

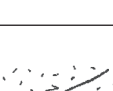
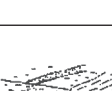
Soil Description Explanation Sheet (2 of 2)

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.	

Borehole No. **BH MSB-1**

Engineering Log - Borehole

Sheet 1 of 1
Project No: **GEOTLCOV24080AC**

Client: **University of New South Wales C/- Taylor Thomson Whitting**

Date started: **18.9.2010**

Principal:

Date completed: **18.9.2010**

Project: **UNSW, Proposed MSB Building**

Logged by: **DB**

Borehole Location: **Car Park behind Applied Sciences Building**

Checked by: **DG**

drill model and mounting: Edson 3000 Truck Easting: 336269.68 slope: -90° R.L. Surface: 29.41
hole diameter: 200 mm Northing 6245687.56 bearing: N/A datum: AHD

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												
DT								29			FILL: BITUMEN FILL: CONCRETE FILL: CONCRETE FILL: CONCRETE				PAVEMENT REINFORCED CONCRETE SLAB REINFORCED CONCRETE SLAB UNREINFORCED CONCRETE
								1							
								28			Borehole BH MSB-1 terminated at 1.5m				
								2							
								27							
								3							
								26							
								4							
								25							
								5							
								24							
								6							
								23							
								7							
								22							
								8							

method	support	notes, samples, tests	classification symbols and soil description	consistency/density index
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	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. **BH MSB-2**

Engineering Log - Borehole

Sheet 1 of 1
Project No: **GEOTLCOV24080AC**

Client: **University of New South Wales C/- Taylor Thomson Whitting**

Date started: **18.9.2010**

Principal:

Date completed: **18.9.2010**

Project: **UNSW, Proposed MSB Building**

Logged by: **DB**

Borehole Location: **Car Park behind Applied Sciences Building**

Checked by: **DG**

drill model and mounting: Edson 3000 Truck		Easting: 336204.74		slope: -90°		R.L. Surface: 28.62	
hole diameter: 100 mm		Northing: 6245684.19		bearing: N/A		datum: AHD	
drilling information				material substance			
method	penetration	support	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol
ADT	1 2 3						
			E	28	1		SP
			E				
			E				
Borehole BH MSB-2 terminated at 1.1m							
				27	2		
				26	3		
				25	4		
				24	5		
				23	6		
				22	7		
				21	8		
method		support		notes, samples, tests		classification symbols and soil description	
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		penetration		D disturbed sample		F firm	
W washbore		1 2 3 4		N standard penetration test (SPT)		St stiff	
CT cable tool		no resistance ranging to refusal		N* SPT - sample recovered		VSt very stiff	
HA hand auger		water		Nc SPT with solid cone		H hard	
DT diatube		10/1/98 water level on date shown		V vane shear (kPa)		Fb friable	
B blank bit		water inflow		P pressuremeter		VL very loose	
V V bit		water outflow		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.	BH MSB-3
Sheet	1 of 2
Project No:	GEOTLCOV24080AC
Date started:	18.9.2010
Date completed:	18.9.2010
Logged by:	DB
Checked by:	DG

Engineering Log - Borehole

Client: **University of New South Wales C/- Taylor Thomson Whitting**

Principal:

Project: **UNSW, Proposed MSB Building**

Borehole Location: ***Car Park behind Applied Sciences Building***

Sheet 1 of 2
Project No: **GEOTLCOV24080AC**

Date started: **18.9.2010**Date completed: **18.9.2010**

Logged by: **DB**

Checked by: **DG**

[illegible]

Borehole No. **BH MSB-3**

Engineering Log - Borehole

Sheet 2 of 2
Project No: **GEOTLCOV24080AC**

Client: **University of New South Wales C/- Taylor Thomson Whitting**

Date started: **18.9.2010**

Principal:

Date completed: **18.9.2010**

Project: **UNSW, Proposed MSB Building**

Logged by: **DB**

Borehole Location: **Car Park behind Applied Sciences Building**

Checked by: **DG**

drill model and mounting: Edson 3000 Truck		Easting: 336234.21		slope: -90°		R.L. Surface: 28.76					
hole diameter: 100 mm		Northing: 6245663.41		bearing: N/A		datum: AHD					
drilling information				material substance							
method	penetration 1 2 3	support water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol				
ADT											
				20	9						
				19	10						
				18	11						
				17	12						
				16	13						
				15	14						
				14	15						
				13	16						
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	

Engineering Log - Borehole

Client: **University of New South Wales C/- Taylor Thomson Whitting**

Date started: **18.9.2010**

Principal:

Date completed: **18.9.2010**

Project: **UNSW, Proposed MSB Building**

Logged by: **DB**

Borehole Location: **Car Park behind Applied Sciences Building**

Checked by: **DG**

drill model and mounting: Edson 3000 Truck		Easting: 336265.89		slope: -90°		R.L. Surface: 29.16	
hole diameter: 100 mm		Northing: 6245662.52		bearing: N/A		datum: AHD	
drilling information				material substance			
method	penetration 1 2 3	support water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol
ADT		C	E	29			FILL: BITUMEN FILL: CONCRETE
			E		1		SAND: Fine to medium grained, pale brown-pale grey.
			E	28			
			SPT 6,6,5 N*=11	27	2		SAND: Fine to medium grained, pale brown-orange brown, pale orange-pale grey.
					3		
			SPT 3,5,8 N*=13	26	4		SAND: Fine to medium grained, pale grey-off white, some pale brown.
					5		
			SPT 11,7,9 N*=16	24	6		SAND: Fine grained with some medium grained, pale orange-pale brown-pale grey, with some minor clay and iron indurated banding.
					7		
			SPT 6,8,8 N*=16	23	8		
				22			
method				support		notes, samples, tests	
AS auger screwing*				M mud		U ₅₀ undisturbed sample 50mm diameter	
AD auger drilling*				C casing		U ₆₃ undisturbed sample 63mm diameter	
RR roller/tricone				penetration		D disturbed sample	
W washbore				1 2 3 4		N standard penetration test (SPT)	
CT cable tool				no resistance ranging to refusal		N* SPT - sample recovered	
HA hand auger						Nc SPT with solid cone	
DT diatube				water		V vane shear (kPa)	
B blank bit				10/1/98 water level on date shown		P pressuremeter	
V V bit						Bs bulk sample	
T TC bit						E environmental sample	
*bit shown by suffix e.g. ADT						R refusal	
				water inflow		classification symbols and soil description	
				water outflow		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. **BH MSB-4**

Engineering Log - Borehole

Sheet 2 of 2
Project No: **GEOTLCOV24080AC**

Client: **University of New South Wales C/- Taylor Thomson Whitting**

Date started: **18.9.2010**

Principal:

Date completed: **18.9.2010**

Project: **UNSW, Proposed MSB Building**

Logged by: **DB**

Borehole Location: **Car Park behind Applied Sciences Building**

Checked by: **DG**

drill model and mounting: Edson 3000 Truck Easting: 336265.89 slope: -90° R.L. Surface: 29.16
hole diameter: 100 mm Northing 6245662.52 bearing: N/A datum: AHD

