coffey geotechnics

Engineering Log - Cored Borehole

Borehole No.	***BH7***		
Sheet	2 of 3		
Project No:	***GEOTLCOV24207AB***		
Client:	***Health Infrastructure***	Date started:	***17.2.2011***
Principal:		Date completed:	***17.2.2011***
Project:	***Blacktown Hospital Development***	Logged by:	***VJ***
Borehole Location:	***Blacktown District Hospital Carpark***	Checked by:	***SS***

drill model & mounting: Hydrapower Scout Truck | Easting: 307104 | slope: -90° | R.L. Surface: 61.74

hole diameter: 125 mm | Drilling fluid: | Northing: 6260658 | bearing: | datum: AHD

drilling information					material substance					rock mass defects		
method	core-lift	water	RL	depth metres	graphic log core recovery	material: rock type; grain characteristics, colour, structure, minor components	weathering alteration	estimated strength VL L M H VH EH	$Is_{(50)}$ MPa D- diametral A- axial	RQD %	defect spacing mm 30 100 300 1000 3000	defect description: type, inclination, planarity, roughness, coating, thickness — particular / general
			61	1								
			60	2								
			59	3		Continued from non-cored borehole						
NMLC		Groundwater Not Monitored	58	4		**SHALE:** Pale brown/dark grey mottled orange brown, indistinctly bedded at 0-5°, ironstained.	XW / HW / MW		D 0.28 A 0.48	73		JT, 90°, IR, RO, 120mm PT PT, ST, SO, SN PT PT PT PT PT PT PT
			57	5		**INTERLAMINATED SANDSTONE (60%) AND SHALE (40%):** Fine to medium grained, sandstone, pale grey/dark grey, thinly bedded at 5°.	MW / HW / SW		D 0.12 A 0.35 D 0.11 A 0.24 D 0.28 A 0.38			PT, 0-5°, CU, SO, SN Highly Fractured Zone, 60mm PT, 0°, IR, RO, SN PT, 0°, IR, RO, CN
			56	6					D 0.5 A 0.3 D 0.5 A 0.8			Highly Fractured Zone, 20mm PT, 0°, CU, SO, SN PT, 0°, CU, SO, CN
			55	7		**SANDSTONE:** Fine to medium grained, pale grey.			D 0.3 A 0.8 D 0.4 A 1.4 D 0.4 A 1.6	87		PT, 0°, ST, SO, CN JT, 80-85°, 80mm PT PT PT, 0°-5°, PL, RO, SN PT, 0°, PL, RO, CN PT, 0°, IR, RO, CN
			54	8					D 1.1 A 2			PT, 0°, PL, RO, CN PT, 0°, IR, RO, CN

All defects are: PT, 0°-10°; PL-IR, SO, CN-SN

method

DT	diatube
AS	auger screwing
AD	auger drilling
RR	roller/tricone
CB	claw or blade bit
NMLC	NMLC core
NQ, HQ, PQ	wireline core

core-lift

- casing used
- barrel withdrawn

graphic log/core recovery

- core recovered - graphic symbols indicate material
- no core recovered

water

- 10/1/98 water level on date shown
- water inflow
- partial drill fluid loss
- complete drill fluid loss
- 25 water pressure test result (lugeons) for depth interval shown

weathering

FR	fresh
SW	slightly weathered
MW	moderately weathered
HW	highly weathered
XW	extremely weathered
DW	distinctly weathered (covers MW and HW)

strength

VL	very low
L	low
M	medium
H	high
VH	very high
EH	extremely high

defect type

JT	joint
PT	parting
SM	seam
SZ	sheared zone
SS	sheared surface
CS	crushed seam

planarity

PL	planar
CU	curved
UN	undulating
ST	stepped
IR	irregular

roughness

VR	very rough
RO	rough
SO	smooth
SL	slickensided

coating

CN	clean
SN	stained
VN	veneer
CO	coating

coffey geotechnics

Engineering Log - Cored Borehole

Borehole No.	***BH7***
Sheet	3 of 3
Project No:	***GEOTLCOV24207AB***
Client:	***Health Infrastructure***
Date started:	***17.2.2011***
Principal:	
Date completed:	***17.2.2011***
Project:	***Blacktown Hospital Development***
Logged by:	***VJ***
Borehole Location:	***Blacktown District Hospital Carpark***
Checked by:	***SS***

drill model & mounting: Hydrapower Scout Truck | Easting: 307104 | slope: -90° | R.L. Surface: 61.74

hole diameter: 125 mm | Drilling fluid: | Northing: 6260658 | bearing: | datum: AHD

drilling information					material substance					rock mass defects		
method	core-lift	water	RL	depth metres	graphic log core recovery	material: rock type; grain characteristics, colour, structure, minor components	weathering alteration	estimated strength VL L M H VH EH	$Is_{(50)}$ MPa D- diametral A- axial	RQD %	defect spacing mm 30 100 300 1000 3000	defect description: type, inclination, planarity, roughness, coating, thickness — particular / general
NMLC			53	9		**SANDSTONE:** Fine to medium grained, pale grey. *(continued)*	SW		D 0.2 A 0.5	87		PT, 0°, PL, RO, CN
									D 0.4 A 0.6			PT, 0°, PL, RO, CN
			52						D 0.1 A 0.3			PT, 0°, PL, RO, CN
									D 0.4 A 0.5			PT, 0°, PL, RO, CN
				10					D 0.2 A 0.3	100		PT, 0°, PL, RO, CN
									D 0.4 A 0.3			
						BH7 terminated at 10m						
			51	11								
			50	12								
			49	13								
			48	14								
			47	15								
			46	16								

method

DT	diatube
AS	auger screwing
AD	auger drilling
RR	roller/tricone
CB	claw or blade bit
NMLC	NMLC core
NQ, HQ, PQ	wireline core

core-lift

- casing used
- barrel withdrawn

graphic log/core recovery

- core recovered - graphic symbols indicate material
- no core recovered

water

- 10/1/98 water level on date shown
- water inflow
- partial drill fluid loss
- complete drill fluid loss
- 25 water pressure test result (lugeons) for depth interval shown

weathering

FR	fresh
SW	slightly weathered
MW	moderately weathered
HW	highly weathered
XW	extremely weathered
DW	distinctly weathered (covers MW and HW)

strength

VL	very low
L	low
M	medium
H	high
VH	very high
EH	extremely high

defect type

JT	joint
PT	parting
SM	seam
SZ	sheared zone
SS	sheared surface
CS	crushed seam

planarity

PL	planar
CU	curved
UN	undulating
ST	stepped
IR	irregular

roughness

VR	very rough
RO	rough
SO	smooth
SL	slickensided

coating

CN	clean
SN	stained
VN	veneer
CO	coating

drawn	**BM**	coffey geotechnics SPECIALISTS MANAGING THE EARTH	client:	**Health Infrastructure , NSW**
approved	**SS**		project:	**GEOTECHNICAL & ENVIRONMENTAL INVESTIGATION – BLACKTOWN HOSPITAL**
date	**18/2/2011**		title:	**BOREHOLE PHOTOGRAPH–BH7: 3.05m – 10.00m**
scale	**Not to scale**		project no: **GEOTLCOV24207AB**	Photo no: **BH7 1 of 1**
original size	**A4**			

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Engineering Log - Borehole

Borehole No. **BH8**
Sheet 1 of 3
Project No: **GEOTLCOV24207AB**

Client: ***Health Infrastructure***
Date started: ***18.2.2011***
Principal:
Date completed: ***18.2.2011***
Project: ***Blacktown Hospital Development***
Logged by: ***VJ***
Borehole Location: ***Blacktown District Hospital Carpark***
Checked by: ***SS***

drill model and mounting: Hydrapower Scout Truck | Easting: 307137 | slope: -90° | R.L. Surface: 61.2
hole diameter: 125 mm | Northing 6260722 | bearing: | datum: AHD

drilling information							material substance						
method	penetration 1 2 3	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		C		E + D	61	1			**FILL: BITUMEN:** Black. **FILL: SAND:** Fine grained, brown, with some medium to coarse gravel, trace of clay.	D			PAVEMENT FILL 0.1-0.3m PID=2.9ppm 0.5-0.6m PID=6.7ppm
				SPT 4,5,7 N*=12	60	2		CL	**CLAY:** Medium plasticity, pale grey, with some fine to coarse ironstone gravel, trace of tree roots.	<Wp	St/VSt		POSSIBLE FILL 2.0-2.1m PID=4.1ppm
				SPT 5,9,13 N*=22	59	3		CL/CH	**CLAY:** Medium to high plasticity, pale grey/pale brown mottled red/brown.		VSt		RESIDUAL SOIL 3.5-3.6m PID=4.7ppm
				SPT 10,29,26 N*=55	58	4			**SANDSTONE:** Extremely weathered, pale grey/pale brown, estimated to be very low strength, remoulds to a sandy clay.				SANDSTONE
					57	5							
					56	6			Borehole BH8 continued as cored hole				
					55	7							
					54	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 GEOTLCOV24207AB.GPJ COFFEY.GDT 15.3.11

Form GEO 5.3 Issue 3 Rev.2

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Engineering Log - Cored Borehole

Borehole No.	**BH8**
Sheet	2 of 3
Project No:	**GEOTLCOV24207AB**
Client:	**Health Infrastructure**
Date started:	**18.2.2011**
Principal:	
Date completed:	**18.2.2011**
Project:	**Blacktown Hospital Development**
Logged by:	**VJ**
Borehole Location:	**Blacktown District Hospital Carpark**
Checked by:	**SS**

drill model & mounting: Hydrapower Scout Truck | Easting: 307137 | slope: -90° | R.L. Surface: 61.2

hole diameter: 125 mm | Drilling fluid: | Northing: 6260722 | bearing: | datum: AHD

drilling information | **material substance** | **rock mass defects**

method	core-lift	water	RL	depth metres	graphic log core recovery	material: rock type; grain characteristics, colour, structure, minor components	weathering alteration	estimated strength VL L M H VH EH	$Is_{(50)}$ MPa D- diametral A- axial	RQD %	defect spacing mm 30 100 300 1000 3000	defect description: type, inclination, planarity, roughness, coating, thickness — particular	general
			61	1									
			60	2									
			59	3									
			58	4									
			57	5		Continued from non-cored borehole							
NMLC		Groundwater Not Monitored	56	6		**SANDSTONE :** Fine to medium grained, pale grey/red brown, ironstained.	SW		D 0.87 A 0.31	62		PT, CU	
							MW					PT, ST, SN, RO	
									D 2.18 A 0.7			PT	
							HW					PT	
			55	7			MW					SM, 0°, RO, VN	
									D 0.29 A 0.45			PT	
									D 0.17 A 0.22			PT	
									D 0.4 A 0.3			PT	
			54			**SHALE:** Dark grey, with some fine grained sandstone laminations.			D 0.5 A 0.5			PT	
									D 0.2 A 0.2			PT	
				8					A 0			JT, 90°, PL, 100mm	
												PT	
												PT	
												Highly Fractured Zone, 20mm	
												PT	
												PT	
												PT	
												PT, 0-5°, CU, RO, SN	
												PT	
												PT	

All defects are: PT, 0°-10°, PL-IR, RO, SN-CN unles s noted otherwise

method
DT diatube; AS auger screwing; AD auger drilling; RR roller/tricone; CB claw or blade bit; NMLC NMLC core; NQ, HQ, PQ wireline core

core-lift
casing used; barrel withdrawn

graphic log/core recovery
core recovered - graphic symbols indicate material; no core recovered

water
10/1/98 water level on date shown; water inflow; partial drill fluid loss; complete drill fluid loss; water pressure test result (lugeons) for depth interval shown (25)

weathering
FR fresh; SW slightly weathered; MW moderately weathered; HW highly weathered; XW extremely weathered; DW distinctly weathered (covers MW and HW)

strength
VL very low; L low; M medium; H high; VH very high; EH extremely high

defect type
JT joint; PT parting; SM seam; SZ sheared zone; SS sheared surface; CS crushed seam

planarity
PL planar; CU curved; UN undulating; ST stepped; IR irregular

roughness
VR very rough; RO rough; SO smooth; SL slickensided

coating
CN clean; SN stained; VN veneer; CO coating

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Engineering Log - Cored Borehole

Borehole No.	**BH8**
Sheet	3 of 3
Project No:	**GEOTLCOV24207AB**
Client:	**Health Infrastructure**
Date started:	**18.2.2011**
Principal:	
Date completed:	**18.2.2011**
Project:	**Blacktown Hospital Development**
Logged by:	**VJ**
Borehole Location:	**Blacktown District Hospital Carpark**
Checked by:	**SS**

drill model & mounting: Hydrapower Scout Truck | Easting: 307137 | slope: -90° | R.L. Surface: 61.2

hole diameter: 125 mm | Drilling fluid: | Northing: 6260722 | bearing: | datum: AHD

drilling information					material substance						rock mass defects			
method	core-lift	water	RL	depth metres	graphic log core recovery	material: rock type; grain characteristics, colour, structure, minor components	weathering alteration	estimated strength (VL L M H VH EH)	Is(50) MPa D- diametral A- axial		RQD %	defect spacing mm (30 100 300 1000 3000)	defect description: type, inclination, planarity, roughness, coating, thickness — particular	general
NMLC			53			**SHALE:** Dark grey, with some fine grained sandstone laminations. *(continued)*	SW		D 0.3	A 0.3	93		JT, 5-10°, CN, 20mm	
									D 0.3	A 0.3			JT, 20-30°, RO, SN, 30mm	
													JT, 10°, PL, 100mm	
													PT	
													JT, 70-80°, PL, SN, 90mm	
													JT, 45°, PL, SN, 50mm	
				9					D 0.3	A 0.2			Highly Fractured Zone, 70mm	
			52						D 0.2	A 0.2	81		PT, 0°, IR	
													PT	
													PT	
							HW						XW SM, 100mm	
							SW		D 0.2	A 0.2				
							MW		D 0.2	A 0.1			PT	
				10									Highly Fractured Zone, 10mm	
													PT, 0°, CU, IR, SN	
			51			BH8 terminated at 10m								
				11										
			50											
				12										
			49											
				13										
			48											
				14										
			47											
				15										
			46											
				16										

method
DT diatube; AS auger screwing; AD auger drilling; RR roller/tricone; CB claw or blade bit; NMLC NMLC core; NQ, HQ, PQ wireline core

core-lift
casing used; barrel withdrawn

graphic log/core recovery
core recovered - graphic symbols indicate material; no core recovered

water
10/1/98 water level on date shown; water inflow; partial drill fluid loss; complete drill fluid loss; 25 water pressure test result (lugeons) for depth interval shown

weathering
FR fresh; SW slightly weathered; MW moderately weathered; HW highly weathered; XW extremely weathered; DW distinctly weathered (covers MW and HW)

strength
VL very low; L low; M medium; H high; VH very high; EH extremely high

defect type
JT joint; PT parting; SM seam; SZ sheared zone; SS sheared surface; CS crushed seam

planarity
PL planar; CU curved; UN undulating; ST stepped; IR irregular

roughness
VR very rough; RO rough; SO smooth; SL slickensided

coating
CN clean; SN stained; VN veneer; CO coating

drawn	**BM**	coffey geotechnics SPECIALISTS MANAGING THE EARTH	client:	**Health Infrastructure , NSW**
approved	**SS**		project:	**GEOTECHNICAL & ENVIRONMENTAL INVESTIGATION – BLACKTOWN HOSPITAL**
date	**21/2/2011**		title:	**BOREHOLE PHOTOGRAPH–BH8: 5.00m – 10.00m**
scale	**Not to scale**		project no: **GEOTLCOV24207AB**	Photo no: **BH8 1 of 1**
original size	**A4**			

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Engineering Log - Borehole

Borehole No. **BH9**

Sheet 1 of 3

Project No: **GEOTLCOV24207AB**

Client: ***Health Infrastructure***

Date started: ***21.2.2011***

Principal:

Date completed: ***21.2.2011***

Project: ***Blacktown Hospital Development***

Logged by: ***VJ***

Borehole Location: ***Blacktown District Hospital Carpark***

Checked by: ***SS***

drill model and mounting: Hydrapower Scout Truck | Easting: 307100 | slope: -90° | R.L. Surface: 61.35

hole diameter: 125 mm | Northing 6260716 | bearing: | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	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		C		E + D	61				**FILL: BITUMEN:** Black.	D			PAVEMENT
									FILL: Gravelly SAND: Fine to medium grained sand, dark grey, fine to coarse gravel.				FILL 0.1-0.3m PID=0.9ppm
				SPT 3,1,2 N*=3		1			**FILL: Sandy CLAY:** Medium plasticity, pale brown, fine to coarse sand, trace of fine gravel.	<Wp			0.5-0.6m PID=3.4ppm
					60			CL	**CLAY:** Medium plasticity, pale grey.		VSt		POSSIBLE FILL
				SPT 1,2,5 N*=7	59	2						×	2.0-2.1m PID=4.1ppm
								CL	**CLAY:** Medium plasticity, pale grey/pale brown.			×	RESIDUAL SOIL
					58	3							
				SPT 15 N*=R					**SANDSTONE:** Extremely weathered, fine to medium grained, pale brown/red brown, estimated to be very low strength.				SANDSTONE 3.5-3.6m PID=5.4ppm
					57	4							
						5			Borehole BH9 continued as cored hole				
					56								
						6							
					55								
						7							
					54								
						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

