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BOREHOLE ENGINEERING LOG

HOLE NO : CURVE 22_BH05

CLIENT : TRANSPORT AND MAIN ROADS

POSITION : E: 359400, N: 8137546 (56 MGA94)

PAGE : 1 OF 4

PROJECT : BLACK SPOT PROJECT

SURFACE ELEVATION : 111.6 (AHD)

DATE DRILLED : 5/8/13 TO 5/8/13

JOB NO : CB24735.04

DIP / AZIMUTH : 90°

LOGGED BY : JP

LOCATION : KENNEDY HWY (CAIRNS - MAREEBA)

CHECKED BY : AJ

DRILLING					MATERIAL							
PROGRESS		DRILLING PENETRATION	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY	STRUCTURE & Other Observations
DRILLING & CASING	WATER											
AD/T		VH			111.6	0.0			0.10m ASPHALT: 0.10 m.			FILL
		F				GM		SANDY GRAVEL (GM): Pale brown, fine to medium gravel, sub-angular, fine to coarse grained sand, trace of fine to coarse grained sand and clay.	D			
WB		NOT OBSERVED		1.00m SPT 7, 15, 13 N=28	110.6	1.0			1.00m SILTY GRAVEL (GM): Grey brown, fine to medium gravel, angular, comprising of high to very high strength quartzite , with fine to coarse grained sand, trace cobbles.			
				1.45m								
					109.6	2.0			At 2.00 m trace of rootlets.			
				2.50m SPT 29, 33, 13 N=46				GM				
				2.95m	108.6	3.0						
				4.00m SPT 11, 12, 19 N=31	107.6	4.0			4.00m SILTY GRAVEL (GM): Red brown, grey brown, fine to medium gravel, angular, fine to coarse grained sand, with clay.		MD - D	RESIDUAL SOIL? 4.00: Moisture Content (%) = 10.3, Liquid Limit (%) = 26, Plastic Limit (%) = 20, Plasticity Index (%) = 6, Linear Shrinkage (%) = 3, % Passing 37.5mm: 100, % Passing 2.36mm: 49, % Passing 0.425mm: 32, % Passing 0.075mm: 21, % Passing 0.002mm: 3 RESIDUAL SOIL?
				4.45m				GM				
					106.6	5.0						
				5.50m SPT 4, 6, 6 N=12					5.50m SILTY GRAVEL (GM): Red brown, grey, fine to medium gravel, angular, fine to coarse grained sand.		MD	RESIDUAL SOIL
				5.95m	105.6	6.0		GM				

DRILLING				SAMPLES & FIELD TESTS				DENSITY (SPT N-value)		CONSISTENCY (Su) {N-value}			
HA	Hand Auger	RR	Rock Rolling	DS	Disturbed Sample	SPT	Standard Penetration Test	VL	Very Loose	0 - 4	VS	Very Soft	< 12 kPa {0-2}
AS	Auger Screw	AT	Air Track	ES	Env Soil Sample	U	Undisturbed Tube Sample	L	Loose	4 - 10	S	Soft	12 - 25 {2-4}
AD/T	Auger Drill TC-bit	HQ	HQ Coring	EW	Env Water Sample	W	Water Sample	MD	Medium Dense	10 - 30	F	Firm	25 - 50 {4-8}
AD/V	Auger Drill V-bit	NQ	NQ Coring					D	Dense	30 - 50	St	Stiff	50 - 100 {8-15}
WB	Washbore	NMLC	NMLC Coring	HP	Hand Penetrometer			VD	Very Dense	50 - 100	VSt	Very Stiff	100 - 200 {15-30}
DRILLING PENETRATION				HV	Hand Vane Shear	MOISTURE CONDITION		CO	Compact	>50/150mm	H	Hard	> 200 kPa {>30}
VE	Very Easy	F	Firm	VH	Very Hard								
E	Easy	H	Hard										
GROUNDWATER SYMBOLS													
▼ = Water level (static)													
▽ = Water level (during drilling)													

