PointID : BH03 Depth Range: 8.00 - 12.00 m

drawn	**BC**
approved	**MG**
date	**4/09/2015**
scale	**N.T.S.**
original size	**A4**

coffey

client: Wanda One Sydney Pty Ltd

project: Sydney One Project
Sydney CBD, NSW

title: **CORE PHOTOGRAPH**
BH03

project no: GEOTLCOV24001AF | fig no: **FIGURE 2** | rev:

PointID : BH03 Depth Range: 12.00 - 16.00 m

drawn	BC
approved	MG
date	4/09/2015
scale	N.T.S.
original size	A4

coffey

client:	Wanda One Sydney Pty Ltd
project:	Sydney One Project Sydney CBD, NSW
title:	**CORE PHOTOGRAPH** **BH03**
project no:	GEOTLCOV24001AF
fig no:	**FIGURE 3**
rev:	

PointID : BH03 Depth Range: 16.00 - 20.00 m

drawn	BC
approved	MG
date	4/09/2015
scale	N.T.S.
original size	A4

coffey

client:	Wanda One Sydney Pty Ltd
project:	Sydney One Project Sydney CBD, NSW
title:	**CORE PHOTOGRAPH** **BH03**
project no:	GEOTLCOV24001AF
fig no:	**FIGURE 4**
rev:	

PointID : BH03 Depth Range: 20.00 - 25.00 m

drawn	BC
approved	MG
date	4/09/2015
scale	N.T.S.
original size	A4

coffey

client: Wanda One Sydney Pty Ltd

project: Sydney One Project
Sydney CBD, NSW

title: **CORE PHOTOGRAPH**
BH03

project no: GEOTLCOV24001AF | fig no: **FIGURE 5** | rev:

coffey

Engineering Log - Borehole

Borehole ID.	**BH04**
sheet:	1 of 4
project no.	**GEOTLCOV24001AF**
client:	**Wanda One Sydney Pty Ltd**
date started:	**24 Aug 2015**
principal:	
date completed:	**25 Aug 2015**
project:	**Sydney One Project**
logged by:	**BY**
location:	**Goldfield House Basement**
checked by:	**MG**

position: E: 334315; N: 6251717 (WGS84 Zone 56) surface elevation: -4.57 m (AHD) angle from horizontal: 90°

drill model: XC Rig, Track mounted casing diameter : HW

drilling information | **material substance**

method & support	penetration 1 2 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description **SOIL TYPE**: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	structure and additional observations
DT AD/T HW casing		Not Observable		-5				**CONCRETE**: 0.2 m.				**CONCRETE**
								GRAVEL: medium to coarse grained, sub-angular to angular, dark grey.				**DRAINAGE LAYER**
								Borehole BH04 continued as cored hole				
				-6	1.0							
				-7	2.0							
				-8	3.0							
				-9	4.0							
				-10	5.0							
				-11	6.0							
				-12	7.0							

CDF_0_9_04BB.GLB Log COF BOREHOLE: NON CORED GEOTLCOV24001AF.GPJ <<DrawingFile>> 02/10/2015 14:32

method
AD auger drilling*
AS auger screwing*
HA hand auger
W washbore
DT diatube
HE hand excavation
NDD non destructive drilling
* bit shown by suffix
e.g. AD/T
B blank bit
T TC bit
V V bit

support
M mud N nil
C casing

penetration
1 2 3 no resistance ranging to refusal

water
10-Oct-12 water level on date shown
water inflow
water outflow

samples & field tests
B bulk disturbed sample
D disturbed sample
E environmental sample
SS split spoon sample
U## undisturbed sample ##mm diameter
HP hand penetrometer (kPa)
N standard penetration test (SPT)
N* SPT - sample recovered
Nc SPT with solid cone
VS vane shear; peak/remouded (kPa)
R refusal
HB hammer bouncing

classification symbol & soil description
based on Unified Classification System

moisture
D dry
M moist
W wet
Wp plastic limit
Wl liquid limit

consistency / relative density

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

coffey

Engineering Log - Cored Borehole

Borehole ID.	**BH04**
sheet:	2 of 4
project no.	**GEOTLCOV24001AF**
client:	**Wanda One Sydney Pty Ltd**
date started:	**24 Aug 2015**
principal:	
date completed:	**25 Aug 2015**
project:	**Sydney One Project**
logged by:	**BY**
location:	**Goldfield House Basement**
checked by:	**MG**

position: E: 334315; N: 6251717 (WGS84 Zone 56) surface elevation: -4.57 m (AHD) angle from horizontal: 90°

drill model: XC Rig, Track mounted drilling fluid: casing diameter : HW

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

method & support	water	RL (m)	depth (m)	graphic log	material description **ROCK TYPE**: grain characterisics, colour, structure, minor components	weathering & alteration	estimated strength & Is50 (X = axial; O = diametral) VL L M H VH EH	samples, field tests & Is(50) (MPa) a = axial; d = diametral	core run & RQD	defect spacing (mm) 30 100 300 1000 3000	additional observations and defect descriptions (type, inclination, planarity, roughness, coating, thickness, other) particular / general
		-5			start coring at 0.56m						
NMLC	Not Observable	-6	1.0		**SANDSTONE**: medium grained, pale grey, massive.	FR		a=1.23 d=1.29	100%		JT, 30°, PL, RO, Fe SN
		-7	2.0					a=1.03 d=1.28	100%		PT, 5°, CU, RO, CN
		-8	3.0		3.14 m: Siltstone clast (20mm)			a=1.14 d=0.93	99%		CS, 0°, PL, 10 mm
		-9	4.0		**SANDSTONE**: medium grained, pale grey, indistinctly bedded at 5° to 10°.			a=0.60 d=1.02			CS, 0°, PL, 30 mm
		-10	5.0		**SANDSTONE**: medium grained, pale grey, with dark grey laminations, distinctly bedded at 5° to 10°.			a=0.31 d=0.92	100%		
		-11	6.0					a=1.47 d=1.00			PT, 0°, UN, RO, X CO
		-12	7.0					a=0.64 d=0.80	100%		PT, 0°, UN, RO, X CO
								a=0.66 d=0.64	100%		PT, 0°, UN, RO, X CO

CDF_0_9_04BB.GLB Log COF BOREHOLE: CORED GEOTLCOV24001AF.GPJ <<DrawingFile>> 02/10/2015 14:34

method & support
AS auger screwing
AD auger drilling
CB claw or blade bit
W washbore
NMLC NMLC core (51.9 mm)
NQ wireline core (47.6mm)
HQ wireline core (63.5mm)
PQ wireline core (85.0mm)
SPT standard penetration test
DT diatube
HE hand excavation
NDD non destructive drilling

water
10/10/12, water level on date shown
water inflow
complete drilling fluid loss
partial drilling fluid loss
25uL water pressure test result (lugeons) for depth interval shown

graphic log / core recovery
core recovered (graphic symbols indicate material)
no core recovered

core run & RQD
barrel withdrawn
RQD = Rock Quality Designation (%)

weathering & alteration*
RS residual soil
XW extremely weathered
HW highly weathered
DW distinctly weathered
MW moderately weathered
SW slightly weathered
FR fresh
*W replaced with A for alteration

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

defect type
PT parting
JT joint
SZ shear zone
SS shear surface
CS crushed seam
SM seam
DB drilling break

roughness
SL slickensided
POL polished
SO smooth
RO rough
VR very rough

planarity
PL planar
CU curved
UN undulating
ST stepped
IR Irregular

coating
CN clean
SN stain
VN veneer
CO coating

coffey

Engineering Log - Cored Borehole

Borehole ID.	**BH04**
sheet:	3 of 4
project no.	**GEOTLCOV24001AF**
client:	**Wanda One Sydney Pty Ltd**
date started:	**24 Aug 2015**
principal:	
date completed:	**25 Aug 2015**
project:	**Sydney One Project**
logged by:	**BY**
location:	**Goldfield House Basement**
checked by:	**MG**

position: E: 334315; N: 6251717 (WGS84 Zone 56) surface elevation: -4.57 m (AHD) angle from horizontal: 90°

drill model: XC Rig, Track mounted drilling fluid: casing diameter : HW

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

method & support	water	RL (m)	depth (m)	graphic log	material description **ROCK TYPE**: grain characterisics, colour, structure, minor components	weathering & alteration	estimated strength & Is50 (X = axial; O = diametral) VL L M H VH EH	samples, field tests & Is(50) (MPa) a = axial; d = diametral	core run & RQD	defect spacing (mm) 30 100 300 1000 3000	additional observations and defect descriptions (type, inclination, planarity, roughness, coating, thickness, other) particular / general
NMLC	Not Observable	-13	9.0		**SANDSTONE**: medium grained, pale grey, with dark grey laminations, distinctly bedded at 5º to 10º. *(continued)*	FR		a=1.59 d=1.49	100%		
		-14			**SANDSTONE**: fine to medium grained, pale grey, indistinctly cross bedded at 10º to 15º.			a=1.10 d=1.10	100%		
		-15	10.0					a=1.36 d=1.08			
		-16	11.0		**SANDSTONE**: medium grained, pale grey, massive to indistinctly bedded at 0º, trace carbonaceous flecks and laminations.				100%		PT, 0°, UN, RO, X CO
		-17	12.0					a=1.24 d=0.75			SM, 0°, PL, Sandy clay, 50 mm
		-18	13.0		**BRECCIA**: dark grey siltstone clasts within a medium to coarse grained sandstone matrix, massive.	SW		a=1.16 d=1.33	94%		PT, 10°, PL, RO, CN
		-19	14.0		**SANDSTONE**: fine to medium grained, pale grey, indistinctly bedded at 5º to 10º.	FR		a=0.52 d=0.46	91%		PT, 10°, PL, RO, CN SM, 5°, CU, Sandy clay, 40 mm SM, 0°, PL, Sandy clay, 15 mm
		-20	15.0					a=1.14 d=0.84	100%		PT, 10°, PL, RO, Fe SN
								a=1.15 d=1.45			

CDF_0_9_04BB.GLB Log COF BOREHOLE: CORED GEOTLCOV24001AF.GPJ <<DrawingFile>> 02/10/2015 14:34

method & support
AS auger screwing
AD auger drilling
CB claw or blade bit
W washbore
NMLC NMLC core (51.9 mm)
NQ wireline core (47.6mm)
HQ wireline core (63.5mm)
PQ wireline core (85.0mm)
SPT standard penetration test
DT diatube
HE hand excavation
NDD non destructive drilling

water
10/10/12, water level on date shown
water inflow
complete drilling fluid loss
partial drilling fluid loss
25uL water pressure test result (lugeons) for depth interval shown

graphic log / core recovery
core recovered (graphic symbols indicate material)
no core recovered

core run & RQD
barrel withdrawn
RQD = Rock Quality Designation (%)

weathering & alteration*
RS residual soil
XW extremely weathered
HW highly weathered
DW distinctly weathered
MW moderately weathered
SW slightly weathered
FR fresh
*W replaced with A for alteration

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

defect type
PT parting
JT joint
SZ shear zone
SS shear surface
CS crushed seam
SM seam
DB drilling break

planarity
PL planar
CU curved
UN undulating
ST stepped
IR Irregular

roughness
SL slickensided
POL polished
SO smooth
RO rough
VR very rough

coating
CN clean
SN stain
VN veneer
CO coating

coffey

Engineering Log - Cored Borehole

Borehole ID.	**BH04**
sheet:	4 of 4
project no.	**GEOTLCOV24001AF**
client:	**Wanda One Sydney Pty Ltd**
date started:	**24 Aug 2015**
principal:	
date completed:	**25 Aug 2015**
project:	**Sydney One Project**
logged by:	**BY**
location:	**Goldfield House Basement**
checked by:	**MG**

position: E: 334315; N: 6251717 (WGS84 Zone 56) surface elevation: -4.57 m (AHD) angle from horizontal: 90°

drill model: XC Rig, Track mounted drilling fluid: casing diameter : HW

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

method & support	water	RL (m)	depth (m)	graphic log	material description **ROCK TYPE**: grain characterisics, colour, structure, minor components	weathering & alteration	estimated strength & Is50 (X = axial; O = diametral) VL L M H VH EH	samples, field tests & Is(50) (MPa) a = axial; d = diametral	core run & RQD	defect spacing (mm) 30 100 300 1000 3000	additional observations and defect descriptions (type, inclination, planarity, roughness, coating, thickness, other) particular / general
NMLC	Not Observable	-21	17.0		**SANDSTONE**: fine to medium grained, pale grey, massive, trace carbonaceous flecks and laminations. *(continued)*	FR		a=1.61 d=0.71	100%		
		-22	18.0		**SANDSTONE**: fine to medium grained, pale grey, distinctly bedded at 5º to 10º.			a=1.27 d=1.41 a=1.47 d=1.66	99%		
		-23	19.0		**LAMINITE (60% SILTSTONE, 40% SANDSTONE**: siltstone is dark grey, sandstone is fine grained, pale grey, distinctly laminated at 0º to 10º.			a=1.00 d=1.06	100%		
		-24	20.0		**SANDSTONE**: fine to medium grained, pale grey, massive to indistinctly bedded at 0º, trace carbonaceous flecks and laminations.			a=2.10 d=1.78			
		-25	21.0		Borehole BH04 terminated at 20.00 m Target depth						
		-26	22.0								
		-27	23.0								
		-28									

method & support
AS auger screwing
AD auger drilling
CB claw or blade bit
W washbore
NMLC NMLC core (51.9 mm)
NQ wireline core (47.6mm)
HQ wireline core (63.5mm)
PQ wireline core (85.0mm)
SPT standard penetration test
DT diatube
HE hand excavation
NDD non destructive drilling

water
10/10/12, water level on date shown
water inflow
complete drilling fluid loss
partial drilling fluid loss
25uL water pressure test result (lugeons) for depth interval shown

graphic log / core recovery
core recovered (graphic symbols indicate material)
no core recovered

core run & RQD
barrel withdrawn
RQD = Rock Quality Designation (%)

weathering & alteration*
RS residual soil
XW extremely weathered
HW highly weathered
DW distinctly weathered
MW moderately weathered
SW slightly weathered
FR fresh
*W replaced with A for alteration

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

defect type
PT parting
JT joint
SZ shear zone
SS shear surface
CS crushed seam
SM seam
DB drilling break

roughness
SL slickensided
POL polished
SO smooth
RO rough
VR very rough

planarity
PL planar
CU curved
UN undulating
ST stepped
IR Irregular

coating
CN clean
SN stain
VN veneer
CO coating

PointID : BH04 Depth Range: 0.56 - 5.00 m

drawn	BC
approved	MG
date	4/09/2015
scale	N.T.S.
original size	A4

client: Wanda One Sydney Pty Ltd

project: Sydney One Project
Sydney CBD, NSW

title: **CORE PHOTOGRAPH**
BH04

project no: GEOTLCOV24001AF | fig no: **FIGURE 1** | rev:

PointID : BH04 Depth Range: 5.00 - 10.00 m

drawn	BC
approved	MG
date	4/09/2015
scale	N.T.S.
original size	A4

coffey

client: Wanda One Sydney Pty Ltd

project: Sydney One Project
Sydney CBD, NSW

title: **CORE PHOTOGRAPH**
BH04

project no: GEOTLCOV24001AF | fig no: **FIGURE 2** | rev:

PointID : BH04 Depth Range: 10.00 - 15.00 m

drawn	BC
approved	MG
date	4/09/2015
scale	N.T.S.
original size	A4

coffey

client:	Wanda One Sydney Pty Ltd
project:	Sydney One Project Sydney CBD, NSW
title:	**CORE PHOTOGRAPH** **BH04**

project no:	fig no:	rev:
GEOTLCOV24001AF	**FIGURE 3**	

PointID : BH04 Depth Range: 15.00 - 20.00 m

drawn	BC
approved	MG
date	4/09/2015
scale	N.T.S.
original size	A4

coffey

client: Wanda One Sydney Pty Ltd

project: Sydney One Project
Sydney CBD, NSW

title: **CORE PHOTOGRAPH**
BH04

project no: GEOTLCOV24001AF | fig no: **FIGURE 4** | rev:

coffey

Engineering Log - Borehole

Borehole ID.	**BH05**
sheet:	1 of 4
project no.	**GEOTLCOV24001AF**
client:	**Wanda One Sydney Pty Ltd**
date started:	**17 Aug 2015**
principal:	
date completed:	**18 Aug 2015**
project:	**Sydney One Project**
logged by:	**BY**
location:	**Goldfield House Basement**
checked by:	**MG**

position: E: 334267; N: 6251730 (WGS84 Zone 56) surface elevation: -4.57 m (AHD) angle from horizontal: 90°

drill model: XC Rig, Track mounted casing diameter : HW

drilling information | **material substance**

method & support	penetration 1 2 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description (SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components)	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	structure and additional observations
DT								**CONCRETE**: (0.165 m).				**CONCRETE**
AD/T HW casing		Not Observable		-5			GP	**FILL: GRAVEL**: coarse grained, sub-angular to angular, dark grey.	D			**DRAINAGE LAYER**
								Borehole BH05 continued as cored hole				
				-6	1.0							
				-7	2.0							
				-8	3.0							
				-9	4.0							
				-10	5.0							
				-11	6.0							
				-12	7.0							

CDF_0_9_04BB.GLB Log COF BOREHOLE: NON CORED GEOTLCOV24001AF.GPJ <<DrawingFile>> 02/10/2015 14:32

method
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore
- DT diatube
- HE hand excavation
- NDD non destructive drilling
- * bit shown by suffix
- e.g. AD/T
- B blank bit
- T TC bit
- V V bit

support
- M mud
- C casing
- N nil

penetration
1 2 3 — no resistance ranging to refusal

water
- 10-Oct-12 water level on date shown
- water inflow
- water outflow

samples & field tests
- B bulk disturbed sample
- D disturbed sample
- E environmental sample
- SS split spoon sample
- U## undisturbed sample ##mm diameter
- HP hand penetrometer (kPa)
- N standard penetration test (SPT)
- N* SPT - sample recovered
- Nc SPT with solid cone
- VS vane shear; peak/remouded (kPa)
- R refusal
- HB hammer bouncing

classification symbol & soil description based on Unified Classification System

moisture
- D dry
- M moist
- W wet
- Wp plastic limit
- Wl liquid limit

consistency / relative density

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

coffey

Engineering Log - Cored Borehole

Borehole ID.	**BH05**
sheet:	2 of 4
project no.	**GEOTLCOV24001AF**
client:	**Wanda One Sydney Pty Ltd**
date started:	**17 Aug 2015**
principal:	
date completed:	**18 Aug 2015**
project:	**Sydney One Project**
logged by:	**BY**
location:	**Goldfield House Basement**
checked by:	**MG**

position: E: 334267; N: 6251730 (WGS84 Zone 56) surface elevation: -4.57 m (AHD) angle from horizontal: 90°

drill model: XC Rig, Track mounted drilling fluid: casing diameter : HW

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

method & support	water	RL (m)	depth (m)	graphic log	material description **ROCK TYPE**: grain characterisics, colour, structure, minor components	weathering & alteration	estimated strength & Is50 (X = axial; O = diametral) VL L M H VH EH	samples, field tests & Is(50) (MPa) a = axial; d = diametral	core run & RQD	defect spacing (mm) 30 100 300 1000 3000	additional observations and defect descriptions (type, inclination, planarity, roughness, coating, thickness, other) particular / general
					start coring at 0.43m						
NMLC	Not Observable	-5	1.0		**SANDSTONE**: fine to medium grained, pale grey, massive to indistinctly bedded at 0°, trace carbonaceous flecks and laminations.	SW / FR		a=1.26 d=0.65			
		-6	2.0					a=1.34 d=1.74	100%		
		-7	3.0					a=1.59 d=1.61			
		-8	4.0					a=1.54 d=1.49	100%		
		-9	5.0					a=1.31 d=1.37			
		-10	6.0		**SANDSTONE**: medium grained, pale grey, with dark grey laminations, distinctly bedded at 5° to 10°.			a=0.98 d=1.82	100%		JT, 40 - 45°, PL, RO, CN
		-11	7.0					a=1.38 d=1.08			
		-12						a=1.19 d=1.24	100%		JT, 70°, PL, RO, CN

