

Borehole No. **BH50**

Engineering Log - Borehole

Sheet 1 of 1
Project No: **GEOTKPAR01560AA**

Client: **BROWN CONSULTING (QLD) PTY LTD**

Date started: **21.4.2009**

Principal:

Date completed: **21.4.2009**

Project: **BELLVISTA 2**

Logged by: **DF**

Borehole Location: **REFER TO SITE PLAN**

Checked by:

drill model and mounting: EDSON CPI Easting: 509397.734 slope: -90° R.L. Surface: 2.828
hole diameter: 100 mm Northing 7035025.736 bearing: datum: GDA94

drilling information							material substance											
method	penetration			support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer				structure and additional observations
	1	2	3											100 kPa	200 kPa	300 kPa	400 kPa	
ADT				D	ASS	2	1		SM	SILTY SAND: fine to medium grained, dark grey, trace of organics.	M	MD					DIST PP=160kPa	
									SP	SAND: fine to medium grained, grey/brown, trace of silt. ...colour changing to dark brown. ...colour changing to pale grey.	M/W	VD						DIST PP=250kPa
									W	D	D/M	St						
									CH	SANDY CLAY: medium to high plasticity, orange/red and pale grey, fine to medium grained sand. ...colour changing to pale grey.	M							
Borehole BH50 terminated at 3m																		
LIMIT OF INVESTIGATION																		

Engineering Log - Borehole

Borehole No. **BH51**

Sheet 1 of 1

Project No: **GEOTKPAR01560AA**

Client: **BROWN CONSULTING (QLD) PTY LTD**

Date started: **24.4.2009**

Principal:

Date completed: **24.4.2009**Project: **BELLVISTA 2**

Logged by: **DF**

Borehole Location: **REFER TO SITE PLAN**

Checked by:

[illegible]

Borehole No. **BH52**

Engineering Log - Borehole

Sheet 1 of 1
Project No: **GEOTKPAR01560AA**

Client: **BROWN CONSULTING (QLD) PTY LTD**

Date started: **24.4.2009**

Principal:

Date completed: **24.4.2009**

Project: **BELLVISTA 2**

Logged by: **DF**

Borehole Location: **REFER TO SITE PLAN**

Checked by:

drill model and mounting: EDSON CPI Easting: 509614.286 slope: -90° R.L. Surface: 3.311
hole diameter: 100 mm Northing 7035158.052 bearing: datum: GDA94

drilling information						material substance										
method	penetration			support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro- meter kPa	structure and additional observations	
ADT	1	2	3	N										100 200 300 400		
										SM	SILTY SAND: fine to medium grained, dark grey, trace of organics.	M	L			
					D		3			SP	SAND: fine to medium grained, grey, trace of silt.		L/MD			
							1				...colour changing to pale grey. ...colour changing to dark brown.	M/W M	MD VD			
							2			SP	SAND: fine to medium grained, dark brown, with silt and trace of clay fines.	W	MD			
					ASS		2			SC	CLAYEY SAND: fine to medium grained, grey/brown, low plasticity fines. ...colour changing to pale grey.	M/W				
							1			CL	SANDY CLAY: medium plasticity, pale grey, fine to medium grained sand.	M	St	x	DIST PP=180kPa	
							3							x	DIST PP=180kPa	
							0				Borehole BH52 terminated at 3m				LIMIT OF INVESTIGATION	
							4									
							-1									
						5										
						-2										
						6										
						-3										
						7										
						-4										
						8										

method	support	notes, samples, tests	classification symbols and soil description	consistency/density index
AS AD RR W CT HA DT B V T *bit shown by suffix e.g. ADT	M mud C casing penetration 1 2 3 4  no resistance ranging to refusal water  10/1/98 water level on date shown  water inflow  water outflow	U ₅₀ undisturbed sample 50mm diameter U ₆₃ undisturbed sample 63mm diameter D disturbed sample N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone V vane shear (kPa) P pressuremeter Bs bulk sample E environmental sample R refusal	based on unified classification system moisture D dry M moist W wet Wp plastic limit WL liquid limit	VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense

Borehole No. **BH53**

Engineering Log - Borehole

Sheet 1 of 1
Project No: **GEOTKPAR01560AA**

Client: **BROWN CONSULTING (QLD) PTY LTD**

Date started: **24.4.2009**

Principal:

Date completed: **24.4.2009**

Project: **BELLVISTA 2**

Logged by: **DF**

Borehole Location: **REFER TO SITE PLAN**

Checked by:

drill model and mounting: EDSON CPI Easting: 509690.015 slope: -90° R.L. Surface: 3.199
hole diameter: 100 mm Northing 7035199.353 bearing: datum: GDA94

drilling information					material substance									
method	penetration	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material	moisture condition	consistency/ density index	pocket penetro- meter kPa	structure and additional observations	
ADT	1 2 3	N				3		SM	SILTY SAND: fine to medium grained, dark grey, trace of organics.	M	L		DIST PP=270kPa	
						1		SP	SAND: fine to medium grained, grey.					
						2		SP	...colour changing to grey/brown. ...colour changing to dark brown.	D/M	MD			
						2		SC	SAND: fine to medium grained, dark brown, with silt and trace of clay fines.	W	MD			
						2		CH	CLAYEY SAND: fine to medium grained, pale grey, medium plasticity fines.					
						2		CH	SANDY CLAY: medium to high plasticity, pale grey, fine to medium grained sand.	M	VSt	X	DIST PP=320kPa	
						1		CH	SILTY CLAY: high plasticity, pale grey, trace of sand.			X		
						3			Borehole BH53 terminated at 3m				LIMIT OF INVESTIGATION	
						0								
						4								
						-1								
						5								
						-2								
						6								
						-3								
						7								
						-4								
						8								

method AS auger screwing* AD auger drilling* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit *bit shown by suffix e.g. ADT	support M mud C casing penetration 1 2 3 4 no resistance ranging to refusal water 10/1/98 water level on date shown water inflow water outflow	notes, samples, tests U ₅₀ undisturbed sample 50mm diameter U ₆₃ undisturbed sample 63mm diameter D disturbed sample N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone V vane shear (kPa) P pressuremeter Bs bulk sample E environmental sample R refusal	classification symbols and soil description based on unified classification system moisture D dry M moist W wet Wp plastic limit WL liquid limit	consistency/density index VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense
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Borehole No. **BH54**

Engineering Log - Borehole

Client: **BROWN CONSULTING (QLD) PTY LTD**

Principal:

Project: **BELLVISTA 2**

Borehole Location: **REFER TO SITE PLAN**

Sheet 1 of 1

Project No: **GEOTKPAR01560AA**Date started: **26.4.2009**Date completed: **26.4.2009**

Logged by: **DF**

Checked by:

drill model and mounting:										EDSON CPI		Easting:		509752.263		slope:		-90°		R.L. Surface:		2.813			
hole diameter:										100 mm		Northing:		7035247.374		bearing:				datum:		GDA94			
drilling information										material substance															
method	penetration			support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro- meter kPa 100 200 300 400	structure and additional observations										
	1	2	3																						
ADT				N						SM	SILTY SAND: fine to medium grained, dark grey, trace of organics.	M	L												
							-2	1		SP	SAND: fine to medium grained, grey, with silt present.														
										SP	SAND: fine to medium grained, pale brown and grey, trace of silt and fine grained gravel.	W	D/VD												
										SP	SAND: fine to medium grained, dark brown, trace of silt.		D												
							-1	2		SC	CLAYEY SAND: fine to medium grained, pale brown/orange and pale grey, medium plasticity fines.	M	MD												
										CH	SANDY CLAY: medium to high plasticity, pale grey, fine to medium grained sand.		St/VSt			X						DIST PP=150kPa			
							-0	3								X						DIST PP=280kPa			
											Borehole BH54 terminated at 3m											LIMIT OF INVESTIGATION			
							-1	4																	
							-2	5																	
							-3	6																	
							-4	7																	
							-5	8																	
method AS auger screwing* AD auger drilling* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit *bit shown by suffix e.g. ADT										support M mud N nil C casing penetration 1 2 3 4  no resistance ranging to refusal water  10/1/98 water level on date shown  water inflow  water outflow				notes, samples, tests U ₅₀ undisturbed sample 50mm diameter U ₆₃ undisturbed sample 63mm diameter D disturbed sample N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone V vane shear (kPa) P pressuremeter Bs bulk sample E environmental sample R refusal				classification symbols and soil description based on unified classification system moisture D dry M moist W wet Wp plastic limit WL liquid limit				consistency/density index VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense			

Borehole No. **BH55**

Engineering Log - Borehole

Sheet 1 of 1
Project No: **GEOTKPAR01560AA**

Client: **BROWN CONSULTING (QLD) PTY LTD**

Date started: **2.5.2009**

Principal:

Date completed: **2.5.2009**

Project: **BELLVISTA 2**

Logged by: **DF**

Borehole Location: **REFER TO SITE PLAN**

Checked by: **RFM**

drill model and mounting: EDSON CPI Easting: 509654.551 slope: -90° R.L. Surface: 7.382
hole diameter: 100 mm Northing 7035759.228 bearing: datum: GDA94

drilling information						material substance									
method	penetration			support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro- meter kPa	structure and additional observations
	1	2	3												
ADT				N								M	L		
							7			SM	SILTY SAND: fine to medium grained, dark grey, trace of organics.				
										SP	SAND: fine to medium grained, dark grey, trace of silt.				
							1			SP	SAND: fine to medium grained, grey. ...colour changing to pale grey. ...colour changing to grey/brown.	W	MD		
							6			SC	CLAYEY SAND: fine to medium grained, pale grey.				
							2			CL	SANDY CLAY: medium plasticity, pale grey, fine to coarse grained sand.	M	VSt	X	DIST PP=220kPa
							5								
							3			CH	SANDY CLAY: medium to high plasticity, pale grey, fine to medium grained sand.			X	DIST PP=250kPa
							4								
							4				...colour changing to pale grey and pale brown/orange.				
							3							X	DIST PP=350kPa
							5								
							2							X	DIST PP=400kPa
							6								
											Borehole BH55 terminated at 6m				LIMIT OF INVESTIGATION
							1								
							7								
							0								
							8								

method AS auger screwing* AD auger drilling* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit *bit shown by suffix e.g. ADT	support M mud N nil C casing penetration 1 2 3 4  no resistance ranging to refusal water  10/1/98 water level on date shown  water inflow  water outflow	notes, samples, tests U ₅₀ undisturbed sample 50mm diameter U ₆₃ undisturbed sample 63mm diameter D disturbed sample N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone V vane shear (kPa) P pressuremeter Bs bulk sample E environmental sample R refusal	classification symbols and soil description based on unified classification system moisture D dry M moist W wet Wp plastic limit WL liquid limit	consistency/density index VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense
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Borehole No. **BH56**

Sheet 1 of 1
Project No: **GEOTKPAR01560AA**

Engineering Log - Borehole

Client: **BROWN CONSULTING (QLD) PTY LTD**

Date started: **2.5.2009**

Principal:

Date completed: **2.5.2009**

Project: **BELLVISTA 2**

Logged by: **DF**

Borehole Location: **REFER TO SITE PLAN**

Checked by: **RFM**

drill model and mounting: EDSON CPI Easting: 509713.058 slope: -90° R.L. Surface: 6.609
hole diameter: 100 mm Northing 7035689.589 bearing: datum: GDA94

drilling information						material substance									
method	penetration			support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro- meter kPa	structure and additional observations
	1	2	3												
ADT				N						SM	SILTY SAND: fine to medium grained, dark grey, trace of organics.	M	L		
							6	1		SP	SAND: fine to medium grained, dark grey, trace of silt. ...colour changing to grey/brown.	M/W	MD		
							5	2		SC	CLAYEY SAND: fine to medium grained, grey/brown, low plasticity fines.	W	D		
							4	3		CL	SANDY CLAY: medium plasticity, pale grey, fine to coarse grained sand. ...colour changing to pale grey and orange.	M	St/VSt		
							3	4					St		
							2	5		SC	CLAYEY SAND: fine to coarse grained, pale grey, medium plasticity fines.	W	MD		
							1	6							
							0	7			Borehole BH56 terminated at 6m				LIMIT OF INVESTIGATION
							-1	8							

method AS auger screwing* AD auger drilling* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit *bit shown by suffix e.g. ADT	support M mud N nil C casing penetration 1 2 3 4  no resistance ranging to refusal water  10/1/98 water level on date shown  water inflow  water outflow	notes, samples, tests U ₅₀ undisturbed sample 50mm diameter U ₆₃ undisturbed sample 63mm diameter D disturbed sample N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone V vane shear (kPa) P pressuremeter Bs bulk sample E environmental sample R refusal	classification symbols and soil description based on unified classification system moisture D dry M moist W wet Wp plastic limit WL liquid limit	consistency/density index VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense
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Borehole No. **BH57**

Engineering Log - Borehole

Client: **BROWN CONSULTING (QLD) PTY LTD**

Principal:

Project: **BELLVISTA 2**

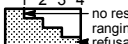
Borehole Location: **REFER TO SITE PLAN**

Sheet 1 of 1

Project No: **GEOTKPAR01560AA**Date started: **9.5.2009**Date completed: **9.5.2009**

Logged by: **DF**

Checked by: ***RFM***

drill model and mounting:						EDSON CPI		Easting: 509783.534		slope: -90°		R.L. Surface: 5.550									
hole diameter:						100 mm		Northing 7035588.995		bearing:		datum: GDA94									
drilling information						material substance															
method	penetration			support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro- meter kPa				structure and additional observations			
	1	2	3											100	200	300	400				
ADT				N		ASS		5		SM	SILTY SAND: fine to medium grained, dark grey, trace or organics.	M	L					DIST PP=240kPa DIST PP=180kPa DIST PP=250kPa DIST PP=300kPa			
								1		SP	SAND: fine to medium grained, dark grey, with silt present. ...trace of silt.										
								4		CL	CLAY: medium plasticity, pale grey, fine to medium grained sand.	M	St								
								2		SP	SAND: fine to medium grained, pale grey, trace of clay.	W	MD								
								3		SC	CLAYEY SAND: fine to coarse grained, pale grey, low plasticity fines.										
								3		CH	SANDY CLAY: medium to high plasticity, pale grey, fine to medium grained sand.	M	VSt			x					
								2		CL	SANDY CLAY: medium plasticity, pale grey, fine to medium grained sand.		St			x					
								4		SC	CLAYEY SAND: fine to medium grained, pale grey, medium plasticity fines.	W	MD								
								1		SP	SAND: fine to medium grained, pale grey, trace of clay fines.										
								5		CH	SILTY CLAY: high plasticity, pale grey, with sand present.	M	VSt			x					
							0									x					
							6														
								-1			Borehole BH57 terminated at 6m						LIMIT OF INVESTIGATION				
								7													
								-2													
								8													
method AS auger screwing* AD auger drilling* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit *bit shown by suffix e.g. ADT						support M mud N nil C casing penetration 1 2 3 4  no resistance ranging to refusal water  10/1/98 water level on date shown  water inflow  water outflow		notes, samples, tests U ₅₀ undisturbed sample 50mm diameter D ₆₃ undisturbed sample 63mm diameter D disturbed sample N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone V vane shear (kPa) P pressuremeter Bs bulk sample E environmental sample R refusal						classification symbols and soil description based on unified classification system moisture D dry M moist W wet Wp plastic limit WL liquid limit				consistency/density index VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense			

Borehole No. **BH58**

Engineering Log - Borehole

Sheet 1 of 1
Project No: **GEOTKPAR01560AA**

Client: **BROWN CONSULTING (QLD) PTY LTD**

Date started: **3.5.2009**

Principal:

Date completed: **3.5.2009**

Project: **BELLVISTA 2**

Logged by: **DF**

Borehole Location: **REFER TO SITE PLAN**

Checked by: **RFM**

drill model and mounting: EDSON CPI Easting: 509775.137 slope: -90° R.L. Surface: 4.453
hole diameter: 100 mm Northing 7035457.666 bearing: datum: GDA94

drilling information						material substance									
method	penetration			support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro- meter kPa	structure and additional observations
	1	2	3												
ADT				N						SM	SILTY SAND: fine to medium grained, dark grey, trace of organics.	M	L		
							4			SP	SAND: fine to medium grained, pale grey/pale brown, trace of silt.	M/W	MD		
							1								
							3								
							2				...colour changing to dark grey.				
							2				...colour changing to grey.				
							2			CH	SANDY CLAY: medium to high plasticity, pale grey, fine to medium grained sand.	M	VSt		
					ASS		3							X	DIST PP=250kPa
							1								
							4							X	DIST PP=300kPa
							0				...colour changing to pale grey and red.				
							5			CH	SANDY CLAY: high plasticity, pale grey and red, fine to medium grained sand.			X	DIST PP=220kPa
							-1								
							6				Borehole BH58 terminated at 6m				LIMIT OF INVESTIGATION
							-2								
							7								
							-3								
							8								

method AS auger screwing* AD auger drilling* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit *bit shown by suffix e.g. ADT	support M mud N nil C casing penetration 1 2 3 4  no resistance ranging to refusal water  10/1/98 water level on date shown  water inflow  water outflow	notes, samples, tests U ₅₀ undisturbed sample 50mm diameter U ₆₃ undisturbed sample 63mm diameter D disturbed sample N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone V vane shear (kPa) P pressuremeter Bs bulk sample E environmental sample R refusal	classification symbols and soil description based on unified classification system moisture D dry M moist W wet Wp plastic limit WL liquid limit	consistency/density index VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense
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Borehole No. **BH59**

Engineering Log - Borehole

Sheet 1 of 1
Project No: **GEOTKPAR01560AA**

Client: **BROWN CONSULTING (QLD) PTY LTD**

Date started: **9.5.2009**

Principal:

Date completed: **9.5.2009**

Project: **BELLVISTA 2**

Logged by: **DF**

Borehole Location: **REFER TO SITE PLAN**

Checked by: **RFM**

drill model and mounting: EDSON CPI Easting: 509882.244 slope: -90° R.L. Surface: 4.809
hole diameter: 100 mm Northing 7035545.983 bearing: datum: GDA94

drilling information						material substance											
method	penetration			support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro- meter kPa	structure and additional observations		
ADT	1	2	3	N						SM	SILTY SAND: fine to medium grained, dark grey, trace of organics.	M	L	100 200 300 400			
							4	1		SP	SAND: fine to medium grained, dark grey, with silt present.	M/W					
								2		SP	SAND: fine to medium grained, grey. ...trace of clay fines.	W	MD				
							3			SC	CLAYEY SAND: fine to medium grained, pale grey, medium plasticity fines.	M					
						ASS	2	3		CL	SANDY CLAY: medium plasticity, pale grey, fine to medium grained sand.		VSt	×	DIST PP=250kPa		
							1	4		CH	SILTY CLAY: high plasticity, pale grey and red, trace of fine grained sand.			×	DIST PP=230kPa		
							0	5						×	DIST PP=240kPa		
							-1	6									
											Borehole BH59 terminated at 6m				LIMIT OF INVESTIGATION		
							-2	7									
							-3	8									
method AS auger screwing* AD auger drilling* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit *bit shown by suffix e.g. ADT						support M mud N nil C casing penetration 1 2 3 4  no resistance ranging to refusal water  10/1/98 water level on date shown  water inflow  water outflow			notes, samples, tests U ₅₀ undisturbed sample 50mm diameter U ₆₃ undisturbed sample 63mm diameter D disturbed sample N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone V vane shear (kPa) P pressuremeter Bs bulk sample E environmental sample R refusal			classification symbols and soil description based on unified classification system moisture D dry M moist W wet W _p plastic limit W _L liquid limit			consistency/density index VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense		

method AS auger screwing* AD auger drilling* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit *bit shown by suffix e.g. ADT	support M mud N nil C casing penetration 1 2 3 4  no resistance ranging to refusal water  10/1/98 water level on date shown  water inflow  water outflow	notes, samples, tests U ₅₀ undisturbed sample 50mm diameter U ₆₃ undisturbed sample 63mm diameter D disturbed sample N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone V vane shear (kPa) P pressuremeter Bs bulk sample E environmental sample R refusal	classification symbols and soil description based on unified classification system moisture D dry M moist W wet Wp plastic limit WL liquid limit	consistency/density index VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense
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Borehole No. **BH60**

Engineering Log - Borehole

Sheet 1 of 1
Project No: **GEOTKPAR01560AA**

Client: **BROWN CONSULTING (QLD) PTY LTD**

Date started: **3.5.2009**

Principal:

Date completed: **3.5.2009**

Project: **BELLVISTA 2**

Logged by: **DF**

Borehole Location: **REFER TO SITE PLAN**

Checked by: **RFM**

drill model and mounting: EDSON CPI Easting: 509851.435 slope: -90° R.L. Surface: 2.723
hole diameter: 100 mm Northing 7035356.896 bearing: datum: GDA94

drilling information						material substance									
method	penetration			support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro- meter kPa	structure and additional observations
ADT	1	2	3	N						SM	SILTY SAND: fine to medium grained, dark grey, trace of organics.	M	L	100	DIST PP=230kPa
							2		SP	SAND: fine to medium grained, dark grey, trace of silt.	M/W	MD	200		
							1		SP	SAND: fine to medium grained, grey. ...colour changing to pale brown and grey.	W	D/V/D	300		
							1		SP	SAND: fine to coarse grained, pale grey, trace of clay.		D	400		
							2		SC	CLAYEY SAND: fine to medium grained, pale grey, medium plasticity fines.	M				
							0		CH	SANDY CLAY: medium to high plasticity, pale grey, fine to medium grained sand.		VSt			
							3		SC	CLAYEY SAND: fine to medium grained, pale grey, low plasticity fines.	W	MD			
							-1		SP	SAND: fine to medium grained, pale grey, trace of clay fines.					
							4		SC	CLAYEY SAND: fine to medium grained, pale grey, medium plasticity fines.					
							-2		CH	SANDY CLAY: high plasticity, pale grey, fine to medium grained sand.	M	St			
							5							×	DIST PP=150kPa
							-3							×	
							6				Borehole BH60 terminated at 6m				LIMIT OF INVESTIGATION
							-4								
							7								
							-5								
							8								

Borehole No. **BH61**

Engineering Log - Borehole

Client: **BROWN CONSULTING (QLD) PTY LTD**

Principal:

Project: **BELLVISTA 2**

Borehole Location: **REFER TO SITE PLAN**

Sheet 1 of 1

Project No: **GEOTKPAR01560AA**

Date started: **9.5.2009**

Date completed: **9.5.2009**

Logged by: **DF**

Checked by: **RFM**

drill model and mounting:						EDSON CPI		Easting: 509949.571		slope: -90°		R.L. Surface: 2.450					
hole diameter:						100 mm		Northing 7035424.983		bearing:		datum: GDA94					
drilling information							material substance										
method	penetration			support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro- meter kPa 100 200 300 400	structure and additional observations		
	1	2	3														
ADT				N		ASS	-2			SM	SILTY SAND: fine to medium grained, dark grey, trace of organics.	M	L		DIST PP=150kPa		
							-1			SP	SAND: fine to medium grained, pale grey.	W	MD				
							0			CL	SANDY CLAY: medium plasticity, pale grey and pale brown, fine to medium grained sand.	M	VSt	X			
							1			CH	SANDY CLAY: medium to high plasticity, pale grey and pale brown, fine to medium grained sand.			X			
							2										
							3										
							4										
							5										
							6										
							7										
			8														
							-4				Borehole BH61 terminated at 6m				LIMIT OF INVESTIGATION		
							-5										
							-6										
							-7										
							-8										
method AS auger screwing* AD auger drilling* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit *bit shown by suffix e.g. ADT							support M mud N nil C casing penetration 1 2 3 4 no resistance ranging to refusal water 10/1/98 water level on date shown water inflow water outflow		notes, samples, tests U ₅₀ undisturbed sample 50mm diameter U ₆₃ undisturbed sample 63mm diameter D disturbed sample N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone V vane shear (kPa) P pressuremeter Bs bulk sample E environmental sample R refusal				classification symbols and soil description based on unified classification system moisture D dry M moist W wet Wp plastic limit W _L liquid limit			consistency/density index VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense	

Borehole No. **BH62**

Engineering Log - Borehole

Sheet 1 of 1
Project No: **GEOTKPAR01560AA**

Client: **BROWN CONSULTING (QLD) PTY LTD**

Date started: **9.5.2009**

Principal:

Date completed: **9.5.2009**

Project: **BELLVISTA 2**

Logged by: **DF**

Borehole Location: **REFER TO SITE PLAN**

Checked by: **RFM**

drill model and mounting: EDSON CPI Easting: 510034.665 slope: -90° R.L. Surface: 4.240
hole diameter: 100 mm Northing 7035474.141 bearing: datum: GDA94

drilling information						material substance									
method	penetration			support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro- meter kPa	structure and additional observations
	1	2	3												
ADT				N			4			SM	SILTY SAND: fine to medium grained, grey, trace of organics.	M	L		
										SP	SAND: fine to medium grained, pale brown/grey, trace of clay.		MD		
							1			SC	CLAYEY SAND: fine to medium grained, pale grey and pale brown, medium plasticity fines.				
							3			CH	SANDY CLAY: medium to high plasticity, pale grey and orange/red, fine to medium grained sand.		VSt		
							2				...high plasticity, colour changing to pale grey.			X	DIST PP=250kPa
							2							X	DIST PP=260kPa
							3								SEEPAGE
							1			CH	SILTY CLAY: high plasticity, pale grey and red.				
							4							X	DIST PP=240kPa
							5							X	DIST PP=230kPa
							-1								
							6				Borehole BH62 terminated at 6m				LIMIT OF INVESTIGATION
							-2								
							7								
							-3								
							8								
method AS auger screwing* AD auger drilling* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit *bit shown by suffix e.g. ADT						support M mud C casing penetration 1 2 3 4  no resistance ranging to refusal water  10/1/98 water level on date shown  water inflow  water outflow		notes, samples, tests U ₅₀ undisturbed sample 50mm diameter U ₆₃ undisturbed sample 63mm diameter D disturbed sample N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone V vane shear (kPa) P pressuremeter Bs bulk sample E environmental sample R refusal				classification symbols and soil description based on unified classification system moisture D dry M moist W wet W _p plastic limit W _L liquid limit		consistency/density index VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense	

method AS auger screwing* AD auger drilling* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit *bit shown by suffix e.g. ADT	support M mud N nil C casing penetration 1 2 3 4  no resistance ranging to refusal water  10/1/98 water level on date shown  water inflow  water outflow	notes, samples, tests U ₅₀ undisturbed sample 50mm diameter U ₆₃ undisturbed sample 63mm diameter D disturbed sample N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone V vane shear (kPa) P pressuremeter Bs bulk sample E environmental sample R refusal	classification symbols and soil description based on unified classification system moisture D dry M moist W wet Wp plastic limit WL liquid limit	consistency/density index VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense
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Borehole No. **BH63**

Engineering Log - Borehole

Client: **BROWN CONSULTING (QLD) PTY LTD**

Principal:

Project: **BELLVISTA 2**

Borehole Location: **REFER TO SITE PLAN**

Sheet 1 of 1

Project No: **GEOTKPAR01560AA**Date started: **3.5.2009**Date completed: **3.5.2009**

Logged by: **DF**

Checked by:

drill model and mounting:				EDSON CPI		Eastings: 509835.54		slope: -90°		R.L. Surface: 2.260						
hole diameter:				100 mm		Northing 7035218.376		bearing:		datum: GDA94						
drilling information						material substance										
method	penetration			support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro- meter kPa	structure and additional observations	
	1	2	3													
ADT				N			-2			SM	SILTY SAND: fine to medium grained, dark grey, trace of organics.	M	L			
										SP	SAND: fine to medium grained, pale brown and grey, trace of silt.	M/W				
										SP	SAND: fine grained, pale brown and grey, with silt present.	M	MD			
							1			CH	SANDY CLAY: medium to high plasticity, pale brown/orange and pale grey, fine to medium grained sand.		VSt			
							-1				...colour changing to pale grey.			X	DIST PP=230kPa	
							2									
							-0							X	DIST PP=240kPa	
							3									
							-1							X	DIST PP=240kPa	
							4									
							-2			CH	SANDY CLAY: high plasticity, pale grey, fine to medium grained sand.			X	DIST PP=320kPa	
							5			SC	CLAYEY SAND: fine to medium grained, pale grey, low plasticity fines.	M/W	MD			
							-3			CH	SANDY CLAY: medium to high plasticity, pale grey, fine to medium grained sand.	M	VSt			
							6									
							-4				Borehole BH63 terminated at 6m				LIMIT OF INVESTIGATION	
							7									
							-5									
							8									
method						support		notes, samples, tests				classification symbols and soil description			consistency/density index	
AS AD RR W CT HA DT B V T *bit shown by suffix e.g. ADT						M mud C casing penetration 1 2 3 4  water 10/1/98 water level on date shown water inflow water outflow		U ₅₀ undisturbed sample 50mm diameter U ₆₃ undisturbed sample 63mm diameter D disturbed sample N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone V vane shear (kPa) P pressuremeter Bs bulk sample E environmental sample R refusal				based on unified classification system moisture D dry M moist W wet Wp plastic limit W _L liquid limit			VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense	

Borehole No. **BH65**

Engineering Log - Borehole

Client: **BROWN CONSULTING (QLD) PTY LTD**

Principal:

Project: **BELLVISTA 2**

Borehole Location: **REFER TO SITE PLAN**

Sheet 1 of 1

Project No: **GEOTKPAR01560AA**Date started: **9.5.2009**Date completed: **9.5.2009**

Logged by: **DF**

Checked by: **RFM**

drill model and mounting:				EDSON CPI				Easting: 510109.442				slope: -90°				R.L. Surface: 2.724																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
hole diameter:				100 mm				Northing 7035396.648				bearing:				datum: GDA94																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
drilling information								material substance																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
method	penetration			support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro- meter kPa	structure and additional observations																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
	1	2	3																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
ADT				N						SM	SILTY SAND: fine grained, dark grey, trace of organics.	M	L																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										

Borehole No. **BH66**

Engineering Log - Borehole

Sheet 1 of 1
Project No: **GEOTKPAR01560AA**

Client: **BROWN CONSULTING (QLD) PTY LTD**

Date started: **2.5.2009**

Principal:

Date completed: **2.5.2009**

Project: **BELLVISTA 2**

Logged by: **DF**

Borehole Location: **REFER TO SITE PLAN**

Checked by:

drill model and mounting: EDSON CPI Easting: 509654.065 slope: -90° R.L. Surface: 6.598
hole diameter: 100 mm Northing 7035692.587 bearing: datum: GDA94

drilling information					material substance									
method	penetration	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro- meter kPa	structure and additional observations	
ADT	1 2 3	N	SEEPAGE					SM	SILTY SAND: fine to medium grained, dark grey, trace of organics.	M	L		DIST PP=180kPa DIST PP=220kPa DIST PP=240kPa	
					6			SP	SAND: fine to medium grained, grey, trace of silt. ...colour changing to pale grey.	W				
					1			CH	SANDY CLAY: medium to high plasticity, pale brown/orange and pale grey, fine to medium grained sand. ...colour changing to pale grey.	M	St	X		
					5			SC	CLAYEY SAND: fine to coarse grained, pale grey, medium plasticity fines.		VSt	X		
					2			CH	SANDY CLAY: high plasticity, pale grey, fine to medium grained sand.		VSt	X	DIST PP=240kPa	
					4			SC	CLAYEY SAND: fine to coarse grained, pale grey, medium plasticity fines.		D			
					3								LIMIT OF INVESTIGATION	
					3									
					4									
					4									
					2									
					5									
					1									
					6									
					0									
					7									
					-1									
					8									

method AS auger screwing* AD auger drilling* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit *bit shown by suffix e.g. ADT	support M mud N nil C casing penetration 1 2 3 4  no resistance ranging to refusal water  10/1/98 water level on date shown  water inflow  water outflow	notes, samples, tests U ₅₀ undisturbed sample 50mm diameter U ₆₃ undisturbed sample 63mm diameter D disturbed sample N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone V vane shear (kPa) P pressuremeter Bs bulk sample E environmental sample R refusal	classification symbols and soil description based on unified classification system moisture D dry M moist W wet Wp plastic limit WL liquid limit	consistency/density index VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense
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Engineering Log - Borehole

Borehole No. **BH67**

Sheet 1 of 1
Project No: **GEOTKPAR01560AA**

Client: **BROWN CONSULTING (QLD) PTY LTD**

Date started: **2.5.2009**

Principal:

Date completed: **2.5.2009**Project: **BELLVISTA 2**

Logged by: **DF**

Borehole Location: **REFER TO SITE PLAN**

Checked by: **RFM**

drill model and mounting:						EDSON CPI		Easting: 509813.874		slope: -90°		R.L. Surface: 4.803																	
hole diameter:						100 mm		Northing: 7035541.308		bearing:		datum: GDA94																	
drilling information						material substance																							
method	penetration			support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material	moisture condition	consistency/ density index	pocket penetro- meter kPa	structure and additional observations														
	1	2	3																										
ADT				N						SM	SILTY SAND: fine to medium grained, dark grey, trace of organics.	M	L																
										SP	SAND: fine to medium grained, grey, trace of silt.																		
							-4	1				W	MD																
											...colour changing to dark brown.																		
						ASS	-3	2		SC	CLAYEY SAND: fine to medium grained, grey, low plasticity fines. ...colour changing to pale grey and brown.																		
										CH	SANDY CLAY: medium to high plasticity, pale grey, fine to medium grained sand.	M	VSt	X	DIST PP=250kPa														
							-2	3						X	DIST PP=300kPa														
							-1				...colour changing to pale grey.			X	DIST PP=220kPa														
							-4	4			Borehole BH67 terminated at 4m				LIMIT OF INVESTIGATION														
							0	5																					
							-1	6																					
							-2	7																					
							-3	8																					
method AS auger screwing* AD auger drilling* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit *bit shown by suffix e.g. ADT						support M mud N nil C casing penetration 1 2 3 4  no resistance ranging to refusal water  10/1/98 water level on date shown  water inflow  water outflow						notes, samples, tests U ₅₀ undisturbed sample 50mm diameter U ₆₃ undisturbed sample 63mm diameter D disturbed sample N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone V vane shear (kPa) P pressuremeter Bs bulk sample E environmental sample R refusal						classification symbols and soil description based on unified classification system moisture D dry M moist W wet Wp plastic limit W _L liquid limit						consistency/density index VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense					

Borehole No. **BH68**

Engineering Log - Borehole

Client: **BROWN CONSULTING (QLD) PTY LTD**

Principal:

Project: **BELLVISTA 2**

Borehole Location: **REFER TO SITE PLAN**

Sheet 1 of 1

Project No: **GEOTKPAR01560AA**Date started: **3.5.2009**Date completed: **3.5.2009**

Logged by: **DF**

Checked by: ***RFM***

drill model and mounting:				EDSON CPI		Easting: 509859.722		slope: -90°		R.L. Surface: 3.418					
hole diameter:				100 mm		Northing: 7035129.363		bearing:		datum: GDA94					
drilling information						material substance									
method	penetration			support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material	moisture condition	consistency/ density index	pocket penetro- meter kPa	structure and additional observations
ADT	1	2	3	N							soil type: plasticity or particle characteristics, colour, secondary and minor components.	M	L		
							3			SM	SILTY SAND: fine to medium grained, dark grey, trace of organics.				
								1		SP	SAND: fine to medium grained, dark grey, trace of silt. ...colour changing to dark brown.	W	MD		
							2				...colour changing to grey.				
								2		SC	CLAYEY SAND: fine to medium grained, pale grey, medium plasticity fines.				
						ASS					...colour changing to pale grey.				
							2			CL	SANDY CLAY: medium plasticity, pale grey, fine to medium grained sand.	M	VSt		
							1			CH	SANDY CLAY: medium to high plasticity, pale grey and orange, fine to medium grained sand.			×	DIST PP=300kPa
							3							×	DIST PP=300kPa
							0							×	DIST PP=240kPa
							4				Borehole BH68 terminated at 4m				LIMIT OF INVESTIGATION
							-1								
							5								
							-2								
							6								
							-3								
							7								
							-4								
							8								
method				support		notes, samples, tests				classification symbols and soil description				consistency/density index	
AS auger screwing*				M mud N nil		U ₅₀ undisturbed sample 50mm diameter				VS very soft					
AD auger drilling*				C casing		U ₆₃ undisturbed sample 63mm diameter				S soft					
RR roller/tricone						D disturbed sample				F firm					
W washbore						N standard penetration test (SPT)				St stiff					
CT cable tool						N* SPT - sample recovered				VSt very stiff					
HA hand auger						Nc SPT with solid cone				H hard					
DT diatube						V vane shear (kPa)				Fb friable					
B blank bit						P pressuremeter				VL very loose					
V V bit						Bs bulk sample				L loose					
T TC bit						E environmental sample				MD medium dense					
*bit shown by suffix e.g. ADT						R refusal				D dense					
										VD very dense					

Borehole No. **BH69**

Engineering Log - Borehole

Sheet 1 of 1
Project No: **GEOTKPAR01560AA**

Client: **BROWN CONSULTING (QLD) PTY LTD**

Date started: **2.5.2009**

Principal:

Date completed: **2.5.2006**

Project: **BELLVISTA 2**

Logged by: **DF**

Borehole Location: **REFER TO SITE PLAN**

Checked by: **RFM**

drill model and mounting: EDSON CPI Easting: 509962.416 slope: -90° R.L. Surface: 4.084
hole diameter: 100 mm Northing 7035492.924 bearing: datum: GDA94

drilling information						material substance									
method	penetration			support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro- meter kPa	structure and additional observations
	1	2	3												
ADT				N						SM	SILTY SAND: fine to medium grained, dark grey, trace of organics.	M	L		
								1		SP	SAND: fine to medium grained, dark grey, trace of silt. ...colour changing to grey. ...colour changing to pale grey and brown. ...colour changing to brown. ...colour changing to pale grey.	W	MD		
						ASS		2		SC	CLAYEY SAND: fine to medium grained, pale grey, low plasticity fines.				
										CL	SANDY CLAY: medium plasticity, pale grey, fine to medium grained sand.	M	St		
										CH	SANDY CLAY: high plasticity, pale grey, fine to medium grained sand.		St/VSt		
								3						X	DIST PP=250kPa
														X	DIST PP=240kPa
								4			Borehole BH69 terminated at 4m				LIMIT OF INVESTIGATION
								5							
								6							
								7							
								8							
method AS auger screwing* AD auger drilling* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit *bit shown by suffix e.g. ADT						support M mud N nil C casing penetration 1 2 3 4  no resistance ranging to refusal water  10/1/98 water level on date shown  water inflow  water outflow		notes, samples, tests U ₅₀ undisturbed sample 50mm diameter U ₆₃ undisturbed sample 63mm diameter D disturbed sample N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone V vane shear (kPa) P pressuremeter Bs bulk sample E environmental sample R refusal				classification symbols and soil description based on unified classification system moisture D dry M moist W wet Wp plastic limit W _L liquid limit		consistency/density index VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense	

Borehole No. **BH70**

Engineering Log - Borehole

Sheet 1 of 1
Project No: **GEOTKPAR01560AA**

Client: **BROWN CONSULTING (QLD) PTY LTD**

Date started: **3.5.2009**

Principal:

Date completed: **3.5.2009**

Project: **BELLVISTA 2**

Logged by: **DF**

Borehole Location: **REFER TO SITE PLAN**

Checked by: **RFM**

drill model and mounting: EDSON CPI Easting: 509940.133 slope: -90° R.L. Surface: 2.097
hole diameter: 100 mm Northing 7035363.761 bearing: datum: GDA94

drilling information						material substance													
method	penetration			support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro- meter kPa				structure and additional observations	
	1	2	3											100	200	300	400		
ADT				N			-2			SM	SILTY SAND: fine to medium grained, dark grey, with clay fines and trace of organics.	M	L						
							-1	1		SP	SAND: fine to medium grained, pale grey, trace of silt.		MD						
							-0	2		SC	CLAYEY SAND: fine to medium grained, pale grey, medium plasticity fines.		St			X			DIST PP=150kPa
						ASS	-0	2		CH	SANDY CLAY: medium to high plasticity, pale grey, fine to medium grained sand.		VSt			X			DIST PP=240kPa
							-1	3											
							-1	3		CL	SANDY CLAY: medium plasticity, pale grey, fine to coarse grained sand.					X			DIST PP=240kPa
							-2	4			Borehole BH70 terminated at 4m								LIMIT OF INVESTIGATION
							-3	5											
							-4	6											
							-5	7											
							-6												
							-7												
							-8												
method AS auger screwing* AD auger drilling* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit *bit shown by suffix e.g. ADT						support M mud N nil C casing penetration 1 2 3 4  no resistance ranging to refusal water  10/1/98 water level on date shown  water inflow  water outflow		notes, samples, tests U ₅₀ undisturbed sample 50mm diameter U ₆₃ undisturbed sample 63mm diameter D disturbed sample N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone V vane shear (kPa) P pressuremeter Bs bulk sample E environmental sample R refusal				classification symbols and soil description based on unified classification system moisture D dry M moist W wet W _p plastic limit W _L liquid limit				consistency/density index VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense			

Borehole No. **BH71**

Engineering Log - Borehole

Sheet 1 of 1
Project No: **GEOTKPAR01560AA**

Client: **BROWN CONSULTING (QLD) PTY LTD**

Date started: **3.5.2009**

Principal:

