



Section 10.7 Certificates



Applicant:

JK Environments Pty Ltd
PO Box 976
NORTH RYDE BC NSW 1670

Planning Certificate – Section 10.7 (2)(5) Certificate Environmental Planning and Assessment Act, 1979

Certificate no:	ePC:19/5156	Delivery option:	
Certificate date:	06/12/2019	Your reference:	E32889B

Property:

Lot 1 DP 1253156
30 Eton Street SUTHERLAND NSW 2232

Zone:

* Sutherland Shire Local Environmental Plan 2015

Zone B3 Commercial Core

Zone RE1 Public Recreation

Notes:

- (a) *The information in this certificate only relates to the real property Identifier associated with the property and not to any licence or permissive occupancy that may be attached to and included in the property details contained in the description of the land.*
- (b) *The Environmental Planning and Assessment Act 1979 will be referred to in this Certificate as 'the Act'.*

Disclaimer:

- (a) *This certificate contains information provided to Council by third parties and is as current as the latest information available to Council at the time of production of this document. Council does not warrant the accuracy of the information contained within the information provided by third parties and has not independently verified the information. It is strongly recommended that you contact the relevant third parties to confirm the accuracy of the information.*

**INFORMATION PURSUANT TO SECTION 10.7(2),
ENVIRONMENTAL PLANNING & ASSESSMENT ACT, 1979**

1. Names of relevant instruments and DCPs

1. The name of each environmental planning instrument that applies to the carrying out of development on the land:

- * Sutherland Shire Local Environmental Plan 2015

- * Greater Metropolitan Regional Environmental Plan No. 2 - Georges River Catchment (5/2/1999) (deemed SEPP).

- * Sydney Regional Environmental Plan No.09 (Extractive Industry (No.2) 1995) (deemed SEPP).

- * SEPP (Building Sustainability Index: BASIX) 2004

- * SEPP (Exempt and Complying Development Codes) 2008

- * SEPP (Affordable Rental Housing) 2009

- * SEPP (Educational Establishments & Child Care Facilities) 2017

- * SEPP (Infrastructure) 2007

- * SEPP (Mining, Petroleum & Extractive Industries) 2007

- * SEPP (Miscellaneous Consent Provisions) 2007

- * SEPP (Housing for Seniors or People with a Disability) 2004

- * SEPP No.19 - Bushland in Urban Areas

- * SEPP No.21 - Caravan Parks

- * SEPP No.33 - Hazardous and Offensive Development

- * SEPP No.50 - Canal Estates

- * SEPP No.55 - Remediation of Land

- * SEPP No.64 - Advertising and Signage
- * SEPP No.65 - Design Quality of Residential Flats
- * SEPP No.70 - Affordable Housing (Revised Schemes)
- * SEPP (State and Regional Development) 2011
- * SEPP (State Significant Precincts) 2005
- * SEPP (Vegetation in Non-Rural Areas) 2017
- * SEPP (Concurrences) 2018
- * SEPP (Primary Production and Rural Development) 2019

2. The name of each proposed environmental planning instrument that will apply to the carrying out of development on the land and that is or has been the subject of community consultation or on public exhibition under the Act (unless the Director-General has notified the council that the making of the proposed instrument has been deferred indefinitely or has not been approved):

The following Draft State Environmental Planning Policies apply: Amendments to SEPP (Infrastructure) 2007, SEPP (Mining, Petroleum Production and Extractive Industries) 2007, SEPP (Housing for Seniors or People with a Disability) 2004, SEPP (State Significant Precincts) 2005, SEPP (Exempt and Complying Development Codes) 2008, and new draft policies - SEPP Environment, SEPP Short-term Rental Accommodation and SEPP Remediation of Land.

3. The name of each development control plan that applies to the carrying out of development on the land:

Sutherland Shire Development Control Plan 2015

Note: In this clause, proposed environmental planning instrument includes a planning proposal for a LEP or a draft environmental planning instrument.

2. Zoning and land use under relevant LEPs

For each environmental planning instrument or proposed instrument referred to in clause 1 (other than a SEPP or proposed SEPP) in any zone (however described).

- (a) The name and number of the zone:

**Sutherland Shire Local Environmental Plan 2015
Zone B3 Commercial Core**

- (b) Permitted without consent:

Home occupations

- (c) Permitted with consent:

Centre-based child care facilities; Commercial premises; Community facilities; Educational establishments; Entertainment facilities; Function centres; Hotel or motel accommodation; Information and education facilities; Medical centres; Oyster aquaculture; Passenger transport facilities; Recreation facilities (indoor); Registered clubs; Respite day care centres; Restricted premises, Roads; Tank-based aquaculture

Any other development not specified in item (b) or (d).

- (d) Prohibited:

Advertising structures; Agriculture; Air transport facilities; Airstrips; Animal boarding or training establishments; Attached dwellings; Biosolids treatment facilities; Boat building and repair facilities; Boat launching ramps; Boat sheds; Camping grounds; Caravan parks; Cemeteries; Charter and tourism boating facilities; Depots; Dual occupancies; Dwelling houses; Eco-tourist facilities; Electricity generating works; Exhibition homes; Exhibition villages; Farm buildings; Forestry; Freight transport facilities; General industries; Heavy industrial storage establishments; Heavy industries; Helipads; Highway service centres; Home-based child care; Home occupations (sex services); Industrial retail outlets; Industrial training facilities; Jetties; Marinas; Multi dwelling housing; Open cut mining; Pond-based aquaculture; Recreation facilities (major); Resource recovery facilities; Rural industries; Rural worker's dwellings; Semi-detached dwellings; Sewage treatment plants; Sex services premises; Storage premises; Transport depots; Truck depots; Vehicle body repair workshops; Warehouse or distribution centres; Waste disposal

facilities; Water recycling facilities; Water supply systems; Wholesale supplies.

**Sutherland Shire Local Environmental Plan 2015
Zone RE1 Public Recreation**

- (b) Permitted without consent:

Environmental protection works

- (c) Permitted with consent:

Aquaculture; Community facilities; Environmental facilities; Food and drink premises; Information and education facilities; Kiosks; Passenger transport facilities; Recreation areas; Recreation facilities (indoor); Recreation facilities (outdoor); Roads

- (d) Prohibited:

Pubs;
Any other development not specified in item (b) or (c)

- (e) Minimum land dimensions fixed for the erection of a dwelling-house on the land:

Under Sutherland Shire Local Environmental Plan 2015 there are no relevant development standards for the erection of a dwelling house due to site dimensions.

- (f) Does the land include or comprise critical habitat?

No

- (g) Is the land in a conservation area?

No

- (h) Is an item of environmental heritage situated on the land?

There is no item of environmental heritage situated on the property.

2A. Zoning and land use under State Environmental Planning Policy (Sydney Region Growth Centres) 2006

To the extent that the land is within any zone (however described) under:

- (a) Part 3 of the *State Environmental Planning Policy (Sydney Region Growth Centres) 2006* (**the 2006 SEPP**), or
- (b) a Precinct Plan (within the meaning of the 2006 SEPP), or
- (c) a proposed Precinct Plan that is or has been the subject of community consultation or on public exhibition under the Act,

the particulars referred to in clause 2 (a)-(h) in relation to that land (with a reference to “the instrument” in any of those paragraphs being read as a reference to Part 3 of the 2006 SEPP, or the Precinct Plan or proposed Precinct Plan, as the case requires).

Note: Sutherland Shire Council does not currently have any land in the Growth Centres that has been zoned by a Precinct Plan in the Appendices to this SEPP, proposed to be zoned in a draft Precinct Plan (that has been publicly exhibited or formally consulted on) or has been zoned under Part 3 of the Growth Centres SEPP.

3. Complying Development

- (1) The extent to which the land is land on which complying development may be carried out under each of the codes for complying development because of the provisions of clauses 1.17A (1) (c) to (e), (2), (3) and (4) and 1.19 of *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008*.
- (2) The extent to which complying development may not be carried out on that land because of the provisions of clauses 1.17A (1) (c) to (e), (2), (3) and (4) and 1.19 of that Policy and the reasons why it may not be carried out under those clauses.
- (3) If the council does not have sufficient information to ascertain the extent to which complying development may or may not be carried out on the land, a statement that a restriction applies to the land, but it may not apply to all of the land, and that council does not have sufficient information to ascertain the extent to which complying development may or may not be carried out on the land.

Housing Code

Complying development may be carried out on the land under this Code.

(Note: this code applies only to land within, or proposed to be within, the following zones R1, R2, R3, R4 or RU5. Check the zoning on the front of this certificate.)

Housing Alterations Code

Complying development may be carried out on the land under the Housing Internal Alterations Code.

Commercial and Industrial Alterations Code

Complying development may be carried out on the land under the Commercial and Industrial Alterations Code.

Commercial and Industrial (New Buildings and Additions) Code

Complying development may be carried out on the land under the Commercial and Industrial (New Buildings and Additions) Code.

(Note: this code applies only to land within, or proposed to be within, the following zones B1, B2, B3, B4, B5, B6, B7, B8, IN1, IN2, IN3, IN4 or SP3. Check the zoning on the front of this certificate.)

Container Recycling Facilities Code

Complying development may be carried out on the land under the Container Recycling Facilities Code.

Subdivisions Code

Complying development may be carried out on the land under the Subdivisions Code.

Rural Housing Code

Complying development may be carried out on the land under the Rural Housing Code.

(Note: this code applies only to land within, or proposed to be within, the following zones RU1, RU2, RU3, RU4, RU6 or R5. Check the zoning on the front of this certificate.)

Low Rise Medium Density Housing Code

Complying development may be carried out on the land under the Low Rise Medium Density Housing Code.

(Note: All land in the Sutherland Shire is deferred from this code until the 1st of July 2020.)

Green Field Housing Code

Complying development under the Greenfield Housing Code may be carried out on the land.

(Note: This code applies to land within the Greenfield Housing Code Area as mapped in State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.)

General Development Code

Complying development may be carried out on the land under the General Development Code.

Demolition Code

Complying development may be carried out on the land under the Demolition Code.

Fire Safety Code

Complying development may be carried out on the land under the Fire Safety Code.

Inland Code

Complying development may be carried out on the land under this Code.

(Note: This code only applies to local government areas specified in State Environmental Planning Policy (Exempt and Complying Development Codes) 2008. At this time it does not apply to the Sutherland Shire.)

4B. Annual charges under Local Government Act 1993 for coastal protection services that relate to existing coastal protection works

In relation to a coastal council—whether the owner (or any previous owner) of the land has consented in writing to the land being subject to annual charges under section 496B of the Local Government Act 1993 for coastal

protection services that relate to existing coastal protection works (within the meaning of section 553B of that Act).

There are no properties subject to annual charges under section 496B of the Local Government Act 1993 for coastal protection services.

Note. "Existing coastal protection works" are works to reduce the impact of coastal hazards on land (such as seawalls, revetments, groynes and beach nourishment) that existed before the commencement of section 553B of the Local Government Act 1993.

5. Mine Subsidence

Is the land proclaimed to be a mine subsidence district within the meaning of the *Coal Mine Subsidence Compensation Act 2017*?

No

6. Road Widening and Road Realignment

(a) Is the land affected by a road widening or road realignment under Division 2 of Part 3 of the *Roads Act 1993*?

No

(b) Is the land affected by any road widening or road realignment under any environmental planning instrument?

No

(c) Is the land affected by any road widening or road realignment under any resolution of the Council?

No

7. Council and other public authority policies on hazard risk restrictions

- (a) Is the land affected by a policy adopted by the council that restricts the development of the land because of the likelihood of landslip, bushfire, tidal inundation, subsidence, acid sulfate or any other risk?

No

- (b) Is the land affected by a policy adopted by any other public authority that restricts the development of the land because of the likelihood of landslip, bushfire, tidal inundation, subsidence, acid sulphate or any other risk?

No

7A. Flood related development controls information

- (1) Whether or not development on that land or part of the land for the purposes of dwelling houses, dual occupancies, multi dwelling housing or residential flat buildings (not including development for the purposes of group homes or seniors housing) is subject to flood related development controls.

No

- (2) Whether or not development on that land or part of the land for any other purpose is subject to flood related development controls.

No

- (3) Words and expressions in this clause have the same meanings as in the Instrument set out in the Schedule to the Standard Instrument (Local Environmental Plans) Order 2006.

8. Land reserved for acquisition

Whether or not any environmental planning instrument or proposed environmental planning instrument referred to in clause 1 makes provision in relation to the acquisition of the land by a public authority, as referred to in section 3.15 of the Act?

No

9. Contribution Plans

Council has adopted the following Contribution Plans that apply to the land:

- * The 2016 Section 7.12 Development Contributions Plan applies to this property (Effective 01/01/17).
- * The 2016 Section 7.11 Development Contributions Plan applies to this property (Effective 01/01/17).

9A. Biodiversity certified land

If the land is biodiversity certified land under Part 8 of the *Biodiversity Conservation Act 2016*, a statement to that effect.

Note. Biodiversity certified land includes land certified under Part 7AA of the *Threatened Species Conservation Act 1995* that is taken to be certified under Part 8 of the *Biodiversity Conservation Act 2016*.

