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BOREHOLE: BHL-04

Project:	Pioneer-Burdekin PHES	Position:	Lower Reservoir	Sheet	1 of 5
Location:	Netherdale/Dalrymple Heights	Coords:	659904.5 m E 7662639.1 m N MGA2020-55		
Client:	Queensland Hydro	Surface RL:	206.88 m AHD	Date Started:	18/12/2023
Job No.:	PS138693	Contractor:	Twin Hills Engineering & Drilling Drill Rig: Hanjin D&B-8DTM	Date Completed:	4/1/2023
		Inclination:	-87° Direction: 110° Hole Dia.: 96/122.6/200 mm	Logged:	NLP

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/V			0	206.88								
				0.20				CI	FILL Sandy CLAY: medium plasticity, dark brown, sand is fine to coarse grained; trace fine to coarse grained gravel; trace root fibres.	w<PL	St	FILL
				206.68				CI	CLAY: medium plasticity, brown, with fine to medium grained sand; occasional cobbles.	w>PL	F to St	ALLUVIAL SOIL
				0.70								
				206.18				SW	Gravelly SAND: fine to coarse grained, brown, gravel is fine to coarse grained; with low plasticity clay; trace occasional cobbles.			
	E-F	Groundwater Not Encountered	1		SPT 1.50-1.95 m 5,9,9 N=18 SPTLS 1.50-1.95 m PB-BHL-04-001						MD	
			2									
				3.00								
RR			3	203.88	SPT 3.00-3.45 m 6,14,20 HB N=34 SPTLS 3.00-3.45 m PB-BHL-04-002			SP	Clayey Gravelly SAND: fine to coarse grained, brown, gravel is fine to coarse sub-angular; clay is low plasticity; with silt; trace occasional cobbles.	M		
		90% Water Return 10/2024							without cobbles			
	F-H		4								D	
					SPT 4.50-4.95 m 10,17,14 N=31 SPTLS 4.50-4.95 m PB-BHL-04-003				medium plasticity, mottled brown, grey, and orange			
			5									
	VH			5.42								
									Continued as Cored Borehole			
			6									
			7									
			8									
			9									
			10									

Comments

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BOREHOLE: BHL-04

		Position:	Lower Reservoir	Sheet	2 OF 5
Project:	Pioneer-Burdekin PHES	Coords:	659904.5 m E 7662639.1 m N MGA2020-55		
Location:	Netherdale/Dalrymple Heights	Surface RL:	206.88 m AHD	Date Started:	18/12/2023
Client:	Queensland Hydro	Contractor:	Twin Hills Engineering & Drilling Drill Rig: Hanjin D&B-8DTM	Date Completed:	4/1/2023
Job No.:	PS138693	Inclination:	-87° Direction: 110° Hole Dia.: 96/122.6/200 mm	Logged:	NLP

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 -5 M -20 H -60 VH -200 EH	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	5.42		Continuation from non-cored borehole				
HQ3	60% Water Return	100	0		201.47		SP Clayey Gravelly SAND: fine to coarse grained, brown, gravel is fine to coarse sub-angular; clay is low plasticity; with silt; trace occasional cobbles. dense. basalt boulder, fine grained, black, crystalline, very high strength, fresh				
		100	0		6.00						
				6	200.89		NO CORE 0.25m (6.00-6.25)				
		50	0		6.25						
					200.64		SC Clayey SAND: fine to coarse grained, mottled brown, pale brown, orange, and black, clay is low to medium plasticity; with fine to coarse gravel. dense.			6.50-6.95: SPT, 16,15,18 N= 33	
		0	0		6.95						
				7	199.94		NO CORE 0.45m (6.95-7.40)			6.95-17.38: NO CORE, drilling process were unable to recover sandy soils.	
					7.40						
					199.49		NO CORE 1.50m (7.40-8.90) SC Clayey SAND: fine to coarse grained, brown mottled orange, clay is medium plasticity; with fine to coarse gravel; (Material description inferred based on SPT sample). dense.			7.40-7.85: SPT, 3,5,22, N= 27	
		0	0	8							
					8.90						
		0	0	9	197.99		NO CORE 5.80m (8.90-14.70) SW Gravelly SAND: fine to coarse grained, brown, gravel is fine to coarse grained; with low plasticity clay; (Material description inferred based on SPT sample). very dense.			8.90-9.04: SPT, 30/140 mm, HB	
		0	0								
				10							

Comments

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BOREHOLE: BHL-04

		Position:	Lower Reservoir	Sheet	3 OF 5
Project:	Pioneer-Burdekin PHES	Coords:	659904.5 m E 7662639.1 m N MGA2020-55		
Location:	Netherdale/Dalrymple Heights	Surface RL:	206.88 m AHD	Date Started:	18/12/2023
Client:	Queensland Hydro	Contractor:	Twin Hills Engineering & Drilling Drill Rig: Hanjin D&B-8DTM	Date Completed:	4/1/2023
Job No.:	PS138693	Inclination:	-87° Direction: 110° Hole Dia.: 96/122.6/200 mm	Logged:	NLP

Drilling

METHOD	WATER	TCR	RQD
HQ3	60% Water Return	0	0
		0	0
		0	0
		0	0
		0	0
		29	0
		100	54
		100	84

Field Material Description

DEPTH (metres)	DEPTH RL	ROCK / SOIL MATERIAL DESCRIPTION	WEATHERING
10		NO CORE 5.80m (8.90-14.70) SW Gravelly SAND: fine to coarse grained, brown, gravel is fine to coarse grained; with low plasticity clay; (Material description inferred based on SPT sample). very dense.	
11			
12			
13			
14	14.70		
	192.20	NO CORE 0.30m (14.70-15.00) GW Sandy GRAVEL: fine to medium, well graded, sub-rounded to sub-angular, pale brown and white, sand is fine to coarse grained; trace medium plasticity clay; (Material description inferred based on SPT sample). very dense.	
15	15.00 / 191.90		
	15.50 / 191.40	NO CORE 0.50m (15.00-15.50) SW Gravelly SAND: fine to coarse grained, brown, gravel is fine; with non-plastic silt; (Material description inferred based on SPT sample). very dense.	
16		NO CORE 1.88m (15.50-17.38) GW Sandy GRAVEL: fine to medium, brown, sand is fine grained; with non-plastic silt; (Material description inferred based on SPT sample). very dense.	
17	17.38		
	17.58 / 189.32	SW Gravelly SAND: fine to coarse grained, brown to pale brown, gravel is fine to coarse grained, sub-angular; with low plasticity clay. very dense.	MW to SW
18		GRANITE: medium to coarse grained, grey, white, and black, crystalline, slightly altered green around some defects.	SW to FR
19			FR
20			

Defect Information

DEFECT DESCRIPTION & Additional Observations (Core partings shown - refer to Detailed Defect Descriptions table for all logged features)
10.50-10.64: SPT, 30/140 mm, HB
12.00-12.15: SPT, 30/150 mm, HB
13.50-13.64: SPT, 30/140 mm, HB
15.00-15.27: SPT, 30/120 mm, HB
16.50-16.79: SPT, 30/140 mm, HB
17.64: J, 0°, UN, RF
17.60-17.75: J, 80°, bk SN, PR, RF
17.70: J, 60°, bk SN, PR, VR
17.72: J, 20°, bk SN, PR, RF
17.75: J, 60°, Clayey SAND CT, PR, VR
17.76: J, 20°, CN, PR, SM
17.83: J, 0°, CN, IR, VR
17.84-17.97: J, 90°, ph SAND CT, IR, VR
18.01: J, 40°, wh Clayey SAND CT, IR, SM
18.04: J, 40°, wh Sandy CLAY CT, IR, SM
18.06: J, 60°, wh Sandy CLAY CT, UN, SM
18.07: J, 60°, bk SN, UN, SM
18.09: J, 30°, CN, UN, VR
18.12: J, 30°, CN, PR, SM
18.15: J, 45°, CN, PR, SM
18.20: J, 60°, CN, PR, RF
18.25: J, 70°, ph bk SN, PR, SM
18.26-18.34: EW, 25 - 60°, wh clay CT, PR, 80 mm, GRAVEL, fine to coarse grained, angular, br-gy, with fine to coarse grained sand, with wh clay, significant
18.45: J, 30°, CN, UN, RF

