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BOREHOLE RECORD SHEET

Location Number: BH 327

Project Number: 110-12936

Project Name: Cross River Rail

Location: Brisbane

Client: AECOM

Date: 29/01/2022

Page: 1 OF 5

Easting: 502806 Northing: 6961193 RL: 5.51 m
Logger: CS/JI/CB Operator: PD Machine: MC450

Drilling Method	Depth	Graphic	Description	Weathering	Strength Estimated	Defect Spacing	Rec (%)	RQD	Samples and Remarks								
									TC	WB	PR	NHLC	Casing	rs/w/w/w/s/v/s/es	20 60 200 600		
	0.05		PAVER														
	0.20		CONCRETE														
	1.0		GRAVEL (GP Loose, fine to coarse size, grey, with some concrete and brick fragments.)														
	1.70		OBSTRUCTION - BOULDER or COBBLE														
	2.0		Gravely CLAY (CH) Firm, high plasticity, dark grey, fine to coarse size gravel, some cobbles/boulders.														
	3.0		VOID - No resistance to drilling, flush return maintained.														
	4.0																
	5.0																
	5.00		FILL Gravely CLAY (CH) Soft to firm, high plasticity, grey, fine to medium size gravel.														
	6.0																
	6.10		PHYLLITE (XW) Weak, dark grey, with quartz fragments.														
	7.0																
	7.50		PHYLLITE (DW-SW) Weak, dark grey, with quartz fragments.														
	8.0																
	8.80																
	9.0		PHYLLITE Fine grained, dark grey with some white bands and trace orange bands, thinly laminated, with closely spaced fractures, with trace quartz veins and trace pygmy folding.	SW													
	10.0																

Comments:

1) Groundwater not observed. 2) Inclined 20 deg. off vertical towards centre of Albert St. 3) Defect angles not corrected for hole inclination. 4) Borehole grouted on completion.

Water First Noted Water Steady Level

Defects - 1.54m : F,60°,P,R,O,C

Depth (m)
Type Dip (deg)
B - Bedding C - Planar
C - Clay seam D - Curvilinear
D - Discontinuous E - Horizontal
E - Fracture F - Polished
F - Foliation G - Smooth
G - Schistosity H - Subplanar
H - Subplanar I - Open
I - Laminar L - Steeped
L - Curved M - Undulating
M - Irregular N - Vertical
N - Contact O - Vertical
O - Vertical P - Vertical
P - Vertical Q - Quartz
Q - Pyrophyllite R - Fracture
R - Fracture S - Smooth
S - Subplanar T - Steeped
T - Curved U - Undulating
U - Irregular V - Vertical
V - Vertical W - Vertical
W - Vertical X - Quartz
X - Pyrophyllite Y - Unidentified mineral
Y - Unidentified mineral Z - Clean

Weathering Grades

RS - Residual Soil
XW - Extremely weathered
DW - Distinctly weathered
SW - Slightly weathered
FR - Fresh
Rock Strength
VV - Very weak
W - Weak
MS - Moderate
S - Strong
VS - Very strong
ES - Extremely strong

Samples

U50
SPT
Disturbed Sample

Approved:

Date:



BOREHOLE RECORD SHEET

Location Number: BH 327

Project Number: 110-12936

Project Name: Cross River Rail

Location: Brisbane

Client: AECOM

Date: 29/01/2022

Page: 2 OF 5

Easting: 502806 Northing: 6961193 RL: 5.51 m
Logger: CS/JI/CB Operator: PD Machine: MC450

Drilling Method	Depth	Graphic	Description	Weathering	Strength Estimated	Defect Spacing	Rec (%)	RQD	Samples and Remarks											
									RS	WV	W	WS	VS	S	VES	20	60	200	600	
TC	11.0		PHYLLITE Fine grained, dark grey with some white bands and trace orange bands, thinly laminated, with closely spaced fractures, with trace quartz veins and trace pygmy folding. <i>(continued)</i>	SW					96	0										
WB	11.60		PHYLLITE Fine grained, dark grey with some white bands and trace orange bands, thinly laminated, with closely spaced fractures, with some quartz veins and limonite staining from 11.68m to 12.30m and trace pygmy folding.	XW - DW					93	17										
PR	12.0			SW					86	17										
NHLC	13.0								100	40										
Casing	14.0								100	30										
	14.55		PHYLLITE Fine grained, dark grey with some white bands and trace orange bands, thinly laminated, with closely spaced fractures, with trace quartz veins and trace pygmy folding.	SW - FR																
	15.0																			
	16.0																			
	17.0																			
	18.0																			
	19.0																			
	20.0																			

Comments:

1) Groundwater not observed. 2) Inclined 20 deg. off vertical towards centre of Albert St. 3) Defect angles not corrected for hole inclination. 4) Borehole grouted on completion.

