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BOREHOLE: BHUA-15

SHEET: 1 OF 13
DRILL RIG: TH23
CONTRACTOR: Twin Hills
LOGGED: ENGEO DATE: 4/8/23
CHECKED: SF DATE: 28/8/23

CLIENT: SMEC COORDS: 658508.7 m 7666335.9 m GDA 2020 MGA Zone 55
PROJECT: Pioneer Burdekin PHES GI SURFACE RL: 872.84 m DATUM: AHD
LOCATION: Dalrymple Heights INCLINATION: -88° DIRECTION: 185°
JOB NO: 23117.000.001 HOLE DIA: 96/100 mm HOLE DEPTH: 55.56 m

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	EP		0.0	872.84			CI	TOPSOIL: CLAY with silt medium plasticity, trace fine grained sand		TOPSOIL
			0.20							
				872.64			CI-CH	Silty CLAY medium to high plasticity, red brown mottled orange, trace fine grained sand		RESIDUAL SOIL
MP			0.5							
			1.0						St	
			1.5		LL = 64% PI = 27% LS = 10.0% Soil Particle Density (t/m³) = 2.39 SPT 1.50-1.95 m 3, 6, 8 N=14					
				1.90						
				870.94			CH	Silty CLAY high plasticity, pale orange brown mottled orange, trace fine to medium grained, sub-rounded to sub-angular gravel, trace fine to medium grained sand		
			2.0							
			2.5						W<PL	
			3.0		ECN = 5 Soil Particle Density (t/m³) = 2.49 SPT 3.00-3.45 m 2, 6, 8 N=14					St
			3.5							
			4.0							
			4.5		LL = 61% PI = 22% LS = 10.0% Soil Particle Density (t/m³) = 2.62 SPT 4.50-4.95 m 2, 6, 8 N=14		SW	SAND with gravel fine to medium grained, well graded, pale orange brown mottled orange, fine to medium grained, subangular gravel, trace silt		MD
				4.50						
				868.34						
			5.0							

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ENGEO 2.00 2.2 L.B.G.L.B. Log ENGEO CORED BOREHOLE PIONEER BURDEKIN -MASTERBHT03 REWORK-AUSLAFTOP008.GPJ <<DrawingFile>> 2011/2024 17:03 10.03.00.09 Datagel Tools



BOREHOLE: BHUA-15

SHEET: 2 OF 13
DRILL RIG: TH23
CONTRACTOR: Twin Hills
LOGGED: ENGEO DATE: 4/8/23
CHECKED: SF DATE: 28/8/23

CLIENT: SMEC COORDS: 658508.7 m 7666335.9 m GDA 2020 MGA Zone 55
PROJECT: Pioneer Burdekin PHES GI SURFACE RL: 872.84 m DATUM: AHD
LOCATION: Dalrymple Heights INCLINATION: -88° DIRECTION: 185°
JOB NO: 23117.000.001 HOLE DIA: 96/100 mm HOLE DEPTH: 55.56 m

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					SW	SAND with gravel fine to medium grained, well graded, pale orange brown mottled orange, fine to medium grained, sub-angular gravel, trace silt		MD	
			5.5									
			6.0	6.00 866.84	ECN = 6 Soil Particle Density (t/m³) = 2.46 SPT 6.00-6.45 m 1, 2, 3 N=5		ML	Clayey SILT with sand low liquid limit, orange brown mottled pale grey and orange, with fine to coarse grained sand		F		
6.5		U 6.50-7.00 m LL = 55% PI = 21% LS = 9.5%										
MP			7.0						W<PL			
			7.5	7.50 865.34	U 7.50-8.00 m SPT 7.50-7.95 m 1, 1, 2 N=3		ML	SILT with clay and sand low liquid limit, pale orange brown mottled pale grey and black, fine to coarse grained sand, well graded.				
			8.0									
WB	31/07/23		8.5						W=PL			
			9.0		LL = 49% PI = 17% LS = 6.0% ECN = 6 Soil Particle Density (t/m³) = 2.61 SPT 9.00-9.45 m 1, 2, 4 N=6							
			9.5									
			10.0									

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BOREHOLE: BHUA-15

SHEET: 3 OF 13
DRILL RIG: TH23
CONTRACTOR: Twin Hills
LOGGED: ENGEO DATE: 4/8/23
CHECKED: SF DATE: 28/8/23

CLIENT: SMEC COORDS: 658508.7 m 7666335.9 m GDA 2020 MGA Zone 55
PROJECT: Pioneer Burdekin PHES GI SURFACE RL: 872.84 m DATUM: AHD
LOCATION: Dalrymple Heights INCLINATION: -88° DIRECTION: 185°
JOB NO: 23117.000.001 HOLE DIA: 96/100 mm HOLE DEPTH: 55.56 m

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		
WB	MP		10.0				ML	SILT with clay and sand low liquid limit, pale orange brown mottled pale grey and black, fine to coarse grained sand, well graded.					
			10.5	SPT 10.50-10.95 m 1, 3, 5 N=8									
			11.0										
			11.5				St - VSt						
			12.0		ECN = 6 Soil Particle Density (t/m³) = 2.61 SPT 12.00-12.45 m 3, 8, 8 N=16			Silty CLAY medium plasticity, pale orange brown mottled grey, (Extremely Weathered Granite).	W=PL				
			12.5										
			13.0	13.00 859.85									
			13.5	SPT 13.50-13.80 m 7, 7/40mm HB								H	
			14.0					For Continuation Refer to Sheet 4					
			14.5										
			15.0										

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BOREHOLE: BHUA-15

SHEET: 5 OF 13
DRILL RIG: TH23
CONTRACTOR: Twin Hills
LOGGED: ENGEO DATE: 4/8/23
CHECKED: SF DATE: 28/8/23

CLIENT: SMEC COORDS: 658508.7 m 7666335.9 m GDA 2020 MGA Zone 55
PROJECT: Pioneer Burdekin PHES GI SURFACE RL: 872.84 m DATUM: AHD
LOCATION: Dalrymple Heights INCLINATION: -88° DIRECTION: 185°
JOB NO: 23117.000.001 HOLE DIA: 96/100 mm HOLE DEPTH: 55.56 m

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 _u (MPa) (AS1726:2017)	MEASURED STRENGTH: UCS & I ₅₀ (A _{0.1}) (MPa)	DEFECT DESCRIPTION	AVERAGE DEFECT SPACING (mm) (ISO14689:2017)		
											Mechanical Discontinuities / non-intact defects shown only. See attached Detailed Defect Log for all recorded discontinuities and defects	EC ²⁰	VC ²⁰	VC ²⁰
HQ3	0% RETURN			100	97		GRANITE with MICROGRANITE bands Medium to coarse grained, igneous plutonic. Grey and dark grey. Crystalline, anhedral to subhedral. Weak to moderately developed foliation (indistinct) defined by segregation and alignment of mafic and felsic minerals and mineral, elongation commonly with irregularly shaped MICROGRANITE bands / inclusions, typically < 50mm diameter diameter (fine to medium grained and dark grey).	FR - SA			14.59-14.59 m: J, 3°, Pln, Ro, Std 14.61-14.64 m: J, 40°, Pln, Ro, Std 14.64-14.67 m: J, 59°, Pln, Ro, Std 14.67-14.67 m: J, 6°, Pln, Ro, Std 14.68-14.73 m: J, 69°, Und, Ro, Std 14.71-14.72 m: BP, 7°, Irr, Vro, Cn 14.73-14.77 m: Cs, Irr, Vro, Cru, Cru due to intersecting Js. 14.77-14.84 m: J, x5, 5°, UN, Fe, SN			
										I ₅₀ (A)=9.53 I ₅₀ (D)=11.59	15.61-15.66 m: J, 48°, Pln, FL, Propylitic (?) A.			
							16.40 m - 16.49 m: MICROGRANITE inclusion, fine to medium grained, dark grey, round, irregular margins.	SW			16.18-16.23 m: Cs, Irr, Vro 16.23-16.25 m: J, x4, 14°, UN, Fe, SN			
								FR - SA		UCS=226				
HQ3	90% RETURN			100	96		16.40 m - 16.49 m: MICROGRANITE inclusion, fine to medium grained, dark grey, round, irregular margins.							
							17.60 m - 17.75 m: MICROGRANITE inclusion, fine to medium grained, grey and dark grey, irregular margins.				17.70-17.76 m: J, 42°, Pln, Ro, Cn			
							18.25 m - 18.35 m: Weak, pale yellow-green-brown propylitic (?) alteration around thin felsic vein.				18.25-18.26 m: J, 18°, Pln, Ro, Std			
										UCS=221				
HQ3	70% RETURN			100	100		18.25 m - 18.35 m: Weak, pale yellow-green-brown propylitic (?) alteration around thin felsic vein.							
							19.32 m - 19.36 m: MICROGRANITE inclusion, fine to medium grained, grey and dark grey, irregular margins.							
							19.52 m - 19.60 m: MICROGRANITE inclusion, fine to medium grained, grey and dark grey, irregular margins.							
							19.63 m - 19.75 m: Felsic / rhyolite (?) microdykes at ~73°, <1 mm thick.							
HQ3	60% RETURN			100	100		19.32 m - 19.36 m: MICROGRANITE inclusion, fine to medium grained, grey and dark grey, irregular margins.							
							19.52 m - 19.60 m: MICROGRANITE inclusion, fine to medium grained, grey and dark grey, irregular margins.							
							19.63 m - 19.75 m: Felsic / rhyolite (?) microdykes at ~73°, <1 mm thick.							

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BOREHOLE: BHUA-15

SHEET: 6 OF 13

CLIENT: SMEC

COORDS: 658508.7 m 7666335.9 m GDA 2020 MGA Zone 55

DRILL RIG: TH23

PROJECT: Pioneer Burdekin PHES GI

SURFACE RL: 872.84 m DATUM: AHD

CONTRACTOR: Twin Hills

LOCATION: Dalrymple Heights

INCLINATION: -88° DIRECTION: 185°

LOGGED: ENGEO

DATE: 4/8/23

JOB NO: 23117.000.001

HOLE DIA: 96/100 mm HOLE DEPTH: 55.56 m

CHECKED: SF

DATE: 28/8/23

Drilling						Field Material Description						Defect Information																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
METHOD / SUPPORT	WATER	TCR	RQD	DRILLED LENGTH (metres)	DEPTH RL	GRAPHIC LOG	MATERIAL DESCRIPTION	DETAILED WEATHERING	INFERRED STRENGTH I_{s0} (MPa) (AS1726:2017)	MEASURED STRENGTH: UCS & I_{p50} (MPa) (A.D.1)	DEFECT DESCRIPTION	AVERAGE DEFECT SPACING (mm) (ISO14889:2017)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
HQ3	60% RETURN	100	100	20.0			GRANITE with MICROGRANITE bands Medium to coarse grained, igneous plutonic. Grey and dark grey. Crystalline, anhedral to subhedral. Weak to moderately developed foliation (indistinct) defined by segregation and alignment of mafic and felsic minerals and mineral, elongation commonly with irregularly shaped MICROGRANITE bands / inclusions, typically < 50mm diameter diameter (fine to medium grained and dark grey). 20.49 m - 20.54 m: MICROGRANITE inclusion, fine to medium grained, grey and dark grey, irregular margins.	FR - SA																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	

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BOREHOLE: BHUA-15

SHEET: 7 OF 13
DRILL RIG: TH23
CONTRACTOR: Twin Hills
LOGGED: ENGEO DATE: 4/8/23
CHECKED: SF DATE: 28/8/23

CLIENT: SMEC COORDS: 658508.7 m 7666335.9 m GDA 2020 MGA Zone 55
PROJECT: Pioneer Burdekin PHES GI SURFACE RL: 872.84 m DATUM: AHD
LOCATION: Dalrymple Heights INCLINATION: -88° DIRECTION: 185°
JOB NO: 23117.000.001 HOLE DIA: 96/100 mm HOLE DEPTH: 55.56 m

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 ₉₀ (MPa) (AS1728:2017)	MEASURED STRENGTH: UCS & Is ₅₀ (A _{0.1}) (MPa)	DEFECT DESCRIPTION	AVERAGE DEFECT SPACING (mm) (ISO14689:2017)																	
											Mechanical Discontinuities / non-intact defects shown only. See attached Detailed Defect Log for all recorded discontinuities and defects	EC<20	VC10	C 200	M 600	W >2000	VW												
HQ3	10% RETURN	100	93	25.0			GRANITE with MICROGRANITE bands Medium to coarse grained, igneous plutonic. Grey and dark grey. Crystalline, anhedral to subhedral. Weak to moderately developed foliation (indistinct) defined by segregation and alignment of mafic and felsic minerals and mineral, elongation commonly with irregularly shaped MICROGRANITE bands / inclusions, typically < 50mm diameter diameter (fine to medium grained and dark grey). 25.10 m: MICROGRANITE inclusions / bands becomes more regular (3-5/m), fine to medium grained, typically grey and dark grey with irregular margins, mm to cm scale.	FR - SA		Is ₅₀ (D)=1.90 Is ₅₀ (A)>5.03																			
				25.10	847.76																								
				25.5																									
				26.0	26.03 846.83		26.03 m - 27.08 m: cm scale, moderately strong pale green (propylitic ?) alteration halo (3-5 mm) associated with veins / microdykes. 26.20 m - 26.33 m: Fine Rhyolite (?) stringer. Appears pyritic though hand lens appears intrusive pale brown, siliceous, generally < 2 mm wide, though parent "vein" to 42 mm. Minor alteration to 3 mm halo. Intact.					26.06-26.12 m: J, 44°, Pln, Ro, KT																	
				26.20	846.66																								
	10% RETURN	100	96	26.5			27.08 m - 30.60 m: Increasing proportion of coarse grained pale pink-white, felsic / (feldspar rich) bands.	MA - SA				26.65-26.68 m: J, 22°, Pln, Ro, Py Vr, Chlorite also present on J surface. 26.85-26.98 m: J, 61°, Irr, KT FL, VNing and fractures crosscut defect. 26.93-26.93 m: BP, 2°, Cvd, Ro																	
				27.0	27.08 845.78																								
				27.5																									
				28.0																									
				28.5																									
	10% RETURN	100	100	29.0	29.00 843.86		29.00 m: Fractionation of magma noted, likely near top of chamber, variable grain size with unclear margins - subtle transitions and blebs. Crystal texture varies throughout, multiphase intrusive with fractionation.	SA		Is ₅₀ (A)=10.83 UCS=200 Is ₅₀ (D)=10.17		28.26-28.31 m: J, 51°, Pln, Ro, KT																	
				29.5																									
				29.9																									
				29.9																									
				30.0																									
				29.39-29.44 m: J, 30°, Stp, Ro, KT 29.46-29.48 m: J, 14°, Pln, Ro, Cn																									
				29.78-29.82 m: J, 40°, Und, Vro, Cn																									