INFERRED STRENGTH (MPa) ■ - UCS: VL <2, L 2-6, M 6-20, H 20-60, VH 60-200, EH >200

AVERAGE DEFECT SPACING (mm): 10, 30, 100, 300, 1000, 3000

Comments

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BOREHOLE: BHL-04

		Position:	Lower Reservoir	Sheet	4 OF 5
Project:	Pioneer-Burdekin PHES	Coords:	659904.5 m E 7662639.1 m N MGA2020-55		
Location:	Netherdale/Dalrymple Heights	Surface RL:	206.88 m AHD	Date Started:	18/12/2023
Client:	Queensland Hydro	Contractor:	Twin Hills Engineering & Drilling Drill Rig: Hanjin D&B-8DTM	Date Completed:	4/1/2023
Job No.:	PS138693	Inclination:	-87° Direction: 110° Hole Dia.: 96/122.6/200 mm	Logged:	NLP

Drilling

METHOD	WATER	TCR	RQD
HQ3	60% Water Return	100	84
		100	86
		100	100
		100	90
		100	100
		100	97
		100	100
		100	65
		100	53

DEPTH (metres): 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30

DEPTH RL

Field Material Description

GRAPHIC LOG

ROCK / SOIL MATERIAL DESCRIPTION

GRANITE: medium to coarse grained, grey, white, and black, crystalline, slightly altered green around some defects.

some irregular inclusions of APLITE/RHYOLITE, fine to medium grained, pink, crystalline, 15-120 mm diameter

slightly altered green and pink around some defects

pink alteration halo around most defects

WEATHERING: FR

INFERRED STRENGTH (MPa) ■ - UCS: VL <2, L 2-5, M 5-20, H 20-60, VH 60-200, EH >200

Defect Information

DEFECT DESCRIPTION & Additional Observations (Core partings shown - refer to Detailed Defect Descriptions table for all logged features)

18.46: J, 70°, CN, PR, RF
18.61: J, 65°, CN, IR, RF
18.65: J, 60°, CN, PR, RF
18.85: J, 55°, CN, PR, VR
18.87: J, 70°, ph rd SN, PR, RF
19.24: J, 0°, CN, PR, RF
19.42: J, 5°, dk gr SN, PR, SM, rare ph rd SN
19.45: J, 50°, dk gr SN, PR, SM, rare ph rd SN
20.04: J, 25°, CN, CU, SM
20.24: J, 25°, CN, PR, RF
20.25: J, 15°, CN, PR, VR
20.34: J, 0°, CN, IR, VR
20.35: J, 90°, CN, PR, SM
20.37: J, 40°, CN, PR, RF
20.37: J, 65°, CN, PR, SM
20.38: J, 65°, CN, PR, SM
20.40: J, 5°, CN, IR, RF
20.41: J, 70°, CN, PR, SM
20.64: J, 45°, ph wh mi CT, PR, SM
20.70: J, 30°, CN, PR, SM
20.77: J, 30°, bk SN, PR, RF
20.98: J, 55°, CN, PR, RF
21.00: J, 75°, CN, PR, SM
21.28: J, 60°, ph wh mi VN, PR, SM, <8 mm gr alt halo
21.30: J, 5°, CN, UN, RF
21.41: J, 35°, ph wh mi VN, PR, SM, <10 mm gr alt halo
21.45: J, 35°, CN, PR, RF
21.47: J, 80°, CN, PR, RF
21.89: J, 30°, bk SN, PR, SM
22.07: J, 5°, CN, PR, RF
22.29: J, 30°, CN, PR, RF
22.56: J, 45°, bk SN, PR, RF
22.58: J, 35°, bk SN, PR, RF
22.59: J, 35°, bk SN, PR, RF, <15 mm gr alt halo
23.06: J, 25°, CN, UN, RF
23.37: J, 30°, CN, PR, RF
23.54: J, 50°, CN, PR, RF
23.77: J, 30°, ph wh mi VN, PR, RF
24.12: J, 10°, CN, UN, RF
24.82: J, 50°, CN, PR, SM
25.41: J, 50°, CN, PR, RF, <3 mm pk alt halo
26.06: J, 60°, CN, PR, RF, <20 mm gr alt halo
26.10: J, 50°, CN, PR, VR
26.15-26.50: PLT(D) Is50 = 12.00MPa (M)
26.12: J, 55°, SN, PR, RF
26.18: J, 40°, ph bk SN, PR, RF
26.53: J, 40°, gr and bk SN, PR, RF
27.02: J, 65°, bk SN, PR, RF
27.15: J, 60°, ph wh mi VN, UN, VR, bk SN
27.60: J, 30°, CN, UN, RF, <5 mm pk alt halo
27.87: J, 60°, bk SN, PR, VR, <3 mm pk alt halo
28.13: J, 30°, CN, UN, VR
28.26: J, 50°, ph wh mi VN, PR, RF, bk SN
28.31: J, 40°, PR, tight, incipient
28.55: J, 60°, PR, incipient
28.63: J, 55°, CN, PR, SM, <5 mm gr alt halo
28.92: J, 50°, ph bk SN, PR, RF
28.93: J, 30°, CN, PR, VR, possible DB
28.95: J, 30°, CN, PR, VR, possible DB
28.99: J, 30°, ph pk mi VN, PR, SM
29.05: J, 20°, CN, UN, VR
29.20: J, 50°, CN, PR, SM
29.21: J, 30°, CN, IR, RF
29.26: J, 0°, IR, incipient
29.30: J, 50°, ph wh mi VN, PR, SM

AVERAGE DEFECT SPACING (mm): 10, 30, 100, 300, 1000, 3000

Comments

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BOREHOLE: BHL-04

		Position:	Lower Reservoir	Sheet	5 OF 5
Project:	Pioneer-Burdekin PHES	Coords:	659904.5 m E 7662639.1 m N MGA2020-55		
Location:	Netherdale/Dalrymple Heights	Surface RL:	206.88 m AHD	Date Started:	18/12/2023
Client:	Queensland Hydro	Contractor:	Twin Hills Engineering & Drilling Drill Rig: Hanjin D&B-8DTM	Date Completed:	4/1/2023
Job No.:	PS138693	Inclination:	-87° Direction: 110° Hole Dia.: 96/122.6/200 mm	Logged:	NLP

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	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
		100	53	30	30.12 176.80		Hole Terminated at 30.12 m Target depth. Standpipe Piezometer Installed.			29.31: J, 20°, CN, UN, RF, possible DB 29.32: J, 70°, CN, UN, SM 29.41: J, 50°, ph pk mi CT, PR, SM 29.46: J, 40°, ph wh mi VN, PR, SM 29.48: J, 50°, ph wh mi VN, PR, SM 29.51: J, 50°, CN, PR, SM 29.57: J, 60°, CN, PR, VR 29.71: J, 60°, ph pk mi CT, PR, SM, rare ph rd SN 29.76-30.06: J, 40 - 60°, wh mi CN, PR, SM, closely spaced	
				31							
				32							
				33							
				34							
				35							
				36							
				37							
				38							
				39							
				40							

Comments

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Pioneer-Burdekin Pumped Hydro Energy Scheme: Tranche 1 – BHL-04 Defects List

