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Drilling Method				Depth	Graphic	Description	Weathering	Strength Estimated	Defect Spacing	Rec (%)	RQD	Samples and Remarks
TC	WB	RR	NM/LC									
				1.0		SILT (ML) low plasticity, dark grey and black.						
				2.0								
				3.0								
				4.0								
				5.0								
				6.0								
				7.0								
				8.0								
				9.0								
				10.0								

SOIL SURVEYS 00:LIBRARY 2012:05:G.LB Log SOIL SURVEY BOREHOLE LOG 111-12936 NEW.GPJ <<DrawingFiles>> 21/05/2012 14:32 8.30.002 Developed by Dargel

Comments:
1) Drilled from floating barge - all depths measured from river bed level. 2) Note: the coring method used was NQ3 not NM/LC. 3) Borehole grouted on completion.

Defects - 1.54m : F,60° P,R,O,C

Depth (m)	Type	Dip (deg)	Planarity	Roughness	Aperture	Width
B - Bedding	C - Curvilinear	P - Polished	F - Filled	F - Iron Oxide		
C - Clay seam	D - Discontinuous	R - Rough	N - Clean	K - Calcite		
F - Foliation	P - Planar	S - Smooth	O - Open	L - Limonite		
H - Schistosity	S - Subplanar	V - Very rough	S - Stain	Q - Quartz		
J - Joint	T - Stepped			S - Secondary mineral		
L - Cleavage	U - Undulating			U - Unidentified mineral		
R - Fracture				W - Weathered rock		
S - Shear zone				X - Carbonaceous		
T - Contact				Z - Clean		
V - Vein						
Z - Decomposed Zone						
DI - Drilling induced break						

Weathering Grades

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

Rock Strength

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

Samples

U50
SPT
Disturbed Sample

Approved: _____
Date: _____



Easting: 503128 Northing: 6960960 RL: -1.74 m
Logger: CS/DT Operator: SO Machine: Scout 2

Drilling Method				Depth	Graphic	Description	Weathering	Strength Estimated	Defect Spacing	Rec (%)	RQD	Samples and Remarks
TC	WB	FR	Casing									
				11.0								



Easting: 503128 Northing: 6960960 RL: -1.74 m
Logger: CS/DT Operator: SO Machine: Scout 2

Drilling Method				Depth	Graphic	Description	Weathering	Strength Estimated	Defect Spacing	Rec (%)	RQD	Samples and Remarks
TC	WB	FR	Casing									
				21.0		Sandy CLAY (CH) high plasticity, black and white speckled, fine grained sand. (continued)						
				22.0								
				23.0								
				23.50								
				24.0		PHYLLITE, fine grained, dark blue grey, banded pale grey, foliated, fragmented to closely spaced fractures. Quartzite from 24.62m to 24.68m. Unidentifiable oxides/sulphides present in defects, with some quartz veins.	SW			99	13	23.80 m; DI, 12°, P, R, O, Z
				25.0			SW - FR					23.89-24.74 m; J, 81° - 87°, S, R, O, Z
				25.90								25.1m, Is50 = 1.15 MPa
				26.0		QUARTZITE, fine grained, pale grey, medium bedded, very closely spaced to closely spaced fractures, trace of quartz veins.				98	59	25.76 m; F, 8°, P, S, O, Z
				26.49		Interbedded METASILTSTONE and METASANDSTONE, fine grained, alternating pale green grey and dark grey, banded pale grey, thinly laminated to laminated bedding, closely spaced to moderately widely spaced fractures.	FR					26.27m, Is50 = 2.05 MPa
				27.0								24.82-27.89 m; F, 30° - 40°, P, S, O, Z
				27.87								26.78 m; F, 5°, S, R, O, Z
				28.0		PHYLLITE, fine grained, dark blue grey, banded pale grey, foliated, fragmented to closely spaced fractures. Unidentifiable oxides/sulphides present in defects, with some quartz veins.						27.55m, Is50 = 0.78 MPa
				28.34								27.65m, Is50 = 0.82 MPa
				28.68		QUARTZITE, fine grained, pale grey, cryptocrystalline, medium bedded, very closely spaced to closely spaced fractures.						27.92-28.67 m; J, 75° - 83°, S, R, O, Z
				29.0		PHYLLITE, fine grained, dark blue grey, banded pale grey, foliated, fragmented to closely spaced fractures, trace of pygmatic folds, with some quartz veins.						28.56 m; V, 25°, P, S, C, Q
				29.00								28.73 m; F, 10°, P, S, O, Z
				30.0								28.79 m; V, 4°, P, S, C, Q
												28.93 m; F, 34°, P, S, O, Z
												29.15 m; DI, 3°, S, R, O, Z
												29.23 m; F, 34°, P, S, O, Z
												29.32 m; F, 34°, P, S, O, Z
												29.36 m; J, 25°, P, R, O, Z
												29.7m, Is50 = 1.1 MPa