Date completed: **3.5.2009**

Project: **BELLVISTA 2**

Logged by: **DF**

Borehole Location: **REFER TO SITE PLAN**

Checked by:

drill model and mounting: EDSON CPI Easting: 509908.723 slope: -90° R.L. Surface: 1.802
hole diameter: 100 mm Northing 7035246.336 bearing: datum: GDA94

drilling information							material substance								
method	penetration			support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro- meter kPa	structure and additional observations
ADT	1	2	3	N						SM	SILTY SAND: fine to medium grained, dark grey, trace of organics.	M	L	100	DIST PP=250kPa DIST PP=260kPa DIST PP=250kPa LIMIT OF INVESTIGATION
							1	1	SP	SAND: fine to medium grained, pale grey, trace of silt. ... colour changing to pale grey and orange.	MW M	MD	200		
									SC	CLAYEY SAND: fine to coarse grained, pale grey and orange, medium plasticity fines.			300		
					ASS		0	2	CH	SANDY CLAY: medium to high plasticity, orange/red and pale grey, fine to coarse grained sand. ... colour changing to pale grey.		VSt	400		
							-1	3							
							-2	4	CL	SANDY CLAY: medium plasticity, pale grey, fine to coarse grained sand, with trace of gravel.					
										Borehole BH71 terminated at 4m					
							-3	5							
							-4	6							
							-5	7							
							-6	8							

method AS auger screwing* AD auger drilling* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit *bit shown by suffix e.g. ADT	support M mud N nil C casing penetration 1 2 3 4  no resistance ranging to refusal water  10/1/98 water level on date shown  water inflow  water outflow	notes, samples, tests U ₅₀ undisturbed sample 50mm diameter U ₆₃ undisturbed sample 63mm diameter D disturbed sample N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone V vane shear (kPa) P pressuremeter Bs bulk sample E environmental sample R refusal	classification symbols and soil description based on unified classification system moisture D dry M moist W wet Wp plastic limit WL liquid limit	consistency/density index VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense
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Borehole No. **BH73**

Engineering Log - Borehole

Client: **BROWN CONSULTING (QLD) PTY LTD**

Principal:

Project: **BELLVISTA 2**

Borehole Location: **REFER TO SITE PLAN**

Sheet 1 of 1

Project No: **GEOTKPAR01560AA**Date started: **1.5.2009**Date completed: **1.5.2009**

Logged by: **DF**

Checked by:

drill model and mounting:				EDSON CPI				Easting: 509720.84				slope: -90°				R.L. Surface: 5.491				
hole diameter:				100 mm				Northing 7035580.136				bearing:				datum: GDA94				
drilling information								material substance												
method		penetration			support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro- meter				structure and additional observations	
		1	2	3											100 kPa	200 kPa	300 kPa	400 kPa		
ADT					N			5			SM SP	SILTY SAND: fine to medium grained, dark grey, with clay fines and trace of organics. SAND: fine to medium grained, dark grey, trace of silt.	M	L						
								1				... colour changing to grey/brown. ... colour changing to brown. ... colour changing to grey.	W	MD						
							ASS	4			SC	CLAYEY SAND: fine to medium grained, pale grey, medium plasticity fines.	M							
								2			CH	SANDY CLAY: medium to high plasticity, pale grey, fine to medium grained sand.		St/Vst						
								3												
								3												
								2				Borehole BH73 terminated at 3m							LIMIT OF INVESTIGATION	
								4												
								1												
								5												
								0												
								6												
								-1												
								7												
								-2												
								8												
method		support				M mud		N nil		notes, samples, tests		classification symbols and soil description				consistency/density index				
AS		auger screwing*				C casing				U ₅₀		undisturbed sample 50mm diameter				VS				very soft
AD		auger drilling*								U ₆₃		undisturbed sample 63mm diameter				S				soft
RR		roller/tricone								D		disturbed sample				F				firm
W		washbore								N		standard penetration test (SPT)				St				stiff
CT		cable tool								N*		SPT - sample recovered				VSt				very stiff
HA		hand auger								Nc		SPT with solid cone				H				hard
DT		diatube								V		vane shear (kPa)				Fb				friable
B		blank bit								P		pressuremeter				VL				very loose
V		V bit								Bs		bulk sample				L				loose
T		TC bit								E		environmental sample				MD				medium dense
*bit shown by suffix e.g. ADT										R		refusal				D				dense
																VD				very dense

Borehole No. **BH74**

Engineering Log - Borehole

Sheet 1 of 1
Project No: **GEOTKPAR01560AA**

Client: **BROWN CONSULTING (QLD) PTY LTD**

Date started: **2.5.2009**

Principal:

Date completed: **2.5.2009**

Project: **BELLVISTA 2**

Logged by: **DF**

Borehole Location: **REFER TO SITE PLAN**

Checked by: **RFM**

drill model and mounting: EDSON CPI Easting: 509799.426 slope: -90° R.L. Surface: 6.436
hole diameter: 100 mm Northing 7035659.35 bearing: datum: GDA94

drilling information					material substance									
method	penetration	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro- meter kPa	structure and additional observations	
AST	1 2 3	N						SM	SILTY SAND: fine to medium grained, dark grey, trace of organics.	M	L		DIST PP=140kPa DIST PP=220kPa DIST PP=240kPa	
					6			SP	SAND: fine to medium grained, grey/brown, trace of silt.					
					1			SP	SAND: fine to medium grained, brown, with clay fines.	M/W	MD			
				ASS	5			CL	SANDY CLAY: medium plasticity, pale brown/orange and grey, fine to medium grained sand. ... colour changing to pale grey and red. ... colour changing to pale grey and orange. ... colour changing to pale grey.	M	St	X		
					4							X	DIST PP=240kPa	
					3								LIMIT OF INVESTIGATION	
					3				Borehole BH74 terminated at 3m					
					4									
					2									
					5									
					1									
					6									
					0									
					7									
					-1									
					8									

method	support	notes, samples, tests	classification symbols and soil description based on unified classification system	consistency/density index
AS AD RR W CT HA DT B V T *bit shown by suffix e.g. ADT	M mud C casing penetration 1 2 3 4  no resistance ranging to refusal water  10/1/98 water level on date shown  water inflow  water outflow	U ₅₀ undisturbed sample 50mm diameter U ₆₃ undisturbed sample 63mm diameter D disturbed sample N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone V vane shear (kPa) P pressuremeter Bs bulk sample E environmental sample R refusal		VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense

Borehole No. **BH75**

Engineering Log - Borehole

Client: **BROWN CONSULTING (QLD) PTY LTD**

Principal:

Project: **BELLVISTA 2**

Borehole Location: **REFER TO SITE PLAN**

Sheet 1 of 1

Project No: **GEOTKPAR01560AA**Date started: **2.5.2009**Date completed: **2.5.2009**

Logged by: **DF**

Checked by:

drill model and mounting:						EDSON CPI		Easting: 509880.604		slope: -90°		R.L. Surface: 6.059				
hole diameter:						100 mm		Northing 7035604.597		bearing:		datum: GDA94				
drilling information						material substance										
method	penetration			support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro- meter kPa	structure and additional observations	
ADT	1	2	3	N		ASS	-	1 2 3		SM	SILTY SAND: fine to medium grained, dark grey, trace of organics.	M	L		DIST PP=180kPa DIST PP=240kPa DIST PP=230kPa DIST PP=400kPa	
					5		SP			SAND: fine to medium grained, grey, trace of silt.						
							SC			CLAYEY SAND: fine to medium grained, pale brown/orange and pale grey, low plasticity fines.		MD				
							CL			SANDY CLAY: medium plasticity, pale brown/orange and grey, fine to medium grained sand.		St				
							CH			SANDY CLAY: medium to high plasticity, orange/red and pale grey, fine to medium grained sand. ... colour changing to pale grey.		VSt				
						4	2							X		
						3	3							X		
						3	3				Borehole BH75 terminated at 3m			X	LIMIT OF INVESTIGATION	
							2	4								
							1	5								
							0	6								
							-1	7								
								8								
method AS auger screwing* AD auger drilling* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit *bit shown by suffix e.g. ADT						support M mud N nil C casing penetration 1 2 3 4 no resistance ranging to refusal water 10/1/98 water level on date shown water inflow water outflow		notes, samples, tests U ₅₀ undisturbed sample 50mm diameter U ₆₃ undisturbed sample 63mm diameter D disturbed sample N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone V vane shear (kPa) P pressuremeter Bs bulk sample E environmental sample R refusal				classification symbols and soil description based on unified classification system moisture D dry M moist W wet Wp plastic limit W _L liquid limit			consistency/density index VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense	

Borehole No. **BH76**

Engineering Log - Borehole

Sheet 1 of 1
Project No: **GEOTKPAR01560AA**

Client: **BROWN CONSULTING (QLD) PTY LTD**

Date started: **3.5.2009**

Principal:

Date completed: **3.5.2009**

Project: **BELLVISTA 2**

Logged by: **DF**

Borehole Location: **REFER TO SITE PLAN**

Checked by: **RFM**

drill model and mounting: EDSON CPI Easting: 509762.953 slope: -90° R.L. Surface: 3.472
hole diameter: 100 mm Northing 7035392.797 bearing: datum: GDA94

drilling information						material substance									
method	penetration			support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro- meter kPa 100 200 300 400	structure and additional observations
ADT	1	2	3	N						SM	SILTY SAND: fine to medium grained, dark grey, trace of organics.	M	L		
							3			SP	SAND: fine to medium grained, dark grey, trace of silt. ... colour changing to dark brown.	W	MD		
						ASS	2			SP	SAND: fine to medium grained, pale grey and pale brown, trace of silt and clay fines.	W	D/VD		
										SC	CLAYEY SAND: fine to coarse grained, pale grey and pale brown, medium plasticity fines.	M	MD		
							1			CH	SANDY CLAY: medium to high plasticity, pale grey and pale brown/orange, fine to medium grained sand.	St/VSt		X	DIST PP=150kPa
							3				Borehole BH76 terminated at 3m			X	DIST PP=260kPa
							0								LIMIT OF INVESTIGATION
							4								
							-1								
							5								
							-2								
							6								
							-3								
							7								
							-4								
							8								

method	support	notes, samples, tests	classification symbols and soil description	consistency/density index
AS AD RR W CT HA DT B V T *bit shown by suffix e.g. ADT	M mud C casing penetration 1 2 3 4  no resistance ranging to refusal water  10/1/98 water level on date shown  water inflow  water outflow	U ₅₀ undisturbed sample 50mm diameter U ₆₃ undisturbed sample 63mm diameter D disturbed sample N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone V vane shear (kPa) P pressuremeter Bs bulk sample E environmental sample R refusal	based on unified classification system moisture D dry M moist W wet Wp plastic limit WL liquid limit	VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense

Borehole No. **BH77**

Engineering Log - Borehole

Sheet 1 of 1
Project No: **GEOTKPAR01560AA**

Client: **BROWN CONSULTING (QLD) PTY LTD**

Date started: **2.5.2009**

Principal:

Date completed: **2.5.2009**

Project: **BELLVISTA 2**

Logged by: **DF**

Borehole Location: **REFER TO SITE PLAN**

Checked by:

drill model and mounting: EDSON CPI Easting: 509895.411 slope: -90° R.L. Surface: 3.877
hole diameter: 100 mm Northing 7035488.733 bearing: datum: GDA94

drilling information						material substance									
method	penetration			support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro- meter kPa	structure and additional observations
	1	2	3												
ADT				N						SM	SILTY SAND: fine to medium grained, dark grey, trace of organics.	M	L		
										SP	SAND: fine to medium grained, dark grey, trace of silt. ... colour changing to grey.	W			
										SC	CLAYEY SAND: fine to medium grained, pale brown and pale grey, low plasticity fines. ... colour changing to pale grey.		MD		
					ASS					CH	SANDY CLAY: fine to medium grained, pale grey, fine to medium grained sand. ... colour changing to pale grey and orange.	M	St/VSt	X	DIST PP=150kPa
														X	DIST PP=190kPa
														X	DIST PP=210kPa
											Borehole BH77 terminated at 3m				LIMIT OF INVESTIGATION

method AS auger screwing* AD auger drilling* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit *bit shown by suffix e.g. ADT	support M mud C casing penetration 1 2 3 4 no resistance ranging to refusal water 10/1/98 water level on date shown water inflow water outflow	notes, samples, tests U ₅₀ undisturbed sample 50mm diameter U ₆₃ undisturbed sample 63mm diameter D disturbed sample N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone V vane shear (kPa) P pressuremeter Bs bulk sample E environmental sample R refusal	classification symbols and soil description based on unified classification system moisture D dry M moist W wet Wp plastic limit WL liquid limit	consistency/density index VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense
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Borehole No. **BH78**

Engineering Log - Borehole

Sheet 1 of 1
Project No: **GEOTKPAR01560AA**

Client: **BROWN CONSULTING (QLD) PTY LTD**

Date started: **3.5.2009**

Principal:

Date completed: **3.5.2009**

Project: **BELLVISTA 2**

Logged by: **DF**

Borehole Location: **REFER TO SITE PLAN**

Checked by: **RFM**

drill model and mounting: EDSON CPI Easting: 509845.621 slope: -90° R.L. Surface: 2.473
hole diameter: 100 mm Northing 7035299.267 bearing: datum: GDA94

drilling information							material substance											
method	penetration			support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro- meter				structure and additional observations
	1	2	3											kPa	mm	mm	mm	
ADT		1	2	3	N		-	2		SM	SILTY SAND: fine to medium grained, dark grey, trace of organics.	M	L				DIST PP=140kPa	
										SP	SAND: fine to medium grained, dark grey, trace of silt.							
										SP	SAND: fine to medium grained, pale grey.	W	MD					
										SC	CLAYEY SAND: fine to medium grained, pale grey and pale brown/orange, low plasticity fines.	M						
										CL	SANDY CLAY: medium plasticity, pale grey and pale brown, fine to medium grained sand.		St					
										CH	SANDY CLAY: medium to high plasticity, pale grey, fine to medium grained sand.		VSt					
										SC	CLAYEY SAND: fine to coarse grained, pale grey, medium plasticity fines.	MD						
Borehole BH78 terminated at 3m																LIMIT OF INVESTIGATION		
							-1											
							4											
							-2											
							5											
							-3											
							6											
							-4											
							7											
							-5											
							8											

method	support	notes, samples, tests	classification symbols and soil description	consistency/density index
AS AD RR W CT HA DT B V T *bit shown by suffix e.g. ADT	M mud C casing penetration 1 2 3 4  no resistance ranging to refusal water 10/1/98 water level on date shown water inflow water outflow	U ₅₀ undisturbed sample 50mm diameter U ₆₃ undisturbed sample 63mm diameter D disturbed sample N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone V vane shear (kPa) P pressuremeter Bs bulk sample E environmental sample R refusal	based on unified classification system moisture D dry M moist W wet Wp plastic limit WL liquid limit	VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense

Borehole No. **BH79**

Sheet 1 of 1
Project No: **GEOTKPAR01560AA**

Engineering Log - Borehole

Client: **BROWN CONSULTING (QLD) PTY LTD**

Date started: **2.5.2009**

Principal:

Date completed: **2.5.2009**

Project: **BELLVISTA 2**

Logged by: **DF**

Borehole Location: **REFER TO SITE PLAN**

Checked by:

drill model and mounting: EDSON CPI Easting: 510025.243 slope: -90° R.L. Surface: 2.208
hole diameter: 100 mm Northing 7035406.406 bearing: datum: GDA94

drilling information						material substance																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
method	penetration			support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro- meter kPa	structure and additional observations																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
	1	2	3																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
ADT				N			-2			SM	SILTY SAND: fine to medium grained, dark grey, trace of organics.	M	L																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			

method	support	notes, samples, tests	classification symbols and soil description based on unified classification system	consistency/density index
AS AD RR W CT HA DT B V T *bit shown by suffix e.g. ADT	M mud C casing penetration 1 2 3 4  no resistance ranging to refusal water  10/1/98 water level on date shown  water inflow  water outflow	U ₅₀ undisturbed sample 50mm diameter U ₆₃ undisturbed sample 63mm diameter D disturbed sample N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone V vane shear (kPa) P pressuremeter Bs bulk sample E environmental sample R refusal		VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense
			moisture D dry M moist W wet Wp plastic limit WL liquid limit	

Soil Description Explanation Sheet (1 of 2)

DEFINITION:

In engineering terms soil includes every type of uncemented or partially cemented inorganic or organic material found in the ground. In practice, if the material can be remoulded or disintegrated by hand in its field condition or in water it is described as a soil. Other materials are described using rock description terms.

CLASSIFICATION SYMBOL & SOIL NAME

Soils are described in accordance with the Unified Soil Classification (UCS) as shown in the table on Sheet 2.

PARTICLE SIZE DESCRIPTIVE TERMS

NAME	SUBDIVISION	SIZE
Boulders		>200 mm
Cobbles		63 mm to 200 mm
Gravel	coarse	20 mm to 63 mm
	medium	6 mm to 20 mm
	fine	2.36 mm to 6 mm
Sand	coarse	600 μ m to 2.36 mm
	medium	200 μ m to 600 μ m
	fine	75 μ m to 200 μ m

MOISTURE CONDITION

Dry Looks and feels dry. Cohesive and cemented soils are hard, friable or powdery. Uncemented granular soils run freely through hands.

Moist Soil feels cool and darkened in colour. Cohesive soils can be moulded. Granular soils tend to cohere.

Wet As for moist but with free water forming on hands when handled.

CONSISTENCY OF COHESIVE SOILS

TERM	UNDRAINED STRENGTH S_u (kPa)	FIELD GUIDE
Very Soft	<12	A finger can be pushed well into the soil with little effort.
Soft	12 - 25	A finger can be pushed into the soil to about 25mm depth.
Firm	25 - 50	The soil can be indented about 5mm with the thumb, but not penetrated.
Stiff	50 - 100	The surface of the soil can be indented with the thumb, but not penetrated.
Very Stiff	100 - 200	The surface of the soil can be marked, but not indented with thumb pressure.
Hard	>200	The surface of the soil can be marked only with the thumbnail.
Friable	–	Crumbles or powders when scraped by thumbnail.

DENSITY OF GRANULAR SOILS

TERM	DENSITY INDEX (%)
Very loose	Less than 15
Loose	15 - 35
Medium Dense	35 - 65
Dense	65 - 85
Very Dense	Greater than 85

MINOR COMPONENTS

TERM	ASSESSMENT GUIDE	PROPORTION OF MINOR COMPONENT IN:
Trace of	Presence just detectable by feel or eye, but soil properties little or no different to general properties of primary component.	Coarse grained soils: <5% Fine grained soils: <15%
With some	Presence easily detected by feel or eye, soil properties little different to general properties of primary component.	Coarse grained soils: 5 - 12% Fine grained soils: 15 - 30%

SOIL STRUCTURE

ZONING	CEMENTING
Layers Continuous across exposure or sample.	Weakly cemented Easily broken up by hand in air or water.
Lenses Discontinuous layers of lenticular shape.	Moderately cemented Effort is required to break up the soil by hand in air or water.
Pockets Irregular inclusions of different material.	

GEOLOGICAL ORIGIN

WEATHERED IN PLACE SOILS

Extremely weathered material Structure and fabric of parent rock visible.

Residual soil Structure and fabric of parent rock not visible.

TRANSPORTED SOILS

Aeolian soil Deposited by wind.

Alluvial soil Deposited by streams and rivers.

Colluvial soil Deposited on slopes (transported downslope by gravity).

Fill Man made deposit. Fill may be significantly more variable between tested locations than naturally occurring soils.

Lacustrine soil Deposited by lakes.

Marine soil Deposited in ocean basins, bays, beaches and estuaries.

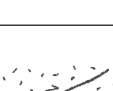
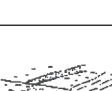
Soil Description Explanation Sheet (2 of 2)

SOIL CLASSIFICATION INCLUDING IDENTIFICATION AND DESCRIPTION

FIELD IDENTIFICATION PROCEDURES (Excluding particles larger than 60 mm and basing fractions on estimated mass)					USC	PRIMARY NAME
COARSE GRAINED SOILS More than 50% of materials less than 63 mm is larger than 0.075 mm	GRAVELS More than half of coarse fraction is larger than 2.0 mm	CLEAN GRAVELS (Little or no fines)	Wide range in grain size and substantial amounts of all intermediate particle sizes.		GW	GRAVEL
			Predominantly one size or a range of sizes with more intermediate sizes missing.		GP	GRAVEL
		GRAVELS WITH FINES (Appreciable amount of fines)	Non-plastic fines (for identification procedures see ML below)		GM	SILTY GRAVEL
			Plastic fines (for identification procedures see CL below)		GC	CLAYEY GRAVEL
	SANDS More than half of coarse fraction is smaller than 2.0 mm	CLEAN SANDS (Little or no fines)	Wide range in grain sizes and substantial amounts of all intermediate sizes		SW	SAND
			Predominantly one size or a range of sizes with some intermediate sizes missing.		SP	SAND
		SANDS WITH FINES (Appreciable amount of fines)	Non-plastic fines (for identification procedures see ML below).		SM	SILTY SAND
			Plastic fines (for identification procedures see CL below).		SC	CLAYEY SAND
FINE GRAINED SOILS More than 50% of material less than 63 mm is smaller than 0.075 mm	SILTS & CLAYS Liquid limit less than 50	IDENTIFICATION PROCEDURES ON FRACTIONS <0.2 mm.				
		DRY STRENGTH	DILATANCY	TOUGHNESS		
		None to Low	Quick to slow	None	ML	SILT
		Medium to High	None	Medium	CL	CLAY
	SILTS & CLAYS Liquid limit greater than 50	Low to medium	Slow to very slow	Low	OL	ORGANIC SILT
		Low to medium	Slow to very slow	Low to medium	MH	SILT
		High	None	High	CH	CLAY
		Medium to High	None	Low to medium	OH	ORGANIC CLAY
HIGHLY ORGANIC SOILS	Readily identified by colour, odour, spongy feel and frequently by fibrous texture.			Pt	PEAT	
• Low plasticity – Liquid Limit W _L less than 35%. • Medium plasticity – W _L between 35% and 50%.						