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	meter			
RR							21				SAND: Fine grained with some medium grained, pale orange-pale brown-pale grey, with some minor clay and iron indurated banding. <i>(continued)</i>	W	D					
								9			Borehole BH MSB-4 terminated at 8.5m							
							20											
								10										
							19											
								11										
							18											
								12										
							17											
								13										
							16											
								14										
							15											
								15										
							14											
								16										

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	based on unified classification system	VS very soft
AD auger drilling*	C casing	U ₆₃ undisturbed sample 63mm diameter		S soft
RR roller/tricone	penetration 1 2 3 4	D disturbed sample		F firm
W washbore	no resistance ranging to refusal	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	moisture	VL very loose
V V bit	10/1/98 water level on date shown	Bs bulk sample	D dry	L loose
T TC bit		E environmental sample	M moist	MD medium dense
*bit shown by suffix e.g. ADT	water inflow	R refusal	W wet	D dense
	water outflow		Wp plastic limit	VD very dense
			WL liquid limit	

Appendix B

Cone Penetration Test Logs

Electric Friction Cone Penetrometer Test Explanation Sheet

The Electric Friction Cone Penetrometer was developed from the original mechanical Dutch Cone Penetrometer. The test consists of advancing a 36 mm diameter rod with penetrometer attached into the soil at a rate of approximately 20 mm per second.

Reaction is provided by a purpose made truck or a conventional drilling rig. It is also possible to operate the penetrometer from a floating barge or jack-up rig.

The penetrometer itself consists of a conically shaped tip and a separate cylindrical sleeve fitted immediately behind the tip. The maximum diameter of the tip corresponds to the sleeve diameter, and the cross sectional area is 1000 mm^2 . The surface area of the sleeve is $15,000 \text{ mm}^2$. Separate force transducers are attached to the tip and the sleeve permitting independent measurements of respective resistances. The transducer signals are transmitted by means of an electric cable passing through the centre of the rods to an amplifier and field computer at the surface. The data consists of:

Cone Resistance, q_c . This is the end bearing resistance acting on the tip in MPa.

Sleeve Resistance, f_s . This is the friction resistance acting on the sleeve in kPa.

Friction Ratio, R_f . This is the ratio of sleeve resistance to cone resistance, expressed in percent.

The cone penetration test procedure is standardised in Australian Standard AS1289.

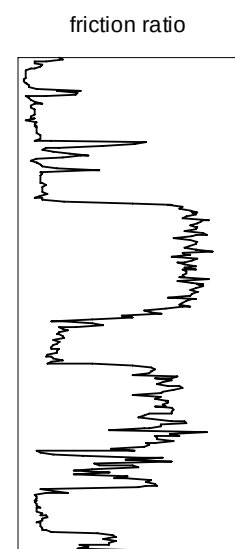
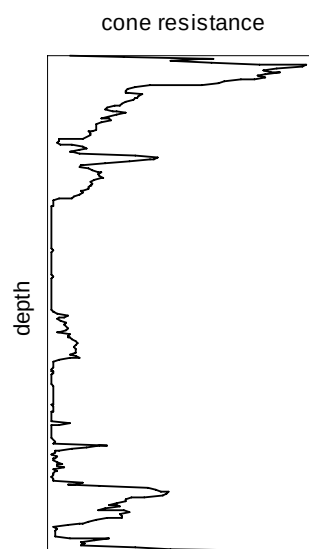
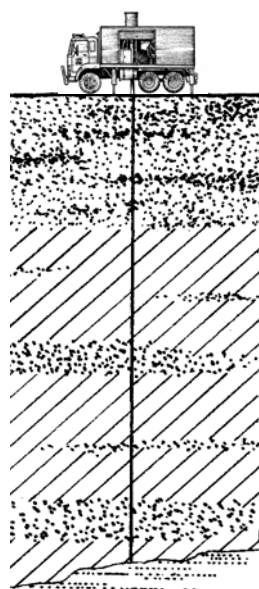
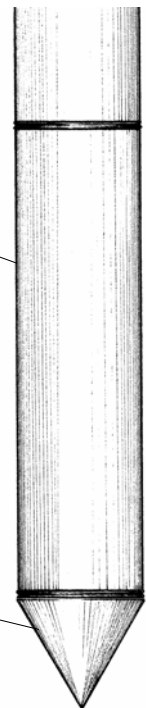
The cone penetration test has proven capable of providing data for design in most of the types of soil where the equipment can penetrate. Significant amounts of gravel-sized particles, however, can render the data very erratic and difficult to interpret quantitatively.

Soil samples for visual inspection are not provided and in most cases it is necessary to obtain appropriate samples for interpretation of test data.

Identification of soil types from cone penetration data is usually based on cone resistance and friction ratio. Friction ratios of the order of 1% are likely to indicate sands, whereas insensitive clays would be of the order of 4% to 7%.