Defects are:PT, 0 - 10°, PL, RO, CN, unless otherwise described

CDF_0_9_04BB.GLB Log COF BOREHOLE: CORED GEOTLCOV24001AF.GPJ <<DrawingFile>> 02/10/2015 14:34

method & support
- AS auger screwing
- AD auger drilling
- CB claw or blade bit
- W washbore
- NMLC NMLC core (51.9 mm)
- NQ wireline core (47.6mm)
- HQ wireline core (63.5mm)
- PQ wireline core (85.0mm)
- SPT standard penetration test
- DT diatube
- HE hand excavation
- NDD non destructive drilling

water
- 10/10/12, water level on date shown
- water inflow
- complete drilling fluid loss
- partial drilling fluid loss
- 25uL water pressure test result (lugeons) for depth interval shown

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

core run & RQD
- barrel withdrawn
- RQD = Rock Quality Designation (%)

weathering & alteration*
- RS residual soil
- XW extremely weathered
- HW highly weathered
- DW distinctly weathered
- MW moderately weathered
- SW slightly weathered
- FR fresh

*W replaced with A for alteration

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

defect type
- PT parting
- JT joint
- SZ shear zone
- SS shear surface
- CS crushed seam
- SM seam
- DB drilling break

roughness
- SL slickensided
- POL polished
- SO smooth
- RO rough
- VR very rough

planarity
- PL planar
- CU curved
- UN undulating
- ST stepped
- IR Irregular

coating
- CN clean
- SN stain
- VN veneer
- CO coating

coffey

Engineering Log - Cored Borehole

Borehole ID.	**BH05**
sheet:	3 of 4
project no.	**GEOTLCOV24001AF**
client:	**Wanda One Sydney Pty Ltd**
date started:	**17 Aug 2015**
principal:	
date completed:	**18 Aug 2015**
project:	**Sydney One Project**
logged by:	**BY**
location:	**Goldfield House Basement**
checked by:	**MG**

position: E: 334267; N: 6251730 (WGS84 Zone 56) surface elevation: -4.57 m (AHD) angle from horizontal: 90°

drill model: XC Rig, Track mounted drilling fluid: casing diameter : HW

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

method & support	water	RL (m)	depth (m)	graphic log	material description **ROCK TYPE**: grain characterisics, colour, structure, minor components	weathering & alteration	estimated strength & Is50 (X = axial; O = diametral) VL L M H VH EH	samples, field tests & Is(50) (MPa) a = axial; d = diametral	core run & RQD	defect spacing (mm) 30 100 300 1000 3000	additional observations and defect descriptions (type, inclination, planarity, roughness, coating, thickness, other) particular / general
NMLC	Not Observable	-13	9.0		**SANDSTONE**: medium grained, pale grey, with dark grey laminations, distinctly bedded at 5º to 10º. *(continued)*	FR		a=1.29 d=1.40	100%		
		-14	10.0		**SANDSTONE**: fine to medium grained, pale grey, indistinctly cross bedded at 10º to 15º.			a=1.26 d=1.03	100%		
		-15	11.0		**BRECCIA**: dark grey siltstone clasts within a medium to coarse grained sandstone matrix, massive.			a=0.24 d=0.71	100%		JT, 20 - 30°, PL, RO, CN CS, 0 - 10°, PL, Sand, 5 mm
		-16	12.0		**SANDSTONE**: medium grained, pale grey, massive to indistinctly bedded at 0º, trace carbonaceous flecks and laminations.			d=1.96 d=1.67	100%		
		-17	13.0					a=1.34 d=1.56			
		-18	14.0		**SANDSTONE**: fine to medium grained, pale grey, distinctly bedded at 5º to 10º.			a=0.68 d=1.37	100%		
		-19	15.0		**SANDSTONE**: fine to medium grained, pale grey, indistinctly bedded at 10º.			a=1.26 d=1.40	100%		
		-20						a=1.39 d=1.56			

Defects are: PT, 0 - 10°, PL, RO, CN, unless otherwise described

CDF_0_9_04BB.GLB Log COF BOREHOLE: CORED GEOTLCOV24001AF.GPJ <<DrawingFile>> 02/10/2015 14:34

method & support
- AS auger screwing
- AD auger drilling
- CB claw or blade bit
- W washbore
- NMLC NMLC core (51.9 mm)
- NQ wireline core (47.6mm)
- HQ wireline core (63.5mm)
- PQ wireline core (85.0mm)
- SPT standard penetration test
- DT diatube
- HE hand excavation
- NDD non destructive drilling

water
- 10/10/12, water level on date shown
- water inflow
- complete drilling fluid loss
- partial drilling fluid loss
- 25uL water pressure test result (lugeons) for depth interval shown

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

core run & RQD
- barrel withdrawn

RQD = Rock Quality Designation (%)

weathering & alteration*
- RS residual soil
- XW extremely weathered
- HW highly weathered
- DW distinctly weathered
- MW moderately weathered
- SW slightly weathered
- FR fresh

*W replaced with A for alteration

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

defect type
- PT parting
- JT joint
- SZ shear zone
- SS shear surface
- CS crushed seam
- SM seam
- DB drilling break

roughness
- SL slickensided
- POL polished
- SO smooth
- RO rough
- VR very rough

planarity
- PL planar
- CU curved
- UN undulating
- ST stepped
- IR Irregular

coating
- CN clean
- SN stain
- VN veneer
- CO coating

coffey

Engineering Log - Cored Borehole

Borehole ID.	**BH05**
sheet:	4 of 4
project no.	**GEOTLCOV24001AF**
client:	**Wanda One Sydney Pty Ltd**
date started:	**17 Aug 2015**
principal:	
date completed:	**18 Aug 2015**
project:	**Sydney One Project**
logged by:	**BY**
location:	**Goldfield House Basement**
checked by:	**MG**

position: E: 334267; N: 6251730 (WGS84 Zone 56) surface elevation: -4.57 m (AHD) angle from horizontal: 90°

drill model: XC Rig, Track mounted drilling fluid: casing diameter : HW

drilling information				material substance					rock mass defects		
method & support	water	RL (m)	depth (m)	graphic log	material description **ROCK TYPE**: grain characterisics, colour, structure, minor components	weathering & alteration	estimated strength & Is50 (X = axial; O = diametral) VL L M H VH EH	samples, field tests & Is(50) (MPa) a = axial; d = diametral	core run & RQD	defect spacing (mm) 30 100 300 1000 3000	additional observations and defect descriptions (type, inclination, planarity, roughness, coating, thickness, other) particular / general
NMLC	10% Not Observable	-21	17.0		**SANDSTONE**: fine to medium grained, pale grey, indistinctly bedded at 10°. *(continued)*	FR			100% 100%		
		-22									
			18.0		Borehole BH05 terminated at 17.70 m Target depth						
		-23	19.0								
		-24	20.0								
		-25	21.0								
		-26	22.0								
		-27	23.0								
		-28									

CDF_0_9_04BB.GLB Log COF BOREHOLE: CORED GEOTLCOV24001AF.GPJ <<DrawingFile>> 02/10/2015 14:34

method & support
AS auger screwing
AD auger drilling
CB claw or blade bit
W washbore
NMLC NMLC core (51.9 mm)
NQ wireline core (47.6mm)
HQ wireline core (63.5mm)
PQ wireline core (85.0mm)
SPT standard penetration test
DT diatube
HE hand excavation
NDD non destructive drilling

water
10/10/12, water level on date shown
water inflow
complete drilling fluid loss
partial drilling fluid loss
25uL water pressure test result (lugeons) for depth interval shown

graphic log / core recovery
core recovered (graphic symbols indicate material)
no core recovered

core run & RQD
barrel withdrawn
RQD = Rock Quality Designation (%)

weathering & alteration*
RS residual soil
XW extremely weathered
HW highly weathered
DW distinctly weathered
MW moderately weathered
SW slightly weathered
FR fresh
*W replaced with A for alteration

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

defect type
PT parting
JT joint
SZ shear zone
SS shear surface
CS crushed seam
SM seam
DB drilling break

roughness
SL slickensided
POL polished
SO smooth
RO rough
VR very rough

planarity
PL planar
CU curved
UN undulating
ST stepped
IR Irregular

coating
CN clean
SN stain
VN veneer
CO coating

PointID : BH05 Depth Range: 0.43 - 5.00 m

drawn	BC
approved	MG
date	4/09/2015
scale	N.T.S.
original size	A4

coffey

client: Wanda One Sydney Pty Ltd

project: Sydney One Project
Sydney CBD, NSW

title: **CORE PHOTOGRAPH BH05**

project no: GEOTLCOV24001AF | fig no: **FIGURE 1** | rev:

PointID : BH05 Depth Range: 5.00 - 10.00 m

drawn	BC
approved	MG
date	4/09/2015
scale	N.T.S.
original size	A4

coffey

client: Wanda One Sydney Pty Ltd

project: Sydney One Project
Sydney CBD, NSW

title: **CORE PHOTOGRAPH**
BH05

project no: GEOTLCOV24001AF | fig no: **FIGURE 2** | rev:

PointID : BH05 Depth Range: 10.00 - 15.00 m

drawn	BC
approved	MG
date	4/09/2015
scale	N.T.S.
original size	A4

coffey

client: Wanda One Sydney Pty Ltd

project: Sydney One Project
Sydney CBD, NSW

title: **CORE PHOTOGRAPH**
BH05

project no: GEOTLCOV24001AF | fig no: **FIGURE 3** | rev:

PointID : BH05 Depth Range: 15.00 - 17.70 m

drawn	**BC**
approved	**MG**
date	**4/09/2015**
scale	**N.T.S.**
original size	**A4**

coffey

client: Wanda One Sydney Pty Ltd

project: Sydney One Project
Sydney CBD, NSW

title: **CORE PHOTOGRAPH**
BH05

project no: GEOTLCOV24001AF | fig no: **FIGURE 4** | rev:

coffey

Engineering Log - Borehole

Borehole ID.	**BH06**
sheet:	1 of 4
project no.	**GEOTLCOV24001AF**
client:	**Wanda One Sydney Pty Ltd**
date started:	**26 Aug 2015**
principal:	
date completed:	**27 Aug 1975**
project:	**Sydney One Project**
logged by:	**BY**
location:	**Goldfield House Basement**
checked by:	**MG**

position: E: 334277; N: 6251718 (WGS84 Zone 56) surface elevation: -4.57 m (AHD) angle from horizontal: 90°

drill model: XC Rig, Track mounted casing diameter : HW

drilling information | **material substance**

method & support	penetration 1 2 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description **SOIL TYPE**: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	structure and additional observations
DT HE HW casing		Not Observable		-5				**CONCRETE**: 0.15 m.				**CONCRETE**
								FILL: GRAVEL: coarse grained, sub-angular to angular, dark grey.	W			**DRAINAGE LAYER**
								Borehole BH06 continued as cored hole				
				-6	1.0							
				-7	2.0							
				-8	3.0							
				-9	4.0							
				-10	5.0							
				-11	6.0							
				-12	7.0							

CDF_0_9_04BB.GLB Log COF BOREHOLE: NON CORED GEOTLCOV24001AF.GPJ <<DrawingFile>> 02/10/2015 14:32

method
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore
- DT diatube
- HE hand excavation
- NDD non destructive drilling
- * bit shown by suffix
- e.g. AD/T
- B blank bit
- T TC bit
- V V bit

support
- M mud
- C casing
- N nil

penetration
1 2 3 — no resistance ranging to refusal

water
- 10-Oct-12 water level on date shown
- water inflow
- water outflow

samples & field tests
- B bulk disturbed sample
- D disturbed sample
- E environmental sample
- SS split spoon sample
- U## undisturbed sample ##mm diameter
- HP hand penetrometer (kPa)
- N standard penetration test (SPT)
- N* SPT - sample recovered
- Nc SPT with solid cone
- VS vane shear; peak/remouded (kPa)
- R refusal
- HB hammer bouncing

classification symbol & soil description
based on Unified Classification System

moisture
- D dry
- M moist
- W wet
- Wp plastic limit
- Wl liquid limit

consistency / relative density

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

coffey

Engineering Log - Cored Borehole

Borehole ID.	**BH06**
sheet:	2 of 4
project no.	**GEOTLCOV24001AF**
client:	***Wanda One Sydney Pty Ltd***
date started:	***26 Aug 2015***
principal:	
date completed:	***27 Aug 1975***
project:	***Sydney One Project***
logged by:	***BY***
location:	***Goldfield House Basement***
checked by:	***MG***

position: E: 334277; N: 6251718 (WGS84 Zone 56) surface elevation: -4.57 m (AHD) angle from horizontal: 90°

drill model: XC Rig, Track mounted drilling fluid: casing diameter : HW

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

method & support	water	RL (m)	depth (m)	graphic log	material description **ROCK TYPE**: grain characterisics, colour, structure, minor components	weathering & alteration	estimated strength & Is50 (X = axial; O = diametral) VL L M H VH EH	samples, field tests & Is(50) (MPa) a = axial; d = diametral	core run & RQD	defect spacing (mm) 30 100 300 1000 3000	additional observations and defect descriptions (type, inclination, planarity, roughness, coating, thickness, other) particular / general
		-5			start coring at 0.52m						
NMLC	Not Observable	-6	1.0		**SANDSTONE**: medium grained, pale grey, massive.	FR		a=1.43 d=1.52	95%		JT, 20°, PL, RO, SN, Fe
		-7	2.0		**SANDSTONE**: medium grained, pale grey, indistinctly cross bedded at 10º to 15º.			a=1.54 d=1.57	100%		
		-8	3.0					a=1.62 d=1.61	93%		
		-9	4.0		**SANDSTONE**: fine to medium grained, pale grey, distinctly bedded at 0º to 10º.			a=1.23 d=1.39			SM, 0°, PL, Clay, 10 mm PT, 10°, PL, RO, CN SM, 0 - 5°, PL, Clay, 20 mm
		-10	5.0					a=1.36 d=1.55	100%		
		-11	6.0					a=1.12 d=1.09			
		-12	7.0		**SANDSTONE**: medium grained, pale grey, massive to indistinctly bedded at 0º, trace carbonaceous flecks and laminations.			a=1.90 d=1.64	100%		PT, 0°, UN, RO, CN
								a=1.69 d=1.36	99%		SM, 0°, PL, Sandy clay, 3 mm

CDF_0_9_04BB.GLB Log COF BOREHOLE: CORED GEOTLCOV24001AF.GPJ <<DrawingFile>> 02/10/2015 14:34

method & support
- AS auger screwing
- AD auger drilling
- CB claw or blade bit
- W washbore
- NMLC NMLC core (51.9 mm)
- NQ wireline core (47.6mm)
- HQ wireline core (63.5mm)
- PQ wireline core (85.0mm)
- SPT standard penetration test
- DT diatube
- HE hand excavation
- NDD non destructive drilling

water
- 10/10/12, water level on date shown
- water inflow
- complete drilling fluid loss
- partial drilling fluid loss
- 25uL water pressure test result (lugeons) for depth interval shown

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

core run & RQD
- barrel withdrawn
- RQD = Rock Quality Designation (%)

weathering & alteration*
- RS residual soil
- XW extremely weathered
- HW highly weathered
- DW distinctly weathered
- MW moderately weathered
- SW slightly weathered
- FR fresh

*W replaced with A for alteration

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

defect type
- PT parting
- JT joint
- SZ shear zone
- SS shear surface
- CS crushed seam
- SM seam
- DB drilling break

roughness
- SL slickensided
- POL polished
- SO smooth
- RO rough
- VR very rough

planarity
- PL planar
- CU curved
- UN undulating
- ST stepped
- IR Irregular

coating
- CN clean
- SN stain
- VN veneer
- CO coating

coffey

Engineering Log - Cored Borehole

Borehole ID.	**BH06**
sheet:	3 of 4
project no.	**GEOTLCOV24001AF**
client:	**Wanda One Sydney Pty Ltd**
date started:	**26 Aug 2015**
principal:	
date completed:	**27 Aug 1975**
project:	**Sydney One Project**
logged by:	**BY**
location:	**Goldfield House Basement**
checked by:	**MG**

position: E: 334277; N: 6251718 (WGS84 Zone 56) surface elevation: -4.57 m (AHD) angle from horizontal: 90°

drill model: XC Rig, Track mounted drilling fluid: casing diameter : HW

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

method & support	water	RL (m)	depth (m)	graphic log	material description **ROCK TYPE**: grain characterisics, colour, structure, minor components	weathering & alteration	estimated strength & Is50 (X = axial; O = diametral) VL L M H VH EH	samples, field tests & Is(50) (MPa) a = axial; d = diametral	core run & RQD	defect spacing (mm) 30 100 300 1000 3000	additional observations and defect descriptions (type, inclination, planarity, roughness, coating, thickness, other) particular / general
NMLC	Not Observable	-13	9.0		**SANDSTONE**: fine to medium grained, pale grey, distinctly cross bedded at 15º to 20º.	FR		a=1.81 d=1.46	99%		SM, 0°, PL, Sandy clay, 3 mm
		-14									PT, 0°, PL, RO, CN
											PT, 0°, PL, RO, CN
									99%		
								a=1.40 d=1.19			PT, 0°, PL, RO, CN
			10.0		**SANDSTONE**: fine to medium grained, pale grey, indistinctly bedded at 0º to 10º.						
		-15						a=1.48 d=1.20			
									99%		
			11.0					a=1.28 d=1.12			
		-16									SM, 0°, PL, Sandy clay, 10 mm
			12.0								
		-17							100%		
			13.0					a=0.90 d=1.49			
								a=1.82 d=1.53			
		-18									
			14.0						100%		
		-19									PT, 5°, PL, RO, CN
								a=1.25 d=1.49			
			15.0		**SANDSTONE**: medium grained, pale grey, massive to indistinctly bedded at 0º, trace carbonaceous flecks and laminations.				100%		
		-20						a=2.28 d=1.88			

CDF_0_9_04BB.GLB Log COF BOREHOLE: CORED GEOTLCOV24001AF.GPJ <<DrawingFile>> 02/10/2015 14:34

method & support
AS auger screwing
AD auger drilling
CB claw or blade bit
W washbore
NMLC NMLC core (51.9 mm)
NQ wireline core (47.6mm)
HQ wireline core (63.5mm)
PQ wireline core (85.0mm)
SPT standard penetration test
DT diatube
HE hand excavation
NDD non destructive drilling

water
10/10/12, water level on date shown
water inflow
complete drilling fluid loss
partial drilling fluid loss
25uL water pressure test result (lugeons) for depth interval shown

graphic log / core recovery
core recovered (graphic symbols indicate material)
no core recovered

core run & RQD
barrel withdrawn
RQD = Rock Quality Designation (%)

weathering & alteration*
RS residual soil
XW extremely weathered
HW highly weathered
DW distinctly weathered
MW moderately weathered
SW slightly weathered
FR fresh
*W replaced with A for alteration