Water First Noted Water Steady Level

Defects - 1.54m : F, 60°, P, R, O, C

Depth (m)
Type
B - Bedding
C - Clay seam
D - Discontinuity
E - Erosional
H - Schistosity
I - Interbedded
S - Subplanar
L - Cleavage
R - Fracture
T - Contact
V - Vertical
Z - Unconsolidated Zone
DI - Drilling Induced break

Dip (deg)
C - Curvilinear
D - Discontinuous
P - Polished
F - Filled
R - Rough
N - Nodular
S - Smooth
O - Open
V - Very rough
S - Stain
Q - Quartz
L - Limonite
U - Undulating

Weathering Grades

RS - Residual Soil
XW - Extremely weathered
DW - Distinctly weathered
SW - Slightly weathered
FR - Fresh
Rock Strength
VV - Very weak
W - Weak
MS - Moderate
S - Strong
VS - very strong
ES - Extremely strong

Samples

U50
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Disturbed Sample

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BOREHOLE RECORD SHEET

Location Number: BH 327

Project Number: 110-12936

Project Name: Cross River Rail

Location: Brisbane

Client: AECOM

Date: 29/01/2022

Page: 3 OF 5

Easting: 502806 Northing: 6961193 RL: 5.51 m
Logger: CS/JI/CB Operator: PD Machine: MC450

Drilling Method	Depth	Graphic	Description	Weathering	Strength Estimated	Defect Spacing	Rec (%)	RQD	Samples and Remarks											
									rs	w	w	ns	s	v	es	20	60	200	600	
TC	20.63			SW - FR												86	20			
WB	21.0		PHYLLITE Fine grained, dark grey banded white, thinly laminated, with closely to moderately widely spaced fractures, with some quartz veins and trace ptygmatic folding.																	
PR	22.0																			
NINLC	23.0																			
Casing	24.0																			
	25.0																			
	26.0		PHYLLITE Fine grained, dark grey banded white, laminated to thinly laminated bedding, with closely to moderately widely spaced fractures, with some quartz veins and trace ptygmatic folding.	FR																
	26.00																			
	27.0																			
	28.0																			
	29.0																			
	30.0																			

Comments:

1) Groundwater not observed. 2) Inclined 20 deg. off vertical towards centre of Albert St. 3) Defect angles not corrected for hole inclination. 4) Borehole grouted on completion.

Water First Noted Water Steady Level

Defects - 1.54m : F,60°,P,R,O,C

Depth (m)
Type
B - Bedding
C - Clay seam
D - Discontinuous
E - Erosional
H - Schistosity
L - Laminations
L - Crevices
R - Fracture
T - Contact
V - Vertical
Z - Compacted Zone
DI - Drilling Induced break

Dip (deg)
C - Curvilinear
D - Discontinuous
F - Filled
P - Polished
R - Rough
S - Subplanar
T - Steeped
U - Undulating

Planarity
L - Stickenates
P - Polished
R - Rough
S - Subplanar
T - Steeped
U - Undulating

Roughness
L - Stickenates
P - Polished
R - Rough
S - Smooth
V - Very rough

Aperures
C - Closed
O - Open

Infill
C - Clay
F - Calcite
L - Limonite
Q - Quartz
U - Unconsolidated mineral
W - Weathered rock
X - Calcareous
Z - Clean

Weathering Grades

RS - Residual Soil
XW - Extremely weathered
DW - Distinctly weathered
SW - Strongly weathered
FR - Fresh

Rock Strength

VW - Very weak
W - Weak
MS - Moderate
S - Strong
VS - very strong
ES - Extremely strong

Samples

U50
SPT
Disturbed Sample

Approved:
Date:



BOREHOLE RECORD SHEET

Location Number: BH 327

Project Number: 110-12936

Project Name: Cross River Rail

Location: Brisbane

Client: AECOM

Date: 29/01/2022

Page: 4 OF 5

Easting: 502806 Northing: 6961193 RL: 5.51 m
Logger: CS/JI/CB Operator: PD Machine: MC450