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Engineering Log - Cored Borehole

Borehole No. **BH9**
Sheet 2 of 3
Project No: **GEOTLCOV24207AB**

Client: ***Health Infrastructure***
Date started: ***21.2.2011***
Principal:
Date completed: ***21.2.2011***
Project: ***Blacktown Hospital Development***
Logged by: ***VJ***
Borehole Location: ***Blacktown District Hospital Carpark***
Checked by: ***SS***

drill model & mounting: Hydrapower Scout Truck | Easting: 307100 | slope: -90° | R.L. Surface: 61.35
hole diameter: 125 mm Drilling fluid: | Northing: 6260716 | bearing: | datum: AHD

drilling information					material substance							rock mass defects		
method	core-lift	water	RL	depth metres	graphic log core recovery	material: rock type; grain characteristics, colour, structure, minor components	weathering alteration	estimated strength VL L M H VH EH	$Is_{(50)}$ MPa D- diametral A- axial	RQD %	defect spacing mm 30 100 300 1000 3000	defect description: type, inclination, planarity, roughness, coating, thickness — particular / general
			61	1								
			60	2								
			59	3								
			58	4								
			57	5		Continued from non-cored borehole						
NMLC		Groundwater Not Monitored	56	6		**SANDSTONE:** Fine to medium grained, pale brown/pale grey.	MW		D A 0.36 0.91	52		PT
			55	7			HW		D A 0.11 0.15			JT, ~90°, PL, RO, 190mm
			54	8			MW		D A 0.18 0.29			PT, 0°, PL, SN
									D A 4.9 4.89			Highly Fractured Zone, 50mm
												HFZ, 30mm
												PT
												Highly Fractured Zone, 100mm
												PT
												PT
												PT
												PT
												Highly Fractured Zone, 330mm
												PT
												JT, 80-85°, PL, SN, 110mm
												PT
												PT
												PT
												PT
												PT
												PT
							SW		D A 0.2 0.4			

All defects are: PT, 0°-10°, PL-IR, RO, SN-CN unles s noted otherwise

method
DT diatube
AS auger screwing
AD auger drilling
RR roller/tricone
CB claw or blade bit
NMLC NMLC core
NQ, HQ, PQ wireline core

core-lift
casing used
barrel withdrawn

graphic log/core recovery
core recovered - graphic symbols indicate material
no core recovered

water
10/1/98 water level on date shown
water inflow
partial drill fluid loss
complete drill fluid loss
25 water pressure test result (lugeons) for depth interval shown

weathering
FR fresh
SW slightly weathered
MW moderately weathered
HW highly weathered
XW extremely weathered
DW distinctly weathered (covers MW and HW)

strength
VL very low
L low
M medium
H high
VH very high
EH extremely high

defect type
JT joint
PT parting
SM seam
SZ sheared zone
SS sheared surface
CS crushed seam

planarity
PL planar
CU curved
UN undulating
ST stepped
IR irregular

roughness
VR very rough
RO rough
SO smooth
SL slickensided

coating
CN clean
SN stained
VN veneer
CO coating

coffey geotechnics

Engineering Log - Cored Borehole

Borehole No. **BH9**

Sheet 3 of 3

Project No: **GEOTLCOV24207AB**

Client: ***Health Infrastructure***

Date started: ***21.2.2011***

Principal:

Date completed: ***21.2.2011***

Project: ***Blacktown Hospital Development***

Logged by: ***VJ***

Borehole Location: ***Blacktown District Hospital Carpark***

Checked by: ***SS***

drill model & mounting: Hydrapower Scout Truck | Easting: 307100 | slope: -90° | R.L. Surface: 61.35

hole diameter: 125 mm | Drilling fluid: | Northing: 6260716 | bearing: | datum: AHD

drilling information					material substance					rock mass defects		
method	core-lift	water	RL	depth metres	graphic log core recovery	material: rock type; grain characteristics, colour, structure, minor components	weathering alteration	estimated strength VL L M H VH EH	$Is_{(50)}$ MPa D- diametral A- axial	RQD %	defect spacing mm 30 100 300 1000 3000	defect description: type, inclination, planarity, roughness, coating, thickness — particular / general
NMLC			53	9		**SHALE:** Grey/dark grey, thinly laminated.	SW		D A 0.4 0.4 D A 0 0.1 D A 0.2 0.3 D A 0.1 0.4 D A 0.3 0.4 D A 0.1 0.3 D A 0.2 0.5	91		JT, 15-20°, PL PT PT CS, PL PT PT JT, 45°, IR Highly Fractured Zone, 50mm PT PT PT PT
			52	10		BH9 terminated at 10m						
			51	11								
			50	12								
			49	13								
			48	14								
			47	15								
			46	16								

method

DT	diatube
AS	auger screwing
AD	auger drilling
RR	roller/tricone
CB	claw or blade bit
NMLC	NMLC core
NQ, HQ, PQ	wireline core

core-lift

- casing used
- barrel withdrawn

graphic log/core recovery

- core recovered - graphic symbols indicate material
- no core recovered

water

- 10/1/98 water level on date shown
- water inflow
- partial drill fluid loss
- complete drill fluid loss
- 25 water pressure test result (lugeons) for depth interval shown

weathering

FR	fresh
SW	slightly weathered
MW	moderately weathered
HW	highly weathered
XW	extremely weathered
DW	distinctly weathered (covers MW and HW)

strength

VL	very low
L	low
M	medium
H	high
VH	very high
EH	extremely high

defect type

JT	joint
PT	parting
SM	seam
SZ	sheared zone
SS	sheared surface
CS	crushed seam

planarity

PL	planar
CU	curved
UN	undulating
ST	stepped
IR	irregular

roughness

VR	very rough
RO	rough
SO	smooth
SL	slickensided

coating

CN	clean
SN	stained
VN	veneer
CO	coating

drawn	**BM**	coffey geotechnics SPECIALISTS MANAGING THE EARTH	client: **Health Infrastructure , NSW**	
approved	**SS**		project: **GEOTECHNICAL & ENVIRONMENTAL INVESTIGATION – BLACKTOWN HOSPITAL**	
date	**20/2/2011**		title: **BOREHOLE PHOTOGRAPH–BH9: 5.00m – 10.00m**	
scale	**Not to scale**		project no: **GEOTLCOV24207AB**	Photo no: **BH9 1 of 1**
original size	**A4**			

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Engineering Log - Borehole

Borehole No. **BH10**

Sheet 1 of 3

Project No: **GEOTLCOV24207AB**

Client: ***Health Infrastructure***

Date started: ***21.2.2011***

Principal:

Date completed: ***21.2.2011***

Project: ***Blacktown Hospital Development***

Logged by: ***VJ***

Borehole Location: ***Blacktown District Hospital Carpark***

Checked by: ***SS***

drill model and mounting: Hydrapower Scout Truck | Easting: 307072 | slope: -90° | R.L. Surface: 61.34

hole diameter: 125 mm | Northing 6260735 | bearing: | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	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		C		E + D	61				**FILL: BITUMEN:** Black.	D			PAVEMENT
									FILL: SAND: Fine to medium grained sand, pale brown, with some fine to coarse gravel, trace of clay.				FILL 0.1-0.3m PID=2.7ppm
				SPT 3,3,4 N*=7		1			**FILL: CLAY:** Medium plasticity, brown, with some fine to medium grained sand.	<Wp			0.5-0.6m PID=1.6ppm
					60								
				SPT 3,7,5 N*=12	59	2							2.0-2.1m PID=6.3ppm
					58	3							
				SPT 4,5,5 N*=10				CL/CH	**CLAY:** Medium to high plasticity, pale grey/red brown, with some fine grained angular ironstone gravel.		VSt/H		RESIDUAL SOIL 3.5-3.6m PID=0.7ppm
					57	4							
						5							
				SPT 7,11,15 N*=26	56								
						6							
					55								
				SPT 21 N*=R		7			**SHALE:** Extremely weathered, dark grey/pale grey, estimated to be very low strength, remoulds to a gravelly clay.				SHALE
					54								
						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

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Engineering Log - Borehole

Borehole No. **BH10**

Sheet 2 of 3

Project No: **GEOTLCOV24207AB**

Client: ***Health Infrastructure***

Date started: ***21.2.2011***

Principal:

Date completed: ***21.2.2011***

Project: ***Blacktown Hospital Development***

Logged by: ***VJ***

Borehole Location: ***Blacktown District Hospital Carpark***

Checked by: ***SS***

drill model and mounting: Hydrapower Scout Truck | Easting: 307072 | slope: -90° | R.L. Surface: 61.34

hole diameter: 125 mm | Northing 6260735 | bearing: | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	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
		C		SPT 2 N*=R	53				Borehole BH10 continued as cored hole				
					52	9							
					51	10							
					50	11							
					49	12							
					48	13							
					47	14							
					46	15							
						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 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 GEOTLCOV24207AB.GPJ COFFEY.GDT 15.3.11

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Engineering Log - Cored Borehole

Borehole No.	**BH10**
Sheet	3 of 3
Project No:	**GEOTLCOV24207AB**
Client:	**Health Infrastructure**
Date started:	**21.2.2011**
Principal:	
Date completed:	**21.2.2011**
Project:	**Blacktown Hospital Development**
Logged by:	**VJ**
Borehole Location:	**Blacktown District Hospital Carpark**
Checked by:	**SS**

drill model & mounting: Hydrapower Scout Truck | Easting: 307072 | slope: -90° | R.L. Surface: 61.34

hole diameter: 125 mm | Drilling fluid: | Northing: 6260735 | bearing: | datum: AHD

drilling information					material substance						rock mass defects		
method	core-lift	water	RL	depth metres	graphic log core recovery	material: rock type; grain characteristics, colour, structure, minor components	weathering alteration	estimated strength VL L M H VH EH	$Is_{(50)}$ MPa D- diametral A- axial	RQD %	defect spacing mm 30 100 300 1000 3000	defect description: type, inclination, planarity, roughness, coating, thickness — particular	general
						Continued from non-cored borehole							
NMLC		Groundwater Not Monitored	53	9		**SHALE:** Grey/dark grey, thinly laminated.	HW		D 0 A 0.06	59		PT	All defects are PT, 0-5°, PL, RO, CN; unless noted otherwise
												PT	
												PT	
												PT	
												PT	
												PT	
												PT	
												CS, 20mm	
							MW		D 0.05 A 0.17			PT	
			52									PT, 0°, CU, SN, SN	
												JT, 75-80°, SN, 160mm	
									D 0.2 A 0.21			PT, 0°, ST, SN, SN	
												JT, 90°, CU, RO, SN ~90mm	
												JT, 30-35°, PL, SN, ~60mm	
				10					D 0.36 A 0.17			PT	
												Highly Fractured Zone, 80mm	
						BH10 terminated at 10m							
			51										
				11									
			50										
				12									
			49										
				13									
			48										
				14									
			47										
				15									
			46										
				16									

method

DT	diatube
AS	auger screwing
AD	auger drilling
RR	roller/tricone
CB	claw or blade bit
NMLC	NMLC core
NQ, HQ, PQ	wireline core

core-lift

- casing used
- barrel withdrawn

graphic log/core recovery

- core recovered - graphic symbols indicate material
- no core recovered

water

- 10/1/98 water level on date shown
- water inflow
- partial drill fluid loss
- complete drill fluid loss
- 25 water pressure test result (lugeons) for depth interval shown

weathering

FR	fresh
SW	slightly weathered
MW	moderately weathered
HW	highly weathered
XW	extremely weathered
DW	distinctly weathered (covers MW and HW)

strength

VL	very low
L	low
M	medium
H	high
VH	very high
EH	extremely high

defect type

JT	joint
PT	parting
SM	seam
SZ	sheared zone
SS	sheared surface
CS	crushed seam

planarity

PL	planar
CU	curved
UN	undulating
ST	stepped
IR	irregular

roughness

VR	very rough
RO	rough
SO	smooth
SL	slickensided

coating

CN	clean
SN	stained
VN	veneer
CO	coating

drawn	**BM**	coffey geotechnics SPECIALISTS MANAGING THE EARTH	client:	**Health Infrastructure , NSW**
approved	**SS**		project:	**GEOTECHNICAL & ENVIRONMENTAL INVESTIGATION – BLACKTOWN HOSPITAL**
date	**20/2/2011**		title:	**BOREHOLE PHOTOGRAPH–BH10: 8.20m – 10.00m**
scale	**Not to scale**		project no: **GEOTLCOV24207AB**	Photo no: **BH10 1 of 1**
original size	**A4**			

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Engineering Log - Borehole

Borehole No. **BH11**

Sheet 1 of 3

Project No: **GEOTLCOV24207AB**

Client: ***Health Infrastructure***

Date started: ***22.2.2011***

Principal:

Date completed: ***22.2.2011***

Project: ***Blacktown Hospital Development***

Logged by: ***VJ***

Borehole Location: ***Blacktown District Hospital Carpark***

Checked by: ***SS***

drill model and mounting: Hydrapower Scout Truck | Easting: 307075 | slope: -90° | R.L. Surface: 61.6

hole diameter: 125 mm | Northing 6260694 | bearing: | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	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		C		E					**FILL: BITUMEN:** Black.	D			PAVEMENT
									FILL: SAND: Fine to medium grained sand, brown, with some fine to coarse gravel, trace of clay.				FILL 0.1-0.3m PID=4.5ppm
				SPT 1,2,2 N*=4	61	1		CL	**CLAY:** Medium plasticity, brown, with some fine to medium sand and fine gravel.	<Wp	VSt	×	POSSIBLE FILL 0.5-0.6m PID=6.8ppm
					60	2							
				SPT 4,9,16 N*=25				CL	**CLAY:** Medium plasticity, pale grey/pale brown, with some ironstone gravel.		VSt/H		RESIDUAL SOIL 2.0-2.1m PID=2.9ppm
					59	3							
				SPT 9,8 N*=R	58	4			**SHALE:** Extremely weathered, pale grey/pale brown/orange brown, estimated to be very low strength, remoulds to a gravelly clay.				SHALE 3.5-3.6m PID=3.9ppm
					57	5							
									Borehole BH11 continued as cored hole				
					56	6							
					55	7							
					54	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

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Engineering Log - Cored Borehole

Borehole No.	***BH11***		
Sheet	2 of 3		
Project No:	***GEOTLCOV24207AB***		
Client:	***Health Infrastructure***	Date started:	***22.2.2011***
Principal:		Date completed:	***22.2.2011***
Project:	***Blacktown Hospital Development***	Logged by:	***VJ***
Borehole Location:	***Blacktown District Hospital Carpark***	Checked by:	***SS***

drill model & mounting: Hydrapower Scout Truck | Easting: 307075 | slope: -90° | R.L. Surface: 61.6

hole diameter: 125 mm Drilling fluid: | Northing: 6260694 | bearing: | datum: AHD

drilling information | **material substance** | **rock mass defects**

method	core-lift	water	RL	depth metres	graphic log core recovery	material: rock type; grain characteristics, colour, structure, minor components	weathering alteration	estimated strength VL L M H VH EH	$Is_{(50)}$ MPa D- diametral A- axial	RQD %	defect spacing mm 30 100 300 1000 3000	defect description: type, inclination, planarity, roughness, coating, thickness — particular / general
			61	1								
			60	2								
			59	3								
			58	4								
			57	5		Continued from non-cored borehole						
NMLC		Groundwater Not Monitored	56	6		**SHALE:** Pale grey/red brown, thinly bedded at 0-5°, with some laminations of fine grained sandstone.	HW / MW		D 0.11 A 0.44; D 0.22	70		Highly Fractured Zone, 230mm; JT, 20°, CLAY SM, 20mm; PT; PT; PT; JT, 90°, PL, SN, 30mm; PT; PT; PT; PT; SM, 0°, ~5mm; PT; JT, 90°, IR, SN, ~130mm; PT; PT; SM, 0°, 5mm; PT; SM, 0°, ~5mm; PT, 0°, PL, SO, SN; PT, 0°, PL, SO, CN; PT, 0°, PL, SO, CN
			55	7		**INTERLAMINATED SANDSTONE (70%) AND SHALE (30%):** Fine to medium grained sandstone, pale grey mottled orange brown/dark grey, thinly bedded at 0-5°, with some iron staining along defects.	SW		D 0.3 A 1.01			
			54	8		**INTERLAMINATED SHALE (55%) AND SANDSTONE (45%):** Fine to medium grained sandstone, pale grey to dark grey, thinly bedded at 0-5°.			D 0.36 A 0.38; D 0.3 A 0.7; D A			

