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GEOTECHNICAL
BOREHOLE LOG

FOR GEOTECHNICAL TERMS AND
SYMBOLS REFER FORM F:GEOT 017/8-2014

BOREHOLE No **CRR718**

Sheet 1 of 5

REFERENCE No **H12944**

PROJECT	Cross River Rail CRR2017 - Additional Geotechnical Investigation				
LOCATION	Hardgrave Park			COORDINATES 501491.8 E; 6962274.6 N	
PROJECT No	FG6470	SURFACE RL	26.75m	PLUNGE	90°
				DATE STARTED	10/10/2017
				GRID DATUM	MGA94
JOB No		HEIGHT DATUM	AHD	BEARING	°
				DATE COMPLETED	13/10/2017
				DRILLER	Hinterland

DEPTH (m)	R.L. (m)	AUGER CASING WASHBORING CORE DRILLING	RQD (%) CORE REC %	SAMPLE	MATERIAL DESCRIPTION	LITHOLOGY	USCS WEATHERING	INTACT STRENGTH	DEFECT SPACING	ADDITIONAL DATA AND TEST RESULTS	SAMPLES TESTS
1	25.75				Silty Gravelly SAND (Fill) Grey, dry. Fine to coarse grained sand. Fine grained gravel. Appears to be poorly compacted.		(SM)			0.00m-1.00m: Non destructive drilling.	
2	25.15			A	Sandy CLAY (Alluvium) Brown and pale brown, moist, stiff to very stiff. High plasticity. Fine grained sand. Trace fine to medium grained gravel.		(CH)				7, 15, 15 N=30
3				B	Silty CLAY (Residual) Orange brown and grey, dry, hard. Medium plasticity.		(CI)				11, 16, 20 N=36
4	23.55			C	ARGILLITE (DCf) HW: Orange brown and grey, fine grained, foliated, with some silty clay bands, very low strength. Recovered as Gravelly Silty SAND.		HW				15, 18, 25 N=43 LL=34% PI= 15% LS= 8% <75µm= 44%
5	22.40			(50)	ARGILLITE (DCf) HW: Grey and orange brown, fine grained, foliated, very low strength.		HW				Is(50)=0.19 MPa Is(50)=0.07 MPa
6	21.25			100 (48)	-Js: 30°-45° (2-4/m), Pl-Un/Sm, CD-Tl, Cn-Ct -FP: 50°-70° (2-4/m), Un/Sm, CD, St-Vr		MW			4.92m-4.95m: XW	D (4.46m) A (4.57m)
7	19.65			100 (60)	ARGILLITE (DCf) MW: Grey, pale orange brown and pale grey, fine grained, foliated, medium to high strength.		MW				Is(50)=0.31 MPa Is(50)=0.90 MPa
8				100 (80)	-FP: 40°-50° (2-4/m), Un/Sm, CD, Fe St - Js: 20°-40° (3/m) Pl/Ro, Tl, Fe St, some DI.		MW				Is(50)=0.56 MPa Is(50)=1.40 MPa
9	17.65			84 (81)	METAGREYWACKE (DCf) MW: Pale orange grey and grey, fine grained, foliated, medium to high strength, with bands of Argillite <70mm.		MW			8.05m-8.20m: SZ 8.33m-8.35m: XW	D (7.47m) A (7.73m)
	16.90				ARGILLITE (DCf) SW: Grey, orange grey, fine grained, foliated, medium strength. - FP:45°-60° (4-5/m), Pl/Sm, Tl, FeSt		SW				Is(50)=0.28 MPa Is(50)=0.37 MPa
							HW				A (9.36m)
							MW				D (9.60m)

Continued on next sheet

REMARKS: DCf - Neranleigh Fernvale Beds. Standpipe piezometer installed.	LOGGED BY	REVIEWED BY
	MH	S. Foley



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GEOTECHNICAL BOREHOLE LOG

FOR GEOTECHNICAL TERMS AND
SYMBOLS REFER FORM F:GEOT 017/8-2014

BOREHOLE No **CRR718**

Sheet 2 of 5

REFERENCE No **H12944**

PROJECT **Cross River Rail CRR2017 - Additional Geotechnical Investigation**

LOCATION **Hardgrave Park**

COORDINATES **501491.8 E; 6962274.6 N**

PROJECT No **FG6470**

SURFACE RL **26.75m**

PLUNGE **90°**

DATE STARTED **10/10/2017**

GRID DATUM **MGA94**

JOB No

HEIGHT DATUM **AHD**

BEARING °

DATE COMPLETED **13/10/2017**

DRILLER **Hinterland**

DEPTH (m)	R.L. (m)	AUGER CASING WASHBORING CORE DRILLING	RQD (%) CORE REC %	SAMPLE	MATERIAL DESCRIPTION	LITHOLOGY	USCS WEATHERING	INTACT STRENGTH					DEFECT SPACING					ADDITIONAL DATA AND TEST RESULTS	SAMPLES TESTS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
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REMARKS: DCf - Neranleigh Fernvale Beds. Standpipe piezometer installed.