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BOREHOLE: BHUA-15

SHEET: 8 OF 13

CLIENT: SMEC

COORDS: 658508.7 m 7666335.9 m GDA 2020 MGA Zone 55

DRILL RIG: TH23

PROJECT: Pioneer Burdekin PHES GI

SURFACE RL: 872.84 m DATUM: AHD

CONTRACTOR: Twin Hills

LOCATION: Dalrymple Heights

INCLINATION: -88° DIRECTION: 185°

LOGGED: ENGEO

DATE: 4/8/23

JOB NO: 23117.000.001

HOLE DIA: 96/100 mm HOLE DEPTH: 55.56 m

CHECKED: SF

DATE: 28/8/23

Drilling					Field Material Description					Defect Information				
METHOD / SUPPORT	WATER	TCR	RQD	DRILLED LENGTH (metres)	DEPTH RL	GRAPHIC LOG	MATERIAL DESCRIPTION	DETAILED WEATHERING	INFERRED STRENGTH I_{s0} (MPa) (AS1726:2017)	MEASURED STRENGTH: UCS & I_{s50} (A.D.L.)	DEFECT DESCRIPTION	AVERAGE DEFECT SPACING (mm) (ISO14689:2017)		
													VC	C
HQ3	10% RETURN	100	83	30.0			GRANITE with MICROGRANITE bands Medium to coarse grained, igneous plutonic. Grey and dark grey. Crystalline, anhedral to subhedral. Weak to moderately developed foliation (indistinct) defined by segregation and alignment of mafic and felsic minerals and mineral, elongation commonly with irregularly shaped MICROGRANITE bands / inclusions, typically < 50mm diameter diameter (fine to medium grained and dark grey).	SA			30.23-30.34 m: J, x4, 24°,PR, IT			
				30.5										
				31.0										
	10% RETURN	100	85	31.5			31.86 m - 31.96 m: Pale green propylitic alteration, strongest adjacent to lithological contact. 31.96 m: Contact sharp and inclined at 64°, possible chilled margin. ALTERED QUARTZ MICRODIORITE Fine to medium grained, igneous intrusive. Dark grey and grey. Crystalline. Feldspar comprises mostly plagioclase, fine grained and lath shaped. Indistinctly foliated, Veins infilled with calcite, some with pyrite as coatings Red to purple coating on some defects, undulating and rough.			31.00-31.05 m: J, 80°, Pln, Ch and Qz along J surface. 31.05-31.08 m: J, 29°, Pln, Sm, KT Vr 31.16-31.32 m: J, J, x5, 49°,PR, KT, IT 31.33-31.35 m: J, 16°, Pln, Sm, Cn 31.50-31.53 m: J, 18°, Pln, Sm, Cn				
				32.0										
				32.5										
	10% RETURN	100	0	33.0			31.86 m - 31.96 m: Pale green propylitic alteration, strongest adjacent to lithological contact. 31.96 m: Contact sharp and inclined at 64°, possible chilled margin. ALTERED QUARTZ MICRODIORITE Fine to medium grained, igneous intrusive. Dark grey and grey. Crystalline. Feldspar comprises mostly plagioclase, fine grained and lath shaped. Indistinctly foliated, Veins infilled with calcite, some with pyrite as coatings Red to purple coating on some defects, undulating and rough.			32.41-32.41 m: J, 3°, Pln, Ro, Py Vr 32.61-32.63 m: J, 18°, Pln, Py Vr, Py crystals ~1mm. 32.67-32.71 m: J, 60°, Pln, Sm, Unidentified purple mineral on joint surface. 32.86-32.87 m: J, 5°, Pln, Sm, Cn 32.87-32.95 m: J, 64°, Und, Ro, Unidentified purple mineral on J surface. 32.91-32.95 m: J, 34°, Pln, Sm, Py Vr 32.94-33.00 m: J, 32°, Pln, Sm, Py Vr 33.08-33.12 m: J, 48°, Pln, Sm, Vr, Unidentified purple mineral on J surface. 33.19-33.31 m: J, 48°, Pln, Sm, KT Vr, Unidentified purple mineral also present. 33.24-33.25 m: J, 9°, Pln, Sm, Vr, Unidentified purple mineral on J surface. 33.61-33.68 m: J, 52°, Und 33.67-33.82 m: J, 65°, Pln, Sm 33.80-34.23 m: J, x8,50-70° , PR, Py, VN, unidentified purple mineral on joint surface.				
				34.0										
				34.5										
	10% RETURN		100	82	35.0			From 34.30 m: Becomes mainly medium grained, pale-grey and grey.			UCS=81.6 $I_{s0}(A)>5.77$	34.30-34.35 m: J, 45°, Pln, Ro, Vr, Soft white material on J surface. 34.42-34.51 m: J, 64°, Pln, CA Vr 34.52-34.55 m: J, 18°, Pln, Ro, Py Vr, Rare 1mm Py crystals.		

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BOREHOLE: BHUA-15

SHEET: 9 OF 13

CLIENT: SMEC

COORDS: 658508.7 m 7666335.9 m GDA 2020 MGA Zone 55

DRILL RIG: TH23

PROJECT: Pioneer Burdekin PHES GI

SURFACE RL: 872.84 m DATUM: AHD

CONTRACTOR: Twin Hills

LOCATION: Dalrymple Heights

INCLINATION: -88° DIRECTION: 185°

LOGGED: ENGEO DATE: 4/8/23

JOB NO: 23117.000.001

HOLE DIA: 96/100 mm HOLE DEPTH: 55.56 m

CHECKED: SF DATE: 28/8/23

Drilling						Field Material Description						Defect Information			
METHOD / SUPPORT	WATER	TCR	RQD	DRILLED LENGTH (metres)	DEPTH RL	GRAPHIC LOG	MATERIAL DESCRIPTION	DETAILED WEATHERING	INFERRED STRENGTH I_s (MPa) (AS1728:2017)	MEASURED STRENGTH: UCS & I_{p50} (A.D.I.)	DEFECT DESCRIPTION	AVERAGE DEFECT SPACING (mm) (ISO14689:2017)			
											Mechanical Discontinuities / non-intact defects shown only. See attached Detailed Defect Log for all recorded discontinuities and defects	EC-29	VC-29	C-29	M-29
HQ3	10% RETURN	100	82	35.0	837.86		ALTERED QUARTZ MICRODIORITE Fine to medium grained, igneous intrusive. Pale grey and grey. Crystalline. Feldspar comprises mostly plagioclase, fine grained and lath shaped. Indistinctly foliated, CA (?) veinlets (<1 mm) and some with pyrite as coatings.	SA			35.06-35.10 m: J, 75°, Irr, Ro, Vr, Identified purple mineral on J surface. 35.10-35.14 m: J, 54°, Pln, Ro, CA Vr, Unidentified purple mineral also present on J surface.				
	10% RETURN	100	68	35.5							35.63-35.88 m: J, 81°, Pln, Qz FL, CA also present. 35.68-35.71 m: J, 40°, Pln, CA FL 35.80-35.82 m: J, 15°, Pln, Ro, Vr, Unidentified purple mineral.				
	10% RETURN	100	78	36.0							36.00-36.06 m: J, 40°, Pln, Ro 36.25-36.29 m: J, Pln, Ro, KT Vr 36.49-36.55 m: J, 40°, Pln, Sm, KT Vr 36.77-36.83 m: J, 46°, Pln, Ro, KT Vr 36.87-36.88 m: J, 13°, Pln, Unidentified purple mineral on J surface. 37.05-37.24 m: J, 75°, Pln, FL 37.32-37.50 m: J, Pln, Ro 37.72-37.78 m: J, 48°, Pln, Sm, CA Vr, CA had red purple A.				
	10% RETURN	100	69	38.0							38.03-38.06 m: J, 17°, Pln, FL 38.11-38.93 m: J, 64°, Pln, Ro, Unidentified purple mineral on J surface. 38.36-38.40 m: J, x3, 25°, PR, Ca, IT, 1mm aperture 38.51-38.53 m: J, 18°, Pln, Ro, Cn 38.61-38.61 m: BP, 0°, Irr, Vro, Cn 38.63-38.66 m: J, 10°, Pln, Propylitic A.				
				38.35	834.51		From 38.35 m: Increasing frequency of CA (?) veinlets (<1 mm) and thin veins (<5 mm thick), various orientations, up to 10/m.			UCS=133					
				39.19	833.67		39.19 m - 39.29 m: Pyritic zone, inclined 48°, pale grey.				39.02-39.12 m: J, 64°, Pln, Ro, Vr, Unidentified purple mineral on J surface. 39.12-39.22 m: J, 68°, Pln, CA Vr, Defect IT. 39.22-39.28 m: J, 50°, Pln, Ro, KT Vr 39.49-39.52 m: J, 30°, Und, CA 39.82-39.96 m: J, 69°, Pln				

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BOREHOLE: BHUA-15

SHEET: 11 OF 13

CLIENT: SMEC COORDS: 658508.7 m 7666335.9 m GDA 2020 MGA Zone 55
PROJECT: Pioneer Burdekin PHES GI SURFACE RL: 872.84 m DATUM: AHD
LOCATION: Dalrymple Heights INCLINATION: -88° DIRECTION: 185°
JOB NO: 23117.000.001 HOLE DIA: 96/100 mm HOLE DEPTH: 55.56 m

DRILL RIG: TH23
CONTRACTOR: Twin Hills
LOGGED: ENGEO DATE: 4/8/23
CHECKED: SF DATE: 28/8/23

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 _u (MPa) (AS1726:2017)	MEASURED STRENGTH: UCS & Is ₅₀ (A.D.U.) (MPa)	DEFECT DESCRIPTION	AVERAGE DEFECT SPACING (mm) (ISO14689:2017)		
											Mechanical Discontinuities / non-intact defects shown only. See attached Detailed Defect Log for all recorded discontinuities and defects	EC-29	VC-29	VC-29
HQ3	10% RETURN		100	60	45.0		ALTERED ANDESITE Fine to medium grained, aphanitic to phaneritic igneous intrusive. Dark grey to grey. Porphyritic, with plagioclase and olivine (?) phenocrysts typically <3mm. Very poorly developed, weak foliation (sub-horizontal mineral alignment). Frequent CA and QZ (?) veinlets and veins <5mm. Sharp upper contact, gradational lower contact.	SA			45.00-45.08 m: J, 50°, Und, Ro, Vr, Unidentified purple mineral. 45.08-45.11 m: J, 35°, Und, Vro, Vr, Unidentified purple mineral on J surface. 45.14-45.63 m: J, 78°, Und, Ro, CA FL, Unidentified purple mineral also on J surface. 45.15-45.16 m: J, 20°, Pln, CA Vr 45.33-45.34 m: J, 10°, Pln, Ro, CA Vr 45.44-45.63 m: J, 70°, Und, Ro, CA Vr, Unidentified purple mineral also present on J surface.			
					45.5						45.71-45.88 m: J, 80°, Und			
					46.0						45.84-45.87 m: J, 27°, Pln, Ro, CA Vr			
					46.5		ALTERED GRANITE Medium to coarse grained with some fine to medium grained bands (generally darker in colour). Pale grey and dark grey Crystalline, anhedral to subhedral Weakly foliated at ~35°, defined by mineral segregation and alignment of mafic and felsic minerals Pervasive epidote alteration (?). Gradational upper contact and sharp lower contact.				46.08-46.09 m: J, 9°, FL			
					47.0						46.26-46.34 m: J, x2, 24°, Pln			
	10% RETURN		100	100	47.5		ALTERED ANDESITE Described as per 44.67 m 46.00 m Sharp contact, moderately inclined at ~45°.				46.48-46.52 m: J, 35°, Ro, Cn			
					48.0						46.84-46.90 m: J			
					48.5						47.06-47.21 m: J, x2, 25°, Pln			
					49.0						47.18-47.29 m: J, 71°, Pln, FL			
					49.5						47.41-47.60 m: 31°, J, x8, 31°, Pln, IT			
	10% RETURN		100	93	49.5		ALTERED GRANITE As per 45.90 m description. 48.64 m - 48.78 m: Pyritic quartz vein to 2 mm (pyrite to 20%), intact.				47.85-47.91 m: J, x3, 24°, Pln ,IT			
					50.0						48.10-48.12 m: J, 26°, Pln, CA FL			
											48.21-48.23 m: J, 14°, Pln, FL			
											48.33-48.34 m: J, 33°, Pln, CA Vr			
											48.92-49.05 m: J, x3, 46°, Pln , IT			
HQ3	10% RETURN		100	95	49.5		ALTERED ANDESITE As per 47.34 m description, with many altered pale green altered veins and phenocrysts, and some altered granite bands up to 120 mm thick.	MA			49.30-49.35 m: J, 45°, Und, KT Vr			
					50.0						49.52-49.53 m: J, 10°, Pln, Ro, Cn 49.52-49.56 m: J, Pln, Vr 49.52-49.53 m: J, 10°, Pln, Ro, Cn 49.52-49.56 m: J, Pln, Vr 49.65-49.78 m: J, 70°, Pln, Parasites with 3 mm halo. 49.79-49.80 m: J, 30°, Pln, CA Vr 49.82-49.92 m: J, x5, 45°, Pln , IT			

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-15

SHEET: 12 OF 13

CLIENT: SMEC

COORDS: 658508.7 m 7666335.9 m GDA 2020 MGA Zone 55

DRILL RIG: TH23

PROJECT: Pioneer Burdekin PHES GI

SURFACE RL: 872.84 m DATUM: AHD

CONTRACTOR: Twin Hills

LOCATION: Dalrymple Heights

INCLINATION: -88° DIRECTION: 185°

LOGGED: ENGEO DATE: 4/8/23

JOB NO: 23117.000.001

HOLE DIA: 96/100 mm HOLE DEPTH: 55.56 m

CHECKED: SF DATE: 28/8/23

Drilling					Field Material Description					Defect Information				
METHOD / SUPPORT	WATER	TCR	RQD	DRILLED LENGTH (metres)	DEPTH RL	GRAPHIC LOG	MATERIAL DESCRIPTION	DETAILED WEATHERING	INFERRED STRENGTH I_{s0} (MPa) (AS1726:2017)	MEASURED STRENGTH: UCS & I_{s0} (MPa) (A.0.1)	DEFECT DESCRIPTION	AVERAGE DEFECT SPACING (mm) (ISO14689:2017)		
											Mechanical Discontinuities / non-intact defects shown only. See attached Detailed Defect Log for all recorded discontinuities and defects	EC-29	VC-29	WV-29
HQ3	10% RETURN	100	95	50.0			ALTERED ANDESITE As per 47.34 m description, with many altered pale green altered veins and phenocrysts, and some altered granite bands up to 120 mm thick.	MA			50.09-50.12 m: J, 28°, Pln, Ro, Vr 50.10-50.33 m: J, x9, 29°, Pln, parasites with 2 mm halo. 50.31-50.37 m: J, 33°, Pln, Ro, Qz FL 50.39-50.60 m: J, x6, 29°, Pln, parasites with 2 mm halo.			
	10% RETURN	100	100	50.5							50.77-50.78 m: J, 5°, Irr, CA Vr			
	10% RETURN	100	100	51.0							51.10-51.11 m: J, 15°, Pln, Ro, CA Vr 51.15-51.16 m: J, 4°, Irr, Ro, Vr, Potassium A on J surface. 51.38-51.39 m: J, 14°, Irr, Ro			
	10% RETURN	100	89	51.5										
HQ3	10% RETURN	100	89	51.60			ALTERED GRANITE Medium to coarse grained, phaneritic igneous intrusive Pale grey, pale green and dark grey Crystalline, anhedral to subhedral, generally equigranular., Poorly to moderately developed, weak foliation (subhorizontal mineral alignment) With microgranite bands up to 100 mm thick. Strong propylitic alteration from 51.60 m to 52.54 m	SA			51.81-51.93 m: J, x4, 53°, Pln, IT			
	10% RETURN	100	89	52.0							52.38-52.43 m: J, 28°, Pln, Ro, Cn 52.50-52.52 m: J, 20°, Cvd, Ro, CA Vr			
	10% RETURN	100	89	52.5							52.83-52.85 m: J, 13°, Pln, Ro			
	10% RETURN	100	89	53.0										
HQ3	10% RETURN	100	89	53.22			ANDESITE (DYKE ?) Fine grained, igneous intrusive. Dark grey. Crystalline, porphyritic. Upper and lower contacts at 56°.							
	10% RETURN	100	89	53.5			ALTERED GRANITE Medium to coarse grained with some fine to medium grained bands (generally darker in colour), igneous intrusive Pale grey and grey Crystalline, subhedral feldspar, anhedral quartz, generally equigranular., Weakly foliated (indistinct), defined by mineral segregation and alignment of mafic and felsic minerals and mineral elongation. Variation in banding of subhedral feldspar, anhedral quartz and micas indicates flow in melt during placement. 53.22 m: With some mafic inclusions, porphyritic, 10 mm - 100 mm diameter, circular and irregular with diffuse and sharp margins.				UCS=201 $I_{s0}(A)>5.89$			
	10% RETURN	100	89	54.0							53.90-53.98 m: J, 52°, Pln, Ro			
	10% RETURN	100	89	54.5										
HQ3	10% RETURN	100	89	55.0										
	10% RETURN	100	89	55.00										

