Queensland Government
Department of Main Roads

ENGINEERING BOREHOLE

FOR GEOTECHNICAL TERMS AND SYMBOLS REFER FORM F:GEOT 017/2-2004

BOREHOLE No BH18
SHEET 1 of 13
REFERENCE No H9567

PROJECT GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION
LOCATION PIER 7 - NORTHERN FACE OF PILE CAP- DOWNSTREAM/RIGHT HAND SIDE COORDINATES 10216.9 E; 167963.9 N
PROJECT No FG5388 SURFACE R.L. -3.74 DATE STARTED 02/04/05 DATUM SETP
JOB No DATUM AHD DATE COMPLETED 08/04/05 DRILLER CAIRNS DRILLING

DEPTH (m)	R.L. (m)	CASING / WASH BORING / CORE DRILLING	RQD ( )% CORE REC %	SAMPLE	MATERIAL DESCRIPTION	LITHOLOGY	USC	WEATHERING	INTACT STRENGTH (EH VH H M L VL EL)	DEFECT SPACING (mm) (20 60 200 600 2000)	GRAPHIC LOG	ADDITIONAL DATA AND TEST RESULTS	SAMPLES / TESTS
0	-3.74				**ESTUARINE SILTY CLAY** Dark grey, moist to mainly wet, very soft to soft.		OH						
1													
2	-5.74				**ESTUARINE SANDY SILTY CLAY** Grey, moist, very soft to soft. Fine grained sand; minor shell fragments; some clayey sand interlayers.							RW,-,- N<1	SPT
3							OH					RW,-,- N<1	SPT
4													
5	-8.74											RW,1,- N<1	SPT

BOREHOLE WITH LITHOLOGY MEERA PIER 7 BOREHOLES-GATEWAY BRIDGE - GATEWAY UPGRADE PROJECT.GPJ ENGINEERING BOREHOLE 09_04.GDT 31/08/05

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BOREHOLE No BH18
SHEET 2 of 13
REFERENCE No H9567

PROJECT GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION
LOCATION PIER 7 - NORTHERN FACE OF PILE CAP- DOWNSTREAM/RIGHT HAND SIDE
COORDINATES 10216.9 E; 167963.9 N
PROJECT No FG5388
SURFACE R.L. -3.74
DATE STARTED 02/04/05
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JOB No
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DRILLER CAIRNS DRILLING

DEPTH (m)	R.L. (m)	CASING / WASH BORING / CORE DRILLING	RQD ( )% CORE REC %	SAMPLE	MATERIAL DESCRIPTION	LITHOLOGY	USC	WEATHERING	INTACT STRENGTH (EH VH H M L VL EL)	DEFECT SPACING (mm) (20 60 200 600 2000)	GRAPHIC LOG	ADDITIONAL DATA AND TEST RESULTS	SAMPLES / TESTS
5	-8.74				**ESTUARINE SANDY SILTY CLAY** Grey, moist, very soft to soft. As above.		OH						
	-9.24				**ESTUARINE SILTY SAND** Brown, wet, very loose to loose. Fine grained sand; becoming more sandy with depth.								
6												RW,-,- N<1	SPT
7							SC-SM						
												RW,1,2 N=3	SPT
8													
	-12.24				**ESTUARINE SANDY SILTY CLAY** Grey, moist, soft to firm. Fine grained sand; minor shell fragments.								
9												Hole collapsed - casing advanced.	
							OH					2,3,3 N=6	SPT
10	-13.74												

BOREHOLE WITH LITHOLOGY MEERA PIER 7 BOREHOLES-GATEWAY BRIDGE - GATEWAY UPGRADE PROJECT.GPJ ENGINEERING BOREHOLE 09_04.GDT 31/08/05

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BOREHOLE No BH18
SHEET 3 of 13
REFERENCE No H9567

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LOCATION PIER 7 - NORTHERN FACE OF PILE CAP- DOWNSTREAM/RIGHT HAND SIDE COORDINATES 10216.9 E; 167963.9 N
PROJECT No FG5388 SURFACE R.L. -3.74 DATE STARTED 02/04/05 DATUM SETP
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DEPTH (m)	R.L. (m)	CASING / WASH BORING / CORE DRILLING	RQD ( )% CORE REC %	SAMPLE	MATERIAL DESCRIPTION	LITHOLOGY	USC	WEATHERING	INTACT STRENGTH (EH VH H M L VL EL)	DEFECT SPACING (mm) (20 60 200 600 2000)	GRAPHIC LOG	ADDITIONAL DATA AND TEST RESULTS	SAMPLES / TESTS
10	-13.74				**ESTUARINE SILTY CLAY** (As above).		CI-CH					RW,-,- N<1	SPT
11													
	-15.24				**ALLUVIAL SILTY CLAY** Pale grey to grey brown, moist, stiff to vey stiff becoming firm with depth. Minor orange yellow incipient lateritic features; trace amount of charcoal and organic fragments.							
12												5,8,11 N=19	SPT
13							CI-CH						
												4,6,6 N=12	SPT
14													
15	-18.74												

BOREHOLE WITH LITHOLOGY MEERA PIER 7 BOREHOLES-GATEWAY BRIDGE - GATEWAY UPGRADE PROJECT.GPJ ENGINEERING BOREHOLE 09_04.GDT 31/08/05

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BOREHOLE No BH18
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DEPTH (m)	R.L. (m)	CASING / WASH BORING / CORE DRILLING	RQD ( )% CORE REC %	SAMPLE	MATERIAL DESCRIPTION	LITHOLOGY	USC	WEATHERING	INTACT STRENGTH (EH VH H M L VL EL)	DEFECT SPACING (mm) (20 60 200 600 2000)	GRAPHIC LOG	ADDITIONAL DATA AND TEST RESULTS	SAMPLES / TESTS
15	-18.74				**ALLUVIAL SILTY CLAY** Pale grey to grey brown, moist, stiff to vey stiff becoming firm with depth. As above.							0,3,3 N=6	SPT
16												2,3,4 N=7	SPT
17							CL-CH						
18												1,2,7 N=9	SPT
19	-22.74				**ALLUVIAL CLAYEY SAND** Pale brown, wet, medium dense.		SC-SM					6,11,11 N=22	SPT
20	-23.74												

BOREHOLE WITH LITHOLOGY MEERA PIER 7 BOREHOLES-GATEWAY BRIDGE - GATEWAY UPGRADE PROJECT.GPJ ENGINEERING BOREHOLE 09_04.GDT 31/08/05

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BOREHOLE No BH18
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DEPTH (m)	R.L. (m)	CASING / WASH BORING / CORE DRILLING	RQD ( )% CORE REC %	SAMPLE	MATERIAL DESCRIPTION	LITHOLOGY	USC	WEATHERING	INTACT STRENGTH EH VH H M L VL EL	DEFECT SPACING (mm) 20 60 200 600 2000	GRAPHIC LOG	ADDITIONAL DATA AND TEST RESULTS	SAMPLES / TESTS
20	-23.74				**ALLUVIAL CLAYEY SAND** (As above). Fine medium grained sand; some sandy clay interlayers.		SC-SM						
	-24.24				**ALLUVIAL SAND** Pale brown to brown, wet, medium to very dense with depth. Medium to coarse grained with trace clay throughout.								
21												9,12,14 N=26	SPT
22							SP						
												7,22,30/130 N>50	SPT
23													
	-27.24				**ALLUVIAL CLAYEY GRAVELY SAND** Pale grey to grey brown, wet, medium dense. Fine to coarse grained sand and gravel sizing up to 50mm. (Sand fraction>Gravel fraction)								
24							SP						
												20,7,15 N=22	SPT
	-28.24				**ALLUVIAL SAND AND GRAVEL** Pale brown to grey, moist, wet, very dense. See below								
25	-28.74						GP-GM						