• Low plasticity – Liquid Limit W_L less than 35%. • Medium plasticity – W_L between 35% and 50%.

COMMON DEFECTS IN SOIL

TERM	DEFINITION	DIAGRAM	TERM	DEFINITION	DIAGRAM
PARTING	A surface or crack across which the soil has little or no tensile strength. Parallel or sub parallel to layering (eg bedding). May be open or closed.		SOFTENED ZONE	A zone in clayey soil, usually adjacent to a defect in which the soil has a higher moisture content than elsewhere.	
JOINT	A surface or crack across which the soil has little or no tensile strength but which is not parallel or sub parallel to layering. May be open or closed. The term 'fissure' may be used for irregular joints <0.2 m in length.		TUBE	Tubular cavity. May occur singly or as one of a large number of separate or inter-connected tubes. Walls often coated with clay or strengthened by denser packing of grains. May contain organic matter	
SHEARED ZONE	Zone in clayey soil with roughly parallel near planar, curved or undulating boundaries containing closely spaced, smooth or slickensided, curved intersecting joints which divide the mass into lenticular or wedge shaped blocks.		TUBE CAST	Roughly cylindrical elongated body of soil different from the soil mass in which it occurs. In some cases the soil which makes up the tube cast is cemented.	
SHEARED SURFACE	A near planar curved or undulating, smooth, polished or slickensided surface in clayey soil. The polished or slickensided surface indicates that movement (in many cases very little) has occurred along the defect.		INFILLED SEAM	Sheet or wall like body of soil substance or mass with roughly planar to irregular near parallel boundaries which cuts through a soil mass. Formed by infilling of open joints.	

Appendix B

Laboratory Test Results

A.S.S. FIELD SCREEN ANALYSIS REPORT

CERTIFICATE OF ANALYSIS



Analysis By: **Bio-Track Pty Ltd** ABN 91 056 237 275 781 Mt. Glorious Road Highvale, Brisbane, Australia, 4520 Ph. 07 3289 7179 EMAIL pe@biotrack.com.au

DATE OF REPORT 30 APRIL 2009
CLIENT NAME MR LUKE CRAIG
CLIENT FIRM COFFEY GEOTECHNICS PTY LTD YOUR PROJECT/JOB REFERENCE GK1560AA
CLIENT ADDRESS PO BOX 5537 MAROOCHYDORE 4558
PROJECT NAME GK1560AA SAMPLING DATE 18/4/2009
NUMBER OF SAMPLES 12 SAMPLE TYPE SOIL SAMPLE FOR ACID SULFATE STUDY
PACKAGING SAMPLES LABELLED - INTACT
SAMPLES DISPOSED ON 1/8/2009
LOG-IN DATE 27 APRIL 2009 LAB REF. LR27049.436

Page 1 of 1 Report Pages.

TEST METHODOLOGY FOR pH_f AND pH_{fox} AS PER QASSIT 2004 Laboratory Methods. Indications based on pH data only.
RATE: 0=none 1=slight 2=moderate 3=high 4=very high (steam evolved) visual observation at 0-5 minutes.
TEMP: Surface temperature rise (°C) oxidised sample at 5 minutes.

SAMPLE ID	Upper	Lower (R.L.)	pH _f pH _{fox} change			RATE	TEMP	INDICATION
			pH _f	pH _{fox}	change			
BH 44	0.25		5.3	2.4	-2.9	4	6	low TAA & high TPA & sulphide possible
BH 44	0.50		5.0	3.4	-1.6	2	2	low TAA & moderate TPA
BH 44	0.75		5.5	3.1	-2.4	2	1	low TAA & moderate TPA & sulphide possible
BH 44	1.0		5.7	3.5	-2.2	2	1	low TAA & sulphide possible
BH 44	1.25		5.5	3.5	-2.0	1	0	low TAA
BH 44	1.50		5.6	3.4	-2.2	1	7	low TAA & moderate TPA & sulphide possible
BH 44	1.75		5.5	3.9	-1.6	1	2	low TAA
BH 44	2.0		5.5	3.9	-1.6	2	0	low TAA
BH 44	2.25		5.4	3.9	-1.5	1	1	low TAA
BH 44	2.50		5.4	3.7	-1.7	1	0	low TAA
BH 44	2.75		5.1	4.1	-1.0	1	3	low TAA
BH 44	3.0		5.4	4.0	-1.4	1	3	low TAA

Signatory For and behalf of Bio-Track Pty Ltd

A.S.S. FIELD SCREEN ANALYSIS REPORT

CERTIFICATE OF ANALYSIS



Analysis By: **Bio-Track Pty Ltd** ABN 91 056 237 275 781 Mt. Glorious Road Highvale, Brisbane, Australia, 4520 Ph. 07 3289 7179 EMAIL pe@biotrack.com.au

DATE OF REPORT 28 APRIL 2009
CLIENT NAME MR LUKE CRAIG
CLIENT FIRM COFFEY GEOTECHNICS PTY LTD YOUR PROJECT/JOB REFERENCE GK1560AA
CLIENT ADDRESS PO BOX 5537 MAROOCHYDORE 4558
PROJECT NAME GK1560AA SAMPLING DATE 18/4/2009
NUMBER OF SAMPLES 32 SAMPLE TYPE SOIL SAMPLE FOR ACID SULFATE STUDY
PACKAGING SAMPLES LABELLED - INTACT
SAMPLES DISPOSED ON 1/8/2009
LOG-IN DATE 27 APRIL 2009 LAB REF. LR27049.434

Page 1 of 1 Report Pages.

TEST METHODOLOGY FOR pH_f AND pH_{fox} AS PER QASSIT 2004 Laboratory Methods. Indications based on pH data only.
RATE: 0=none 1=slight 2=moderate 3=high 4=very high (steam evolved) visual observation at 0-5 minutes.
TEMP: Surface temperature rise (°C) oxidised sample at 5 minutes.

SAMPLE ID	Upper	Lower (R.L.)	pH _f pH _{fox} change			RATE	TEMP	INDICATION
			pH _f	pH _{fox}	change			
BH 24	0.25		3.8	2.1	-1.7	2	7	high TPA
BH 24	0.50		4.1	2.3	-1.8	2	5	high TPA
BH 24	0.75		4.8	1.3	-3.5	2	6	low TAA & high TPA & high sulphide/low buffer
BH 24	1.00		4.6	2.7	-1.9	1	5	low TAA & moderate TPA
BH 24	1.25		5.2	2.5	-2.7	2	5	low TAA & moderate TPA & sulphide possible
BH 24	1.50		5.0	2.6	-2.4	2	5	low TAA & moderate TPA & sulphide possible
BH 24	1.75		5.1	3.6	-1.5	1	4	low TAA
BH 24	2.00		5.2	3.6	-1.6	1	5	low TAA
BH 24	2.25		5.4	3.6	-1.8	1	4	low TAA
BH 24	2.50		5.4	3.7	-1.7	1	2	low TAA
BH 24	2.75		5.2	3.2	-2.0	2	1	low TAA & moderate TPA
BH 24	3.00		5.4	3.2	-2.2	2	3	low TAA & moderate TPA & sulphide possible
BH 24	3.25		5.5	3.1	-2.4	2	4	low TAA & moderate TPA & sulphide possible
BH 24	3.50		5.5	3.2	-2.3	2	5	low TAA & moderate TPA & sulphide possible
BH 24	3.75		5.6	3.3	-2.3	2	5	low TAA & moderate TPA & sulphide possible
BH 24	4.00		5.4	3.4	-2.0	2	1	low TAA & moderate TPA
BH 29	0.25		4.6	2.2	-2.4	3	4	low TAA & high TPA & sulphide possible
BH 29	0.50		4.6	2.9	-1.7	2	2	low TAA & moderate TPA
BH 29	0.75		5.0	3.7	-1.3	2	3	low TAA
BH 29	1.00		5.0	3.9	-1.1	2	3	low TAA
BH 29	1.25		5.2	3.8	-1.4	1	0	low TAA
BH 29	1.50		5.0	4.0	-1.0	1	2	low TAA
BH 29	1.75		5.1	4.1	-1.0	2	3	low TAA
BH 29	2.00		5.2	4.1	-1.1	1	3	low TAA
BH 29	2.25		5.6	4.4	-1.2	2	3	low TAA
BH 29	2.50		5.2	4.4	-0.8	2	2	low TAA & low sulphide
BH 29	2.75		5.2	3.5	-1.7	2	2	low TAA
BH 29	3.00		5.4	3.3	-2.1	2	1	low TAA & moderate TPA & sulphide possible
BH 29	3.25		5.4	3.1	-2.3	2	4	low TAA & moderate TPA & sulphide possible
BH 29	3.50		5.4	3.3	-2.1	2	1	low TAA & moderate TPA & sulphide possible
BH 29	3.75		5.2	3.4	-1.8	2	1	low TAA & moderate TPA
BH 29	4.00		5.2	3.5	-1.7	3	8	low TAA

Signatory For and behalf of Bio-Track Pty Ltd

A.S.S. FIELD SCREEN ANALYSIS REPORT

CERTIFICATE OF ANALYSIS



Analysis By: **Bio-Track Pty Ltd** ABN 91 056 237 275 781 Mt. Glorious Road Highvale, Brisbane, Australia, 4520 Ph. 07 3289 7179 EMAIL pe@biotrack.com.au

DATE OF REPORT 28 APRIL 2009
CLIENT NAME MR LUKE CRAIG
CLIENT FIRM COFFEY GEOTECHNICS PTY LTD YOUR PROJECT/JOB REFERENCE GK1560AA
CLIENT ADDRESS PO BOX 5537 MAROOCHYDORE 4558
PROJECT NAME GK1560AA SAMPLING DATE 18/4/2009
NUMBER OF SAMPLES 32 SAMPLE TYPE SOIL SAMPLE FOR ACID SULFATE STUDY
PACKAGING SAMPLES LABELLED - INTACT
SAMPLES DISPOSED ON 1/8/2009
LOG-IN DATE 27 APRIL 2009 LAB REF. LR27049.432

Page 1 of 1 Report Pages.

TEST METHODOLOGY FOR pH_f AND pH_{fox} AS PER QASSIT 2004 Laboratory Methods. Indications based on pH data only.
RATE: 0=none 1=slight 2=moderate 3=high 4=very high (steam evolved) visual observation at 0-5 minutes.
TEMP: Surface temperature rise (°C) oxidised sample at 5 minutes.

SAMPLE ID	Upper	Lower (R.L.)	pH _f pH _{fox} change			RATE	TEMP	INDICATION
			pH _f	pH _{fox}	change			
BH 21	0.25		4.9	2.7	-2.2	4	4	low TAA & moderate TPA & sulphide possible
BH 21	0.50		5.0	3.1	-1.9	2	5	low TAA & moderate TPA
BH 21	0.75		5.1	3.3	-1.8	1	3	low TAA & moderate TPA
BH 21	1.00		5.1	3.6	-1.5	1	4	low TAA
BH 21	1.25		5.2	3.8	-1.4	1	3	low TAA
BH 21	1.50		5.3	3.6	-1.7	1	2	low TAA
BH 21	1.75		5.4	3.7	-1.7	2	6	low TAA
BH 21	2.00		5.2	3.4	-1.8	1	6	low TAA & moderate TPA
BH 21	2.25		5.1	3.3	-1.8	2	5	low TAA & moderate TPA
BH 21	2.50		4.9	3.6	-1.3	2	4	low TAA
BH 21	2.75		5.2	3.7	-1.5	1	4	low TAA
BH 21	3.00		5.2	3.8	-1.4	1	6	low TAA
BH 21	3.25		5.4	3.5	-1.9	1	2	low TAA
BH 21	3.50		5.3	3.5	-1.8	1	2	low TAA
BH 21	3.75		5.2	3.5	-1.7	1	2	low TAA
BH 21	4.00		5.3	3.3	-2.0	1	3	low TAA & moderate TPA
BH 23	0.25		4.9	2.9	-2.0	2	3	low TAA & moderate TPA
BH 23	0.50		5.0	3.2	-1.8	1	2	low TAA & moderate TPA
BH 23	0.75		5.2	3.8	-1.4	1	4	low TAA
BH 23	1.00		5.0	3.6	-1.4	2	5	low TAA
BH 23	1.25		5.4	3.4	-2.0	1	2	low TAA & moderate TPA
BH 23	1.50		5.5	3.4	-2.1	1	2	low TAA & moderate TPA & sulphide possible
BH 23	1.75		5.3	3.8	-1.5	1	3	low TAA
BH 23	2.00		5.5	3.5	-2.0	1	1	low TAA
BH 23	2.25		5.4	3.5	-1.9	1	1	low TAA
BH 23	2.50		5.4	3.5	-1.9	1	0	low TAA
BH 23	2.75		5.3	3.4	-1.9	1	1	low TAA & moderate TPA
BH 23	3.00		5.3	3.7	-1.6	1	2	low TAA
BH 23	3.25		5.1	3.5	-1.6	1	1	low TAA
BH 23	3.50		5.2	3.4	-1.8	1	0	low TAA & moderate TPA
BH 23	3.75		5.2	3.6	-1.6	1	1	low TAA
BH 23	4.00		5.3	3.6	-1.7	1	2	low TAA

Signatory For and behalf of Bio-Track Pty Ltd

A.S.S. FIELD SCREEN ANALYSIS REPORT

CERTIFICATE OF ANALYSIS



Analysis By: **Bio-Track Pty Ltd** ABN 91 056 237 275 781 Mt. Glorious Road Highvale, Brisbane, Australia, 4520 Ph. 07 3289 7179 EMAIL pe@biotrack.com.au

DATE OF REPORT 27 APRIL 2009
CLIENT NAME MR LUKE CRAIG
CLIENT FIRM COFFEY GEOTECHNICS PTY LTD YOUR PROJECT/JOB REFERENCE GK1560AA
CLIENT ADDRESS PO BOX 5537 MAROOCHYDORE 4558
PROJECT NAME GK1560AA SAMPLING DATE 18/4/2009
NUMBER OF SAMPLES 32 SAMPLE TYPE SOIL SAMPLE FOR ACID SULFATE STUDY
PACKAGING SAMPLES LABELLED - INTACT
SAMPLES DISPOSED ON 1/8/2009
LOG-IN DATE 27 APRIL 2009 LAB REF. LR27049.430

Page 1 of 1 Report Pages.

TEST METHODOLOGY FOR pH_f AND pH_{fox} AS PER QASSIT 2004 Laboratory Methods. Indications based on pH data only.
RATE: 0=none 1=slight 2=moderate 3=high 4=very high (steam evolved) visual observation at 0-5 minutes.
TEMP: Surface temperature rise (°C) oxidised sample at 5 minutes.

SAMPLE ID	Upper	Lower (R.L.)						TEMP	INDICATION
			pH _f	pH _{fox}	change	RATE			
BH 17	0.25		5.2	3.5	-1.7	1	3	low TAA	
BH 17	0.50		5.0	3.9	-1.1	1	4	low TAA	
BH 17	0.75		5.1	1.8	-3.3	4	0	low TAA & high TPA & high sulphide/low buffer	
BH 17	1.00		5.1	3.4	-1.7	2	3	low TAA & moderate TPA	
BH 17	1.25		5.1	3.8	-1.3	1	3	low TAA	
BH 17	1.50		5.1	3.8	-1.3	1	4	low TAA	
BH 17	1.75		5.1	3.6	-1.5	1	3	low TAA	
BH 17	2.00		5.2	3.6	-1.6	1	2	low TAA	
BH 17	2.25		5.3	3.5	-1.8	1	3	low TAA	
BH 17	2.50		4.8	3.6	-1.2	1	3	low TAA	
BH 17	2.75		5.2	3.6	-1.6	1	5	low TAA	
BH 17	3.00		5.1	3.6	-1.5	1	4	low TAA	
BH 17	3.25		5.2	3.6	-1.6	1	5	low TAA	
BH 17	3.50		5.1	3.6	-1.5	1	5	low TAA	
BH 17	3.75		5.3	3.6	-1.7	1	4	low TAA	
BH 17	4.00		5.0	3.7	-1.3	1	4	low TAA	
BH 18	0.25		5.3	3.1	-2.2	2	4	low TAA & moderate TPA & sulphide possible	
BH 18	0.50		5.3	3.9	-1.4	1	5	low TAA	
BH 18	0.75		4.9	3.8	-1.1	1	5	low TAA	
BH 18	1.00		5.1	4.4	-0.7	1	3	low TAA & low sulphide	
BH 18	1.25		5.4	3.8	-1.6	1	2	low TAA	
BH 18	1.50		5.2	4.0	-1.2	1	4	low TAA	
BH 18	1.75		5.3	3.4	-1.9	1	5	low TAA & moderate TPA	
BH 18	2.00		5.4	3.6	-1.8	1	4	low TAA	
BH 18	2.25		5.3	3.6	-1.7	1	4	low TAA	
BH 18	2.50		5.3	4.1	-1.2	1	2	low TAA	
BH 18	2.75		5.1	3.7	-1.4	1	3	low TAA	
BH 18	3.00		5.2	3.8	-1.4	1	3	low TAA	
BH 18	3.25		5.1	3.9	-1.2	1	4	low TAA	
BH 18	3.50		4.5	3.9	-0.6	1	3	low TAA & low sulphide	
BH 18	3.75		5.2	4.0	-1.2	1	5	low TAA	
BH 18	4.00		5.1	3.8	-1.3	1	3	low TAA	

Signatory For and behalf of Bio-Track Pty Ltd

A.S.S. FIELD SCREEN ANALYSIS REPORT

CERTIFICATE OF ANALYSIS



Analysis By: **Bio-Track Pty Ltd** ABN 91 056 237 275 781 Mt. Glorious Road Highvale, Brisbane, Australia, 4520 Ph. 07 3289 7179 EMAIL pe@biotrack.com.au

DATE OF REPORT 28 MAY 2009
CLIENT NAME MR LUKE CRAIG
CLIENT FIRM COFFEY GEOTECHNICS PTY LTD YOUR PROJECT/JOB REFERENCE GK1560AA - AREA 4
CLIENT ADDRESS PO BOX 5537 MAROOCHYDORE 4558
PROJECT NAME GK1560AA - AREA 4 SAMPLING DATE 15/5/2009
NUMBER OF SAMPLES 32 SAMPLE TYPE SOIL SAMPLE FOR ACID SULFATE STUDY
PACKAGING SAMPLES LABELLED - INTACT
SAMPLES DISPOSED ON 1/9/2009
LOG-IN DATE 21 MAY 2009 LAB REF. LR21059.450

Page 1 of 1 Report Pages.

TEST METHODOLOGY FOR pH_f AND pH_{fox} AS PER QASSIT 2004 Laboratory Methods. Indications based on pH data only.
RATE: 0=none 1=slight 2=moderate 3=high 4=very high (steam evolved) visual observation at 0-5 minutes.
TEMP: Surface temperature rise (°C) oxidised sample at 5 minutes.

SAMPLE ID	Upper	Lower (m)	pH _f	pH _{fox}	change	RATE	TEMP	INDICATION
BH 69	0.25		4.5	2.6	-1.9	2	4	low TAA & moderate TPA
BH 69	0.50		4.6	2.5	-2.1	3	3	low TAA & moderate TPA & sulphide possible
BH 69	0.75		4.8	3.8	-1.0	1	3	low TAA
BH 69	1.00		4.7	4.0	-0.7	0	6	low TAA & low sulphide
BH 69	1.25		4.6	4.3	-0.3	0	3	low TAA & low sulphide
BH 69	1.50		4.6	4.0	-0.6	0	1	low TAA & low sulphide
BH 69	1.75		4.9	3.4	-1.5	1	2	low TAA & moderate TPA
BH 69	2.00		5.0	4.4	-0.6	1	3	low TAA & low sulphide
BH 69	2.25		4.9	4.3	-0.6	1	4	low TAA & low sulphide
BH 69	2.50		5.4	4.8	-0.6	1	3	low TAA & low TPA & low sulphide
BH 69	2.75		5.4	4.9	-0.5	1	2	low TAA & low TPA & low sulphide
BH 69	3.00		5.6	4.8	-0.8	1	2	low TAA & low TPA & low sulphide
BH 69	3.25		5.6	5.0	-0.6	1	1	low TAA & low TPA & low sulphide
BH 69	3.50		5.8	5.7	-0.1	2	3	low TAA & low TPA & low sulphide
BH 69	3.75		6.1	6.2	0.1	2	5	low TAA & low TPA & low sulphide
BH 69	4.00		6.4	6.7	0.3	1	1	low TAA & no TPA & low sulphide
BH 71	0.25		5.1	2.6	-2.5	2	3	low TAA & moderate TPA & sulphide possible
BH 71	0.50		5.0	3.0	-2.0	2	3	low TAA & moderate TPA
BH 71	0.75		6.4	5.0	-1.4	1	3	low TAA & low TPA
BH 71	1.00		7.0	6.0	-1.0	1	3	no TAA & low TPA
BH 71	1.25		7.1	6.2	-0.9	1	1	no TAA & low TPA & low sulphide
BH 71	1.50		7.4	6.1	-1.3	1	0	no TAA & low TPA
BH 71	1.75		7.0	4.6	-2.4	1	2	no TAA & low TPA & sulphide possible
BH 71	2.00		6.6	6.5	-0.1	2	2	no TAA & low TPA & low sulphide
BH 71	2.25		7.0	6.0	-1.0	2	2	no TAA & low TPA
BH 71	2.50		7.3	6.3	-1.0	2	2	no TAA & low TPA
BH 71	2.75		7.3	5.7	-1.6	2	6	no TAA & low TPA
BH 71	3.00		6.6	5.9	-0.7	2	1	no TAA & low TPA & low sulphide
BH 71	3.25		7.1	5.8	-1.3	2	2	no TAA & low TPA
BH 71	3.50		7.4	7.3	-0.1	2	2	no TAA & no TPA & low sulphide
BH 71	3.75		7.5	7.7	0.2	2	2	no TAA & no TPA & low sulphide
BH 71	4.00		7.1	7.6	0.5	2	1	no TAA & no TPA & low sulphide

Signatory For and behalf of Bio-Track Pty Ltd

A.S.S. FIELD SCREEN ANALYSIS REPORT

CERTIFICATE OF ANALYSIS



Analysis By: **Bio-Track Pty Ltd** ABN 91 056 237 275 781 Mt. Glorious Road Highvale, Brisbane, Australia, 4520 Ph. 07 3289 7179 EMAIL pe@biotrack.com.au

DATE OF REPORT 28 MAY 2009
CLIENT NAME MR LUKE CRAIG
CLIENT FIRM COFFEY GEOTECHNICS PTY LTD YOUR PROJECT/JOB REFERENCE GK1560AA - AREA 4
CLIENT ADDRESS PO BOX 5537 MAROOCHYDORE 4558
PROJECT NAME GK1560AA - AREA 4 SAMPLING DATE 15/5/2009
NUMBER OF SAMPLES 34 SAMPLE TYPE SOIL SAMPLE FOR ACID SULFATE STUDY
PACKAGING SAMPLES LABELLED - INTACT
SAMPLES DISPOSED ON 1/9/2009
LOG-IN DATE 21 MAY 2009 LAB REF. LR21059.447

Page 1 of 1 Report Pages.