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

Borehole ID:	BHUA-15
Termination Depth:	55.56

Depth (m)			Type	Angle (°)	Roughness	Shape	Infill	Weathering	Nature	Comments
From	To	Midpoint								
13.93	13.94	13.94	Joint	5	Rough	Undulating	Chlorite	Highly Weathered	Stained	
14	14.05	14.03	Bedding Parting	89	Rough	Planar		Highly Weathered	Stained	
14.08	14.09	14.09	Joint	20	Very Rough	Irregular		Highly Weathered	Stained	
14.14	14.14	14.14	Bedding Parting	0	Very Rough	Irregular			Clean	
14.17	14.26	14.22	Fault	16		Irregular		Residual Soil		
14.25	14.32	14.29	Joint	61	Rough	Planar		Highly Weathered	Stained	
14.33	14.44	14.39	Joint	75	Smooth	Planar		Highly Weathered	Stained	
14.41	14.47	14.44	Joint	89	Rough	Planar		Highly Weathered	Stained	
14.43	14.46	14.45	Joint	90		Planar		Moderately Weathered	Healed	
14.45	14.47	14.46	Joint	20	Rough	Undulating		Moderately Weathered	Stained	
14.46	14.5	14.48	Joint	60	Smooth	Planar		Distinctly Weathered	Stained	
14.47	14.49	14.48	Joint	20	Rough	Planar		Highly Weathered	Stained	
14.48	14.56	14.52	Joint	77	Rough	Planar		Moderately Weathered	Stained	
14.52	14.55	14.54	Joint	71	Rough	Planar		Moderately Weathered	Stained	
14.54	14.57	14.56	Joint	39	Rough	Planar		Moderately Weathered	Stained	
14.54	14.63	14.59	Joint	59	Rough	Planar		Moderately Weathered	Stained	
14.59	14.59	14.59	Joint	3	Rough	Planar		Moderately Weathered	Stained	
14.61	14.64	14.63	Joint	40	Rough	Planar		Moderately Weathered	Stained	
14.64	14.67	14.66	Joint	59	Rough	Planar		Moderately Weathered	Stained	
14.67	14.67	14.67	Joint	6	Rough	Planar		Highly Weathered	Stained	
14.68	14.73	14.71	Joint	69	Rough	Undulating		Highly Weathered	Stained	
14.71	14.72	14.72	Bedding Parting	7	Very Rough	Irregular			Clean	
14.73	14.77	14.75	Crushed Seam	14.75	Very Rough	Irregular		Moderately Weathered	Crushed	Crushed due to intersecting joints.
14.77	14.84	14.81					Quartz			J, x5, 5° ,UN, Fe, SN
15.61	15.66	15.64	Joint	48		Planar		Moderately Altered	Infilled	Propylitic (?) Alteration.
15.64	15.65	15.65	Joint	48		Planar		Moderately Altered	Intact	Moderately Weathered (DW), Propylitic (?) Alteration.
15.66	15.86	15.76	Joint			Planar		Moderately Altered	Intact	Propylitic (?) Alteration.
15.85	15.97	15.91	Joint	70		Planar		Moderately Altered	Intact	Propylitic (?) Alteration.
15.88	15.88	15.88	Other	0		Undulating			Intact	Distinct change from dark fine - med grained to med - dark, med - coarse grained.
16.18	16.23	16.21	Crushed Seam		Very Rough	Irregular		Moderately Weathered		
16.23	16.25	16.24	Joint							J, x4, 14° ,UN, Fe, SN
16.35	16.37	16.36	Joint	14		Planar		Moderately Altered	Intact	J, x2, 14° ,Pln, Fe, IT
17.09	17.09	17.09	Alteration Zone	5		Planar		Moderately Altered		Propylitic alteration.
17.7	17.76	17.73	Joint	42	Rough	Planar			Clean	
18.25	18.26	18.26	Joint	18	Rough	Planar		Moderately Weathered	Stained	
18.29	18.33	18.31	Vein	50		Irregular		Moderately Weathered	Intact	Propylitic alteration.
18.33	18.35	18.34	Vein	50		Planar		Moderately Weathered	Infilled	Propylitic alteration.
18.4	18.51	18.46	Vein							V, x2, 68°,IR, Qz, IT , HD, 1mm thickness
18.5	18.6	18.55	Vein	74		Undulating		Moderately Altered		Propylitic alteration.
18.6	18.8	18.70	Vein	65		Irregular		Moderately Altered		Propylitic alteration.
19.65	19.82	19.74	Alteration Zone	73		Irregular		Moderately Weathered	Intact	
21.93	21.96	21.95	Vein	49		Undulating		Moderately Weathered	Intact	Propylitic alteration.
22.22	22.3	22.26	Joint	63		Planar		Moderately Weathered	Infilled	Propylitic alteration along joint surface.
22.29	22.3	22.30	Joint	63		Planar		Moderately Weathered	Intact	Propylitic alteration on joint surface.
24.37	24.42	24.40	Joint	8		Planar	Quartz	Slightly Altered	Infilled	Propylitic.
24.39	24.4	24.40	Joint	25	Smooth	Planar			Clean	
24.49	24.54	24.52	Joint	52		Planar	Chlorite	Moderately Altered	Intact	Propylitic alteration.
24.67	24.7	24.69	Joint	26	Rough	Undulating			Clean	
24.75	24.87	24.81	Alteration Zone	72		Planar	Chlorite	Moderately Altered	Intact	Propylitic alteration.
24.94	25	24.97	Joint	65		Planar		Moderately Weathered	Infilled	Propylitic alteration.
26.06	26.12	26.09	Joint	44	Rough	Planar	Quartz			
26.21	26.5	26.36	Alteration Zone							AZ, x8, 20°-60°,IR, IT
26.22	26.93	26.58	Vein	85		Undulating	Chlorite		FD	
26.45	26.61	26.53	Joint	53		Undulating		Moderately Altered	Intact	
26.65	26.68	26.67	Joint	22	Rough	Planar	Pyrite	Moderately Altered	Veneer	Chlorite also Plinesent on joint surface.
26.78	26.9	26.84	Joint	59		Planar		Moderately Altered	Intact	
26.85	26.98	26.92	Joint	61		Irregular	Chlorite	Moderately Altered	Infilled	Veining and fractures crosscut defect.
26.93	26.93	26.93	Bedding Parting	2	Rough	Curved				
27.14	27.29	27.22	Vein	80		Undulating	Quartz		FD	

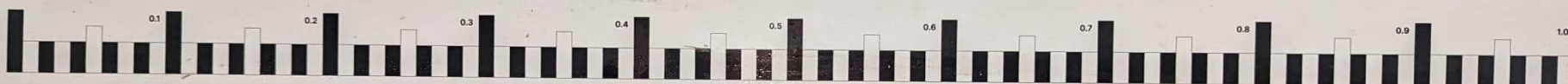
Depth (m)			Type	Angle (°)	Roughness	Shape	Infill	Weathering	Nature	Comments
From	To	Midpoint								
27.25	27.43	27.34	Vein	89		Undulating	Quartz	Moderately Altered	FD	Propylitic ad potassic alteration observed along vein.
27.38	27.41	27.40	Joint	89	Smooth	Planar			Clean	
27.78	27.8	27.79	Joint	11	Rough	Planar	Chlorite	Moderately Altered	Veneer	
28.26	28.31	28.29	Joint	51	Rough	Planar	Chlorite	Moderately Altered		
28.42	28.51	28.47	Alteration Zone	58		Undulating	Chlorite	Moderately Weathered		
29.38	29.44	29.41	Vein	70		Undulating	Quartz		HL	
29.39	29.44	29.42	Joint	30	Rough	stepped	Chlorite	Moderately Altered		
29.46	29.48	29.47	Joint	14	Rough	Planar			Clean	
29.78	29.82	29.80	Joint	40	Very Rough	Undulating			Clean	
30.23	30.34	30.29	Joint							J, x4, 24°,Pln, IT
30.31	30.4	30.36	Alteration Zone	71		Irregular	Chlorite		Intact	
30.44	30.61	30.53	Alteration Zone	90		Irregular	Chlorite	Moderately Altered	Intact	Parasites with 4 mm halo..
30.65	30.74	30.70	Alteration Zone			Planar				
30.74	30.78	30.76	Alteration Zone	31		Planar	Chlorite	Moderately Weathered	Intact	
30.91	30.95	30.93	Alteration Zone	36		Planar	Chlorite	Moderately Weathered	Intact	
31	31.05	31.03	Joint	80		Planar		Moderately Altered		Ch and Qz along joint surface.
31.05	31.08	31.07	Joint	29	Smooth	Planar	Chlorite	Moderately Altered	Veneer	
31.16	31.32	31.24	Joint							J, x5, 49°,Pln, KT, IT
31.33	31.35	31.34	Joint	16	Smooth	Planar			Clean	
31.5	31.53	31.52	Joint	18	Smooth	Planar			Clean	
31.72	31.82	31.77	Vein	46		Undulating	Quartz	Moderately Altered	Healed	
31.86	32.02	31.94	Alteration Zone	64		Irregular		Moderately Altered	Intact	
31.92	32.02	31.97	CO	64		Planar			Infilled	
32	32.17	32.09	Vein							V, x5, 75°, IR, Qz, IT
32.38	32.47	32.43	Vein	57		Planar	Quartz		Intact	
32.41	32.41	32.41	Joint	3	Rough	Planar	Pyrite		Veneer	
32.61	32.63	32.62	Joint	18		Planar	Pyrite		Veneer	Pyrite crystals ~1mm.
32.63	32.77	32.70	Vein	88		Irregular	Calcite		Infilled	
32.67	32.71	32.69	Joint	30	Smooth	Planar				Unidentified purple mineral on joint surface.
32.86	32.87	32.87	Joint	5	Smooth	Planar			Clean	
32.87	32.95	32.91	Joint	64	Rough	Undulating				Unidentified purple mineral on joint surface.
32.91	32.95	32.93	Joint	34	Smooth	Planar	Pyrite		Veneer	
32.94	33	32.97	Joint	32	Smooth	Planar	Pyrite		Veneer	
33.08	33.12	33.10	Joint	48	Smooth	Planar			Veneer	Unidentified purple mineral on joint surface.
33.14	33.25	33.20	Vein	48		Irregular	Calcite		Infilled	Unidentified purple mineral also Plnesent.
33.19	33.31	33.25	Joint	48	Smooth	Planar	Chlorite		Veneer	Unidentified purple mineral also Plnesent.
33.24	33.25	33.25	Joint	9	Smooth	Planar			Veneer	Unidentified purple mineral on joint surface.
33.41	33.6	33.51	Joint	59		Planar			Intact	
33.5	33.54	33.52	Joint	26	Smooth	Planar			Veneer	Unidentified purple mineral slo Plnesent on joint surface.
33.61	33.68	33.65	Joint	52		Undulating				
33.67	33.74	33.71	Vein	62		Undulating	Calcite		Coating	
33.67	33.82	33.75	Joint	65	Smooth	Planar				
33.8	34.23	34.02								J, x8,50-70°, Pln, Py, VN, unidentified purple mineral on joint surface.
34.3	34.35	34.33	Joint	45	Rough	Planar			Veneer	Soft white material on joint surface.
34.42	34.51	34.47	Joint	64		Planar	Calcite		Veneer	
34.52	34.55	34.54	Joint	18	Rough	Planar	Pyrite		Veneer	Rare 1mm pyrite crystals.
34.66	34.73	34.70	Vein	50		Planar	Calcite		Intact	
34.74	34.84	34.79	Joint	50		Planar	Calcite		Intact	
34.75	34.81	34.78	Joint	50		Planar	Chlorite		Intact	
35.06	35.1	35.08	Joint	75	Rough	Irregular			Veneer	Indentified purple mineral on joint surface.
35.1	35.14	35.12	Joint	54	Rough	Planar	Calcite	Moderately Altered	Veneer	Unidentified purple mineral also Plnesent on joint surface.
35.1	35.35	35.23	Joint	76			Calcite		Intact	
35.36	35.5	35.43	Vein	76		Planar	Calcite		Intact	
35.5	35.55	35.53	Vein	56		Planar	Calcite		Intact	Normal to another vein.
35.63	35.88	35.76	Joint	81		Planar	Quartz		Infilled	Calcite also Plnesent.
35.68	35.71	35.70	Joint	40		Planar	Calcite		Infilled	
35.8	35.82	35.81	Joint	15	Rough	Planar			Veneer	Unidentified purple mineral.
36	36.06	36.03	Joint	40	Rough	Planar				
36.06	36.14	36.10	Joint	44		Planar		Moderately Altered	Intact	Unidentified purple mineral on joint surface.
36.13	36.24	36.19	Joint	74		Irregular		Moderately Weathered	Intact	Chlorite alteration.
36.25	36.29	36.27	Joint		Rough	Planar	Chlorite		Veneer	
36.44	36.6	36.52	Vein	40		Planar	Calcite		Veneer	
36.46	36.54	36.50	Vein	68		Irregular	Pyrite		Intact	

Depth (m)			Type	Angle (°)	Roughness	Shape	Infill	Weathering	Nature	Comments
From	To	Midpoint								
36.49	36.55	36.52	Joint	40	Smooth	Planar	Chlorite		Veneer	Unidentified purple mineral on joint surface.
36.77	36.83	36.80	Joint	46	Rough	Planar	Chlorite		Veneer	
36.87	36.88	36.88	Joint	13		Planar				
36.88	36.94	36.91	Joint	51		Planar			Intact	
37.05	37.24	37.15	Joint	75		Planar			Infilled	
37.32	37.5	37.41	Joint		Rough	Planar				
37.69	37.73	37.71	Joint	38		Planar			Intact	
37.72	37.78	37.75	Joint	48	Smooth	Planar	Calcite		Veneer	Calcite had red purple alteration.
37.78	37.94	37.86	Joint	78		Planar			Intact	
38.03	38.06	38.05	Joint	17		Planar		Moderately Altered	Infilled	
38.11	38.93	38.52	Joint	64	Rough	Planar		Moderately Altered		Unidentified purple mineral on joint surface.
38.26	38.61	38.44	Vein	19		Undulating	Calcite		Infilled	
38.36	38.4	38.38								J, x3, 25", Pln, Ca, IT, 1mm aperture
38.48	38.53	38.51	Alteration Zone	18		Irregular			Infilled	Propylitic alteration .
38.51	38.53	38.52	Joint	18	Rough	Planar			Clean	
38.53	38.57	38.55	Joint	35		Irregular			Intact	Propylitic alteration.
38.61	38.61	38.61	Bedding Parting	0	Very Rough	Irregular			Clean	
38.63	38.66	38.65	Joint	10		Planar		Moderately Altered		Propylitic alteration.
38.7	38.75	38.73	Joint	26		Planar		Moderately Altered	Intact	
38.72	38.93	38.83	Vein	84		Undulating	Calcite	Moderately Altered		Unidentified purple mineral on joint surface.
38.82	38.83	38.83	Vein	3		Planar	Calcite		Veneer	
39.02	39.12	39.07	Joint	64	Rough	Planar		Moderately Altered	Veneer	Unidentified purple mineral on joint surface.
39.12	39.22	39.17	Joint	68		Planar	Calcite		Veneer	
39.22	39.28	39.25	Joint	50	Rough	Planar	Chlorite	Moderately Altered	Veneer	Defect intact.
39.28	39.28	39.28	Joint	80		Planar			Intact	
39.49	39.52	39.51	Joint	30		Undulating	Calcite	Moderately Altered		
39.52	39.53	39.53	Joint	10		Planar		Moderately Weathered	HL	
39.61	39.67	39.64	Vein	30		Planar	Quartz		Infilled	
39.66	39.74	39.70	Joint	51		Planar		Slightly Altered	Intact	
39.82	39.96	39.89	Joint	69		Planar		Slightly Altered		
40.05	40.07	40.06	Joint	18		Planar		Moderately Altered		
40.12	40.15	40.14	Vein	10		Planar	Calcite		Veneer	
40.19	40.23	40.21	Joint	35	Rough	Undulating	Calcite		Veneer	
40.2	40.25	40.23	Joint	35	Rough	Planar	Calcite		Coating	
40.25	40.32	40.29	Joint	52	Very Rough	Stepped		Moderately Altered	Veneer	Unidentified purple mineral on joint surface.
40.47	40.5	40.49	Joint	10	Rough	Planar	Calcite	Moderately Altered	Veneer	Unidentified purple mineral also on joint surface.
40.47	40.53	40.50	Joint	48		Planar			Intact	
40.47	40.85	40.66	Vein	87		Planar	Calcite		Intact	
40.5	41.25	40.88	Joint	90	Rough	Undulating		Moderately Weathered	FD	Unidentified purple mineral on joint surface.
40.53	40.73	40.63	Vein	90		Irregular	Calcite		Infilled	
40.75	40.8	40.78	Vein	41		Planar	Calcite		Veneer	
40.83	40.88	40.86	Joint	41	Smooth		Calcite	Moderately Altered	Veneer	Unidentified purple mineral on joint sirface.
41.12	41.4	41.26	Vein	80		Planar	Quartz		Coating	
41.19	41.2	41.20	Joint	6	Rough	Planar	Calcite	Moderately Altered	Veneer	
41.4	41.41	41.41	Joint		Very Rough	Undulating	Calcite	Slightly Altered	Veneer	
		41.42								
41.4	41.44		Joint	75	Very Rough	Undulating	Calcite	Moderately Weathered	Veneer	Calcite only on part of the joint surface, unidentified mineral on joint surface, Propylitic alteration also Plnesent.
41.64	41.7	41.67	Joint	77		Planar			Intact	
41.68	41.71	41.70	Joint	31		Planar		Moderately Weathered	Intact	
41.7	41.73	41.72	Joint	26		Planar		Moderately Weathered	Intact	
41.76	41.79	41.78	Vein	34		Planar	Calcite	Slightly Altered	Veneer	
41.79	41.86	41.83	Joint	56	Rough	Planar	Calcite		Veneer	
41.93	41.98	41.96	Joint	76		Undulating	Calcite		Veneer	
41.93	42	41.97	Joint	55		Planar			Intact	
42.21	42.26	42.24	Joint	60		Planar	Calcite		Veneer	
42.29	42.3	42.30	Vein	60		Planar	Quartz			
42.33	42.38	42.36	Vein	45		Irregular	Calcite			
42.41	42.5	42.46	Joint	72	Rough	Undulating	Calcite		Veneer	
42.5	42.52	42.51	Joint	20	Rough	Planar			Clean	
42.58	42.6	42.59	Joint	25		Planar		Moderately Altered	Intact	
42.63	42.71	42.67	Joint	51	Rough	Planar	Calcite		Veneer	
42.79	42.81	42.80	Vein	14		Planar	Quartz		Intact	
42.9	42.93	42.92	Joint	24	Smooth	Planar	Calcite		Infilled	