Drilling Method	Depth	Graphic	Description	Weathering	Strength Estimated	Defect Spacing	Rec (%)	RQD	Samples and Remarks										
									TC	WB	PR	NHLC	Casing	20	60	200	600		
	31.0		PHYLLITE Fine grained, dark grey banded white, laminated to thinly laminated bedding, with closely to moderately widely spaced fractures, with some quartz veins and trace pygmy folding. <i>(continued)</i>	FR															30.50 m; B, 20°, P, R, O, Q
	32.0																		31.35 m; J, 85°, P, R, O, Q
	33.0																		31.49 m; B, 20°, S, R, O, Z
	34.0																		31.55 m; B, 18°, S, R, O, L
	35.0																		31.81 m; B, 40°, S, R, O, Z
	36.0																		32.07 m; B, 40°, S, S, O, Z
	37.0																		32.27 m; J, 22°, P, R, O, Z
	38.0																		32.86 m; B, 20°, T, R, O, Z
	39.0																		33.15 m; B, 17°, S, R, O, Z
	40.0																		33.52 m; B, 10°, S, R, O, Z
																			33.64 m; J, 50°, U, R, O, Z
																			33.76 m; J, 26°, T, R, O, Z
																			34.25 m; B, 20°, S, S, O, Z
																			34.35 m; B, 50°, P, V, O, Z
																			34.59 m; B, 18°, S, R, O, Z
																			34.80 m; B, 10°, P, R, O, Z
																			35.11 m; B, 25°, S, R, O, Z
																			35.29 m; B, 20°, P, S, O, Z
																			35.38 m; B, 30°, U, S, O, Z
																			36.21 m; B, 30°, P, R, O, Z
																			36.67 m; B, 41°, P, S, O, Z
																			36.83 m; J, 20°, U, R, O, Z
																			36.91 m; B, 30°, S, S, O, Z
																			37.38 m; J, 10°, P, R, O, Z
																			37.51 m; J, 20°, T, R, O, Z
																			37.63 m; J, 15°, T, R, O, Z
																			37.77 m; B, 25°, S, S, O, Z
																			38.13 m; B, 20°, P, R, O, Z
																			38.21 m; B, 10°, P, R, O, Z
																			38.24 m; J, 10°, T, R, O, Z
																			38.33 m; B, 15°, T, R, O, Z
																			38.36 m; J, 5°, S, V, O, Z
																			38.48 m; B, 30°, P, R, O, Z
																			38.84 m; B, 22°, P, R, O, Z
																			39.09 m; B, 35°, S, R, O, W
																			39.21 m; J, 15°, T, R, O, Z
																			39.48 m; B, 40°, P, S, O, Z
																			39.67 m; B, 30°, S, S, O, Z
																			39.83 m; B, 40°, P, R, O, Z

Comments:

1) Groundwater not observed. 2) Inclined 20 deg. off vertical towards centre of Albert St. 3) Defect angles not corrected for hole inclination. 4) Borehole grouted on completion.

Water First Noted Water Steady Level

Defects - 1.54m : F, 60°, P, R, O, C

Depth (m)
Type (m)
Dip (deg)
Dip (deg)
Planar
Curvilinear
Discontinuous
Polished
Filled
Rough
Smooth
Subplanar
Steeped
Very rough
Stain
Cleavage
Fracture
Contact
Vein
Composed Zone
Drilling Induced break

Roughness
Slippage
Closed
Open
Aptil
Clay
Oxide
Calcareous
Limestone
Quartz
Spatular
Unidentified mineral
Weathered rock
Calcareous
Clean

Weathering Grades

RS - Residual Soil
XW - Extremely weathered
DW - Distinctly weathered
SW - Slight weathered
FR - Fresh
Rock Strength
VV - Very weak
W - Weak
MS - Moderate strong
S - Strong
VS - Very strong
ES - Extremely strong

Samples

U50
SPT
Disturbed Sample

Approved:
Date:



BOREHOLE RECORD SHEET

Location Number: BH 327

Project Number: 110-12936

Project Name: Cross River Rail

Location: Brisbane

Client: AECOM

Date: 29/01/2022

Page: 5 OF 5

Easting: 502806 Northing: 6961193 RL: 5.51 m
Logger: CS/JI/CB Operator: PD Machine: MC450

