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SOIL SURVEYS

Easting: 502541 Northing: 6957749 RL: 5.46 m Logger: SO/CB Operator: SO Machine: Scout 2

BOREHOLE RECORD SHEET

Location Number: BH 324

Project Number: 110-12936 Project Name: Cross River Rail Location: Brisbane **Client: AECOM** Date: 01/02/2012

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Origination Depth 68 Description Weaking Depth 68 0 Samples and Permission 1 1 0.10 0.10 0 010 MML 100 MML
Comments:
1) Groundwater not observed. 2) Borenole grouted on completion. ¹) Groundwater not observed. 2) Borenole grouted on ¹ - bar ¹ - bar sem ¹ - b
T - Contain the standy lavel 2 Clean S Strong Disturbed S Strong Disturbed S Strong Disturbed C Clean S Strong Disturbed S Strong Disturbed C Clean S Strong

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Soil Surveys Engineering Pty. Limited Specialist in Applied Geotechnics

RL: 5.46 m

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Page: 2 OF 3

	209	ige	J. U	O/CB Operator. SO		Machine: Scoul 2 Date: 01/02								Faye. 2 OF 3		
	Drilling Method Depth Depth				Weathering			ct (%) Mec (%) ROD		Samples and Remarks						
				<u> </u>			Gravelly SANE grained, grey, clay/silt fines.	D (SP) Very dense, f fine to medium sized (continued)	ine to coarse d gravel, some						30/130mm N=R	
					11.80		SANDSTONE	, Coarse grained, ye	llow brown							
				- 12.0 	12.19 12.46	· · · · · · · · · · · · · · · · · · ·	mottled grey o CONGLOMER yellow brown o	range, granular. RATE, Coarse graine prange, medium size	ed, grey mottled	DW XW RS					30/45mm N=R 12.33 m; J, 70° , P, V, O, C	
				 <u>13</u> .0 	12.80 13.20		laminated, frag	Fine grained, dark b		К5			67	33		
							`	Fine grained, dark b		RS			100	40	13.20-13.36 m; B, 5° , P, S, O, Z	
by Datgel				<u> </u>			MUDSTONE, Fine grained laminated, closely spaced						100	46		
6 NEW.GPJ < <drawingfile>> 21/05/2012 14:34 8:30.002 Developed by Datgel</drawingfile>				<u> </u>				Fine grained, dark brown, thinly bsely spaced fractures.								
5/2012 14:34 8.3									rown, thinly s.	XW - DW					15.52m, Is50 = 2.51 MPa	
awingFile>> 21/0				<u>16</u> .0								60				
NEW.GPJ < <dra< td=""><td></td><td></td><td></td><td> <u>1</u>7.0</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>16.72m, ls50 = 4.51 MPa 15.50-18.00 m; Dl, 5°, P, S, O, Z</td></dra<>				 <u>1</u> 7.0											16.72m, ls50 = 4.51 MPa 15.50-18.00 m; Dl, 5 °, P, S, O, Z	
										DW						
SURVEYS_00 LIBRARY 2012-05.GLB_Log_SOIL_SURVEY_BOREHOLE_LOG_111-1293				<u> 18</u> .0 <u> </u>	18.00 18.13 18.20	· · · · · · · · · · · · · · · · · · ·		, Fine grained, grey ar, thinly laminated, o		SW			100	50	18.11 m; B, 12° , P, S, O, C 18.13 m; B, 5° , P, S, O, Z	
				<u> </u>	18.66		laminated, clos SANDSTONE SILTSTONE, F	Fine grained, dark gu sely spaced fracture , Fine grained, grey, Fine grained, dark gu sely spaced fracture	s. granular. rey, thinly				94	66		
RARY 2012-05.GL				 			armitateu, clos									
SURVEYS_00 LIBF	1) G	Grou	nent undw etion.		erved. 2	!) Boreh	ole grouted on	Depth (m) Type Dip (deg) Planarity B - Bedding C - Curvilinear	Roughness Aperature Infill L - Slickensides C - Closed C - Clay y - Polished F - Filled F - Iron Ox R - Rough N - Clean K - Calcite S - Smooth O - Open L - Limonit V - Very rough S - Stain Q - Quartz S - Second U - Unider Second	ide E lary mineral	/eathering Gra RS - Residual Sc W - Extremely weath W - Distinctly weath FR - Fresh Rock Streng VW - Very weak W - Weak W - Weak	hered hered ered th	u5 U5 SP	ю П т Т	Approved:	
SOIL	<u>₹</u> \	Vat	er Firs	st Noted 💻	Water S	teady Le	vel	T - Contact V - Vein Z - Decomposed Zone DI - Drilling Induced break	W - Weatt X - Carbon Z - Clean	hered rock	MS - Medium stro S - Strong VS - Very strong ES - Extremely stro		sturbe Sampl		Date:	



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SOIL SURVEYS

Easting: 502541Northing: 6957749RL: 5.46 mLogger: SO/CBOperator: SOMachine:Scout 2

BOREHOLE RECORD SHEET

Location Number: BH 324

Project Number: 110-12936 Project Name: Cross River Rail Location: Brisbane Client: AECOM Date: 01/02/2012