friction sleeve with surface area of $15,000 \text{ mm}^2$ measures f_s

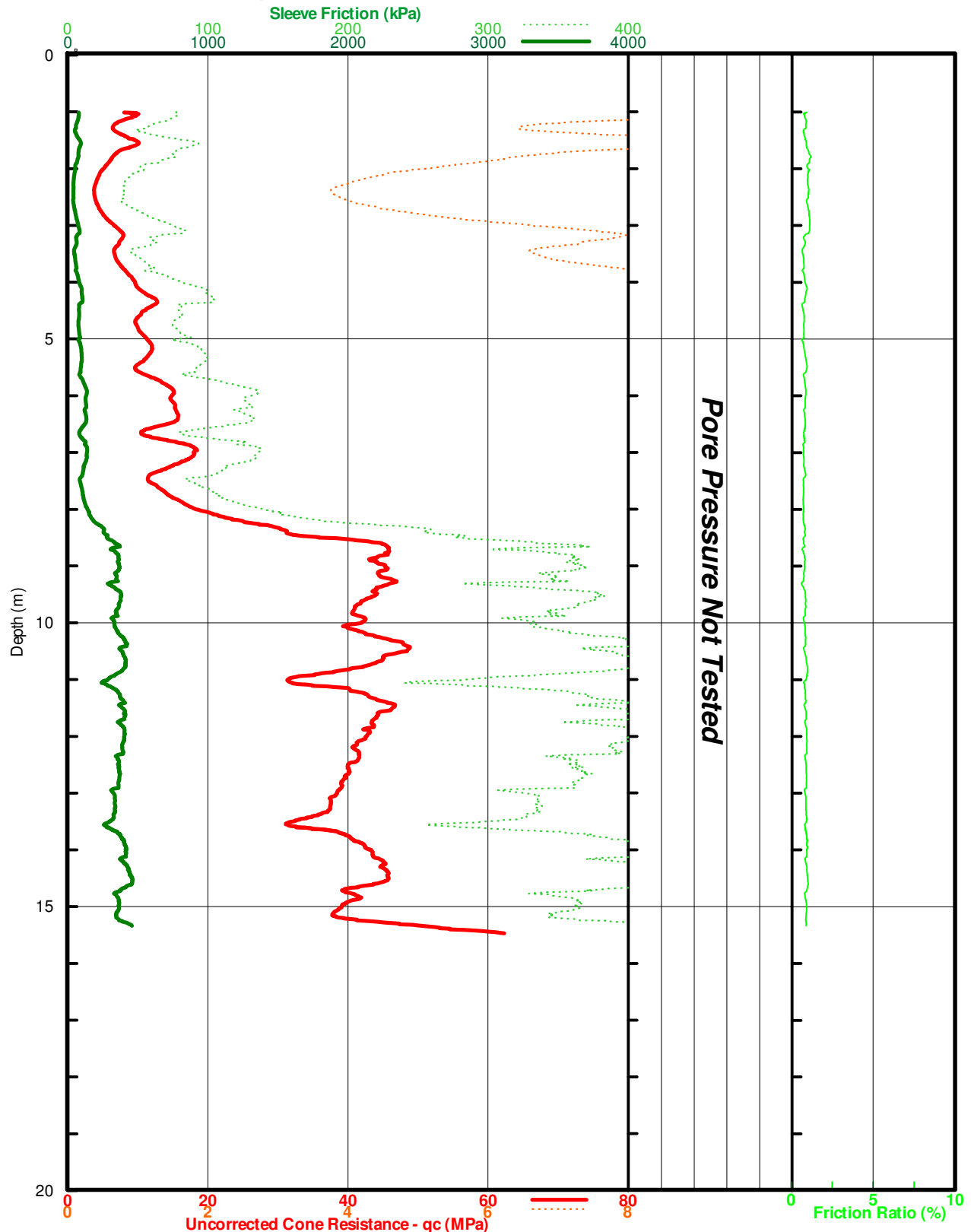
60° cone measures q_c



CONE PENETROMETER TEST RESULT

Coffey Geotechnics
UNSW Proposed MSB Building
UNSW Kensington NSW

CPTMSB-01



Job Number : G1009-106
Test Date : 18/09/2010
DGPS Position : 56H 0336259, 6245664
DGPS Format : GDA

Tested By : Glen Beaven
Test Class : IGS-3
Checked By : Glen Beaven

Cone Number : S15CFII.E49
Predrill Depth : 1.00m
Dissipation Tests @ : N/A
Terminated Due To : Equipment at Risk

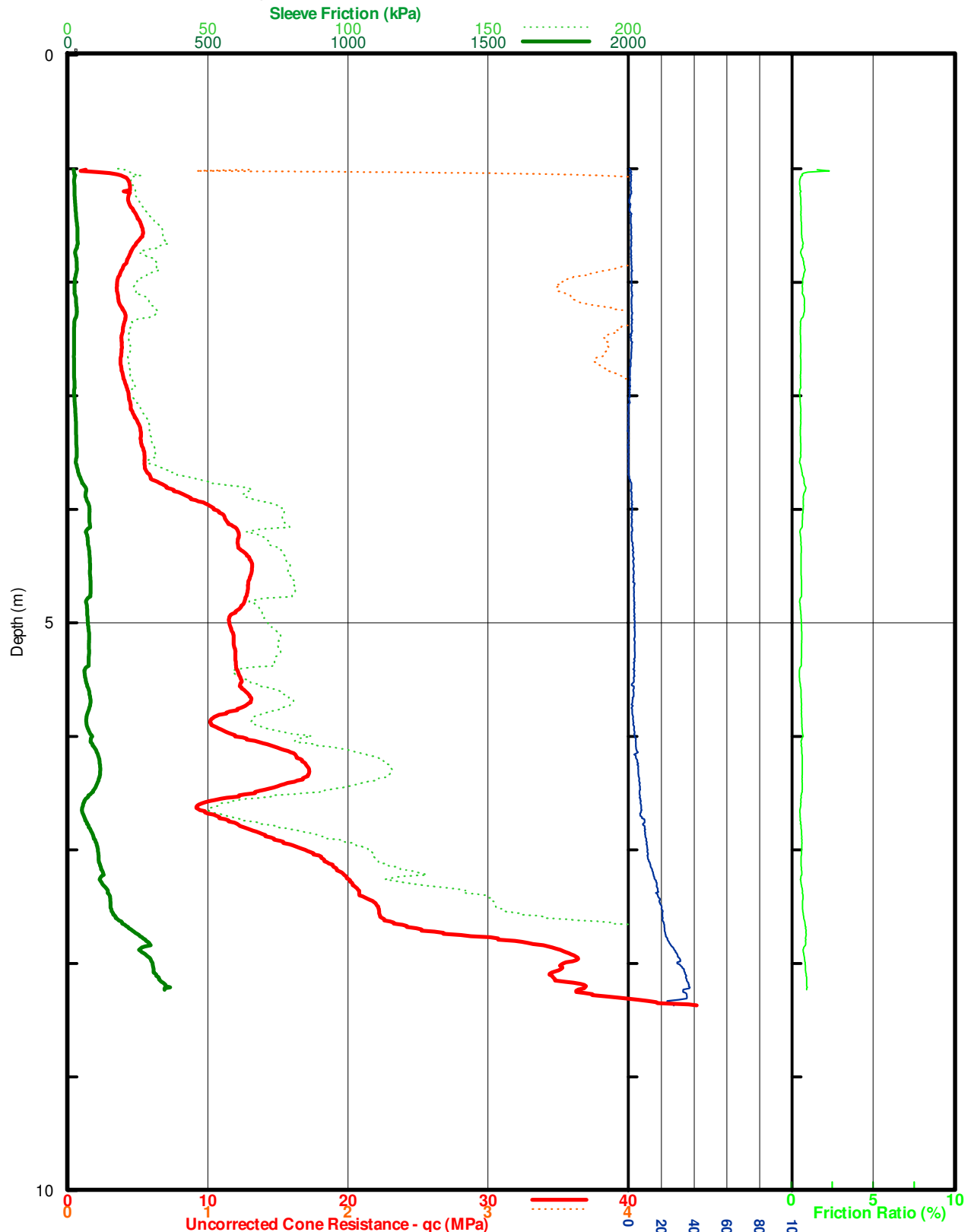
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Services
Pty Ltd

IGS

CONE PENETROMETER TEST RESULT

Coffey Geotechnics
UNSW Proposed MSB Building
UNSW Kensington NSW

CPTMSB-02



Job Number : G1009-106
Test Date : 18/09/2010
DGPS Position : 56H 0336238, 6245677
DGPS Format : GDA

Tested By : Glen Beaven
Test Class : IGS-1
Checked By : Glen Beaven

Cone Number : C10CFIIP.E29
Predrill Depth : 1.00m
Dissipation Tests @ : N/A
Terminated Due To : Abrupt Tilt