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

defect type
PT parting
JT joint
SZ shear zone
SS shear surface
CS crushed seam
SM seam
DB drilling break

roughness
SL slickensided
POL polished
SO smooth
RO rough
VR very rough

planarity
PL planar
CU curved
UN undulating
ST stepped
IR Irregular

coating
CN clean
SN stain
VN veneer
CO coating

coffey

Engineering Log - Cored Borehole

Borehole ID.	**BH06**
sheet:	4 of 4
project no.	**GEOTLCOV24001AF**
client:	**Wanda One Sydney Pty Ltd**
date started:	**26 Aug 2015**
principal:	
date completed:	**27 Aug 1975**
project:	**Sydney One Project**
logged by:	**BY**
location:	**Goldfield House Basement**
checked by:	**MG**

position: E: 334277; N: 6251718 (WGS84 Zone 56) surface elevation: -4.57 m (AHD) angle from horizontal: 90°

drill model: XC Rig, Track mounted drilling fluid: casing diameter : HW

drilling information				material substance					rock mass defects		
method & support	water	RL (m)	depth (m)	graphic log	material description **ROCK TYPE**: grain characterisics, colour, structure, minor components	weathering & alteration	estimated strength & Is50 (X = axial; O = diametral) VL L M H VH EH	samples, field tests & Is(50) (MPa) a = axial; d = diametral	core run & RQD	defect spacing (mm) 30 100 300 1000 3000	additional observations and defect descriptions (type, inclination, planarity, roughness, coating, thickness, other) particular / general
NMLC	Not Observable	-21	17.0		**SANDSTONE**: medium grained, pale grey, massive to indistinctly bedded at 0°, trace carbonaceous flecks and laminations. *(continued)*	FR		a=1.62 d=1.62	100%		PT, 5°, PL, RO, CO
		-22			**SANDSTONE**: fine to medium grained, pale grey, distinctly bedded at 0° to 10°.			a=1.19 d=1.21			
		-23	18.0					a=1.73 d=1.62	100%		
		-24	19.0					a=1.35 d=1.14	100%		
		-25	20.0		Borehole BH06 terminated at 20.00 m Target depth						
		-26	21.0								
		-27	22.0								
		-28	23.0								

method & support
AS auger screwing
AD auger drilling
CB claw or blade bit
W washbore
NMLC NMLC core (51.9 mm)
NQ wireline core (47.6mm)
HQ wireline core (63.5mm)
PQ wireline core (85.0mm)
SPT standard penetration test
DT diatube
HE hand excavation
NDD non destructive drilling

water
10/10/12, water level on date shown
water inflow
complete drilling fluid loss
partial drilling fluid loss
25uL water pressure test result (lugeons) for depth interval shown

graphic log / core recovery
core recovered (graphic symbols indicate material)
no core recovered

core run & RQD
barrel withdrawn
RQD = Rock Quality Designation (%)

weathering & alteration*
RS residual soil
XW extremely weathered
HW highly weathered
DW distinctly weathered
MW moderately weathered
SW slightly weathered
FR fresh
*W replaced with A for alteration

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

defect type
PT parting
JT joint
SZ shear zone
SS shear surface
CS crushed seam
SM seam
DB drilling break

roughness
SL slickensided
POL polished
SO smooth
RO rough
VR very rough

planarity
PL planar
CU curved
UN undulating
ST stepped
IR Irregular

coating
CN clean
SN stain
VN veneer
CO coating

PointID : BH06 Depth Range: 0.52 - 5.00 m

drawn	BC
approved	MG
date	4/09/2015
scale	N.T.S.
original size	A4

coffey

client: Wanda One Sydney Pty Ltd

project: Sydney One Project
Sydney CBD, NSW

title: **CORE PHOTOGRAPH**
BH06

project no: GEOTLCOV24001AF | fig no: **FIGURE 1** | rev:

PointID : BH06 Depth Range: 5.00 - 10.00 m

drawn	BC
approved	MG
date	4/09/2015
scale	N.T.S.
original size	A4

coffey

client: Wanda One Sydney Pty Ltd

project: Sydney One Project
Sydney CBD, NSW

title: **CORE PHOTOGRAPH**
BH06

project no: GEOTLCOV24001AF | fig no: **FIGURE 2** | rev:

PointID : BH06 Depth Range: 10.00 - 15.00 m

drawn	BC
approved	MG
date	4/09/2015
scale	N.T.S.
original size	A4

coffey

client:	Wanda One Sydney Pty Ltd
project:	Sydney One Project Sydney CBD, NSW
title:	**CORE PHOTOGRAPH** **BH06**

project no:	fig no:	rev:
GEOTLCOV24001AF	**FIGURE 3**	

PointID : BH06 Depth Range: 15.00 - 20.00 m

drawn	BC
approved	MG
date	4/09/2015
scale	N.T.S.
original size	A4

client: Wanda One Sydney Pty Ltd

project: Sydney One Project
Sydney CBD, NSW

title: **CORE PHOTOGRAPH**
BH06

project no: GEOTLCOV24001AF | fig no: **FIGURE 4** | rev:

coffey

Soil Description Explanation Sheet (1 of 2)

DEFINITION:

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

CLASSIFICATION SYMBOL & SOIL NAME

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

PARTICLE SIZE DESCRIPTIVE TERMS

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

MOISTURE CONDITION

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

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

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

CONSISTENCY OF COHESIVE SOILS

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

DENSITY OF GRANULAR SOILS

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

MINOR COMPONENTS

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

SOIL STRUCTURE

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

GEOLOGICAL ORIGIN

WEATHERED IN PLACE SOILS

Extremely weathered material	Structure and fabric of parent rock visible.
Residual soil	Structure and fabric of parent rock not visible.

TRANSPORTED SOILS

Aeolian soil	Deposited by wind.
Alluvial soil	Deposited by streams and rivers.
Colluvial soil	Deposited on slopes (transported downslope by gravity).
Fill	Man made deposit. Fill may be significantly more variable between tested locations than naturally occurring soils.
Lacustrine soil	Deposited by lakes.
Marine soil	Deposited in ocean basins, bays, beaches and estuaries.

coffey

Soil Description Explanation Sheet (2 of 2)

SOIL CLASSIFICATION INCLUDING IDENTIFICATION AND DESCRIPTION

FIELD IDENTIFICATION PROCEDURES (Excluding particles larger than 60 mm and basing fractions on estimated mass)							USC	PRIMARY NAME
COARSE GRAINED SOILS More than 50% of materials less than 63 mm is larger than 0.075 mm	(A 0.075 mm particle is about the smallest particle visible to the naked eye)	GRAVELS More than half of coarse fraction is larger than 2.36 mm	CLEAN GRAVELS (Little or no fines)	Wide range in grain size and substantial amounts of all intermediate particle sizes.			GW	GRAVEL
				Predominantly one size or a range of sizes with more intermediate sizes missing.			GP	GRAVEL
			GRAVELS WITH FINES (Appreciable amount of fines)	Non-plastic fines (for identification procedures see ML below)			GM	SILTY GRAVEL
				Plastic fines (for identification procedures see CL below)			GC	CLAYEY GRAVEL
		SANDS More than half of coarse fraction is smaller than 2.36 mm	CLEAN SANDS (Little or no fines)	Wide range in grain sizes and substantial amounts of all intermediate sizes			SW	SAND
				Predominantly one size or a range of sizes with some intermediate sizes missing.			SP	SAND
			SANDS WITH FINES (Appreciable amount of fines)	Non-plastic fines (for identification procedures see ML below).			SM	SILTY SAND
				Plastic fines (for identification procedures see CL below).			SC	CLAYEY SAND
FINE GRAINED SOILS More than 50% of material less than 63 mm is smaller than 0.075 mm			IDENTIFICATION PROCEDURES ON FRACTIONS <0.2 mm.					
		SILTS & CLAYS Liquid limit less than 50	**DRY STRENGTH**	**DILATANCY**	**TOUGHNESS**			
			None to Low	Quick to slow	None		ML	SILT
			Medium to High	None	Medium		CL	CLAY
			Low to medium	Slow to very slow	Low		OL	ORGANIC SILT
		SILTS & CLAYS Liquid limit greater than 50	Low to medium	Slow to very slow	Low to medium		MH	SILT
			High	None	High		CH	CLAY
			Medium to High	None	Low to medium		OH	ORGANIC CLAY
HIGHLY ORGANIC SOILS			Readily identified by colour, odour, spongy feel and frequently by fibrous texture.				Pt	PEAT

• Low plasticity – Liquid Limit w_L less than 35%. • Medium plasticity – w_L between 35% and 50%. • High plasticity – w_L greater than 50%.

COMMON DEFECTS IN SOIL

TERM	DEFINITION	DIAGRAM
PARTING	A surface or crack across which the soil has little or no tensile strength. Parallel or sub parallel to layering (eg bedding). May be open or closed.	
JOINT	A surface or crack across which the soil has little or no tensile strength but which is not parallel or sub parallel to layering. May be open or closed. The term 'fissure' may be used for irregular joints <0.2 m in length.	
SHEARED ZONE	Zone in clayey soil with roughly parallel near planar, curved or undulating boundaries containing closely spaced, smooth or slickensided, curved intersecting joints which divide the mass into lenticular or wedge shaped blocks.	
SHEARED SURFACE	A near planar curved or undulating, smooth, polished or slickensided surface in clayey soil. The polished or slickensided surface indicates that movement (in many cases very little) has occurred along the defect.	

TERM	DEFINITION	DIAGRAM
SOFTENED ZONE	A zone in clayey soil, usually adjacent to a defect in which the soil has a higher moisture content than elsewhere.	
TUBE	Tubular cavity. May occur singly or as one of a large number of separate or inter-connected tubes. Walls often coated with clay or strengthened by denser packing of grains. May contain organic matter	
TUBE CAST	Roughly cylindrical elongated body of soil different from the soil mass in which it occurs. In some cases the soil which makes up the tube cast is cemented.	
INFILLED SEAM	Sheet or wall like body of soil substance or mass with roughly planar to irregular near parallel boundaries which cuts through a soil mass. Formed by infilling of open joints.	

coffey

Rock Description Explanation Sheet (1 of 2)

The descriptive terms used by Coffey are given below. They are broadly consistent with Australian Standard AS1726-1993.

DEFINITIONS: Rock substance, defect and mass are defined as follows:

Rock Substance	In engineering terms rock substance is any naturally occurring aggregate of minerals and organic material which cannot be disintegrated or remoulded by hand in air or water. Other material is described using soil descriptive terms. Effectively homogenous material, may be isotropic or anisotropic.
Defect	Discontinuity or break in the continuity of a substance or substances.
Mass	Any body of material which is not effectively homogeneous. It can consist of two or more substances without defects, or one or more substances with one or more defects.

SUBSTANCE DESCRIPTIVE TERMS:

ROCK NAME	Simple rock names are used rather than precise geological classification.
PARTICLE SIZE	Grain size terms for sandstone are:
Coarse grained	Mainly 0.6mm to 2mm
Medium grained	Mainly 0.2mm to 0.6mm
Fine grained	Mainly 0.06mm (just visible) to 0.2mm
FABRIC	Terms for layering of penetrative fabric (eg. bedding, cleavage etc.) are:
Massive	No layering or penetrative fabric.
Indistinct	Layering or fabric just visible. Little effect on properties.
Distinct	Layering or fabric is easily visible. Rock breaks more easily parallel to layering of fabric.

CLASSIFICATION OF WEATHERING PRODUCTS

Term	Abbreviation	Definition
Residual Soil	**RS**	Soil derived from the weathering of rock; the mass structure and substance fabric are no longer evident; there is a large change in volume but the soil has not been significantly transported.
Extremely Weathered Material	**XW**	Material is weathered to such an extent that it has soil properties, ie, it either disintegrates or can be remoulded in water. Original rock fabric still visible.
Highly Weathered Rock	**HW**	Rock strength is changed by weathering. The whole of the rock substance is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable. Some minerals are decomposed to clay minerals. Porosity may be increased by leaching or may be decreased due to the deposition of minerals in pores.
Moderately Weathered Rock	**MW**	The whole of the rock substance is discoloured, usually by iron staining or bleaching , to the extent that the colour of the fresh rock is no longer recognisable.
Slightly Weathered Rock	**SW**	Rock substance affected by weathering to the extent that partial staining or partial discolouration of the rock substance (usually by limonite) has taken place. The colour and texture of the fresh rock is recognisable; strength properties are essentially those of the fresh rock substance.
Fresh Rock	**FR**	Rock substance unaffected by weathering.

Notes on Weathering:

1. AS1726 suggests the term "Distinctly Weathered" (DW) to cover the range of substance weathering conditions between XW and SW. For projects where it is not practical to delineate between HW and MW or it is judged that there is no advantage in making such a distinction. DW may be used with the definition given in AS1726.
2. Where physical and chemical changes were caused by hot gasses and liquids associated with igneous rocks, the term "altered" may be substituted for "weathering" to give the abbreviations XA, HA, MA, SA and DA.

ROCK SUBSTANCE STRENGTH TERMS

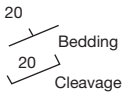
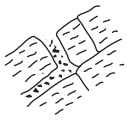
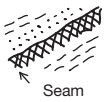
Term	Abbrev-iation	Point Load Index, $I_{s(50)}$ (MPa)	Field Guide
Very Low	**VL**	Less than 0.1	Material crumbles under firm blows with sharp end of pick; can be peeled with a knife; pieces up to 30mm thick can be broken by finger pressure.
Low	**L**	0.1 to 0.3	Easily scored with a knife; indentations 1mm to 3mm show with firm bows of a pick point; has a dull sound under hammer. Pieces of core 150mm long by 50mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling.
Medium	**M**	0.3 to 1.0	Readily scored with a knife; a piece of core 150mm long by 50mm diameter can be broken by hand with difficulty.
High	**H**	1 to 3	A piece of core 150mm long by 50mm can not be broken by hand but can be broken by a pick with a single firm blow; rock rings under hammer.
Very High	**VH**	3 to 10	Hand specimen breaks after more than one blow of a pick; rock rings under hammer.
Extremely High	**EH**	More than 10	Specimen requires many blows with geological pick to break; rock rings under hammer.

Notes on Rock Substance Strength:

1. In anisotropic rocks the field guide to strength applies to the strength perpendicular to the anisotropy. High strength anisotropic rocks may break readily parallel to the planar anisotropy.
2. The term "extremely low" is not used as a rock substance strength term. While the term is used in AS1726-1993, the field guide therein makes it clear that materials in that strength range are soils in engineering terms.
3. The unconfined compressive strength for isotropic rocks (and anisotropic rocks which fall across the planar anisotropy) is typically 10 to 25 times the point load index $I_{s(50)}$. The ratio may vary for different rock types. Lower strength rocks often have lower ratios than higher strength rocks.

coffey

Rock Description Explanation Sheet (2 of 2)

COMMON DEFECTS IN ROCK MASSES Term	Definition	Diagram	Map Symbol	Graphic Log (Note 1)
Parting	A surface or crack across which the rock has little or no tensile strength. Parallel or sub parallel to layering (eg bedding) or a planar anisotropy in the rock substance (eg, cleavage). May be open or closed.			 (Note 2)
Joint	A surface or crack across which the rock has little or no tensile strength. but which is not parallel or sub parallel to layering or planar anisotropy in the rock substance. May be open or closed.			 (Note 2)
Sheared Zone (Note 3)	Zone of rock substance with roughly parallel near planar, curved or undulating boundaries cut by closely spaced joints, sheared surfaces or other defects. Some of the defects are usually curved and intersect to divide the mass into lenticular or wedge shaped blocks.			
Sheared Surface (Note 3)	A near planar, curved or undulating surface which is usually smooth, polished or slickensided.			
Crushed Seam (Note 3)	Seam with roughly parallel almost planar boundaries, composed of disoriented, usually angular fragments of the host rock substance which may be more weathered than the host rock. The seam has soil properties.			
Infilled Seam	Seam of soil substance usually with distinct roughly parallel boundaries formed by the migration of soil into an open cavity or joint, infilled seams less than 1mm thick may be described as veneer or coating on joint surface.			
Extremely Weathered Seam	Seam of soil substance, often with gradational boundaries. Formad by weathering of the rock substance in place.			

DEFECT SHAPE TERMS	
Planar	The defect does not vary in orientation
Curved	The defect has a gradual change in orientation
Undulating	The defect has a wavy surface
Stepped	The defect has one or more well defined steps
Irregular	The defect has many sharp changes of orientation

Note: The assessment of defect shape is partly influenced by the scale of the observation.

ROUGHNESS TERMS	
Slickensided	Grooved or striated surface, usually polished
Polished	Shiny smooth surface
Smooth	Smooth to touch. Few or no surface irregularities
Rough	Many small surface irregularities (amplitude generally less than 1mm). Feels like fine to coarse sand paper.
Very Rough	Many large surface irregularities (amplitude generally more than 1mm). Feels like, or coarser than very coarse sand paper.

COATING TERMS	
Clean	No visible coating
Stained	No visible coating but surfaces are discoloured
Veneer	A visible coating of soil or mineral, too thin to measure; may be patchy
Coating	A visible coating up to 1mm thick. Thicker soil material is usually described using appropriate defect terms (eg, infilled seam). Thicker rock strength material is usually described as a vein.

BLOCK SHAPE TERMS	
Blocky	Approximately equidimensional
Tabular	Thickness much less than length or width
Columnar	Height much greate than cross section

Notes on Defects:

1. Usually borehole logs show the true dip of defects and face sketches and sections the apparent dip.
2. Partings and joints are not usually shown on the graphic log unless considered significant.
3. Sheared zones, sheared surfaces and crushed seams are faults in geological terms.

