BOREHOLE: BHUA-02

Project:	Pioneer-Burdekin PHES	Position:	Upper Reservoir	Sheet	1 of 5
Location:	Netherdale/Dalrymple Heights	Coords:	658909.4 m E 7666467.1 m N MGA2020-55		
Client:	Queensland Hydro	Surface RL:	874.90 m AHD	Date Started:	30/7/2024
Job No.:	PS138693	Contractor:	Twin Hills Engineering & Drilling Drill Rig: TH25	Date Completed:	6/8/2024
		Inclination:	~~-84°~~ -86° Direction: 269°	Logged:	LH/MFR

Drilling					Sampling		Field Material Description				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	E	Groundwater Not Observed	0	0.10 874.80				SC CI-CH	Clayey SAND: fine to medium grained, pale brown and red-brown, clay is medium plasticity; with low to medium plasticity silt.	w<PL	L - MD F - St	RESIDUAL SOIL
	F		1		D 0.50-0.60 m D 1.00-1.10 m D 1.50-1.60 m D 2.00-2.10 m D 2.50-2.60 m				Silty CLAY: medium to high plasticity, red-brown and dark to pale brown, trace fine to medium grained sand.			
	H		3	3.50 871.41	D 3.00-3.10 m D 3.50-3.60 m			CI	CLAY: medium plasticity, brown.			
WB	F		4		D 4.00-4.50 m U63 4.50-4.92 m					w≈PL	F - St	
	F-H		6	5.95 868.96 6.60				CI	Gravelly CLAY: medium plasticity, pale brown mottled grey and black, gravel is fine grained.	w<PL	H - Fr	
			7						Continued as Cored Borehole			
			10									

Comments

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BOREHOLE: BHUA-02

Project:	Pioneer-Burdekin PHES	Position:	Upper Reservoir	Sheet	2 OF 5
Location:	Netherdale/Dalrymple Heights	Coords:	658909.4 m E 7666467.1 m N MGA2020-55		
Client:	Queensland Hydro	Surface RL:	874.90 m AHD	Date Started:	30/7/2024
Job No.:	PS138693	Contractor:	Twin Hills Engineering & Drilling Drill Rig: TH25	Date Completed:	6/8/2024
		Inclination:	-86° Direction: 269°	Logged:	LH/MFR

Drilling						Field Material Description				Defect Information	
METHOD	WATER	TCR	RQD	DEPTH (metres)	DEPTH RL	GRAPHIC LOG	ROCK / SOIL MATERIAL DESCRIPTION	WEATHERING	INFERRED STRENGTH (MPa) ■ - UCS (VL -2, L -6, M -20, H -60, VH -200, EH -200)	DEFECT DESCRIPTION & Additional Observations (Core partings shown - refer to Detailed Defect Descriptions table for all logged features)	AVERAGE DEFECT SPACING (mm) (10, 30, 100, 300, 1000, 3000)
				0							
				1							
				2							
				3							
				4							
				5							
				6							
					6.60		Continuation from non-cored borehole				
HQ3	Groundwater Not Observed	60	0	7	868.32 6.80 868.12 7.05		NO CORE 0.20m (6.60-6.80) MICROGRANITE: fine to medium grained, pale green-grey.	HW			
		100	0		867.82 7.40		GRANITE: medium to coarse grained, white mottled black, crystalline, massive.	HW HW		6.80-7.40: FZ, recovered as medium to coarse grained, subangular gravel and subangular to subrounded cobbles	
		52	0		867.52 7.80		MICROGRANITE: fine to medium grained, mottled dark grey, grey and white, crystalline, massive, staining throughout. NO CORE 0.40m (7.40-7.80)				
				8	867.12 8.25		MICROGRANITE: fine to medium grained, mottled grey, dark grey and white, crystalline, massive.	HW to MW		7.80-8.25: FZ, recovered as medium to coarse grained, subangular gravel and subangular to subrounded cobbles 8.25-8.75: reduce penetrative resistance	
		0	0		866.67 8.70		NO CORE 0.45m (8.25-8.70)				
		100	66	9	866.22 9.05		MIXED LAMPROPHYRE AND ALTERED GRANITE: lamprophyre is fine grained, black to dark grey, porphritic, massive; altered granite is white to grey mottled black to dark grey, massive, crystalline, metamorphic recrystallisation and crystal orientation evident; slightly altered.	MW to SW		8.70-8.79: FZ, recovered as medium to coarse grained, subangular gravel and subangular to subrounded cobbles 9.00: J, 5°, CN, PR, RF-SM	
		100	100		865.87 9.80 865.12		GRANODIORITE: medium to coarse grained, pale grey mottled dark grey and white, crystalline, massive.	SW - FR			
				10							

Comments

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Date 9/12/2024

BOREHOLE: BHUA-02

Project:	Pioneer-Burdekin PHES	Position:	Upper Reservoir	Sheet	3 OF 5
Location:	Netherdale/Dalrymple Heights	Coords:	658909.4 m E 7666467.1 m N MGA2020-55		
Client:	Queensland Hydro	Surface RL:	874.90 m AHD	Date Started:	30/7/2024
Job No.:	PS138693	Contractor:	Twin Hills Engineering & Drilling Drill Rig: TH25	Date Completed:	6/8/2024
		Inclination:	-86° Direction: 269°	Logged:	LH/MFR

Drilling						Field Material Description				Defect Information	
METHOD	WATER	TCR	RQD	DEPTH (metres)	DEPTH RL	GRAPHIC LOG	ROCK / SOIL MATERIAL DESCRIPTION	WEATHERING	INFERRED STRENGTH (MPa) ■ - UCS	DEFECT DESCRIPTION & Additional Observations (Core partings shown - refer to Detailed Defect Descriptions table for all logged features)	AVERAGE DEFECT SPACING (mm)
HQ3	Groundwater Not Observed	100	100	10			MIXED LAMPROPHYRE AND ALTERED GRANITE: lamprophyre is fine grained, dark grey to grey, porphritic, massive, up to 600mm; altered granite is white to grey mottled black to dark grey, massive, crystalline, metamorphic recrystallisation and crystal orientation evident; slightly altered.	SW - FR	VL .2 L .6 M .20 H .60 VH .200 EH		10 30 100 300 1000 3000
		100	100	11						11.55: J, 5°, CN, PR-UN, RF, dark gy and pale br mi	
		100	100	12						12.00-12.07: FZ, recovered as fragmented rock	
		100	100	13						13.04-13.06: CS, 10°, PR, RF, 20 mm, gravel	
		100	100	14						14.04-14.65: J x3, 5°, CN, PR, RF	
		100	100	15						15.69: J, 5°, CN, PR, RF 15.70: J, 5°, PR, RF	
		100	100	16						16.30: J, 25°, PR, RF-SM	
		100	100	17						16.73-16.88: Jx2, 5°, CN, PR-UN, RF	
		100	100	18							
		100	100	19			lamprophyre is black to dark grey, up to 400mm.				
		100	100	20	20.00						

Comments

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BOREHOLE: BHUA-02

Project:	Pioneer-Burdekin PHES	Position:	Upper Reservoir	Sheet	4 OF 5
Location:	Netherdale/Dalrymple Heights	Coords:	658909.4 m E 7666467.1 m N MGA2020-55		
Client:	Queensland Hydro	Surface RL:	874.90 m AHD	Date Started:	30/7/2024
Job No.:	PS138693	Contractor:	Twin Hills Engineering & Drilling Drill Rig: TH25	Date Completed:	6/8/2024
		Inclination:	-86° Direction: 269°	Logged:	LH/MFR

Drilling						Field Material Description				Defect Information	
METHOD	WATER	TCR	RQD	DEPTH (metres)	DEPTH RL	GRAPHIC LOG	ROCK / SOIL MATERIAL DESCRIPTION	WEATHERING	INFERRED STRENGTH (MPa) ■ - UCS	DEFECT DESCRIPTION & Additional Observations (Core partings shown - refer to Detailed Defect Descriptions table for all logged features)	AVERAGE DEFECT SPACING (mm)
HQ3	Groundwater Not Observed	100	100	20	854.95		MIXED LAMPROPHYRE AND ALTERED GRANITE: lamprophyre is fine grained, black to dark grey, porphritic, massive, up to 400mm; altered granite is white to grey mottled black to dark grey, massive, crystalline, metamorphic recrystallisation and crystal orientation evident..	SW - FR	VL -2 L -6 M -20 H -60 VH -200 EH		10 30 100 300 1000 3000
		100	100	21							
		100	100	22			lamprophyre is dark grey to grey, up to 450mm.				
		100	100	23						23.50: J, 15°, CN, PR-UN-IR, RF, pale yl, wh and dark gy/gr	
		100	100	24						24.23: J, 15°, CN, PR-ST, RF, dark gy/gr and wh mi	
		100	100	25			moderately altered, possibly epidote/chlorite			25.18-25.50: AZ, VN-CT, CU-UN-IR, pale yl mi	
		100	95	26						25.63: J, 5°, CN, PR-UN, RF-SM, dark gr to pale yl mi 25.68: J, 5°, CN, PR-UN, RF, dark gy/gr and wh mi	
										26.25: J, 25°, CN, PR-UN, RF, dark gy/gr mi	
										26.50: J, 10°, CN, PR-UN, RF, dark gy and wh mi	
										26.77: J, 10°, CN, PR-UN, RF, dark gy/gr mi	
		100	100	27			moderately altered, possibly epidote/chlorite			27.10-27.25: AZ, VN-CT, CU-UN-IR, pale yl mi	
		100	100	28						28.46: J, 10°, CN, PR-UN-IR, RF, dark gy and wh mi	
		100	100	29							
				30	30.00						