No

10. Biodiversity stewardship sites

If the land is a biodiversity stewardship site under a biodiversity stewardship agreement under Part 5 of the *Biodiversity Conservation Act 2016*, a statement to that effect (but only if the council has been notified of the existence of the agreement by the Chief Executive of the Office of Environment and Heritage).

Note. Biodiversity stewardship agreements include biobanking agreements under Part 7A of the *Threatened Species Conservation Act 1995* that are taken to be biodiversity stewardship agreements under Part 5 of the *Biodiversity Conservation Act 2016*.

No

10A. Native vegetation clearing set asides

If the land contains a set aside area under section 60ZC of the Local Land Services Act 2013, a statement to that effect (but only if the council has been notified of the existence of the set aside area by Local Land Services or it is registered in the public register under that section).

No

11. Bush fire prone land

Is the land bush fire prone?

No

12. Property Vegetation Plans

Has Council been notified that a property vegetation plan under the *Native Vegetation Act 2003* applies to the land?

No

13. Orders Under Trees (Disputes Between Neighbours) Act 2006

Whether an order has been made under the Trees (Disputes Between Neighbours) Act 2006 to carry out work in relation to a tree on the land (but only if Council has been notified of the order).

No.

14. Directions under Part 3A

Is there a direction by the Minister in force under section 75P (2) (c1) of the Act that a provision of an environmental planning instrument prohibiting or restricting the carrying out of a project or a stage of a project on the land under Part 4 of the Act that does not have effect?

No

15. Site compatibility certificates and conditions for seniors housing

Is there a current site compatibility certificate (seniors housing) under State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004, of which the council is aware, in respect of proposed development on the land? If there is a certificate, the period for which the certificate is current. Are there any terms of a kind referred to in clause 18 (2) of that Policy that have been imposed as a condition of consent to a development application granted after 11 October 2007 in respect of the land?

No

16. Site compatibility certificates for infrastructure, schools or TAFE establishments

Is there a valid site compatibility certificate (of which the council is aware), issued under clause 19 of State Environmental Planning Policy (Infrastructure) 2007 in respect of proposed development on the land?

No

17. Site compatibility certificates and conditions for affordable rental housing

Is there a current site compatibility certificate (affordable rental housing), of which the council is aware, in respect of proposed development on the land? If so this statement sets out the period for which the certificate is current and any conditions pursuant to cl17(1) or cl38(1) of SEPP (Affordable Rental Housing) 2009.

No

18. Paper subdivision information

Is the land subject to any development plan adopted by a relevant authority or that is proposed to be subject to a consent ballot? If so, this statement sets out the date of any subdivision order that applies to the land.

Note: Words and expressions used in this clause have the same meaning as they have in Part 16C of this Regulation.

No

19. Site verification certificates

Is there a current site verification certificate, of which the council is aware, in respect of the land?

If so, this statement includes:

- (a) the matter certified by the certificate, and
- (b) the date on which the certificate ceases to be current (if any), and
- (c) that a copy may be obtained from the head office of the Department of Planning and Infrastructure.

Note. A site verification certificate sets out the Director-General's opinion as to whether the land concerned is or is not biophysical strategic agricultural land or critical industry cluster

land—see Division 3 of Part 4AA of State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007.

No

20. Loose-fill asbestos insulation

Is the land to which the certificate relates identified on the Loose-Fill Asbestos Insulation Register maintained by the Secretary of NSW Fair Trading?

No

21. Affected building notices and building product rectification orders

Are there any affected building notices of which the council is aware that is in force in respect of the land.

No

If so, this statement includes:

- (a) whether there is any building product rectification order of which the council is aware that is in force in respect of the land and has not been fully complied with, and
- (b) whether any notice of intention to make a building product rectification order of which the council is aware has been given in respect of the land and is outstanding.

Note: affected building notice has the same meaning as in Part 4 of the Building Products (Safety) Act 2017.

building product rectification order has the same meaning as in the Building Products (Safety) Act 2017.

Note: The following matters are prescribed by section 59 (2) of the Contaminated Land Management Act 1997 as additional matters to be specified in a planning certificate:

- (a) Is the land significantly contaminated land within the meaning of that Act?

No

- (b) Is the land subject to a management order within the meaning of that Act?

No

- (c) Is the land the subject of an approved voluntary management proposal within the meaning of that Act?

No

- (d) Is the land subject to an ongoing maintenance order within the meaning of that Act?

No

(e) Is the land subject of a site audit statement within the meaning of that Act?

No

Any Other Prescribed Matter

Note: Section 26 of the Nation Building and Jobs Plan (State Infrastructure Delivery) Act 2009 provides that a planning certificate must include advice about any exemption under section 23 or authorisation under section 24 of that Act if the Council is provided with a copy of the exemption or authorisation by the Co-ordinator General under the Act.

No

Additional Information

Council holds additional information relating to this property for provision in accordance with Section 10.7(5) of the Environmental Planning and Assessment Act, 1979.

**ADDITIONAL INFORMATION PURSUANT TO SECTION 10.7(5),
ENVIRONMENTAL PLANNING AND ASSESSMENT ACT, 1979**

The following additional information relating to the land is provided in good faith. The information is not exhaustive of matters likely to affect the land. Section 10.7(6) states that a council shall not incur any liability in respect of any advice provided in good faith pursuant to subsection (5).

This land is within an area of high Aboriginal Archaeological Sensitivity. Aboriginal objects and areas are protected by the National Parks and Wildlife Act 1974. It is an offence to damage, deface, remove or destroy or cause damage, defacement, removal or destruction of aboriginal objects and areas without the consent of the NSW Office of Environment and Heritage. Further information is available on Council and the OEH websites www.environment.nsw.gov.au.

For further information please telephone [02] 9710 0333.

Yours faithfully



Mark Carlon
Manager Strategic Planning



SafeWork NSW Records (pending)



Appendix D: Borehole Logs

JKEnvironments

ENVIRONMENTAL LOG



Log No.
BH/MW1
1/1

Environmental logs are not to be used for geotechnical purposes

DUPMP5: 0.14m-0.3m

Client:	NBRS ARCHITECTURE
Project:	PROPOSED REFURBISHMENTS TO SUTHERLAND ENTERTAINMENT CENTRE
Location:	LOT 1 DP1253156, 30 ETON STREET, SUTHERLAND, NSW

Job No.: E32889B	Method: SPIRAL AUGER	R.L. Surface: N/A
Date: 22/1/20	Datum:	
Plant Type: JK205	Logged/Checked by: M.M.P./V.B.	

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0		-	CONCRETE: 140mm.t				NO OBSERVED REINFORCEMENT
					N = 5 2,2,3	0.5			FILL: Silty clayey sand, fine to medium grained, dark brown, trace of igneous and ironstone gravel, ash and root fibres.	D			
						1			FILL: Silty sandy clay, low plasticity, dark brown, trace of igneous and ironstone gravel, terracotta fragments.	w~PL			
					N = 19 4,11,8	1.5		CI-CH	FILL: Silty clay, medium to high plasticity, orange brown and grey, trace of igneous gravel.	w<PL			
						2		-	Silty CLAY: medium to high plasticity, grey, trace of ironstone gravel. Extremely Weathered siltstone: silty CLAY, medium to high plasticity, grey.	XW			GROUNDWATER MONITORING WELL INSTALLED TO 6.0m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 6.0m TO 1.5m. CASING 1.5m TO 0m. 2mm SAND FILTER PACK 6.0m TO 1.5m. BENTONITE SEAL 1.5m TO 1.2m. BACKFILLED WITH SAND TO THE SURFACE. COMPLETED WITH A CONCRETED GATIC COVER.
						5		-	SILTSTONE: red brown and grey.	M			
						6			END OF BOREHOLE AT 6.0m				
						7							

JKEnvironments

ENVIRONMENTAL LOG



Log No.
BH2
1/1

Environmental logs are not to be used for geotechnical purposes

Client:	NBRS ARCHITECTURE
Project:	PROPOSED REFURBISHMENTS TO SUTHERLAND ENTERTAINMENT CENTRE
Location:	LOT 1 DP1253156, 30 ETON STREET, SUTHERLAND, NSW

Job No.: E32889B	Method: SPIRAL AUGER	R.L. Surface: N/A
Date: 22/1/20	Datum:	
Plant Type: JK205	Logged/Checked by: M.M.P./V.B.	

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0			FILL: Silty sand, fine to medium grained, dark brown, trace of root fibres.	W			GRASS COVER
					N = 13 15,8,5	1			FILL: Sandy clay, low to medium plasticity, dark orange brown and grey, trace of igneous and ironstone gravel and ash.	w<PL w≈PL			
					N = 6 2,2,4	2			FILL: Silty clay, low to medium plasticity, yellow brown and grey, trace of igneous and ironstone gravel.				
						2		CI-CH	Silty CLAY: medium to high plasticity, red brown mottled grey, trace of ironstone gravel.	w≈PL			
					3				END OF BOREHOLE AT 3.0m				
						4							
						5							
						6							
						7							

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ENVIRONMENTAL LOG



Log No.
BH/MW3
1/1

Environmental logs are not to be used for geotechnical purposes

DUPMP1: 0.2m-0.3m

Client:	NBRS ARCHITECTURE
Project:	PROPOSED REFURBISHMENTS TO SUTHERLAND ENTERTAINMENT CENTRE
Location:	LOT 1 DP1253156, 30 ETON STREET, SUTHERLAND, NSW

Job No.: E32889B	Method: SPIRAL AUGER	R.L. Surface: N/A
Date: 22/1/20	Datum:	
Plant Type: JK205	Logged/Checked by: M.M.P./V.B.	

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0			CONCRETE: 200mm.t				NO OBSERVED REINFORCEMENT
					N = 7 2,3,4	0.5		CI-CH	FILL: Silty sand, fine to medium grained, light brown, trace of igneous and ironstone gravel. FILL: Silty clay, low to medium plasticity, orange brown and grey brown, trace of igneous and ironstone gravel and ash.	D w~PL			
						1			Silty CLAY: medium to high plasticity, orange brown and grey, trace of ironstone gravel.	w~PL			
						2		-	Extremely Weathered siltstone: silty CLAY, medium to high plasticity, grey.	XW			LOW 'TC' RESISTANCE TO TERMINATION OF BOREHOLE
						4							GROUNDWATER MONITORING WELL INSTALLED TO 6.0m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 6.0m TO 1.1m. CASING 1.1m TO 0m. 2mm SAND FILTER PACK 6.0m TO 1.2m. BENTONITE SEAL 1.2m TO 0.9m. BACKFILLED WITH SAND TO THE SURFACE. COMPLETED WITH A CONCRETED GATIC COVER.
						6			END OF BOREHOLE AT 6.0m				
						7							

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ENVIRONMENTAL LOG



Log No.
BH4
1/1

Environmental logs are not to be used for geotechnical purposes

Client:	NBRS ARCHITECTURE
Project:	PROPOSED REFURBISHMENTS TO SUTHERLAND ENTERTAINMENT CENTRE
Location:	LOT 1 DP1253156, 30 ETON STREET, SUTHERLAND, NSW

Job No.: E32889B	Method: SPIRAL AUGER	R.L. Surface: N/A
Date: 22/1/20	Datum:	
Plant Type: JK205	Logged/Checked by: M.M.P./V.B.	

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION						0			FILL: Clayey sand, fine to medium grained, dark brown, trace of ironstone gravel and root fibres.	M			GRASS COVER
					N = 12 3,5,7	1		FILL: Silty sandy clay, low to medium plasticity, dark brown, trace of igneous and ironstone, sandstone gravel, and root fibres.	w<PL				
					N = 7 3,3,4	2		FILL: Sandy clay, low to medium plasticity, dark brown, trace of igneous, ironstone and sandstone gravel, and ash.	w≈PL				
						2		FILL: Silty sandy clay, low to medium plasticity, red brown mottled grey.					
						2.5	CI-CH	Silty CLAY: medium to high plasticity, red brown mottled grey.	w<PL				
						3	-	Extremely Weathered siltstone: silty CLAY, medium to high plasticity, grey.	XW				
						3		END OF BOREHOLE AT 3.0m					
						4							
						5							
						6							
						7							

JKEnvironments

ENVIRONMENTAL LOG



Log No.
BH/MW5
1/1

Environmental logs are not to be used for geotechnical purposes

DUPMP3: 0.0m-0.2m

Client:	NBRS ARCHITECTURE
Project:	PROPOSED REFURBISHMENTS TO SUTHERLAND ENTERTAINMENT CENTRE
Location:	LOT 1 DP1253156, 30 ETON STREET, SUTHERLAND, NSW

Job No.: E32889B	Method: SPIRAL AUGER	R.L. Surface: N/A
Date: 22/1/20	Datum:	
Plant Type: JK205	Logged/Checked by: M.M.P./V.B.	

