <1.5

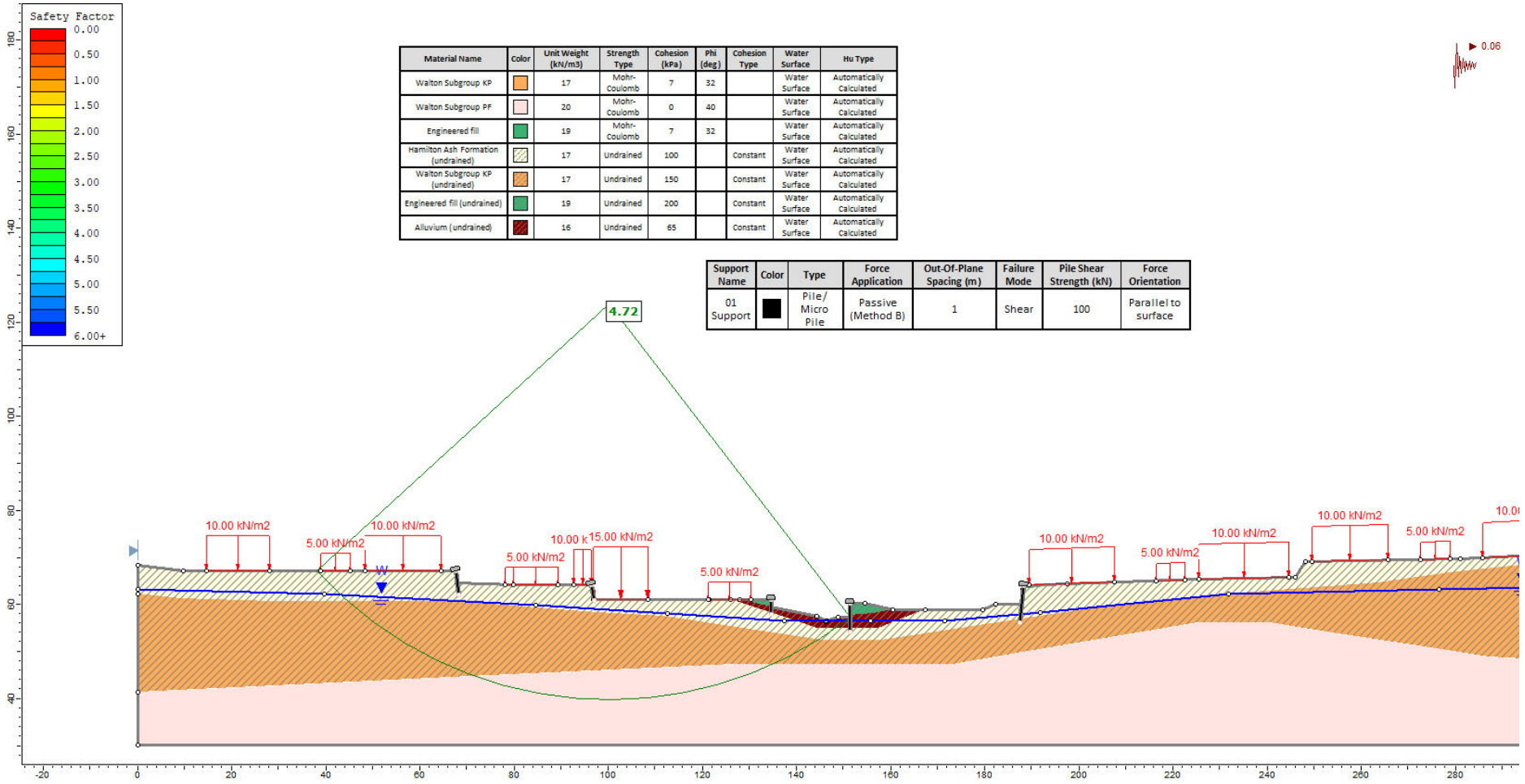


Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Water Surface	Hu Type	Ru
Hamilton Ash Formation		17	Mohr-Coulomb	5	30	Water Surface	Automatically Calculated	
Walton Subgroup KP		17	Mohr-Coulomb	7	32	Water Surface	Automatically Calculated	
Walton Subgroup PF		20	Mohr-Coulomb	0	40	Water Surface	Automatically Calculated	
Alluvium		16	Mohr-Coulomb	3	28	Water Surface	Automatically Calculated	
Hamilton Ash Formation (wet)		17	Mohr-Coulomb	5	30	None		0.3
Walton Subgroup KP (wet)		17	Mohr-Coulomb	7	32	None		0.2
Engineered Fill (wet)		19	Mohr-Coulomb	7	32	None		0.2
Alluvium (wet)		16	Mohr-Coulomb	3	28	None		0.3

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Failure Mode	Pile Shear Strength (kN)	Force Orientation
01 Support		Pile/ Micro Pile	Passive (Method B)	1	Shear	100	Parallel to surface

