BOREHOLE: BHUA-19

SHEET: 1 OF 11

CLIENT: SMEC
PROJECT: Pioneer Burdekin PHES GI
LOCATION: Dalrymple Heights
JOB NO: 23117.000.001

COORDS: 657617.2 m 7666440.0 m GDA 2020 MGA Zone 55
SURFACE RL: 895.10 m DATUM: AHD
INCLINATION: -88° DIRECTION: 190°
HOLE DIA: 96/100 mm HOLE DEPTH: 48.34 m

DRILL RIG: Hydrapower Scout
CONTRACTOR: Twin Hills
LOGGED: ENGEO DATE: 2/9/23
CHECKED: SF DATE: 1/9/23

Drilling					Sampling		Field Material Description					
METHOD / SUPPORT	PENETRATION RESISTANCE	WATER	LENGTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
SSA	MP	25/08/23, Standing Fluid Level (BGL)	0.0	0.05 895.05				CI	TOPSOIL: Silty CLAY low plasticity, dark brown to red brown, trace fine to coarse grained sand, trace rootlets (<2mm)	w=PL	St	TOPSOIL
									Silty CLAY medium plasticity, pale orange brown mottled off-white, trace fine to medium grained sand			RESIDUAL SOIL
			0.5									
			1.0									Coring water returns were not recorded.
			1.5		LL = 50% PI = 22% LS = 10.5% SPT 1.50-1.95 m 2, 5, 6 N=11							
			2.0									
			2.5							w=PL	St	
			3.0		LL = 53% PI = 24% LS = 13.0% Soil Particle Density (t/m³) = 2.27 SPT 3.00-3.45 m 4, 7, 8 N=15							
			3.5									
			4.0									
			4.5		SPT 4.50-4.95 m 3, 6, 8 N=14							
			5.0									

This log must be read in conjunction with accompanying symbols and abbreviations used on Geotechnical Logs. It has been prepared for geotechnical purposes only.

ENGEO 2.00.2.2 LIB.GLB Log ENGEO NON-CORED FULL PAGE PIONEER BURDEKIN -MASTERBHT03 REWORK-AUSLAPTOP008.GPJ <<DrawingFile>> 30/10/2024 20:59 10.03.00.09 Datgel Tools

BOREHOLE: BHUA-19

SHEET: 2 OF 11

CLIENT: SMEC
PROJECT: Pioneer Burdekin PHES GI
LOCATION: Dalrymple Heights
JOB NO: 23117.000.001

COORDS: 657617.2 m 7666440.0 m GDA 2020 MGA Zone 55
SURFACE RL: 895.10 m DATUM: AHD
INCLINATION: -88° DIRECTION: 190°
HOLE DIA: 96/100 mm HOLE DEPTH: 48.34 m

DRILL RIG: Hydrapower Scout
CONTRACTOR: Twin Hills
LOGGED: ENGEO DATE: 2/9/23
CHECKED: SF DATE: 1/9/23

Drilling					Sampling		Field Material Description					
METHOD / SUPPORT	PENETRATION RESISTANCE	WATER	LENGTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
SSA			5.0					CI	Silty CLAY medium plasticity, pale orange brown mottled off-white, trace fine to medium grained sand	w=PL	St	RESIDUAL SOIL
			5.5	5.50 889.61				CI	Silty CLAY medium plasticity, orange brown, with fine to coarse grained sand	w<PL	St	
	MP		6.0		Soil Particle Density (t/m³) = 2.35 SPT 6.00-6.45 m 3, 7, 7 N=14							
			6.5	6.40 888.71				SC	Clayey SAND with gravel fine to coarse grained, well graded, pale orange brown and off-white, low plasticity clay, with fine to medium grained, sub-angular gravel	D	MD	
WB			7.0	7.00 888.11				CL	Sandy CLAY low plasticity, pale brown and yellow brown mottled dark red, fine to coarse grained sand, trace fine grained, sub-angular gravel			
	DP		7.5		SPT 7.50-7.87 m 10, 18, 25/70mm HB							
			8.0							w=PL	H	
	PR		8.5									
			9.0						For Continuation Refer to Sheet 3			
			9.5									
			10.0									

This log must be read in conjunction with accompanying symbols and abbreviations used on Geotechnical Logs.
It has been prepared for geotechnical purposes only.

ENGEO 2.00.2.2 LIB.GLB Log ENGEO CORED BOREHOLE PIONEER BURDEKIN -MASTERBHT03 REWORK-AUSLAPTOP008.GPJ <<DrawingFile>> 30/10/2024 18:06 10.03.00.09 Datgel Tools

BOREHOLE: BHUA-19

SHEET: 3 OF 11

CLIENT: SMEC
PROJECT: Pioneer Burdekin PHES GI
LOCATION: Dalrymple Heights
JOB NO: 23117.000.001

COORDS: 657617.2 m 7666440.0 m GDA 2020 MGA Zone 55
SURFACE RL: 895.10 m DATUM: AHD
INCLINATION: -88° DIRECTION: 190°
HOLE DIA: 96/100 mm HOLE DEPTH: 48.34 m

DRILL RIG: Hydrapower Scout
CONTRACTOR: Twin Hills
LOGGED: ENGEO DATE: 2/9/23
CHECKED: SF DATE: 1/9/23

Drilling						Field Material Description					Defect Information	
METHOD / SUPPORT	WATER	TCR	RQD	DRILLED LENGTH (metres)	DEPTH RL	GRAPHIC LOG	MATERIAL DESCRIPTION	DETAILED WEATHERING	INFERRED STRENGTH Is_{50} (MPa) (AS1726:2017) VL 0.03 L 0.1 M 0.3 H 1.0 VH 3.0 EH 10	MEASURED STRENGTH: UCS & I_{s50} (MPa) (A.D.I.)	DEFECT DESCRIPTION Mechanical Discontinuities / non-intact defects shown only. See attached Detailed Defect Log for all recorded discontinuities and defects	AVERAGE DEFECT SPACING (mm) (ISO14689:2017) EC 20 VC 60 C 200 M 600 W 2000 VW
					5.0							
					5.5							
					6.0							
					6.5							
					7.0							
					7.5							
					8.0							
					8.5							
					9.00		Continuation of Sheet 2					
					9.0							
HQ3	95% RETURN	35	0		886.11		CORE LOSS					
					9.5							
					9.85							
					885.26			HW				
					10.0							

This log must be read in conjunction with accompanying symbols and abbreviations used on Geotechnical Logs.
It has been prepared for geotechnical purposes only.

BOREHOLE: BHUA-19

SHEET: 4 OF 11

CLIENT: SMEC
PROJECT: Pioneer Burdekin PHES GI
LOCATION: Dalrymple Heights
JOB NO: 23117.000.001

COORDS: 657617.2 m 7666440.0 m GDA 2020 MGA Zone 55
SURFACE RL: 895.10 m DATUM: AHD
INCLINATION: -88° DIRECTION: 190°
HOLE DIA: 96/100 mm HOLE DEPTH: 48.34 m

DRILL RIG: Hydrapower Scout
CONTRACTOR: Twin Hills
LOGGED: ENGEO DATE: 2/9/23
CHECKED: SF DATE: 1/9/23

Drilling						Field Material Description				Defect Information	
METHOD / SUPPORT	WATER	TCR	RQD	DRILLED LENGTH (metres)	DEPTH RL	GRAPHIC LOG	MATERIAL DESCRIPTION	DETAILED WEATHERING	INFERRED STRENGTH Is_{50} (MPa) (AS1726:2017) VL 0.03, L 0.1, M 0.3, H 1.0, VH 3.0, EH 10	MEASURED STRENGTH: UCS & I_{s50} (MPa) (A.D.I.)	DEFECT DESCRIPTION Mechanical Discontinuities / non-intact defects shown only. See attached Detailed Defect Log for all recorded discontinuities and defects	AVERAGE DEFECT SPACING (mm) (ISO14689:2017) EC 20, VC 60, C 200, M 600, W 2000, VW
HQ3		35	0	10.0			GRANITE Coarse grained, igneous plutonic. Orange-brown, yellow-brown and brown. Crystalline, phaneritic. No observable foliation.	HW				
	95% RETURN				*10.30*		Some feldspar crystals completely lost to weathering. FeO staining on defects.					
					10.40 884.71		CORE LOSS	HW				
				10.5			GRANITE Coarse grained, plutonic igneous. Orange-brown, yellow-brown and brown. Crystalline, phaneritic.					
					10.71 884.40		Some feldspar crystals completely lost to weathering. ALTERED GRANITE Medium to coarse grained, plutonic igneous. Brown, dark grey and pale grey-brown. Crystalline, phaneritic, subhedral.	MW				
		93	0	11.0			With some (<1-3/m) ALTERED MICRODIORITE (?) bands /intrusions;, generally fine grained groundmass with medium grained phenocrysts, dark green-grey, up to 400 mm thick. With some (~2-5/m) DOLERITE (?) inclusions; fine grained, dark grey, irregular to rounded, sharp to diffuse margins, up to 200 mm wide.,					
					11.45 883.66		Pervasive green-grey propylitic and pale pink-grey potassic alteration throughout. 11.00 m: VWP installed 02/09/2023	SW				
				11.5			11.45 m: Becomes dark grey-grey and pale pink-grey.				11.59-11.59 m: J, 5°, Und, Ro, FeO Std	
					11.85 883.26		11.85 m - 12.08 m: ALTERED MICRODIORITE (?) intrusion; fine grained groundmass with medium grained phenocrysts, dark green-grey, porphyritic.					
				12.0							12.10-12.15 m: J, 44°, Und, Ro, CA Ct	
					12.16 882.95		12.16 m - 12.26 m: ALTERED MICRODIORITE (?) intrusion; fine grained groundmass with medium grained phenocrysts, dark green-grey, porphyritic.	SA			12.25-12.25 m: J, 0°, Und, Ro, Cn	
	95% RETURN	100	52	12.5							12.47-12.51 m: J, 44°, Und, Ro, Cn	
					12.73 882.38		12.73 m - 12.86 m: ALTERED MICRODIORITE (?) intrusion; fine grained groundmass with medium grained phenocrysts, dark green-grey, porphyritic.					
					12.89 882.22		12.89 m - 13.23 m: ALTERED MICRODIORITE (?) intrusion; fine grained groundmass with medium grained phenocrysts, dark green-grey, pervasive propylitic alteration of groundmass.					
				13.0							13.16-13.16 m: J, 1°, Stp, Ro, Cn	
					13.33 881.78		13.33 m - 13.85 m: Intermediate to felsic intrusion, sharp upper contact, diffuse lower contact with multiple phases of intrusion, pale pink-grey and dark grey-green, flow banding / plastic deformation and healed breccia observed.					
				13.5								
				14.0								
	95% RETURN	100	90		*14.16* 880.95		14.16 m - 14.20 m, 14.23 m - 14.34 m, and 14.73 m - 14.83 m: ALTERED MICRODIORITE (?) intrusions / bands; fine grained groundmass with medium grained phenocrysts, dark green-grey, pervasive propylitic alteration of groundmass.				14.23-14.29 m: J, 71°, Und, Sm, Cn	
				14.5							14.67-14.67 m: J, 28°, Und, Sm, Cn	
		100	100	15.0								

This log must be read in conjunction with accompanying symbols and abbreviations used on Geotechnical Logs.
It has been prepared for geotechnical purposes only.

BOREHOLE: BHUA-19

SHEET: 5 OF 11

CLIENT: SMEC
PROJECT: Pioneer Burdekin PHES GI
LOCATION: Dalrymple Heights
JOB NO: 23117.000.001

COORDS: 657617.2 m 7666440.0 m GDA 2020 MGA Zone 55
SURFACE RL: 895.10 m DATUM: AHD
INCLINATION: -88° DIRECTION: 190°
HOLE DIA: 96/100 mm HOLE DEPTH: 48.34 m

DRILL RIG: Hydrapower Scout
CONTRACTOR: Twin Hills
LOGGED: ENGEO DATE: 2/9/23
CHECKED: SF DATE: 1/9/23

Drilling						Field Material Description					Defect Information	
METHOD / SUPPORT	WATER	TCR	RQD	DRILLED LENGTH (metres)	DEPTH RL	GRAPHIC LOG	MATERIAL DESCRIPTION	DETAILED WEATHERING	INFERRED STRENGTH Is_{50} (MPa) (AS1726:2017) VL 0.03 L 0.1 M 0.3 H 1.0 VH 3.0 EH 10	MEASURED STRENGTH: UCS & I_{s50} (MPa) (A.D.I.)	DEFECT DESCRIPTION Mechanical Discontinuities / non-intact defects shown only. See attached Detailed Defect Log for all recorded discontinuities and defects	AVERAGE DEFECT SPACING (mm) (ISO14689:2017) EC 20 VC 60 C 200 M 600 W 2000 VW
HQ3	95% RETURN	100	100	15.0			ALTERED GRANITE Medium to coarse grained, plutonic igneous. Brown, dark grey and pale grey-brown. Crystalline, phaneritic, subhedral. With some (<1-3/m) ALTERED MICRODIORITE (?) bands /intrusions;, generally fine grained groundmass with medium grained phenocrysts, dark green-grey, up to 400 mm thick. With some (~2-5/m) DOLERITE (?) inclusions; fine grained, dark grey, irregular to rounded, sharp to diffuse margins, up to 200 mm wide., Pervasive green-grey propylitic and pale pink-grey potassic alteration throughout. 15.12 m - 15.30 m, 15.59 m - 15.74 m, 15.76 m - 15.99 m, 16.06 m - 16.14 m, 16.39 m - 16.43 m: DOLERITE (?) inclusions; fine grained, dark grey, irregular to rounded, sharp to diffuse margins.	SA		UCS=85.0 I_{50}(D)=2.59 I_{50}(A)>5.35	15.62-15.62 m: J, 1°, Und, Sm, Cn 15.90-15.90 m: J, 13°, Und, Sm, CA Ct 16.10-16.13 m: J, 41°, Und, Ro, Cn	
					15.12 879.99							
	95% RETURN	100	100	15.5								
				16.0								
				16.5								
					16.61 878.50		16.61 m - 16.91 m, 17.17 m - 17.55 m, 18.33 m - 18.39 m, and 18.68 m - 18.81 m: ALTERED MICRODIORITE (?) intrusions / inclusions; fine to medium grained, dark green-grey, irregular shaped, diffuse margins, patchy propylitic alteration.					
	95% RETURN	100	100	17.0								
				17.5							17.57-17.59 m: J, 19°, Und, Sm, Cn	
				18.0								
					18.41 876.70							
	90% RETURN	100	100	18.5			18.41 m - 18.61 m, 18.85 m - 18.91 m, 18.94 m - 19.10 m, 19.22 m - 19.37 m, 19.43 m - 19.47 m, 19.50 m - 19.54 m, 19.56 m - 19.67 m, 19.72 m - 19.96 m, 20.00 m - 20.26 m, 20.34 m - 20.39 m, 20.54 m - 20.66 m, and 20.87 m - 20.91 m: DOLERITE inclusions, fine to medium grained, dark grey to black, irregular to rounded shaped, sharp to diffuse margins.				18.73-18.93 m: J, 25°, Pln, Ro, Cn 18.93-18.99 m: J, 45°, Pln, VRo, Cn	
				19.0							19.19-19.21 m: J, 10°, Pln, Ro, Cn	
	90% RETURN	100	85	19.5								
				20.0								

This log must be read in conjunction with accompanying symbols and abbreviations used on Geotechnical Logs.
It has been prepared for geotechnical purposes only.

BOREHOLE: BHUA-19

SHEET: 6 OF 11

CLIENT: SMEC
PROJECT: Pioneer Burdekin PHES GI
LOCATION: Dalrymple Heights
JOB NO: 23117.000.001

COORDS: 657617.2 m 7666440.0 m GDA 2020 MGA Zone 55
SURFACE RL: 895.10 m DATUM: AHD
INCLINATION: -88° DIRECTION: 190°
HOLE DIA: 96/100 mm HOLE DEPTH: 48.34 m

DRILL RIG: Hydrapower Scout
CONTRACTOR: Twin Hills
LOGGED: ENGEO DATE: 2/9/23
CHECKED: SF DATE: 1/9/23

Drilling						Field Material Description					Defect Information	
METHOD / SUPPORT	WATER	TCR	RQD	DRILLED LENGTH (metres)	DEPTH RL	GRAPHIC LOG	MATERIAL DESCRIPTION	DETAILED WEATHERING	INFERRED STRENGTH Is_{50} (MPa) (AS1726:2017) VL 0.03 L 0.1 M 0.3 H 1.0 VH 3.0 EH 10	MEASURED STRENGTH: UCS & I_{s50} (MPa) (A.D.I.)	DEFECT DESCRIPTION Mechanical Discontinuities / non-intact defects shown only. See attached Detailed Defect Log for all recorded discontinuities and defects	AVERAGE DEFECT SPACING (mm) (ISO14689:2017) EC 20 VC 60 C 200 M 600 W 2000 VW
HQ3	90% RETURN	100	85	1.5	20.0							
					20.5		ALTERED GRANITE Medium to coarse grained, plutonic igneous. Brown, dark grey and pale grey-brown. Crystalline, phaneritic, subhedral. With some (<1-3/m) ALTERED MICRODIORITE (?) bands /intrusions;, generally fine grained groundmass with medium grained phenocrysts, dark green-grey, up to 400 mm thick. With some (~2-5/m) DOLERITE (?) inclusions; fine grained, dark grey, irregular to rounded, sharp to diffuse margins, up to 200 mm wide., Pervasive green-grey propylitic and pale pink-grey potassic alteration throughout.	SA			20.56-20.56 m: J, 5°, Cvd, Ro, Cn 20.56-20.60 m: J, 40°, Pln, Ro, Cn 20.56-20.56 m: J, 5°, Cvd, Ro, Cn 20.56-20.60 m: J, 40°, Pln, Ro, Cn 20.70-20.70 m: J, 0°, Pln, Ro, Cn	
	90% RETURN	100	90	1.5	21.0							
					21.30 873.81		21.30 m - 21.71 m: ALTERED MICRODIORITE (?) intrusion, fine to medium grained, pale green-grey, sharp upper and lower contacts, phaneritic.				21.38-21.38 m: J, 5°, Pln, Ro, Cn 21.50-21.50 m: J, 0°, Pln, Ro, Cn	
	90% RETURN	100	90	1.5	21.5							
					21.71 873.41		21.71 m - 23.06 m: Accumulation of dark grey, fine grained mafic minerals (Biotite / Hornblende(?)).					
					22.0							
					22.5							
	90% RETURN	100	100	1.5	23.0							
					23.06 872.06		DOLERITE DYKE / SILL (?) Fine grained groundmass with medium grained phenocrysts, intrusive igneous. Dark grey and black. Crystalline, phaneritic, subhedral to anhedral plagioclase crystals. Sharp upper contact, diffuse lower contact., Patchy propylitic alteration.	SA				
					23.5							
					23.65 871.47		ALTERED GRANITE As per description at 10.71 m, dark grey-grey and pale pink-grey.	FR - SA		UCS=179 I_{50}(D)>5.89	23.63-23.65 m: J, 10°, Pln, Ro, Cn	
					24.0							
	90% RETURN	100	90	1.5	24.24 870.88		PORPHYRITIC DOLERITE Fine grained groundmass with medium grained phenocrysts, igneous intrusive. Dark grey. Crystalline, porphyritic, subhedral feldspar crystals., With many (15-20/m) crosscutting quartz veinletts, <2 mm wide, generally at 30° - 45°. Integral Discontinuities Vn/veinletts; gentle to moderate, (15-20/m), some // to FOL, most <2 mm wide, quartz filled.	FR				
					24.5							
					25.0							

This log must be read in conjunction with accompanying symbols and abbreviations used on Geotechnical Logs.
It has been prepared for geotechnical purposes only.

BOREHOLE: BHUA-19

SHEET: 7 OF 11

CLIENT: SMEC
PROJECT: Pioneer Burdekin PHES GI
LOCATION: Dalrymple Heights
JOB NO: 23117.000.001

COORDS: 657617.2 m 7666440.0 m GDA 2020 MGA Zone 55
SURFACE RL: 895.10 m DATUM: AHD
INCLINATION: -88° DIRECTION: 190°
HOLE DIA: 96/100 mm HOLE DEPTH: 48.34 m

DRILL RIG: Hydrapower Scout
CONTRACTOR: Twin Hills
LOGGED: ENGEO DATE: 2/9/23
CHECKED: SF DATE: 1/9/23

Drilling						Field Material Description				Defect Information	
METHOD / SUPPORT	WATER	TCR	RQD	DRILLED LENGTH (metres)	DEPTH RL	GRAPHIC LOG	MATERIAL DESCRIPTION	DETAILED WEATHERING	INFERRED STRENGTH Is_{50} (MPa) (AS1726:2017) VL 0.03 L 0.1 M 0.3 H 1.0 VH 3.0 EH 10	MEASURED STRENGTH: UCS & I_{s50} (MPa) (A.D.I.)	DEFECT DESCRIPTION Mechanical Discontinuities / non-intact defects shown only. See attached Detailed Defect Log for all recorded discontinuities and defects	AVERAGE DEFECT SPACING (mm) (ISO14689:2017) EC 20 VC 60 C 200 M 600 W 2000 VW
HQ3		100	90	25.0				FR				
					25.28 869.84		ALTERED GRANITE Medium to coarse grained, plutonic igneous. Off-white and dark grey. Crystalline, phaneritic, subhedral feldspar. Some ALTERED MICRODIORITE intrusions, irregular, fine grained, dark grey-grey, diffuse to sharp margins, <100 mm wide Patchy propylitic alteration (pale green-grey) throughout. Integral Discontinuities Vein; moderate to steep, (<2-4/m), most <2mm wide, few <5 mm wide.	SA				
	90% RETURN	100	100	25.5 26.0								
					26.45 868.67		26.45 m - 26.76 m, 26.92 m - 27.05 m and 27.50 m - 27.80 m: ALTERED MICRODIORITE (?) intrusions, fine to medium grained, dark grey to grey-green, sharp to diffuse margins, very closely to closely space quartz veinletts throughout.	SA				
	90% RETURN	100	100	26.5 27.0	*27.07* 868.05		27.07 m - 27.45 m: Very closely spaced, sub-parallel quartz (?) veinletts, <1 mm wide, at 70° - 85°, undulating.					
				27.5	*28.00*							
	90% RETURN	100	100	28.0 28.5	867.12		PORPHYRITIC DOLERITE Fine grained groundmass with medium grained phenocrysts, intrusive igneous. Dark grey-grey. Aphanitic, groundmass subhedral feldspar phenocrysts., With many (15-20/m) intact, crosscutting quartz veins / veinletts, <2 mm wide, generally at 30° - 60°. Integral Discontinuities Vn/veinletts; moderate to steep, (15-20/m), some // to FOL, most <2 mm wide, some >5 mm wide., Mechanical Defects Js; gentle to moderate; (~3-5/m) Pln - Und, Sm - Ro, Cn. 28.75 m - 29.95 m: Veinletts become less frequent (5-10/m), most <1 mm wide, generally at 25°- 50°.	SA				
					28.75 866.37							
	90% RETURN	100	100	29.0 29.5	*29.50* 865.62					UCS=172 $I_{50}(D)$>5.89		
		100	100	30.0	*29.95* *30.00*							

This log must be read in conjunction with accompanying symbols and abbreviations used on Geotechnical Logs.
It has been prepared for geotechnical purposes only.

ENGEO

BOREHOLE: BHUA-19

CLIENT: SMEC
PROJECT: Pioneer Burdekin PHES GI
LOCATION: Dalrymple Heights
JOB NO: 23117.000.001

COORDS: 657617.2 m 7666440.0 m GDA 2020 MGA Zone 55
SURFACE RL: 895.10 m DATUM: AHD
INCLINATION: -88° DIRECTION: 190°
HOLE DIA: 96/100 mm HOLE DEPTH: 48.34 m

DRILL RIG: Hydrapower Scout
CONTRACTOR: Twin Hills
LOGGED: ENGEO DATE: 2/9/23
CHECKED: SF DATE: 1/9/23

METHOD / SUPPORT	WATER	TCR	RQD	DRILLED LENGTH (metres)	DEPTH RL	MATERIAL DESCRIPTION	DETAILED WEATHERING	MEASURED STRENGTH: UCS & I_{s50} (MPa)	DEFECT DESCRIPTION
HQ3	90% RETURN	100	100	30.0	865.02	29.95 m - 31.05 m: Veinletts become more frequent (15-20/m), most <1 mm wide, generally at 25°- 50°, few steeper at 65°- 80°. PORPHYRITIC DOLERITE Fine grained groundmass with medium grained phenocrysts, intrusive igneous. Dark grey-grey. Aphanitic, groundmass subhedral feldspar phenocrysts.	SA		30.79-30.82 m: J, 20°, Cvd, Ro, Ct, 3mm greenish Ct.
				31.0	31.05 864.07	31.05 m - 33.08: Vn/Veinletts become more frequent (>50/m) and very closely to extremely closely spaced, most <1 mm wide, few <10 mm, generally at 20°- 50°, few steeper at 65°- 80°.			
	90% RETURN	100	95	31.5 – 33.0					
	90% RETURN	100	100	33.0	33.08 862.04	DOLERITE Fine grained, aphanitic. Dark grey-black. Crystalline. Some quartz veins / veinletts throughout. Integral Discontinuities Vn/Veinletts; gentle (4-6/m), Pln - Und, most <1 mm wide, few < 5mm wide., With many (15-20/m) intact, crosscutting quartz veins / veinletts, <2 mm wide, generally at 30° - 60°. Integral Discontinuities Vn/veinletts; moderate to steep, (15-20/m), some // to FOL, most <2 mm wide, some >5 mm wide., Mechanical Defects Js; gentle to moderate; (~3-5/m) Pln - Und, Sm - Ro, Cn.	FR	UCS=225 I_{50}(D)>5.89 I_{50}(A)>5.62	
	90% RETURN	100	100	34.5	34.46 860.66	ALTERED GRANITE Medium to coarse grained, intrusive igneous. Dark grey to grey and white. Crystalline, subhedral plagioclase in colourless quartz groundmass.	SA		
					34.77 860.35	Patchy propylitic alteration (pale green-grey), becomes stronger at lower contact.	MA SA		
				35.0					

This log must be read in conjunction with accompanying symbols and abbreviations used on Geotechnical Logs.
It has been prepared for geotechnical purposes only.