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
DRY ON COMPLETION	█	█	█	█	N = 5 2,2,3	0			FILL: Silty sand, fine to medium grained, dark brown, trace of igneous gravel, and root fibres.	M			GRASS COVER
	█	█	█	█		1			FILL: Silty clay, low to medium plasticity, dark yellow brown, trace of igneous and ironstone gravel, and ash.	w≈PL			
	█	█	█	█		2		CI-CH	Silty CLAY: medium to high plasticity, red brown mottled grey.	w≈PL			
	█	█	█	█		4		-	Extremely Weathered siltstone: silty CLAY, medium to high plasticity, red brown and grey.	XW			
					6			SILTSTONE: red brown, with ironstone bands.	D				
						6		END OF BOREHOLE AT 6.0m					
						7							

JKEnvironments

ENVIRONMENTAL LOG



Log No.
BH6
1/1

Environmental logs are not to be used for geotechnical purposes

DUPMP2: 0.14m-0.3m

Client:	NBRS ARCHITECTURE
Project:	PROPOSED REFURBISHMENTS TO SUTHERLAND ENTERTAINMENT CENTRE
Location:	LOT 1 DP1253156, 30 ETON STREET, SUTHERLAND, NSW

Job No.: E32889B	Method: SPIRAL AUGER	R.L. Surface: N/A
Date: 22/1/20	Datum:	
Plant Type: JK205	Logged/Checked by: M.M.P./V.B.	

Groundwater Record	SAMPLES				Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL									
						0			CONCRETE: 140mm.t				NO OBSERVED REINFORCEMENT
						0.5		FILL: Clayey sand, fine to medium grained, light brown, trace of igneous and ironstone gravel.	M				
					N = SPT 6/150mm REFUSAL	1			FILL: Sand, fine to medium grained, yellow brown.	W			
						1.5		CI-CH	Silty CLAY: medium to high plasticity, red brown mottled grey.	w<PL			
						2			END OF BOREHOLE AT 1.5m				
						3							
						4							
						5							
						6							
						7							

JKEnvironments

ENVIRONMENTAL LOG



Log No.
BH7
1/1

Environmental logs are not to be used for geotechnical purposes

DUPMP4: 0m-0.2m

Client:	NBRS ARCHITECTURE
Project:	PROPOSED REFURBISHMENTS TO SUTHERLAND ENTERTAINMENT CENTRE
Location:	LOT 1 DP1253156, 30 ETON STREET, SUTHERLAND, NSW

Job No.: E32889B	Method: SPIRAL AUGER	R.L. Surface: N/A
Date: 22/1/20	Datum:	
Plant Type: JK205	Logged/Checked by: M.M.P./V.B.	

Groundwater Record	SAMPLES					Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL	DB									
DRY ON COMPLETION	█	█	█	█	█	N = 11 3,4,7	0		CI-CH	FILL: Silty clayey sand, fine to medium grained, dark orange brown, trace of igneous, ironstone and sandstone gravel, and root fibres.	D			GRASS COVER
	█	█	█	█	█		1			Silty CLAY: medium to high plasticity, red brown and grey, trace of ironstone gravel.	w<PL			
	█	█	█	█	█		2		-	Extremely Weathered siltstone: silty CLAY: medium to high plasticity, red brown and grey. END OF BOREHOLE AT 1.5m	XW			
							3							
							4							
							5							
							6							
							7							

JKEnvironments

ENVIRONMENTAL LOG



Log No.
BH8
1/1

Environmental logs are not to be used for geotechnical purposes

Client: NBR ARCHITECTURE
Project: PROPOSED REFURBISHMENTS TO SUTHERLAND ENTERTAINMENT CENTRE
Location: LOT 1 DP1253156, 30 ETON STREET, SUTHERLAND, NSW

Job No.: E32889B **Method:** HAND AUGER **R.L. Surface:** N/A
Date: 22/1/20 **Datum:**
Plant Type: **Logged/Checked by:** M.M.P./V.B.

Groundwater Record	SAMPLES					Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	ES	ASS	ASB	SAL	DB									
DRY ON COMPLETION							0			FILL: Silty sand, fine to medium grained, dark brown, trace of ironstone gravel, and root fibres.	M w>PL			GRASS COVER
							1			FILL: Sandy clay, low to medium plasticity, grey brown, trace of igneous and ironstone gravel, and ash. END OF BOREHOLE AT 0.4m				HAND AUGER REFUSAL ON GRAVEL
							2							
							3							
							4							
							5							
							6							
							7							



ENVIRONMENTAL LOGS EXPLANATION NOTES

INTRODUCTION

These notes have been provided to amplify the environmental report in regard to classification methods, field procedures and certain matters relating to the logging of soil and rock. Not all notes are necessarily relevant to all reports.

Where geotechnical borehole logs are utilised for environmental purpose, reference should also be made to the explanatory notes included in the geotechnical report. Environmental logs are not suitable for geotechnical purposes.

The ground is a product of continuing natural and man-made processes and therefore exhibits a variety of characteristics and properties which vary from place to place and can change with time. Environmental studies include gathering and assimilating limited facts about these characteristics and properties in order to understand or predict the behaviour of the ground on a particular site under certain conditions. This report may contain such facts obtained by inspection, excavation, probing, sampling, testing or other means of investigation. If so, they are directly relevant only to the ground at the place where and time when the investigation was carried out.

DESCRIPTION AND CLASSIFICATION METHODS

The methods of description and classification of soils and rocks used in this report are based on Australian Standard 1726:2017 'Geotechnical Site Investigations'. In general, descriptions cover the following properties – soil or rock type, colour, structure, strength or density, and inclusions. Identification and classification of soil and rock involves judgement and the Company infers accuracy only to the extent that is common in current geoenvironmental practice.

Soil types are described according to the predominating particle size and behaviour as set out in the attached soil classification table qualified by the grading of other particles present (eg. sandy clay) as set out below:

Soil Classification	Particle Size
Clay	< 0.002mm
Silt	0.002 to 0.075mm
Sand	0.075 to 2.36mm
Gravel	2.36 to 63mm
Cobbles	63 to 200mm
Boulders	> 200mm

Non-cohesive soils are classified on the basis of relative density, generally from the results of Standard Penetration Test (SPT) as below:

Relative Density	SPT 'N' Value (blows/300mm)
Very loose (VL)	< 4
Loose (L)	4 to 10
Medium dense (MD)	10 to 30
Dense (D)	30 to 50
Very Dense (VD)	> 50

Cohesive soils are classified on the basis of strength (consistency) either by use of a hand penetrometer, vane shear, laboratory testing and/or tactile engineering examination. The strength terms are defined as follows.

Classification	Unconfined Compressive Strength (kPa)	Indicative Undrained Shear Strength (kPa)
Very Soft (VS)	≤ 25	≤ 12
Soft (S)	> 25 and ≤ 50	> 12 and ≤ 25
Firm (F)	> 50 and ≤ 100	> 25 and ≤ 50
Stiff (St)	> 100 and ≤ 200	> 50 and ≤ 100
Very Stiff (VSt)	> 200 and ≤ 400	> 100 and ≤ 200
Hard (Hd)	> 400	> 200
Friable (Fr)	Strength not attainable – soil crumbles	

Rock types are classified by their geological names, together with descriptive terms regarding weathering, strength, defects, etc. Where relevant, further information regarding rock classification is given in the text of the report. In the Sydney Basin, 'shale' is used to describe fissile mudstone, with a weakness parallel to bedding. Rocks with alternating inter-laminations of different grain size (eg. siltstone/claystone and siltstone/fine grained sandstone) are referred to as 'laminite'.

INVESTIGATION METHODS

The following is a brief summary of investigation methods currently adopted by the Company and some comments on their use and application. All methods except test pits, hand auger drilling and portable Dynamic Cone Penetrometers require the use of a mechanical rig which is commonly mounted on a truck chassis or track base.

Test Pits: These are normally excavated with a backhoe or a tracked excavator, allowing close examination of the insitu soils and 'weaker' bedrock if it is safe to descend into the pit. The depth of penetration is limited to about 3m for a backhoe and up to 6m for a large excavator. Limitations of test pits are the problems associated with disturbance and difficulty of reinstatement and the consequent effects on close-by structures. Care must be taken if construction is to be carried out near test pit locations to either properly recompact the backfill during construction or to design and construct the

structure so as not to be adversely affected by poorly compacted backfill at the test pit location.

Hand Auger Drilling: A borehole of 50mm to 100mm diameter is advanced by manually operated equipment. Refusal of the hand auger can occur on a variety of materials such as obstructions within any fill, tree roots, hard clay, gravel or ironstone, cobbles and boulders, and does not necessarily indicate rock level.

Continuous Spiral Flight Augers: The borehole is advanced using 75mm to 115mm diameter continuous spiral flight augers, which are withdrawn at intervals to allow sampling and insitu testing. This is a relatively economical means of drilling in clays and in sands above the water table. Samples are returned to the surface by the flights or may be collected after withdrawal of the auger flights, but they can be very disturbed and layers may become mixed. Information from the auger sampling (as distinct from specific sampling by SPTs or undisturbed samples) is of limited reliability due to mixing or softening of samples by groundwater, or uncertainties as to the original depth of the samples. Augering below the groundwater table is of even lesser reliability than augering above the water table.

Rock Augering: Use can be made of a Tungsten Carbide (TC) bit for auger drilling into rock to indicate rock quality and continuity by variation in drilling resistance and from examination of recovered rock cuttings. This method of investigation is quick and relatively inexpensive but provides only an indication of the likely rock strength and predicted values may be in error by a strength order. Where rock strengths may have a significant impact on construction feasibility or costs, then further investigation by means of cored boreholes may be warranted.

Wash Boring: The borehole is usually advanced by a rotary bit, with water being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be assessed from the cuttings, together with some information from “feel” and rate of penetration.

Mud Stabilised Drilling: Either Wash Boring or Continuous Core Drilling can use drilling mud as a circulating fluid to stabilise the borehole. The term ‘mud’ encompasses a range of products ranging from bentonite to polymers. The mud tends to mask the cuttings and reliable identification is only possible from intermittent intact sampling (eg. from SPT and U50 samples) or from rock coring, etc.

Continuous Core Drilling: A continuous core sample is obtained using a diamond tipped core barrel. Provided full core recovery is achieved (which is not always possible in very low strength rocks and granular soils), this technique provides a very reliable (but relatively expensive) method of investigation. In rocks, NMLC or HQ triple tube core barrels, which give a core of about 50mm and 61mm diameter, respectively, is usually used with water flush. The length of core recovered is compared to the length drilled and any length not recovered is shown as NO CORE. The location of NO CORE recovery is determined on site by the supervising engineer; where the location is uncertain, the loss is placed at the bottom of the drill run.

Standard Penetration Tests: Standard Penetration Tests (SPT) are used mainly in non-cohesive soils, but can also be used in cohesive soils, as a means of indicating density or strength and also of obtaining a relatively undisturbed sample. The test procedure is

described in Australian Standard 1289.6.3.1–2004 (R2016) ‘*Methods of Testing Soils for Engineering Purposes, Soil Strength and Consolidation Tests – Determination of the Penetration Resistance of a Soil – Standard Penetration Test (SPT)*’.

The test is carried out in a borehole by driving a 50mm diameter split sample tube with a tapered shoe, under the impact of a 63.5kg hammer with a free fall of 760mm. It is normal for the tube to be driven in three successive 150mm increments and the ‘N’ value is taken as the number of blows for the last 300mm. In dense sands, very hard clays or weak rock, the full 450mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form:

- In the case where full penetration is obtained with successive blow counts for each 150mm of, say, 4, 6 and 7 blows, as

N = 13
4, 6, 7

- In a case where the test is discontinued short of full penetration, say after 15 blows for the first 150mm and 30 blows for the next 40mm, as

N > 30
15, 30/40mm

The results of the test can be related empirically to the engineering properties of the soil.

A modification to the SPT is where the same driving system is used with a solid 60° tipped steel cone of the same diameter as the SPT hollow sampler. The solid cone can be continuously driven for some distance in soft clays or loose sands, or may be used where damage would otherwise occur to the SPT. The results of this Solid Cone Penetration Test (SCPT) are shown as ‘N_c’ on the borehole logs, together with the number of blows per 150mm penetration.

LOGS

The borehole or test pit logs presented herein are an interpretation of the subsurface conditions, and their reliability will depend to some extent on the frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will enable the most reliable assessment, but is not always practicable or possible to justify on economic grounds. In any case, the boreholes or test pits represent only a very small sample of the total subsurface conditions.

The terms and symbols used in preparation of the logs are defined in the following pages.

Interpretation of the information shown on the logs, and its application to design and construction, should therefore take into account the spacing of boreholes or test pits, the method of drilling or excavation, the frequency of sampling and testing and the possibility of other than ‘straight line’ variations between the boreholes or test pits. Subsurface conditions between boreholes or test pits may vary significantly from conditions encountered at the borehole or test pit locations.

GROUNDWATER

Where groundwater levels are measured in boreholes, there are several potential problems:

- Although groundwater may be present, in low permeability soils it may enter the hole slowly or perhaps not at all during the time it is left open.
- A localised perched water table may lead to an erroneous indication of the true water table.
- Water table levels will vary from time to time with seasons or recent weather changes and may not be the same at the time of construction.
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must be washed out of the hole or 'reverted' chemically if reliable water observations are to be made.

More reliable measurements can be made by installing standpipes which are read after the groundwater level has stabilised at intervals ranging from several days to perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from perched water tables or surface water.