Comments

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BOREHOLE: BHUA-02

Project:	Pioneer-Burdekin PHES	Position:	Upper Reservoir	Sheet	5 OF 5
Location:	Netherdale/Dalrymple Heights	Coords:	658909.4 m E 7666467.1 m N MGA2020-55		
Client:	Queensland Hydro	Surface RL:	874.90 m AHD	Date Started:	30/7/2024
Job No.:	PS138693	Contractor:	Twin Hills Engineering & Drilling Drill Rig: TH25	Date Completed:	6/8/2024
		Inclination:	-86° Direction: 269°	Logged:	LH/MFR

Drilling						Field Material Description				Defect Information	
METHOD	WATER	TCR	RQD	DEPTH (metres)	DEPTH RL	GRAPHIC LOG	ROCK / SOIL MATERIAL DESCRIPTION	WEATHERING	INFERRED STRENGTH (MPa) ■ - UCS	DEFECT DESCRIPTION & Additional Observations (Core partings shown - refer to Detailed Defect Descriptions table for all logged features)	AVERAGE DEFECT SPACING (mm)
HQ3	Groundwater Not Observed	100	100	30	844.97		MIXED LAMPROPHYRE AND ALTERED GRANITE: lamprophyre is fine grained, dark grey to grey, porphritic, massive, up to 450mm; altered granite is white to grey mottled black to dark grey, massive, crystalline, metamorphic recrystallisation and crystal orientation evident; slightly altered..	SW - FR	VL -2 L -6 M -20 H -60 VH -200 EH	29.82: J, 15°, CN, PR-UN, RF, pale yl, dark gy and wh mi 30.65: J, 25°, CN, PR-UN, RF, dark gy mi 30.77: J, 35°, CN, PR-UN, RF, dark gy mi	10 30 100 300 1000 3000
		100	85	32				MW		31.83: J, 10°, CN-SN, UN-IR, RF, orange and dark gr mi; Fe stained surfaces 31.85: J, 60°, CN-SN, PR-UN, RF, orange and dark gr; iron stained surfaces 31.98: J, 75°, CN-SN, PR-UN, RF, orange and dark gy mi	
		100	100	33				SW - FR		32.00-32.18: FZ, CN-SN, IR, RF-SM, orange and dark gr; iron stained surfaces. 32.22: J, 5°, CN-SN, PR-UN, RF, orange and dark gy mi; iron stained surfaces 32.23-32.36: Js, 75°, CN-SN, PR-UN, RF, orange and dark gy; iron stained surfaces ; + x4 32.42: J, 5°, CN, PR-UN, RF, dark gy to wh 32.50: J, 70°, CN-SN, PR, RF-SM, pale orange and dark gy; iron stained surfaces 32.77: J, 10°, CN, PR-UN, RF, dark gy and wh 33.58: J, 15°, CN, PR-UN, RF, wh and dark gy mi 33.75: J, 10°, CN, PR-UN-ST, RF, dark gy mi	
		100	86	34	35.00					34.26: J, 5°, CN, UN-ST, RF, pale yl and dark gy mi 34.77: J, 45°, CN, PR-UN, RF, wh, pale yellow and dark gy mi	
				35	839.99		Hole Terminated at 35.00 m Target depth. Backfilled with grout.				
				36							
				37							
				38							
				39							
				40							

Comments

Checked GEM

Date 9/12/2024

Pioneer Burdekin Pumped Hydro Energy Storage: Tranche 2 – BHUA-02
Defects List

Depth	Bottom	Fracture Set	Defect Number	Type	Type Suffix	Dip Minimum (degrees)	Dip Maximum (degrees)	Infilling Material	Aperture Observation	Planarity	Roughness	Aperture Measurement Sign	Aperture Measurement	Aperture	Spacing	Remark
6.80	7.40			FZ												recovered as medium to coarse grained, subangular gravel and subangular to subrounded cobbles
7.80	8.25			FZ												recovered as medium to coarse grained, subangular gravel and subangular to subrounded cobbles
8.70	8.79			FZ												recovered as medium to coarse grained, subangular gravel and subangular to subrounded cobbles
8.82				hJ		15				UN-PR						pale grey
8.89	8.96			hJ	x2	50				PR						white
8.98				hJ		70				PR-UN						white
9.00				J		5			CN	PR	RF-SM					
9.27				hJ		15				PR						pale yellow
9.31				hJ		40				PR						white
9.36	9.45			hJ	x5	20				PR						pale yellow-white
9.64	9.69			hJ	x3	60				PR-CU						pale orange- white
9.76				hJ		70				PR						white
9.81				hJ		50				PR-CU						pale yellow-pale green 2mm alt halo
9.89				V		15				PR						<30mm white mineral pale green alt halo 10 mm
9.96				hJ		60				CU						pale yellow-pale green
10.13				hJ		30				PR						pale green
10.15				hJ		70				PR-CU						white
10.21				V		70				PR-UN						wh mi <5mm
10.28				hJ		60				PR						white
10.36	10.39			hJ	x3	15				PR						
10.40				hJ		60				PR-UN						pale yellow
10.45				hJ		30				IR						pale yellow
10.49	10.53			hJ		30				PR						grey - pale green
10.60				hJ		20				PR						
10.60	10.61			hJ	x2	80				PR						
10.74				hJ						PR						
10.78				hJ		60				PR						grey-pale green
10.80				hJ		60				CU-UN						grey-pale green
10.81				hJ		60				PR-UN						grey-pale green
10.83				CO		5				PR						
10.96				hJ		45				PR						white
11.02				hJ		30				PR-CU						white
11.11				hJ		30				PR						
11.16				CO		50				PR-ST						
11.17				hJ		60				PR-CU						pale grey
11.21				hJ		60				PR						white, 2mm pale brown-white alt
11.27				hJ		70				PR						pale yellow
11.30				hJ		80				IR						pale green-pale yellow
11.55				J		5			CN	PR-UN	RF					dark gy and pale br mi
11.65				hJ		70				PR						1mm white halo
11.74				hJ		25				PR-CU						grey-pale green
11.76				hJ		25				PR						pale green
11.85				V		75				PR						white-pale orange
11.91	11.95			hJ	x2	60				PR						White
12.00	12.07			FZ												recovered as fragmented rock
12.08				hJ	x3	60				PR-UN						white-pale yellow
12.27	12.31			hJ	x2	45				PR-UN						white
12.30				hJ		60				PR						white
12.31				hJ		50				PR-ST						pale grey
12.40				hJ		45				PR						white-pale yellow
12.41				hJ		30				PR						
12.49				hJ		60				PR						white-pale yellow
12.58				hJ		70				PR						white
12.62				CO		60				PR						
12.67				hJ		10				PR						1mm pale grey alt halo
12.69				hJ		80				IR						
12.74				hJ		60				PR						
12.87				hJ		60				PR						5mm pale green -pale yellow alt halo
12.92				hJ		80				PR-CU						pl gy
12.96	12.98			hJ	x2	60				PR-CU						white
13.04	13.06			CS		10				PR	RF		20			gravel
13.06				CO		5				PR						
13.09	13.19			hJ	x5	70				PR						pale grey
13.11				CO		5				UN						
13.19				hJ		30				PR						white
13.27	13.54			hJ	x6	60				PR						white
13.46	13.50			hJ	x2	45				PR-UN						wh
13.49				hJ		30				PR						pl gy-pl gr
13.57				hJ		15				PR						
13.58				hJ		30				PR						
13.59	13.60			hJ	x2	80				PR						pl yl wh
13.63				hJ		45				PR						
13.70				CO		5				UN						
13.70	13.72			hJ	x2	65				PR						white-pale grey
13.79				hJ		40				PR						
13.82				CO		20				PR						