Comments:
1) Drilled from floating barge - all depths measured from river bed level. 2) Note: the coring method used was NQ3 not NMLC. 3) Borehole grouted on completion.

Defects - 1.54m : F, 60°, P, R, O, C

Depth (m)	Type	Dip (deg)	Planarity	Roughness	Aperture	Fill
	B - Bedding		C - Curvilinear	L - Slickensides	C - Closed	C - Clay
	F - Foliation		D - Discontinuous	P - Polished	F - Filled	F - Iron Oxide
	H - Schistosity		P - Planar	R - Rough	N - Clean	K - Calcite
	J - Joint		S - Subplanar	S - Smooth	O - Open	L - Limonite
	L - Cleavage		T - Stepped	V - Very rough	S - Stain	Q - Quartz
	R - Fracture		U - Undulating			S - Secondary mineral
	S - Shear zone					U - Unidentified mineral
	T - Contact					W - Weathered rock
	V - Vein					X - Carbonaceous
	Z - Decomposed Zone					Z - Clean
	DI - Drilling induced break					

Weathering Grades

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

Rock Strength

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

Samples

U50

SPT

Disturbed Sample

Approved: _____
Date: _____

SOIL SURVEYS 00: LIBRARY 2012:05:GLB Log SOIL SURVEY BOREHOLE LOG 111-12936 NEW.GPJ <<DrawingFiles>> 21/05/2012 14:33 8.30.002 Developed by Datigel



Drilling Method				Depth	Graphic	Description	Weathering	Strength Estimated	Defect Spacing	Rec (%)	RQD	Samples and Remarks	
TC	WB	FR	NMLC										
				30.10		QUARTZITE, fine grained, pale grey, medium bedded, very closely spaced to closely spaced fractures, thin beds of phyllite present from 29.14m to 29.16m and 29.29m to 29.38m, some Metasediment laminae. (continued)	FR			99	56	29.94-30.75 m; FDI, 20 - 30°, S, S, O, Z 29.81-31.38 m; DI, 5 - 24°, S, R, O, Z	
				31.0		METASEDIMENT, fine grained, alternating, pale green grey and dark grey, banded pale grey, thinly laminated to laminated bedding, closely spaced fractures. Various interbedded Metasediments.							
				32.0		Interbedded QUARTZITE and PHYLLITE, fine grained, alternating dark grey and pale green grey, thinly to medium bedded, extremely closely to closely spaced fractures, clay rich band from 33.40m to 33.51m, trace of ptygmatic folds with some quartz veins.				100	38	31.57 m; FDI, 33°, P, S, O, Z 31.61 m; J, 65°, P, S, O, Z 31.75 m; DI, 16°, P, R, O, Z 31.88 m; F, 65°, P, S, O, Z 31.94 m; F, 34°, P, S, O, Z 32.29 m; F, 23°, P, S, O, Z	
				33.0									32.64 m; J, 65°, P, S, O, C 32.67 m; F, 53°, P, S, O, Z 32.75 m; J, 66°, P, S, O, Z
				34.0			XW FR						
				35.0						97	59	34.75 m; J, 89°, S, R, O, Z 35.28 m; J, 35°, P, R, O, Z 35.34 m; J, 60°, P, R, O, Z 35.5m, Is50 = 1.21 MPa	
				36.0									35.64 m; J, 35°, P, S, O, Z 32.87-38.55 m; F, 35 - 40°, P, S, O, Z 35.77 m; J, 72°, S, R, O, Z 36.2m, Is50 = 0.47 MPa
				36.70									
				37.0		QUARTZITE, fine grained, pale grey, cryptocrystalline, medium bedded, closely spaced fractures.							37.25m, Is50 = 2.04 MPa
				37.42									
				38.0		PHYLLITE, fine grained, dark blue grey, banded pale grey, foliated, fragmented to closely spaced fractures. Quartzite from 38.90m to 39.20m and 40.45m to 40.56m, with some quartz veins, trace ptygmatic folds.				99	75	38.04 m; J, 74°, S, R, O, Z 38.11 m; V, 68°, P, S, C, Q 38.46 m; J, 85°, P, R, O, Z 38.61 m; V, 76°, P, R, C, Q 38.71 m; DI, 80°, S, R, O, Z 38.82 m; F, 34°, P, S, O, Z 38.94 m; DI, 74°, S, R, O, Z 39.12 m; F, 30°, P, R, O, Z	
				39.0									39.36 m; V, 60°, P, S, C, Q 39.40 m; V, 60°, P, S, C, Q
				40.0						100	79		

