BOREHOLE LOG - MH05-23

Client: Fulton Hogan Land Development Limited
Project: Waterloo Creek Bridge
Site Location: Milldale Stage 10/11
Project No.: AKL2023-0202
Date: 11/09/2023
Borehole Location: WWLA BH05 Logged by: NK Checked by: MJC Scale: 1:50 Sheet 1 of 2
Position: 389421.4mE; 830490.8mN Projection: EDENMT2000 Angle from horizontal: 90°
Elevation: 29.25m Datum: NZVD2016 Survey Source: Handheld GPS

Depth	Type & Results	RL (m)	Depth (m)	Material Description	Moisture Condition	Consistency/ Relative Density	Recovery	RQD	Drilling Method/ Support	Structure & Other Observations
		29.2		OL: Organic SILT: Dark brown. Low plasticity. Minor rootlets. (Topsoil)						
		29.0		CH: Silty CLAY: Brown mottled orange. High plasticity. (Alluvium)	W	F	100		OB / PQ3	
1.5	SPT = (0,0,2) N* = 2, Recovery = 450mm		1				100		SPT	
		27.1	2	ML: Clayey SILT with minor fine sand: Brownish grey mottled orange. Low plasticity. (Alluvium)			100		OB / PQ3	
3.0	SPT = (0,0,0) N* = 0, Recovery = 450mm		3	*... at 2.65m, Becoming Clayey SILT. Brownish grey mottled orange. Minor orootlets and manganese staining.*	S	S	100		SPT	
		25.6		*... from 3.65m to 3.70m, Core loss*			143		OB / PQ3	4.2m:1,JN,70°,UN,R,CL,CN,
4.5	SPT = (15,21,29/145mm) N* = 50+, Recovery = 300mm		4	Highly weathered, grey, massive, SILTSTONE. Extremely weak : Blocky fabric. (Mangakahia Complex)			75		SPT	4.4-4.4m:1,IS,20°,IF,Manganese
		24.4		GP: Fine to medium, grey, SILTSTONE GRAVEL.: Fine to medium, subangular. In a fine to medium sand matrix. Poorly graded. (Mangakahia Complex)			100	77	OB / PQ3	5.2-5.3m:SZ,Medium to coarse, subangular SILTSTONE gravels in a clayey matrix.
		24.2	5	Moderately weathered, grey, massive, SILTSTONE. Very weak: Blocky fabric. (Mangakahia Complex)						5.3-5.5m:JN,70°,CL,
6.0	SPT = (5,11,22) Nc = 33	23.2	6	Highly weathered, grey, massive, SILTSTONE. Very weak: Blocky fabric. (Mangakahia Complex)			100		SPT	5.6m:1,JN,45°,UN,R,CL,CN,
		22.4	7	Highly weathered, dark brown, massive, MUDSTONE. Extremely weak : Blocky fabric (Hukerenui Mudstone)			100	100	SPT	
7.5	SPT = (12,22,28/140mm) N* = 50+, Recovery = 350mm						100		SPT	
			8				100	100	OB / PQ3	8.5m:1,JN,70°,UN,R,CL,CN,
9.0	SPT = (13,30,20/85mm) N* = 50+		9	*... from 9.00m to 9.65m, Core loss*			0		SPT	
				... from 9.65m to 10.00m, Becoming Completely weathered MUDSTONE. Retrieve as Clayey SILT. Brown. Low Plasticity.			100	100	OB / PQ3	
			10	*... from 9.90m to 10.00m, Becoming with minor fine to medium grained sand.*						

Termination Reason: Target Depth Reached.
Shear Vane No: DCP No:
Remarks: Groundwater encountered at 2.36m. Piezometer installed.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

BOREHOLE LOG - MH05-23

Client: Fulton Hogan Land Development Limited
Project: Waterloo Creek Bridge
Site Location: Milldale Stage 10/11
Project No.: AKL2023-0202
Date: 11/09/2023
Borehole Location: WWLA BH05 Logged by: NK Checked by: MJC Scale: 1:50 Sheet 2 of 2
Position: 389421.4mE; 830490.8mN Projection: EDENMT2000 Angle from horizontal: 90°
Elevation: 29.25m Datum: NZVD2016 Survey Source: Handheld GPS

Depth	Type & Results	RL (m)	Depth (m)	Material Description	Recovery	RQD	Drilling Method/ Support	Structure & Other Observations
10.5	SPT = (15,32,18/70mm) Nc = 50+	18.4	11	Slightly weathered, brownish grey, massive, MUDSTONE. Extremely weak: Blocky fabric. Microfractures. (Hukerenui Mudstone)	0		SPT	
					100	100	OB / PQ3	11.3-11.4m:SZ,45°,Medium to coarse, subangular MUDSTONE gravels in a clayey matrix. 11.5m:JN,60°,UN,R,CL,CN,
12.0	SPT = (17,22,18/70mm) Nc = 50+		12		0		SPT	
					100		OB / PQ3	13.0m:JN,10°,CL, 13.4m:JN,35°,UN,R,CL,CN,
13.5	SPT = (17,32,18/70mm) Nc = 50+		13		0		SPT	
			14		100	100	OB / PQ3	14.2m:JN,45°,CL,
15.0	SPT = (17,31,19/78mm) Nc = 50+		15	Borehole terminated at 15.00 m	0		SPT	
			16					
			17					
			18					
			19					
			20					

Termination Reason: Target Depth Reached.
Shear Vane No: DCP No:
Remarks: Groundwater encountered at 2.36m. Piezometer installed.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

PHOTOGRAPH SHEET - MH05-23

Client: Fulton Hogan Land Development Limited
Project: Waterloo Creek Bridge
Location: Milldale Stage 10/11
Project ID: AKL2023-0202
Date:11/09/2023

MH05-23: 0.00m - 2.55m

MH05-23: 2.55m - 5.55m

PHOTOGRAPH SHEET - MH05-23

Client: Fulton Hogan Land Development Limited
Project: Waterloo Creek Bridge
Location: Milldale Stage 10/11
Project ID: AKL2023-0202
Date:11/09/2023

MH05-23: 5.55m - 7.85m

MH05-23: 7.85m - 10.20m

PHOTOGRAPH SHEET - MH05-23

Client: Fulton Hogan Land Development Limited
Project: Waterloo Creek Bridge
Location: Milldale Stage 10/11
Project ID: AKL2023-0202
Date:11/09/2023

MH05-23: 10.20m - 13.10m

MH05-23: 13.10m - 15.00m

BOREHOLE LOG - MH06-23

Client: Fulton Hogan Land Development Limited
Project: Waterloo Creek Bridge
Site Location: Milldale Stage 10/11
Project No.: AKL2023-0202
Date: 08/09/2023
Borehole Location: WWLA BH02 Logged by: ST Checked by: MJC Scale: 1:50 Sheet 1 of 2
Position: 389301.8mE; 830553.4mN Projection: EDENMT2000 Angle from horizontal: 90°
Elevation: 41.00m Datum: NZVD2016 Survey Source: Handheld GPS

Depth	Type & Results	RL (m)	Depth (m)	Material Description	Moisture Condition	Consistency/ Relative Density	Recovery	RQD	Drilling Method/ Support
		41.0		OL: Organic SILT : Dark brown. Low plasticity. Some rootlets. (Topsoil)					
		40.6		CH: CLAY : with trace silt; Orange brown. High plasticity. (Alluvium)			43		OB / PQ3
			1						
1.5	SPT = (0,0,4) N* = 4, Recovery = 450mm			... at 1.50m, Becoming light grey, streaked orange brown.			78		SPT
			2			St	100		OB / PQ3
3.0	SPT = (0,4,4) N* = 8, Recovery = 450mm		3				100		SPT
		37.5		CH: Silty CLAY : Light grey, streaked orange brown. High plasticity. (Alluvium)			38		OB / PQ3
			4						
4.5	SPT = (0,1,4) N* = 5, Recovery = 300mm	36.5		CH: CLAY : Brownish grey, speckled black. High plasticity. Trace organics- wood fragments. (Alluvium)	M		67		SPT
			5				86		OB / PQ3
6.0	SPT = (0,0,4) N* = 4, Recovery = 400mm		6	... from 6.20m to 6.45m, Becoming grey, mottled brown and light grey. Some fine to coarse sand sized silt angular clasts.			89		SPT
			7			F	100		OB / PQ3
7.5	SPT = (0,0,0) N* = 0, Recovery = 450mm						100		SPT
			8				100		OB / PQ3
9.0	SPT = (0,0,0) N* = 0, Recovery = 450mm		9				100		SPT
			10				100		OB / PQ3

Groundwater: 19-09-2023

Weathering: RS, CW, HW, MW, SW, UW
Estimated Strength: EW, VW, W, MS, S, VS, ES
Defect Spacing (mm): <20, 20-60, 60-200, 200-600, 600-2000, >2000
Structure & Other Observations: Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks

Termination Reason: Target Depth Reached.
Shear Vane No: DCP No:
Remarks: Groundwater encountered. Piezometer installed.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

BOREHOLE LOG - MH06-23

Client: Fulton Hogan Land Development Limited
Project: Waterloo Creek Bridge
Site Location: Milldale Stage 10/11
Project No.: AKL2023-0202
Date: 08/09/2023
Borehole Location: WWLA BH02 Logged by: ST Checked by: MJC Scale: 1:50 Sheet 2 of 2
Position: 389301.8mE; 830553.4mN Projection: EDENMT2000 Angle from horizontal: 90°
Elevation: 41.00m Datum: NZVD2016 Survey Source: Handheld GPS

Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Material Description	Recovery	RQD	Drilling Method/ Support
10.5	SPT = (0,0,0) N* = 0, Recovery = 400mm			89		SPT
				100		OB / PQ3
12.0	SPT = (0,3,4) N* = 7, Recovery = 450mm			100		SPT
				71	71	OB / PQ3
13.5	SPT = (2,6,11) N* = 17, Recovery = 400mm	27.5	Highly weathered. Greenish grey. Massive MUDSTONE: Extremely weak. (Hukerenui Mudstone)	89	89	SPT
				100	100	OB / PQ3
			... at 14.75m, Becoming dark grey, mottled light greenish grey.			
15.0	SPT = (11,13,15) N* = 28, Recovery = 300mm		Borehole terminated at 15.00 m	67	67	SPT

