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

BOREHOLE No	BH12
SHEET	<u>1</u> of <u>8</u>
REFERENCE No	H9561

LOGGED BY
J. LESTER & A. DISSANAYAKE (DIS

GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION **PROJECT** PIER 6 - CENTRE OF THE PILE CAP LOCATION COORDINATES 10324.8 E; 167708.4 N PROJECT No \_FG5388 \_ \_ \_ \_ SURFACE R.L. \_\_-5.48 \_\_ DATE STARTED 30/3/05 DATUM SETP JOB No. DATUM \_AHD \_. DATE COMPLETED 31/3/05 DRILLER CAIRNS DRILLING RL ROD INTACT DEFECT CÁSING WASH BORING CORE DRILLING (m)()% ADDITIONAL DATA STRENGTH SPACING Ξ MATERIAL (mm) DEPTH AND SAMPLES DESCRIPTION ÇORE TEST RESULTS REC % 0 -5.48 ESTUARINE SILTY CLAY Grey, wet, very soft. Contains some shell fragments throughout. ENGINEERING BOREHOLE 09 04.GDT OH RW/ SPT N<1 MEERA PIER 6 BOREHOLES-GATEWAY BRIDGE - GATEWAY UPGRADE PROJECT GPJ -8.18 SAND AND GRAVEL - ALLUVIUM Grey, wet, mainly loose to medium dense. Contains gravel up to 25mm size and trace of clay. 5,3,7 SPT GP -9.58 LOW GRADE COAL FINE GRAINED MAINLY DULL TO BOREHOLE WITH LITHOLOGY VITREOUS THINLY LAMINATED FRAGILE CARBONACEOUS SEDIMENTARY ROCK XW: Generally exhibits engineering properties of dark grey to black, dry, medium dense silty gravel. 9,9,15 SPT N = 24REMARKS This borelog should be read in conjunction with the appropriate Defect Description Sheets. Defect angles have been

measured with respect to a horizontal plane.



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

**PROJECT** GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION PIER 6 - CENTRE OF THE PILE CAP LOCATION COORDINATES 10324.8 E; 167708.4 N PROJECT No FG5388 DATE STARTED 30/3/05 SURFACE R.L. \_\_-5,48 DATUM SETP JOB No DATUM \_\_AHD\_\_\_ DATE COMPLETED 31/3/05 DRILLER CAIRNS DRILLING R.L ROD INTACT DEFECT (m) ()% STRENGTH SPACING ADDITIONAL DATA DEPTH (m) MATERIAL (mm) AND DESCRIPTION SAMPLI TESTS CORE TEST RESULTS REC % LOW GRADE COAL XW: (As Above) XW -10.98 HW: Dark grey to black, dry, very dense silty gravel rapidly grading into very low to low strength rock with depth. BOREHOLE WITH LITHOLOGY MEERA PIER & BOREHOLES-GATEWAY BRIDGE - GATEWAY UPGRADE PROJECT. GPJ ENGINEERING BOREHOLE 09 04.GDT 31/8/05 50/110 mm SPT N>50 18.30/75 mm SPT N>50 (15) Coreloss Broken / crushed seam. -13.80 MW: Dark grey to black, fine grained, thinly laminated and interbedded, very low to mainly low strength. ls(50)=0.12 MPa ls(50)=0.12 MPa Minor grey siltstone and dark grey 0 carbonaceous interbeds up to 150mm thick Defects: Is(50)=0.15 MPa 0 - Lamination & bedding partings 5°-15° ls(50)=0.15 MPa Is(50)=0.10 MPa 0 ls(50)=0.24 MPa - Occasional joints @ 60° (1-2/m) - Occasional joints @ 80° (1/m) - Some broken & weathered seams Is(50)=0.16 MPa Is(50)=0.20 MPa REMARKS This borelog should be read in conjunction with the appropriate Defect Description Sheets. Defect angles have been LOGGED BY J. LESTER & A. DISSANAYAKE (DIS measured with respect to a horizontal plane.



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

BOREHOLE No	BH12
SHEET	3_ of8
REFERENCE No	H9 <u>5</u> 61

 PROJECT
 GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION

 LOCATION
 PIER 6 - CENTRE OF THE PILE CAP
 COORDINATES
 10324.8 E; 167708.4 N

 PROJECT No FG5388
 SURFACE R.L. -5.48
 DATE STARTED
 30/3/05
 DATUM
 SETP

 JOB No
 DATUM
 AHD
 DATE COMPLETED
 31/3/05
 DRILLER
 CAIRNS DRILLING

PROJECT	T No <u>FG5388</u>	SURFACE R.L <u>5.48</u>	DATE STARTED _30/3/05	DATUM <u>SETP</u>	
JOB No		DATUM AHD	DATE COMPLETED 31/3/05		
(m) (m) 10 -15	CORE REC %	MATERIAL DESCRIPTION	UTACT CALL WEATHERING (with)	ADDITIONAL DATA AND TEST RESULTS	SAMPLES
	86 (14)	LOW GRADE COAL  MW: (As above).  Becoming low to medium strength with depth.  Defects: - Bedding & lamination partings <10° (3-4/m) - Joints @ 15° & 90° (4-5/m)  Defects are generally planar, smooth and mainly clean with some weathered &		Is(50)=0.04 MPa Is(50)=0.07 MPa Is(50)=0.28 MPa Is(50)=0.38 MPa Is(50)=0.05 MPa Is(50)=0.09 MPa Is(50)=0.07 MPa Is(50)=0.12 MPa	X 0 - 0 X - X - 0 X - X
NG BOREHOLE 09_04.GDT 31/8/05		attered seams.	MW	Is(50)=0.43 MPa Is(50)=0.25 MPa Is(50)=0.64 MPa Is(50)=0.17 MPa	0 . X .
ADE PROJECT.GPJ ENGINEER!	7.53	SILTSTONE  MW: Pale grey, fine grained, mainly low to medium strength. Minor thin coal laminations dipping 5-10° throughout.	× × × × × × × × × × × × × × × × × × ×	Is(50)=0.50 MPa Is(50)=0.41 MPa UCS =10.2 Mpa MC=8.6% WD=2424N/m <sup>2</sup> Is(50)=0.22 MPa	x o
BOREHOLE WITH LITHOLOGY MEERA PIER 6 BOREHOLES-GATEWAY BRIDGE - GATEWAY UPGRADE PROJECT.GPJ ENGINEERING BOREHOLE 09 04.GDT 3/18/05		LOW GRADE COAL  MW: Dark grey to black, fine grained, thinly laminated & Interbedded, low to medium strength.  Defects: - Lamination partings <10° (7/m) - Occasional joints @ 80° (1/m)  Highly fractured in parts with intersecting bedding plane partings and subvertical joints. Minor crushed or broken zones throughout.	MW	Is(50)=0.21 MPa Is(50)=0.14 MPa Is(50)=0.46 MPa	×
Y MEERA PIER 6 BOREHOLES-G	96 (20)	SANDSTONE SW: Grey, fine grained, laminated, low to mainly medium strength.  Defects: - Numerous thin carbonaceous laminations <10-15°Occasional joints @ 70°-80° (1/m).	sw	Coreloss  Siltstone band grading to Sandstone with depth.  UCS = 28.6 Mpa MC=2.6% WD=2401N/m² Is(50)=0.57 MPa Is(50)=0.14 MPa	0 x -
REHOLE WITH LITHOLOG	0.04	LOW GRADE COAL MW: See next page	MW	Is(50)=0.80 MPa Is(50)=0.27 MPa	0 _ x
S 15 -20	0.48			Is(50)=0.88 MPa	
REMA	RKS This borelog sho	uld be read in conjunction with the appropriate Defec	Description Sheets. Defect angles h		

This borelog should be read in conjunction with the appropriate Defect Description Sheets. Defect angles have been

measured with respect to a horizontal plane.