Refer to Explanatory Notes sheets for abbreviation definitions

PointID	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
BHL-04	17.60	17.75			J		80		bk	SN	PR	RF					
BHL-04	17.64				J		0				UN	RF					
BHL-04	17.70				J		60		bk	SN	PR	VR					
BHL-04	17.72				J		20		bk	SN	PR	RF					
BHL-04	17.74	18.00			V		90		wh to gy mi (qu)		UN		<	20			
BHL-04	17.75				J		60		Clayey SAND	CT	PR	VR					
BHL-04	17.76				J		20			CN	PR	SM					
BHL-04	17.83				J		0			CN	IR	VR					
BHL-04	17.84	17.97			J		90		ph SAND	CT	IR	VR					
BHL-04	18.01				J		40		wh Clayey SAND	CT	IR	SM					
BHL-04	18.04				J		40		wh Sandy CLAY	CT	IR	SM					
BHL-04	18.06				J		60		wh Sandy CLAY	CT	UN	SM					
BHL-04	18.07				J		60		bk	SN	UN	SM					
BHL-04	18.09				J		30			CN	UN	VR					
BHL-04	18.12				J		30			CN	PR	SM					
BHL-04	18.15				J		45			CN	PR	SM					
BHL-04	18.20				J		60			CN	PR	RF					
BHL-04	18.22				hJ						IR						
BHL-04	18.24				hJ		80				UN						
BHL-04	18.25				J		70		ph bk	SN	PR	SM					
BHL-04	18.26	18.34			EW		25	60	wh clay	CT	PR			80			GRAVEL, fine to coarse grained, angular, br-gy, with fine to coarse grained sand, with wh clay, significant
BHL-04	18.45				J		30			CN	UN	RF					
BHL-04	18.46				J		70			CN	PR	RF					
BHL-04	18.50				hJ		70		wh mi		PR						
BHL-04	18.52				hJ		70		wh mi		PR						
BHL-04	18.55				V		5		wh mi		PR			2			
BHL-04	18.57				hJ				wh mi		IR						
BHL-04	18.61				J		65			CN	IR	RF					
BHL-04	18.65				J		60			CN	PR	RF					
BHL-04	18.66				V		60		wh and pk mi		PR			3			
BHL-04	18.78				hJ		90		wh and bk mi		PR						<20 mm gr alt halo
BHL-04	18.83				hJ		60		wh mi		PR						<5 mm gr alt halo
BHL-04	18.85				J		55			CN	PR	VR					
BHL-04	18.87				J		70		ph rd	SN	PR	RF					
BHL-04	19.16				hJ		80				UN						<15 mm dk gr alt halo
BHL-04	19.21				hJ		80				UN						<15 mm dk gr alt halo
BHL-04	19.24				J		0			CN	PR	RF					
BHL-04	19.33				hJ		70		wh mi		UN						<10 mm dk gr alt halo
BHL-04	19.42				J		5		dk gr	SN	PR	SM					rare ph rd SN
BHL-04	19.45				J		50		dk gr	SN	PR	SM					rare ph rd SN
BHL-04	19.49				hJ		60		wh mi		PR						<5 mm dk gr alt halo
BHL-04	19.55				hJ		30		wh mi		PR						
BHL-04	19.69				hJ		5		wh mi		PR						
BHL-04	19.71				hJ		20		wh mi		PR						<5 mm dk gr alt halo
BHL-04	19.80				hJ		85		wh mi		UN						<5 mm dk gr to bk alt halo
BHL-04	19.85				hJ		30		wh mi		UN						<5 mm dk gr to bk alt halo
BHL-04	19.88				hJ		85		wh mi		UN						<5 mm dk gr to bk alt halo
BHL-04	19.98				hJ		65		wh mi		PR						<5 mm dk gr to bk alt halo
BHL-04	20.04				J		25			CN	CU	SM					
BHL-04	20.21				hJ		20		wh mi		PR						
BHL-04	20.23				hJ		20		wh mi		PR						
BHL-04	20.24				J		25			CN	PR	RF					
BHL-04	20.25				J		15			CN	PR	VR					
BHL-04	20.28				hJ		40		wh mi		PR						
BHL-04	20.29				hJ		60		wh and pk mi		PR						incipient
BHL-04	20.30				hJ		60		wh and pk mi		PR						incipient
BHL-04	20.34				J		0			CN	IR	VR					
BHL-04	20.35				J		90			CN	PR	SM					
BHL-04	20.37				J		40			CN	PR	RF					
BHL-04	20.37				J		65			CN	PR	SM					
BHL-04	20.38				J		65			CN	PR	SM					
BHL-04	20.40				J		5			CN	IR	RF					
BHL-04	20.41				J		70			CN	PR	SM					
BHL-04	20.42				hJ		15				UN						
BHL-04	20.43				hJ		70				PR						incipient
BHL-04	20.46				hJ		20		wh mi		PR						<5 mm gr alt halo
BHL-04	20.47				hJ		75				UN						incipient
BHL-04	20.48				hJ		80				UN						incipient
BHL-04	20.49				hJ		90		wh mi		UN						
BHL-04	20.50				hJ		10		wh mi		UN						
BHL-04	20.51				hJ		5		wh mi		UN						
BHL-04	20.54				hJ		40				PR						<3 mm gr alt halo, incipient
BHL-04	20.60				hJ		15		wh mi		PR						
BHL-04	20.60				hJ		50				PR						incipient
BHL-04	20.61				hJ		60		wh mi		PR						incipient
BHL-04	20.62				hJ		70		wh mi		PR						
BHL-04	20.64				J		45		ph wh mi	CT	PR	SM					
BHL-04	20.70				J		30			CN	PR	SM					

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Pioneer-Burdekin Pumped Hydro Energy Scheme: Tranche 1 – BHL-04 Defects List

Refer to Explanatory Notes sheets for abbreviation definitions

PointID	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
BHL-04	20.77				J		30		bk	SN	PR	RF					
BHL-04	20.84				hJ		20		wh mi		PR						<1 mm gr alt halo
BHL-04	20.96				hJ		55		wh mi		PR						<5 mm gr alt halo
BHL-04	20.98				J		55			CN	PR	RF					
BHL-04	21.00				J		75			CN	PR	SM					
BHL-04	21.03				hJ		60				PR						<5 mm gr alt halo
BHL-04	21.12				hJ		65				PR						<1 mm gr alt halo
BHL-04	21.14				hJ		25		gy-gr mi		PR						<1 mm gr alt halo
BHL-04	21.21				hJ		70		bk and wh mi		PR						<2 mm gr alt halo
BHL-04	21.28				J		60		ph wh mi	VN	PR	SM					<8 mm gr alt halo
BHL-04	21.30				J		5			CN	UN	RF					
BHL-04	21.35				hJ		35		wh mi		UN						
BHL-04	21.41				J		35		ph wh mi	VN	PR	SM					<10 mm gr alt halo
BHL-04	21.45				J		35			CN	PR	RF					
BHL-04	21.47				J		80			CN	PR	RF					
BHL-04	21.71				hJ		35				PR						<3 mm alt halo
BHL-04	21.72				hJ		65				PR						<3 mm alt halo
BHL-04	21.89				J		30		bk	SN	PR	SM					
BHL-04	22.01				hJ		25				PR						HB
BHL-04	22.07				J		5			CN	PR	RF					
BHL-04	22.13				hJ		75				UN						<5 mm dk gr alt halo
BHL-04	22.20				V						IR						possible APLITE vein or inclusion
BHL-04	22.29				J		30			CN	PR	RF					
BHL-04	22.39				hJ		30		wh mi		UN						
BHL-04	22.42				hJ		80		pk and wh mi		UN						
BHL-04	22.43				hJ		30		wh mi		UN						
BHL-04	22.53				hJ		90		wh mi		UN						40 mm persistance
BHL-04	22.56				J		45		bk	SN	PR	RF					
BHL-04	22.58				J		35		bk	SN	PR	RF					
BHL-04	22.59				J		35		bk	SN	PR	RF					<15 mm gr alt halo
BHL-04	22.68				hJ		75				UN						incipient
BHL-04	22.71				hJ		70				UN						incipient
BHL-04	22.72				hJ		75				UN						<1 mm gr alt halo
BHL-04	22.74				hJ		65		gr to bk mi		UN						<1 mm gr alt halo
BHL-04	22.79				hJ		60				UN						<1 mm gr alt halo
BHL-04	22.83				hJ		75				UN						<1 mm gr alt halo
BHL-04	22.98				hJ		55		gr, bk, and wh mi		UN						<1 mm gr alt halo
BHL-04	23.06				J		25			CN	UN	RF					
BHL-04	23.14				V		80		gy mi (qu)		PR		<	2			
BHL-04	23.18				hJ		80		wh to pk mi		PR						<1 mm pk alt halo
BHL-04	23.31				hJ		25		dk rd mi		PR						<3 mm ph bk alt halo
BHL-04	23.37				J		30			CN	PR	RF					
BHL-04	23.39				hJ		70		pk mi		PR						
BHL-04	23.49				hJ		70		gr and bk mi		UN						<1 mm gr alt halo
BHL-04	23.51				hJ		50				UN						<1 mm gr alt halo
BHL-04	23.54				J		50			CN	PR	RF					
BHL-04	23.57				hJ		75		pk mi		PR						<2 mm pk alt halo
BHL-04	23.59				hJ		75				PR						<5 mm gr alt halo
BHL-04	23.64				hJ		80		wh to pk mi		UN						
BHL-04	23.69				hJ		75		pk mi		UN						<2 mm pk alt halo
BHL-04	23.70				hJ				wh and bk mi		UN						
BHL-04	23.74				hJ		75		wh mi		PR						possible <30 mm dk gr alt halo
BHL-04	23.75				hJ		80		wh mi		UN						
BHL-04	23.77				J		30		ph wh mi	VN	PR	RF					
BHL-04	23.93				hJ		10				UN						<2 mm pk alt halo
BHL-04	23.95				hJ		55		wh mi		PR						
BHL-04	23.96				hJ		70		wh mi		UN						
BHL-04	24.04				hJ		45		wh mi		UN						<7 mm pk alt halo
BHL-04	24.12				J		10			CN	UN	RF					
BHL-04	24.25				hJ		85				UN						<30 mm dk gr alt halo
BHL-04	24.31				hJ		10		br and wh mi		PR						
BHL-04	24.47				hJ		90		wh mi		UN						<5 mm gr alt halo
BHL-04	24.61				hJ		70				PR						
BHL-04	24.70				hJ				gr mi		UN						
BHL-04	24.75				hJ						UN						
BHL-04	24.80				hJ		50				PR						
BHL-04	24.82				J		50			CN	PR	SM					
BHL-04	24.85				hJ		30		bk mi		PR						
BHL-04	24.88				hJ		30		bk and wh mi		UN						
BHL-04	25.13				hJ		70				PR						
BHL-04	25.21				hJ		65		gy mi		PR						
BHL-04	25.31				hJ		50				PR						
BHL-04	25.34				hJ		55				PR						<3 mm ph pk alt halo
BHL-04	25.36				hJ		40				PR						
BHL-04	25.41				J		50			CN	PR	RF					<3 mm pk alt halo
BHL-04	25.51				hJ		60		pk mi		PR						<2 mm pk alt halo
BHL-04	26.02				hJ		35				PR						
BHL-04	26.06				J		60			CN	PR	RF					<20 mm gr alt halo
BHL-04	26.10				J		50			CN	PR	VR					