BOREHOLE WITH LITHOLOGY MEERA PIER 7 BOREHOLES-GATEWAY BRIDGE - GATEWAY UPGRADE PROJECT.GPJ ENGINEERING BOREHOLE 09_04.GDT 31/08/05

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25	-28.74				**ALLUVIAL SAND AND GRAVEL** Pale brown to grey, moist, wet, very dense. Poorly sorted coarse sand and gravel sizing up to 40mm; trace amount of clay ; particles sizes increases with depth; large cobble to boulders more towards bottom. (Sand fraction<Gravel fraction)							14,30/130 N>50	SPT
26													
27							GP-GM					18,30/110 N>50	SPT
28												Casing could not penetrate gravel to core drill. Casing shoe damaged and lost in hole. The borehole was unable to be advanced and therefore move slightly toward pile cap redrilled a new borehole.	
29	-32.74		(0) 44 (53)				MW SW					Granite boulder Is(50)=9.66 MPa Basalt boulder Is(50)=8.01 MPa Coreloss	o o
	-32.94				**SILTSTONE** MW: Grey to dark grey medium strength.		MW					Is(50)=0.17 MPa Is(50)=0.11 MPa	x o
30	-33.74				**SANDSTONE** SW: Pale grey to grey fine grained thinly laminated medium to high strength. Defects: - laminated partings <5° (7/m) - Occasional Joints 50° - 70° (1/m)		SW					Is(50)=1.08 MPa Is(50)=0.24 MPa UCS=32.1MPa MC=3.4% WD=2411N/m³ Is(50)=0.60 MPa Is(50)=0.37 MPa Siltstone interbed	x o x o

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30	-33.74				**SANDSTONE** SW: (As above).		SW							
	-33.89				**LOW GRADE COAL & SILTSTONE** MW: Dark grey to black mainly dull to vitreous, fine grained; thinly laminated and interbedded, mainly low to medium strength with some high strength bands.							Is(50)=0.14 MPa		x
			100 (54)		Highly fractured, weathered and altered seams and siltstone interbeds throughout; gradually grading into siltstone with depth. Defects : - Occasional weathered seams, 20-30mm. - Frequent laminated partings < 15° (6-10/m) - Occasional broken zones < 150mm thick - Occasional joints <60° Defects: Mainly drilling induced planar, smooth and open to closed with frequent broken zones and weathered seams.							Siltstone interbed		
31												Siltstone interbed Is(50)=0.05 MPa Is(50)=0.05 MPa		x o
												Siltstone interbed Is(50)=0.47 MPa		o
												UCS=32.5MPa MC=2.8% WD=2411N/m² Is(50)=1.58 MPa Siltstone interbed Is(50)=1.38 MPa		x o
32												Siltstone interbed Is(50)=5.72 MPa Is(50)=0.43 MPa		x o
												Siltstone interbed Is(50)=0.57 MPa		o
							MW							
33			100 (63)									Siltstone interbed Siltstone interbed		
												Is(50)=0.25 MPa		o
34												Siltstone interbed		
												Is(50)=0.47 MPa Is(50)=0.34 MPa		o x
												Is(50)=0.18 MPa Is(50)=0.09 MPa		o x
			100 (75)									Siltstone interbed		
35	-38.74											Siltstone interbed Siltstone interbed Is(50)=0.12 MPa		x

BOREHOLE WITH LITHOLOGY MEERA PIER 7 BOREHOLES-GATEWAY BRIDGE - GATEWAY UPGRADE PROJECT.GPJ ENGINEERING BOREHOLE 09_04.GDT 31/08/05

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BOREHOLE No BH18
SHEET 8 of 13
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35	-38.74				**LOW GRADE COAL & SILTSTONE** MW : (As above).							Siltstone interbed		
												Is(50)=0.18 MPa		x
												Is(50)=0.11 MPa		o
												Is(50)=0.05 MPa		x
												Is(50)=0.33 MPa		o
36			100 (35)									Siltstone interbed		
												Is(50)=0.13 MPa		o
												Coreloss		
37								MW						
												Is(50)=0.23 MPa		x
												Is(50)=0.19 MPa		o
												Siltstone interbed		
												Siltstone interbed		
												Is(50)=0.08 MPa		o
												Siltstone interbed		
												Is(50)=0.15 MPa		x
												Siltstone interbed		
												Is(50)=0.63 MPa		o
38												Is(50)=0.13 MPa		x
												Is(50)=0.16 MPa		o
												Is(50)=0.21 MPa		x
												Siltstone interbed		
												Is(50)=0.19 MPa		o
												Is(50)=0.10 MPa		x
												Is(50)=0.66 MPa		o
			80 (42)									Weathered seam		
												Coreloss		
39														
	-42.94											Clay infilled crushed seam		
					SILTSTONE XW - HW :Generally exhibits engineering properties of grey to dark grey, moist, very stiff to hard silty clay grading into low strength rock with depth.							LL=30.6%; PI=10.4%; LS=5.0%		
								XW-HW						
												LL=34.4%; PI=15.4%; LS=9.0%		
40	-43.74													

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BOREHOLE No BH18
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40	-43.74		72 (24)		**SILTSTONE** XW - HW : (As above).			XW-HW				Clay seam Clay seam Clay infilled sheared zone Is(50)=0.88 MPa Is(50)=0.90 MPa Is(50)=0.71 MPa Clay infilled broken zone parallel to lamination partings Wedge shaped clay infilled sheared zone		x o x
	-44.31				**SANDSTONE** MW-SW : Pale grey to grey fine to medium grained thinly laminated low to mainly medium strength with some high strength bands. Frequent carbonaceous laminations; easily erodable and friable along defects in the upper area especially between 40.57 and 43.40m. Defects: - Frequent lamination partings <30° (8/m) - Fractured, sheared and broken zones (300-700mm) - Joints 50-60° (3-4/m) - Joints 35-45° (3/1m) Defects are generally rough, open to closed and coated wth silty/sandy clay.							Broken zone with multidirectional joints		
41			100 (19)									Healed sheared zone		
												Broken zone parallel to lamination partings		
42								MW				Easily erodable and friable band (Healed shear zone?)		
			86 (0)									Coreloss		
												Clay infiled broken zone parallel to lamination partings Clay infilled crushed seam		
43			100 (89)									Is(50)=0.03 MPa Is(50)=0.50 MPa	x o	
												Broken zone parallel to lamination partings Is(50)=0.64 MPa Is(50)=0.25 MPa Is(50)=1.26 MPa	x o o	
44								SW				Is(50)=0.25 MPa UCS=22.5MPa MC=2.4% WD=2413N/m^2	x	
												Is(50)=2.28 MPa	x	
45	-48.74		100									Broken zone		

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45	-48.74		(38)		**SANDSTONE** MW-SW : As above			SW				Is(50)=0.05 MPa		o
	-49.90				**MUDSTONE** **DARK GREY FINE GRAINED THINLY LAMINATED SEDIMENTARY ROCK** SW : Grey to dark grey, thinly laminated mainly low to medium strength. Some rehelaed sheared zones towards bottom. Joints 50-60° (2/m). Defects: - Joints @ 50° -60° (2/m).			SW				Clay infilled crushed seam		
47	-50.74		100 (98)		**SANDSTONE** SW : Pale grey to grey fine to medium grained thinly laminated mainly medium to high strength. Defects: mainly rough, closed to open, cross-cutting - Frequent laminated partings <30° (2-4/m) - Occasional fault planes - Occasional joint 65°							Is(50)=1.95 MPa Is(50)=0.69 MPa Siltstone interbed Siltstone interbed Is(50)=0.20 MPa Is(50)=1.45 MPa Fault Fault Clay infilled crushed seam Siltstone interbed Is(50)=0.73 MPa Is(50)=0.73 MPa Fault Siltstone interbed Is(50)=0.97 MPa	x o	
48								SW						
49														
	-53.59		100 (90)					HW-MW				Clay infilled crushed seam		
50	-53.74				**IB MUDSTONE/SANDSTONE** see below			SW						