72710 / 07-06

Appendix B – Laboratory Test Certificates

Certificate of Analysis

Coffey Geotechnics Pty Ltd Chatswood
Level 18, Tower B, Citadel Tower 799 Pacific Highway
Chatswood
NSW 2067

NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025.
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Attention: **Bernice Cahill**

Report **470640-S**
Project name SYDNEY ONE
Project ID GEOTLCOV24CC1AF
Received Date Sep 01, 2015

Client Sample ID			**BH03_(0.5-0.6)**	**BH03_(1.0-1.1)**	**BH03_(2.0-2.1)**	**BH03_(3.4-3.5)**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**S15-Se00378**	**S15-Se00379**	**S15-Se00380**	**S15-Se00382**
Date Sampled			**Aug 24, 2015**	**Aug 24, 2015**	**Aug 24, 2015**	**Aug 24, 2015**
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	-	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	-	< 20	< 20
TRH C15-C28	50	mg/kg	210	-	< 50	< 50
TRH C29-C36	50	mg/kg	790	-	< 50	< 50
TRH C10-36 (Total)	50	mg/kg	1000	-	< 50	< 50
BTEX						
Benzene	0.1	mg/kg	< 0.1	-	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	-	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	-	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	-	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	-	< 0.1	< 0.1
Xylenes - Total	0.3	mg/kg	< 0.3	-	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	60	-	84	71
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	-	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	-	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	-	< 20	< 20
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	-	< 50	< 50
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	1.6	-	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	1.9	-	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	2.1	-	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	-	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	-	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	-	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	1.3	-	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	1.2	-	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	1.2	-	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	0.8	-	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	0.9	-	< 0.5	< 0.5
Chrysene	0.5	mg/kg	0.9	-	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	-	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	2.3	-	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	-	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	0.6	-	< 0.5	< 0.5

Client Sample ID			BH03_(0.5-0.6)	BH03_(1.0-1.1)	BH03_(2.0-2.1)	BH03_(3.4-3.5)
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins | mgt Sample No.			S15-Se00378	S15-Se00379	S15-Se00380	S15-Se00382
Date Sampled			Aug 24, 2015	Aug 24, 2015	Aug 24, 2015	Aug 24, 2015
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Naphthalene	0.5	mg/kg	< 0.5	-	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	1.2	-	< 0.5	< 0.5
Pyrene	0.5	mg/kg	2.5	-	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	13	-	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	91	-	114	112
p-Terphenyl-d14 (surr.)	1	%	84	-	109	104
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	50	mg/kg	< 50	-	< 50	< 50
TRH >C16-C34	100	mg/kg	670	-	< 100	< 100
TRH >C34-C40	100	mg/kg	850	-	< 100	< 100
Chloride	10	mg/kg	-	71	45	56
pH (1:5 Aqueous extract)	0.1	pH Units	-	6.8	7.4	7.3
Sulphate (as SO4)	10	mg/kg	-	600	140	300
% Moisture	0.1	%	13	11	11	18
Heavy Metals						
Arsenic	2	mg/kg	14	-	4.4	< 2
Cadmium	0.4	mg/kg	< 0.4	-	< 0.4	< 0.4
Chromium	5	mg/kg	21	-	6.3	< 5
Copper	5	mg/kg	30	-	220	11
Lead	5	mg/kg	43	-	150	15
Mercury	0.05	mg/kg	0.24	-	0.25	0.11
Nickel	5	mg/kg	5.9	-	< 5	< 5
Zinc	5	mg/kg	43	-	66	5.6
Chromium Suite						
pH-KCL	0.1	pH Units	-	7.5	-	6.7
Acid trail - Titratable Actual Acidity	2	mol H+/t	-	< 2	-	< 2
sulfidic - TAA equiv. S% pyrite	0.02	% pyrite S	-	< 0.02	-	< 0.02
Chromium Reducible Sulfur[S04]	0.005	% S	-	0.090	-	0.22
Chromium Reducible Sulfur -acidity units	3	mol H+/t	-	56	-	130
Sulfur - KCl Extractable	0.02	% S	-	n/a	-	n/a
HCl Extractable Sulfur	0.02	% S	-	n/a	-	n/a
Net Acid soluble sulfur	0.02	% S	-	n/a	-	n/a
Net Acid soluble sulfur - acidity units	10	mol H+/t	-	n/a	-	n/a
Net Acid soluble sulfur - equivalent S% pyrite[S02]	0.02	% S	-	n/a	-	n/a
Acid Neutralising Capacity (ANCbt)	0.01	%CaCO3	-	0.76	-	1.5
Acid Neutralising Capacity - acidity (ANCbt)	2	mol H+/t	-	150	-	300
Acid Neutralising Capacity - equivalent S% pyrite (s-ANCbt)[S03]	0.02	% S	-	0.24	-	0.49
ANC Fineness Factor		factor	-	1.5	-	1.5
Net Acidity (Sulfur Units)	0.02	% S	-	< 0.02	-	< 0.02
Net Acidity (Acidity Units)	10	mol H+/t	-	< 10	-	< 10
Liming Rate[S01]	1	kg CaCO3/t	-	< 1	-	< 1
Extraneous Material						
<2mm Fraction	0.005	g	-	n/a	-	n/a
>2mm Fraction	0.005	g	-	n/a	-	n/a
Analysed Material	0.1	%	-	100	-	100
Extraneous Material	0.1	%	-	< 0.1	-	< 0.1

Client Sample ID			BH03_(3.5-3.9)	BH03_(4.5-4.52)	BH02_(2.1-2.3)	BH02_(3.3-3.5)
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins | mgt Sample No.			S15-Se00383	S15-Se00384	S15-Se00385	S15-Se00386
Date Sampled			Aug 24, 2015	Aug 24, 2015	Aug 27, 2015	Aug 27, 2015
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	-	-	< 20	-
TRH C10-C14	20	mg/kg	-	-	< 20	-
TRH C15-C28	50	mg/kg	-	-	< 50	-
TRH C29-C36	50	mg/kg	-	-	< 50	-
TRH C10-36 (Total)	50	mg/kg	-	-	< 50	-
BTEX						
Benzene	0.1	mg/kg	-	-	< 0.1	-
Toluene	0.1	mg/kg	-	-	< 0.1	-
Ethylbenzene	0.1	mg/kg	-	-	< 0.1	-
m&p-Xylenes	0.2	mg/kg	-	-	< 0.2	-
o-Xylene	0.1	mg/kg	-	-	< 0.1	-
Xylenes - Total	0.3	mg/kg	-	-	< 0.3	-
4-Bromofluorobenzene (surr.)	1	%	-	-	71	-
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	-	-	< 0.5	-
TRH C6-C10	20	mg/kg	-	-	< 20	-
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	-	-	< 20	-
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	-	-	< 50	-
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	-	-	< 0.5	-
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	-	-	0.6	-
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	-	-	1.2	-
Acenaphthene	0.5	mg/kg	-	-	< 0.5	-
Acenaphthylene	0.5	mg/kg	-	-	< 0.5	-
Anthracene	0.5	mg/kg	-	-	< 0.5	-
Benz(a)anthracene	0.5	mg/kg	-	-	< 0.5	-
Benzo(a)pyrene	0.5	mg/kg	-	-	< 0.5	-
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	-	-	< 0.5	-
Benzo(g.h.i)perylene	0.5	mg/kg	-	-	< 0.5	-
Benzo(k)fluoranthene	0.5	mg/kg	-	-	< 0.5	-
Chrysene	0.5	mg/kg	-	-	< 0.5	-
Dibenz(a.h)anthracene	0.5	mg/kg	-	-	< 0.5	-
Fluoranthene	0.5	mg/kg	-	-	< 0.5	-
Fluorene	0.5	mg/kg	-	-	< 0.5	-
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	-	-	< 0.5	-
Naphthalene	0.5	mg/kg	-	-	< 0.5	-
Phenanthrene	0.5	mg/kg	-	-	< 0.5	-
Pyrene	0.5	mg/kg	-	-	< 0.5	-
Total PAH*	0.5	mg/kg	-	-	< 0.5	-
2-Fluorobiphenyl (surr.)	1	%	-	-	115	-
p-Terphenyl-d14 (surr.)	1	%	-	-	106	-
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	50	mg/kg	-	-	< 50	-
TRH >C16-C34	100	mg/kg	-	-	< 100	-
TRH >C34-C40	100	mg/kg	-	-	< 100	-

Client Sample ID			BH03_(3.5-3.9)	BH03_(4.5-4.52)	BH02_(2.1-2.3)	BH02_(3.3-3.5)
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**S15-Se00383**	**S15-Se00384**	**S15-Se00385**	**S15-Se00386**
Date Sampled			**Aug 24, 2015**	**Aug 24, 2015**	**Aug 27, 2015**	**Aug 27, 2015**
Test/Reference	LOR	Unit				
Chloride	10	mg/kg	-	-	-	1400
pH (1:5 Aqueous extract)	0.1	pH Units	-	-	-	8.2
Sulphate (as SO4)	10	mg/kg	-	-	-	330
% Moisture	0.1	%	20	12	22	28
Heavy Metals						
Arsenic	2	mg/kg	-	-	< 2	-
Cadmium	0.4	mg/kg	-	-	< 0.4	-
Chromium	5	mg/kg	-	-	< 5	-
Copper	5	mg/kg	-	-	15	-
Lead	5	mg/kg	-	-	22	-
Mercury	0.05	mg/kg	-	-	0.08	-
Nickel	5	mg/kg	-	-	< 5	-
Zinc	5	mg/kg	-	-	21	-
Chromium Suite						
pH-KCL	0.1	pH Units	8.6	9.1	8.9	8.8
Acid trail - Titratable Actual Acidity	2	mol H+/t	< 2	< 2	< 2	< 2
sulfidic - TAA equiv. S% pyrite	0.02	% pyrite S	< 0.02	< 0.02	< 0.02	< 0.02
Chromium Reducible Sulfur[S04]	0.005	% S	0.28	0.17	0.021	0.23
Chromium Reducible Sulfur -acidity units	3	mol H+/t	170	100	13	140
Sulfur - KCl Extractable	0.02	% S	n/a	n/a	n/a	n/a
HCl Extractable Sulfur	0.02	% S	n/a	n/a	n/a	n/a
Net Acid soluble sulfur	0.02	% S	n/a	n/a	n/a	n/a
Net Acid soluble sulfur - acidity units	10	mol H+/t	n/a	n/a	n/a	n/a
Net Acid soluble sulfur - equivalent S% pyrite[S02]	0.02	% S	n/a	n/a	n/a	n/a
Acid Neutralising Capacity (ANCbt)	0.01	%CaCO3	5.7	0.51	1.2	1.0
Acid Neutralising Capacity - acidity (ANCbt)	2	mol H+/t	1100	100	230	200
Acid Neutralising Capacity - equivalent S% pyrite (s-ANCbt)[S03]	0.02	% S	1.8	0.16	0.37	0.32
ANC Fineness Factor		factor	1.5	1.5	1.5	1.5
Net Acidity (Sulfur Units)	0.02	% S	< 0.02	0.06	< 0.02	< 0.02
Net Acidity (Acidity Units)	10	mol H+/t	< 10	36	< 10	< 10
Liming Rate[S01]	1	kg CaCO3/t	< 1	3.0	< 1	1.0
Extraneous Material						
<2mm Fraction	0.005	g	170	150	n/a	n/a
>2mm Fraction	0.005	g	64	43	n/a	n/a
Analysed Material	0.1	%	73	78	100	100
Extraneous Material	0.1	%	27	22	< 0.1	< 0.1

Client Sample ID			BH02_(3.5-3.95)	BH02_(4.5-4.95)	QC1
Sample Matrix			**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**S15-Se00387**	**S15-Se00389**	**S15-Se00390**
Date Sampled			**Aug 27, 2015**	**Aug 27, 2015**	**Aug 27, 2015**
Test/Reference	LOR	Unit			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions					
TRH C6-C9	20	mg/kg	-	-	< 20
TRH C10-C14	20	mg/kg	-	-	< 20
TRH C15-C28	50	mg/kg	-	-	170
TRH C29-C36	50	mg/kg	-	-	780
TRH C10-36 (Total)	50	mg/kg	-	-	950
BTEX					
Benzene	0.1	mg/kg	-	-	< 0.1
Toluene	0.1	mg/kg	-	-	< 0.1
Ethylbenzene	0.1	mg/kg	-	-	< 0.1
m&p-Xylenes	0.2	mg/kg	-	-	< 0.2
o-Xylene	0.1	mg/kg	-	-	< 0.1
Xylenes - Total	0.3	mg/kg	-	-	< 0.3
4-Bromofluorobenzene (surr.)	1	%	-	-	80
Total Recoverable Hydrocarbons - 2013 NEPM Fractions					
Naphthalene[N02]	0.5	mg/kg	-	-	< 0.5
TRH C6-C10	20	mg/kg	-	-	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	-	-	< 20
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	-	-	< 50
Polycyclic Aromatic Hydrocarbons					
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	-	-	1.0
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	-	-	1.3
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	-	-	1.6
Acenaphthene	0.5	mg/kg	-	-	< 0.5
Acenaphthylene	0.5	mg/kg	-	-	< 0.5
Anthracene	0.5	mg/kg	-	-	< 0.5
Benz(a)anthracene	0.5	mg/kg	-	-	1.1
Benzo(a)pyrene	0.5	mg/kg	-	-	0.8
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	-	-	0.6
Benzo(g.h.i)perylene	0.5	mg/kg	-	-	0.8
Benzo(k)fluoranthene	0.5	mg/kg	-	-	0.6
Chrysene	0.5	mg/kg	-	-	0.7
Dibenz(a.h)anthracene	0.5	mg/kg	-	-	< 0.5
Fluoranthene	0.5	mg/kg	-	-	2.0
Fluorene	0.5	mg/kg	-	-	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	-	-	< 0.5
Naphthalene	0.5	mg/kg	-	-	< 0.5
Phenanthrene	0.5	mg/kg	-	-	1.0
Pyrene	0.5	mg/kg	-	-	2.2
Total PAH*	0.5	mg/kg	-	-	9.8
2-Fluorobiphenyl (surr.)	1	%	-	-	113
p-Terphenyl-d14 (surr.)	1	%	-	-	104
Total Recoverable Hydrocarbons - 2013 NEPM Fractions					
TRH >C10-C16	50	mg/kg	-	-	< 50
TRH >C16-C34	100	mg/kg	-	-	790
TRH >C34-C40	100	mg/kg	-	-	630
% Moisture	0.1	%	24	19	13

Client Sample ID			BH02_(3.5-3.95)	BH02_(4.5-4.95)	QC1
Sample Matrix			**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**S15-Se00387**	**S15-Se00389**	**S15-Se00390**
Date Sampled			**Aug 27, 2015**	**Aug 27, 2015**	**Aug 27, 2015**
Test/Reference	LOR	Unit			
Heavy Metals					
Arsenic	2	mg/kg	-	-	5.6
Cadmium	0.4	mg/kg	-	-	< 0.4
Chromium	5	mg/kg	-	-	11
Copper	5	mg/kg	-	-	10
Lead	5	mg/kg	-	-	91
Mercury	0.05	mg/kg	-	-	0.31
Nickel	5	mg/kg	-	-	6.4
Zinc	5	mg/kg	-	-	47
Chromium Suite					
pH-KCL	0.1	pH Units	8.8	9.1	-
Acid trail - Titratable Actual Acidity	2	mol H+/t	< 2	< 2	-
sulfidic - TAA equiv. S% pyrite	0.02	% pyrite S	< 0.02	< 0.02	-
Chromium Reducible Sulfur[S04]	0.005	% S	0.42	0.22	-
Chromium Reducible Sulfur -acidity units	3	mol H+/t	260	140	-
Sulfur - KCl Extractable	0.02	% S	n/a	n/a	-
HCl Extractable Sulfur	0.02	% S	n/a	n/a	-
Net Acid soluble sulfur	0.02	% S	n/a	n/a	-
Net Acid soluble sulfur - acidity units	10	mol H+/t	n/a	n/a	-
Net Acid soluble sulfur - equivalent S% pyrite[S02]	0.02	% S	n/a	n/a	-
Acid Neutralising Capacity (ANCbt)	0.01	%CaCO3	3.8	5.4	-
Acid Neutralising Capacity - acidity (ANCbt)	2	mol H+/t	760	1100	-
Acid Neutralising Capacity - equivalent S% pyrite (s-ANCbt)[S03]	0.02	% S	1.2	1.7	-
ANC Fineness Factor		factor	1.5	1.5	-
Net Acidity (Sulfur Units)	0.02	% S	< 0.02	< 0.02	-
Net Acidity (Acidity Units)	10	mol H+/t	< 10	< 10	-
Liming Rate[S01]	1	kg CaCO3/t	< 1	< 1	-
Extraneous Material					
<2mm Fraction	0.005	g	130	32	-
>2mm Fraction	0.005	g	27	26	-
Analysed Material	0.1	%	83	55	-
Extraneous Material	0.1	%	17	45	-

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Sydney	Sep 03, 2015	14 Day
- Method: TRH C6-C36 - LTM-ORG-2010			
BTEX	Sydney	Sep 03, 2015	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Sep 03, 2015	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Polycyclic Aromatic Hydrocarbons	Sydney	Sep 03, 2015	14 Day
- Method: E007 Polyaromatic Hydrocarbons (PAH)			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Sep 03, 2015	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Metals M8	Sydney	Sep 03, 2015	28 Day
- Method: LTM-MET-3040_R0 TOTAL AND DISSOLVED METALS AND MERCURY IN WATERS BY ICP-MS			
Eurofins | mgt Suite B18			
Chloride	Sydney	Sep 04, 2015	28 Day
- Method: E033 /E045 /E047 Chloride			
pH (1:5 Aqueous extract)	Sydney	Sep 04, 2015	7 Day
- Method: LTM-GEN-7090 pH in soil by ISE			
Sulphate (as SO4)	Sydney	Sep 04, 2015	28 Day
- Method: E045 Sulphate			
% Moisture	Sydney	Sep 01, 2015	14 Day
- Method: LTM-GEN-7080 Moisture			
Chromium Suite			
Chromium Suite	Brisbane	Sep 08, 2015	6 Week
- Method: LTM-GEN-7070			
Extraneous Material	Brisbane	Sep 08, 2015	6 Week
- Method: LTM-GEN-7050/7070			

Company Name: Coffey Geotechnics Pty Ltd Chatswood
Address: Level 18, Tower B, Citadel Tower 799 Pacific Highway
Chatswood
NSW 2067

Project Name: SYDNEY ONE
Project ID: GEOTLCOV24CC1AF

Order No.:
Report #: 470640
Phone: +61 2 9406 1000
Fax: +61 2 9406 1002

Received: Sep 1, 2015 10:27 AM
Due: Sep 9, 2015
Priority: 6 Day
Contact Name: Bernice Cahill

Eurofins | mgt Client Manager: Charl Du Preez

Sample Detail					Asbestos Absence /Presence	HOLD	Eurofins | mgt Suite B18	Chromium Suite	Moisture Set	Moisture Set	Eurofins | mgt Suite B7
Laboratory where analysis is conducted											
Melbourne Laboratory - NATA Site # 1254 & 14271											
Sydney Laboratory - NATA Site # 18217					X	X	X		X	X	X
Brisbane Laboratory - NATA Site # 20794							X	X	X	X	
External Laboratory											
Sample ID	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**							
BH03_(0.5-0.6)	Aug 24, 2015		Soil	S15-Se00378	X					X	X
BH03_(1.0-1.1)	Aug 24, 2015		Soil	S15-Se00379			X	X		X	
BH03_(2.0-2.1)	Aug 24, 2015		Soil	S15-Se00380	X		X			X	X
BH03_(2.9-3.0)	Aug 24, 2015		Soil	S15-Se00381		X					
BH03_(3.4-3.5)	Aug 24, 2015		Soil	S15-Se00382			X	X		X	X
BH03_(3.5-3.9)	Aug 24, 2015		Soil	S15-Se00383				X	X		
BH03_(4.5-4.52)	Aug 24, 2015		Soil	S15-Se00384				X	X		
BH02_(2.1-2.3)	Aug 27, 2015		Soil	S15-Se00385				X		X	X

ABN – 50 005 085 521 e.mail : EnviroSales@eurofins.com.au web : www.eurofins.com.au

Melbourne
3-5 Kingston Town Close
Oakleigh VIC 3166
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

Sydney
Unit F3, Building F
16 Mars Road
Lane Cove West NSW 2066
Phone : +61 2 9900 8400
NATA # 1261 Site # 18217

Brisbane
1/21 Smallwood Place
Murarrie QLD 4172
Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

Company Name:	Coffey Geotechnics Pty Ltd Chatswood	**Order No.:**		**Received:**	Sep 1, 2015 10:27 AM
Address:	Level 18, Tower B, Citadel Tower 799 Pacific Highway Chatswood NSW 2067	**Report #:**	470640	**Due:**	Sep 9, 2015
		Phone:	+61 2 9406 1000	**Priority:**	6 Day
		Fax:	+61 2 9406 1002	**Contact Name:**	Bernice Cahill
Project Name:	SYDNEY ONE				
Project ID:	GEOTLCOV24CC1AF				

Eurofins | mgt Client Manager: Charl Du Preez

Sample Detail					Asbestos Absence /Presence	HOLD	Eurofins | mgt Suite B18	Chromium Suite	Moisture Set	Moisture Set	Eurofins | mgt Suite B7
Laboratory where analysis is conducted											
Melbourne Laboratory - NATA Site # 1254 & 14271											
Sydney Laboratory - NATA Site # 18217					X	X	X		X	X	X
Brisbane Laboratory - NATA Site # 20794							X	X	X	X	
External Laboratory											
BH02_(3.3-3.5)	Aug 27, 2015		Soil	S15-Se00386			X	X		X	
BH02_(3.5-3.95)	Aug 27, 2015		Soil	S15-Se00387				X	X		
BH02_(4.5-4.7)	Aug 27, 2015		Soil	S15-Se00388		X					
BH02_(4.5-4.95)	Aug 27, 2015		Soil	S15-Se00389				X	X		
QC1	Aug 27, 2015		Soil	S15-Se00390						X	X

Eurofins | mgt Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
4. Results are uncorrected for matrix spikes or surrogate recoveries.
5. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
6. Samples were analysed on an 'as received' basis. 7. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Advice.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

****NOTE:** pH duplicates are reported as a range NOT as RPD

UNITS

mg/kg: milligrams per Kilogram

ug/l: micrograms per litre

ppb: Parts per billion

org/100ml: Organisms per 100 millilitres

MPN/100mL: Most Probable Number of organisms per 100 millilitres

mg/l: milligrams per litre

ppm: Parts per million

%: Percentage

NTU: Nephelometric Turbidity Units

TERMS

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery
CRM	Certified Reference Material - reported as percent recovery
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands. In the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
Batch Duplicate	A second piece of analysis from a sample outside of the clients batch of samples but run within the laboratory batch of analysis.
Batch SPIKE	Spike recovery reported on a sample from outside of the clients batch of samples but run within the laboratory batch of analysis.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
ASLP	Australian Standard Leaching Procedure (AS4439.3)
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within
TEQ	Toxic Equivalency Quotient

QC - ACCEPTANCE CRITERIA

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries : Recoveries must lie between 50-150% - Phenols 20-130%.