J. LES

J. LESTER & A. DISSANAYAKE (DIS



## ENGINEERING BORFHOLF

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

J. LESTER & A. DISSANAYAKE (DIS

GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION PROJECT LOCATION PIER 6 - CENTRE OF THE PILE CAP COORDINATES 10324.8 E; 167708.4 N PROJECT No FG5388 SURFACE R.L. \_\_-5,48 DATUM SETP DATE STARTED \_30/3/05 JOB No DATE COMPLETED 31/3/05 DATUM \_AHD \_\_\_ DRILLER CAIRNS DRILLING R.L. RÓD INTACT DEFECT (m) ()% STRENGTH SPACING ADDITIONAL DATA DEPTH (m) MATERIAL (mm) AND SAMPLES DESCRIPTION CASING WASH CORE WEATH 888888 FFT8T CORE TEST RESULTS 380 REC % 15 -20.48 LOW GRADE COAL Ts(50)≂0.19 MPa MW: Dark grey to black, fine grained, thinly laminated and interbedded, mainly low to medium strength. Minor grey siltstone and dark grey carbonaceous interbeds up to 50mm thick. Defects: N/NA/ - Lamination/bedding partings <10° (6/m) Joints @ 60°-90° Defects are generally planar, smooth, mainly clean with some weathered and -21.43 altered seams.
INTERBEDDED SILTSTONE & ENGINEERING BOREHOLE 09\_04.GDT MW MUDSTONE Crushed seam. FINE GRAINED THINLY LAMINATED нw SEDIMENTARY ROCK SW: Dark grey and black, minor coal bands Coreloss and thin carbonaceous laminations in parts, low to medium strength with occasional high strength bands. (43)Frequent HW to MW seams. ls(50)=0.52 MPa SW Is(50)=0.64 MPa - Bedding/lamination partings <10° (1-4/m) - Joints @ 60° and 80° (6/m) GATEWAY UPGRADE PROJECT.GPJ Coal interbed Defects are generally planar, smooth with thin clay infills or undulating with thin clayey ls(50)=0.42 MPa Is(50)=1.07 MPa 0 Broken zone. MW (s(50)=0.27 MPa (s(50)=0.27 MPa 0 UCS =11.9 Mpa BOREHOLE WITH LITHOLOGY MEERA PIER 6 BOREHOLES-GATEWAY BRIDGE. MC=4.6% WD=2391N/m<sup>2</sup> Is(50)=0.28 MPa Pressuremeter Is(50)=0.11 MPa 0 Test 4 @ 18.0m MW band SW Broken zone. ΜW (57) MW band. SW Pressuremeter Test 3 @ 19.80m REMARKS This borelog should be read in conjunction with the appropriate Defect Description Sheets. Defect angles have been LOGGED BY

measured with respect to a horizontal plane.



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

BOREHOLE No	B <u>H12</u>
SHEET	_5_ of _8_
REFERENCE No	H9561

PROJECT GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION LOCATION PIER 6 - CENTRE OF THE PILE CAP COORDINATES 10324.8 E; 167708.4 N PROJECT No FG5388 \_ \_ \_ SURFACE R.L. \_\_-5.48 \_\_\_ DATE STARTED 30/3/05 DATUM SETP\_ JOB No DATUM \_AHD \_\_. DATE COMPLETED 31/3/05 DRILLER CAIRNS DRILLING RI. ROD INTACT CASING WASH BORING CORE DRILLING (m) ()% STRENGTH ADDITIONAL DATA SPACING ε MATERIAL (mm) LITHOLOGY DEPTH AND SAMPLE DESCRIPTION SAMPL CORE TEST RESULTS REC % 20 -25.48 131444 INTERBEDDED SILTSTONE & MUDSTONE SW: (As above) SW Is(50)=0.54 MPa ls(50)=0.34 MPa Pressuremeter Test 2 @ 20.6m UCS =101.7 Mpa MC=2.6% -26.38 WD=2843N/m<sup>2</sup> Is(50)=0.26 MPa SANDSTONE Is(50)=0.78 MPa 0 SW: Pale grey, fine-medium grained, MEERA PIER 6 BOREHOLES-GATEWAY BRIDGE - GATEWAY UPGRADE PROJECT. GRJ. ENGINEERING BOREHOLE 09\_04.GDT laminated to slightly massive, mainly medium becoming high strength with Is(50)=0.85 MPa ls(50)=0.48 MPa Х Pressuremeter Test 1 @ 21.3m UCS =23.4 Mpa Minor thin carbonaceous laminations ls(50)=0.58 MPa throughout. MC=3.2% Is(50)=0.84 MPa Defects: Lamination partings <20° (2-3/m). 0 WD=2411N/m2 SW Is(50)=0.87 MPa 0 Defects: ls(50)=0.83 MPa - Lamination partings <10°. - Occasional joints @ 20°, 60° or 80°. - Occasional clay seams <5mm. Is(50)=1.34 MPa Is(50)=0.51 MPa Defects are generally planar, smooth and Coal seam, 20mm clean with clayey film or thin infillings. thick, dip 20° ls(50)=1.58 MPa 0 Is(50)=0.67 MPa (79)UCS =40.0 Mpa MC=2.4% ls(50)=1.76 MPa WD=2541N/m<sup>2</sup> ls(50)=1.26 MPa 0 Is(50)=0.26 MPa Is(50)=2.00 MPa -28.89 MUDSTONE SW: Dark grey to black, fine grained, thinly laminated, medium to mainly high strength. Is(50)=0.46 MPa Is(50)=1.92 MPa Occasionally varies to sandstone 0 UCS =37.7 Mpa interbands up to 5mm thick. MC=3.6% WD=2405N/m<sup>2</sup> ls(50)=0.60 MPa Defects: Generally rare. Is(50)=1.01 MPa 0 Occasional drilling induced lamination Is(50)=0.42 MPa Is(50)=1.99 MPa Is(50)=1.58 MPa partings <10° (3/m). SW 0 0 ls(50)=0.32 MPa BOREHOLE WITH LITHOLOGY -30.16MUDSTONE - SHEARED MW : See next page RW -30.48

REMARKS This borelog should be read in conjunction with the appropriate Defect Description Sheets. Defect angles have been

J. LESTER & A. DISSANAYAKE (D

LOGGED BY

measured with respect to a horizontal plane.