Comments:
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Defects - 1.54m : F, 60°, P, R, O, C

Depth (m)	Type	Dip (Deg)	Planarity	Roughness	Aperture	Fill
	B - Bedding		C - Curvilinear	L - Slickensides	C - Closed	C - Clay
	C - Clay seam		D - Discontinuous	P - Polished	F - Filled	F - Iron Oxide
	F - Foliation		P - Planar	R - Rough	N - Clean	K - Calcite
	H - Schistosity		S - Subplanar	S - Smooth	O - Open	L - Limonite
	J - Joint		T - Stepped	V - Very rough	S - Stain	Q - Quartz
	L - Cleavage		R - Fracture			S - Secondary mineral
	R - Fracture		S - Shear zone			U - Unidentified mineral
	T - Contact		V - Vein			W - Weathered rock
	Z - Decomposed Zone		DI - Drilling induced break			X - Carbonaceous
						Z - Clean

Weathering Grades

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

Rock Strength

VW - Very weak
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ES - Extremely strong

Samples

U50
SPT
Disturbed Sample

Approved: _____
Date: _____

SOIL SURVEYS 00:LIBRARY 2012:05:G.LB Log SOIL SURVEY BOREHOLE LOG 111-12936 NEW.GPJ <<DrawingFiles>> 21/05/2012 14:33 8.30.002 Developed by Datigel



Drilling Method				Depth	Graphic	Description	Weathering	Strength Estimated	Defect Spacing	Rec (%)	RQD	Samples and Remarks
TC	WB	RR	NM/LC									
				41.0	40.92	PHYLLITE, fine grained, dark blue grey, banded pale grey, foliated, fragmented to closely spaced fractures. Quartzite from 38.90m to 39.20m and 40.45m to 40.56m, with some quartz veins, trace ptymatic folds. (continued)	FR					40.50 m; J, 80°, S, R, O, Z 40.65m, Is50 = 0.27 MPa
				42.0	41.85	QUARTZITE, fine grained, pale grey, cryptocrystalline, medium bedded, closely spaced fractures.				100	79	41.25m, Is50 = 1.48 MPa
				43.0		Interbedded QUARTZITE and PHYLLITE, fine grained, alternating dark grey and pale green grey, banded pale grey, thinly to medium bedded, extremely closely to moderately widely spaced fractures, with some quartz veins.						
				44.0	43.80	QUARTZITE, fine grained, pale grey, cryptocrystalline, medium bedded, closely spaced fractures.						43.10 m; J, 64°, S, R, O, Z 43.53 m; DI, 6°, S, R, O, Z 43.76 m; T, 78°, S, R, O, Z
				45.0	44.58	PHYLLITE, fine grained, dark grey, banded pale grey, foliated, very closely to closely spaced fractures, with some quartz veins.				97	53	44.15m, Is50 = 1.51 MPa 44.28 m; J, 35°, S, R, O, Z
				46.0	45.60	PHYLLITE, fine grained, pale green grey, banded pale grey, foliated, very closely to moderately widely spaced fractures, with some quartz veins and quartzite lenses.						45.42m, Is50 = 1.46 MPa 39.73-51.00 m; FDI, 34 - 45°, P, S, O, Z
				47.0						100	73	46.60 m; DI, 22°, P, R, O, Z 46.77 m; DI, 5°, P, R, O, Z
				48.0	47.71	QUARTZITE, fine grained, pale grey, cryptocrystalline, medium bedded, closely spaced to moderately widely spaced fractures.						47.91m, Is50 = 1.53 MPa
				49.0	48.28	PHYLLITE, fine grained, dark blue grey, banded pale grey, foliated, moderately widely spaced fractures. Oxides/sulphides visible in some defects, with some quartz veins, trace ptymatic folds.						48.65 m; DI, 3°, S, V, O, Z 48.86 m; DI, 6°, S, V, O, Z 49.1m, Is50 = 0.36 MPa
				50.0						100	93	49.89 m; J, 30°, P, S, O, Z