Depth (m)			Type	Angle (°)	Roughness	Shape	Infill	Weathering	Nature	Comments
From	To	Midpoint								
42.95	43	42.98	Joint					Moderately Altered		J, x3, 25°, Pln, IT, 1mm aperture
43.03	43.18	43.11	Joint					Moderately Altered		J, x5, 21°,Pln, IT, 1mm aperture
43.18	43.4	43.29	Joint	90		Undulating	Calcite	Moderately Altered	Veneer	
43.28	43.36	43.32	Joint							J, x5, 14° ,Pln, IT
43.4	43.42	43.41	Joint	20	Very Rough	Stepped			Veneer	Unidentified purple mineral on joint surface.
43.41	43.42	43.42	Joint	8	Smooth	Planar			Veneer	Unidentified purple mineral on joint surface.
43.53	43.65	43.59	Joint	70		Undulating	Calcite		Intact	
43.87	43.98	43.93	Joint	57		Planar		Moderately Altered		
43.89	43.9	43.90	Vein	57		Undulating			Intact	
43.95	44.04	44.00	Con	57		Planar				
44	44.2	44.10	Joint	80	Rough	Undulating	Calcite	Moderately Weathered	Veneer	Unidentified purple mineral on joint surface.
44.17	44.24	44.21	Vein	88		Irregular	Calcite		Infilled	
44.21	44.3	44.26	Vein	75		Planar	Quartz	Moderately Altered		
44.29	44.64	44.47	Vein	75		Curved	Calcite	Highly Altered	Infilled	
44.62	44.7	44.66	Joint	71		Undulating	Calcite	Moderately Altered	Veneer	Unidentified purple mineral also on joint surface.
44.68	44.7	44.69	Joint	20	Smooth	Planar			Veneer	
44.71	44.89	44.80	Joint	76		Undulating	Calcite		Veneer	
44.76	44.9	44.83	Vein	90		Irregular	Calcite	Slightly Altered	Infilled	
45	45.08	45.04	Joint	50	Rough	Undulating		Moderately Altered	Veneer	Unidentified purple mineral.
45.08	45.11	45.10	Joint	35	Very Rough	Undulating		Moderately Altered	Veneer	Unidentified purple mineral on joint surface.
45.14	45.63	45.39	Joint	78	Rough	Undulating	Calcite	Moderately Altered	Infilled	Unidentified purple mineral also on joint surface.
45.15	45.16	45.16	Joint	20		Planar	Calcite		Veneer	
45.19	45.21	45.20	Joint	14		Planar		Moderately Altered	Intact	
45.22	45.23	45.23	Joint	30		Planar		Moderately Altered	Intact	
45.26	45.37	45.32	Joint	72		Planar		Moderately Altered	Intact	
45.33	45.34	45.34	Joint	10	Rough	Planar	Calcite	Moderately Altered	Veneer	
45.44	45.63	45.54	Joint	70	Rough	Undulating	Calcite	Moderately Altered	Veneer	Unidentified purple mineral also Plnesent on joint surface.
45.6	45.74	45.67	Vein	80		Irregular	Calcite	Moderately Altered		
45.64	45.68	45.66	Vein	36		Irregular	Calcite	Sightly Altered		
45.71	45.88	45.80	Joint	80		Undulating		Moderately Altered		
45.84	45.87	45.86	Joint	27	Rough	Planar	Calcite		Veneer	
45.96	46.04	46.00	Vein	49		Planar	Calcite		Infilled	
46	46.16	46.08	Joint	80		Planar		Moderately Altered	Intact	
46.08	46.09	46.09	Joint	9				Moderately Altered	Infilled	
46.21	46.31	46.26	Joint	71		Planar		Moderately Altered	Intact	
46.26	46.34	46.30	Joint					Moderately Altered		J, x2, 24°,Pln
46.3	46.35	46.33	Vein	46		Planar			Intact	
46.48	46.52	46.50	Joint	35	Rough			Moderately Altered	Clean	
46.71	46.75	46.73	Joint	26		Planar		Moderately Weathered	Intact	
46.75	46.95	46.85	Joint	75		Planar		Moderately Altered	Intact	
46.81	46.82	46.82	Joint	12		Planar		Moderately Altered	Intact	
46.84	46.9	46.87	Joint							
47.06	47.21	47.14	Joint					Moderately Altered		J, x2, 25°,Pln
47.18	47.29	47.24	Joint	71		Planar		Moderately Altered	Infilled	
47.19	47.21	47.20	Joint	53		Planar		Moderately Altered	Intact	
47.25	47.31	47.28	Joint	43		Planar		Moderately Altered	Intact	
47.41	47.6	47.51	Joint	31				Highly Altered		J, x8, 31°,Pln, IT
47.85	47.91	47.88	Joint							J, x3, 24°,Pln,IT
48.1	48.12	48.11	Joint	26		Planar	Calcite		Infilled	
48.15	48.17	48.16	Joint	26		Planar	Calcite	Moderately Weathered	Intact	
48.21	48.23	48.22	Joint	14		Planar		Moderately Altered	Infilled	
48.26	48.28	48.27	Vein	14		Planar	Quartz		Infilled	
48.29	48.32	48.31	Joint	36		Planar		Moderately Altered	Intact	
48.33	48.34	48.34	Joint	33		Planar	Calcite		Veneer	
48.46	48.57	48.52	Joint	75		Undulating		Moderately Weathered	Intact	
48.56	48.66	48.61	Joint						Healed	J, x5, 60°,Pln, IT
48.66	48.76	48.71	Vein	64		Planar	Quartz		Infilled	Pyrite curtains in warts vein.
48.75	48.83	48.79	Joint	60		Planar		Moderately Weathered	Intact	
48.92	49.05	48.99	Joint							J, x3, 46°, Pln , IT
49.26	49.29	49.28	Vein	33		Irregular			Intact	
49.3	49.35	49.33	Joint	45		Undulating	Chlorite		Veneer	
49.39	49.68	49.54	Vein	86		Irregular	Calcite		Infilled	Pyrite also Plnesent in defect.
49.52	49.53	49.53	Joint	10	Rough	Planar			Clean	

Depth (m)			Type	Angle (°)	Roughness	Shape	Infill	Weathering	Nature	Comments
From	To	Midpoint								
49.52	49.56	49.54	Joint			Planar		Moderately Altered	Veneer	
49.58	49.59	49.59	Joint	40		Planar		Moderately Altered	Intact	Parasites with 3 mm halo
49.59	49.63	49.61	Joint	40		Planar		Moderately Altered	Intact	Parasites with 3 mm halo.
49.65	49.78	49.72	Joint	70		Planar		Moderately Altered		Parasites with 3 mm halo.
49.66	49.69	49.68	Vein	24		Planar	Quartz		Infilled	
49.73	49.82	49.78	Joint	70		Planar		Moderately Altered	Intact	Parasites with 2 mm halo.
49.79	49.8	49.80	Joint	30		Planar	Calcite		Veneer	
49.82	49.92	49.87	Joint							J, x5, 45°,Pln , IT
50	50.11	50.06	Vein	59		Planar	Quartz		Infilled	
50.05	50.09	50.07	Vein	66		Planar			Intact	
50.06	50.11	50.09	Fault	32		Planar		Moderately Weathered	Intact	4mm displacement observed.
50.09	50.12	50.11	Joint	28	Rough	Planar		Moderately Altered	Veneer	
50.1	50.33	50.22	Joint							J, x9, 29° ,Pln, parasites with 2 mm halo.
50.31	50.37	50.34	Joint	33	Rough	Planar	Quartz		Infilled	
50.39	50.6	50.50	Joint							J, x6, 29° , Pln, parasites with 2 mm halo.
50.57	50.67	50.62	Joint	66		Planar		Moderately Altered	Intact	Parasites with 1 mm halo..
50.77	50.78	50.78	Joint	5		Irregular	Calcite		Veneer	
50.78	50.87	50.83	Joint	75		Planar			Intact	
50.85	50.94	50.90	Joint			Planar		Moderately Altered	Intact	J, x6, 25° ,Pln, IT, parasites with 3 mm halo.
51.05	51.07	51.06	Joint	15		Planar		Moderately Altered	Intact	Parasites with 3 mm halo.
51.1	51.11	51.11	Joint	15	Rough	Planar	Calcite		Veneer	
51.15	51.16	51.16	Joint	4	Rough	Irregular		Moderately Altered	Veneer	Potassium alteration on joint surface.
51.19	51.25	51.22	Joint							J, x4, 20° , Pln, parasites with 2 mm halo.
51.38	51.39	51.39	Joint	14	Rough	Irregular		Highly Altered		
51.48	51.5	51.49	Joint	45		Planar			Intact	
51.52	51.58	51.55	Joint	11		Planar		Moderately Altered	Intact	
51.81	51.93	51.87	Joint							J, x4, 53°,Pln, IT
52.38	52.43	52.41	Joint	28	Rough	Planar			Clean	
52.5	52.52	52.51	Joint	20	Rough	Curved	Calcite		Veneer	
52.5	52.65	52.58	Vein	60		Planar			Infilled	Mafic intrusion.
52.76	52.83	52.80	Joint	68		Planar			Intact	
52.83	52.85	52.84	Joint	13	Rough	Planar		Slightly Altered		
53.16	53.22	53.19	Joint	56		Planar		Moderately Altered	Intact	Parasites with 1 mm halo.
53.9	53.98	53.94	Joint	52	Rough	Planar				
55.05	55.06	55.06	Joint	30	Rough	Planar		Moderately Altered		
55.13	55.16	55.15	Joint	34		Planar		Moderately Altered		Parasites with 3 mm halo.
55.21	55.29	55.25	Joint	60	Rough	Planar			Veneer	

ENGEO

Borehole No.: BHUA-15		Depth Range: 17.0 – 21.0		Box: 2 / 11	
JOB NO: 30032732		PROJECT: Pioneer-Burdekin			
BOREHOLE ID: BHUA-15		CORE TRAY NO: Box 2			
DEPTH: 17.0-21.0					
DATE: 14-12-23					
					
					
		Geotechnical Investigation Borehole Photos		Client: SMEC	
				Project: Pioneer-Burdekin PHES	
				Project No. 23117.000.001	
				Date Drilled: 15/06/2023	
		Drawn: RC		Page No. 2/11	
		Checked: SF		Size: A4	
		Revision: 0		Scale: N/A	

ENGEO

ENGEO

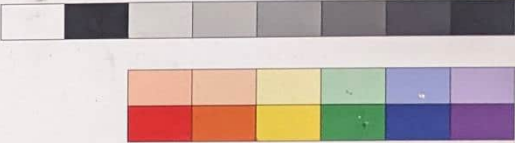
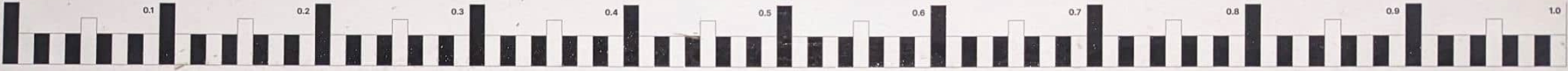
ENGEO

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ENGEO

Borehole No.: BHUA-15		Depth Range: 49.0 – 53.0		Box: 10 / 11	
JOB NO: 30032772		PROJECT: Pioneer-Burdekin			
BOREHOLE ID: BHUA-15		CORE TRAY NO: Box 10			
DEPTH: 49.0-53.0					
DATE: 14-12-23				✗ CHALK MARKS DENOTE HANDLING OR DRILLING BREAKS	
					
					
		Geotechnical Investigation Borehole Photos	Client: SMEC		
			Project: Pioneer-Burdekin PHES		
			Project No. 23117.000.001		
			Date Drilled: 15/06/2023		
			Drawn: RC	Page No. 10/11	
			Checked: SF	Size: A4	
			Revision: 0	Scale: N/A	

The photograph shows a metal tray containing three sections of a dark, granular borehole core sample. Above the tray is a white label with the following information:

- JOB NO: 30032772
- PROJECT: Pioneer-Burdekin
- BOREHOLE ID: BHUA-15
- DEPTH: 53.0-55.56
- DATE: 14-12-23
- CORE TRAY NO: Box 11

To the right of the text is a color calibration chart with 11 color patches. Below the text is a scale bar with markings from 0.1 to 1.0. A red 'X' symbol is next to the text "CHALK MARKS DENOTE HANDLING OR DRILLING BREAKS".

The core sample sections are labeled with their lengths: 53.26m, 53.66m, and EOH 55.56. The tray is placed on a white surface.