TEST METHODOLOGY FOR pH_f AND pH_{fox} AS PER QASSIT 2004 Laboratory Methods. Indications based on pH data only.
RATE: 0=none 1=slight 2=moderate 3=high 4=very high (steam evolved) visual observation at 0-5 minutes.
TEMP: Surface temperature rise (°C) oxidised sample at 5 minutes.

SAMPLE ID	Upper	Lower (m)	pH _f	pH _{fox}	change	RATE	TEMP	INDICATION
BH 4	0.25		5.0	3.1	-1.9	1	2	low TAA & moderate TPA
BH 4	0.50		5.4	2.9	-2.5	1	2	low TAA & moderate TPA & sulphide possible
BH 4	0.75		5.9	4.1	-1.8	1	3	low TAA
BH 4	1.0		4.7	4.5	-0.2	1	2	low TAA & low sulphide
BH 4	1.25		5.1	4.1	-1.0	0	3	low TAA
BH 4	1.5		5.0	4.1	-0.9	0	2	low TAA & low sulphide
BH 4	1.75		5.4	4.3	-1.1	1	2	low TAA
BH 4	2.0		5.3	4.4	-0.9	1	2	low TAA & low sulphide
BH 4	2.25		5.5	4.2	-1.3	1	4	low TAA
BH 4	2.5		5.0	4.1	-0.9	1	4	low TAA & low sulphide
BH 4	2.75		5.1	4.5	-0.6	1	2	low TAA & low sulphide
BH 4	3.0		5.4	4.2	-1.2	1	3	low TAA
BH 4	3.25		5.5	4.2	-1.3	1	7	low TAA
BH 4	3.5		5.8	3.9	-1.9	1	5	low TAA
BH 4	3.75		5.6	4.0	-1.6	1	5	low TAA
BH 4	4.0		6.0	4.5	-1.5	1	7	low TAA
BH 4	4.25		5.6	4.5	-1.1	2	7	low TAA
BH 4	4.5		5.6	4.3	-1.3	1	8	low TAA
BH 4	4.75		5.5	4.3	-1.2	1	7	low TAA
BH 4	5.0		5.6	4.1	-1.5	1	4	low TAA
BH 4	5.25		5.5	3.8	-1.7	1	4	low TAA
BH 4	5.75		5.5	4.5	-1.0	4	1	low TAA
BH 4	6.0		5.5	4.5	-1.0	4	1	low TAA
BH 65	0.25		4.6	2.4	-2.2	3	5	low TAA & high TPA & sulphide possible
BH 65	0.50		5.0	3.1	-1.9	4	2	low TAA & moderate TPA
BH 65	0.75		5.0	3.4	-1.6	1	0	low TAA & moderate TPA
BH 65	1.25		5.6	4.0	-1.6	1	1	low TAA
BH 65	1.5		5.4	4.8	-0.6	1	3	low TAA & low TPA & low sulphide
BH 65	1.75		5.7	4.4	-1.3	1	0	low TAA
BH 65	2.0		5.1	4.3	-0.8	1	2	low TAA & low sulphide
BH 65	2.25		5.1	4.8	-0.3	1	2	low TAA & low TPA & low sulphide
BH 65	2.5		5.9	4.8	-1.1	1	1	low TAA & low TPA
BH 65	2.75		5.7	4.8	-0.9	1	2	low TAA & low TPA & low sulphide
BH 65	3.0		6.3	6.0	-0.3	1	0	low TAA & low TPA & low sulphide

Signatory For and behalf of Bio-Track Pty Ltd

A.S.S. FIELD SCREEN ANALYSIS REPORT

CERTIFICATE OF ANALYSIS



Analysis By: **Bio-Track Pty Ltd** ABN 91 056 237 275 781 Mt. Glorious Road Highvale, Brisbane, Australia, 4520 Ph. 07 3289 7179 EMAIL pe@biotrack.com.au

DATE OF REPORT 29 MAY 2009 Page 1 of 1 Report Pages.
CLIENT NAME MR LUKE CRAIG
CLIENT FIRM COFFEY GEOTECHNICS PTY LTD YOUR PROJECT/JOB REFERENCE GK1560AA - AREA 4
CLIENT ADDRESS PO BOX 5537 MAROOCHYDORE 4558
PROJECT NAME GK1560AA - AREA 4 SAMPLING DATE 15/5/2009
NUMBER OF SAMPLES 24 SAMPLE TYPE SOIL SAMPLE FOR ACID SULFATE STUDY
PACKAGING SAMPLES LABELLED - INTACT
SAMPLES DISPOSED ON 1/9/2009
LOG-IN DATE 21 MAY 2009 LAB REF. LR21059.451

TEST METHODOLOGY FOR pH_f AND pH_{fox} AS PER QASSIT 2004 Laboratory Methods. Indications based on pH data only.
RATE: 0=none 1=slight 2=moderate 3=high 4=very high (steam evolved) visual observation at 0-5 minutes.
TEMP: Surface temperature rise (°C) oxidised sample at 5 minutes.

SAMPLE ID	Upper	Lower (m)	pH _f	pH _{fox}	change	RATE	TEMP	INDICATION
BH 73	0.25		5.3	3.1	-2.2	2	4	low TAA & moderate TPA & sulphide possible
BH 73	0.50		5.1	4.0	-1.1	1	1	low TAA
BH 73	0.75		5.3	3.9	-1.4	1	0	low TAA
BH 73	1.00		5.3	4.2	-1.1	1	0	low TAA
BH 73	1.25		5.2	4.5	-0.7	1	1	low TAA & low sulphide
BH 73	1.50		4.6	4.2	-0.4	1	1	low TAA & low sulphide
BH 73	1.75		5.7	4.0	-1.7	0	0	low TAA
BH 73	2.00		5.6	4.0	-1.6	1	3	low TAA
BH 73	2.25		5.7	4.6	-1.1	1	3	low TAA & low TPA
BH 73	2.50		5.7	4.8	-0.9	2	4	low TAA & low TPA & low sulphide
BH 73	2.75		5.6	4.5	-1.1	2	1	low TAA
BH 73	3.00		5.7	4.8	-0.9	2	6	low TAA & low TPA & low sulphide
BH 76	0.25		4.5	2.3	-2.2	3	1	low TAA & high TPA & sulphide possible
BH 76	0.50		4.9	3.9	-1.0	1	2	low TAA
BH 76	0.75		5.3	4.3	-1.0	1	2	low TAA
BH 76	1.00		5.4	5.3	-0.1	1	0	low TAA & low TPA & low sulphide
BH 76	1.25		5.7	4.7	-1.0	1	2	low TAA & low TPA
BH 76	1.50		5.6	5.2	-0.4	0	2	low TAA & low TPA & low sulphide
BH 76	1.75		5.8	4.8	-1.0	2	4	low TAA & low TPA
BH 76	2.00		6.1	4.5	-1.6	1	3	low TAA
BH 76	2.25		6.2	5.0	-1.2	0	2	low TAA & low TPA
BH 76	2.50		6.2	5.1	-1.1	0	1	low TAA & low TPA
BH 76	2.75		6.3	5.4	-0.9	0	2	low TAA & low TPA & low sulphide
BH 76	3.00		6.2	5.6	-0.6	2	3	low TAA & low TPA & low sulphide

Signatory For and behalf of Bio-Track Pty Ltd

A.S.S. FIELD SCREEN ANALYSIS REPORT

CERTIFICATE OF ANALYSIS



Analysis By: **Bio-Track Pty Ltd** ABN 91 056 237 275 781 Mt. Glorious Road Highvale, Brisbane, Australia, 4520 Ph. 07 3289 7179 EMAIL pe@biotrack.com.au

DATE OF REPORT 29 MAY 2009 Page 1 of 1 Report Pages.
CLIENT NAME MR LUKE CRAIG
CLIENT FIRM COFFEY GEOTECHNICS PTY LTD YOUR PROJECT/JOB REFERENCE GM1560AA - AREA 1
CLIENT ADDRESS PO BOX 5537 MAROOCHYDORE 4558
PROJECT NAME GM1560AA - AREA 1 SAMPLING DATE 15/5/2009
NUMBER OF SAMPLES 24 SAMPLE TYPE SOIL SAMPLE FOR ACID SULFATE STUDY
PACKAGING SAMPLES LABELLED - INTACT
SAMPLES DISPOSED ON 1/9/2009
LOG-IN DATE 21 MAY 2009 LAB REF. LR21059.383

TEST METHODOLOGY FOR pH_f AND pH_{fox} AS PER QASSIT 2004 Laboratory Methods. Indications based on pH data only.
RATE: 0=none 1=slight 2=moderate 3=high 4=very high (steam evolved) visual observation at 0-5 minutes.
TEMP: Surface temperature rise (°C) oxidised sample at 5 minutes.

SAMPLE ID	Upper	Lower (m)	pH _f	pH _{fox}	change	RATE	TEMP	INDICATION
BH 89	0.25		4.8	3.6	-1.2	2	0	low TAA
BH 89	0.50		5.4	4.7	-0.7	1	0	low TAA & low TPA & low sulphide
BH 89	0.75		5.5	4.1	-1.4	1	0	low TAA
BH 89	1.00		5.5	4.2	-1.3	1	0	low TAA
BH 89	1.25		5.3	4.2	-1.1	1	1	low TAA
BH 89	1.50		5.3	4.5	-0.8	1	0	low TAA & low sulphide
BH 89	1.75		5.1	4.5	-0.6	1	0	low TAA & low sulphide
BH 89	2.00		5.2	4.4	-0.8	1	0	low TAA & low sulphide
BH 89	2.25		5.2	4.5	-0.7	1	0	low TAA & low sulphide
BH 89	2.50		5.3	4.4	-0.9	1	0	low TAA & low sulphide
BH 89	2.75		5.0	4.6	-0.4	1	1	low TAA & low TPA & low sulphide
BH 89	3.00		5.2	4.4	-0.8	1	0	low TAA & low sulphide
BH 94	0.25		5.2	3.7	-1.5	1	0	low TAA
BH 94	0.50		5.5	3.4	-2.1	1	0	low TAA & moderate TPA & sulphide possible
BH 94	0.75		6.0	3.6	-2.4	0	0	low TAA & sulphide possible
BH 94	1.00		5.8	5.4	-0.4	0	0	low TAA & low TPA & low sulphide
BH 94	1.25		5.8	5.0	-0.8	0	0	low TAA & low TPA & low sulphide
BH 94	1.50		6.3	5.3	-1.0	1	1	low TAA & low TPA
BH 94	1.75		6.4	5.8	-0.6	1	0	low TAA & low TPA & low sulphide
BH 94	2.00		6.6	5.8	-0.8	1	0	no TAA & low TPA & low sulphide
BH 94	2.25		6.7	6.5	-0.2	1	0	no TAA & low TPA & low sulphide
BH 94	2.50		6.7	6.3	-0.4	1	0	no TAA & low TPA & low sulphide
BH 94	2.75		7.2	6.7	-0.5	1	0	no TAA & no TPA & low sulphide
BH 94	3.00		7.0	7.1	0.1	1	4	no TAA & no TPA & low sulphide

Signatory For and behalf of Bio-Track Pty Ltd

A.S.S. FIELD SCREEN ANALYSIS REPORT

CERTIFICATE OF ANALYSIS



Analysis By: **Bio-Track Pty Ltd** ABN 91 056 237 275 781 Mt. Glorious Road Highvale, Brisbane, Australia, 4520 Ph. 07 3289 7179 EMAIL pe@biotrack.com.au

DATE OF REPORT 16 JUNE 2009
CLIENT NAME MR LUKE CRAIG
CLIENT FIRM COFFEY GEOTECHNICS PTY LTD YOUR PROJECT/JOB REFERENCE GK1560AA
CLIENT ADDRESS PO BOX 5537 MAROOCHYDORE 4558
PROJECT NAME GK1560AA SAMPLING DATE 24/4/2009
NUMBER OF SAMPLES 40 SAMPLE TYPE SOIL SAMPLE FOR ACID SULFATE STUDY
PACKAGING SAMPLES LABELLED - INTACT
SAMPLES DISPOSED ON 1/10/2009
LOG-IN DATE 12 JUNE 2009 LAB REF. LR12069.513

Page 1 of 1 Report Pages.

TEST METHODOLOGY FOR pH_f AND pH_{fox} AS PER QASSIT 2004 Laboratory Methods. Indications based on pH data only.
RATE: 0=none 1=slight 2=moderate 3=high 4=very high (steam evolved) visual observation at 0-5 minutes.
TEMP: Surface temperature rise (°C) oxidised sample at 5 minutes.

SAMPLE ID	Upper	Lower (m)	pH _f	pH _{fox}	change	RATE	TEMP	INDICATION
BH 10	0.25		4.7	3.0	-1.7	2	4	low TAA & moderate TPA
BH 10	0.50		5.1	3.3	-1.8	2	3	low TAA & moderate TPA
BH 10	0.75		5.4	4.4	-1.0	1	3	low TAA
BH 10	1.0		5.3	4.2	-1.1	1	5	low TAA
BH 10	1.25		5.1	3.9	-1.2	1	8	low TAA
BH 10	1.5		4.8	4.2	-0.6	1	1	low TAA & low sulphide
BH 10	1.75		5.5	3.8	-1.7	1	2	low TAA
BH 10	2.0		5.5	3.8	-1.7	1	4	low TAA
BH 10	2.25		5.2	3.9	-1.3	1	7	low TAA
BH 10	2.5		5.3	4.0	-1.3	1	8	low TAA
BH 10	2.75		5.4	4.2	-1.2	1	7	low TAA
BH 10	3.0		5.2	3.8	-1.4	1	7	low TAA
BH 14	0.25		4.8	2.2	-2.6	1	3	low TAA & high TPA & sulphide possible
BH 14	0.50		4.2	2.3	-1.9	1	3	high TPA
BH 14	0.75		4.6	2.4	-2.2	1	6	low TAA & high TPA & sulphide possible
BH 14	1.0		4.5	3.4	-1.1	1	7	low TAA & moderate TPA
BH 14	1.25		4.6	3.6	-1.0	0	6	low TAA
BH 14	1.5		4.9	3.6	-1.3	0	6	low TAA
BH 14	1.75		4.7	3.6	-1.1	1	6	low TAA
BH 14	2.0		5.0	3.6	-1.4	0	6	low TAA
BH 14	2.25		5.2	3.5	-1.7	0	2	low TAA
BH 14	2.5		5.2	3.1	-2.1	0	6	low TAA & moderate TPA & sulphide possible
BH 14	2.75		5.0	3.3	-1.7	2	5	low TAA & moderate TPA
BH 14	3.0		5.3	3.1	-2.2	1	6	low TAA & moderate TPA & sulphide possible
BH 35	0.25		5.1	3.2	-1.9	4	4	low TAA & moderate TPA
BH 35	0.50		4.6	3.5	-1.1	2	3	low TAA
BH 35	0.75		4.8	3.1	-1.7	2	5	low TAA & moderate TPA
BH 35	1.0		5.0	3.4	-1.6	2	4	low TAA & moderate TPA
BH 35	1.25		5.3	3.6	-1.7	1	3	low TAA
BH 35	1.5		5.0	3.9	-1.1	0	3	low TAA
BH 35	1.75		5.0	3.8	-1.2	1	1	low TAA
BH 35	2.0		5.0	4.0	-1.0	0	3	low TAA
BH 35	2.25		4.9	3.7	-1.2	1	4	low TAA
BH 35	2.5		5.2	3.4	-1.8	1	4	low TAA & moderate TPA
BH 35	2.75		4.8	3.5	-1.3	1	2	low TAA
BH 35	3.0		4.9	3.5	-1.4	1	0	low TAA
BH 35	3.25		4.8	3.7	-1.1	1	3	low TAA
BH 35	3.5		5.0	3.5	-1.5	1	4	low TAA
BH 35	3.75		4.6	3.5	-1.1	1	1	low TAA
BH 35	4.0		4.4	3.5	-0.9	1	1	low sulphide

Signatory For and behalf of Bio-Track Pty Ltd

A.S.S. FIELD SCREEN ANALYSIS REPORT

CERTIFICATE OF ANALYSIS



Analysis By: **Bio-Track Pty Ltd** ABN 91 056 237 275 781 Mt. Glorious Road Highvale, Brisbane, Australia, 4520 Ph. 07 3289 7179 EMAIL pe@biotrack.com.au

DATE OF REPORT 01 JUNE 2009
CLIENT NAME MR MARK THOMSON
CLIENT FIRM COFFEY GEOTECHNICS PTY LTD YOUR PROJECT/JOB REFERENCE GK1576AA
CLIENT ADDRESS PO BOX 5537 MAROOCHYDORE 4558
PROJECT NAME GK1576AA SAMPLING DATE 19/5/2009
NUMBER OF SAMPLES 36 SAMPLE TYPE SOIL SAMPLE FOR ACID SULFATE STUDY
PACKAGING SAMPLES LABELLED - INTACT
SAMPLES DISPOSED ON 1/9/2009
LOG-IN DATE 25 MAY 2009 LAB REF. LR25059.581

Page 1 of 1 Report Pages.

TEST METHODOLOGY FOR pH_f AND pH_{fox} AS PER QASSIT 2004 Laboratory Methods. Indications based on pH data only.
RATE: 0=none 1=slight 2=moderate 3=high 4=very high (steam evolved) visual observation at 0-5 minutes.
TEMP: Surface temperature rise (°C) oxidised sample at 5 minutes.