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

BOREHOLE No	BH12
SHEET	_6_ of _8_
DESERBENCE NO	H9561

GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION **PROJECT** LOCATION PIER 6 - CENTRE OF THE PILE CAP COORDINATES 10324.8 E; 167708.4 N PROJECT No FG5388 \_ \_ \_ DATE STARTED 30/3/05\_\_ SURFACE R.L. \_\_-5,48 DATUM SETP \_\_\_\_\_ JOB No DATUM \_AHD \_. DATE COMPLETED 31/3/05 DRILLER CAIRNS DRILLING R.L ROD INTACT DEFECT (m) ()% STRENGTH SPACING ADDITIONAL DATA Ξ MATERIAL (mm) DEPTH ( AND SAMPLES DESCRIPTION CASIN CASIN CORE CORE SAMPL TESTS CORE TEST RESULTS REC % 25 MUDSTONE - SHEARED MW: Dark grey to black, faulted, contorted, sheared and healed at some places, low to LL=39%; PI=17.6%; LS=11% medium strength. MW Pale grey firm to stiff clay interbands. Coreloss (76)-31.08 SANDSTONE SW: Pale grey, fine to medium grained, Is(50)=1.47 MPa x o laminated to slightly massive, medium to Is(50)=2.96 MPa UCS =60.9 Mpa mainly high strength. MC=1.8% Is(50)=1.31 MPa WD=2468N/m2 - 26 Minor dark grey mudstone interbeds and Is(50)=2.54 MPa 0 04.GDT thin carbonaceous interlaminations throughout. ENGINEERING BOREHOLE 09 Is(50)=1.53 MPa 0 Defects: Is(50)=1.01 MPa х - Lamination/bedding partings~10° - Joints @ 60°, 70° and 80° (5/m). Is(50)=0.93 MPa Is(50)=1.70 MPa 0 Numerous closed or tight joints dipping 60°, 70° or 80°, PL, SM-SR with thin clay infill or coat below 26.7m. BOREHOLE WITH LITHOLOGY MEERA PIER 8 BOREHOLES-GATEWAY BRIDGE - GATEWAY UPGRADE PROJECT.GPJ SW (74) Is(50)=1.83 MPa Numerous mudstone (\$(50)=1.56 MPa -34.18 rip-up clasts ~10° INTERBEDDED UCS =35.3 Moa MC=2.4% SILTSTONE/MUDSTONE & WD=2464N/m<sup>2</sup> SANDSTONE. MUDSTONE DOMINANT SW: Grey and black, fine grained, thinly laminated and interbedded, medium to mainly high strength. Defects: Lamination/bedding partings~10° (1-3/m). SW - Subvertical joints -60°-70° (7-10/m). REMARKS This borelog should be read in conjunction with the appropriate Defect Description Sheets. Defect angles have been LOGGED BY measured with respect to a horizontal plane. J. LESTER & A. DISSANAYAKE (DIS



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

J. LESTER & A. DISSANAYAKE (D

GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION PROJECT PIER 6 - CENTRE OF THE PILE CAP LOCATION COORDINATES 10324.8 E; 167708.4 N PROJECT No \_FG5388 \_ \_ \_ \_ SURFACE R.L. \_\_-5.48 \_\_\_ DATE STARTED 30/3/05 DATUM SETP JOB No DATUM \_AHD \_.. DATE COMPLETED 31/3/05 DRILLER CAIRNS DRILLING R.L ROD INTACT DEFECT ING SH BORING SE DRILLING ()% STRENGTH SPACING ADDITIONAL DATA Ē MATERIAL DEPTH ( AND **3RAPHIC** DESCRIPTION SAMPL TESTS CORE TEST RESULTS 30 -35.48 REC % INTERBEDDED SILTSTONE/MUDSTONE & ls(50)=0.62 MPa SANDSTONE. MUDSTONE DOMINANT Is(50)=0.20 MPa 0 SW: (As above). Mudstone beds becoming thicker and more prominant below 30,55m. ls(50)=0.87 MPa 0 Is(50)=0.79 MPa Defects: - Drilling induced lamination/bedding partings Occasional joints @ 60°, 70° or 80°. ENGINEERING BOREHOLE 09\_04.GDT 31/8/05 SW Defects are generally planar, smooth and Is(50)=1.03 MPa mainly clean with occasional clay infillings Is(50)=1.69 MPa 0 up to 10mm thick. UCS =44.1 Mpa MC=3.0% Is(50)=0.89 MPa Is(50)=2.45 MPa Is(50)=1.71 MPa WD=2384N/m<sup>2</sup> 0 0 Is(50)=0.97 MPa х (37)Is(50)=0.64 MPa Is(50)=2.50 MPa Is(50)=3.05 MPa -37.23 0 MUDSTONE 0 Is(50)=1.02 MPa Is(50)=1.76 MPa Is(50)=0.92 MPa х SW: Dark grey to black, fine grained, thinly 0 laminated, medium to mainly high strength. BOREHOLE WITH LITHOLOGY MEERA PIER 6 BOREHOLES-GATEWAY BRIDGE - GATEWAY UPGRADE PROJECT.GPJ Occasional thin interlaminations of siltstone and sandstone. ls(50)=0.62 MPa ls(50)=1.43 MPa o Defects: - Lamination partings <10° - Occasional steeply dipping joints - Clay seams up to 15mm thick. Mudstone appears to be generally massive below 32.85m. Occasional thin sandstone Is(50)=0.72 MPa laminations in parts. Is(50)=1.89 MPa SW (70) -40.48 REMARKS This borelog should be read in conjunction with the appropriate Defect Description Sheets. Defect angles have been LOGGED BY

measured with respect to a horizontal plane.



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

GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION INVESTIGATION PROJECT LOCATION PIER 6 - CENTRE OF THE PILE CAP COORDINATES 10324.8 E; 167708.4 N SURFACE R.L. \_-5.48 \_. PROJECT No FG5388 DATUM SETP\_\_\_\_\_ DATE STARTED 30/3/05 DATUM \_AHD \_\_ JOB No DATE COMPLETED 31/3/05 DRILLER <u>CAIRNS DRILLING</u> RΙ RQD INTACT DEFECT BORING ()% ADDITIONAL DATA SPACING STRENGTH DEPTH (m) MATERIAL (mm) AND SAMPLES DESCRIPTION NASAN CASIN USC WEATH THE W SAMP TESTS CORE TEST RESULTS REC % 35 MUDSTONE SW: (As above) Is(50)=0.99 MPa ENGINEERING BOREHOLE 09\_04.GDT 31/8/05 Is(50)=1.83 MPa Is(50)=2.09 MPa 0 ٥ -36 ls(50)=1.10 MPa ls(50)=2.10 MPa ls(50)=0.98 MPa BOREHOLE WITH LITHOLOGY MEERA PIER 6 BOREHOLES-GATEWAY BRIDGE - GATEWAY UPGRADE PROJECT.GPJ -42.66 100 Borehole terminated at 37.18m - 38 -39 REMARKS This borelog should be read in conjunction with the appropriate Defect Description Sheets. Defect angles have been LOGGED BY J. LESTER & A. DISSANAYAKE (DIS measured with respect to a horizontal plane.