Geotechnical
Investigation
Borehole
Photos

Client: SMEC

Project: Pioneer-Burdekin PHES

Project No. 23117.000.001

Date Drilled: 15/06/2023

Drawn: RC

Checked: SF

Revision: 0

Page No. 11/11

Size: A4

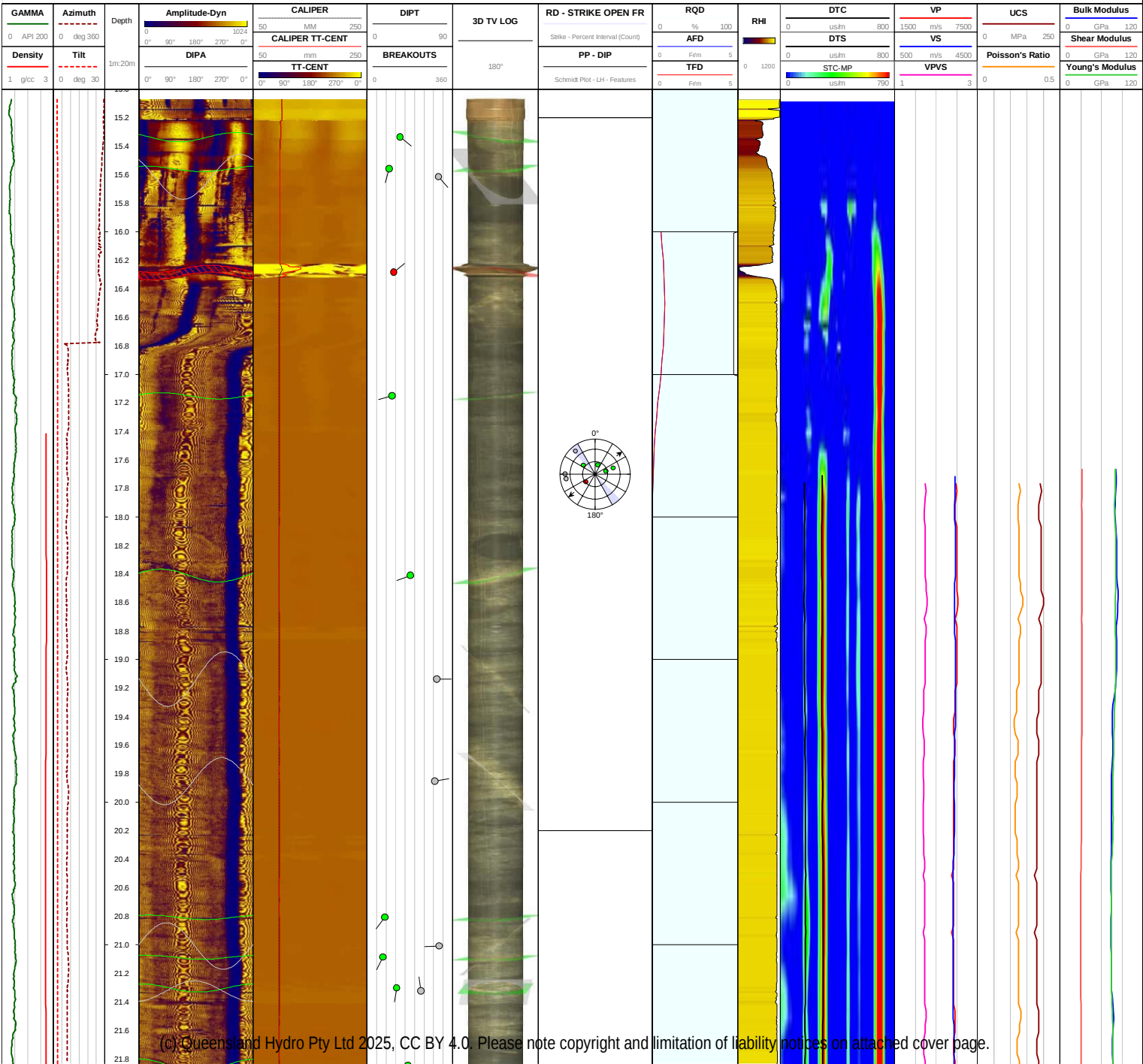
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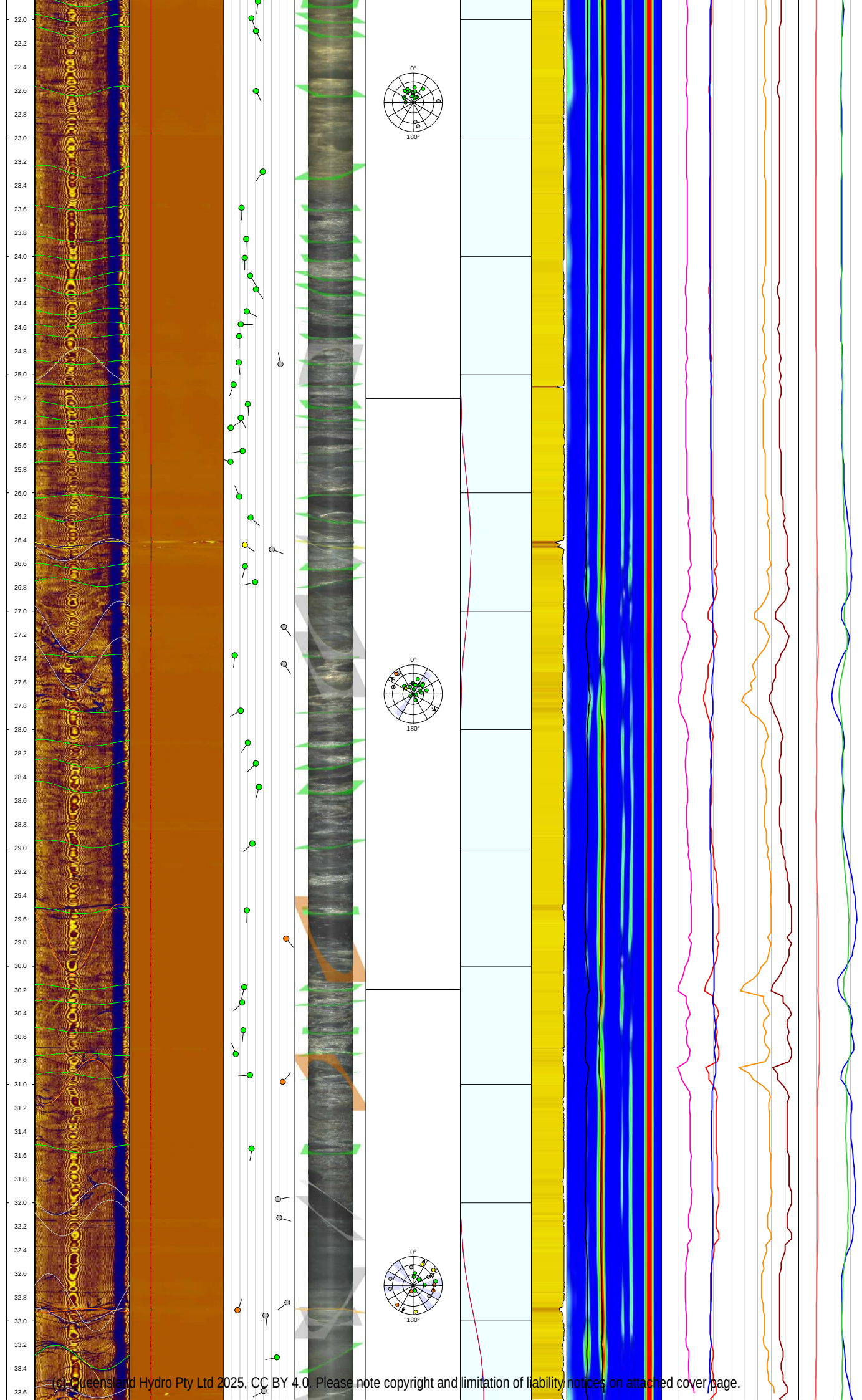
		COMPOSITE LOG BOREHOLE TELEVIEWER AND FULL WAVEFORM SONIC LOGS AND ADVANCED ANALYSIS				Epiroc	
Hole Name	BHUA_15	Drill Depth	55.0m	Grid Name		Logging Unit	SV013
Field	EUNGELLA	Bit Size	9.6CM	Collar Easting	658394m	Engineer	DAMON HOSKING
Log Date	05/08/23	Casing Type	STEEL	Collar Northing	7666155m	Client Representative	ROB CAINE
Location	PIONEER-BURDEKIN	Casing Depth	15.0m	Reduced Level		Service Type	Televiewer Interpretation

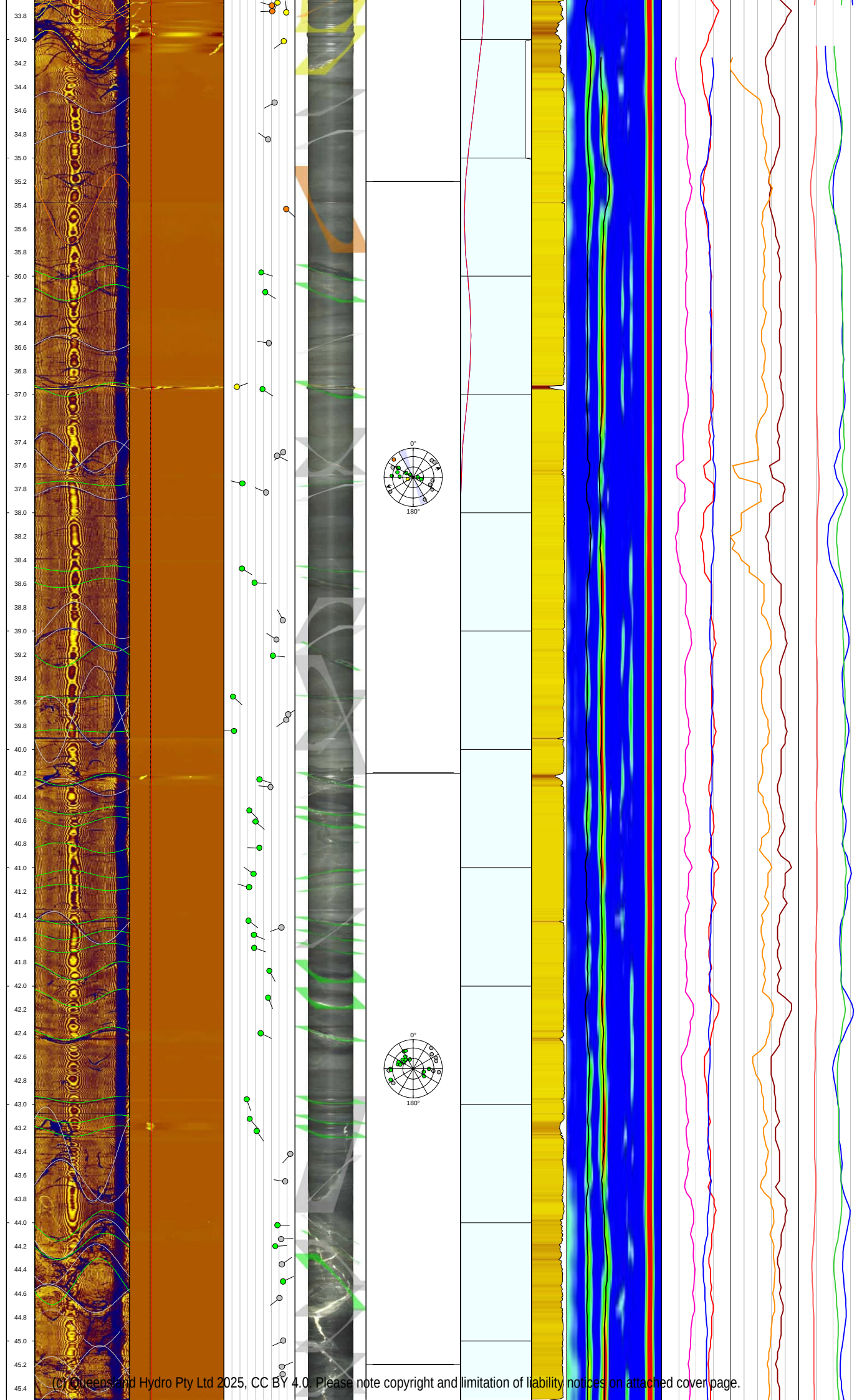
TELEVIEWER LOGS		STRUCTURAL LOGS		FEATURES & TADPOLES	
Amplitude	ATV Amplitude Image	DIPA	Apparent Dip Feature Picks (Sinusoid Presentation)	Open Fracture	Partially Open Fracture
TT-CENT	Centralised ATV Travel Time Image	DIPT	True Dip Feature Picks (Tadpole Presentation)	Closed Fracture	Foliation/Banding/Bedding
3D TV LOG	3D Televiewer Image	RD - STRIKE	Rose Diagram - Strike Open Fract. (Arrows represent Mean Vector)	Healed Fracture/Vein	
Caliper TT-CENT	Acoustic Travel Time Caliper	PP - DIP	Polar Projection - Dip (Schmidt) (Lower Hemisphere)		
OTV Picture	Optical Televiewer Image				
FULL WAVEFORM SONIC LOG & MECHANICAL PROPERTIES		STRUCTURAL ANALYSIS LOGS		COMMENTS	
STC-MP	Monopole Slowness-Time-Coherence Projection	RQD	Rock Quality Designation (Partial) Open Apparent Fracture Density	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 $\mu s/m$ units. Poisson's Ratio was calculated from DTC & DTS. Young's, Bulk & Shear Modulus were calculated from DTC, DTS & Density estimated as $\nu = 0.31.Vp \exp(1/4)$	
DTC	Compressional wave slowness	AFD	(Partial) Open True Fracture Density		
DTS	Shear wave slowness	TFD	Rock Hardness Index		
VP	Compressional wave velocity	RHI			
VS	Shear wave velocity	GEOPHYSICAL AND VERTICALITY LOGS			
VPVS	Compressional to Shear wave velocity ratio	Density	Density Log		
UCS	Uniaxial (Unconfined) Compressive Strength	GAMMA	Natural Gamma Ray		
Poisson's Ratio	Indicator of material elastic deformation	Tilt	Hole Inclination (0 = Vertical Down)		
Young's Modulus	Material length change by applied stress	Azimuth	Hole Azimuth		
Bulk Modulus	Change in material volume by applied stress	CALIPER	Mechanical Caliper		
Shear Modulus	Transverse material displacement by applied stress				

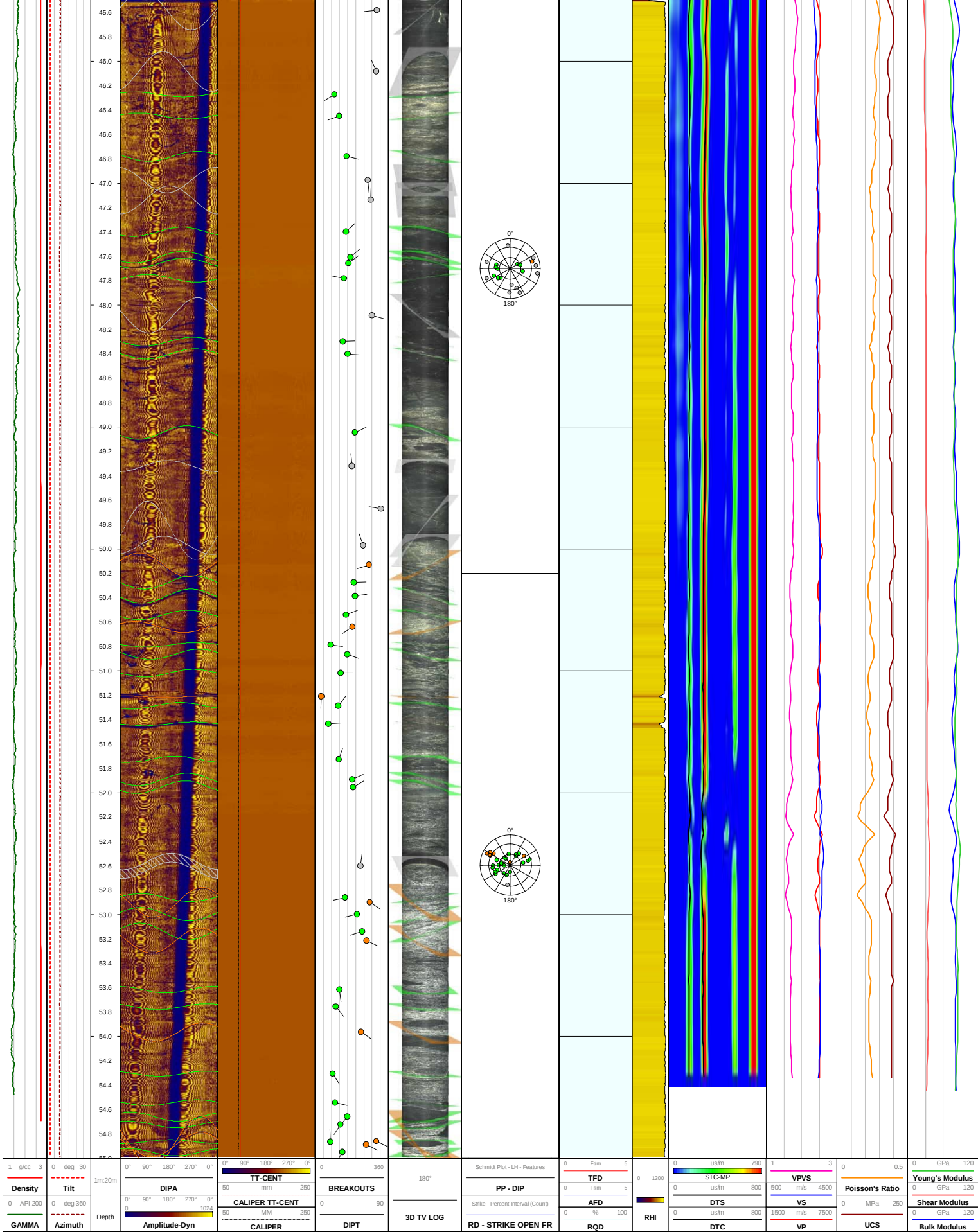
IMPORTANT NOTE

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.