SAMPLE ID	Upper	Lower (m)	pH _f	pH _{fox}	change	RATE	TEMP	INDICATION
BH 1	0.25		4.7	3.4	-1.3	3	1	low TAA & moderate TPA
BH 1	0.50		4.5	3.6	-0.9	3	1	low TAA & low sulphide
BH 1	0.75		4.5	3.0	-1.5	2	2	low TAA & moderate TPA
BH 1	1.0		4.4	3.3	-1.1	2	1	moderate TPA
BH 1	1.25		4.9	3.5	-1.4	3	0	low TAA
BH 1	1.5		4.5	3.5	-1.0	0	3	low TAA
BH 1	1.75		4.8	3.1	-1.7	2	0	low TAA & moderate TPA
BH 1	2.0		4.4	3.6	-0.8	0	2	low sulphide
BH 1	2.25		4.7	3.2	-1.5	2	0	low TAA & moderate TPA
BH 1	2.5		4.2	3.2	-1.0	3	3	moderate TPA
BH 1	2.75		4.1	3.1	-1.0	3	1	moderate TPA
BH 1	3.0		4.1	3.7	-0.4	3	1	low sulphide
BH 3	0.25		4.3	3.5	-0.8	3	1	low sulphide
BH 3	0.5		4.4	3.3	-1.1	3	1	moderate TPA
BH 3	0.75		4.4	3.0	-1.4	2	2	moderate TPA
BH 3	1.0		4.6	3.1	-1.5	1	1	low TAA & moderate TPA
BH 3	1.25		4.4	3.2	-1.2	1	1	moderate TPA
BH 3	1.5		4.4	3.7	-0.7	1	1	low sulphide
BH 3	1.75		4.8	3.6	-1.2	1	1	low TAA
BH 3	2.0		4.5	3.1	-1.4	1	1	low TAA & moderate TPA
BH 3	2.25		4.7	4.1	-0.6	3	2	low TAA & low sulphide
BH 3	2.5		4.5	3.8	-0.7	3	2	low TAA & low sulphide
BH 3	2.75		4.6	3.6	-1.0	3	2	low TAA
BH 3	3.0		4.5	3.7	-0.8	3	2	low TAA & low sulphide
BH 5	0.5		4.5	3.4	-1.1	1	1	low TAA & moderate TPA
BH 5	1.0		4.6	3.3	-1.3	2	1	low TAA & moderate TPA
BH 5	1.5		4.5	3.8	-0.7	1	2	low TAA & low sulphide
BH 5	2.0		4.3	3.6	-0.7	1	2	low sulphide
BH 5	2.5		4.4	4.0	-0.4	0	1	low sulphide
BH 5	3.0		4.7	3.8	-0.9	1	1	low TAA & low sulphide
BH 8	0.5		5.0	3.2	-1.8	1	1	low TAA & moderate TPA
BH 8	1.0		5.1	3.8	-1.3	1	1	low TAA
BH 8	1.5		4.8	3.6	-1.2	1	1	low TAA
BH 8	2.0		4.6	3.8	-0.8	0	0	low TAA & low sulphide
BH 8	2.5		4.4	3.8	-0.6	0	0	low sulphide
BH 8	3.0		4.6	4.1	-0.5	1	3	low TAA & low sulphide

Signatory For and behalf of Bio-Track Pty Ltd

A.S.S. FIELD SCREEN ANALYSIS REPORT

CERTIFICATE OF ANALYSIS



Analysis By: **Bio-Track Pty Ltd** ABN 91 056 237 275 781 Mt. Glorious Road Highvale, Brisbane, Australia, 4520 Ph. 07 3289 7179 EMAIL pe@biotrack.com.au

DATE OF REPORT 01 JUNE 2009
CLIENT NAME MR LUKE CRAIG
CLIENT FIRM COFFEY GEOTECHNICS PTY LTD YOUR PROJECT/JOB REFERENCE GM1560AA - AREA 1
CLIENT ADDRESS PO BOX 5537 MAROOCHYDORE 4558
PROJECT NAME GM1560AA - AREA 1 SAMPLING DATE 15/5/2009
NUMBER OF SAMPLES 48 SAMPLE TYPE SOIL SAMPLE FOR ACID SULFATE STUDY
PACKAGING SAMPLES LABELLED - INTACT
SAMPLES DISPOSED ON 1/9/2009
LOG-IN DATE 21 MAY 2009 LAB REF. LR21059.387

Page 1 of 1 Report Pages.

TEST METHODOLOGY FOR pH_f AND pH_{fox} AS PER QASSIT 2004 Laboratory Methods. Indications based on pH data only.
RATE: 0=none 1=slight 2=moderate 3=high 4=very high (steam evolved) visual observation at 0-5 minutes.
TEMP: Surface temperature rise (°C) oxidised sample at 5 minutes.

SAMPLE ID	Upper	Lower (m)	pH _f	pH _{fox}	change	RATE	TEMP	INDICATION
BH 95	0.25		4.7	1.2	-3.5	1	1	low TAA & high TPA & high sulphide/low buffer
BH 95	0.50		4.7	2.0	-2.7	1	1	low TAA & high TPA & sulphide possible
BH 95	0.75		4.8	3.5	-1.3	1	1	low TAA
BH 95	1.00		4.9	4.1	-0.8	1	1	low TAA & low sulphide
BH 95	1.25		4.9	4.0	-0.9	1	2	low TAA & low sulphide
BH 95	1.50		4.9	3.9	-1.0	1	0	low TAA
BH 95	1.75		4.9	4.2	-0.7	0	1	low TAA & low sulphide
BH 95	2.00		5.1	4.1	-1.0	0	1	low TAA
BH 95	2.25		5.1	4.4	-0.7	1	1	low TAA & low sulphide
BH 95	2.50		5.2	4.2	-1.0	1	1	low TAA
BH 95	2.75		5.5	3.9	-1.6	1	1	low TAA
BH 95	3.00		5.2	4.0	-1.2	1	1	low TAA
BH 95	3.25		5.1	3.7	-1.4	1	1	low TAA
BH 95	3.50		5.2	4.0	-1.2	1	0	low TAA
BH 95	3.75		5.1	4.1	-1.0	1	1	low TAA
BH 95	4.00		5.1	4.4	-0.7	1	1	low TAA & low sulphide
BH 96	0.25		4.5	2.0	-2.5	2	2	low TAA & high TPA & sulphide possible
BH 96	0.50		4.7	2.0	-2.7	1	1	low TAA & high TPA & sulphide possible
BH 96	0.75		5.4	3.7	-1.7	1	1	low TAA
BH 96	1.00		5.4	3.9	-1.5	0	1	low TAA
BH 96	1.25		5.5	3.9	-1.6	0	1	low TAA
BH 96	1.50		5.2	5.0	-0.2	0	1	low TAA & low TPA & low sulphide
BH 96	1.75		5.0	4.0	-1.0	0	1	low TAA
BH 96	2.00		5.0	3.8	-1.2	1	2	low TAA
BH 96	2.25		4.9	3.9	-1.0	1	1	low TAA
BH 96	2.50		4.8	4.1	-0.7	1	1	low TAA & low sulphide
BH 96	2.75		4.9	4.2	-0.7	1	1	low TAA & low sulphide
BH 96	3.00		4.6	4.1	-0.5	1	1	low TAA & low sulphide
BH 96	3.25		5.4	3.9	-1.5	1	1	low TAA
BH 96	3.50		4.9	3.7	-1.2	1	1	low TAA
BH 96	3.75		5.0	4.4	-0.6	1	2	low TAA & low sulphide
BH 96	4.00		5.0	4.2	-0.8	1	1	low TAA & low sulphide
BH 97	0.25		4.6	1.7	-2.9	1	2	low TAA & high TPA & sulphide possible
BH 97	0.50		4.6	1.8	-2.8	1	1	low TAA & high TPA & sulphide possible
BH 97	0.75		4.8	3.2	-1.6	1	2	low TAA & moderate TPA
BH 97	1.00		5.1	3.6	-1.5	0	1	low TAA
BH 97	1.25		5.1	3.9	-1.2	1	1	low TAA
BH 97	1.50		5.1	3.9	-1.2	1	1	low TAA
BH 97	1.75		5.1	4.1	-1.0	1	1	low TAA
BH 97	2.00		6.0	4.0	-2.0	0	1	low TAA
BH 97	2.25		5.0	4.0	-1.0	1	1	low TAA
BH 97	2.50		4.6	4.0	-0.6	1	0	low TAA & low sulphide
BH 97	2.75		5.0	3.9	-1.1	1	1	low TAA
BH 97	3.00		5.1	4.1	-1.0	1	0	low TAA
BH 97	3.25		5.2	4.4	-0.8	1	0	low TAA & low sulphide
BH 97	3.50		5.2	4.1	-1.1	1	1	low TAA
BH 97	3.75		5.2	4.4	-0.8	1	1	low TAA & low sulphide
BH 97	4.00		5.3	4.4	-0.9	1	0	low TAA & low sulphide

Signatory For and behalf of Bio-Track Pty Ltd

A.S.S. FIELD SCREEN ANALYSIS REPORT

CERTIFICATE OF ANALYSIS



Analysis By: **Bio-Track Pty Ltd** ABN 91 056 237 275 781 Mt. Glorious Road Highvale, Brisbane, Australia, 4520 Ph. 07 3289 7179 EMAIL pe@biotrack.com.au

DATE OF REPORT 01 JUNE 2009 Page 1 of 1 Report Pages.
CLIENT NAME MR LUKE CRAIG
CLIENT FIRM COFFEY GEOTECHNICS PTY LTD YOUR PROJECT/JOB REFERENCE GK1560AA - AREA 4
CLIENT ADDRESS PO BOX 5537 MAROOCHYDORE 4558
PROJECT NAME GK1560AA - AREA 4 SAMPLING DATE 15/5/2009
NUMBER OF SAMPLES 1 SAMPLE TYPE SOIL SAMPLE FOR ACID SULFATE STUDY
PACKAGING SAMPLES LABELLED - INTACT
SAMPLES DISPOSED ON 1/10/2009
LOG-IN DATE 01 JUNE 2009 LAB REF. LR01069.550

TEST METHODOLOGY FOR pH_f AND pH_{fox} AS PER QASSIT 2004 Laboratory Methods. Indications based on pH data only.
RATE: 0=none 1=slight 2=moderate 3=high 4=very high (steam evolved) visual observation at 0-5 minutes.
TEMP: Surface temperature rise (°C) oxidised sample at 5 minutes.

SAMPLE ID	Upper	Lower (m)	pH _f	pH _{fox}	change	RATE	TEMP	INDICATION
BH 65	1.0		5.0	3.8	-1.2	1	0	low TAA

Signatory For and behalf of Bio-Track Pty Ltd

A.S.S. FIELD SCREEN ANALYSIS REPORT

CERTIFICATE OF ANALYSIS



Analysis By: **Bio-Track Pty Ltd** ABN 91 056 237 275 781 Mt. Glorious Road Highvale, Brisbane, Australia, 4520 Ph. 07 3289 7179 EMAIL pe@biotrack.com.au

DATE OF REPORT 01 JUNE 2009
CLIENT NAME MR LUKE CRAIG
CLIENT FIRM COFFEY GEOTECHNICS PTY LTD YOUR PROJECT/JOB REFERENCE GM1560AA - AREA 1
CLIENT ADDRESS PO BOX 5537 MAROCHYDORE 4558
PROJECT NAME GM1560AA - AREA 1 SAMPLING DATE 15/5/2009
NUMBER OF SAMPLES 32 SAMPLE TYPE SOIL SAMPLE FOR ACID SULFATE STUDY
PACKAGING SAMPLES LABELLED - INTACT
SAMPLES DISPOSED ON 1/9/2009
LOG-IN DATE 21 MAY 2009 LAB REF. LR21059.394

Page 1 of 1 Report Pages.

TEST METHODOLOGY FOR pH_f AND pH_{fox} AS PER QASSIT 2004 Laboratory Methods. Indications based on pH data only.
RATE: 0=none 1=slight 2=moderate 3=high 4=very high (steam evolved) visual observation at 0-5 minutes.
TEMP: Surface temperature rise (°C) oxidised sample at 5 minutes.

SAMPLE ID	Upper	Lower (m)	pH _f	pH _{fox}	change	RATE	TEMP	INDICATION
BH 99	0.25		4.0	2.3	-1.7	3	3	high TPA
BH 99	0.50		4.2	2.8	-1.4	2	3	moderate TPA
BH 99	0.75		4.3	4.0	-0.3	0	5	low sulphide
BH 99	1.00		4.4	3.8	-0.6	0	5	low sulphide
BH 99	1.25		4.5	4.1	-0.4	0	6	low TAA & low sulphide
BH 99	1.50		4.4	4.1	-0.3	1	4	low sulphide
BH 99	1.75		4.6	4.1	-0.5	1	6	low TAA & low sulphide
BH 99	2.00		4.3	4.4	0.1	1	6	low sulphide
BH 99	2.25		4.5	4.1	-0.4	1	6	low TAA & low sulphide
BH 99	2.50		4.7	4.6	-0.1	1	4	low TAA & low TPA & low sulphide
BH 99	2.75		4.5	4.3	-0.2	1	3	low TAA & low sulphide
BH 99	3.00		4.5	4.6	0.1	0	5	low TAA & low TPA & low sulphide
BH 99	3.25		4.4	4.6	0.2	1	4	low TPA & low sulphide
BH 99	3.50		4.7	4.1	-0.6	1	5	low TAA & low sulphide
BH 99	3.75		4.6	4.3	-0.3	1	3	low TAA & low sulphide
BH 99	4.00		4.9	4.0	-0.9	1	2	low TAA & low sulphide
BH 101	0.25		4.1	2.8	-1.3	3	3	moderate TPA
BH 101	0.50		5.3	3.4	-1.9	2	5	low TAA & moderate TPA
BH 101	0.75		4.6	3.9	-0.7	2	5	low TAA & low sulphide
BH 101	1.00		4.7	4.1	-0.6	0	3	low TAA & low sulphide
BH 101	1.25		4.7	4.2	-0.5	1	3	low TAA & low sulphide
BH 101	1.50		4.5	4.2	-0.3	1	2	low TAA & low sulphide
BH 101	1.75		4.7	4.1	-0.6	1	2	low TAA & low sulphide
BH 101	2.00		4.6	4.0	-0.6	1	3	low TAA & low sulphide
BH 101	2.25		4.5	4.0	-0.5	0	0	low TAA & low sulphide
BH 101	2.50		4.4	4.2	-0.2	1	1	low sulphide
BH 101	2.75		4.8	3.9	-0.9	1	3	low TAA & low sulphide
BH 101	3.00		4.6	4.3	-0.3	1	3	low TAA & low sulphide
BH 101	3.25		5.0	4.2	-0.8	1	1	low TAA & low sulphide
BH 101	3.50		4.9	4.6	-0.3	0	0	low TAA & low TPA & low sulphide
BH 101	3.75		4.8	4.0	-0.8	0	1	low TAA & low sulphide
BH 101	4.00		4.7	4.4	-0.3	0	2	low TAA & low sulphide

Signatory For and behalf of Bio-Track Pty Ltd

DETERMINATION OF ACID SULFATE SOIL PROPERTIES



CERTIFICATE OF ANALYSIS

Analysis By: **Bio-Track Pty Ltd** ABN 91 056 237 275

781 Mt. Glorious Road Highvale, Brisbane, Australia, 4520 Ph. 07 3289 7179 Fx. 07 3289 7155

LAB REFERENCE LRO1059.479 DATE OF REPORT 06 MAY 2009 @21:14:46 Page 1 of 1 Report Pages.
CLIENT NAME MR LUKE CRAIG c/o COFFEY GEOTECHNICS PTY LTD PO BOX 5537 MAROOCHYDORE 4558
PROJECT NAME YOUR PROJECT/JOB REFERENCE GK1560AA
SAMPLING DATE 18/4/2009 NUMBER OF SAMPLES 6 Samples supplied by client SAMPLE TYPE:SOIL SAMPLE FOR ACID SULFATE STUDY
DATE RECEIVED 01 MAY 2009 PACKAGING SAMPLES LABELLED - INTACT Ground Oven Dry Samples DISPOSED ON 1/2/2010

Sample ID as received. METHODOLOGY: As per (DNR QASSIT May 2004), oven dried (85°C), >1000 um shell removed, fine grind. All reported values gravimetric, dry mass.
%SEQ (equivalent sulphur) calculated as moles TAA/624 + %S Cr + %sNAS - sANC/ 1.5 (sNAS included irrespective of pH).
LIME1 rates calculated to neutralise TPA (or TAA if >TPA)+ aS_RAS -ANC_E/1.5 LIME2 rates calculated to neutralise TAA + aS_POS or S_Cr + aS_RAS -ANC_BT/1.5
NB. Lime rates assume 97% lime neutralisation but DO NOT include any safety factors. Suggested factor=1.5-2. Rates are kg/ton. Multiply by bulk density to convert to kg/m3.
Fineness Factor (FF)=1.5 CBN POS= moles carbonate alkalinity released by oxidation assuming (Ca POS - Ca KCl) + (Mg POS - Mg KCl) is due to carbonate solution.
Blanks represent unmeasured values, zeros & <0.x represent measured values. If pH KCl>4.5 then s-RAS (calculated from acid extract) may be zero for undisturbed soil. Ca NAS is the acid reactive calcium calculated as the difference between 1 M KCl and 4 M HCl soluble Ca.

ID.	DEPTH	pH	pH	TPA	TSA	S KCL	S P	S POS	S Cr	S-NAS	s EQ	Ca KCl	Ca P	Mg KCL	Mg P	CBN POS	LIME1	LIME2	sANC_BT/FF	Ca NAS
Analytical Method Codes																				
	R.L.	KCL	ox	m/t	m/t	%	%	%	%	%	%	mg/kg	mg/kg	mg/kg	mg/kg	m/t	kg/t	kg/t	%	mg/kg
	23A	23B	23B	23F	23G	23H	23Ce	23De	23Ee	22B	s20Je	s	23Vh	23Wh	23Sm	23Tm	a23U&X	s19A2		
BH 44	0.50	4.82		8		<0.01	<0.01	<0.01	<0.01	<0.01	0.014	16			20			0		<10
BH 44	1.00	4.13		17		<0.01	<0.01	<0.01	<0.01	<0.01	0.028	8			155			1		<10
BH 44	1.50	4.52		1		<0.01	<0.01	<0.01	<0.01	<0.01	0.004	7			47			0		<10
BH 44	2.00	4.10		11		<0.01	<0.01	<0.01	<0.01	<0.01	0.018	10			98			1		<10
BH 44	2.50	4.40		7		<0.01	<0.01	<0.01	<0.01	<0.01	0.011	9			43			0		<10
BH 44	3.00	4.36		5		<0.01	<0.01	<0.01	<0.01	<0.01	0.009	9			44			0		<10

Signature *P. Edmund*

For and on behalf of Bio-Track Pty Ltd

DETERMINATION OF ACID SULFATE SOIL PROPERTIES



CERTIFICATE OF ANALYSIS

Analysis By: **Bio-Track Pty Ltd** ABN 91 056 237 275

781 Mt. Glorious Road Highvale, Brisbane, Australia, 4520 Ph. 07 3289 7179 Fx. 07 3289 7155

LAB REFERENCE LR01059-435 DATE OF REPORT 06 MAY 2009 @21:15:20
CLIENT NAME MR LUKE CRAIG c/o COFFEY GEOTECHNICS PTY LTD PO BOX 5537 MAROOCHYDORE 4558
PROJECT NAME GK1560AA YOUR PROJECT/JOB REFERENCE GK1560AA
SAMPLING DATE 18/4/2009 NUMBER OF SAMPLES 16 Samples supplied by client SAMPLE TYPE:SOIL SAMPLE FOR ACID SULFATE STUDY
DATE RECEIVED 01 MAY 2009 PACKAGING SAMPLES LABELLED - INTACT Ground Oven Dry Samples DISPOSED ON 1/2/2010

Page 1 of 1 Report Pages.

Sample ID as received. METHODOLOGY: As per (DNR QASSIT May 2004), oven dried (85°C), >1000 um shell removed, fine grind. ALL reported values gravimetric, dry mass.
%sEQ (equivalent sulphur) calculated as moles TAA/624 + %S Cr + %sNAS - sANC/ 1.5 (sNAS included irrespective of pH).
LIME1 rates calculated to neutralise TPA (or TAA if >TPA)+ aS_RAS -ANC_E/1.5 LIME2 rates calculated to neutralise TAA + aS_POS or S_Cr + aS_RAS -ANC_BT/1.5
NB. Lime rates assume 97% lime neutralisation but DO NOT include any safety factors. Suggested factor=1.5-2. Rates are kg/ton. Multiply by bulk density to convert to kg/m³.
Fineness Factor (FF)=1.5 CBN POS= moles carbonate alkalinity released by oxidation assuming (Ca POS - Ca KCl) + (Mg POS - Mg KCl) is due to carbonate solution.
Blanks represent unmeasured values, zeros & <0.x represent measured values. If pH KCl>4.5 then s-RAS (calculated from acid extract) may be zero for undisturbed soil. Ca NAS is the acid reactive calcium calculated as the difference between 1 M KCl and 4 M HCl soluble Ca.

ID.	DEPTH	pH	pH	ox	TPA	TSA	S KCl	S P	S POS	S Cr	S-NAS	s EQ	Ca KCl	Ca P	Mg KCl	Mg P	CBN	POS	LIME1	LIME2	sANC_BT/FF	Ca NAS
R.L.		23A	23B	23F	23G	23H	23Ce	23De	23Ee	22B	s20Je	s	23Vh	23Wh	23Sm	mg/kg	mg/kg	m/t	kg/t	kg/t	%	mg/kg
Analytical Method Codes																		23tm	a23u8X		s19A2	
BH 17 0.25		4.24		21			0.01			0.01	<0.01	0.047	28		103				1			<10
BH 17 0.75		4.35		22			<0.01			<0.01	<0.01	0.040	166		71				1			38
BH 17 1.25		4.69		12			<0.01			<0.01	<0.01	0.020	35		68				1			<10
BH 17 1.75		4.38		10			<0.01			<0.01	<0.01	0.017	12		107				1			<10
BH 17 2.25		4.41		18			0.01			<0.01	<0.01	0.034	12		100				1			<10
BH 17 2.75		4.22		21			<0.01			<0.01	<0.01	0.034	10		104				1			<10
BH 17 3.25		4.22		15			<0.01			<0.01	<0.01	0.024	10		97				1			<10
BH 17 3.75		4.20		17			<0.01			<0.01	<0.01	0.027	12		98				1			<10
BH 18 0.25		4.46		47			<0.01			<0.01	<0.01	0.079	55		35				3			21
BH 18 0.75		4.83		18			<0.01			<0.01	<0.01	0.031	24		21				1			<10
BH 18 1.25		4.44		25			<0.01			<0.01	<0.01	0.040	13		100				1			<10
BH 18 1.75		4.28		24			<0.01			<0.01	<0.01	0.038	10		77				1			<10
BH 18 2.25		4.18		26			<0.01			<0.01	<0.01	0.042	11		92				1			<10
BH 18 2.75		4.21		12			<0.01			<0.01	<0.01	0.020	12		88				1			<10
BH 18 3.25		4.11		22			<0.01			<0.01	<0.01	0.036	14		116				1			<10
BH 18 3.75		4.13		22			<0.01			<0.01	<0.01	0.036	17		122				1			<10

Signatory

P. Polunin

For and on behalf of Bio-Track Pty Ltd

DETERMINATION OF ACID SULFATE SOIL PROPERTIES



CERTIFICATE OF ANALYSIS

Analysis By: Bio-Track Pty Ltd ABN 91 056 237 275

781 Mt. Glorious Road Highvale, Brisbane, Australia, 4520 Ph. 07 3289 7179 Fx. 07 3289 7155

LAB REFERENCE: LR01059.482 DATE OF REPORT: 06 MAY 2009 @21:15:58
CLIENT NAME: MR LUKE CRAIG c/o COFFEY GEOTECHNICS PTY LTD PO BOX 5537 MAROOCHYDORE 4558
PROJECT NAME: GK1560AA YOUR PROJECT/JOB REFERENCE: GK1560AA
SAMPLING DATE: 18/4/2009 NUMBER OF SAMPLES: 16 Samples supplied by client SAMPLE TYPE: SOIL SAMPLE FOR ACID SULFATE STUDY
DATE RECEIVED: 01 MAY 2009 PACKAGING: SAMPLES LABELLED - INTACT Ground Oven Dry Samples DISPOSED ON 1/2/2010

Page 1 of 1 Report Pages.