QC DATA GENERAL COMMENTS

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxophene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxophene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Arochlor 1260 in Matrix Spikes and LCS's.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPD's are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	mg/kg	< 20			20	Pass	
TRH C10-C14	mg/kg	< 20			20	Pass	
TRH C15-C28	mg/kg	< 50			50	Pass	
TRH C29-C36	mg/kg	< 50			50	Pass	
Method Blank							
BTEX							
Benzene	mg/kg	< 0.1			0.1	Pass	
Toluene	mg/kg	< 0.1			0.1	Pass	
Ethylbenzene	mg/kg	< 0.1			0.1	Pass	
m&p-Xylenes	mg/kg	< 0.2			0.2	Pass	
o-Xylene	mg/kg	< 0.1			0.1	Pass	
Xylenes - Total	mg/kg	< 0.3			0.3	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/kg	< 0.5			0.5	Pass	
TRH C6-C10	mg/kg	< 20			20	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/kg	< 0.5			0.5	Pass	
Acenaphthylene	mg/kg	< 0.5			0.5	Pass	
Anthracene	mg/kg	< 0.5			0.5	Pass	
Benz(a)anthracene	mg/kg	< 0.5			0.5	Pass	
Benzo(a)pyrene	mg/kg	< 0.5			0.5	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Benzo(g.h.i)perylene	mg/kg	< 0.5			0.5	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Chrysene	mg/kg	< 0.5			0.5	Pass	
Dibenz(a.h)anthracene	mg/kg	< 0.5			0.5	Pass	
Fluoranthene	mg/kg	< 0.5			0.5	Pass	
Fluorene	mg/kg	< 0.5			0.5	Pass	
Indeno(1.2.3-cd)pyrene	mg/kg	< 0.5			0.5	Pass	
Naphthalene	mg/kg	< 0.5			0.5	Pass	
Phenanthrene	mg/kg	< 0.5			0.5	Pass	
Pyrene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH >C10-C16	mg/kg	< 50			50	Pass	
TRH >C16-C34	mg/kg	< 100			100	Pass	
TRH >C34-C40	mg/kg	< 100			100	Pass	
Method Blank							
Chloride	mg/kg	< 10			10	Pass	
Sulphate (as SO4)	mg/kg	< 10			10	Pass	
Method Blank							
Heavy Metals							
Arsenic	mg/kg	< 2			2	Pass	
Cadmium	mg/kg	< 0.4			0.4	Pass	
Chromium	mg/kg	< 5			5	Pass	
Copper	mg/kg	< 5			5	Pass	
Lead	mg/kg	< 5			5	Pass	
Mercury	mg/kg	< 0.05			0.05	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Nickel	mg/kg	< 5			5	Pass	
Zinc	mg/kg	< 5			5	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	82			70-130	Pass	
TRH C10-C14	%	76			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	89			70-130	Pass	
Toluene	%	76			70-130	Pass	
Ethylbenzene	%	73			70-130	Pass	
m&p-Xylenes	%	77			70-130	Pass	
o-Xylene	%	78			70-130	Pass	
Xylenes - Total	%	77			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	70			70-130	Pass	
TRH C6-C10	%	85			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	103			70-130	Pass	
Acenaphthylene	%	100			70-130	Pass	
Anthracene	%	109			70-130	Pass	
Benz(a)anthracene	%	106			70-130	Pass	
Benzo(a)pyrene	%	88			70-130	Pass	
Benzo(b&j)fluoranthene	%	76			70-130	Pass	
Benzo(g.h.i)perylene	%	92			70-130	Pass	
Benzo(k)fluoranthene	%	90			70-130	Pass	
Chrysene	%	92			70-130	Pass	
Dibenz(a.h)anthracene	%	92			70-130	Pass	
Fluoranthene	%	110			70-130	Pass	
Fluorene	%	102			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	95			70-130	Pass	
Naphthalene	%	100			70-130	Pass	
Phenanthrene	%	111			70-130	Pass	
Pyrene	%	111			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH >C10-C16	%	77			70-130	Pass	
LCS - % Recovery							
Chloride	%	100			70-130	Pass	
Sulphate (as SO4)	%	100			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	110			70-130	Pass	
Cadmium	%	112			70-130	Pass	
Chromium	%	102			70-130	Pass	
Copper	%	106			70-130	Pass	
Lead	%	107			70-130	Pass	
Mercury	%	112			70-130	Pass	
Nickel	%	111			70-130	Pass	
Zinc	%	107			70-130	Pass	
LCS - % Recovery							
Chromium Suite							

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Chromium Reducible Sulfur			%	101			70-130	Pass	
Acid Neutralising Capacity (ANCbt)			%	101			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
BTEX				Result 1					
Benzene	S15-Se03821	NCP	%	76			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	S15-Se03821	NCP	%	82			70-130	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	S15-Se01940	NCP	%	104			70-130	Pass	
Acenaphthylene	S15-Se01940	NCP	%	105			70-130	Pass	
Anthracene	S15-Se01940	NCP	%	108			70-130	Pass	
Benz(a)anthracene	S15-Se01940	NCP	%	122			70-130	Pass	
Benzo(a)pyrene	S15-Se01940	NCP	%	84			70-130	Pass	
Benzo(b&j)fluoranthene	S15-Se01940	NCP	%	92			70-130	Pass	
Benzo(g.h.i)perylene	S15-Se01940	NCP	%	98			70-130	Pass	
Benzo(k)fluoranthene	S15-Se01940	NCP	%	106			70-130	Pass	
Chrysene	S15-Se01940	NCP	%	84			70-130	Pass	
Dibenz(a.h)anthracene	S15-Se01940	NCP	%	100			70-130	Pass	
Fluoranthene	S15-Se01940	NCP	%	115			70-130	Pass	
Fluorene	S15-Se01940	NCP	%	107			70-130	Pass	
Indeno(1.2.3-cd)pyrene	S15-Se01940	NCP	%	101			70-130	Pass	
Naphthalene	S15-Se01940	NCP	%	100			70-130	Pass	
Phenanthrene	S15-Se01940	NCP	%	110			70-130	Pass	
Pyrene	S15-Se01940	NCP	%	116			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S15-Se00520	NCP	%	96			70-130	Pass	
Cadmium	S15-Se00520	NCP	%	101			70-130	Pass	
Chromium	S15-Se00520	NCP	%	82			70-130	Pass	
Copper	S15-Se01948	NCP	%	102			70-130	Pass	
Lead	S15-Se01411	NCP	%	107			70-130	Pass	
Mercury	S15-Se00520	NCP	%	111			70-130	Pass	
Nickel	S15-Se00520	NCP	%	95			70-130	Pass	
Zinc	S15-Se00520	NCP	%	86			70-130	Pass	
Spike - % Recovery									
				Result 1					
Chloride	S15-Se00379	CP	%	113			70-130	Pass	
Sulphate (as SO4)	S15-Se00379	CP	%	83			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	S15-Se00380	CP	%	87			70-130	Pass	
TRH C10-C14	S15-Se00380	CP	%	80			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Toluene	S15-Se00380	CP	%	93			70-130	Pass	
Ethylbenzene	S15-Se00380	CP	%	88			70-130	Pass	
m&p-Xylenes	S15-Se00380	CP	%	92			70-130	Pass	
o-Xylene	S15-Se00380	CP	%	92			70-130	Pass	
Xylenes - Total	S15-Se00380	CP	%	92			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
TRH C6-C10	S15-Se00380	CP	%	96			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
TRH >C10-C16	S15-Se00380	CP	%	84			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	S15-Se00378	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C10-C14	S15-Se00378	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	S15-Se00378	CP	mg/kg	210	170	18	30%	Pass	
TRH C29-C36	S15-Se00378	CP	mg/kg	790	870	10	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	S15-Se00378	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	S15-Se00378	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	S15-Se00378	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	S15-Se00378	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	S15-Se00378	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total	S15-Se00378	CP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	S15-Se00378	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
TRH C6-C10	S15-Se00378	CP	mg/kg	< 20	< 20	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
TRH >C10-C16	S15-Se00378	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C16-C34	S15-Se00378	CP	mg/kg	670	690	2.0	30%	Pass	
TRH >C34-C40	S15-Se00378	CP	mg/kg	850	690	21	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Chloride	S15-Se00379	CP	mg/kg	71	54	28	30%	Pass	
pH (1:5 Aqueous extract)	S15-Se00379	CP	pH Units	6.8	6.9	pass	30%	Pass	
Sulphate (as SO4)	S15-Se00379	CP	mg/kg	600	490	21	30%	Pass	
Duplicate									
Chromium Suite				Result 1	Result 2	RPD			
pH-KCL	S15-Se00379	CP	pH Units	7.5	7.5	<1	30%	Pass	
Acid trail - Titratable Actual Acidity	S15-Se00379	CP	mol H+/t	< 2	< 2	<1	30%	Pass	
sulfidic - TAA equiv. S% pyrite	S15-Se00379	CP	% pyrite S	< 0.02	< 0.02	<1	30%	Pass	
Chromium Reducible Sulfur	S15-Se00379	CP	% S	0.090	0.086	5.0	30%	Pass	
Chromium Reducible Sulfur -acidity units	S15-Se00379	CP	mol H+/t	56	53	5.0	30%	Pass	
Sulfur - KCl Extractable	S15-Se00379	CP	% S	n/a	n/a	n/a	30%	Pass	
HCl Extractable Sulfur	S15-Se00379	CP	% S	n/a	n/a	n/a	30%	Pass	
Net Acid soluble sulfur	S15-Se00379	CP	% S	n/a	n/a	n/a	30%	Pass	
Net Acid soluble sulfur - acidity units	S15-Se00379	CP	mol H+/t	n/a	n/a	n/a	30%	Pass	
Net Acid soluble sulfur - equivalent S% pyrite	S15-Se00379	CP	% S	n/a	n/a	n/a	30%	Pass	
Acid Neutralising Capacity (ANCbt)	S15-Se00379	CP	%CaCO3	0.76	0.76	<1	30%	Pass	
Acid Neutralising Capacity - equivalent S% pyrite (s-ANCbt)	S15-Se00379	CP	% S	0.24	0.24	<1	30%	Pass	
ANC Fineness Factor	S15-Se00379	CP	factor	1.5	1.5	<1	30%	Pass	
Net Acidity (Sulfur Units)	S15-Se00379	CP	% S	< 0.02	< 0.02	<1	30%	Pass	
Net Acidity (Acidity Units)	S15-Se00379	CP	mol H+/t	< 10	< 10	<1	30%	Pass	
Liming Rate	S15-Se00379	CP	kg CaCO3/t	< 1	< 1	<1	30%	Pass	

Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S15-Se00383	CP	%	20	21	7.0	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	S15-Se00385	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	S15-Se00385	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	S15-Se00385	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	S15-Se00385	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	S15-Se00385	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	S15-Se00385	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	S15-Se00385	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	S15-Se00385	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	S15-Se00385	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a.h)anthracene	S15-Se00385	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	S15-Se00385	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	S15-Se00385	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	S15-Se00385	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	S15-Se00385	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	S15-Se00385	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	S15-Se00385	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S15-Se00386	CP	%	28	24	13	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S15-Se00390	CP	mg/kg	5.6	6.0	9.0	30%	Pass	
Cadmium	S15-Se00390	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	S15-Se00390	CP	mg/kg	11	12	10	30%	Pass	
Copper	S15-Se00390	CP	mg/kg	10	12	15	30%	Pass	
Lead	S15-Se00390	CP	mg/kg	91	87	5.0	30%	Pass	
Mercury	S15-Se00390	CP	mg/kg	0.31	0.34	9.0	30%	Pass	
Nickel	S15-Se00390	CP	mg/kg	6.4	7.1	11	30%	Pass	
Zinc	S15-Se00390	CP	mg/kg	47	62	28	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
S01	Liming rate is calculated and reported on a dry weight basis assuming use of fine agricultural lime (CaCO3) and using a safety factor of 1.5 to allow for non-homogeneous mixing and poor reactivity of lime. For conversion of Liming Rate from 'kg/t dry weight' to 'kg/m3 in-situ soil' multiply 'reported results' x 'wet bulk density of soil in t/m3'
S02	Retained Acidity is Reported when the pHKCl is less than pH 4.5
S03	Acid Neutralising Capacity is only required if the pHKCl if greater than or equal to pH 6.5
S04	Acid Sulfate Soil Samples have a 24 hour holding time unless frozen or dried within that period

Authorised By

Charl Du Preez	Analytical Services Manager
Bob Symons	Senior Analyst-Inorganic (NSW)
Bryan Wilson	Senior Analyst-Metal (QLD)
Ivan Taylor	Senior Analyst-Metal (NSW)
Nibha Vaidya	Senior Analyst-Asbestos (NSW)
Richard Corner	Senior Analyst-Inorganic (QLD)
Ryan Hamilton	Senior Analyst-Organic (NSW)
Ryan Hamilton	Senior Analyst-Volatile (NSW)

Glenn Jackson

National Laboratory Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Uncertainty data is available on request

Appendix C – Pressure (Packer) Test Results

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

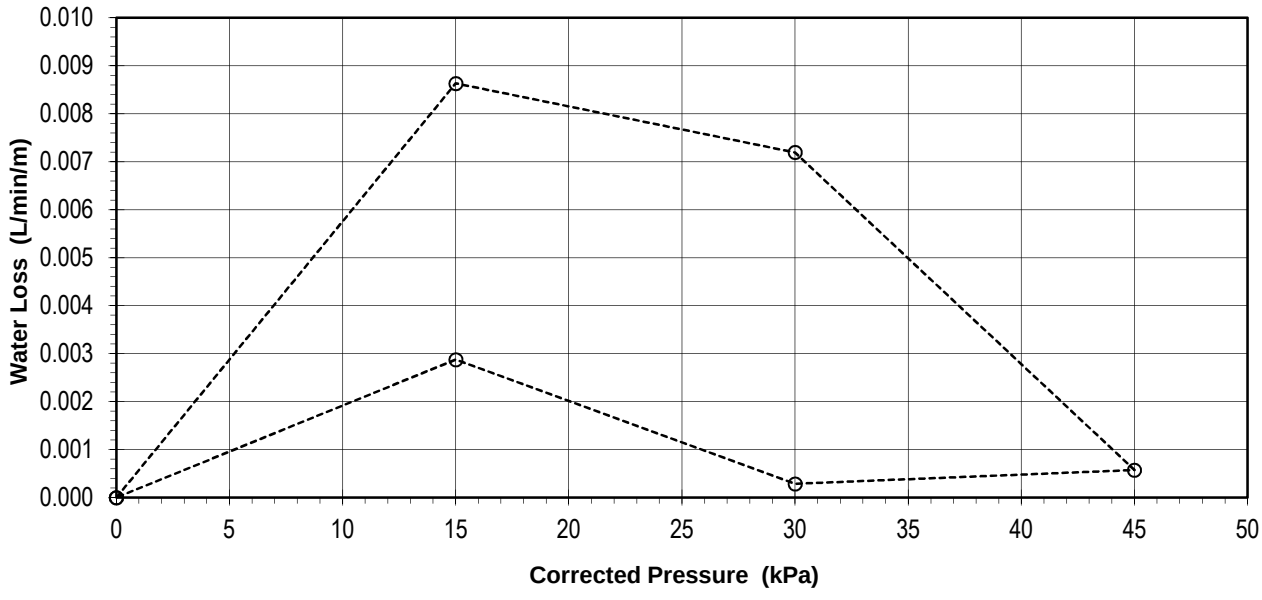
Borehole Water Pressure Test

Borehole	***BH03***
Depth Interval	***6.00 m to 12.95 m***

Client	***Wanda One Sydney Pty Ltd***	Job No.	***GEOTLCOV24001AF***
Principal		Test date	***25/8/2015***
Project	***Australia Sydney One Project***	Interpreted by	***BR***
Location	***Pitt Street, Sydney, NSW***	Checked	***RJB***