BOREHOLE: BHUA-19

SHEET: 9 OF 11

CLIENT: SMEC
PROJECT: Pioneer Burdekin PHES GI
LOCATION: Dalrymple Heights
JOB NO: 23117.000.001

COORDS: 657617.2 m 7666440.0 m GDA 2020 MGA Zone 55
SURFACE RL: 895.10 m DATUM: AHD
INCLINATION: -88° DIRECTION: 190°
HOLE DIA: 96/100 mm HOLE DEPTH: 48.34 m

DRILL RIG: Hydrapower Scout
CONTRACTOR: Twin Hills
LOGGED: ENGEO DATE: 2/9/23
CHECKED: SF DATE: 1/9/23

Drilling						Field Material Description					Defect Information	
METHOD / SUPPORT	WATER	TCR	RQD	DRILLED LENGTH (metres)	DEPTH RL	GRAPHIC LOG	MATERIAL DESCRIPTION	DETAILED WEATHERING	INFERRED STRENGTH Is_{50} (MPa) (AS1726:2017) VL 0.03 L 0.1 M 0.3 H 1.0 VH 3.0 EH 10	MEASURED STRENGTH: UCS & I_{s50} (MPa) (A.D.I.)	DEFECT DESCRIPTION Mechanical Discontinuities / non-intact defects shown only. See attached Detailed Defect Log for all recorded discontinuities and defects	AVERAGE DEFECT SPACING (mm) (ISO14689:2017) EC 20 VC 60 C 200 M 600 W 2000 VW
HQ3	90% RETURN	100	100	35.0			DOLERITE Fine grained, aphanitic. Dark grey-black. Crystalline. Some quartz veins / veinletts and granitic bands up to 50 mm thick. Integral Discontinuities Vn/Veinletts; gentle (4-6/m), Pln - Und, most <1 mm wide, few < 5mm wide.	SA				
					35.48							
				35.5	859.64		ALTERED GRANITE Medium to coarse grained, plutonic igneous. Off-white and dark grey. Crystalline, phaneritic, subhedral feldspar. Some ALTERED MICRODIORITE intrusions, irregular, fine grained, dark grey-grey, diffuse to sharp margins, <150 mm wide Patchy propylitic alteration (pale green-grey) throughout. Integral Discontinuities Vein; moderate to steep, (<2-4/m), most <2mm wide, few <5 mm wide.	SA			35.69-35.72 m: J, 25°, Pln, Ro, Cn 36.12-36.24 m: J, 60°, Pln, Ro, FL, Grey mineral infill.	
	90% RETURN	100	100	36.0								
				36.5								
				37.0	*37.06*							
					858.06		PORPHYRITIC DOLERITE Fine grained groundmass with medium grained phenocrysts, intrusive igneous. Dark grey-grey. Crystalline, aphanitic groundmass, with subhedral to anhedral plagioclase phenocrysts. Sharp upper contact, diffuse lower contact.	SA			37.03-37.03 m: Cs, 0°, Pln, Ro, Ct	
				37.5	*37.70*							
					857.42		ALTERED GRANITE Medium to coarse grained, plutonic igneous. Grey-dark grey and pale grey Crystalline, phaneritic, subhedral. With some (<1-3/m) ALTERED MICRODIORITE (?) bands /intrusions;, generally fine grained groundmass with medium grained phenocrysts, dark green-grey, up to 400 mm thick. With some (~2-5/m) DOLERITE (?) inclusions; fine grained, dark grey, irregular to rounded, sharp to diffuse margins, up to 200 mm wide., Patchy propylitic (pale green-grey) alteration throughout.	SA			38.42-38.60 m: J, 70°, Cvd, Ro, CA FL	
	90% RETURN	100	100	38.0								
				38.5								
				39.0							39.20-39.22 m: J, 30°, Und, Ro, CA FL	
	90% RETURN	100	100	39.5								
				40.0								

This log must be read in conjunction with accompanying symbols and abbreviations used on Geotechnical Logs.
It has been prepared for geotechnical purposes only.

BOREHOLE: BHUA-19

SHEET: 10 OF 11

CLIENT: SMEC
PROJECT: Pioneer Burdekin PHES GI
LOCATION: Dalrymple Heights
JOB NO: 23117.000.001

COORDS: 657617.2 m 7666440.0 m GDA 2020 MGA Zone 55
SURFACE RL: 895.10 m DATUM: AHD
INCLINATION: -88° DIRECTION: 190°
HOLE DIA: 96/100 mm HOLE DEPTH: 48.34 m

DRILL RIG: Hydrapower Scout
CONTRACTOR: Twin Hills
LOGGED: ENGEO DATE: 2/9/23
CHECKED: SF DATE: 1/9/23

Drilling						Field Material Description					Defect Information	
METHOD / SUPPORT	WATER	TCR	RQD	DRILLED LENGTH (metres)	DEPTH RL	GRAPHIC LOG	MATERIAL DESCRIPTION	DETAILED WEATHERING	INFERRED STRENGTH Is_{50} (MPa) (AS1726:2017) VL 0.03, L 0.1, M 0.3, H 1.0, VH 3.0, EH 10	MEASURED STRENGTH: UCS & I_{s50} (MPa) (A.D.I.)	DEFECT DESCRIPTION Mechanical Discontinuities / non-intact defects shown only. See attached Detailed Defect Log for all recorded discontinuities and defects	AVERAGE DEFECT SPACING (mm) (ISO14689:2017) EC 20, VC 60, C 200, M 600, W 2000, VW
HQ3		100	100	40.0			ALTERED GRANITE Medium to coarse grained, plutonic igneous. Grey-dark grey and pale grey Crystalline, phaneritic, subhedral. With some (<1-3/m) ALTERED MICRODIORITE (?) bands /intrusions;, generally fine grained groundmass with medium grained phenocrysts, dark green-grey, up to 400 mm thick. With some (~2-5/m) DOLERITE (?) inclusions; fine grained, dark grey, irregular to rounded, sharp to diffuse margins, up to 200 mm wide., Patchy propylitic (pale green-grey) alteration throughout.	SA				
	90% RETURN	100	100	40.5								
				41.0								
					41.45 853.68							
	90% RETURN	100	100	41.5			41.45 m: Becomes pervasively altered, pale green-grey and off-white as interstitial quartz size increases. Common fractionation textures and mineral accumulations encountered.					
				42.0								
				42.5								
				43.0								
					43.10 852.03		43.10 m - 43.40 m: Crenulated bands, <10 mm wide (alteration fronts?)					
				43.5								
					43.65 *43.70* 851.43		43.65 m - 43.96 m: Steep altered shear zone with brecciation and silicic alteration along contact.	SA				
	90% RETURN	100	85	44.0			DOLERITE Fine grained groundmass with medium grained phenocrysts, intrusive igneous. Dark grey-grey. Crystalline, phaneritic, subhedral to anhedral plagioclase crystals. Sharp upper and lower contact.			UCS=150		
					44.27 850.86		44.27 m - 44.48m: pervasive pale green propylitic alteration.					
				44.5								
		100	100	45.0								

This log must be read in conjunction with accompanying symbols and abbreviations used on Geotechnical Logs.
It has been prepared for geotechnical purposes only.

ENGEO 2.00.2.2 LIB.GLB Log ENGEO CORED BOREHOLE PIONEER BURDEKIN -MASTERBHT03 REWORK-AUSLAPTOP008.GPJ <<DrawingFile>> 30/10/2024 18:06 10.03.00.09 Datgel Tools

BOREHOLE: BHUA-19

SHEET: 11 OF 11

CLIENT: SMEC
PROJECT: Pioneer Burdekin PHES GI
LOCATION: Dalrymple Heights
JOB NO: 23117.000.001

COORDS: 657617.2 m 7666440.0 m GDA 2020 MGA Zone 55
SURFACE RL: 895.10 m DATUM: AHD
INCLINATION: -88° DIRECTION: 190°
HOLE DIA: 96/100 mm HOLE DEPTH: 48.34 m

DRILL RIG: Hydrapower Scout
CONTRACTOR: Twin Hills
LOGGED: ENGEO DATE: 2/9/23
CHECKED: SF DATE: 1/9/23

Drilling						Field Material Description				Defect Information	
METHOD / SUPPORT	WATER	TCR	RQD	DRILLED LENGTH (metres)	DEPTH RL	GRAPHIC LOG	MATERIAL DESCRIPTION	DETAILED WEATHERING	INFERRED STRENGTH Is_{50} (MPa) (AS1726:2017) VL 0.03 L 0.1 M 0.3 H 1.0 VH 3.0 EH 10	MEASURED STRENGTH: UCS & I_{s50} (MPa) (A.D.I.)	DEFECT DESCRIPTION Mechanical Discontinuities / non-intact defects shown only. See attached Detailed Defect Log for all recorded discontinuities and defects	AVERAGE DEFECT SPACING (mm) (ISO14689:2017) EC 20 VC 60 C 200 M 600 W 2000 VW
HQ3	90% RETURN	100	100	45.0			DOLERITE Fine grained groundmass with medium grained phenocrysts, intrusive igneous. Dark grey-grey. Crystalline, phaneritic, subhedral to anhedral plagioclase crystals. Sharp upper and lower contact.	SA		I_{50}(A)=2.67		
				45.5	45.62 849.51		ALTERED MICRODIORITE DYKE / SILL Fine to medium grained, intrusive igneous. Dark green-grey. Crystalline, phaneritic, equigranular. Sharp upper and lower contacts.	SA				
					45.85 849.28		ALTERED GRANITE Medium to coarse grained, plutonic igneous. Grey-dark grey and pale grey Crystalline, phaneritic, with colourless interstitial quartz up to 3 mm. Weakly foliated at 15°- 20° With some (<1-3/m) ALTERED MICRODIORITE (?) bands /intrusions, generally fine grained groundmass with medium grained phenocrysts, dark green-grey, up to 400 mm thick. With few (<1-2/m) DOLERITE (?) inclusions; fine grained, dark grey, irregular to rounded, sharp to diffuse margins, up to 200 mm wide., Patchy propylitic (pale green-grey) alteration throughout. Many quartz veins / veinletts throughout at various orientations from subhorizontal to subvertical.	FR				
	90% RETURN	100	100	46.0				SA				
				46.5				FR				
				47.0								
				47.5								
				48.0	48.34 846.79		END OF BOREHOLE @ 48.34 m TARGET DEPTH VIBRATING WIRE PIEZOMETER INSTALLED, SINGLE SENSOR AT 11.00 M DEPTH. Bearing is approximate only.					
				48.5								
				49.0								
				49.5								
				50.0								

This log must be read in conjunction with accompanying symbols and abbreviations used on Geotechnical Logs. It has been prepared for geotechnical purposes only.

JOB No.:	30032772
Client:	Queensland Hydro
Site:	Pioneer-Burdekin

Borehole ID:	BHUA-19
Termination Depth:	48.34

Depth (m)			Type	Angle (°)	Roughness	Shape	Infill	Weathering	Nature	Comments
From	To	Midpoint								
9.85	9.90	9.88	Joint	86	Rough	Undulating	Mn Oxide	Highly Weathered	Intact	
9.97	10.00	9.99	Seam	20	Smooth	Undulating	Chlorite	Extremely Weathered	Filled	
10.04	10.13	10.09	Joint	81	Rough	Undulating	Mn Oxide	Highly Weathered	Intact	
10.08	10.13	10.11	Joint	88	Rough	Undulating	Mn Oxide	Highly Weathered	Intact	
10.12	10.14	10.13	Joint	28	Rough	Undulating	Mn Oxide	Moderately Weathered	Intact	
10.41	10.44	10.43	Joint	6	Rough	Undulating	Fe Oxide	Highly Weathered	Stained	
10.46	10.46	10.46	Joint	6	Rough	Undulating	Fe Oxide	Highly Weathered	Stained	
10.46	10.56	10.51	Joint	6	Rough	Undulating	Fe Oxide	Highly Weathered	Stained	J x8, 6°, UN, Ro, Fe, SN
10.57	10.83	10.70	Joint	82	Rough	Stepped	Fe Oxide	Highly Weathered	Stained	
10.59	10.59	10.59	Joint	5	Rough	Undulating	Fe Oxide	Highly Weathered	Stained	
10.61	10.61	10.61	Joint	2	Rough	Undulating	Fe Oxide	Highly Weathered	Stained	
10.63	10.68	10.66	Joint	41	Rough	Undulating	Fe Oxide	Highly Weathered	Stained	
10.65	10.65	10.65	Joint	4	Rough	Undulating	Fe Oxide	Highly Weathered	Stained	
10.68	10.79	10.74	Joint	29	Rough	Undulating	Fe Oxide	Highly Weathered	Stained	
10.72	10.85	10.79	Joint	89	Rough	Undulating	Calcite	Moderately Weathered	Intact	
10.74	10.74	10.74	Joint	2	Rough	Undulating	Fe Oxide	Highly Weathered	Stained	
10.74	10.75	10.75	Joint	24	Rough	Curved	Fe Oxide	Highly Weathered	Stained	
10.75	10.75	10.75	Joint	6	Smooth	Undulating	Fe Oxide	Highly Weathered	Stained	
10.82	10.94	10.88	Joint	88	Rough	Undulating	Fe Oxide	Moderately Weathered	Intact	
10.94	10.94	10.94	Joint	5	Rough	Irregular	Fe Oxide	Highly Weathered	Stained	
10.94	11.61	11.28	Joint	89	Rough	Undulating	Fe Oxide	Moderately Weathered	Stained	<700mm long.
11.01	11.23	11.12	Joint		Rough	Undulating	Chlorite	Highly Weathered	Vein	
11.05	11.05	11.05	Joint	2	Rough	Undulating	Fe Oxide	Highly Weathered	Stained	
11.05	11.80	11.43	Joint	90	Smooth	Undulating	Chlorite	Highly Weathered	Vein	<780mm long.
11.07	11.07	11.07	Joint	9	Rough	Undulating	Fe Oxide	Highly Weathered	Stained	
11.10	11.22	11.16	Joint	89	Smooth	Undulating	Chlorite	Highly Weathered	Vein	
11.13	11.14	11.14	Joint	14	Rough	Undulating	Fe Oxide	Highly Weathered	Stained	
11.15	11.15	11.15	Joint	15	Rough	Undulating	Fe Oxide	Highly Weathered	Stained	
11.28	11.28	11.28	Joint	16	Smooth	Planar	Chlorite	Highly Weathered	Vein	
11.38	11.42	11.40	Joint	59	Rough	Undulating	Fe Oxide	Highly Weathered	Stained	
11.39	11.39	11.39	Joint	7	Rough	Curved	Fe Oxide	Highly Weathered	Stained	
11.42	11.42	11.42	Joint	6	Smooth	Curved	Fe Oxide	Highly Weathered	Stained	
11.57	11.57	11.57	Joint	11	Rough	Undulating	Fe Oxide	Moderately Weathered	Stained	
11.59	11.59	11.59	Joint	4	Rough	Undulating		Moderately Weathered	Clean	
11.60	11.80	11.70	Joint	86	Rough	Undulating	Fe Oxide	Moderately Weathered	Stained	
11.67	11.67	11.67	Joint	2	Rough	Undulating	Fe Oxide	Highly Weathered	Stained	
11.75	11.75	11.75	Joint	8	Rough	Undulating	Fe Oxide	Moderately Weathered	Stained	
11.88	11.88	11.88	Joint	13	Rough	Curved	Fe Oxide	Moderately Weathered	Stained	
11.88	12.01	11.95	Joint	82	Rough	Undulating	Fe Oxide	Slightly Weathered	Stained	
11.97	12.02	12.00	Joint	39	Rough	Undulating	Fe Oxide	Moderately Weathered	Stained	
12.03	12.05	12.04	Joint	21	Rough	Stepped	Fe Oxide	Moderately Weathered	Stained	
12.04	12.07	12.06	Joint	69	Rough	Curved	Fe Oxide	Moderately Weathered	Intact	
12.07	12.09	12.08	Joint	30	Very Rough	Undulating	Fe Oxide	Moderately Weathered	Stained	
12.10	12.15	12.13	Joint	44	Rough	Undulating	Calcite	Slightly Weathered	Coating	
12.20	12.46	12.33	Joint	89	Rough	Curved	Fe Oxide	Slightly Weathered	Stained	
12.25	12.25	12.25	Joint	0	Rough	Undulating		Slightly Weathered	Clean	
12.30	12.36	12.33	Vein	35	Smooth	Undulating	Unidentified	Slightly Altered	Intact	
12.40	12.40	12.40	Joint	11	Rough	Undulating	Fe Oxide	Slightly Weathered	Stained	
12.41	12.44	12.43	Joint	13	Rough	Curved	Calcite	Slightly Weathered	Vein	
12.47	12.51	12.49	Joint	44	Rough	Undulating		Slightly Weathered	Clean	
12.51	12.68	12.60	Vein	69	Smooth	Undulating	Calcite	Slightly Weathered	Intact	
12.62	12.73	12.68	Joint	89	Smooth	Undulating	Fe Oxide	Slightly Weathered	Intact	
12.75	12.81	12.78	Joint	41	Smooth	Undulating		Slightly Weathered	Intact	
12.81	12.81	12.81	Vein	20	Smooth	Curved	Calcite	Slightly Altered	Intact	
12.85	12.99	12.92	Joint	89	Smooth	Undulating	Calcite	Slightly Altered	Intact	
13.16	13.16	13.16	Joint	1	Rough	Stepped		Slightly Weathered	Clean	
13.17	13.71	13.44	Joint	79	Rough	Undulating	Fe Oxide	Slightly Weathered	Stained	
13.30	13.47	13.39	Vein	71	Smooth	Undulating	Calcite	Slightly Altered	Intact	

Depth (m)			Type	Angle (°)	Roughness	Shape	Infill	Weathering	Nature	Comments
From	To	Midpoint								
13.33	13.36	13.35	Vein	17	Smooth	Undulating	Calcite	Slightly Altered	Intact	
13.33	13.47	13.40	Vein	78	Smooth	Undulating	Calcite	Slightly Altered	Intact	
13.61	13.62	13.62	Joint	25	Rough	Undulating	Fe Oxide	Slightly Weathered	Stained	
13.61	13.64	13.63	Joint	38	Rough	Undulating	Fe Oxide	Slightly Weathered	Stained	
13.62	13.74	13.68	Joint	82	Smooth	Undulating	Fe Oxide	Slightly Weathered	Intact	
13.63	13.64	13.64	Joint	24	Smooth	Undulating	Fe Oxide	Slightly Weathered	Intact	
13.71	13.73	13.72	Joint	26	Smooth	Undulating	Fe Oxide	Slightly Weathered	Stained	
13.72	13.75	13.74	Joint	77	Smooth	Undulating	Fe Oxide	Slightly Weathered	Stained	
13.73	13.78	13.76	Joint	31	Smooth	Undulating	Fe Oxide	Slightly Weathered	Stained	
13.77	13.78	13.78	Joint	58	Smooth	Undulating	Fe Oxide	Slightly Altered	Intact	
13.78	13.96	13.87	Joint	84	Smooth	Undulating	Calcite	Slightly Altered	Intact	
14.02	14.02	14.02	Joint	7	Rough	Undulating	Fe Oxide	Slightly Weathered	Stained	
14.03	14.22	14.13	Joint	80	Smooth	Undulating	Calcite	Slightly Altered	Intact	
14.15	14.21	14.18	Joint	69	Smooth	Undulating	Calcite	Slightly Altered	Intact	
14.23	14.29	14.26	Joint	71	Smooth	Undulating		Slightly Weathered	Clean	
14.27	14.37	14.32	Vein	78	Smooth	Undulating	Calcite	Slightly Altered	Intact	
14.32	14.42	14.37	Joint	76	Smooth	Undulating	Calcite	Slightly Altered	Vein	
14.36	14.38	14.37	Vein	29	Smooth	Stepped	Calcite	Slightly Altered	Infilled	
14.44	14.53	14.49	Joint	69	Smooth	Undulating	Calcite	Slightly Altered	Intact	
14.48	14.66	14.57	Joint	86	Smooth	Undulating	Calcite	Slightly Altered	Intact	
14.67	14.67	14.67	Joint	28	Smooth	Undulating		Slightly Weathered	Clean	
14.75	14.83	14.79	Joint	41	Smooth	Undulating	Calcite	Slightly Altered	Intact	
14.80	14.95	14.88	Joint	78	Smooth	Undulating	Calcite	Slightly Altered	Intact	
14.82	15.05	14.94	Joint	79	Smooth	Undulating	Calcite	Slightly Altered	Intact	
15.20	15.20	15.20	Joint	15	Smooth	Undulating	Calcite	Slightly Altered	Intact	
15.38	15.38	15.38	Joint	9	Smooth	Curved	Unidentified	Slightly Altered	Stained	Dark green colour.
15.44	15.58	15.51	Joint	71	Smooth	Stepped	Unidentified	Slightly Altered	Intact	Dark green colour.
15.52	15.55	15.54	Joint	30	Smooth	Undulating	Calcite	Slightly Altered	Intact	
15.62	15.62	15.62	Joint	1	Smooth	Undulating		Slightly Weathered	Clean	
15.63	15.86	15.75	Joint	84	Smooth	Undulating	Calcite	Slightly Altered	Intact	
15.69	15.93	15.81	Joint	86	Smooth	Undulating	Calcite	Slightly Altered	Intact	
15.70	15.77	15.74	Joint	35	Smooth	Undulating	Calcite	Slightly Altered	Intact	
15.72	15.72	15.72	Joint	19	Smooth	Stepped	Calcite	Slightly Altered	Vein	
15.73	15.76	15.75	Joint	21	Smooth	Undulating	Calcite	Slightly Altered	Intact	
15.90	15.90	15.90	Joint	13	Smooth	Undulating	Calcite	Slightly Weathered	Coating	
15.92	15.98	15.95	Joint	49	Smooth	Undulating	Calcite	Slightly Altered	Intact	
15.94	15.96	15.95	Joint	44	Smooth	Undulating	Calcite	Slightly Altered	Intact	
16.06	16.07	16.07	Joint	23	Smooth	Undulating	Calcite	Slightly Altered	Intact	
16.06	16.13	16.10	Joint	58	Smooth	Undulating	Calcite	Slightly Altered	Intact	
16.10	16.13	16.12	Joint	41	Rough	Undulating		Slightly Weathered	Clean	
16.20	17.14	16.67	Vein	78	Smooth	Undulating	Calcite	Slightly Altered	Intact	<1m.
16.22	16.55	16.39	Joint	86	Smooth	Undulating	Calcite	Slightly Altered	Intact	
16.43	16.62	16.53	Vein	78	Smooth	Undulating	Calcite	Moderately Altered	Intact	
16.47	16.82	16.65	Joint	89	Smooth	Undulating	Calcite	Moderately Altered	Intact	
16.68	16.85	16.77	Vein	78	Smooth	Undulating	Calcite	Moderately Altered	Intact	
16.93	17.21	17.07	Joint	84	Smooth	Undulating	Calcite	Slightly Altered	Intact	
17.17	17.21	17.19	Joint	16	Smooth	Undulating	Fe Oxide	Slightly Weathered	Stained	
17.21	17.25	17.23	Joint	34	Smooth	Undulating	Calcite	Slightly Altered	Intact	
17.27	17.27	17.27	Joint	34	Smooth	Undulating	Calcite	Slightly Altered	Intact	
17.35	17.40	17.38	Joint	69	Smooth	Curved	Calcite	Slightly Altered	Intact	
17.46	17.49	17.48	Joint	24	Smooth	Undulating	Calcite	Slightly Altered	Intact	
17.50	17.56	17.53	Vein	64	Smooth	Undulating	Calcite	Moderately Altered	Intact	
17.57	17.59	17.58	Joint	19	Smooth	Undulating		Slightly Weathered	Clean	
17.62	17.62	17.62	Joint	18	Smooth	Curved	Calcite	Slightly Altered	Intact	
17.65	17.82	17.74	Vein	84	Smooth	Stepped	Calcite	Slightly Altered	Intact	
18.05	18.11	18.08	Joint	40	Rough	Planar			Stained	
18.18	18.34	18.26	Vein	75	Rough	Undulating			Filled	1mm infill
18.29	18.42	18.36	Joint	80	Rough	Planar			Hairline	
18.36	18.42	18.39	Joint	80	Rough	Planar			Hairline	
18.43	18.51	18.47	Vein	80	Rough	Planar			Infilled	2-3mm infill
18.52	18.68	18.60	Vein	80	Rough	Undulating			Infilled	
18.73	18.93	18.83	Joint	25	Rough	Planar			Clean	

Depth (m)			Type	Angle (°)	Roughness	Shape	Infill	Weathering	Nature	Comments
From	To	Midpoint								
18.93	18.99	18.96	Joint	45	Very Rough	Planar			Clean	
19.03	19.15	19.09	Joint	70	Smooth	Planar				Chloritic
19.07	19.21	19.14	Vein	75	Rough	Undulating			Infilled	2mm infill, white
19.19	19.21	19.20	Joint	10	Rough	Planar			Clean	
19.22	19.39	19.31	Vein	75					Hairline	Less than 1mm.
19.43	19.67	19.55	Vein	85	Rough	Undulating			Infilled	Up to 2mm white infill
19.54	19.54	19.54	Joint	0	Rough	Planar		Slightly Altered		
19.57	19.67	19.62	Vein	70	Rough	Undulating			Infilled	2mm white infill
19.69	19.74	19.72	Vein	70	Very Rough	Undulating			Hairline	
19.72	19.80	19.76	Vein	65	Rough	Undulating			Infilled	Less than 1mm greenish infilll.
19.73	19.83	19.78	Vein	70	Very Rough	Planar			Infilled	1mm greenish infill.
19.91	20.00	19.96	Vein	90	Very Rough	Planar			Infilled	3mm white infil.
19.95	19.98	19.97	Joint	30	Rough	Planar		Slightly Altered		
20.04	20.04	20.04	Vein	10	Rough	Undulating			Infilled	Less than 1mm infill.
20.05	20.10	20.08	Vein	60	Rough	Planar			Infilled	1mm white infill.
20.16	20.25	20.21	Vein	35	Rough	Planar			Hairline	
20.21	20.26	20.24	Joint	65	Rough	Planar		Slightly Altered		
20.21	20.32	20.27	Vein	50	Rough	Planar		Slightly Altered	Hairline	
20.45	20.56	20.51	Vein	75	Rough	Planar			Hairline	
20.56	20.56		Joint	5	Rough	Curved			Clean	
20.56	20.60	20.58	Joint		Rough	Planar			Clean	
20.60	20.60	20.60	Joint	0	Rough	Planar			Healed	
20.61	20.62	20.62	Joint	5	Smooth	Curved				Chloritic
20.61	20.67	20.64	Joint	45	Rough	Curved				Chloritic
20.70	20.70		Joint	0	Rough	Planar			Clean	
20.80	20.80		Joint	0	Rough	Undulating		Slightly Altered	Stained	
20.86	20.94	20.90	Vein	45	Rough	Planar			Infilled	1mm infill.
20.87	20.87		Joint	5	Very Rough	Undulating		Slightly Altered	Stained	
20.92	21.00	20.96	Vein	70	Rough	Planar			Infilled	Less than 1mm infill.
21.00	21.29	21.15	Vein	70	Rough	Undulating			Infilled	1mm white infill.
21.00	21.78	21.39	Vein	90	Rough	Undulating			Hairline	White hairline.
21.08	21.19	21.14	Vein	60	Rough	Planar			Infilled	Less than 1mm infill.
21.09	21.17	21.13	Vein	60	Rough	Planar			Infilled	1mm white infill.
21.25	21.35	21.30	Vein	50	Rough	Planar			Infilled	Up to 3mm infill white.
21.29	21.36	21.33	Vein	45	Smooth	Planar		Slightly Altered	Stained	Greenish hairline stain.
21.38	21.38	21.38	Joint	5	Rough	Planar			Clean	
21.50	21.50	21.50	Joint	0	Rough	Planar			Clean	
21.53	21.68	21.61	Vein	60	Rough	Planar		Slightly Altered	Infilled	
21.67	21.82	21.75	Vein	80	Rough	Curved			Stained	Appears as a stain.
21.81	21.84	21.83	Vein	30	Rough	Curved			Infilled	Less than 1mm infill.
21.82	21.96	21.89	Alteration Zone	70	Rough	Curved			Stained	Black staining.
21.88	21.97	21.93	Vein	50	Rough	Planar			Infilled	Less than 1mm infilled.
22.03	22.90	22.47	Alteration Zone	50	Rough	Undulating			Stained	Altered area up to 20mm in thickness with few other surrounding defects.
22.09	22.16	22.13	Joint		Smooth	Planar				Chloritic
22.15	22.20	22.18	Joint	30	Rough	Planar				Chloritic
22.87	22.92	22.90	Joint	30	Rough	Planar				Chloritic
23.02	23.06	23.04	Joint	30	Rough	Planar		Slightly Altered		
23.03	23.38	23.21	Joint	90	Rough	Planar				Chloritic
23.08	23.35	23.22	Vein	90	Rough	Undulating			Hairline	
23.09	23.16	23.13	Vein	25	Rough	Undulating			Infilled	1mm white infill.
23.16	23.21	23.19	Vein	45	Smooth	Planar		Slightly Altered	Hairline	
23.20	23.23	23.22	Vein	30	Very Rough	Curved			Hairline	
23.37	23.37	23.37	Joint	0	Rough	Planar		Slightly Altered		
23.37	23.75	23.56	Vein	85	Rough	Planar			Hairline	
23.46	23.53	23.50	Vein	45	Rough	Planar			Infilled	1mm white infill.
23.56	23.63	23.60	Vein	45	Rough	Planar			Infilled	1mm white infill.
23.63	23.65	23.64	Joint	10	Rough	Planar			Clean	
23.67	23.69	23.68	Alteration Zone	15	Smooth	Planar			Stained	Up to 5mm thick.
23.71	23.77	23.74	Vein	45	Rough	Planar			Hairline	
23.74	23.83	23.79	Joint	45	Rough	Curved			Stained	Chloritic
23.78	23.81	23.80	Vein	35	Smooth	Curved			Hairline	
23.82	23.88	23.85	Vein	60	Smooth	Planar			Infilled	Infill up to3mm.