Gateway Upgrade Project - Gateway Bridge Borehole No: BH 12 Start Depth: 7.73 Finish Depth: 37.18 Project No: FG 5388 H No: 9561 16.65 1,17 1 1915 -19.65 1 19.65 1:20 22,55 1 22.55 23.0 1.24 CORE LOSS 0.130 25.50 1 H9561\_6

Project:

Gateway Upgrade Project - Gateway Bridge Project: Borehole No: BH 12
Start Depth: 7.73 Start Depth: Finish Depth: 37.18 Project No: FG 5388 H No: 9561 25SO 1 26 140 280 Z8.50↑ H 95(1 -- 28.5 J 8. IJ2PH 31,44 31.40 1315 0 7 H9561 \_7 34.36

Project: Gateway Upgrade Project - Gateway Bridge

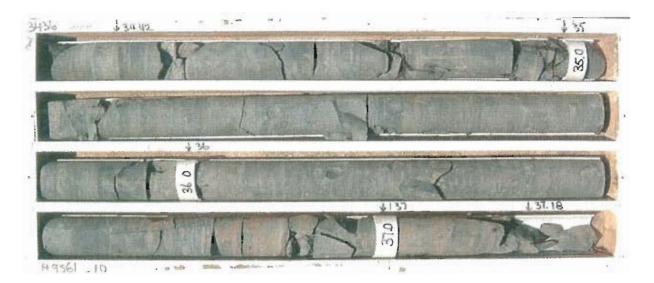
Borehole No: BH 12
Start Depth: 7.73

 Start Depth:
 7.73

 Finish Depth:
 37.18

 Project No:
 FG 5388

 H No:
 9561



Geotechnical Branch

35 Butterfield Street HERSTON Q 4006 Phone: (07) 38343035 Fax: (07) 38343011



## DEFECT DESCRIPTIONS OF ENGINEERING BORELOGS

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

BOREHOLE NO BH12

SHEET 1 of 12

REFERENCE NO: H9561

PROJECT

GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION

INVESTIGATION

LOCATION

PIER 6 - CENTRE OF THE PILE CAP

PROJECT NO:

FG5388

SURFACE R.L: -5.48

DRILLER

: CAIRNS DRILLING PTY LTD

JOB NO

**DATUM** 

AHD

DATE DRILLED : 30 - 31/3/05

DEPTH .	DEFECT TYPE	DIP	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
7.73-8.15	_		-	-		16.	Coreloss
8.15-8.31	BZ/WS		-		1.0	W	DI
8.32	LP	10°	P	S	С	3.5	CI, 1mm
8.33	LP	10°	P	S	0	Cn	DI
8.38-8.4	BZ/WS		-	μ	-	W	-
8.44-8.48	BZ	-	-	~	-	Cn	DI
8.48-8.53	J	90°	P	S/R	С	Cn	~
8.53	LP	10°	P	S	C	Cn	-
8.54	LP	10°	P	S	С	Cn	_
8.57	LP	10°	P	S	С	Cn	-
8.58-8.69	J	60°	P	R	С	FeSt	-
8.6	LP	10°	P	S	С	Cn	-
8.64-8.68	BZ		-	-	-	Cn	-
8.87	LP	10°	Р	S	C	Cn	-
8.97	BP/LP	10°		-		Cn	-
8.98	LP	10°	Р	S	С	Cn	
9.06	J	20°	P	S	0		CI
9.08	LP	10°	P	S	С	Cn	-
9.08-9.17	J	80°	P/Ir	S/R	С	Cn	-
9.11	LP	10°	P	S	С	Cn	
9.14	LP	10°	P	S	C	Cn	
9.18	LP	10°	P	S	C	Cn	T-

#### Abbreviations

			Audie	unitons				
	ROUGHNESS	1	WALL ALTERATIONS		TYPE		OTHER	
R	Rough	FeSt	Iron Stained	J	Joint	DI	Drilling Induced	
S	Smooth	W	Weathered	В	Bedding	CL	Carbonaceous lamination	
SL	Slickensided	SM	Secondary Mineralisation	BP	Bedding Parting	Co	Coal seam	
				FP	Foliation Parting	<i>I</i> n	Incipient	
	PLANARITY APERTURE		APERTURE	LP	Lamination Parting	ŞI	Sand Infill	
P	Planar	С	Closed	SZ	Sheared Zone	Н	Horizontal	
St	Stepped	0	Open	CZ	Crushed Zone	v	Vertical	
Un	Undulating	F	Filled	ws	Weathered Seam	CI	Clay Infill	
Cu	Curved	T	Tight	BZ	Broken Zone	Çn	Clean	
Ir	Irregular			HFZ	Highly Fractured Zone	CS	Clay Seam	
				Fr	Fracture			

Geotechnical Branch

35 Butterfield Street HERSTON Q 4006 Phone: (07) 38343035 Fax: (07) 38343011



BH12

2 of 12

H9561

# DEFECT DESCRIPTIONS OF ENGINEERING BORELOGS

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

GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION

REFERENCE NO:

SHEET

BOREHOLE NO

PROJECT

INVESTIGATION

INVESTIGATION

LOCATION : PIER 6 - CENTRE OF THE PILE CAP

PROJECT NO: FG5388 SURFACE R.L: -5.48 DRILLER : CAIRNS DRILLING PTY LTD

JOB NO : DATUM : AHD DATE DRILLED : 30 – 31/3/05

DEPTH	DEFECT TYPE	DIP	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
9.2-9.29	BZ	35	-	-	0	Cn	-
9.29	LP	10°	P	S	0	Cn	
9.35-9.6	BZ	-	н	-	-1	Cn	-
9.45-9.46	WS	10°		-	-	W	CI
9.52-9.59	WS	10°			-	W	CI
9.65-9.66	WS	10°	-		-	W	CI
9.6-9.72	J	60°	P	-	T	-	CI
9.72	LP	<10°	Un	-	T	Cn	1.5
9.75	LP	10°	St	S	C	Cn	-
9.82	LP	10°	P	S	С	Cn	-
9.88	LP	10°	P	-	Т	Cn	15
9.96	LP	15°	P		Т	Cn	
10.12-10.13	WS	10°		-	-	- 1	CI
10.07-10.08	SZ	10°	-	-	-	W	-
10.17-10.18	BZ	<u> </u>		-	0	Cn	-
10.32	J	20°	Cu	S	0	Cn	Cv
10.47	LP	10°	P	S	С	Cn	-
10.49	LP	10°	P	S	С	Cn	, <del>-</del> ,
10.58	LP	10°	P	S	0	Cn	Cv
10.59-10.67	BZ/WS	-		-	0	W	(+)
10.69-10.74	BZ/WS	-	15	-	0	W	BR

#### Abbreviations

			***************************************	Percent				
	ROUGHNESS		ROUGHNESS WALL ALTERATIONS		TYPE		OTHER	
R	Rough	FeSt	Iron Stained	J	Joint	DI	Drilling Induced	
S	Smooth	W	Weathered	В	Bedding	CL	Carbonaceous lamination	
SL	Slickensided	SM	Secondary Mineralisation	BP	Bedding Parting	Со	Coal seam	
		į.		FP	Foliation Parting	In	Incipient	
	PLANARITY APER		APERTURE	LP	Lamination Parting	SI	Sand Infill	
Р	Planar	С	Closed	SZ	Sheared Zone	Н	Horizontal	
Sŧ	Stepped	0	Open	CZ	Crushed Zone	V	Vertical	
Un	Undulating	F	Filled	ws	Weathered Seam	CI	Clay Infill	
Си	Curved	T	Tight	BZ	Broken Zone	Cn	Clean	
Ιr	Irregular			HFZ	Highly Fractured Zone	CS	Clay Seam	
				Fr	Fracture	Cv	Calcite Vein	