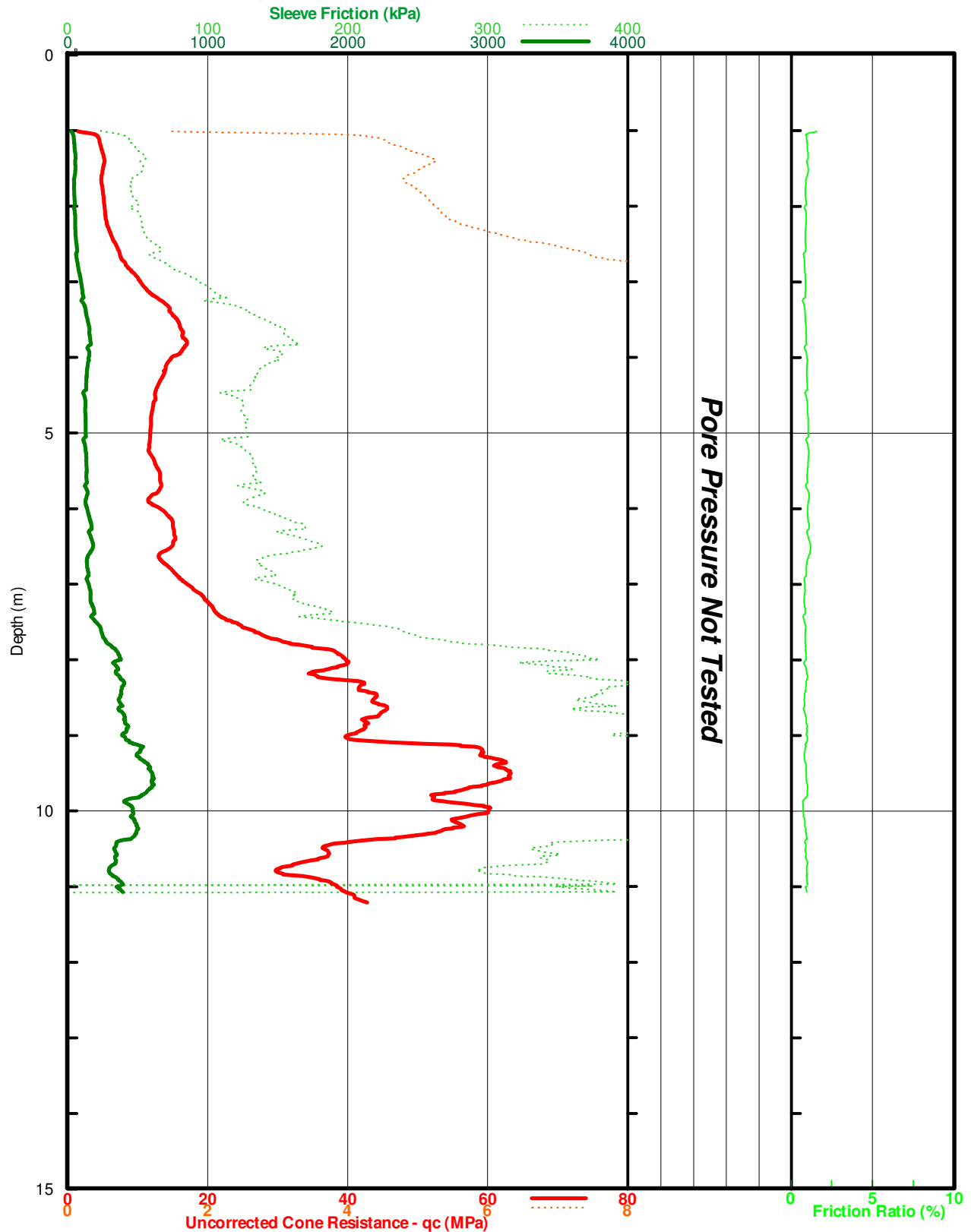
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CONE PENETROMETER TEST RESULT

CPTMSB-02A

Coffey Geotechnics
UNSW Proposed MSB Building
UNSW Kensington NSW



Job Number : G1009-106
Test Date : 18/09/2010
DGPS Position : 56H 0336236, 6245675
DGPS Format : GDA

Tested By : Glen Beaven
Test Class : IGS-3
Checked By : Glen Beaven

Cone Number : S15CFII.E49
Predrill Depth : 1.00m
Dissipation Tests @ : N/A
Terminated Due To : Abrupt Tilt

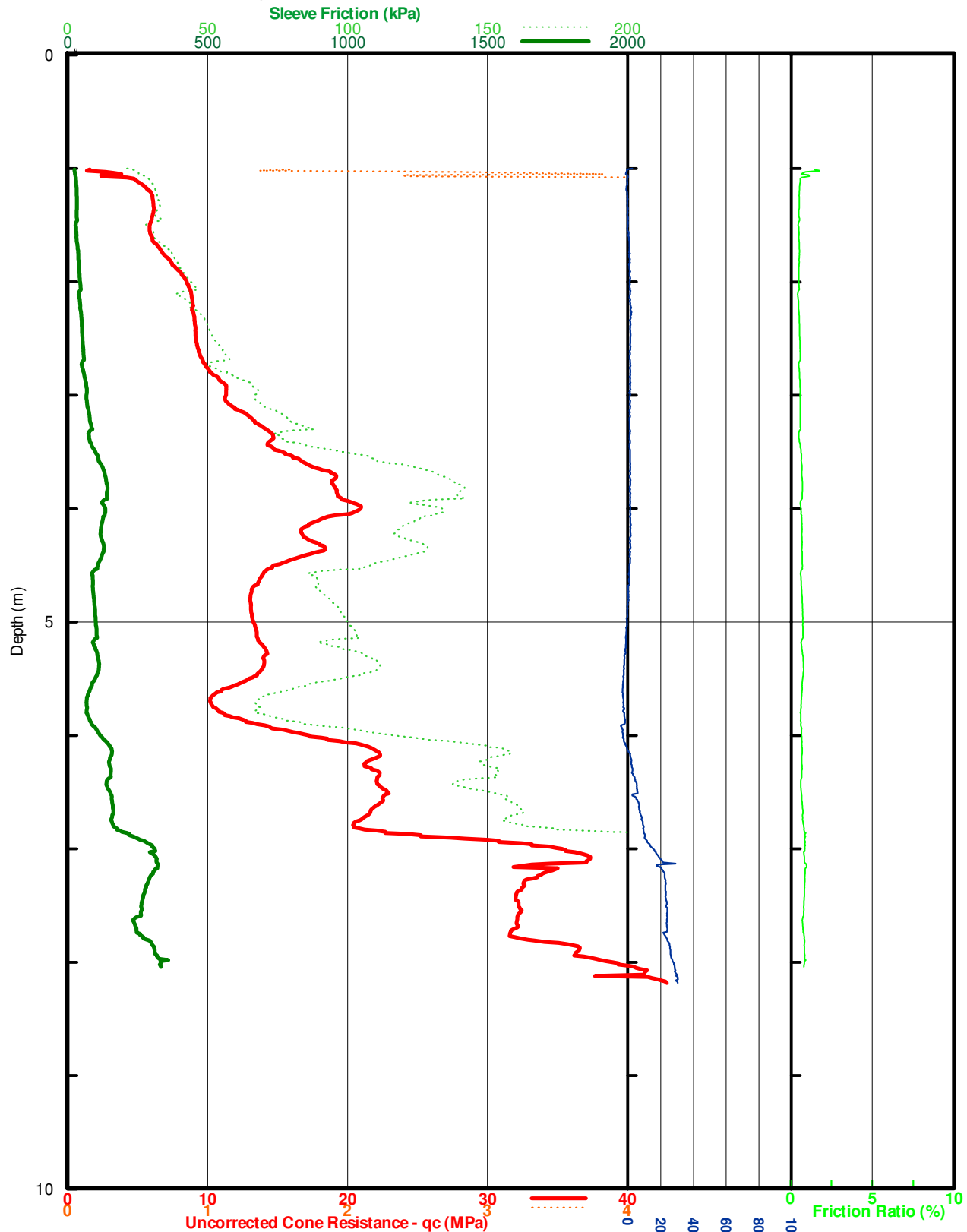
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CONE PENETROMETER TEST RESULT

