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ENGINEERING BOREHOLE LOG

___BH046___ BOREHOLE No SHEET _1_ of _3_ REFERENCE No ____H10616___

FOR GEOTECHNICAL TERMS AND SYMBOLS REFER FORM F:GEOT 017/5-2009

PROJECT	BRUCE HIGHWAY (COOROY - CURRA) SECTION A GEOTECHNICAL INVESTIGATION		,
LOCATION	Cut 14	COORDINATES	484162.6 E; 7081327.0 N

JOB No

PROJECT No FG5825 _____ SURFACE R.L. 149.76m PLUNGE _____ DATE STARTED 17/8/09 GRID DATUM MGA94 _____

128/10A/901 HEIGHT DATUM AHD BEARING DATE COMPLETED 17/8/09

DRILLER R & D Drilling

AN

R.L. (m)	G BORING DRILLING	RQD ()%		MATERIAL	75	SING	INTACT STRENGTH	DEFECT SPACING (mm)	DOG	ADDITIONAL DATA	
149.76	山三工山	CORE REC %	SAMPLE	DESCRIPTION	LITHOLOGY	USC	STRENGTH	200 200 2000 2000	GRAPHIC LOG	AND TEST RESULTS	SAMPI ES
149.76		REC 76	0,	Gravelly SILT (COLLUVIUM?) Brown to mottled red, moist, firm.					0		
			A	Intermediate plasticity; relic rock fragments throughout.		(MI)				3,3,4 N=7	and the second second
148.41							-		_		
			в	PHYLLITE (XW/HW) Generally exhibits the engineering properties of light brown to grey, moist, very stiff to hard, clayey silt.		xw-		-		11,10,15 N=25	
				Rock fabric visible throughout.		HW	-				
146.76			с							14,18,23 N=41	and solars
140.70		(90)		PHYLLITE (MW) Pale greyish brown, fine grained, foliated.				E_		Clayey zone	
				Foliation dips at ~40°.						Is(50) = 0.53MPa]− Clay seam	
				Defects are generally medium spaced. Defect sets are dipping at 10°, parallel to foliation and sub-vertically. Defect surfaces						ls(50) = 0.23MPa ls(50) = 0.11MPa	
		100		are typically clay infilled.]– Clayey zone	
		(71)		Prominent clayey zones throughout.						ls(50) = 0.80MPa	
										MC = 5.6%; UCS=4.37MPa	
						мw		Ţ		ls(50) = 0.67MPa	
		100 (46)		Detailed defect descriptions are shown on Form GEOT533/8 attached.							
		100							1111]− Broken clayey zone Is(50) = 0.04MPa	
		(39)								ls(50) = 0.50MPa	
141.26		100		PHYLLITE (MW/SW) Pale grey with distinctive dark grey mottling, fine grained, foliated.						☐– Brecciated clayey zone Is(50) = 0.68MPa	
		(26)		Foliation is indistinct. See over for defect descriptions.		MW- SW					
								T		ls(50) = 3.13MPa	