Geotechnical Branch

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# DEFECT DESCRIPTIONS OF ENGINEERING BORELOGS

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

BOREHOLE NO : BH12

SHEET : 3 of 12

REFERENCE NO: H9561

PROJECT

GATEWAY UPGRADE PROJECT -- GATEWAY BRIDGE DUPLICATION FOUNDATION

INVESTIGATION

LOCATION : PIER 6 - CENTRE OF THE PILE CAP

LOCATION . TIER 0 - CENTRE OF THE FIEL CAI

PROJECT NO: FG5388 SURFACE R.L: -5.48 DRILLER : CAIRNS DRILLING PTY LTD

JOB NO : DATUM : AHD DATE DRILLED : 30 – 31/3/05

DEPTH	DEFECT TYPE	DIP	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
10.74-10.77	SZ	<5°	P		0	Cn	5mm
10.8	J	<20°	Un	IR	0	-	CI, 5-10rnm
10.85	Ј	<20°	P	S	0	Cn	2mm
10.91	J	<5°	P	S	C	Cn	-
10.91-10.95	J	90°	Un	S	С	Cn	-
10.95	J	15°	P	S	0	Cn	1mm
10.95-11	J	60°	Ir	S	0	Cn	1mm
11.07	J	5-10°	P	S	0	Cn	2mm
11.14	J	10°	P	S	0	Cn	1 mm
11.18	J	5°	P	S	0	Cn	2mm
11.18-11.22	J	90°	P	S	С	-	CI, 5mm
11.22-11.25	BZ/WS	10°	-	-	~	W	-
11.29-11.33	BZ/WS		-	-	-	W	15
11.4-11.41	BZ/WS	_	-		-	W	
11.45	LP	5°	P	S	С	Cn	-
11.45-11.49	CZ/SZ	20°	-	-	-	W	~
11.53	LP	5°	P	S	0	Cn	-
11.55	J	20°	P	S	0	Cn	-
11.59	J	60°	P	~	T	Cn	-
11.64	LP	10°	P	S	0	-	Co
11.71-11.73	BZ	-	-	-	-	Cin	
11.77	LP	15°	P	S	Т	Cn	5 <del>0</del>

#### Abbreviations

	ROUGHNESS		WALL ALTERATIONS		TYPE		OTHER
R	Rough	FeSt	Iron Stained	J	Joint	Dl	Drilling Induced
S	Smooth	w	Weathered	В	Bedding	CL	Carbonaceous lamination
SL	Slickensided	SM	Secondary Mineralisation	BP	Bedding Parting	Co	Coal seam
				FP	Foliation Parting	Ĭn	Incipient
	PLANARITY APERTURE:		APERTURE	LP	Lamination Parting	SI	Sand Infill
Р	Planar	С	Closed	SZ	Sheared Zone	Н	Horizontal
St	Stepped	0	Open	CZ	Crushed Zone	V	Vertical
Un	Undulating	F	Filled	WS	Weathered Seam	CI	Clay Infill
Cu	Curved	Т	Tight	BZ	Broken Zone	Cn	Clean
ŀ	Irregular			HFZ	Highly Fractured Zone	CS	Clay Seam
				Fr	Fracture	Cv	Calcite Vein

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

F:GEOT533/4

Geotechnical Branch

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## DEFECT DESCRIPTIONS OF ENGINEERING BORELOGS

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

BH12 BOREHOLE NO :

4 of 12 SHEET

H9561 REFERENCE NO:

**PROJECT** 

GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION

INVESTIGATION

LOCATION

PIER 6 - CENTRE OF THE PILE CAP

PROJECT NO:

FG5388

SURFACE R.L: -5.48

DATUM

DRILLER

: CAIRNS DRILLING PTY LTD

JOB NO

AHD

DATE DRILLED : 30 - 31/3/05

DEPTH	DEFECT TYPE	DIP	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
11.8-11.81	SZ	10°	-	-	-	W	-
11.88	SZ	10°	-	-	0	W	-
12.2	LP	10°	P	S	0	Cn	Со
12.28	J	55°	St	<u> </u>	T	Cn	-
12.48-12.53	WS	10°	-	-	С	W	CI
12.63-12.76	BZ/WS	-	-	-	-	W	-
12.88	LP	5°	P	S	С	Cn	Cn
12.92	J	20°	St	-	_	Cn	Cn
12.98-13.12	BZ	80°	P	S/R	0	Cn	Parallel to LP
13	LP	10°	P	R	0	Cn	-
13.02	LP	10°	P	R	0	Cn	14
13.05	LP	10°	P	S	O	Cn	(H)
13.08	LP	10°	P	S	0	Cn	-
13.1	LP	10°	P	S	0	Cn	-
13.17	LP	15°	P	-	T	Cn	-
13.2	J	45°	P	S	С	Cn	-
13.2-13.28	BZ/WS	~		-	0	W	-
13.22-13.42	J	80°	Un	S/R	0	Cn	
13.35	LP	10°	P	S	С	Cn	-8
13.37	LP	10°	P	S	0	Cn	-
13.39	LP	10°	P	S	0	Cn	-
13.42	J	30°	Cu	S/R	0	-	CI, 5mm

			Abbrev	tutton 3				
	ROUGHNESS WALL ALTERATIONS				TYPE		OTHER	
R	Rough	FeSt	Iron Stained	J	Joint	DI	Drilling Induced	
S	Smooth	w	Weathered	В	Bedding	CL	Carbonaceous lamination	
SL	Slickensided	SM	Secondary Mineralisation	BP	Bedding Parting	Со	Coal seam	
				FP	Foliation Parting	In	Incipient	
PLANARITY AP		APERTURE	LP	Lamination Parting	SI	Sand Infill		
Р	Planar	С	Closed	SZ	Sheared Zone	H	Horizontal	
St	Stepped	0	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	
Ιſ	Irregular			HFZ	Highly Fractured Zone	CS	Clay Seam	
				Fr	Fracture			

Geotechnical Branch 35 Butterfield Street HERSTON Q 4006 Phone: (07) 38343035 Fax: (07) 38343011



BOREHOLE NO :

# DEFECT DESCRIPTIONS OF ENGINEERING BORELOGS

SHEET 5 of 12

[CHARACTERISATION OF DEFECTS ARE IN ACCORDANCE WITH REFERENCE NO:

ISRM SUGGESTED METHODS (1981)]

H9561

PROJECT

'n

GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION

INVESTIGATION

PIER 6 - CENTRE OF THE PILE CAP LOCATION

**PROJECT** FG5388

DRILLER

: CAIRNS DRILLING PTY LTD

**BH12** 

JOB NO

SURFACE R.L: -5.48 DATUM

AHD

DATE DRILLED : 30 - 31/3/05

DEPTH	DEFECT TYPE	DIP	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
13.47	LP	5°	P	S	O	Cn	5-10mm Co
13.64-13.67	-	30mm	-	-		-	CI
13.47-13.54	J	70-80°	U	S/R	С	Cn	Co
13.54-13.65	-	-	_	-		-	Coreloss
13.65-13.73	BZ/WS	-	-		0	W	
13.91-14.05	J	70°	P	R	О	Cn	-
13.96	LP	10°	P	S	O	Cn	-
14.07	LP	10°	P	S	О	Cn	-
14.11-14.16	LP	0°	-	~	_	-	CI
14.21	LP	10°	Un	S	О	Cn	
14.21-14.34	J	80°	P/IR	-	C/T	Cn	-
14.48	LP	10°	P	S	С	-Cn	-
14.53-14.59	BZ/WS	_	-	-	-:	W	-
14.66	LP	10°	P	S	О	Cn	-
14.67	ĹĒ	10°	Р	S	C	-	CI, 2mm
14.8	J	20°	Р		С	-	CI, 2mm
14.82-14.83	LP	10°	P	S	0	Cn	-
14.85	LP	10°	P		0	~-	CI, 2.5mm
14.89	LP	10°	-	-	0	Cn	
14.97	LP	10°	-	-	0	Cn	-
15.17	LP	10°	P	S	0	-	CI
15.19	LP	10°	P	S	C	Cn	_