Pioneer Burdekin Pumped Hydro Energy Storage: Tranche 2 – BHUA-02
Defects List

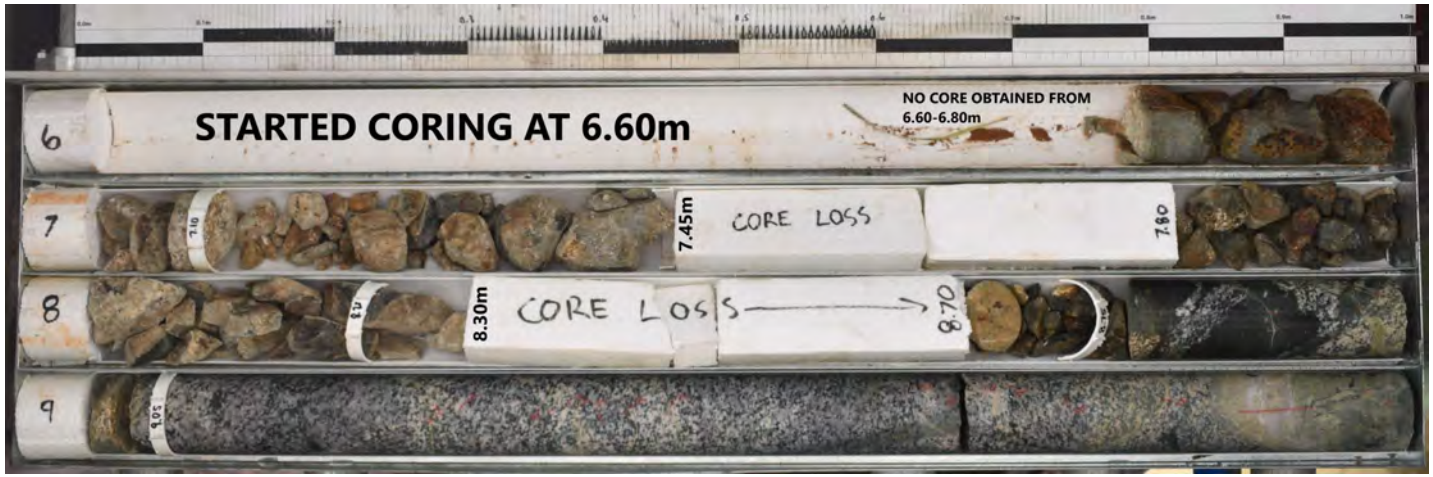
Depth	Bottom	Fracture Set	Defect Number	Type	Type Suffix	Dip Minimum (degrees)	Dip Maximum (degrees)	Infilling Material	Aperture Observation	Planarity	Roughness	Aperture Measurement Sign	Aperture Measurement	Aperture	Spacing	Remark
13.87				hJ		70				PR-UN						white
13.91				V		60				PR-IR						wh mi <4mm
14.03				CO		5				PR-UN						
14.04	14.65			J	x3	5			CN	PR	RF					
14.15				V		70				PR-CU						wh mi <2mm
14.21				V		85				IR						pale brown - white <3mm
14.47	14.55			hJ	x2	75				PR						pale yellow-pale green
14.50	14.55			hJ	x2	70				PR						pale yellow-pale green
14.74				hJ		60				PR						white
14.94				hJ		70				PR						white
15.06				CO		5				PR						
15.09	15.15			hJ	x3	10				PR-UN						pale green-grey
15.15	15.17			hJ	x2	50				PR						white x2
15.17	15.19			hJ	x2	20				PR-CU						pale green-pale yellow
15.21				MB												
15.26	15.34			hJ	x5	15				PR						pale yellow-pale grey
15.30				hJ		60				PR						pale yellow-pale grey
15.37	15.43			hJ	x2	5				PR						pale yellow-pale grey
15.45	15.51			hJ	x2	20				PR						pale yellow-pale grey
15.50				hJ		45				PR						pale yellow-pale grey
15.56				hJ		50				PR-UN						
15.65				hJ		70				PR						pale gresy
15.66	15.67			hJ	x2	30				PR						pale yellow -grey x 2
15.69				J		5			CN	PR	RF					
15.70				J		5				PR	RF					
16.04				hJ		60				PR						white
16.10				hJ		60				PR						1mm pale yellow-grey halo
16.15				hJ		30				PR						pale green-pale grey
16.29				hJ		35				PR-CU						pale yellow
16.30				J		25				PR	RF-SM					
16.37				CO		20				PR-UN						
16.51	16.70			hJ	x2	80				PR-UN						pale grey
16.54	16.56			hJ	x2	10				PR						pale grey-white
16.73	16.88			J	x2	5			CN	PR-UN	RF					
16.84	16.90			hJ	x2	65				PR						pale green-grey
16.90				hJ		30				PR						pale green- grey
17.04	17.08			V		35				PR						<5 mm pale green, 1mm pale yellow-pale green alt halo
17.16				CO		10				PR						
17.18	17.19			hJ	x2	60				PR						pale yellow-white
17.26				hJ		30				PR						pl grey-white
17.33				hJ		30				PR						dark grey
17.35				hJ		70				PR-CU						pale yellow-white
17.53				CO		60				PR						
17.55	17.72			hJ	x12	45				PR-UN						pale green-pale yellow
17.75				CO		50				PR-CU						
17.85	17.95			hJ		80				UN-PR						pale yellow-pale grey
17.90				V		50				PR						<4 mm parle green - pale yellow
18.05				hJ		85				CU-PR-UN						pale yellow-pale grey
18.08				hJ		20				PR						pale green-pale yellow
18.08	18.12			hJ	x3	30				PR-UN						pace grey- white
18.10				V		90				PR-CU						pale yellow-white <2 mm
18.15				CO		5				PR						
18.18				CO		5				PR						
18.23				CO		25				PR						
18.25				hJ		60				PR						pale yellow-White
18.36				hJ		80				PR						White
18.39	18.43			hJ	x3	30				PR-UN						pale yellow-white
18.70				V		70				PR-CU						pale yellow-white
18.73				CO		5				PR						
18.80				CO		5				PR						
18.87				CO		10				UN						
18.90				V		50				CU-PR						2mm pale yellow-white
18.93				V		70				PR-CU						< 2mm pele yellow- white
18.96				hJ		85				UN						grey
19.20				hJ		60				PR						
19.21	19.23			hJ		80				PR-CU						white
19.37				DB		5			CN		RF					
19.40				hJ		40				PR						White
19.91				CO		10				UN-ST						
20.09	20.35			hJ	x3	50				PR						
20.13	20.49			hJ	x4	20				PR						pale yellow- white
20.23				hJ		20				PR						
20.31				hJ		5				PR						while, Imm pale grey halo
20.64				V		70				PR						<2mm wh mi
20.78	20.82			hJ	x2	20				PR						
21.04				hJ		30				PR						
21.16	21.31			hJ	x2	25				PR						pale yellow-white
21.22				hJ		30				PR						
21.38				hJ		80				PR-UN						