Depth (m)			Type	Angle (°)	Roughness	Shape	Infill	Weathering	Nature	Comments
From	To	Midpoint								
23.93	24.04	23.99	Vein	45	Rough	Planar			Infilled	2mm infill.
24.14	24.15	24.15	Joint	15	Rough	Curved		Slightly Altered	Stained	
24.15	24.16	24.16	Vein	30	Smooth	Planar		Slightly Altered	Infilled	Infilled white 3mm.
24.22	24.24	24.23	Vein	30	Smooth	Planar	Calcite		Infilled	
24.24	24.38	24.31	Vein	75	Rough	Planar	Calcite		Infilled	
24.28	24.31	24.30	Vein	50	Rough	Planar	Calcite			
24.29	24.55	24.42	Vein	80	Rough	Planar	Calcite			
24.30	24.31	24.31	Vein	10	Rough	Curved/PL	Calcite			
24.30	24.51	24.41	Vein	80	Rough	Stepped	Calcite			
24.34	24.42	24.38	Vein	75	Rough	Planar	Calcite		Hairline	Hairline
24.35	24.43	24.39	Vein	75	Rough	Planar	Calcite		Hairline	Hairline
24.37	24.52	24.45	Vein	80	Rough	Planar	Calcite			
24.38	24.54	24.46	Vein	80	Rough	Undulating	Calcite			
24.39	24.46	24.43	Vein	85	Very Rough	Curved	Calcite			
24.39	24.48	24.44	Vein	85	Rough	Undulating	Calcite			
24.42	24.42	24.42	Vein	0	Rough	Planar	Calcite		Hairline	Hairline
24.43	24.43	24.43	Vein	0	Rough	Planar	Calcite			
24.44	24.53	24.49	Vein	70	Rough	Planar	Calcite			
24.44	24.60	24.52	Vein	70	Rough	Stepped	Calcite			
24.47	24.60	24.54	Vein	70	Rough	Planar	Calcite			
24.49	24.62	24.56	Vein	80	Rough	Planar	Calcite			
24.50	24.62	24.56	Vein	80	Rough	Planar	Calcite			
24.59	24.60	24.60	Joint	50	Rough	Planar		Slightly Altered		
24.60	24.64	24.62	Joint	45	Smooth	Planar		Slightly Altered		
24.67	24.71	24.69	Joint	50	Rough	Planar		Slightly Altered		
24.68	24.71	24.70	Joint	45	Smooth	Planar		Slightly Altered		
24.71	24.84	24.78	Vein	70	Rough	Planar	Calcite			
24.72	24.79	24.76	Vein	70	Rough	Planar	Calcite			
24.72	24.85	24.79	Vein	70	Rough	Planar	Calcite			Two adjacent veins that converge at the ends.
24.78	24.88	24.83	Vein	60	Rough	Planar	Calcite			
24.78	24.89	24.84	Vein	60	Rough	Planar	Calcite			
24.78	24.96	24.87	Vein	60	Rough	Planar	Calcite			
24.80	24.93	24.87	Vein	60	Rough	Planar	Calcite			
24.81	24.87	24.84	Vein	90	Rough	Curved	Calcite			
24.82	24.88	24.85	Vein	90	Rough	Curved	Calcite			
24.83	24.90	24.87	Vein	60	Rough	Planar	Calcite			
24.88	24.94	24.91	Vein	45	Rough	Planar	Calcite		Hairline	
24.90	24.95	24.93	Vein	45	Rough	Planar	Calcite			
24.90	24.97	24.94	Vein	65	Rough	Planar	Calcite			
24.90	24.98	24.94	Vein	65	Rough	Planar	Calcite			
25.00	25.37	25.19	Alteration Zone	45	Very Rough	Irregular	Calcite			Numerous calcite veins and white alteration oriented at 45°. Lightning shaped with some other murky sections.
25.14			Joint	10	Rough	Planar		Slightly Altered		
25.27			Joint	10	Rough	Planar		Slightly Altered		
25.46	25.56	25.51	Vein	65	Rough	Planar	Calcite			
25.70	25.90	25.80	Alteration Zone	70	Rough	Planar	Calcite		Hairline	
25.75	25.77	25.76	Joint	25	Rough	Planar				
25.93	25.99	25.96	Alteration Zone	4	Rough	Planar		Moderately Altered	Stained	
26.06	26.12	26.09	Alteration Zone	50	Rough	Planar			Stained	
26.10	26.21	26.16	Alteration Zone	60	Rough	Planar			Stained	
26.22	26.33	26.28	Alteration Zone	50	Rough	Planar			Stained	
26.40		13.20	Joint	0	Rough	Planar		Slightly Altered	Stained	
26.43	26.51	26.47	Vein	60	Rough	Undulating		Slightly Altered		
26.56	26.72	26.64	Vein	65	Very Rough	Undulating			Infilled	Green infill.
26.74	26.79	26.77	Vein	50	Rough	Curved	Calcite		Infilled	
26.87	26.89	26.88	Alteration Zone	25	Rough	Irregular		Slightly Altered	Infilled	
26.87	26.96	26.92	Alteration Zone	60	Rough	Planar			Infilled	
27.02	27.12	27.07	Vein	60	Rough	Planar	Calcite		Hairline	
27.11	27.45	27.28	Vein	70	Rough	Irregular	Calcite	Slightly Altered		
27.11	27.91	27.51	Alteration Zone	45	Very Rough	Irregular	Calcite	Slightly Altered	Hairline	Many hairline veins along this section, oriented at varying angles between 5 and 85 degrees.
27.12			Joint		Rough	Planar		Slightly Altered		

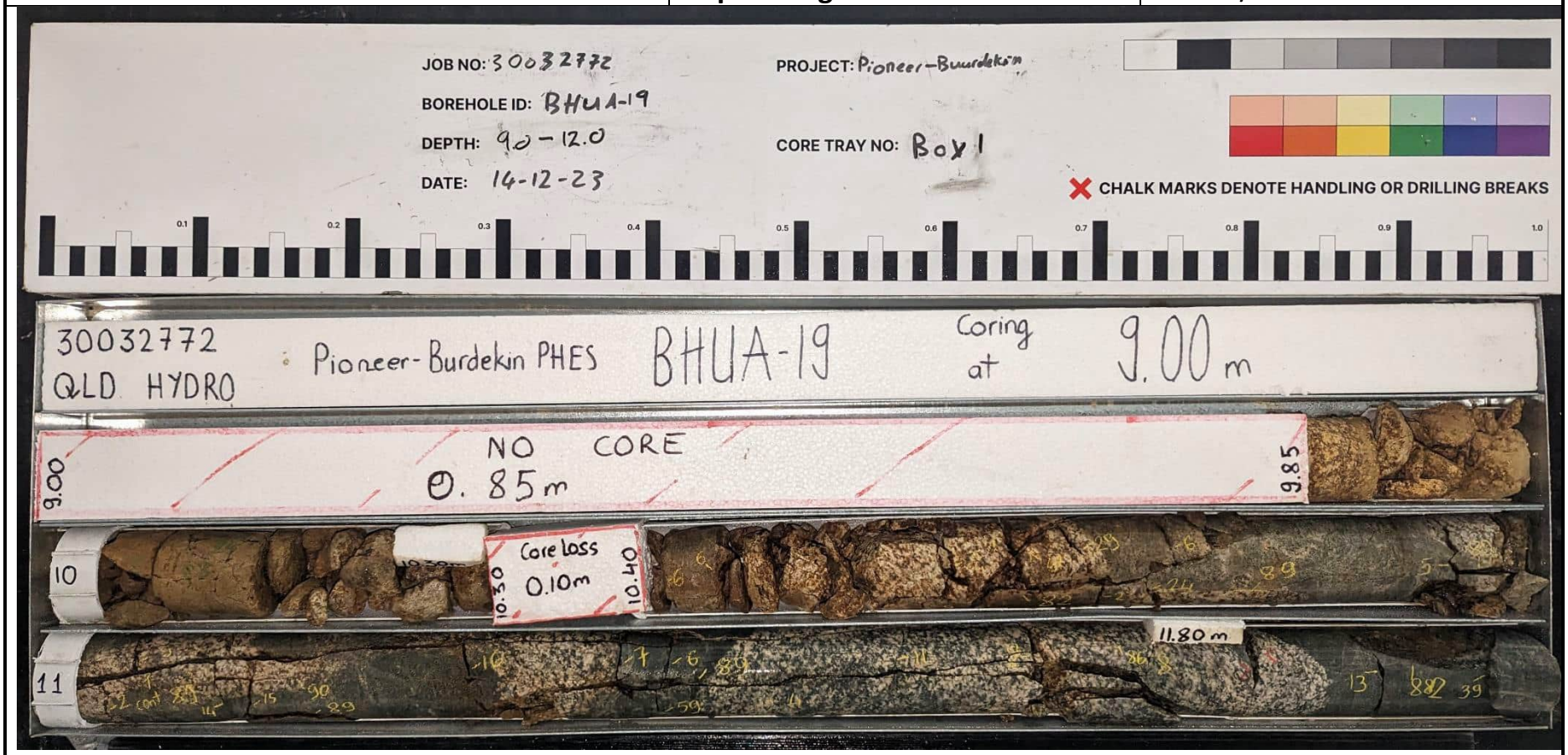
Depth (m)			Type	Angle (°)	Roughness	Shape	Infill	Weathering	Nature	Comments
From	To	Midpoint								
27.52			Joint	20	Rough	Planar		Slightly Altered		
27.70	27.72	27.71	Joint	30	Rough	Planar		Slightly Altered		
27.72	27.90	27.81	Vein	10-50	Rough	Planar	Calcite	Slightly Altered	Infilled	J x6, 10-50°, Pln, Ro, IF
28.05	28.30	28.18	Vein	85	Rough	Undulating	Calcite			
28.06			Joint	10	Rough	Planar		Slightly Altered		
28.28			Joint	0	Rough	Irregular		Slightly Altered		
28.35	28.57	28.46	Vein	70	Rough	Planar	Calcite	Slightly Altered		
28.47	28.52	28.50	Joint	45	Rough	Planar		Slightly Altered		
28.60	28.76	28.68	Vein	75	Rough	Planar	Calcite			
28.85			Joint	0	Rough	Planar		Slightly Altered		
29.04	29.19	29.12	Vein	70	Rough	Undulating	Calcite			
29.32	29.35	29.34	Vein	35	Rough	Planar	Calcite			
29.40	29.43	29.42	Joint	45	Rough	Planar		Slightly Altered		
29.53	29.59	29.56	Vein	30	Rough	Undulating	Calcite			1mm infll.
29.61	29.79	29.70	Vein	70	Rough	Planar	Calcite			
29.69	29.74	29.72	Joint	50	Smooth	Planar		Slightly Altered		
30.12	30.18	30.15	Vein	45	Rough	Planar	Calcite			
30.28	30.34	30.31	Vein	55	Rough	Planar	Calcite			
30.39	30.53	30.46	Vein	60	Very Rough	Planar	Calcite			
30.52	30.60	30.56	Vein	55	Rough	Planar	Calcite	Slightly Altered		
30.62			Vein	10	Rough	Planar		Moderately Altered		Greenish staining.
30.64	30.67	30.66	Joint	20	Rough	Undulating		Slightly Altered		
30.68	30.70	30.69	Vein	20	Rough	Planar		Moderately Altered		
30.79	30.82	30.81	Joint	20	Rough	Curved		Slightly Altered	Coating	3mm greenish coating.
30.91	30.93	30.92	Joint	20	Smooth	Planar		Slightly Altered		
31.04	31.20	31.12	Vein	75	Rough	Planar	Calcite		Infilled	Up to 15 mm.
31.15	31.97	31.56	Vein	0-20	Rough	Planar	Calcite		Hairline	V x28, 0-20°, Pln, Ro, CA, HL
31.29	31.31	31.30	Joint	30	Rough	Planar		Slightly Altered		
31.29	31.34	31.32	Joint	45	Smooth	Planar		Slightly Altered		
31.31	31.34	31.33	Joint	30	Rough	Planar		Slightly Altered		
31.75	31.81	31.78	Joint	50	Smooth	Planar		Slightly Altered		
32.04	35.04	33.54	Joint	45	Rough	Planar			Intact	J x51, 45°°, Pln, Ro, IT, with random veins between oriented apPlnox 70 to 90 degrees.
32.09	32.15	32.12	Joint	50	Smooth	Planar		Slightly Altered		
32.14	32.18	32.16	Vein	40	Rough	Planar	Calcite	Slightly Altered		
32.19	32.22	32.21	Joint	30	Smooth	Planar		Slightly Altered		
32.34	32.35	32.35	Joint	30	Smooth	Planar		Slightly Altered		
32.44	32.53	32.49	Vein	60	Smooth	Planar	Calcite	Slightly Altered		
32.59	32.64	32.62	Joint	55	Smooth	Planar		Slightly Altered		
32.63	32.67	32.65	Vein	30	Rough	Planar	Calcite	Slightly Altered		up to 10mm thick.
32.78	32.83	32.81	Joint	55	Smooth	Planar		Slightly Altered		
32.85	33.08	32.97	Vein	65	Rough	Planar	Calcite		Infilled	Infilled up to 40mm.
32.91	32.93	32.92	Joint	0	Rough	Stepped		Slightly Altered		
33.12	33.14	33.13	Vein	15	Rough	Planar	Calcite		Infilled	
33.14	33.23	33.19	Vein	70	Very Rough	Undulating	Calcite		Infilled	2mm.
33.24	33.27	33.26	Vein	30	Rough	Planar	Calcite		Infilled	Infilled 1mm.
33.28			Vein	10	Rough	Undulating	Calcite		Infilled	
33.29			Vein	5	Rough	Undulating	Calcite		Infilled	
33.35	33.40	33.38	Vein	0	Very Rough	Irregular	Calcite		Hairline	J x8, 0-75°, Pln, Ro, CA, HL
33.53	33.61	33.57	Vein	45	Rough	Planar	Calcite		Hairline	V x6, 45°, Pln, Ro, CA, HL
33.62	33.64	33.63	Joint	15	Rough	Planar		Slightly Altered		Some greenish amygdales.
33.70	33.74	33.72	Vein	45	Rough	Planar	Calcite		Infilled	
33.76	33.80	33.78	Vein	45	Rough	Planar	Calcite		Infilled	
33.76	33.81	33.79	Vein	80	Rough	Stepped	Calcite		Infilled	
33.79	33.81	33.80	Vein	20	Rough	Planar	Calcite		Infilled	
33.80	33.82	33.81	Vein	25	Rough	Planar	Calcite		Infilled	
33.93	33.98	33.96	Vein	70	Rough	Undulating	Calcite		Infilled	
34.03	34.15	34.09	Vein	40	Rough	Planar	Calcite		Infilled	V x4, 30-45°, Pln, Ro, CA, IF
34.28	34.35	34.32	Vein	45	Very Rough	Planar	Calcite		Infilled	Up to 5mm.
34.36	34.52	34.44	Vein	70	Rough	Planar	Calcite		Infilled	V x5, 70°, Pln, Ro, CA, IF
34.53	34.58	34.56	Vein	20	Very Rough	Planar	Calcite		Infilled	4mm.
34.57	34.65	34.61	Joint	65	Rough	Planar	Calcite		Intact	
34.64	34.74	34.69	Vein	50	Rough	Planar	Calcite		Intact	

Depth (m)			Type	Angle (°)	Roughness	Shape	Infill	Weathering	Nature	Comments
From	To	Midpoint								
34.80	34.90	34.85	Vein	90	Rough	Irregular	Calcite		Infilled	3mm.
35.10	35.12	35.11	Alteration Zone	20	Rough	Curved				Intrusion boundary.
35.16	35.21	35.19	Joint	45	Rough	Planar	Calcite		Hairline	
35.19	35.26	35.23	Vein	45	Rough	Planar	Calcite		Hairline	
35.31	35.66	35.49	Vein	90	Rough	Undulating	Calcite		Infilled	3mm.
35.46	35.54	35.50	Vein	80	Rough	Planar	Calcite		Hairline	
35.47	35.52	35.50	Vein	45	Rough	Planar	Calcite		Hairline	
35.63	35.74	35.69	Vein	60	Rough	Undulating	Calcite		Hairline	
35.69	35.72	35.71	Joint	25	Rough	Planar			Clean	
35.77	35.91	35.84	Vein	85	Rough	Planar	Calcite		Infilled	
36.12	36.24	36.18	Joint	60	Rough	Planar			Infilled	Grey mineral infill.
36.25	36.50	36.38	Vein	87	Rough	Undulating	Calcite		Infilled	5mm.
36.46	36.55	36.51	Vein	45	Rough	Planar	Calcite		Infilled	Up to 10mm.
36.55	36.57	36.56	Joint	20	Rough	Planar		Slightly Altered		
36.67	37.06	36.87	Joint	90	Rough	Undulating		Slightly Altered	Intact	
36.71	36.73	36.72	Joint	25	Rough	Curved		Slightly Altered	Intact	
36.74	36.76	36.75	Joint	30	Rough	Curved		Slightly Altered		
36.86	36.90	36.88	Joint	30	Rough	Curved		Slightly Altered		
36.91	36.93	36.92	Alteration Zone	15	Rough	Planar		Slightly Altered	Stained	Dark grey staining.
37.03	37.03	37.03	Crushed Seam	0	Rough	Planar			Coating	
37.07	37.11	37.09	Joint	30	Rough	Curved			Intact	
37.07	37.23	37.15	Joint	65	Rough	Planar			Intact	
37.22	37.24	37.23	Joint	20	Rough	Planar		Slightly Altered		
37.32	37.47	37.40	Vein	50	Rough	Planar	Calcite		Intact	3mm.
37.51	37.75	37.63	Vein	80		Undulating			Infilled	Up to 3mm.
37.64	37.64	37.64	Joint	0	Rough	Irregular			Intact	
37.88	37.88	37.88	Joint	5	Rough	Planar		Slightly Altered		
37.95	38.08	38.02	Joint	55	Rough	Planar		Slightly Altered	Intact	
38.05	38.12	38.09	Joint	45	Rough	Planar		Slightly Altered	Stained	
38.06	38.07	38.07	Joint	30	Rough	Curved				
38.21	38.24	38.23	Vein	30	Rough	Planar		Slightly Altered		Greenish infill 3mm thick.
38.23	38.28	38.26	Joint	45	Rough	Planar			Intact	
38.26	38.28	38.27	Joint	30	Rough	Curved			Intact	
38.28	38.33	38.31	Joint	45	Rough	Planar			Intact	
38.31	38.35	38.33	Joint	45	Rough	Planar			Intact	
38.38	38.43	38.41	Joint	45	Rough	Planar			Intact	
38.42	38.60	38.51	Joint	70	Rough	Curved			Infilled	
38.43	38.53	38.48	Joint	70	Rough	Planar			Intact	
38.51	38.53	38.52	Vein	10	Rough	Undulating			Infilled	
38.54	38.60	38.57	Joint	40	Rough	Planar			Intact	
38.63	38.71	38.67	Vein	55	Rough	Planar			Infilled	3mm.
38.72	38.78	38.75	Vein	45	Rough	Planar			Infilled	
38.76	38.80	38.78	Joint	45	Rough	Planar			Intact	
38.81	38.84	38.83	Joint	20	Rough	Curved		Slightly Altered		
38.82	38.98	38.90	Vein	70	Rough	Planar			Infilled	
38.87	38.97	38.92	Vein	45	Rough	Planar			Infilled	V x3, 45°, Pln, Ro, IF
39.06	39.10	39.08	Vein	50	Rough	Planar	Calcite		Infilled	
39.08	39.14	39.11	Vein	55	Rough	Planar	Calcite		Infilled	Up to 8mm.
39.20	39.22	39.21	Joint	30	Rough	Undulating			Infilled	
39.24	39.24	39.24	Joint	5	Rough	Undulating		Slightly Altered		
39.40	39.57	39.49	Joint	65	Rough	Planar			Intact	
39.42	39.42	39.42	Joint	0	Rough	Planar			Intact	
39.45	39.45	39.45	Joint	0	Rough	Planar			Intact	
39.57	39.61	39.59	Joint		Rough	Planar				
39.65	39.65	39.65	Joint	5	Rough	Planar			Intact	
39.70	39.70	39.70	Joint	0	Rough	Planar		Slightly Altered		
39.72	39.74	39.73	Alteration Zone	10	Rough	Curved			Stained	20mm thick band of dark grey alteration.
39.80	39.82	39.81	Joint	15	Rough	Planar		Slightly Altered		
39.82	39.86	39.84	Joint	30	Rough	Planar		Slightly Altered	Intact	
39.96	40.14	40.05	Alteration Zone	60	Rough	Planar		Moderately Altered	Stained	Brownish stain.
40.04	40.18	40.11	Alteration Zone	45	Rough	Planar		Moderately Altered	Stained	5 altered bands resembling brownish stains, oriented 30 to 60 degrees.
40.17	40.32	40.25	Vein	70	Rough	Planar	Calcite		Infilled	40mm thick at largest point.

Depth (m)			Type	Angle (°)	Roughness	Shape	Infill	Weathering	Nature	Comments
From	To	Midpoint								
40.21	40.38	40.30	Vein	70	Rough	Planar	Calcite	Moderately Altered	Infilled	
40.36	40.49	40.43	Alteration Zone			Irregular		Moderately Altered	Stained	
40.54	40.62	40.58	Vein	60	Rough	Planar	Calcite		Hairline	
40.60	40.62	40.61	Vein	25	Rough	Planar	Calcite		Hairline	
40.73	40.78	40.76	Vein	45	Rough	Undulating	Calcite		Infilled	3mm infill.
40.80	40.82	40.81	Vein	5	Rough	Planar	Calcite		Infilled	
40.81	40.96	40.89	Vein	85	Rough	Planar	Calcite		Intact	
40.88	40.91	40.90	Joint	10	Rough	Planar			Intact	
41.04	41.08	41.06	Joint	30	Rough	Planar		Slightly Altered		
41.13	41.16	41.15	Joint	20	Rough	Irregular			Intact	
41.22	41.25	41.24	Joint	30	Rough	Planar			Intact	
41.32	41.36	41.34	Joint	20	Rough	Planar			Intact	
41.43	41.53	41.48	Vein	45	Rough	Planar	Calcite		Intact	30mm.
41.57	41.66	41.62	Joint	45	Rough	Planar	Calcite		Intact	2mm.
41.59	41.59	41.59	Joint	0	Very Rough	Planar		Slightly Altered		
41.81	41.83	41.82	Joint	20	Rough	Planar				
41.85	41.89	41.87	Joint	45	Rough	Undulating			Intact	
42.01	42.05	42.03	Joint	30	Rough	Planar			Intact	
42.08	42.25	42.17	Vein	85	Rough	Undulating	Calcite		Infilled	
42.41	42.43	42.42	Joint	25	Rough	Planar			Intact	
42.46	43.18	42.82	Vein	90	Very Rough	Planar	Calcite		Infilled	Up to 15mm.
42.56	42.57	42.57	Joint	10	Rough	Planar			Intact	
42.61	42.62	42.62	Joint	10	Rough	Planar			Intact	
42.72	42.73	42.73	Joint	20	Rough	Planar			Intact	
43.00	43.16	43.08	Joint	70	Rough	Planar			Intact	
43.19	43.19	43.19	Joint	0	Rough	Planar			Intact	
43.20	43.36	43.28	Joint	85	Rough	Undulating			Intact	
43.24	43.29	43.27	Joint	30	Rough	Planar			Intact	J x3, 45°, Pln, Ro, IT
43.29	43.40	43.35	Joint	85	Rough	Undulating			Intact	
43.30	43.32	43.31	Joint	35	Rough	Planar		Slightly Altered		
43.39	43.46	43.43	Joint	80	Rough	Irregular			Intact	10 to 80 degrees.
43.41	43.50	43.46	Joint	25	Rough	Planar			Intact	
43.49	43.54	43.52	Joint	30	Rough	Irregular		Slightly Altered		
43.51	43.51	43.51	Joint	5	Rough	Planar			Intact	
43.58	44.00	43.79	Alteration Zone	90	Very Rough	Irregular	Calcite	Moderately Altered	Infilled	Alteration with calcite inclusions/veins.
43.61	43.65	43.63	Joint	10	Rough	Planar			Intact	
43.72	43.72	43.72	Joint	0	Smooth	Planar		Slightly Altered		
43.73	43.78	43.76	Vein	40	Smooth	Planar	Calcite		Infilled	2mm.
44.18	44.48	44.33	Alteration Zone	90	Rough	Irregular	Calcite	Moderately Altered	Infilled	Whitish/green alterations with thin calcite veins within and along the border.
44.48	44.48	44.48	Joint	0	Very Rough	Planar		Slightly Altered		
44.56	44.59	44.58	Vein	40	Smooth	Planar			Infilled	1mm infill.
44.57	44.58	44.58	Joint	25	Smooth	Planar		Slightly Altered		
44.60	44.94	44.77	Vein	88	Rough	Undulating	Calcite		Infilled	3mm infill.
44.63	44.65	44.64	Alteration Zone	15	Rough	Planar		Slightly Altered	Stained	
44.67	44.68	44.68	Joint	15	Rough	Planar		Slightly Altered		
44.77	44.85	44.81	Vein	90	Rough	Irregular	Calcite		Infilled	Up to 4mm infill.
44.89	45.16	45.03	Alteration Zone	90	Very Rough	Irregular	Calcite	Moderately Altered	Infilled	Greenish white alteration with some calcite veins oriented apPlnox 90 degrees, undulating. Infilled up to 7mm at largest point.
45.19	45.34	45.27	Vein	85	Rough	Irregular	Calcite		Infilled	Up to 4mm.
45.31	45.33	45.32	Vein	10	Rough	Undulating	Calcite		Intact	5mm infill.
45.33	45.38	45.36	Alteration Zone	45	Very Rough	Curved		Slightly Altered		
45.37	45.43	45.40	Vein	40	Rough	Curved	Calcite		Infilled	Up to 20mm at thickest point.
45.49	45.56	45.53	Vein	70	Rough	Undulating	Calcite		Infilled	2mm.
45.65	45.91	45.78	Vein	75	Rough	Undulating	Calcite	Moderately Altered	Infilled	Possible calcite? Black colouration? Forks in two
46.01	46.09	46.05	Joint	45	Rough	Undulating			Intact	
46.19	46.35	46.27	Vein	55	Very Rough	Undulating	Calcite		Infilled	2mm infill.
46.20	46.78	46.49	Vein	45	Rough	Planar		Moderately Altered	Stained	V x12, 30-45°, Pln, Ro, SN. Hairline alterations between randomly oriented. Altered bands are 30-45 degrees. Bands from 1 - 5 mm thick.
46.25	46.44	46.35	Vein	75	Rough	Undulating	Calcite		Infilled	V x2, 45°, UN, Ro, IF. Areas between are filled with randomly oriented calcite veins, hairline to 1mm thickness.
46.32	46.77	46.55	Alteration Zone	70	Rough	Planar			Stained	
46.45	46.53	46.49	Alteration Zone							Few white mineral amygdales, up to 4mm in size.