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BOREHOLE No BH18
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LOCATION PIER 7 - NORTHERN FACE OF PILE CAP- DOWNSTREAM/RIGHT HAND SIDE COORDINATES 10216.9 E; 167963.9 N
PROJECT No FG5388 SURFACE R.L. -3.74 DATE STARTED 02/04/05 DATUM SETP
JOB No DATUM AHD DATE COMPLETED 08/04/05 DRILLER CAIRNS DRILLING

DEPTH (m)	R.L. (m)	CASING / WASH BORING / CORE DRILLING	RQD ( )% CORE REC %	SAMPLE	MATERIAL DESCRIPTION	LITHOLOGY	USC	WEATHERING	INTACT STRENGTH (EH VH H M L VL EL)	DEFECT SPACING (mm) (20 60 200 600 2000)	GRAPHIC LOG	ADDITIONAL DATA AND TEST RESULTS	SAMPLES	TESTS
50	-53.74				**INTERBEDDED MUDSTONE AND SANDSTONE.SANDSTONE DOMINANT** SW : Pale grey to black, fine grained, thinly laminated and interbedded, medium to mainly high strength. Defects: - Frequent laminated partings <30° (4/m) - Joints @ 45°-70° (4/m) - Occasional weathered seams <70mm		SW	HW				Weathered seam Clay infilled crushed seam UCS=20.5MPa MC=4.2% WD=2401N/m²		
51							SW							
			100 (100)									UCS=38.6MPa MC=3.8% WD=2535N/m²	Is(50)=0.85 MPa Is(50)=1.32 MPa Is(50)=0.28 MPa Is(50)=2.31 MPa	x o x o
	-55.64				**SANDSTONE** SW : Pale grey to grey fine to medium grained thinly laminated mainly medium to high strength. Defects: - Joints @ 70° (4/m) - Joints @ 50° (2/m)							UCS=49.8MPa MC=2.4% WD=2493N/m²	Is(50)=0.85 MPa Is(50)=1.23 MPa Is(50)=1.99 MPa	o x x
52							SW							
	-56.59				**INTERBEDDED MUDSTONE AND SANDSTONE. MUDSTONE DOMINANT** SW : Pale grey to black, fine grained, thinly laminated and interbedded, medium to mainly high strength. Frequent sandstone interbeds in the upper area. Defects: frequent laminated partings <20° (4/m) Occasional subvertical joints.							UCS=53.1MPa MC=2.8% WD=2421N/m²	Is(50)=0.46 MPa Is(50)=1.07 MPa Is(50)=0.59 MPa Is(50)=1.09 MPa Is(50)=2.98 MPa Is(50)=1.76 MPa Is(50)=0.83 MPa Is(50)=1.11 MPa	x o x o o x x o
53							SW							
54												UCS=27.2MPa MC=2.8% WD=2421N/m²	Is(50)=0.48 MPa Is(50)=1.90 MPa Is(50)=0.88 MPa Is(50)=0.78 MPa	x o x o
	-58.29													
			100 (79)		**MUDSTONE** **FINE GRAINED THINLY LAMINATED SEDIMENTARY ROCK** HW - SW: See below		SW					UCS=37.4MPa MC=3.6% WD=2443N/m²	Is(50)=2.06 MPa Is(50)=0.18 MPa Is(50)=0.45 MPa Is(50)=1.73 MPa Is(50)=0.39 MPa	o x x o x
55	-58.74													

BOREHOLE WITH LITHOLOGY MEERA PIER 7 BOREHOLES-GATEWAY BRIDGE - GATEWAY UPGRADE PROJECT.GPJ ENGINEERING BOREHOLE 09_04.GDT 31/08/05

REMARKS SPT N values in gravel can overestimate density due to influence of coarser size gravel particles. This borelog should be read in conjunction with the appropriate Defect Description Sheets. Defect angles were measured with respect to a horizontal plane.

LOGGED BY
A. DISSANAYAKE (DISS)

Queensland Government
Department of Main Roads

ENGINEERING BOREHOLE

FOR GEOTECHNICAL TERMS AND SYMBOLS REFER FORM F:GEOT 017/2-2004

BOREHOLE No BH18
SHEET 12 of 13
REFERENCE No H9567

PROJECT GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION
LOCATION PIER 7 - NORTHERN FACE OF PILE CAP- DOWNSTREAM/RIGHT HAND SIDE COORDINATES 10216.9 E; 167963.9 N
PROJECT No FG5388 SURFACE R.L. -3.74 DATE STARTED 02/04/05 DATUM SETP
JOB No DATUM AHD DATE COMPLETED 08/04/05 DRILLER CAIRNS DRILLING

DEPTH (m)	R.L. (m)	CASING / WASH BORING / CORE DRILLING	RQD ( )% / CORE REC %	SAMPLE	MATERIAL DESCRIPTION	LITHOLOGY	USC	WEATHERING	INTACT STRENGTH (EH VH H M L VL EL)	DEFECT SPACING (mm) (20 60 200 600 2000)	GRAPHIC LOG	ADDITIONAL DATA AND TEST RESULTS	SAMPLES	TESTS
55	-58.74				**MUDSTONE** **FINE GRAINED THINLY LAMINATED SEDIMENTARY ROCK** HW - SW: Grey to dark grey, thinly laminated mainly high strength. Highly fractured below 58m with some brecciated zones. Defects : - Fractured and brecciated zones<300mm. - Mutidirectional joints @ 30°, 45° & 60°. - Laminated partings 10-30° (4/2m)									
56							SW					Is(50)=0.87 MPa Is(50)=0.81 MPa UCS=37.9MPa MC=3.6% WD=2443N/m² Is(50)=1.53 MPa Is(50)=0.61 MPa Is(50)=0.94 MPa UCS14.7MPa MC=4.6% WD=2505N/m² Is(50)=0.52 MPa	o x o x o x	
57												Fractured zone.		
58			100 (9)				MW-SW					Is(50)=0.48 MPa Is(50)=0.41 MPa Fractured zone. Brecciated zone.	x o	
59							HW-MW SW							
60	-63.74		100 (40)				HW-MW SW					Highly fractured and slightly brecciated zone. Is(50)=0.41 MPa Is(50)=0.61 MPa	o x	

BOREHOLE WITH LITHOLOGY MEERA PIER 7 BOREHOLES-GATEWAY BRIDGE - GATEWAY UPGRADE PROJECT.GPJ ENGINEERING BOREHOLE 09_04.GDT 31/08/05

REMARKS SPT N values in gravel can overestimate density due to influence of coarser size gravel particles. This borelog should be read in conjunction with the appropriate Defect Description Sheets. Defect angles were measured with respect to a horizontal plane.