Abbroviations

			Alboir	tuttons			
	ROUGHNESS		WALL ALTERATIONS		ТҮРЕ		OTHER
R	Rough	FeSt	Iron Stained	J	Joint	DI	Drilling Induced
S	Smooth	W	Weathered	В	Bedding	CF	Carbonaceous lamination
SL	Slickensided	SM	Secondary Mineralisation	BP	Bedding Parting	Co	Coal seam
		_		FP	Foliation Parting	l In	Incipient
	PLANARITY APERTURE		LP	Lamination Parting	SÍ	Sand Infill	
Р	Planar	C	Closed	SZ	Sheared Zone	Н	Horizontal
St	Stepped	0	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	Člay Seam
				Fr	Fracture		

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

F:GEOT533/4

Geotechnical Branch

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## DEFECT DESCRIPTIONS OF ENGINEERING BORELOGS

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

BOREHOLE NO : BH12

SHEET 6 of 12

REFERENCE NO: H9561

**PROJECT** 

GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION

INVESTIGATION

LOCATION

PIER 6 - CENTRE OF THE PILE CAP

PROJECT NO:

FG5388

SURFACE R.L: -5.48

DRILLER

: CAIRNS DRILLING PTY LTD

JOB NO

DATUM

AHD

DATE DRILLED : 30 - 31/3/05

DEPTH	DEFECT TYPE	DIP	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
15.22-15.24	BZ	-	-	-	0	_	-
15.26	CS	10°	-	-	-	-	5mm thick
15.3-15.35	CS	10°	-	-	-	-	50mm thick
15.52	CS	10°	-	ie.			2mm
15.59	LP	10°	P	S	С		CI
15.7	LP	10-20°	Un	S	С	Cn	-
15.72	LP	20°	P	S	С	Cn	
15.75	LP	15°	-	-		Cn	
15.89	LP	10°	P	S	O	Cn	-
15.93	LP	10°	Р	- [	C	Cn	-
16.14-16.31	WS	-	SZ	-	_	W	CI
16.24-16.29	CS	-	-	-	С		CI
16.17	Ĵ	80°	Un	R	С	-	Cĭ
16.20	J	60°	P	S	С	Cn	9
16.25	Ј	60°	P	-	С	Cn	-
16.22-16.23	Co	20°	-	-	-	Cn	_
16.27-16.34	J	60°	P	S	С	-	CI
16.32-16.38	J	90°	P	-	Т	Cn	-
16.38-16.57			-	-	-	-	Coreloss
16.65-16.69	BZ		-	-	-	Cn	DI
16.69-16.79	J	80°	P	S	T	-	CI
16.75	Fr	-	-	-	-	Cn	DI
16.8	J	20°	Un	St/SM	0	-	CI

**Abbreviations** 

		216,646	ecceso, 110			
ROUGHNESS		WALL ALTERATIONS	TYPE			OTHER
Rough	FeSt	Iron Stained	[ ]	Joint	DI	Drilling Induced
Smooth	W	Weathered	В	Bedding	CL	Carbonaceous la mination
Slickensided	SM	Secondary Mineralisation	ВР	Bedding Parting	Co	Coal seam
	_		FP	Foliation Parting	In	Incipient
PLANARITY APERTURE		LP	Lamination Parting	SI	Sand Infill	
Planar	С	Closed	SZ	Sheared Zone	Н	Horizontal
Stepped	0	Open	CZ	Crushed Zone	V	Vertical
Undulating	F	Filled	ws	Weathered Seam	CI	Clay Infili
Curved	Т	Tight	BZ	Broken Zone	Cn	Clean
Irregular			HFZ	Highly Fractured Zone	CS	Clay Seam
			Fr	Fracture		
	Rough Smooth Slickensided  PLANARITY Planar Stepped Undulating Curved	Rough FeSt Smooth W Slickensided SM  PLANARITY  Planar C Stepped O Undulating F Curved T	ROUGHNESS  Rough FeSt Iron Stained Smooth W Westbard Slickensided SM Secondary Mineralisation  PLANARITY Planar C Closed Stepped O Open Undulating F Filled Curved T Tight	ROUGHNESS  Rough FeSt Iron Stained J Smooth W Weathered B Slickensided SM Secondary Mineralisation BP  PLANARITY APERCURE LP Planar C Closed SZ Stepped O Open CZ Undulating F Filled WS Curved T Tight BZ Irregular	Rough FeSt Iron Stained J Joint Smooth W Weathered B Bedding Slickensided SM Secondary Mineralisation BP Bedding Parting FP Foliation Parting PLANARITY APEXTURE LP Lamination Parting Planar C Closed SZ Sheared Zone Stepped O Open CZ Crushed Zone Undulating F Filled WS Weathered Seam Curved T Tight BZ Broken Zone Irregular HFZ Highly Fractured Zone	ROUGHNESS WALL ALTERATIONS TYPE  Rough FeSt Iron Stained J Joint DI  Smooth W Weathered B Bedding Ct  Slickensided SM Secondary Mineralisation BP Bedding Parting Co  FP Foliation Parting In  PLANARITY APEXTURE LP Lamination Parting SI  Planar C Closed SZ Sheared Zone H  Stepped O Open CZ Crushed Zone V  Undulating F Filled WS Weathered Seam CI  Curved T Tight BZ Broken Zone Cn  Irregular CS

Geotechnical Branch

NO

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# DEFECT DESCRIPTIONS OF ENGINEERING BORELOGS

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

BOREHOLE NO : BH12

SHEET : 7 of 12

REFERENCE NO: H9561

PROJECT GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION

INVESTIGATION

LOCATION: PIER 6 - CENTRE OF THE PILE CAP

PROJECT POSSES SURFACE

: FG5388 R.L

: -5.48

DRILLER CAIRI

CAIRNS DRILLING PTY

LTD

JOB NO :

DATUM : AHD

DATE DRILLED

: 30 - 31/3/05

DEPTH	DEFECT TYPE	DIP	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
16.96	J	20°	Un	S	С	Cn	_
17.00	LP	10°	P	S	С	Cn	-
17.13	LP	10°	St	S	C	Cn	-
17.10-17.19	J	80°	P	S	С	Cn	-
17,19	LP	10°	P	S	С	Cn	141
17.26	LP	10°	P	S	С		CI, 2mm
17.3	J	35°	P	R	С	Cn	
17.35	J	80°	P	S	С	Cn	
17.52-17.61	WS	60°	-	-	-	W	CI
17.53	Ј	60°	P	S	С	-	
17.56	J	60°	P	S	С		CI, 25mm
17.6	J	30°	P	S	C/T	Cn	_
18.11	J	20°	Р	S	С	-	CI, 10mm
18.14-18.21	HEZ,	-	-	_	С	-	CI, 2-5mm
18.21-18.45	J	800	-	-	-	Cn	~
18.45	LP	10°	P	S	С	Cn	-
18.55-18.79	J	80°	Р	S	С	-	CI
18.68	J	20°	P	-	C/T	-	CI
18.78	J	55°	P	S	С	_	CI, 1mm
18.93 - 19.02	J	80°	Un	S	С	Cn	-
18.98 - 19.14	I	80°	Un	S/R	C/T	Cm	_