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DRILLING					MATERIAL							
PROGRESS		DRILLING PENETRATION	GROUND WATER LEVELS	SAMPLES & FIELD TESTS	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION Soil Type, Colour, Plasticity or Particle Characteristic Secondary and Minor Components	MOISTURE CONDITION	CONSISTENCY	STRUCTURE & Other Observations
DRILLING & CASING	WATER											
WB	0% Water RETURN (at 6.00 m)	E	NOT OBSERVED		105.6	6.0		GM	SILTY GRAVEL (GM): Red brown, grey, fine to medium gravel, angular, fine to coarse grained sand. (continued)		VL	RESIDUAL SOIL 6.00: From 6.00 m to 6.50 m drill string dropped under own weight
		F		7.00m SPT 9, 5, 4 N=9	104.6	7.0		GNEISS: Red brown, grey brown, highly weathered, low to medium strength.		MD	HIGHLY WEATHERED ROCK	
				7.45m								
				8.50m SPT 2, 2, 4 N=6	103.6	8.0						
				8.95m								
		H			102.6	9.0		GNEISS: Red brown orange, extremely to highly weathered, extremely to medium strength, appears as SILTY GRAVEL (GM), fine to medium grained angular gravel, fine to medium grained sand, with clay.			EXTREMELY TO HIGHLY WEATHERED ROCK	
		VH		10.00m SPT 9, 7, 10 N=17	101.6	10.0					10.00: Moisture Content (%) = 14.7, Liquid Limit (%) = 26, Plastic Limit (%) = 20, Plasticity Index (%) = 6, Linear Shrinkage (%) = 3, % Passing 2.36mm: 66, % Passing 0.425mm: 51, % Passing 0.075mm: 33, % Passing 0.002mm: 7	
10.45m												
				11.50m SPT 11/40mm HB N=R 11.54m	100.6	11.0						
					99.6	12.0			Continued as Cored Drill Hole			

DRILLING				SAMPLES & FIELD TESTS				DENSITY (SPT N-value)		CONSISTENCY (Su) {N-value}			
HA	Hand Auger	RR	Rock Rolling	DS	Disturbed Sample	SPT Standard Penetration Test		VL	Very Loose	0 - 4	VS	Very Soft	< 12 kPa {0-2}
AS	Auger Screw	AT	Air Track	ES	Env Soil Sample	U Undisturbed Tube Sample		L	Loose	4 - 10	S	Soft	12 - 25 {2-4}
AD/T	Auger Drill TC-bit	HQ	HQ Coring	EW	Env Water Sample	W Water Sample		MD	Medium Dense	10 - 30	F	Firm	25 - 50 {4-8}
AD/V	Auger Drill V-bit	NQ	NQ Coring					D	Dense	30 - 50	St	Stiff	50 - 100 {8-15}
WB	Washbore	NMLC	NMLC Coring					VD	Very Dense	50 - 100	VSt	Very Stiff	100 - 200 {15-30}
DRILLING PENETRATION				HP	Hand Penetrometer	MOISTURE CONDITION		CO	Compact	>50/150mm	H	Hard	> 200 kPa {>30}
VE	Very Easy	F	Firm	HV	Hand Vane Shear	D = Dry M = Moist W = Wet							
E	Easy	H	Hard	(P: Peak Su R: Residual Su)									
				N SPT blows per 300mm									
				HW SPT penetration by hammer weight									
				RW SPT penetration by rod weight									
GROUNDWATER SYMBOLS													
▼ = Water level (static)													
▽ = Water level (during drilling)													

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DRILLING				MATERIAL				DEFECTS & COMMENTS														
DRILLING	WATER DETAIL	TCR/QD	RL (m)	DEPTH (m)	GRAPHIC LOG	DESCRIPTION ROCK TYPE : Colour, Grain size, Structure (texture, fabric, mineral composition, hardness alteration, cementation, etc as applicable)	Weathering	ESTIMATED STRENGTH Is(50) ● Axial ○ Diametral				DEFECT SPACING (mm)	Description of joints, seams, defects, additional observations and comments	GENERAL								
			105.6	6.0				EL -0.03	VL -0.1	L -0.3	M -1	H -3	VH -6	EH -10		20	60	200	600	2000		