LOGGED BY
A. DISSANAYAKE (DISS)

Queensland Government
Department of Main Roads

ENGINEERING BOREHOLE

FOR GEOTECHNICAL TERMS AND SYMBOLS REFER FORM F:GEOT 017/2-2004

BOREHOLE No BH18
SHEET 13 of 13
REFERENCE No H9567

PROJECT GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION

LOCATION PIER 7 - NORTHERN FACE OF PILE CAP- DOWNSTREAM/RIGHT HAND SIDE COORDINATES 10216.9 E; 167963.9 N

PROJECT No FG5388 SURFACE R.L. -3.74 DATE STARTED 02/04/05 DATUM SETP

JOB No DATUM AHD DATE COMPLETED 08/04/05 DRILLER CAIRNS DRILLING

DEPTH (m)	R.L. (m)	CASING / WASH BORING / CORE DRILLING	RQD ( )% CORE REC %	SAMPLE	MATERIAL DESCRIPTION	LITHOLOGY	USC	WEATHERING	INTACT STRENGTH (EH VH H M L VL EL)	DEFECT SPACING (mm) (20 60 200 600 2000)	GRAPHIC LOG	ADDITIONAL DATA AND TEST RESULTS	SAMPLES / TESTS
60	-63.74				**MUDSTONE** HW-SW : (As above).		SW					Highly fractured and slightly brecciated zone.	
	-64.06		100				HW						
					Borehole terminated at 60.32m								

BOREHOLE WITH LITHOLOGY MEERA PIER 7 BOREHOLES-GATEWAY BRIDGE - GATEWAY UPGRADE PROJECT.GPJ ENGINEERING BOREHOLE 09_04.GDT 31/08/05

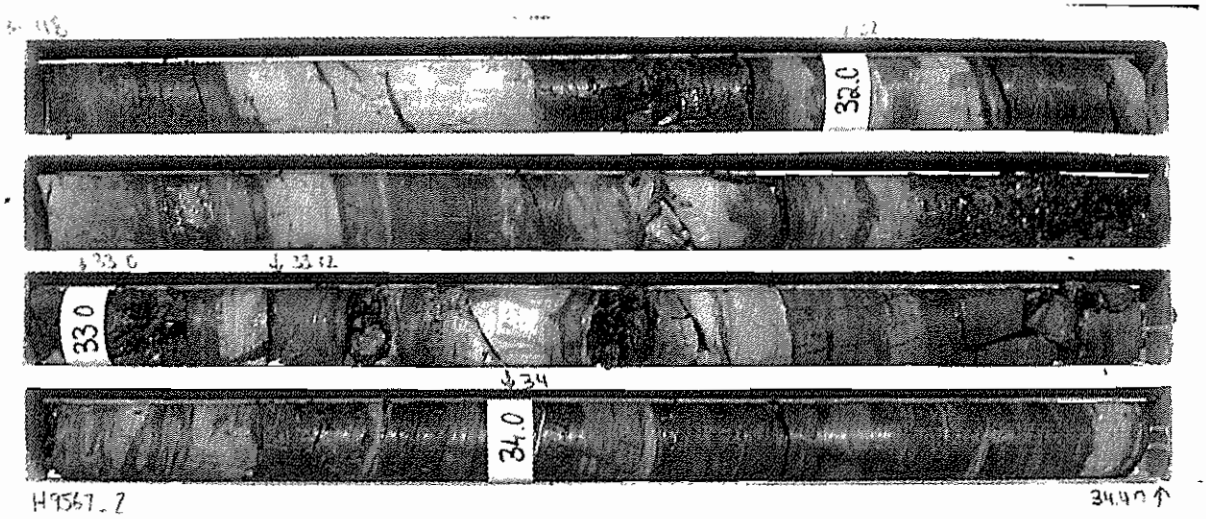
REMARKS SPT N values in gravel can overestimate density due to influence of coarser size gravel particles. This borelog should be read in conjunction with the appropriate Defect Description Sheets. Defect angles were measured with respect to a horizontal plane.

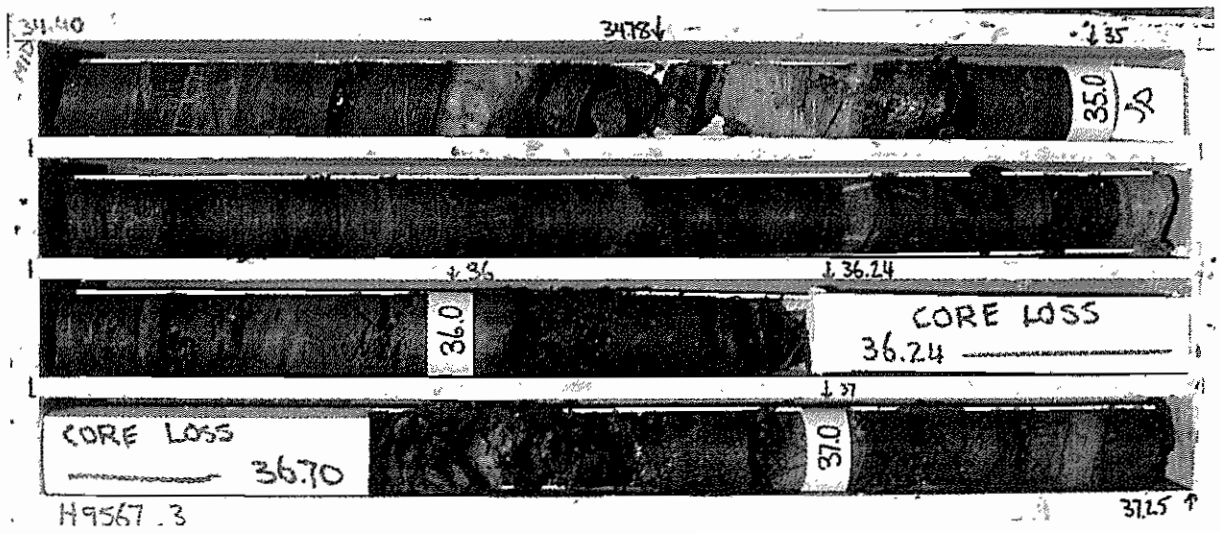
LOGGED BY A. DISSANAYAKE (DISS)

Project: **Gateway Upgrade Project - Gateway Bridge**

Borehole No: **BH 18**

Start Depth: 28.50m
Finish Depth: 60.32m
Project No: FG 5388
H No: 9567





Project: **Gateway Upgrade Project - Gateway Bridge**

Borehole No: **BH 18**

Start Depth: 28.50m
Finish Depth: 60.32m
Project No: FG 5388
H No: 9567

Project: **Gateway Upgrade Project - Gateway Bridge**

Borehole No: **BH 18**

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Project: **Gateway Upgrade Project - Gateway Bridge**

Borehole No: **BH 18**

Start Depth: 28.50m
Finish Depth: 60.32m
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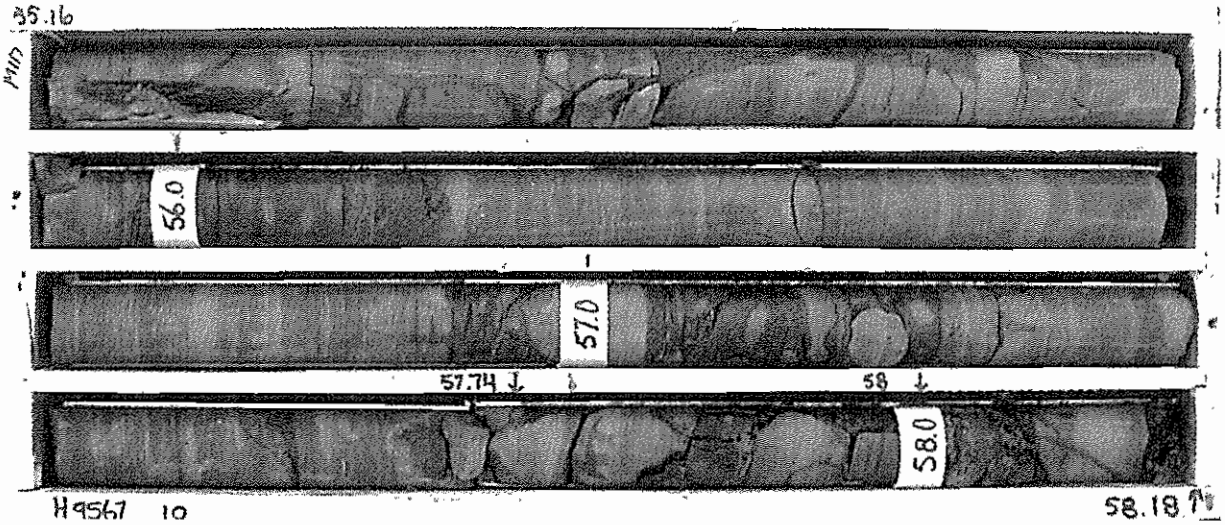