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ENGINEERING BOREHOLE LOG

BOREHOLE No	BH046
SHEET	<u>2</u> of <u>3</u>
REFERENCE No	<u>H10616</u>

FOR GEOTECHNICAL TERMS AND SYMBOLS REFER FORM F:GEOT 017/5-2009

PROJECT	<u>BRU</u>	<u>CE HIG</u>	HW	AY (COOROY - CURRA) SECTION A GEOT	ECH	NIC	AL IN	VESTI	GATION			
	<u>Cut</u>										ORDINATES 484162.6 E; 7081327.	<u>0 N</u>
				SURFACE R.L. <u>149.76m</u> PLUNGE								
JOB No	_128/	<u>10A/901</u>		HEIGHT DATUM <u>AHD</u> BEARING		<u> </u>	DA	TE COM	IPLETED	17/8/	09 DRILLER R&DDrilling	L
R.L. (m)	o	RQD ()%		0		Π	CT	NTACT RENGTH	DEFECT SPACING		ADDITIONAL DATA	
l l l l l l l l l l l l l l l l l l l	BORING	() 70		MATERIAL	5	HERING	511	KENGIH	(mm)	GRAPHIC LOG	AND	
DEPTH (m)	ж <u>о</u> шп		SAMPLE	DESCRIPTION	ГІТНОГОСУ				008	DIHd	- Macanopusrument	SAMPLES
법 10 139.76	CASS CASS CORSCASS CO	CORE REC %	SAN			USC	·王王:	⊑≥⊐⋜⋳	2000 2000 11111	GRA	TEST RESULTS	SAMPLE TESTS
				PHYLLITE (MW/SW) (Cont'd)							ls(50) = 0.78MPa	x
		100			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~							
-		(32)		Defects are generally medium to widely spaced.							MC = 3.4%; UCS=3.54MPa	UCS
				Defect sets dip at 10 and 45° with occasional sub-vertical sets. Defect	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~							
				surfaces are typically thinly clay infilled and iron stained.								
-				iron stained.	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~						ls(50) = 0.33MPa	x
Ē					×							
- 12		100								ITE		
E		(35)		12.0-12.8m: Zone with prominent clay seams (sheared zone?)	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~					11		
-											- Sheared zone?	
					~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~					12		
-13					$\mathbb{M}$						ls(50) = 2.78MPa	x
	100				5						ls(50) = 0.97MPa	x
-		100										
		(78)			×						ls(50) = 2.10MPa	x
-14			510H	Detailed defect descriptions are shown on	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~							
				Form GEOT533/8 attached.							ls(50) = 3.12MPa	x
-					~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~							
-					$\mathbb{M}$						ls(50) = 1.44MPa	X
15		 (78)			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	MW- SW						
-		(,			$\sim$						ls(50) = 1.79MPa	x
					$\sim$							
					××							
- 16											ls(50) = 1.00MPa	
					~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~						15(00) - 1.0000 a	x
					\sim						MC = 1.6%; UCS=11.7MPa	UCS
					~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~							
-17					$\sim$							
					~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~							
-					~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~							
		100			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~						ls(50) = 1.44MPa	
- 18		(89)			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~						15(50) - 1.441VIFa	
					\sim			23.206			L- (50) - 0.00MB-	
Ē					~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~						ls(50) = 0.86MPa	X
-					\sim							
- 19					\sim							
					¥						ls(50) = 0.62MPa	x
E					~							
20					\$\$ \$ \$						MC = 2.6%; UCS=4.98MPa	UCS
REMARKS	<u>Detai</u>	led defec	t des	scriptions are shown on Form GEOT533/8 attach	ed. F	lezo	mete	installed	d at base.		LOGGED BY AN	



PROJECT

ENGINEERING BOREHOLE LOG

BOREHOLE No	BH046
SHEET	<u>3</u> of <u>3</u>
REFERENCE No	<u>H10616</u>

FOR GEOTECHNICAL TERMS AND SYMBOLS REFER FORM F:GEOT 017/5-2009

BRUCE HIGHWAY (COOROY - CURRA) SECTION A GEOTECHNICAL INVESTIGATION

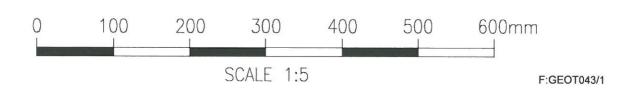
OCATION	<u>Cut 1</u>									ORDINATES <u>484162.6 E; 7081327.0</u>	
ROJECT No DB No				SURFACE R.L. <u>149.76m</u> PLUNGE HEIGHT DATUM <u>AHD</u> BEARING				MPLETED			
(m) (m) (m) (m) (m) (m) (m) (m) (m) (m)	AUGER CASING WASH BORING CORE DRILLING		SAMPLE	MATERIAL DESCRIPTION	К ПТНОГОСУ	USC WEATHERING	INTACT STRENGTH	DEFECT SPACING (mm)	GRAPHIC LOG	ADDITIONAL DATA AND TEST RESULTS	SAMPLES
21	11	100		PHYLLITE (MW/SW) (Cont'd)						ls(50) = 3.51MPa	x
		(87)		Detailed defect descriptions are shown on Form GEOT533/8 attached.						ls(50) = 1.97MPa	x
22 23 24 25 124.16						MW- SW				ls(50) = 0.50MPa	×
3				23.2-25.1m: Possible sheared zone with heavily disturbed foliations, microfractures and occasional brecciation.						ls(50) = 0.78MPa	×
4		 (95)								ls(50) = 1.56MPa _ Possible sheared zone, numerous closed defects)
5										Is(50) = 0.56MPa)
124.16		100			***					ls(50) = 1.35MPa ls(50) = 3.21MPa	×
6 7 8				Borehole terminated at 25.6m							
60								‡ +			
REMARK	s <u>Deta</u> i	led defe	<u>ct de</u>	scriptions are shown on Form GEOT533/8 attach	ned.	Piezo	meter installe	ed at base.		LOGGED BY AN	