Coffey Geotechnics
UNSW Proposed MSB Building
UNSW Kensington NSW

CPTMSB-03



Job Number : G1009-105
Test Date : 18/09/2010
DGPS Position : 56H 0336205, 6245666
DGPS Format : GDA

Tested By : Glen Beaven
Test Class : IGS-1
Checked By : Glen Beaven

Cone Number : C10CFIIP.E29
Predrill Depth : 1.00m
Dissipation Tests @ : N/A
Terminated Due To : Abrupt Tilt

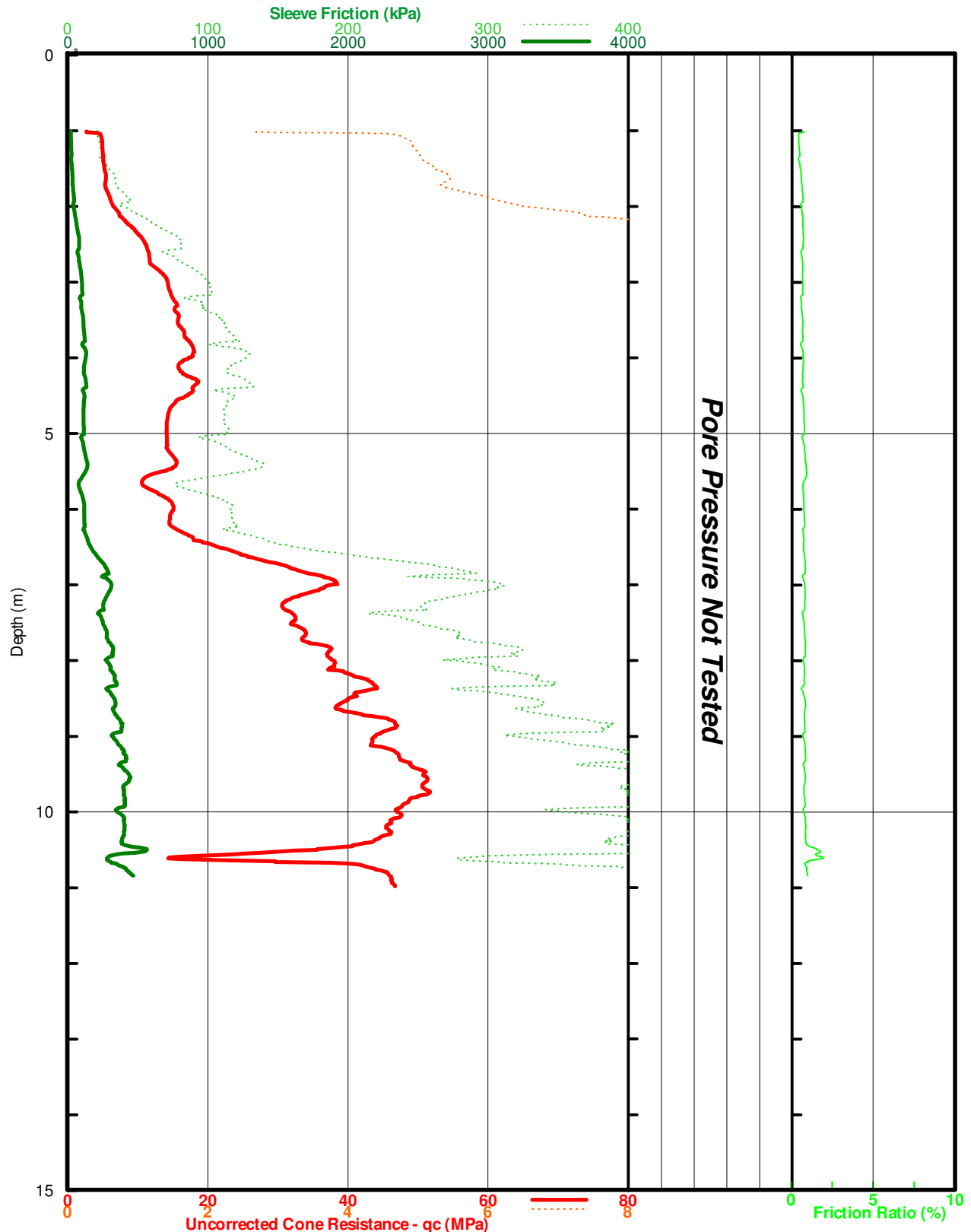
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CONE PENETROMETER TEST RESULT

CPTMSB-03A

Coffey Geotechnics
UNSW Proposed MSB Building
UNSW Kensington NSW



Job Number : G1009-106
Test Date : 18/09/2010
DGPS Position : 56 H 0336205, 6245654
DGPS Format : GDA

Tested By : Glen Beaven
Test Class : IGS-3
Checked By : Sergey Skrobotov

Cone Number : S15CFII.E49
Predrill Depth : 1.00m
Dissipation Tests @ : N/A
Terminated Due To : Equipment at Risk