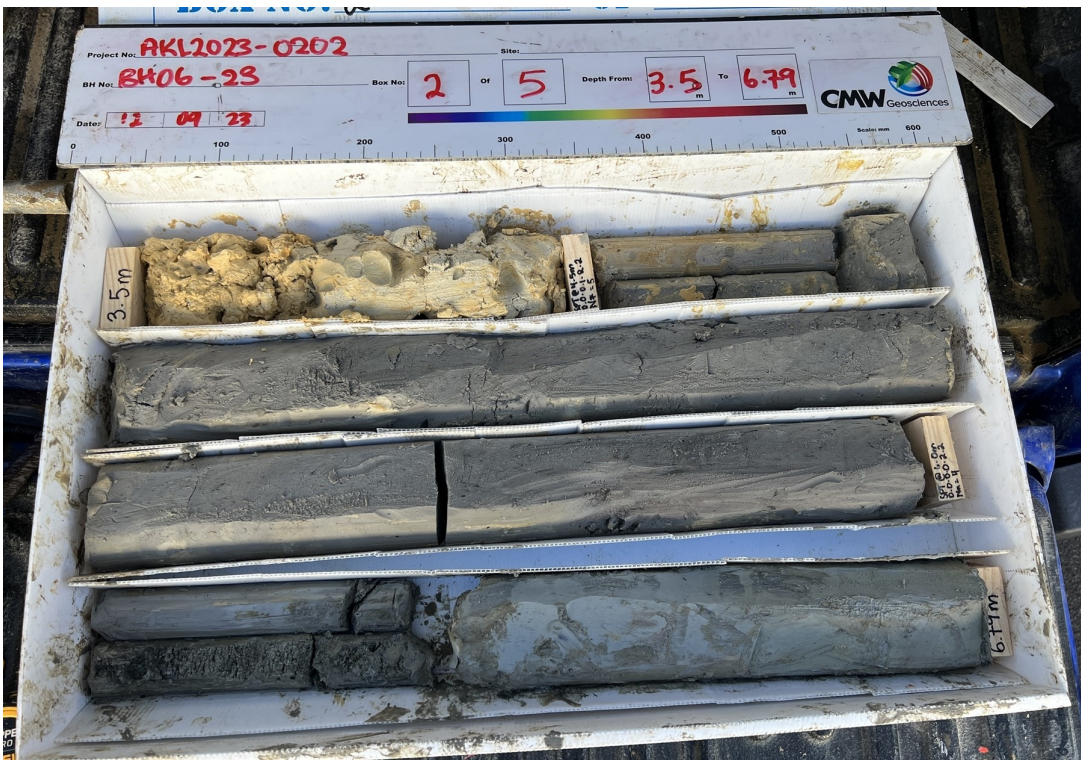
Termination Reason: Target Depth Reached.
Shear Vane No: DCP No:
Remarks: Groundwater encountered. Piezometer installed.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

PHOTOGRAPH SHEET - MH06-23

Client: Fulton Hogan Land Development Limited
Project: Waterloo Creek Bridge
Location: Milldale Stage 10/11
Project ID: AKL2023-0202
Date:08/09/2023

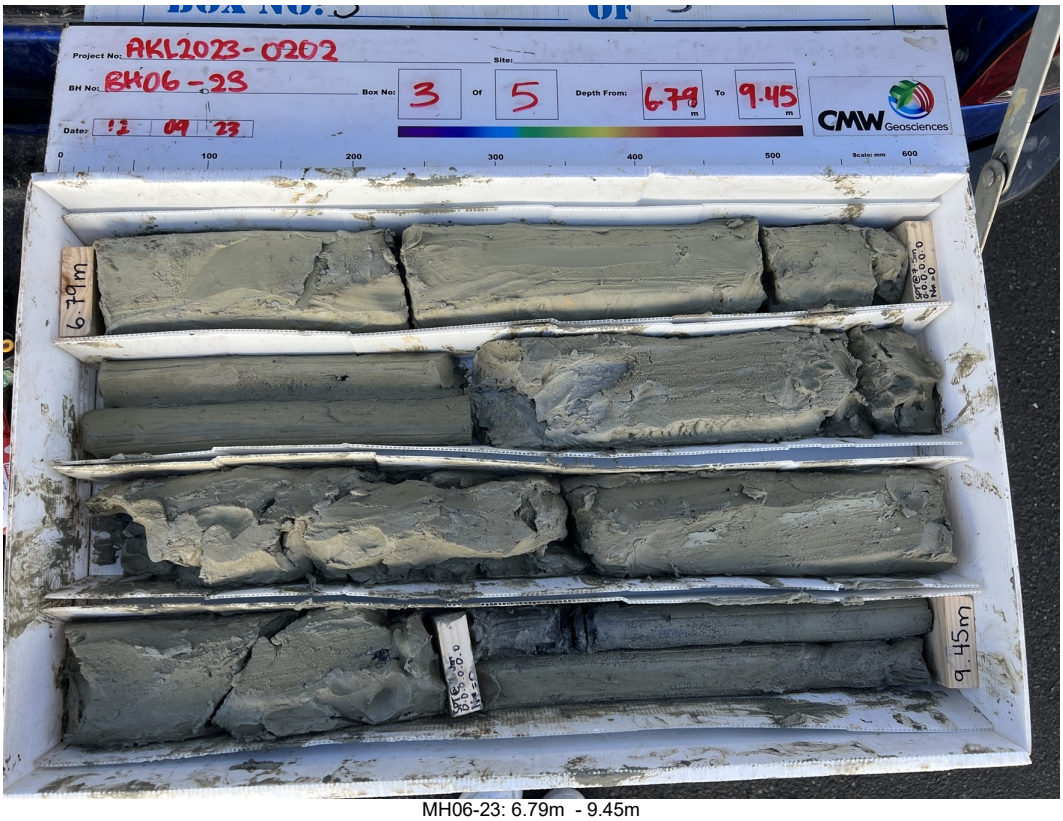
MH06-23: 0.00m - 3.50m



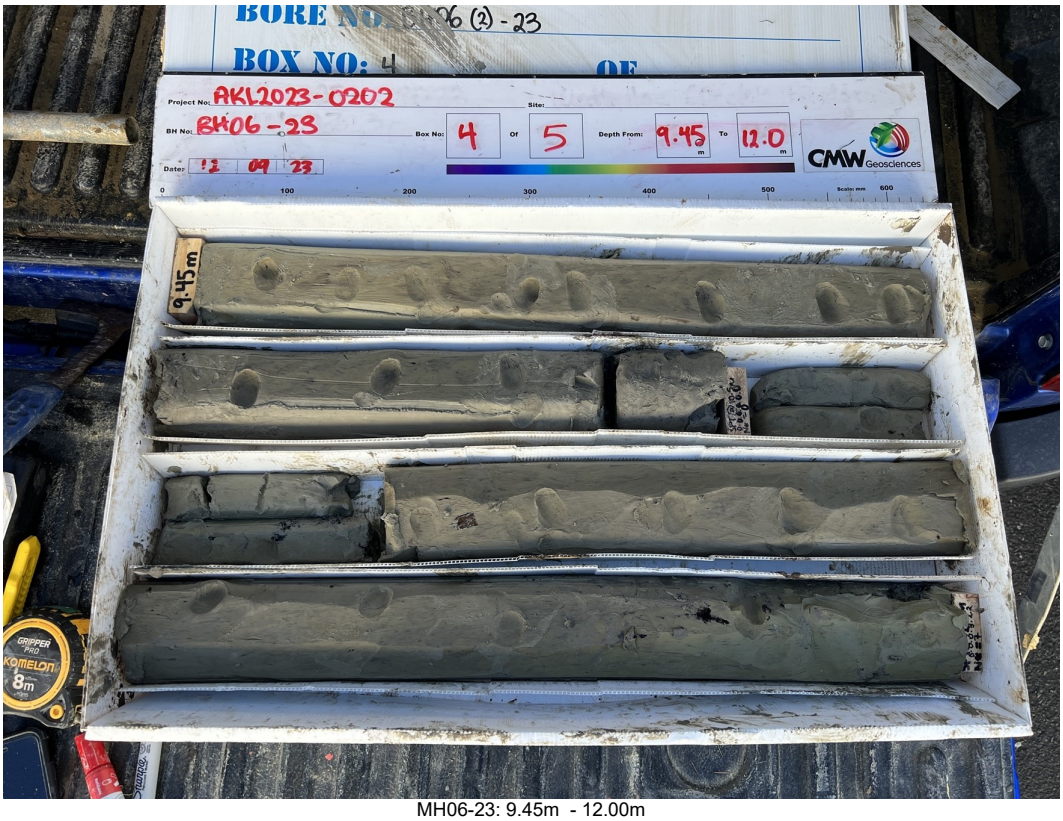
MH06-23: 3.50m - 6.79m

PHOTOGRAPH SHEET - MH06-23

Client: Fulton Hogan Land Development Limited
Project: Waterloo Creek Bridge
Location: Milldale Stage 10/11
Project ID: AKL2023-0202
Date:08/09/2023



MH06-23: 6.79m - 9.45m



MH06-23: 9.45m - 12.00m

This borehole report must be read in conjunction with accompanying notes and abbreviations. It has been prepared for geotechnical purposes only, without attempt to assess possible contamination.

PHOTOGRAPH SHEET - MH06-23

Client: Fulton Hogan Land Development Limited
Project: Waterloo Creek Bridge
Location: Milldale Stage 10/11
Project ID: AKL2023-0202
Date:08/09/2023

MH06-23: 12.00m - 15.45m

BOREHOLE LOG - MH07-23

Client: Fulton Hogan Land Development Limited
Project: Waterloo Creek Bridge
Site Location: Milldale Stage 10/11
Project No.: AKL2023-0202
Date: 05/09/2023 - 07/09/2023
Borehole Location: WWLA BH03 Logged by: RS Checked by: MJC Scale: 1:50 Sheet 1 of 3
Position: 389547.2mE; 830702.9mN Projection: EDENMT2000 Angle from horizontal: 90°
Elevation: 35.50m Datum: NZVD2016 Survey Source: Handheld GPS

Depth	Type & Results	RL (m)	Material Description	Moisture Condition	Consistency/ Relative Density	Recovery	Drilling Method/ Support
		35.5	OL: Organic SILT: Dark brown. Low plasticity. Some rootlets. (Topsoil)			100	TT / HQ3
		35.4	CH: Silty CLAY: Light grey mottled orange. High plasticity. Trace limonite staining. (Tauranga Group)				
1.5	SPT = (0,2,2) N* = 4, Recovery = 450mm				S to F	100	SPT
						100	TT / HQ3
3.0	SPT = (0,1,2) N* = 3, Recovery = 450mm					100	SPT
		32.0	CH: Silty CLAY: Greyish brown mottled brown. Minor organics. (Tauranga Group)			100	TT / HQ3
			... at 3.45m, Becoming greyish brown streaked brown. Trace organics.				
4.5	SPT = (0,0,0) N* = 0, Recovery = 450mm			M		100	SPT
						100	TT / HQ3
			... at 5.70m, Becoming brown. Minor organics.				
6.0	SPT = (0,0,0) N* = 0, Recovery = 450mm					100	SPT
			... at 6.45m, Becoming grey mottled brown. Trace organics.		S	100	TT / HQ3
			... at 7.20m, Becoming greyish brown streaked brown. Minor organics.				
7.5	SPT = (0,0,0) N* = 0, Recovery = 450mm					100	SPT
						100	TT / HQ3
9.0	SPT = (0,0,1) N* = 1, Recovery = 450mm					100	SPT
		26.3	CH: Silty CLAY: Greenish grey. High plasticity. (RS Northland Allochthon)			100	TT / HQ3