All defects are: PT, 0°-10°, PL-IR, RO, CN-SN; unless noted otherwise

method
DT diatube; AS auger screwing; AD auger drilling; RR roller/tricone; CB claw or blade bit; NMLC NMLC core; NQ, HQ, PQ wireline core

core-lift
casing used; barrel withdrawn

graphic log/core recovery
core recovered - graphic symbols indicate material; no core recovered

water
10/1/98 water level on date shown; water inflow; partial drill fluid loss; complete drill fluid loss; 25 water pressure test result (lugeons) for depth interval shown

weathering
FR fresh; SW slightly weathered; MW moderately weathered; HW highly weathered; XW extremely weathered; DW distinctly weathered (covers MW and HW)

strength
VL very low; L low; M medium; H high; VH very high; EH extremely high

defect type
JT joint; PT parting; SM seam; SZ sheared zone; SS sheared surface; CS crushed seam

planarity
PL planar; CU curved; UN undulating; ST stepped; IR irregular

roughness
VR very rough; RO rough; SO smooth; SL slickensided

coating
CN clean; SN stained; VN veneer; CO coating

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Engineering Log - Cored Borehole

Borehole No. **BH11**

Sheet 3 of 3

Project No: **GEOTLCOV24207AB**

Client: ***Health Infrastructure***

Date started: ***22.2.2011***

Principal:

Date completed: ***22.2.2011***

Project: ***Blacktown Hospital Development***

Logged by: ***VJ***

Borehole Location: ***Blacktown District Hospital Carpark***

Checked by: ***SS***

drill model & mounting: Hydrapower Scout Truck | Easting: 307075 | slope: -90° | R.L. Surface: 61.6

hole diameter: 125 mm | Drilling fluid: | Northing: 6260694 | bearing: | datum: AHD

drilling information					material substance					rock mass defects		
method	core-lift	water	RL	depth metres	graphic log core recovery	material: rock type; grain characteristics, colour, structure, minor components	weathering alteration	estimated strength VL L M H VH EH	$Is_{(50)}$ MPa D- diametral A- axial	RQD %	defect spacing mm 30 100 300 1000 3000	defect description: type, inclination, planarity, roughness, coating, thickness — particular / general
NMLC			53	9		**INTERLAMINATED SHALE (55%) AND SANDSTONE (45%):** Fine to medium grained sandstone, pale grey to dark grey, thinly bedded at 0-5°. *(continued)*	SW		0.3 0.5 D A; 0.4 0.8 D A; 0.4 0.7; D A 0.2 0.3; D A 0.2 0.3; D A 0.4 0.5; D A 0.4 0.4	80		PT, 0°, PL, SO, CN; PT; Highly Fractured Zone, 60mm; PT; PT; Highly Fractured Zone, 80mm; PT; PT; PT
			52	10		**NO CORE:** 0.03m						
						BH11 terminated at 10m						
			51	11								
			50	12								
			49	13								
			48	14								
			47	15								
			46	16								

method

DT	diatube
AS	auger screwing
AD	auger drilling
RR	roller/tricone
CB	claw or blade bit
NMLC	NMLC core
NQ, HQ, PQ	wireline core

core-lift

- casing used
- barrel withdrawn

graphic log/core recovery

- core recovered - graphic symbols indicate material
- no core recovered

water

- 10/1/98 water level on date shown
- water inflow
- partial drill fluid loss
- complete drill fluid loss
- 25 water pressure test result (lugeons) for depth interval shown

weathering

FR	fresh
SW	slightly weathered
MW	moderately weathered
HW	highly weathered
XW	extremely weathered
DW	distinctly weathered (covers MW and HW)

strength

VL	very low
L	low
M	medium
H	high
VH	very high
EH	extremely high

defect type

JT	joint
PT	parting
SM	seam
SZ	sheared zone
SS	sheared surface
CS	crushed seam

planarity

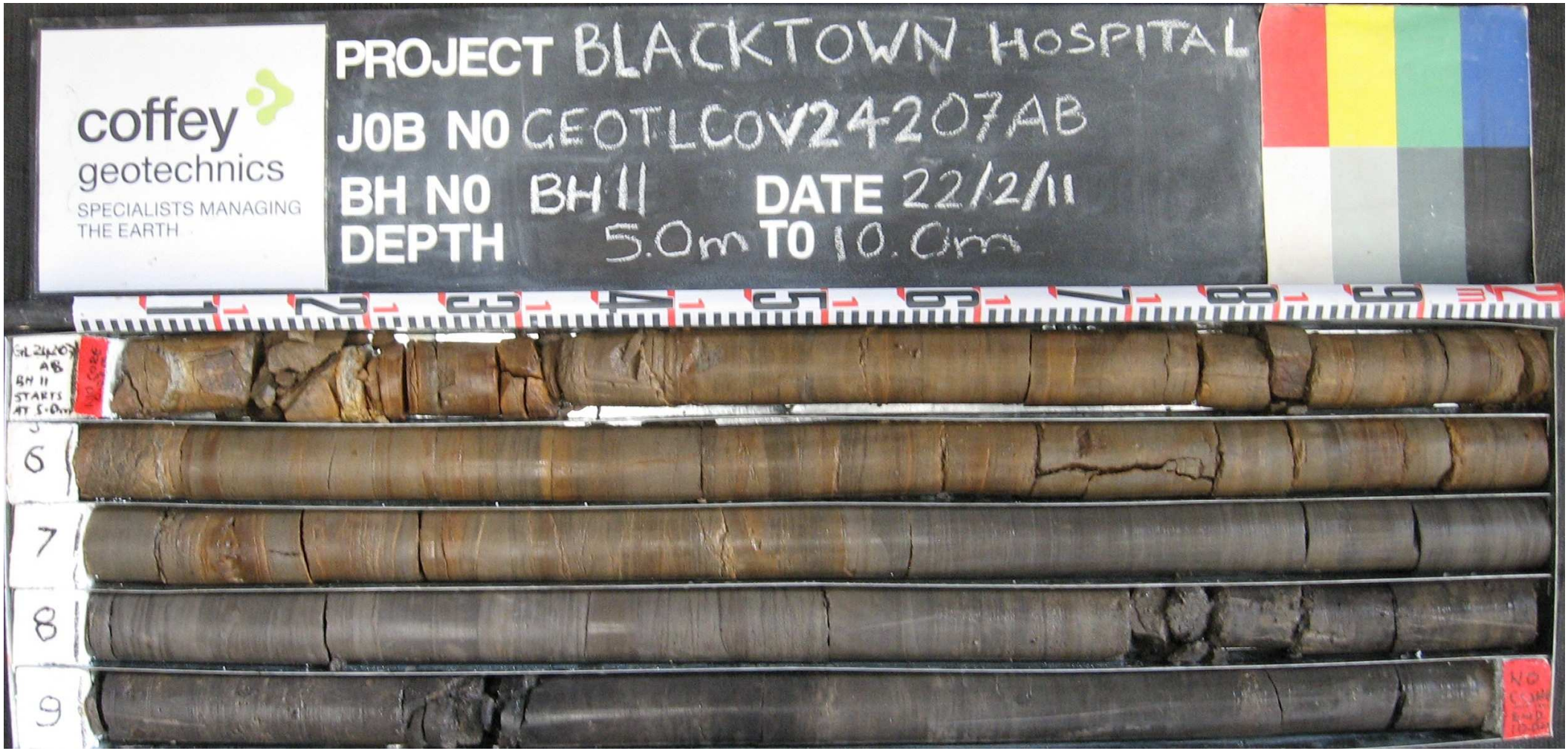
PL	planar
CU	curved
UN	undulating
ST	stepped
IR	irregular

roughness

VR	very rough
RO	rough
SO	smooth
SL	slickensided

coating

CN	clean
SN	stained
VN	veneer
CO	coating



drawn	**BM**	coffey geotechnics SPECIALISTS MANAGING THE EARTH	client:	**Health Infrastructure , NSW**
approved	**SS**		project:	**GEOTECHNICAL & ENVIRONMENTAL INVESTIGATION – BLACKTOWN HOSPITAL**
date	**22/2/2011**		title:	**BOREHOLE PHOTOGRAPH–BH11: 5.00m – 10.00m**
scale	**Not to scale**		project no: **GEOTLCOV24207AB**	Photo no: **BH11 1 of 1**
original size	**A4**			

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Engineering Log - Excavation

Excavation No. **TPB1**

Sheet 1 of 1

Project No: **GEOTLCOV24207AB**

Client: ***Health Infrastructure***

Date started: ***18.2.2011***

Principal:

Date completed: ***18.2.2011***

Project: ***Blacktown Hospital Development***

Logged by: ***LJG***

Test pit location: ***Blacktown District Hospital Carpark***

Checked by: ***SS***

equipment type and model: Yanmar 5t Excavator | Pit Orientation: | Easting: 307294 m | R.L. Surface: 57.3

excavation dimensions: 3.3m long 1.9m wide | Northing: 6260716 m | datum: AHD

excavation information | **material substance**

method	penetration 1 2 3	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 kPa 100 200 300 400	structure and additional observations
E		N	Groundwater Not Encountered	E + D	57.0	0.5			**FILL: Sandy CLAY:** Low to medium plasticity, fine grained sand, with some roots.	<Wp			TOPSOIL
									FILL: CLAY: Low to medium plasticity, brown, with some fine to medium roots, trace of gravel and sand.				FILL 0.2-0.3m PID=4.0ppm
				Bs					**FILL: CLAY:** Medium to high plasticity, pale grey/red brown, with some fine ironstone gravel, trace of sand, roots and terracotta pipe.				From 0.4m fill has appearance of residual soil.
				E + D	56.5	1.0							0.8-0.9m PID=4.6ppm
				E + D	56.0	1.5							1.2-1.3m PID=3.4ppm
				Bs									Terracotta pipe at 1.4m; 150mm diameter
					55.5	2.0		CL/CH	**CLAY:** Medium to high plasticity, pale grey/red brown, with some fine ironstone gravel and fine angular shale gravel, trace of sand.		VSt/H	×	RESIDUAL SOIL
				E	55.0	2.5							2.1-2.2m PID=1.1ppm
				Bs	54.5	3.0			**SHALE:** Extremely weathered, pale grey mottled red brown, estimated to be very low strength, remoulds to a gravelly clay.				SHALE
									SHALE: Highly weathered, pale grey mottled red brown, estimated to be low strength, remoulds to a gravelly clay.				
					54.0	3.5			Test pit TPB1 terminated at 3m				
					53.5	4.0							

Sketch

method
N natural exposure
X existing excavation
BH backhoe bucket
B bulldozer blade
R ripper
E excavator

support
S shoring N nil

penetration
1 2 3 4 no resistance ranging to refusal

water
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
V vane shear (kPa)
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

TESTPIT GEOTLCOV24207AB.GPJ COFFEY.GDT 15.3.11

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Engineering Log - Excavation

Excavation No. **TPB2**

Sheet 1 of 1

Project No: **GEOTLCOV24207AB**

Client: ***Health Infrastructure***

Date started: ***18.2.2011***

Principal:

Date completed: ***18.2.2011***

Project: ***Blacktown Hospital Development***

Logged by: ***LJG***

Test pit location: ***Blacktown District Hospital Carpark***

Checked by: ***SS***

equipment type and model: Yanmar 5t Excavator | Pit Orientation: | Easting: 307330 m | R.L. Surface: 56.85

excavation dimensions: 2.8m long 1.7m wide | Northing: 6260714 m | datum: AHD

excavation information | **material substance**

method	penetration 1 2 3	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
E		N	Groundwater Not Encountered	E + D	56.5	0.5			**FILL: Sandy CLAY:** Low to medium plasticity, dark brown, fine to medium grained sand, with some fine to medium roots.	<Wp			TOPSOIL FILL 0.1-0.2m PID=0.2ppm DUP 2: 0.1-0.2m
				E + D					**FILL: CLAY:** Medium plasticity, brown, with some fine to medium roots, trace of fine gravel and fine sand.				
				Bs	56.0	1.0		CL/CH	**CLAY:** Medium to high plasticity, brown/pale grey, with some fine rounded ironstone, trace of sand and roots.		VSt		RESIDUAL SOIL
				E + D	55.5	1.5		CL/CH	**CLAY:** Medium to high plasticity, red brown/pale grey, with some fine ironstone gravel, trace of roots.		H		1.0-1.2m PID=4.5ppm Large root at 1.25m
				Bs	55.0	2.0			**SHALE:** Extremely weathered, pale grey/red brown, iron stained, estimated to be very low strength, remoulds to a gravelly clay. At 1.80m becoming with some fine to medium angular shale gravel.				SHALE
				Bs	54.5	2.5			Test pit TPB2 terminated at 2.4m				
					54.0	3.0							
					53.5	3.5							
					53.0	4.0							

Sketch

method
- N natural exposure
- X existing excavation
- BH backhoe bucket
- B bulldozer blade
- R ripper
- E excavator

support
- S shoring
- N nil

penetration
1 2 3 4 — no resistance ranging to refusal

water
- 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
- V vane shear (kPa)
- 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

TESTPIT GEOTLCOV24207AB.GPJ COFFEY.GDT 15.3.11

Form GEO 5.2 Issue 3 Rev.2

Appendix B

Geotechnical Laboratory Testing Results

POINT LOAD STRENGTH INDEX

Australian Standard AS4133.4.1-1993 Method 4.1:Rock Strength Tests - Determination of Point Load Strength Index

Job No. GEOTLCOV24207AB
Sheet 1 OF **11**

CLIENT: Health Infrastructure NSW
PROJECT: GEOTLCOV24207AB
LOCATION: Blacktown Hospital

Test Machine: GSA bench-mounted
Testing Locality: Lane Cove West indoor storage area
Tested By: BM
Test Date: 23/2/2011
Checked:

Date of Calibration:
Calibrated By:
Sampled Date: 15/2/2011
Storage Location: Lane Cove West indoor storage area

Borehole No. / Test Depth (m)		Rock Description	Moisture Condition[1] (N, D or S)	Diametral test							Axial or Irregular lump								Comments / Strength Classification
				Length L[2] (mm)	Diameter D (mm)	Load P (Gauge) (N)	$I_s=(P/D^2)$ x 1000 (MPa)	Size Correction $F=(D/50)^{0.45}$	$I_{s(50)}$ (MPa)	Strength Class (Diametral)	Width W (core diameter) (mm)	Platen Separation D[2] (mm)	D_e^2	Load (Gauge) (kN)	$I_s=(P/D_e^2)$ x 1000 (MPa)	Size Correction $F=(D_e/50)^{0.45}$	$I_{s(50)}$ (MPa)	Strength Class (Axial)	
BH1	6.80	Shale	N	27.0	50.0	0	0.00	1.00	0.00	**V. Low**	50.0	27.0	1719	0.00	0.00	0.92	0.00	**V. Low**	BB
BH1	7.93	Shale	N	34.0	50.0	0.55	0.22	1.00	0.22	**Low**	50.0	34.0	2165	0.52	0.24	0.97	0.23	**Low**	
BH1	8.10	Shale	N	35.0	50.0	0.82	0.33	1.00	0.33	**Medium**	50.0	35.0	2228	0.89	0.40	0.97	0.39	**Medium**	
BH1	8.49	Shale	N	35.0	50.0	0.71	0.28	1.00	0.28	**Low**	50.0	35.0	2228	0.77	0.35	0.97	0.34	**Medium**	
BH1	8.87	Shale	N	37.0	50.0	0.74	0.30	1.00	0.3	**Low**	50.0	37.0	2355	0.53	0.23	0.99	0.2	**Low**	
BH1	9.0	Shale	N	29.0	50.0	0.41	0.16	1.00	0.2	**Low**	50.0	29.0	1846	0.56	0.30	0.93	0.3	**Low**	
BH1	9.44	Shale	N	44.0	50.0	0.74	0.30	1.00	0.3	**Low**	50.0	44.0	2801	0.87	0.31	1.03	0.3	**Medium**	
BH1	9.92	Shale	N	26.0	50.0	0.67	0.27	1.00	0.3	**Low**	50.0	26.0	1655	0.50	0.30	0.91	0.3	**Low**	

NOTES

(1): N = Natural, D = Dry, S = Saturated
(2): L > 0.5D, 0.3 < D/W < 1.0

$I_{s(50)}$ MPa and Strength Classification

< 0.1	Very Low	1 - 3	High
0.1 - 0.3	Low	3 - 10	Very High
0.3 - 1	Medium	> 10	Extreamly High