#### Abbreviations

			7100101	CHEEDING			
	ROUGHNESS		WALL ALTERATIONS		TYPE		OTHER
R	Rough	FeSt	Iron Stained	J	Joint	DI	Drilling Induced
S	Smooth	W	Weathered	В	Bedding	CL	Carbonaceous lamination
SL	Slickensided	SM	Secondary Mineralisation	BP	Bedding Parting	Co	Coal seam
				FP	Foliation Parting	ln	Incipient
	PLANARITY		APERTURE	LP	Lamination Parting	SI	Sand Infill
P	Planar	С	Closed	SZ	Sheared Zone	Н	Horizontal
St	Stepped	0	Open	CZ	Crushed Zone	V	Vertical
Un	Undulating	F	Filled	ws	Weathered Seam	CI	Clay Infill
Си	Curved	T	Tight	BZ	Broken Zone	Cn	Clean
ß	Irregular			HFZ	Highly Fractured Zone	CS	Clay Seam
				Fr	Fracture		1

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## DEFECT DESCRIPTIONS OF ENGINEERING BORELOGS

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

BOREHOLE NO : BH12

SHEET 8 of 12

REFERENCE NO: H9561

PROJECT

GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION

INVESTIGATION

LOCATION

PIER 6 - CENTRE OF THE PILE CAP

PROJECT NO:

FG5388

SURFACE R.L: -5.48

DRILLER

: CAIRNS DRILLING PTY LTD

JOB NO

DATUM

AHD

DATE DRILLED : 30 - 31/3/05

DEPTH	DEFECT TYPE	DIP	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
19.02	J	25°	P	S/R	C/T	Cn	
19.14 - 19.25	BZ		-	-	О	-	_
19.35 - 19.42	BZ	-	-		О	-	
19.33	1	10°	Un	S			CI, 20mm
19.32	J	55°	P	R	C	-	CI, 1mm
19.42 - 19.65	J	80 - 90°	Un	-	C/T	-	CI, 2mm
19.52	J	60°	Р	-	Т	-	CI, 2mm
19.67	J	60 0	St	R	С	~	CI
19.77	Fr	-		м	_	Cn	DI
19.8 - 19.92	J	70-80°	P	-	T	-	CI, 1mm
19.94	LP	10°	P	S	C	Cn	1004000 *
19.9 - 20.03	J	70°	P	-	Т	= =	CI
20 - 20.08	J	80°	Un	S/R	С	Cn	
20.08	LP	10°	P	S	С	Cri	3
20.08 - 20.15	J	80°	P	S	С	-	CI
20.15	LP	10°	-	~	-	-	CI, 5mm
20.2	LP/B	20°	P	S	С	Cn	-
20.2 - 20.31	J	70°	P/Un	S	-	-	CI, 2mm
20.25	LP	10°	P	S	С	Cn	-
20.38	LP	10	P	S	С	Cn	-
20.49	LP	10°	P	S	0	Cn	-
20.8	JT	45°	P	S	С	Cn	(+)

Abbreviations

				*********				
	ROUGHNESS		WALL ALTERATIONS	LL ALTERATIONS			OTHER	
R	Rough	FeSt	Iron Stained	J	Joint	P	Partly	
S	Smooth	w	Weathered	В	Bedding	CL	Carbonaceous lamination	
SL	Slickensided	SM	Secondary Mineralisation	BP	Bedding Parting	Со	Coal seam	
				FP	Foliation Parting	In	Incipient	
	PLANARITY APERTURE		APERTURE	LP	Lamination Parting	SI	Sand Infill	
P	Planar	С	Closed	SZ	Sheared Zone	H	Horizontal	
St	Stepped	0	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	

Geotechnical Branch

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# DEFECT DESCRIPTIONS OF ENGINEERING BORELOGS

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

BH12 BOREHOLE NO :

9 of 12 SHEET

REFERENCE NO: H9561

**PROJECT** 

GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION

INVESTIGATION

LOCATION

PIER 6 - CENTRE OF THE PILE CAP

PROJECT NO:

FG5388

SURFACE R.L: -5.48

DRILLER

: CAIRNS DRILLING PTY LTD

JOB NO

**DATUM** 

: AHD

DATE DRILLED : 30 - 31/3/05

	_	
Tree	APERTURE	WALL
1722	APERIUKE	A V COXCINE A COM

		-			The second secon					
DEPTH	DEFECT TYPE	DIP	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER			
20.84	J	10°	P	SL	С	Cn				
20.9	LP/B	10°	Р	S	С	Cn	1151			
21.47	LP	10°	P	S	C	Cn	-			
21.92	LP 20° P S C		Cn	The state of						
22.06	LP	20°	P	S	С	Cn	-			
22.15	Со	E	-	-	-	-	30mm thick			
22.17	LP	20°	P	S	С	Cn				
22.17-22.27	J	70°	Un/P	S/R	0	Cn				
22.28&22.29	LP	10-20°	P	S	С	Cn	Со			
22.31	LP	20°	P/Cu	S	C	Cn	Co			
22.57	J	40°	P	R	С	Cn	•			
22.9	Fr	-	-	-	-	Cn	DA.			
23.03	Fr	_		-	-	Cn	DI			
23.07	Fr	-	-	-	-	Cn	DI			
23.42	BP	10°	P	S	С	Cn	-			
23.9	LP	10°	Р	S	C	Cn	-			
24.09	J	15-20°°	Cu/P	S	С	-	CI			
24.26-24.56	J	80°	P	S/R	С	-	CI			
24.41	LP	10°	P	S	С	Cn	-			
24.56	LP	10°	P	S	С	Cn	-			
24.58	T.P	10°	P	S	С	Cn	-			
24.58-24.65	J	90°	P	R	С	Cn	5,			
24.65	LP	10°	P	S	C	Cn	-			

Abbroviations

	ROUGHNESS		WALL ALTERATIONS		TYPE		OTHER.		
R.	Rough	FeSt	Iron Stained	J	Joint	DI	Drilling Induced		
S	Smooth	W	Weathered	В	Bedding	CL	Carbonaceous laminations		
SL	Stickensided	SM	Secondary Mineralisation	BP	Bedding Parting	Co	Coal seam		
			1	£Р	Foliation Parting	Ľn	Incipient		
	PLAN ARITY APERTURE		ĹP	Lamination Parting	SI	Sand Infill			
P	Planar	С	Closed	SZ	Sheared Zone	Н	Horizontal		
St	Stepped	0	Open	CZ	Crushed Zone	V	Vertical		
Un	Undulating	F	Filled	WS	Weathered Seam	CI	Clay Infill		
Cu	Curved	Т	Tight	BZ	Broken Zone	Cn	Clean		
Ir	Irregular			HFZ	Highly Fractured Zone	CS	Clay Seam		
				Fr	Fracture				

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

F:GEOT533/4

Geotechnical Branch

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# DEFECT DESCRIPTIONS OF ENGINEERING BORELOGS

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

BOREHOLE NO : BH12

SHEET 10 of 12

REFERENCE NO: H9561

**PROJECT** 

GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION

INVESTIGATION

LOCATION

PIER 6 - CENTRE OF THE PILE CAP

PROJECT NO:

FG5388 SURFACE R.L: -5.48

DRILLER

: CAIRNS DRILLING PTY LTD

JOB NO

DATUM

: AHD

DATE DRILLED : 30 - 31/3/05

DEPTH	DEFECT TYPE	DIP	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
24.83-24.85	LP	10°	P	S	С	Cn	
24.86-24.89	CS	10°	-	-	-	Cn	H
24.7-25.2	SZ	-	-	-	0	-	CI, 2-5mn
25.27-25.37	SZ	2	-		0	-	CI, 2-5mn
31.67	LP	10°	P	S	С	Cn	×
31.92-32.04	1	60°	Un/P	S/R	C/T	*	CI
Intersects w 32.04-32.16	J	80°	P	S	С	-	CI
32.16	J/LP	10°	С	S	С	Cn	Di
32.24	J	20°	P/Un	R	С		CI
32.295	LP	10°	P	S	С	Cn	DI
32.32	J	20°	P/Un	S/R	С	Cn	
32.37	LP	10°	P	S	С	Cn	DI
32.42	J	20°	Un	S/R	С	-	CI
32.425	LP	10°	P	S	C	-	CI
32.43	J	20°	Cu	S	C	-	CI
32.45	J	50°	P	S	C	-	CI
32.49	J	20°	P	S/R	,,	-	
32.49	J	40°	Р	R	10	Cn	- 3
32.49	J	70°	P	S	-	-	
32.53	J	80°	P	S	С	Cn	-22

Abbreviations

			ZIODEC	P. see a constitution				
ROUGHNESS		L	WALL ALTERATIONS		ТҮРЕ		OTHER	
R	Rough	FeSt	Iron Stained	J	Joint	DI	Drilling Induced	
S	Smooth	W	Weathered	В	Bedding	CL	Carbonaceous lamination	
SL	Slickensided	SM	Secondary Mineralisation	BP	Bedding Parting	Со	Coal seam	
		19 ===		FP	Foliation Parting	In	Incipient	
	PLANARITY APERTURE		APERTURE	LP	Lamination Parting	SI	Sand Infill	
P	Planar	С	Closed	SZ	Sheared Zone	Н	Horizontal	
St	Stepped	0	Open	CZ	Crushed Zone	V	Vertical	
Un	Undulating	F	Filled	ws	Weathered Seam	CI	Clay Infill	
Cu	Curved	Т	Tight	BZ	Broken Zone	Cn	Clean	
ſг	Irregular			HFZ	Highly Fractured Zone	CS	Clay Seam	
				Fr	Fracture			

Geotechnical Branch

**PROJECT** 

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SHEET

# DEFECT DESCRIPTIONS OF ENGINEERING BORELOGS

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

BOREHOLE NO : BH12

REFERENCE NO: H9561

11 of 12

GATEWAY UPGRADE PROJECT – GATEWAY BRIDGE DUPLICATION FOUNDATION

INVESTIGATION

LOCATION : PIER 6 - CENTRE OF THE PILE CAP

PROJECT NO: FG5388 SURFACE R.L: -5.48 DRILLER : CAIRNS DRILLING PTY LTD

JOB NO : DATUM : AHD DATE DRILLED : 30 – 31/3/05

DEPTH	DEFECT TYPE	DIP	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
32.13-32.25	2*J parallel 80°	-	P	S	C	-	CI
32.42-32.52	2*J parallel 70°	-	P	S	C	-	CI
32.55	J	70°	P	S	C	Cn	-
33.68-33.93	WS	J-0	1	-	-	W	CĬ
33.93	-	-	-		-	Cn	-
34.03	J	45°	P	S	С	-	CI
34.05-34.17	J	70-80°	P	S/R	Ĉ	-	CI
34.18-34.28	J	70-80°	P	S/R	С	Cn	DI
34.38	J	50°	P	S	С	-	CI
34.62	Fr	-	-	-	Т	Cn	DI
34.68	Fr	-	_	_	Т	Cn	DI
34.75	Fr	<b>~</b>	-	-	T	Cn	DI
34.78-35.1	J	80°	P to Un-St	S/R	2	-	DI/CI
35.25	J	70°	P to Cu	S/R	C_T	-	CI
35.47	Fr		-	-	Т	Cn	-
35.75	Fr		-	-	Т	Cn	-
35.54-35.64	J	90°	P	S	Т	-	CI
35.59	J	0°	P	S	С	FeSt	DI
35.85	Fr	*	_	_	T	Cn	DI
35.93	Fr	_	-	-	Т	Cn	ÐI

#### Abbreviations

			***************************************	the to the				
	ROUGHNESS WALL ALTERATIONS		WALL ALTERATIONS		TYPE		OTHER	
R	Rough	FeSt	Iron Stained	J	Joint	DI	Drilling Induced	
S	Smooth	W	Weathered	В	Bedding	CL	Carbonaceous lamination	
SL	Slickensided	SM	Secondary Mineralisation	BP	Bedding Parting	Co	Coal seam	
				FP	Foliation Parting	l'n	Incipient	
	PLANANTY APERTURE		LP	Lamination Parting	SI	Sand Infill		
P	Planar	С	Closed	SZ	Sheared Zone	H	Horizontal	
St	Stepped	0	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			

Geotechnical Branch

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# DEFECT DESCRIPTIONS OF ENGINEERING BORELOGS

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

BOREHOLE NO : BH12

SHEET 12 of 12

REFERENCE NO: H9561

**PROJECT** 

GATEWAY UPGRADE PROJECT - GATEWAY BRIDGE DUPLICATION FOUNDATION

INVESTIGATION

LOCATION

PIER 6 - CENTRE OF THE PILE CAP

PROJECT NO:

FG5388

SURFACE R.L: -5.48

DRILLER

: CAIRNS DRILLING PTY LTD

JOB NO

DATUM

AHD

DATE DRILLED : 30 - 31/3/05

DEPTH	DEFECT TYPE	DIP	PLANARITY	ROUGHNESS	APERTURE	WALL ALTERATION	OTHER
35.97	Fr	-	-	-	T	Cn	DI
36.0-36.08	J	80°	P	S	C	Cn	-
36.3	J	70-80°	P	S	T	FeSt	DI
36.44	J	0°	-	-	17	Cn	DI
36.65-36.79	J	80-90°	P	S	T	Cn	-
36.8	Ј	20°	P	S	С	Cn	-
36.89	J	. 0°	P	S	С	-	CI
36.95	J	80°	P	S	T	~	CI
36.95-37.1	J	65°	P/Un	S/R	С	FeSt	CI
37.08-37.12	J	80°	St	S	Т	FeSt	Cī
37.15	J	10°	Un	S	С	FeSt	CI

Abbreviations

			AUDIC	Lattering				
ROUGHNESS			WALL ALTERATIONS		TYPE		OTHER	
R	Rough	FeSt	Iron Stained	J	Joint	DI	Drilling Induced	
S	Smooth	W	Weathered	В	Bedding	CL	Carbonaceous lamination	
SL	Slickensided	SM	Secondary Mineralisation	BP	Bedding Parting	Co	Coal seam	
				FP	Foliation Parting	ſn	Incipient	
	PLANARITY APERTURE		APERTURE	LP	Lamination Parting	SI	Sand Infill	
Р	Planar	С	Closed	\$2.	Sheared Zone	H	Horizontal	
St	Stepped	0	Open	CZ	Crushed Zone	V	Vertical	
Un	Undulating	F	Filled	WS	Weathered Seam	CI	Clay Infill	
Cu	Curved	Т	Tight	BZ	Broken Zone	Cn	Clean	
Ir	Irregular			HFZ	Highly Fractured Zone	CS	Clay Seam	
				Fr	Fracture			