Groundwater: 20-09-2023

Weathering: RS, CW, HW, MW, SW, UW
Estimated Strength: EW, VW, W, MS, S, VS, ES
Defect Spacing (mm): <20, 20-60, 60-200, 200-600, 600-2000, >2000
RQD
Structure & Other Observations: Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks

Termination Reason: Target Depth Reached.
Shear Vane No: DCP No:
Remarks: Groundwater encountered. Piezometer installed.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

BOREHOLE LOG - MH07-23

Client: Fulton Hogan Land Development Limited
Project: Waterloo Creek Bridge
Site Location: Milldale Stage 10/11
Project No.: AKL2023-0202
Date: 05/09/2023 - 07/09/2023
Borehole Location: WWLA BH03 Logged by: RS Checked by: MJC Scale: 1:50 Sheet 2 of 3

Position: 389547.2mE; 830702.9mN Projection: EDENMT2000 Angle from horizontal: 90°
Elevation: 35.50m Datum: NZVD2016 Survey Source: Handheld GPS

Depth	Type & Results	RL (m)	Depth (m)	Material Description	Consistency/ Relative Density	Recovery	RQD	Drilling Method/ Support	Structure & Other Observations
10.5	SPT = (0,0,2) N* = 2, Recovery = 450mm				S to F	100		SPT	
		24.5	11	Highly weathered, dark greenish grey, massive MUDSTONE: Extremely weak. (Hukerenui Mudstone)		95	100	TT / HQ3	
12.0	SPT = (4,9,13) N* = 22, Recovery = 450mm		12			100	100	SPT	
		23.0		Highly weathered, grey, highly fractured but tightly interlocked SILTSTONE: Very weak. (Mangakahia Complex)		100	100	TT / HQ3	13.2-13.3m:2,SS,60°,UN,S,CL,CN,
13.5	SPT = (10,18,25) N* = 43, Recovery = 300mm		13			67	67	SPT	
			14			100	100	TT / HQ3	
15.0	SPT = (11,20,27) N* = 47, Recovery = 400mm		15			89	89	SPT	
			16			100	100	TT / HQ3	15.7m:1,JN,45°,UN,S,CL,CN,
16.5	SPT = (10,15,23) N* = 38, Recovery = 450mm					71	71	SPT	16.5m:1,JN,45°,UN,S,CL,CN,
			17			100	100	TT / HQ3	17.5m:1,JN,45°,UN,S,CL,CN,
18.0	SPT = (12,19,22) N* = 41, Recovery = 450mm	17.5	18	Highly to completely weathered, grey, massive SILTSTONE: Very weak. (Mangakahia Complex)		71	71	SPT	
			19			100	100	TT / HQ3	
19.5	SPT = (10,14,20) N* = 34, Recovery = 450mm					100	100	SPT	
			20						

Termination Reason: Target Depth Reached.
Shear Vane No: DCP No:

Remarks: Groundwater encountered. Piezometer installed.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

BOREHOLE LOG - MH07-23

Client: Fulton Hogan Land Development Limited
Project: Waterloo Creek Bridge
Site Location: Milldale Stage 10/11
Project No.: AKL2023-0202
Date: 05/09/2023 - 07/09/2023
Borehole Location: WWLA BH03 Logged by: RS Checked by: MJC Scale: 1:50 Sheet 3 of 3
Position: 389547.2mE; 830702.9mN Projection: EDENMT2000 Angle from horizontal: 90°
Elevation: 35.50m Datum: NZVD2016 Survey Source: Handheld GPS

Depth	Type & Results	RL (m)	Depth (m)	Material Description	Recovery	RQD	Drilling Method/ Support	Structure & Other Observations
			21	... from 20.60m to 21.45m, *Becoming with higher clay content.*	73	67	TT / HQ3	20.5m:1,CS,15°,ST,S,CL,CN,
21.0	SPT = (10,16,22) N* = 38, Recovery = 300mm	14.0			67	67	SPT	
			22	Highly weathered, grey, massive, SILTSONE: Very weak. (Mangakahia Complex)	100	100	TT / HQ3	
22.5	SPT = (10,19,28) N* = 47, Recovery = 300mm			Borehole terminated at 22.50 m	67	67	SPT	
			23					
			24					
			25					
			26					
			27					
			28					
			29					
			30					

Termination Reason: Target Depth Reached.
Shear Vane No: DCP No:
Remarks: Groundwater encountered. Piezometer installed.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

PHOTOGRAPH SHEET - MH07-23

Client: Fulton Hogan Land Development Limited
Project: Waterloo Creek Bridge
Location: Milldale Stage 10/11
Project ID: AKL2023-0202
Date:05/09/2023 - 07/09/2023

MH07-23: 0.00m - 2.55m

MH07-23: 2.50m - 5.25m

PHOTOGRAPH SHEET - MH07-23

Client: Fulton Hogan Land Development Limited
Project: Waterloo Creek Bridge
Location: Milldale Stage 10/11
Project ID: AKL2023-0202
Date:05/09/2023 - 07/09/2023

MH07-23: 5.25m - 7.95m

MH07-23: 7.95m - 10.37m

PHOTOGRAPH SHEET - MH07-23

Client: Fulton Hogan Land Development Limited
Project: Waterloo Creek Bridge
Location: Milldale Stage 10/11
Project ID: AKL2023-0202
Date:05/09/2023 - 07/09/2023

MH07-23: 10.37m - 13.05m

MH07-23: 13.05m - 15.45m

PHOTOGRAPH SHEET - MH07-23

Client: Fulton Hogan Land Development Limited
Project: Waterloo Creek Bridge
Location: Milldale Stage 10/11
Project ID: AKL2023-0202
Date:05/09/2023 - 07/09/2023

MH07-23: 15.45m - 18.00m

MH07-23: 18.00m - 20.80m

PHOTOGRAPH SHEET - MH07-23

Client: Fulton Hogan Land Development Limited
Project: Waterloo Creek Bridge
Location: Milldale Stage 10/11
Project ID: AKL2023-0202
Date:05/09/2023 - 07/09/2023

MH07-23: 20.80m - 22.95m

BOREHOLE LOG - MH08-23

Client: Fulton Hogan Land Development Limited
Project: Waterloo Creek Bridge
Site Location: Milldale Stage 10/11
Project No.: AKL2023-0202
Date: 05/09/2023
Borehole Location: WWLA BH04 Logged by: ST Checked by: MJC Scale: 1:50 Sheet 1 of 2
Position: 389064.8mE; 830286.0mN Projection: EDENMT2000 Angle from horizontal: 90°
Elevation: 35.25m Datum: NZVD2016 Survey Source: Handheld GPS

Depth	Type & Results	RL (m)	Depth (m)	Material Description	Moisture Condition	Consistency/ Relative Density	Recovery	RQD	Drilling Method/ Support
		35.2		OL: Organic SILT: with trace gravel. Dark brown. Low plasticity. Some rootlets. (Topsoil)			45		TT / HQ3
		35.1		CL: Clayey SILT: Dark brown, mottled orange brown. Low plasticity. Trace rootlets. (Alluvium)					
		34.9	1	CH: CLAY: Orange brown, streaked light grey and orange. High plasticity. (Mangakahia Complex)	M				
1.5	SPT = (2,3,5) Nc = 8, Recovery = 450mm						1878		SPT
			2			St	48		TT / HQ3
3.0	SPT = (2,2,3) N* = 5, Recovery = 450mm		3	*... from 3.10m to 3.45m, Becoming purplish brown, speckled black. Trace organics.*			89		SPT
				... from 3.65m to 3.75m, Trace organics- decomposing roots.			71		TT / HQ3
			4						
4.5	SPT = (1,2,4) N* = 6, Recovery = 450mm	30.8		CH: Silty CLAY: with minor silt clasts. Grey. High plasticity. (Mangakahia Complex)			100		SPT
			5	*... at 4.50m, Becoming grey, mottled orange brown.*					
		29.8		MH: Clayey SILT: with minor silt clasts. Grey. Low plasticity. (Mangakahia Complex)			81		TT / HQ3
6.0	SPT = (3,2,1) N* = 3, Recovery = 450mm		6	*... from 5.85m to 5.90m, Lens of organic roots.*			100		SPT
				... at 6.45m, Trace fine to medium gravel.is angular. angular.	D to M	F	100		TT / HQ3
			7						
7.5	SPT = (4,7,6) N* = 13, Recovery = 450mm						22		SPT
			8						
		27.1		Highly weathered. Dark grey. SILTSTONE. Extremely weak. Highly fractured, angular, tightly interlocking fabric. Gravel is fine to medium. (Mangakahia Complex)			48	71	TT / HQ3
9.0	SPT = (12,14,15) N* = 29, Recovery = 450mm		9				44		SPT
		25.4		Highly weathered. Greenish grey, mottled light grey. Extremely weak MUDSTONE. (Hukerenui Mudstone)			57	12	TT / HQ3
			10						

Groundwater: 19-09-2023

Termination Reason: Target Depth Reached.
Shear Vane No: DCP No:
Remarks: Groundwater encountered. Piezometer installed.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

BOREHOLE LOG - MH08-23

Client: Fulton Hogan Land Development Limited
Project: Waterloo Creek Bridge
Site Location: Milldale Stage 10/11
Project No.: AKL2023-0202
Date: 05/09/2023
Borehole Location: WWLA BH04 Logged by: ST Checked by: MJC Scale: 1:50 Sheet 2 of 2
Position: 389064.8mE; 830286.0mN Projection: EDENMT2000 Angle from horizontal: 90°
Elevation: 35.25m Datum: NZVD2016 Survey Source: Handheld GPS

Depth	Type & Results	Material Description	Recovery	RQD	Drilling Method/ Support
10.5	SPT = (5,6,9) N* = 15, Recovery = 450mm		80		SPT
11					
		... from 11.50m to 12.60m, Fine to coarse gravel clasts. Angular..	100	100	
12.0	SPT = (18,14,16) N* = 30, Recovery = 450mm		60		SPT
12					
13			77	50	TT / HQ3
13.5	SPT = (6,8,11) N* = 19, Recovery = 450mm		69		SPT
14			77	48	TT / HQ3
15		Borehole terminated at 15.00 m			
16					
17					
18					
19					
20					

Termination Reason: Target Depth Reached.
Shear Vane No: DCP No:
Remarks: Groundwater encountered. Piezometer installed.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

PHOTOGRAPH SHEET - MH08-23

Client: Fulton Hogan Land Development Limited
Project: Waterloo Creek Bridge
Location: Milldale Stage 10/11
Project ID: AKL2023-0202
Date:05/09/2023

MH08-23: 0.00m - 5.35m

MH08-23: 5.35m - 9.75m

PHOTOGRAPH SHEET - MH08-23

Client: Fulton Hogan Land Development Limited
Project: Waterloo Creek Bridge
Location: Milldale Stage 10/11
Project ID: AKL2023-0202
Date:05/09/2023