FILL

The presence of fill materials can often be determined only by the inclusion of foreign objects (eg. bricks, steel, etc) or by distinctly unusual colour, texture or fabric. Identification of the extent of fill materials will also depend on investigation methods and frequency. Where natural soils similar to those at the site are used for fill, it may be difficult with limited testing and sampling to reliably assess the extent of the fill.

The presence of fill materials is usually regarded with caution as the possible variation in density and material type is much greater than with natural soil deposits. Consequently, there is an increased risk of adverse environmental characteristics or behaviour. If the volume and nature of fill is of importance to a project, then frequent test pit excavations are preferable to boreholes.

LABORATORY TESTING

Laboratory testing has not been undertaken to confirm the soil classification and rock strengths indicated on the environmental logs unless noted in the report.

SYMBOL LEGENDS

SOIL



FILL



TOPSOIL



CLAY (CL, CI, CH)



SILT (ML, MH)



SAND (SP, SW)



GRAVEL (GP, GW)



SANDY CLAY (CL, CI, CH)



SILTY CLAY (CL, CI, CH)



CLAYEY SAND (SC)



SILTY SAND (SM)



GRAVELLY CLAY (CL, CI, CH)



CLAYEY GRAVEL (GC)



SANDY SILT (ML, MH)



PEAT AND HIGHLY ORGANIC SOILS (Pt)

ROCK



CONGLOMERATE



SANDSTONE



SHALE/MUDSTONE



SILTSTONE



CLAYSTONE



COAL



LAMINITE



LIMESTONE



PHYLLITE, SCHIST



TUFF



GRANITE, GABBRO



DOLERITE, DIORITE



BASALT, ANDESITE



QUARTZITE

OTHER MATERIALS



BRICKS OR PAVERS



CONCRETE



ASPHALTIC CONCRETE

CLASSIFICATION OF COARSE AND FINE GRAINED SOILS

Major Divisions		Group Symbol	Typical Names	Field Classification of Sand and Gravel	Laboratory Classification	
Coarse grained soil (more than 68% of soil excluding oversize fraction is greater than 0.075mm)	GRAVEL (more than half of coarse fraction is larger than 2.36mm)	GW	Gravel and gravel-sand mixtures, little or no fines	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	$C_u > 4$ $1 < C_c < 3$
		GP	Gravel and gravel-sand mixtures, little or no fines, uniform gravels	Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	Fails to comply with above
		GM	Gravel-silt mixtures and gravel-sand-silt mixtures	'Dirty' materials with excess of non-plastic fines, zero to medium dry strength	≥ 12% fines, fines are silty	Fines behave as silt
		GC	Gravel-clay mixtures and gravel-sand-clay mixtures	'Dirty' materials with excess of plastic fines, medium to high dry strength	≥ 12% fines, fines are clayey	Fines behave as clay
	SAND (more than half of coarse fraction is smaller than 2.36mm)	SW	Sand and gravel-sand mixtures, little or no fines	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	$C_u > 6$ $1 < C_c < 3$
		SP	Sand and gravel-sand mixtures, little or no fines	Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	Fails to comply with above
		SM	Sand-silt mixtures	'Dirty' materials with excess of non-plastic fines, zero to medium dry strength	≥ 12% fines, fines are silty	N/A
		SC	Sand-clay mixtures	'Dirty' materials with excess of plastic fines, medium to high dry strength	≥ 12% fines, fines are clayey	

Laboratory Classification Criteria

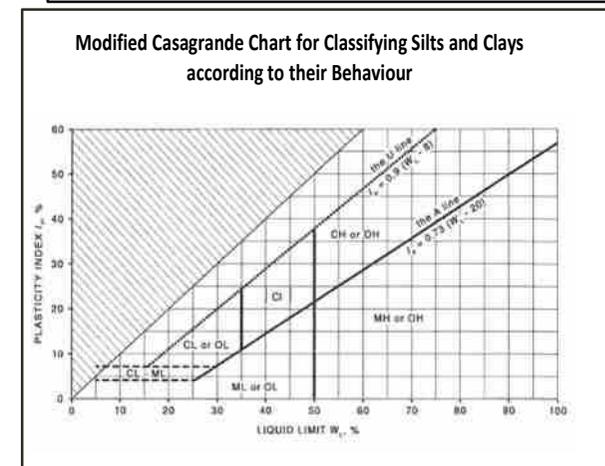
A well graded coarse grained soil is one for which the coefficient of uniformity $C_u > 4$ and the coefficient of curvature $1 < C_c < 3$. Otherwise, the soil is poorly graded. These coefficients are given by:

$$C_u = \frac{D_{60}}{D_{10}} \quad \text{and} \quad C_c = \frac{(D_{30})^2}{D_{10} D_{60}}$$

Where D_{10} , D_{30} and D_{60} are those grain sizes for which 10%, 30% and 60% of the soil grains, respectively, are smaller.

- NOTES:**
- For a coarse grained soil with a fines content between 5% and 12%, the soil is given a dual classification comprising the two group symbols separated by a dash; for example, for a poorly graded gravel with between 5% and 12% silt fines, the classification is GP-GM.
 - Where the grading is determined from laboratory tests, it is defined by coefficients of curvature (C_c) and uniformity (C_u) derived from the particle size distribution curve.
 - Clay soils with liquid limits $> 35\%$ and $\leq 50\%$ may be classified as being of medium plasticity.
 - The U line on the Modified Casagrande Chart is an approximate upper bound for most natural soils.

Major Divisions		Group Symbol	Typical Names	Field Classification of Silt and Clay			Laboratory Classification
				Dry Strength	Dilatancy	Toughness	
fine grained soils (more than 35% of soil excluding oversize fraction is less than 0.075mm)	SILT and CLAY (low to medium plasticity)	ML	Inorganic silt and very fine sand, rock flour, silty or clayey fine sand or silt with low plasticity	None to low	Slow to rapid	Low	Below A line
		CL, CI	Inorganic clay of low to medium plasticity, gravelly clay, sandy clay	Medium to high	None to slow	Medium	Above A line
		OL	Organic silt	Low to medium	Slow	Low	Below A line
	SILT and CLAY (high plasticity)	MH	Inorganic silt	Low to medium	None to slow	Low to medium	Below A line
		CH	Inorganic clay of high plasticity	High to very high	None	High	Above A line
		OH	Organic clay of medium to high plasticity, organic silt	Medium to high	None to very slow	Low to medium	Below A line
	Highly organic soil	Pt	Peat, highly organic soil	–	–	–	–





LOG SYMBOLS

Log Column	Symbol	Definition		
Groundwater Record	▼	Standing water level. Time delay following completion of drilling/excavation may be shown.		
	⊖	Extent of borehole/test pit collapse shortly after drilling/excavation.		
	▶	Groundwater seepage into borehole or test pit noted during drilling or excavation.		
Samples	ES	Sample taken over depth indicated, for environmental analysis.		
	U50	Undisturbed 50mm diameter tube sample taken over depth indicated.		
	DB	Bulk disturbed sample taken over depth indicated.		
	DS	Small disturbed bag sample taken over depth indicated.		
	ASB	Soil sample taken over depth indicated, for asbestos analysis.		
	ASS	Soil sample taken over depth indicated, for acid sulfate soil analysis.		
	SAL	Soil sample taken over depth indicated, for salinity analysis.		
Field Tests	N = 17 4, 7, 10	Standard Penetration Test (SPT) performed between depths indicated by lines. Individual figures show blows per 150mm penetration. 'Refusal' refers to apparent hammer refusal within the corresponding 150mm depth increment.		
	N _c =	5	Solid Cone Penetration Test (SCPT) performed between depths indicated by lines. Individual figures show blows per 150mm penetration for 60° solid cone driven by SPT hammer. 'R' refers to apparent hammer refusal within the corresponding 150mm depth increment.	
		7		
		3R		
VNS = 25 PID = 100	Vane shear reading in kPa of undrained shear strength. Photoionisation detector reading in ppm (soil sample headspace test).			
Moisture Condition (Fine Grained Soils)	w > PL	Moisture content estimated to be greater than plastic limit.		
	w ≈ PL	Moisture content estimated to be approximately equal to plastic limit.		
	w < PL	Moisture content estimated to be less than plastic limit.		
	w ≈ LL	Moisture content estimated to be near liquid limit.		
	w > LL	Moisture content estimated to be wet of liquid limit.		
	(Coarse Grained Soils)	D	DRY – runs freely through fingers.	
		M	MOIST – does not run freely but no free water visible on soil surface.	
W		WET – free water visible on soil surface.		
Strength (Consistency) Cohesive Soils	VS	VERY SOFT – unconfined compressive strength ≤ 25kPa.		
	S	SOFT – unconfined compressive strength > 25kPa and ≤ 50kPa.		
	F	FIRM – unconfined compressive strength > 50kPa and ≤ 100kPa.		
	St	STIFF – unconfined compressive strength > 100kPa and ≤ 200kPa.		
	VSt	VERY STIFF – unconfined compressive strength > 200kPa and ≤ 400kPa.		
	Hd	HARD – unconfined compressive strength > 400kPa.		
	Fr	FRIABLE – strength not attainable, soil crumbles.		
	()	Bracketed symbol indicates estimated consistency based on tactile examination or other assessment.		
Density Index/ Relative Density (Cohesionless Soils)		Density Index (I_D) Range (%)	SPT 'N' Value Range (Blows/300mm)	
	VL	VERY LOOSE	≤ 15	0 – 4
	L	LOOSE	> 15 and ≤ 35	4 – 10
	MD	MEDIUM DENSE	> 35 and ≤ 65	10 – 30
	D	DENSE	> 65 and ≤ 85	30 – 50
	VD	VERY DENSE	> 85	> 50
	()	Bracketed symbol indicates estimated density based on ease of drilling or other assessment.		
Hand Penetrometer Readings	300	Measures reading in kPa of unconfined compressive strength. Numbers indicate individual test results on representative undisturbed material unless noted otherwise.		
	250			



Log Column	Symbol	Definition
Remarks	'V' bit 'TC' bit T ₆₀ Soil Origin	Hardened steel 'V' shaped bit. Twin pronged tungsten carbide bit. Penetration of auger string in mm under static load of rig applied by drill head hydraulics without rotation of augers. The geological origin of the soil can generally be described as: RESIDUAL – soil formed directly from insitu weathering of the underlying rock. No visible structure or fabric of the parent rock. EXTREMELY WEATHERED – soil formed directly from insitu weathering of the underlying rock. Material is of soil strength but retains the structure and/or fabric of the parent rock. ALLUVIAL – soil deposited by creeks and rivers. ESTUARINE – soil deposited in coastal estuaries, including sediments caused by inflowing creeks and rivers, and tidal currents. MARINE – soil deposited in a marine environment. AEOLIAN – soil carried and deposited by wind. COLLUVIAL – soil and rock debris transported downslope by gravity, with or without the assistance of flowing water. Colluvium is usually a thick deposit formed from a landslide. The description 'slopewash' is used for thinner surficial deposits. LITTORAL – beach deposited soil.



Classification of Material Weathering

Term	Abbreviation	Definition
Residual Soil	RS	Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are no longer visible, but the soil has not been significantly transported.
Extremely Weathered	XW	Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are still visible.
Highly Weathered	HW	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable. Rock strength is significantly changed by weathering. Some primary minerals have weathered to clay minerals. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores.
Moderately Weathered	MW	
Distinctly Weathered (Note 1)		
Slightly Weathered	SW	Rock is partially discoloured with staining or bleaching along joints but shows little or no change of strength from fresh rock.
Fresh	FR	Rock shows no sign of decomposition of individual minerals or colour changes.

NOTE 1: The term 'Distinctly Weathered' is used where it is not practicable to distinguish between 'Highly Weathered' and 'Moderately Weathered' rock. 'Distinctly Weathered' is defined as follows: 'Rock strength usually changed by weathering. The rock may be highly discoloured, usually by iron staining. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores'. There is some change in rock strength.

Rock Material Strength Classification

Term	Abbreviation	Uniaxial Compressive Strength (MPa)	Guide to Strength	
			Point Load Strength Index $Is_{(50)}$ (MPa)	Field Assessment
Very Low Strength	VL	0.6 to 2	0.03 to 0.1	Material crumbles under firm blows with sharp end of pick; can be peeled with knife; too hard to cut a triaxial sample by hand. Pieces up to 30mm thick can be broken by finger pressure.
Low Strength	L	2 to 6	0.1 to 0.3	Easily scored with a knife; indentations 1mm to 3mm show in the specimen with firm blows of the pick point; has dull sound under hammer. A piece of core 150mm long by 50mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling.
Medium Strength	M	6 to 20	0.3 to 1	Scored with a knife; a piece of core 150mm long by 50mm diameter can be broken by hand with difficulty.
High Strength	H	20 to 60	1 to 3	A piece of core 150mm long by 50mm diameter cannot be broken by hand but can be broken by a pick with a single firm blow; rock rings under hammer.
Very High Strength	VH	60 to 200	3 to 10	Hand specimen breaks with pick after more than one blow; rock rings under hammer.
Extremely High Strength	EH	> 200	> 10	Specimen requires many blows with geological pick to break through intact material; rock rings under hammer.