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REVIEWED BY

MH

S. Foley

GEOTECHNICAL BOREHOLE LOG

FOR GEOTECHNICAL TERMS AND
SYMBOLS REFER FORM E:GEOT 017/8-2014

BOREHOLE No **CRR718**

Sheet 3 of 5

REFERENCE No **H12944**

PROJECT	Cross River Rail CRR2017 - Additional Geotechnical Investigation
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LOCATION	Hardgrave Park
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COORDINATES 501491.8 E; 6962274.6 N

PROJECT No	FG6470
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SURFACE RL 26.75m

PLUNGE 90°

DATE STARTED 10/10/2017

GRID DATUM MGA94

JOB No

HEIGHT DATUM AHD

BEARING °

DATE COMPLETED 13/10/2017

DRILLER Hinterland

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REMARKS: DCF - Neranleigh Fernvale Beds. Standpipe piezometer installed.

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GEOTECHNICAL BOREHOLE LOG

FOR GEOTECHNICAL TERMS AND
SYMBOLS REFER FORM E:GEOT 017/8-2014

BOREHOLE No **CRR718**

Sheet 4 of 5

REFERENCE No **H12944**

PROJECT	Cross River Rail CRR2017 - Additional Geotechnical Investigation
---------	--

LOCATION	Hardgrave Park
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COORDINATES 501491.8 E; 6962274.6 N

PROJECT No	FG6470
------------	--------

SURFACE RL 26.75m

PLUNGE 90°

DATE STARTED 10/10/2017

GRID DATUM MGA94

JOB No

HEIGHT DATUM AHD

BEARING °

DATE COMPLETED 13/10/2017

DRILLER Hinterland

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Continued on next sheet

REMARKS: DCF - Neranleigh Fernvale Beds. Standpipe piezometer installed.

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GEOTECHNICAL
BOREHOLE LOG

FOR GEOTECHNICAL TERMS AND
SYMBOLS REFER FORM F:GEOT 017/8-2014

BOREHOLE No **CRR718**

Sheet 5 of 5

REFERENCE No **H12944**

PROJECT Cross River Rail CRR2017 - Additional Geotechnical Investigation

LOCATION Hardgrave Park COORDINATES 501491.8 E; 6962274.6 N

PROJECT No FG6470 SURFACE RL 26.75m PLUNGE 90° DATE STARTED 10/10/2017 GRID DATUM MGA94

JOB No _____ HEIGHT DATUM AHD BEARING ° DATE COMPLETED 13/10/2017 DRILLER Hinterland

DEPTH (m)	R.L. (m)	AUGER CASING WASHBORING CORE DRILLING	RQD (%) CORE REC %	SAMPLE	MATERIAL DESCRIPTION	LITHOLOGY	USCS WEATHERING	INTACT STRENGTH					DEFECT SPACING					ADDITIONAL DATA AND TEST RESULTS	SAMPLES TESTS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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	-13.45		100		ARGILLITE (DCf) FR: Cont'd. Borehole completed at 40.20m		FR																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										

REMARKS: <u>DCf - Neranleigh Fernvale Beds. Standpipe piezometer installed.</u>	LOGGED BY	REVIEWED BY
	<u>MH</u>	<u>S. Foley</u>

TMR GEOTECHNICAL BOREHOLE LOG - CREATED WITH HOLEBASE SI



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STANDPIPE INSTALLATION LOG

FOR GEOTECHNICAL TERMS AND
SYMBOLS REFER FORM F:GEOT 017/8-2014

BOREHOLE No **CRR718**

Sheet 1 of 5

PIEZOMETER No **CRR718**

PROJECT	Cross River Rail CRR2017 - Additional Geotechnical Investigation						
LOCATION	Hardgrave Park				COORDINATES 501491.8 E; 6962274.6 N		
PROJECT No	FG6470	SURFACE RL	26.75m	PLUNGE	90°	DATE STARTED	10/10/2017
JOB No		HEIGHT DATUM	AHD	BEARING	°	DATE COMPLETED	13/10/2017
						GRID DATUM	MGA94
						DRILLER	Hinterland