POINT LOAD STRENGTH INDEX

Australian Standard AS4133.4.1-1993 Method 4.1:Rock Strength Tests - Determination of Point Load Strength Index

Job No. GEOTLCOV24207AB
Sheet 2 of **11**

CLIENT: Health Infrastructure NSW
PROJECT: GEOTLCOV24207AB
LOCATION: Blacktown Hospital

Test Machine: GSA bench-mounted
Testing Locality: Lane Cove West indoor storage area
Tested By: BM
Test Date: 23/2/2011
Checked:

Date of Calibration:
Calibrated By:
Sampled Date: 16/2/2011
Storage Location: Lane Cove West indoor storage area

Borehole No. / Test Depth (m)		Rock Description	Moisture Condition(1) (N, D or S)	Diametral test							Axial or Irregular lump								Comments / Strength Classification
				Length L (2) (mm)	Diameter D (mm)	Load P (Gauge) (N)	$I_s=(P/D^2)$ x 1000 (MPa)	Size Correction $F=(D/50)^{0.45}$	$I_{s(50)}$ (MPa)	Strength Class (Diametral)	Width W (core diameter) (mm)	Platen Separation D (2) (mm)	D_e^2	Load (Gauge) (kN)	$I_s=(P/D_e^2)$ x 1000 (MPa)	Size Correction $F=(D_e/50)^{0.45}$	$I_{s(50)}$ (MPa)	Strength Class (Axial)	
BH2	8.01	Shale	N	28.0	50.0	0.78	0.31	1.00	0.31	**Medium**	50.0	28.0	1783	0.58	0.33	0.93	0.30	**Medium**	
BH2	8.44	Shale	N	31.0	50.0	0.69	0.28	1.00	0.28	**Low**	50.0	28.0	1783	0.61	0.34	0.93	0.32	**Medium**	
BH2	8.68	Shale	N	30.0	50.0	0.49	0.20	1.00	0.20	**Low**									JT/BB (diametral)
BH2	9.17	Shale	N	39.0	50.0	0.49	0.20	1.00	0.20	**Low**	50.0	30.0	1910	1.30	0.68	0.94	0.64	**Medium**	
BH2	9.80	Shale	N	27.0	50.0	0.63	0.25	1.00	0.3	**Low**	50.0	39.0	2483						BB

NOTES

(1): N = Natural, D = Dry, S = Saturated
(2): L > 0.5D, 0.3 < D/W < 1.0

$I_{s(50)}$ MPa and Strength Classification

< 0.1	Very Low	1 - 3	High
0.1 - 0.3	Low	3 - 10	Very High
0.3 - 1	Medium	> 10	Extreamly High

POINT LOAD STRENGTH INDEX

Australian Standard AS4133.4.1-1993 Method 4.1:Rock Strength Tests - Determination of Point Load Strength Index

Job No. GEOTLCOV24207AB
Sheet 3 of **11**

CLIENT: Health Infrastructure NSW
PROJECT: GEOTLCOV24207AB
LOCATION: Blacktown Hospital

Test Machine: GSA bench-mounted
Testing Locality: Lane Cove West indoor storage area
Tested By: BM
Test Date: 23/2/2011
Checked:

Date of Calibration:
Calibrated By:
Sampled Date: 16/2/2011
Storage Location: Lane Cove West indoor storage area

Borehole No. / Test Depth (m)		Rock Description	Moisture Condition[1] (N, D or S)	Diametral test							Axial or Irregular lump								Comments / Strength Classification
				Length L [2] (mm)	Diameter D (mm)	Load P (Gauge) (N)	$I_s=(P/D^2)$ x 1000 (MPa)	Size Correction $F=(D/50)^{0.45}$	$I_{s(50)}$ (MPa)	Strength Class (Diametral)	Width W (core diameter) (mm)	Platen Separation D [2] (mm)	D_e^2	Load (Gauge) (kN)	$I_s=(P/D_e^2)$ x 1000 (MPa)	Size Correction $F=(D_e/50)^{0.45}$	$I_{s(50)}$ (MPa)	Strength Class (Axial)	
BH3	7.16	Shale	N	35.0	50.0	0	0.00	1.00	0.00	**V. Low**	50.0	35.0	2228	0.14	0.06	0.97	0.06	**V. Low**	BB
BH3	7.60	Shale	N	36.0	50.0	0.42	0.17	1.00	0.17	**Low**	50.0	36.0	2292	0.28	0.12	0.98	0.12	**Low**	BB
BH3	7.80	Shale	N	30.0	50.0	0.63	0.25	1.00	0.25	**Low**	50.0	30.0	1910	0.52	0.27	0.94	0.26	**Low**	
BH3	8.51	Shale	N	35.0	50.0	1.07	0.43	1.00	0.43	**Medium**	50.0	35.0	2228	1.14	0.51	0.97	0.50	**Medium**	
BH3	9.96	Shale	N	40.0	50.0	0.41	0.16	1.00	0.2	**Low**	50.0	40.0	2546	0.55	0.22	1.00	0.2	**Low**	BB
BH3	9.39	Shale	N	30.0	50.0	0.64	0.26	1.00	0.3	**Low**	50.0	30.0	1910	0.71	0.37	0.94	0.3	**Medium**	
BH3	9.97	Shale	N	35.0	50.0	0.46	0.18	1.00	0.2	**Low**	50.0	35.0	2228	0.64	0.29	0.97	0.3	**Low**	

NOTES

(1): N = Natural, D = Dry, S = Saturated
(2): L > 0.5D, 0.3 < D/W < 1.0

$I_{s(50)}$ MPa and Strength Classification

< 0.1	Very Low	1 - 3	High
0.1 - 0.3	Low	3 - 10	Very High
0.3 - 1	Medium	> 10	Extreamly High

POINT LOAD STRENGTH INDEX

Australian Standard AS4133.4.1-1993 Method 4.1:Rock Strength Tests - Determination of Point Load Strength Index

Job No. GEOTLCOV24207AB
Sheet 4 of **11**

CLIENT: Health Infrastructure NSW
PROJECT: GEOTLCOV24207AB
LOCATION: Blacktown Hospital

Test Machine: GSA bench-mounted
Testing Locality: Lane Cove West indoor storage area
Tested By: BM
Test Date: 23/2/2011
Checked:

Date of Calibration:
Calibrated By:
Sampled Date: 18/2/2011
Storage Location: Lane Cove West indoor storage area

Borehole No. / Test Depth (m)		Rock Description	Moisture Condition[1] (N, D or S)	Diametral test							Axial or Irregular lump								Comments / Strength Classification
				Length L[2] (mm)	Diameter D (mm)	Load P (Gauge) (N)	$I_s=(P/D^2)$ x 1000 (MPa)	Size Correction $F=(D/50)^{0.45}$	$I_{s(50)}$ (MPa)	Strength Class (Diametral)	Width W (core diameter) (mm)	Platen Separation D[2] (mm)	D_e^2	Load (Gauge) (kN)	$I_s=(P/D_e^2)$ x 1000 (MPa)	Size Correction $F=(D_e/50)^{0.45}$	$I_{s(50)}$ (MPa)	Strength Class (Axial)	
BH4	5.54	Shale	N	34.0	50.0	0.53	0.21	1.00	0.21	**Low**	50.0	34.0	2165	0.30	0.14	0.97	0.13	**Low**	
BH4	5.93	Shale	N	28.0	50.0	0.2	0.08	1.00	0.08	**V. Low**	50.0	28.0	1783	0.35	0.20	0.93	0.18	**Low**	BB
BH4	6.09	Shale	N	28.0	50.0	0	0.00	1.00	0.00	**V. Low**	50.0	28.0	1783	0.06	0.03	0.93	0.03	**V. Low**	BB
BH4	6.87	Shale	N	36.0	50.0	0.24	0.10	1.00	0.10	**V. Low**	50.0	36.0	2292	0.22	0.10	0.98	0.09	**V. Low**	BB
BH4	7.11	Shale	N	36.0	50.0	0.13	0.05	1.00	0.1	**V. Low**	50.0	36.0	2292	0.44	0.19	0.98	0.2	**Low**	BB
BH4	7.93	Shale	N	35.0	50.0	0	0.00	1.00	0.0	**V. Low**	50.0	35.0	2228	0.49	0.22	0.97	0.2	**Low**	BB
BH4	8.00	Shale	N	40.0	50.0	0.61	0.24	1.00	0.2	**Low**	50.0	40.0	2546	0.72	0.28	1.00	0.3	**Low**	
BH4	8.27	Shale	N	27.0	50.0	0.55	0.22	1.00	0.2	**Low**	50.0	27.0	1719	0.53	0.31	0.92	0.3	**Low**	
BH4	8.94	Shale	N	30.0	50.0	0.55	0.22	1.00	0.2	**Low**	50.0	30.0	1910	0.06	0.03	0.94	0.0	**V. Low**	
BH4	9.58	Shale	N	35.0	50.0	0.88	0.35	1.00	0.4	**Medium**	50.0	35.0	2228	1.47	0.66	0.97	0.6	**Medium**	
BH4	9.71	Shale	N	42.0	50.0	0.13	0.05	1.00	0.1	**V. Low**	50.0	42.0	2674	0.78	0.29	1.02	0.3	**Low**	BB

NOTES

(1): N = Natural, D = Dry, S = Saturated
(2): L > 0.5D, 0.3 < D/W < 1.0

$I_{s(50)}$ MPa and Strength Classification

< 0.1	Very Low	1 - 3	High
0.1 - 0.3	Low	3 - 10	Very High
0.3 - 1	Medium	> 10	Extreamly High

POINT LOAD STRENGTH INDEX

Australian Standard AS4133.4.1-1993 Method 4.1:Rock Strength Tests - Determination of Point Load Strength Index

Job No. GEOTLCOV24207AB
Sheet 5 of **11**

CLIENT: Health Infrastructure NSW
PROJECT: GEOTLCOV24207AB
LOCATION: Blacktown Hospital

Test Machine: GSA bench-mounted
Testing Locality: Lane Cove West indoor storage area
Tested By: BM
Test Date: 23/2/2011
Checked:

Date of Calibration:
Calibrated By:
Sampled Date: 17/2/2011
Storage Location: Lane Cove West indoor storage area

Borehole No. / Test Depth (m)		Rock Description	Moisture Condition[1] (N, D or S)	Diametral test							Axial or Irregular lump								Comments / Strength Classification
				Length L[2] (mm)	Diameter D (mm)	Load P (Gauge) (N)	$I_s=(P/D^2)$ x 1000 (MPa)	Size Correction $F=(D/50)^{0.45}$	$I_{s(50)}$ (MPa)	Strength Class (Diametral)	Width W (core diameter) (mm)	Platen Separation D[2] (mm)	D_e^2	Load (Gauge) (kN)	$I_s=(P/D_e^2)$ x 1000 (MPa)	Size Correction $F=(D_e/50)^{0.45}$	$I_{s(50)}$ (MPa)	Strength Class (Axial)	
BH5	6.77	Shale	N	35.0	50.0	0.33	0.13	1.00	0.13	**Low**	50.0	35.0	2228	0.44	0.20	0.97	0.19	**Low**	BB
BH5	6.80	Shale	N								50.0	30.0	1910	0.52	0.27	0.94	0.26	**Low**	
BH5	7.07	Shale	N	28.0	50.0	0.31	0.12	1.00	0.12	**Low**	50.0	28.0	1783	0.42	0.24	0.93	0.22	**Low**	BB
BH5	7.29	Shale	N	26.0	50.0	0.25	0.10	1.00	0.10	**V. Low**	50.0	26.0	1655	0.55	0.33	0.91	0.30	**Medium**	
BH5	8.0	Shale	N	35.0	50.0	0.58	0.23	1.00	0.2	**Low**	50.0	35.0	2228	0.64	0.29	0.97	0.3	**Low**	
BH5	8.7	Shale	N	26.0	50.0	0.53	0.21	1.00	0.2	**Low**	50.0	26.0	1655	0.67	0.40	0.91	0.4	**Medium**	BB
BH5	8.97	Shale	N	30.0	50.0	0.6	0.24	1.00	0.2	**Low**	50.0	30.0	1910	0.72	0.38	0.94	0.4	**Medium**	
BH5	9.07	Shale	N	26.0	50.0	0.08	0.03	1.00	0.0	**V. Low**	50.0	26.0	1655	0.50	0.30	0.91	0.3	**Low**	
BH5	9.68	Shale	N	30.0	50.0	0.47	0.19	1.00	0.2	**Low**	50.0	30.0	1910	0.61	0.32	0.94	0.3	**Medium**	
BH5	9.34	Shale	N	38.0	50.0	0.58	0.23	1.00	0.2	**Low**	50.0	358.0	22791	0.72	0.03	1.64	0.1	**V. Low**	BB

NOTES

(1): N = Natural, D = Dry, S = Saturated
(2): L > 0.5D, 0.3 < D/W < 1.0

$I_{s(50)}$ MPa and Strength Classification

< 0.1	Very Low	1 - 3	High
0.1 - 0.3	Low	3 - 10	Very High
0.3 - 1	Medium	> 10	Extreamly High

POINT LOAD STRENGTH INDEX

Australian Standard AS4133.4.1-1993 Method 4.1:Rock Strength Tests - Determination of Point Load Strength Index

Job No. GEOTLCOV24207AB
Sheet 6 of **11**

CLIENT: Health Infrastructure NSW
PROJECT: GEOTLCOV24207AB
LOCATION: Blacktown Hospital

Test Machine: GSA bench-mounted
Testing Locality: Lane Cove West indoor storage area
Tested By: BM
Test Date: 23/2/2011
Checked:

Date of Calibration:
Calibrated By:
Sampled Date: 17/2/2011
Storage Location: Lane Cove West indoor storage area

Borehole No. / Test Depth (m)		Rock Description	Moisture Condition(1) (N, D or S)	Diametral test							Axial or Irregular lump									Comments / Strength Classification
				Length L (2) (mm)	Diameter D (mm)	Load P (Gauge) (N)	$I_s=(P/D^2)$ x 1000 (MPa)	Size Correction $F=(D/50)^{0.45}$	$I_{s(50)}$ (MPa)	Strength Class (Diametral)	Width W (core diameter) (mm)	Platen Separation D (2) (mm)	D_e^2	Load (Gauge) (kN)	$I_s=(P/D_e^2)$ x 1000 (MPa)	Size Correction $F=(D_e/50)^{0.45}$	$I_{s(50)}$ (MPa)	Strength Class (Axial)	
BH6	6.41	Shale	N	32.0	50.0	0.08	0.03	1.00	0.03	**V. Low**	50.0	32.0	2037	0.36	0.18	0.95	0.17	**Low**	BB
BH6	7.15	Shale	N	27.0	50.0	0	0.00	1.00	0.00	**V. Low**	50.0	27.0	1719	0.00	0.00	0.92	0.00	**V. Low**	
BH6	7.42	Shale	N	31.0	50.0	0	0.00	1.00	0.00	**V. Low**	50.0	31.0	1974	0.78	0.40	0.95	0.37	**Medium**	
BH6	7.90	Shale	N	33.0	50.0	0.31	0.12	1.00	0.12	**Low**	50.0	33.0	2101	0.41	0.20	0.96	0.19	**Low**	
BH6	8.04	Shale	N	31.0	50.0	0	0.00	1.00	0.0	**V. Low**	50.0	31.0	1974	0.52	0.26	0.95	0.2	**Low**	
BH6	8.86	Shale	N	34.0	50.0	0.06	0.02	1.00	0.0	**V. Low**	50.0	34.0	2165	0.56	0.26	0.97	0.3	**Low**	
BH6	8.96	Shale	N	30.0	50.0	0.39	0.16	1.00	0.2	**Low**	50.0	30.0	1910	0.72	0.38	0.94	0.4	**Medium**	
BH6	9.12	Shale	N	36.0	50.0	0.27	0.11	1.00	0.1	**Low**	50.0	36.0	2292	1.10	0.48	0.98	0.5	**Medium**	
BH6	9.72	Shale	N	36.0	50.0	1.24	0.50	1.00	0.5	**Medium**	50.0	36.0	2292	1.10	0.48	0.98	0.5	**Medium**	
BH6	9.92	Shale	N	29.0	50.0	1.16	0.46	1.00	0.5	**Medium**	50.0	29.0	1846	0.72	0.39	0.93	0.4	**Medium**	

NOTES

(1): N = Natural, D = Dry, S = Saturated
(2): L > 0.5D, 0.3 < D/W < 1.0

$I_{s(50)}$ MPa and Strength Classification

< 0.1	Very Low	1 - 3	High
0.1 - 0.3	Low	3 - 10	Very High
0.3 - 1	Medium	> 10	Extreamly High

POINT LOAD STRENGTH INDEX

Australian Standard AS4133.4.1-1993 Method 4.1:Rock Strength Tests - Determination of Point Load Strength Index