Drilling Method	Depth	Graphic	Description	Weathering	Strength Estimated	Defect Spacing	Rec (%)	RQD	Samples and Remarks										
									RS	XW	DW	MS	S	VSES	20	60	200	600	
TC	41.0	wavy	PHYLLITE Fine grained, dark grey banded white, laminated to thinly laminated bedding, with closely to moderately widely spaced fractures, with some quartz veins and trace pygmy folding. <i>(continued)</i>	FR	Very weathered	100	72		40.10 m; B, 50°, P, S, O, Z 40.20 m; J, 10°, C, R, O, Z 40.38 m; J, 5°, U, R, O, Z 40.52 m; B, 21°, P, R, O, Z 40.66 m; B, 41°, P, R, O, Z										
WB	42.0	wavy							41.11 m; B, 30°, P, R, O, Z 41.17 m; J, 5°, S, S, O, Z 41.31 m; J, 30°, P, R, O, O 41.40 m; B, 30°, P, R, O, W 41.47 m; B, 25°, P, S, O, Z										
PR	43.0	wavy							42.38 m; B, 10°, T, R, O, Z 42.57 m; B, 20°, P, S, O, Z										
NINLC	44.0	wavy							43.17 m; DI, 5°, T, S, O, Z 43.35 m; J, 10°, T, S, O, Z 43.52 m; B, 20°, P, S, O, Z 43.76 m; B, 20°, P, R, O, Z										
Casing	44.65	wavy							44.25 m; B, 30°, P, R, O, Z 44.44 m; B, 12°, S, S, O, Z										
			BOREHOLE BH 327 TERMINATED AT 44.65 m						44.61 m; B, 10°, P, R, O, Z										
	45.0																		
	46.0																		
	47.0																		
	48.0																		
	49.0																		
	50.0																		

SOIL SURVEYS 00 LIBRARY 2012-05.GLB Log SOIL SURVEY BOREHOLE LOG 111-12936 NEW.GPJ <>DrawingFile>> 2/10/2012 14:34 8:30:00Z Developed by Dugel

Comments:

1) Groundwater not observed. 2) Inclined 20 deg. off vertical towards centre of Albert St. 3) Defect angles not corrected for hole inclination. 4) Borehole grouted on completion.

Water First Noted Water Steady Level

Defects - 1.54m : F, 60°, P, R, O, C

Depth (m) Type Dip (deg) Planar? Curvilinear? Roughness Slitkeness Apertures Infill
A - Bedding C - Clay seam D - Discontinuous L - Smooth C - Closed F - Filled C - Clay
B - Joint H - Schistosity E - Horizontal P - Polished N - Very rough N - Calcite L - Limonite
G - Gouge S - Subplanar S - Smooth O - Open Q - Quartz U - Unidirectional mineral U - Unidentified mineral W - Weathered rock X - Calcareous
L - Cleavage T - Steeped V - Very rough S - Stain Z - Clean Z - Clean