MH08-23: 9.75m - 14.20m

MH08-23: 14.20m - 15.00m

BOREHOLE LOG - MH01-21

Client: Fulton Hogan Land Development Ltd
Project: Wainui Road, Argent Lane Intersection Upgrade
Site Location: Wainui Road
Project No.: AKL2021-0054
Date: 06/04/2021
Borehole Location: Refer to site plan
Logged by: Alex Adams
Checked by: FYZ
Scale: 1:25
Sheet 1 of 3
Position: 1746627.0mE; 5947543.0mN Projection: NZTM
Angle from horizontal: 90°
Elevation: 49.50m
Datum:
Survey Source: Hand Held GPS

Well	Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description	Moisture Condition	Consistency/ Relative Density	Recovery	Drilling Method/ Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations
				49.5			TOPSOIL.						
				49.3			CLAY with some silt; dark brownish orange mottled grey. High plasticity. (Alluvium)						
							... at 0.70m, ...becoming light grey mottled orange			80	TT / HQ3		
		1.5 1.5	Peak = 55kPa Residual = 15kPa SPT = (1,2,2) N* = 4		1						SPT		
					2		*... at 2.30m, ...becoming light yellowish grey mottled orange*			100	TT / HQ3		
							... at 2.60m, ...becoming dark grey mottled light yellowish grey and orange						
							... at 2.80m, ...becoming dark grey						
		3.0 3.0	SPT = (2,4,5) N* = 9 Peak = UTP		3					56	SPT		
				46.2			Clayey SILT; light greyish blue. Low plasticity. (Northland Allochthon)						
							... at 3.80m, ...becoming light greyish blue mottled dark brownish red			76	TT / HQ3		
					4		*... at 4.00m, ...becoming dark brownish red*						
		4.5 4.5	SPT = (2,4,4) N* = 8 Peak = UTP	45.0			Clayey SILT; light bluish grey mottled dark grey, Irregular fabric, highly fractured. Low plasticity. (Northland Allochthon)			67	SPT		
					5								

Termination Reason: Target depth
Shear Vane No: 2082 DCP No:
Remarks:

BOREHOLE LOG - MH01-21

Client: Fulton Hogan Land Development Ltd
Project: Wainui Road, Argent Lane Intersection Upgrade
Site Location: Wainui Road
Project No.: AKL2021-0054
Date: 06/04/2021
Borehole Location: Refer to site plan
Logged by: Alex Adams
Checked by: FYZ
Scale: 1:25
Sheet 2 of 3
Position: 1746627.0mE; 5947543.0mN Projection: NZTM
Angle from horizontal: 90°
Elevation: 49.50m
Datum:
Survey Source: Hand Held GPS

Well	Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description	Moisture Condition	Consistency/ Relative Density	Recovery	Drilling Method/ Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations
							Clayey SILT; light bluish grey mottled dark grey, Irregular fabric, highly fractured. Low plasticity. (Northland Allochthon)			48	TT / HQ3		
							... from 5.70m to 5.75m, ...dark red stripe						
		6.0	SPT = (2,3,4) N* = 7		6					0	SPT		
							... at 6.45m, ...becoming light greenish grey			100	TT / HQ3		
					7								
				42.4			MUDSTONE;, light greenish grey, Irregular fabric, highly fractured. (Northland Allochthon)						
							... at 7.20m, ...becoming greenish grey						
		7.5	SPT = (3,7,8) N* = 15				*... at 7.50m, ...becoming dark grey*			0	SPT		
					8					86	TT / HQ3		
							... at 8.70m, ...becoming dark grey mottled dark green						
		9.0	SPT = (4,8,11) N* = 19		9		*... at 9.00m, ...becoming dark greenish grey mottled dark brownish red*			0	SPT		
										100	TT / HQ3		
					10		*... at 10.00m, ...becoming dark grey*						

Termination Reason: Target depth
Shear Vane No: 2082 DCP No:
Remarks:

BOREHOLE LOG - MH01-21

Client: Fulton Hogan Land Development Ltd
Project: Wainui Road, Argent Lane Intersection Upgrade
Site Location: Wainui Road
Project No.: AKL2021-0054
Date: 06/04/2021
Borehole Location: Refer to site plan
Logged by: Alex Adams
Checked by: FYZ
Scale: 1:25
Sheet 3 of 3
Position: 1746627.0mE; 5947543.0mN
Projection: NZTM
Angle from horizontal: 90°
Elevation: 49.50m
Datum:
Survey Source: Hand Held GPS

Well	Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description	Moisture Condition	Consistency/ Relative Density	Recovery	Drilling Method/ Support	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations
		10.5	SPT = (10,13,14) N* = 27	39.0	11		MUDSTONE, dark grey. (Northland Allochthon)			0	SPT	5 10 15	Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		12.0	SPT = (7,10,14) N* = 24		12					67	TT / HQ3		
							Borehole terminated at 12.4 m			0	SPT		
					13								
					14								
					15								

Termination Reason: Target depth
Shear Vane No: 2082
DCP No:
Remarks:

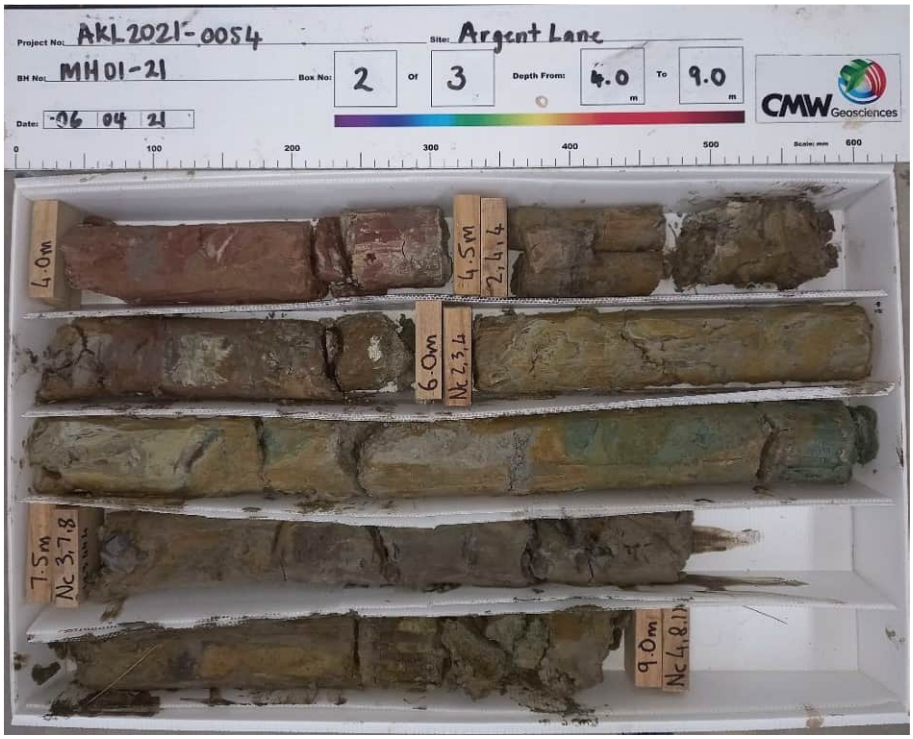
This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

BOREHOLE CORE PHOTOGRAPHS: MH01-21

Client: Fulton Hogan Land Developments Ltd
Project: Wainui Road, Argent Lane Intersection Upgrade
Location: Argent Lane
Project No: AKL2021-0054
Date: 06 April 2021

Logged by: AA
Checked by: CR

MH01-21: 0.0m to 4.0m



MH01-21: 4.0m to 9.0m

MH01-21: 9.0m-12.0m

TEST PIT LOG - TP01-21

Client: Fulton Hogan Land Development Ltd
Project: Wainui Road, Argent Lane Intersection Upgrade
Site Location: Wainui Road
Project No.: AKL2021-0054
Date: 22/04/2021
Test Pit Location: Refer to site plan | Logged by: LSW | Checked by: FYZ | Scale: 1:25 | Sheet 1 of 1
Position: 1746610.0mE; 5947401.0mN Projection: NZTM | Pit Dimensions: 2.5m by 3.5m
Elevation: 40.00m | Datum: AUCKHT1946 | Survey Source: Hand Held GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description	Moisture Condition	Consistency/ Relative Density	Dynamic Cone Penetrometer (Blows/100mm) 5 10 15 20	Structure & Other Observations
			40.0			OL: TOPSOIL: brown.	M			
			39.7			CH: Silty CLAY: light orange mottled orange, high plasticity, sensitive. (Alluvium)				
	0.5	Peak = 126kPa Residual = 19kPa						VSt		
	1.0	Peak = 35kPa Residual = 29kPa	39.0	1		ML: Clayey SILT: light grey mottled orange, low plasticity, insensitive to moderately sensitive. (Alluvium)		F		
	1.5	Peak = 96kPa Residual = 48kPa					M to W	St		
	2.0	Peak = 134kPa Residual = 51kPa		2						
						... at 2.40m, Partially decomposed tree root approximately 75mm diameter.				
	2.5	Peak = 147kPa Residual = 62kPa						VSt		
	3.0	Peak = UTP	37.0	3		MUDSTONE : bluish grey. Completely weathered to clayey SILT with trace fine sand. Low plasticity. (Northland Allochthon)	M	H		
	3.4	Peak = UTP				Test pit terminated at 3.40 m				
				4						
				5						

Termination Reason: Refusal on hard ground
Shear Vane No: 1620 DCP No:

Remarks: No groundwater encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

TEST PIT LOG - TP02-21

Client: Fulton Hogan Land Development Ltd
Project: Wainui Road, Argent Lane Intersection Upgrade
Site Location: Wainui Road
Project No.: AKL2021-0054
Date: 22/04/2021
Test Pit Location: Refer to site plan | Logged by: LSW | Checked by: FYZ | Scale: 1:25 | Sheet 1 of 1
Position: 1746664.0mE; 5947418.0mN Projection: NZTM | Pit Dimensions: 2.5m by 3.0m
Elevation: 35.60m | Datum: AUCKHT1946 | Survey Source: Hand Held GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description	Moisture Condition	Consistency/ Relative Density	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations
			35.6			OL: TOPSOIL: brown.	M			
			35.3			CH: Silty CLAY: orange mottled light grey, high plasticity, moderately sensitive to insensitive. (Alluvium)				
	0.5	Peak = 62kPa Residual = 27kPa						St		
	1.0	Peak = 67kPa Residual = 40kPa		1		... *at 1.00m, Becoming light grey*	M			
	1.5	Peak = 78kPa Residual = 37kPa	34.1			ML: Clayey SILT: light grey mottled orange, low plasticity, moderately sensitive. (Alluvium)				
	1.8	Peak = 136kPa Residual = 43kPa						VSt		
	2.0	Peak = 43kPa Residual = 21kPa	33.6	2		CH: CLAY minor silt: dark grey, high plasticity, moderately sensitive. (Alluvium)	M to W	F		
	2.4	Peak = UTP	33.3			MUDSTONE: light bluish grey. Completely weathered to clayey SILT with trace fine sand. Low plasticity. (Northland Allochthon)		H		
	3.0	Peak = UTP		3		Test pit terminated at 3.00 m				
				4						
				5						

Termination Reason: Refusal on hard ground
Shear Vane No: 1620 DCP No:

Remarks: No groundwater encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

TEST PIT LOG - TP03-21

Client: Fulton Hogan Land Development Ltd
Project: Wainui Road, Argent Lane Intersection Upgrade
Site Location: Wainui Road
Project No.: AKL2021-0054
Date: 22/04/2021
Test Pit Location: Refer to site plan | Logged by: LSW | Checked by: FYZ | Scale: 1:25 | Sheet 1 of 1
Position: 1746604.0mE; 5947435.0mN Projection: NZTM | Pit Dimensions: 3.0m by 3.6m
Elevation: 44.90m | Datum: AUCKHT1946 | Survey Source: Hand Held GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description (Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit))	Moisture Condition	Consistency/ Relative Density	Dynamic Cone Penetrometer (Blows/100mm) 5 10 15 20	Structure & Other Observations (Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks)
			44.9			OL: TOPSOIL: brown.	M			
			44.7			ML: Clayey SILT: orange mottled light grey, low plasticity. (Alluvium)				
	0.5	Peak = 67kPa Residual = 21kPa					D to M			
	1.0	Peak = 78kPa Residual = 43kPa	43.9	1		ML: Clayey SILT: light grey mottled orange, low plasticity. (Alluvium)				
	1.5	Peak = 67kPa Residual = 32kPa					M to W	St		
	2.0	Peak = 99kPa Residual = 27kPa	42.9	2		ML: Clayey SILT: light grey mottled red-brown, orange and brown. Low plasticity. (Alluvium)				
	2.5	Peak = 91kPa Residual = 35kPa					M			
						... at 2.70m, Becoming reddish brown				
	3.0	Peak = 187+	41.9	3		MUDSTONE: bluish grey mottled light grey streaked reddish brown. Completely weathered to clayey SILT. Low plasticity. (Northland Allochthon)				
	3.5	Peak = UTP						H		
	4.0	Peak = UTP		4		Test pit terminated at 4.00 m				
				5						

Termination Reason: Refusal on hard ground
Shear Vane No: 1620 DCP No:

Remarks: No groundwater encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

TEST PIT LOG - TP04-21

Client: Fulton Hogan Land Development Ltd
Project: Wainui Road, Argent Lane Intersection Upgrade
Site Location: Wainui Road
Project No.: AKL2021-0054
Date: 22/04/2021
Test Pit Location: Refer to site plan | Logged by: LSW | Checked by: FYZ | Scale: 1:25 | Sheet 1 of 1
Position: 1746588.0mE; 5947477.0mN Projection: NZTM | Pit Dimensions: 3.0m by 3.0m
Elevation: 52.80m | Datum: AUCKHT1946 | Survey Source: Hand Held GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description	Moisture Condition	Consistency/ Relative Density	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations
			52.8			OL: TOPSOIL: brown.				
			52.7			ML: Clayey SILT : orange-brown, low plasticity, moderately sensitive. (Alluvium)				
	0.5	Peak = 182kPa Residual = 64kPa	52.3			CH: Silty CLAY: orange, high plasticity, insensitive to moderately sensitive. (Alluvium)	M	VSt		
	1.0	Peak = 128kPa Residual = 51kPa		1		... *at 1.00m, Becoming light grey mottled orange*				
	1.5	Peak = 99kPa Residual = 59kPa	51.3			ML: Clayey SILT: light grey mottled orange, low plasticity, moderately sensitive to sensitive. (Alluvium)		St		
	2.0	Peak = 118kPa Residual = 43kPa		2				VSt		
	2.5	Peak = 75kPa Residual = 37kPa					M to W	St		
	3.0	Peak = 142kPa Residual = 48kPa		3						
	3.5	Peak = 163kPa Residual = 32kPa						VSt		
			48.8	4		ML: Clayey SILT: light bluish grey, low plasticity. Limonite staining. (Northland Allochthon)	M	H		
				5		Test pit terminated at 5.00 m				

Termination Reason: Maximum Reach of Excavator
Shear Vane No: 1620 DCP No:

Remarks: No groundwater encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

TEST PIT LOG - TP05-21

Client: Fulton Hogan Land Development Ltd
Project: Wainui Road, Argent Lane Intersection Upgrade
Site Location: Wainui Road
Project No.: AKL2021-0054
Date: 22/04/2021
Test Pit Location: Refer to site plan | Logged by: LSW | Checked by: FYZ | Scale: 1:25 | Sheet 1 of 1
Position: 1746591.0mE; 5947587.0mN Projection: NZTM | Pit Dimensions: 2.5m by 2.5m
Elevation: 44.50m | Datum: AUCKHT1946 | Survey Source: Hand Held GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description	Moisture Condition	Consistency/ Relative Density	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations
			44.5			OL: TOPSOIL: brown.				
			44.3			ML: Clayey SILT: orange-brown, low plasticity, insensitive. (Alluvium)	M			
	0.5	Peak = 78kPa Residual = 40kPa								
			43.9			ML: SILT minor clay: grey, low plasticity, insensitive. (Alluvium)		St		
	1.0	Peak = 67kPa Residual = 35kPa		1			M to W			
			42.9			MUDSTONE: light grey mottled orange and grey. Completely weathered to sandy SILT with minor clay. Low plasticity. Sand is fine to medium grained. (Northland Allochthon)		H		
				2		Test pit terminated at 2.20 m				
				3						
				4						
				5						

Dynamic Cone Penetrometer (Blows/100mm): 5 10 15 20

Structure & Other Observations: Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks

Termination Reason: Refusal on Hard Ground
Shear Vane No: 1620 DCP No:

Remarks: No groundwater encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

TEST PIT LOG - TP06-21

Client: Fulton Hogan Land Development Ltd
Project: Wainui Road, Argent Lane Intersection Upgrade
Site Location: Wainui Road
Project No.: AKL2021-0054
Date: 22/04/2021
Test Pit Location: Refer to site plan | Logged by: LSW | Checked by: FYZ | Scale: 1:25 | Sheet 1 of 2
Position: 1746701.0mE; 5947618.0mN Projection: NZTM | Pit Dimensions: 3.0m by 3.5m
Elevation: 46.80m | Datum: AUCKHT1946 | Survey Source: Hand Held GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description	Moisture Condition	Consistency/ Relative Density	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations
			46.8			OL: TOPSOIL: brown.			5 10 15 20	Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
			46.6			CL: Silty CLAY: orange mottled light grey, low plasticity, insensitive to sensitive. (Alluvium)				
	0.5	Peak = 158kPa Residual = 35kPa	46.2			CH: CLAY minor silt: light grey, high plasticity, insensitive to moderately sensitive. (Alluvium)				
						... from 0.60m to 1.50m, Trace organics				
	1.0	Peak = 147kPa Residual = 75kPa		1						
	1.5	Peak = 118kPa Residual = 32kPa						VSt		
	2.0	Peak = 120kPa Residual = 48kPa		2						
	2.5	Peak = 110kPa Residual = 80kPa					M			
	3.0	Peak = 94kPa Residual = 83kPa		3						
				4		*... at 4.00m, becoming light greenish grey*		St to VSt		
				5						

Termination Reason: Maximum Reach of Excavator
Shear Vane No: 1620 DCP No:

Remarks: No groundwater encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

TEST PIT LOG - TP06-21

Client: Fulton Hogan Land Development Ltd
Project: Wainui Road, Argent Lane Intersection Upgrade
Site Location: Wainui Road
Project No.: AKL2021-0054
Date: 22/04/2021
Test Pit Location: Refer to site plan | Logged by: LSW | Checked by: FYZ | Scale: 1:25 | Sheet 2 of 2
Position: 1746701.0mE; 5947618.0mN Projection: NZTM | Pit Dimensions: 3.0m by 3.5m
Elevation: 46.80m | Datum: AUCKHT1946 | Survey Source: Hand Held GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description (Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit))	Moisture Condition	Consistency/ Relative Density	Dynamic Cone Penetrometer (Blows/100mm) 5 10 15 20	Structure & Other Observations (Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks)
						Test pit terminated at 5.60 m				

Termination Reason: Maximum Reach of Excavator
Shear Vane No: 1620 DCP No:

Remarks: No groundwater encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

TEST PIT LOG - TP07-21

Client: Fulton Hogan Land Development Ltd
Project: Wainui Road, Argent Lane Intersection Upgrade
Site Location: Wainui Road
Project No.: AKL2021-0054
Date: 22/04/2021
Test Pit Location: Refer to site plan | Logged by: LSW | Checked by: FYZ | Scale: 1:25 | Sheet 1 of 1
Position: 1746507.0mE; 5947586.0mN Projection: NZTM | Pit Dimensions: 3.0m by 3.5m
Elevation: 40.70m | Datum: AUCKHT1946 | Survey Source: Hand Held GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description (Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit))	Moisture Condition	Consistency/ Relative Density	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations (Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks)
			40.7			OL: TOPSOIL: brown.	M			
			40.4			ML: Clayey SILT : orange mottled light grey, low plasticity, moderately sensitive. (Alluvium)		VSt		
	0.5	Peak = 107kPa Residual = 35kPa								
			39.9			CH: Silty CLAY: light grey mottled orange, high plasticity, moderately sensitive. (Alluvium)				
	1.0	Peak = 53kPa Residual = 32kPa		1						
	1.5	Peak = 94kPa Residual = 40kPa					M to W			
				2				St		
	2.5	Peak = 56kPa Residual = 43kPa								
	3.0	Peak = 96kPa Residual = 29kPa		3						
			37.1			MUDSTONE: grey. Completely weathered to clayey SILT. Limonite staining. Low plasticity. (Northland Allochthon)				
	4.0	Peak = 198+		4			M	H		
						Test pit terminated at 4.70 m				
				5						

Termination Reason: Refusal on Hard Ground
Shear Vane No: 1620 DCP No:

Remarks: No groundwater encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

BOREHOLE LOG - MH01-22

Client: Fulton Hogan Land Development Ltd
Project: Precinct 3, Argent Lane
Site Location: Milldale
Project No.: AKL2022-0138
Date: 01/09/2022
Borehole Location: Refer to Site Plan Logged by: DW Checked by: MC Scale: 1:50 Sheet 1 of 2

CMW Geosciences

Position: 389206.2mE; 829646.2mN Projection: EDENTM2000
Elevation: 44.45m Datum: AUCKHT1946 Survey Source: Hicks Survey