BHUA_15 Televiewer Structures

Feature Depth	Depth	Azimuth	Dip	Aperture	Visible Azimuth Ranges	Type	Features
m	m	deg	deg	mm	deg		
15.34	15.34	128.18	34.72	0		4	Foliation/Banding/Bedding
15.56	15.56	196.04	23.26	0		4	Foliation/Banding/Bedding
15.61	15.61	139.54	75.25	0		5	Healed Fracture/Vein
16.28	16.28	49.82	28.32	44.07		1	Open Fracture
17.15	17.15	253.44	26.32	0		4	Foliation/Banding/Bedding
18.41	18.41	250.41	45.57	0		4	Foliation/Banding/Bedding
19.14	19.14	90.99	73.61	0		5	Healed Fracture/Vein
19.85	19.85	80.87	71.51	0		5	Healed Fracture/Vein
20.81	20.81	217.74	18.94	0		4	Foliation/Banding/Bedding
21.01	21.01	266.38	76	0		5	Healed Fracture/Vein
21.09	21.09	207.73	16.79	0		4	Foliation/Banding/Bedding
21.3	21.3	190.1	31.19	0		4	Foliation/Banding/Bedding
21.32	21.32	353.48	56.76	0		5	Healed Fracture/Vein
21.85	21.85	186.15	43.27	0		4	Foliation/Banding/Bedding
21.99	21.99	160.73	34.9	0		4	Foliation/Banding/Bedding
22.1	22.1	155.03	40.72	0		4	Foliation/Banding/Bedding
22.6	22.6	157	40.79	0		4	Foliation/Banding/Bedding
23.28	23.28	216.06	49.15	0		4	Foliation/Banding/Bedding
23.59	23.59	180.99	22.47	0		4	Foliation/Banding/Bedding
23.85	23.85	176.73	28.57	0		4	Foliation/Banding/Bedding
24.01	24.01	180.08	26.43	0		4	Foliation/Banding/Bedding
24.16	24.16	150.49	33.3	0		4	Foliation/Banding/Bedding
24.28	24.28	144.03	40.87	0		4	Foliation/Banding/Bedding
24.47	24.47	117.58	28.86	0		4	Foliation/Banding/Bedding
24.57	24.57	91.59	21.19	0		4	Foliation/Banding/Bedding
24.68	24.68	179.54	19.3	0		4	Foliation/Banding/Bedding
24.9	24.9	175.86	19.05	0		4	Foliation/Banding/Bedding
24.91	24.91	348.04	71.57	0		5	Healed Fracture/Vein
25.09	25.09	199.73	12.16	0		4	Foliation/Banding/Bedding
25.25	25.25	176.12	30.31	0		4	Foliation/Banding/Bedding
25.37	25.37	153.98	21.4	0		4	Foliation/Banding/Bedding
25.45	25.45	56.68	8.71	0		4	Foliation/Banding/Bedding
25.65	25.65	261.42	23.72	0		4	Foliation/Banding/Bedding
25.74	25.74	287.32	8.36	0		4	Foliation/Banding/Bedding
26.03	26.03	336.65	19.35	0		4	Foliation/Banding/Bedding
26.21	26.21	131.63	33.8	0		4	Foliation/Banding/Bedding
26.44	26.43	126.99	26.66	0	251.28-174.78	2	Partially Open Fracture
26.48	26.48	109.08	60.94	0		5	Healed Fracture/Vein
26.62	26.62	192.56	26.77	0		4	Foliation/Banding/Bedding
26.75	26.75	254.54	39.57	0		4	Foliation/Banding/Bedding
27.13	27.13	144.01	76.21	0		5	Healed Fracture/Vein
27.37	27.37	187.38	13.93	0		4	Foliation/Banding/Bedding
27.45	27.45	147.29	76.33	0		5	Healed Fracture/Vein
27.84	27.84	242.16	21.18	0		4	Foliation/Banding/Bedding
28.11	28.11	213.73	30.17	0		4	Foliation/Banding/Bedding
28.29	28.29	224.61	40.63	0		4	Foliation/Banding/Bedding
28.49	28.49	196.79	44.62	0		4	Foliation/Banding/Bedding
28.97	28.97	227.65	35.97	0		4	Foliation/Banding/Bedding
29.53	29.53	182.23	29.16	0		4	Foliation/Banding/Bedding
29.77	29.77	139.78	78.98	0		3	Closed Fracture
30.18	30.18	193.93	25.66	0		4	Foliation/Banding/Bedding
30.31	30.31	225.33	23.22	0		4	Foliation/Banding/Bedding
30.54	30.54	185.41	24.46	0		4	Foliation/Banding/Bedding
30.74	30.74	339.13	15.14	0		4	Foliation/Banding/Bedding
30.92	30.92	266.87	33.09	0		4	Foliation/Banding/Bedding

Feature Depth	Depth	Azimuth	Dip	Aperture	Visible Azimuth Ranges	Type	Features
m	m	deg	deg	mm	deg		
30.98	30.98	39.22	74.83	0		3	Closed Fracture
31.54	31.54	187.66	35.17	0		4	Foliation/Banding/Bedding
31.97	31.97	81.25	68.39	0		5	Healed Fracture/Vein
32.13	32.13	106.63	70.31	0		5	Healed Fracture/Vein
32.84	32.84	233.44	80.54	0		5	Healed Fracture/Vein
32.91	32.91	19.03	17.51	0		3	Closed Fracture
32.95	32.95	173.53	52.79	0		5	Healed Fracture/Vein
33.31	33.31	259.23	67.31	0		4	Foliation/Banding/Bedding
33.59	33.59	240.77	50.52	0		5	Healed Fracture/Vein
33.69	33.79	204.07	67.9	0	348.33-56.73	2	Partially Open Fracture
33.71	33.71	284.57	60.75	0		3	Closed Fracture
33.76	33.76	268.18	61.27	0		3	Closed Fracture
33.77	33.57	354.04	79.14	0	354.18-48.18	2	Partially Open Fracture
34.01	34.09	232.46	75.75	0	310.05-97.65	2	Partially Open Fracture
34.53	34.53	241.35	64.14	0		5	Healed Fracture/Vein
34.84	34.84	303.58	55.95	0		5	Healed Fracture/Vein
35.43	35.43	132.51	78.84	0		3	Closed Fracture
35.97	35.97	108.09	47.3	0		4	Foliation/Banding/Bedding
36.14	36.14	121.79	52.43	0		4	Foliation/Banding/Bedding
36.57	36.57	279.57	57.03	0		5	Healed Fracture/Vein
36.94	36.93	69.88	16.39	0	285.18-203.28	2	Partially Open Fracture
36.96	36.96	122.8	49.03	0		4	Foliation/Banding/Bedding
37.49	37.49	228.13	75.37	0		5	Healed Fracture/Vein
37.52	37.52	115.63	67.47	0		5	Healed Fracture/Vein
37.75	37.75	283.81	23.46	0		4	Foliation/Banding/Bedding
37.83	37.83	293.83	53.53	0		5	Healed Fracture/Vein
38.47	38.47	121.85	22.81	0		4	Foliation/Banding/Bedding
38.59	38.59	93.4	38.6	0		4	Foliation/Banding/Bedding
38.91	38.91	332.4	74.75	0		5	Healed Fracture/Vein
39.07	39.07	302.69	66.73	0		5	Healed Fracture/Vein
39.21	39.21	94.14	62.05	0		4	Foliation/Banding/Bedding
39.55	39.55	132.58	11.27	0		4	Foliation/Banding/Bedding
39.7	39.7	57.69	81.58	0		5	Healed Fracture/Vein
39.75	39.75	235.07	78.82	0		5	Healed Fracture/Vein
39.84	39.84	271.76	12.92	0		4	Foliation/Banding/Bedding
40.25	40.25	106.86	45.3	0		4	Foliation/Banding/Bedding
40.32	40.32	276.33	59.21	0		5	Healed Fracture/Vein
40.52	40.52	134.54	32.15	0		4	Foliation/Banding/Bedding
40.61	40.61	131.57	40.13	0		4	Foliation/Banding/Bedding
40.83	40.83	271.36	45.08	0		4	Foliation/Banding/Bedding
41.05	41.05	303.91	37.44	0		4	Foliation/Banding/Bedding
41.17	41.17	286.29	31.68	0		4	Foliation/Banding/Bedding
41.45	41.45	127.11	31.32	0		4	Foliation/Banding/Bedding
41.51	41.51	251.46	72.79	0		5	Healed Fracture/Vein
41.57	41.57	111.92	38.23	0		4	Foliation/Banding/Bedding
41.68	41.68	108.49	38.55	0		4	Foliation/Banding/Bedding
41.87	41.87	151.41	57.47	0		4	Foliation/Banding/Bedding
42.1	42.1	157.56	55.96	0		4	Foliation/Banding/Bedding
42.4	42.4	116.58	46.46	0		4	Foliation/Banding/Bedding
42.96	42.96	160.2	28.77	0		4	Foliation/Banding/Bedding
43.12	43.12	140.55	32.8	0		4	Foliation/Banding/Bedding
43.23	43.23	147.61	41.58	0		4	Foliation/Banding/Bedding
43.42	43.42	221.4	84.17	0		5	Healed Fracture/Vein
43.65	43.65	278.15	77.82	0		5	Healed Fracture/Vein
44.02	44.02	90.04	67.72	0		4	Foliation/Banding/Bedding
44.14	44.14	85.99	72.69	0		5	Healed Fracture/Vein

Feature Depth	Depth	Azimuth	Dip	Aperture	Visible Azimuth Ranges	Type	Features
m	m	deg	deg	mm	deg		
44.2	44.2	85.94	65.02	0		4	Foliation/Banding/Bedding
44.35	44.35	54.04	73.51	0		5	Healed Fracture/Vein
44.5	44.5	64.06	74.85	0		4	Foliation/Banding/Bedding
44.64	44.64	232.27	70.44	0		5	Healed Fracture/Vein
45	44.89	243.36	75.18	0	183.09-324.39	5	Healed Fracture/Vein
45.22	45.22	67.32	73.42	0		5	Healed Fracture/Vein
45.28	45.28	244.85	74.34	0		5	Healed Fracture/Vein
45.58	45.58	263.13	75.81	0		5	Healed Fracture/Vein
46.08	46.08	337.74	75.41	0		5	Healed Fracture/Vein
46.27	46.27	238.69	23.63	0		4	Foliation/Banding/Bedding
46.45	46.45	251.42	29.57	0		4	Foliation/Banding/Bedding
46.78	46.78	105.05	38.82	0		4	Foliation/Banding/Bedding
46.97	46.97	173.98	64.93	0		5	Healed Fracture/Vein
47.14	47.14	2.18	68.49	0		5	Healed Fracture/Vein
47.4	47.4	45.64	38.05	0		4	Foliation/Banding/Bedding
47.61	47.61	50.2	43.52	0		4	Foliation/Banding/Bedding
47.66	47.66	53.53	41.08	0		4	Foliation/Banding/Bedding
47.78	47.78	282.04	35.49	0		4	Foliation/Banding/Bedding
48.08	48.08	105.75	69.95	0		5	Healed Fracture/Vein
48.3	48.3	88.27	34.3	0		4	Foliation/Banding/Bedding
48.4	48.4	95.18	40.15	0		4	Foliation/Banding/Bedding
49.04	49.04	65.66	48.83	0		4	Foliation/Banding/Bedding
49.32	49.32	354.34	45.27	0		5	Healed Fracture/Vein
49.67	49.85	280.47	81.1	0	21.66-149.46	5	Healed Fracture/Vein
49.97	49.97	341.16	59.18	0		5	Healed Fracture/Vein
50.13	50.13	251.93	66.29	0		3	Closed Fracture
50.27	50.27	88.18	47.7	0		4	Foliation/Banding/Bedding
50.39	50.39	81.24	49.2	0		4	Foliation/Banding/Bedding
50.54	50.54	68.97	38.07	0		4	Foliation/Banding/Bedding
50.64	50.64	236.6	45.89	0		3	Closed Fracture
50.79	50.79	98.58	19.27	0		4	Foliation/Banding/Bedding
50.86	50.86	111.68	39.64	0		4	Foliation/Banding/Bedding
51.02	51.02	88.87	31.6	0		4	Foliation/Banding/Bedding
51.21	51.21	180.6	7.6	0		3	Closed Fracture
51.29	51.29	37.76	28.38	0		4	Foliation/Banding/Bedding
51.43	51.43	85.99	16.07	0		4	Foliation/Banding/Bedding
51.73	51.73	18.55	29.08	0		4	Foliation/Banding/Bedding
51.89	51.89	64.92	45.46	0		4	Foliation/Banding/Bedding
51.95	51.95	58.6	46.73	0		4	Foliation/Banding/Bedding
52.6	52.6	8.18	55.74	40.87		5	Healed Fracture/Vein
52.86	52.86	258.83	36.91	0		4	Foliation/Banding/Bedding
52.9	52.9	122.91	67.11	0		3	Closed Fracture
53	53	256.37	51.67	0		4	Foliation/Banding/Bedding
53.14	53.14	253.09	57.89	0		4	Foliation/Banding/Bedding
53.21	53.21	115.85	63.36	0		3	Closed Fracture
53.61	53.61	172.73	30.14	0		4	Foliation/Banding/Bedding
53.75	53.75	142.08	25.53	0		4	Foliation/Banding/Bedding
53.96	53.96	125.14	56.33	0		3	Closed Fracture
54.3	54.3	146.42	21.74	0		4	Foliation/Banding/Bedding
54.54	54.54	102.59	24.58	0		4	Foliation/Banding/Bedding
54.66	54.66	217.74	39.68	0		4	Foliation/Banding/Bedding
54.72	54.72	212.09	31.09	0		4	Foliation/Banding/Bedding
54.86	54.86	116.82	75.27	0		3	Closed Fracture
54.86	54.86	358.26	18.79	0		4	Foliation/Banding/Bedding
54.89	54.89	116.92	63.08	0		3	Closed Fracture
54.95	54.95	208.46	33.48	0		4	Foliation/Banding/Bedding

BHUA_15

SMEC - Pioneer-Burdekin

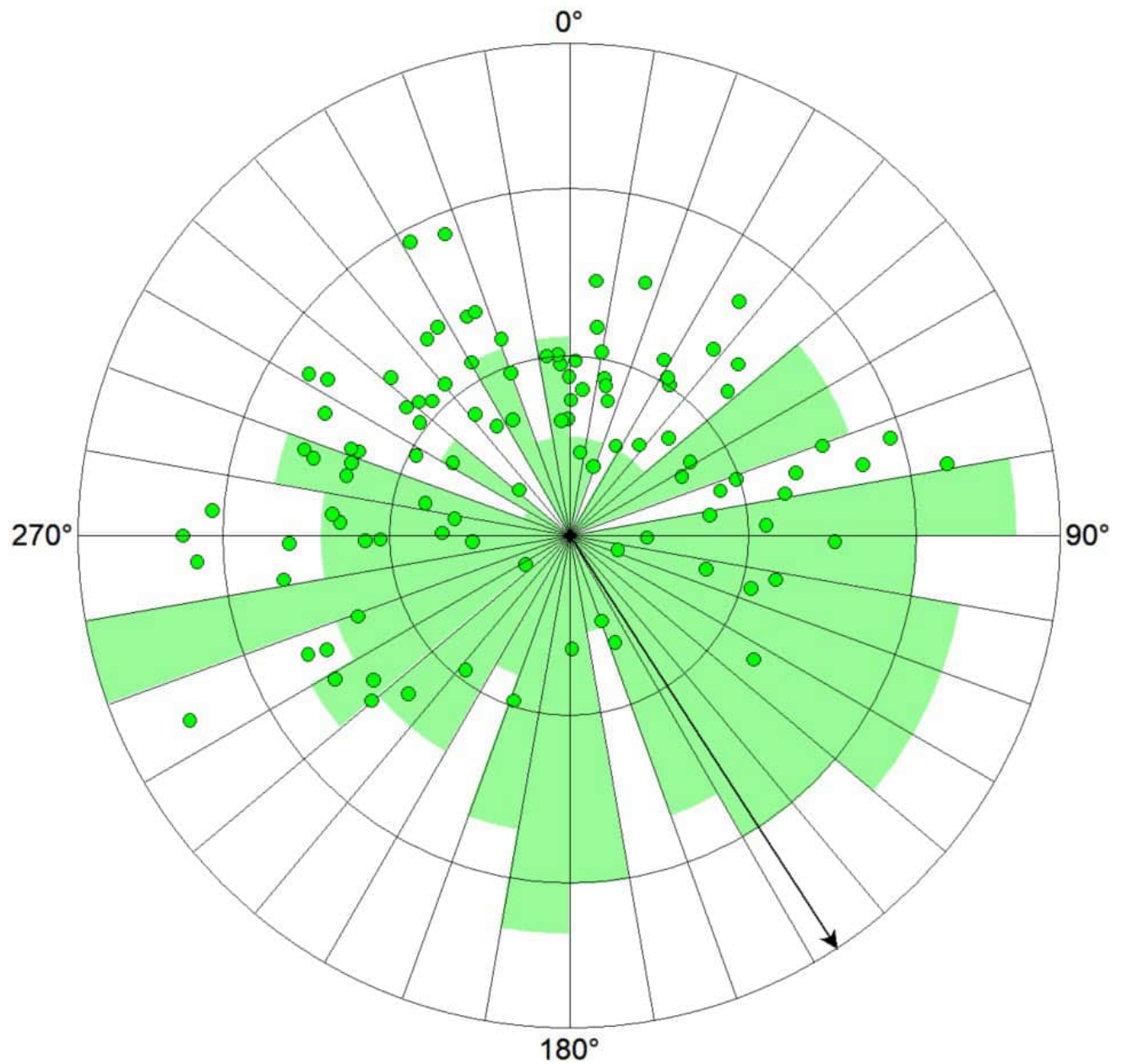
**Acoustic and Optical Televiewer image log Schmidt
Stereonet evaluation for interpreted log interval**

Log Date: 5 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.