DEPTH (m)	R.L. (m)	LITHOLOGY	MATERIAL DESCRIPTION	Standpipe Construction Details		
				Depth (m) / RL (AHD)	50mm PVC Class No. 18 Stick Up = 0.00m	Backfill Details
1	25.75		Silty Gravelly SAND(Fill) Grey, dry. Fine to coarse grained sand. Fine grained gravel. Appears to be poorly compacted.			
	25.15		Sandy CLAY(Alluvium) Brown and pale brown, moist, stiff to very stiff. High plasticity. Fine grained sand. Trace fine to medium grained gravel.			
2			Silty CLAY(Residual) Orange brown and grey, dry, hard. Medium plasticity.			
3	23.55					
4	22.40		ARGILLITE Orange brown and grey, fine grained, foliated, with some silty clay bands, very low strength. Recovered as Gravelly Silty SAND.			
5	21.25		ARGILLITE Grey and orange brown, fine grained, foliated, very low strength. -Js: 30°-45° (2-4/m), Pl-Un/Sm, CD-Tl, Cn-Ct -FP: 50°-70° (2-4/m), Un/Sm, CD, St-Vr			
6			ARGILLITE Grey, pale orange brown and pale grey, fine grained, foliated, medium to high strength. -FP: 40°-50° (2-4/m), Un/Sm, CD, Fe St - Js: 20°-40° (3/m) Pl/Ro, Tl, Fe St, some Dl.			
7	19.65					
8			METAGREYWACKE Pale orange grey and grey, fine grained, foliated, medium to high strength, with bands of Argillite <70mm. -FP: 45° (5-10/m), Pl/Sm, CD, Cn-Vr			
9	17.65					
	16.90		ARGILLITE Grey, orange grey, fine grained, foliated, medium strength. -FP:45°-60° (4-5/m), Pl/Sm, Tl, FeSt			

Continued on next sheet

REMARKS: Dcf - Neranleigh Fernvale Beds. Standpipe piezometer installed.

LOGGED BY

REVIEWED BY

MH

S. Foley



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STANDPIPE
INSTALLATION LOG

FOR GEOTECHNICAL TERMS AND
SYMBOLS REFER FORM F:GEOT 017/8-2014

BOREHOLE No **CRR718**

Sheet 2 of 5

PIEZOMETER No **CRR718**

PROJECT	Cross River Rail CRR2017 - Additional Geotechnical Investigation								
LOCATION	Hardgrave Park				COORDINATES 501491.8 E; 6962274.6 N				
PROJECT No	FG6470	SURFACE RL	26.75m	PLUNGE	90°	DATE STARTED	10/10/2017	GRID DATUM	MGA94
JOB No		HEIGHT DATUM	AHD	BEARING	°	DATE COMPLETED	13/10/2017	DRILLER	Hinterland

DEPTH (m)	R.L. (m)	LITHOLOGY	MATERIAL DESCRIPTION	Standpipe Construction Details		
				Depth (m) / RL (AHD)	50mm PVC Class No. 18 Stick Up = 0.00m	Backfill Details
			METAGREYWACKE Grey and orange brown, fine grained, foliated, medium to high strength. -FP: 45°-60° (8/m), Pl/Sm, CD, FeSt			
11	15.85		ARGILLITE Grey and orange brown, fine grained, foliated, medium to high strength. -FP: 45°-60° (3-5/m), Pl-Un/Sm, CD, FeSt -J: 10°-30° (3/m), Pl/Sm, CD, FeSt			
12						
13			From 13.0m: -FP: 45°-60° (1-3/m), Pl/Sm, CD, FeSt -J: 5°-20° (1-3/m), Un/Ro-Sm, CD-OP, Cn-FeSt			
14						
15						Grout: Cement / Bentonite mix
16						
17						
18						
19	8.15		METAGREYWACKE Grey and pale grey, fine grained, foliated, high to very high strength. Frequent Qz veins <50mm thick; occasional Metagreywacke beds <25mm.			
	6.75					

Continued on next sheet

REMARKS: Dcf - Neranleigh Fernvale Beds. Standpipe piezometer installed.	LOGGED BY	REVIEWED BY
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STANDPIPE
INSTALLATION LOG

FOR GEOTECHNICAL TERMS AND
SYMBOLS REFER FORM F:GEOT 017/8-2014

BOREHOLE No **CRR718**

Sheet 3 of 5

PIEZOMETER No **CRR718**

PROJECT	Cross River Rail CRR2017 - Additional Geotechnical Investigation								
LOCATION	Hardgrave Park				COORDINATES 501491.8 E; 6962274.6 N				
PROJECT No	FG6470	SURFACE RL	26.75m	PLUNGE	90°	DATE STARTED	10/10/2017	GRID DATUM	MGA94
JOB No		HEIGHT DATUM	AHD	BEARING	°	DATE COMPLETED	13/10/2017	DRILLER	Hinterland

DEPTH (m)	R.L. (m)	LITHOLOGY	MATERIAL DESCRIPTION	Standpipe Construction Details		
				Depth (m) / RL (AHD)	50mm PVC Class No. 18 Stick Up = 0.00m	Backfill Details
			METAGREYWACKE Cont'd. -FP: 45°-60° (1-3/m), Pl/Sm, CD, FeSt			
6.15						
21			ARGILLITE Dark grey and grey, fine grained, foliated, high to very high strength. Metagreywacke bands up to 600mm thick. Frequent crosscutting quartz veinlets <25mm, 40°-70°, some crenulated. -FP: 45°-70° (3/m), Pl/Sm, TI, Cn -Js: 10°-20° (2-5/m), Un/Ro, OP, Cn			
22						
23						
24						
25						
26						
27						
28						
29						
-3.25				29.70m / -2.95 AHD		