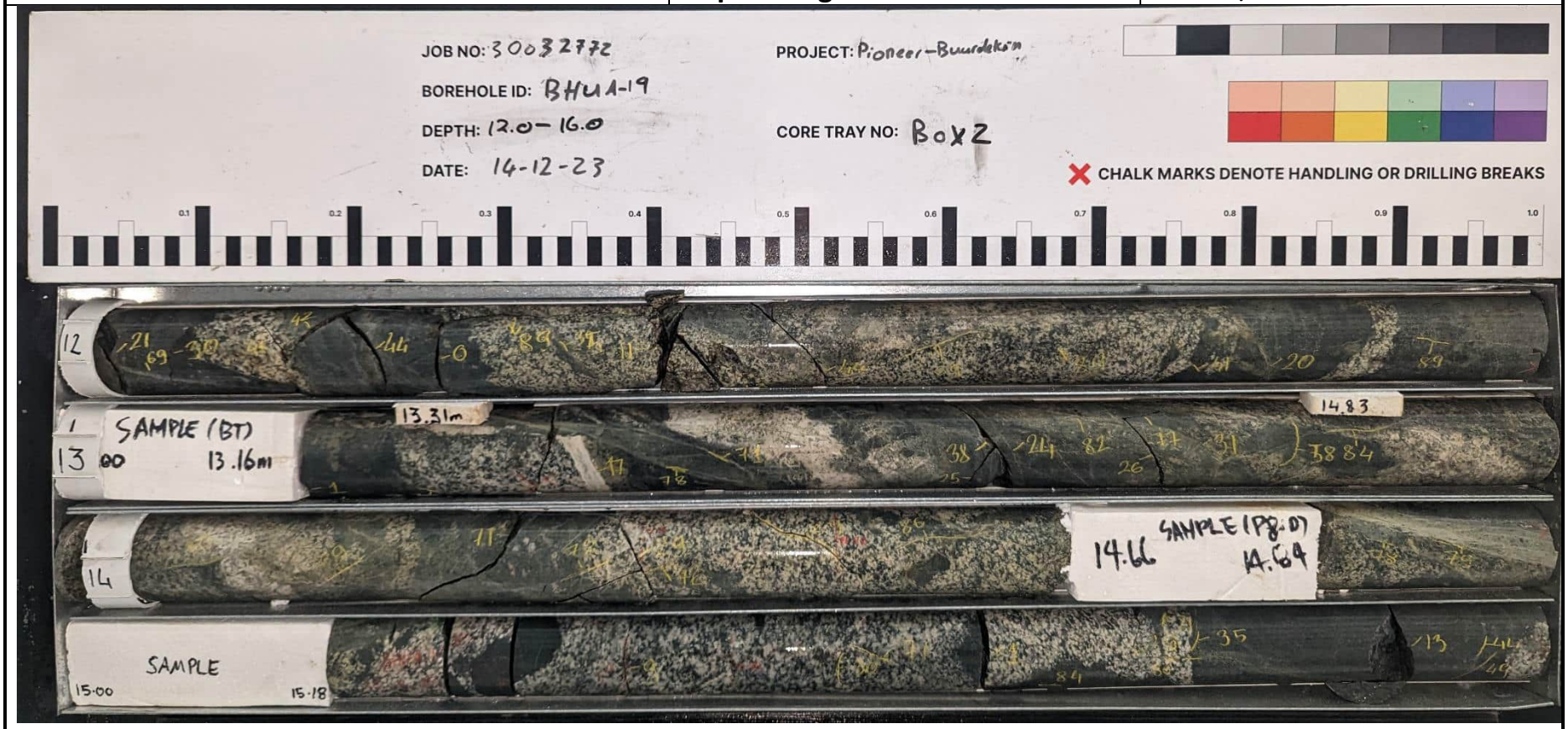
Depth (m)			Type	Angle (°)	Roughness	Shape	Infill	Weathering	Nature	Comments
From	To	Midpoint								
46.63	46.95	46.79	Vein	90	Rough	Planar			Infilled	Dark grey infill? 2mm thick.
46.69	46.76	46.73	Alteration Zone	35	Rough	Planar		Slightly Altered	Stained	
46.73			Alteration Zone	5	Rough	Undulating		Slightly Altered	Stained	
46.77	46.88	46.83	Alteration Zone	50	Rough	Planar		Slightly Altered	Stained	
46.86	47.82	47.34	Alteration Zone	45	Rough	Planar		Slightly Altered	Infilled	
47.02	47.07	47.05	Alteration Zone	20	Rough	Planar			Stained	
47.09	47.17	47.13	Alteration Zone	65	Rough	Planar			Stained	
47.21	47.24	47.23	Alteration Zone	40	Rough	Planar			Stained	
47.69	47.70	47.70	Joint	10	Rough	Planar		Slightly Altered		
47.73	47.91	47.82	Alteration Zone	75	Rough	Planar			Stained	
47.93	47.93	47.93	Joint	5	Very Rough	Stepped		Slightly Altered		
48.09	48.09	48.09	Joint	0	Very Rough	Planar		Slightly Altered		
48.26	48.28	48.27	Joint	15	Rough	Planar			Intact	

Borehole No.: BHUA-19	**Depth Range:** 9.85 – 12.0m	**Box:** 1 / 10



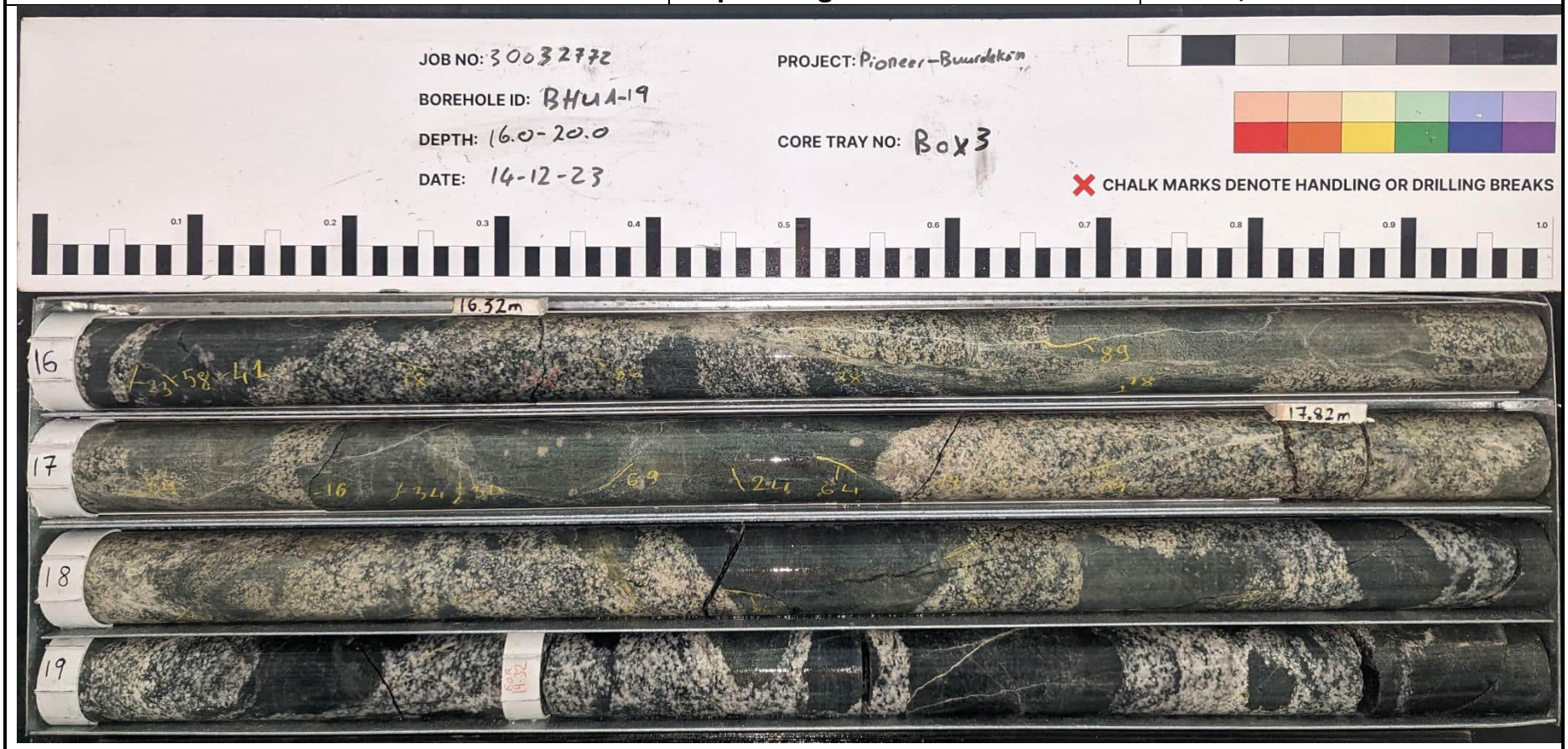
ENGEO	**Geotechnical Investigation Borehole Photos**	**Client:** SMEC		
		Project: Pioneer-Burdekin PHES	**Drawn:** RC	**Page No.**1/10
		Project No. 23117.000.001	**Checked:** SF	**Size:** A4
		Date Drilled:18/06/2023	**Revision:** 0	**Scale:** N/A

Borehole No.: BHUA-19	Depth Range:12.0 – 16.0m	Box: 2 / 10



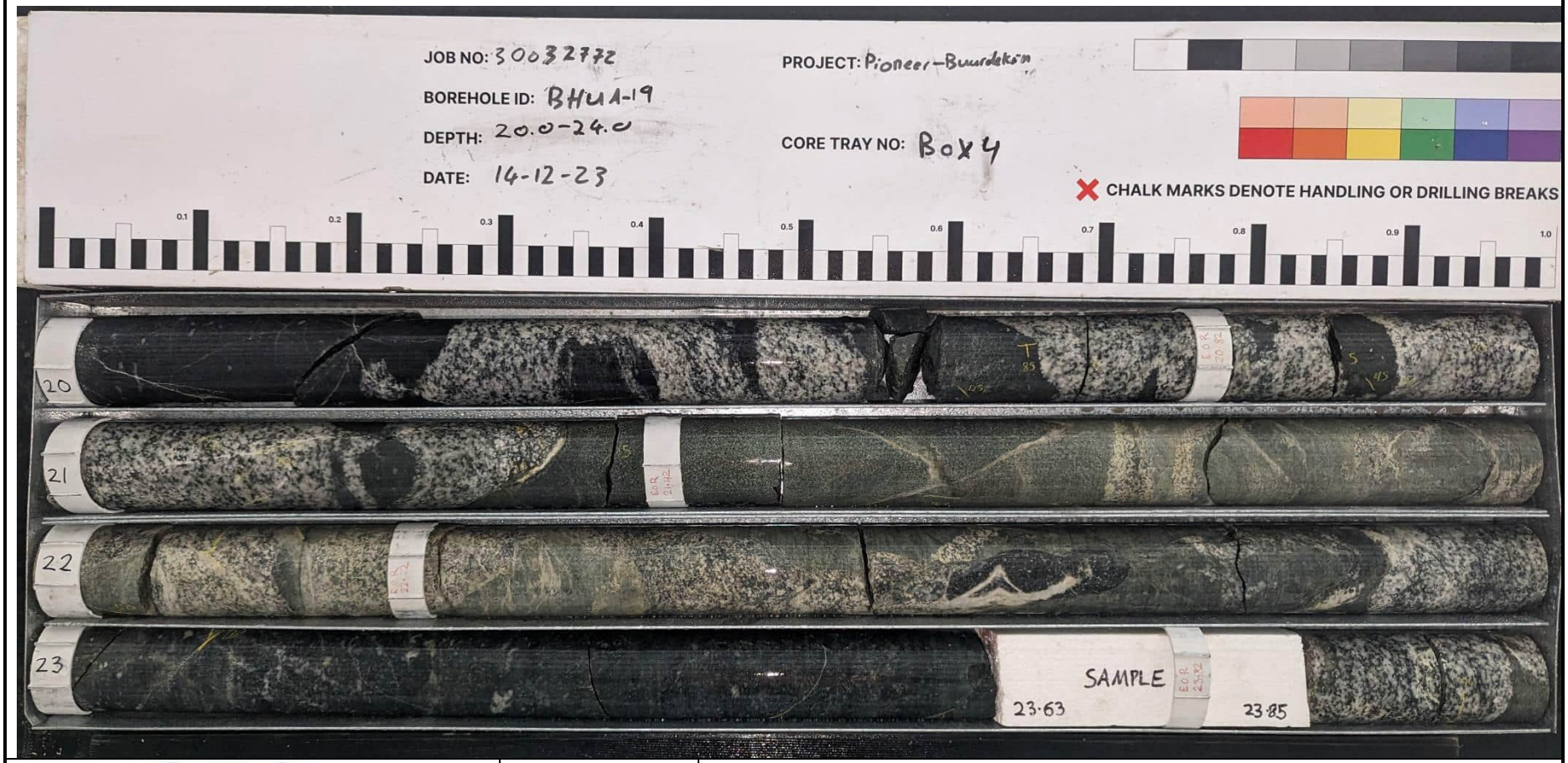
ENGEO	**Geotechnical Investigation Borehole Photos**	**Client:** SMEC		
		Project: Pioneer-Burdekin PHES	**Drawn:** RC	**Page No.**2/10
		Project No. 23117.000.001	**Checked:** SF	**Size:** A4
		Date Drilled:18/06/2023	**Revision:** 0	**Scale:** N/A

Borehole No.: BHUA-19	**Depth Range:**16.0 – 20.0m	**Box:** 3 / 10



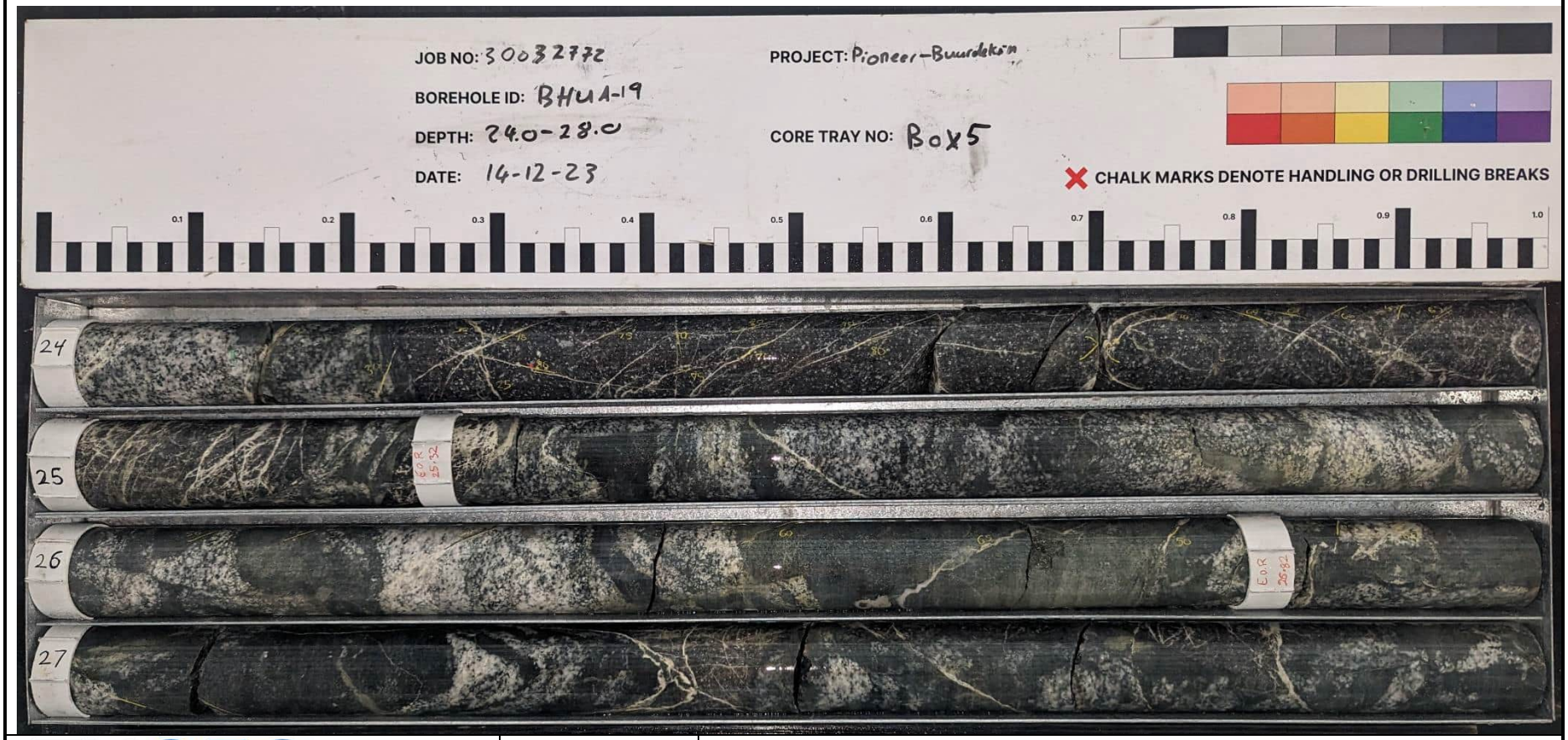
ENGEO	**Geotechnical Investigation Borehole Photos**	**Client:** SMEC		
		Project: Pioneer-Burdekin PHES	**Drawn:** RC	**Page No.3**/10
		Project No. 23117.000.001	**Checked:** SF	**Size:** A4
		Date Drilled:18/06/2023	**Revision:** 0	**Scale:** N/A

Borehole No.: BHUA-19	**Depth Range:**20.0 – 24.0m	**Box:** 4 / 10



ENGEO	**Geotechnical Investigation Borehole Photos**	**Client:** SMEC		
		Project: Pioneer-Burdekin PHES	**Drawn:** RC	**Page No.4**/10
		Project No. 23117.000.001	**Checked:** SF	**Size:** A4
		Date Drilled:18/06/2023	**Revision:** 0	**Scale:** N/A

Borehole No.: BHUA-19	Depth Range:24.0 – 28.0m	Box: 5 / 10



ENGEO	**Geotechnical Investigation Borehole Photos**	**Client:** SMEC		
		Project: Pioneer-Burdekin PHES	**Drawn:** RC	**Page No.**5/10
		Project No. 23117.000.001	**Checked:** SF	**Size:** A4
		Date Drilled:18/06/2023	**Revision:** 0	**Scale:** N/A

Borehole No.: BHUA-19	**Depth Range:**28.0 – 33.0m	**Box:** 6 / 10

ENGEO	**Geotechnical Investigation Borehole Photos**	**Client:** SMEC		
		Project: Pioneer-Burdekin PHES	**Drawn:** RC	**Page No.**6/10
		Project No. 23117.000.001	**Checked:** SF	**Size:** A4
		Date Drilled:18/06/2023	**Revision:** 0	**Scale:** N/A

Borehole No.: BHUA-19	Depth Range:33.0 – 38.0m	Box: 7 / 10

ENGEO	Geotechnical Investigation Borehole Photos	Client: SMEC		
		Project: Pioneer-Burdekin PHES	Drawn: RC	Page No.7/10
		Project No. 23117.000.001	Checked: SF	Size: A4
		Date Drilled:18/06/2023	Revision: 0	Scale: N/A

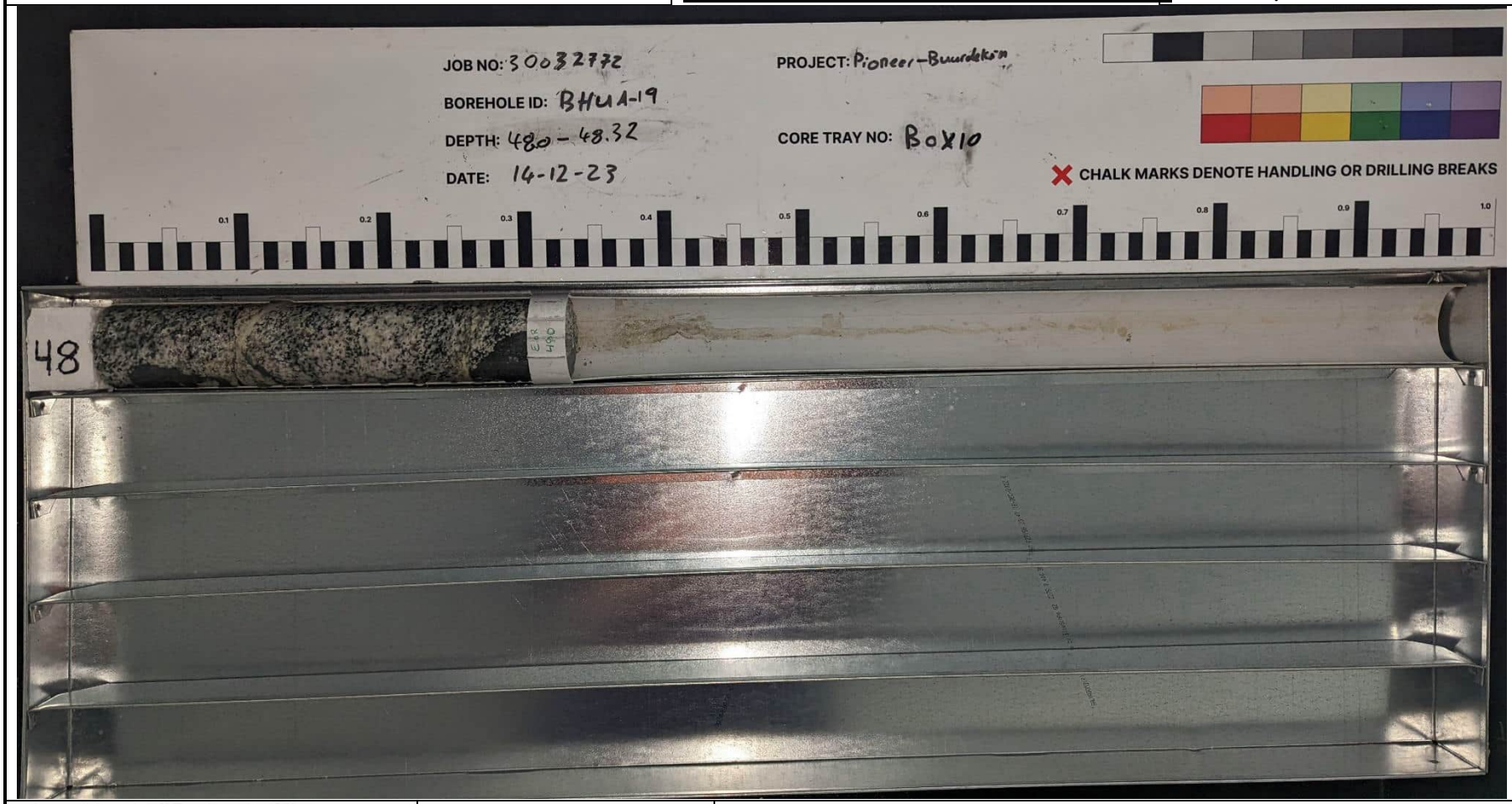
Borehole No.: BHUA-19	**Depth Range:**38.0 – 43.0m	**Box:** 8 / 10

ENGEO	**Geotechnical Investigation Borehole Photos**	**Client:** SMEC		
		Project: Pioneer-Burdekin PHES	**Drawn:** RC	**Page No.8**/10
		Project No. 23117.000.001	**Checked:** SF	**Size:** A4
		Date Drilled:18/06/2023	**Revision:** 0	**Scale:** N/A

Borehole No.: BHUA-19	Depth Range:43.0 – 48.0m	Box: 9 / 10

ENGEO	**Geotechnical Investigation Borehole Photos**	**Client:** SMEC		
		Project: Pioneer-Burdekin PHES	**Drawn:** RC	**Page No.9**/10
		Project No. 23117.000.001	**Checked:** SF	**Size:** A4
		Date Drilled:18/06/2023	**Revision:** 0	**Scale:** N/A

Borehole No.: BHUA-19	**Depth Range:**48.0 – 48.34m	**Box:** 10 / 10



ENGEO	**Geotechnical Investigation Borehole Photos**	**Client:** SMEC		
		Project: Pioneer-Burdekin PHES	**Drawn:** RC	**Page No.**10/10
		Project No. 23117.000.001	**Checked:** SF	**Size:** A4
		Date Drilled:18/06/2023	**Revision:** 0	**Scale:** N/A

COMPOSITE LOG

BOREHOLE TELEVIEWER AND FULL WAVEFORM SONIC LOGS AND ADVANCED ANALYSIS

Epiroc

Hole Name	BHUA_19	**Drill Depth**	48.00m	**Grid Name**		**Logging Unit**	SV013
Field	EUNGELLA	**Bit Size**	96mm	**Collar Easting**	657634m	**Engineer**	JORDAN TEICHRIB
Log Date	31/08/2023	**Casing Type**	STEEL	**Collar Northing**	7664290m	**Client Representative**	TIM HARDIGAN
Location	PIONEER-BURDEKIN	**Casing Depth**	12.0m	**Reduced Level**		**Service Type**	Televiewer Interpretation

TELEVIEWER LOGS

Amplitude	ATV Amplitude Image
TT-CENT	Centralised ATV Travel Time Image
3D TV LOG	3D Televiewer Image
Caliper TT-CENT	Acoustic Travel Time Caliper
OTV Picture	Optical Televiewer Image

FULL WAVFORM SONIC LOG & MECHANICAL PROPERTIES

STC-MP	Monopole Slowness-Time-Coherence Projection
DTC	Compressional wave slowness
DTS	Shear wave slowness
VP	Compressional wave velocity
VS	Shear wave velocity
VPVS	Compressional to Shear wave velocity ratio
UCS	Uniaxial (Unconfined) Compressive Strength
Poisson's Ratio	Indicator of material elastic deformation
Young's Modulus	Material length change by applied stress
Bulk Modulus	Change in material volume by applied stress
Shear Modulus	Transverse material displacement by applied stress

STRUCTURAL LOGS

DIPA	Apparent Dip Feature Picks (Sinusoid Presentation)
DIPT	True Dip Feature Picks (Tadpole Presentation)
RD - STRIKE	Rose Diagram - Strike Open Fract. (Arrows represent Mean Vector)
PP - DIP	Polar Projection - Dip (Schmidt) (Lower Hemisphere)

STRUCTURAL ANALYSIS LOGS

RQD	Rock Quality Designation
AFD	(Partial) Open Apparent Fracture Density
TFD	(Partial) Open True Fracture Density
RHI	Rock Hardness Index

GEOPHYSICAL AND VERTICALITY LOGS

Density	Density Log
GAMMA	Natural Gamma Ray
Tilt	Hole Inclination (0 = Vertical Down)
Azimuth	Hole Azimuth
CALIPER	Mechanical Caliper

FEATURES & TADPOLES

Partially Open Fracture | Closed Fracture | Foliation/Banding/Bedding | Healed Fracture/Vein

COMMENTS

Image and azimuth data are presented oriented to True north. The magnetic declination correction is +8.12 degrees.