Sample ID as received. METHODOLOGY: As per (DNR QASSIT May 2004), oven dried (85°C), >1000 um shell removed, fine grind. ALL reported values gravimetric, dry mass.
%SEQ (equivalent sulphur) calculated as moles TAA/624 + %S Cr + %sNAS - sANC/ 1.5 (sNAS included irrespective of pH).
LIME1 rates calculated to neutralise TPA (or TAA if >TPA)+ aS_RAS -ANC_E/1.5 LIME2 rates calculated to neutralise TAA + aS_POS or S_Cr + aS_RAS -ANC_BT/1.5
NB. Lime rates assume 97% lime neutralisation but DO NOT include any safety factors. Suggested factor=1.5-2. Rates are kg/ton. Multiply by bulk density to convert to kg/m3.
Fineness Factor (FF)=1.5 CBN POS= moles carbonate alkalinity released by oxidation assuming (Ca POS - Ca KCl) + (Mg POS - Mg KCl) is due to carbonate solution.
Blanks represent unmeasured values, zeros & <0.x represent measured values. If pH KCl>4.5 then s-RAS (calculated from acid extract) may be zero for undisturbed soil. Ca NAS is the acid reactive calcium calculated as the difference between 1 M KCl and 4 M HCl soluble Ca.

ID.	DEPTH	pH	pH	TPA	TSA	S KCl	S P	S POS	S Cr	s-NAS	s EQ	Ca KCl	Ca P	Mg KCl	Mg P	CBN POS	LIME1	LIME2	sANC_BT/FF	Ca NAS
Analytical Method Codes																				
	R.L.	KCL	ox	m/t	m/t	%	%	%	%	%	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	kg/t	kg/t	%	mg/kg
		23A	23B	23F	23G	23H	23Ce	23De	23Ee	22B	s20Je	23Vh	23Wh	23Sm	23Tm	a23U&X			s19A2	
BH 21	0.50	4.77		6			<0.01	<0.01	<0.01	<0.01	0.009	19	20	20	0					<10
BH 21	1.00	4.76		24			<0.01	<0.01	<0.01	<0.01	0.041	16	21	21	1					<10
BH 21	1.50	4.26		26			<0.01	<0.01	<0.01	<0.01	0.042	10	89	89	1					<10
BH 21	2.00	3.89		42			<0.01	<0.01	<0.01	<0.01	0.067	9	173	173	2					<10
BH 21	2.50	3.99		30			<0.01	<0.01	<0.01	<0.01	0.048	8	116	116	2					<10
BH 21	3.00	3.70		52			<0.01	<0.01	<0.01	<0.01	0.084	36	227	227	3					<10
BH 21	3.50	3.77		39			<0.01	<0.01	<0.01	<0.01	0.063	33	190	190	2					<10
BH 21	4.00	3.92		24			<0.01	<0.01	<0.01	<0.01	0.039	27	125	125	1					18
BH 23	0.50	4.71		9			<0.01	<0.01	<0.01	<0.01	0.015	11	18	18	0					<10
BH 23	1.00	4.72		17			<0.01	<0.01	<0.01	<0.01	0.027	11	20	20	1					<10
BH 23	1.50	3.85		26			<0.01	<0.01	<0.01	<0.01	0.042	10	155	155	1					<10
BH 23	2.00	3.87		21			<0.01	<0.01	<0.01	<0.01	0.034	8	109	109	1					<10
BH 23	2.50	3.90		24			<0.01	<0.01	<0.01	<0.01	0.040	9	121	121	1					<10
BH 23	3.00	3.66		41			<0.01	<0.01	<0.01	<0.01	0.066	19	174	174	2					<10
BH 23	3.50	3.80		29			<0.01	<0.01	<0.01	<0.01	0.047	22	130	130	2					<10
BH 23	4.00	3.90		23			<0.01	<0.01	<0.01	<0.01	0.037	20	95	95	1					<10

P. Edmunds

Signature

For and on behalf of Bio-Track Pty Ltd

DETERMINATION OF ACID SULFATE SOIL PROPERTIES



CERTIFICATE OF ANALYSIS

Analysis By: **Bio-Track Pty Ltd** ABN 91 056 237 275

781 Mt. Glorious Road Highvale, Brisbane, Australia, 4520 Ph. 07 3289 7179 Ex. 07 3289 7155

LAB REFERENCE LRO1059.486 DATE OF REPORT 06 MAY 2009 @21:28:41 Page 1 of 1 Report Pages.
CLIENT NAME MR LUKE CRAIG C/o COFFEY GEOTECHNICS PTY LTD PO BOX 5537 MAROOCHYDORE 4558
PROJECT NAME GK1560AA YOUR PROJECT/JOB REFERENCE GK1560AA
SAMPLING DATE 18/4/2009 NUMBER OF SAMPLES 16 Samples supplied by client SAMPLE TYPE:SOIL SAMPLE FOR ACID SULFATE STUDY
DATE RECEIVED 01 MAY 2009 PACKAGING SAMPLES LABELLED - INTACT Ground Oven Dry Samples DISPOSED ON 1/2/2010

Sample ID as received. METHODOLOGY: As per (DNR QASSIT May 2004), oven dried (85°C), >1000 um shell removed, fine grind. All reported values gravimetric, dry mass.
LIME1 rates calculated to neutralise TPA (or TAA if >TPA)+ as_RAS -ANC_E/1.5 LIME2 rates calculated to neutralise TAA + as_POS or S_Cr + as_RAS -ANC_BT/1.5
NB. Lime rates assume 97% lime neutralisation but DO NOT include any safety factors. Suggested factor=1.5-2. Rates are kg/ton. Multiply by bulk density to convert to kg/m3.
Fineness Factor (FF)=1.5 CBN POS= moles carbonate alkalinity released by oxidation assuming (Ca POS - Ca KCl) + (Mg POS - Mg KCl) is due to carbonate solution.
Blanks represent unmeasured values, zeros & <0. x represent measured values. If pH KCl>4.5 then s-RAS (calculated from acid extract) may be zero for undisturbed soil. Ca NAS is the acid reactive calcium calculated as the difference between 1 M KCl and 4 M HCl soluble Ca.

ID.	DEPTH	pH	pH	ox	TAA	TPA	TSA	S KCl	S P	S POS	S Cr	s	EQ	Ca KCl	Ca P	Mg KCl	Mg P	CBN	POS	LIME1	LIME2	sANC_BT/FF	Ca NAS
Analytical	Method	Codes	23A	23B	23F	23G	23H	23Ce	23De	23Ee	22B	s	%	mg/kg	mg/kg	mg/kg	mg/kg	m/t	m/t	kg/t	kg/t	%	mg/kg
BH 24 0.25											<0.01	0.002											
BH 24 0.75											<0.01	0.002											
BH 24 1.25											<0.01	0.001											
BH 24 1.75											<0.01	0.000											
BH 24 2.25											<0.01	0.000											
BH 24 2.75											<0.01	0.000											
BH 24 3.25											<0.01	0.000											
BH 24 3.75											<0.01	0.000											
BH 29 0.25											<0.01	0.000											
BH 29 0.75											<0.01	0.000											
BH 29 1.25											<0.01	0.000											
BH 29 1.75											<0.01	0.001											
BH 29 2.25											<0.01	0.000											
BH 29 2.75											<0.01	0.000											
BH 29 3.25											<0.01	0.000											
BH 29 3.75											<0.01	0.000											

INTERIM REPORT: FULL TEST RESULTS PENDING

P. Edwards

Signatory

For and on behalf of Bio-Track Pty Ltd

DETERMINATION OF ACID SULFATE SOIL PROPERTIES



CERTIFICATE OF ANALYSIS

Analysis By: **Bio-Track Pty Ltd** ABN 91 056 237 275

781 Mt. Glorious Road Highvale, Brisbane, Australia, 4520 Ph. 07 3289 7179 Fx. 07 3289 7155

LAB REFERENCE: LR01059.486 DATE OF REPORT: 11 MAY 2009 @08:59:21 Page 1 of 1 Report Pages.
CLIENT NAME: MR LUKE CRAIG c/o COFFEY GEOTECHNICS PTY LTD PO BOX 5537 MAROOCHYDORE 4558
PROJECT NAME: GK1560AA YOUR PROJECT/JOB REFERENCE GK1560AA
SAMPLING DATE: 18/4/2009 NUMBER OF SAMPLES: 16 SAMPLE TYPE: SOIL SAMPLE FOR ACID SULFATE STUDY
DATE RECEIVED: 01 MAY 2009 PACKAGING: SAMPLES LABELLED - INTACT Ground Oven Dry Samples DISPOSED ON 1/2/2010

Sample ID as received. METHODOLOGY: As per (DNR QASSIT May 2004), oven dried (85°C), >1000 um shell removed, fine grind. ALL reported values gravimetric, dry mass.
%sEQ (equivalent sulphur) calculated as moles TAA/624 + %S Cr + %sNAS - sANC/ 1.5 (sNAS included irrespective of pH).
LIME1 rates calculated to neutralise TPA (or TAA if >TPA)+ as_RAS -ANC_E/1.5 LIME2 rates calculated to neutralise TAA + as_POS or s_Cr + as_RAS -ANC_BT/1.5
NB. Lime rates assume 97% lime neutralisation but DO NOT include any safety factors. Suggested factor=1.5-2. Rates are kg/ton. Multiply by bulk density to convert to kg/m³.
Fineness Factor (FF)=1.5 CBN POS= moles carbonate alkalinity released by oxidation assuming (Ca POS - Ca KCl) + (Mg POS - Mg KCl) is due to carbonate solution.
Blanks represent unmeasured values, zeros & <0.x represent measured values. If pH KCl>4.5 then s-RAS (calculated from acid extract) may be zero for undisturbed soil. Ca NAS is the acid reactive calcium calculated as the difference between 1 M KCl and 4 M HCl soluble Ca.

ID.	DEPTH R.L.	pH KCL	pH ox	TAA m/t	TPA m/t	TSA m/t	S KCL %	S POS %	S P %	S Cr %	S NAS %	s EQ %	Ca KCL mg/kg	Ca P mg/kg	Mg KCL mg/kg	Mg P mg/kg	CBN POS m/t	LIME1 kg/t	LIME2 kg/t	sANC_BT/FF %	Ca NAS mg/kg
Analytical Method Codes																					
BH 24 0.25		4.59	23A	2	23G	<0.01	23Ce	23De	23Ee	22B	s20Je	0.005	26	23Wh	18	0					27
BH 24 0.75		4.48		16		<0.01				<0.01	<0.01	0.027	15		20	1					<10
BH 24 1.25		4.31		68		<0.01				<0.01	<0.01	0.110	10		90	4					12
BH 24 1.75		4.35		22		<0.01				<0.01	<0.01	0.035	13		100	1					19
BH 24 2.25		4.35		17		<0.01				<0.01	<0.01	0.028	14		93	1					<10
BH 24 2.75		4.30		18		<0.01				<0.01	<0.01	0.030	14		119	1					<10
BH 24 3.25		4.18		23		<0.01				<0.01	<0.01	0.038	15		141	1					<10
BH 24 3.75		4.23		22		<0.01				<0.01	<0.01	0.036	16		150	1					15
BH 29 0.25		4.85		<1		<0.01				<0.01	<0.01	0.000	30		19	0					<10
BH 29 0.75		4.89		25		<0.01				<0.01	<0.01	0.041	23		18	1					12
BH 29 1.25		4.94		31		<0.01				<0.01	<0.01	0.051	16		45	2					19
BH 29 1.75		5.11		22		<0.01				<0.01	<0.01	0.040	25		26	1					19
BH 29 2.25		5.19		33		<0.01				<0.01	0.01	0.064	20		21	2					11
BH 29 2.75		4.89		14		<0.01				<0.01	<0.01	0.024	29		67	1					<10
BH 29 3.25		4.31		21		<0.01				<0.01	<0.01	0.034	14		106	1					<10
BH 29 3.75		4.32		21		<0.01				<0.01	<0.01	0.033	14		121	1					11

Signatory

P. Coleman

For and on behalf of Bio-Track Pty Ltd

DETERMINATION OF ACID SULFATE SOIL PROPERTIES



CERTIFICATE OF ANALYSIS

Analysis By: **Bio-Track Pty Ltd** ABN 91 056 237 275

781 Mt. Glorious Road Highvale, Brisbane, Australia, 4520 Ph. 07 3289 7179 Fx. 07 3289 7155

Page 1 of 3 Report Pages.

LAB REFERENCE: LR21059.401 DATE OF REPORT: 01 JUNE 2009 @12:09:37

CLIENT NAME: MR LUKE CRAIG c/o COFFEY GEOTECHNICS PTY LTD PO BOX 5537 MAROOCHYDORE 4558

PROJECT NAME: GM1560AA - AREA 1 YOUR PROJECT/JOB REFERENCE: GM1560AA - AREA 1

SAMPLE DATE: 15/5/2009 NUMBER OF SAMPLES: 52 Samples supplied by client SAMPLE TYPE: SOIL SAMPLE FOR ACID SULFATE STUDY

DATE RECEIVED: 21 MAY 2009 PACKAGING: SAMPLES LABELLED - INTACT Ground Oven Dry Samples DISPOSED ON 1/2/2010

Sample ID as received. METHODOLOGY: As per (DNR QASSIT May 2004), oven dried (85°C), >1000 um shell removed, fine grind. ALL reported values gravimetric, dry mass. %SE (equivalent sulphur) calculated as moles TAA/624 + %S Cr + %SNAS - SANC/1.5 (SNAS included irrespective of pH).

LIME1 rates calculated to neutralise TPA (or TAA if >TPA) + as_RAS - ANC_E/1.5 LIME2 rates calculated to neutralise TAA + as_POS or S_Cr + as_RAS - ANC_BT/1.5

NB. Lime rates assume 97% lime neutralisation but DO NOT include any safety factors. Suggested factor=1.5-2. Rates are kg/ton. Multiply by bulk density to convert to kg/m³. Fineness Factor (FF)=1.5 CBN POS= moles carbonate alkalinity released by oxidation assuming (Ca POS - Ca KCl) + (Mg POS - Mg KCl) is due to carbonate solution.

Blanks represent unmeasured values, zeros & <0.x represent measured values. If pH KCl>4.5 then s-RAS (calculated from acid extract) may be zero for undisturbed soil. Ca NAS is the acid reactive calcium calculated as the difference between 1 M KCl and 4 M HCl soluble Ca.

ID.	DEPTH m	pH KCL	pH ox	TPA m/t	TSA m/t	S KCL %	S P %	S POS %	S Cr %	s-NAS %	s %	Eq Ca KCl mg/kg	Ca P mg/kg	Mg KCL mg/kg	Mg P mg/kg	LIME1 kg/t	LIME2 kg/t	sANC_BT/FF %	Ca NAS mg/kg
Analytical Method Codes		23A	23B	23F	23G	23H	23Ce	23De	23Ee	22B	s20Je	23Vh	23Wh	23Sm	23Tm	a23U&X			
BH 89 0.50		5.61		3			<0.01	<0.01	<0.01	<0.01	0.010	25		36		0			<10
BH 89 1.0		4.19		70			<0.01	<0.01	<0.01	<0.01	0.113	19		189		4			<10
BH 89 1.5		4.32		50			<0.01	<0.01	<0.01	<0.01	0.083	18		160		3			<10
BH 89 2.0		4.50		30			<0.01	<0.01	<0.01	<0.01	0.050	9		105		2			<10
BH 89 2.5		4.27		53			<0.01	<0.01	<0.01	<0.01	0.090	19		178		3			<10
BH 89 3.0		4.41		34			<0.01	<0.01	<0.01	<0.01	0.057	11		193		2			<10
BH 94 0.50		5.41		6			<0.01	<0.01	<0.01	<0.01	0.015	10		33		0			<10
BH 94 1.0		5.63		3			<0.01	<0.01	<0.01	<0.01	0.009	23		166		0			<10
BH 94 1.5		5.35		3			<0.01	<0.01	<0.01	<0.01	0.007	65		456		0			12
BH 94 2.0		5.97		<1			<0.01	<0.01	<0.01	<0.01	0.004	85		374		0			14
BH 94 2.5		6.09		<1			<0.01	<0.01	<0.01	<0.01	0.004	101		389		0			15
BH 94 3.0		6.80		0			<0.01	<0.01	<0.01	<0.01	-0.001	140		356		-0	<0.01		41
BH 95 0.50		4.54		23			<0.01	<0.01	<0.01	<0.01	0.042	11		22		1			<10
BH 95 1.0		5.36		18			<0.01	<0.01	<0.01	<0.01	0.047	8		16		2			<10
BH 95 1.5		5.26		27			<0.01	<0.01	<0.01	<0.01	0.053	11		17		2			<10
BH 95 2.0		4.89		25			<0.01	<0.01	<0.01	<0.01	0.043	11		65		1			<10
BH 95 2.5		4.87		25			<0.01	<0.01	<0.01	<0.01	0.042	9		96		1			<10
BH 95 3.0		4.76		33			<0.01	<0.01	<0.01	<0.01	0.054	11		119		2			<10
BH 95 3.5		4.83		17			<0.01	<0.01	<0.01	<0.01	0.029	20		64		1			<10
BH 95 4.0		4.55		46			0.02	<0.01	<0.01	<0.01	0.077	32		167		2			<10
BH 96 0.50		4.74		17			<0.01	<0.01	<0.01	<0.01	0.030	22		20		1			66
BH 96 1.0		5.55		4			<0.01	<0.01	<0.01	<0.01	0.011	9		14		0			<10
BH 96 1.50		5.58		<1			<0.01	<0.01	<0.01	<0.01	0.004	20		17		0			<10
BH 96 2.0		4.59		23			<0.01	<0.01	<0.01	<0.01	0.040	11		38		1			<10

Signature

For and on behalf of Bio-Track Pty Ltd

P. Edmunds

DETERMINATION OF ACID SULFATE SOIL PROPERTIES



CERTIFICATE OF ANALYSIS

Analysis By: Bio-Track Pty Ltd ABN 91 056 237 275

781 Mt. Glorious Road Highvale, Brisbane, Australia, 4520 Ph. 07 3289 7179 Fx. 07 3289 7155

LAB REFERENCE: LR21059.401 DATE OF REPORT: 01 JUNE 2009 @12:09:48
CLIENT NAME: MR LUKE CRAIG c/o COFFEY GEOTECHNICS PTY LTD PO BOX 5537 MAROOCHYDORE 4558
PROJECT NAME: GM1560AA - AREA 1 YOUR PROJECT/JOB REFERENCE: GM1560AA - AREA 1
SAMPLING DATE: 15/5/2009 NUMBER OF SAMPLES: 52 Samples supplied by client SAMPLE TYPE: SOIL SAMPLE FOR ACID SULFATE STUDY
DATE RECEIVED: 21 MAY 2009 PACKAGING: SAMPLES LABELLED - INTACT Ground Oven Dry Samples DISPOSED ON 1/2/2010

Page 2 of 3 Report Pages.

Sample ID as received. METHODOLOGY: As per (DNR QASSIT May 2004), oven dried (85°C), >1000 um shell removed, fine grind. ALL reported values gravimetric, dry mass.
%SEQ (equivalent sulphur) calculated as moles TAA/624 + %S Cr + %sNAS - sANC/1.5 (sNAS included irrespective of pH).
LIME1 rates calculated to neutralise TPA (or TAA if >TPA) + aS_RAS - ANC_E/1.5 LIME2 rates calculated to neutralise TAA + aS_POS or S_Cr + aS_RAS - ANC_BT/1.5
NB. Lime rates assume 97% lime neutralisation but DO NOT include any safety factors. Suggested factor=1.5-2. Rates are kg/ton. Multiply by bulk density to convert to kg/m³.
Fineness Factor (FF)=1.5 CBN POS= moles carbonate alkalinity released by oxidation assuming (Ca POS - Ca KCl) + (Mg POS - Mg KCl) is due to carbonate solution.
Blanks represent unmeasured values, zeros & <0.x represent measured values. If pH KCl>4.5 then s-RAS (calculated from acid extract) may be zero for undisturbed soil. Ca NAS is the acid reactive calcium calculated as the difference between 1 M KCl and 4 M HCl soluble Ca.