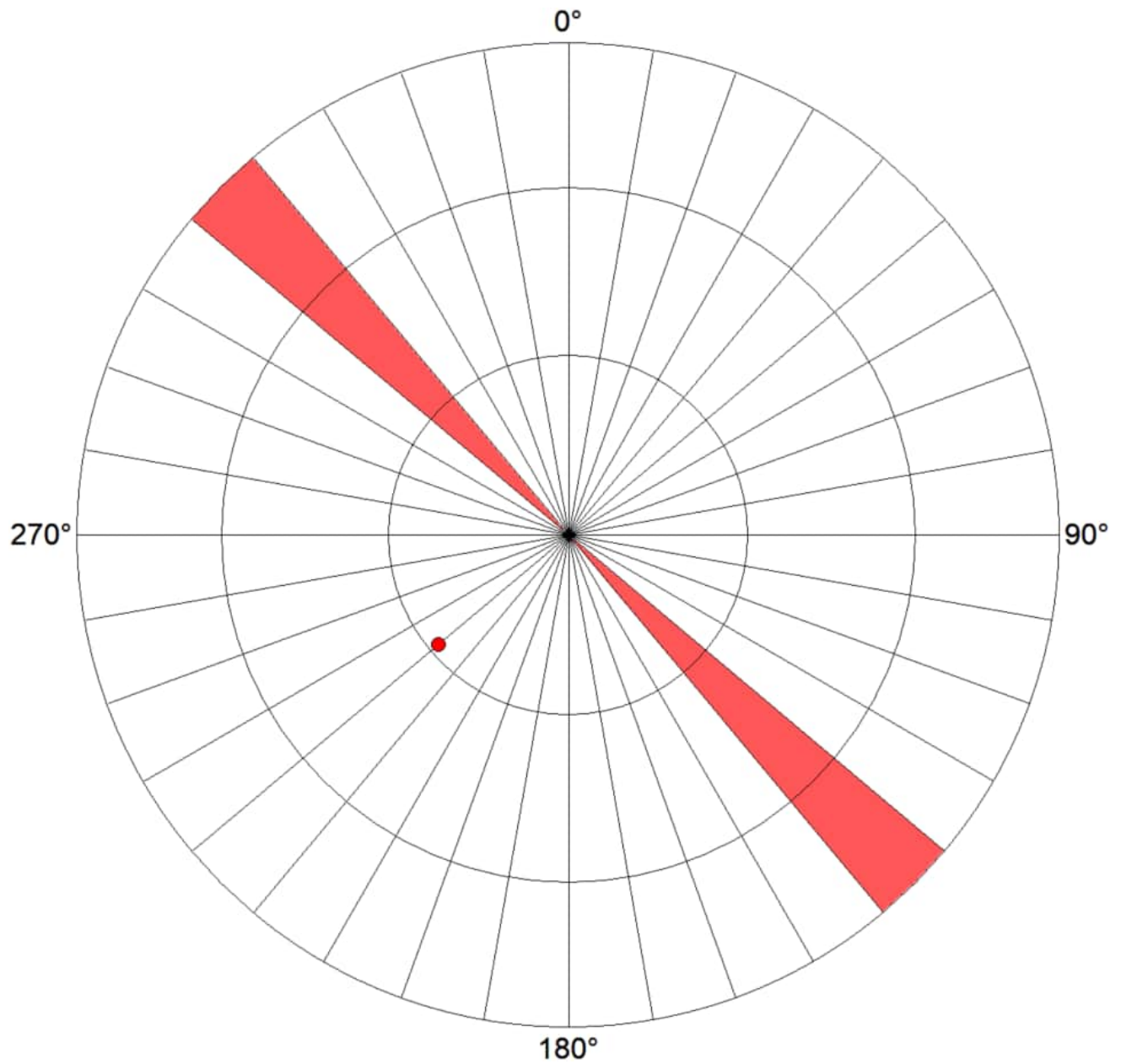
FOLIATIONS – 15.1 TO 54.9 M



	Counts	Dip [deg]	Azimuth [deg]	Strike [deg]
Mean	104	16.68	151.66	61.66 - 241.66

Foliations: Scattered dip azimuth directions with a broad preference in the E to WSW dip azimuth directions

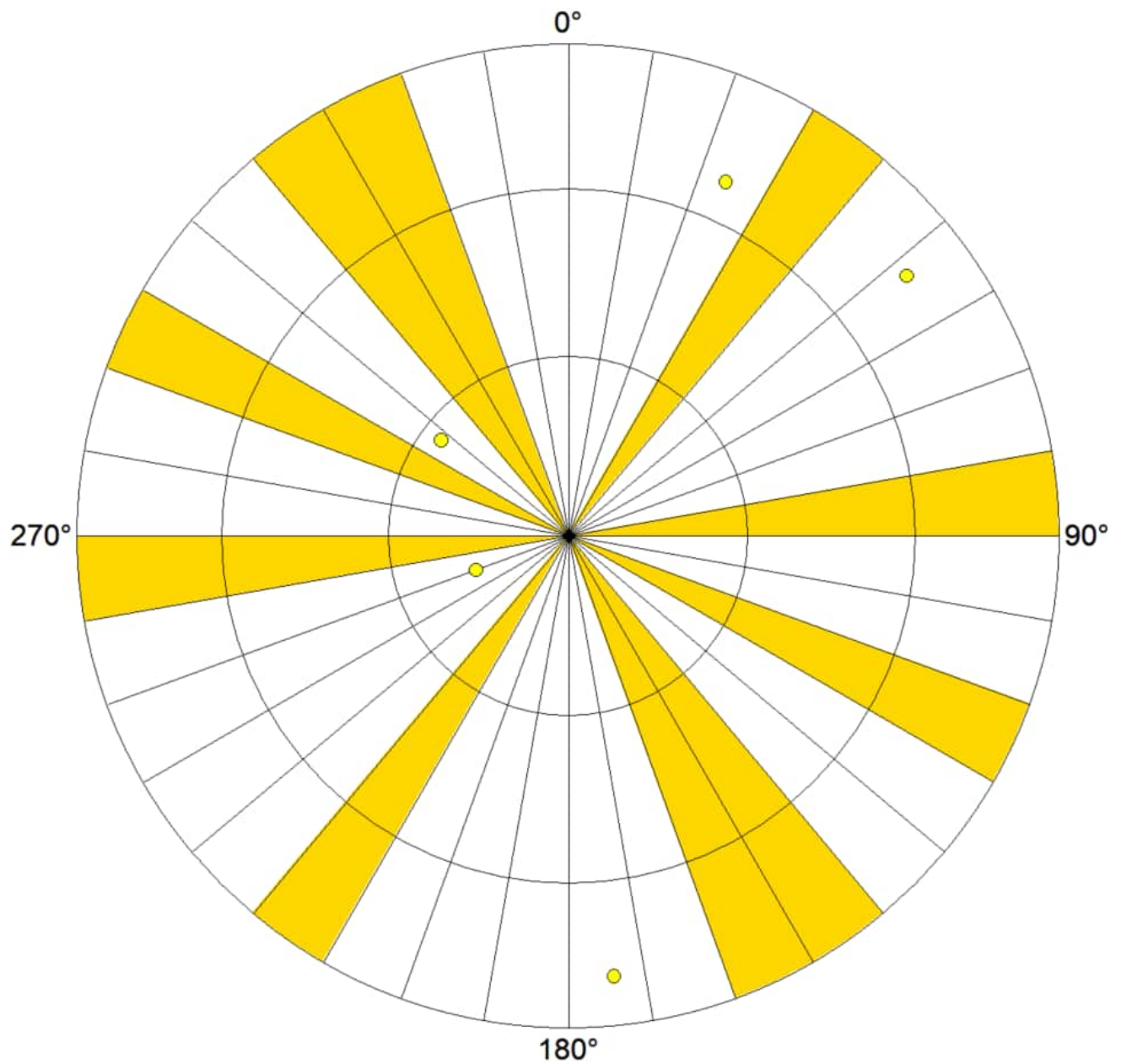
OPEN FRACTURES – 15.1 TO 54.9 M



	Counts	Dip [deg]	Azimuth [deg]	Strike [deg]
Mean	1	28.32	49.82	139.82 - 319.82

Open Fractures: SE to NW strike direction (caution: just one pick)

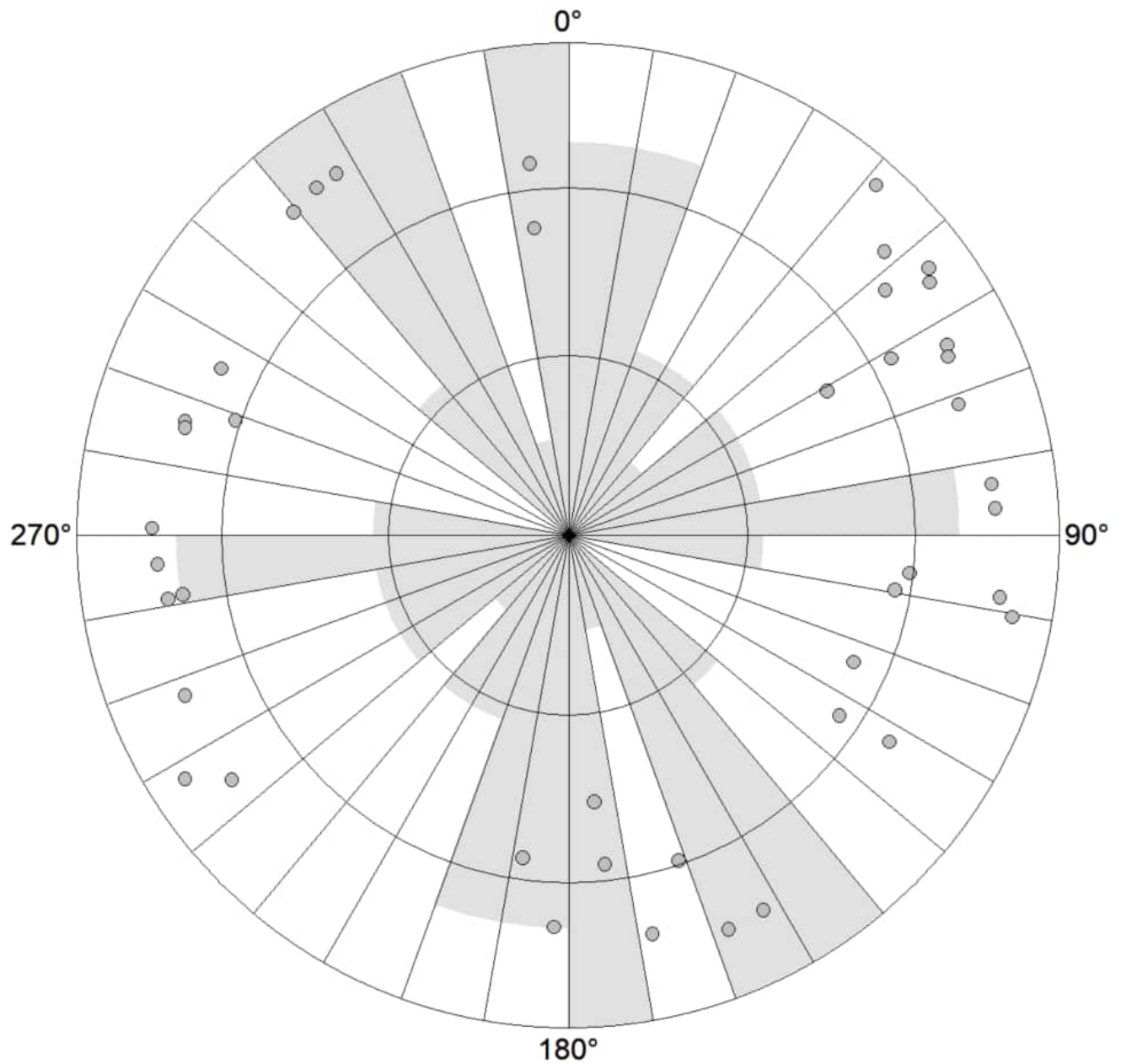
PARTIAL OPEN FRACTURES – 15.1 TO 54.9 M



	Counts	Dip [deg]	Azimuth [deg]	Strike [deg]
Mean	5	59.21	196.19	106.19 - 286.19

Partial Open Fractures: Scattered strike directions

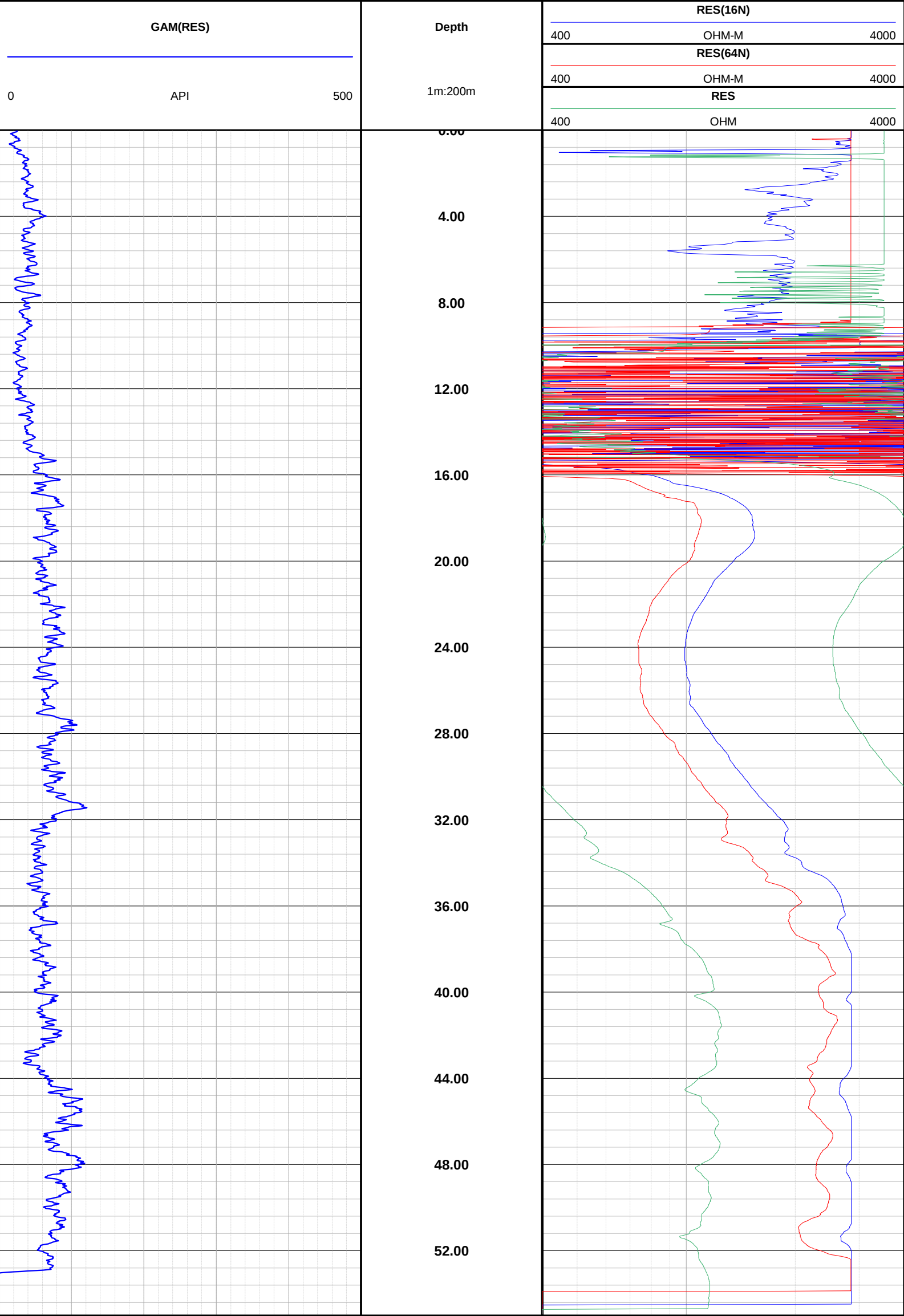
HEALED FRACTURES AND VEINS – 15.1 TO 54.9 M



	Counts	Dip [deg]	Azimuth [deg]	Strike [deg]
Mean	43	83.67	267.63	177.63 - 357.63

Healed Fractures and Veins: Scattered strike directions

				MULTI-RES LOG BHUA_15							
COMPANY WELL		SMEC BHUA_15		FIELD LOCATION		PIONEER-BURDEKIN EUNGELLA		STATE COUNTRY		QLD AUSTRALIA	
LOCATION: EUNGELLA FIELD: PIONEER-BURDEKIN STATE: QLD WELL: BHUA_15 COMPANY: SMEC		LOG MEASURED FROM		GL		ELEVATIONS:		OTHER SERVICES:			
		DRILLING MEASURED FROM		GL		KB		1.			
		PERMANENT DATUM				DF		2.			
		PERMANENT DATUM ELEVATION				GL		3.			
		LICENSE		SECTION		TOWNSHIP		RANGE		MAGNETIC DECLINATION	
								8.12deg			
DATE	04-08-2023			RECORDED BY	DTH						
TIME	15-40			WITNESSED BY							
RUN NUMBER	1			LOGGING UNIT	V013						
DEPTH-DRILLER	55m			RIG NUMBER							
DEPTH-LOGGER	54.99m			TOOL TYPE	9057A						
BIT SIZE	96mm			TOOL SERIAL NO.	361						
CASING TYPE	STEEL			EASTING	658394						
CASING ID	100mm			NORTHING	7666155						
CASING BOTTOM	15m			SAMPLE INT.	.01m						
FLUID TYPE	WATER			LOG DIRECTION	U						
TRUCK CAL NO.	0.09787			FEET OR METER	M						
WATER LEVEL	10			SOURCE TYPE		SOURCE ID					
LOGGER COMMENTS: 1. 2. 3.											
MNEMONICS											
GAM(RES) NATURAL GAMMA FROM MULTI-RES TOOL RES(16N) 16" NORMAL RESISTIVITY RES(64N) 64" NORMAL RESISTIVITY RES SINGLE POINT RESISTIVITY											
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.									