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Pioneer-Burdekin Pumped Hydro Energy Scheme: Tranche 1 – BHL-04 Defects List

Refer to Explanatory Notes sheets for abbreviation definitions

PointID	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
BHL-04	26.12				J		55			SN	PR	RF					
BHL-04	26.15				hJ		55				PR						
BHL-04	26.18				J		40		ph bk	SN	PR	RF					
BHL-04	26.29				hJ		65		bk mi		PR						
BHL-04	26.32				hJ		80		ph pk mi		UN						
BHL-04	26.53				J		40		gr and bk	SN	PR	RF					
BHL-04	26.85				hJ		60		wh mi		PR						<1 mm gr alt halo
BHL-04	27.01				V		65		bk to dk rd mi		PR		<	7			<60 mm dk gr alt halo
BHL-04	27.02				J		65		bk	SN	PR	RF					
BHL-04	27.04				hJ		55				PR						incipient
BHL-04	27.15				J		60		ph wh mi	VN	UN	VR					bk SN
BHL-04	27.19				hJ		60				UN						<1 mm gr alt halo
BHL-04	27.60				J		30			CN	UN	RF					<5 mm pk alt halo
BHL-04	27.73				hJ		30		wh mi		UN						<3 mm pk alt halo
BHL-04	27.84				hJ		55		wh mi		PR						<3 mm pk alt halo
BHL-04	27.87				J		60		bk	SN	PR	VR					<3 mm pk alt halo
BHL-04	28.02				hJ		55		wh mi		UN						
BHL-04	28.08				hJ		20				PR						
BHL-04	28.11				hJ		55		wh mi		UN						<4 mm pk alt halo
BHL-04	28.13				J		30			CN	UN	VR					
BHL-04	28.16				hJ		60		wh mi		PR						incipient
BHL-04	28.17				hJ		50		wh mi		PR						
BHL-04	28.18				V		30		wh mi		UN		<	3			<10 mm dk gr alt halo
BHL-04	28.19				hJ		50				PR						<10 mm pk alt halo
BHL-04	28.20				hJ		50				PR						
BHL-04	28.21				hJ		15				UN						<10 mm pk alt halo
BHL-04	28.25				V		70		pk and wh mi		UN		<	5			<10 mm pk alt halo
BHL-04	28.26				J		50		ph wh mi	VN	PR	RF					bk SN
BHL-04	28.29				hJ		50				PR						
BHL-04	28.30				hJ		60		wh mi		UN						
BHL-04	28.31				J		40				PR						tight, incipient
BHL-04	28.32				hJ		65				UN						incipient
BHL-04	28.33				hJ		80				UN						
BHL-04	28.40				hJ		50				PR						
BHL-04	28.43				hJ		50		bk mi		PR						
BHL-04	28.45				hJ		50				PR						
BHL-04	28.49				V		60		pk mi		IR		<	5			some <2 mm cavities, <20 mm pk alt halo
BHL-04	28.51				V		50		wh mi		IR			1			<5 mm pk alt halo
BHL-04	28.55				J		60				PR						incipient
BHL-04	28.57				hJ		60		wh mi		PR						
BHL-04	28.60				hJ		20				UN						incipient
BHL-04	28.61				hJ		65				UN						incipient
BHL-04	28.62				hJ		55				PR						incipient
BHL-04	28.63				J		55			CN	PR	SM					<5 mm gr alt halo
BHL-04	28.64				hJ		40				IR						
BHL-04	28.70				hJ		60				UN						<4 mm pk alt halo
BHL-04	28.71				hJ		40				PR						
BHL-04	28.72				hJ		85				UN						<2 mm pk alt halo
BHL-04	28.75				hJ		90				UN						<5 mm pk alt halo
BHL-04	28.78				hJ		50				PR						
BHL-04	28.82				hJ		50				PR						incipient
BHL-04	28.88				V		70		pk mi		PR		<	2			
BHL-04	28.92				J		50		ph bk	SN	PR	RF					
BHL-04	28.93				J		30			CN	PR	VR					possible DB
BHL-04	28.95				J		30			CN	PR	VR					possible DB
BHL-04	28.97				V		40		wh mi		UN		<	2			<10 mm pk alt halo
BHL-04	28.99				J		30		ph pk mi	VN	PR	SM					
BHL-04	29.03				hJ		20		wh mi		UN						
BHL-04	29.05				J		20			CN	UN	VR					
BHL-04	29.08				hJ		50		wh mi		PR						
BHL-04	29.10				hJ		55		wh mi		PR						
BHL-04	29.17				hJ		50		wh mi		PR						
BHL-04	29.19				hJ		60		wh mi		PR						
BHL-04	29.19				hJ		25		wh mi		PR						
BHL-04	29.20				J		50			CN	PR	SM					
BHL-04	29.21				J		30			CN	IR	RF					
BHL-04	29.23				hJ		55		wh mi		PR						
BHL-04	29.24				hJ		55				PR						
BHL-04	29.25				hJ		70		wh mi		PR						
BHL-04	29.26				J		0				IR						incipient
BHL-04	29.27				hJ		80		wh mi		UN						
BHL-04	29.28				hJ		40				UN						
BHL-04	29.30				J		50		ph wh mi	VN	PR	SM					
BHL-04	29.31				J		20			CN	UN	RF					possible DB
BHL-04	29.32				J		70			CN	UN	SM					
BHL-04	29.37				hJ		40		wh mi		IR						
BHL-04	29.41				J		50		ph pk mi	CT	PR	SM					
BHL-04	29.42				hJ		45		wh mi		PR						
BHL-04	29.43				hJ		30				UN						

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Pioneer-Burdekin Pumped Hydro Energy Scheme: Tranche 1 – BHL-04 Defects List

Refer to Explanatory Notes sheets for abbreviation definitions

PointID	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
BHL-04	29.44				hJ		65		wh mi		UN						
BHL-04	29.45				hJ		55		wh mi		PR						
BHL-04	29.46				J		40		ph wh mi	VN	PR	SM					
BHL-04	29.48				J		50		ph wh mi	VN	PR	SM					
BHL-04	29.49				hJ		60		wh mi		UN						
BHL-04	29.51				V		50		pl gr soft mi		PR		<	4			
BHL-04	29.51				J		50			CN	PR	SM					
BHL-04	29.55				hJ		75		wh mi		PR						
BHL-04	29.57				J		60			CN	PR	VR					
BHL-04	29.60				hJ		70				PR						
BHL-04	29.61				hJ		70		wh mi		PR						
BHL-04	29.62				hJ		70		wh mi		PR						
BHL-04	29.69				hJ		80		wh mi		PR						
BHL-04	29.71				J		60		ph pk mi	CT	PR	SM					rare ph rd SN
BHL-04	29.74				hJ		70		wh mi		PR						
BHL-04	29.75				hJ		35		wh mi		PR						
BHL-04	29.76	30.06			J		40	60	wh mi	CN	PR	SM				closely	

