BOREHOLE LOG

CLIENT: AECOM Australia Pty Ltd
PROJECT: Cross River Rail - Phase 1
LOCATION: Cornwall Street, Fairfield

SURFACE LEVEL: 30 m AHD
EASTING: 502687
NORTHING: 6958186
DIP/AZIMUTH: -90°/--

BORE No: CRR101
PROJECT No: 74321.00
DATE: 13 April 2010
SHEET 1 OF 6

RL	Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Water	Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00)	Discontinuities (B - Bedding, J - Joint, S - Shear, D - Drill Break)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
30	0.04	Bitumen										
	0.15	CONCRETE										
	0.25	FILLING - moderately compacted, grey sandy gravel filling with some silt, moist										
	0.7	SILTY CLAY - very stiff to hard, orange-brown and pink-brown mottled, low to medium plasticity, silty clay with some fine to medium grained sand, moist (residual tuff)						(See attached sheet for abbreviations)				
29	1	TUFF - extremely low to low strength, highly weathered, pink-grey and orange-brown mottled, tuff							S			30/145mm
	1.18	= becoming brown and grey mottled										
		TUFF - very low strength, highly to moderately weathered, fractured, orange-brown, tuff, subhorizontal flattening lineation and flow banding						1.18m: J, sv, un, sm, cf 3mm, to 1.30m 1.24m: J, 30°, un, sm, lim 1.41m: J, 70°, un, sm, cf 3mm Defects generally overprinted by pervasive weathering 1.77m: J, 60°, un, sm, cc	C	100	22	
		= becoming extremely low strength, highly weathered, grey and orange-brown mottled										
28	2	= becoming highly to moderately weathered, slightly fractured, grey and red-brown mottled							C	100	0	
		- becoming grey										
27	3	- becoming grey and purple-grey mottled										
		- 200mm extremely low to very low strength band, becoming fractured						3.48m: J, 70°, un, sm, lim 3.54m: J, 70°, pl, sm				
26	4	- 150mm low to medium strength, moderately weathered band						3.9m: J, 30°, pl, sm, cc 3.91m: frg to 4.00m, di 4m: J, sv, un, lim, to 4.16m	C	100	28	
		= becoming highly weathered						4.2m: frg to 4.46m, di				
		- 130mm medium strength band						4.53m: J, sv, un, sm, cf 3mm, to 4.70m 4.7m: J, 25°, un, s, cc, lim				
	4.85	SANDSTONE (see below)										

RIG: MD300 **DRILLER:** Taberner **LOGGED:** MAH **CASING:** HW to 1.1m

TYPE OF BORING: Auger 0.00-1.18m, NMLC Core 1.18-30.00m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: PVC standpipe installed

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U,	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ▼ Water level

CHECKED
Initials: CRB
Date: 24/6/10

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SHEET 2 OF 6

RL	Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Water	Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00)	Discontinuities (B - Bedding, J - Joint, S - Shear, D - Drill Break)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
25	5.0	CORE LOSS						5m: CORE LOSS: 750mm				
	5.75	SANDSTONE - extremely low strength, extremely weathered, slightly fractured, grey, fine to medium sandstone, bedding at 15°						5.88m: frg to 6.00m, di				
24	6							6.32m: J, 65°, un, sm 6.42m: J, 60°, un, sm, cc 6.55m: frg to 6.80m, di	C	71	7	
23	7	- 200mm medium strength, moderately weathered, orange-brown band, bedding at 25° = bedding at 10°						7.14m: J, 60°, pl, sm, cc 7.27m: J, 45°, un, sm, cc 7.4m: J, 60°, pl, sm, cc 7.47m: J, 30°, pl, sm, cc				PL(A) = 0.41MPa PL(D) = 0.39MPa
	7.55	- trace of thin carbonaceous laminae										
	7.6	BRECCIA (see below) CORE LOSS						7.6m: CORE LOSS: 300mm				
	7.9	BRECCIA - extremely low strength, highly weathered, slightly fractured, grey, fine to medium breccia, clasts of quartz, sandstone and meta-arenite, subhorizontal clast orientation										
22	8							8.39m: J, 60°, pl, ro	C	84	0	
		- becoming generally medium to coarse conglomerate										
		- becoming fractured						8.73m: J, 45°, un, ro 8.81m: J, 50°, un, ro 8.9m: J, 45°, pl, ro 8.95m: J, 55°, un, sm 9.05m: J, 45°, un, sm 9.15m: J, 30°, un, sm, lim				
21	9											
		- becoming slightly fractured						9.22m: J, 60°, un, sm 9.32m: frg to 9.50m, di				
		- becoming very low to low strength, moderately weathered, slightly fractured, grey and						9.67m: J, 70°, pl, ro	C	100	21	