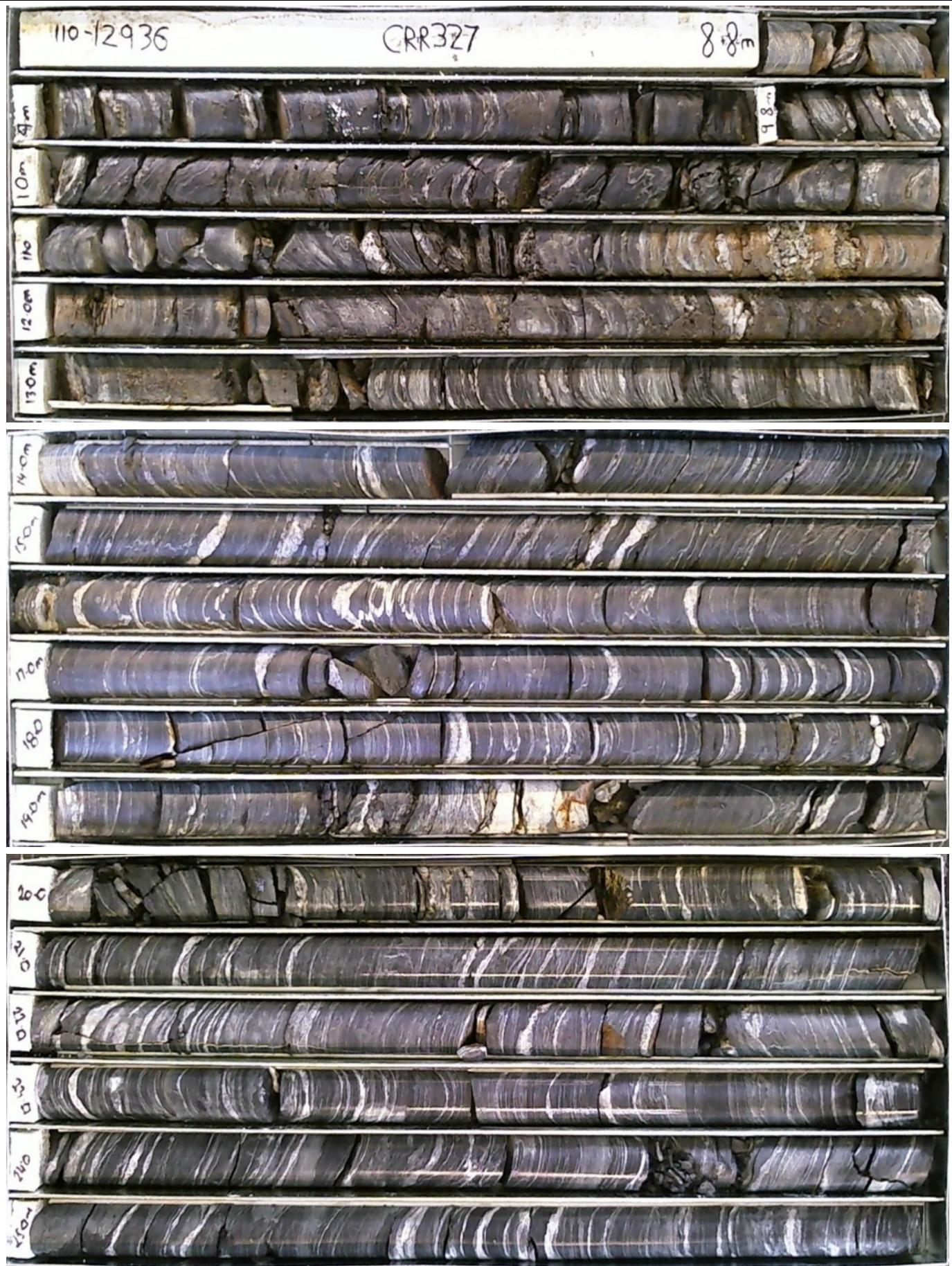
Weathering Grades

RS - Residual Soil
XW - Extremely weathered
DW - Distinctly weathered
SW - Slightly weathered
FR - Fresh
Rock Strength
VV - Very weak
W - Weak
MS - Moderate
S - Strong
VS - Very strong
ES - Extremely strong

Samples

U50 SPT Disturbed Sample

Approved:
Date:



TITLE

AECOM
Brisbane
Cross River Rail
Core Photo - BH 327

DRAWN

DT

DATE

26/04/2012

CHECKED

CB

DATE

26/04/2012

SCALE

Not To Scale

A4

PROJECT No

110-12936

FIGURE No

1/2



TITLE

AECOM
Brisbane
Cross River Rail
Core Photo - BH 327

DRAWN

DT

DATE

26/04/2012

CHECKED

CB

DATE

26/04/2012

SCALE

Not To Scale

A4

PROJECT No

110-12936

FIGURE No

2/2

IN-SITU PACKER PERMEABILITY TEST RESULT

PROJECT: CRR **BH No.:** 327 **Packer type:** Double
PROJECT No.: 110-12936 **Test No.:** 1 **Packer pressure:** 3000kPa
Date: 1/02/2012 **Gauge pressures measured in:** kPa
Tested by: CS

Vertical depth to:	Top of test section (m):	36.00
	Base of test section (m):	37.50
	Centre of test section(m):	36.75
	Base of casing (m):	35.00
	Ground water (m)	NR

Depth of centre of test section (m)	36.75
Length of test section (m):	1.50
Gauge Height above ground level	0.00
Hole Diameter in test section (mm)	75