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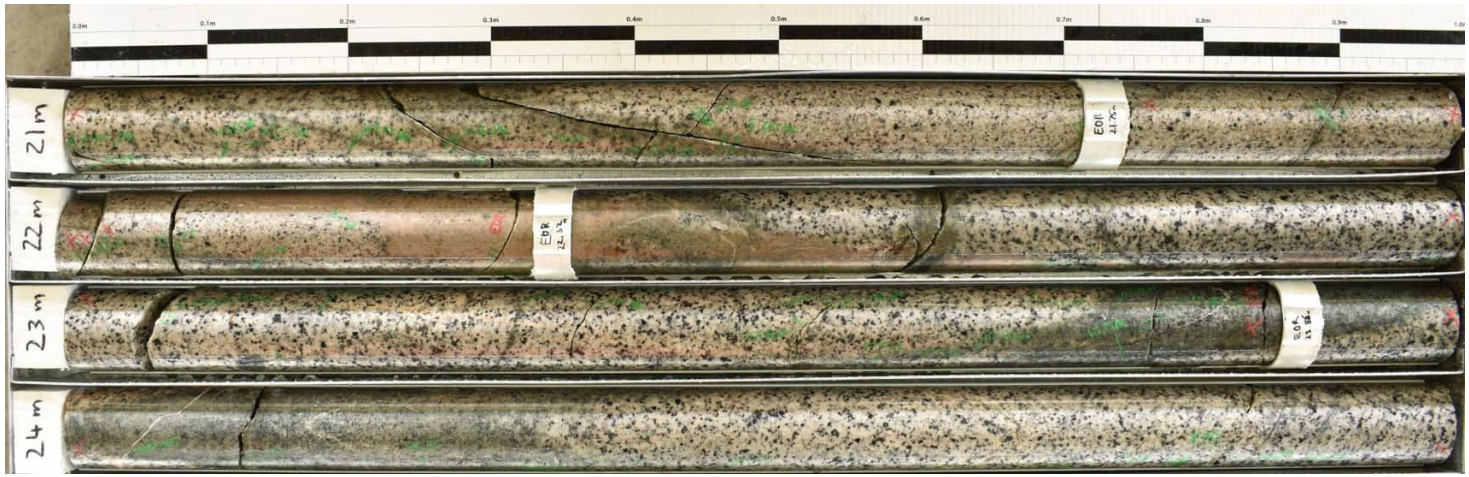
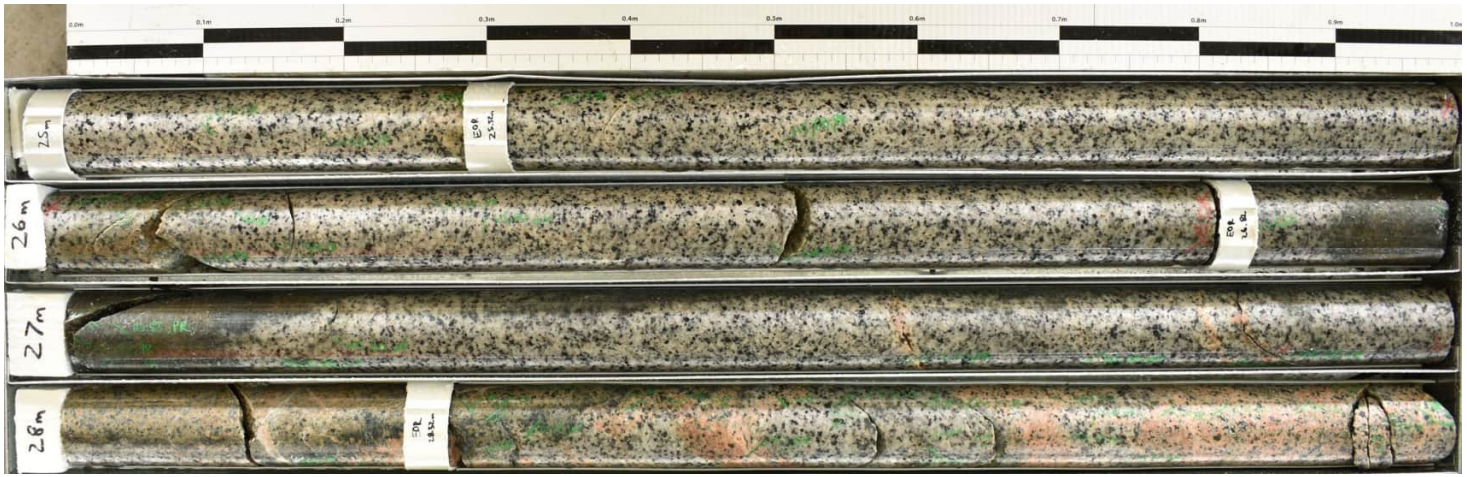
PointID : BHL-04 Depth Range: 5.42 - 6.95 m

PointID : BHL-04 Depth Range: 17.38 - 21.00 m

wsp	TITLE Queensland Hydro Netherdale/Dalrymple Heights Pioneer-Burdekin PHES Core Photo - BHL-04	DRAWN RC/PL	DATE 23/08/2024
		CHECKED GEM	DATE 7/10/2024
		SCALE Not To Scale	A4
		PROJECT No PS138693	FIGURE No 1/3



PointID : BHL-04 Depth Range: 21.00 - 25.00 m



PointID : BHL-04 Depth Range: 25.00 - 29.00 m

wsp	TITLE Queensland Hydro Netherdale/Dalrymple Heights Pioneer-Burdekin PHES Core Photo - BHL-04	DRAWN RC/PL	DATE 23/08/2024
		CHECKED GEM	DATE 7/10/2024
		SCALE Not To Scale	A4
		PROJECT No PS138693	FIGURE No 2/3

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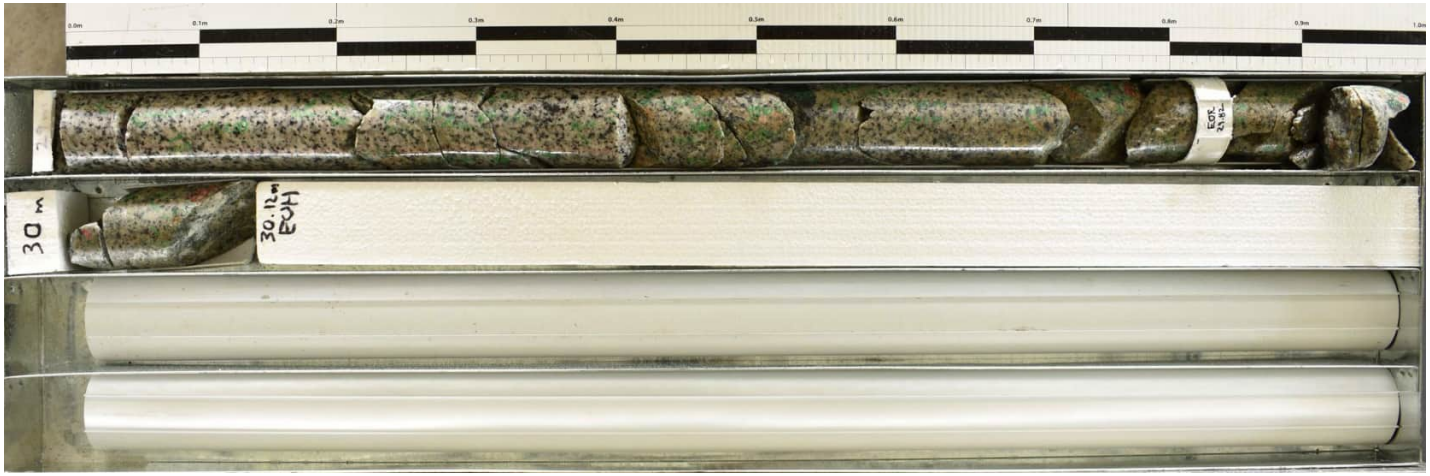