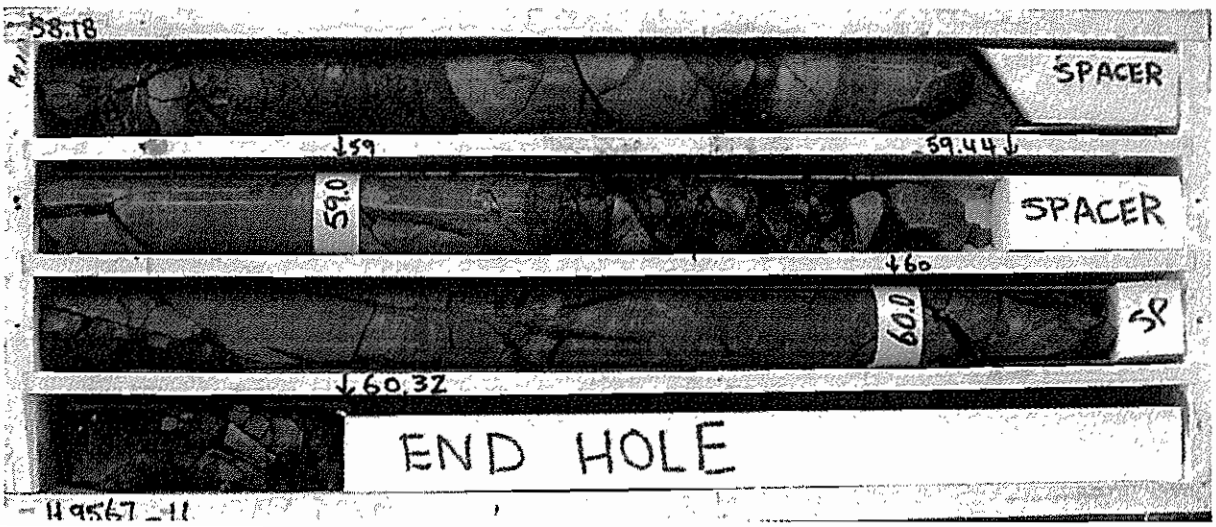

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Queensland Government
Department of Main Roads

DEFECT DESCRIPTIONS OF ENGINEERING BORELOGS

[CHARACTERISATION OF DEFECTS ARE IN ACCORDANCE WITH ISRM SUGGESTED METHODS (1981)]

BOREHOLE NO	: BH18
SHEET	: 1 of 10
REFERENCE NO	: H9567

PROJECT : GATEWAY UPGRADE PROJECT – GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION

LOCATION : PIER 7 – NORTHERN FACE OF PILE CAP – DOWNSTREAM/RIGHT HAND SIDE

PROJECT NO : FG5388 SURFACE R.L : -3.74 DRILLER : CAIRNS DRILLING PTY LTD

JOB NO : DATUM : AHD DATE DRILLED : 2 - 8/4/05

DEPTH	DEFECT TYPE	DIP	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
28.5-29.0	-	-	-	-	-	-	Core loss
29.16	LP	<5°	Ir	S	C	Cn	DI
29.18	LP	<5°	P	S	C	Cn	DI
29.38	LP	<5°	Cu	R	C	Cn	DI
29.39	LP	<5°	P	R	C	Cn	DI
29.60	LP	<5°	P	R	C	Cn	DI
29.78	J	50°-70°	St	R	O	Cn	-
29.83	LP	30°	P	R	C	Cn	DI
29.87	LP	20°	P	S	T	Cn	DI
29.87-30.00	Fr		Ir	R	T	Cn	DI
30.10-30.15	BZ/WS	-	-	-	O	W	-
30.18	LP	<10°	P	S	C	Cn	DI
30.28	J	30°	St	S	C	Cn	DI
30.32-30.35	WS	-	-	-	O	W	
30.39-30.46	WS	-	-	-	O	W	
30.49-30.52	WS	-	-	-	O	W	
30.65-30.90	WS	-	-	-	O	W	CI
31.0	LP	<15°	P	S	-	-	
31.18	LP	<5°	P	S	C		DI
31.26	LP	<5°	P	S	C	Cn	DI
31.48	LP	10°	P	S	C	Cn	DI
31.52	LP	10°	P	S	C	Cn	DI

Abbreviations

ROUGHNESS		WALL ALTERATIONS		TYPE		OTHER	
R	Rough	FeSt	Iron Stained	J	Joint	P	Partly
S	Smooth	W	Weathered	B	Bedding	CL	Carbonaceous lamination
SL	Slickensided	SM	Secondary Mineralisation	BP	Bedding Parting	Co	Coal seam
				FP	Foliation Parting	In	Incipient
PLANARITY		**APERTURE**		LP	Lamination Parting	SI	Sand Infill
Pl	Planar	C	Closed	SZ	Sheared Zone	H	Horizontal
St	Stepped	O	Open	CZ	Crushed Zone	V	Vertical
Un	Undulating	F	Filled	WS	Weathered Seam	Cl	Clay Infill
Cu	Curved	T	Tight	BZ	Broken Zone	Cn	Clean
Ir	Irregular			HFZ	Highly Fractured Zone	CS	Clay Seam
				Fr	Fracture	DI	Drilling Induced

NOTE: This sheet should be read in conjunction with appropriate Engineering Borelog. Defect angles were measured with respect to horizontal plane.

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DEFECT DESCRIPTIONS OF ENGINEERING BORELOGS

[CHARACTERISATION OF DEFECTS ARE IN ACCORDANCE WITH ISRM SUGGESTED METHODS (1981)]

BOREHOLE NO	: BH18
SHEET	: 2 of 10
REFERENCE NO	: H9567

PROJECT : GATEWAY UPGRADE PROJECT – GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION

LOCATION : PIER 7 – NORTHERN FACE OF PILE CAP – DOWNSTREAM/RIGHT HAND SIDE

PROJECT NO : FG5388 SURFACE R.L : -3.74 DRILLER : CAIRNS DRILLING PTY LTD

JOB NO : DATUM : AHD DATE DRILLED : 2 - 8/4/05

DEPTH	DEFECT TYPE	DIP	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
31.53	LP	10°	P	S	C	Cn	DI
31.56	LP	10°	P	S	C	Cn	DI
31.82	LP	10°	P	S	C	Cn	DI
31.83	LP	10°	P	S	C	Cn	DI
31.85	LP	10°	P	S	C	Cn	DI
31.94	LP	10°	P	S	C	Cn	DI
32.10	LP	15°	P	S	C	Cn	DI
32.11	LP	15°	P	S	C	Cn	DI
32.19	LP	15°	P	S	C	Cn	DI
32.29	LP	15°	P	S	C	Cn	DI
32.35	LP	15°	P	S	C	Cn	DI
32.41	LP	15°	P	S	C	Cn	DI
32.49	LP	15°	P	S	C	Cn	DI
32.60-32.63	BZ/WS	-	-	-	O	W	-
32.78-33.08	WS	-	-	-	O	W	CI
33.12	LP	10°	P	S	O	Cn	
33.17-33.20	BZ/WS	-	-	-	O	W	
33.33-33.39	BZ	-	-	-	O	-	
33.57-33.70	BZ	-	-	-	O	-	
33.82	LP	30°	P	S	C	Cn	
33.92	LP	30°	P	S	T	Cn	

Abbreviations

ROUGHNESS		WALL ALTERATIONS		TYPE		OTHER	
R	Rough	FeSt	Iron Stained	J	Joint	P	Partly
S	Smooth	W	Weathered	B	Bedding	CL	Carbonaceous lamination
SL	Slickensided	SM	Secondary Mineralisation	BP	Bedding Parting	Co	Coal seam
				FP	Foliation Parting	In	Incipient
PLANARITY		**APERTURE**		LP	Lamination Parting	SI	Sand Infill
Pl	Planar	C	Closed	SZ	Sheared Zone	H	Horizontal
St	Stepped	O	Open	CZ	Crushed Zone	V	Vertical
Un	Undulating	F	Filled	WS	Weathered Seam	CI	Clay Infill
Cu	Curved	T	Tight	BZ	Broken Zone	Cn	Clean
Ir	Irregular			HFZ	Highly Fractured Zone	CS	Clay Seam
				Fr	Fracture	DI	Drilling Induced

NOTE: This sheet should be read in conjunction with appropriate Engineering Borelog. Defect angles were measured with respect to horizontal plane.