Rock Quality Designation (RQD) is the (Sum of length of image interval sections of more than 10 cm length unaffected by open fractures, faults & breakouts) divided by the (Total length of the interval) times (100%). RQD has been calculated for one meter intervals.

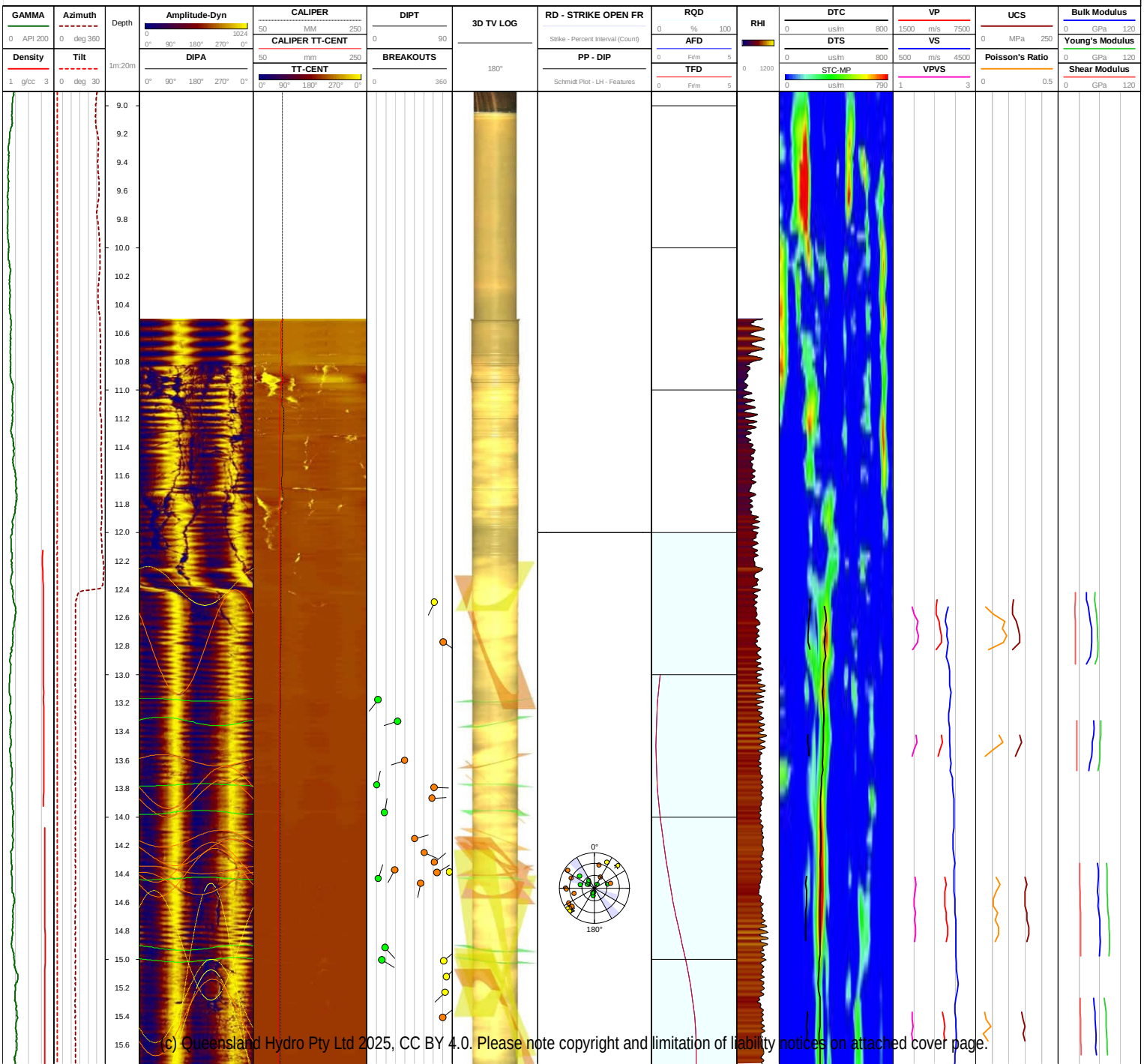
The STC-MP track was produced by processing the RX1-1A (60 cm), RX2-1A (80 cm), RX3-1A (100 cm) and RX4-1A (120 cm) receiver data after applying a moving average filter, stacking and a frequency filter.

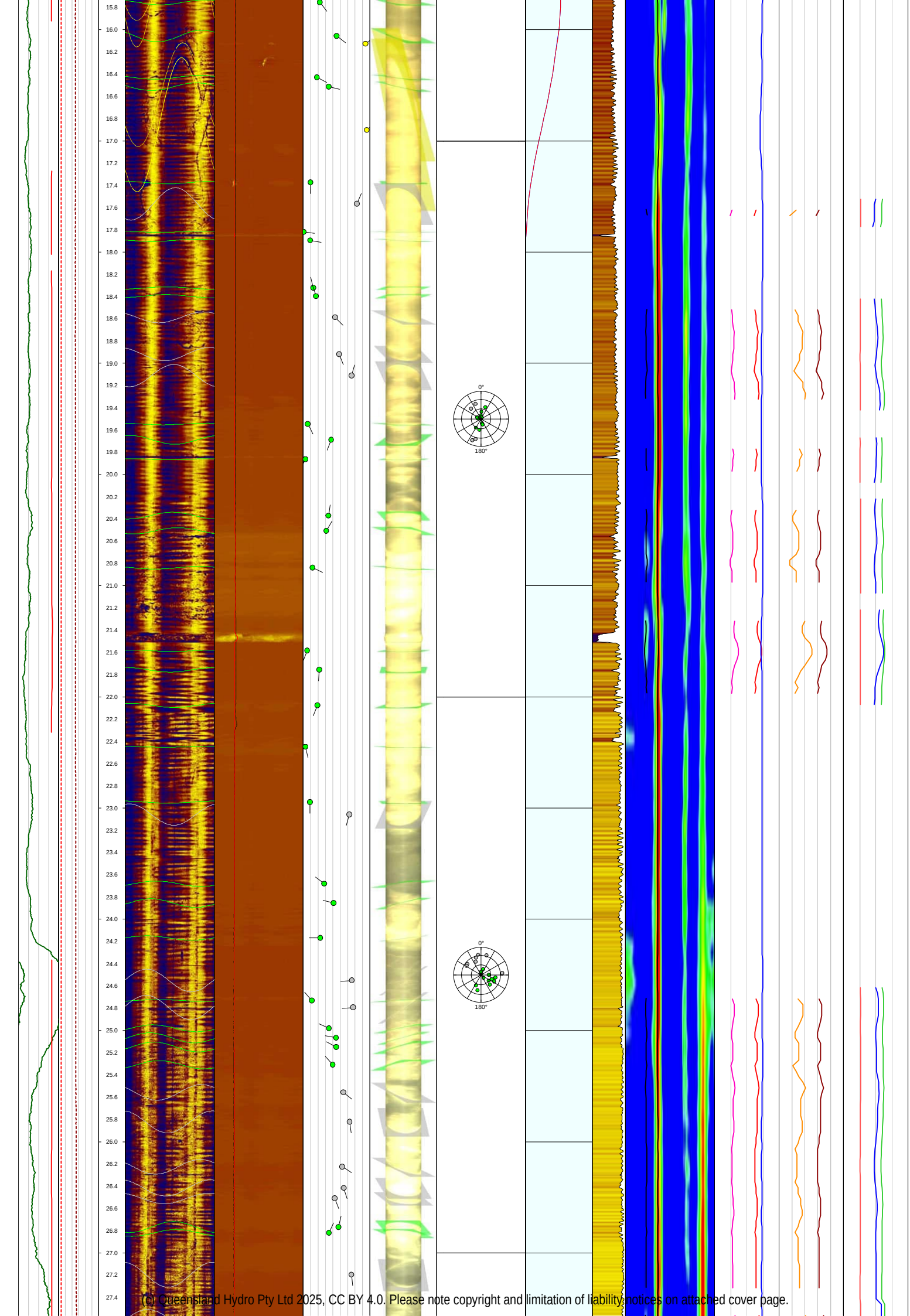
Uniaxial Compressive Strength (UCS) was calculated using an exponential trendline between DTC and UCS (McNally, 1987): UCS = 1200 * exp(-0.036 * DTC) , with UCS in MPa and DTC in µs/m units.

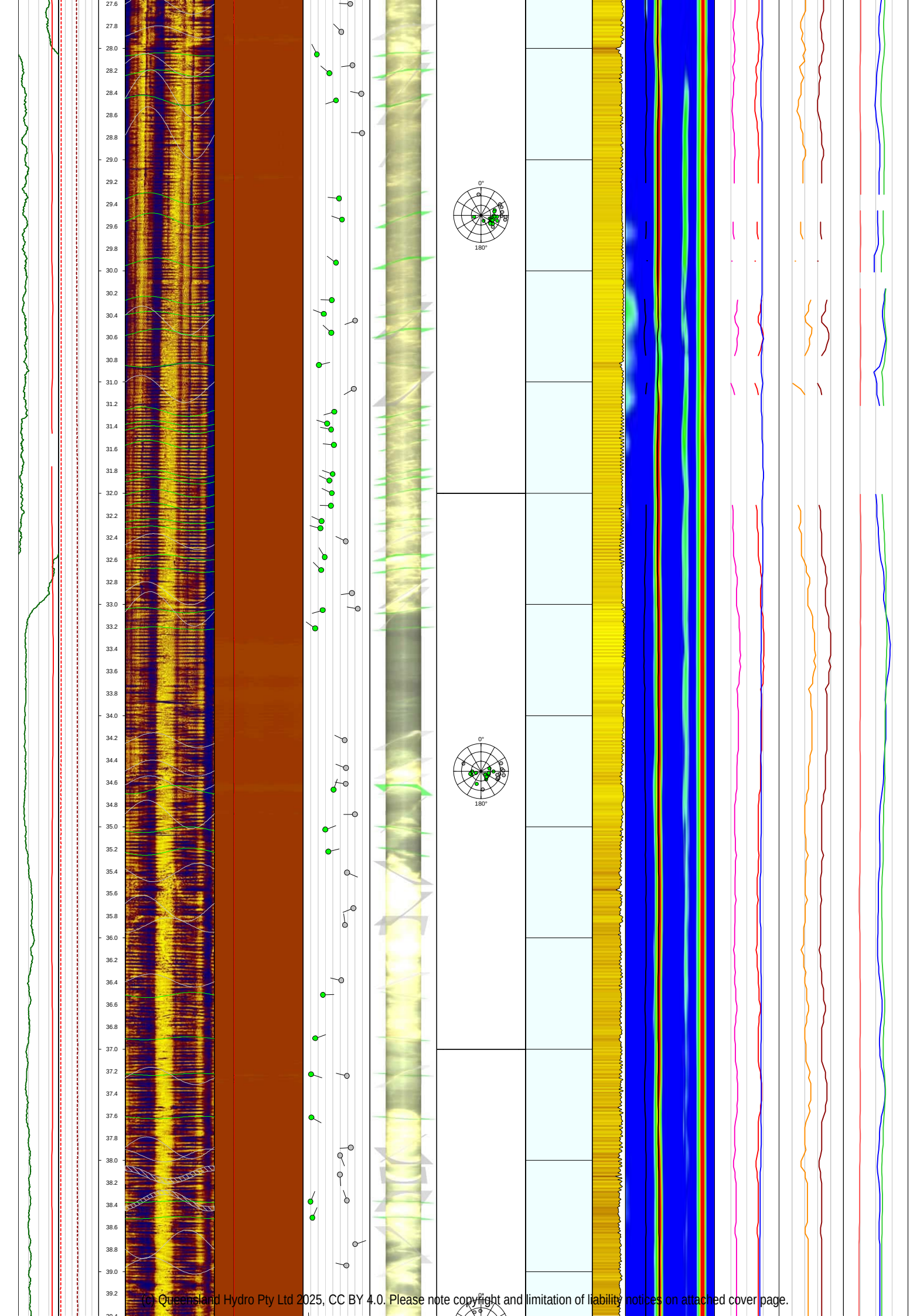
Poisson's Ratio was calculated from DTC & DTS. Young's, Bulk & Shear Modulus were calculated from DTC, DTS & Density estimated as ρ = 0.31.Vp exp(1/4)

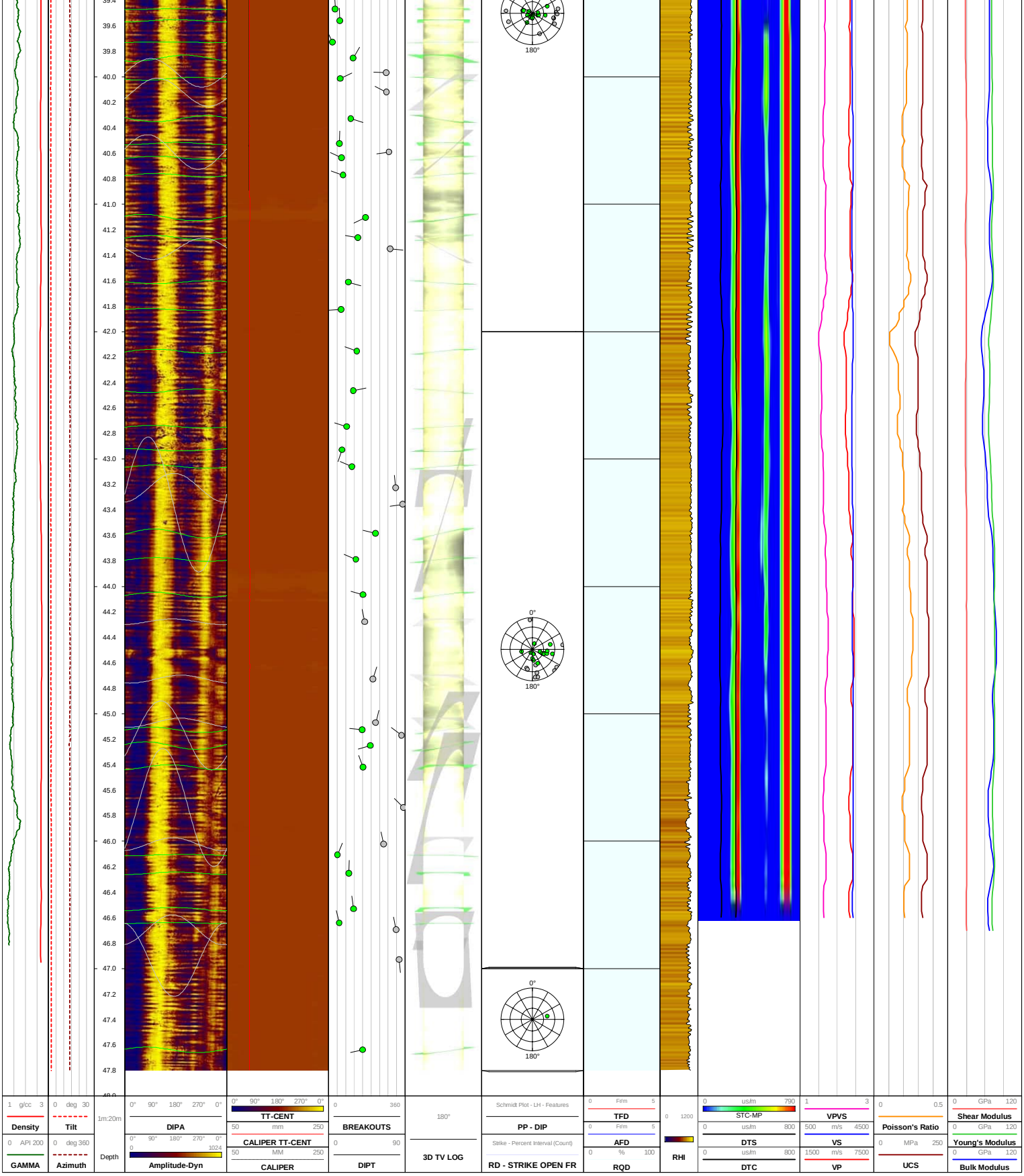
IMPORTANT NOTE

The following interpretations are opinions based upon inferences from borehole logs,
Epiroc Kinetic Logging Services cannot and does not guarantee the correctness or accuracy of any interpretations.
Therefore, Epiroc Kinetic Logging Services shall not be liable or responsible for any loss, damage, cost or expense incurred or sustained by anyone resulting from any interpretations.









1 g/cc 3	0 deg 30	1m:20m	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	0 360	180°	Schmidt Plot - LH - Features	0 Fr/m 5	0 1200	0 us/m 700	1 3	0 0.5	0 GPa 120
Density	Tilt		DIPA	TT-CENT	BREAKOUTS		PP - DIP	TFD		STC-MP	VPVS	Poisson's Ratio	Shear Modulus
0 API 200	0 deg 360	Depth	0 1024	50 mm 250	0 90		Strike - Percent Interval (Count)	0 Fr/m 5		0 us/m 800	500 m/s 4500	0 MPa 250	0 GPa 120
GAMMA	Azimuth		Amplitude-Dyn	CALIPER TT-CENT	DIPT	3D TV LOG	RD - STRIKE OPEN FR	AFD	RHI	DTS	VS	UCS	Young's Modulus
				50 MM 250				0 % 100		0 us/m 800	1500 m/s 7500		0 GPa 120
				CALIPER				RQD		DTC	VP		Bulk Modulus

BHUA_19 Televiewer Structures

Feature Depth	Depth	Azimuth	Dip	Aperture	Visible Azimuth Ranges	Type	Features
m	m	deg	deg	mm	deg		
12.49	12.38	206.12	71.2	0	151.62-250.62	2	Partially Open Fracture
12.77	12.77	123.41	80.6	0		3	Closed Fracture
13.18	13.18	216.46	11.63	0		4	Foliation/Banding/Bedding
13.33	13.33	252.73	32.35	0		4	Foliation/Banding/Bedding
13.6	13.6	253.01	39.91	0		3	Closed Fracture
13.77	13.77	13.37	10.56	0		4	Foliation/Banding/Bedding
13.79	13.79	90.77	70.81	0		3	Closed Fracture
13.87	13.87	88	68.72	0		3	Closed Fracture
13.97	13.97	8.65	18.54	0		4	Foliation/Banding/Bedding
14.15	14.15	74.49	50.32	0		3	Closed Fracture
14.25	14.25	113.4	60.74	0		3	Closed Fracture
14.32	14.32	50.76	71.1	0		3	Closed Fracture
14.37	14.37	209.08	29.53	0		3	Closed Fracture
14.39	15.31	46.26	87.11	0	203.30-242.00	2	Partially Open Fracture
14.39	14.39	59.47	73.97	0		3	Closed Fracture
14.43	14.43	17.6	12.12	0		4	Foliation/Banding/Bedding
14.47	14.47	191.17	56.76	0		3	Closed Fracture
14.92	14.92	137.9	19.17	0		4	Foliation/Banding/Bedding
15	15	122.99	16	0		4	Foliation/Banding/Bedding
15.01	15.29	49.31	80.87	0	197.69-249.89	2	Partially Open Fracture
15.12	15.49	46.48	83.86	0	177.09-256.29	2	Partially Open Fracture
15.23	14.9	226.5	82.39	0	197.34-262.14	2	Partially Open Fracture
15.41	15.41	50.91	80.02	0		3	Closed Fracture
15.75	15.75	142.34	22.54	0		4	Foliation/Banding/Bedding
16.06	16.06	128.96	45.16	0		4	Foliation/Banding/Bedding
16.13	16.58	52.26	84.3	0	204.11-252.71	2	Partially Open Fracture
16.43	16.43	117.47	18.54	0		4	Foliation/Banding/Bedding
16.51	16.51	103.93	34.36	0		4	Foliation/Banding/Bedding
16.9	16.85	47.19	85.83	0	27.76-258.16	2	Partially Open Fracture
17.37	17.37	181.29	9.98	0		4	Foliation/Banding/Bedding
17.57	17.57	22.21	72.67	0		5	Healed Fracture/Vein
17.82	17.82	98.41	0.51	0		4	Foliation/Banding/Bedding
17.89	17.89	101.11	9.6	0		4	Foliation/Banding/Bedding
18.32	18.32	345.56	13.89	0		4	Foliation/Banding/Bedding
18.4	18.4	342.67	17.54	0		4	Foliation/Banding/Bedding
18.59	18.59	135.33	43.31	0		5	Healed Fracture/Vein
18.92	18.92	158.91	48.48	0		5	Healed Fracture/Vein
19.11	19.11	15.75	65.39	0		5	Healed Fracture/Vein
19.55	19.55	153.22	6.38	0		4	Foliation/Banding/Bedding
19.69	19.69	201.57	37.84	0		4	Foliation/Banding/Bedding
19.86	19.86	206.89	3	0		4	Foliation/Banding/Bedding
20.37	20.37	8.44	34.07	0		4	Foliation/Banding/Bedding
20.51	20.51	29.57	31.13	0		4	Foliation/Banding/Bedding
20.84	20.84	114.23	12.51	0		4	Foliation/Banding/Bedding
21.58	21.58	202.87	5.53	0		4	Foliation/Banding/Bedding

Feature Depth	Depth	Azimuth	Dip	Aperture	Visible Azimuth Ranges	Type	Features
m	m	deg	deg	mm	deg		
21.76	21.76	184.43	21.75	0		4	Foliation/Banding/Bedding
22.08	22.08	202.17	19.06	0		4	Foliation/Banding/Bedding
22.45	22.45	167	2.86	0		4	Foliation/Banding/Bedding
22.95	22.95	180.29	9.35	0		4	Foliation/Banding/Bedding
23.06	23.06	196.45	62.33	0		5	Healed Fracture/Vein
23.68	23.68	307.01	28.62	0		4	Foliation/Banding/Bedding
23.85	23.85	285.53	41.22	0		4	Foliation/Banding/Bedding
24.17	24.17	271.3	23.15	0		4	Foliation/Banding/Bedding
24.55	24.55	266.84	65.7	0		5	Healed Fracture/Vein
24.73	24.73	318.13	11.81	0		4	Foliation/Banding/Bedding
24.79	24.79	265.2	67.38	0		5	Healed Fracture/Vein
24.98	24.98	292.96	34.8	0		4	Foliation/Banding/Bedding
25.07	25.07	280.53	44.38	0		4	Foliation/Banding/Bedding
25.15	25.15	296.79	44.64	0		4	Foliation/Banding/Bedding
25.31	25.31	318.15	40.02	0		4	Foliation/Banding/Bedding
25.56	25.56	128.37	54.23	0		5	Healed Fracture/Vein
25.82	25.82	171.79	62.72	0		5	Healed Fracture/Vein
26.23	26.23	122.21	52.79	0		5	Healed Fracture/Vein
26.42	26.42	163.68	55	0		5	Healed Fracture/Vein
26.51	26.51	157.85	42.62	0		5	Healed Fracture/Vein
26.77	26.77	13.54	47.81	0		4	Foliation/Banding/Bedding
26.82	26.82	25.17	34.69	0		4	Foliation/Banding/Bedding
27.2	27.2	172.95	65.24	0		5	Healed Fracture/Vein
27.6	27.6	272.21	63.65	0		5	Healed Fracture/Vein
27.85	27.85	314.39	51.49	0		5	Healed Fracture/Vein
28.05	28.05	333.01	18.56	0		4	Foliation/Banding/Bedding
28.15	28.15	261.53	66.62	0		5	Healed Fracture/Vein
28.22	28.22	309.43	35.3	0		4	Foliation/Banding/Bedding
28.41	28.41	281.17	78.72	0		5	Healed Fracture/Vein
28.47	28.47	250.81	44.26	0		4	Foliation/Banding/Bedding
28.76	28.76	274.51	79.56	0		5	Healed Fracture/Vein
29.35	29.35	275.62	48.74	0		4	Foliation/Banding/Bedding
29.54	29.54	288.98	52.39	0		4	Foliation/Banding/Bedding
29.93	29.93	306.68	44.31	0		4	Foliation/Banding/Bedding
30.26	30.26	272.3	38.79	0		4	Foliation/Banding/Bedding
30.39	30.39	291.26	28.03	0		4	Foliation/Banding/Bedding
30.45	30.45	248.44	70.08	0		5	Healed Fracture/Vein
30.56	30.56	312.64	38.01	0		4	Foliation/Banding/Bedding
30.85	30.85	74.66	21.39	0		4	Foliation/Banding/Bedding
31.06	31.06	240.61	68.47	0		5	Healed Fracture/Vein
31.27	31.27	254.83	41.94	0		4	Foliation/Banding/Bedding
31.37	31.37	287.43	32.45	0		4	Foliation/Banding/Bedding
31.43	31.43	281.69	37.81	0		4	Foliation/Banding/Bedding
31.57	31.57	276.87	41.66	0		4	Foliation/Banding/Bedding
31.83	31.83	288.56	39.87	0		4	Foliation/Banding/Bedding
31.89	31.89	295.78	35.37	0		4	Foliation/Banding/Bedding

Feature Depth	Depth	Azimuth	Dip	Aperture	Visible Azimuth Ranges	Type	Features
m	m	deg	deg	mm	deg		
32	32	294.66	38.64	0		4	Foliation/Banding/Bedding
32.11	32.11	272.63	37.41	0		4	Foliation/Banding/Bedding
32.25	32.25	294.66	24.96	0		4	Foliation/Banding/Bedding
32.32	32.32	284.78	23.32	0		4	Foliation/Banding/Bedding
32.43	32.43	295.54	57.71	0		5	Healed Fracture/Vein
32.58	32.58	328.64	29.24	0		4	Foliation/Banding/Bedding
32.69	32.69	315.59	24.27	0		4	Foliation/Banding/Bedding
32.9	32.9	264.11	65.87	0		5	Healed Fracture/Vein
33.04	33.04	279.85	73.83	0		5	Healed Fracture/Vein
33.05	33.05	252.6	26.52	0		4	Foliation/Banding/Bedding
33.22	33.22	305.65	16.23	0		4	Foliation/Banding/Bedding
34.22	34.22	296.11	56.22	0		5	Healed Fracture/Vein
34.47	34.47	290.93	58	0		5	Healed Fracture/Vein
34.61	34.61	278.89	57.52	0		5	Healed Fracture/Vein
34.67	34.67	18.7	41.1	0		4	Foliation/Banding/Bedding
34.89	34.89	268.78	69.91	0		5	Healed Fracture/Vein
35.03	35.03	67.22	30.13	0		4	Foliation/Banding/Bedding
35.22	35.22	75.6	34.14	0		4	Foliation/Banding/Bedding
35.41	35.41	113.22	59.36	0		5	Healed Fracture/Vein
35.73	35.73	248.51	67.78	0		5	Healed Fracture/Vein
35.88	35.88	354.26	56.53	0		5	Healed Fracture/Vein
36.38	36.38	282.91	51.72	0		5	Healed Fracture/Vein
36.51	36.51	87.87	26.78	0		4	Foliation/Banding/Bedding
36.9	36.9	70.82	16.61	0		4	Foliation/Banding/Bedding
37.23	37.23	107.45	10.93	0		4	Foliation/Banding/Bedding
37.24	37.24	283.59	59.12	0		5	Healed Fracture/Vein
37.61	37.61	118.44	10.96	0		4	Foliation/Banding/Bedding
37.89	37.89	267.97	64.45	0		5	Healed Fracture/Vein
37.96	37.96	156.09	49.74	0		5	Healed Fracture/Vein
38.13	38.13	177.12	49.49	28.9		5	Healed Fracture/Vein
38.36	38.36	340.12	59.13	20.39		5	Healed Fracture/Vein
38.37	38.37	23.57	9.78	0		4	Foliation/Banding/Bedding
38.52	38.52	24.21	12.67	0		4	Foliation/Banding/Bedding
38.75	38.75	69.74	70.26	0		5	Healed Fracture/Vein
38.95	38.95	282.26	58.54	0		5	Healed Fracture/Vein
39.47	39.47	358.23	7.67	0		4	Foliation/Banding/Bedding
39.56	39.56	357.73	13.14	0		4	Foliation/Banding/Bedding
39.73	39.73	333.81	4.53	0		4	Foliation/Banding/Bedding
39.85	39.85	29.4	28.68	0		4	Foliation/Banding/Bedding
39.97	39.97	272.43	67.66	0		5	Healed Fracture/Vein
40.01	40.01	64.46	13.91	0		4	Foliation/Banding/Bedding
40.12	40.12	296.39	67.97	0		5	Healed Fracture/Vein
40.33	40.33	105.74	26.17	0		4	Foliation/Banding/Bedding
40.52	40.52	0.63	12.85	0		4	Foliation/Banding/Bedding
40.59	40.59	260.37	71.23	0		5	Healed Fracture/Vein
40.64	40.64	295.31	15.23	0		4	Foliation/Banding/Bedding