Depth	Type & Results	RL (m)	Depth (m)	Material Description	Moisture Condition	Consistency/ Relative Density	Recovery	RQD	Drilling Method/ Support	Structure & Other Observations
		44.4		TOPSOIL: Dark brown. Silty.						
		44.2		CH: FILL: Dark brown mottled light brown. Silty CLAY. High plasticity, with minor large gravel. (Fill)	M		100	0	TT / HQ3	
		42.8	1	ML: Clayey SILT: Light brown. Blocky. Low plasticity. with minor sand. (RS Northland Allochthon)						
			2	*... from 2.10m to 2.20m, Becoming dark orange - Likely limonite staining*	W to S	VSt	40	0		
		41.6								
3.0	SPT = (4,7,7) N* = 14		3	MH: Clayey SILT: Dark blue-grey. Blocky. Low plasticity. Transitional layer breaking into silt with small gravel sized silt clasts (RS Northland Allochthon)	M				SPT	
							40	0	TT / HQ3	
		40.2	4							
4.5	SPT = (6,9,13) N* = 22		5	Completely weathered. Dark blue-grey. MUDSTONE. Fine Fabric. Clay on fractured edges. Soil description as follows. Dark blue-grey. Low plasticity. Blocky. Moist. with hard angular silt clasts Small to large gravel sized. (Transitional Northland Allochthon)					SPT	
							90	0	TT / HQ3	
6.0	SPT = (11,13,14) N* = 27		6						SPT	
			7				60	0	TT / HQ3	
7.5	SPT = (8,12,11) N* = 23								SPT	
			8		W to S		30	0	TT / HQ3	
9.0	SPT = (8,12,15) N* = 27		9		M				SPT	
							70	0	TT / HQ3	
			10							10.0m:CS,UN,IF,S,Ta,

Termination Reason: Target Depth Reached.
Shear Vane No: DCP No:
Remarks: Groundwater encountered at 0.2m

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

BOREHOLE LOG - MH01-22

Client: Fulton Hogan Land Development Ltd
Project: Precinct 3, Argent Lane
Site Location: Milldale
Project No.: AKL2022-0138
Date: 01/09/2022
Borehole Location: Refer to Site Plan Logged by: DW Checked by: MC Scale: 1:50 Sheet 2 of 2
Position: 389206.2mE; 829646.2mN Projection: EDENTM2000
Elevation: 44.45m Datum: AUCKHT1946 Survey Source: Hicks Survey

Well	Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description	Moisture Condition	Consistency/ Relative Density	Weathering: RS CW HW MW SW UW	Recovery	RQD	Estimated Strength: EW VW W MS S VS ES	Defect Spacing (mm): <20 20-60 60-200 200-600 600-2000 >2000	Drilling Method/ Support	Structure & Other Observations
		10.5	SPT = (7,9,11) N* = 20		11			M to W			60	0			SPT	
															TT / HQ3	11.8m:JN,ST,IF,S,Ta,
		12.0	SPT = (10,13,15) N* = 28		12										SPT	
					13			M			50	0			TT / HQ3	
							Borehole terminated at 13.50 m									
					14											
					15											
					16											
					17											
					18											
					19											
					20											

Termination Reason: Target Depth Reached.
Shear Vane No: DCP No:
Remarks: Groundwater encountered at 0.2m

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

PHOTOGRAPH SHEET - MH01-22

Client: Fulton Hogan Land Development Ltd
Project: Precinct 3, Argent Lane
Location: Milldale
Project ID: AKL2022-0138
Date: 01/09/2022
Investigation Location: Refer to Site Plan

0.0m- 4.95m

4.95m -9.75m

PHOTOGRAPH SHEET - MH01-22

Client: Fulton Hogan Land Development Ltd
Project: Precinct 3, Argent Lane
Location: Milldale
Project ID: AKL2022-0138
Date: 01/09/2022
Investigation Location: Refer to Site Plan

9.75m -13.5m

BOREHOLE LOG - MH02-22

Client: Fulton Hogan Land Development Ltd
Project: Precinct 3, Argent Lane
Site Location: Milldale
Project No.: AKL2022-0138
Date: 05/09/2022
Borehole Location: Refer to Site Plan Logged by: PH Checked by: MC Scale: 1:50 Sheet 1 of 2

CMW Geosciences

Position: 389095.4mE; 829613.9mN Projection: EDENTM2000
Elevation: 54.46m Datum: AUCKHT1946 Survey Source: Hicks Survey

Depth	Type & Results	RL (m)	Material Description	Recovery	RQD	Drilling Method/ Support
		54.5	OL: TOPSOIL: Brown. Low plasticity.			
		54.3	CH: Silty CLAY: Light orange brown mottled orange. High plasticity. Minor limonite staining. (RS Northland Allochthon)	100	0	TT / HQ3
1.5	SPT = (6,6,8) N* = 14	53.0	Completely weathered orange brown SILTSTONE. Extremely weak. Weathered to clayey SILT with limonite coated, large gravel sized silt clasts.: (Transitional Northland Allochthon)	100	0	SPT
		52.5	Completely weathered grey SILTSTONE. Extremely weak. Recovered as small to large gravel sized silt clasts.: (Transitional Northland Allochthon)	100	0	TT / HQ3
3.0	SPT = (3,7,8) N* = 15		*... from 2.50m to 2.70m, Layer of highly weathered SILTSTONE*	100	0	SPT
		51.0	Highly weathered grey SILTSTONE. Extremely weak. Sheared structure. : (Mangakahia Complex)	86	28	TT / HQ3
4.5	SPT = (8,10,22) N* = 32			100	0	SPT
				48	38	TT / HQ3
6.0	SPT = (5,11,12) N* = 23		*... at 6.00m, Becoming with bluish grey silt clasts*	100	0	SPT
				100	22	TT / HQ3
7.5	SPT = (7,10,12) N* = 22			100	0	SPT
				100	0	TT / HQ3
9.0	SPT = (10,14,15) N* = 29			100	0	SPT
				72	74	TT / HQ3

Estimated Strength: EW, VW, W, MS, S, VS, ES
Defect Spacing (mm): <20, 20-60, 60-200, 200-600, 600-2000, >2000
Weathering: RS, CW, HW, MW, SW, UW
Moisture Condition; Consistency/ Relative Density
Structure & Other Observations: Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks

Termination Reason: Target Depth Reached.
Shear Vane No: DCP No:
Remarks: Groundwater encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

BOREHOLE LOG - MH02-22

Client: Fulton Hogan Land Development Ltd
Project: Precinct 3, Argent Lane
Site Location: Milldale
Project No.: AKL2022-0138
Date: 05/09/2022
Borehole Location: Refer to Site Plan Logged by: PH Checked by: MC Scale: 1:50 Sheet 2 of 2

Position: 389095.4mE; 829613.9mN Projection: EDENTM2000
Elevation: 54.46m Datum: AUCKHT1946 Survey Source: Hicks Survey

Depth	Type & Results	RL (m)	Depth (m)	Material Description	Recovery	RQD	Drilling Method/ Support
10.5	SPT = (11,16,20) N* = 36		11		100	90	SPT
					100	12	TT / HQ3
12.0	SPT = (15,20,26) N* = 46		12		100	40	SPT
		42.0		Completely weathered to highly weathered grey SILTSTONE. Extremely weak. Sheared structure. Recovered as large angular gravel and angular cobbles. : (Mangakahia Complex)	100	0	TT / HQ3
13.5	SPT = (12,21,29/135mm) N* = 50+		13				SPT
			14		100	19	TT / HQ3
15.0	SPT = (16,30,20/75mm) N* = 50+		15				SPT
			16		63	0	TT / HQ3
		38.2		Completely weathered grey SILTSTONE. Extremely weak. Recovered as clayey SILT. Low plasticity. Some large gravel to cobble sized angular silt blocks. Random orientated fractured structure.: (Mangakahia Complex)			
16.5	SPT = (9,18,27) N* = 45	38.0		ML: Sandy and gravelly SILT: Grey. Low plasticity. Derived from completely weathered to highly weathered SILTSTONE. (Mangakahia Complex)			SPT
			17		51	0	TT / HQ3
		36.6		Completely weathered grey SILTSTONE. Extremely weak. Recovered as clayey SILT with some large gravel to cobble sized silt blocks. Sheared structure. : (Mangakahia Complex)			
18.0	SPT = (19,31,19/65mm) N* = 50+		18				SPT
		36.1		Highly weathered grey SILTSTONE. Extremely weak. Sheared structure. Partially recovered as angular fractured blocks. : (Mangakahia Complex)			
			19		84	26	TT / HQ3
		35.4		Completely to highly weathered grey SILTSTONE. Extremely weak. Sheared structure. : (Mangakahia Complex)			
19.5	SPT = (11,22,28/135mm) N* = 50+						SPT
			20	Borehole terminated at 19.90 m			

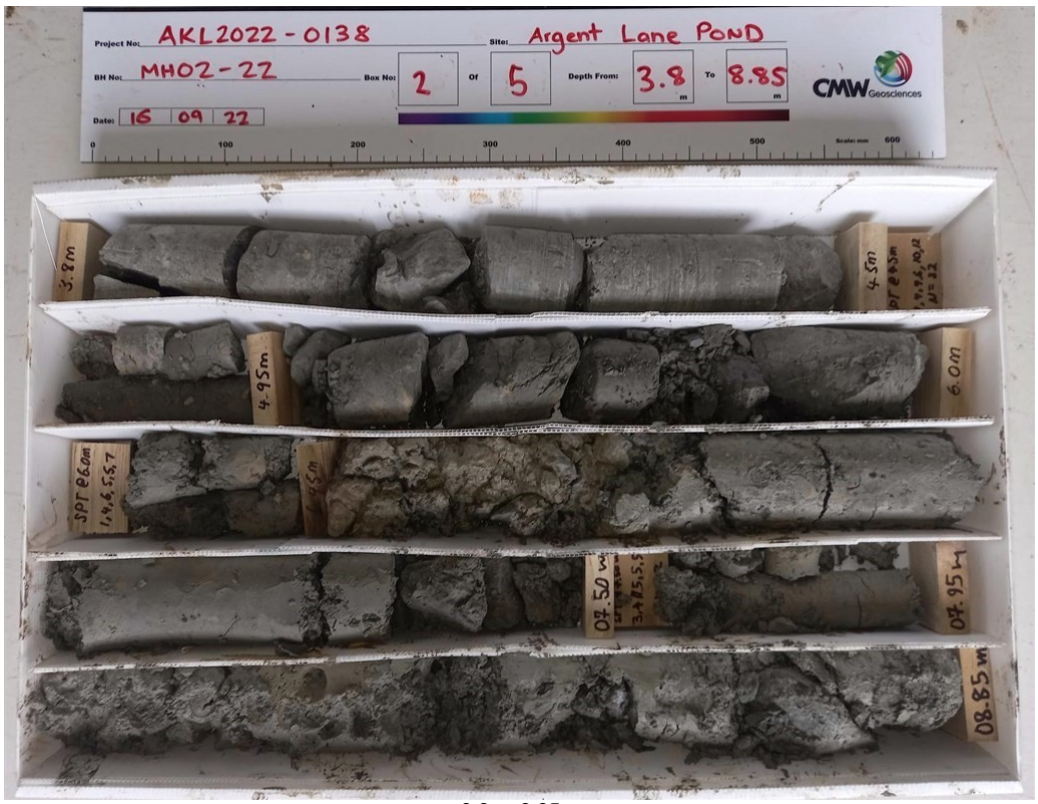
Termination Reason: Target Depth Reached.
Shear Vane No: DCP No:
Remarks: Groundwater encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

PHOTOGRAPH SHEET - MH02-22

Client: Fulton Hogan Land Development Ltd
Project: Precinct 3, Argent Lane
Location: Milldale
Project ID: AKL2022-0138
Date: 05/09/2022
Investigation Location: Refer to Site Plan