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Department of Main Roads

DEFECT DESCRIPTIONS OF ENGINEERING BORELOGS

[CHARACTERISATION OF DEFECTS ARE IN ACCORDANCE WITH ISRM SUGGESTED METHODS (1981)]

BOREHOLE NO	: BH18
SHEET	: 3 of 10
REFERENCE NO	: H9567

PROJECT : GATEWAY UPGRADE PROJECT – GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION

LOCATION : PIER 7 – NORTHERN FACE OF PILE CAP – DOWNSTREAM/RIGHT HAND SIDE

PROJECT NO : FG5388 SURFACE R.L : -3.74 DRILLER : CAIRNS DRILLING PTY LTD

JOB NO : DATUM : AHD DATE DRILLED : 2 - 8/4/05

DEPTH	DEFECT TYPE	DIP	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
34.10	LP/BP	20°	P	S	T	Cn	
34.18	LP/BP	20°	P	S	T	Cn	
34.59-34.60	WS	-	P	S	W		Parallel to LP
34.64	LP	<10°	W	S	C	Cn	
34.67	LP	<15°	Ir	S	C	Cn	
34.76	BP	15°	P	S	O	Cn	
34.95-34.97	CS	-	-	-	-	W	CI, High Plastic
34.98	LP	<10°	P	S	O	Cn	
35.09	LP	<10°	P	S	C	Cn	
35.20	LP	<10°	Ir	S	C	Cn	
35.65-35.69	BZ	-	-	-	O		
35.58	LP	<10°	P	S	C	Cn	
36.03-36.11	BZ/WS	-	-	-	O	W	
36.17-36.24	BZ/WS	-		S	O	W	
36.24-36.70		-	-	-			Core Loss
36.70-36.88	WS	-	-	-		W	CI
36.92-36.98	WS	-	-	-		W	
37.02-37.13	BZ/WS	-	-	-	O		
37.20-37.25	BZ/WS	-	-	-	O		
37.30	J	60°	P	S	C		
37.33	LP	0°	P	S	C		

Abbreviations

ROUGHNESS		WALL ALTERATIONS		TYPE		OTHER	
R	Rough	FeSt	Iron Stained	J	Joint	P	Partly
S	Smooth	W	Weathered	B	Bedding	CL	Carbonaceous lamination
SL	Slickensided	SM	Secondary Mineralisation	BP	Bedding Parting	Co	Coal seam
				FP	Foliation Parting	In	Incipient
PLANARITY		APERTURE		LP	Lamination Parting	SI	Sand Infill
Pl	Planar	C	Closed	SZ	Sheared Zone	H	Horizontal
St	Stepped	O	Open	CZ	Crushed Zone	V	Vertical
Un	Undulating	F	Filled	WS	Weathered Seam	Cl	Clay Infill
Cu	Curved	T	Tight	BZ	Broken Zone	Cn	Clean
Ir	Irregular			HFZ	Highly Fractured Zone	CS	Clay Seam
				Fr	Fracture	DI	Drilling Induced

NOTE: This sheet should be read in conjunction with appropriate Engineering Borelog. Defect angles were measured with respect to horizontal plane.

F:GEOT533/4

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Department of Main Roads

DEFECT DESCRIPTIONS OF ENGINEERING BORELOGS

[CHARACTERISATION OF DEFECTS ARE IN ACCORDANCE WITH ISRM SUGGESTED METHODS (1981)]

BOREHOLE NO	: BH18
SHEET	: 4 of 10
REFERENCE NO	: H9567

PROJECT : GATEWAY UPGRADE PROJECT – GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION

LOCATION : PIER 7 – NORTHERN FACE OF PILE CAP – DOWNSTREAM/RIGHT HAND SIDE

PROJECT NO : FG5388 SURFACE R.L : -3.74 DRILLER : CAIRNS DRILLING PTY LTD

JOB NO : DATUM : AHD DATE DRILLED : 2 - 8/4/05

DEPTH	DEFECT TYPE	DIP	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
37.37-37.44	BZ/WS	-	-	-	O	W	
37.57-37.64	BZ/WS	-	-	-	O	W	
37.76	LP	15°	Un	S	C	Cn	
37.50	LP	10°	P	S	C	Cn	
37.84-37.87	BZ/WS		-	-	O	W	
38.01	J	60°	P	S	C	Cn	
38.07	LP	<5°	W	S	C	Cn	
38.15-38.19	BZ/WS	-	-		O	W	
38.39-38.42	BZ	-	-	-	O	Cn	
38.49-38.54	BZ	-	-	-	O		
38.54-39.00							Core Loss
39.0-39.20	WS	-	-		O	W	
39.20-40.0	WS				C	W	XW-HW rock
40.10-40.23	BZ		Ir		O		Parallel to LP
40.27-40.29	CS	25°	P	S	C	W	
40.41-40.14	LP	30°	Ir	S	C	W	Cl
40.48	J	35°	P	S	C	Cn	
40.49-40.75	SZ/BrZ				C	W	Cl
40.81	J	35°	P	S	C	Cn	-
40.84	J	30°	Ir	R	C	W	Cl
40.91	J	45°	Ir	R	C	W	

Abbreviations

ROUGHNESS		WALL ALTERATIONS		TYPE		OTHER	
R	Rough	FeSt	Iron Stained	J	Joint	P	Partly
S	Smooth	W	Weathered	B	Bedding	CL	Carbonaceous lamination
SL	Slickensided	SM	Secondary Mineralisation	BP	Bedding Parting	Co	Coal seam
				FP	Foliation Parting	In	Incipient
PLANARITY		**APERTURE**		LP	Lamination Parting	SI	Sand Infill
Pl	Planar	C	Closed	SZ	Sheared Zone	H	Horizontal
St	Stepped	O	Open	CZ	Crushed Zone	V	Vertical
Un	Undulating	F	Filled	WS	Weathered Seam	Cl	Clay Infill
Cu	Curved	T	Tight	BZ	Broken Zone	Cn	Clean
Ir	Irregular			HFZ	Highly Fractured Zone	CS	Clay Seam
				Fr	Fracture	DI	Drilling Induced

NOTE: This sheet should be read in conjunction with appropriate Engineering Borelog. Defect angles were measured with respect to horizontal plane.