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Appendix C

Geotechnical Laboratory Testing Results

PARTICLE SIZE DISTRIBUTION & ATTERBERG LIMITS REPORT

Client: **COFFEY GEOTECHNICS PTY LTD. (GEOTLCOV24080ABA)**

Job No: **INFOGLEN00740AA**

Principal: **UNIVERSITY OF NEW SOUTH WALES**

Laboratory: **SYDNEY**

Project: **KENSINGTON CAMPUS RESIDENTIAL UPGRADE**

Report Date: **27th September, 2010**

Location: **KENSINGTON, NSW**

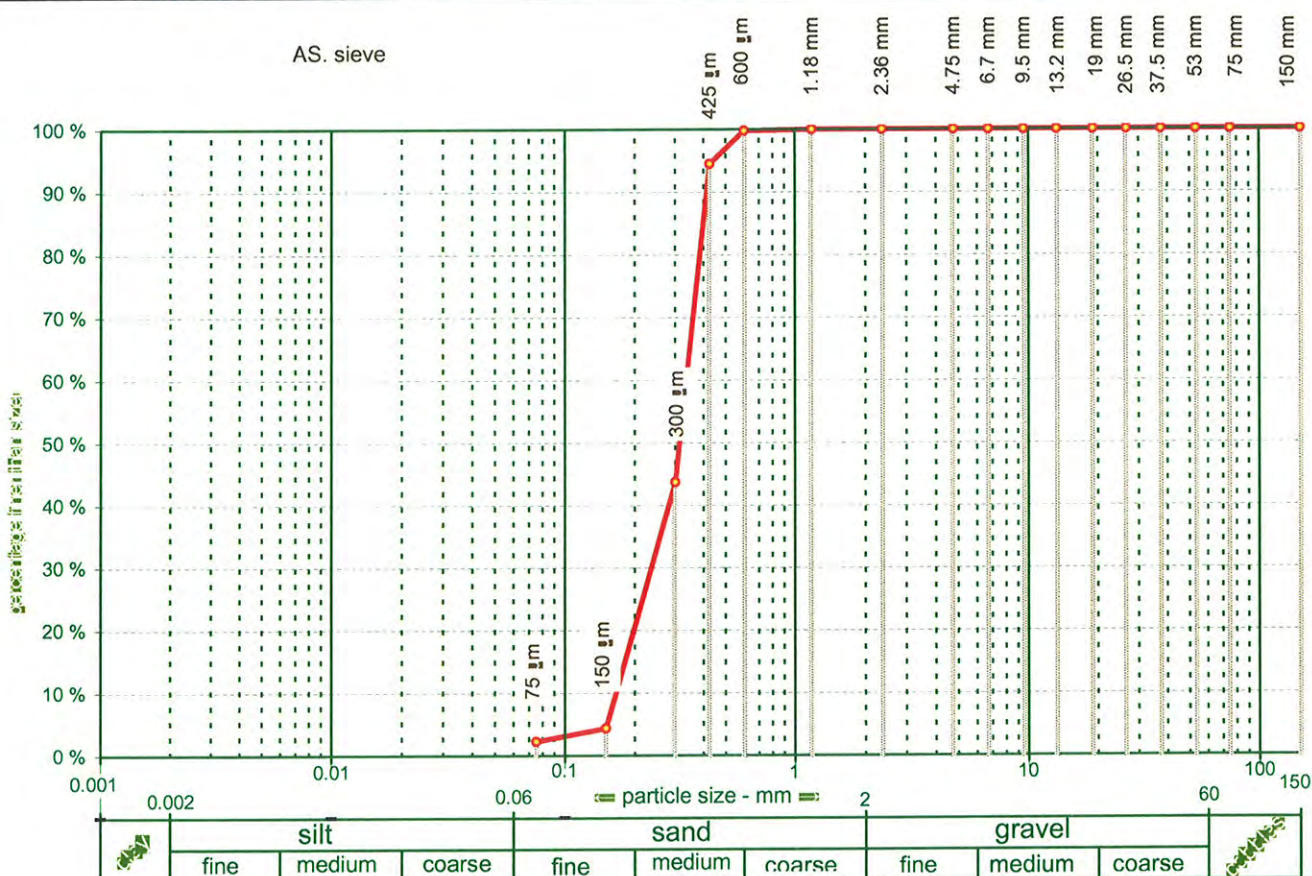
Test report No: **-**

Test procedure: **AS1289.3.6.1; 2.1.1**

Depth: **4.50 to 4.95m**

Sample No: **GLEN10S-06469**

Sample Identification: **BHM3B - 4**



Form Number: GLEN001A Issue Date 01/01/10

Sieve Analysis		Hydrometer Analysis		ATTERBERG LIMITS		Procedures
Sieve Size mm	% Passing	Particle Size μm	% Passing			
75	100			Liquid Limit	%	AS1289 3.1.1
53	100			Plastic Limit	%	AS1289 3.2.1
37.5	100			Plasticity Index		AS1289 3.3.1
26.5	100			Linear Shrinkage	%	AS1289 3.4.1
19	100			Mould Length	mm	
13.2	100			Crumbling &/or Curling		
9.5	100			Sample History	Oven Dried ☐ Air Dried ☐	
6.7	100			Sample Preparation	Dry Sieved ☐ Wet Sieved ☐	
4.75	100			NOTES: Loss of mass in pretreatment: No pretreatment. Dispersion method: Sodium hexametaphosphate and Sodium carbonate Type of hydrometer: ASTM Soil Particle density: g/cm ³ Moisture Content (as received) 21.9% N.D. = not determined N.O.= not obtainable		
2.36	100					
1.18	100					
600 μm	100					
425 μm	95					
300 μm	44					
150 μm	4					
75 μm	2					

Page 1 of 1

F:\2. Laboratory\1-INFOGLEN Jobs\INFOGLEN 00740AA - UNSW\Gradings\BHM3B 4 4.5m.xls\Report



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The results of the tests, calibrations, and/or measurements included in this document are traceable to Australian/national standards

NATA Accredited Laboratory No. 431

Date:

Approved Signatory:

27th September, 2010

Alex Munoz
Senior Technical Officer

Appendix D

Environmental Laboratory Testing Results

Table 1
Soil Analytical Results
UNSW Proposed MSB Building

Sample ID		BH MSB-2 0.20-0.30	BH MSB-2 1.00-1.10	BH MSB-3 0.20-0.30	BH MSB-3 0.50-0.60	BH MSB-4 0.20-0.30	BH MSB-4 1.00-1.10	BH MSB-4 1.50-1.60
Sample Depth		BH MSB-2 0.20-0.30	BH MSB-2 1.00-1.10	BH MSB-3 0.20-0.30	BH MSB-3 0.50-0.60	BH MSB-4 0.20-0.30	BH MSB-4 1.00-1.10	BH MSB-4 1.50-1.60
Sample Date		18/02/2010	18/02/2010	18/02/2010	18/02/2010	18/02/2010	18/02/2010	18/02/2010
Chemical Type	Chemical Name	Units	EQL	NEPM 1999 EIL	NEPM 1999 HIL B			
BTEX	Benzene	mg/kg	0.1			<0.1	<0.1	<0.1
	Toluene	mg/kg	0.1			<0.1	<0.1	<0.1
	Ethylbenzene	mg/kg	0.1			<0.1	<0.1	<0.1
	Xylene Total	mg/kg	0.3			<0.3	<0.3	<0.3
Metals	Arsenic	mg/kg	3	20	400	<3	<3	<3
	Cadmium	mg/kg	0.3	3	80	0.3	<0.3	<0.3
	Chromium (III+VI)	mg/kg	0.3	400	6	1.2	2.8	0.6
	Copper	mg/kg	0.5	100	4000	32	<0.5	19
	Lead	mg/kg	1	600	1200	25	1	45
	Mercury	mg/kg	0.05	1	60	0.28	<0.05	0.18
	Nickel	mg/kg	0.5	60	2400	34	0.7	3.8
	Zinc	mg/kg	0.5	200	28000	39	<0.5	40
OC Pesticides	2,4-DDT	mg/kg	0.1			<0.1	-	<0.1
	4,4-DDE	mg/kg	0.1			<0.1	-	<0.1
	a-BHC	mg/kg	0.1			<0.1	-	<0.1
	Aldrin	mg/kg	0.1			<0.1	-	<0.1
	b-BHC	mg/kg	0.1			<0.1	-	<0.1
	cis-Chlordane	mg/kg	0.1			<0.1	-	<0.1
	d-BHC	mg/kg	0.1			<0.1	-	<0.1
	DDD	mg/kg	0.1			<0.1	-	<0.1
	DDT	mg/kg	0.1			<0.1	-	<0.1
	Dieldrin	mg/kg	0.1			<0.1	-	<0.1
	Endosulfan I	mg/kg	0.1			<0.1	-	<0.1
	Endosulfan II	mg/kg	0.1			<0.1	-	<0.1
	Endosulfan sulphate	mg/kg	0.1			<0.1	-	<0.1
	Endrin	mg/kg	0.1			<0.1	-	<0.1
	Endrin aldehyde	mg/kg	0.1			<0.1	-	<0.1
	Endrin ketone	mg/kg	0.1			<0.1	-	<0.1
	g-BHC (Lindane)	mg/kg	0.1			<0.1	-	<0.1
	Heptachlor	mg/kg	0.1		40	<0.1	-	<0.1
	Heptachlor epoxide	mg/kg	0.1			<0.1	-	<0.1
	Hexachlorobenzene	mg/kg	0.1			<0.1	-	<0.1
OP Pesticides	Methoxychlor	mg/kg	0.1			<0.1	-	<0.1
	o,p'-DDD	mg/kg	0.1			<0.1	-	<0.1
	o,p'-DDE	mg/kg	0.1			<0.1	-	<0.1
	trans-chlordane	mg/kg	0.1			<0.1	-	<0.1
	trans-Nonachlor	mg/kg	0.1			<0.1	-	<0.1
	Azinophos methyl	mg/kg	0.2			<0.2	-	<0.2
	Bromophos-ethyl	mg/kg	0.2			<0.2	-	<0.2
	Chlorpyrifos	mg/kg	0.2			<0.2	-	<0.2
	Diazinon	mg/kg	0.5			<0.5	-	<0.5
	Dichlorvos	mg/kg	1			<1	-	<1
PAHs	Dimethoate	mg/kg	1			<1	-	<1
	Ethion	mg/kg	0.2			<0.2	-	<0.2
	Fenitrothion	mg/kg	0.2			<0.2	-	<0.2
	Malathion	mg/kg	0.2			<0.2	-	<0.2
	Methidathion	mg/kg	0.5			<0.5	-	<0.5
	Parathion	mg/kg	0.2			<0.2	-	<0.2
	1-Methylnaphthalene	mg/kg	0.1			0.11	<0.1	<0.1
	2-methylnaphthalene	mg/kg	0.1			<0.1	<0.1	<0.1
PCBs	Acenaphthene	mg/kg	0.1			<0.1	<0.1	<0.1
	Acenaphthylene	mg/kg	0.1			<0.1	<0.1	<0.1
	Anthracene	mg/kg	0.1			<0.1	<0.1	<0.1
	Benz(a)anthracene	mg/kg	0.1			0.11	<0.1	<0.1
	Benzo(a) pyrene	mg/kg	0.05		4	0.06	<0.05	0.59
	Benzo(b)&(k)fluoranthene	mg/kg	0.2			<0.2	<0.2	1
	Benzo(g,h,i)perylene	mg/kg	0.1			<0.1	<0.1	0.32
	Chrysene	mg/kg	0.1			0.12	<0.1	0.59
	Dibenz(a,h)anthracene	mg/kg	0.1			<0.1	<0.1	<0.1
	Fluoranthene	mg/kg	0.1			0.22	<0.1	1.3
	Fluorene	mg/kg	0.1			<0.1	<0.1	<0.1
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.1			<0.1	<0.1	0.36
	Naphthalene	mg/kg	0.1			<0.1	<0.1	<0.1
	PAHs (Sum of total)	mg/kg	1.75		80	<2.12	<1.75	<7.6
	Phenanthrene	mg/kg	0.1			0.23	<0.1	0.59
TPH	Pyrene	mg/kg	0.1			0.17	<0.1	1.3
	Aroclor 1221	mg/kg	0.1			<0.1	-	<0.1
	Aroclor 1016	mg/kg	0.1			<0.1	-	<0.1
Materials	Aroclor 1232	mg/kg	0.1			<0.1	-	<0.1
	Aroclor 1242	mg/kg	0.1			<0.1	-	<0.1
	Aroclor 1248	mg/kg	0.1			<0.1	-	<0.1
	Aroclor 1254	mg/kg	0.1			<0.1	-	<0.1
	Aroclor 1260	mg/kg	0.1			<0.1	-	<0.1
	Aroclor 1262	mg/kg	0.1			<0.1	-	<0.1
	Aroclor 1268	mg/kg	0.1			<0.1	-	<0.1
	PCBs (Sum of total)	mg/kg	0.9		40	<0.9	-	<0.9
Asbestos	TPH C6 - C9 Fraction	mg/kg	20			<20	<20	<20
	TPH C10 - C14 Fraction	mg/kg	20			<20	<20	<20
	TPH C15 - C28 Fraction	mg/kg	50			<50	<50	<50
	TPH C29 - C36 Fraction	mg/kg	50			<50	<50	<50
Asbestos		-	-			Not Detected	-	Not Detected

Table 2
QA/QC Results
UNSW Proposed MSB Building

Lab ID		SE81592	SE81592		
Sample ID		BH MSB-4 1.00-1.10	D1	RPD	
Sample Date		18/02/2010	18/02/2010		

Chemical Type	Chemical Name	Units	EQL			
BTEX	Benzene	mg/kg	0.1	<0.1	<0.1	0
	Toluene	mg/kg	0.1	<0.1	<0.1	0
	Ethylbenzene	mg/kg	0.1	<0.1	<0.1	0
	Xylene Total	mg/kg	0.3	<0.3	<0.3	0
Metals	Arsenic	mg/kg	3	<3.0	<3.0	0
	Cadmium	mg/kg	0.3	<0.3	<0.3	0
	Chromium (III+VI)	mg/kg	0.3	1.5	1.9	24
	Copper	mg/kg	0.5	4.6	5.8	23
	Lead	mg/kg	1	12.0	19.0	45
	Mercury	mg/kg	0.05	<0.05	<0.05	0
	Nickel	mg/kg	0.5	1.4	1.7	19
	Zinc	mg/kg	0.5	11.0	18.0	48
PAHs	1-Methylnaphthalene	mg/kg	0.1	<0.1	<0.1	0
	2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	0
	Acenaphthene	mg/kg	0.1	<0.1	<0.1	0
	Acenaphthylene	mg/kg	0.1	0.59	0.57	3
	Anthracene	mg/kg	0.1	0.72	3.5	132
	Benz(a)anthracene	mg/kg	0.1	1.6	1.8	12
	Benzo(a) pyrene	mg/kg	0.05	1.3	1.4	7
	Benzo(b)&(k)fluoranthene	mg/kg	0.2	2.2	2.3	4
	Benzo(g,h,i)perylene	mg/kg	0.1	0.68	0.73	7
	Chrysene	mg/kg	0.1	1.1	1.2	9
	Dibenz(a,h)anthracene	mg/kg	0.1	<0.1	<0.1	0
	Fluoranthene	mg/kg	0.1	3.8	3.8	0
	Fluorene	mg/kg	0.1	0.35	0.32	9
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	0.83	0.9	8
	Naphthalene	mg/kg	0.1	<0.1	0.1	0
	PAHs (Sum of total)	mg/kg	1.75	<20.65	<23.71	0
	Phenanthrene	mg/kg	0.1	3.8	3.5	8
	Pyrene	mg/kg	0.1	3.2	3.3	3
TPH	TPH C6 - C9 Fraction	mg/kg	20	<20.0	<20.0	0
	TPH C10 - C14 Fraction	mg/kg	20	<20.0	<20.0	0
	TPH C15 - C28 Fraction	mg/kg	50	<50.0	<50.0	0
	TPH C29 - C36 Fraction	mg/kg	50	<50.0	<50.0	0

*RPDs have only been considered where a concentration is greater than 5 times the EQL.