0.0m- 3.8m



3.8m- 8.85m

PHOTOGRAPH SHEET - MH02-22

Client: Fulton Hogan Land Development Ltd
Project: Precinct 3, Argent Lane
Location: Milldale
Project ID: AKL2022-0138
Date: 05/09/2022
Investigation Location: Refer to Site Plan

8.85m- 12.6m

12.6m- 17.2m

PHOTOGRAPH SHEET - MH02-22

Client: Fulton Hogan Land Development Ltd
Project: Precinct 3, Argent Lane
Location: Milldale
Project ID: AKL2022-0138
Date: 05/09/2022
Investigation Location: Refer to Site Plan

17.2m- 19.5m

BOREHOLE LOG - MH03-22

Client: Fulton Hogan Land Development Ltd
Project: Precinct 3, Argent Lane
Site Location: Milldale
Project No.: AKL2022-0138
Date: 29/08/2022
Borehole Location: Refer to Site Plan Logged by: DW Checked by: MC Scale: 1:50 Sheet 1 of 2
Position: 389144.3mE; 829540.0mN Projection: EDENTM2000
Elevation: 44.95m Datum: AUCKHT1946 Survey Source: Hicks Survey

Depth	Type & Results	RL (m)	Depth (m)	Material Description	Recovery	RQD	Drilling Method/ Support	Structure & Other Observations
		45.0		Limestone: Highly weathered. light grey streaked white. Fine Fabric. Highly fractured, Angular large gravel to cobble size blocks. Limonite oxidation on blocks. (Northland Allochthon)	45	0	TT / HQ3	
		44.0	1	Limestone: Highly weathered. light grey streaked dark grey. Fine Fabric. Randomly orientated micro fractures and randomly orientated mudstone seams. fractures into angular jagged large gravel to cobble size (Northland Allochthon)	60	0		
1.5	SPT = (50/75mm) Nc = 50+						SPT	
			2		83	0	TT / HQ3	
					83	0		2.5m:1,SS,35°,PL,S,CL,IF, (CL),
3.0	SPT = (36,14/30mm) Nc = 50+		3		33	0	SPT	
					80	0	TT / HQ3	
			4		100	0		
					100	0		
4.5	SPT = (19,31/25mm) Nc = 50+			... at 4.50m, Becoming with hard light grey sub-angular large gravel sized limestone clasts			SPT	
			5		80	0		4.9-5.0m:2,CS,0°,UN,S,CL,IF, (CL),
					47	0		
			6		65	0		
			7				TT / HQ3	
		37.4		Mudstone : Highly weathered. Dark blue-grey mottled light grey. with hard angular large gravel to cobble size limestone clasts. clayey surface on cracks, randomly orientated micro fractures throughout. (Northland Allochthon)	70	0		
		36.7	8	... from 7.75m to 7.85m, Becoming with angular large gravel sized muddy limestone clasts in a sub horizontal clayey seam				8.5m:3,SS,25°,PL,S,CL,IF, (CL),
			9	Limestone: Moderately weathered. Light blue-grey streaked dark grey. Fine Fabric. Randomly orientated mudstone seams and randomly orientated micro fractures throughout.	80	60		
			10	(Northland Allochthon)				

Termination Reason: Target Depth Reached.
Shear Vane No: DCP No:
Remarks: Groundwater encountered at 1.27m

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

BOREHOLE LOG - MH03-22

Client: Fulton Hogan Land Development Ltd
Project: Precinct 3, Argent Lane
Site Location: Milldale
Project No.: AKL2022-0138
Date: 29/08/2022
Borehole Location: Refer to Site Plan Logged by: DW Checked by: MC Scale: 1:50 Sheet 2 of 2
Position: 389144.3mE; 829540.0mN Projection: EDENTM2000
Elevation: 44.95m Datum: AUCKHT1946 Survey Source: Hicks Survey

Depth (m)	Material Description	Recovery	RQD	Structure & Other Observations
11		90	70	11.1m:4,JN,25°,ST,S,CL,IF,(CL),
12				11.8m:5,SS,25°,PL,S,CL,IF,(CL),
13		90	65	
14	Borehole terminated at 14.00 m	90	75	
15				
16				
17				
18				
19				
20				

Termination Reason: Target Depth Reached.
Shear Vane No: DCP No:
Remarks: Groundwater encountered at 1.27m

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

PHOTOGRAPH SHEET - MH03-22

Client: Fulton Hogan Land Development Ltd
Project: Precinct 3, Argent Lane
Location: Milldale
Project ID: AKL2022-0138
Date: 29/08/2022
Investigation Location: Refer to Site Plan

0.0m- 4.1m

4.1m- 7.75m

PHOTOGRAPH SHEET - MH03-22

Client: Fulton Hogan Land Development Ltd
Project: Precinct 3, Argent Lane
Location: Milldale
Project ID: AKL2022-0138
Date: 29/08/2022
Investigation Location: Refer to Site Plan

7.75m- 10.75m

10.75m- 13.5m

PHOTOGRAPH SHEET - MH03-22

Client: Fulton Hogan Land Development Ltd
Project: Precinct 3, Argent Lane
Location: Milldale
Project ID: AKL2022-0138
Date: 29/08/2022
Investigation Location: Refer to Site Plan

13.5m-14.0m

BOREHOLE LOG - MH04-22

Client: Fulton Hogan Land Development Ltd
Project: Precinct 3, Argent Lane
Site Location: Milldale
Project No.: AKL2022-0138
Date: 23/09/2022
Borehole Location: Refer to Site Plan Logged by: PH Checked by: MC Scale: 1:50 Sheet 1 of 2
Position: 389256.1mE; 829446.6mN Projection: EDENTM2000
Elevation: 61.09m Datum: AUCKHT1946 Survey Source: Hicks Survey

Depth	Type & Results	RL (m)	Depth (m)	Material Description	Moisture Condition	Consistency/ Relative Density	Recovery	RQD	Drilling Method/ Support
		61.1		OL: TOPSOIL: Brown. Low plasticity. Minor rootlets.					
		61.0		ML: Clayey SILT: Light orange brown. Low plasticity. Blocky structure. Minor rootlets. (RS Northland Allochthon)			73	0	TT / HQ3
1.5	SPT = (3,3,4) N* = 7		1				100	0	SPT
		58.9	2	ML: Clayey SILT: Dark brownish grey. Low plasticity. Sheared structure. Some fine to large gravel sized sub angular silt clasts present. Glossy surfaces on clast face. (RS Northland Allochthon)			90	0	TT / HQ3
3.0	SPT = (2,6,8) N* = 14		3				100	0	
			4				83	0	SPT
4.5	SPT = (10,14,20) N* = 34						100	0	TT / HQ3
			5		M to W	St to VSt	100	0	SPT
6.0	SPT = (7,12,16) N* = 28		6				100	0	TT / HQ3
			7				100	0	SPT
7.5	SPT = (9,19,25) N* = 44		8				100	0	TT / HQ3
		52.2	9	Completely weathered grey SILTSTONE. Extremely weak. Fractured structure. Fractures into large gravel to cobble sized silt blocks.: (Mangakahia Complex)			80	70	SPT
9.0	SPT = (9,24,18) N* = 42						90	78	TT / HQ3
			10						

Termination Reason: Target Depth Reached.
Shear Vane No: DCP No:
Remarks: Groundwater encountered at 1.2m

BOREHOLE LOG - MH04-22

Client: Fulton Hogan Land Development Ltd
Project: Precinct 3, Argent Lane
Site Location: Milldale
Project No.: AKL2022-0138
Date: 23/09/2022
Borehole Location: Refer to Site Plan Logged by: PH Checked by: MC Scale: 1:50 Sheet 2 of 2

CMW Geosciences

Position: 389256.1mE; 829446.6mN Projection: EDENTM2000
Elevation: 61.09m Datum: AUCKHT1946 Survey Source: Hicks Survey

Depth	Type & Results	RL (m)	Depth (m)	Material Description	Recovery	RQD	Drilling Method/ Support	Structure & Other Observations
10.5	SPT = (9,15,21) N* = 36				80	0	SPT	
		50.1	11	Completely to highly weathered grey SILTSTONE. Extremely weak. Sheared structure. Shatters into small to medium gravel sized angular silt clasts. : (Mangakahia Complex)	100	84	TT / HQ3	11.2m:1,CS,30°,UN,R,CL,CO,(CL), 11.3m:1,IS,10°,ST,R,CL,IF,(SP), 11.6-11.8m:2,JN,25°,ST,R,CL,CN,
12.0	SPT = (7,14,18) N* = 32		12		100	40	SPT	
		48.1	13	Completely weathered grey SILTSTONE. Extremely weak. Blocky structure. Recovered as clayey SILT. High plasticity. Some small to large gravel sized silt clasts. : (Mangakahia Complex)	100	85	TT / HQ3	12.7-13.2m:3,CS,15°,(GP),
13.5	SPT = (32,50,/125mm) N* = 50+				100	0	SPT	
			14		100	72	TT / HQ3	
15.0	SPT = (14,36,14/45mm) N* = 50+		15				SPT	
			16		100	60	TT / HQ3	
16.5	SPT = (27,50/115mm) N* = 50+						SPT	
			17	*... from 16.80m to 17.20m, Becoming with some bluish grey mottles*				
		43.8		Highly weathered to moderately weathered grey and light grey LIMESTONE. Weak. Randomly orientated limestone seams. Some minor layers of completely weathered siltstone throughout with clay seams. Mostly recovering as large gravel to cobble sized limestone sub angular blocks.: (Northland Allochthon)	100	50	TT / HQ3	
18.0	SPT = (50/85mm) N* = 50+		18				SPT	
			19		45	0	TT / HQ3	
19.5	SPT = (50/85mm) N* = 50+						SPT	
				Borehole terminated at 19.50 m				
			20					

Termination Reason: Target Depth Reached.
Shear Vane No: DCP No:
Remarks: Groundwater encountered at 1.2m

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 3 - April 2018.