Appendix E: Laboratory Report/s & COC Documents



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CERTIFICATE OF ANALYSIS 235189

Client Details

Client	Environmental Investigation Services
Attention	Vittal Boggaram
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	<u>E32889B, Sutherland</u>
Number of Samples	43 Soil
Date samples received	24/01/2020
Date completed instructions received	24/01/2020

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by 03/02/2020

Date of Issue 03/02/2020

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Asbestos Approved By

Analysed by Asbestos Approved Identifier: Lucy Zhu

Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By

Jaimie Loa-Kum-Cheung, Metals Supervisor

Loren Bardwell, Senior Chemist

Lucy Zhu, Asbestos Supervisor

Steven Luong, Organics Supervisor

Authorised By

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		235189-1	235189-2	235189-7	235189-13	235189-14
Your Reference	UNITS	BH1	BH1	BH2	BH3	BH3
Depth		0.14-0.3	0.7-0.8	0.0-0.1	0.2-0.3	0.4-0.6
Date Sampled		22/01/2020	22/01/2020	22/01/2020	22/01/2020	22/01/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/01/2020	29/01/2020	29/01/2020	29/01/2020	29/01/2020
Date analysed	-	31/01/2020	31/01/2020	31/01/2020	31/01/2020	31/01/2020
TRH C ₆ - C ₉	mg/kg	<25	<25	<25	<25	<25
TRH C ₆ - C ₁₀	mg/kg	<25	<25	<25	<25	<25
vTPH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	105	102	107	104	106

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		235189-17	235189-21	235189-24	235189-28	235189-32
Your Reference	UNITS	BH4	BH4	BH5	BH6	BH7
Depth		0.0-0.1	1.7-1.9	0.0-0.2	0.14-0.3	0.0-0.2
Date Sampled		22/01/2020	22/01/2020	22/01/2020	22/01/2020	22/01/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/01/2020	29/01/2020	29/01/2020	29/01/2020	29/01/2020
Date analysed	-	31/01/2020	31/01/2020	31/01/2020	31/01/2020	31/01/2020
TRH C ₆ - C ₉	mg/kg	<25	<25	<25	<25	<25
TRH C ₆ - C ₁₀	mg/kg	<25	<25	<25	<25	<25
vTPH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	99	108	103	106	104

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		235189-35	235189-36	235189-37	235189-39	235189-41
Your Reference	UNITS	BH8	BH8	SDUP1	SDUP3	TS-S1
Depth		0.0-0.1	0.1-0.2	-	-	-
Date Sampled		22/01/2020	22/01/2020	22/01/2020	22/01/2020	22/01/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/01/2020	29/01/2020	29/01/2020	29/01/2020	29/01/2020
Date analysed	-	31/01/2020	31/01/2020	31/01/2020	31/01/2020	31/01/2020
TRH C ₆ - C ₉	mg/kg	<25	<25	<25	<25	[NA]
TRH C ₆ - C ₁₀	mg/kg	<25	<25	<25	<25	[NA]
vTPH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25	<25	<25	<25	[NA]
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	98%
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	98%
Ethylbenzene	mg/kg	<1	<1	<1	<1	100%
m+p-xylene	mg/kg	<2	<2	<2	<2	100%
o-Xylene	mg/kg	<1	<1	<1	<1	99%
naphthalene	mg/kg	<1	<1	<1	<1	[NA]
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	[NA]
Surrogate aaa-Trifluorotoluene	%	105	107	106	102	104

vTRH(C6-C10)/BTEXN in Soil		
Our Reference		235189-42
Your Reference	UNITS	TB-S1
Depth		-
Date Sampled		22/01/2020
Type of sample		Soil
Date extracted	-	29/01/2020
Date analysed	-	31/01/2020
Benzene	mg/kg	<0.2
Toluene	mg/kg	<0.5
Ethylbenzene	mg/kg	<1
m+p-xylene	mg/kg	<2
o-Xylene	mg/kg	<1
Surrogate aaa-Trifluorotoluene	%	106

svTRH (C10-C40) in Soil						
Our Reference		235189-1	235189-2	235189-7	235189-13	235189-14
Your Reference	UNITS	BH1	BH1	BH2	BH3	BH3
Depth		0.14-0.3	0.7-0.8	0.0-0.1	0.2-0.3	0.4-0.6
Date Sampled		22/01/2020	22/01/2020	22/01/2020	22/01/2020	22/01/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/01/2020	29/01/2020	29/01/2020	29/01/2020	29/01/2020
Date analysed	-	31/01/2020	31/01/2020	31/01/2020	31/01/2020	31/01/2020
TRH C ₁₀ - C ₁₄	mg/kg	<50	<50	<50	<50	<50
TRH C ₁₅ - C ₂₈	mg/kg	<100	<100	<100	<100	<100
TRH C ₂₉ - C ₃₆	mg/kg	210	<100	<100	110	<100
TRH >C ₁₀ -C ₁₆	mg/kg	<50	<50	<50	<50	<50
TRH >C ₁₀ - C ₁₆ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C ₁₆ -C ₃₄	mg/kg	230	<100	<100	140	<100
TRH >C ₃₄ -C ₄₀	mg/kg	240	150	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	470	150	<50	140	<50
Surrogate o-Terphenyl	%	82	77	86	76	75

svTRH (C10-C40) in Soil						
Our Reference		235189-17	235189-21	235189-24	235189-28	235189-32
Your Reference	UNITS	BH4	BH4	BH5	BH6	BH7
Depth		0.0-0.1	1.7-1.9	0.0-0.2	0.14-0.3	0.0-0.2
Date Sampled		22/01/2020	22/01/2020	22/01/2020	22/01/2020	22/01/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/01/2020	29/01/2020	29/01/2020	29/01/2020	29/01/2020
Date analysed	-	31/01/2020	31/01/2020	31/01/2020	31/01/2020	31/01/2020
TRH C ₁₀ - C ₁₄	mg/kg	<50	<50	<50	<50	<50
TRH C ₁₅ - C ₂₈	mg/kg	<100	<100	<100	<100	<100
TRH C ₂₉ - C ₃₆	mg/kg	<100	<100	<100	<100	<100
TRH >C ₁₀ -C ₁₆	mg/kg	<50	<50	<50	<50	<50
TRH >C ₁₀ - C ₁₆ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C ₁₆ -C ₃₄	mg/kg	<100	<100	<100	<100	<100
TRH >C ₃₄ -C ₄₀	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	74	81	82	72	80

svTRH (C10-C40) in Soil					
Our Reference		235189-35	235189-36	235189-37	235189-39
Your Reference	UNITS	BH8	BH8	SDUP1	SDUP3
Depth		0.0-0.1	0.1-0.2	-	-
Date Sampled		22/01/2020	22/01/2020	22/01/2020	22/01/2020
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	29/01/2020	29/01/2020	29/01/2020	29/01/2020
Date analysed	-	31/01/2020	31/01/2020	31/01/2020	31/01/2020
TRH C ₁₀ - C ₁₄	mg/kg	<50	<50	<50	<50
TRH C ₁₅ - C ₂₈	mg/kg	<100	<100	110	<100
TRH C ₂₉ - C ₃₆	mg/kg	<100	<100	140	<100
TRH >C ₁₀ -C ₁₆	mg/kg	<50	<50	<50	<50
TRH >C ₁₀ - C ₁₆ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50
TRH >C ₁₆ -C ₃₄	mg/kg	<100	<100	190	<100
TRH >C ₃₄ -C ₄₀	mg/kg	<100	<100	<100	<100
Total +ve TRH (>C ₁₀ -C ₄₀)	mg/kg	<50	<50	190	<50
Surrogate o-Terphenyl	%	80	73	76	72

PAHs in Soil						
Our Reference		235189-1	235189-2	235189-7	235189-13	235189-14
Your Reference	UNITS	BH1	BH1	BH2	BH3	BH3
Depth		0.14-0.3	0.7-0.8	0.0-0.1	0.2-0.3	0.4-0.6
Date Sampled		22/01/2020	22/01/2020	22/01/2020	22/01/2020	22/01/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/01/2020	29/01/2020	29/01/2020	29/01/2020	29/01/2020
Date analysed	-	30/01/2020	30/01/2020	30/01/2020	30/01/2020	30/01/2020
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate <i>p</i> -Terphenyl-d14	%	88	86	86	86	85

PAHs in Soil						
Our Reference		235189-17	235189-21	235189-24	235189-28	235189-32
Your Reference	UNITS	BH4	BH4	BH5	BH6	BH7
Depth		0.0-0.1	1.7-1.9	0.0-0.2	0.14-0.3	0.0-0.2
Date Sampled		22/01/2020	22/01/2020	22/01/2020	22/01/2020	22/01/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/01/2020	29/01/2020	29/01/2020	29/01/2020	29/01/2020
Date analysed	-	30/01/2020	30/01/2020	30/01/2020	30/01/2020	30/01/2020
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	0.1	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate <i>p</i> -Terphenyl-d14	%	84	86	81	85	86

PAHs in Soil					
Our Reference		235189-35	235189-36	235189-37	235189-39
Your Reference	UNITS	BH8	BH8	SDUP1	SDUP3
Depth		0.0-0.1	0.1-0.2	-	-
Date Sampled		22/01/2020	22/01/2020	22/01/2020	22/01/2020
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	29/01/2020	29/01/2020	29/01/2020	29/01/2020
Date analysed	-	30/01/2020	30/01/2020	30/01/2020	30/01/2020
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	0.06	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	0.06	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5
Surrogate <i>p</i> -Terphenyl-d14	%	83	86	84	87

Organochlorine Pesticides in soil						
Our Reference		235189-1	235189-7	235189-13	235189-17	235189-24
Your Reference	UNITS	BH1	BH2	BH3	BH4	BH5
Depth		0.14-0.3	0.0-0.1	0.2-0.3	0.0-0.1	0.0-0.2
Date Sampled		22/01/2020	22/01/2020	22/01/2020	22/01/2020	22/01/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/01/2020	29/01/2020	29/01/2020	29/01/2020	29/01/2020
Date analysed	-	30/01/2020	30/01/2020	30/01/2020	30/01/2020	30/01/2020
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	97	96	95	94	89

Organochlorine Pesticides in soil						
Our Reference		235189-28	235189-32	235189-35	235189-37	235189-39
Your Reference	UNITS	BH6	BH7	BH8	SDUP1	SDUP3
Depth		0.14-0.3	0.0-0.2	0.0-0.1	-	-
Date Sampled		22/01/2020	22/01/2020	22/01/2020	22/01/2020	22/01/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/01/2020	29/01/2020	29/01/2020	29/01/2020	29/01/2020
Date analysed	-	30/01/2020	30/01/2020	30/01/2020	30/01/2020	30/01/2020
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	95	96	93	94	96

Organophosphorus Pesticides in Soil						
Our Reference		235189-1	235189-7	235189-13	235189-17	235189-24
Your Reference	UNITS	BH1	BH2	BH3	BH4	BH5
Depth		0.14-0.3	0.0-0.1	0.2-0.3	0.0-0.1	0.0-0.2
Date Sampled		22/01/2020	22/01/2020	22/01/2020	22/01/2020	22/01/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/01/2020	29/01/2020	29/01/2020	29/01/2020	29/01/2020
Date analysed	-	30/01/2020	30/01/2020	30/01/2020	30/01/2020	30/01/2020
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	97	96	95	94	89

Organophosphorus Pesticides in Soil						
Our Reference		235189-28	235189-32	235189-35	235189-37	235189-39
Your Reference	UNITS	BH6	BH7	BH8	SDUP1	SDUP3
Depth		0.14-0.3	0.0-0.2	0.0-0.1	-	-
Date Sampled		22/01/2020	22/01/2020	22/01/2020	22/01/2020	22/01/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/01/2020	29/01/2020	29/01/2020	29/01/2020	29/01/2020
Date analysed	-	30/01/2020	30/01/2020	30/01/2020	30/01/2020	30/01/2020
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	95	96	93	94	96

PCBs in Soil						
Our Reference		235189-1	235189-7	235189-13	235189-17	235189-24
Your Reference	UNITS	BH1	BH2	BH3	BH4	BH5
Depth		0.14-0.3	0.0-0.1	0.2-0.3	0.0-0.1	0.0-0.2
Date Sampled		22/01/2020	22/01/2020	22/01/2020	22/01/2020	22/01/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/01/2020	29/01/2020	29/01/2020	29/01/2020	29/01/2020
Date analysed	-	30/01/2020	30/01/2020	30/01/2020	30/01/2020	30/01/2020
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	97	96	95	94	89

PCBs in Soil						
Our Reference		235189-28	235189-32	235189-35	235189-37	235189-39
Your Reference	UNITS	BH6	BH7	BH8	SDUP1	SDUP3
Depth		0.14-0.3	0.0-0.2	0.0-0.1	-	-
Date Sampled		22/01/2020	22/01/2020	22/01/2020	22/01/2020	22/01/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/01/2020	29/01/2020	29/01/2020	29/01/2020	29/01/2020
Date analysed	-	30/01/2020	30/01/2020	30/01/2020	30/01/2020	30/01/2020
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	95	96	93	94	96