Comments:
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Defects - 1.54m : F,60°,P,R,O,C

Depth (m)	Type	Dip (Deg)	Planarity	Roughness	Aperture	Fill
	B - Bedding		C - Curvilinear	L - Slickensides	C - Closed	C - Clay
	C - Clay seam		D - Discontinuous	P - Polished	F - Filled	F - Iron Oxide
	F - Faultion		P - Planar	R - Rough	N - Clean	K - Kaolinite
	H - Schistosity		S - Subplanar	S - Smooth	O - Open	L - Limonite
	J - Joint		T - Stepped	V - Very rough	S - Stain	Q - Quartz
	L - Cleavage		R - Fracture			S - Secondary mineral
	R - Fracture		S - Shear zone			U - Unidentified mineral
	T - Contact		Z - Decomposed Zone			W - Weathered rock
	V - Vein		DI - Drilling induced break			X - Carbonaceous
	Z - Decomposed Zone					Z - Clean

Weathering Grades

RS - Residual Soil
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Rock Strength

VW - Very weak
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MS - Medium strong
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Samples

U50
SPT
Disturbed Sample

Approved: _____
Date: _____

SOIL SURVEYS 00:LIBRARY 2012:05:G.LB Log SOIL SURVEY BOREHOLE LOG 111-12936 NEW.GPJ <<DrawingFiles>> 2/10/2012 14:33 8.30.002 Developed by Datigel



Easting: 503128 Northing: 6960960 RL: -1.74 m
Logger: CS/DT Operator: SO Machine: Scout 2

Drilling Method				Depth	Graphic	Description	Weathering	Strength Estimated	Defect Spacing	Rec (%)	RQD	Samples and Remarks	
TC	WB	FR	NMLC										
				51.0 - 51.00		PHYLLITE, fine grained, dark blue grey, banded pale grey, foliated, moderately widely spaced fractures. Oxides/sulphides visible in some defects, with some quartz veins, trace pygmatic folds. (continued)	FR			100	93	50.75m, Is50 = 0.62 MPa	
				52.0		BOREHOLE BH 315 TERMINATED AT 51.00 m							
				53.0									
				54.0									
				55.0									
				56.0									
				57.0									
				58.0									
				59.0									
				60.0									

Comments:
1) Drilled from floating barge - all depths measured from river bed level. 2) Note: the coring method used was NQ3 not NMLC. 3) Borehole grouted on completion.

Defects - 1.54m : F,60° P,R,O,C

Depth (m)	Type	Dip (Deg)	Planarity	Roughness	Aperture	Width
	B - Bedding		C - Curvilinear	L - Slickensides	C - Closed	C - Clay
	C - Clay seam		D - Discontinuous	P - Polished	F - Filled	F - Iron Oxide
	F - Foliation		P - Planar	R - Rough	N - Clean	K - Kaolinite
	H - Schistosity		S - Subplanar	S - Smooth	O - Open	L - Limonite
	J - Joint		T - Stepped	V - Very rough	S - Stain	Q - Quartz
	L - Cleavage		U - Undulating			S - Secondary mineral
	R - Fracture					U - Unidentified mineral
	S - Shear zone					W - Weathered rock
	T - Contact					X - Carbonaceous
	V - Vein					Z - Clean
	Z - Decomposed zone					
	DI - Drilling induced break					

Weathering Grades

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Rock Strength

VW - Very weak
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S - Strong
VS - Very strong
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Samples