Slide2 model - Static condition (intense rainfall event) – FoS required: 1.3

Failure Arcs limited to <1.3

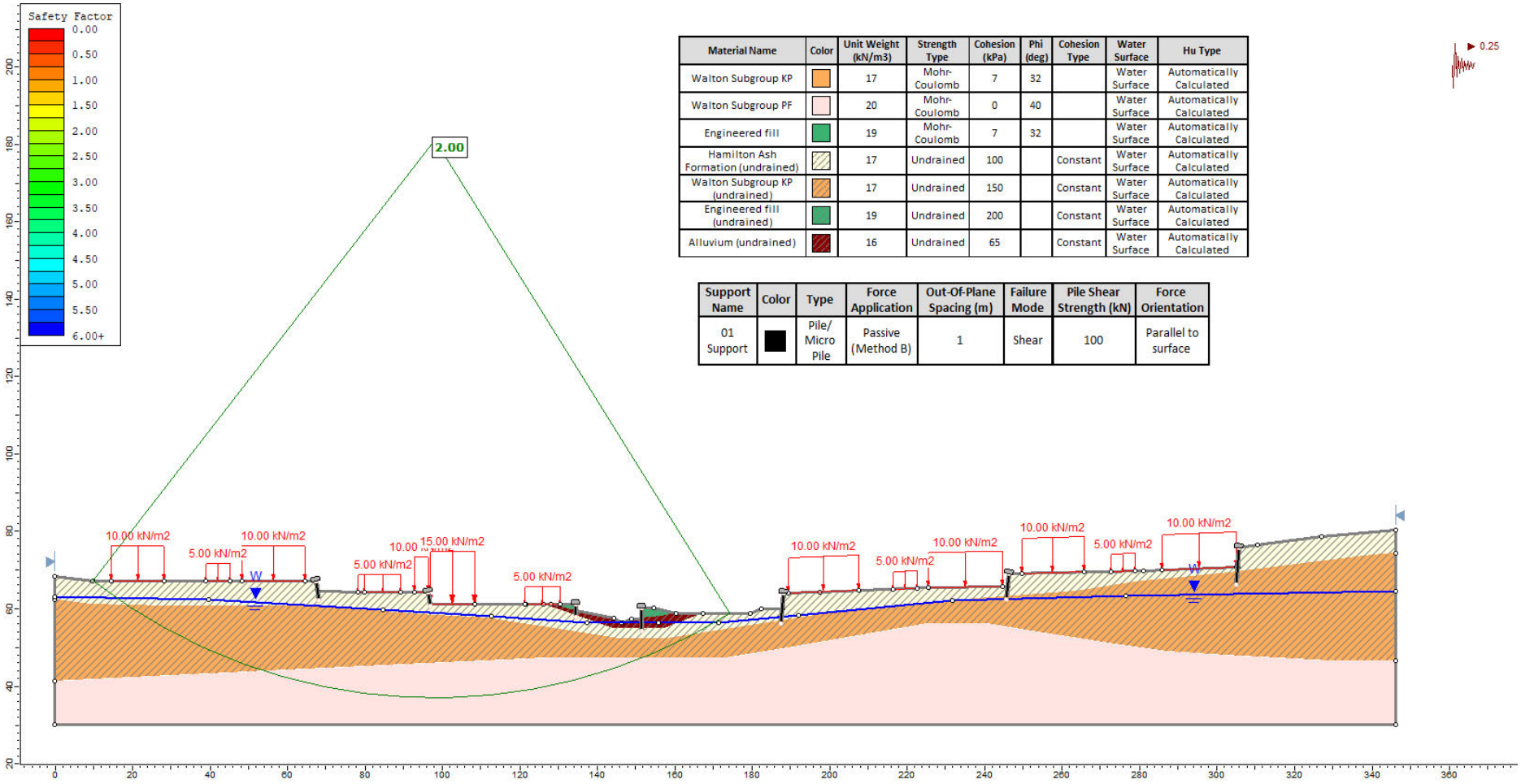


Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Cohesion Type	Water Surface	Hu Type
Walton Subgroup KP		17	Mohr-Coulomb	7	32		Water Surface	Automatically Calculated
Walton Subgroup PF		20	Mohr-Coulomb	0	40		Water Surface	Automatically Calculated
Engineered fill		19	Mohr-Coulomb	7	32		Water Surface	Automatically Calculated
Hamilton Ash Formation (undrained)		17	Undrained	100		Constant	Water Surface	Automatically Calculated
Walton Subgroup KP (undrained)		17	Undrained	150		Constant	Water Surface	Automatically Calculated
Engineered fill (undrained)		19	Undrained	200		Constant	Water Surface	Automatically Calculated
Alluvium (undrained)		16	Undrained	65		Constant	Water Surface	Automatically Calculated

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Failure Mode	Pile Shear Strength (kN)	Force Orientation
01 Support		Pile/ Micro Pile	Passive (Method B)	1	Shear	100	Parallel to surface

Slide2 model - Seismic condition SLS – FoS required: 1.3

Failure Arcs limited to <1.3

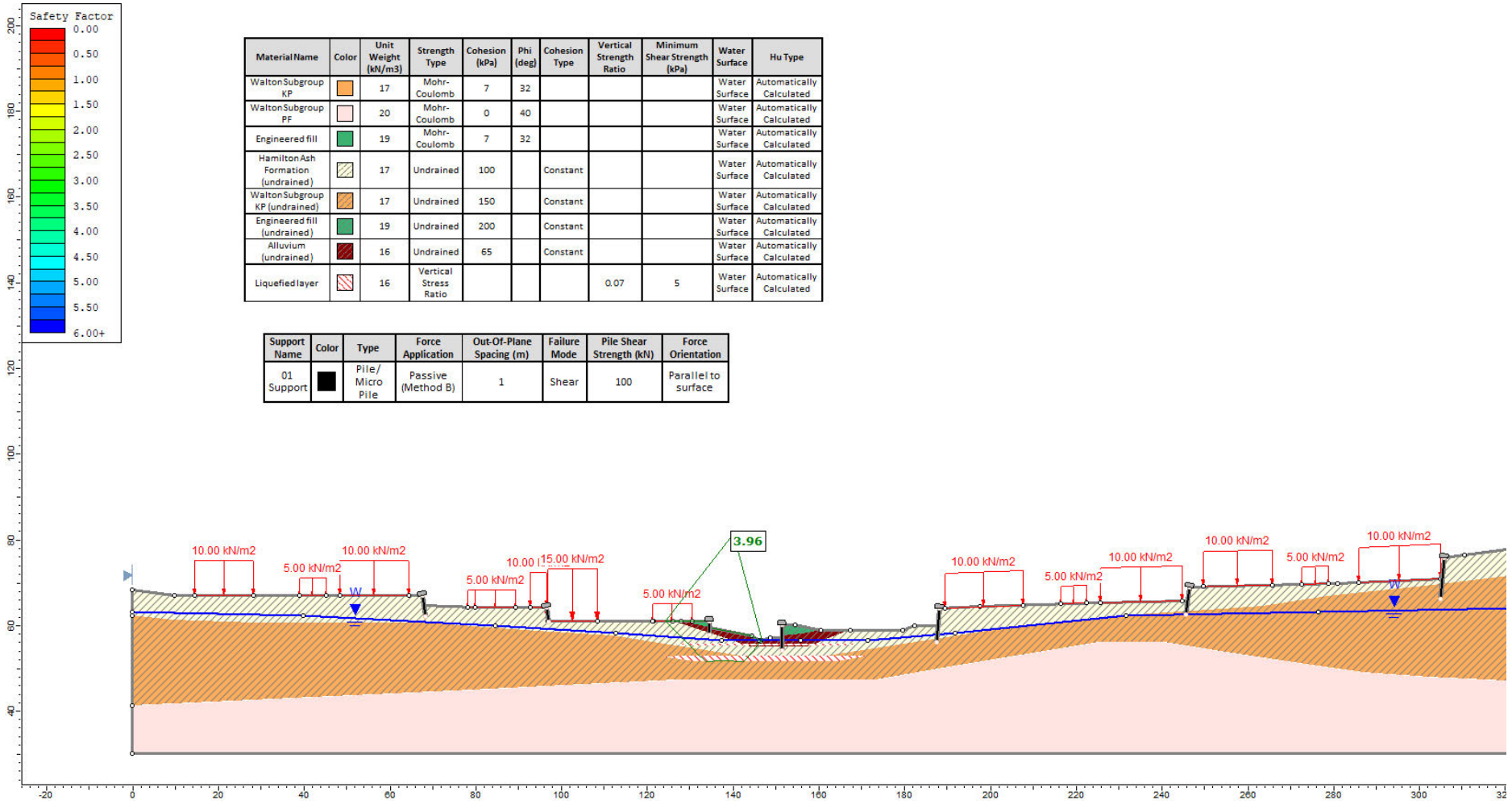


Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Cohesion Type	Water Surface	Hu Type
Walton Subgroup KP		17	Mohr-Coulomb	7	32		Water Surface	Automatically Calculated
Walton Subgroup PF		20	Mohr-Coulomb	0	40		Water Surface	Automatically Calculated
Engineered fill		19	Mohr-Coulomb	7	32		Water Surface	Automatically Calculated
Hamilton Ash Formation (undrained)		17	Undrained	100		Constant	Water Surface	Automatically Calculated
Walton Subgroup KP (undrained)		17	Undrained	150		Constant	Water Surface	Automatically Calculated
Engineered fill (undrained)		19	Undrained	200		Constant	Water Surface	Automatically Calculated
Alluvium (undrained)		16	Undrained	65		Constant	Water Surface	Automatically Calculated

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Failure Mode	Pile Shear Strength (kN)	Force Orientation
01 Support		Pile/ Micro Pile	Passive (Method B)	1	Shear	100	Parallel to surface

Slide2 model - Seismic condition ULS – FoS required: 1.0

Failure Arcs limited to <1.0



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Cohesion Type	Vertical Strength Ratio	Minimum Shear Strength (kPa)	Water Surface	Hu Type
Walton Subgroup KP		17	Mohr-Coulomb	7	32				Water Surface	Automatically Calculated
Walton Subgroup PF		20	Mohr-Coulomb	0	40				Water Surface	Automatically Calculated
Engineered fill		19	Mohr-Coulomb	7	32				Water Surface	Automatically Calculated
Hamilton Ash Formation (undrained)		17	Undrained	100		Constant			Water Surface	Automatically Calculated
Walton Subgroup KP (undrained)		17	Undrained	150		Constant			Water Surface	Automatically Calculated
Engineered fill (undrained)		19	Undrained	200		Constant			Water Surface	Automatically Calculated
Alluvium (undrained)		16	Undrained	65		Constant			Water Surface	Automatically Calculated
Liquefied layer		16	Vertical Stress Ratio				0.07	5	Water Surface	Automatically Calculated