Acid Extractable metals in soil						
Our Reference		235189-1	235189-2	235189-7	235189-13	235189-14
Your Reference	UNITS	BH1	BH1	BH2	BH3	BH3
Depth		0.14-0.3	0.7-0.8	0.0-0.1	0.2-0.3	0.4-0.6
Date Sampled		22/01/2020	22/01/2020	22/01/2020	22/01/2020	22/01/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	29/01/2020	29/01/2020	29/01/2020	29/01/2020	29/01/2020
Date analysed	-	29/01/2020	29/01/2020	29/01/2020	29/01/2020	29/01/2020
Arsenic	mg/kg	6	11	5	5	6
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	16	29	10	19	19
Copper	mg/kg	20	2	9	240	51
Lead	mg/kg	58	19	12	68	35
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	11	2	6	11	6
Zinc	mg/kg	92	5	28	280	130

Acid Extractable metals in soil						
Our Reference		235189-17	235189-21	235189-24	235189-28	235189-32
Your Reference	UNITS	BH4	BH4	BH5	BH6	BH7
Depth		0.0-0.1	1.7-1.9	0.0-0.2	0.14-0.3	0.0-0.2
Date Sampled		22/01/2020	22/01/2020	22/01/2020	22/01/2020	22/01/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	29/01/2020	29/01/2020	29/01/2020	29/01/2020	29/01/2020
Date analysed	-	29/01/2020	29/01/2020	29/01/2020	29/01/2020	29/01/2020
Arsenic	mg/kg	<4	6	5	<4	6
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	6	21	7	14	14
Copper	mg/kg	14	14	30	13	22
Lead	mg/kg	12	34	21	31	24
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	3	12	4	8	3
Zinc	mg/kg	31	43	88	22	140

Acid Extractable metals in soil					
Our Reference		235189-35	235189-36	235189-37	235189-39
Your Reference	UNITS	BH8	BH8	SDUP1	SDUP3
Depth		0.0-0.1	0.1-0.2	-	-
Date Sampled		22/01/2020	22/01/2020	22/01/2020	22/01/2020
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	29/01/2020	29/01/2020	29/01/2020	29/01/2020
Date analysed	-	29/01/2020	29/01/2020	29/01/2020	29/01/2020
Arsenic	mg/kg	5	5	<4	5
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	4	18	12	7
Copper	mg/kg	5	11	260	22
Lead	mg/kg	5	19	61	20
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	2	10	9	3
Zinc	mg/kg	310	49	300	78

Moisture						
Our Reference		235189-1	235189-2	235189-7	235189-13	235189-14
Your Reference	UNITS	BH1	BH1	BH2	BH3	BH3
Depth		0.14-0.3	0.7-0.8	0.0-0.1	0.2-0.3	0.4-0.6
Date Sampled		22/01/2020	22/01/2020	22/01/2020	22/01/2020	22/01/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	29/01/2020	29/01/2020	29/01/2020	29/01/2020	29/01/2020
Date analysed	-	30/01/2020	30/01/2020	30/01/2020	30/01/2020	30/01/2020
Moisture	%	13	22	19	14	15

Moisture						
Our Reference		235189-17	235189-21	235189-24	235189-28	235189-32
Your Reference	UNITS	BH4	BH4	BH5	BH6	BH7
Depth		0.0-0.1	1.7-1.9	0.0-0.2	0.14-0.3	0.0-0.2
Date Sampled		22/01/2020	22/01/2020	22/01/2020	22/01/2020	22/01/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	29/01/2020	29/01/2020	29/01/2020	29/01/2020	29/01/2020
Date analysed	-	30/01/2020	30/01/2020	30/01/2020	30/01/2020	30/01/2020
Moisture	%	22	18	15	11	18

Moisture					
Our Reference		235189-35	235189-36	235189-37	235189-39
Your Reference	UNITS	BH8	BH8	SDUP1	SDUP3
Depth		0.0-0.1	0.1-0.2	-	-
Date Sampled		22/01/2020	22/01/2020	22/01/2020	22/01/2020
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	29/01/2020	29/01/2020	29/01/2020	29/01/2020
Date analysed	-	30/01/2020	30/01/2020	30/01/2020	30/01/2020
Moisture	%	10	12	12	14

Asbestos ID - soils						
Our Reference		235189-1	235189-2	235189-7	235189-13	235189-14
Your Reference	UNITS	BH1	BH1	BH2	BH3	BH3
Depth		0.14-0.3	0.7-0.8	0.0-0.1	0.2-0.3	0.4-0.6
Date Sampled		22/01/2020	22/01/2020	22/01/2020	22/01/2020	22/01/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	03/02/2020	03/02/2020	03/02/2020	03/02/2020	03/02/2020
Sample mass tested	g	Approx. 20g	Approx. 15g	Approx. 15g	Approx. 25g	Approx. 15g
Sample Description	-	Brown fine-grained soil & rocks				
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg
		Organic fibres detected				
Trace Analysis	-	No asbestos detected				

Asbestos ID - soils						
Our Reference		235189-17	235189-21	235189-24	235189-28	235189-32
Your Reference	UNITS	BH4	BH4	BH5	BH6	BH7
Depth		0.0-0.1	1.7-1.9	0.0-0.2	0.14-0.3	0.0-0.2
Date Sampled		22/01/2020	22/01/2020	22/01/2020	22/01/2020	22/01/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	03/02/2020	03/02/2020	03/02/2020	03/02/2020	03/02/2020
Sample mass tested	g	Approx. 10g	Approx. 25g	Approx. 15g	Approx. 25g	Approx. 25g
Sample Description	-	Brown fine-grained soil & rocks				
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected				

Asbestos ID - soils			
Our Reference		235189-35	235189-36
Your Reference	UNITS	BH8	BH8
Depth		0.0-0.1	0.1-0.2
Date Sampled		22/01/2020	22/01/2020
Type of sample		Soil	Soil
Date analysed	-	03/02/2020	03/02/2020
Sample mass tested	g	Approx. 20g	Approx. 20g
Sample Description	-	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
AT-008	Determination of VOCs sampled onto coconut shell charcoal sorbent tubes, that can be desorbed using carbon disulphide, and analysed by GC-MS.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-012/017	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS.
Org-012/017	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-MS and/or GC-MS/MS. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.

Method ID	Methodology Summary
Org-012/017	<p>Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.</p> <p>For soil results:-</p> <ol style="list-style-type: none"> 1. 'EQ PQL' values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero' values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL' values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. <p>Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.</p>
Org-014	<p>Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.</p>
Org-016	<p>Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.</p>
Org-016	<p>Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.</p> <p>Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.</p>

Client Reference: E32889B, Sutherland

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-13	235189-7
Date extracted	-			29/01/2020	1	29/01/2020	29/01/2020		29/01/2020	29/01/2020
Date analysed	-			31/01/2020	1	31/01/2020	31/01/2020		31/01/2020	31/01/2020
TRH C ₆ - C ₉	mg/kg	25	Org-016	<25	1	<25	<25	0	111	101
TRH C ₆ - C ₁₀	mg/kg	25	Org-016	<25	1	<25	<25	0	111	101
Benzene	mg/kg	0.2	Org-016	<0.2	1	<0.2	<0.2	0	118	113
Toluene	mg/kg	0.5	Org-016	<0.5	1	<0.5	<0.5	0	116	111
Ethylbenzene	mg/kg	1	Org-016	<1	1	<1	<1	0	105	91
m+p-xylene	mg/kg	2	Org-016	<2	1	<2	<2	0	108	95
o-Xylene	mg/kg	1	Org-016	<1	1	<1	<1	0	107	93
naphthalene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	103	1	105	102	3	110	102

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	39	29/01/2020	29/01/2020		[NT]	[NT]
Date analysed	-			[NT]	39	31/01/2020	31/01/2020		[NT]	[NT]
TRH C ₆ - C ₉	mg/kg	25	Org-016	[NT]	39	<25	<25	0	[NT]	[NT]
TRH C ₆ - C ₁₀	mg/kg	25	Org-016	[NT]	39	<25	<25	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-016	[NT]	39	<0.2	<0.2	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-016	[NT]	39	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-016	[NT]	39	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-016	[NT]	39	<2	<2	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-016	[NT]	39	<1	<1	0	[NT]	[NT]
naphthalene	mg/kg	1	Org-014	[NT]	39	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	[NT]	39	102	105	3	[NT]	[NT]

Client Reference: E32889B, Sutherland

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-13	235189-7
Date extracted	-			29/01/2020	1	29/01/2020	29/01/2020		29/01/2020	30/01/2020
Date analysed	-			31/01/2020	1	31/01/2020	31/01/2020		31/01/2020	31/01/2020
TRH C ₁₀ - C ₁₄	mg/kg	50	Org-003	<50	1	<50	<50	0	100	102
TRH C ₁₅ - C ₂₈	mg/kg	100	Org-003	<100	1	<100	<100	0	102	130
TRH C ₂₉ - C ₃₆	mg/kg	100	Org-003	<100	1	210	170	21	108	[NT]
TRH >C ₁₀ -C ₁₆	mg/kg	50	Org-003	<50	1	<50	<50	0	100	102
TRH >C ₁₆ -C ₃₄	mg/kg	100	Org-003	<100	1	230	190	19	102	130
TRH >C ₃₄ -C ₄₀	mg/kg	100	Org-003	<100	1	240	220	9	108	[NT]
Surrogate o-Terphenyl	%		Org-003	74	1	82	78	5	84	86

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	39	29/01/2020	29/01/2020		[NT]	[NT]
Date analysed	-			[NT]	39	31/01/2020	31/01/2020		[NT]	[NT]
TRH C ₁₀ - C ₁₄	mg/kg	50	Org-003	[NT]	39	<50	<50	0	[NT]	[NT]
TRH C ₁₅ - C ₂₈	mg/kg	100	Org-003	[NT]	39	<100	<100	0	[NT]	[NT]
TRH C ₂₉ - C ₃₆	mg/kg	100	Org-003	[NT]	39	<100	<100	0	[NT]	[NT]
TRH >C ₁₀ -C ₁₆	mg/kg	50	Org-003	[NT]	39	<50	<50	0	[NT]	[NT]
TRH >C ₁₆ -C ₃₄	mg/kg	100	Org-003	[NT]	39	<100	<100	0	[NT]	[NT]
TRH >C ₃₄ -C ₄₀	mg/kg	100	Org-003	[NT]	39	<100	<100	0	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-003	[NT]	39	72	71	1	[NT]	[NT]

Client Reference: E32889B, Sutherland

QUALITY CONTROL: PAHs in Soil				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-13	235189-7
Date extracted	-			29/01/2020	1	29/01/2020	29/01/2020		29/01/2020	29/01/2020
Date analysed	-			30/01/2020	1	30/01/2020	30/01/2020		30/01/2020	30/01/2020
Naphthalene	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	100	96
Acenaphthylene	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	102	99
Phenanthrene	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	108	102
Anthracene	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	102	97
Pyrene	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	104	99
Benzo(a)anthracene	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	116	108
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-012/017	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012/017	<0.05	1	<0.05	<0.05	0	108	99
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012/017	90	1	88	85	3	90	84

QUALITY CONTROL: PAHs in Soil				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	39	29/01/2020	29/01/2020		[NT]	[NT]
Date analysed	-			[NT]	39	30/01/2020	30/01/2020		[NT]	[NT]
Naphthalene	mg/kg	0.1	Org-012/017	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Acenaphthylene	mg/kg	0.1	Org-012/017	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-012/017	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012/017	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Phenanthrene	mg/kg	0.1	Org-012/017	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Anthracene	mg/kg	0.1	Org-012/017	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012/017	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Pyrene	mg/kg	0.1	Org-012/017	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-012/017	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012/017	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-012/017	[NT]	39	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012/017	[NT]	39	<0.05	<0.05	0	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012/017	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012/017	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012/017	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012/017	[NT]	39	87	83	5	[NT]	[NT]

Client Reference: E32889B, Sutherland

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate		Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-13	235189-7
Date extracted	-			29/01/2020	1	29/01/2020	29/01/2020		29/01/2020	29/01/2020
Date analysed	-			30/01/2020	1	30/01/2020	30/01/2020		30/01/2020	30/01/2020
alpha-BHC	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	104	99
HCB	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	106	99
gamma-BHC	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	110	94
delta-BHC	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	112	107
Heptachlor Epoxide	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	110	106
gamma-Chlordane	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	110	104
Dieldrin	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	116	104
Endrin	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	118	109
Endosulfan II	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	102	96
Endrin Aldehyde	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	104	99
Methoxychlor	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-012/017	105	1	97	93	4	96	92