PointID : BHL-04 Depth Range: 29.00 - 30.12 m

wsp	TITLE Queensland Hydro Netherdale/Dalrymple Heights Pioneer-Burdekin PHES Core Photo - BHL-04	DRAWN RC/PL	DATE 23/08/2024
		CHECKED GEM	DATE 7/10/2024
		SCALE Not To Scale	A4
		PROJECT No PS138693	FIGURE No 3/3

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BHL-04 Structural Log

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

GEOPHYSICAL RECORD OF BOREHOLE: BHL-04

PROJECT:	Pioneer-Burdekin PHES	JOB #	PS138693
CLIENT:	Queensland Hydro	DATE:	19/06/2024

BOREHOLE DETAILS

LOCATION:	Lower Reservoir	BH DEPTH:	30.12 m
EASTING:	659904.453 m	BH DIAMETER:	96 mm (HQ)
NORTHING:	7662639.062 m	BH AZIMUTH:	110° TN
ELEVATION:	206.880 m	BH PLUNGE:	-87°
COORD SYSTEM:	MGA2020-55	CASING DEPTH:	10.92 m
LOGGING DATUM:	Ground Level	CASING TYPE:	HWT

DOCUMENT DETAILS

LOGGED BY:	HC
LOGGED DATE:	10/01/2024
DRAWN BY:	SB
REVIEWED BY:	GH
FILE:	BHL-04_Structure_RevC
LOGGED DEPTH:	29.77 m

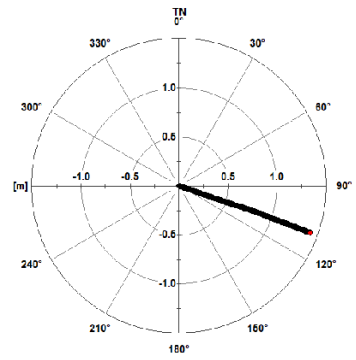
NOTES

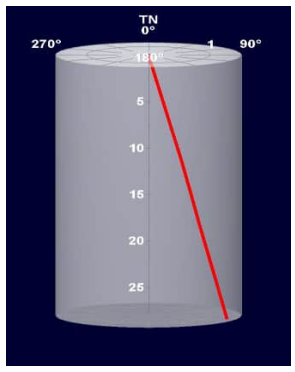
Image logs are oriented relative to borehole high side. Final structures corrected to true north using magnetic declination of 8.2 deg East.

Mechanical calliper log used for structure dip corrections.

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

BOREHOLE DEVIATION

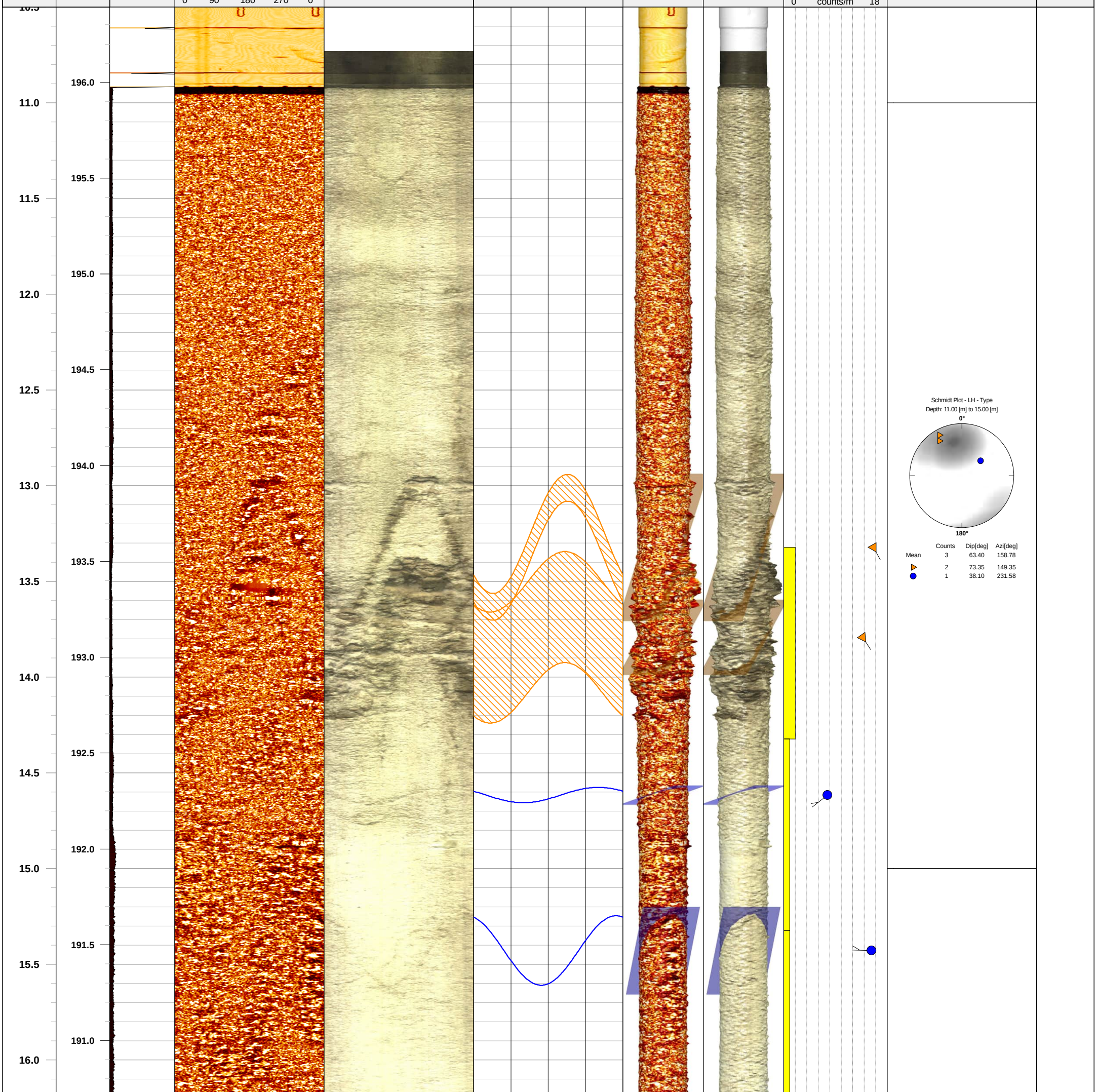




INTERPRETED STRUCTURES

Contact · Crushed Seam · Joint · Shear Seam · Shear Zone · Vein · Healed Joint

BHL-04



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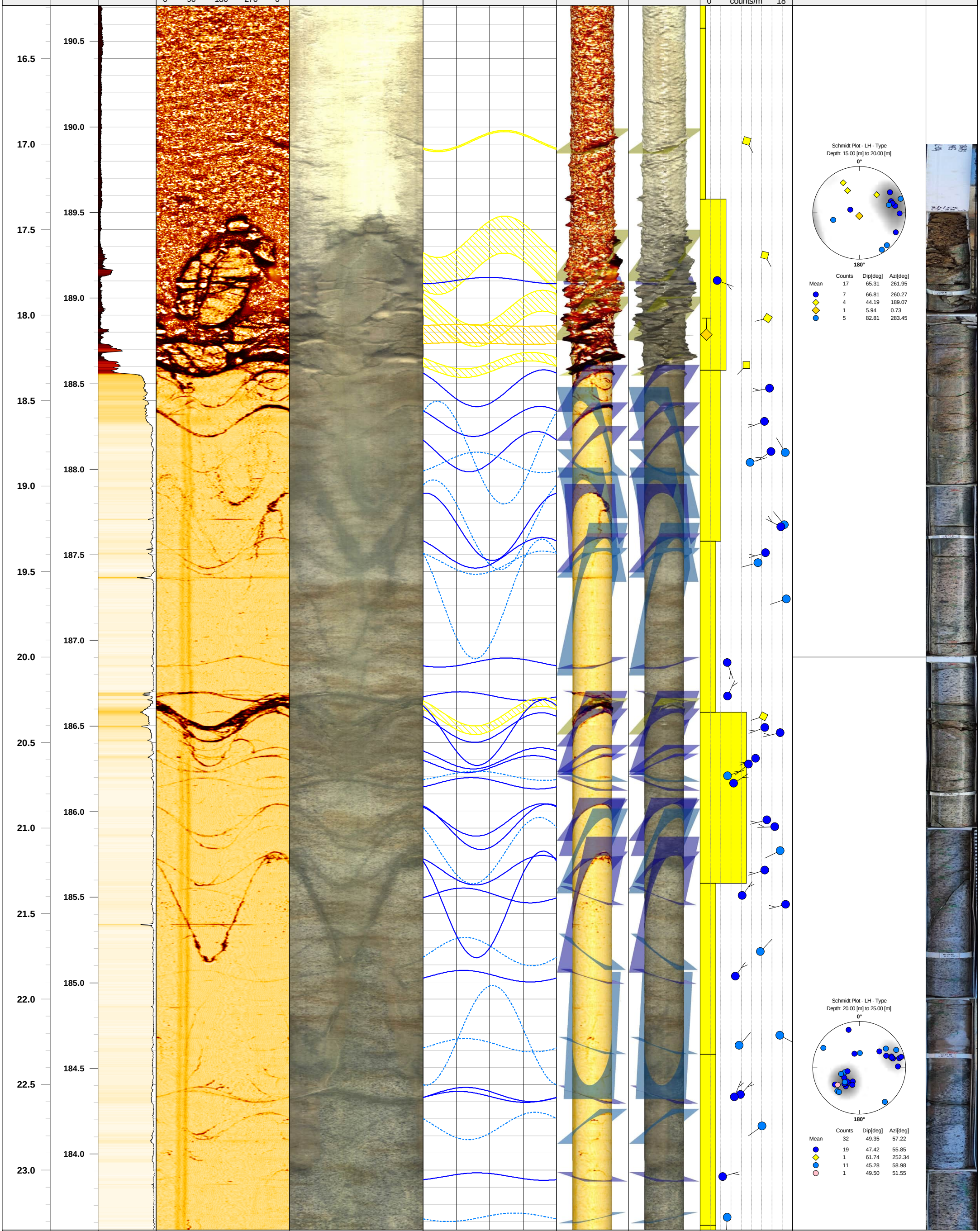
BHL-04