Pioneer Burdekin Pumped Hydro Energy Storage: Tranche 2 – BHUA-02
Defects List

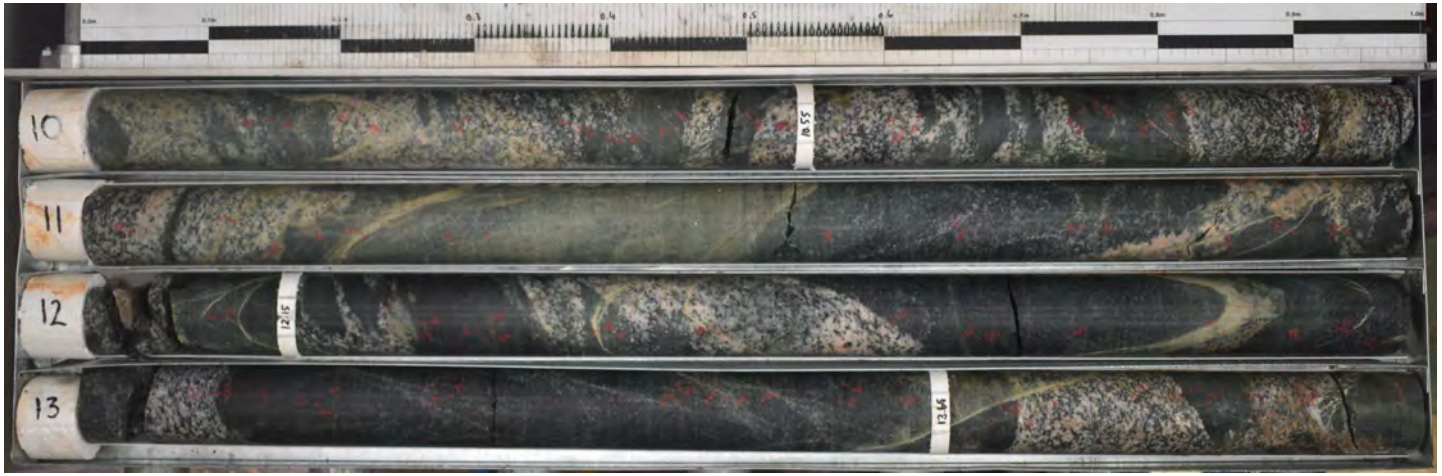
Depth	Bottom	Fracture Set	Defect Number	Type	Type Suffix	Dip Minimum (degrees)	Dip Maximum (degrees)	Infilling Material	Aperture Observation	Planarity	Roughness	Aperture Measurement Sign	Aperture Measurement	Aperture	Spacing	Remark
21.52	21.87			hJ	x6	30				PR						pale yellow-white
21.69				hJ		20				PR						pale yellow
21.74				hJ		90				PR-UN						palh yellow- white
21.89				hJ		15				PR-CU						
22.00				MB						UN	RF					
22.03	22.48			hJ	x7	45				PR						pale grey- white
22.20				hJ		20				PR-CU						pale yellow-pale grey
22.28				hJ		5				PR-UN						
22.40				MB		5			CN	UN-PR	RF					
22.50				HB		10			CN	PR-UN-IR	RF					dark gy mi
22.52	22.70			hJ	x5	25			VN-CT	PR-UN						pale yl; halo alteration; up to 3mm;
22.56				hJ		60				PR-CU						pale yellow-white
22.60	22.92			hJ	x5	70			VN-CT	PR-UN						pale yl; up to 2mm
23.00	23.32			V	x5	70			CT	UN-PR						pale yl and wh; up to 5mm
23.14	23.38			hJ	x5	45			VN-CT	PR-UN						pale yl; up to 2mm
23.38	23.85			V	x5	90			CT	UN-CU						pale yl; up to 15mm
23.50				J		15			CN	PR-UN-IR	RF					pale yl, wh and dark gy/gr
23.80	24.00			hJ	x5	25			VN	PR-UN						pale yl
24.00	24.40			hJ	x10	90			VN	PR-UN						pale yl mi
24.00	24.48			hJ	x12	75			VN	PR-UN						pale yl mi
24.08	24.38			hJ	x10	35			VN	PR-UN						pale yl mi
24.09	24.78			hJ	x15	20			VN	PR-UN						pale yl mi
24.23				J		15			CN	PR-ST	RF					dark gy/gr and wh mi
24.75	24.85			hJ	x5	20			VN	PR-UN						pale yl mi
24.92				hJ		60			VN	PR-UN						wh and pale yl mi
25.00	25.16			hJ	x3	50			VN	PR-UN						pale yl mi
25.00	25.21			hJ	x5	5			VN	PR-UN						pale yl mi
25.18	25.50			AZ					VN-CT	CU-UN-IR						pale yl mi
25.60				hJ		45			CT	UN-PR						pale yl mi
25.63				J		5			CN	PR-UN	RF-SM					dark gr to pale yl mi
25.68				J		5			CN	PR-UN	RF					dark gy/gr and wh mi
25.69	26.00			hJ	x5	90			VN-CT	PR-UN						pale yl mi; up to 3mm
25.82	25.92			hJ	x5	35			VN-CT	PR-UN-CU						pale yl mi
26.02	27.00			hJ	x15	85			VN	PR-UN						pale yl mi
26.10	26.32			hJ	x6	55			VN-CT	PR-UN						wh and pale yl; up to 3mm
26.12	26.39			hJ	x6	10			VN	PR-UN						pale yl mi
26.25				J		25			CN	PR-UN	RF					dark gy/gr mi
26.42				hJ		55			VN-CT	PR-UN						pale yl mi; up to 3mm
26.50				J		10			CN	PR-UN	RF					dark gy and wh mi
26.66				V		85			CT	UN-PR-CU						pale yl mi; up to 4mm
26.74	26.90			hJ	x5	40			VN	PR-UN						pale yl mi
26.77				J		10			CN	PR-UN	RF					dark gy/gr mi
27.02	28.00			hJ	x20	45			VN-CT	PR-UN						pale yl mi; up to 2mm
27.10	27.25			AZ					VN-CT	CU-UN-IR						pale yl mi
27.40	28.00			hJ	x12	75			VN-CT	PR-UN						pale yl mi; up to 2mm
28.00	28.68			hJ	x12	65			VN	PR-UN						wh and pale yl mi
28.37	28.58			hJ	x6	35			VN-CT	PR-UN						pale yl mi; up to 2mm
28.46				J		10			CN	PR-UN-IR	RF					dark gy and wh mi
28.60	29.00			hJ	x8	55			VN	PR-UN						wh and pale yl mi
29.11	29.65			hJ	x10	40			VN	PR-UN						wh and pale yl mi
29.26	29.50			hJ	x6	85			VN	PR-UN						pale yl mi
29.65	29.85			hJ	x5	45			VN	PR-UN						pale yl mi
29.82				J		15			CN	PR-UN	RF					pale yl, dark gy and wh mi
29.88				hJ		75			VN	PR-UN						wh and pale yl mi
30.01	30.31			hJ	x6	85			VN-CT	PR-UN						pale yl mi; up to 3mm
30.03	30.37			hJ		35			VN	PR-UN						pale yl mi
30.24	30.33			hJ	x3	45			CT-VN	PR-UN						pale yl mi; 1-3mm
30.65				J		25			CN	PR-UN	RF					dark gy mi
30.65	30.92			hJ	x8	45			VN-CT	PR-UN						pale yl mi; 1-3mm
30.77				J		35			CN	PR-UN	RF					dark gy mi
30.88	31.00			hJ	x5	80			VN	PR-UN						pale yl mi
30.89				V		70			CT	PR-UN						pale yl mi; up to 5mm
30.96				hJ		15			VN-CT	PR-UN						pale yl mi; 1-2mm
31.05	31.50			hJ	x10	65			VN-CT	PR-UN						pale yl mi; 1-3mm
31.06	31.32			hJ	x5	35			VN-CT	PR-UN						pale yl mi; 1-2mm
31.42	31.80			hJ	x5	80			VN-CT	PR-UN						pale yl mi; up to 3mm
31.75	31.90			hJ	x6	55			VN-CT	PR-UN						pale yl mi; 1-3mm
31.83				J		10			CN-SN	UN-IR	RF					orange and dark gr mi; Fe stained surfaces
31.85				J		60			CN-SN	PR-UN	RF					orange and dark gr; iron stained surfaces
31.98				J		75			CN-SN	PR-UN	RF					orange and dark gy mi
32.00	32.18			FZ					CN-SN	IR	RF-SM					orange and dark gr; iron stained surfaces.
32.22				J		5			CN-SN	PR-UN	RF					orange and dark gy mi; iron stained surfaces
32.23	32.36			Js		75			CN-SN	PR-UN	RF					orange and dark gy; iron stained surfaces ; + x4
32.24				hJ		5			CN-SN	PR-UN	RF					orange and dark gy; iron stained surfaces
32.42				J		5			CN	PR-UN	RF					dark gy to wh
32.45	33.00			hJ	x12	15			VN-CT	PR-UN						wh and pale yl mi; up to 4mm
32.50				J		70			CN-SN	PR	RF-SM					pale orange and dark gy; iron stained surfaces
32.60	33.00			hJ	x10				VN-CT	PR-UN						pale yl; up to 3mm
32.70	32.82			hJ	x5	45			VN	PR-UN						pale yl mi

Pioneer Burdekin Pumped Hydro Energy Storage: Tranche 2 – BHUA-02
Defects List

Depth	Bottom	Fracture Set	Defect Number	Type	Type Suffix	Dip Minimum (degrees)	Dip Maximum (degrees)	Infilling Material	Aperture Observation	Planarity	Roughness	Aperture Measurement Sign	Aperture Measurement	Aperture	Spacing	Remark
32.77				J		10			CN	PR-UN	RF					dark gy and wh
32.83				V		55			CT	PR-UN-IR						wh mi; up to 5mm; halo alteration around vein
32.94				V		80			CT	UN-CU						wh and pale yl mi; up to 4mm
33.05	33.82			hJ	x15	45			VN-CT	PR-UN						wh and pale yl mi; 1-3mm
33.06	33.42			hJ	x8	20			VN-CT	PR-UN						wh and pale yl mi; 1-2mm
33.58				J		15			CN	PR-UN	RF					wh and dark gy mi
33.70	33.93			hJ	x6	5			VN	PR-UN						pale yl mi
33.75				J		10			CN	PR-UN-ST	RF					dark gy mi
33.88				hJ		40			VN-CT	PR-UN						wh and pale yl mi; 1-2mm
33.99				hJ		45			VN-CT	PR-UN						pale yl mi; 1-3mm
34.05	34.50			hJ	x12	35			VN-CT	PR-UN						wh and pale yl mi; 1-3mm
34.11				V		75			VN-CT	PR-UN						wh and pale yl mi; up to 3mm
34.26				J		5			CN	UN-ST	RF					pale yl and dark gy mi
34.44	34.70			hJ	x6	20			VN-CT	PR-UN						wh and pale yl; up to 3mm
34.77				J		45			CN	PR-UN	RF					wh, pale yellow and dark gy mi
34.84				hJ		70			VN	PR-UN						pale yl mi
34.93				MB		5			CN	PR	RF					dark gy mi