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DEFECT DESCRIPTIONS OF ENGINEERING BORELOGS

[CHARACTERISATION OF DEFECTS ARE IN ACCORDANCE WITH ISRM SUGGESTED METHODS (1981)]

BOREHOLE NO	: BH18
SHEET	: 5 of 10
REFERENCE NO	: H9567

PROJECT : GATEWAY UPGRADE PROJECT – GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION

LOCATION : PIER 7 – NORTHERN FACE OF PILE CAP -- DOWNSTREAM/RIGHT HAND SIDE

PROJECT NO : FG5388 SURFACE R.L : -3.74 DRILLER : CAIRNS DRILLING PTY LTD

JOB NO : DATUM : AHD DATE DRILLED : 2 - 8/4/05

DEPTH	DEFECT TYPE	DIP	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
41.0-41.19	BZ	MDJ	Ir	R	O		Parallel to LP
41.26-41.36	SZ	45°	P	-	T		3mm thick
41.42	J	60°	Un	R	C		
41.52	J	50°	P	S	C		
41.62-42.30	BZ/WS		Ir	-	O-C	W	PCI
42.34-42.52							Coreloss
42.52	LP	20°	P	R	O	-	-
42.57	LP	20°	P	R	O		CI
42.60	LP	20°	P	R	O		CI
42.65	LP	20°	P	R	O		CI
42.68	LP	20°	P	R	O		
42.71	LP	30-30°	Ir	R	C		Co
42.50	LP	20°	P	R	-		CI
42.84	LP	20°	P	S	O		CI
43.0-43.03	SZ	50°		-	C		Healed
43.17-43.41	BZ/WS	Closely spaced	-	-	O	W	Sandy CI
43.45	LP	20°	P	S	T	Cn	DI
43.47	LP	20°	P	S	C	Cn	DI
43.50	LP	20°	P	S	C	Cn	DI
43.53	LP	<20°	P	S	C	Cn	DI
43.54	LP	<20°	P	S	C	Cn	DI

Abbreviations

ROUGHNESS		WALL ALTERATIONS		TYPE		OTHER	
R	Rough	FeSt	Iron Stained	J	Joint	P	Partly
S	Smooth	W	Weathered	B	Bedding	CL	Carbonaceous lamination
SL	Slickensided	SM	Secondary Mineralisation	BP	Bedding Parting	Co	Coal seam
				MDJ	Multidirectional Joints	In	Incipient
PLANARITY		APERTURE		LP	Lamination Parting	SI	Sand Infill
Pl	Planar	C	Closed	SZ	Sheared Zone	H	Horizontal
St	Stepped	O	Open	CZ	Crushed Zone	V	Vertical
Un	Undulating	F	Filled	WS	Weathered Seam	CI	Clay Infill
Cu	Curved	T	Tight	BZ	Broken Zone	Cn	Clean
Ir	Irregular			HFZ	Highly Fractured Zone	CS	Clay Seam
				BrZ	Brecciated Zone	DI	Drilling Induced

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DEFECT DESCRIPTIONS OF ENGINEERING BORELOGS

[CHARACTERISATION OF DEFECTS ARE IN ACCORDANCE WITH ISRM SUGGESTED METHODS (1981)]

BOREHOLE NO	: BH18
SHEET	: 6 of 10
REFERENCE NO	: H9567

PROJECT : GATEWAY UPGRADE PROJECT – GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION

LOCATION : PIER 7 – NORTHERN FACE OF PILE CAP – DOWNSTREAM/RIGHT HAND SIDE

PROJECT NO : FG5388 SURFACE R.L : -3.74 DRILLER : CAIRNS DRILLING PTY LTD

JOB NO : DATUM : AHD DATE DRILLED : 2 - 8/4/05

DEPTH	DEFECT TYPE	DIP	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
43.66-43.70	BZ/WS		Un	R	W		CI
43.74	LP	20°	P	S	T	Cn	DI
43.75	LP	20°	P	S	T	Cn	DI
44.08	LP	20°	P	S	C	Cn	
44.16	LP	20°	P	S	C	Cn	
44.55	J	50°	P	S	T	Cn	
44.70	J	50°	P	S	C	Cn	
44.75	J	50°	P	S	C	Cn	
44.81-45.03	BZ/WS	Closely spaced	-	-	O	W	PCI
45.13	LP	25°	P	-	T		CI
45.23-45.25	J	60°	Ir				CI
45.37	J	60°	P	R	O		Cross cutting
45.58	LP	35°	P	R	C		Cross cutting
45.66	J	60°	P	R	C		Cross cutting
46.08	J	60°	P	R	C	Cn	
46.30	J	50°	P	S	O	Cn	
46.45-47.00	SZ/CZ	-	-	-	C-T	W	CI, Healed
47.33	BP	20°	P	S	C	Cn	DI
47.64	LP	10°	P	R	C	Cn	DI
47.90-48.08	Fu	-	-	-	-	Cn	displaced
48.05	LP	<5°	P	R	C		DI

Abbreviations

ROUGHNESS		WALL ALTERATIONS		TYPE		OTHER	
R	Rough	FeSt	Iron Stained	J	Joint	P	Partly
S	Smooth	W	Weathered	B	Bedding	CL	Carbonaceous lamination
SL	Slickensided	SM	Secondary Mineralisation	BP	Bedding Parting	Co	Coal seam
				FP	Foliation Parting	In	Incipient
PLANARITY		APERTURE		LP	Lamination Parting	SI	Sand Infill
Pl	Planar	C	Closed	SZ	Sheared Zone	H	Horizontal
St	Stepped	O	Open	CZ	Crushed Zone	V	Vertical
Un	Undulating	F	Filled	WS	Weathered Seam	CI	Clay Infill
Cu	Curved	T	Tight	BZ	Broken Zone	Cn	Clean
Ir	Irregular			HFZ	Highly Fractured Zone	CS	Clay Seam
				Fr	Fracture	DI	Drilling Induced

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DEFECT DESCRIPTIONS OF ENGINEERING BORELOGS

[CHARACTERISATION OF DEFECTS ARE IN ACCORDANCE WITH ISRM SUGGESTED METHODS (1981)]

BOREHOLE NO	: BH18
SHEET	: 7 of 10
REFERENCE NO	: H9567

PROJECT : GATEWAY UPGRADE PROJECT – GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION

LOCATION : PIER 7 – NORTHERN FACE OF PILE CAP – DOWNSTREAM/RIGHT HAND SIDE

PROJECT NO : FG5388 SURFACE R.L : -3.74 DRILLER : CAIRNS DRILLING PTY LTD

JOB NO : DATUM : AHD DATE DRILLED : 2 - 8/4/05

DEPTH	DEFECT TYPE	DIP	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
48.45	LP	30°	P	S	C		DI
48.61-48.81	J	70°	P	-	T	-	Healed
48.64-48.87	SZ	-	-	-	T	-	Healed
49.10-49.3	Fu	75°		-	-	Cn	20mm displaceed
49.12	LP	15°	P	S	T	Cn	DI
49.16	LP	30°	P	S	T	Cn	DI
49.45	LP	25°	P	S	T	Cn	DI
49.50	LP	25°	P	R	T	Cn	DI
49.60	LP	25°	Ir	R	T	Cn	DI
49.70	BP	25°	Ir	R	O		-
49.85	J	40°	St	R	O	W	-
49.87	J	65°	Ir	R	O	W	-
49.95	LP	25°	P	S	C	Cn	DI
50.00	J	70°	P	S	O	Cn	
50.10	LP	25°	P	S	C	Cn	DI
50.12	LP	25°	Cu	R	C	Cn	DI
50.17	J	40°	Ir	R	C	Cn	
50.23	J	70°	P	S	C		CI
50.30	J	70°	P	S	C		CI
50.31–50.38	WS	-	-	-	T	W	CI

Abbreviations

ROUGHNESS		WALL ALTERATIONS		TYPE		OTHER	
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S	Smooth	W	Weathered	B	Bedding	CL	Carbonaceous lamination
SL	Slickensided	SM	Secondary Mineralisation	BP	Bedding Parting	Co	Coal seam
				FP	Foliation Parting	In	Incipient
PLANARITY		**APERTURE**		LP	Lamination Parting	SI	Sand Infill
Pl	Planar	C	Closed	SZ	Sheared Zone	H	Horizontal
St	Stepped	O	Open	CZ	Crushed Zone	V	Vertical
Un	Undulating	F	Filled	WS	Weathered Seam	CI	Clay Infill
Cu	Curved	T	Tight	BZ	Broken Zone	Cn	Clean
Ir	Irregular			HFZ	Highly Fractured Zone	CS	Clay Seam
				Fu	Fault	DI	Drilling Induced

NOTE: This sheet should be read in conjunction with appropriate Engineering Borelog. Defect angles were measured with respect to horizontal plane.