PHOTOGRAPH SHEET - MH04-22

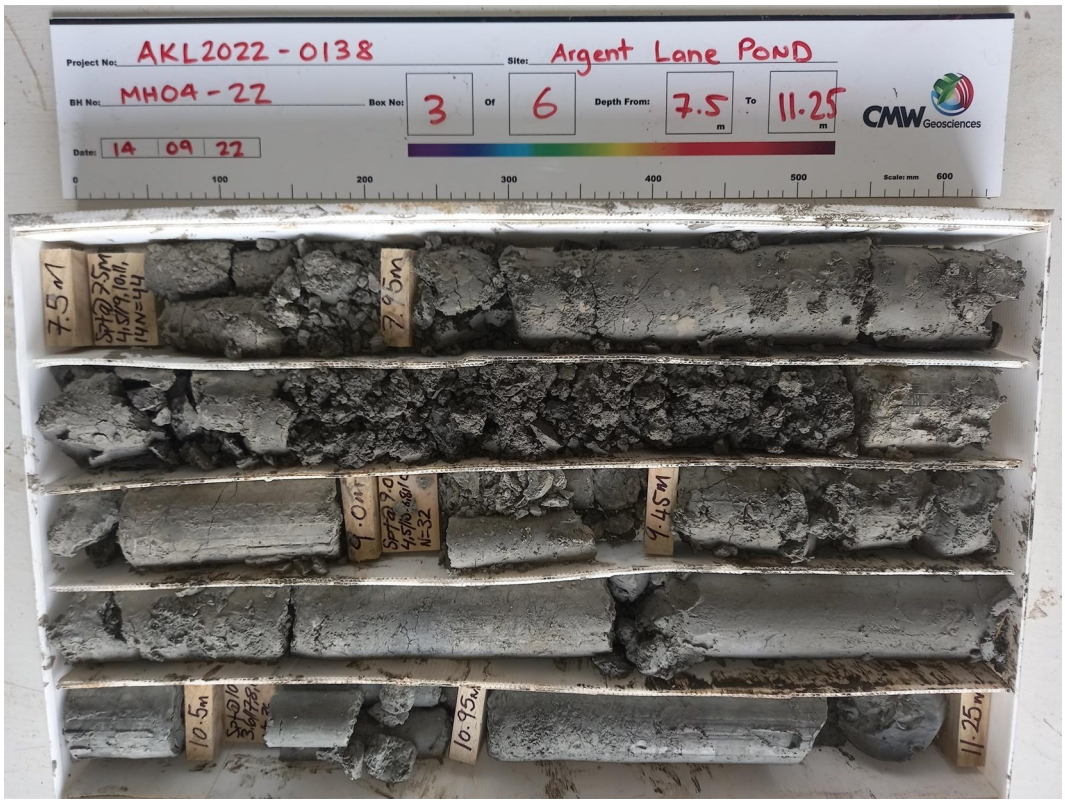
Client: Fulton Hogan Land Development Ltd
Project: Precinct 3, Argent Lane
Location: Milldale
Project ID: AKL2022-0138
Date: 23/09/2022
Investigation Location: Refer to Site Plan

0.0m- 4.05m

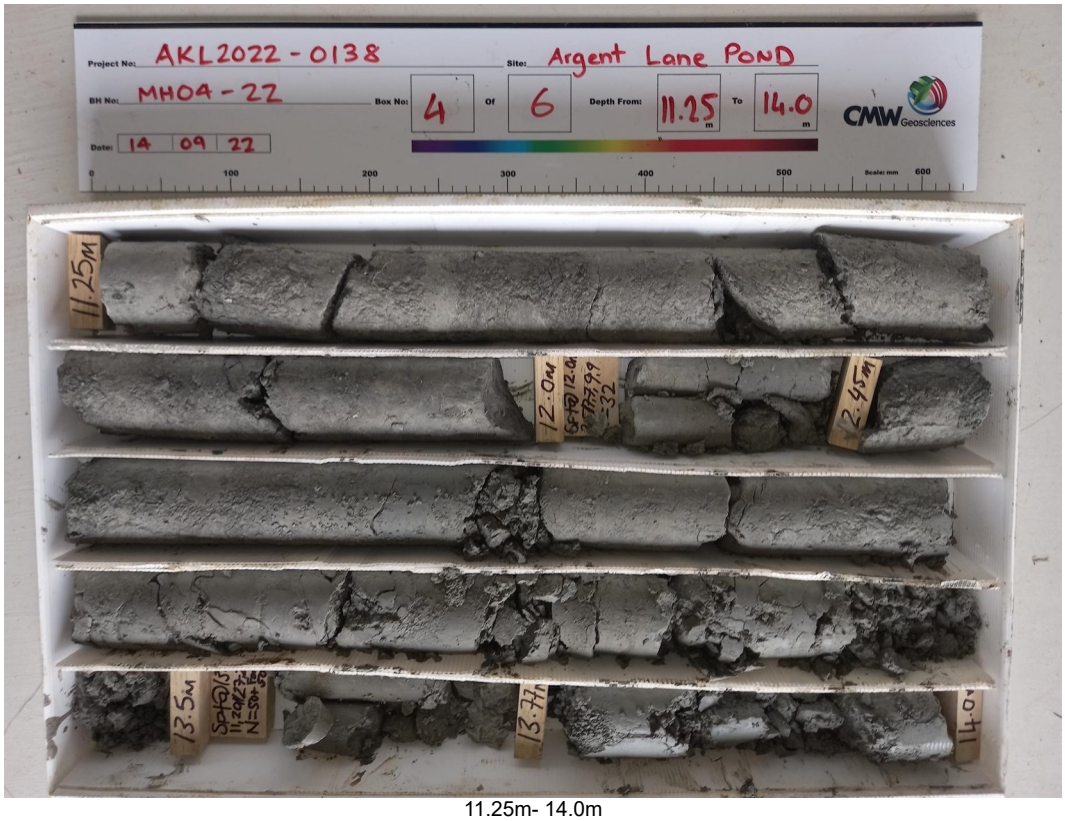
4.05m- 7.5m

PHOTOGRAPH SHEET - MH04-22

Client: Fulton Hogan Land Development Ltd
Project: Precinct 3, Argent Lane
Location: Milldale
Project ID: AKL2022-0138
Date: 23/09/2022
Investigation Location: Refer to Site Plan



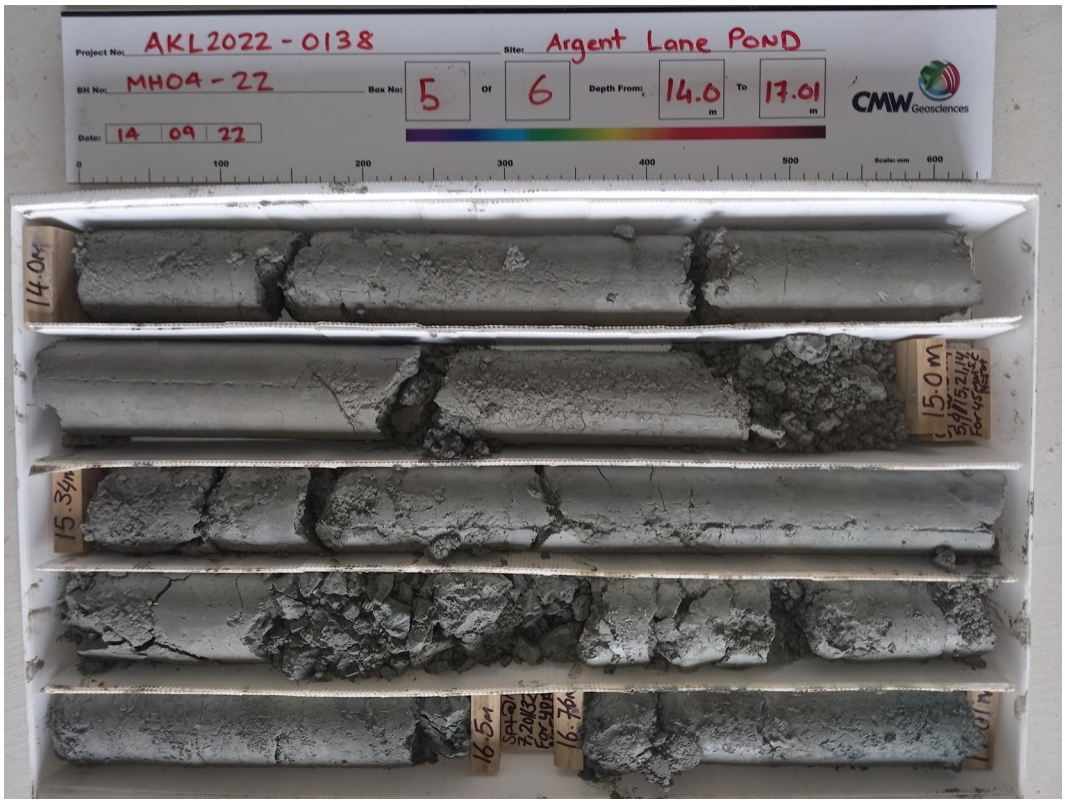
7.5m- 11.25m



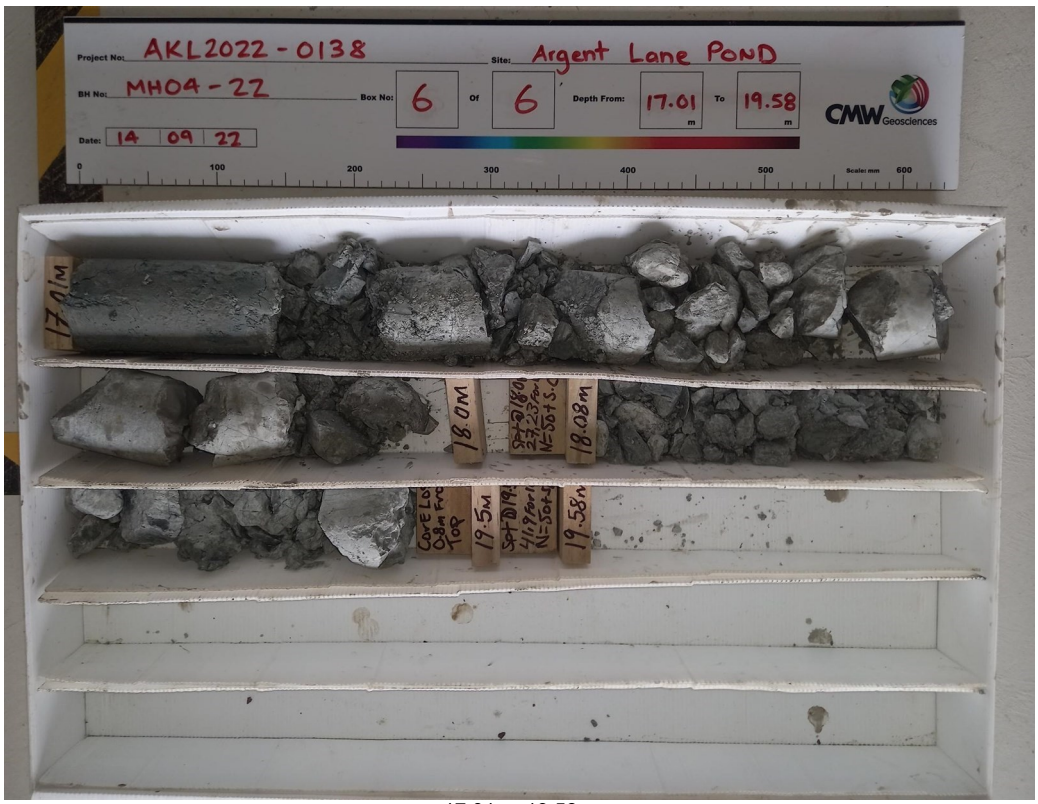
11.25m- 14.0m

PHOTOGRAPH SHEET - MH04-22

Client: Fulton Hogan Land Development Ltd
Project: Precinct 3, Argent Lane
Location: Milldale
Project ID: AKL2022-0138
Date: 23/09/2022
Investigation Location: Refer to Site Plan



14.0m- 17.01m



17.01m- 19.58m