Project: Bruce Highway Upgrade (Cooroy – Curra) Section A

Borehole No:	
Start Depth:	
Finish Depth:	
Project No:	
H No:	

BH46 3.00m 25.60m FG5825 10616



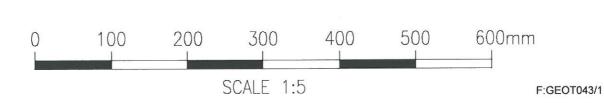


Project: Bruce Highway Upgrade (Cooroy – Curra) Section A

Borehole No:	
Start Depth:	
Finish Depth:	
Project No:	
H No:	

BH46 3.00m 25.60m FG5825





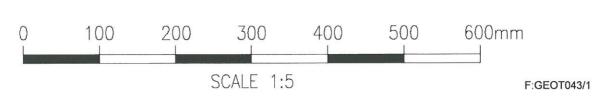
Bruce Highway Upgrade (Cooroy - Curra) Section A

Borehole No: BH46 Start Depth: Finish Depth: Project No: H No:

Project:

3.00m 25.60m FG5825 10616





DEFECT DESCRIPTIONS OF ENGINEERING BORELOGS

[CHARACTERISATION OF DEFECTS ARE IN ACCORDANCE WITH ISRM SUGGESTED METHODS (1981)]

BOREHOLE NO .:	BH46
SHEET:	1 of 3
REFERENCE NO .:	H10616

PROJECT: Bruce Highway (Cooroy – Curra) Section A Geotechnical Investigation										
LOCATION:	Cut 14									
PROJECT NO .:	FG5825	SURFACE R.L.:	149.75	DRILLER:	R & D Drilling					
JOB NO.:	128/10A/901	DATUM:	MGA94	DATE DRILLED:	17/08/09					

DEPTH	DEFECT TYPE	DIP°	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
3.04-3.20	WS						
3.24	Clay Seam	15°	PL	S	С		
3.26-3.29	WS						
3.30	Qtz Vn	25°	PL		С		
3.42-3.49	Qtz Vn						
3.50	Clay Seam	10°	PL		С		
3.54	Qtz Vn	0°	PL		С		
3.64	Crushed Seam	10°	PL		С		
3.67	Qtz Vn	15°	PL		С		
3.89-3.91	Crushed Seam	30-40°	UN		С		
3.97	Qtz Vn	25°	PL		С	W	3mm wide
4.01	Qtz Vn	20°	PL		0		
4.22	J	40°	UN	R	0	FeSt, W	
4.22-4.33	WS						
4.33	J	30°	UN	R	0	FeSt, W	
4.72	WS	75°	UN	SR	С		
4.75	J	45°	IR	R	С		
5.31	J rehealed	55°	UN		С	FeSt	