Feature Depth	Depth	Azimuth	Dip	Aperture	Visible Azimuth Ranges	Type	Features
m	m	deg	deg	mm	deg		
40.77	40.77	289.88	17.22	0		4	Foliation/Banding/Bedding
41.1	41.1	244.86	43.57	0		4	Foliation/Banding/Bedding
41.26	41.26	279.86	34.63	0		4	Foliation/Banding/Bedding
41.35	41.35	95.24	72.75	0		5	Healed Fracture/Vein
41.61	41.61	106.56	23.55	0		4	Foliation/Banding/Bedding
41.83	41.83	266.41	14.83	0		4	Foliation/Banding/Bedding
42.15	42.15	289.89	33.37	0		4	Foliation/Banding/Bedding
42.46	42.46	77.55	28.98	0		4	Foliation/Banding/Bedding
42.75	42.75	287.31	21.3	0		4	Foliation/Banding/Bedding
42.93	42.93	199.83	15.99	0		4	Foliation/Banding/Bedding
43.06	43.06	294.01	27.49	0		4	Foliation/Banding/Bedding
43.23	43.23	354.17	78.92	0		5	Healed Fracture/Vein
43.36	43.36	261.51	87.32	0		5	Healed Fracture/Vein
43.58	43.58	283.48	55.21	0		4	Foliation/Banding/Bedding
43.79	43.79	294.06	32.08	0		4	Foliation/Banding/Bedding
44.07	44.07	286.84	40.38	0		4	Foliation/Banding/Bedding
44.28	44.28	348.07	42.53	0		5	Healed Fracture/Vein
44.73	44.73	16.96	52.16	0		5	Healed Fracture/Vein
45.07	45.07	13.86	55.49	0		5	Healed Fracture/Vein
45.13	45.13	277.15	39.59	0		4	Foliation/Banding/Bedding
45.17	45.17	306.79	85.79	0		5	Healed Fracture/Vein
45.25	45.25	254.71	49.19	0		4	Foliation/Banding/Bedding
45.42	45.42	339.14	40.36	0		4	Foliation/Banding/Bedding
45.74	45.74	314.05	88.24	0		5	Healed Fracture/Vein
46.02	46.02	348.52	64.85	0		5	Healed Fracture/Vein
46.11	46.11	22.27	10.37	0		4	Foliation/Banding/Bedding
46.25	46.25	0.6	23.96	0		4	Foliation/Banding/Bedding
46.53	46.53	352.35	29.41	0		4	Foliation/Banding/Bedding
46.64	46.64	347.82	12.57	0		4	Foliation/Banding/Bedding
46.7	46.7	348.2	79.6	0		5	Healed Fracture/Vein
46.93	46.93	174.63	83.08	0		5	Healed Fracture/Vein
47.64	47.64	257.1	40.14	0		4	Foliation/Banding/Bedding

BHUA_19

SMEC - Pioneer-Burdekin

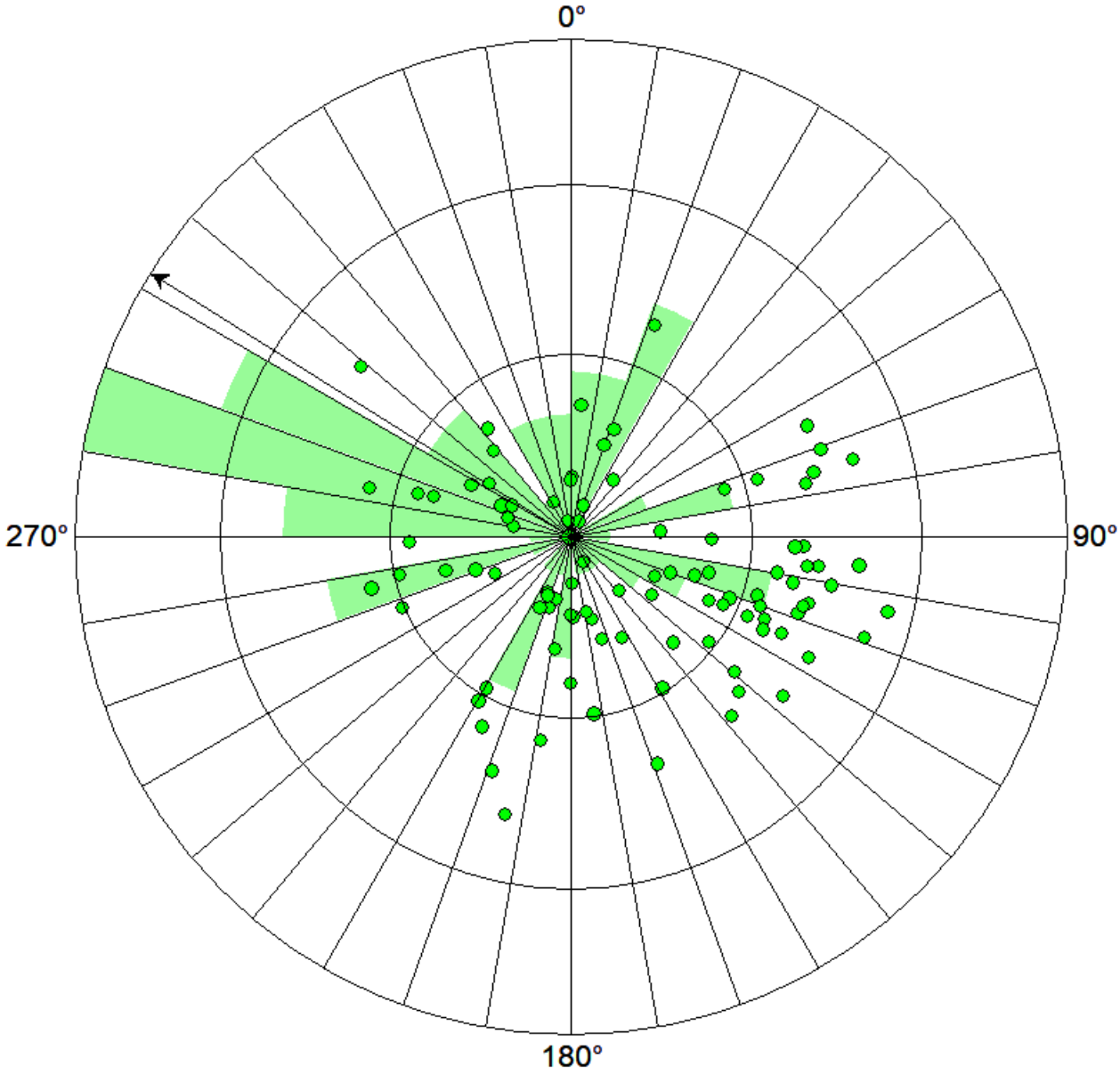
Acoustic and Optical Televiewer image log Schmidt Stereonet evaluation for interpreted log interval

Log Date: 31 August 2023

IMPORTANT NOTE

The following interpretations are opinions based upon inferences from borehole logs. Epiroc Kinetic Logging Services cannot and does not guarantee the correctness or accuracy of any interpretations. Therefore, Epiroc Kinetic Logging Services shall not be liable or responsible for any loss, damage, cost, or expense incurred or sustained by anyone resulting from any interpretations.

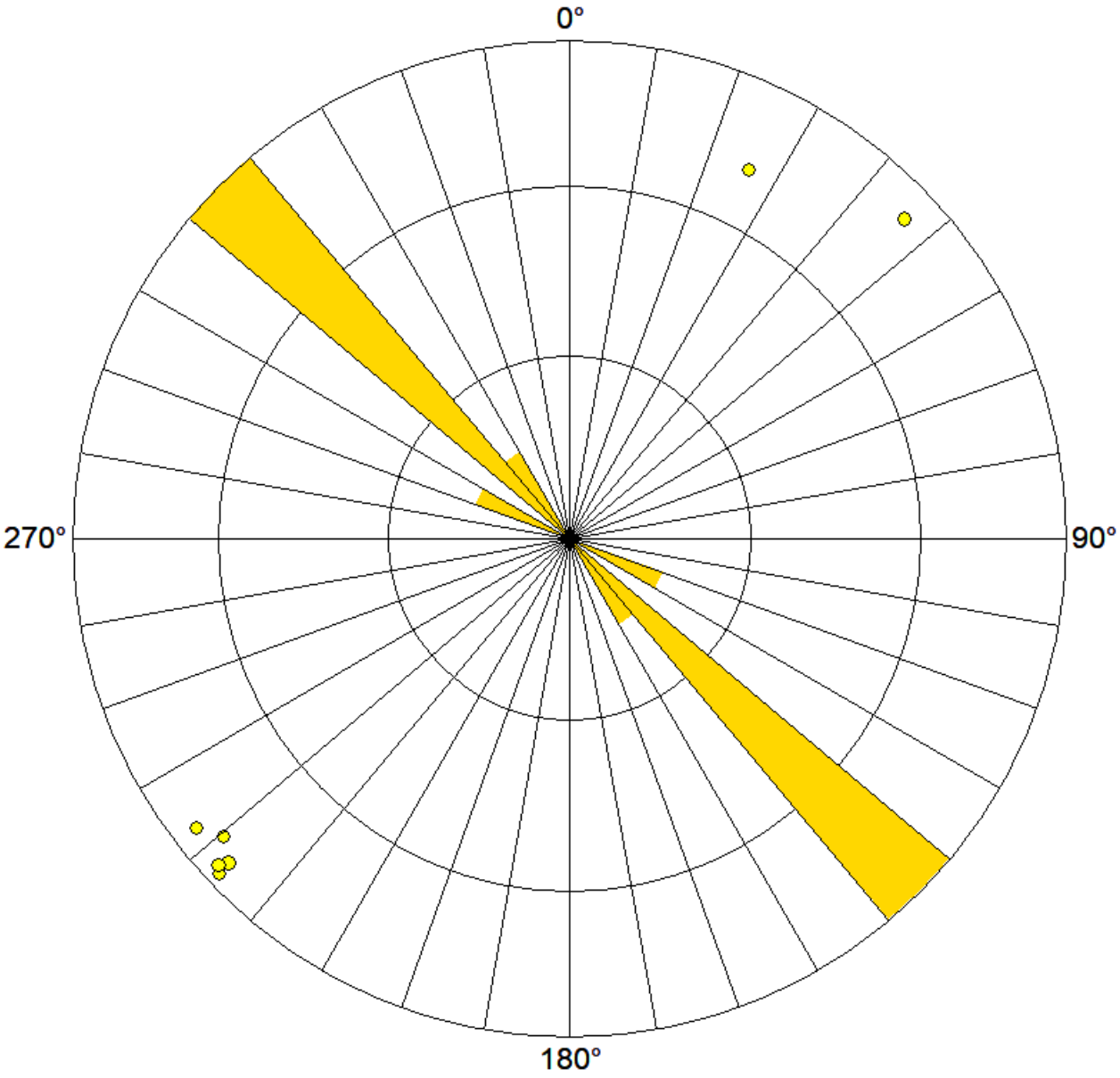
FOLIATIONS – 12.0 TO 47.8 M



	Counts	Dip [deg]	Azimuth [deg]	Strike [deg]
Mean	99	12.75	302.06	32.06 - 212.06

Foliations: Scattered dip azimuth directions with a broad preference in the WNW dip azimuth direction

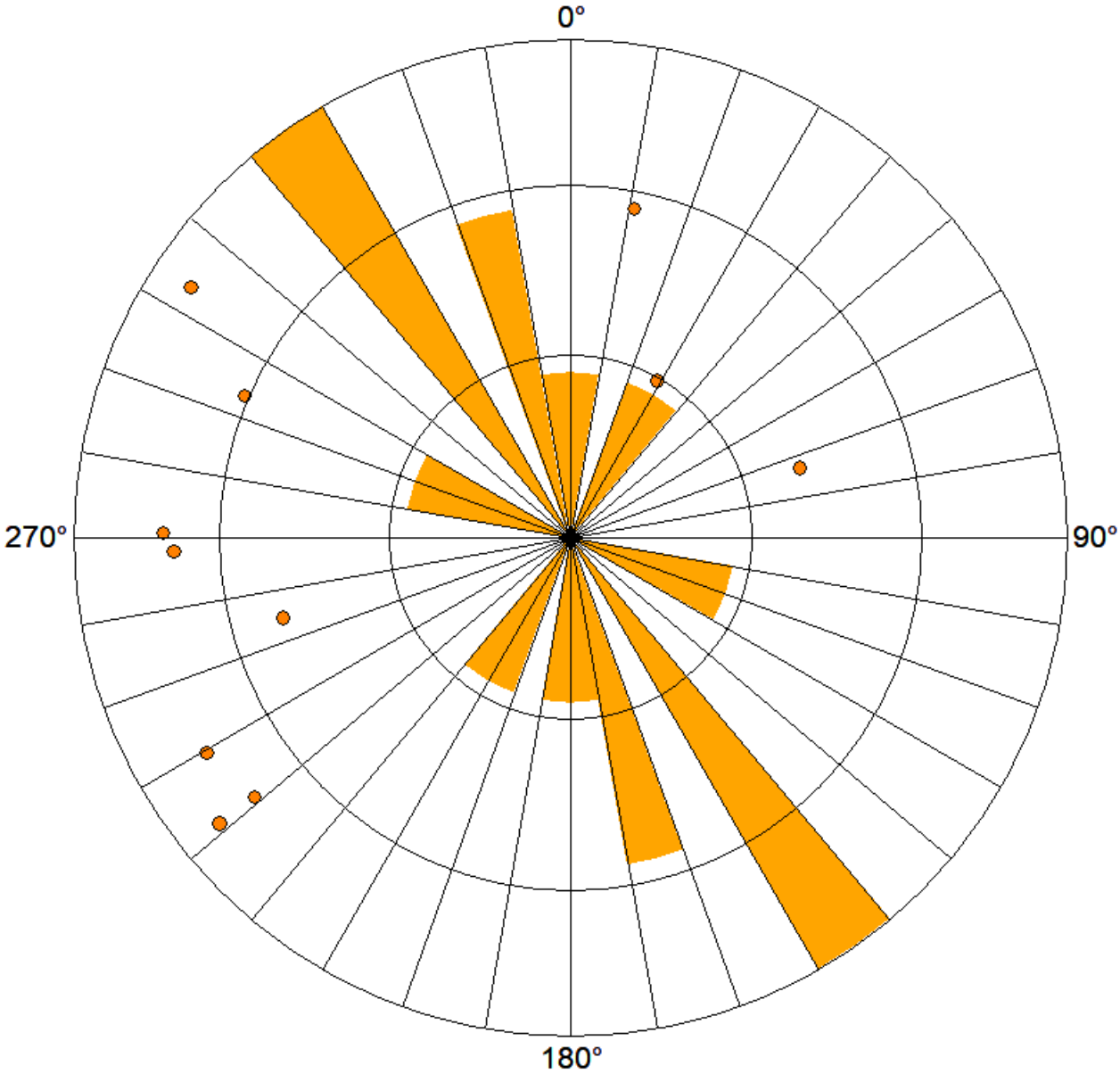
PARTIAL OPEN FRACTURES – 12.0 TO 47.8 M



	Counts	Dip [deg]	Azimuth [deg]	Strike [deg]
Mean	7	89.44	45.31	135.31 - 315.31

Partial Open Fractures: Preferred SE to NW strike direction (caution: small number of picks)

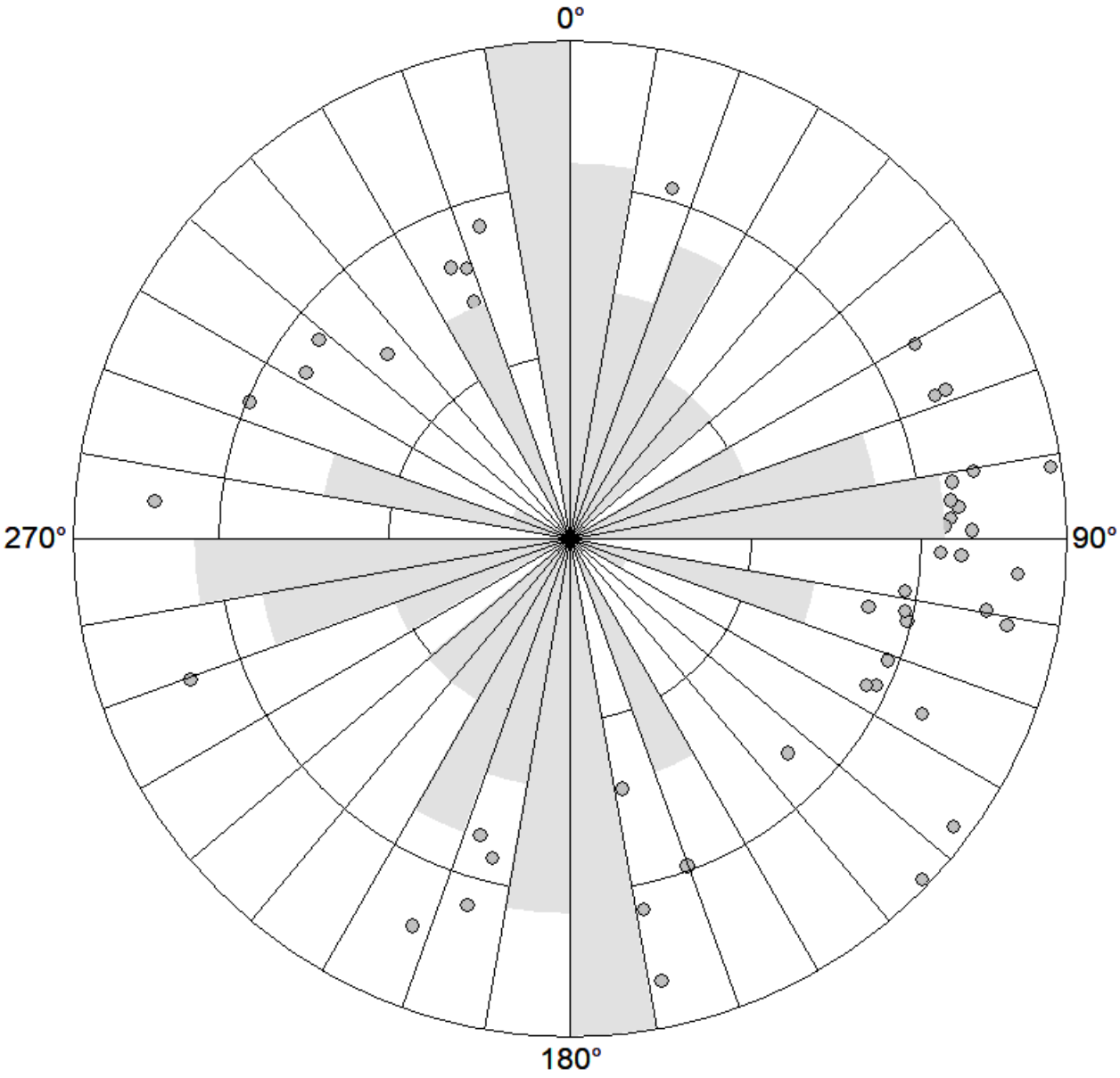
CLOSED FRACTURES – 12.0 TO 47.8 M



	Counts	Dip [deg]	Azimuth [deg]	Strike [deg]
Mean	11	71.21	78.34	168.34 - 348.34

Open Fractures: Scattered strike directions with a preference in the SE to NW strike direction

HEALED FRACTURES AND VEINS – 12.0 TO 47.8 M



	Counts	Dip [deg]	Azimuth [deg]	Strike [deg]
Mean	52	71.37	287.82	17.82 - 197.82

Healed Fractures and Veins: Scattered strike directions

OPTV & BHTV LOG

BHUA_19

WELL	BHUA_19	**DRILL DEPTH**	48	**DATE**	31/08/2023
FIELD	PIONEER-BURDEKIN	**BIT SIZE**	96mm	**CLIENT REP**	TIM HARDIGAN
LOCATION	EUNGELLA	**CASING WEIGHT**	STEEL	**ENGINEER**	JRT
UWI	SV013	**CASING SIZE**	101mm	**EASTING**	628183
COUNTRY	AUSTRALIA	**CASING BOTTOM**	22m	**NORTHING**	5174292

TELEVIEWER LOGS

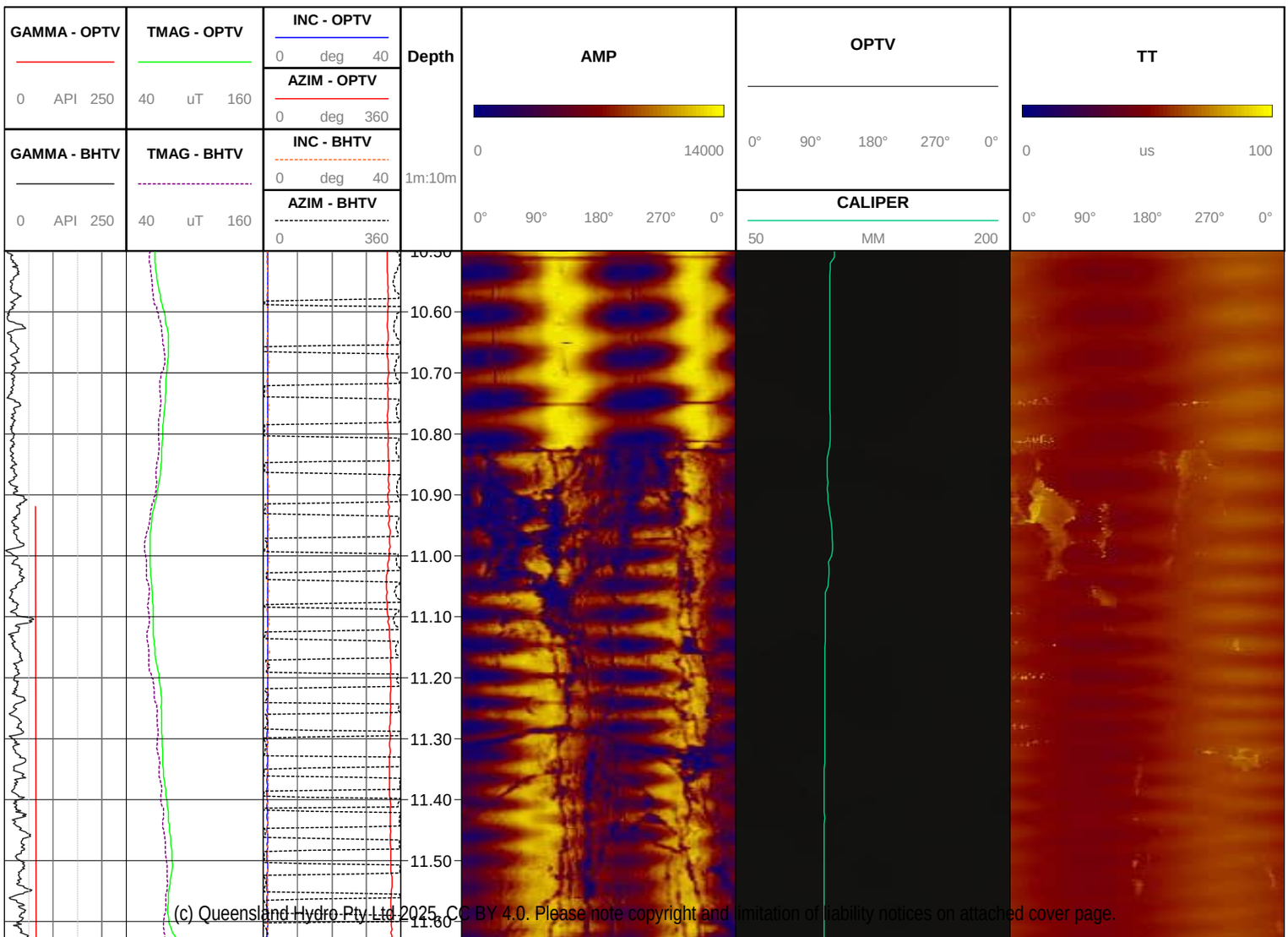
GAMMA	Televiewer Gamma Ray	**INC**	Borehole Inclination (0 deg = Vertical Down)
OPTV	OPTV RGB Image	**AZIM**	Borehole Magnetic Azimuth
AMP	BHTV Amplitude	**HGDELTA**	Potential Field
TT	BHTV Travel Time	**TMAG**	Televiewer Magnetic Field