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Failure Mode	Pile Shear Strength (kN)	Force Orientation
01 Support		Pile/ Micro Pile	Passive (Method B)	1	Shear	100	Parallel to surface

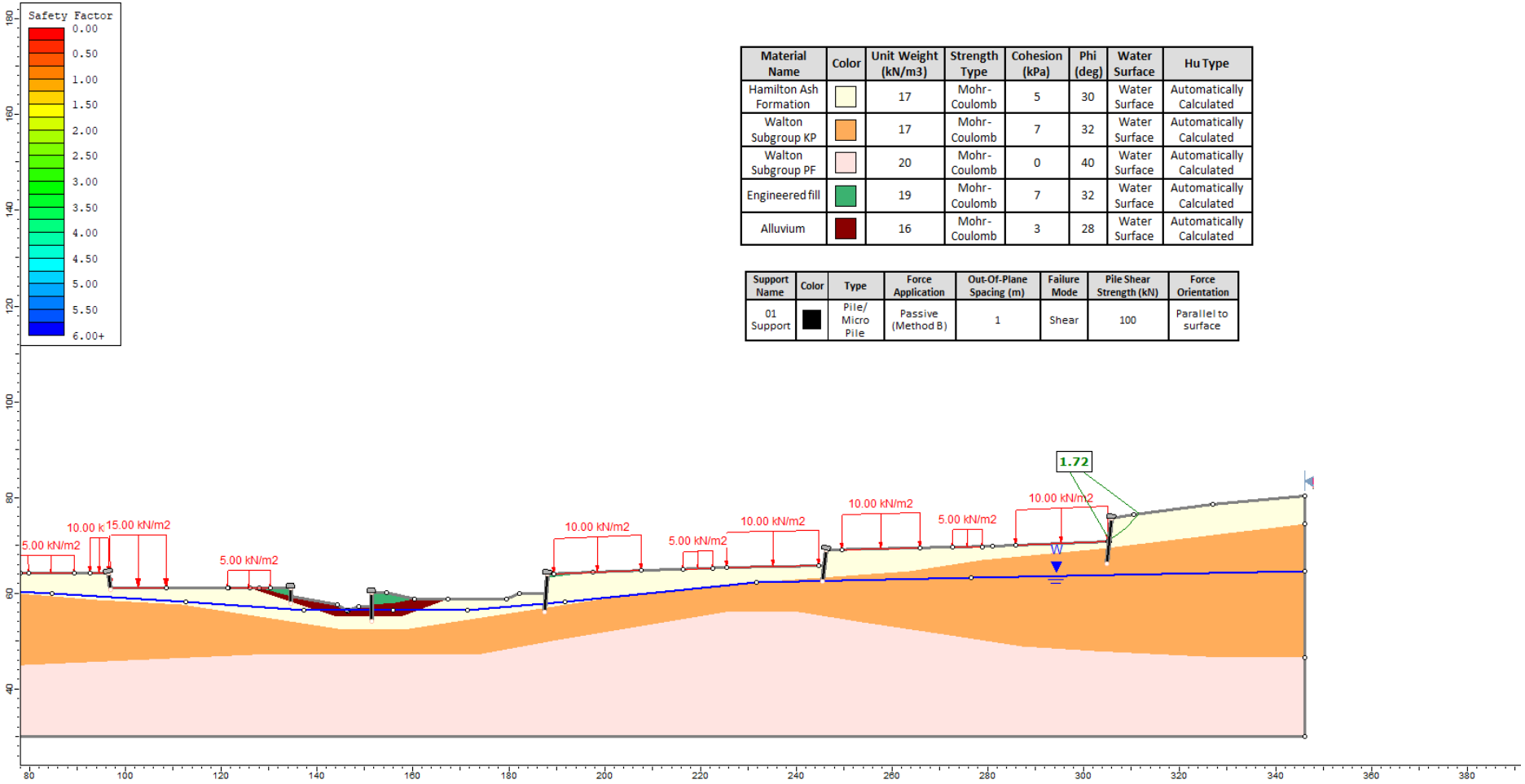
Slide2 model – Post seismic condition – FoS required: 1.0

Failure Arcs limited to <1.0

Cross Section D – Right to Left

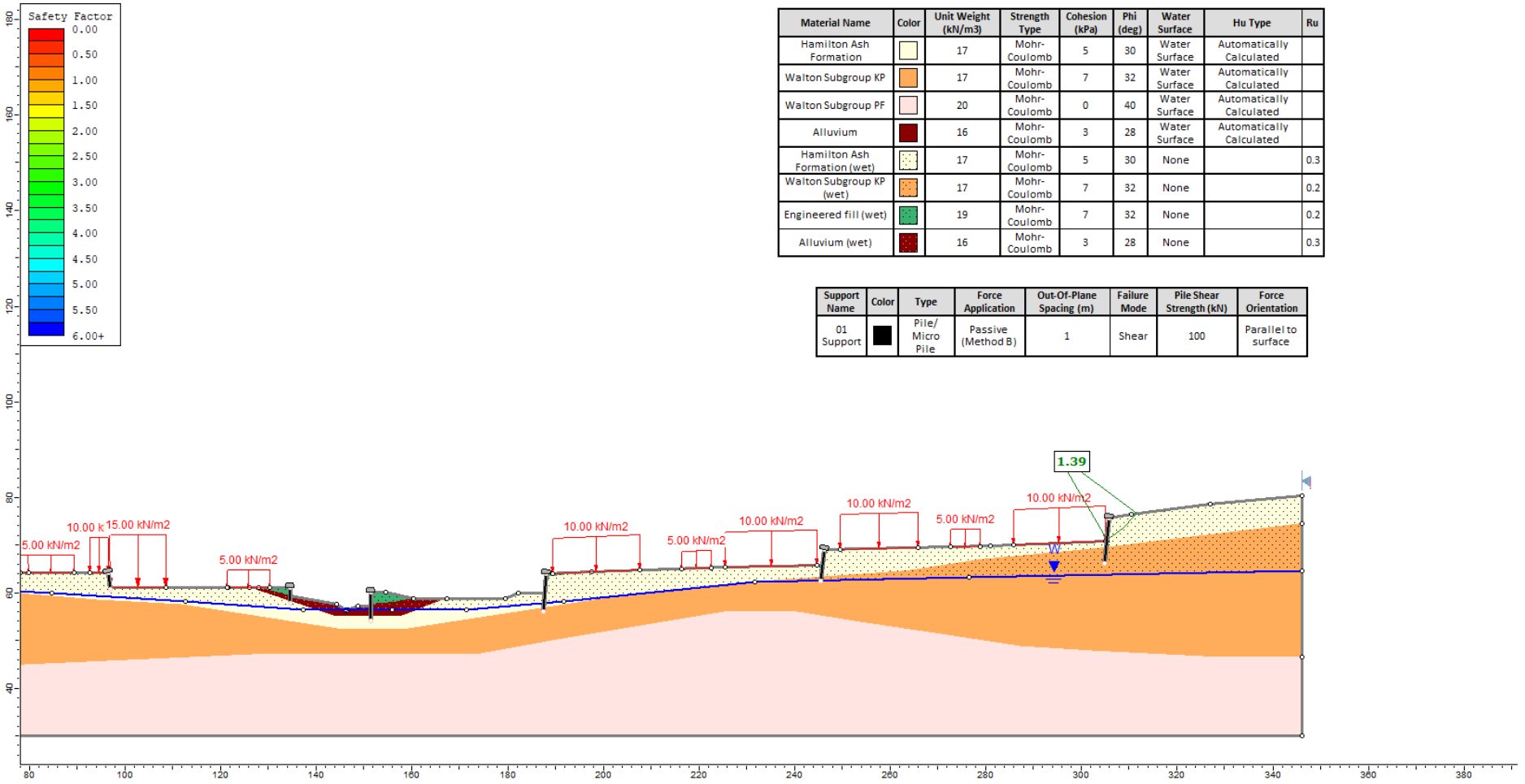
Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Water Surface	Hu Type
Hamilton Ash Formation		17	Mohr-Coulomb	5	30	Water Surface	Automatically Calculated
Walton Subgroup KP		17	Mohr-Coulomb	7	32	Water Surface	Automatically Calculated
Walton Subgroup PF		20	Mohr-Coulomb	0	40	Water Surface	Automatically Calculated
Engineered fill		19	Mohr-Coulomb	7	32	Water Surface	Automatically Calculated
Alluvium		16	Mohr-Coulomb	3	28	Water Surface	Automatically Calculated