PointID : BHUA-02 Depth Range: 6.60 - 10.00 m



PointID : BHUA-02 Depth Range: 10.00 - 14.00 m

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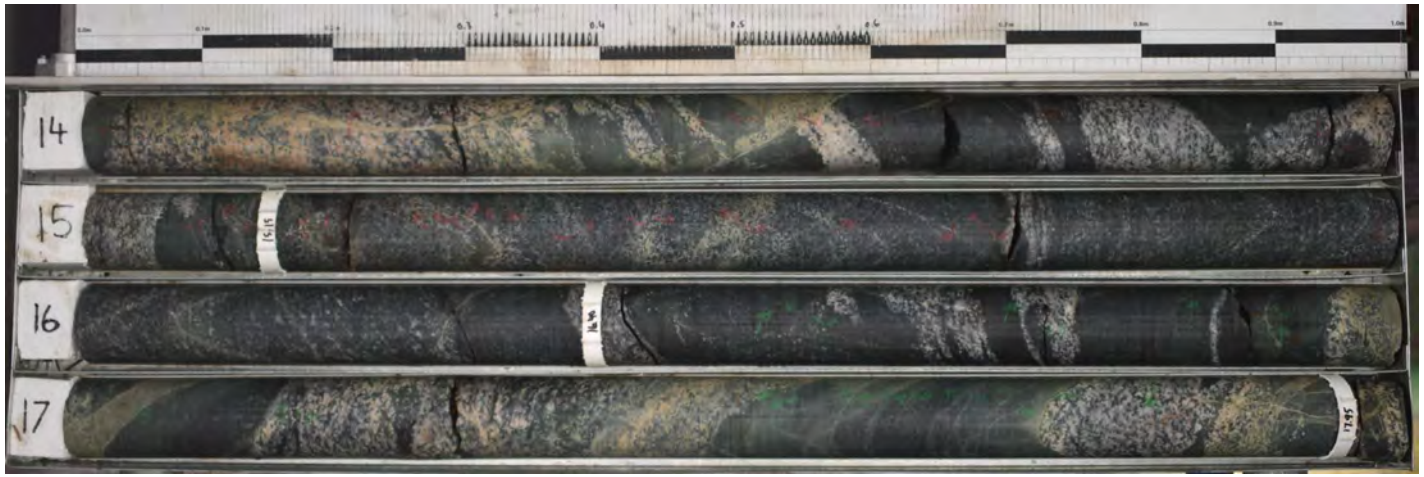
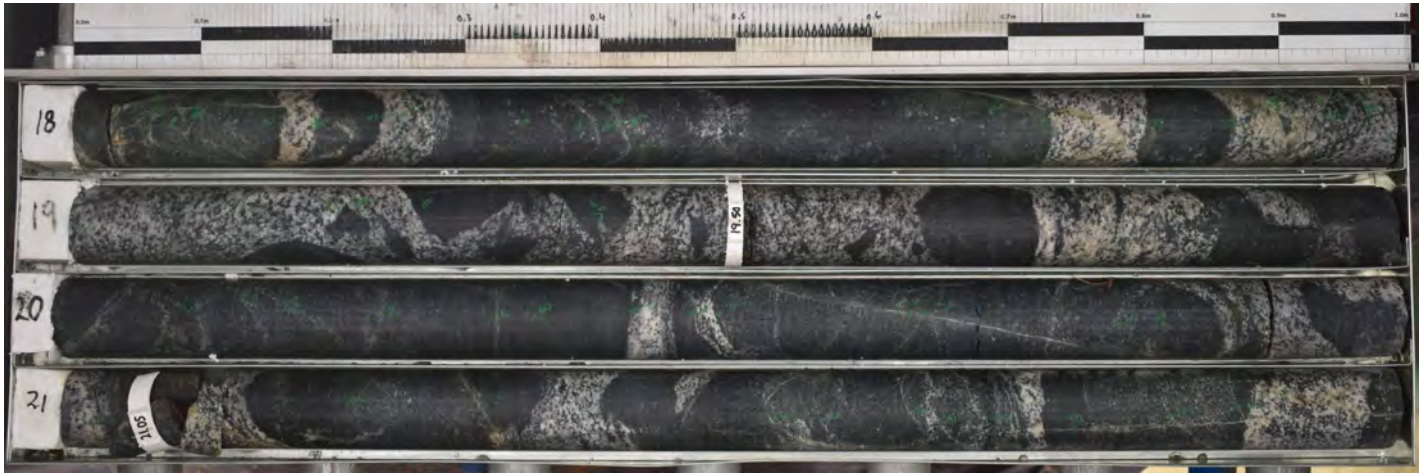
		CHECKED: GEM	DATE: 9/12/2024
		SCALE: Not To Scale	A4
		PROJECT No: PS138693	FIGURE No: 1/4

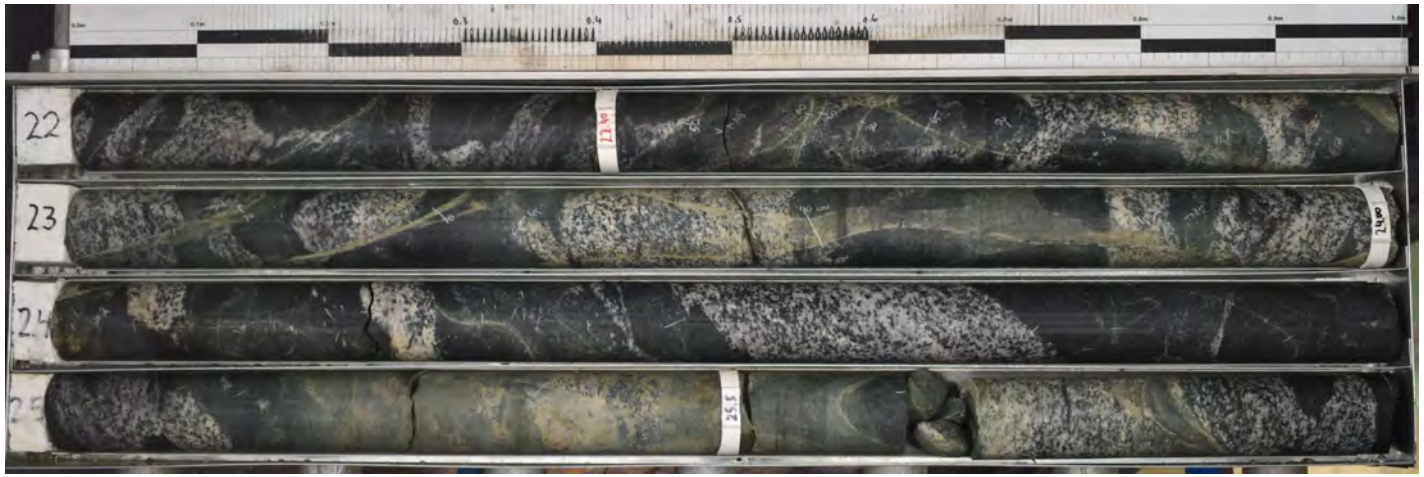


PointID : BHUA-02 Depth Range: 14.00 - 18.00 m

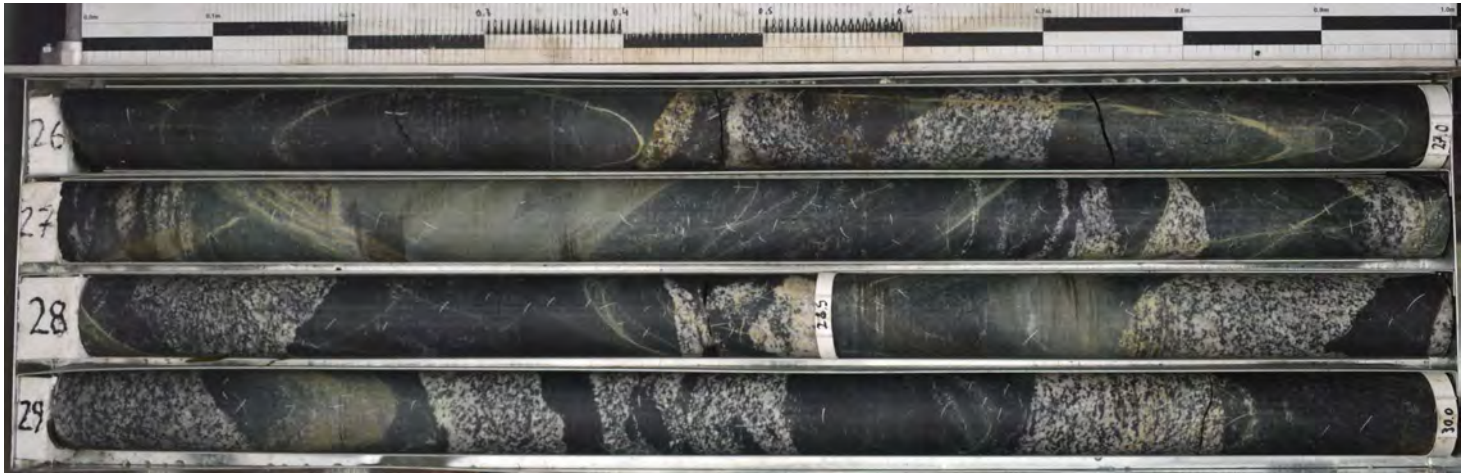


PointID : BHUA-02 Depth Range: 18.00 - 22.00 m

wsp	TITLE: Queensland Hydro Netherdale/Dalrymple Heights Pioneer-Burdekin PHES Core photo - BHUA-02	DRAWN: RC	DATE: 9/12/2024
		CHECKED: GEM	DATE: 9/12/2024
		SCALE: Not To Scale	A4
		PROJECT No: PS138693	FIGURE No: 2/4