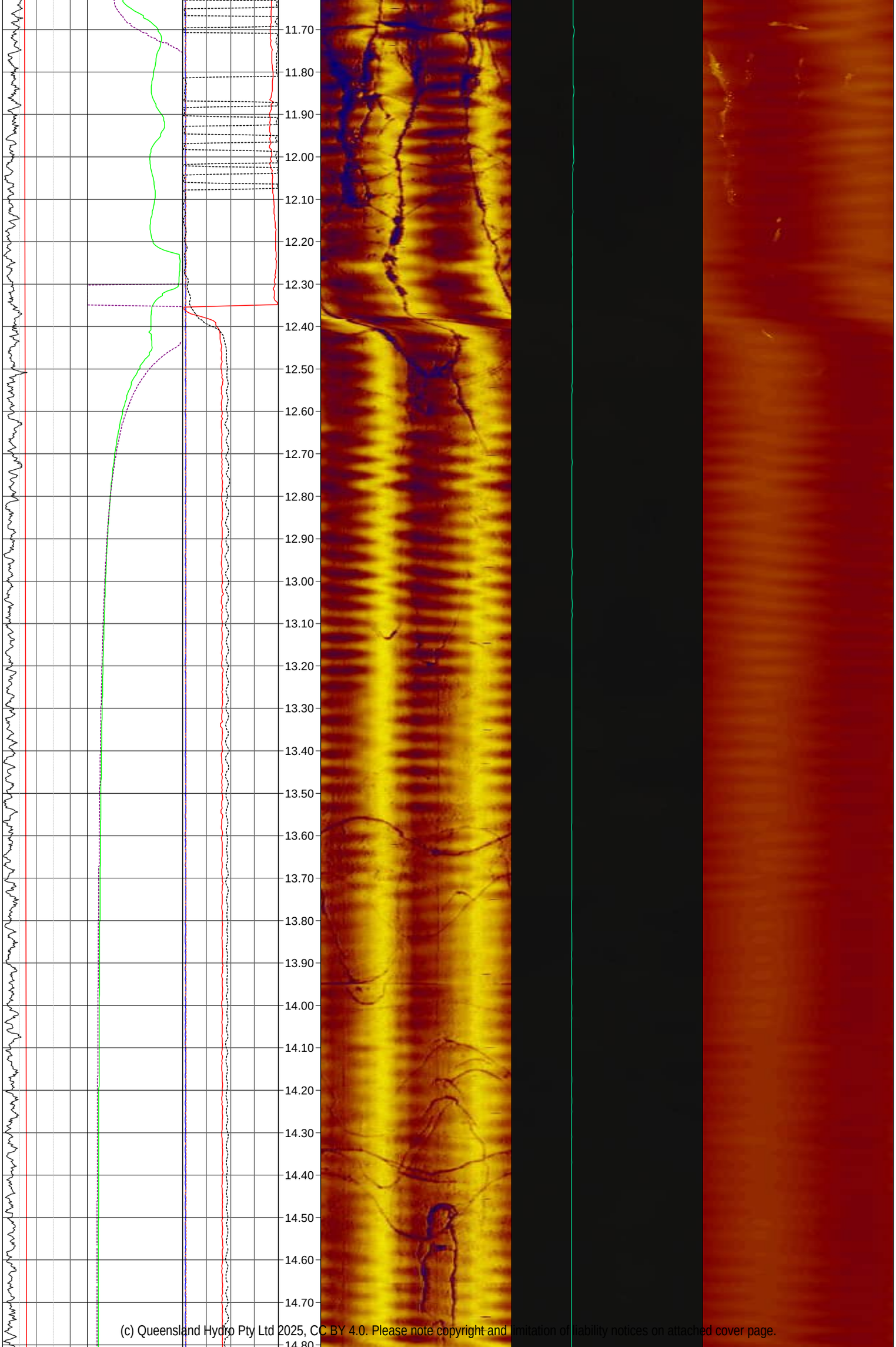
COMMENTS

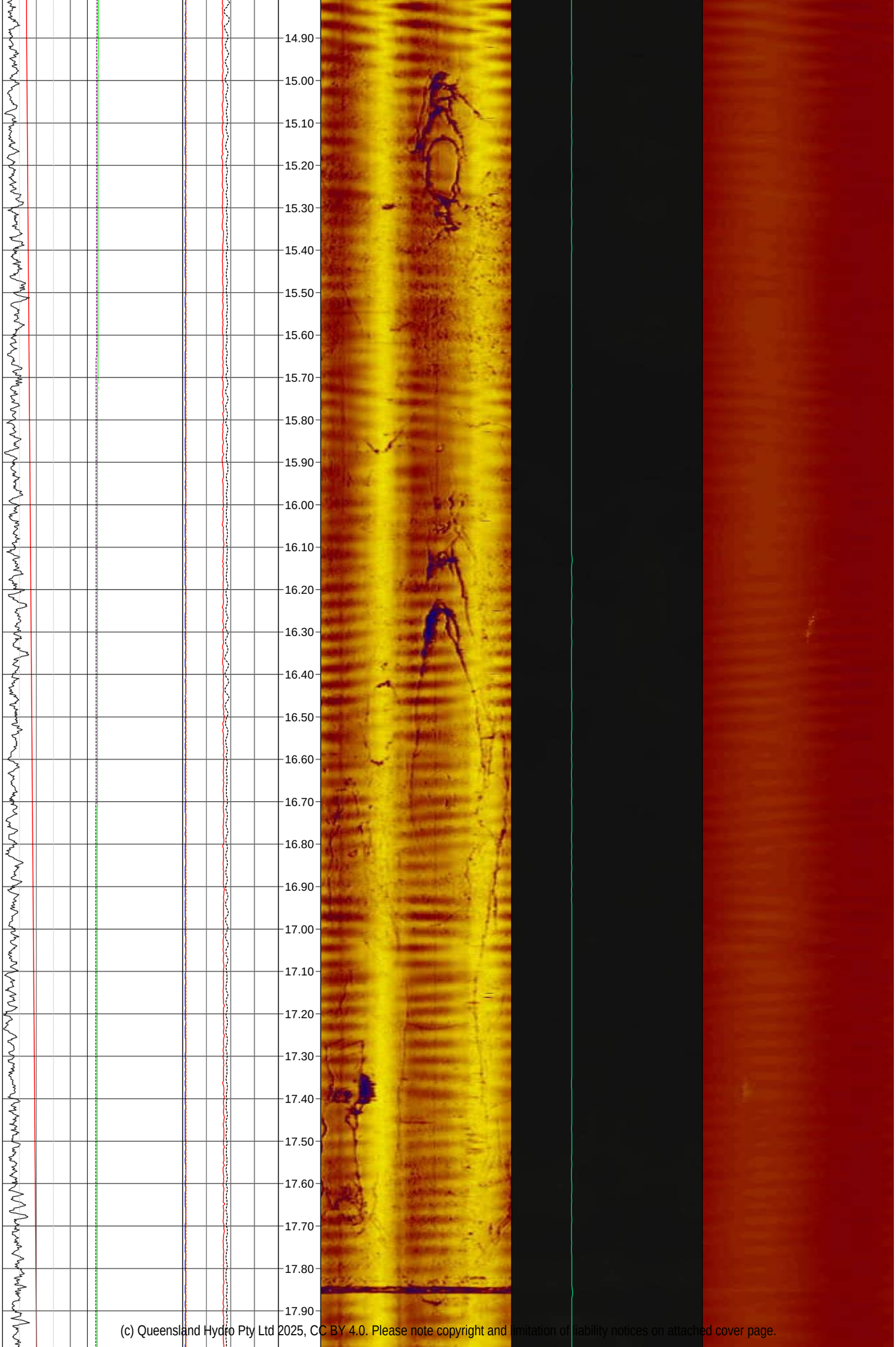
All image log data is oriented to true north. The applied magnetic declination correction is 8.12 degrees.
OTV image affected by water quality in borehole

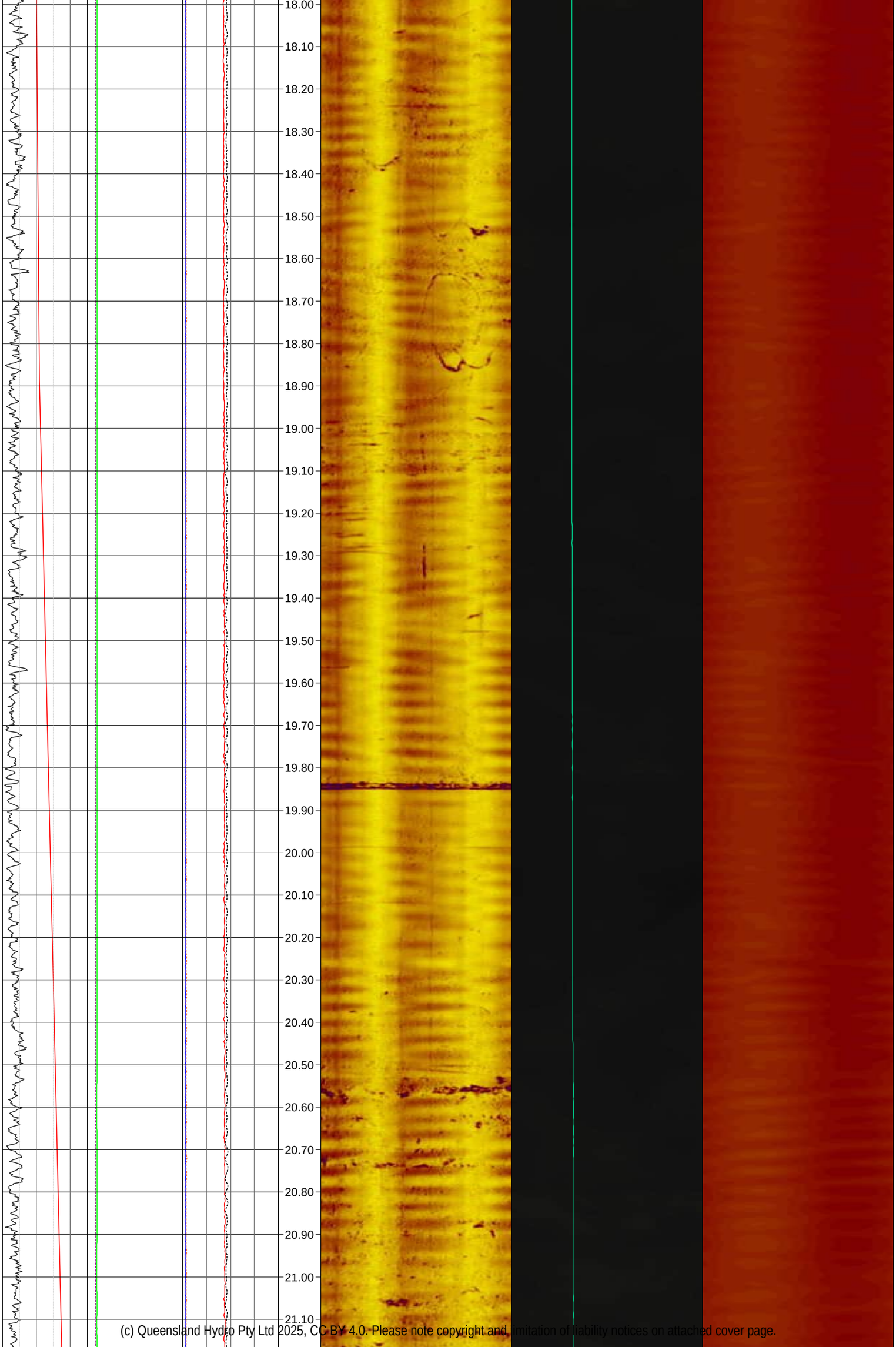
IMPORTANT NOTE

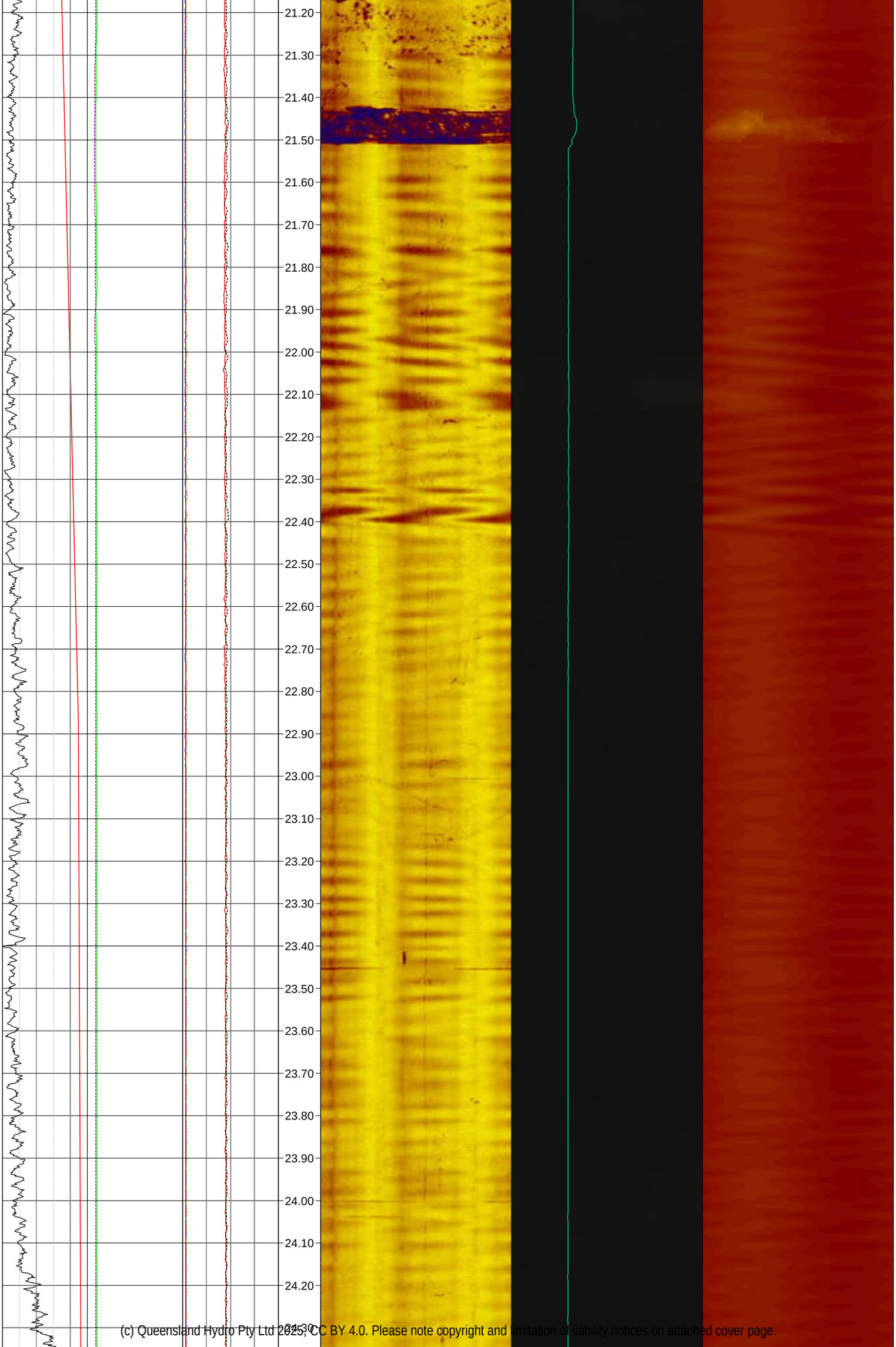
The following interpretations are opinions based upon inferences from borehole logs, Epiroc Kinetic Logging Services cannot and does not guarantee the correctness or accuracy of any interpretations. Therefore, Epiroc Kinetic Logging Services shall not be liable or responsible for any loss, damage, cost or expense incurred or sustained by anyone resulting from any interpretations.