Client Reference: E32889B, Sutherland

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate		Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	39	29/01/2020	29/01/2020		[NT]	[NT]
Date analysed	-			[NT]	39	30/01/2020	30/01/2020		[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-012/017	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
HCB	mg/kg	0.1	Org-012/017	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-012/017	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
gamma-BHC	mg/kg	0.1	Org-012/017	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-012/017	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
delta-BHC	mg/kg	0.1	Org-012/017	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-012/017	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-012/017	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
gamma-Chlordane	mg/kg	0.1	Org-012/017	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-012/017	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-012/017	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-012/017	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Dieldrin	mg/kg	0.1	Org-012/017	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Endrin	mg/kg	0.1	Org-012/017	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Endosulfan II	mg/kg	0.1	Org-012/017	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-012/017	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-012/017	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-012/017	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-012/017	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Methoxychlor	mg/kg	0.1	Org-012/017	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-012/017	[NT]	39	96	93	3	[NT]	[NT]

Client Reference: E32889B, Sutherland

QUALITY CONTROL: Organophosphorus Pesticides in Soil				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-13	235189-7
Date extracted	-			29/01/2020	1	29/01/2020	29/01/2020		29/01/2020	29/01/2020
Date analysed	-			30/01/2020	1	30/01/2020	30/01/2020		30/01/2020	30/01/2020
Dichlorvos	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	116	124
Dimethoate	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	110	102
Fenitrothion	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	98	111
Malathion	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	131	125
Chlorpyriphos	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	112	106
Parathion	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	124	104
Bromophos-ethyl	mg/kg	0.1	AT-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	112	104
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-012/017	105	1	97	93	4	96	92

QUALITY CONTROL: Organophosphorus Pesticides in Soil				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	39	29/01/2020	29/01/2020		[NT]	[NT]
Date analysed	-			[NT]	39	30/01/2020	30/01/2020		[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-012/017	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Dimethoate	mg/kg	0.1	Org-012/017	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-012/017	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-012/017	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-012/017	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Fenitrothion	mg/kg	0.1	Org-012/017	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Malathion	mg/kg	0.1	Org-012/017	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos	mg/kg	0.1	Org-012/017	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Parathion	mg/kg	0.1	Org-012/017	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	AT-008	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-012/017	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-012/017	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-012/017	[NT]	39	96	93	3	[NT]	[NT]

Client Reference: E32889B, Sutherland

QUALITY CONTROL: PCBs in Soil				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-13	235189-7
Date extracted	-			29/01/2020	1	29/01/2020	29/01/2020		29/01/2020	29/01/2020
Date analysed	-			30/01/2020	1	30/01/2020	30/01/2020		30/01/2020	30/01/2020
Aroclor 1016	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	100	95
Aroclor 1260	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-006	105	1	97	93	4	96	92

QUALITY CONTROL: PCBs in Soil				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	39	29/01/2020	29/01/2020		[NT]	[NT]
Date analysed	-			[NT]	39	30/01/2020	30/01/2020		[NT]	[NT]
Aroclor 1016	mg/kg	0.1	Org-006	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-006	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-006	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-006	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-006	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-006	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1260	mg/kg	0.1	Org-006	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-006	[NT]	39	96	93	3	[NT]	[NT]

Client Reference: E32889B, Sutherland

QUALITY CONTROL: Acid Extractable metals in soil				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-13	235189-7
Date prepared	-			29/01/2020	1	29/01/2020	29/01/2020		29/01/2020	29/01/2020
Date analysed	-			29/01/2020	1	29/01/2020	29/01/2020		29/01/2020	29/01/2020
Arsenic	mg/kg	4	Metals-020	<4	1	6	8	29	101	89
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	<0.4	<0.4	0	93	81
Chromium	mg/kg	1	Metals-020	<1	1	16	21	27	103	81
Copper	mg/kg	1	Metals-020	<1	1	20	24	18	104	91
Lead	mg/kg	1	Metals-020	<1	1	58	79	31	105	84
Mercury	mg/kg	0.1	Metals-021	<0.1	1	<0.1	0.1	0	90	98
Nickel	mg/kg	1	Metals-020	<1	1	11	12	9	96	82
Zinc	mg/kg	1	Metals-020	<1	1	92	100	8	101	69

QUALITY CONTROL: Acid Extractable metals in soil				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	39	29/01/2020	29/01/2020		[NT]	[NT]
Date analysed	-			[NT]	39	29/01/2020	29/01/2020		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	39	5	4	22	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	39	<0.4	<0.4	0	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	39	7	7	0	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	39	22	26	17	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	39	20	20	0	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	39	3	4	29	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	39	78	100	25	[NT]	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.
<p>Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.</p>	

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

Acid Extractable Metals in Soil - Spike recovery for Zn in sample #7 at 69% which is outside lab acceptance criteria (70-130%), however, the LCS recovery is acceptable at 101%. Sample heterogeneity suspected.

Asbestos: A portion of the supplied sample was sub-sampled for asbestos analysis according to Envirolab procedures. We cannot guarantee that this sub-sample is indicative of the entire sample. Envirolab recommends supplying 40-50g of sample in its own container.

Note: Samples 235189-35, 37 were sub-sampled from jars provided by the client.

Asbestos: Excessive sample volume was provided for asbestos analysis. A portion of the supplied sample was sub-sampled according to Envirolab procedures. We cannot guarantee that this sub-sample is indicative of the entire sample. Envirolab recommends supplying 40-50g (50mL) of sample in its own container as per AS4964-2004.

Note: Samples 235189-1, 2, 7, 13, 14, 17, 21, 24, 28, 32, 36 were sub-sampled from bags provided by the client.



Envirolab Services Pty Ltd

ABN 37 112 535 645

12 Ashley St Chatswood NSW 2067

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SAMPLE RECEIPT ADVICE

Client Details

Client	Environmental Investigation Services
Attention	Vittal Boggaram

Sample Login Details

Your reference	E32889B, Sutherland
Envirolab Reference	235189
Date Sample Received	24/01/2020
Date Instructions Received	24/01/2020
Date Results Expected to be Reported	03/02/2020

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	43 Soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	2.0
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie

Phone: 02 9910 6200

Fax: 02 9910 6201

Email: ahie@envirolab.com.au

Jacinta Hurst

Phone: 02 9910 6200

Fax: 02 9910 6201

Email: jhurst@envirolab.com.au

Analysis Underway, details on the following page:



Sample ID	VTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides in Soil	PCBs in Soil	Acid Extractable metals in soil	Asbestos ID - soils	On Hold
BH1-0.14-0.3	✓	✓	✓	✓	✓	✓	✓	✓	
BH1-0.7-0.8	✓	✓	✓				✓	✓	
BH1-1.0-1.2									✓
BH1-1.3-1.4									✓
BH1-1.7-1.9									✓
BH1-2.6-2.8									✓
BH2-0.0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	
BH2-0.7-0.95									✓
BH2-1.0-1.2									✓
BH2-1.6-1.8									✓
BH2-2.1-2.3									✓
BH2-2.7-2.8									✓
BH3-0.2-0.3	✓	✓	✓	✓	✓	✓	✓	✓	
BH3-0.4-0.6	✓	✓	✓				✓	✓	
BH3-0.85-0.95									✓
BH3-1.7-1.8									✓
BH4-0.0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	
BH4-0.3-0.4									✓
BH4-0.8-0.95									✓
BH4-1.3-1.5									✓
BH4-1.7-1.9	✓	✓	✓				✓	✓	
BH4-2.1-2.3									✓
BH4-2.8-2.9									✓
BH5-0.0-0.2	✓	✓	✓	✓	✓	✓	✓	✓	
BH5-0.3-0.5									✓
BH5-1.3-1.5									✓
BH5-1.8-2.0									✓
BH6-0.14-0.3	✓	✓	✓	✓	✓	✓	✓	✓	
BH6-0.4-0.5									✓
BH6-0.9-1.0									✓
BH6-1.1-1.3									✓
BH7-0.0-0.2	✓	✓	✓	✓	✓	✓	✓	✓	



Sample ID	VTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides in Soil	PCBs in Soil	Acid Extractable metals in soil	Asbestos ID - soils	On Hold
BH7-0.5-0.7									✓
BH7-1.3-1.5									✓
BH8-0.0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	
BH8-0.1-0.2	✓	✓	✓				✓	✓	
SDUP1	✓	✓	✓	✓	✓	✓	✓		
SDUP2									✓
SDUP3	✓	✓	✓	✓	✓	✓	✓		
SDUP4									✓
TS-S1	✓								
TB-S1	✓								
BH5-0.5-0.7									✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.

Requests for longer term sample storage must be received in writing.

Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.

TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

SAMPLE AND CHAIN OF CUSTODY FORM

TO: ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen	EIS Job E32889B Number: Date Results STANDARD Required: Page: 1 of 2	FROM: JK Environments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: VITTAL vboggaram@jkenvironments.com.au
---	---	---

Location: Sutherland	Sample Preserved in Esky on Ice
Sampler: MMP	Tests Required

Date Sampled	Lab Ref.	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Tests Required												
							Combo 2	Combo 3a	Combo 6	Combo 6a	8 Metals	PAHs	TRH/BTEX	BTEX	Asbestos				
22.1.20	1	BH1	0.14-0.3	G, A	0.3	F: Silty clayey sand						X							
22.1.20	2	BH1	0.7-0.8	G, A	0	F: Silty sandy clay		X											
22.1.20	3	BH1	1.0-1.2	G, A	0	F: Silty clay													
22.1.20	4	BH1	1.3-1.4	G	0	Silty clay													
22.1.20	5	BH1	1.7-1.9	G	0	Weathered siltstone													
22.1.20	6	BH1	2.6-2.8	G	0	Weathered siltstone													
22.1.20	7	BH2	0-0.1	G, A	0	F: Silty sand						X							
22.1.20	8	BH2	0.7-0.95	G, A	0.1	F: Sandy clay													
22.1.20	9	BH2	1-1.2	G, A	0.9	F: Silty clay													
22.1.20	10	BH2	1.6-1.8	G, A	0	F: Silty clay													
22.1.20	11	BH2	2.1-2.3	G	0	Silty clay													
22.1.20	12	BH2	2.7-2.8	G	0	Silty clay													
22.1.20	13	BH3	0.2-0.3	G, A	2.5	F: Silty sand						X							
22.1.20	14	BH3	0.4-0.6	G, A	1.3	F: Silty clay		X											
22.1.20	15	BH3	0.85-0.95	G	0	Silty clay													
22.1.20	16	BH3	1.7-1.8	G	0	Extremely weathered siltstone													
22.1.20	17	BH4	0-0.1	G, A	0	F: Clayey sand						X							
22.1.20	18	BH4	0.3-0.4	G, A	0	F: Sandy clay													
22.1.20	19	BH4	0.8-0.95	G, A	0	F: Sandy clay													
22.1.20	20	BH4	1.3-1.5	G, A	0	F: Sandy clay													
22.1.20	21	BH4	1.7-1.9	G, A	0	F: Silty sandy clay		X											
22.1.20	22	BH4	2.1-2.3	G	0	Silty clay													
22.1.20	23	BH4	2.8-2.9	G	0	Extremely weathered siltstone													
22.1.20	24	BH5	0-0.2	G, A	0	F: Silty sand						X							
22.1.20	25	BH5	0.3-0.5	G, A	0	F: Silty clay													

Remarks (comments/detection limits required):	Sample Containers: G - 250mg Glass Jar A - Ziplock Asbestos Bag P - Plastic Bag
--	--

Relinquished By: Vittal B-S	Date: 23/01/2020	Time:	Received By:	Date:
---------------------------------------	----------------------------	--------------	---------------------	--------------

Envirolab Services
 12 Ashley St
 Chatswood NSW 2067
 Ph: (02) 9910 6200
Job No: 235189
Date Received: 24/1/20
Time Received: 1130
Received by: DAN WP
Temp: C/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

SAMPLE AND CHAIN OF CUSTODY FORM

TO: ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen	EIS Job Number: E32889B Date Results Required: STANDARD Page: 2 of 2	FROM: JK Environments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: vboggaram@jkenvironments.com.au
---	--	--

Location:	Sutherland	Sample Preserved in Esky on Ice
Sampler:	MIMP	Tests Required

Date Sampled	Lab Ref.	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 3	Combo 3a	Combo 6	Combo 6a	8 Metals	PAHs	TRH/BTEX	BTEX	Asbestos
22.1.20	26	BH5	1.3-1.5	G	0	Silty clay									
22.1.20	27	BH5	1.8-2	G	0	Extremely weathered siltstone									
22.1.20	28	BH6	0.14-0.3	G, A	0	F: Clayey sand				X					
22.1.20	29	BH6	0.4-0.5	G, A	0	F: Sand									
22.1.20	30	BH6	0.9-1.0	G, A	0	F: Sand									
22.1.20	31	BH6	1.1-1.3	G	0	Silty clay									
22.1.20	32	BH7	0-0.2	G, A	0	F: Silty clayey sand				X					
22.1.20	33	BH7	0.5-0.7	G	0	Silty clay									
22.1.20	34	BH7	1.3-1.5	G	0	Extremely weathered siltstone									
22.1.20	35	BH8	0-0.1	G, A	0	F: Silty sand				X					
22.1.20	36	BH8	0.1-0.2	G, A	0	F: Sandy clay		X							
22.1.20	37	SDUP1	-	G	-	Soil		X	X						
22.1.20	38	SDUP2	-	G	-	Soil									
22.1.20	39	SDUP3	-	G	-	Soil			X						
22.1.20	40	SDUP4	-	G	-	Soil									
22.1.20	-	SDUP5	-	G	-	Soil	X								
22.1.20	41	TS-S1	-	V	-	Soil								X	
22.1.20	42	TB-S1	-	G	-	Soil								X	
	43	BH5	0.5-0.7												