Continued on next sheet

REMARKS: Dcf - Neranleigh Fernvale Beds. Standpipe piezometer installed.	LOGGED BY	REVIEWED BY
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STANDPIPE
INSTALLATION LOG

FOR GEOTECHNICAL TERMS AND
SYMBOLS REFER FORM F:GEOT 017/8-2014

BOREHOLE No **CRR718**

Sheet 4 of 5

PIEZOMETER No **CRR718**

PROJECT	Cross River Rail CRR2017 - Additional Geotechnical Investigation								
LOCATION	Hardgrave Park				COORDINATES 501491.8 E; 6962274.6 N				
PROJECT No	FG6470	SURFACE RL	26.75m	PLUNGE	90°	DATE STARTED	10/10/2017	GRID DATUM	MGA94
JOB No		HEIGHT DATUM	AHD	BEARING	°	DATE COMPLETED	13/10/2017	DRILLER	Hinterland

DEPTH (m)	R.L. (m)	LITHOLOGY	MATERIAL DESCRIPTION	Standpipe Construction Details		
				Depth (m) / RL (AHD)	50mm PVC Class No. 18 Stick Up = 0.00m	Backfill Details
			ARGILLITE Cont'd.	30.50m / -3.75 AHD		Filter: Washed / Graded Sand
31						Bentonite Seal
32				32.00m / -5.25 AHD		
33						
34				34.15m / -7.40 AHD		Top of Slotted Pipe
35						
36						Filter: Washed / Graded Sand
37						
38						
39						
-13.25						

Continued on next sheet

REMARKS: DCF - Neranleigh Fernvale Beds. Standpipe piezometer installed.	LOGGED BY	REVIEWED BY
	MH	S. Foley



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STANDPIPE
INSTALLATION LOG

FOR GEOTECHNICAL TERMS AND
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BOREHOLE No **CRR718**

Sheet 5 of 5

PIEZOMETER No **CRR718**

PROJECT	Cross River Rail CRR2017 - Additional Geotechnical Investigation		
LOCATION	Hardgrave Park	COORDINATES	501491.8 E; 6962274.6 N
PROJECT No	FG6470	SURFACE RL	26.75m
		PLUNGE	90°
		DATE STARTED	10/10/2017
		GRID DATUM	MGA94
JOB No		HEIGHT DATUM	AHD
		BEARING	°
		DATE COMPLETED	13/10/2017
		DRILLER	Hinterland

DEPTH (m)	R.L. (m)	LITHOLOGY	MATERIAL DESCRIPTION	Standpipe Construction Details		
				Depth (m) / RL (AHD)	50mm PVC Class No. 18 Stick Up = 0.00m	Backfill Details
-13.45		M	ARGILLITE Cont'd. Borehole completed at 40.20m	40.20m / -13.45 AHD		
41						
42						
43						
44						
45						
46						
47						
48						
49						

REMARKS: DCF - Neranleigh Fernvale Beds. Standpipe piezometer installed.	LOGGED BY	REVIEWED BY
	MH	S. Foley

CORE PHOTO LOG
DEPARTMENT OF TRANSPORT AND MAIN ROADS
GEOTECHNICAL SECTION

Project Name	Cross River Rail CRR2017 – Geotechnical Investigation		
Project No.	FG6470	Date	13/10/2017
Borehole No.	CRR718	Reference No.	H12944
Location	Hardgrave Park	Start Depth (m)	4.35
Submitted By	M. de Gee	Finish Depth (m)	40.20



CORE PHOTO LOG

DEPARTMENT OF TRANSPORT AND MAIN ROADS
GEOTECHNICAL SECTION

Project Name	Cross River Rail CRR2017 – Geotechnical Investigation		
Project No.	FG6470	Date	13/10/2017
Borehole No.	CRR718	Reference No.	H12944
Location	Hardgrave Park	Start Depth (m)	4.35
Submitted By	M. de Gee	Finish Depth (m)	40.20



CORE PHOTO LOG

DEPARTMENT OF TRANSPORT AND MAIN ROADS
GEOTECHNICAL SECTION

Project Name	Cross River Rail CRR2017 – Geotechnical Investigation		
Project No.	FG6470	Date	13/10/2017
Borehole No.	CRR718	Reference No.	H12944
Location	Hardgrave Park	Start Depth (m)	4.35
Submitted By	M. de Gee	Finish Depth (m)	40.20



CORE PHOTO LOG
DEPARTMENT OF TRANSPORT AND MAIN ROADS
GEOTECHNICAL SECTION

Project Name	Cross River Rail CRR2017 – Geotechnical Investigation		
Project No.	FG6470	Date	13/10/2017
Borehole No.	CRR718	Reference No.	H12944
Location	Hardgrave Park	Start Depth (m)	4.35
Submitted By	M. de Gee	Finish Depth (m)	40.20



Detailed Discontinuity Description Log

This form is intended for the detailed description of discontinuities and defects as measured in outcrop by line mapping, or as they occur downhole in drilled rock core. The descriptions and abbreviations used shall be in accordance with Australian Standard AS1726-1993 Geotechnical site investigations and TMR Geotechnical Terms and Symbols Form F:GEOT017/8.