Abbreviations (as per F: GEOT 017/5 - 2009) ROUGHNESS WALL ALTERATIONS TYPE OTHER Clay Infill R Rough FeSt Iron Stained J, Js Joint, Joints CI **Slightly Rough** Bedding W Weathered В CLy Clayey Sr Smooth ΒP Co Coal Seam S Smn Secondary Mineralisation **Bedding Parting** SL Slickensided Cn Clean FP Foliation Parting Carb Carbonaceous Manganese Stained LP Sand Infill PO Polished MnSt Lamination Parting SI APERTURE PLANARITY CLV QZ Quartz Cleavage С Closed CA Calcite PL Planar Fr Fracture St Stepped 0 Open SZ Sheared Zone Chl Chlorite UN Undulating F Filled CZ Crushed Zone In Incipient T ΒZ Broken Zone Int Intersecting CU Curved Tight HFZ Highly Fractured Zone Lam (s) Lamination (s) IR Irregular Weathered Seam Di Drilling Induced WS Н Horizontal Vn Vein ٧ Vertical

NOTE: This sheet should be read in conjunction with appropriate Engineering Borelog. Defect angles were measured with respect to horizontal plane.

						BOREHOLE NO .:	BH46
						SHEET:	2 of 3
						REFERENCE NO .:	H10616
DEPTH	DEFECT TYPE	DIP°	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
5.36	J	55°	PL	SR	С	FeSt	7mm wide
5.44	J	15°	PL	S	С	FeSt	Cl 1mm
5.46	J	20°	PL	S	С	FeSt	CI 3mm
5.50	J	15°	PL	SR	С	FeSt	
5.57	J	25°	St	R	С	FeSt	
5.90	J	90°	UN	SR	С	FeSt, MnSt	
6.05	J	20°	PL	SR	С		010
6.11	Qtz Vn	30°	PL	<u> </u>	С	FeSt	Cl 3mm
6.21	J .	35°	PL	S	C C	Cn	150 mm wide
6.25	Qtz Vn J	30° 70°	PL PL	SR	c	Cn	Cl 3mm
6.40	Qtz Vn	25°	PL	51	c		10 mm wide
6.61-6.65	Qtz Vn, WS	25°	UN		c		
6.79	J	15°	PL		C		
6.79-6.97	WS						
7.03	J	10°	UN	R	С	FeSt	
7.17	J	15°	UN	SR	С	Cn	
7.23	Qtz Vn	20°	PL		С		4mm wide
7.28	Qtz Vn	20°	PL		С		7mm wide
7.33	Qtz Vn	25°	PL		С		
7.37	J	70°	UN	S	С	FeSt, MnSt	
7.40	J	35°	PL	S	С	FeSt	
7.56	J	30°	PL	S	С		CI 2mm
7.74	J	30°	UN		С	FeSt	21
7.81-7.85	CZ	150	PL		С	Cn	Clayey matrix
7.97	J	45°	PL PL		C C	Cn	Clayey matrix
8.05-8.07	CZ WS	50°	PL PL		c		Clayey main
8.50	Qtz Vn	15°	PL		c		
8.61	J	10°	PL	SR	c	FeSt, W	
8.93	L J	60°	St	R	С	FeSt, W	200.000
9.02	J	45°	PL	R	С	FeSt	Clay Veneer
9.07	J	45°	PL	R	С	FeSt	Clay Veneer
9.28	J	50°	PL		С		
9.38	Qtz Vn	5-10°	IR		С		3mm wide
9.41	Qtz Vn	10°	PL		С		2mm wide
9.52	J	25°	UN	R	С	FeSt, W	
9.55	L	20°	UN	SR	С		Cl 1mm
9.83	J	10°	IR		С		
9.93	J	5-10°	St		С		
10.11	J	20°	PL		С	5-01 W	
10.24	J	55°	PL	S	c c	FeSt, W	
10.31	J	10° 20°	PL UN	R	c	FeSt, W, MnSt FeSt, W, MnSt	
10.37	L L	30°	UN	R	c	FeSt, W, MnSt	
10.47	J	15°	PL	R	С	FeSt, W, MnSt	
10.84	Qtz Vn	15°	PL		С		
11.08	Qtz Vn	5°	PL		c		6mm wide
11.14	Qtz Vn	25°	PL		С		8-12,, wide
11.16	J	20°	UN		С		
11.61	J J	35°	IR	R	С	FeSt, MnSt	
11.65-11.67	ws	20°	PL				
11.74	J	30°	PL	R	С	FeSt, MnSt	
11.88	J	80°	PL	S	С	FeSt, MnSt	
12.07	Clay Seam	70°	PL		С		
12.13-12.22	BZ				С		
12.38-12.46	WS	75°	PL		С		