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Failure Mode	Pile Shear Strength (kN)	Force Orientation
01 Support		Pile/ Micro Pile	Passive (Method B)	1	Shear	100	Parallel to surface



Slide2 model - Static condition (normal groundwater table) – FoS required: 1.5

Failure Arcs limited to <1.5

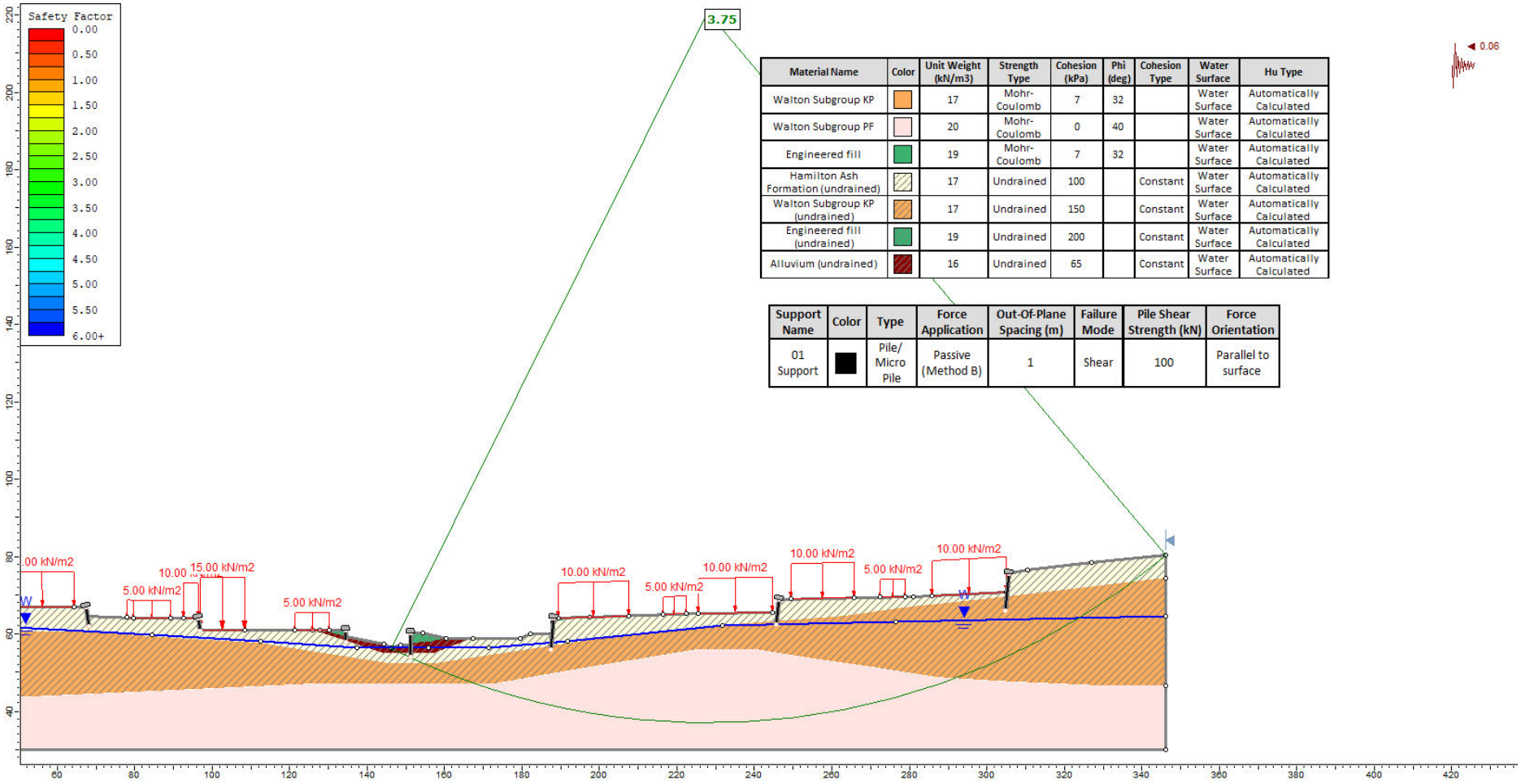


Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Water Surface	Hu Type	Ru
Hamilton Ash Formation		17	Mohr-Coulomb	5	30	Water Surface	Automatically Calculated	
Walton Subgroup KP		17	Mohr-Coulomb	7	32	Water Surface	Automatically Calculated	
Walton Subgroup PF		20	Mohr-Coulomb	0	40	Water Surface	Automatically Calculated	
Alluvium		16	Mohr-Coulomb	3	28	Water Surface	Automatically Calculated	
Hamilton Ash Formation (wet)		17	Mohr-Coulomb	5	30	None		0.3
Walton Subgroup KP (wet)		17	Mohr-Coulomb	7	32	None		0.2
Engineered fill (wet)		19	Mohr-Coulomb	7	32	None		0.2
Alluvium (wet)		16	Mohr-Coulomb	3	28	None		0.3

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Failure Mode	Pile Shear Strength (kN)	Force Orientation
01 Support		Pile/ Micro Pile	Passive (Method B)	1	Shear	100	Parallel to surface