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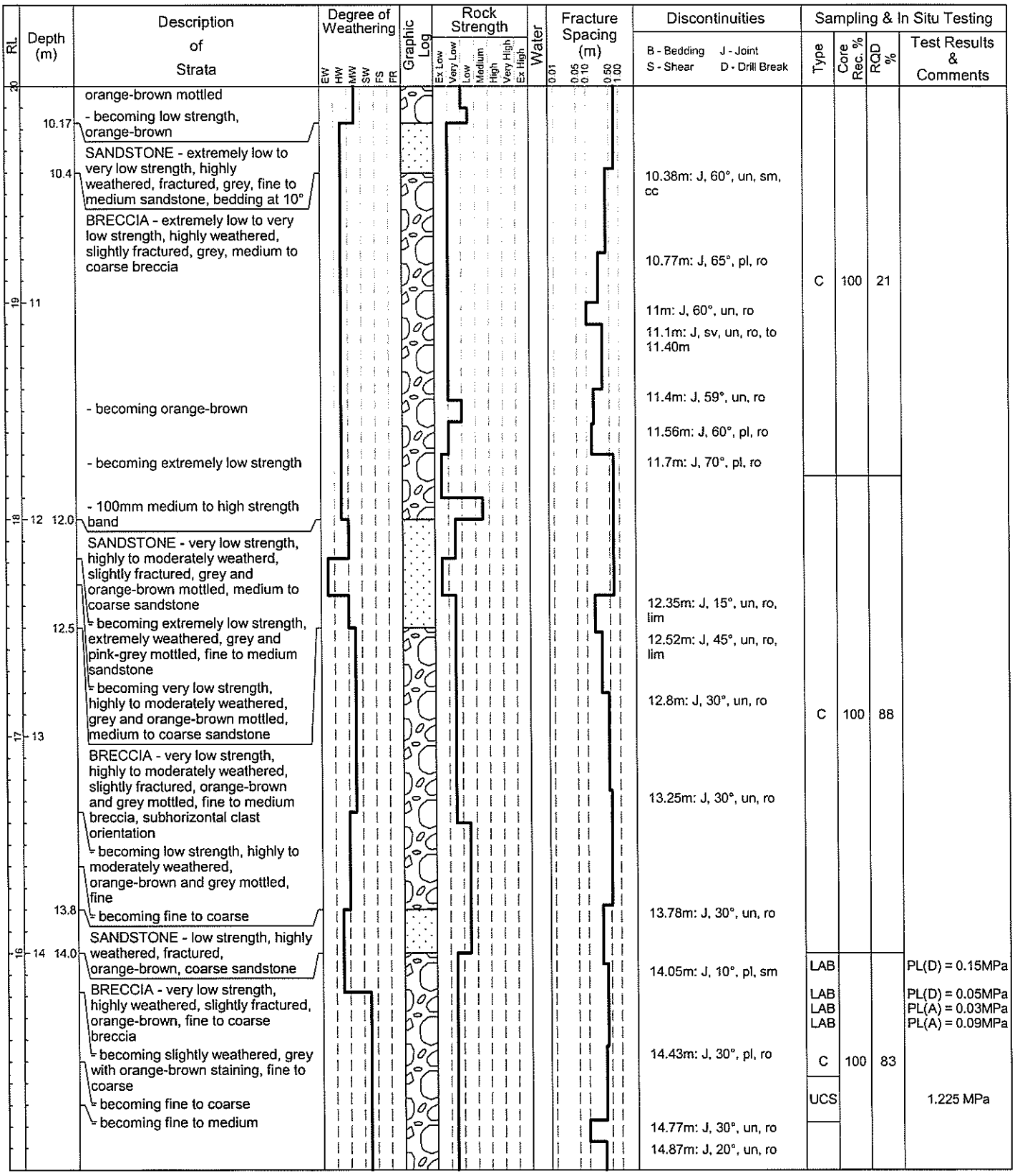
SHEET 3 OF 6