Depth		Image Logs			Structural Data					Core
Depth 1m:20m	RL m AHD	Reflectivity 0 9000	Amplitude-HS HPF 0 6000 0° 90° 180° 270° 0°	Image-HS 0° 90° 180° 270° 0°	Apparent Structures 0° 90° 180° 270° 0°	3D ATV -0°	3D OTV -0°	Structures - TN 0 90 Freq/metre 0 counts/m 18	Stereoplots Schmidt Plot - LH - Type	Core Photo



Depth 1m:20m	RL m AHD	Reflectivity 0 9000	Amplitude-HS HPF 0° 90° 180° 270° 0° 0 6000	Image-HS 0° 90° 180° 270° 0°	Apparent Structures 0° 90° 180° 270° 0°	3D ATV -0°	3D OTV -0°	Structures - TN 0 counts/m 18 Freq/metre 0 90	Stereoplots Schmidt Plot - LH - Type	Core Photo
Depth		Image Logs			Structural Data					Core

BHL-04

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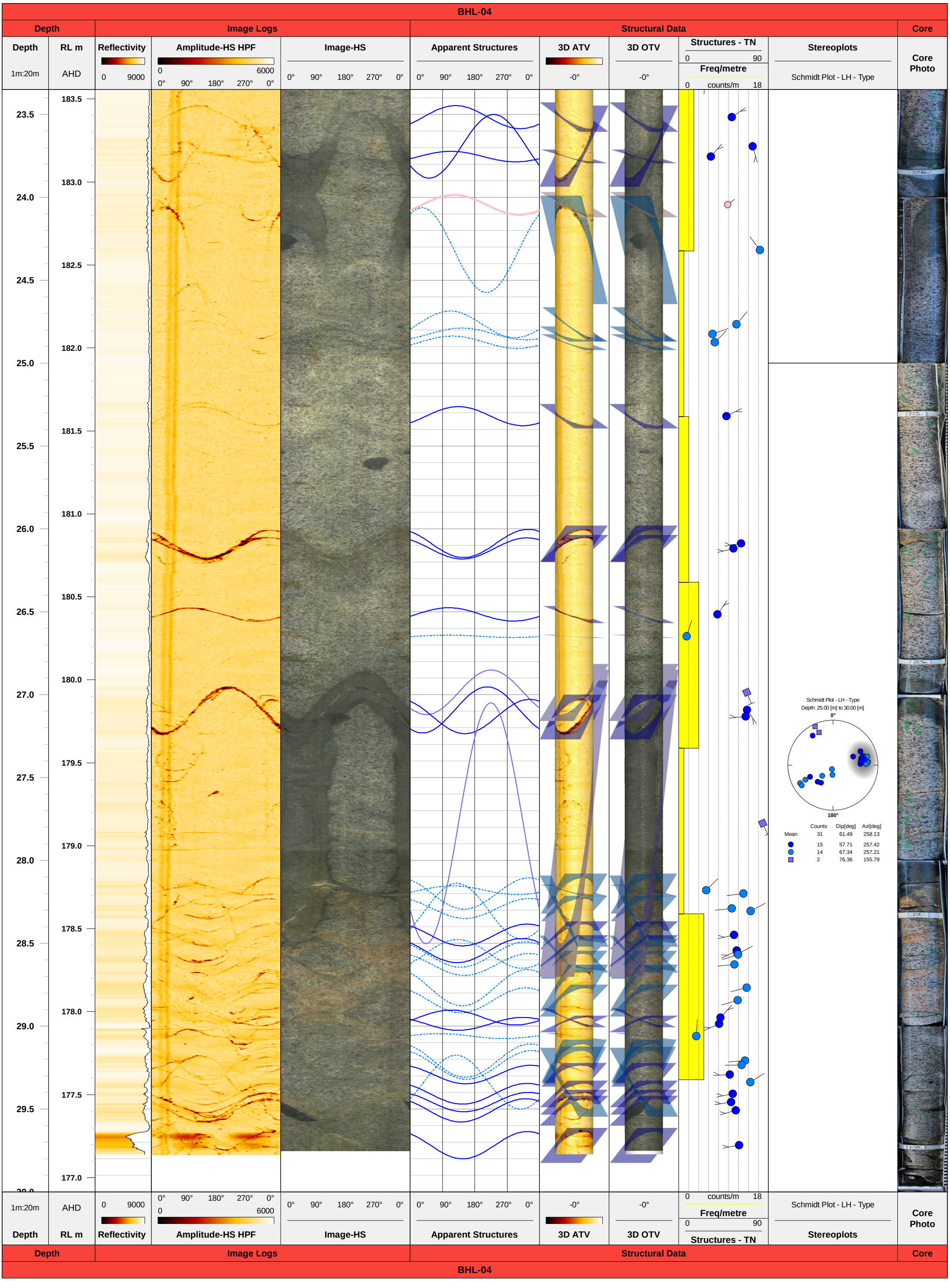

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BHL-04 Composite Log

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

GEOPHYSICAL RECORD OF BOREHOLE: BHL-04

PROJECT:	Pioneer-Burdekin PHES	JOB #	PS138693
CLIENT:	Queensland Hydro	DATE:	19/06/2024

BOREHOLE DETAILS

LOCATION:	Lower Reservoir	BH DEPTH:	30.12 m
EASTING:	659904.453 m	BH DIAMETER:	96 mm (HQ)
NORTHING:	7662639.062 m	BH AZIMUTH:	110° TN
ELEVATION:	206.880 m	BH PLUNGE:	-87°
COORD SYSTEM:	MGA2020-55	CASING DEPTH:	10.92 m
LOGGING DATUM:	Ground Level	CASING TYPE:	HWT

DOCUMENT DETAILS

LOGGED BY:	HC
LOGGED DATE:	10/01/2024
DRAWN BY:	SB
REVIEWED BY:	GH
FILE:	BHL-04_Composite_RevC
LOGGED DEPTH:	29.77 m

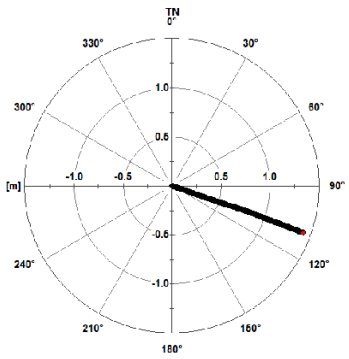
NOTES

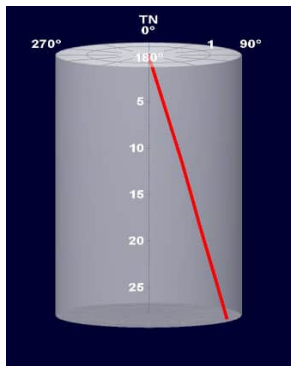
Image logs are oriented relative to borehole high side. Final structures corrected to true north using magnetic declination of 8.2 deg East.