Slide2 model - Static condition (intense rainfall event) – FoS required: 1.3

Failure Arcs limited to <1.3

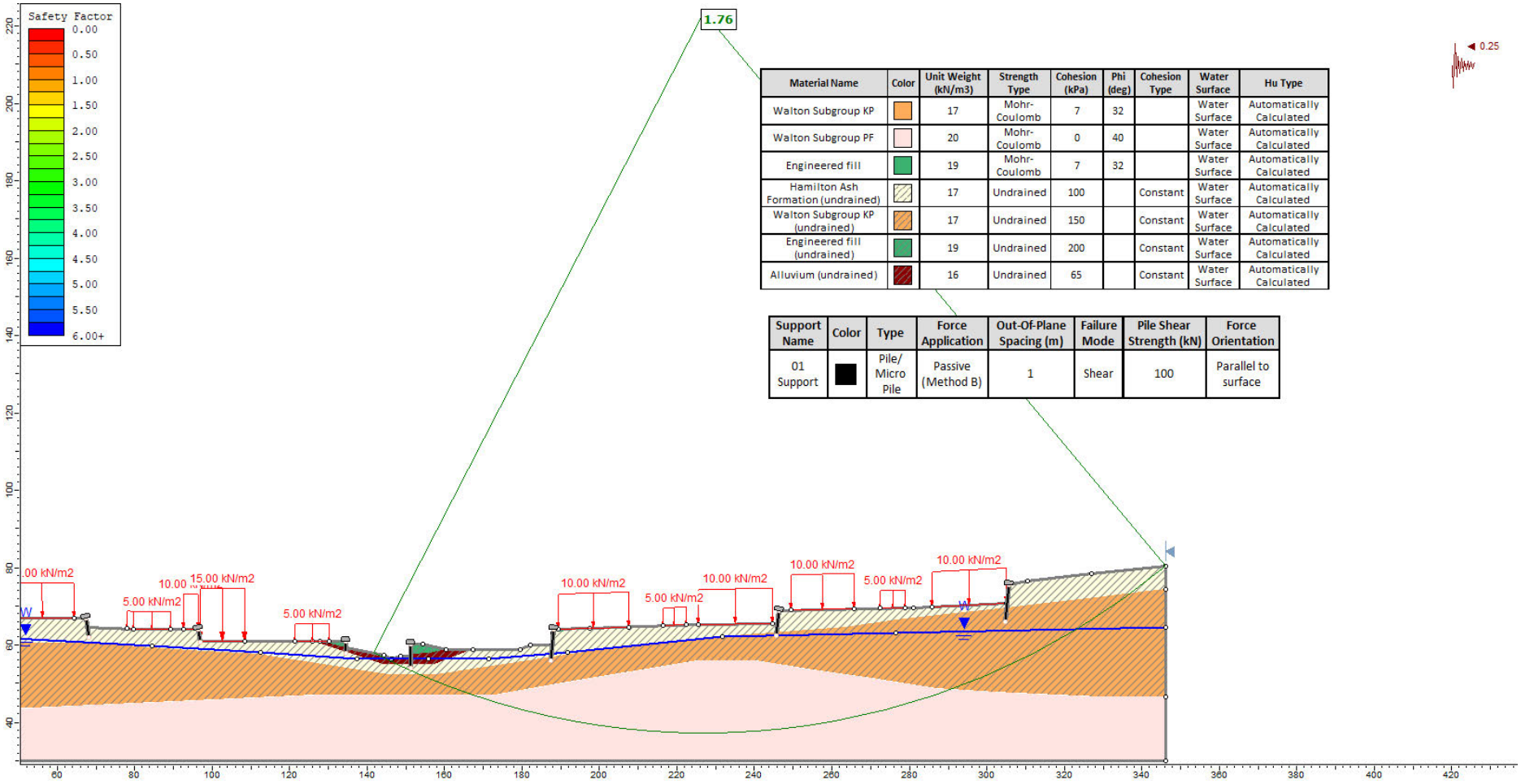


Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Cohesion Type	Water Surface	Hu Type
Walton Subgroup KP		17	Mohr-Coulomb	7	32		Water Surface	Automatically Calculated
Walton Subgroup PF		20	Mohr-Coulomb	0	40		Water Surface	Automatically Calculated
Engineered fill		19	Mohr-Coulomb	7	32		Water Surface	Automatically Calculated
Hamilton Ash Formation (undrained)		17	Undrained	100		Constant	Water Surface	Automatically Calculated
Walton Subgroup KP (undrained)		17	Undrained	150		Constant	Water Surface	Automatically Calculated
Engineered fill (undrained)		19	Undrained	200		Constant	Water Surface	Automatically Calculated
Alluvium (undrained)		16	Undrained	65		Constant	Water Surface	Automatically Calculated

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Failure Mode	Pile Shear Strength (kN)	Force Orientation
01 Support		Pile/ Micro Pile	Passive (Method B)	1	Shear	100	Parallel to surface

Slide2 model - Seismic condition SLS – FoS required: 1.3

Failure Arcs limited to <1.3

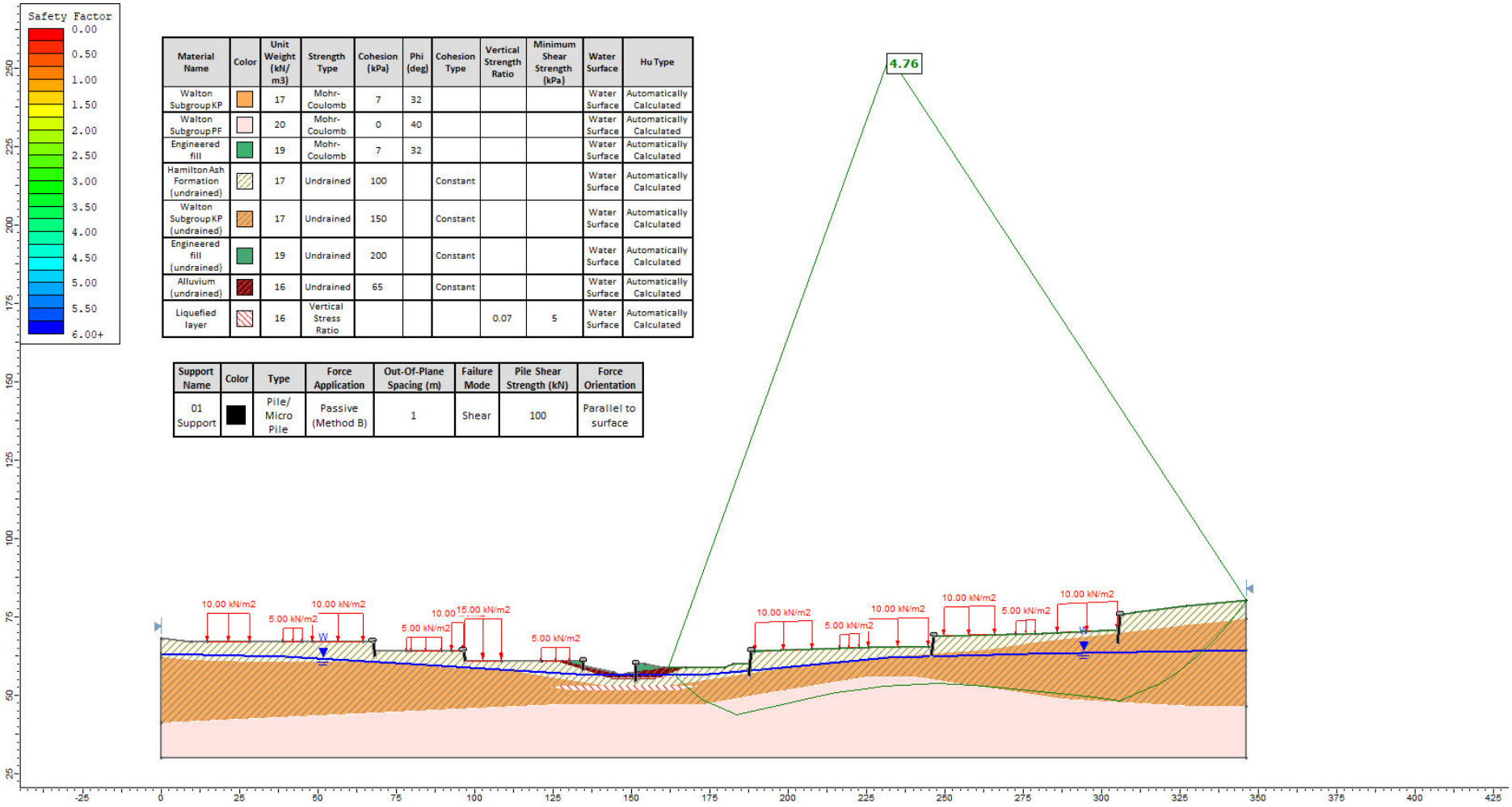


Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Cohesion Type	Water Surface	Hu Type
Walton Subgroup KP		17	Mohr-Coulomb	7	32		Water Surface	Automatically Calculated
Walton Subgroup PF		20	Mohr-Coulomb	0	40		Water Surface	Automatically Calculated
Engineered fill		19	Mohr-Coulomb	7	32		Water Surface	Automatically Calculated
Hamilton Ash Formation (undrained)		17	Undrained	100		Constant	Water Surface	Automatically Calculated
Walton Subgroup KP (undrained)		17	Undrained	150		Constant	Water Surface	Automatically Calculated
Engineered fill (undrained)		19	Undrained	200		Constant	Water Surface	Automatically Calculated
Alluvium (undrained)		16	Undrained	65		Constant	Water Surface	Automatically Calculated