Test Details	Packer type	Borehole diam.	***50 mm***
	Type of pump	Borehole inclination	***-90 degrees***
	Pressure gauge	Test interval length	***6.95 m***

time interval (min)	gauge pressure (kPa)	water loss (L)	flow rate (L/min)	pressure correction (kPa)	water loss rate (L/min/m)	corrected pressure (kPa)
5	*15*	*1.1*	*0.22*	*0*	***0.03***	***15***
5	*15*	*1.1*	*0.22*	*0*	***0.03***	***15***
5	*15*	*0.6*	*0.12*	*0*	***0.02***	***15***
5	*15*	*0.3*	*0.06*	*0*	***0.01***	***15***
5	*15*	*0.3*	*0.06*	*0*	***0.01***	***15***
5	*30*	*0.3*	*0.05*	*0*	***0.01***	***30***
5	*30*	*0.3*	*0.05*	*0*	***0.01***	***30***
5	*45*	*0.2*	*0.05*	*0*	***0.01***	***45***
5	*45*	*0.0*	*0.00*	*0*	***0.00***	***45***
5	*45*	*0.0*	*0.00*	*0*	***0.00***	***45***
5	*30*	*0.0*	*0.00*	*0*	***0.00***	***30***
5	*30*	*0.0*	*0.00*	*0*	***0.00***	***30***
5	*15*	*0.1*	*0.02*	*0*	***0.00***	***15***



Interpreted Lugeon Permeability: ***0.3 uL*** (L/min/m @ 1000 kPa)

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

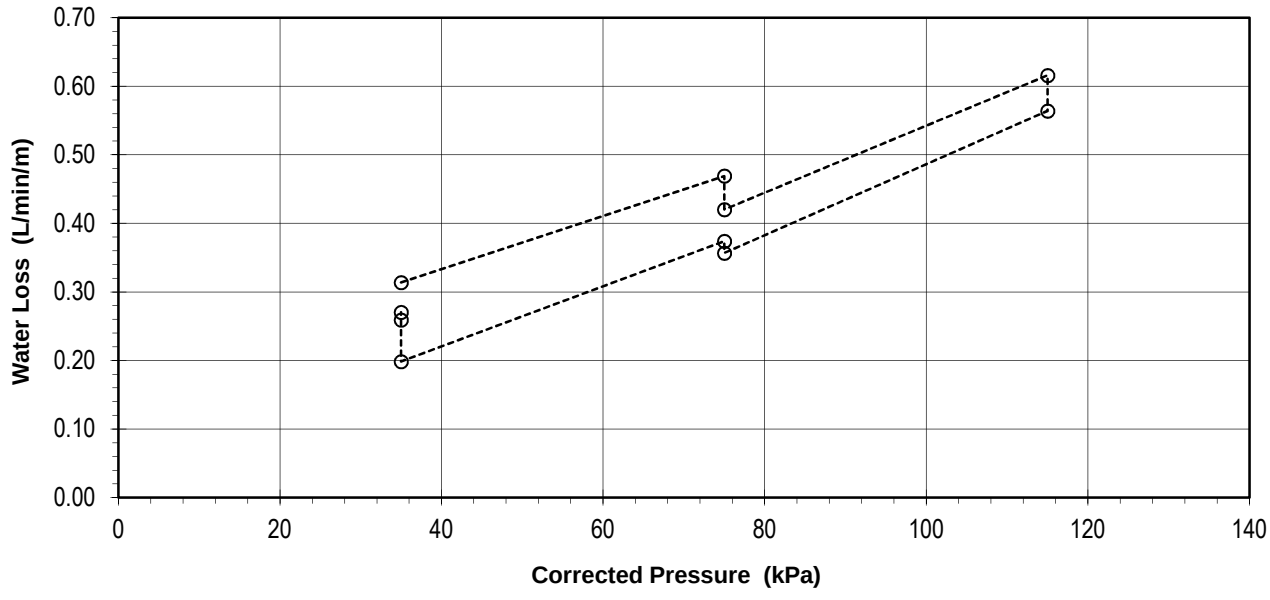
Borehole Water Pressure Test

Borehole	***BH03***
Depth Interval	***13.00 m to 19.95 m***

Client	***Wanda One Sydney Pty Ltd***	Job No.	***GEOTLCOV24001AF***
Principal		Test date	***25/8/2015***
Project	***Australia Sydney One Project***	Interpreted by	***BR***
Location	***Pitt Street, Sydney, NSW***	Checked	***RJB***

Test Details	Packer type	Borehole diam.	***50 mm***
	Type of pump	Borehole inclination	***-90 degrees***
	Pressure gauge	Test interval length	***6.95 m***

time interval (min)	gauge pressure (kPa)	water loss (L)	flow rate (L/min)	pressure correction (kPa)	water loss rate (L/min/m)	corrected pressure (kPa)
5	*35*	*11.9*	*2.38*	*0*	***0.34***	***35***
5	*35*	*11.9*	*2.38*	*0*	***0.34***	***35***
5	*35*	*10.9*	*2.18*	*0*	***0.31***	***35***
5	*75*	*16.3*	*3.26*	*0*	***0.47***	***75***
5	*75*	*14.6*	*2.92*	*0*	***0.42***	***75***
5	*115*	*21.4*	*4.28*	*0*	***0.62***	***115***
5	*115*	*19.6*	*3.92*	*0*	***0.56***	***115***
5	*75*	*12.4*	*2.48*	*0*	***0.36***	***75***
5	*75*	*13.0*	*2.60*	*0*	***0.37***	***75***
5	*35*	*6.9*	*1.38*	*0*	***0.20***	***35***
5	*35*	*9.0*	*1.80*	*0*	***0.26***	***35***
5	*35*	*9.4*	*1.88*	*0*	***0.27***	***35***
5						



Interpreted Lugeon Permeability: ***5.2 uL*** (L/min/m @ 1000 kPa)

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

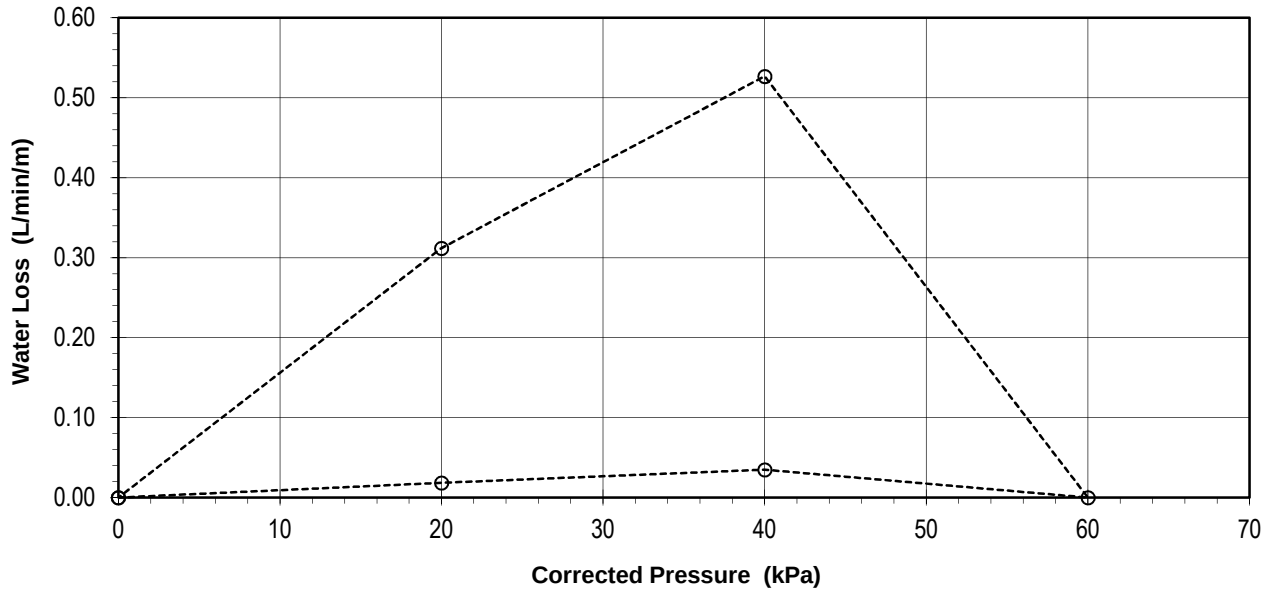
Borehole Water Pressure Test

Borehole	***BH05***
Depth Interval	***7.00 m to 13.00 m***

Client	***Wanda One Sydney Pty Ltd***	Job No.	***GEOTLCOV24001AF***
Principal		Test date	***18/8/2015***
Project	***Australia Sydney One Project***	Interpreted by	***BR***
Location	***Pitt Street, Sydney, NSW***	Checked	***RJB***

Test Details	Packer type	***Pneumatic NQ***	Borehole diam.	***76 mm***	
	Type of pump		Borehole inclination	***-90 degrees***	
	Pressure gauge		Test interval length	***6.0 m***	

time interval (min)	gauge pressure (kPa)	water loss (L)	flow rate (L/min)	pressure correction (kPa)	water loss rate (L/min/m)	corrected pressure (kPa)
5	*20*	*1.1*	*0.22*	*0*	***0.04***	***20***
5	*20*	*1.1*	*0.22*	*0*	***0.04***	***20***
5	*20*	*0.7*	*0.13*	*0*	***0.02***	***20***
5	*20*	*0.5*	*0.11*	*0*	***0.02***	***20***
5	*40*	*1.0*	*0.19*	*0*	***0.03***	***40***
5	*40*	*1.0*	*0.21*	*0*	***0.03***	***40***
5	*60*	*0.0*	*0.01*	*0*	***0.00***	***60***
5	*60*	*0.0*		*0*		
5	*40*	*0.0*		*0*		
5	*40*	*8.1*	*1.61*	*0*	***0.27***	***40***
5	*40*	*15.2*	*3.04*	*0*	***0.51***	***40***
5	*40*	*15.8*	*3.16*	*0*	***0.53***	***40***
5	*20*	*10.0*	*1.99*	*0*	***0.33***	***20***



Interpreted Lugeon Permeability: ***13.2 uL*** (L/min/m @ 1000 kPa)

Appendix D – Rising Head Test Results

Piezometer Installation Log

Hole ID.	**BH02**
sheet:	1 of 1
project no.	**GEOTLCOV24001AF**
client:	***Wanda One Sydney Pty Ltd***
date started:	***27 Aug 2015***
principal:	
date completed:	***29 Aug 2015***
project:	***Sydney One Project***
logged by:	***HT***
location:	***Rugby Place - northern Pitt Street Sydney***
checked by:	***MG***

position: E: 334328; N: 6251675 (WGS84 Zone 56) surface elevation: 2.40 m (AHD) angle from horizontal: 90°

equipment type: Geo-205, Track mounted casing diameter : HW

drilling information | **material substance** | **piezometer construction details**

method & support: NDD, AD, HW casing, HQ

water: 29/08/2015 Observed

RL (m): 0, -4, -8, -12, -16, -20, -24, -28

depth (m): 4, 8, 12, 16, 20, 24, 28

graphic log

material name

- ASPHALT
- FILL: Sandy GRAVEL
- FILL: Silty SAND
- SAND
- SANDSTONE
- SILTSTONE
- SANDSTONE
- Borehole BH02 terminated at 25.00 m
  Target depth

bore construction license:
drilling company:
driller:
driller's permit no.:

BH02-well

8.80 m
9.80 m
11.00 m
20.00 m

Cuttings

Bentonite

ID: BH02-well PVC TYPE: uPVC
ID/OD: 51/60.2 mm
DESCRIPTION OF SLOTS: Slot Spacing = 4 mm, Slot width = 0.5 mm

Sand

CDF_0_9_04BB.GLB Log COF PIEZOMETER INSTALLATION LOG GEOTLCOV24001AF.GPJ <<DrawingFile>> 02/10/2015 14:59

method & support
see engineering log for details

water
- 10-Oct-12, water level on date shown
- water inflow
- complete drilling fluid loss
- partial drilling fluid loss
- 25 water pressure test result (lugeons) for depth interval shown

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

ID	type	stick up & RL	tip depth & RL	install. date	water level
BH02-well	standpipe		20.00 m -17.60 m AHD	29/08/2015	

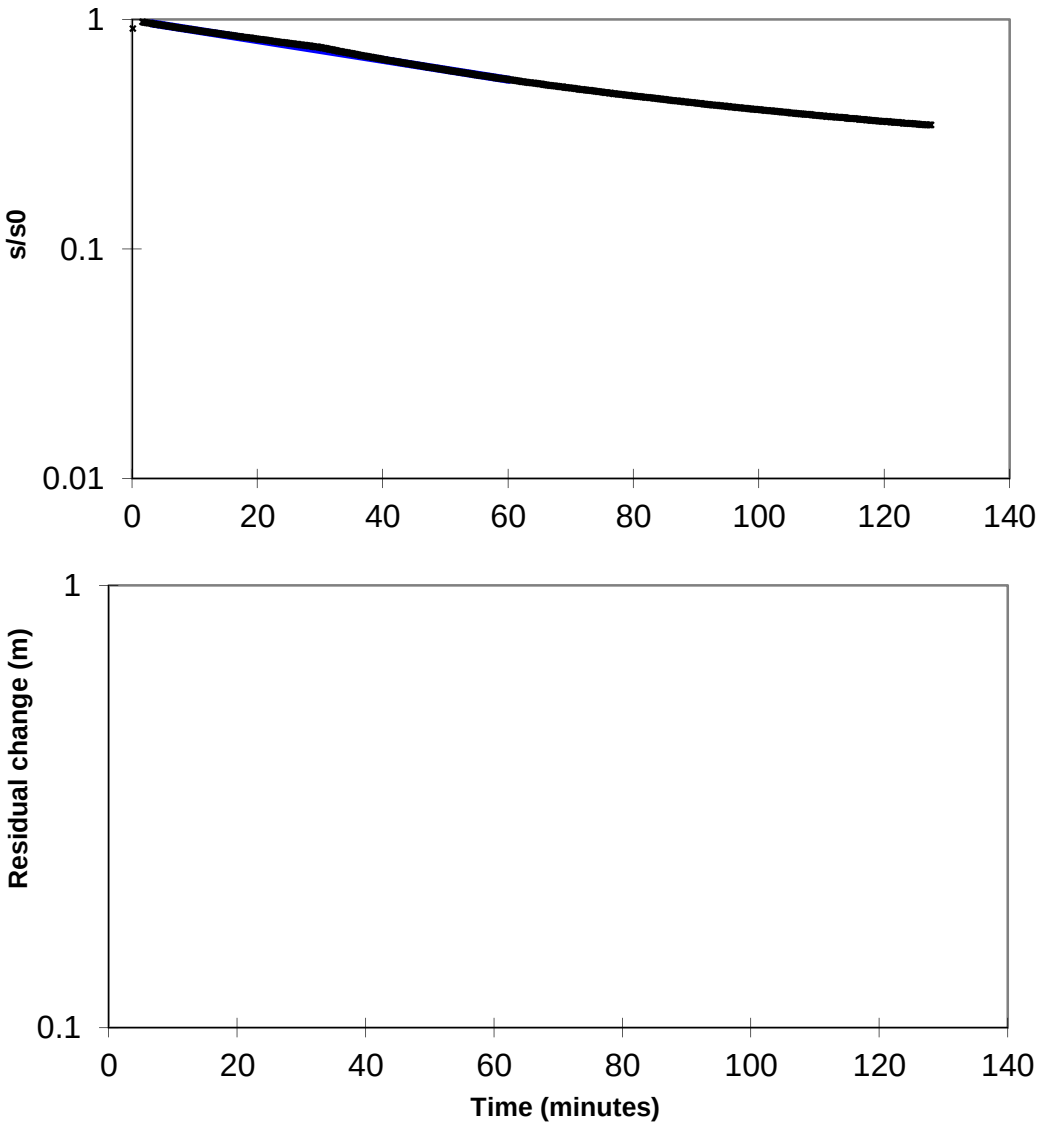
RISING OR FALLING HEAD TEST ANALYSIS

Bore Data	Units	Value
Initial groundwater level	m	5.09
Groundwater level at t=0	m	12.7
Casing radius (r)	m	0.025
Bore radius (R)	m	0.05
Screened interval length (L)	m	8
Match time start	min	3
Match time end	min	60
Characteristic Time (t_0)	**min**	**99.90**
Hydraulic Conductivity (K)	**m/day**	**0.0029**

Borehole: BH02

Method Developed by Hvorslev (1951)

$$K = \frac{r^2 \ln(L/R)}{2Lt_0}$$



Reference: Hvorslev, M.J. (1951), Time lag and soil permeability in ground water observations. U.S. Army Corps of Engineers Waterway Experimentation Station, Bulletin 36.

drawn	BR	coffey	client:	WANDA ONE SYDNEY PTY LTD
approved	RJB		project:	SYDNEY ONE PROJECT
date	28 Sep 2015			PITT STREET, SYDNEY
scale	AS SHOWN		title:	RISING HEAD TEST - BH02
original size	A4		project no:	GEOTLCOV24001AF

Piezometer Installation Log

Hole ID.	**BH03**
sheet:	1 of 1
project no.	**GEOTLCOV24001AF**
client:	**Wanda One Sydney Pty Ltd**
date started:	**24 Aug 2015**
principal:	
date completed:	**26 Aug 2015**
project:	**Sydney One Project**
logged by:	**HT**
location:	**Rugby Place - northern Pitt Street Sydney**
checked by:	**MG**

position: E: 334305; N: 6251683 (WGS84 Zone 56) surface elevation: 2.40 m (AHD) angle from horizontal: 90°

equipment type: Geo-205, Track mounted hole diameter : 100 mm

drilling information | **material substance** | **piezometer construction details**

method & support	water	RL (m)	depth (m)	graphic log	material name
AD/T, CASING	25/08/15 07:30	0	0		ROAD SURFACE: ASPHALT
					ROAD SURFACE: CONCRETE
					FILL: Clayey SAND
					FILL: Silty SAND
			4		Silty SAND
		-4			SANDSTONE
			8		
		-8			
			12		
HQ		-12			
			16		
		-16			
			20		SHALE BRECCIA
		-20			SANDSTONE
			24		
		-24			Borehole BH03 terminated at 25.00 m
			28		Target depth
		-28			

BH03-well

bore construction license:
drilling company:
driller:
driller's permit no.:

Bentonite

4.50 m
5.00 m

Sand

ID: BH03-well PVC TYPE: uPVC
ID/OD: 51/60.2 mm
DESCRIPTION OF SLOTS: Slot Spacing = 4 mm, Slot width = 0.5 mm

16.00 m
16.00 m

method & support
see engineering log for details

water
- 10-Oct-12, water level on date shown
- water inflow
- complete drilling fluid loss
- partial drilling fluid loss
- 25 water pressure test result (lugeons) for depth interval shown

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

ID	type	stick up & RL	tip depth & RL	install. date	water level
BH03-well	standpipe		15.00 m -12.60 m AHD	26/08/2015	