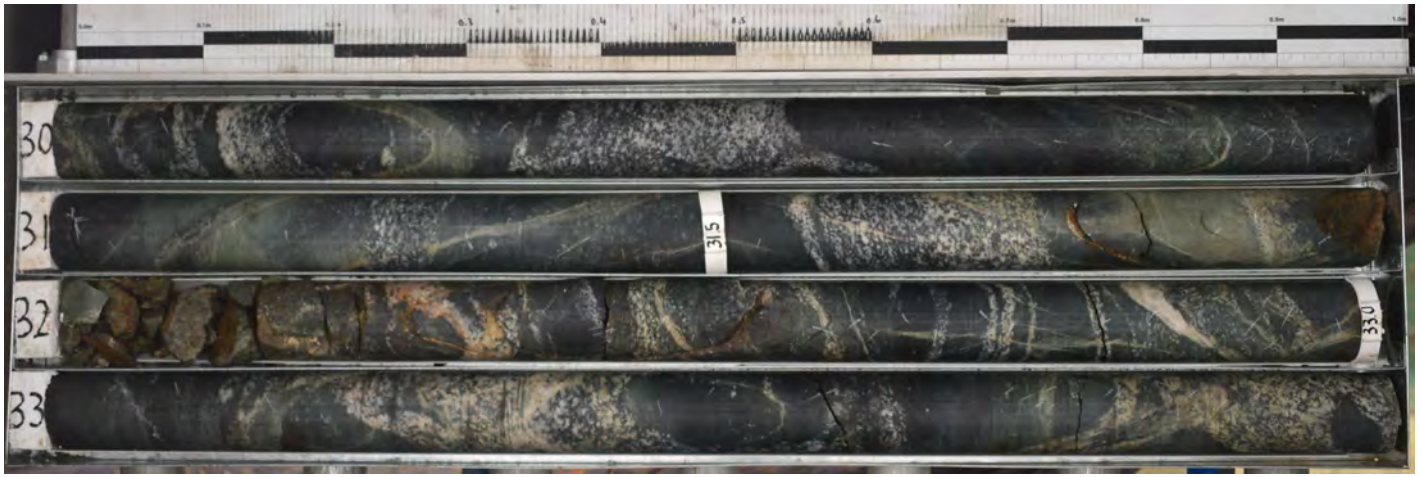


PointID : BHUA-02 Depth Range: 22.00 - 26.00 m

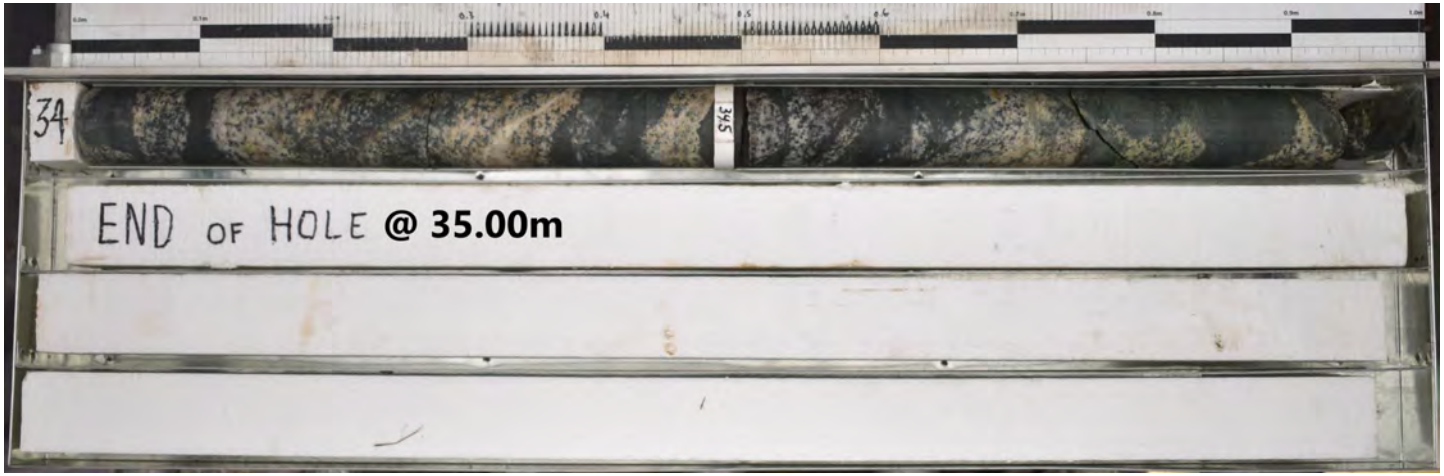


PointID : BHUA-02 Depth Range: 26.00 - 30.00 m

wsp	TITLE: Queensland Hydro Netherdale/Dalrymple Heights Pioneer-Burdekin PHES Core photo - BHUA-02	DRAWN: RC	DATE: 9/12/2024
		CHECKED: GEM	DATE: 9/12/2024
		SCALE: Not To Scale	A4
		PROJECT No: PS138693	FIGURE No: 3/4



PointID : BHUA-02 Depth Range: 30.00 - 34.00 m



PointID : BHUA-02 Depth Range: 34.00 - 35.00 m

wsp	TITLE: Queensland Hydro Netherdale/Dalrymple Heights Pioneer-Burdekin PHES Core photo - BHUA-02	DRAWN: RC	DATE: 9/12/2024
		CHECKED: GEM	DATE: 9/12/2024
		SCALE: Not To Scale	A4
		PROJECT No: PS138693	FIGURE No: 4/4

BHUA-02 Structural Logs

WSP Australia Pty Limited
Level 12, 900 Ann Street
Fortitude Valley
QLD 4006
Australia

GEOPHYSICAL RECORD OF BOREHOLE: BHUA-02

PROJECT: Pioneer-Burdekin PHES JOB # PS138693

CLIENT: Queensland Hydro DATE: 22/11/2024

BOREHOLE DETAILS

LOCATION:	Upper Reservoir A	BH DEPTH:	35 m
EASTING:	658909.40 m E	BH DIAMETER:	HQ
NORTHING:	7666467.07 m N	BH AZIMUTH:	269° TN
ELEVATION:	874.897 m	BH PLUNGE:	-86° TN
COORD SYSTEM:	MGA2020	CASING DEPTH:	8.63 m
LOGGING DATUM:	Ground Level	CASING TYPE:	HWT

DOCUMENT DETAILS

LOGGED BY:	JH
LOGGED DATE:	05/08/2024
DRAWN BY:	JH
REVIEWED BY:	GH
FILE:	BHUA-02_Struct_RevB
LOGGED DEPTH:	34.5 m

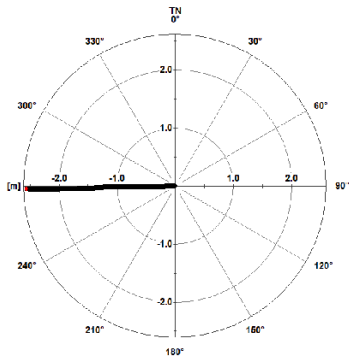
NOTES

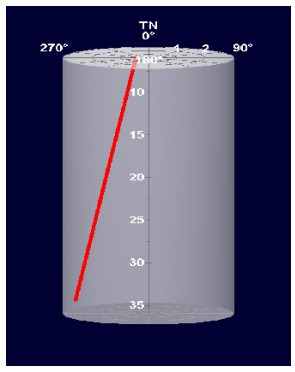
Image logs are oriented relative to borehole high side. Final structure log is oriented relative to true north using magnetic declination of 8.2° East.

Mechanical calliper log used for structure dip corrections.

All logs zerored to ground level. Cased section assumed straight for deviation calculations.