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Failure Mode	Pile Shear Strength (kN)	Force Orientation
01 Support		Pile/ Micro Pile	Passive (Method B)	1	Shear	100	Parallel to surface

Slide2 model - Seismic condition ULS – FoS required: 1.0

Failure Arcs limited to <1.0



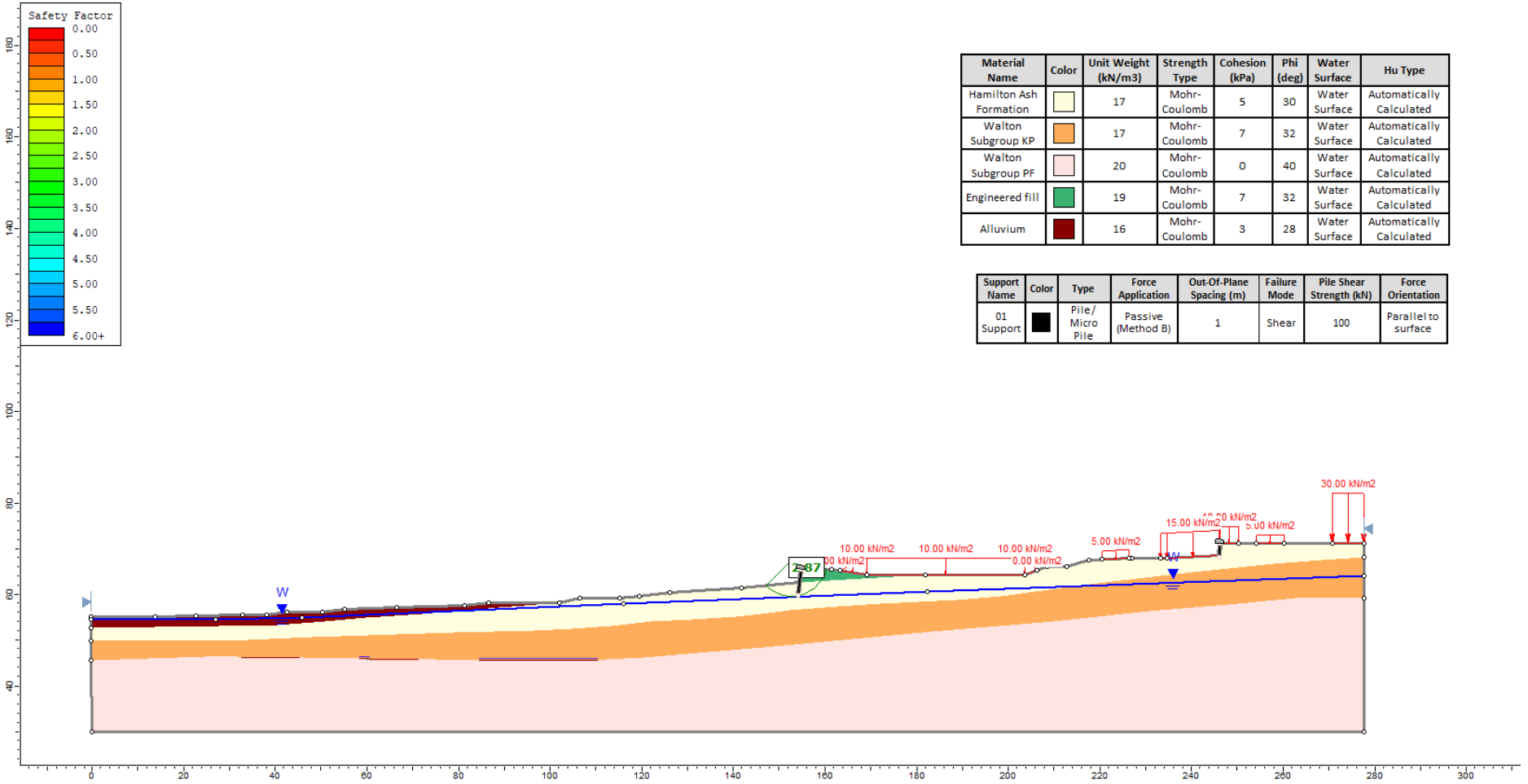
Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Cohesion Type	Vertical Strength Ratio	Minimum Shear Strength (kPa)	Water Surface	Hu Type
Walton Subgroup KP		17	Mohr-Coulomb	7	32				Water Surface	Automatically Calculated
Walton Subgroup PF		20	Mohr-Coulomb	0	40				Water Surface	Automatically Calculated
Engineered fill		19	Mohr-Coulomb	7	32				Water Surface	Automatically Calculated
Hamilton Ash Formation (undrained)		17	Undrained	100		Constant			Water Surface	Automatically Calculated
Walton Subgroup KP (undrained)		17	Undrained	150		Constant			Water Surface	Automatically Calculated
Engineered fill (undrained)		19	Undrained	200		Constant			Water Surface	Automatically Calculated
Alluvium (undrained)		16	Undrained	65		Constant			Water Surface	Automatically Calculated
Liquefied layer		16	Vertical Stress Ratio				0.07	5	Water Surface	Automatically Calculated

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Failure Mode	Pile Shear Strength (kN)	Force Orientation
01 Support		Pile/ Micro Pile	Passive (Method B)	1	Shear	100	Parallel to surface