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DEFECT DESCRIPTIONS OF ENGINEERING BORELOGS

[CHARACTERISATION OF DEFECTS ARE IN ACCORDANCE WITH ISRM SUGGESTED METHODS (1981)]

BOREHOLE NO	: BH18
SHEET	: 8 of 10
REFERENCE NO	: H9567

PROJECT : GATEWAY UPGRADE PROJECT – GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION

LOCATION : PIER 7 – NORTHERN FACE OF PILE CAP – DOWNSTREAM/RIGHT HAND SIDE

PROJECT NO : FG5388 SURFACE R.L : -3.74 DRILLER : CAIRNS DRILLING PTY LTD

JOB NO : DATUM : AHD DATE DRILLED : 2 - 8/4/05

DEPTH	DEFECT TYPE	DIP	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
50.53	LP	30°	P	S	T		DI
50.62–50.66	WS	-	-	-	O	W	CI
50.76	LP	30°	P	S	T		DI
50.80	J	35°	Ir	-	T	Cn	
50.84	LP	30°	Ir	-	T	Cn	
51.05	LP	30°	P	R	T	Cn	DI
51.08	J	35°	P	R	T	Cn	Cv
51.10	J	70°	P	-	T	Cn	
51.18	J	70°	P	-	T	-	DI
51.25	LP	20°	P	R	T	-	DI
51.30	J	70°	Un	-	T	Cn	
51.66	LP	20°	P	S	T	Cn	DI
51.72	LP	20°	P	R	C	Cn	DI
51.89	LP	20°	P	-	C	Cn	DI
51.91	LP	20°	P	-	T	Cn	DI
51.20	J	30°	St	R	T	Cn	
52.30	J	70°	Cu	-	T	Cn	
52.31	J	70°	Cu	-	T	Cn	
52.40	J	70°	P	-	T	Cn	
52.50	J	70°	P	-	T	Cn	
52.60	J	48°	St	-	T	Cn	

Abbreviations

ROUGHNESS		WALL ALTERATIONLPS		TYPE		OTHER	
R	Rough	FeSt	Iron Stained	J	Joint	P	Partly
S	Smooth	W	Weathered	B	Bedding	CL	Carbonaceous lamination
SL	Slickensided	SM	Secondary Mineralisation	BP	Bedding Parting	Cv	Calcite vein
				Fu	Fault	In	Incipient
PLANARITY		APERTURE		LP	Lamination Parting	SI	Sand Infill
Pl	Planar	C	Closed	SZ	Sheared Zone	H	Horizontal
St	Stepped	O	Open	CZ	Crushed Zone	V	Vertical
Un	Undulating	F	Filled	WS	Weathered Seam	CI	Clay Infill
Cu	Curved	T	Tight	BZ	Broken Zone	Cn	Clean
Ir	Irregular			HFZ	Highly Fractured Zone	CS	Clay Seam
				Fr	Fracture	DI	Drilling Induced

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DEFECT DESCRIPTIONS OF ENGINEERING BORELOGS

[CHARACTERISATION OF DEFECTS ARE IN ACCORDANCE WITH ISRM SUGGESTED METHODS (1981)]

BOREHOLE NO	: BH18
SHEET	: 9 of 10
REFERENCE NO	: H9567

PROJECT : GATEWAY UPGRADE PROJECT – GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION

LOCATION : PIER 7 – NORTHERN FACE OF PILE CAP – DOWNSTREAM/RIGHT HAND SIDE

PROJECT NO : FG5388 SURFACE R.L : -3.74 DRILLER : CAIRNS DRILLING PTY LTD

JOB NO : DATUM : AHD DATE DRILLED : 2 - 8/4/05

DEPTH	DEFECT TYPE	DIP	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
52.65	J	48°	P	R	C	Cn	DI
52.85	LP	30°	P	S	T	Cn	DI
53.23	LP	20°	P	S	C	Cn	DI
53.40	LP	20°	P	-	T	Cn	DI
53.42	LP	20°	P	-	T	Cn	DI
53.49	LP	20°	P	-	T	Cn	DI
53.82	LP	15°	P	-	T	Cn	DI
51.12-54.35	J	70-90°	Cu	-	T	Cn	
54.65	LP	10°	P	-	C	Cn	DI
54.67	LP	10°	P	-	C	Cn	DI
54.72	LP	10°	P	-	C	Cn	DI
54.77	LP	10°	P	-	C	Cn	DI
54.85	LP	10°	P	-	C	Cn	DI
55.0-55.40	J	80-90°	Un	S	T	-	PCI
55.50-55.95	J	80-90°	Un	S	T	-	PCI
56.10-56.17	WS	-	-	-	O	W	CI
55.97-56.05	BZ	10°	-	-	-		
56.40	LP	<10°	P	S	-		DI
56.96-57.00	BZ	-	-	-	O	Cn	Parallel to LP
57.05-57.27	BZ	-	-	-	O	Cn	Parallel to LP
57.60	LP	15°	P	S	C	Cn	DI

Abbreviations

ROUGHNESS		WALL ALTERATIONS		TYPE		OTHER	
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PLANARITY		APERTURE		LP	Lamination Parting	SI	Sand Infill
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Un	Undulating	F	Filled	WS	Weathered Seam	CI	Clay Infill
Cu	Curved	T	Tight	BZ	Broken Zone	Cn	Clean
Ir	Irregular			HFZ	Highly Fractured Zone	CS	Clay Seam
				Fr	Fracture	DI	Drilling Induced

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BOREHOLE NO	: BH18
SHEET	: 10 of 10
REFERENCE NO	: H9567

PROJECT : GATEWAY UPGRADE PROJECT – GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION

LOCATION : PIER 7 – NORTHERN FACE OF PILE CAP – DOWNSTREAM/RIGHT HAND SIDE

PROJECT NO : FG5388 SURFACE R.L : -3.74 DRILLER : CAIRNS DRILLING PTY LTD

JOB NO : DATUM : AHD DATE DRILLED : 2 - 8/4/05

DEPTH	DEFECT TYPE	DIP	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
57.74	LP	15°	P	-	-	Cn	DI
57.79	LP	30°	P	R	O	Cn	DI
57.86-57.90	BZ		P	-	O		CI, Parallel to LP
57.95-58.00	WS		-	-	O	W	
58.18-58.46	BrZ		-		C	W	CI
58.54	J	35°	P	S	C	Cn	
58.64	J	35°	P	S	C		
58.77	J	35°	P	S	C		
58.85-59.10	J	85-90°	P	S	O		
59.15-59.35	BrZ		-	-	O		CI
59.35-59.57	BZ	MDJ	-	-	O		CI
60.0-60.05	BZ	MDJ	-	-	O		CI
60.10-60.32	BrZ		-	-	O		CI

Abbreviations

ROUGHNESS		WALL ALTERATIONS		TYPE		OTHER	
R	Rough	FeSt	Iron Stained	J	Joint	P	Partly
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				MDJ	Multidirectional Joints	In	Incipient
PLANARITY		**APERTURE**		LP	Lamination Parting	SI	Sand Infill
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