U50

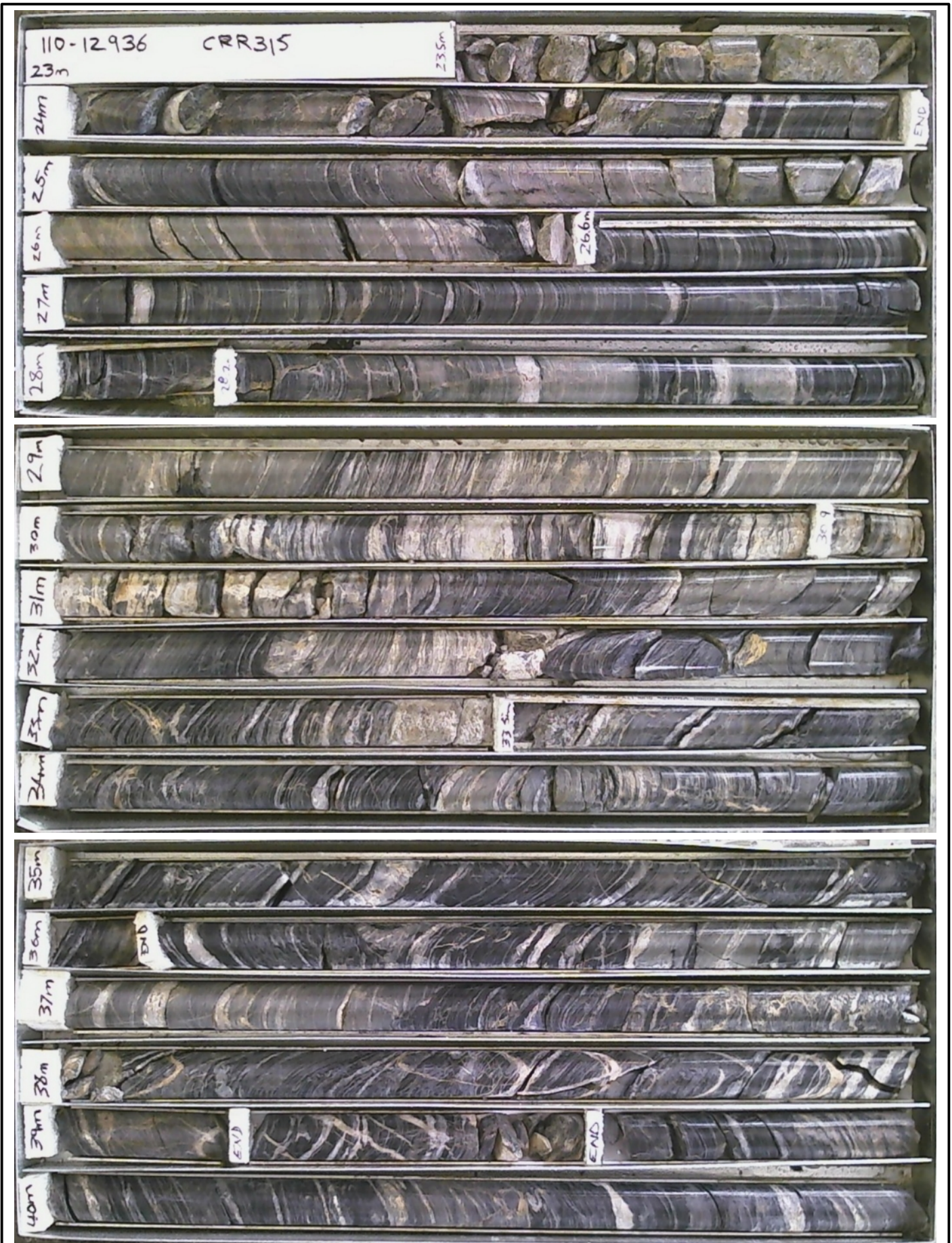
SPT

Disturbed Sample

Approved: _____
Date: _____

SOIL SURVEYS 00: LIBRARY 2012:05:G.LB Log SOIL SURVEY BOREHOLE LOG 111-12936 NEW.GPJ <<DrawingFiles>> 21/05/2012 14:33 8.30.002 Developed by Dargel

SOIL_SURVEYS_00.LIBRARY.GLB.Grctbl.DG PHOTO CORE PHOTO 4 PER PAGE 111-12936 NEW.GPJ <<DrawingFile>> 26/04/2012 14:47 8.2.856 Developed by Datgel



TITLE

AECOM
Brisbane
Cross River Rail
Core Photo - BH 315

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

SOIL_SURVEYS.00.LIBRARY.GLB.Grfctbl.DG.PHOTO.CORE.PHOTO.4.PER.PAGE.111-12936.NEW.GPJ <<DrawingFile>> 26/04/2012 14:47 8.2.856 Developed by Datgel