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SHEET 4 OF 6

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15	15.0	- becoming low strength, highly to moderately weathered, orange-brown, fine to coarse breccia						15.18m: J, 45°, un, ro	C	100	83	
	15.65	SANDSTONE - extremely low strength, highly weathered, fractured, grey, fine sandstone, bedding at 10°						15.65m: B, 10°, un, sm				
14	16	- 50mm clay band - becoming very low strength - 70mm extremely low strength band - extremely low strength siltstone laminae to 7mm at 5-15mm spacings to 17.50m						16.39m: J, 20°, pl, sm, cc				PL(A) = 0.05MPa PL(D) = 0.08MPa
		- becoming low strength, fractured						16.79m: J, 65°, pl, sm, cc				
13	17							17.08m: J, 60°, pl, sm 17.21m: J, 60°, pl, sm, cc 17.33m: J, 60°, un, sm, cc				PL(A) = 2.7MPa PL(D) = 0.9MPa
	17.5	- becoming extremely low to very low strength, slightly fractured						17.48m: B, 20°, pl, ti	C	100	70	
		SILTSTONE - extremely low strength, moderately to slightly weathered, slightly fractured, siltstone, bedding at 20°, extremely low strength sandstone laminae to 5mm at 50-100mm spacing to 17.85m						17.62m: J, 60°, pl, sm 17.91m: J, 45°, pl, sm				PL(A) = 0.29MPa PL(D) = 0.24MPa
12	17.85 18	SANDSTONE - extremely low strength, moderately to slightly weathered, slightly fractured, grey, fine to medium sandstone, bedding at 10°, siltstone laminae to 3mm at 5-10mm spacings to 18.00m - becoming very low strength, slightly weathered - becoming low strength - becoming medium strength with some medium to coarse tuff derived sand (predominantly plagioclase crystals) - becoming medium to high strength						18.24m: J, 65°, un, sm 18.45m: J, 45°, pl, sm 18.63m: J, 60°, pl, ro 18.67m: J, 60°, pl, ro				PL(A) = 0.84MPa PL(D) = 0.83MPa
11	18.95 19	TUFF - extremely low strength, extremely weathered, fractured, grey tuff, slightly reworked - very low strength, moderately to slightly weathered, slightly fractured, green-grey, tuff, flattening lineation at 10°, lithics of meta-arenite and tuff to 10mm, flattened pumice clasts to 30mm - becoming low strength, slightly						18.95m: sharp contact 19.25m: J, 10°, pl, sm, cc 19.48m: J, 30°, pl, sm, cf 4mm	C	100	97	PL(A) = 1.4MPa

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10	20.0	weathered, slightly fractured to unbroken - becoming medium strength, fresh - becoming medium to high strength										PL(D) = 0.4MPa
		TUFF - medium to high strength, fresh, fractured, grey tuff, slightly reworked - sporadic pyrite mineralisation (infill and replacement)										
9	21								C	100	97	PL(A) = 1.6MPa PL(D) = 0.6MPa
8	22											
7	23											PL(A) = 1.3MPa PL(D) = 0.5MPa
									C	100	100	
6	24	- sporadic extremely weathered pumice clasts						24.32m: J, 10°				PL(A) = 1.5MPa

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CHECKED
Initials: CJB
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	25.0											PL(D) = 0.9MPa
		- becoming high strength										
		- becoming medium strength						25.78m: J, 30°, pl, sm				
4	26											
								26.32m: J, 40°, pl	C	100	100	
3	27											PL(A) = 0.7MPa PL(D) = 0.6MPa
								27.11m: J, 45°, un, sm				
		- becoming fractured						27.58m: J, 10°, pl, sm, cc				
		- becoming very low to low strength, slightly weathered						27.72m: J, 40°, pl, sm, cc				
2	28							27.94m: J, 10°, pl, sm, cf 3mm				PL(A) = 0.2MPa PL(D) = 0.3MPa
		- becoming slightly fractured						28.06m: J, 15°, un, sm, cf 4mm				
		- becoming very low strength						28.56m: J, 10°, pl, sm, cf 3mm				
		- becoming extremely low strength, highly weathered, clay bands to 20mm at 20-50mm spacings to 29.48m							C	100	65	
1	29	- becoming extremely weathered										
	29.48	SANDSTONE - medium strength, fresh, slightly fractured, grey, fine to medium sandstone, bedding at 10-20°						29.46m: B, 10°, pl, sm, cc, sharp contact 29.56m: J, 70°, un, sm, cc				
	29.98											PL(A) = 0.8MPa PL(D) = 0.2MPa