Project Name		Cross River Rail				Project No.	FG6470		
Site ID / Borehole No.		CRR718				Surface RL	26.42		
Geologist		M.H.				Date	10/10/2017		
						Page	1	of	7
Traverse Chainage; or Down hole depth (rock core)	Type	Dip ° / Dip Direction °;	Planarity	Roughness	Roughness Class	Aperture	Infilling	Zones ¹	Other
	LP /	or				CD /	Cn /	SZ /	
	BP /	Angle ° from	Stp /	Ro /	I to IX	OP /	St /	CZ /	
	FP /	horizontal	Un /	Sm /		FL /	Vr /	HFZ /	
(rock core)	J etc.	(rock core)	PI	SI		TI	Ct ¹	AZ	
4.40	J	30-35	PI	Sm	VIII	TI	Cn		
4.50	J	30	Un	Ro	IV	OP	Cn		BZ 10mm
4.62	J	40	Un	Sm	VIII	CD	Cn		
4.70	J	30	PI	Sm	VIII	OP	Ct		Cly 5mm
4.83	J	10	Un	Sm	VIII	OP	Cn		
4.93	J	30	PI	Sm	VIII	OP	Ct		Clay 20mm
5.00	FP	80-85	Un	Sm	VIII	CD	Vr		Cly
5.01	J	30	PI	Sm	VIII	OP	Ct		Cly 3mm
5.05	J	45	PI	Sm	VIII	OP	Ct		Cly 10mm
5.09	J	30	Un	Ro	IV	OP	Cn		
5.14	J	30-80	Un	Sm	VIII	CD	Vr	Cly every 0.01-5.4m	
5.48	FP	60	Un	Sm	VIII	CD	St		Fe
5.54	J	35	Un	Sm	V	OP	Cn		
5.64	J	15	Un	Sm	V	OP	Cn		
5.93	FP	60	Un	Sm	V	CD	St		Fe
6.00	FP	45	PI	Sm	VIII	OP	St		Fe
6.14	FP	60	Un	Sm	V	CD	Cn		
6.17	FP	75	Un	Sm	V	CD	Cn		
6.42	J	30	Un	Sm	V	CD	Cn		
6.51	J	35	Stp	Sm	III	CD	Cn		
6.55	FP	70	Un	Sm	V	CD	Cn		
6.57	J	10	PI	Sm	VIII	OP	Cn		
6.63	J	10	PI	Sm	VIII	OP	Cn		
6.75	J	10	Un	Sm	V	OP	St		Fe
6.94	J	30	PI	Sm	VIII	CD	St		Fe
6.97	FP	50	PI	Sm	VIII	OP	Vr		Cly
7.13	FP	35	PI	Sm	VIII	OP	St		Fe
7.24	FP	40	PI	Sm	VIII	OP	St		Fe
7.37	FP	30	PI	Sm	VIII	CD	St		Fe
7.45	FP	40	PI	Sm	VIII	CD	Vr		Cly
7.53	FP	30	PI	Sm	VIII	OP	St		Fe

Note: 1. Describe zones and coatings in terms of composition and thickness (mm)

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Detailed Discontinuity Description Log

This form is intended for the detailed description of discontinuities and defects as measured in outcrop by line mapping, or as they occur downhole in drilled rock core. The descriptions and abbreviations used shall be in accordance with Australian Standard AS1726-1993 Geotechnical site investigations and TMR Geotechnical Terms and Symbols Form F:GEOT017/8.