Job No. GEOTLCOV24207AB
Sheet 7 of **11**

CLIENT: Health Infrastructure NSW
PROJECT: GEOTLCOV24207AB
LOCATION: Blacktown Hospital

Test Machine: GSA bench-mounted
Testing Locality: Lane Cove West indoor storage area
Tested By: BM
Test Date: 23/2/2011
Checked:

Date of Calibration:
Calibrated By:
Sampled Date: 18/2/2011
Storage Location: Lane Cove West indoor storage area

Borehole No. / Test Depth (m)		Rock Description	Moisture Condition[1] (N, D or S)	Diametral test							Axial or Irregular lump								Comments / Strength Classification
				Length L[2] (mm)	Diameter D (mm)	Load P (Gauge) (N)	$I_s=(P/D^2)$ x 1000 (MPa)	Size Correction $F=(D/50)^{0.45}$	$I_{s(50)}$ (MPa)	Strength Class (Diametral)	Width W (core diameter) (mm)	Platen Separation D[2] (mm)	D_e^2	Load (Gauge) (kN)	$I_s=(P/D_e^2)$ x 1000 (MPa)	Size Correction $F=(D_e/50)^{0.45}$	$I_{s(50)}$ (MPa)	Strength Class (Axial)	
BH7	4.4	Shale	N	36.0	50.0	0.69	0.28	1.00	0.28	**Low**	50.0	36.0	2292	1.13	0.49	0.98	0.48	**Medium**	
BH7	4.74	Shale	N	30.0	50.0	0.3	0.12	1.00	0.12	**Low**	50.0	30.0	1910	0.71	0.37	0.94	0.35	**Medium**	
BH7	5.27	Shale	N	30.0	50.0	0.27	0.11	1.00	0.11	**Low**	50.0	30.0	1910	0.49	0.26	0.94	0.24	**Low**	BB
BH7	5.60	Shale	N	40.0	50.0	0.69	0.28	1.00	0.28	**Low**	50.0	40.0	2546	0.97	0.38	1.00	0.38	**Medium**	
BH7	6.17	Sandstone	N	34.0	50.0	1.3	0.52	1.00	0.5	**Medium**	50.0	34.0	2165	0.75	0.35	0.97	0.3	**Medium**	
BH7	6.38	Sandstone	N	35.0	50.0	1.35	0.54	1.00	0.5	**Medium**	50.0	35.0	2228	1.79	0.80	0.97	0.8	**Medium**	
BH7	6.87	Sandstone	N	40.0	50.0	0.86	0.34	1.00	0.3	**Medium**	50.0	40.0	2546	1.98	0.78	1.00	0.8	**Medium**	BB
BH7	7.05	Sandstone	N	35.0	50.0	0.94	0.38	1.00	0.4	**Medium**	50.0	35.0	2228	3.14	1.41	0.97	1.4	**High**	BB
BH7	7.22	Sandstone	N	35.0	50.0	1.11	0.44	1.00	0.4	**Medium**	50.0	35.0	2228	3.64	1.63	0.97	1.6	**High**	
BH7	7.76	Sandstone	N	35.0	50.0	2.76	1.10	1.00	1.1	**High**	50.0	35.0	2228	4.47	2.01	0.97	2.0	**High**	
BH7	8.07	Sandstone	N	35.0	50.0	0.61	0.24	1.00	0.2	**Low**	50.0	35.0	2228	1.10	0.49	0.97	0.5	**Medium**	
BH7	8.45	Sandstone	N	27.0	50.0	1.11	0.44	1.00	0.4	**Medium**	50.0	27.0	1719	1.11	0.65	0.92	0.6	**Medium**	BB
BH7	8.70	Sandstone	N	30.0	50.0	0.30	0.12	1.00	0.1	**Low**	50.0	30.0	1910	0.63	0.33	0.94	0.3	**Medium**	BB
BH7	9.01	Sandstone	N	30.0	50.0	0.89	0.36	1.00	0.4	**Medium**	50.0	30.0	1910	1.10	0.58	0.94	0.5	**Medium**	
BH7	9.53	Sandstone	N	36.0	50.0	0.53	0.21	1.00	0.2	**Low**	50.0	36.0	2292	0.63	0.27	0.98	0.3	**Low**	
BH7	9.90	Sandstone	N	35.0	50.0	1.05	0.42	1.00	0.4	**Medium**	50.0	35.0	2228	1.14	0.51	0.97	0.5	**Medium**	

NOTES

(1): N = Natural, D = Dry, S = Saturated
(2): L > 0.5D, 0.3 < D/W < 1.0

$I_{s(50)}$ MPa and Strength Classification

< 0.1	Very Low	1 - 3	High
0.1 - 0.3	Low	3 - 10	Very High
0.3 - 1	Medium	> 10	Extreamly High

POINT LOAD STRENGTH INDEX

Australian Standard AS4133.4.1-1993 Method 4.1:Rock Strength Tests - Determination of Point Load Strength Index

Job No. GEOTLCOV24207AB
Sheet 8 of **11**

CLIENT: Health Infrastructure NSW
PROJECT: GEOTLCOV24207AB
LOCATION: Blacktown Hospital

Test Machine: GSA bench-mounted
Testing Locality: Lane Cove West indoor storage area
Tested By: BM
Test Date: 23/2/2011
Checked:

Date of Calibration:
Calibrated By:
Sampled Date: 21/2/2011
Storage Location: Lane Cove West indoor storage area

Borehole No. / Test Depth (m)		Rock Description	Moisture Condition[1] (N, D or S)	Diametral test							Axial or Irregular lump								Comments / Strength Classification
				Length L[2] (mm)	Diameter D (mm)	Load P (Gauge) (N)	$I_s=(P/D^2)$ x 1000 (MPa)	Size Correction $F=(D/50)^{0.45}$	$I_{s(50)}$ (MPa)	Strength Class (Diametral)	Width W (core diameter) (mm)	Platen Separation D[2] (mm)	D_e^2	Load (Gauge) (kN)	$I_s=(P/D_e^2)$ x 1000 (MPa)	Size Correction $F=(D_e/50)^{0.45}$	$I_{s(50)}$ (MPa)	Strength Class (Axial)	
BH8	5.30	Sandstone	N	30.0	50.0	0.78	0.31	1.00	0.31	**Medium**	50.0	30.0	1910	1.77	0.93	0.94	0.87	**Medium**	
BH8	5.86	Sandstone	N	30.0	50.0	1.74	0.70	1.00	0.70	**Medium**	50.0	30.0	1910	4.16	2.18	0.94	2.05	**High**	
BH8	6.43	Sandstone	N	35.0	50.0	1.13	0.45	1.00	0.45	**Medium**	50.0	35.0	2228	0.67	0.30	0.97	0.29	**Low**	
BH8	6.70	Sandstone	N	38.0	50.0	0.56	0.22	1.00	0.22	**Low**	50.0	38.0	2419	0.41	0.17	0.99	0.17	**Low**	BB
BH8	6.93	Sandstone	N	32.0	50.0	0.85	0.34	1.00	0.3	**Medium**	50.0	32.0	2037	0.86	0.42	0.95	0.4	**Medium**	
BH8	7.07	Sandstone	N	26.0	50.0	1.13	0.45	1.00	0.5	**Medium**	50.0	26.0	1655	0.93	0.56	0.91	0.5	**Medium**	
BH8	7.89	Shale	N	26.0	50.0	0.09	0.04	1.00	0.0	**V. Low**									
BH8	7.35	Shale	N	27.0	50.0	0.47	0.19	1.00	0.2	**Low**	50.0	26.0	1655	0.38	0.23	0.91	0.2	**Low**	
BH8	8.14	Shale	N	30.0	50.0	0.80	0.32	1.00	0.3	**Medium**	50.0	30.0	1910	0.61	0.32	0.94	0.3	**Medium**	
BH8	8.44	Shale	N	35.0	50.0	0.74	0.30	1.00	0.3	**Low**	50.0	35.0	2228	0.78	0.35	0.97	0.3	**Medium**	
BH8	8.87	Shale	N	34.0	50.0	0.50	0.20	1.00	0.2	**Low**	50.0	34.0	2165	0.71	0.33	0.97	0.3	**Medium**	
BH8	9.15	Shale	N	30.0	50.0	0.60	0.24	1.00	0.2	**Low**	50.0	30.0	1910	0.50	0.26	0.94	0.2	**Low**	
BH8	9.66	Shale	N	35.0	50.0	0.17	0.07	1.00	0.1	**V. Low**	50.0	35.0	2228	0.39	0.18	0.97	0.2	**Low**	BB
BH8	9.62	Shale	N	30.0	50.0	0.52	0.21	1.00	0.2	**Low**	50.0	30.0	1910	0.50	0.26	0.94	0.2	**Low**	

NOTES

(1): N = Natural, D = Dry, S = Saturated
(2): L > 0.5D, 0.3 < D/W < 1.0

$I_{s(50)}$ MPa and Strength Classification

< 0.1	Very Low	1 - 3	High
0.1 - 0.3	Low	3 - 10	Very High
0.3 - 1	Medium	> 10	Extreamly High

POINT LOAD STRENGTH INDEX

Australian Standard AS4133.4.1-1993 Method 4.1:Rock Strength Tests - Determination of Point Load Strength Index

Job No. GEOTLCOV24207AB
Sheet 9 of **11**

CLIENT: Health Infrastructure NSW
PROJECT: GEOTLCOV24207AB
LOCATION: Blacktown Hospital

Test Machine: GSA bench-mounted
Testing Locality: Lane Cove West indoor storage area
Tested By: BM
Test Date: 23/2/2011
Checked:

Date of Calibration:
Calibrated By:
Sampled Date: 20/2/2011
Storage Location: Lane Cove West indoor storage area

Borehole No. / Test Depth (m)		Rock Description	Moisture Condition(1) (N, D or S)	Diametral test							Axial or Irregular lump								Comments / Strength Classification
				Length L (2) (mm)	Diameter D (mm)	Load P (Gauge) (N)	$I_s=(P/D^2)$ x 1000 (MPa)	Size Correction $F=(D/50)^{0.45}$	$I_{s(50)}$ (MPa)	Strength Class (Diametral)	Width W (core diameter) (mm)	Platen Separation D (2) (mm)	D_e^2	Load (Gauge) (kN)	$I_s=(P/D_e^2)$ x 1000 (MPa)	Size Correction $F=(D_e/50)^{0.45}$	$I_{s(50)}$ (MPa)	Strength Class (Axial)	
BH9	5.24	Sandstone	N	31.0	50.0	0.89	0.36	1.00	0.36	**Medium**	50.0	31.0	1974	1.90	0.96	0.95	0.91	**Medium**	
BH9	5.50	Sandstone	N	32.0	50.0	0.28	0.11	1.00	0.11	**Low**	50.0	32.0	2037	0.31	0.15	0.95	0.15	**Low**	BB
BH9	6.28	Sandstone	N	31.0	50.0	0.46	0.18	1.00	0.18	**Low**	50.0	31.0	1974	0.60	0.30	0.95	0.29	**Low**	BB
BH9	6.43	Sandstone	N	27.0	50.0	12.25	4.90	1.00	4.90	**V. High**	50.0	27.0	1719	9.15	5.32	0.92	4.89	**V. High**	
BH9	7.30	Sandstone	N	34.0	50.0	0.31	0.12	1.00	0.1	**Low**	50.0	34.0	2165	1.35	0.62	0.97	0.6	**Medium**	
BH9	7.55	Sandstone	N	35.0	50.0	0.39	0.16	1.00	0.2	**Low**	50.0	35.0	2228	0.17	0.08	0.97	0.1	**V. Low**	
BH9	7.85	Sandstone	N	31.0	50.0	0.53	0.21	1.00	0.2	**Low**	50.0	31.0	1974	0.89	0.45	0.95	0.4	**Medium**	
BH9	8.02	Sandstone	N	32.0	50.0	0.93	0.37	1.00	0.4	**Medium**	50.0	32.0	2037	0.78	0.38	0.95	0.4	**Medium**	BB
BH9	8.28	Shale	N	27.0	50.0	0.06	0.02	1.00	0.0	**V. Low**	50.0	27.0	1719	0.28	0.16	0.92	0.1	**Low**	BB
BH9	8.46	Shale	N	28.0	50.0	0.61	0.24	1.00	0.2	**Low**	50.0	28.0	1783	0.61	0.34	0.93	0.3	**Medium**	BB
BH9	8.97	Sha;e	N	30.0	50.0	0.31	0.12	1.00	0.1	**Low**	50.0	30.0	1910	0.89	0.47	0.94	0.4	**Medium**	
BH9	9.17	Shale	N	31.0	50.0	0.67	0.27	1.00	0.3	**Low**	50.0	31.0	1974	0.89	0.45	0.95	0.4	**Medium**	
BH9	9.46	Shale	N	34.0	50.0	0.27	0.11	1.00	0.1	**Low**	50.0	34.0	2165	0.64	0.30	0.97	0.3	**Low**	BB
BH9	9.77	Shale	N	34.0	50.0	0.38	0.15	1.00	0.2	**Low**	50.0	34.0	2165	1.08	0.50	0.97	0.5	**Medium**	

NOTES

(1): N = Natural, D = Dry, S = Saturated
(2): L > 0.5D, 0.3 < D/W < 1.0

$I_{s(50)}$ MPa and Strength Classification

< 0.1	Very Low	1 - 3	High
0.1 - 0.3	Low	3 - 10	Very High
0.3 - 1	Medium	> 10	Extreamly High

SAMPLE RECEIPT ADVICE (SRA)

24 February 2011

Client Details			**Laboratory Details**		
Requested By	:	**Edward Wu**			
Client	:	Coffey Geotechnics Pty Ltd	Laboratory	:	SGS Environmental Services
Contact	:	Edward Wu	Manager	:	Edward Ibrahim
Address	:	8/12 Mars Road LANE COVE WEST NSW 2066	Address	:	Unit 16, 33 Maddox Street Alexandria NSW 2015
Email	:	edward_wu@coffey.com	Email	:	au.samplereceipt.sydney@sgs.com
Telephone	:	02 9911 1099	Telephone	:	61 2 8594 0400
Facsimile	:	02 9911 1002	Facsimile	:	61 2 8594 0499
Project	:	GL24207AB	Report No	:	**SE85671**
Order Number	:	20555,562,561,557,53	No. of Samples	:	43
Samples	:	38 Soils, 5 Waters	Due Date	:	1/03/2011

Date Instructions Received	:	22/02/2011
Sample Receipt Date	:	22/2/11

Samples received in good order	:	YES	Samples received in correct containers	:	YES
Samples received without headspace	:	YES	Sufficient quantity supplied	:	YES
Upon receipt sample temperature	:	Cool	Cooling Method	:	Ice Pack
Sample containers provided by	:	SGS	Samples clearly Labelled	:	YES
Turnaround time requested	:	Standard	Completed documentation received	:	YES

Samples will be held for 1 month for water samples and 3 months for soil samples from date of receipt of samples, unless otherwise instructed.

Comments

Extra samples TB2 and TS2 received to be placed on hold.

The signed chain of custody will be returned to you with the original report.

SGS Australia Pty Ltd | Unit 16, 33 Maddox Street Alexandria New South Wales 2015 t+61 (0)2 8594 0400 f+61 (0)2 85940499 www.au.sgs.com

Member of the SGS Group (SGS SA)

SAMPLE RECEIPT ADVICE (SRA) - continued

Client : Coffey Geotechnics Pty Ltd Report No : SE85671
Project : GL24207AB

Summary of Samples and Requested Analysis

The table below represents SGS Environmental Service's understanding and interpretation of the customer supplied sample request.
Please indicate ASAP if your request differs from these details.
Testing shall commence immediately as per this table, unless the customer intervenes with a correction prior to testing.
Note that a small X in the table below indicates some testing has not been requested in the package.