Page: 3 OF 3

Dril	ling I	Method		ic				Strength	Defect	(%		0 I I	\neg	
						Weathering	Estimated	Spacing	Rec (%)	RQD	Samples and Remarks			
					SILTSTONE, F laminated, clos	Fine grained, dark grey, thi sely spaced fractures. <i>(cor</i>	inly htinued)	SW			94	66	18.86-22.10 m; DI, 5° , P, S, O, [—] Z	
			<u>2</u> 1.0 <u>2</u> 1.0 <u>2</u> 2.0 <u>2</u> 2.0 <u>2</u> 2.0		MUDSTONE, laminated, frag	Fine grained, dark brown, gmented.	thinly	RS			100	86	-	
			<u> </u>	74	SILTSTONE, F laminated, clos Interbedded S to medium gra spaced fractur Granular, thinly fractures, beds material with a	Fine grained, dark grey, thinly sely spaced fractures. ILTSTONE and SANDSTONE, Fine ained, grey, laminated, widely		SW					22.60 m; J, 80°, P, R, O, Z	
eloped by Datgel			<u>- 2</u> 4.0 - - - - -			, Fine to medium grained, y bedded, with closely spaces s infilled with carbonaceou a coal band from 24.67m to d from 27.71m.						– 24.19 m; J, 25° , P, R, O, Z 24.21 m; J, 5° , P, R, O, Z – –		
36 NEW.GPJ < <drawingfile>> 21/05/2012 14:34 8.30.002 Developed by Dargel</drawingfile>			- 00000 li(00000 m 00000 s 00000 s	light grey and light brown clasts, granular, massively bedded, closely to moderately widely spaced fractures. Clasts are medium to coarse gravel sized, sub-rounded of siltstone, sandstone,			FR			98	95	25.18 m; DI, 5° , U, R, O, Z 25.37 m; DI, 5° , U, R, O, Z 25.58 m; J, 10° , C, V, O, Z 25.75 m; J, 20° , C, R, O, Z 25.89 m; J, 25° , S, R, O, Z		
2012-05.GLB Log SOIL_SURVEY_BOREHOLE_LOG 111-129			<u>- 27</u> .0 - 28.0 - 29.0								95	95	28.36 m; Dl, 10° , S, V, O, Z 28.54 m; Dl, 15° , S, V, O, Z 28.80 m; Dl, 15° , S, V, O, Z 28.20 m; Dl, 15° , S, V, O, Z 29.21 m; Dl, 5° , U, R, O, Z 29.28 m; J, 40° , P, R, O, Z 29.40 m; J, 10° , S, V, O, S	
RARY			- 30.0			BH 324 TERMINATED AT			Veathering Gra	ades S	ample	s		-
SURVEYS) Gro omp	oletion.	ater not observed			Definition 1: 5400: F, 600 Depin (n) Type Dp (sop) Paramity B B B B B B B B B B B B B B B B B B B	Aperature Infill des C - Closed C - Clay F - Filled F - Iron Oxi N - Clean K - Calcite O - Open L - Limonite D - Stein O - Culartz	X E e ary mineral lifed mineral ered rock	Rs - Residual Sc W - Extremely weath DW - Distinctly weath FR - Fresh Rock Streng WW - Very weak W - Weak MS - Medium stro S - Strong VS - Very strong	Mi hered ered th ng Dis	U5 SP sturbe		Approved: Date:	
¥	- vva	alei Fils	st Noted Wate	i Steduy L	2421	DI - Drilling Induced break			ES - Extremely stro		Sampl	e L		_

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IN-SITU PACKER PERMEABILITY TEST RESULT

PROJECT: PROJECT No.:	CRR 110-12936	BH No.: Test No.: Date:	324 1 4/01/2012		Packer type: Packer pressure: Gauge pressures Tested by:		Double 2500kPa kPa CS	
Vertical depth to:	Top of test section	ı (m):	21.00		Depth of centre of	of test section (m)	22.00]
	Base of test section		23.00		Length of test se		2.00	
	Centre of test sect	ion(m):	22.00					
	Base of casing (m):	20.00		Gauge Height ab	ove ground level	0.00	
	Ground water (m)	,	NR		Hole Diameter in	test section (mm	75	
	1st period	Time (mins)	0	5	10	15	Average	
	Gauge Pressure	Flow reading	1539.0	1557.0	1567.5	1577.0	Flow (l/min)	
	100	Water Take	0.00	18.00	10.50	9.50	2.533	
	2nd period Time (mins)		0	5	10	15	Average	
	Gauge Pressure	Flow reading	1581.0	1609.0	1652.0	1687.0	Flow (l/min)	
	200	Water Take	0.00	28.00	43.00	35.00	7.067	1
	3rd period	Time (mins)	0	5	10	15	Average	
	Gauge Pressure	Flow reading	1695.0	1745.0	1801.0	1857.0	1733.800	
	300	Water Take	0.00	50.00	56.00	56.00	10.800	
	4th period	Time (mins)	0	5	10	15	Average	
	Gauge Pressure	Flow reading	1851.0	1879.0	1910.0	1930.0	Flow (I/min)	
	200	Water Take	0.00	28.00	31.00	20.00	5.267	
	5th period	Time (mins)	0	5	10	15	Average	
	Gauge Pressure	Flow reading	1923.0	1928.0	1934.0	1936.0	Flow (l/min)	
	100	Water Take	0.00	5.00	6.00	2.00	0.867	
	•							
Period	Flow (q)	Gauge Press	Gauge Press	Friction Lo		Total Head	Lugeon	Perm.
	(l/min)	(kPa)	(m of water)	Basic	In extra rods	(m)	Value	(m/s)
1st	2.533	100.00	10.220	0.000	0.000	32.220	4.016	4.14E-07
2nd	7.067	200.00	20.440	0.000	0.000	42.440	8.505	8.77E-07

5th 0.867 100.00 *Where friction loss is assumed to be negligible.

3rd

4th

N.B. Pressure Conversion: 1 bar = 100 kPa = 14.503 psi

10.800

5.267

300.00

200.00

30.660

20.440

10.220

0.000

0.000

0.000

0.000

0.000

0.000

52.660

42.440

32.220

10.475

6.339

1.374

1.08E-06

6.54E-07

1.42E-07