TITLE

AECOM
Brisbane
Cross River Rail
Core Photo - BH 315

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**
PROJECT No.: **110-12936**

BH No.: **315**
Test No.: **1**
Date: **11/01/2012**

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

Vertical depth to:
(below river bed)

Top of test section (m):	37.00
Base of test section (m):	39.50
Centre of test section(m):	38.25
Base of casing (m):	36.00
Ground water (m)	TIDAL

Depth of centre of test section (m):	38.25
Length of test section (m):	2.50

Gauge Height above ground level (m):	
Hole Diameter in test section (mm)	75

1st period	Time (mins)	0	5	10	15	Average
Gauge Pressure 150	Flow reading	1060.5	1060.5	1060.5	1060.5	Flow (l/min)
	Water Take	0.00	0.00	0.00	0.00	0.000
2nd period	Time (mins)	0	5	10	15	Average
	Gauge Pressure 300	Flow reading	1061.0	1061.0	1061.0	1061.0
Water Take		0.00	0.00	0.00	0.00	0.000
3rd period	Time (mins)	0	5	10	15	Average
	Gauge Pressure 450	Flow reading	1065.5	1066.0	1066.5	1067.5
Water Take		0.00	0.50	0.50	1.00	0.133
4th period	Time (mins)	0	5	10	15	Average
	Gauge Pressure 300	Flow reading	1067.5	1067.5	1067.5	1067.5
Water Take		0.00	0.00	0.00	0.00	0.000
5th period	Time (mins)	0	5	10	15	Average
	Gauge Pressure 150	Flow reading	1066.0	1066.0	1066.0	1066.0
Water Take		0.00	0.00	0.00	0.00	0.000

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	0.000	150.00	15.330	0.000	0.000	53.580	0.000	0.00E+00
2nd	0.000	300.00	30.660	0.000	0.000	68.910	0.000	0.00E+00
3rd	0.133	450.00	45.990	0.000	0.000	84.240	0.065	7.04E-09
4th	0.000	300.00	30.660	0.000	0.000	68.910	0.000	0.00E+00
5th	0.000	150.00	15.330	0.000	0.000	53.580	0.000	0.00E+00

*Where friction loss is assumed to be negligible.

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

IN-SITU PACKER PERMEABILITY TEST RESULT

PROJECT: CRR
PROJECT No.: 110-12936

BH No.: 315
Test No.: 2
Date: 11/01/2012

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

Vertical depth to:
(below river bed)

Top of test section (m):	28.00
Base of test section (m):	30.50
Centre of test section(m):	29.25
Base of casing (m):	27.00
Ground water (m)	TIDAL

Depth of centre of test section (m):	29.25
Length of test section (m):	2.50

Gauge Height above ground level (m):	
Hole Diameter in test section (mm)	75

1st period	Time (mins)	0	5	10	15	Average
Gauge Pressure 100	Flow reading	1069.8	1070.0	1070.6	1071.1	Flow (l/min)
	Water Take	0.00	0.20	0.60	0.50	0.087
2nd period	Time (mins)	0	5	10	15	Average
	Gauge Pressure 200	Flow reading	1072.5	1072.8	1073.0	1073.4
	Water Take	0.00	0.30	0.20	0.40	0.060
3rd period	Time (mins)	0	5	10	15	Average
	Gauge Pressure 300	Flow reading	1074.5	1074.5	1075.5	1075.5
	Water Take	0.00	0.00	1.00	0.00	0.067
4th period	Time (mins)	0	5	10	15	Average
	Gauge Pressure 200	Flow reading	1075.4	1075.4	1075.4	1075.4
	Water Take	0.00	0.00	0.00	0.00	0.000
5th period	Time (mins)	0	5	10	15	Average
	Gauge Pressure 100	Flow reading	1075.3	1075.3	1075.3	1075.3
	Water Take	0.00	0.00	0.00	0.00	0.000

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	0.087	100.00	10.220	0.000	0.000	39.470	0.090	9.77E-09
2nd	0.060	200.00	20.440	0.000	0.000	49.690	0.049	5.37E-09
3rd	0.067	300.00	30.660	0.000	0.000	59.910	0.045	4.95E-09
4th	0.000	200.00	20.440	0.000	0.000	49.690	0.000	0.00E+00
5th	0.000	100.00	10.220	0.000	0.000	39.470	0.000	0.00E+00

*Where friction loss is assumed to be negligible.

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