ID.	DEPTH m	pH KCL	pH ox	TPA m/t	TSA m/t	S P %	S POS %	S Cr %	s-NAS %	Ca KCl mg/kg	Ca P mg/kg	Mg KCl mg/kg	Mg P mg/kg	LIME1 kg/t	LIME2 kg/t	sANC_BT/FF %	Ca NAS mg/kg
Analytical Method Codes																	
		23A	23B	23F	23G	23H	23Ce	23De	23Ee	22B	s20Je	s	23Vh	23Wh	23Sm	23Tm	a23U&X
BH 96 2.5		4.38		39			<0.01	<0.01	<0.01	<0.01	0.069	19	72		2		<10
BH 96 3.0		4.36		44			0.01	<0.01	<0.01	<0.01	0.075	16	103		2		<10
BH 96 3.5		4.55		27			<0.01	<0.01	<0.01	<0.01	0.047	9	61		2		23
BH 96 4.0		4.54		30			<0.01	<0.01	<0.01	<0.01	0.052	9	64		2		<10
BH 97 0.50		4.68		18			<0.01	<0.01	<0.01	<0.01	0.032	14	40		1		<10
BH 97 1.0		4.81		22			<0.01	<0.01	<0.01	<0.01	0.039	8	62		1		<10
BH 97 1.5		4.46		27			<0.01	<0.01	<0.01	<0.01	0.046	7	126		1		23
BH 97 2.0		4.38		41			<0.01	<0.01	<0.01	<0.01	0.068	9	179		2		<10
BH 97 2.5		4.36		43			<0.01	<0.01	<0.01	<0.01	0.071	11	200		2		<10
BH 97 3.0		4.48		29			<0.01	<0.01	<0.01	<0.01	0.047	11	179		2		<10
BH 97 3.5		4.23		19			<0.01	<0.01	<0.01	<0.01	0.031	15	134		1		<10
BH 97 4.0		4.38		19			<0.01	<0.01	<0.01	<0.01	0.031	21	136		1		<10
BH 99 0.50		4.50		13			<0.01	<0.01	<0.01	<0.01	0.024	9	23		1		<10
BH 99 1.0		4.18		48			<0.01	<0.01	<0.01	<0.01	0.079	8	107		3		32
BH 99 1.5		4.08		67			0.01	<0.01	<0.01	<0.01	0.109	8	171		4		<10
BH 99 2.0		4.15		46			<0.01	<0.01	<0.01	<0.01	0.075	10	139		2		<10
BH 99 2.5		3.99		83			0.01	<0.01	<0.01	<0.01	0.134	32	214		4		<10
BH 99 3.0		4.25		23			<0.01	<0.01	<0.01	<0.01	0.037	17	78		1		<10
BH 99 3.5		4.23		26			<0.01	<0.01	<0.01	<0.01	0.042	16	100		1		<10
BH 99 4.0		4.22		31			<0.01	<0.01	<0.01	<0.01	0.050	18	116		2		<10
BH 101 0.50		5.05		15			<0.01	<0.01	<0.01	<0.01	0.028	28	19		1		<10
BH 101 1.0		4.79		9			<0.01	<0.01	<0.01	<0.01	0.014	34	74		0		<10
BH 101 1.5		4.15		32			<0.01	<0.01	<0.01	<0.01	0.052	61	207		2		<10
BH 101 2.0		4.09		40			<0.01	<0.01	<0.01	<0.01	0.064	19	130		2		<10

Signatory

P. Edmund

For and on behalf of Bio-Track Pty Ltd

DETERMINATION OF ACID SULFATE SOIL PROPERTIES



CERTIFICATE OF ANALYSIS

Analysis By: **Bio-Track Pty Ltd** ABN 91 056 237 275

781 Mt. Glorious Road Highvale, Brisbane, Australia, 4520 Ph. 07 3289 7179 Fx. 07 3289 7155

Page 2 of 3 Report Pages.

LAB REFERENCE: LR21059.401 DATE OF REPORT: 01 JUNE 2009 @12:10:00
 CLIENT NAME: MR LUKE CRAIG c/o COFFEY GEOTECHNICS PTY LTD PO BOX 5537 MAROOCHYDORE 4558
 PROJECT NAME: GM1560AA - AREA 1 YOUR PROJECT/JOB REFERENCE: GM1560AA - AREA 1
 SAMPLING DATE: 15/5/2009 NUMBER OF SAMPLES: 52 Samples supplied by client SAMPLE TYPE: SOIL SAMPLE FOR ACID SULFATE STUDY
 DATE RECEIVED: 21 MAY 2009 PACKAGING: SAMPLES LABELLED - INTACT Ground Oven Dry Samples DISPOSED ON 1/2/2010

Sample ID as received. METHODOLOGY: As per (DNR QASSIT May 2004), oven dried (85°C), >1000 um shell removed, fine grind. All reported values gravimetric, dry mass.
 %sEq (equivalent sulphur) calculated as moles TAA/624 + %S Cr + %sNAS - sANC/ 1.5 (sNAS included irrespective of pH).
 LIME1 rates calculated to neutralise TPA (or TAA if >TPA) + as_RAS -ANC_E/1.5 LIME2 rates calculated to neutralise TAA + as_POS or S_Cr + as_RAS -ANC_BT/1.5
 NB. Lime rates assume 97% lime neutralisation but DO NOT include any safety factors. Suggested factor=1.5-2. Rates are kg/ton. Multiply by bulk density to convert to kg/m³.
 Fineness Factor (FF)=1.5 CBN POS= moles carbonate alkalinity released by oxidation assuming (Ca POS - Ca KCl) + (Mg POS - Mg KCl) is due to carbonate solution.
 Blanks represent unmeasured values, zeros & <0.x represent measured values. If pH KCl>4.5 then s-RAS (calculated from acid extract) may be zero for undisturbed soil. Ca NAS is the acid reactive calcium calculated as the difference between 1 M KCl and 4 M HCl soluble Ca.

ID.	DEPTH m	pH KCL 23A	pH ox 23B	TAA m/t 23F	TPA m/t 23G	TSA m/t 23H	S KCL % 23Ce	S P % 23De	S POS % 23Ee	S Cr % 22B	s-NAS % s20Je	s EQ % 23Vh	Ca KCL mg/kg 23Vh	Ca P mg/kg 23Wh	Mg KCL mg/kg 23Sm	Mg P mg/kg 23Tm	CBN POS m/t a230&X	LIME1 kg/t	LIME2 kg/t	sANC_BT/FF % s19A2	Ca NAS mg/kg
Analytical Method Codes																					
BH 101	2.5	4.04		45			<0.01		<0.01	<0.01	<0.01	0.074	18		145			2		<10	
BH 101	3.0	4.05		48			<0.01		<0.01	<0.01	<0.01	0.076	27		215			2		<10	
BH 101	3.5	4.13		25			<0.01		<0.01	<0.01	<0.01	0.040	39		280			1		11	
BH 101	4.0	3.80		10			<0.01		<0.01	<0.01	<0.01	0.017	3		15			1		17	

Signatory 

For and on behalf of Bio-Track Pty Ltd

DETERMINATION OF ACID SULFATE SOIL PROPERTIES



CERTIFICATE OF ANALYSIS

Analysis By: **Bio-Track Pty Ltd** ABN 91 056 237 275

781 Mt. Glorious Road Highvale, Brisbane, Australia, 4520 Ph. 07 3289 7179 Fx. 07 3289 7155

Page 1 of 2 Report Pages.

LAB REFERENCE: LR21059.485 DATE OF REPORT: 02 JUNE 2009 a13:14:43
 CLIENT NAME: MR LUKE CRAIG c/o COFFEY GEOTECHNICS PTY LTD PO BOX 5537 MAROOCHYDORE 4558
 PROJECT NAME: GK1560AA - AREA 4 YOUR PROJECT/JOB REFERENCE: GK1560AA - AREA 4
 SAMPLING DATE: 15/5/2009 NUMBER OF SAMPLES: 45 Samples supplied by client SAMPLE TYPE: SOIL SAMPLE FOR ACID SULFATE STUDY
 DATE RECEIVED: 21 MAY 2009 PACKAGING: SAMPLES LABELLED - INTACT Ground Oven Dry Samples DISPOSED ON 1/2/2010

Sample ID as received. METHODOLOGY: As per (DNR QASSIT May 2004), oven dried (85°C), >1000 um shell removed, fine grind. All reported values gravimetric, dry mass.
 %sEq (equivalent sulphur) calculated as moles TAA/624 + %S Cr + %sNAS - sANC/ 1.5 (sNAS included irrespective of pH).
 LIME1 rates calculated to neutralise TPA (or TAA if >TPA) + aS_RAS -ANC.E/1.5 LIME2 rates calculated to neutralise TAA + aS_POS or S_Cr + aS_RAS -ANC_BT/1.5
 NB. Lime rates assume 97% lime neutralisation but DO NOT include any safety factors. Suggested factor=1.5-2. Rates are kg/ton. Multiply by bulk density to convert to kg/m³.
 Fineness Factor (FF)=1.5 CBN POS= moles carbonate alkalinity released by oxidation assuming (Ca POS - Ca KCl) + (Mg POS - Mg KCl) is due to carbonate solution.
 Blanks represent unmeasured values, zeros & <0.x represent measured values. If pH KCl>4.5 then s-RAS (calculated from acid extract) may be zero for undisturbed soil. Ca NAS is the acid reactive calcium calculated as the difference between 1 M KCl and 4 M HCl soluble Ca.

ID.	DEPTH m	pH KCL 23A	pH ox 23B	TAA m/t 23F	TPA m/t 23G	TSA m/t 23H	S KCL %	S P %	S POS %	S Cr %	S NAS %	s EQ %	Ca KCL mg/kg 23Vh	Ca P mg/kg 23Wh	Mg KCL mg/kg 23Sm	Mg P mg/kg 23Tm	CBN m/t a23U&X	LIME1 kg/t	LIME2 kg/t	sANC_BT/FF %	Ca NAS mg/kg s19A2
BH 4	0.50	5.37		2		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.005	23	17	17			0			<10
BH 4	1.0	4.80		36		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.061	11	17	17			2			<10
BH 4	1.5	4.56		37		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.061	9	95	95			2			<10
BH 4	2.0	4.59		23		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.038	8	61	61			1			<10
BH 4	2.5	4.69		18		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.029	34	82	82			1			<10
BH 4	3.0	4.34		40		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.065	62	175	175			2			<10
BH 4	3.5	4.53		31		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.050	71	153	153			2			12
BH 4	4.0	4.12		45		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.074	134	257	257			2			14
BH 4	4.5	4.39		33		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.054	153	248	248			2			<10
BH 4	5.0	4.45		28		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.046	158	233	233			1			<10
BH 4	5.75	4.31		23		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.039	500	603	603			1			39
BH 65	0.50	4.32		29		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.048	35	83	83			2			<10
BH 65	1.0	4.12		31		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.052	295	815	815			2			28
BH 65	1.5	4.32		19		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.033	468	1355	1355			1			41
BH 65	2.0	4.62		17		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.040	464	1215	1215			1			45
BH 65	2.5	4.85		10		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.025	514	1232	1232			1			42
BH 65	3.0	6.32		2		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.005	687	1259	1259			0			69
BH 69	0.50	4.46		24		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.039	41	78	78			1			12
BH 69	1.0	5.20		11		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.019	17	22	22			1			<10
BH 69	1.5	5.32		13		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.025	33	76	76			1			<10
BH 69	2.0	5.17		5		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.009	15	39	39			0			17
BH 69	2.5	4.67		24		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.038	85	278	278			1			13
BH 69	3.0	4.54		22		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.035	130	385	385			1			19
BH 69	3.5	5.16		5		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.009	341	871	871			0			25

For and on behalf of Bio-Track Pty Ltd

Signature

DETERMINATION OF ACID SULFATE SOIL PROPERTIES



CERTIFICATE OF ANALYSIS

Analysis By: **Bio-Track Pty Ltd** ABN 91 056 237 275

781 Mt. Glorious Road Highvale, Brisbane, Australia, 4520 Ph. 07 3289 7179 Fx. 07 3289 7155

LAB REFERENCE: LR12069.517 DATE OF REPORT: 22 JUNE 2009 @16:49:21
 CLIENT NAME: MR LUKE CRAIG c/o COFFEY GEOTECHNICS PTY LTD PO BOX 5537 MAROOCHYDORE 4558
 PROJECT NAME: GK1560AA YOUR PROJECT/JOB REFERENCE: GK1560AA
 SAMPLING DATE: 24/4/2009 NUMBER OF SAMPLES: 20 Samples supplied by client SAMPLE TYPE: SOIL SAMPLE FOR ACID SULFATE STUDY
 DATE RECEIVED: 12 JUNE 2009 PACKAGING: SAMPLES LABELLED - INTACT Ground Oven Dry Samples DISPOSED ON 1/3/2010

Page 1 of 1 Report Pages.

Sample ID as received. METHODOLOGY: As per (DNR QASSIT May 2004), oven dried (85°C), >1000 um shell removed, fine grind. ALL reported values gravimetric, dry mass.
 %SE (equivalent sulphur) calculated as moles TAA/624 + %S Cr + %SNAS - SANC/ 1.5 (SNAS included irrespective of pH).
 LIME1 rates calculated to neutralise TPA (or TAA if >TPA) + as RAS - ANC_E/1.5 LIME2 rates calculated to neutralise TAA + as POS or S_Cr + as_RAS - ANC_BT/1.5
 NB. Lime rates assume 97% lime neutralisation but DO NOT include any safety factors. Suggested factor=1.5-2. Rates are kg/ton. Multiply by bulk density to convert to kg/m³.
 Fineness Factor (FF)=1.5 CBN POS= moles carbonate alkalinity released by oxidation assuming (Ca POS - Ca KCl) + (Mg POS - Mg KCl) is due to carbonate solution.
 Blanks represent unmeasured values, zeros & <0.x represent measured values. If pH KCl>4.5 then s-RAS (calculated from acid extract) may be zero for undisturbed soil. Ca NAS is the acid reactive calcium calculated as the difference between 1 M KCl and 4 M HCl soluble Ca.

ID.	DEPTH m	pH KCL 23A	pH ox 23B	TPA m/t 23G	TSA m/t 23H	S KCL % 23C	S P % 23De	S POS % 23Ee	S Cr % 22B	s-NAS s20Je	s EQ % 23Wh	Ca P mg/kg 23Wh	Mg KCL mg/kg 235m	Mg P mg/kg 23Tm	CBN a23U&X	LIME1 kg/t	LIME2 kg/t	sANC_BT/FF % s19A2	Ca NAS mg/kg
BH 10	0.50	5.21		<1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.003	26	24			0			11
BH 10	1.0	4.95		1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.004	9	195			0			24
BH 10	1.5	4.50		11	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.018	27	333			1			11
BH 10	2.0	4.27		14	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.024	57	408			1			21
BH 10	2.5	4.17		13	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.022	66	319			1			20
BH 10	3.0	4.35		5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.008	55	177			0			13
BH 14	0.50	5.12		<1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.000	9	20			0			11
BH 14	1.0	4.34		42	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.069	10	42			2			11
BH 14	1.5	4.46		26	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.044	10	40			1		<10	<10
BH 14	2.0	3.93		17	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.030	11	49			1		<10	<10
BH 14	2.5	4.31		21	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.034	19	103			1		<10	<10
BH 14	3.0	4.25		14	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.023	18	107			1		22	22
BH 35	0.50	4.96		5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.009	12	18			0		<10	<10
BH 35	1.0	4.85		6	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.010	8	24			0		<10	<10
BH 35	1.5	4.57		8	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.014	16	229			0		12	12
BH 35	2.0	4.52		8	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.014	27	312			0		20	20
BH 35	2.5	4.36		11	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.019	44	290			1		19	19
BH 35	3.0	4.27		20	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.034	53	193			1		28	28
BH 35	3.5	4.12		29	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.048	84	261			2		27	27
BH 35	4.0	4.16		30	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.048	67	217			2		20	20

Signature

P. Edwards

For and on behalf of Bio-Track Pty Ltd

DETERMINATION OF ACID SULFATE SOIL PROPERTIES



CERTIFICATE OF ANALYSIS

Analysis By: **Bio-Track Pty Ltd** ABN 91 056 237 275

781 Mt. Glorious Road Highvale, Brisbane, Australia, 4520 Ph. 07 3289 7179 Fx. 07 3289 7155

LAB REFERENCE LR21059.485 DATE OF REPORT 02 JUNE 2009 @13:14:54
 CLIENT NAME MR LUKE CRAIG c/o COFFEY GEOTECHNICS PTY LTD PO BOX 5537 MAROOCHYDORE 4558
 PROJECT NAME GK1560AA - AREA 4 YOUR PROJECT/JOB REFERENCE GK1560AA - AREA 4
 SAMPLING DATE 15/5/2009 NUMBER OF SAMPLES 45 SAMPLE TYPE: SOIL SAMPLE FOR ACID SULFATE STUDY
 DATE RECEIVED 21 MAY 2009 PACKAGING SAMPLES LABELLED - INTACT Ground Oven Dry Samples DISPOSED ON 1/2/2010

Page 2 of 2 Report Pages.

Sample ID as received. METHODOLOGY: As per (DNR QASSIT May 2004), oven dried (85°C), >1000 um shell removed, fine grind. All reported values gravimetric, dry mass.
 %SEQ (equivalent sulphur) calculated as moles TAA/624 + %S Cr + %SNAS - SANC/ 1.5 (SNAS included irrespective of pH).
 LIME1 rates calculated to neutralise TPA (or TAA if >TPA) + aS_RAS - ANC.E/1.5 LIME2 rates calculated to neutralise TAA + aS_POS or S_Cr + aS_RAS - ANC_BT/1.5
 NB. Lime rates assume 97% lime neutralisation but DO NOT include any safety factors. Suggested factor=1.5-2. Rates are kg/ton. Multiply by bulk density to convert to kg/m³.
 Fineness Factor (FF)=1.5 CBN POS= moles carbonate alkalinity released by oxidation assuming (Ca POS - Ca KCl) + (Mg POS - Mg KCl) is due to carbonate solution.
 Blanks represent unmeasured values, zeros & <0.x represent measured values. If pH KCl>4.5 then s-RAS (calculated from acid extract) may be zero for undisturbed soil. Ca NAS is the acid reactive calcium calculated as the difference between 1 M KCl and 4 M HCl soluble Ca.

ID.	DEPTH m	pH KCL 23A	pH ox 23B	TPA m/t 23F	TSA m/t 23G	S KCL % 23C	S P % 23De	S POS % 23Ee	S Cr % 22B	s-NAS % s20Je	s EQ % 23Vh	Ca KCL mg/kg 23Vh	Ca P mg/kg 23Wh	Mg KCL mg/kg 23Sm	Mg P mg/kg 23Tm	CBN POS m/t a23U&X	LIME1 kg/t	LIME2 kg/t	sANC_BT/FF % s19A2	Ca NAS mg/kg
BH 69	4.0	5.85		4		<0.01			<0.01	<0.01	0.008	415	1037				0			35
BH 71	0.50	4.81		27		<0.01			<0.01	<0.01	0.048	37	66				2			<10
BH 71	1.0	6.84		0		<0.01			<0.01	<0.01	-0.008	13	131				-0		<0.01	<10
BH 71	1.5	7.19		0		<0.01			<0.01	<0.01	-0.020	19	187				-1		0.02	<10
BH 71	2.0	6.32		121		<0.01			<0.01	<0.01	0.193	66	244				6			13
BH 71	2.5	6.11		116		<0.01			<0.01	<0.01	0.187	136	327				6			14
BH 71	3.0	6.30		67		<0.01			<0.01	<0.01	0.108	203	354				3			<10
BH 71	3.5	6.04		92		<0.01			<0.01	<0.01	0.148	226	376				5			12
BH 71	4.0	5.90		121		<0.01			<0.01	<0.01	0.195	241	391				6			26
BH 73	0.50	4.49		29		<0.01			<0.01	<0.01	0.051	24	32				2			<10
BH 73	1.0	4.84		14		<0.01			<0.01	<0.01	0.032	14	28				1			13
BH 73	1.5	4.98		6		<0.01			<0.01	<0.01	0.013	11	23				0			12
BH 73	2.0	4.66		13		<0.01			<0.01	<0.01	0.023	30	123				1			<10
BH 73	2.5	4.27		47		<0.01			<0.01	<0.01	0.077	100	258				2			79
BH 73	3.0	4.29		70		<0.01			<0.01	<0.01	0.113	81	204				4			10
BH 76	0.50	4.93		64		<0.01			<0.01	<0.01	0.104	11	18				3			<10
BH 76	1.0	5.01		89		<0.01			<0.01	<0.01	0.142	12	17				5			<10
BH 76	1.5	5.20		87		<0.01			<0.01	<0.01	0.149	52	167				5			<10
BH 76	2.0	4.88		83		<0.01			<0.01	<0.01	0.134	158	283				4			<10
BH 76	2.5	4.83		75		<0.01			<0.01	<0.01	0.121	175	287				4			<10
BH 76	3.0	4.88		60		<0.01			<0.01	<0.01	0.098	13	17				3			175

Signature

For and on behalf of Bio-Track Pty Ltd