Sample No.	Description	Metals Prep & Inorganics - All	BTEX in Soil	TRH in soil with C6-C9 by P/T	PAHs in Soil	OC Pesticides in Soil	PCBs in Soil	Metals in Soil by ICP-OES	Mercury Cold Vapor/Hg Analyser	Asbestos ID in soil	BTEX in Water (µg/L)	TRH in water with C6-C9 by P/T	PAHs in Water	OC Pesticides in Water	PCBs in Water	Trace HM (ICP-MS)-Dissolved
1	BH1 (0.1-0.5)	x	X	X				X	X	X						
2	BH1 (0.5-0.95)	x	X	X				X	X	X						
3	BH1 (2.0-2.45)															
4	BH2 (0.1-0.3)	x	X	X	X	X	X	X	X	X						
5	BH2 (2.0-2.2)															
6	BH2 (0.5-0.7)	x	X	X				X	X	X						
7	BH2 (6.5-6.7)															
8	BH2 (3.5-3.7)															
9	BH2 (5-5.20)															
10	BH4A (0.2-0.3)															
11	BH4A (0.5-0.6)															
12	BH3 (0.1-0.3)	x	X	X				X	X	X						
13	BH3 (0.4-0.5)															
14	BH3 (0.5-0.75)	x	X	X	X	X	X	X	X	X						
15	BH3 (1.2-1.3)															
16	BH3 (2.0-2.45)															
17	BH3 (3.5-3.95)															
18	BH5 (0.3-0.4)	x	X	X	X	X	X	X	X	X						

SAMPLE RECEIPT ADVICE (SRA) - continued

Client : Coffey Geotechnics Pty Ltd Report No : SE85671
Project : GL24207AB

Sample No.	Description	Metals Prep & Inorganics - All	BTEX in Soil	TRH in soil with C6-C9 by P/T	PAHs in Soil	OC Pesticides in Soil	PCBs in Soil	Metals in Soil by ICP-OES	Mercury Cold Vapor/Hg Analyser	Asbestos ID in soil	BTEX in Water (µg/L)	TRH in water with C6-C9 by P/T	PAHs in Water	OC Pesticides in Water	PCBs in Water	Trace HM (ICP-MS)-Dissolved
19	BH5 (1-1.1)															
20	BH5 (1.3-1.4)	x	X	X				X	X	X						
21	BH5 (3.5-3.6)															
22	BH4 (0.1-0.3)	x	X	X				X	X	X						
23	BH4 (0.5-0.6)															
24	BH4 (2.0-2.1)															
25	BH4 (3.5-3.6)															
26	BH6 (0.1-0.3)	x	X	X				X	X	X						
27	BH6 (1.1-1.2)	x	X	X	X	X	X	X	X	X						
28	BH6 (2.35-2.45)															
29	BH6 (0.5-0.6)															
30	BH6 (5-5.1)															
31	TPB1 (0.2-0.4)	x	X	X				X	X	X						
32	TPB1 (0.8-0.9)															
33	TPB1 (1.2-1.3)															
34	TPB1 (2.1-2.2)															
35	TPB2 (0.1-0.2)	x	X	X	X	X	X	X	X	X						
36	TPB2 (0.4-0.6)															
37	TPB2 (1.0-1.2)															
38	WB1	x									X	X	X	X	X	X
39	TB1										X					
40	TS1										X					
41	DUP1	x	X	X	X	X	X	X	X							
42	TB2															

SAMPLE RECEIPT ADVICE (SRA) - continued

Client : Coffey Geotechnics Pty Ltd Report No : SE85671
Project : GL24207AB

Sample No.	Description	Metals Prep & Inorganics - All	BTEX in Soil	TRH in soil with C6-C9 by P/T	PAHs in Soil	OC Pesticides in Soil	PCBs in Soil	Metals in Soil by ICP-OES	Mercury Cold Vapor/Hg Analyser	Asbestos ID in soil	BTEX in Water (µg/L)	TRH in water with C6-C9 by P/T	PAHs in Water	OC Pesticides in Water	PCBs in Water	Trace HM (ICP-MS)-Dissolved
43	TS2															

Sample No.	Description	Mercury Cold Vapor/Hg Analyser	Hold sample-NO test required	Moisture
1	BH1 (0.1-0.5)			X
2	BH1 (0.5-0.95)			X
3	BH1 (2.0-2.45)		X	
4	BH2 (0.1-0.3)			X
5	BH2 (2.0-2.2)		X	
6	BH2 (0.5-0.7)			X
7	BH2 (6.5-6.7)		X	
8	BH2 (3.5-3.7)		X	
9	BH2 (5-5.20)		X	
10	BH4A (0.2-0.3)		X	
11	BH4A (0.5-0.6)		X	
12	BH3 (0.1-0.3)			X
13	BH3 (0.4-0.5)		X	
14	BH3 (0.5-0.75)			X

SAMPLE RECEIPT ADVICE (SRA) - continued

Client : Coffey Geotechnics Pty Ltd Report No : SE85671
Project : GL24207AB

Sample No.	Description	Mercury Cold Vapor/Hg Analyser	Hold sample-NO test required	Moisture
15	BH3 (1.2-1.3)		X	
16	BH3 (2.0-2.45)		X	
17	BH3 (3.5-3.95)		X	
18	BH5 (0.3-0.4)			X
19	BH5 (1-1.1)		X	
20	BH5 (1.3-1.4)			X
21	BH5 (3.5-3.6)		X	
22	BH4 (0.1-0.3)			X
23	BH4 (0.5-0.6)		X	
24	BH4 (2.0-2.1)		X	
25	BH4 (3.5-3.6)		X	
26	BH6 (0.1-0.3)			X
27	BH6 (1.1-1.2)			X
28	BH6 (2.35-2.45)		X	
29	BH6 (0.5-0.6)		X	
30	BH6 (5-5.1)		X	
31	TPB1 (0.2-0.4)			X
32	TPB1 (0.8-0.9)		X	
33	TPB1 (1.2-1.3)		X	
34	TPB1 (2.1-2.2)		X	
35	TPB2 (0.1-0.2)			X
36	TPB2 (0.4-0.6)		X	
37	TPB2 (1.0-1.2)		X	
38	WB1	X		

SAMPLE RECEIPT ADVICE (SRA) - continued

Client : Coffey Geotechnics Pty Ltd Report No : SE85671
Project : GL24207AB

Sample No.	Description	Mercury Cold Vapor/Hg Analyser	Hold sample-NO test required	Moisture
39	TB1			
40	TS1			
41	DUP1			X
42	TB2		X	
43	TS2		X	

ANALYTICAL REPORT

3 March 2011

Coffey Geotechnics Pty Ltd
8/12 Mars Road
LANE COVE WEST
NSW 2066

Attention: **Edward Wu**

Your Reference: GL24207AB - Blacktown

Our Reference: SE85709 Samples: 19 Soils
Received: 24/02/2011

Preliminary Report Sent: Not Issued

These samples were analysed in accordance with your written instructions.

For and on Behalf of:
SGS ENVIRONMENTAL SERVICES

Sample Receipt:	Angela Mamalicos	AU.SampleReceipt.Sydney@sgs.com
Production Manager:	Huong Crawford	Huong.Crawford@sgs.com

Results Approved and/or Authorised by:

Dong Liang
Quality Manager

Ravee Sivasubramaniam
Asbestos Signatory

Ly Kim Ha
Organics Signatory

Huong Crawford
Metals Signatory

SGS Australia Pty Ltd
ABN 44 000 964 278
Environmental Services Unit 16/33 Maddox Street Alexandria NSW 2015 Australia
t +61 (0)2 8594 0400 f + 61 (0)2 8594 0499 www.au.sgs.com

BTEX in Soil Our Reference: Your Reference Sample Matrix Date Sampled	UNITS ----------	SE85709-1 BH7 (0.1-0.3) Soil 17/02/2011	SE85709-4 BH8 (0.1-0.3) Soil 18/02/2011	SE85709-8 BH9 (0.1-0.3) Soil 21/02/2011	SE85709-9 BH9 (0.5-0.6) Soil 21/02/2011	SE85709-12 BH10 (0.1-0.3) Soil 21/02/2011
Date Extracted (BTEX)		1/03/2011	1/03/2011	1/03/2011	1/03/2011	1/03/2011
Date Analysed (BTEX)		2/03/2011	2/03/2011	2/03/2011	2/03/2011	2/03/2011
Benzene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total Xylenes	mg/kg	<0.3	<0.3	<0.3	<0.3	<0.3
BTEX Surrogate (%)	%	97	103	92	101	107

BTEX in Soil Our Reference: Your Reference Sample Matrix Date Sampled	UNITS ----------	SE85709-16 BH11 (0.1-0.3) Soil 22/02/2011	SE85709-17 BH11 (0.5-0.6) Soil 22/02/2011
Date Extracted (BTEX)		1/03/2011	1/03/2011
Date Analysed (BTEX)		2/03/2011	2/03/2011
Benzene	mg/kg	<0.1	<0.1
Toluene	mg/kg	<0.1	<0.1
Ethylbenzene	mg/kg	<0.1	<0.1
Total Xylenes	mg/kg	<0.3	<0.3
BTEX Surrogate (%)	%	101	92

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TRH in soil with C6-C9 by P/T Our Reference: Your Reference Sample Matrix Date Sampled	UNITS ---------- ----------	SE85709-1 BH7 (0.1-0.3) Soil 17/02/2011	SE85709-4 BH8 (0.1-0.3) Soil 18/02/2011	SE85709-8 BH9 (0.1-0.3) Soil 21/02/2011	SE85709-9 BH9 (0.5-0.6) Soil 21/02/2011	SE85709-12 BH10 (0.1-0.3) Soil 21/02/2011
Date Extracted (TRH C6-C9 PT)		1/03/2011	1/03/2011	1/03/2011	1/03/2011	1/03/2011
Date Analysed (TRH C6-C9 PT)		2/03/2011	2/03/2011	2/03/2011	2/03/2011	2/03/2011
TRH C_6 - C_9 P&T	mg/kg	<20	<20	<20	<20	<20
Date Extracted (TRH C10-C36)		1/03/2011	1/03/2011	1/03/2011	1/03/2011	1/03/2011
Date Analysed (TRH C10-C36)		1/03/2011	1/03/2011	1/03/2011	1/03/2011	1/03/2011
TRH C_{10} - C_{14}	mg/kg	<20	<40	<20	<40	<20
TRH C_{15} - C_{28}	mg/kg	<50	<100	<50	<100	<50
TRH C_{29} - C_{36}	mg/kg	<50	<100	<50	<100	<50

TRH in soil with C6-C9 by P/T Our Reference: Your Reference Sample Matrix Date Sampled	UNITS ---------- ----------	SE85709-16 BH11 (0.1-0.3) Soil 22/02/2011	SE85709-17 BH11 (0.5-0.6) Soil 22/02/2011
Date Extracted (TRH C6-C9 PT)		1/03/2011	1/03/2011
Date Analysed (TRH C6-C9 PT)		2/03/2011	2/03/2011
TRH C_6 - C_9 P&T	mg/kg	<20	<20
Date Extracted (TRH C10-C36)		1/03/2011	1/03/2011
Date Analysed (TRH C10-C36)		1/03/2011	1/03/2011
TRH C_{10} - C_{14}	mg/kg	<20	<20
TRH C_{15} - C_{28}	mg/kg	<50	<50
TRH C_{29} - C_{36}	mg/kg	<50	<50

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PAHs in Soil Our Reference:	UNITS	SE85709-4	SE85709-8	SE85709-12	SE85709-17
Your Reference	----------	BH8 (0.1-0.3)	BH9 (0.1-0.3)	BH10 (0.1-0.3)	BH11 (0.5-0.6)
Sample Matrix	----------	Soil	Soil	Soil	Soil
Date Sampled		18/02/2011	21/02/2011	21/02/2011	22/02/2011
Date Extracted		1/03/2011	1/03/2011	1/03/2011	1/03/2011
Date Analysed		2/03/2011	2/03/2011	2/03/2011	2/03/2011
Naphthalene	mg/kg	<0.2	<0.10	<0.10	<0.10
Acenaphthylene	mg/kg	<0.2	<0.10	<0.10	<0.10
Acenaphthene	mg/kg	<0.2	<0.10	<0.10	<0.10
Fluorene	mg/kg	<0.2	<0.10	<0.10	<0.10
Phenanthrene	mg/kg	<0.2	<0.10	<0.10	<0.10
Anthracene	mg/kg	<0.2	<0.10	<0.10	<0.10
Fluoranthene	mg/kg	<0.2	<0.10	<0.10	<0.10
Pyrene	mg/kg	<0.2	<0.10	<0.10	<0.10
Benzo[*a*]anthracene	mg/kg	<0.2	<0.10	<0.10	<0.10
Chrysene	mg/kg	<0.2	<0.10	<0.10	<0.10
Benzo[*b*]fluoranthene	mg/kg	<0.2	<0.1	<0.1	<0.1
Benzo[*k*]fluoranthene	mg/kg	<0.2	<0.10	<0.10	<0.10
Benzo[*a*]pyrene	mg/kg	<0.2	<0.10	<0.10	<0.10
Indeno[*123-cd*]pyrene	mg/kg	<0.2	<0.10	<0.10	<0.10
Dibenzo[*ah*]anthracene	mg/kg	<0.2	<0.10	<0.10	<0.10
Benzo[*ghi*]perylene	mg/kg	<0.2	<0.10	<0.10	<0.10
Total PAHs (sum)	mg/kg	<3.20	<2	<2	<2
Nitrobenzene-d5	%	119	116	120	77
2-Fluorobiphenyl	%	111	110	111	71
p -Terphenyl-*d14*	%	87	87	89	88

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OC Pesticides in Soil Our Reference:	UNITS	SE85709-4	SE85709-8	SE85709-12	SE85709-17
Your Reference	----------	BH8 (0.1-0.3)	BH9 (0.1-0.3)	BH10 (0.1-0.3)	BH11 (0.5-0.6)
Sample Matrix	----------	Soil	Soil	Soil	Soil
Date Sampled		18/02/2011	21/02/2011	21/02/2011	22/02/2011
Date Extracted		1/03/2011	1/03/2011	1/03/2011	1/03/2011
Date Analysed		1/03/2011	1/03/2011	1/03/2011	1/03/2011
HCB	mg/kg	<0.2	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.2	<0.1	<0.1	<0.1
gamma-BHC (Lindane)	mg/kg	<0.2	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.2	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.2	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.2	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.2	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.2	<0.1	<0.1	<0.1
o,p-DDE	mg/kg	<0.2	<0.1	<0.1	<0.1
alpha-Endosulfan	mg/kg	<0.2	<0.1	<0.1	<0.1
trans-Chlordane *(gamma)*	mg/kg	<0.2	<0.1	<0.1	<0.1
cis-Chlordane *(alpha)*	mg/kg	<0.2	<0.1	<0.1	<0.1
trans-Nonachlor	mg/kg	<0.2	<0.1	<0.1	<0.1
p,p-DDE	mg/kg	<0.2	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.2	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.2	<0.1	<0.1	<0.1
o,p-DDD	mg/kg	<0.2	<0.1	<0.1	<0.1
o,p-DDT	mg/kg	<0.2	<0.1	<0.1	<0.1
beta-Endosulfan	mg/kg	<0.2	<0.1	<0.1	<0.1
p,p-DDD	mg/kg	<0.2	<0.1	<0.1	<0.1
p,p-DDT	mg/kg	<0.2	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.2	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.2	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.2	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	<0.2	<0.1	<0.1	<0.1
2,4,5,6-Tetrachloro-m-xylene *(Surrogate*	%	115	115	115	121

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PCBs in Soil Our Reference: Your Reference Sample Matrix Date Sampled	UNITS ---------- ----------	SE85709-4 BH8 (0.1-0.3) Soil 18/02/2011	SE85709-8 BH9 (0.1-0.3) Soil 21/02/2011	SE85709-12 BH10 (0.1-0.3) Soil 21/02/2011	SE85709-17 BH11 (0.5-0.6) Soil 22/02/2011
Date Extracted		1/03/2011	1/03/2011	1/03/2011	1/03/2011
Date Analysed		1/03/2011	1/03/2011	1/03/2011	1/03/2011
Arochlor 1016	mg/kg	<0.2	<0.1	<0.1	<0.1
Arochlor 1221	mg/kg	<0.2	<0.1	<0.1	<0.1
Arochlor 1232	mg/kg	<0.2	<0.1	<0.1	<0.1
Arochlor 1242	mg/kg	<0.2	<0.1	<0.1	<0.1
Arochlor 1248	mg/kg	<0.2	<0.1	<0.1	<0.1
Arochlor 1254	mg/kg	<0.2	<0.1	<0.1	<0.1
Arochlor 1260	mg/kg	<0.2	<0.1	<0.1	<0.1
Arochlor 1262	mg/kg	<0.2	<0.1	<0.1	<0.1
Arochlor 1268	mg/kg	<0.1	<0.1	<0.1	<0.1
Total Positive PCB	mg/kg	<1.70	<0.90	<0.90	<0.90
PCB_Surrogate 1	%	115	115	115	121

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Metals in Soil by ICP-OES Our Reference: Your Reference Sample Matrix Date Sampled	UNITS ---------- ----------	SE85709-1 BH7 (0.1-0.3) Soil 17/02/2011	SE85709-4 BH8 (0.1-0.3) Soil 18/02/2011	SE85709-8 BH9 (0.1-0.3) Soil 21/02/2011	SE85709-9 BH9 (0.5-0.6) Soil 21/02/2011	SE85709-12 BH10 (0.1-0.3) Soil 21/02/2011
Date Extracted (Metals)		2/03/2011	2/03/2011	2/03/2011	2/03/2011	2/03/2011
Date Analysed (Metals)		2/03/2011	2/03/2011	2/03/2011	2/03/2011	2/03/2011
Arsenic	mg/kg	<3	<3	<3	<3	<3
Cadmium	mg/kg	0.3	0.6	0.7	0.4	0.5
Chromium	mg/kg	10	7.8	11	11	10
Copper	mg/kg	31	51	62	41	45
Lead	mg/kg	14	3	3	9.2	9.2
Nickel	mg/kg	23	58	72	27	23
Zinc	mg/kg	42	43	50	43	43