0	API	500	1m:200m	RES	400	OHM-M	4000
				RES(64N)			
GAM(RES)				Depth	400	OHM-M	4000
					RES(16N)		

DEPTH SCALE 1:200

				VERTICALITY ANALYSIS BHUA_15							
COMPANY WELL		SMEC BHUA_15		FIELD LOCATION		PIONEER-BURDEKIN EUNGELLA		STATE COUNTRY		QLD AUSTRALIA	
LOCATION: EUNGELLA FIELD: PIONEER-BURDEKIN STATE: QLD WELL: BHUA_15 COMPANY: SMEC		PERMANENT DATUM GL PERMANENT DATUM ELEVATION LOG MEASURED FROM GL DRILLING MEASURED FROM GL				ELEVATIONS: KB DF GL		REMARKS: 1.			
		LICENSE D	SECTION	TOWNSHIP	RANGE	MAG DECL. 8.12deg					
		DATE	04-08-2023				RECORDED BY	DTH			
TIME	16-09				WITNESSED BY						
RUN NUMBER	1				LOGGING UNIT	V013					
DEPTH-DRILLER	55m				RIG NUMBER						
DEPTH-LOGGER	54.99m				TOOL TYPE	9057A					
BIT SIZE	96mm				TOOL SERIAL NO.	361					
CASING TYPE	STEEL				EASTING	658394					
CASING OD	101.4mm				NORTHING	7666155					
CASING BOTTOM	15m				SAMPLE INT.	.01m					
FLUID TYPE	WATER				LOG DIRECTION	U					
TRUCK CAL NO.	0.09787				FEET OR METER	M					
WATER LEVEL	10m				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	SANG	SANGB	EAST	NORTH	TVD	CDIST	CANGB
m	deg	deg	m	m	m	m	deg
0.00	2.65788	260.537	-999.25	-999.25	0	-999.25	-999.25
1.00	2.56411	298.664	-0.00805822	0.0071398	0.998991	0.0107662	311.542
2.00	2.58845	330.77	-0.0362439	0.0413802	1.99798	0.0550086	318.786
3.00	2.57078	331.757	-0.0594393	0.0798651	2.99697	0.0995563	323.342
4.00	2.57349	350.893	-0.0748853	0.121548	3.99595	0.142764	328.363
5.00	2.50567	337.613	-0.0876938	0.163856	4.99497	0.185846	331.845
6.00	2.48212	343.643	-0.103324	0.204115	5.99404	0.228777	333.151
7.00	2.35525	324.557	-0.124216	0.240031	6.99316	0.270268	332.638
8.00	2.30327	330.445	-0.14788	0.272588	7.99233	0.310117	331.52
9.00	2.23201	337.514	-0.166621	0.307482	8.99154	0.349725	331.547
10.00	2.15067	338.408	-0.180593	0.343043	9.99081	0.387675	332.236
11.00	2.10174	337.765	-0.193344	0.377849	10.9901	0.424443	332.901
12.00	2.04151	338.719	-0.207013	0.411265	11.9895	0.460427	333.281
13.00	2.06849	355.899	-0.211892	0.446898	12.9888	0.494587	334.633
14.00	2.03422	358.841	-0.213639	0.482563	13.9882	0.527739	336.12
15.00	2.05901	323.787	-0.223032	0.516253	14.9875	0.56237	336.635
16.00	2.30527	85.137	-0.242168	0.540334	15.9868	0.59212	335.859
17.00	2.158	99.3853	-0.204644	0.532938	16.986	0.570878	338.994
18.00	2.025	99.765	-0.202002	0.532938	17.9853	0.550008	342.47

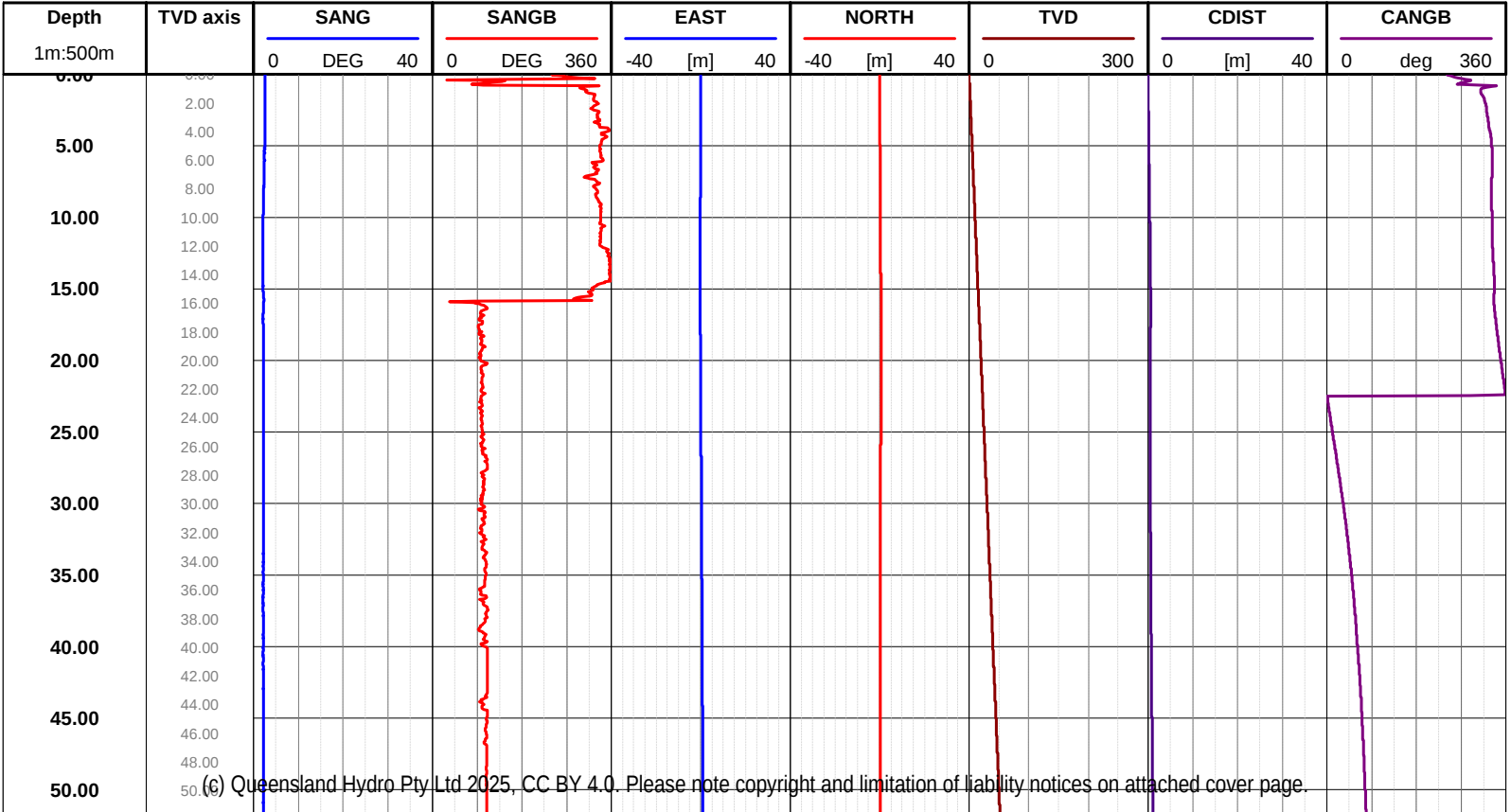
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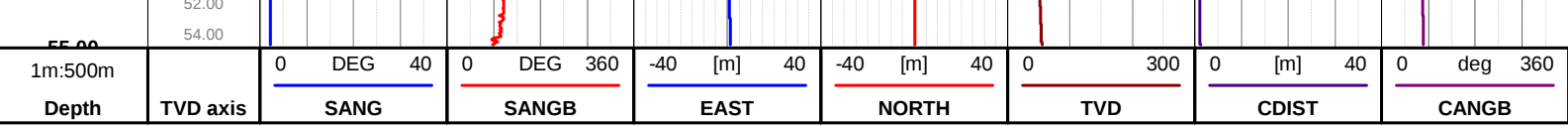
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19.00	2.1645	106.988	-0.129689	0.523525	18.9846	0.539349	346.087
20.00	2.17913	98.3185	-0.0920876	0.518206	19.9839	0.526324	349.923
21.00	2.17669	102.397	-0.0547906	0.510865	20.9831	0.513794	353.878
22.00	2.19682	97.4846	-0.0173795	0.504071	21.9824	0.504371	358.025
23.00	2.18795	98.3064	0.02038	0.498098	22.9817	0.498515	2.34299
24.00	2.19251	97.7844	0.0581558	0.492447	23.9809	0.495869	6.73518
25.00	2.20283	100.811	0.0959562	0.486159	24.9802	0.495539	11.1653
26.00	2.20479	97.9109	0.13374	0.479358	25.9795	0.497665	15.589
27.00	2.21678	109.959	0.171031	0.470046	26.9787	0.500195	19.9944
28.00	2.22494	103.625	0.207894	0.458662	27.978	0.503578	24.383
29.00	2.23454	103.205	0.245839	0.450023	28.9772	0.512794	28.647
30.00	2.22799	97.2946	0.284029	0.443024	29.9765	0.526253	32.6645
31.00	2.24816	106.736	0.322084	0.434982	30.9757	0.541247	36.5182
32.00	2.26466	98.4414	0.360636	0.427816	31.9749	0.55954	40.1299
33.00	2.16149	100.515	0.398356	0.420052	32.9742	0.578905	43.4815
34.00	2.16585	107.289	0.434872	0.41078	33.9735	0.598209	46.6319
35.00	2.16178	107.45	0.470904	0.399652	34.9728	0.617634	49.679
36.00	2.16477	95.1092	0.507365	0.390314	35.9721	0.640128	52.429
37.00	2.16109	102.747	0.544244	0.383163	36.9713	0.665594	54.8534
38.00	2.16483	111.029	0.579917	0.371098	37.9706	0.688489	57.3842
39.00	2.16479	102.616	0.616952	0.364333	38.9699	0.716497	59.4366
40.00	2.15883	106.298	0.6535	0.355142	39.9692	0.743766	61.4783
41.00	2.16449	110.816	0.688759	0.341802	40.9685	0.768907	63.6067
42.00	2.15725	110.872	0.724028	0.328403	41.9678	0.795025	65.602
43.00	2.15373	110.122	0.759349	0.315066	42.9671	0.822118	67.4657
44.00	2.17205	102.369	0.79564	0.305009	43.9664	0.8521	69.0256
45.00	2.16629	109.27	0.83184	0.294385	44.9656	0.882394	70.5113
46.00	2.1767	107.965	0.867837	0.282587	45.9649	0.912687	71.9636
47.00	2.18118	109.849	0.904026	0.270988	46.9642	0.943768	73.3135
48.00	2.17273	109.859	0.939897	0.258332	47.9635	0.974752	74.6317
49.00	2.18376	108.565	0.975857	0.245964	48.9627	1.00638	75.8533
50.00	2.1629	109.6	1.01193	0.233711	49.962	1.03857	76.9952
51.00	2.16422	108.869	1.0476	0.221272	50.9613	1.07072	78.0735
52.00	2.16129	109.159	1.08341	0.208985	51.9606	1.10338	79.082
53.00	2.20207	109.264	1.11965	0.197003	52.9599	1.13685	80.0209
54.00	2.20718	102.723	1.15689	0.187546	53.9591	1.172	80.7918

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.

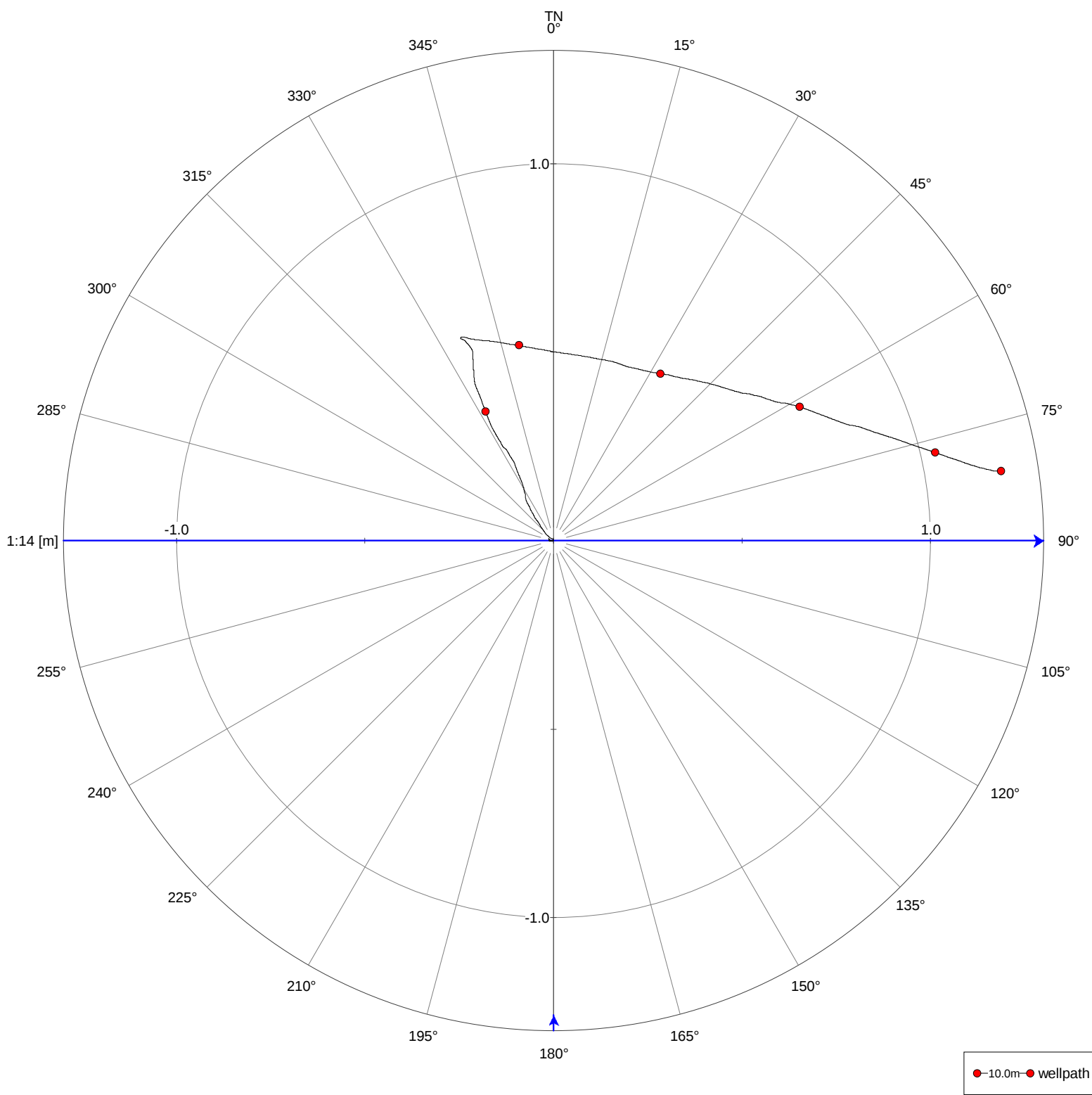




NOTES ON VERTICALITY PLOTS

- 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



Depth [m] 1:251
Horiz [m] 1:15

wellpath 