Slide2 model – Post seismic condition – FoS required: 1.0

Failure Arcs limited to <1.0

Cross Section E

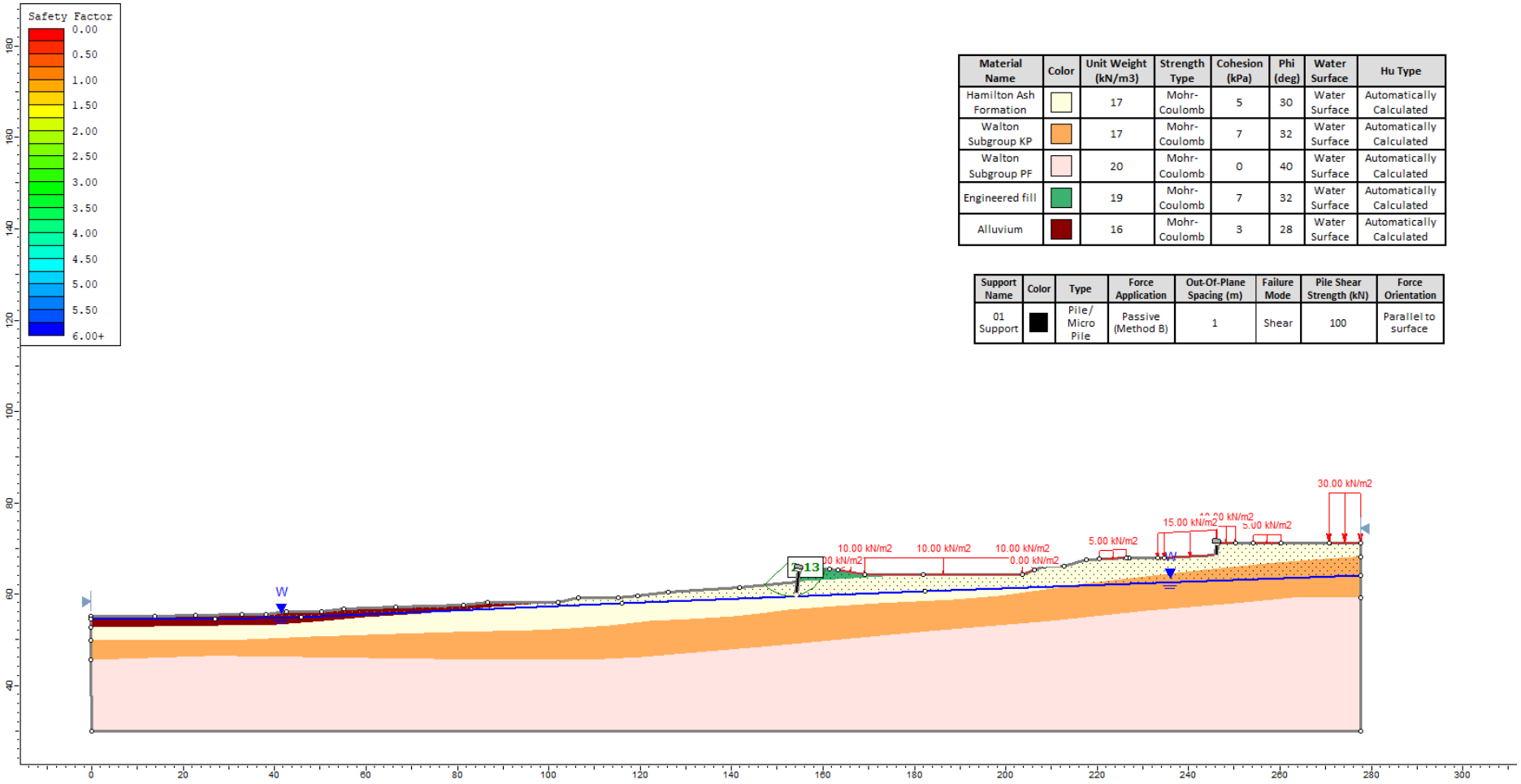


Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Water Surface	Hu Type
Hamilton Ash Formation		17	Mohr-Coulomb	5	30	Water Surface	Automatically Calculated
Walton Subgroup KP		17	Mohr-Coulomb	7	32	Water Surface	Automatically Calculated
Walton Subgroup PF		20	Mohr-Coulomb	0	40	Water Surface	Automatically Calculated
Engineered fill		19	Mohr-Coulomb	7	32	Water Surface	Automatically Calculated
Alluvium		16	Mohr-Coulomb	3	28	Water Surface	Automatically Calculated

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Failure Mode	Pile Shear Strength (kN)	Force Orientation
01 Support		Pile/ Micro Pile	Passive (Method B)	1	Shear	100	Parallel to surface

Slide2 model - Static condition (normal groundwater table) – FoS required: 1.5

Failure Arcs limited to <1.5

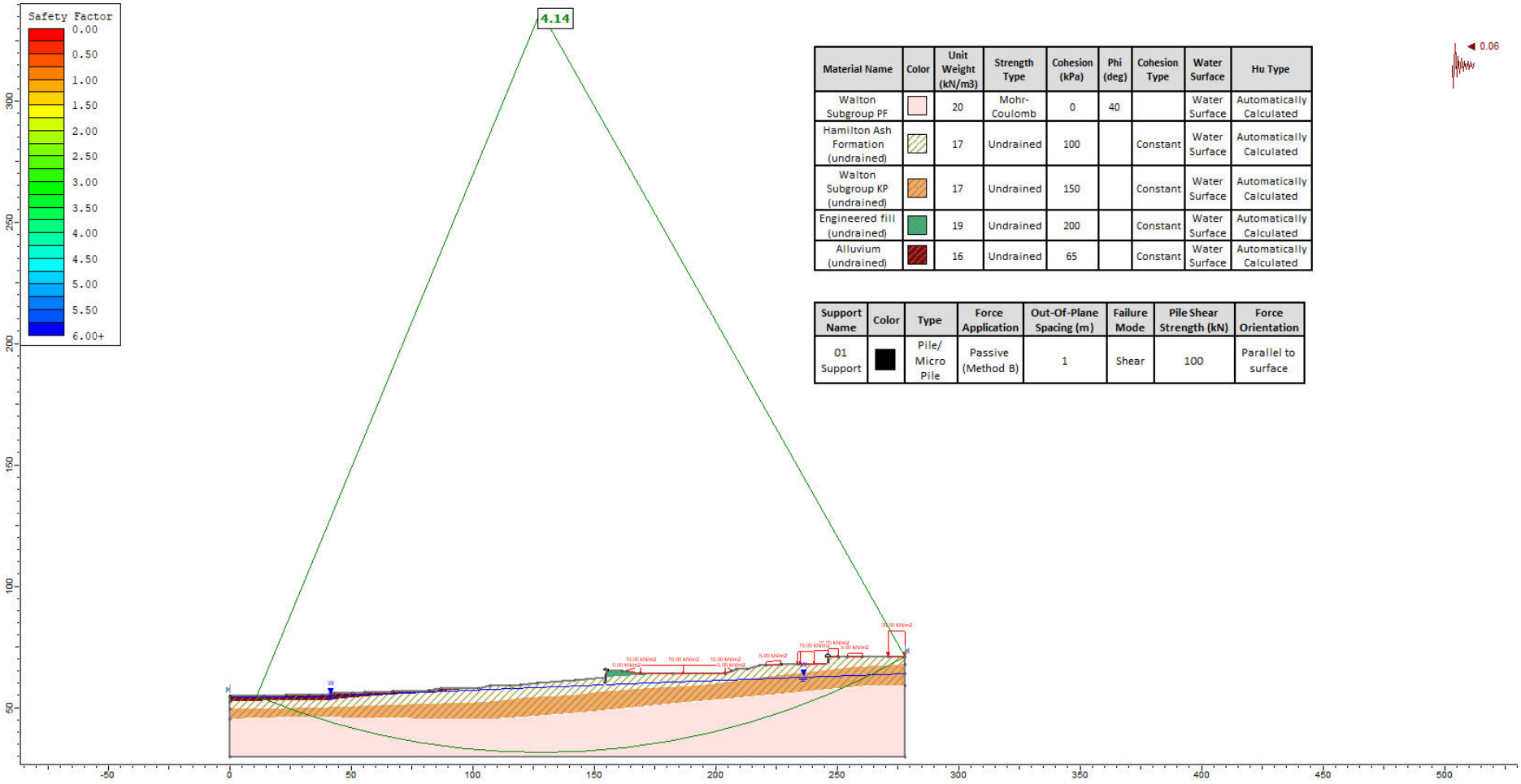


Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Water Surface	Hu Type
Hamilton Ash Formation		17	Mohr-Coulomb	5	30	Water Surface	Automatically Calculated
Walton Subgroup KP		17	Mohr-Coulomb	7	32	Water Surface	Automatically Calculated
Walton Subgroup PF		20	Mohr-Coulomb	0	40	Water Surface	Automatically Calculated
Engineered fill		19	Mohr-Coulomb	7	32	Water Surface	Automatically Calculated
Alluvium		16	Mohr-Coulomb	3	28	Water Surface	Automatically Calculated

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Failure Mode	Pile Shear Strength (kN)	Force Orientation
01 Support		Pile/ Micro Pile	Passive (Method B)	1	Shear	100	Parallel to surface