Project Name		Cross River Rail				Project No.	FG6470		
Site ID / Borehole No.		CRR718				Surface RL	26.42		
Geologist		M.H.				Date	10/10/2017		
						Page	2	of	7
Traverse Chainage; or Down hole depth (rock core)	Type	Dip ° / Dip Direction °;	Planarity	Roughness	Roughness Class	Aperture	Infilling	Zones ¹	Other
	LP /	or				CD /	Cn /	SZ /	
	BP /	Angle ° from	Stp /	Ro /	I to IX	OP /	St /	CZ /	
	FP /	horizontal	Un /	Sm /		FL /	Vr /	HFZ /	
J etc.	(rock core)	PI	SI			TI	Ct ¹	AZ	
7.63	FP	30	PI	Sm	VIII	OP	Vr		Cly
7.66	J	15	PI	Sm	VIII	OP	Cn		
7.69	J	15	Un	Sm	V	OP	Vr		Cly
7.71	FP	45	PI	Sm	VIII	CD	Vr		Cly
7.81	FP	45	PI	Sm	VIII	OP	Cn		
7.84	FP	40	PI	Sm	VIII	OP	Cn		
7.85	J/FP/SZ	80	Un	Sm	V	OP/FL	Ct	Cly + gravel 20-30mm	
7.88	FP	35	PI	Sm	VIII	OP	Cn		
7.90	FP	40	PI	Sm	VIII	OP	Cn		
8.00	FP	40	Stp	Sm	III	CD	Cn		
8.19	J	50	PI	Sm	VIII	OP	Vr		Cly
8.35	J	50	Un	Sm	V	OP/FL	Ct		Cly+Gravel
8.47	FP	45	PI	Sm	VIII	CD	Vr		Cly
8.55	FP	40	Un	Sm	V	OP	St		Fe
8.75	FP	50	PI	Sm	VIII	CD	Cn		
8.78	FP	50	PI	Sm	VIII	CD	Vr		Cly
9.00	FP	60	PI	Sm	VIII	OP	Cn		
9.10	FP	50	PI	Sm	VIII	OP	Cn		
9.27	FP	50	PI	Sm	VIII	CD	Cn		
9.44	FP	60	PI	Sm	VIII	CD	Cn		
9.54	J	40	PI	Sm	VIII	CD	St		Fe
9.64	J	35	Un	Sm	V	CD	St		Fe
9.76	FP	30	PI	Sm	VIII	CD	Vr		Cly
9.84	FP	45	PI	Sm	VIII	CD	Vr		Cly
9.87	FP	40	PI	Sm	VIII	CD	Cn		
10.04	FP	45	PI	Ro	VIII	OP	St		Fe
10.12	FP	40	PI	Sm	VIII	OP	St		Fe
10.24	FP	45	PI	Sm	VIII	OP	Cn		
10.36	FP	30	PI	Sm	VIII	CD	Cn		
10.44	J	30	PI	Sm	VIII	OP	St		Fe
10.65	FP	50	PI	Sm	VIII	CD	St		Fe

Note: 1. Describe zones and coatings in terms of composition and thickness (mm)

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Detailed Discontinuity Description Log

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Project Name		Cross River Rail				Project No.	FG6470		
Site ID / Borehole No.		CRR718				Surface RL	26.42		
Geologist		M.H.				Date	11/10/2017		
						Page	3	of	7
Traverse Chainage; or Down hole depth (rock core)	Type	Dip ° / Dip Direction °;	Planarity	Roughness	Roughness Class	Aperture	Infilling	Zones ¹	Other
	LP /	or				CD /	Cn /	SZ /	
	BP /	Angle ° from	Stp /	Ro /	I to IX	OP /	St /	CZ /	
	FP /	horizontal	Un /	Sm /		FL /	Vr /	HFZ /	
(rock core)	J etc.	(rock core)	PI	SI		TI	Ct ¹	AZ	
10.66	FP	50	PI	Sm	VIII	OP	St		Fe
10.68	FP	50	PI	Sm	VIII	OP	St		Fe
10.80	FP	50	Stp	Sm	II	OP	St		Fe
10.88	FP	50	PI	Sm	VIII	CD	St		Fe
11.24	J	20	Un	Ro	IV	OP	St		Fe
11.30	J	20	Stp	Sm	II	CD	Vr		Cly
11.35	FP	50	PI	Sm	VIII	CD	St		Fe
11.38	FP	45	Un	Sm	V	CD	St		Fe
11.39	J	15	Un	Sm	V	CD	St		Fe
11.43	J	40	PI	Sm	VIII	CD	Vr		Cly
11.59	FP	35	Un	Sm	V	OP	St		Fe
11.84	J	20	PI	Sm	VIII	OP	Vr		Cly
11.86	J	5	Un	Sm	V	CD	St		Fe
12.05	FP	60	PI	Sm	VIII	CD	St		Fe
12.07	J	10	PI	Sm	VIII	CD	St		Fe
12.18	J	25	Un	Sm	V	CD	St		Fe
12.27	FP	60	PI	Sm	VIII	CD	St		Fe
12.53	J/FP	35	Un	Sm	II	CD	St		Fe
12.98	FP	30	PI	Sm	VIII	CD	St		Fe
13.10	J	20	Un	Sm	V	CD	St		Fe
13.20	FP	60	PI	Sm	VIII	CD	St		Fe
13.44	J	10	Stp	Ro	I	OP	St		Fe
13.57	J	10	Stp	Ro	I	OP	St		Fe
13.72	J	30	Un	Ro	IV	FL	Ct	Cly + gravel 70mm	
13.89	J	10	Stp	Ro	I	OP	Cn		
13.91	J	10	Un	Ro	IV	CD	Vr		Cly
14.13	FP	35	Un	Sm	V	CD	St		Fe
14.25	FP	30	Un	Sm	V	CD	St		Fe
14.35	J	10	Stp	Ro	I	OP	St		Fe
14.48	J	10	Stp	Ro	I	OP	St		Fe
15.25	J	30	Stp	Ro	I	OP	Cn		

Note: 1. Describe zones and coatings in terms of composition and thickness (mm)