CDF_0_9_04BB.GLB Log COF PIEZOMETER INSTALLATION LOG GEOTLCOV24001AF.GPJ <<DrawingFile>> 02/10/2015 14:59

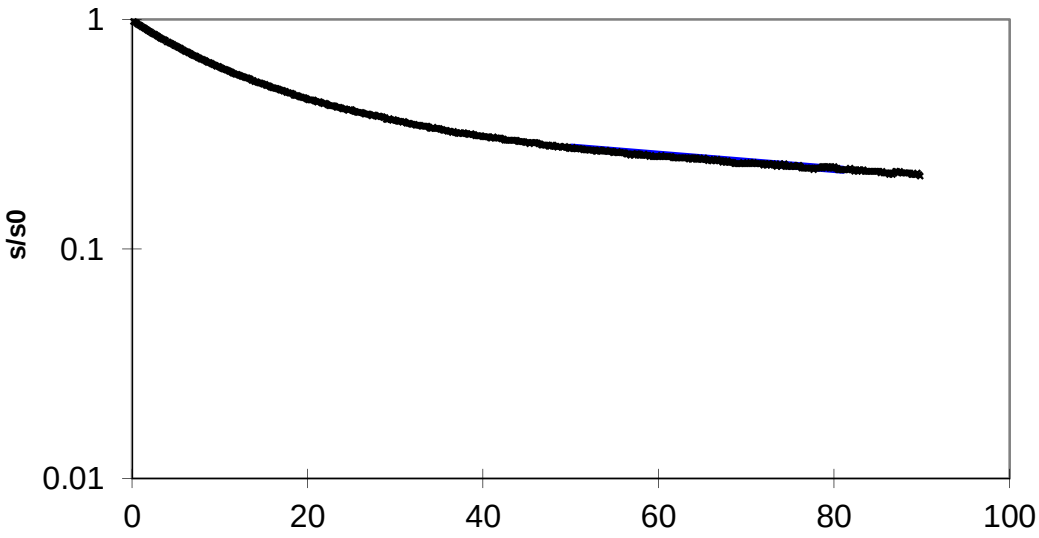
RISING OR FALLING HEAD TEST ANALYSIS

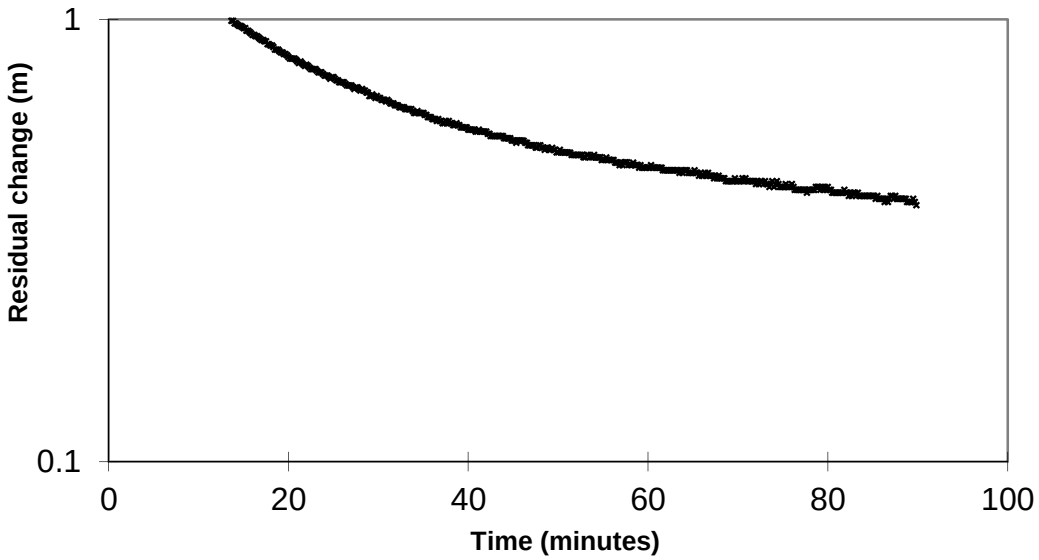
Bore Data	Units	Value
Initial groundwater level	m	8.57
Groundwater level at t=0	m	10.4
Casing radius (r)	m	0.025
Bore radius (R)	m	0.05
Screened interval length (L)	m	8
Match time start	min	50
Match time end	min	81
Characteristic Time (t_0)	**min**	**146.18**
Hydraulic Conductivity (K)	**m/day**	**0.0020**

Borehole: BH03

Method Developed by Hvorslev (1951)

$$K = \frac{r^2 \ln(L/R)}{2Lt_0}$$





Reference: Hvorslev, M.J. (1951), Time lag and soil permeability in ground water observations. U.S. Army Corps of Engineers Waterway Experimentation Station, Bulletin 36.

drawn	BR	coffey	client:	WANDA ONE SYDNEY PTY LTD
approved	RJB		project:	SYDNEY ONE PROJECT
date	28 Sep 2015			PITT STREET, SYDNEY
scale	AS SHOWN		title:	RISING HEAD TEST - BH03
original size	A4		project no:	GEOTLCOV24001AF

Appendix E – Groundwater Quality Results

eurofins | mgt

Certificate of Analysis

Coffey Geotechnics Pty Ltd Chatswood
Level 18, Tower B, Citadel Tower 799 Pacific Highway
Chatswood
NSW 2067

NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025.
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Attention: **Bernice Cahill**

Report **472118-W**
Project name SYDNEY ONE
Project ID GEOTLCOV24001AF
Received Date Sep 11, 2015

Client Sample ID			**BH2**	**BH3**	**DUP**
Sample Matrix			**Water**	**Water**	**Water**
Eurofins | mgt Sample No.			**S15-Se11823**	**S15-Se11824**	**S15-Se11825**
Date Sampled			**Sep 11, 2015**	**Sep 11, 2015**	**Sep 11, 2015**
Test/Reference	LOR	Unit			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions					
TRH C6-C9	0.02	mg/L	0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	0.4	< 0.1	< 0.1
TRH C29-C36	0.1	mg/L	0.2	< 0.1	< 0.1
TRH C10-36 (Total)	0.1	mg/L	0.60	< 0.1	< 0.1
BTEX					
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	0.002	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	0.002	< 0.001	< 0.001
Xylenes - Total	0.003	mg/L	0.005	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	73	88	77
Total Recoverable Hydrocarbons - 2013 NEPM Fractions					
Naphthalene[N02]	0.02	mg/L	< 0.02	< 0.02	< 0.02
TRH C6-C10	0.02	mg/L	0.03	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	0.02	< 0.02	< 0.02
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	0.18	< 0.05	< 0.05
Polycyclic Aromatic Hydrocarbons					
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001	< 0.001	< 0.001
Benzo(g.h.i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Dibenz(a.h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001

Client Sample ID			BH2	BH3	DUP
Sample Matrix			Water	Water	Water
Eurofins | mgt Sample No.			S15-Se11823	S15-Se11824	S15-Se11825
Date Sampled			Sep 11, 2015	Sep 11, 2015	Sep 11, 2015
Test/Reference	LOR	Unit			
Polycyclic Aromatic Hydrocarbons					
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	101	95	86
p-Terphenyl-d14 (surr.)	1	%	112	108	102
Organochlorine Pesticides					
Chlordanes - Total	0.001	mg/L	< 0.001	< 0.001	-
4.4'-DDD	0.0001	mg/L	< 0.0001	< 0.0001	-
4.4'-DDE	0.0001	mg/L	< 0.0001	< 0.0001	-
4.4'-DDT	0.0001	mg/L	< 0.0001	< 0.0001	-
a-BHC	0.0001	mg/L	< 0.0001	< 0.0001	-
Aldrin	0.0001	mg/L	< 0.0001	< 0.0001	-
b-BHC	0.0001	mg/L	< 0.0001	< 0.0001	-
d-BHC	0.0001	mg/L	< 0.0001	< 0.0001	-
Dieldrin	0.0001	mg/L	< 0.0001	< 0.0001	-
Endosulfan I	0.0001	mg/L	< 0.0001	< 0.0001	-
Endosulfan II	0.0001	mg/L	< 0.0001	< 0.0001	-
Endosulfan sulphate	0.0001	mg/L	< 0.0001	< 0.0001	-
Endrin	0.0001	mg/L	< 0.0001	< 0.0001	-
Endrin aldehyde	0.0001	mg/L	< 0.0001	< 0.0001	-
Endrin ketone	0.0001	mg/L	< 0.0001	< 0.0001	-
g-BHC (Lindane)	0.0001	mg/L	< 0.0001	< 0.0001	-
Heptachlor	0.0001	mg/L	< 0.0001	< 0.0001	-
Heptachlor epoxide	0.0001	mg/L	< 0.0001	< 0.0001	-
Hexachlorobenzene	0.0001	mg/L	< 0.0001	< 0.0001	-
Methoxychlor	0.0001	mg/L	< 0.0001	< 0.0001	-
Toxaphene	0.01	mg/L	< 0.01	< 0.01	-
Dibutylchlorendate (surr.)	1	%	128	144	-
Tetrachloro-m-xylene (surr.)	1	%	120	138	-
Chlorinated Hydrocarbons					
1.2-Dichlorobenzene	0.001	mg/L	< 0.001	< 0.001	-
1.2.3-Trichlorobenzene	0.001	mg/L	< 0.001	< 0.001	-
1.2.3.4-Tetrachlorobenzene	0.0001	mg/L	< 0.0001	< 0.0001	-
1.2.3.5-Tetrachlorobenzene	0.0001	mg/L	< 0.0001	< 0.0001	-
1.2.4-Trichlorobenzene	0.001	mg/L	< 0.001	< 0.001	-
1.2.4.5-Tetrachlorobenzene	0.0001	mg/L	< 0.0001	< 0.0001	-
1.3-Dichlorobenzene	0.001	mg/L	< 0.001	< 0.001	-
1.3.5-Trichlorobenzene	0.0001	mg/L	< 0.0001	< 0.0001	-
1.4-Dichlorobenzene	0.001	mg/L	< 0.001	< 0.001	-
Benzal chloride	0.0001	mg/L	< 0.0001	< 0.0001	-
Benzotrichloride	0.0001	mg/L	< 0.0001	< 0.0001	-
Benzyl chloride	0.001	mg/L	< 0.001	< 0.001	-
Hexachlorobenzene	0.0001	mg/L	< 0.0001	< 0.0001	-
Hexachlorobutadiene	0.0001	mg/L	< 0.0001	< 0.0001	-
Hexachlorocyclopentadiene	0.0001	mg/L	< 0.0001	< 0.0001	-
Hexachloroethane	0.0001	mg/L	< 0.0001	< 0.0001	-
Pentachlorobenzene	0.0001	mg/L	< 0.0001	< 0.0001	-
Tetrachloro-m-xylene (surr.)	1	%	120	138	-

Client Sample ID			BH2	BH3	DUP
Sample Matrix			Water	Water	Water
Eurofins | mgt Sample No.			S15-Se11823	S15-Se11824	S15-Se11825
Date Sampled			Sep 11, 2015	Sep 11, 2015	Sep 11, 2015
Test/Reference	LOR	Unit			
Polychlorinated Biphenyls					
Aroclor-1016	0.001	mg/L	< 0.001	< 0.001	-
Aroclor-1221	0.001	mg/L	< 0.001	< 0.001	-
Aroclor-1232	0.001	mg/L	< 0.001	< 0.001	-
Aroclor-1242	0.001	mg/L	< 0.001	< 0.001	-
Aroclor-1248	0.001	mg/L	< 0.001	< 0.001	-
Aroclor-1254	0.001	mg/L	< 0.001	< 0.001	-
Aroclor-1260	0.001	mg/L	< 0.001	< 0.001	-
Total PCB*	0.001	mg/L	< 0.001	< 0.001	-
Dibutylchlorendate (surr.)	1	%	128	144	-
Tetrachloro-m-xylene (surr.)	1	%	120	138	-
Phenols (Halogenated)					
2-Chlorophenol	0.003	mg/L	< 0.003	< 0.003	-
2.4-Dichlorophenol	0.003	mg/L	< 0.003	< 0.003	-
2.4.5-Trichlorophenol	0.01	mg/L	< 0.01	< 0.01	-
2.4.6-Trichlorophenol	0.01	mg/L	< 0.01	< 0.01	-
2.6-Dichlorophenol	0.003	mg/L	< 0.003	< 0.003	-
4-Chloro-3-methylphenol	0.01	mg/L	< 0.01	< 0.01	-
Pentachlorophenol	0.01	mg/L	< 0.01	< 0.01	-
Tetrachlorophenols - Total	0.03	mg/L	< 0.03	< 0.03	-
Total Halogenated Phenol*	0.01	mg/L	< 0.01	< 0.01	-
Phenols (non-Halogenated)					
2-Cyclohexyl-4.6-dinitrophenol	0.1	mg/L	< 0.1	< 0.1	-
2-Methyl-4.6-dinitrophenol	0.03	mg/L	< 0.03	< 0.03	-
2-Methylphenol (o-Cresol)	0.003	mg/L	< 0.003	< 0.003	-
2-Nitrophenol	0.01	mg/L	< 0.01	< 0.01	-
2.4-Dimethylphenol	0.003	mg/L	< 0.003	< 0.003	-
2.4-Dinitrophenol	0.03	mg/L	< 0.03	< 0.03	-
3&4-Methylphenol (m&p-Cresol)	0.006	mg/L	< 0.006	< 0.006	-
4-Nitrophenol	0.03	mg/L	< 0.03	< 0.03	-
Dinoseb	0.1	mg/L	< 0.1	< 0.1	-
Phenol	0.003	mg/L	< 0.003	< 0.003	-
Total Non-Halogenated Phenol*	0.1	mg/L	< 0.1	< 0.1	-
Phenol-d6 (surr.)	1	%	79	65	-
Total Recoverable Hydrocarbons - 2013 NEPM Fractions					
TRH >C10-C16	0.05	mg/L	0.18	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	0.5	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1
Chloride	1	mg/L	2200	1700	-
Cyanide (total)	0.005	mg/L	< 0.005	< 0.005	-
pH	0.1	pH Units	6.6	5.7	-
Sulphate (as SO4)	5	mg/L	270	150	-
Heavy Metals					
Antimony	0.005	mg/L	< 0.005	< 0.005	-
Arsenic	0.001	mg/L	< 0.001	< 0.001	< 0.001
Beryllium	0.001	mg/L	< 0.001	< 0.001	-
Boron	0.05	mg/L	0.26	< 0.05	-
Cadmium	0.0002	mg/L	< 0.0002	0.0003	0.0004
Chromium	0.001	mg/L	< 0.001	< 0.001	< 0.001

Client Sample ID			BH2	BH3	DUP
Sample Matrix			**Water**	**Water**	**Water**
Eurofins | mgt Sample No.			**S15-Se11823**	**S15-Se11824**	**S15-Se11825**
Date Sampled			**Sep 11, 2015**	**Sep 11, 2015**	**Sep 11, 2015**
Test/Reference	LOR	Unit			
Heavy Metals					
Cobalt	0.001	mg/L	0.021	0.13	-
Copper	0.001	mg/L	< 0.001	< 0.001	< 0.001
Iron	0.05	mg/L	19	220	-
Lead	0.001	mg/L	< 0.001	< 0.001	< 0.001
Manganese	0.005	mg/L	2.6	11	-
Mercury	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001
Molybdenum	0.005	mg/L	0.009	< 0.005	-
Nickel	0.001	mg/L	0.014	0.084	0.084
Selenium	0.001	mg/L	< 0.001	< 0.001	-
Silver	0.005	mg/L	< 0.005	< 0.005	-
Tin	0.005	mg/L	< 0.005	< 0.005	-
Zinc	0.001	mg/L	0.018	1.1	1.2

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Eurofins | mgt Suite B7			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Melbourne	Sep 14, 2015	7 Day
- Method: TRH C6-C36 - LTM-ORG-2010			
BTEX	Melbourne	Sep 11, 2015	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Sep 11, 2015	7 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Polycyclic Aromatic Hydrocarbons	Melbourne	Sep 14, 2015	7 Day
- Method: USEPA 8270 Polycyclic Aromatic Hydrocarbons			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Sep 14, 2015	7 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Metals M8	Melbourne	Sep 11, 2015	28 Day
- Method: LTM-MET-3040 Metals in Waters by ICP-MS			
Organochlorine Pesticides	Melbourne	Sep 14, 2015	7 Day
- Method: USEPA 8081 Organochlorine Pesticides			
Chlorinated Hydrocarbons	Melbourne	Sep 14, 2015	7 Day
- Method: USEPA 8121 Chlorinated Hydrocarbons			
Polychlorinated Biphenyls	Melbourne	Sep 14, 2015	7 Day
- Method: USEPA 8082 Polychlorinated Biphenyls			
Phenols (Halogenated)	Melbourne	Sep 14, 2015	7 Day
- Method: USEPA 8270 Phenols			
Phenols (non-Halogenated)	Melbourne	Sep 14, 2015	7 Day
- Method: USEPA 8270 Phenols			
Cyanide (total)	Melbourne	Sep 14, 2015	14 Day
- Method: LTM-INO-4020 Total Free WAD Cyanide by CFA			
ANZECC Metals : Metals M17AN	Melbourne	Sep 11, 2015	28 Day
- Method: LTM-MET-3040 Metals in Waters by ICP-MS			
Eurofins | mgt Suite B18			
Chloride	Melbourne	Sep 11, 2015	28 Day
- Method: MGT 1100A			
Sulphate (as SO4)	Melbourne	Sep 11, 2015	28 Day
- Method: APHA 4500-SO4 Sulfate by FIA			
pH	Melbourne	Sep 14, 2015	0 Hours
- Method: LTM-GEN-7090 pH in water by ISE			
Heavy Metals	Melbourne	Sep 11, 2015	180 Day
- Method: LTM-MET-3040 Metals in Waters by ICP-MS			

eurofins | mgt

ABN – 50 005 085 521 e.mail : EnviroSales@eurofins.com.au web : www.eurofins.com.au

Melbourne
3-5 Kingston Town Close
Oakleigh VIC 3166
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

Sydney
Unit F3, Building F
16 Mars Road
Lane Cove West NSW 2066
Phone : +61 2 9900 8400
NATA # 1261 Site # 18217

Brisbane
1/21 Smallwood Place
Murarrie QLD 4172
Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

Company Name:	Coffey Geotechnics Pty Ltd Chatswood	**Order No.:**		**Received:**	Sep 11, 2015 4:20 PM
Address:	Level 18, Tower B, Citadel Tower 799 Pacific Highway Chatswood NSW 2067	**Report #:**	472118	**Due:**	Sep 18, 2015
		Phone:	+61 2 9406 1000	**Priority:**	5 Day
		Fax:	+61 2 9406 1002	**Contact Name:**	Bernice Cahill
Project Name:	SYDNEY ONE				
Project ID:	GEOTLCOV24001AF				

Eurofins | mgt Client Manager: Charl Du Preez

Sample Detail					Iron	pH	Eurofins | mgt Suite B18	ANZECC Screen	Eurofins | mgt Suite B7
Laboratory where analysis is conducted									
Melbourne Laboratory - NATA Site # 1254 & 14271					X	X	X	X	X
Sydney Laboratory - NATA Site # 18217									
Brisbane Laboratory - NATA Site # 20794									
External Laboratory									
Sample ID	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**					
BH2	Sep 11, 2015		Water	S15-Se11823	X	X	X	X	
BH3	Sep 11, 2015		Water	S15-Se11824	X	X	X	X	
DUP	Sep 11, 2015		Water	S15-Se11825					X

Eurofins | mgt Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
4. Results are uncorrected for matrix spikes or surrogate recoveries.
5. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
6. Samples were analysed on an 'as received' basis. 7. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Advice.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

****NOTE:** pH duplicates are reported as a range NOT as RPD

UNITS

mg/kg: milligrams per Kilogram

ug/l: micrograms per litre

ppb: Parts per billion

org/100ml: Organisms per 100 millilitres

MPN/100mL: Most Probable Number of organisms per 100 millilitres

mg/l: milligrams per litre

ppm: Parts per million

%: Percentage

NTU: Nephelometric Turbidity Units

TERMS

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery
CRM	Certified Reference Material - reported as percent recovery
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands. In the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
Batch Duplicate	A second piece of analysis from a sample outside of the clients batch of samples but run within the laboratory batch of analysis.
Batch SPIKE	Spike recovery reported on a sample from outside of the clients batch of samples but run within the laboratory batch of analysis.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
ASLP	Australian Standard Leaching Procedure (AS4439.3)
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within
TEQ	Toxic Equivalency Quotient

QC - ACCEPTANCE CRITERIA

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries : Recoveries must lie between 50-150% - Phenols 20-130%.