						BOREHOLE NO.: BH46	
						SHEET:	3 of 3
						REFERENCE NO.:	H10616
DEPTH	DEFECT TYPE	DIP°	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
12.60-12.76	WS				С		
12.81	J	15°	PL	SR	С	FeSt, MnSt	
13.07	J	15°	PL	S	С	FeSt	
13.20	J	20°	PL	S	С	FeSt	
13.37	J	45°	PL	SR	С	FeSt, MnSt	
13.46	J	15°	PL	S	С	MnSt	
13.58	J	30°	PL	SR	С	FeSt	
13.69	J	10°	PL		С		
13.73	Rehealed J	10°	PL	S	С	FeSt, MnSt	
13.84	J	30°	UN	POI	С	FeSt, MnSt	
14.09	J	15°	PL	R	С	FeSt, MnSt	
14.27	J	15°	PL	S	С	FeSt	
14.43	J	10°	UN	R	С	FeSt, MnSt	
14.55	J	25°	UN	SR	с	FeSt	
14.78	J	10°	PL	SR	С	FeSt, MnSt	
14.95	J	30°	PL	SR	С	FeSt, MnSt	
15.29	Rehealed J	20°	IR		С		
15.43	J	10°	UN	R	С	FeSt, MnSt	
15.56	J	20°	PL	SR	С	FeSt	Clay Venee
15.88	J	15°	PL	R	С	FeSt, MnSt	
16.12	J	25°	St	S	С	FeSt, MnSt	
16.29	J	15°	PL	S	С	FeSt, MnSt	
16.35	J	35°	UN	R	С	FeSt, MnSt	
17.07	J	55°	PL	SR	С		Clay Venee
17.14	L	30°	PL	S	С	FeSt, MnSt	
17.20	L	45°	PL	POL	С		Sheared surfa
17.32	L	35°	PL	SR	С	FeSt, MnSt	
17.43	J	1 5°	IR	S	С	FeSt, MnSt	
17.58	L	20°	PL	S	С	FeSt, MnSt	CI 2mm
17.62	L	20°	PL	SR	С	FeSt, MnSt	CI 2mm
17.72	J	25°	IR	SR	С		Cn
18.06	L	65°	UN	S	С		Cn
18.79	L	20°	UN	SR		MnSt	CI 2mm
18.97	J	30°	PL	SR	С	MnSt	
19.13	J	60°	PL	SR	С	MnSt. FeSt	
19.26	L	10°	PL	R	С	FeSt	Clay Venee
20.56	Ĺ	55°	PL	S	С		Cn
20.88	L	25°	UN	R	С	FeSt	
21.08	Ĺ	55°	UN	SR	С	FeSt	
21.26	j	30°	IR	R	С	MnSt. FeSt	
21.60	J	40°	PL	S	С	FeSt	Cl 2mm
21.72	J	0°	St		С	MnSt. FeSt	Clayey Matr
21.88	J	25°	St	R	С	MnSt. FeSt	
21.95	J	80°	PL	S	0	FeSt	
22.13	J	65°	UN	SR	С	FeSt	
22.43	J	20°	PL	R	С	MnSt. FeSt	
22.58	L	45°	PL	R	С	FeSt	
22.77	J	45°	UN	SR	С	MnSt. FeSt	Clay Venee
22.84	J	35°	UN	S	С	MnSt. FeSt	
23.0	J	50°	UN	SR	С	MnSt. FeSt	
23.13	DI						Clay Venee
23.49	J	0-10°	IR	S	С	FeSt	
23.68	J	50°	IR	S	С	FeSt	
24.10	J	60°	PL	S	С	FeSt, MnSt	
25.08	J	25°	UN	S	С	FeSt	CI <1MM
25.15	J	60°	IR	S	С	FeSt, MnSt	Clay Venee
25.60	J	35°	UN	R	С	FeSt	