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Detailed Discontinuity Description Log

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Project Name		Cross River Rail				Project No.	FG6470		
Site ID / Borehole No.		CRR718				Surface RL	26.42		
Geologist		M.H.				Date	11/10/2017		
						Page	4	of	7
Traverse Chainage; or Down hole depth (rock core)	Type	Dip ° / Dip Direction °;	Planarity	Roughness	Roughness Class	Aperture	Infilling	Zones ¹	Other
	LP /	or				CD /	Cn /	SZ /	
	BP /	Angle ° from	Stp /	Ro /	I to IX	OP /	St /	CZ /	
	FP /	horizontal	Un /	Sm /		FL /	Vr /	HFZ /	
J etc.	(rock core)	PI	SI			TI	Ct ¹	AZ	
15.32	J/FP	45	Stp	Ro	I	CD	Cn		
15.76	J/FP	30	Stp	Sm	II	CD	St		Fe
15.87	J/FP	10	Stp	Sm	II	CD	Cn		
16.25	J	40	Un	Sm	V	OP	St		Fe
16.44	J	10	Un	Sm	V	OP	St		Fe
16.54	J	30	PI	Sm	VIII	OP/FL	Ct		Cly 30mm
16.62	FP	60	Un	Sm	V	OP	Vr		Cly
16.65	J	40	PI	Sm	VIII	OP	Vr		Cly
16.71	J	15	Un	Ro	IV	CD	Cn		
17.12	J	50	Un	SI	VI	CD	Cn		
17.21	J	30	Un	Sm	V	CD	Cn		
17.36	FP	60	PI	Sm	VIII	CD	Vr		Cly+St Fe
17.44	FP	60	Un	Ro	IV	CD	Vr		Cly
17.50	FP	60	PI	Sm	VIII	CD	St		Fe
17.54	FP	60	PI	Sm	VIII	CD	St		Fe
17.83	FP	50	PI	Sm	VIII	FL	Ct		Cly 5-10mm
17.84	J	45	PI	Sm	VIII	OP	Vr		Cly
18.07	J	25	Un	Sm	V	OP	Vr		Cly
18.10	FP/J	50	Un	Sm	V	CD	Cn		
18.12	J	10	Stp	Ro	I	CD	Cn		
18.68	FP	60	Un	Sm	V	CD	Vr		Cly
18.79	FP	60	PI	Sm	VIII	CD	St		Fe
18.80	J	45	PI	Sm	VIII	CD	St		Fe
19.10	FP	50	PI	SI	IX	CD	St		Fe
19.34	FP/J	45	Stp	Sm	II	CD	Cn		
20.17	J	25	PI	Sm	VIII	OP	St		Fe
20.67	FP	65	PI				St		Fe
21.05	J	5	Stp	Sm	II	OP	St		Fe
21.28	FP	45	PI	Sm	VIII	OP	Cn		
21.29	J	60	PI	Ro	VII	OP	St		Fe + Ct Qz
21.00	J	45	PI				Ct		Qz

Note: 1. Describe zones and coatings in terms of composition and thickness (mm)

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Detailed Discontinuity Description Log

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Project Name		Cross River Rail				Project No.	FG6470		
Site ID / Borehole No.		CRR718				Surface RL	26.42		
Geologist		M.H.				Date	12/10/2017		
						Page	5	of	7
Traverse Chainage; or Down hole depth (rock core)	Type	Dip ° / Dip Direction °;	Planarity	Roughness	Roughness Class	Aperture	Infilling	Zones ¹	Other
	LP /	or				CD /	Cn /	SZ /	
	BP /	Angle ° from	Stp /	Ro /	I to IX	OP /	St /	CZ /	
	FP /	horizontal	Un /	Sm /		FL /	Vr /	HFZ /	
(rock core)	J etc.	(rock core)	PI	SI		TI	Ct ¹	AZ	
21.65	J	10	Un	Ro	IV	OP	Cn		
21.67	FOL	60	PI			FL	Ct		Qz 5-10mm
21.90	J	30	Stp	Sm	III	CD	Cn		
21.93	J	30	Stp	Sm	III	OP	Cn		
22.07	J	10	Stp	Irr	I	OP	Cn		
22.09	J	40	Un	Sm	V	CD	Cn		
22.33	J	10	Stp	Sm	II	CD	Cn		
22.40	J	40	Stp	Sm	II	CD	Cn		
23.40	J	90	Un	Sm	V	CD	Vr	Cal to 23.85m	
23.59	J	35	PI	Sm	VIII	OP	Cn		
23.79	J	10	PI	Sm	VIII	OP	Cn		
23.88	FP	60	PI	Sm	VIII	CD	Cn		
24.14	FP	40	PI	Sm	VIII	CD	Cn		
24.27	J	30	PI	Sm	VIII	CD	Cn		
24.34	FP	45	PI	Sm	VIII	CD	Cn		
24.57	J	10	Un	Sm	V	OP	Cn		BZ 10mm
24.89	FP	55	PI	Sm	VIII	OP	Cn		
25.34	FP	65	PI	Sm	VIII	CD	Cn		
26.07	FP	45	PI	SI	IX	CD	Cn		
26.26	FP	60	PI	SI	IX	CD	Cn		
26.70	J	20	PI	Sm	VIII	CD	Cn		
26.95	FP	50	PI	Sm	VIII	CD	Cn		
27.86	FP	65	PI	SI	IX	CD	Cn		
30.54	J	30	Stp	Sm	II	OP	Cn		
30.61	J	30	PI	SI	IX	OP	Cn		
30.88	J	10	Un	Sm	V	OP	Cn		
32.00	J	25	PI	Sm	VIII	OP	Vr		Cly
33.00	J	60	Un	Sm	V	CD	Cn		
33.68	J	30	Un	Sm	V	OP	Cn		
33.82	J	60	Un	Sm	V	OP	Cn		
33.94	J	5	Stp	Sm	II	OP	Cn		