**High RPDs are in bold (Acceptable RPDs for each EQL multiplier range are: 100 (5-10 x EQL); 50 (10-30 x EQL); 30 (> 30 x EQL))

***Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any methods in the row header relate to those used in the primary laboratory

Appendix E

QA/QC Validation Report

Coffey Environments Australia Pty Ltd

A.C.N. 140 765 902

A.B.N. 65 140 765 902



QA/QC DATA VALIDATION REPORT

Job No: GEOTLCOV24080AB

I. SAMPLE HANDLING

1. Were the sample **holding times** met?
2. Were the samples in **proper custody** between the field and reaching the laboratory?
3. Were the samples **properly and adequately** preserved?
This includes keeping the samples chilled, where applicable.
4. Were the samples received by the laboratory in good condition?

Yes	No (Comment below)
☒	☐
☒	☐
☒	☐
☒	☐

COMMENTS:

NA

Sample Handling was:

☒ Satisfactory

☐ Unsatisfactory

☐ Partially Satisfactory

Coffey Environments Australia Pty Ltd

A.C.N. 140 765 902

A.B.N. 65 140 765 902



QA/QC DATA VALIDATION REPORT

Job No: GEOTLCOV24080AB

II PRECISION/ACCURACY ASSESSMENT

1. Was a NATA registered laboratory used?
2. Did the laboratory perform the requested tests?
3. Were the laboratory methods adopted NATA endorsed?
4. Were the appropriate test procedures followed?
5. Were the reporting limits satisfactory?
6. Was the NATA Seal on the reports?
7. Were the reports signed by an authorised person?

Yes	No (Comment below)
☒	☐
☒	☐
☒	☐
☒	☐
☒	☐
☒	☐
☒	☐

COMMENTS:

NA

Precision/Accuracy of the Laboratory Report



Satisfactory



Unsatisfactory



Partially Satisfactory

QA/QC DATA VALIDATION REPORT

Job No: GEOTLCOV24080AB

III. FIELD QA/QC

- | | | |
|----|-----------------------------|----------------------------|
| 1. | Number of Samples Analysed | Soil: 9 (inc. 1 duplicate) |
| | | Water: 0 |
| 2. | Number of Days of Sampling: | Soil: 1 |
| | | Water: 0 |

3. Number and Type of QA/QC Samples Collected:

	SOIL	WATER
Field Duplicates (at least 1 in 10 samples)	1	NA
Trip Blanks (at least 1/day or sampling event)	1	NA
Wash Blanks (at least 1/day/matrix/equipment)	1	NA
Other (Field Blanks, Spiked Trip Blanks, etc.)	1 x trip spike	NA

4. FIELD DUPLICATES

- A. Were an Adequate Number of field duplicates analysed for each chemical (min. 10%)?
- B. Were RPDs within Control Limits?
- a. Organics (< 50 % for soil; < 30% for water)
 - b. Metals/Inorganics (< 50 % for soil; < 30% for water)

Yes	No (Comment below)
☒	☐
☐ ☐	☒ ☐

COMMENTS:

- An RPD of 51% was reported for phenanthrene which marginally exceeds the control limit of 50%. This result is considered to be attributed to the heterogeneous nature of the contaminant distribution throughout the soil/fill matrix.

Coffey Environments Australia Pty Ltd

A.C.N. 140 765 902

A.B.N. 65 140 765 902



QA/QC DATA VALIDATION REPORT

Job No: GEOTLCOV24080AB

5. TRIP BLANKS

A. Were an Adequate Number of trip blanks collected?

B. Were the Trip Blanks free of contaminants?

(If no, comment whether the contaminants present are also detected in the samples and whether they are common laboratory chemicals.)

Yes	No (Comment below)
☒	☐
☒	☐

6. WASH BLANKS

A. Were an adequate number of Wash Blanks collected?

B. Were the Wash Blanks free of contaminants?

(If no, comment whether the contaminants present are also detected in the samples and whether they are common laboratory chemicals.)

Yes	No (Comment below)
☒	☐
☐	☒

COMMENTS:

- Detectable concentration of zinc was identified in the wash blank however it is considered the detectable concentration is likely to be a result of the presence of zinc in the rinsate water rather than a result of cross contamination in the field. This result is not considered to affect the integrity and usability of the data presented as part of this report.

Field QA/QC was:

☒ Satisfactory

☐ Unsatisfactory

☐ Partially Satisfactory

Coffey Environments Australia Pty Ltd

A.C.N. 140 765 902

A.B.N. 65 140 765 902



SPECIALISTS IN ENVIRONMENTAL,
SOCIAL AND SAFETY PERFORMANCE

QA/QC DATA VALIDATION REPORT

Job No: GEOTLCOV24080AB

IV LABORATORY INTERNAL QUALITY CONTROL PROCEDURES

1. Type of QA/QC Samples (soil)

	TPH (C ₆ -C ₉), BTEX	TPH (C ₁₀ -C ₃₆)	PAH	OCP	OPP	PCB	Metals	VHC	Asbestos
Laboratory Blanks/Reagent Blanks (at least 1 per batch)	1	1	1	1	1	1	1	N/A	N/A
Laboratory Duplicates (at least 1 per batch or 1 per 10 samples whichever is the smaller)	1	1	1	0	1	0	1	N/A	N/A
Matrix Spikes/Matrix Spike Duplicates (1 for each soil type)	-	-	-	-	-	-	-	N/A	N/A
Laboratory Control Spike	1	0	1	1	1	0	1	N/A	N/A
Surrogate (where appropriate)*	1	-	3	1	2	1	-	N/A	N/A

*Number of surrogates/spikes carried out on each sample

2. Were the laboratory blanks/reagents blanks free of contamination?
3. Were the spike recoveries within control limits?
- a. Organics (60% to 140%)
- b. Metals/Inorganic (70% to 130%)
4. Were the RPDs of the laboratory duplicates within control limits?
5. Were the surrogate recoveries within control limits?

Yes	No (Comment below)
☒	☐
☒ ☒	☐ ☐
☒	☐
☒	☐

COMMENTS:

NA

5. The laboratory internal QA/QC was:	☒ Satisfactory	☐ Unsatisfactory
	☐ Partially Satisfactory	

Coffey Environments Australia Pty Ltd

A.C.N. 140 765 902

A.B.N. 65 140 765 902



QA/QC DATA VALIDATION REPORT

Job No: GEOTLCOV24080AB

V. DATA USABILITY

- | | | |
|----|--|-------------------------------------|
| 1. | Data Directly Usable | ☒ |
| 2. | Data Usable with the following corrections/modifications (see comment below) | ☐ |
| 3. | Data Not Usable. | ☐ |

COMMENTS:

NA

QA/QC Report Prepared by

Update

QA/QC Report Reviewed by:

(Reviewer)