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JT 0° - 80° IR	SM-RF spacing 1 - 10 mm
VN 0° - 80° Qz	R SM-RF spacing 5 - 100 mm

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CLIENT : TRANSPORT AND MAIN ROADS

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LOCATION : KENNEDY HWY (CAIRNS - MAREEBA)

CHECKED BY : AJ

DRILLING				MATERIAL				DEFECTS & COMMENTS			
DRILLING	WATER DETAIL	TCR/RQD DEPTH	RL (m)	DEPTH (m)	GRAPHIC LOG	DESCRIPTION ROCK TYPE : Colour, Grain size, Structure (texture, fabric, mineral composition, hardness alteration, cementation, etc as applicable)	Weathering	ESTIMATED STRENGTH Is(50) ● - Axial ○ - Diametral	DEFECT SPACING (mm)	Description of joints, seams, defects, additional observations and comments	GENERAL
NMLC			99.6	12.0		GNEISS: Dark grey, grey brown, black, white, distinct foliation at 40° to 50° (continued)	EW			260 mm	JT 0° - 80° IR SM-RF spacing 1 - 10 mm VN 0° - 80° Qz IR SM-RF spacing 50 - 100 mm
		12.30	CORE LOSS 0.17m (12.20-12.37)								
		95% TCR 27% RQD	98.6	13.0		From 13.00 m indistinct foliation	MW			12.37 JT 40° IR RF 12.45 JT 80° ST RF 12.50 JT 30° IR RF 12.53 JT 20° IR RF 12.57 JT 40° IR RF 12.65 JT 0° IR VR 12.66 JT 40° IR RF 12.69 JT 50° IR RF 12.76 JT 20° ST RF 12.82 JT 0° IR RF 12.84 JT 0° IR RF 12.88 JT 0° IR RF 12.95 CZ 5 - 40° IR RF 50 mm 13.04 JT 60° ST VR 13.28 JT 50° ST RF 13.31 JT 40° IR RF 13.40 VN 60° Qz PR RF 13.45 VN 10° Qz PR RF 13.48 VN 10° Qz PR RF 13.56 JT 60 - 90° IR RF 13.68 JT 30° IR VR	
		13.65	97.6	14.0		F					
		100% TCR 80% RQD	96.6	15.0							
		16.10	95.6	16.0		Terminated Cored Drill Hole at 16.10 m					
			94.6	17.0							
			93.6	18.0							

DRILLING				SAMPLES & FIELD TESTS				DEFECT ABBREVIATIONS				ROCK STRENGTH (Is50 MPa)			
NMLC	NMLC Coring	HQ	HQ Coring	D	Disturbed Sample	ES	Env Soil Sample	CS	Crushed Seam	CN	Clean	Cu	Curved	0-0.03	Extremely Low
NQ	NQ Coring	PQ	PQ Coring	W	Water Sample	EW	Env Water Sample	CZ	Crushed Zone	CT	Coating	IR	Irregular	0.03-0.1	Very Low
				SPT	SPT Sample			DB	Drill Break	SN	Stain	PR	Planar	0.1-0.3	Low
				U	Undisturbed Tube Sample			FZ	Fractured Zone	VR	Veneer	ST	Stepped	0.3-1.0	Medium
								JT	Joint			Un	Undulated	1.0-3.0	High
								IS	Infilled Seam	POL	Polished			3.0-10	Very High
								SZ	Shear Zone	RF	Rough				
								VN	Vein	S	Smooth				
										SL	Slickensided				
GROUNDWATER SYMBOLS															
 = Water level (static)															
 = Water level (during drilling)															



		Client: Transport and Main Roads		
		Project: Black Spot		
drawn	AJ	Core Photograph – Curve 22_BH05		
date	14/08/2013	Project no. CB24735.04		
scale	NTS	Photo No: Curve 22_BH05		1 of 1