QC DATA GENERAL COMMENTS

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxophene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxophene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Arochlor 1260 in Matrix Spikes and LCS's.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPD's are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	mg/L	< 0.02			0.02	Pass	
TRH C10-C14	mg/L	< 0.05			0.05	Pass	
TRH C15-C28	mg/L	< 0.1			0.1	Pass	
TRH C29-C36	mg/L	< 0.1			0.1	Pass	
Method Blank							
BTEX							
Benzene	mg/L	< 0.001			0.001	Pass	
Toluene	mg/L	< 0.001			0.001	Pass	
Ethylbenzene	mg/L	< 0.001			0.001	Pass	
m&p-Xylenes	mg/L	< 0.002			0.002	Pass	
o-Xylene	mg/L	< 0.001			0.001	Pass	
Xylenes - Total	mg/L	< 0.003			0.003	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/L	< 0.02			0.02	Pass	
TRH C6-C10	mg/L	< 0.02			0.02	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/L	< 0.001			0.001	Pass	
Acenaphthylene	mg/L	< 0.001			0.001	Pass	
Anthracene	mg/L	< 0.001			0.001	Pass	
Benz(a)anthracene	mg/L	< 0.001			0.001	Pass	
Benzo(a)pyrene	mg/L	< 0.001			0.001	Pass	
Benzo(b&j)fluoranthene	mg/L	< 0.001			0.001	Pass	
Benzo(g.h.i)perylene	mg/L	< 0.001			0.001	Pass	
Benzo(k)fluoranthene	mg/L	< 0.001			0.001	Pass	
Chrysene	mg/L	< 0.001			0.001	Pass	
Dibenz(a.h)anthracene	mg/L	< 0.001			0.001	Pass	
Fluoranthene	mg/L	< 0.001			0.001	Pass	
Fluorene	mg/L	< 0.001			0.001	Pass	
Indeno(1.2.3-cd)pyrene	mg/L	< 0.001			0.001	Pass	
Naphthalene	mg/L	< 0.001			0.001	Pass	
Phenanthrene	mg/L	< 0.001			0.001	Pass	
Pyrene	mg/L	< 0.001			0.001	Pass	
Method Blank							
Organochlorine Pesticides							
Chlordanes - Total	mg/L	< 0.001			0.001	Pass	
4.4'-DDD	mg/L	< 0.0001			0.0001	Pass	
4.4'-DDE	mg/L	< 0.0001			0.0001	Pass	
4.4'-DDT	mg/L	< 0.0001			0.0001	Pass	
a-BHC	mg/L	< 0.0001			0.0001	Pass	
Aldrin	mg/L	< 0.0001			0.0001	Pass	
b-BHC	mg/L	< 0.0001			0.0001	Pass	
d-BHC	mg/L	< 0.0001			0.0001	Pass	
Dieldrin	mg/L	< 0.0001			0.0001	Pass	
Endosulfan I	mg/L	< 0.0001			0.0001	Pass	
Endosulfan II	mg/L	< 0.0001			0.0001	Pass	
Endosulfan sulphate	mg/L	< 0.0001			0.0001	Pass	
Endrin	mg/L	< 0.0001			0.0001	Pass	
Endrin aldehyde	mg/L	< 0.0001			0.0001	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Endrin ketone	mg/L	< 0.0001			0.0001	Pass	
g-BHC (Lindane)	mg/L	< 0.0001			0.0001	Pass	
Heptachlor	mg/L	< 0.0001			0.0001	Pass	
Heptachlor epoxide	mg/L	< 0.0001			0.0001	Pass	
Hexachlorobenzene	mg/L	< 0.0001			0.0001	Pass	
Methoxychlor	mg/L	< 0.0001			0.0001	Pass	
Toxaphene	mg/L	< 0.01			0.01	Pass	
Method Blank							
Chlorinated Hydrocarbons							
1.2-Dichlorobenzene	mg/L	< 0.001			0.001	Pass	
1.2.3-Trichlorobenzene	mg/L	< 0.001			0.001	Pass	
1.2.3.4-Tetrachlorobenzene	mg/L	< 0.0001			0.0001	Pass	
1.2.3.5-Tetrachlorobenzene	mg/L	< 0.0001			0.0001	Pass	
1.2.4-Trichlorobenzene	mg/L	< 0.001			0.001	Pass	
1.2.4.5-Tetrachlorobenzene	mg/L	< 0.0001			0.0001	Pass	
1.3-Dichlorobenzene	mg/L	< 0.001			0.001	Pass	
1.3.5-Trichlorobenzene	mg/L	< 0.0001			0.0001	Pass	
1.4-Dichlorobenzene	mg/L	< 0.001			0.001	Pass	
Benzal chloride	mg/L	< 0.0001			0.0001	Pass	
Benzotrichloride	mg/L	< 0.0001			0.0001	Pass	
Benzyl chloride	mg/L	< 0.001			0.001	Pass	
Hexachlorobutadiene	mg/L	< 0.0001			0.0001	Pass	
Hexachlorocyclopentadiene	mg/L	< 0.0001			0.0001	Pass	
Hexachloroethane	mg/L	< 0.0001			0.0001	Pass	
Pentachlorobenzene	mg/L	< 0.0001			0.0001	Pass	
Method Blank							
Polychlorinated Biphenyls							
Aroclor-1016	mg/L	< 0.001			0.001	Pass	
Aroclor-1221	mg/L	< 0.001			0.001	Pass	
Aroclor-1232	mg/L	< 0.001			0.001	Pass	
Aroclor-1242	mg/L	< 0.001			0.001	Pass	
Aroclor-1248	mg/L	< 0.001			0.001	Pass	
Aroclor-1254	mg/L	< 0.001			0.001	Pass	
Aroclor-1260	mg/L	< 0.001			0.001	Pass	
Total PCB*	mg/L	< 0.001			0.001	Pass	
Method Blank							
Phenols (Halogenated)							
2-Chlorophenol	mg/L	< 0.003			0.003	Pass	
2.4-Dichlorophenol	mg/L	< 0.003			0.003	Pass	
2.4.5-Trichlorophenol	mg/L	< 0.01			0.01	Pass	
2.4.6-Trichlorophenol	mg/L	< 0.01			0.01	Pass	
2.6-Dichlorophenol	mg/L	< 0.003			0.003	Pass	
4-Chloro-3-methylphenol	mg/L	< 0.01			0.01	Pass	
Pentachlorophenol	mg/L	< 0.01			0.01	Pass	
Tetrachlorophenols - Total	mg/L	< 0.03			0.03	Pass	
Method Blank							
Phenols (non-Halogenated)							
2-Cyclohexyl-4.6-dinitrophenol	mg/L	< 0.1			0.1	Pass	
2-Methyl-4.6-dinitrophenol	mg/L	< 0.03			0.03	Pass	
2-Methylphenol (o-Cresol)	mg/L	< 0.003			0.003	Pass	
2-Nitrophenol	mg/L	< 0.01			0.01	Pass	
2.4-Dimethylphenol	mg/L	< 0.003			0.003	Pass	
2.4-Dinitrophenol	mg/L	< 0.03			0.03	Pass	
3&4-Methylphenol (m&p-Cresol)	mg/L	< 0.006			0.006	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
4-Nitrophenol	mg/L	< 0.03			0.03	Pass	
Dinoseb	mg/L	< 0.1			0.1	Pass	
Phenol	mg/L	< 0.003			0.003	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH >C10-C16	mg/L	< 0.05			0.05	Pass	
TRH >C16-C34	mg/L	< 0.1			0.1	Pass	
TRH >C34-C40	mg/L	< 0.1			0.1	Pass	
Method Blank							
Chloride	mg/L	< 1			1	Pass	
Cyanide (total)	mg/L	< 0.005			0.005	Pass	
Sulphate (as SO4)	mg/L	< 5			5	Pass	
Method Blank							
Heavy Metals							
Antimony	mg/L	< 0.005			0.005	Pass	
Arsenic	mg/L	< 0.001			0.001	Pass	
Beryllium	mg/L	< 0.001			0.001	Pass	
Boron	mg/L	< 0.05			0.05	Pass	
Cadmium	mg/L	< 0.0002			0.0002	Pass	
Chromium	mg/L	< 0.001			0.001	Pass	
Cobalt	mg/L	< 0.001			0.001	Pass	
Copper	mg/L	< 0.001			0.001	Pass	
Iron	mg/L	< 0.05			0.05	Pass	
Lead	mg/L	< 0.001			0.001	Pass	
Manganese	mg/L	< 0.005			0.005	Pass	
Mercury	mg/L	< 0.0001			0.0001	Pass	
Molybdenum	mg/L	< 0.005			0.005	Pass	
Nickel	mg/L	< 0.001			0.001	Pass	
Selenium	mg/L	< 0.001			0.001	Pass	
Silver	mg/L	< 0.005			0.005	Pass	
Tin	mg/L	< 0.005			0.005	Pass	
Zinc	mg/L	< 0.001			0.001	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	83			70-130	Pass	
TRH C10-C14	%	119			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	101			70-130	Pass	
Toluene	%	93			70-130	Pass	
Ethylbenzene	%	76			70-130	Pass	
m&p-Xylenes	%	76			70-130	Pass	
Xylenes - Total	%	78			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	82			75-125	Pass	
TRH C6-C10	%	74			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	77			70-130	Pass	
Acenaphthylene	%	77			70-130	Pass	
Anthracene	%	80			70-130	Pass	
Benz(a)anthracene	%	81			70-130	Pass	
Benzo(a)pyrene	%	86			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Benzo(b&j)fluoranthene	%	79			70-130	Pass	
Benzo(g.h.i)perylene	%	79			70-130	Pass	
Benzo(k)fluoranthene	%	87			70-130	Pass	
Chrysene	%	82			70-130	Pass	
Dibenz(a.h)anthracene	%	80			70-130	Pass	
Fluoranthene	%	76			70-130	Pass	
Fluorene	%	76			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	88			70-130	Pass	
Naphthalene	%	73			70-130	Pass	
Phenanthrene	%	77			70-130	Pass	
Pyrene	%	74			70-130	Pass	
LCS - % Recovery							
Organochlorine Pesticides							
4.4'-DDD	%	96			70-130	Pass	
4.4'-DDE	%	91			70-130	Pass	
4.4'-DDT	%	117			70-130	Pass	
a-BHC	%	97			70-130	Pass	
Aldrin	%	95			70-130	Pass	
b-BHC	%	129			70-130	Pass	
d-BHC	%	130			70-130	Pass	
Dieldrin	%	99			70-130	Pass	
Endosulfan I	%	100			70-130	Pass	
Endosulfan II	%	102			70-130	Pass	
Endosulfan sulphate	%	119			70-130	Pass	
Endrin	%	104			70-130	Pass	
Endrin aldehyde	%	93			70-130	Pass	
Endrin ketone	%	101			70-130	Pass	
g-BHC (Lindane)	%	98			70-130	Pass	
Heptachlor	%	102			70-130	Pass	
Heptachlor epoxide	%	100			70-130	Pass	
Hexachlorobenzene	%	85			70-130	Pass	
Methoxychlor	%	122			70-130	Pass	
LCS - % Recovery							
Chlorinated Hydrocarbons							
1.2-Dichlorobenzene	%	109			70-130	Pass	
1.2.3-Trichlorobenzene	%	110			70-130	Pass	
1.2.3.4-Tetrachlorobenzene	%	111			70-130	Pass	
1.2.3.5-Tetrachlorobenzene	%	95			70-130	Pass	
1.2.4-Trichlorobenzene	%	94			70-130	Pass	
1.2.4.5-Tetrachlorobenzene	%	111			70-130	Pass	
1.3-Dichlorobenzene	%	71			70-130	Pass	
1.3.5-Trichlorobenzene	%	77			70-130	Pass	
1.4-Dichlorobenzene	%	121			70-130	Pass	
Benzal chloride	%	88			70-130	Pass	
Benzotrichloride	%	77			70-130	Pass	
Hexachlorobutadiene	%	83			70-130	Pass	
Hexachloroethane	%	81			70-130	Pass	
LCS - % Recovery							
Polychlorinated Biphenyls							
Aroclor-1260	%	129			70-130	Pass	
LCS - % Recovery							
Phenols (Halogenated)							
2-Chlorophenol	%	76			30-130	Pass	
2.4-Dichlorophenol	%	77			30-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
2.4.5-Trichlorophenol	%	78			30-130	Pass	
2.4.6-Trichlorophenol	%	75			30-130	Pass	
2.6-Dichlorophenol	%	78			30-130	Pass	
4-Chloro-3-methylphenol	%	68			30-130	Pass	
Pentachlorophenol	%	83			30-130	Pass	
Tetrachlorophenols - Total	%	79			30-130	Pass	
LCS - % Recovery							
Phenols (non-Halogenated)							
2-Cyclohexyl-4.6-dinitrophenol	%	75			30-130	Pass	
2-Methyl-4.6-dinitrophenol	%	78			30-130	Pass	
2-Methylphenol (o-Cresol)	%	64			30-130	Pass	
2-Nitrophenol	%	81			30-130	Pass	
2.4-Dimethylphenol	%	74			30-130	Pass	
2.4-Dinitrophenol	%	55			30-130	Pass	
3&4-Methylphenol (m&p-Cresol)	%	57			30-130	Pass	
4-Nitrophenol	%	84			30-130	Pass	
Dinoseb	%	81			30-130	Pass	
Phenol	%	32			30-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH >C10-C16	%	114			70-130	Pass	
LCS - % Recovery							
Chloride	%	101			70-130	Pass	
Cyanide (total)	%	86			70-130	Pass	
Sulphate (as SO4)	%	104			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Antimony	%	100			80-120	Pass	
Arsenic	%	98			80-120	Pass	
Beryllium	%	94			80-120	Pass	
Boron	%	102			80-120	Pass	
Cadmium	%	96			80-120	Pass	
Chromium	%	97			80-120	Pass	
Cobalt	%	97			80-120	Pass	
Copper	%	96			80-120	Pass	
Iron	%	100			80-120	Pass	
Lead	%	93			80-120	Pass	
Manganese	%	99			80-120	Pass	
Mercury	%	100			75-125	Pass	
Molybdenum	%	96			80-120	Pass	
Nickel	%	96			80-120	Pass	
Selenium	%	98			80-120	Pass	
Silver	%	86			80-120	Pass	
Tin	%	102			80-120	Pass	
Zinc	%	97			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	M15-Se11591	NCP	%	107			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	M15-Se11591	NCP	%	110			70-130	Pass	
Toluene	M15-Se11591	NCP	%	101			70-130	Pass	
Ethylbenzene	M15-Se11591	NCP	%	101			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
m&p-Xylenes	M15-Se11591	NCP	%	105			70-130	Pass	
o-Xylene	M15-Se11591	NCP	%	99			70-130	Pass	
Xylenes - Total	M15-Se11591	NCP	%	103			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	M15-Se11591	NCP	%	79			70-130	Pass	
TRH C6-C10	M15-Se11591	NCP	%	95			70-130	Pass	
Spike - % Recovery									
				Result 1					
Chloride	M15-Se12302	NCP	%	96			70-130	Pass	
Cyanide (total)	B15-Se11689	NCP	%	101			70-130	Pass	
Sulphate (as SO4)	M15-Se12302	NCP	%	101			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Antimony	S15-Se10874	NCP	%	95			70-130	Pass	
Arsenic	S15-Se10874	NCP	%	96			75-125	Pass	
Beryllium	S15-Se10874	NCP	%	92			75-125	Pass	
Boron	M15-Se15602	NCP	%	91			75-125	Pass	
Cadmium	S15-Se10874	NCP	%	100			75-125	Pass	
Chromium	S15-Se10874	NCP	%	99			75-125	Pass	
Cobalt	S15-Se10874	NCP	%	98			75-125	Pass	
Copper	S15-Se10874	NCP	%	98			75-125	Pass	
Lead	S15-Se10874	NCP	%	97			75-125	Pass	
Manganese	S15-Se10874	NCP	%	96			75-125	Pass	
Mercury	S15-Se10874	NCP	%	96			70-130	Pass	
Molybdenum	S15-Se10874	NCP	%	98			75-125	Pass	
Nickel	S15-Se10874	NCP	%	98			75-125	Pass	
Selenium	S15-Se10874	NCP	%	98			75-125	Pass	
Silver	S15-Se10874	NCP	%	94			75-125	Pass	
Tin	S15-Se10874	NCP	%	99			75-125	Pass	
Zinc	S15-Se10874	NCP	%	101			75-125	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C10-C14	M15-Se11640	NCP	%	82			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
TRH >C10-C16	M15-Se11640	NCP	%	84			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Iron	S15-Se10874	NCP	%	94			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	M15-Se11590	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH C10-C14	M15-Se13835	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH C15-C28	M15-Se13835	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH C29-C36	M15-Se13835	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	M15-Se11590	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Toluene	M15-Se11590	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Ethylbenzene	M15-Se11590	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
m&p-Xylenes	M15-Se11590	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
o-Xylene	M15-Se11590	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Xylenes - Total	M15-Se11590	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	

Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	M15-Se11590	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH C6-C10	M15-Se11590	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
TRH >C10-C16	M15-Se13835	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH >C16-C34	M15-Se13835	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH >C34-C40	M15-Se13835	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Chloride	M15-Se12302	NCP	mg/L	430	430	<1	30%	Pass	
Cyanide (total)	B15-Se11689	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
pH	M15-Se12076	NCP	pH Units	7.9	7.9	pass	30%	Pass	
Sulphate (as SO4)	M15-Se10405	NCP	mg/L	< 5	< 5	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Antimony	S15-Se10874	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Arsenic	S15-Se10874	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Beryllium	S15-Se10874	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Boron	M15-Se15602	NCP	mg/L	4.6	4.6	<1	30%	Pass	
Cadmium	S15-Se10874	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium	S15-Se10874	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Cobalt	S15-Se10874	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper	S15-Se10874	NCP	mg/L	0.001	0.001	3.0	30%	Pass	
Lead	S15-Se10874	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Manganese	S15-Se10874	NCP	mg/L	0.008	0.007	4.0	30%	Pass	
Mercury	S15-Se10874	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Molybdenum	S15-Se10874	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Nickel	S15-Se10874	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Selenium	S15-Se10874	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Silver	S15-Se10874	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Tin	S15-Se10874	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Zinc	S15-Se10874	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Iron	S15-Se10874	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	No
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs

Authorised By

Charl Du Preez	Analytical Services Manager
Carroll Lee	Senior Analyst-Organic (VIC)
Carroll Lee	Senior Analyst-Volatile (VIC)
Emily Rosenberg	Senior Analyst-Metal (VIC)
Huong Le	Senior Analyst-Inorganic (VIC)

Glenn Jackson

National Laboratory Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Uncertainty data is available on request

Appendix F – Acid Sulfate Soils and Waste Classification