BOREHOLE DEVIATION



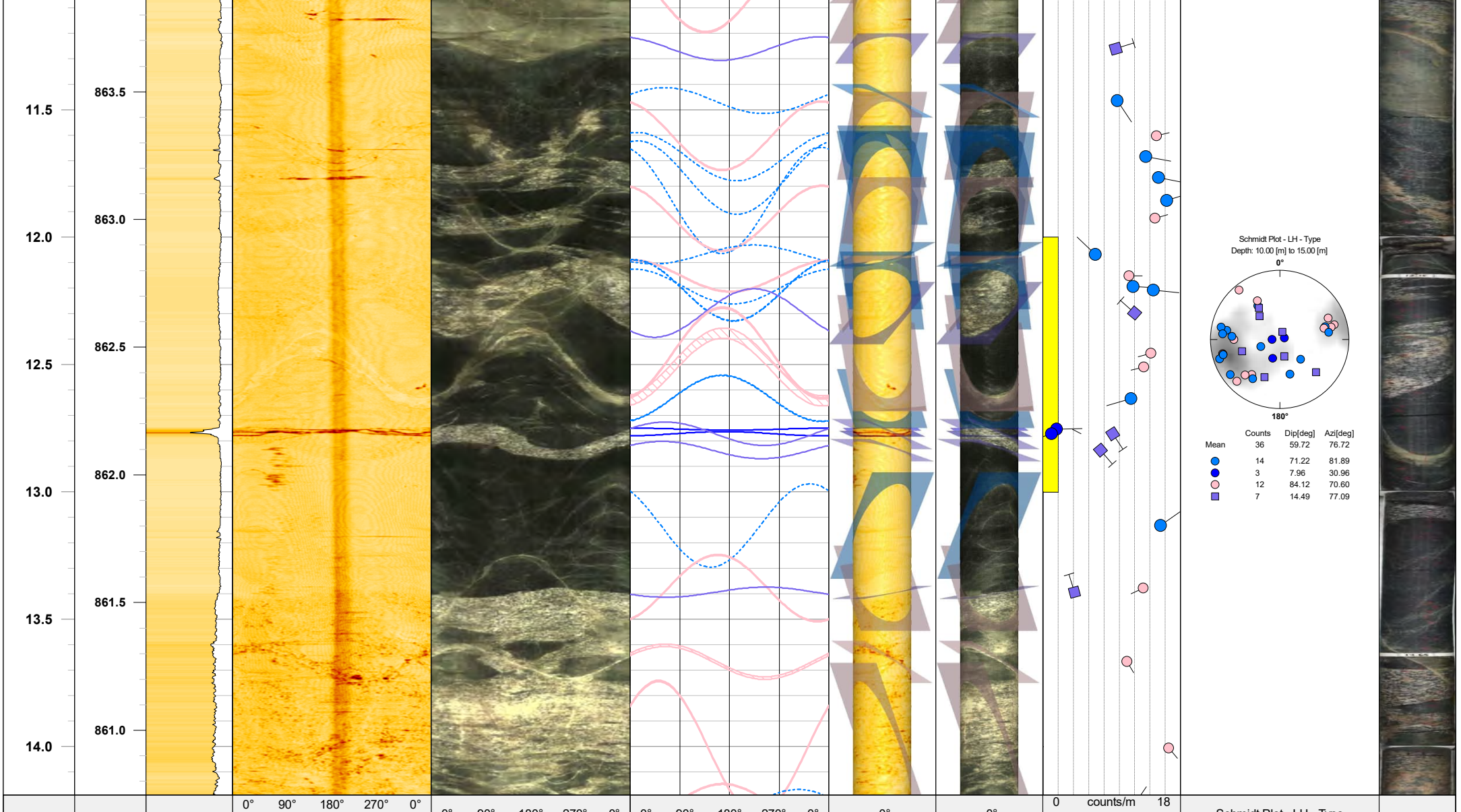


INTERPRETED STRUCTURES

Contact Joint Shear Zone Vein Healed Joint

BHUA-02

Depth		Image Logs			Structural Data					Core
Depth	RL m	Reflectivity	Amplitude-HS	Image-HS PROC	Apparent Structures	3D ATV	3D OTV	Structures - TN	Stereoplots	Core Photo
1m:20m	AHD		0 11000 0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	-0°	-0°	0 90 Freq/metre 0 counts/m 18	Schmidt Plot - LH - Type	

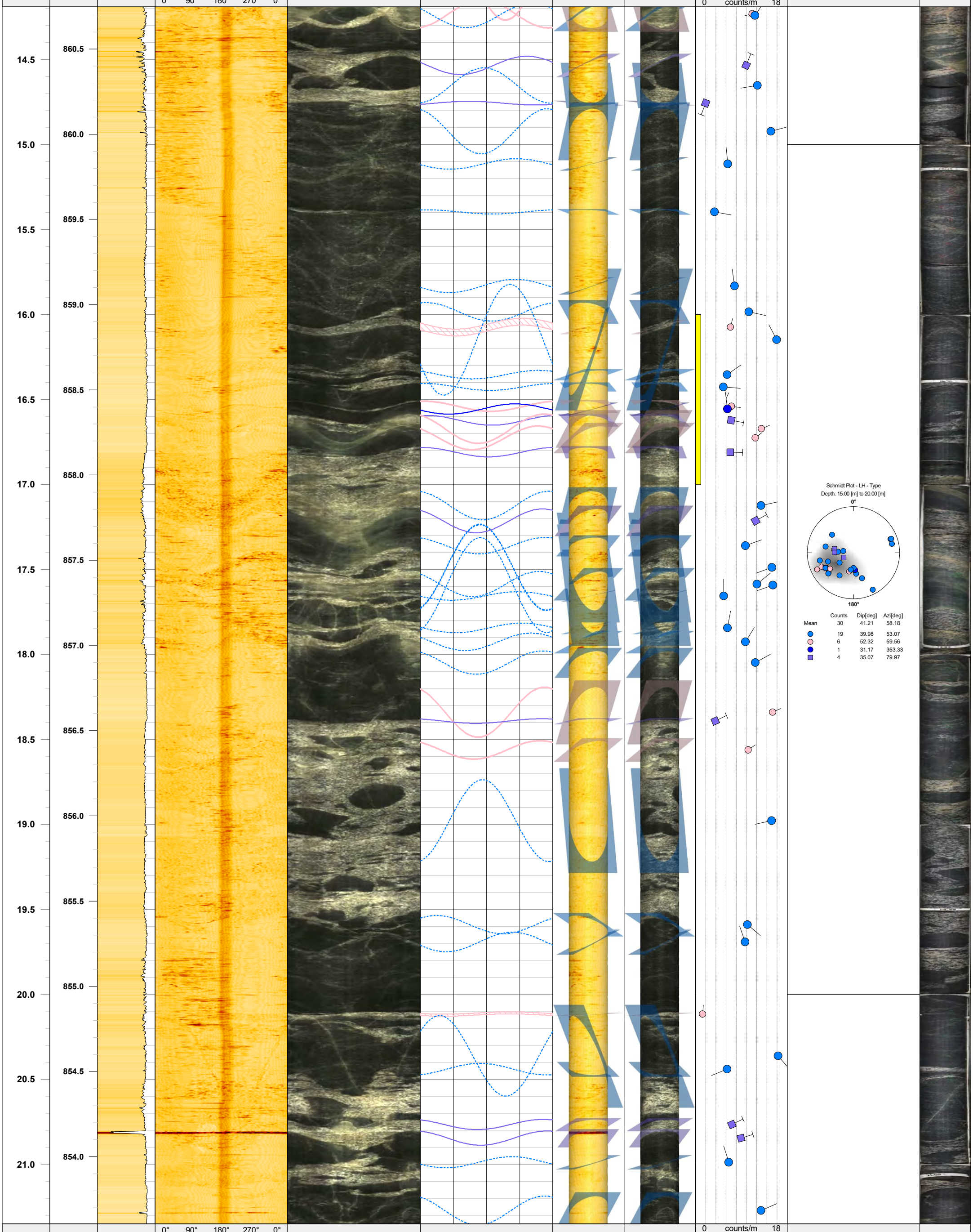


Depth		Image Logs			Structural Data					Core
Depth	RL m	Reflectivity	Amplitude-HS	Image-HS PROC	Apparent Structures	3D ATV	3D OTV	Structures - TN	Stereoplots	Core Photo
1m:20m	AHD		0° 90° 180° 270° 0° 0 11000	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	-0°	-0°	0 counts/m 18 Freq/metre 0 90	Schmidt Plot - LH - Type	

BHUA-02

BHUA-02

Depth		Image Logs			Structural Data					Core
Depth	RL m	Reflectivity	Amplitude-HS	Image-HS PROC	Apparent Structures	3D ATV	3D OTV	Structures - TN	Stereoplots	Core Photo
1m:20m	AHD		0 11000 0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	-0°	-0°	0 90 Freq/metre 0 counts/m 18	Schmidt Plot - LH - Type	



Schmidt Plot - LH - Type
Depth: 15.00 [m] to 20.00 [m]

0°

180°

	Counts	Dip[deg]	Azi[deg]
Mean	30	41.21	58.18
	19	39.98	53.07
	6	52.32	59.56
	1	31.17	353.33
	4	35.07	79.97

Depth		Image Logs			Structural Data					Core
Depth	RL m	Reflectivity	Amplitude-HS	Image-HS PROC	Apparent Structures	3D ATV	3D OTV	Structures - TN	Stereoplots	Core Photo
1m:20m	AHD		0 11000 0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	-0°	-0°	0 90 Freq/metre 0 counts/m 18	Schmidt Plot - LH - Type	

BHUA-02

BHUA-02

Depth		Image Logs			Structural Data					Core
Depth	RL m	Reflectivity	Amplitude-HS	Image-HS PROC	Apparent Structures	3D ATV	3D OTV	Structures - TN	Stereoplots	Core Photo
1m:20m	AHD		0 11000			-0°	-0°	0 90 Freq/metre 0 counts/m 18	Schmidt Plot - LH - Type	
			0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°					

Depth (1m:20m) / RL m (AHD): 21.5 / 853.5; 22.0 / 853.0; 22.5 / 852.5; 23.0 / 852.0; 23.5 / 851.5; 24.0 / 851.0; 24.5 / 850.5; 25.0 / 850.0; 25.5 / 849.5; 26.0 / 849.0; 26.5 / 848.5; 27.0 / 848.0; 27.5 / 847.5; 28.0 / 847.0; 28.5 / 846.5

Schmidt Plot - LH - Type
Depth: 20.00 [m] to 25.00 [m]
0°
180°

	Counts	Dip[deg]	Azi[deg]
Mean	37	42.47	71.24
	7	78.96	251.35
	22	44.27	61.08
	8	27.10	98.94

Schmidt Plot - LH - Type
Depth: 25.00 [m] to 30.00 [m]
0°
180°

	Counts	Dip[deg]	Azi[deg]
Mean	51	44.26	90.87
	9	88.01	70.64
	29	58.49	82.19
	13	25.23	150.64

Depth		Image Logs			Structural Data					Core
Depth	RL m	Reflectivity	Amplitude-HS	Image-HS PROC	Apparent Structures	3D ATV	3D OTV	Structures - TN	Stereoplots	Core Photo

BHUA-02

BHUA-02

Depth		Image Logs			Structural Data					Core
Depth	RL m	Reflectivity	Amplitude-HS	Image-HS PROC	Apparent Structures	3D ATV	3D OTV	Structures - TN	Stereoplots	Core Photo
1m:20m	AHD		0 11000	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	-0°	-0°	0 90 Freq/metre 0 counts/m 18	Schmidt Plot - LH - Type	

Schmidt Plot - LH - Type
Depth: 30.00 [m] to 34.47 [m]

	Counts	Dip[deg]	Azi[deg]
Mean	45	40.31	87.55
	14	21.66	98.26
	17	82.79	61.51
	7	33.08	89.27
	6	68.74	122.35
	1	74.68	123.04