Bore discontinued at 29.98m

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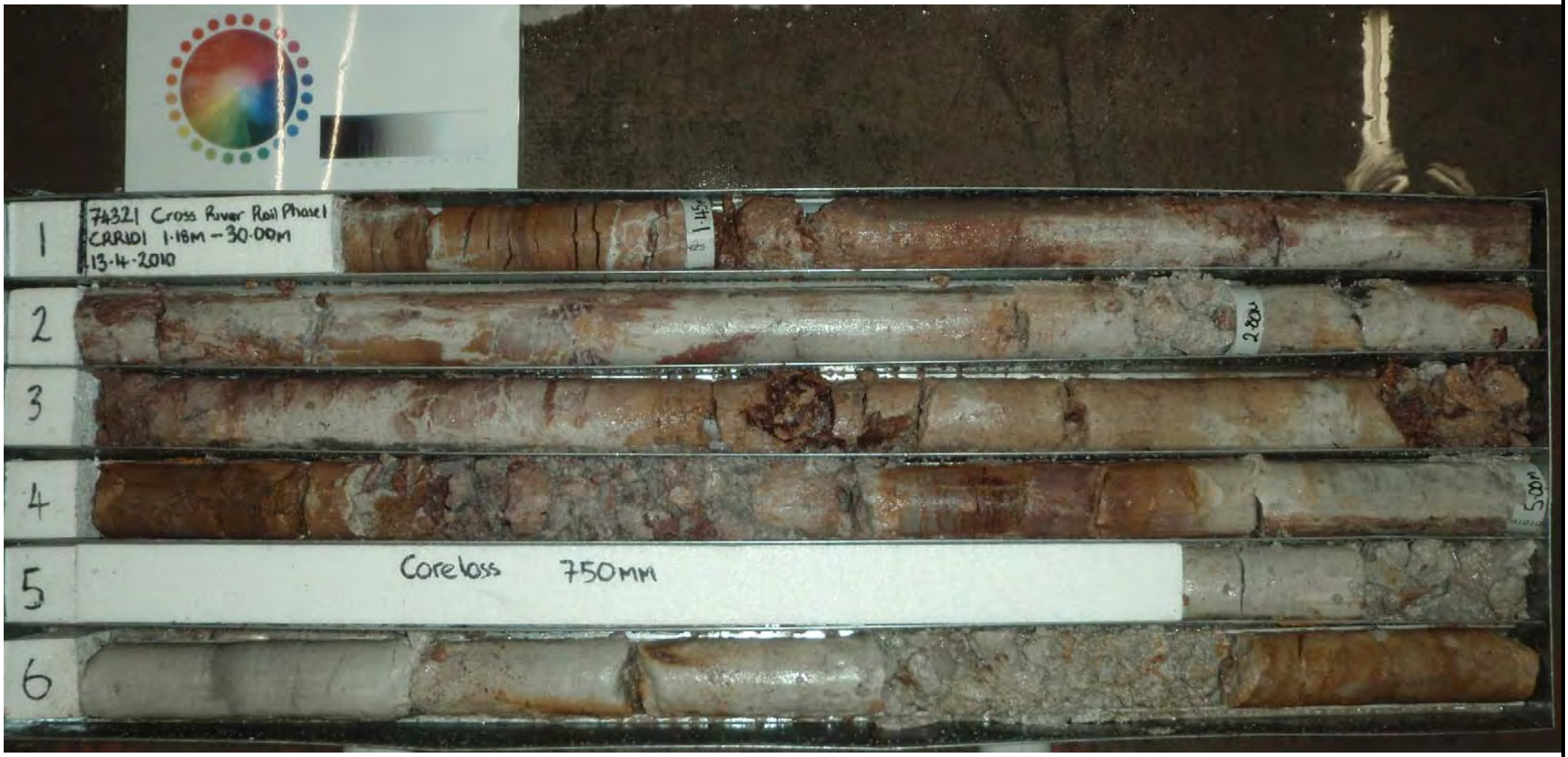

CROSS RIVER RAIL – PHASE 1 GEOTECHNICAL INVESTIGATION	**BORE CRR101**	**Project 74321.00**	Douglas Partners Geotechnics - Environment - Groundwater

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