Note: 1. Describe zones and coatings in terms of composition and thickness (mm)

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Detailed Discontinuity Description Log

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Project Name		Cross River Rail				Project No.		FG6470	
Site ID / Borehole No.		CRR718				Surface RL		26.42	
Geologist		M.H.				Date		12/10/2017	
						Page		6 of 7	
Traverse Chainage; or Down hole depth (rock core)	Type LP / BP / FP / J etc.	Dip ° / Dip Direction °; or Angle ° from horizontal (rock core)	Planarity Stp / Un / Pl	Roughness Ro / Sm / Sl	Roughness Class I to IX	Aperture CD / OP / FL / TI	Infilling Cn / St / Vr / Ct ¹	Zones ¹ SZ / CZ / HFZ / AZ	Other
34.13	J	45	Stp	Irr	I	OP	Cn		
34.16	FP	60	Pl	Sl	IX	CD	Cn		
34.20	J/FP	85	Un	Sm-Sl	VIII-IX	CD	Cn		
34.29	J	5	Un	Sm	V	OP	Cn		
34.34	FP	35	Pl	Sl	IX	CD	Cn		
34.36	FP	35	Pl	Sl	IX	CD	Cn		
34.44	FP	60	Pl	Sm-Sl	VIII-IX	CD	Cn		
34.47	J/FP	30	Un	Sm	V	CD	Cn		
34.73	J	10	Un	Sm	V	CD	Cn		
34.77	FP	30	Pl	Sm	VIII	CD	Cn		
34.93	J	10	Un	Sm	V	CD	Cn		
35.05	J	45	Pl	Sm	VIII	CD	Cn		
35.07	FP	30	Pl	Sl	IX	CD	Cn		
35.29	FP	30	Pl	Sm	VIII	CD	Cn		
35.37	FP	60	Pl	Sl	IX	FL	Ct	SZ	30mm
35.43	J	70	Pl	Sl	IX	OP	Cn		
35.46	J	20	Stp	Irr	I	OP	Cn		
35.92	J	60	Pl	Sm	VIII	CD	FL		Qz 10mm
35.95	J	60	Pl	Sm	VIII	CD	Cn		
35.97	J	50	Pl	Sm	VIII	CD	Cn		
36.08	J	50	Pl	Sm	VIII	OP	Cn		
36.11	J	50	Pl	Sl	IX	OP		SZ	5mm
36.15	FP	30	Stp	Sl	III	OP		SZ	5mm
36.21	J	45	Pl	Sl	IX	OP	Cn	SZ	2mm
36.36	FP	35	Pl	Sl	IX	CD	Cn		
36.92	FP	40	Pl	Sl	IX	CD	Cn		
36.97	FP	40	Stp	Sl	III	CD	Cn		
37.00	FP	40	Pl	Sl	IX	CD	Cn		
37.15	FP	50	Pl	Sm	VIII	CD	Cn		
37.80	J	65	Un	Sm	V	OP	Cn		
39.69	FP	40	Un	Sl	VI	CD	Cn		

Note: 1. Describe zones and coatings in terms of composition and thickness (mm)

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Detailed Discontinuity Description Log

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Project Name		Cross River Rail				Project No.		FG6470		
Site ID / Borehole No.		CRR718				Surface RL		26.42		
Geologist		M.H.				Date		12/10/2017		
						Page		7	of	7
Traverse Chainage; or Down hole depth (rock core)	Type LP / BP / FP / J etc.	Dip ° / Dip Direction °; or Angle ° from horizontal (rock core)	Planarity Stp / Un / Pl	Roughness Ro / Sm / Sl	Roughness Class I to IX	Aperture CD / OP / FL / TI	Infilling Cn / St / Vr / Ct ¹	Zones ¹ SZ / CZ / HFZ / AZ	Other	
39.72	J	45	Stp	Sl	III	CD	Cn			

Note: 1. Describe zones and coatings in terms of composition and thickness (mm)

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