Depth		Image Logs			Structural Data					Core
1m:20m	AHD	Reflectivity	Amplitude-HS	Image-HS PROC	Apparent Structures	3D ATV	3D OTV	Structures - TN	Stereoplots	Core Photo
Depth	RL m		0° 90° 180° 270° 0° 0 11000	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	-0°	-0°	0 counts/m 18 Freq/metre 0 90	Schmidt Plot - LH - Type	
BHUA-02										

BHUA-02 Composite Logs

WSP Australia Pty Limited
Level 12, 900 Ann Street
Fortitude Valley
QLD 4006
Australia

GEOPHYSICAL RECORD OF BOREHOLE: BHUA-02

PROJECT: Pioneer-Burdekin PHES | JOB #: PS138693
CLIENT: Queensland Hydro | DATE: 22/11/2024

BOREHOLE DETAILS

LOCATION:	Upper Reservoir A	BH DEPTH:	35 m
EASTING:	658909.40 m E	BH DIAMETER:	HQ
NORTHING:	7666467.07 m N	BH AZIMUTH:	269° TN
ELEVATION:	874.897 m	BH PLUNGE:	-86° TN
COORD SYSTEM:	MGA2020	CASING DEPTH:	8.63 m
LOGGING DATUM:	Ground Level	CASING TYPE:	HWT

DOCUMENT DETAILS

LOGGED BY:	JH
LOGGED DATE:	05/08/2024
DRAWN BY:	JH
REVIEWED BY:	GH
FILE:	BHUA-02_Comp_RevB
LOGGED DEPTH:	34.5 m

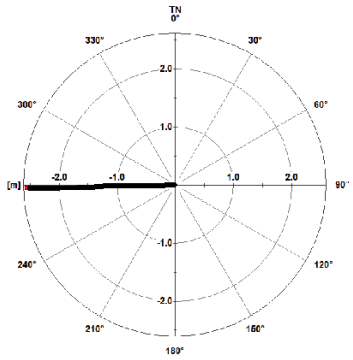
NOTES

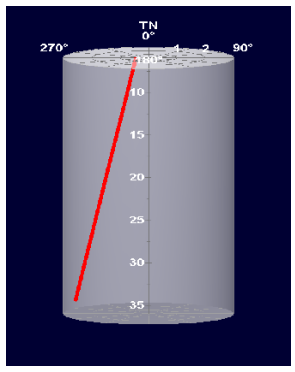
Image logs are oriented relative to borehole high side. Final structure log is oriented relative to true north using magnetic declination of 8.2° East.

Mechanical calliper log used for structure dip corrections.

All logs zerored to ground level. Cased section assumed straight for deviation calculations.

BOREHOLE DEVIATION





INTERPRETED STRUCTURES

Contact | Joint | Shear Zone | Vein | Healed Joint

BHUA-02

Depth	Image Logs			Calliper	Structural Logs			Sonic Logs	Gamma Logs		Electrical Logs	
Depth	Amplitude-HS	Image-HS PROC	Reflectivity	CAL	Structures - TN	3D ATV	Core	Vs	GR	U	N16	Ma16
1m:50m	0 10000		0 9000	80 mm 160	0 90	-0°		1000 m/s 7000	0 API 250	0 ppm 10	200 Ohm.m 20000	0 ms 50
	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°			Freq/metre			Vp		Th	N32	Ma64
					0 counts/m 18			1000 m/s 7000		0 ppm 20	200 Ohm.m 20000	0 ms 50
					0 90			Vs		K	N8	Ma16
					Structures - TN					0 % 10	200 Ohm.m 20000	
										U	N16	
Depth	Image Logs			Calliper	Structural Logs			Sonic Logs	Gamma Logs		Electrical Logs	

BHUA-02

BHUA-02

Depth	Image Logs			Calliper	Structural Logs			Sonic Logs	Gamma Logs		Electrical Logs	
Depth	Amplitude-HS	Image-HS PROC	Reflectivity	CAL	Structures - TN	3D ATV	Core	Vs	GR	U	N16	Ma16
1m:50m	0 10000		0 9000	80 mm 160	0 90	-0°		1000 m/s 7000	0 API 250	0 ppm 10	200 Ohm.m 20000	0 ms 50
	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°			Freq/metre			Vp		Th	N32	Ma64
					0 counts/m 18			1000 m/s 7000		0 ppm 20	200 Ohm.m 20000	0 ms 50
										K	N8	
										0 % 10	200 Ohm.m 20000	

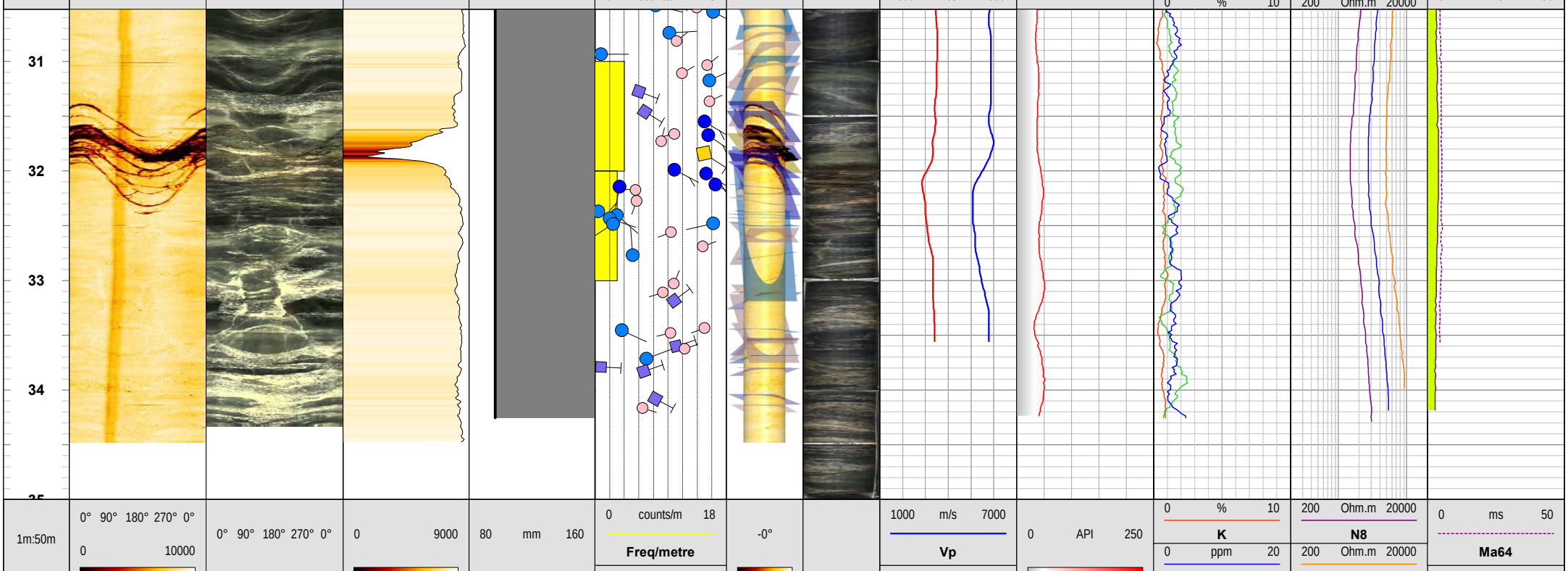
14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

Depth	Image Logs			Calliper	Structural Logs			Sonic Logs	Gamma Logs		Electrical Logs	
Depth	Amplitude-HS	Image-HS PROC	Reflectivity	CAL	Structures - TN	3D ATV	Core	Vs	GR	U	N16	Ma16
1m:50m	0 10000		0 9000	80 mm 160	0 90	-0°		1000 m/s 7000	0 API 250	0 ppm 10	200 Ohm.m 20000	0 ms 50
	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°			Freq/metre			Vp		Th	N32	Ma64
					0 counts/m 18			1000 m/s 7000		0 ppm 20	200 Ohm.m 20000	0 ms 50
										K	N8	
										0 % 10	200 Ohm.m 20000	

BHUA-02

BHUA-02

Depth	Image Logs			Calliper	Structural Logs			Sonic Logs	Gamma Logs		Electrical Logs	
Depth	Amplitude-HS	Image-HS PROC	Reflectivity	CAL	Structures - TN	3D ATV	Core	Vs	GR	U	N16	Ma16
1m:50m	0 10000		0 9000	80 mm 160	0 90	-0°		1000 m/s 7000	0 API 250	0 ppm 10	200 Ohm.m 20000	0 ms 50
	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°			Freq/metre			Vp		Th	N32	Ma64
					0 counts/m 18			1000 m/s 7000		0 ppm 20	200 Ohm.m 20000	0 ms 50
										K	N8	
										0 % 10	200 Ohm.m 20000	



Depth	Image Logs			Calliper	Structural Logs			Sonic Logs	Gamma Logs		Electrical Logs	
Depth	Amplitude-HS	Image-HS PROC	Reflectivity	CAL	Structures - TN	3D ATV	Core	Vs	GR	U	N16	Ma16
1m:50m	0 10000		0 9000	80 mm 160	0 90	-0°		1000 m/s 7000	0 API 250	0 ppm 10	200 Ohm.m 20000	0 ms 50
	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°			Freq/metre			Vp		Th	N32	Ma64
					0 counts/m 18			1000 m/s 7000		0 ppm 20	200 Ohm.m 20000	0 ms 50
										K	N8	
										0 % 10	200 Ohm.m 20000	