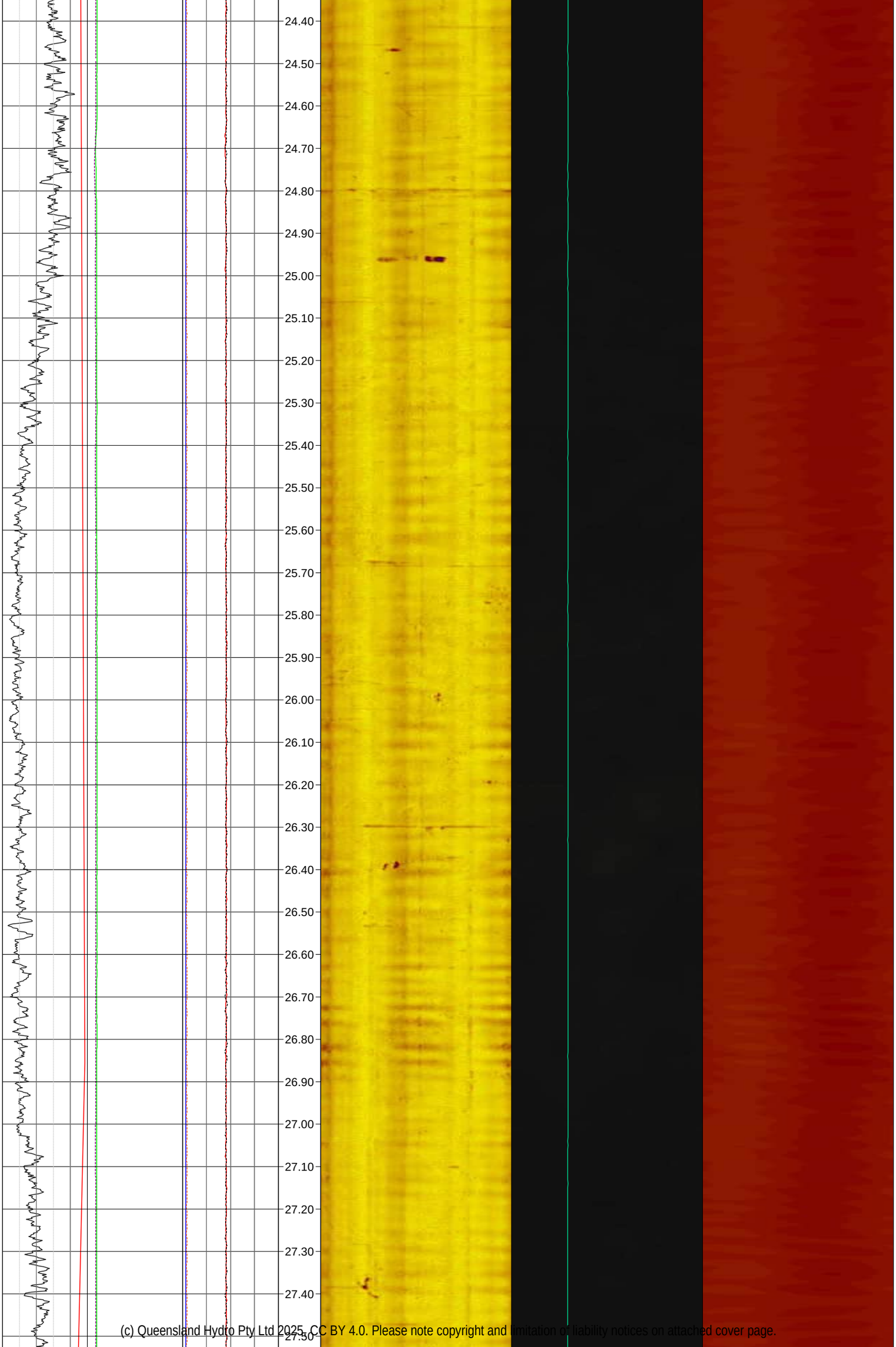


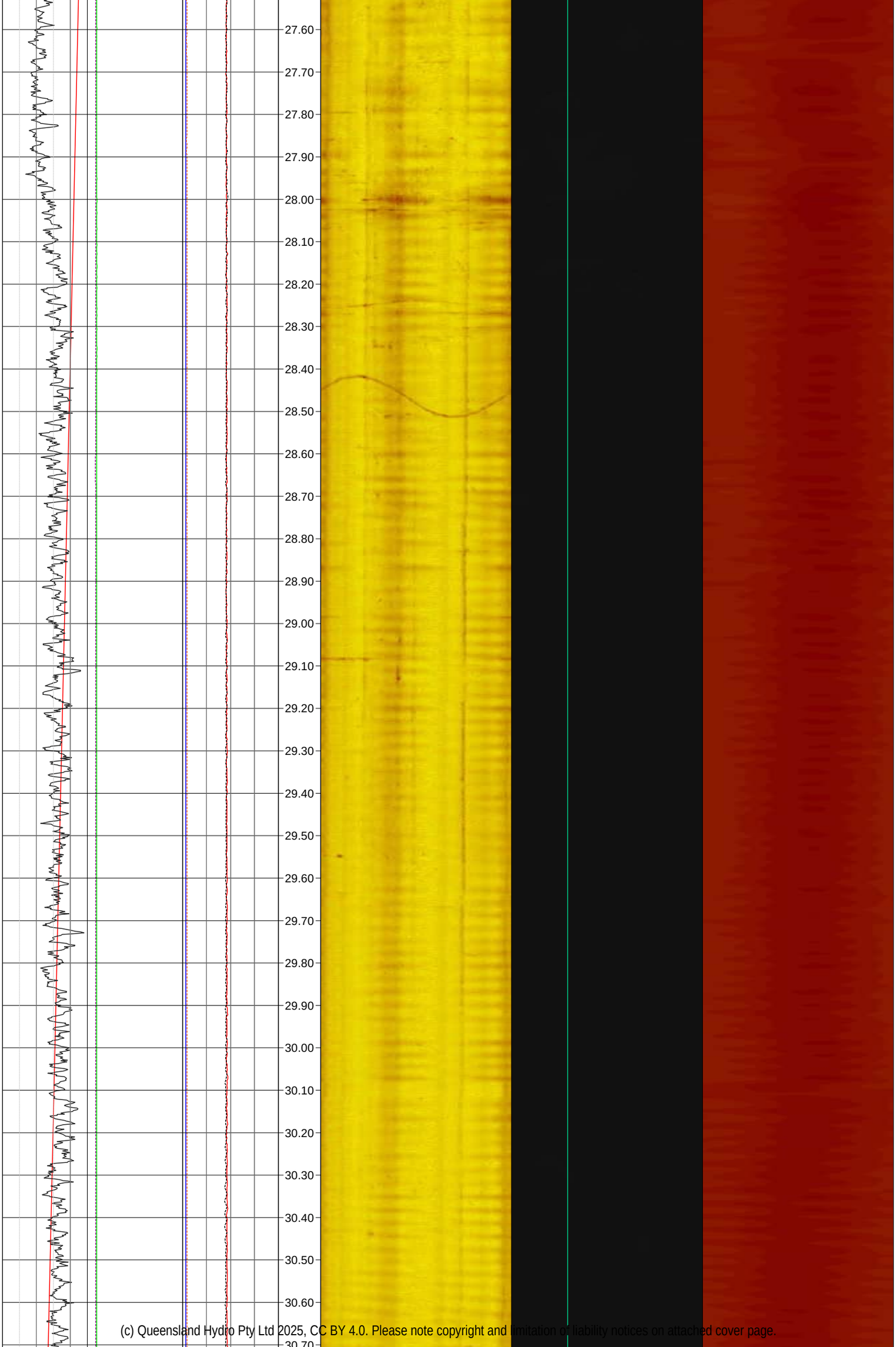


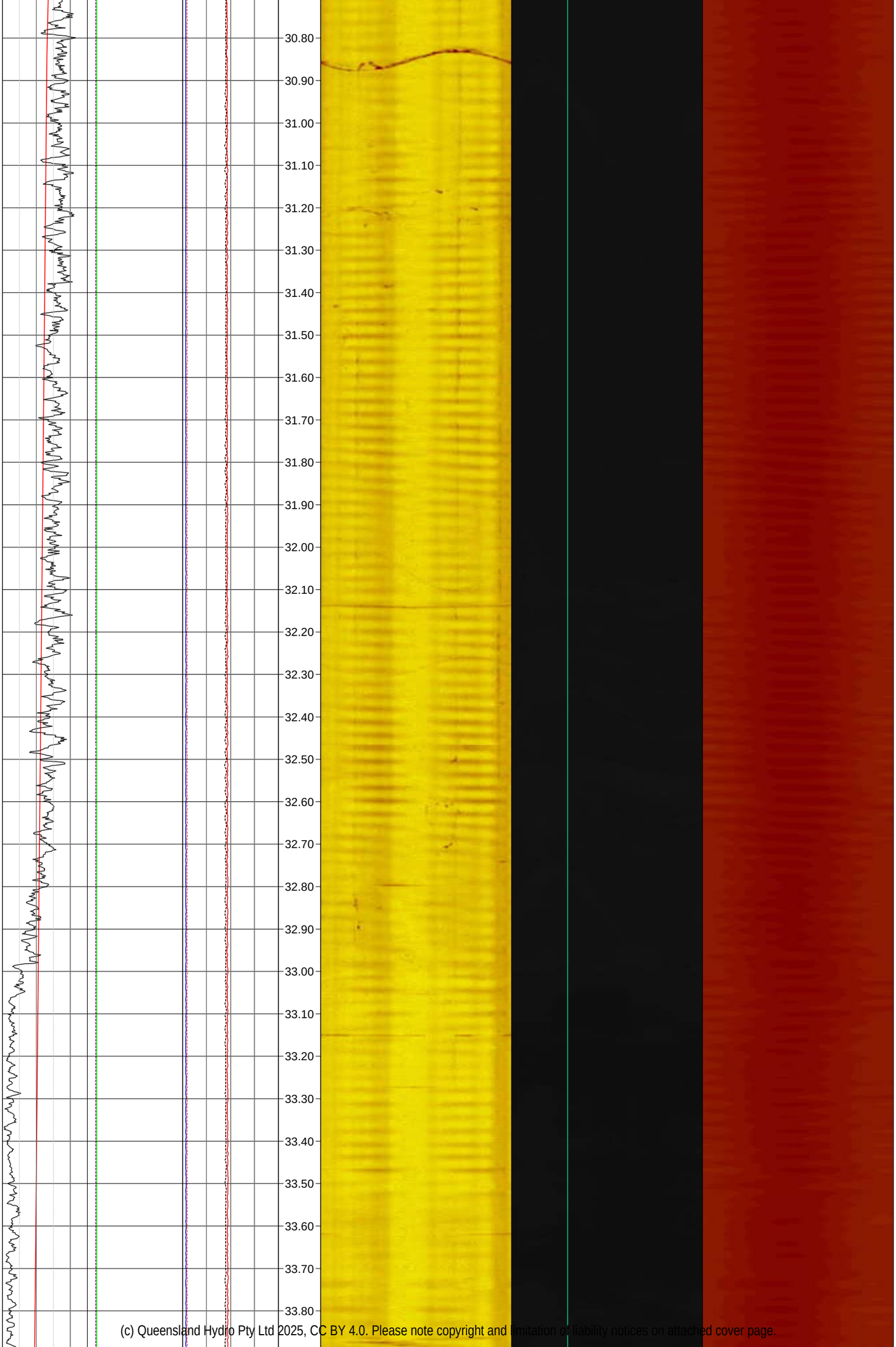


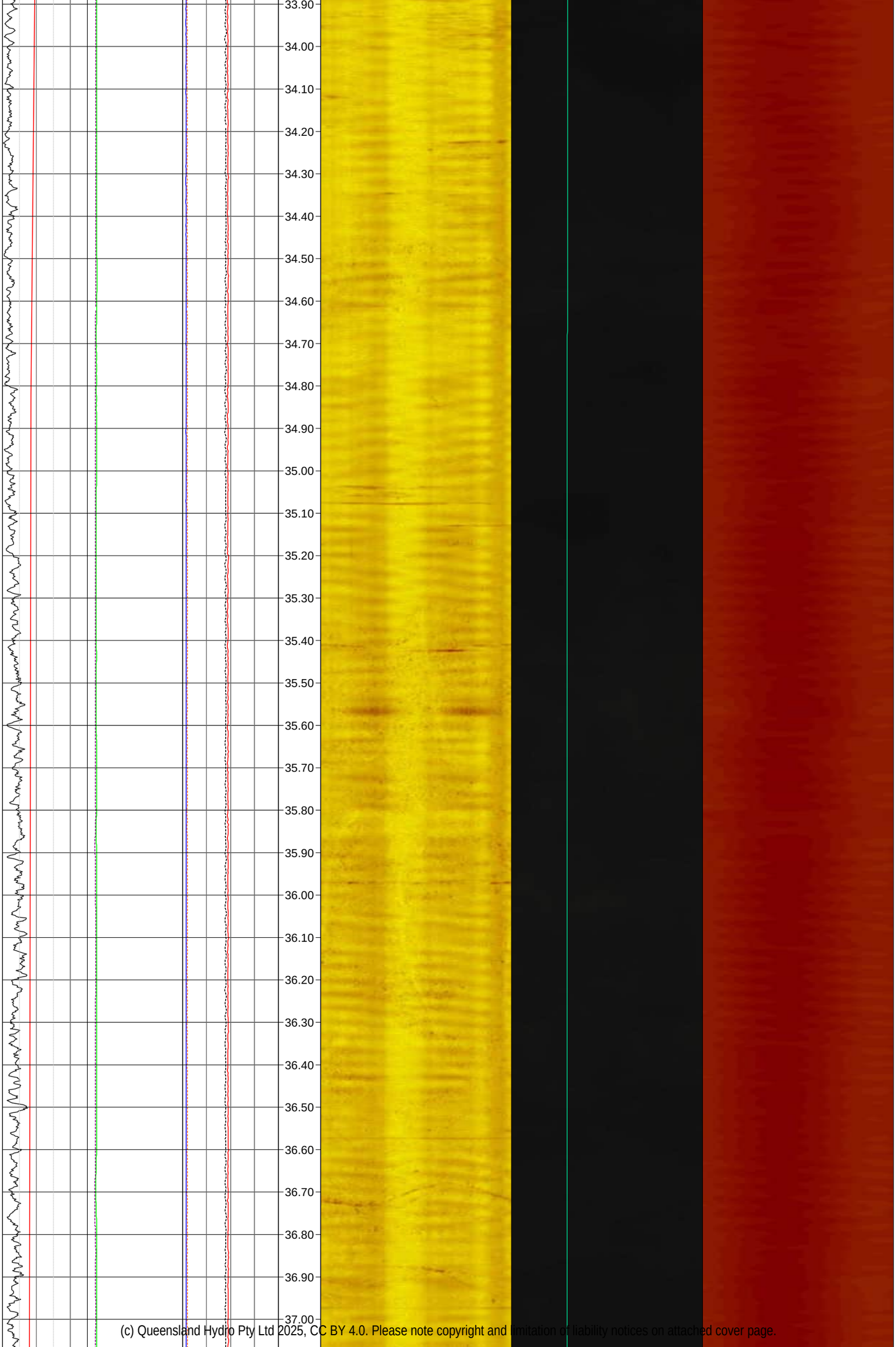


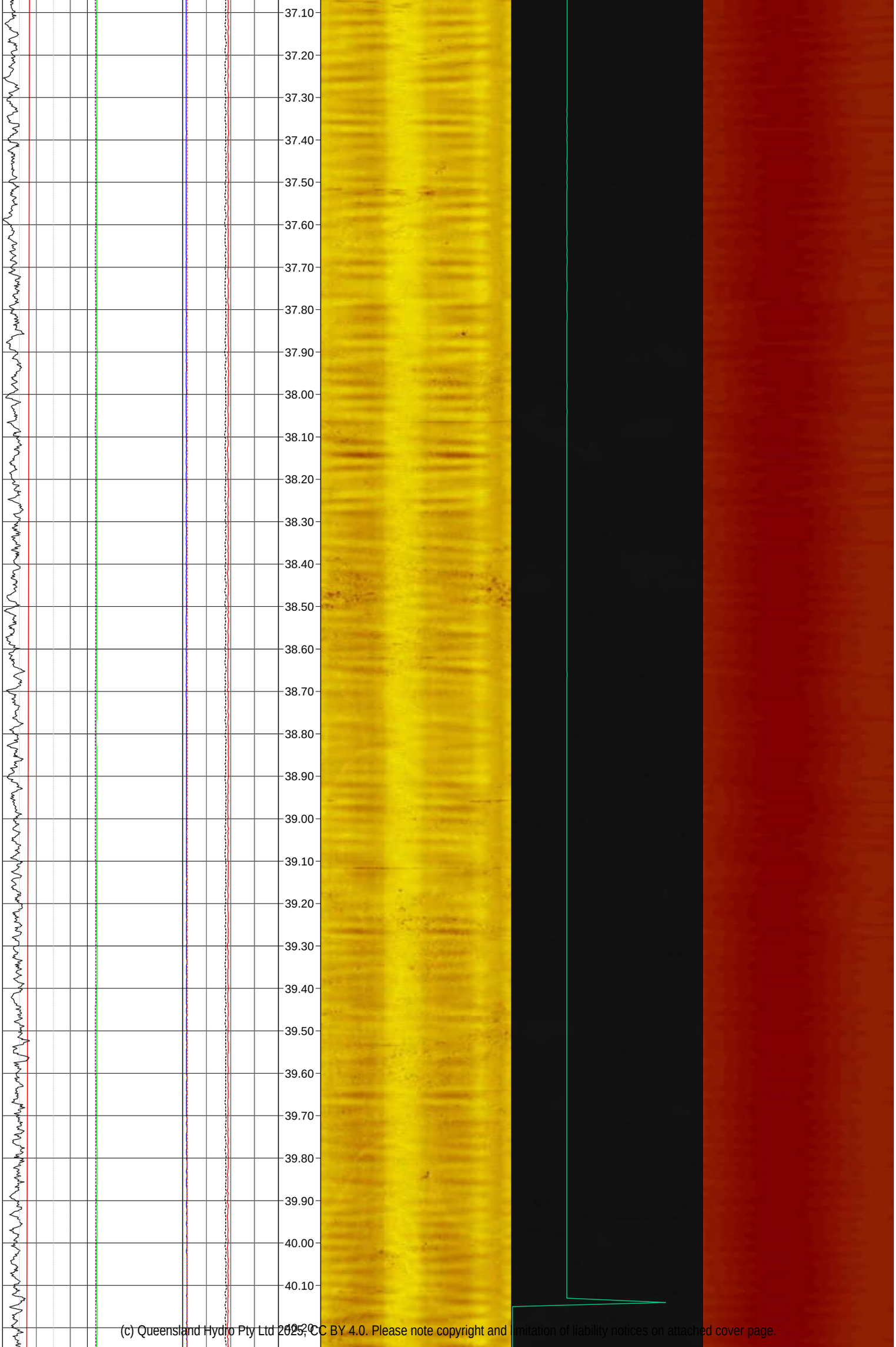


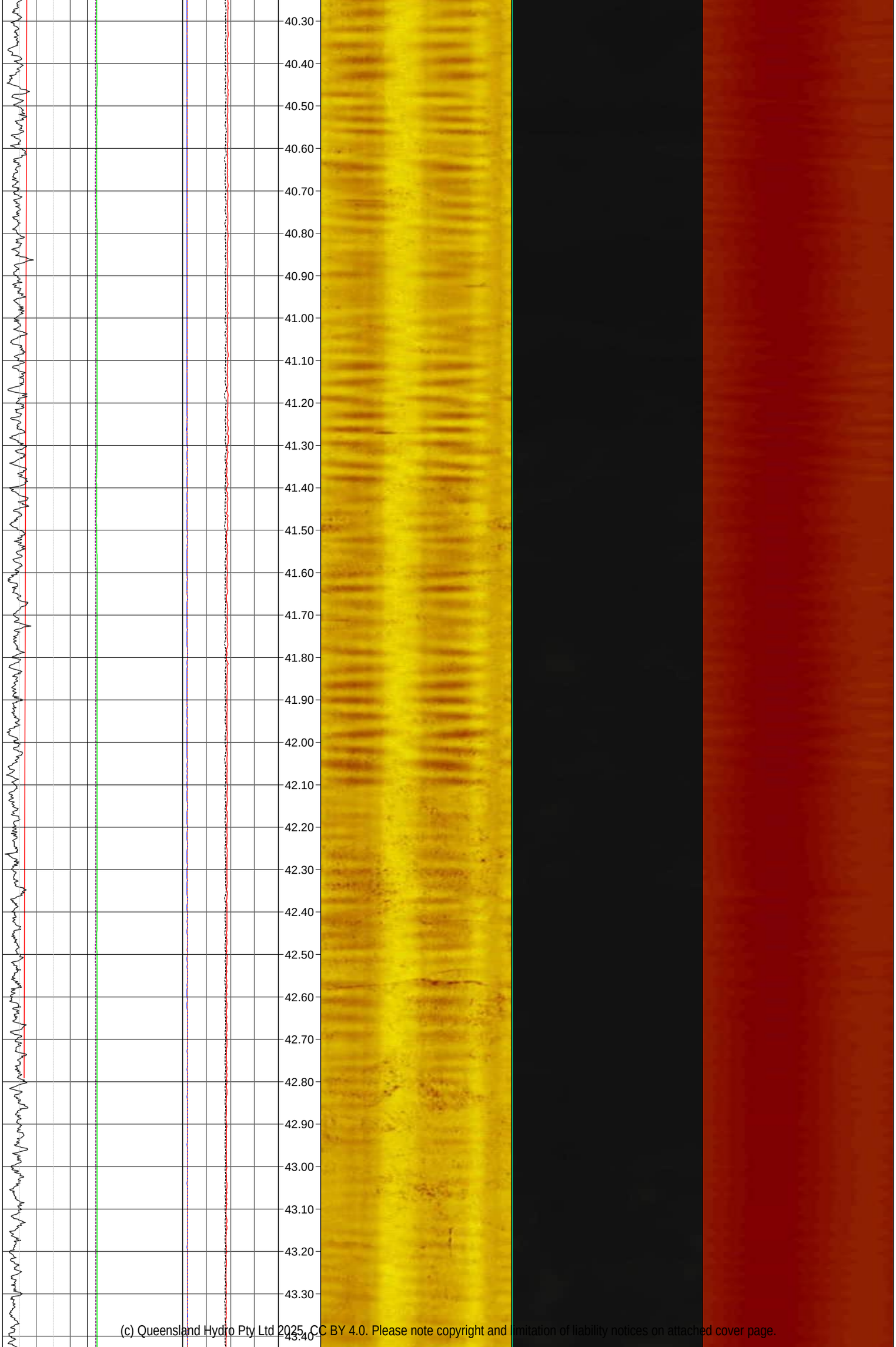


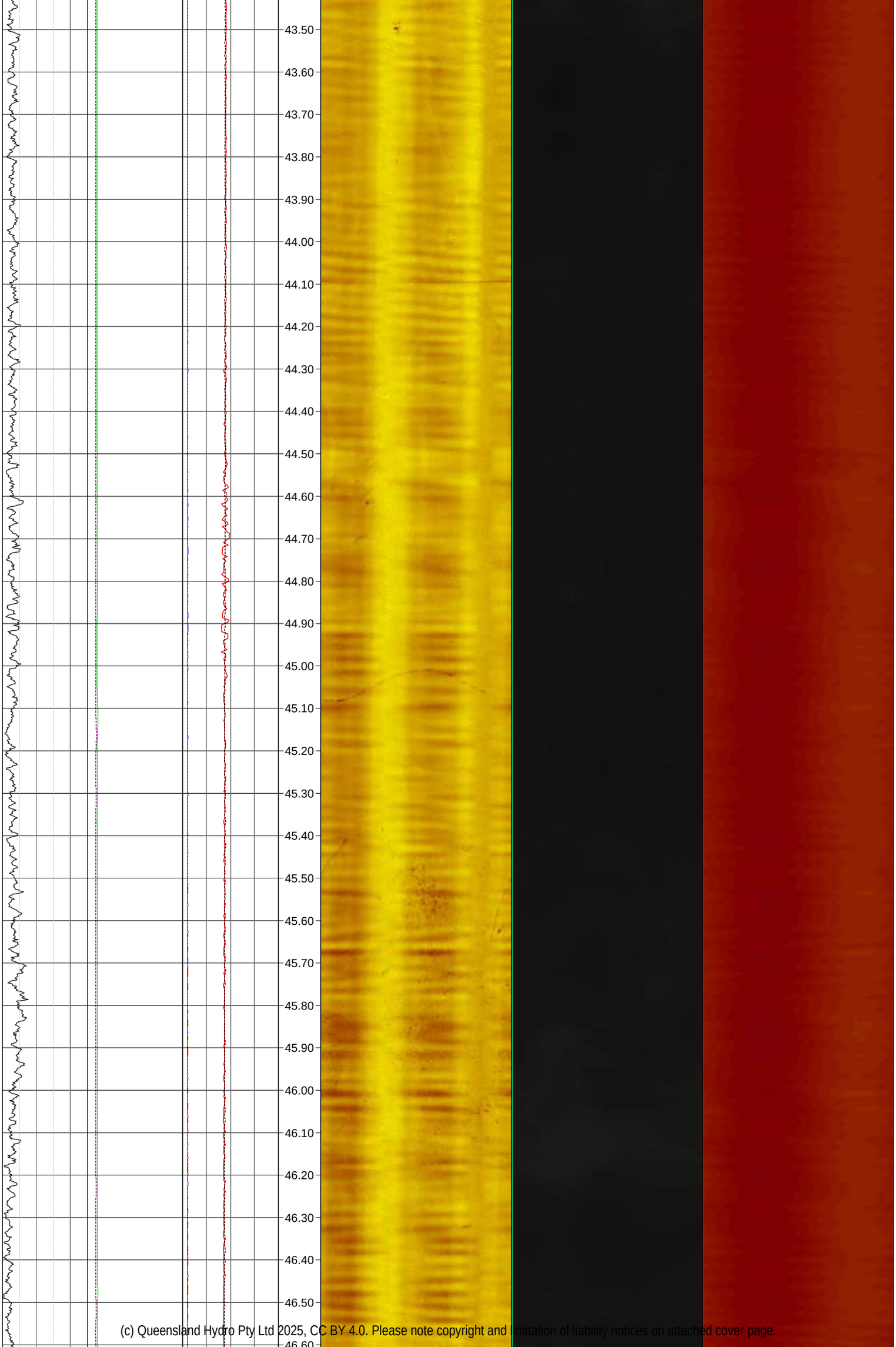


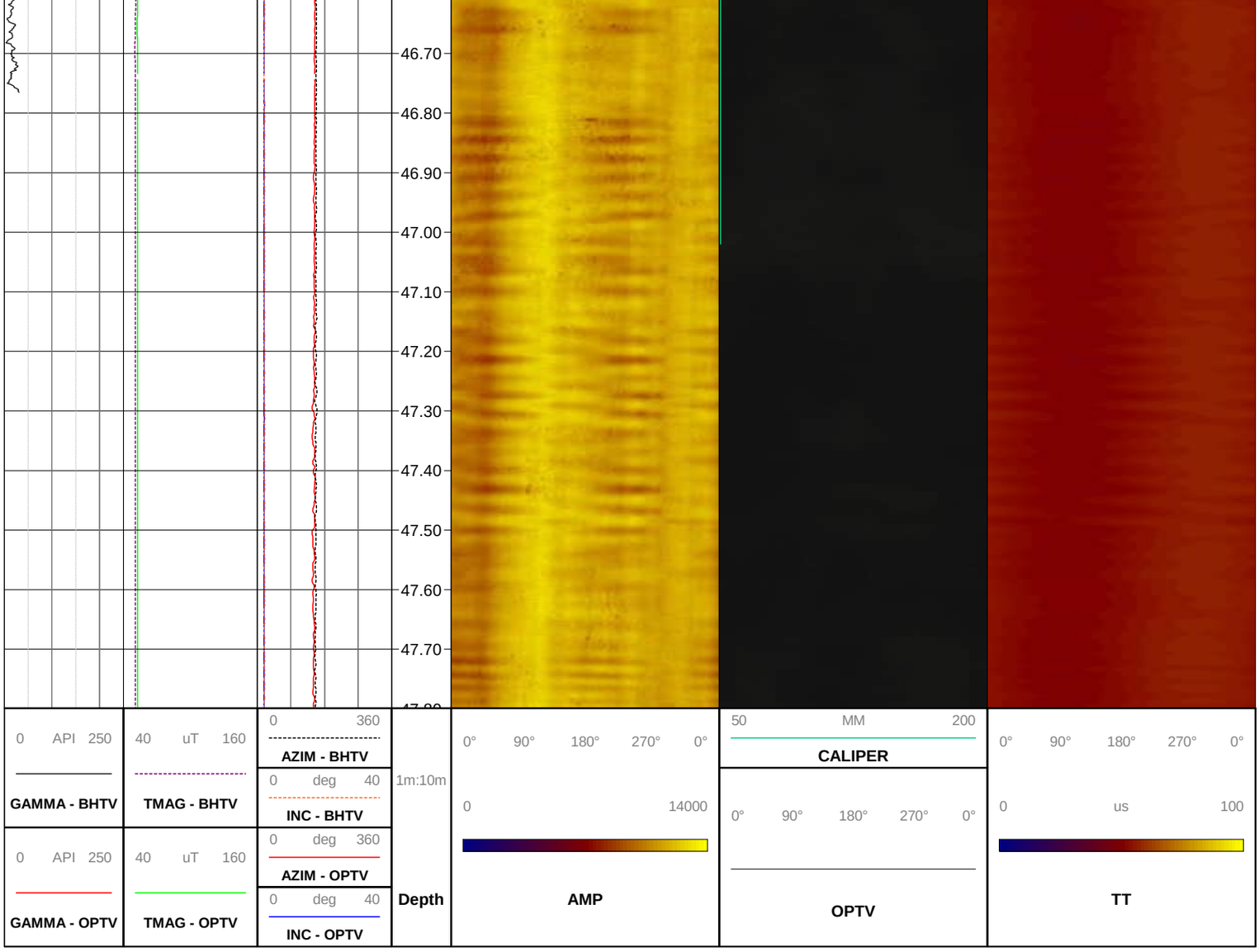












WELL	BHUA_19	**LOCATION**	EUNGELLA	**DATE**	31/08/2023
FIELD	PIONEER-BURDEKIN	**DRILL DEPTH**	48	**ENGINEER**	JRT

	# VERTICALITY ANALYSIS ## BHUA_19

COMPANY	SMEC	**FIELD**	PIONEER-BURDEKIN	**STATE**	QLD
WELL	BHUA_19	**LOCATION**	EUNGELLA	**COUNTRY**	AUSTRALIA

LOCATION: EUNGELLA
FIELD: PIONEER-BURDEKIN
STATE: QLD
WELL: BHUA_19
COMPANY: SMEC

PERMANENT DATUM		ELEVATIONS:	REMARKS:
PERMANENT DATUM ELEVATION		KB	1.
LOG MEASURED FROM	GL	DF	
DRILLING MEASURED FROM	GL	GL	2.

LICENSE	SECTION	TOWNSHIP	RANGE	MAG DECL.
				8.12deg

DATE	31-08-2023			RECORDED BY	JRT		
TIME	10-50			WITNESSED BY			
RUN NUMBER	1			LOGGING UNIT	V013		
DEPTH-DRILLER	48.00m			RIG NUMBER			
DEPTH-LOGGER	48.50m			TOOL TYPE	9057A		
BIT SIZE	96mm			TOOL SERIAL NO.	361		
CASING TYPE	STEEL			EASTING	657634		
CASING OD	101mm			NORTHING	7666429		
CASING BOTTOM	11.0m			SAMPLE INT.	.01m		
FLUID TYPE	0			LOG DIRECTION	U		
TRUCK CAL NO.	0.09778			FEET OR METER	M		
WATER LEVEL	9.0m			SOURCE TYPE		SOURCE ID	

DEVIATION LIST

MNEMONIC DESCRIPTORS

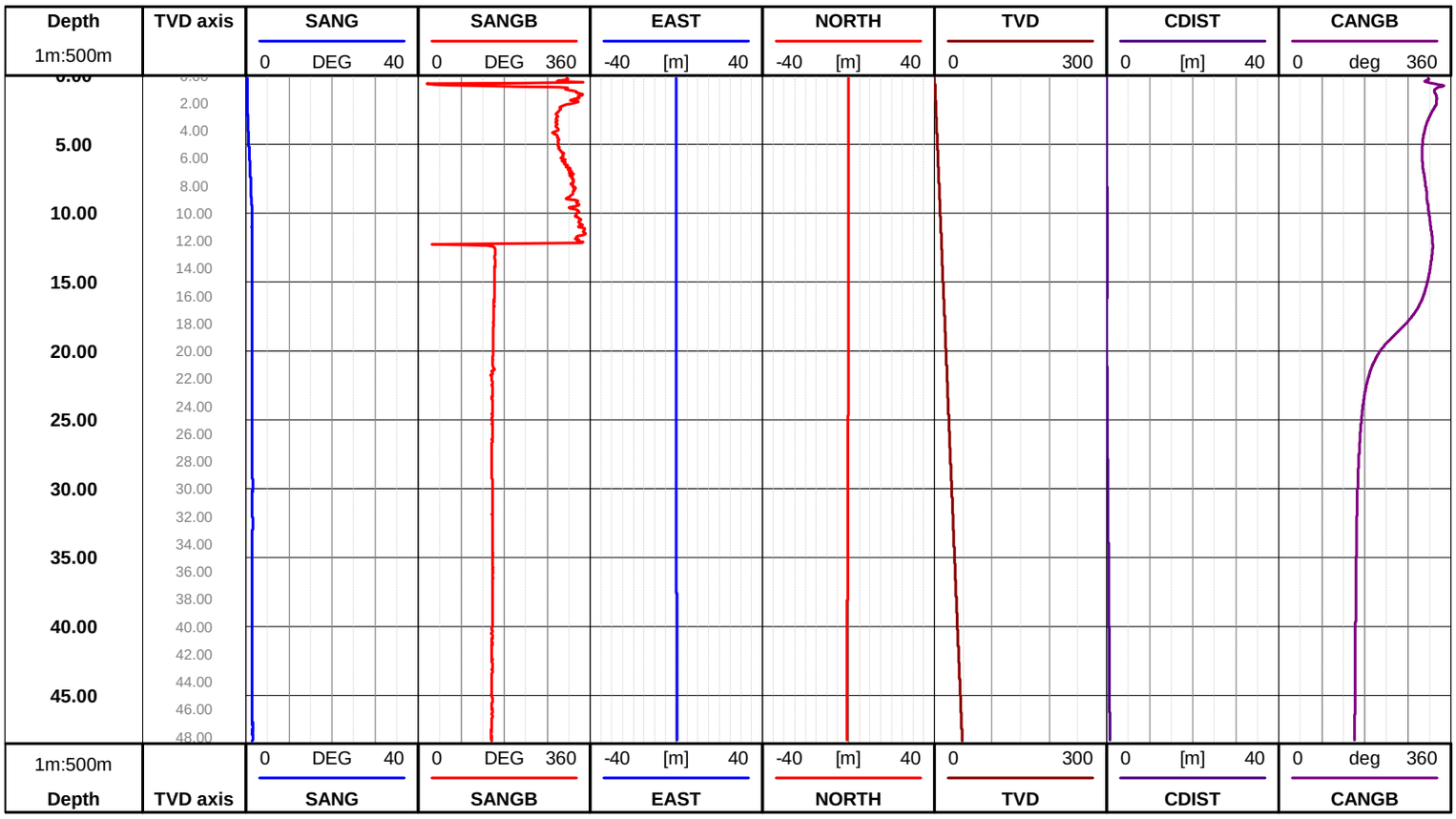
SANGB	SAMPLE ANGLE BEARING	**NORTH**	BOREHOLE NORTH DEVIATION
SANG	SAMPLE SLANT ANGLE (0 DEG = VERTICAL DOWN)	**CDIST**	DEVIATED CLOSURE DISTANCE
TVD	TRUE VERTICAL DEPTH	**CANGB**	DEVIATED CLOSURE ANGLE BEARING
EAST	BOREHOLE EAST DEVIATION		

ALL CO-ORDINATES ARE PRESENTED ORIENTED TO TRUE NORTH   MAGNETIC DECLINATION **8.12deg**

Depth	SANGB	SANG	EAST	NORTH	CDIST	CANGB	TVD
m	DEG	DEG	[m]	[m]	[m]	deg	
0.00	-999.25	-999.25	-999.25	-999.25	-999.25	-999.25	-999.25
1.00	308.365	0.322274	-0.00128338	0.00205714	0.00242464	328.041	0.99999
2.00	329.222	0.293481	-0.00372499	0.00649056	0.00748351	330.148	1.99998
3.00	291.834	0.415694	-0.00927322	0.00930162	0.0131344	315.088	2.99996
4.00	292.514	0.54133	-0.0170411	0.0121581	0.0209336	305.506	3.99992
5.00	293.025	0.692607	-0.0270666	0.0159136	0.0313982	300.453	4.99986
6.00	298.259	0.856862	-0.0389084	0.0223554	0.0448735	299.88	5.99977
7.00	318.905	0.987119	-0.0511651	0.0327925	0.0607718	302.656	6.99964
8.00	323.957	1.11294	-0.0623776	0.0472647	0.0782619	307.152	7.99947
9.00	316.268	1.24526	-0.0748312	0.0629603	0.0977942	310.076	8.99927
10.00	331.41	1.38743	-0.0864298	0.083316	0.120049	313.949	9.99899
11.00	336.88	1.3138	-0.0962692	0.105461	0.142792	317.609	10.9987
12.00	331.922	1.44611	-0.104029	0.128721	0.165503	321.056	11.9984
13.00	161.246	1.47472	-0.0978121	0.118795	0.153881	320.533	12.9981
14.00	160.544	1.49891	-0.0891707	0.0942285	0.129732	316.58	13.9977
15.00	159.439	1.50887	-0.08026	0.0695998	0.106235	310.931	14.9974
16.00	159.325	1.47427	-0.0711702	0.0453096	0.0843692	302.482	15.997
17.00	158.701	1.49547	-0.0618339	0.0210877	0.0653309	288.831	16.9967
18.00	157.595	1.49691	-0.0521121	-0.00302931	0.0522001	266.678	17.9964

19.00	157.343	1.46387	-0.0422622	-0.0268092	0.0500482	237.611	18.996
20.00	156.619	1.46062	-0.0321981	-0.0504291	0.0598315	212.558	19.9957
21.00	155.576	1.4526	-0.0219662	-0.0735812	0.07679	196.622	20.9954
22.00	154.983	1.4441	-0.0116332	-0.0964291	0.0971283	186.879	21.9951
23.00	155.503	1.45638	-0.000872042	-0.119507	0.11951	180.418	22.9948
24.00	155.947	1.51224	0.00999497	-0.143152	0.1435	176.006	23.9944
25.00	154.939	1.51226	0.0210496	-0.167071	0.168391	172.819	24.9941
26.00	155.116	1.5137	0.0321758	-0.19101	0.193701	170.438	25.9937
27.00	154.255	1.50028	0.043352	-0.214674	0.219008	168.583	26.9934
28.00	154.187	1.50086	0.0548132	-0.23831	0.244532	167.047	27.993
29.00	153.895	1.5035	0.0662151	-0.261903	0.270143	165.812	28.9927
30.00	155.616	1.5224	0.0773453	-0.285971	0.296246	164.866	29.9923
31.00	155.091	1.51207	0.088334	-0.310048	0.322386	164.098	30.992
32.00	154.822	1.50921	0.0994198	-0.333959	0.348443	163.422	31.9916
33.00	155.723	1.51489	0.110422	-0.358153	0.374789	162.865	32.9913
34.00	155.44	1.51632	0.121367	-0.382188	0.400996	162.382	33.9909
35.00	155.136	1.51063	0.132152	-0.406055	0.427019	161.972	34.9906
36.00	156.028	1.51204	0.142885	-0.430085	0.453199	161.622	35.9902
37.00	155.707	1.50943	0.153625	-0.454223	0.479499	161.314	36.9899
38.00	155.333	1.50234	0.164478	-0.478058	0.505561	161.014	37.9896
39.00	155.406	1.5006	0.175333	-0.501838	0.531585	160.741	38.9892
40.00	155.34	1.49655	0.186277	-0.52557	0.557605	160.484	39.9889
41.00	154.415	1.49598	0.197476	-0.549128	0.583556	160.221	40.9885
42.00	154.807	1.48894	0.208653	-0.572527	0.609363	159.976	41.9882
43.00	154.798	1.49669	0.219808	-0.596181	0.635411	159.761	42.9879
44.00	154.165	1.49701	0.231018	-0.619783	0.661438	159.558	43.9875
45.00	153.75	1.49828	0.242364	-0.643319	0.687459	159.357	44.9872
46.00	154.454	1.50721	0.253573	-0.666997	0.713571	159.185	45.9868
47.00	153.707	1.51618	0.264887	-0.690809	0.739853	159.021	46.9865
48.00	153.168	1.51852	0.276771	-0.714548	0.766277	158.827	47.9861

IMPORTANT NOTE	The following interpretations are opinions based upon inferences from borehole logs, Epiroc Kinetic Logging Services cannot and does not guarantee the correctness or accuracy of any interpretations. Therefore, Epiroc Kinetic Logging Services shall not be liable or responsible for any loss, damage, cost or expense incurred or sustained by anyone resulting from any interpretations.



NOTES ON VERTICALITY PLOTS

1. The following verticality plots are scaled automatically to obtain the best visual effect within the default page size.

2. All co-ordinates are presented oriented to True North.

DEVIATION PLOT