Slide2 model - Static condition (intense rainfall event) – FoS required: 1.3

Failure Arcs limited to <1.3

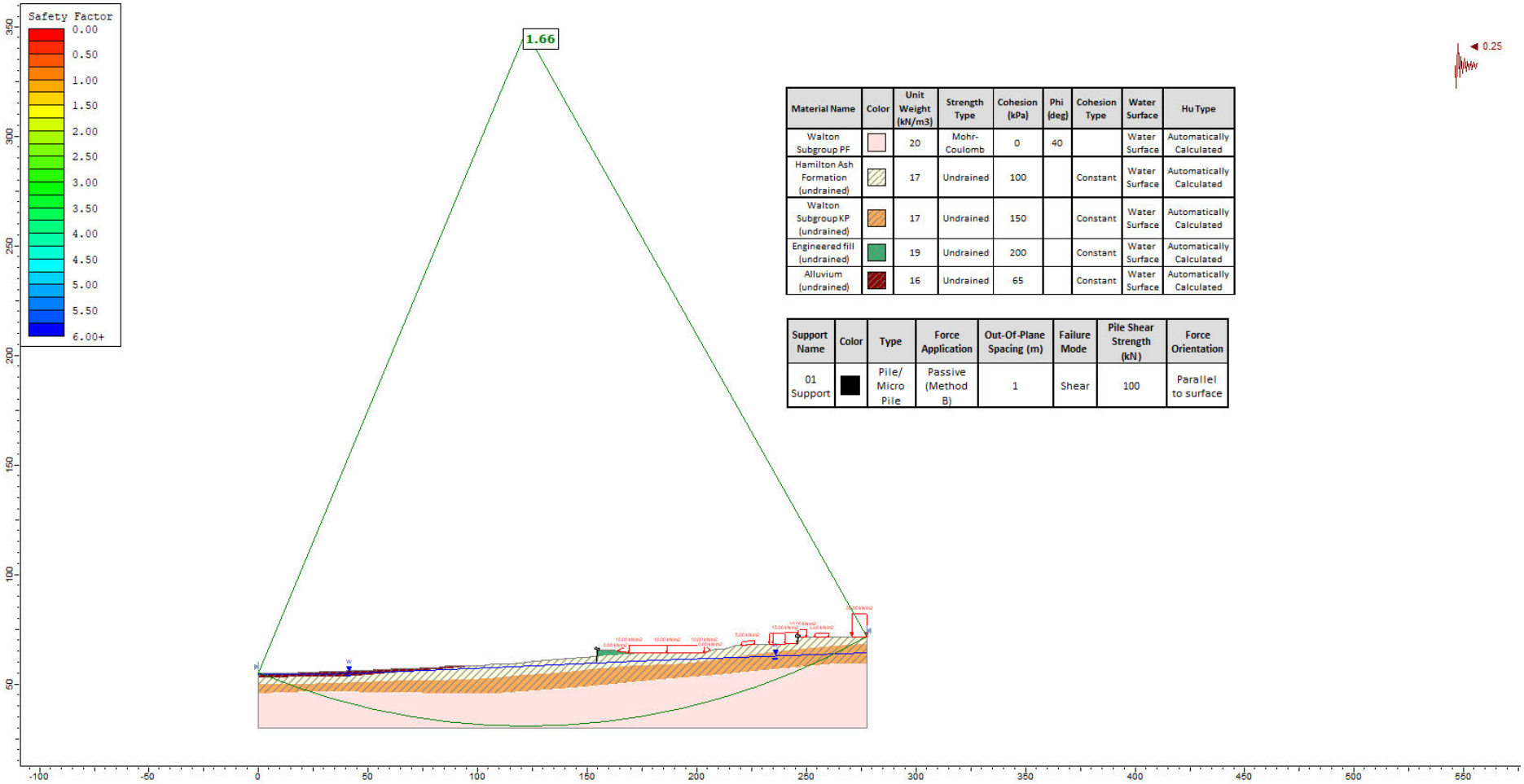


Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Cohesion Type	Water Surface	Hu Type
Walton Subgroup PF		20	Mohr-Coulomb	0	40		Water Surface	Automatically Calculated
Hamilton Ash Formation (undrained)		17	Undrained	100		Constant	Water Surface	Automatically Calculated
Walton Subgroup KP (undrained)		17	Undrained	150		Constant	Water Surface	Automatically Calculated
Engineered fill (undrained)		19	Undrained	200		Constant	Water Surface	Automatically Calculated
Alluvium (undrained)		16	Undrained	65		Constant	Water Surface	Automatically Calculated

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Failure Mode	Pile Shear Strength (kN)	Force Orientation
01 Support		Pile/ Micro Pile	Passive (Method B)	1	Shear	100	Parallel to surface

Slide2 model - Seismic condition SLS – FoS required: 1.3

Failure Arcs limited to <1.3



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Cohesion Type	Water Surface	Hu Type
Walton Subgroup PF		20	Mohr-Coulomb	0	40		Water Surface	Automatically Calculated
Hamilton Ash Formation (undrained)		17	Undrained	100		Constant	Water Surface	Automatically Calculated
Walton Subgroup KP (undrained)		17	Undrained	150		Constant	Water Surface	Automatically Calculated
Engineered fill (undrained)		19	Undrained	200		Constant	Water Surface	Automatically Calculated
Alluvium (undrained)		16	Undrained	65		Constant	Water Surface	Automatically Calculated

Support Name	Color	Type	Force Application	Out-Of-Plane Spacing (m)	Failure Mode	Pile Shear Strength (kN)	Force Orientation
01 Support		Pile/ Micro Pile	Passive (Method B)	1	Shear	100	Parallel to surface

Slide2 model - Seismic condition ULS – FoS required: 1.0

Failure Arcs limited to <1.0

APPENDIX K - Natural Hazard Risk Matrix

Low hills landform

	DEGREE OF DAMAGE						
	Very High	High	Medium	Low			
	Likelihood						
	Almost Certain	Very Likely	Likely	Possible	Unlikely	Rare	Very Rare
	ARI (years)	up to 10	10 to 20	20 to 50	50 to 100	100 to 500	500 to 5000	> 5000
	AEP	10% or More	10% to 5%	5% to 2%	2% to 1%	1% to 0.2%	0.2% to 0.02%	< 0.02%
Consequence Level	Catastrophic							
	Major							
	Moderate							
	Minor							• Seismicity
	Negligible					• Flooding*	• Liquefaction* • Vertical settlements • Lateral spreading • Underground services uplift • Soil Expansivity • Soft/Compressible Soils • Landslips*	• Volcanic eruption/ash fall • Tsunami* • Active faults* • Coastal Erosion* • Coastal inundation*

*Listed in NPS NH 2025

Alluvial plains / gully landforms

DEGREE OF DAMAGE							
Very High	High	Medium	Low				
	Likelihood						
	Almost Certain	Very Likely	Likely	Possible	Unlikely	Rare	Very Rare
ARI (years)	up to 10	10 to 20	20 to 50	50 to 100	100 to 500	500 to 5000	> 5000
AEP	10% or More	10% to 5%	5% to 2%	2% to 1%	1% to 0.2%	0.2% to 0.02%	< 0.02%
Consequence Level: Catastrophic							
Major							
Moderate					• Liquefaction* • Vertical settlements		
Minor					• Underground services uplift • Flooding* • Soft/Compressible Soils		• Seismicity
Negligible						• Soil Expansivity • Lateral spreading	• Volcanic eruption/ash fall • Landslips* • Tsunami* • Active faults* • Coastal Erosion* • Coastal inundation*

*Listed in NPS NH 2025