1st period	Time (mins)	0	5	10	15	Average
Gauge Pressure 150	Flow reading	1459.0	1459.2	1459.5	1459.6	Flow (l/min) 0.040
	Water Take	0.00	0.20	0.30	0.10	
2nd period Gauge Pressure 250	Time (mins)	0	5	10	15	Average Flow (l/min) 0.200
	Flow reading	1463.0	1464.0	1465.5	1466.0	
	Water Take	0.00	1.00	1.50	0.50	
3rd period Gauge Pressure 450	Time (mins)	0	5	10	15	Average Flow (l/min) 0.080
	Flow reading	1466.8	1466.9	1467.3	1468.0	
	Water Take	0.00	0.10	0.40	0.70	
4th period Gauge Pressure 250	Time (mins)	0	5	10	15	Average Flow (l/min) 0.000
	Flow reading	1465.0	1465.0	1465.0	1465.0	
	Water Take	0.00	0.00	0.00	0.00	
5th period Gauge Pressure	Time (mins)	0	5	10	15	Average Flow (l/min) 0.000
	Flow reading					
	Water Take	0.00	0.00	0.00	0.00	

Period	Flow (q) (l/min)	Gauge Press (kPa)	Gauge Press (m of water)	Friction Loss (m)*		Total Head (m)	Lugeon Value	Perm. (m/s)
				Basic	In extra rods			
1st	0.040	150.00	15.330	0.000	0.000	52.080	0.052	5.00E-09
2nd	0.200	250.00	25.550	0.000	0.000	62.300	0.219	2.09E-08
3rd	0.080	450.00	45.990	0.000	0.000	82.740	0.066	6.30E-09
4th	0.000	250.00	25.550	0.000	0.000	62.300	0.000	0.00E+00
5th	0.000	0.00	0.000	0.000	0.000	36.750	0.000	0.00E+00

*Where friction loss is assumed to be negligible.

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

Note - inclined hole - test depth along axis of hole

IN-SITU PACKER PERMEABILITY TEST RESULT

PROJECT: CRR **BH No.:** 327
PROJECT No.: 110-12936 **Test No.:** 2
Date: 1/02/2012

Packer type: Double
Packer pressure: 2000kPa
Gauge pressures measured in: kPa
Tested by: CB

Vertical depth to:	Top of test section (m):	26.00
	Base of test section (m):	27.50
	Centre of test section(m):	26.75
	Base of casing (m):	25.00
	Ground water (m)	NR

Depth of centre of test section (m)	26.75
Length of test section (m):	1.50
Gauge Height above ground level	0.00
Hole Diameter in test section (mm)	75

1st period	Time (mins)	0	5	10	15	Average
Gauge Pressure 100	Flow reading	1470.0	1472.0	1474.5	1476.0	Flow (l/min) 0.400
	Water Take	0.00	2.00	2.50	1.50	
2nd period Gauge Pressure 150	Time (mins)	0	5	10	15	Average Flow (l/min) 0.467
	Flow reading	1477.0	1480.0	1482.5	1484.0	
3rd period Gauge Pressure 250	Water Take	0.00	3.00	2.50	1.50	0.467
	Time (mins)	0	5	10	15	
Gauge Pressure 250	Flow reading	1484.0	1488.0	1490.0	1492.0	1733.800
	Water Take	0.00	4.00	2.00	2.00	
4th period Gauge Pressure 400	Time (mins)	0	5	10	15	Average Flow (l/min) 0.067
	Flow reading	1492.0	1492.1	1492.4	1493.0	
5th period Gauge Pressure 200	Water Take	0.00	0.10	0.30	0.60	0.067
	Time (mins)	0	5	10	15	
Gauge Pressure 200	Flow reading	1491.0	1491.0	1491.0	1491.0	Average Flow (l/min) 0.000
	Water Take	0.00	0.00	0.00	0.00	

Period	Flow (q) (l/min)	Gauge Press (kPa)	Gauge Press (m of water)	Friction Loss (m)*		Total Head (m)	Lugeon Value	Perm. (m/s)
				Basic	In extra rods			
1st	0.400	100.00	10.220	0.000	0.000	36.970	0.737	7.05E-08
2nd	0.467	150.00	15.330	0.000	0.000	42.080	0.755	7.22E-08
3rd	0.533	250.00	25.550	0.000	0.000	52.300	0.694	6.64E-08
4th	0.067	400.00	40.880	0.000	0.000	67.630	0.067	6.42E-09
5th	0.000	200.00	20.440	0.000	0.000	47.190	0.000	0.00E+00

*Where friction loss is assumed to be negligible.

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

Note - inclined hole - test depth along axis of hole