Mechanical calliper log used for structure dip corrections.

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

BOREHOLE DEVIATION

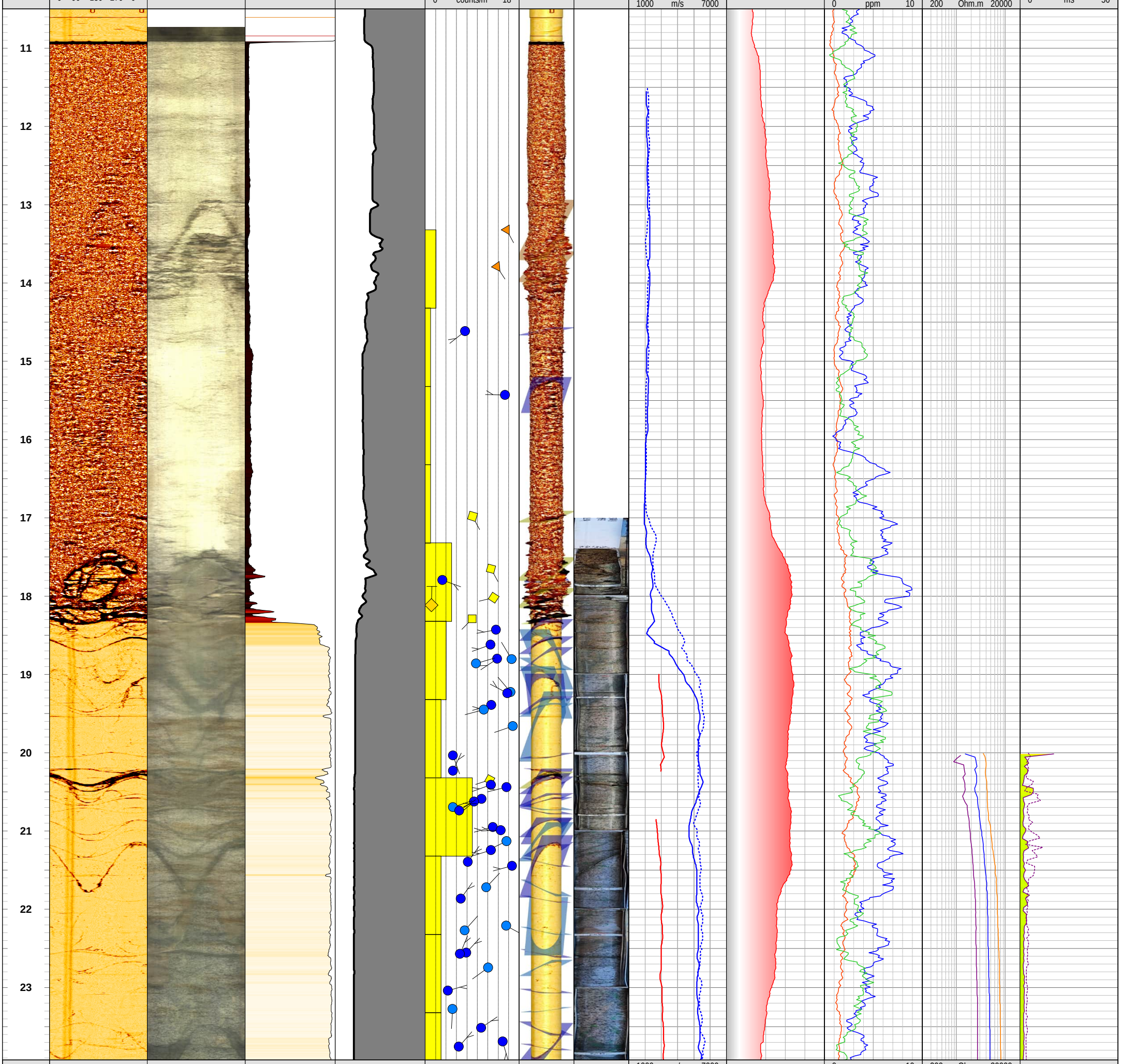




INTERPRETED STRUCTURES

Contact | Crushed Seam | Joint | Shear Seam | Shear Zone | Vein | Healed Joint

BHL-04



Depth
Image Logs
Calliper
Structural Logs
Sonic Logs
Gamma Logs
Electrical Logs

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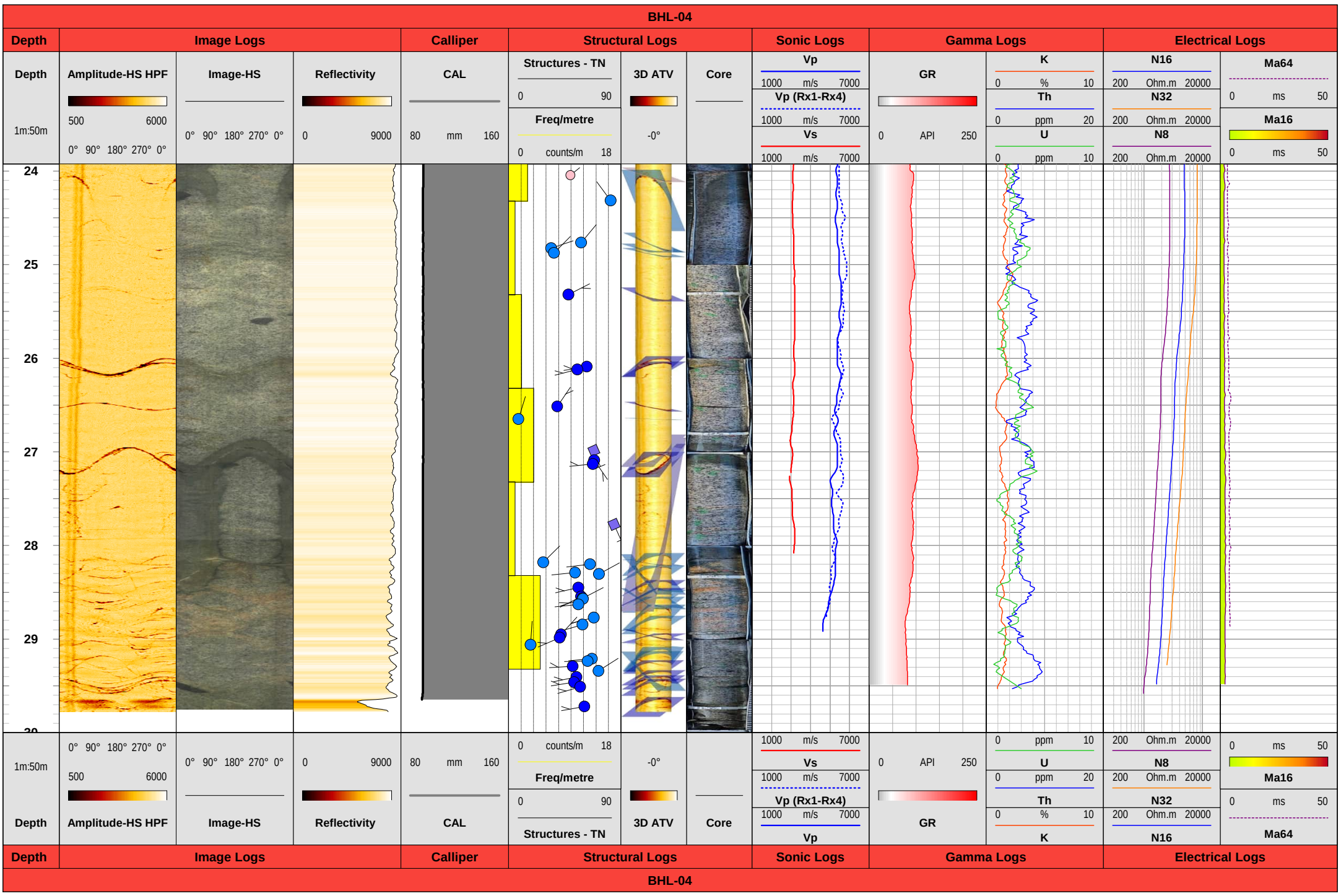

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