Metals in Soil by ICP-OES Our Reference: Your Reference Sample Matrix Date Sampled	UNITS ---------- ----------	SE85709-16 BH11 (0.1-0.3) Soil 22/02/2011	SE85709-17 BH11 (0.5-0.6) Soil 22/02/2011
Date Extracted (Metals)		2/03/2011	2/03/2011
Date Analysed (Metals)		2/03/2011	2/03/2011
Arsenic	mg/kg	<3	5
Cadmium	mg/kg	<0.3	0.5
Chromium	mg/kg	12	14
Copper	mg/kg	30	20
Lead	mg/kg	13	15
Nickel	mg/kg	17	6.4
Zinc	mg/kg	71	30

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Mercury Cold Vapor/Hg Analyser Our Reference:	UNITS	SE85709-1	SE85709-4	SE85709-8	SE85709-9	SE85709-12
Your Reference	----------	BH7 (0.1-0.3)	BH8 (0.1-0.3)	BH9 (0.1-0.3)	BH9 (0.5-0.6)	BH10 (0.1-0.3)
Sample Matrix	----------	Soil	Soil	Soil	Soil	Soil
Date Sampled		17/02/2011	18/02/2011	21/02/2011	21/02/2011	21/02/2011
Date Extracted (Mercury)		2/03/2011	2/03/2011	2/03/2011	2/03/2011	2/03/2011
Date Analysed (Mercury)		2/03/2011	2/03/2011	2/03/2011	2/03/2011	2/03/2011
Mercury	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05

Mercury Cold Vapor/Hg Analyser Our Reference:	UNITS	SE85709-16	SE85709-17
Your Reference	----------	BH11 (0.1-0.3)	BH11 (0.5-0.6)
Sample Matrix	----------	Soil	Soil
Date Sampled		22/02/2011	22/02/2011
Date Extracted (Mercury)		2/03/2011	2/03/2011
Date Analysed (Mercury)		2/03/2011	2/03/2011
Mercury	mg/kg	<0.05	<0.05

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Asbestos ID in soil Our Reference:	UNITS	SE85709-1	SE85709-4	SE85709-8	SE85709-9	SE85709-12
Your Reference	----------	BH7 (0.1-0.3)	BH8 (0.1-0.3)	BH9 (0.1-0.3)	BH9 (0.5-0.6)	BH10 (0.1-0.3)
Sample Matrix	----------	Soil	Soil	Soil	Soil	Soil
Date Sampled		17/02/2011	18/02/2011	21/02/2011	21/02/2011	21/02/2011
Date Analysed		3/03/2011	3/03/2011	3/03/2011	3/03/2011	3/03/2011
Sample Description		68g clay, soil, rocks	55g soil, rocks	58g soil, rocks	36g soil, rocks	36g soil, rocks
Asbestos ID in soil	-	No asbestos detected	No asbestos detected	No asbestos detected Organic fibres detected	No asbestos detected	No asbestos detected Organic fibres detected

Asbestos ID in soil Our Reference:	UNITS	SE85709-16	SE85709-17
Your Reference	----------	BH11 (0.1-0.3)	BH11 (0.5-0.6)
Sample Matrix	----------	Soil	Soil
Date Sampled		22/02/2011	22/02/2011
Date Analysed		3/03/2011	3/03/2011
Sample Description		56g soil, rocks	37g soil, rocks
Asbestos ID in soil	-	No asbestos detected Organic fibres detected	No asbestos detected Organic fibres detected

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Moisture Our Reference:	UNITS	SE85709-1	SE85709-4	SE85709-8	SE85709-9	SE85709-12
Your Reference	----------	BH7 (0.1-0.3)	BH8 (0.1-0.3)	BH9 (0.1-0.3)	BH9 (0.5-0.6)	BH10 (0.1-0.3)
Sample Matrix	----------	Soil	Soil	Soil	Soil	Soil
Date Sampled		17/02/2011	18/02/2011	21/02/2011	21/02/2011	21/02/2011
Date Analysed (moisture)		2/03/2011	2/03/2011	2/03/2011	2/03/2011	2/03/2011
Moisture	%	17	3	6	9	9

Moisture Our Reference:	UNITS	SE85709-16	SE85709-17
Your Reference	----------	BH11 (0.1-0.3)	BH11 (0.5-0.6)
Sample Matrix	----------	Soil	Soil
Date Sampled		22/02/2011	22/02/2011
Date Analysed (moisture)		2/03/2011	2/03/2011
Moisture	%	10	15

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Method ID	Methodology Summary
AN410	BTEX / C6-C9 Hydrocarbons - Soil samples are extracted with methanol, purged and concentrated by a purge and trap apparatus, and then analysed using GC/MS technique. Water samples undergo the same analysis without the extraction step. Based on USEPA 5030B and 8260B.
AN403	Determination of Hydrocarbons by gas chromatography after a solvent extraction. Detection is by flame ionisation detector (FID) that produces an electronic signal in proportion to the combustible matter passing through it. Total Recoverable Hydrocarbons (TRH) are routinely reported as four alkane groupings based on the carbon chain length of the compounds: C_6-C_9, C_{10}-C_{14}, C_{15}-C_{28} and C_{29}-C_{36}, in accordance with the Australian Institute of Petroleum (AIP). Additionally, the volatile C6-C9 fraction may be determined by a purge and trap technique and GC/MS because of the potential for volatiles loss. Total Petroleum Hydrocarbons (TPH) follows the same method of analysis after silica gel cleanup of the solvent extract. Aliphatic/Aromatic Speciation follows the same method of analysis after fractionation of the solvent extract over silica with differential polarity of the elluent solvents. The GC/FID method is not well suited to the analysis of refined high boiling point materials (i.e. lubricating oils or greases) but is particularly suited for measuring diesel, kerosene and petrol (if care to control volatility is taken). This method will detect naturally occurring hydrocarbons, lipids, organic acids, phenols and PAHs if they are present at sufficient levels, dependant on the use of specific cleanup/fractionation techniques. Reference USEPA 3510B, 8015B.
AN422	Polynuclear Aromatic Hydrocarbons - determined by solvent extraction with dichloromethane / acetone for soils and dichloromethane for waters, followed by instrumentation analysis using GC/MS SIM mode.
AN400	The determination of organochlorine (OC) and organophosphorus (OP) pesticides and polychlorinated biphenyls (PCBs) in soils, sludges and groundwater. (Based on USEPA methods 3510, 3550, 8140 and 8080.)
AN320	
AN312	After digestion with nitric acid, hydrogen peroxide and hydrochloric acid, mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500
AN602	Analysed using in house method AN602 - Qualitative identification of Asbestos Fibres, Synthetic Mineral Fibres and Organic Fibres in bulk samples (including building materials and soils) using Polarised Light Microscopy and Dispersion Staining Techniques. Our NATA Accreditation does not currently cover the identification of Synthetic Mineral Fibres and Organic Fibres, however, according to new NATA requirements, the reporting of these fibres is compulsory if detected.
AN002	

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QUALITY CONTROL BTEX in Soil	UNITS	LOR	METHOD	Blank	Duplicate Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Matrix Spike % Recovery Duplicate + %RPD
Date Extracted (BTEX)				01/03/11	SE85709-16	1/03/2011 || 1/03/2011	LCS	01/03/11
Date Analysed (BTEX)				02/03/11	SE85709-16	2/03/2011 || 2/03/2011	LCS	02/03/11
Benzene	mg/kg	0.1	AN410	<0.1	SE85709-16	<0.1 || <0.1	LCS	118%
Toluene	mg/kg	0.1	AN410	<0.1	SE85709-16	<0.1 || <0.1	LCS	118%
Ethylbenzene	mg/kg	0.1	AN410	<0.1	SE85709-16	<0.1 || <0.1	LCS	114%
Total Xylenes	mg/kg	0.3	AN410	<0.3	SE85709-16	<0.3 || <0.3	LCS	110%
BTEX Surrogate (%)	%	0	AN410	126	SE85709-16	101 || 98 || RPD: 3	LCS	99%

QUALITY CONTROL TRH in soil with C6-C9 by P/T	UNITS	LOR	METHOD	Blank	Duplicate Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Matrix Spike % Recovery Duplicate + %RPD
Date Extracted (TRH C6-C9 PT)				01/03/11	SE85709-16	1/03/2011 || 1/03/2011	LCS	01/03/11
Date Analysed (TRH C6-C9 PT)				02/03/11	SE85709-16	2/03/2011 || 2/03/2011	LCS	02/03/11
TRH C_6 - C_9 P&T	mg/kg	20	AN410	<20	SE85709-16	<20 || <20	LCS	129%
Date Extracted (TRH C10-C36)				[NT]	SE85709-16	1/03/2011 || 1/03/2011	LCS	01/03/11
Date Analysed (TRH C10-C36)				[NT]	SE85709-16	1/03/2011 || 1/03/2011	LCS	01/03/11
TRH C_{10} - C_{14}	mg/kg	20	AN403	<20	SE85709-16	<20 || [N/T]	LCS	97%
TRH C_{15} - C_{28}	mg/kg	50	AN403	<50	SE85709-16	<50 || [N/T]	LCS	119%
TRH C_{29} - C_{36}	mg/kg	50	AN403	<50	SE85709-16	<50 || [N/T]	LCS	99%

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QUALITY CONTROL PAHs in Soil	UNITS	LOR	METHOD	Blank	Duplicate Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Matrix Spike % Recovery Duplicate + %RPD
Date Extracted				01/03/11	SE85709-8	1/03/2011 || 1/03/2011	LCS	01/03/11
Date Analysed				02/03/11	SE85709-8	2/03/2011 || 2/03/2011	LCS	02/03/11
Naphthalene	mg/kg	0.1	AN422	<0.10	SE85709-8	<0.10 || <0.10	LCS	115%
Acenaphthylene	mg/kg	0.1	AN422	<0.10	SE85709-8	<0.10 || <0.10	LCS	107%
Acenaphthene	mg/kg	0.1	AN422	<0.10	SE85709-8	<0.10 || <0.10	LCS	116%
Fluorene	mg/kg	0.1	AN422	<0.10	SE85709-8	<0.10 || <0.10	[NR]	[NR]
Phenanthrene	mg/kg	0.1	AN422	<0.10	SE85709-8	<0.10 || <0.10	LCS	111%
Anthracene	mg/kg	0.1	AN422	<0.10	SE85709-8	<0.10 || <0.10	LCS	114%
Fluoranthene	mg/kg	0.1	AN422	<0.10	SE85709-8	<0.10 || <0.10	LCS	111%
Pyrene	mg/kg	0.1	AN422	<0.10	SE85709-8	<0.10 || <0.10	LCS	114%
Benzo[*a*]anthracene	mg/kg	0.1	AN422	<0.10	SE85709-8	<0.10 || <0.10	[NR]	[NR]
Chrysene	mg/kg	0.1	AN422	<0.10	SE85709-8	<0.10 || <0.10	[NR]	[NR]
Benzo[*b*]fluoranthene	mg/kg	0.1	AN422	<0.1	SE85709-8	<0.1 || <0.1	[NR]	[NR]
Benzo[*k*]fluoranthene	mg/kg	0.1	AN422	<0.10	SE85709-8	<0.10 || <0.10	[NR]	[NR]
Benzo[*a*]pyrene	mg/kg	0.1	AN422	<0.10	SE85709-8	<0.10 || <0.10	LCS	114%
Indeno[*123-cd*]pyrene	mg/kg	0.1	AN422	<0.10	SE85709-8	<0.10 || <0.10	[NR]	[NR]
Dibenzo[*ah*]anthracene	mg/kg	0.1	AN422	<0.10	SE85709-8	<0.10 || <0.10	[NR]	[NR]
Benzo[*ghi*]perylene	mg/kg	0.1	AN422	<0.10	SE85709-8	<0.10 || <0.10	[NR]	[NR]
Total PAHs (sum)	mg/kg	1.6	AN422	<2	SE85709-8	<2 || <2	[NR]	[NR]
Nitrobenzene-d5	%	0	AN422	127	SE85709-8	116 || 114 || RPD: 2	LCS	121%
2-Fluorobiphenyl	%	0	AN422	119	SE85709-8	110 || 105 || RPD: 5	LCS	110%
p -Terphenyl-*d*14	%	0	AN422	94	SE85709-8	87 || 82 || RPD: 6	LCS	90%

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QUALITY CONTROL OC Pesticides in Soil	UNITS	LOR	METHOD	Blank	Duplicate Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Matrix Spike % Recovery Duplicate + %RPD
Date Extracted				01/03/2011	[NT]	[NT]	LCS	01/03/2011
Date Analysed				01/03/2011	[NT]	[NT]	LCS	01/03/2011
HCB	mg/kg	0.1	AN400	<0.1	[NT]	[NT]	[NR]	[NR]
alpha-BHC	mg/kg	0.1	AN400	<0.1	[NT]	[NT]	[NR]	[NR]
gamma-BHC (Lindane)	mg/kg	0.1	AN400	<0.1	[NT]	[NT]	[NR]	[NR]
Heptachlor	mg/kg	0.1	AN400	<0.1	[NT]	[NT]	LCS	127%
Aldrin	mg/kg	0.1	AN400	<0.1	[NT]	[NT]	LCS	112%
beta-BHC	mg/kg	0.1	AN400	<0.1	[NT]	[NT]	[NR]	[NR]
delta-BHC	mg/kg	0.1	AN400	<0.1	[NT]	[NT]	LCS	115%
Heptachlor Epoxide	mg/kg	0.1	AN400	<0.1	[NT]	[NT]	[NR]	[NR]
o,p-DDE	mg/kg	0.1	AN400	<0.1	[NT]	[NT]	[NR]	[NR]
alpha-Endosulfan	mg/kg	0.1	AN400	<0.1	[NT]	[NT]	[NR]	[NR]
trans-Chlordane *(gamma)*	mg/kg	0.1	AN400	<0.1	[NT]	[NT]	[NR]	[NR]
cis-Chlordane *(alpha)*	mg/kg	0.1	AN400	<0.1	[NT]	[NT]	[NR]	[NR]
trans-Nonachlor	mg/kg	0.1	AN400	<0.1	[NT]	[NT]	[NR]	[NR]
p,p-DDE	mg/kg	0.1	AN400	<0.1	[NT]	[NT]	[NR]	[NR]
Dieldrin	mg/kg	0.1	AN400	<0.1	[NT]	[NT]	LCS	100%
Endrin	mg/kg	0.1	AN400	<0.1	[NT]	[NT]	LCS	111%
o,p-DDD	mg/kg	0.1	AN400	<0.1	[NT]	[NT]	[NR]	[NR]
o,p-DDT	mg/kg	0.1	AN400	<0.1	[NT]	[NT]	[NR]	[NR]
beta-Endosulfan	mg/kg	0.1	AN400	<0.1	[NT]	[NT]	[NR]	[NR]
p,p-DDD	mg/kg	0.1	AN400	<0.1	[NT]	[NT]	[NR]	[NR]
p,p-DDT	mg/kg	0.1	AN400	<0.1	[NT]	[NT]	LCS	104%
Endosulfan Sulphate	mg/kg	0.1	AN400	<0.1	[NT]	[NT]	[NR]	[NR]
Endrin Aldehyde	mg/kg	0.1	AN400	<0.1	[NT]	[NT]	[NR]	[NR]
Methoxychlor	mg/kg	0.1	AN400	<0.1	[NT]	[NT]	[NR]	[NR]
Endrin Ketone	mg/kg	0.1	AN400	<0.1	[NT]	[NT]	[NR]	[NR]
2,4,5,6-Tetrachloro-m-xylene *(Surrogate*	%	0	AN400	116	[NT]	[NT]	LCS	123%

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QUALITY CONTROL PCBs in Soil	UNITS	LOR	METHOD	Blank	Duplicate Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Matrix Spike % Recovery Duplicate + %RPD
Date Extracted				01/03/2011	[NT]	[NT]	LCS	01/03/2011
Date Analysed				01/03/2011	[NT]	[NT]	LCS	01/03/2011
Arochlor 1016	mg/kg	0.1	AN400	<0.1	[NT]	[NT]	[NR]	[NR]
Arochlor 1221	mg/kg	0.1	AN400	<0.1	[NT]	[NT]	[NR]	[NR]
Arochlor 1232	mg/kg	0.1	AN400	<0.1	[NT]	[NT]	[NR]	[NR]
Arochlor 1242	mg/kg	0.1	AN400	<0.1	[NT]	[NT]	[NR]	[NR]
Arochlor 1248	mg/kg	0.1	AN400	<0.1	[NT]	[NT]	[NR]	[NR]
Arochlor 1254	mg/kg	0.1	AN400	<0.1	[NT]	[NT]	[NR]	[NR]
Arochlor 1260	mg/kg	0.1	AN400	<0.1	[NT]	[NT]	LCS	106%
Arochlor 1262	mg/kg	0.1	AN400	<0.1	[NT]	[NT]	[NR]	[NR]
Arochlor 1268	mg/kg	0.1	AN400	<0.1	[NT]	[NT]	[NR]	[NR]
Total Positive PCB	mg/kg	0.9	AN400	<0.90	[NT]	[NT]	[NR]	[NR]
PCB_Surrogate 1	%	0	AN400	116	[NT]	[NT]	LCS	121%

QUALITY CONTROL Metals in Soil by ICP-OES	UNITS	LOR	METHOD	Blank	Duplicate Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Matrix Spike % Recovery Duplicate + %RPD
Date Extracted (Metals)				2/03/2011	[NT]	[NT]	LCS	2/03/2011
Date Analysed (Metals)				2/03/2011	[NT]	[NT]	LCS	2/03/2011
Arsenic	mg/kg	3	AN320	<3	[NT]	[NT]	LCS	96%
Cadmium	mg/kg	0.3	AN320	<0.3	[NT]	[NT]	LCS	101%
Chromium	mg/kg	0.3	AN320	<0.3	[NT]	[NT]	LCS	101%
Copper	mg/kg	0.5	AN320	<0.5	[NT]	[NT]	LCS	100%
Lead	mg/kg	1	AN320	<1	[NT]	[NT]	LCS	101%
Nickel	mg/kg	0.5	AN320	<0.5	[NT]	[NT]	LCS	101%
Zinc	mg/kg	0.5	AN320	<0.5	[NT]	[NT]	LCS	98%

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QUALITY CONTROL Mercury Cold Vapor/Hg Analyser	UNITS	LOR	METHOD	Blank	Duplicate Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Matrix Spike % Recovery Duplicate + %RPD
Date Extracted (Mercury)				2/03/2011	[NT]	[NT]	LCS	2/03/2011
Date Analysed (Mercury)				2/03/2011	[NT]	[NT]	LCS	2/03/2011
Mercury	mg/kg	0.05	AN312	<0.05	[NT]	[NT]	LCS	109%

QUALITY CONTROL Asbestos ID in soil	UNITS	LOR	METHOD	Blank
Date Analysed				3/03/2011

QUALITY CONTROL Hold sample-**NO test** required	UNITS	LOR	METHOD	Blank
Sample on HOLD		[NT]		[NT]

QUALITY CONTROL Moisture	UNITS	LOR	METHOD	Blank
Date Analysed (moisture)				[NT]
Moisture	%	1	AN002	<1

QUALITY CONTROL TRH in soil with C6-C9 by P/T	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date Extracted (TRH C6-C9 PT)		SE85709-8	1/03/2011 || 1/03/2011
Date Analysed (TRH C6-C9 PT)		SE85709-8	2/03/2011 || 2/03/2011
TRH C_6 - C_9 P&T	mg/kg	SE85709-8	<20 || [N/T]
Date Extracted (TRH C10-C36)		SE85709-8	1/03/2011 || 1/03/2011
Date Analysed (TRH C10-C36)		SE85709-8	1/03/2011 || 1/03/2011
TRH C_{10} - C_{14}	mg/kg	SE85709-8	<20 || <20
TRH C_{15} - C_{28}	mg/kg	SE85709-8	<50 || <50
TRH C_{29} - C_{36}	mg/kg	SE85709-8	<50 || <50

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Result Codes

[INS] : Insufficient Sample for this test
[NR] : Not Requested
[NT] : Not tested
[LOR] : Limit of reporting
[RPD] : Relative Percentage Difference
* : Not part of NATA Accreditation
[N/A] : Not Applicable

Report Comments

PAH/OC/PCB-LOR-raised for sample#4 due to insufficent sample.
TRH - Sampls # 4 & 9 - LOR raised due to insufficient sample.

Sampled by the client

Even after disintegration it can be very difficult, or impossible, to detect the presence of asbestos in some asbestos-containing bulk materials using polarised light microscopy.
This is due to the low grade or small length or diameter of asbestos fibres present in the material, or to the fact that very fine fibres have been distributed intimately throughout the materials.

No respirable fibres detected using trace analysis technique.
Asbestos analysed by Approved Identifier Yusuf Kuthpudin.
Samples analysed as received. Solid samples expressed on a dry weight basis.
Date Organics extraction commenced:
NATA Corporate Accreditation No. 2562, Site No 4354
Note: Test results are not corrected for recovery (excluding Air-toxics and Dioxins/Furans*)

Quality Control Protocol

Method Blank: An analyte free matrix to which all reagents are added in the same volume or proportions as used in sample processing. The method blank should be carried through the complete sample preparation and analytical procedure. A method blank is prepared every 20 samples.
Duplicate: A separate portion of a sample being analysed that is treated the same as the other samples in the batch. One duplicate is processed at least every 10 samples.
Surrogate Spike: An organic compound which is similar to the target analyte(s) in chemical composition and behavior in the analytical process, but which is not normally found in environmental samples. Surrogates are added to samples before extraction to monitor extraction efficiency and percent recovery in each sample.
Internal Standard: Added to all samples requiring analysis for organics (where relevant) or metals by ICP after the extraction/digestion process; the compounds/elements serve to give a standard of retention time and/or response, which is invariant from run-to-run with the instruments.
Laboratory Control Sample: A known matrix spiked with compound(s) representative of the target analytes. It is used to document laboratory performance. When the results of the matrix spike analysis indicates a potential problem due to the sample matrix itself, the LCS results are used to verify that the laboratory can perform the analysis in a clean matrix.
Matrix Spike: An aliquot of sample spiked with a known concentration of target analyte(s). The spiking occurs prior to sample preparation and analysis. A matrix spike is used to document the bias of a method in a given sample matrix.

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Quality Acceptance Criteria

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: http://www.au.sgs.com/sgs-mp-au-env-qu-022-qa-qc-plan-en-09.pdf

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COC received 25/2/11 @ 3:42pm

No: 20563

coffey

Chain of Custody

Laboratory Quotation / Order No:

Job No: GC24267/AB Sheet: 1 of 3

Dispatch to: (Address & Phone No.) SGS, 16/33 Maddox St, Alexandria NSW 2015	Sampled by: VJ	Consigning Officer: Coffey Geot	Date Dispatched: 24 Feb 2011
Attention: Sample Receipt	Project Manager: (report results to) Edward Wu	Courier Service:	Consignment Note No:

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
[signature]	24/2/11	11:00	[signature] YIP 315°	24/2	11:33
			CP	24/2/11	230pm

Comments	Sample Matrix	Container Type and Preservative	Sample No.	Date Sampled	PAHs	TPHs	~~MAHs~~ = BTEX	Metals: 8	OCP	PCB	Asbestos	TCLP Metal	TCLP PAH	HOLD	Sample Condition on Receipt
	Soil	Glass jar & zip lock bag, on ice	1 BH7 (0.1-0.3)	17.2.11		/	/	/			/				
	↓	↓	2 BH7 (0.5-0.6)	↓										/	
			3 BH7 (2-2.1)											/	
			4 BH8 (0.1-0.3)	18.2.11	/	/	/	/	/						
			5 BH8 (0.5-0.6)	↓										/	
			6 BH8 (2.0-2.1)											/	
			7 BH8 (3.5-3.6)											/	

SGS
Received: 24/2/11
By: CP
Time: 230
Samples Intact:
Cool/Cooler Box:
Temperature on Receipt: 5
Storage Location: S342-343, a/b
SGS REF: SE82709

Special Laboratory Instructions:
Metals 8 - As, Cd, Cr, Cu, Pb, Ni, Zn, Hg

Detection Limits:

Turnaround Required: Standard

JOB NUMBER **MUST** BE REFERENCED ON ALL SUBSEQUENT PAGES

Copies: WHITE: Sign on release **YELLOW:** If dispatched to Interstate Lab, Lab to sign on receipt and fax back to Coffey. **BLUE:** To be returned with results.

coffey

Chain of Custody

No: 20566

Laboratory Quotation / Order No:

Job No: Geotech 24207AB

Sheet 2 of 3

Dispatch to: SGS (Address & Phone No.) 16/33 Maddox St Alexandria NSW 2015	Sampled by: VJ	Consigning Officer: Coffey Geotechnics Date Dispatched: 24 Feb 2011
Attention: Sample Receipt	Project Manager: (report results to) Edward Wu	Courier Service: Consignment Note No:

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
K Ramsay	24/2/11	11.00		24/2	11.00
				24/2/11	230pm

Comments	Sample Matrix	Container Type and Preservative	Sample No.	Date Sampled	Analyses Required: PAHs	TPHs	BTEX	Metals	OCP	PCB	Asbestos	Sample Condition on Receipt
	SOIL	Glass Jar & Zip Lock Bag	8 BH9 (0.1-0.3)	21.2.11	✓	✓	✓	✓	✓	✓	✓	
			9 BH9 (0.5-0.6)			✓	✓	✓			✓	
			10 BH9 (2.0-2.1)									✓
			11 BH9 (3.5-3.6)	↓								✓
			12 BH10 (0.1-0.3)		✓	✓	✓	✓	✓	✓	✓	
			13 BH10 (0.5-0.6)									✓
			14 BH10 (2.0-2.1)									✓
			15 BH10 (3.5-3.6)									✓
	↓	↓		↓								

Special Laboratory Instructions:

Metals: As, Cu, Pb, Ni, Zn, Hg

Detection Limits:

Turnaround Required: STD (5 DAYS)

JOB NUMBER **MUST** BE REFERENCED ON ALL SUBSEQUENT PAGES

Copies: **WHITE:** Sign on release. **YELLOW:** If dispatched to interstate Lab. Lab to sign on receipt and fax back to Coffey. **BLUE:** To be returned with results.

coffey

Chain of Custody

No: 20567

Laboratory Quotation / Order No:

Job No: 22707AB Sheet 3 of 3

Dispatch to: (Address & Phone No.) SGS 16/33 Maddox St Alexandria NSW 2015	Sampled by: VJ	Consigning Officer: Coffey Geotechnics
		Date Dispatched: 24 FEB 2011
Attention: Sample Receipt	Project Manager: (report results to) Edward Wu	Courier Service:
		Consignment Note No:

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
[illegible signature]	24/2	11.00	[illegible signature]	24/2	11.00
			CP	24/2/11	2:10pm

Analyses Required

Comments	Sample Matrix	Container Type and Preservative	Sample No.	Date Sampled	PAHs	TPHs	MAHs = BTEX	Metals	ASBESTOS	OCP	PCB	VLO	Sample Condition on Receipt
	Soil	Glass Jar & Zip lock bag on ice	16 GH11 (0.1-0.3)	22.2.11		/	/	/	/				
	↓	↓	17 GH11 (0.5-0.6)	↓	/	/	/	/	/	/	/		
	↓	↓	18 GH11 (2.0-2.1)	↓								/	
	↓	↓	19 GH11 (3.5-3.6)	↓								/	

Special Laboratory Instructions:
METALS: As, Cu, Cr, Cd, Pb, Ni, Hg, Zn

Detection Limits:

Turnaround Required: STANDARD

JOB NUMBER MUST BE REFERENCED ON ALL SUBSEQUENT PAGES

Copies: WHITE: Sign on release. YELLOW: If dispatched to interstate Lab, Lab to sign on receipt and fax back to Coffey. BLUE: To be returned with results.

SAMPLE RECEIPT ADVICE (SRA)

1 March 2011

Client Details			Laboratory Details		
Requested By	:	**Edward Wu**			
Client	:	Coffey Geotechnics Pty Ltd	Laboratory	:	SGS Environmental Services
Contact	:	Edward Wu	Manager	:	Edward Ibrahim
Address	:	8/12 Mars Road LANE COVE WEST NSW 2066	Address	:	Unit 16, 33 Maddox Street Alexandria NSW 2015
Email	:	edward_wu@coffey.com	Email	:	au.samplereceipt.sydney@sgs.com
Telephone	:	02 9911 1099	Telephone	:	61 2 8594 0400
Facsimile	:	02 9911 1002	Facsimile	:	61 2 8594 0499
Project	:	GL24207AB - Blacktown	Report No	:	**SE85709**
Order Number	:	20563,20566-567	No. of Samples	:	19
Samples	:	19 Soils	Due Date	:	3/03/2011

Date Instructions Received	:	24/02/2011
Sample Receipt Date	:	24/02/2011

Samples received in good order	:	YES	Samples received in correct containers	:	YES
Samples received without headspace	:	YES	Sufficient quantity supplied	:	YES
Upon receipt sample temperature	:	Cool	Cooling Method	:	Ice Pack
Sample containers provided by	:	SGS	Samples clearly Labelled	:	NO
Turnaround time requested	:	Standard	Completed documentation received	:	YES

Samples will be held for 1 month for water samples and 3 months for soil samples from date of receipt of samples, unless otherwise instructed.

Comments

Sample BH7(2-2.1) received labelled as BH7

The signed chain of custody will be returned to you with the original report.

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Member of the SGS Group (SGS SA)

SAMPLE RECEIPT ADVICE (SRA) - continued

Client : Coffey Geotechnics Pty Ltd
Project : GL24207AB - Blacktown

Report No : SE85709

Summary of Samples and Requested Analysis

The table below represents SGS Environmental Service's understanding and interpretation of the customer supplied sample request.
Please indicate ASAP if your request differs from these details.
Testing shall commence immediately as per this table, unless the customer intervenes with a correction prior to testing.
Note that a small X in the table below indicates some testing has not been requested in the package.

Sample No.	Description	Metals Prep & Inorganics - All	BTEX in Soil	TRH in soil with C6-C9 by P/T	PAHs in Soil	OC Pesticides in Soil	PCBs in Soil	Metals in Soil by ICP-OES	Mercury Cold Vapor/Hg Analyser	Asbestos ID in soil	Hold sample-NO test required	Moisture
1	BH7 (0.1-0.3)	X	X	X				X	X	X		X
2	BH7 (0.5-0.6)										X	
3	BH7 (2-2.1)										X	
4	BH8 (0.1-0.3)	X	X	X	X	X	X	X	X	X		X
5	BH8 (0.5-0.6)										X	
6	BH8 (2.0-2.1)										X	
7	BH8 (3.5-3.6)										X	
8	BH9 (0.1-0.3)	X	X	X	X	X	X	X	X	X		X
9	BH9 (0.5-0.6)	X	X	X				X	X	X		X
10	BH9 (2.0-2.1)										X	
11	BH9 (3.5-3.6)										X	
12	BH10 (0.1-0.3)	X	X	X	X	X	X	X	X	X		X
13	BH10 (0.5-0.6)										X	
14	BH10 (2-2.1)										X	
15	BH10 (3.5-3.6)										X	
16	BH11 (0.1-0.3)	X	X	X				X	X	X		X
17	BH11 (0.5-0.6)	X	X	X	X	X	X	X	X	X		X
18	BH11 (2.0-2.1)										X	

SAMPLE RECEIPT ADVICE (SRA) - continued

Client : Coffey Geotechnics Pty Ltd Report No : SE85709
Project : GL24207AB - Blacktown

Sample No.	Description	Metals Prep & Inorganics - All	BTEX in Soil	TRH in soil with C6-C9 by P/T	PAHs in Soil	OC Pesticides in Soil	PCBs in Soil	Metals in Soil by ICP-OES	Mercury Cold Vapor/Hg Analyser	Asbestos ID in soil	Hold sample-NO test required	Moisture
19	BH11 (3.5-3.6)										X	

Sample No.	Description
1	BH7 (0.1-0.3)
2	BH7 (0.5-0.6)
3	BH7 (2-2.1)
4	BH8 (0.1-0.3)
5	BH8 (0.5-0.6)
6	BH8 (2.0-2.1)
7	BH8 (3.5-3.6)
8	BH9 (0.1-0.3)
9	BH9 (0.5-0.6)
10	BH9 (2.0-2.1)
11	BH9 (3.5-3.6)
12	BH10 (0.1-0.3)
13	BH10 (0.5-0.6)
14	BH10 (2-2.1)
15	BH10 (3.5-3.6)
16	BH11 (0.1-0.3)
17	BH11 (0.5-0.6)
18	BH11 (2.0-2.1)

SAMPLE RECEIPT ADVICE (SRA) - continued

Client	:	Coffey Geotechnics Pty Ltd	Report No	:	SE85709
Project	:	GL24207AB - Blacktown			

Sample No.	Description
19	BH11 (3.5-3.6)