Remarks (comments/detection limits required):		Sample Containers: G - 250mg Glass Jar A - Ziplock Asbestos Bag P - Plastic Bag			
Relinquished By:	Date:	Time:	Received By:	Date:	



Envirolab Services Pty Ltd

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CERTIFICATE OF ANALYSIS 235189-A

Client Details

Client	Environmental Investigation Services
Attention	Harley Wang
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	<u>E32889B, Sutherland</u>
Number of Samples	43 Soil
Date samples received	24/01/2020
Date completed instructions received	10/02/2020

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date results requested by 13/02/2020

Date of Issue 13/02/2020

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Results Approved By

Jaimie Loa-Kum-Cheung, Metals Supervisor

Priya Samarawickrama, Senior Chemist

Authorised By

Nancy Zhang, Laboratory Manager

CEC			
Our Reference		235189-A-13	235189-A-35
Your Reference	UNITS	BH3	BH8
Depth		0.2-0.3	0.0-0.1
Date Sampled		22/01/2020	22/01/2020
Type of sample		Soil	Soil
Date prepared	-	13/02/2020	13/02/2020
Date analysed	-	13/02/2020	13/02/2020
Exchangeable Ca	meq/100g	45	3.4
Exchangeable K	meq/100g	0.5	<0.1
Exchangeable Mg	meq/100g	0.34	0.52
Exchangeable Na	meq/100g	0.15	<0.1
Cation Exchange Capacity	meq/100g	46	4.0

Misc Inorg - Soil			
Our Reference		235189-A-13	235189-A-35
Your Reference	UNITS	BH3	BH8
Depth		0.2-0.3	0.0-0.1
Date Sampled		22/01/2020	22/01/2020
Type of sample		Soil	Soil
Date prepared	-	12/02/2020	12/02/2020
Date analysed	-	12/02/2020	12/02/2020
pH 1:5 soil:water	pH Units	10.1	6.8

Client Reference: E32889B, Sutherland

Method ID	Methodology Summary
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Metals-009	Determination of exchangeable cations and cation exchange capacity in soils using 1M Ammonium Chloride exchange and ICP-AES analytical finish.

Client Reference: E32889B, Sutherland

QUALITY CONTROL: CEC				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			13/02/2020	[NT]	[NT]	[NT]	[NT]	13/02/2020	[NT]
Date analysed	-			13/02/2020	[NT]	[NT]	[NT]	[NT]	13/02/2020	[NT]
Exchangeable Ca	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	[NT]	[NT]	104	[NT]
Exchangeable K	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	[NT]	[NT]	105	[NT]
Exchangeable Mg	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	[NT]	[NT]	109	[NT]
Exchangeable Na	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	[NT]	[NT]	111	[NT]

Client Reference: E32889B, Sutherland

QUALITY CONTROL: Misc Inorg - Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			12/02/2020	35	12/02/2020	12/02/2020		12/02/2020	[NT]
Date analysed	-			12/02/2020	35	12/02/2020	12/02/2020		12/02/2020	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	35	6.8	6.6	3	101	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.
Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.	
The recommended maximums for analytes in urine are taken from "2018 TLVs and BEIs", as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.	
Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2	

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

SAMPLE RECEIPT ADVICE

Client Details

Client	Environmental Investigation Services
Attention	Harley Wang

Sample Login Details

Your reference	E32889B, Sutherland
Envirolab Reference	235189-A
Date Sample Received	24/01/2020
Date Instructions Received	10/02/2020
Date Results Expected to be Reported	13/02/2020

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	43 Soil
Turnaround Time Requested	3 days
Temperature on Receipt (°C)	2.0
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie

Phone: 02 9910 6200
Fax: 02 9910 6201
Email: ahie@envirolab.com.au

Jacinta Hurst

Phone: 02 9910 6200
Fax: 02 9910 6201
Email: jhurst@envirolab.com.au

Analysis Underway, details on the following page:



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ABN 37 112 535 645

12 Ashley St Chatswood NSW 2067

ph 02 9910 6200 fax 02 9910 6201

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Sample ID	CEC	Misc Inorg - Soil	On Hold
BH1-0.14-0.3			✓
BH1-0.7-0.8			✓
BH1-1.0-1.2			✓
BH1-1.3-1.4			✓
BH1-1.7-1.9			✓
BH1-2.6-2.8			✓
BH2-0.0-0.1			✓
BH2-0.7-0.95			✓
BH2-1.0-1.2			✓
BH2-1.6-1.8			✓
BH2-2.1-2.3			✓
BH2-2.7-2.8			✓
BH3-0.2-0.3	✓	✓	
BH3-0.4-0.6			✓
BH3-0.85-0.95			✓
BH3-1.7-1.8			✓
BH4-0.0-0.1			✓
BH4-0.3-0.4			✓
BH4-0.8-0.95			✓
BH4-1.3-1.5			✓
BH4-1.7-1.9			✓
BH4-2.1-2.3			✓
BH4-2.8-2.9			✓
BH5-0.0-0.2			✓
BH5-0.3-0.5			✓
BH5-1.3-1.5			✓
BH5-1.8-2.0			✓
BH6-0.14-0.3			✓
BH6-0.4-0.5			✓
BH6-0.9-1.0			✓
BH6-1.1-1.3			✓
BH7-0.0-0.2			✓



Sample ID	CEC	Misc Inorg - Soil	On Hold
BH7-0.5-0.7			✓
BH7-1.3-1.5			✓
BH8-0.0-0.1	✓	✓	
BH8-0.1-0.2			✓
SDUP1			✓
SDUP2			✓
SDUP3			✓
SDUP4			✓
TS-S1			✓
TB-S1			✓
BH5-0.5-0.7			✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.

Requests for longer term sample storage must be received in writing.

Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.

TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

Aileen Hie

From: Harley Wang <HWang@jkenvironments.com.au>
Sent: Monday, 10 February 2020 1:55 PM
To: Aileen Hie
Cc: Nancy Zhang; Ken Nguyen; Vittal Boggaram
Subject: Results for Registration 235189 E32889B

Ref: 235189-A
TAT: 3 days
Due: 13/2/20
[Signature]

Hi Aileen,

Can I get additional testing for this job as follows:

Borehole	Depth	Sample No.	Additional Test/s Required
BH3	0.2-0.3	235189-13	CEC and pH
BH8	0-0.1	235189-35	CEC and pH

Please undertake the additional analysis for the above samples on a **3-day TAT**.

Any issues please contact me.

Regards
Harley Wang
Environmental Scientist

South East Queensland Announcement

The JK Group are excited to announce that from 4 November 2019 we will have a full time presence in South East Queensland, based in Maroochydore and supported by our head office in Sydney. For all enquiries regarding our South East Queensland office, please contact Paul Roberts (proberts@jkgeotechnics.com.au).

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JKEnvironments

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CERTIFICATE OF ANALYSIS 235447

Client Details

Client	Environmental Investigation Services
Attention	Vittal Boggaram
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	<u>E32889B, Sutherland</u>
Number of Samples	6 Water
Date samples received	28/01/2020
Date completed instructions received	28/01/2020

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	04/02/2020
Date of Issue	04/02/2020

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Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Results Approved By

Jaimie Loa-Kum-Cheung, Metals Supervisor
Josh Williams, Senior Chemist
Nick Sarlamis, Inorganics Supervisor

Authorised By

Nancy Zhang, Laboratory Manager

VOCs in water					
Our Reference		235447-1	235447-2	235447-3	235447-4
Your Reference	UNITS	MW1	MW3	MW5	GWDUP1
Date Sampled		28/01/2020	28/01/2020	28/01/2020	28/01/2020
Type of sample		Water	Water	Water	Water
Date extracted	-	29/01/2020	29/01/2020	29/01/2020	29/01/2020
Date analysed	-	30/01/2020	30/01/2020	30/01/2020	30/01/2020
Dichlorodifluoromethane	µg/L	<10	<10	<10	<10
Chloromethane	µg/L	<10	<10	<10	<10
Vinyl Chloride	µg/L	<10	<10	<10	<10
Bromomethane	µg/L	<10	<10	<10	<10
Chloroethane	µg/L	<10	<10	<10	<10
Trichlorofluoromethane	µg/L	<10	<10	<10	<10
1,1-Dichloroethene	µg/L	<1	<1	<1	<1
Trans-1,2-dichloroethene	µg/L	<1	<1	<1	<1
1,1-dichloroethane	µg/L	<1	<1	<1	<1
Cis-1,2-dichloroethene	µg/L	<1	<1	<1	<1
Bromochloromethane	µg/L	<1	<1	<1	<1
Chloroform	µg/L	<1	<1	<1	<1
2,2-dichloropropane	µg/L	<1	<1	<1	<1
1,2-dichloroethane	µg/L	<1	<1	<1	<1
1,1,1-trichloroethane	µg/L	<1	<1	<1	<1
1,1-dichloropropene	µg/L	<1	<1	<1	<1
Cyclohexane	µg/L	<1	<1	<1	<1
Carbon tetrachloride	µg/L	<1	<1	<1	<1
Benzene	µg/L	<1	<1	<1	<1
Dibromomethane	µg/L	<1	<1	<1	<1
1,2-dichloropropane	µg/L	<1	<1	<1	<1
Trichloroethene	µg/L	<1	<1	<1	<1
Bromodichloromethane	µg/L	<1	<1	<1	<1
trans-1,3-dichloropropene	µg/L	<1	<1	<1	<1
cis-1,3-dichloropropene	µg/L	<1	<1	<1	<1
1,1,2-trichloroethane	µg/L	<1	<1	<1	<1
Toluene	µg/L	<1	<1	<1	<1
1,3-dichloropropane	µg/L	<1	<1	<1	<1
Dibromochloromethane	µg/L	<1	<1	<1	<1
1,2-dibromoethane	µg/L	<1	<1	<1	<1
Tetrachloroethene	µg/L	<1	<1	<1	<1
1,1,1,2-tetrachloroethane	µg/L	<1	<1	<1	<1
Chlorobenzene	µg/L	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1

VOCs in water					
Our Reference		235447-1	235447-2	235447-3	235447-4
Your Reference	UNITS	MW1	MW3	MW5	GWDUP1
Date Sampled		28/01/2020	28/01/2020	28/01/2020	28/01/2020
Type of sample		Water	Water	Water	Water
Bromoform	µg/L	<1	<1	<1	<1
m+p-xylene	µg/L	<2	<2	<2	<2
Styrene	µg/L	<1	<1	<1	<1
1,1,2,2-tetrachloroethane	µg/L	<1	<1	<1	<1
o-xylene	µg/L	<1	<1	<1	<1
1,2,3-trichloropropane	µg/L	<1	<1	<1	<1
Isopropylbenzene	µg/L	<1	<1	<1	<1
Bromobenzene	µg/L	<1	<1	<1	<1
n-propyl benzene	µg/L	<1	<1	<1	<1
2-chlorotoluene	µg/L	<1	<1	<1	<1
4-chlorotoluene	µg/L	<1	<1	<1	<1
1,3,5-trimethyl benzene	µg/L	<1	<1	<1	<1
Tert-butyl benzene	µg/L	<1	<1	<1	<1
1,2,4-trimethyl benzene	µg/L	<1	<1	<1	<1
1,3-dichlorobenzene	µg/L	<1	<1	<1	<1
Sec-butyl benzene	µg/L	<1	<1	<1	<1
1,4-dichlorobenzene	µg/L	<1	<1	<1	<1
4-isopropyl toluene	µg/L	<1	<1	<1	<1
1,2-dichlorobenzene	µg/L	<1	<1	<1	<1
n-butyl benzene	µg/L	<1	<1	<1	<1
1,2-dibromo-3-chloropropane	µg/L	<1	<1	<1	<1
1,2,4-trichlorobenzene	µg/L	<1	<1	<1	<1
Hexachlorobutadiene	µg/L	<1	<1	<1	<1
1,2,3-trichlorobenzene	µg/L	<1	<1	<1	<1
Surrogate Dibromofluoromethane	%	108	106	106	107
Surrogate toluene-d8	%	102	100	100	102
Surrogate 4-BFB	%	116	105	115	115

vTRH(C6-C10)/BTEXN in Water						
Our Reference		235447-1	235447-2	235447-3	235447-4	235447-5
Your Reference	UNITS	MW1	MW3	MW5	GWDUP1	TB-W1
Date Sampled		28/01/2020	28/01/2020	28/01/2020	28/01/2020	28/01/2020
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	29/01/2020	29/01/2020	29/01/2020	29/01/2020	29/01/2020
Date analysed	-	30/01/2020	30/01/2020	30/01/2020	30/01/2020	30/01/2020
TRH C ₆ - C ₉	µg/L	<10	<10	<10	<10	[NA]
TRH C ₆ - C ₁₀	µg/L	<10	<10	<10	<10	[NA]
TRH C ₆ - C ₁₀ less BTEX (F1)	µg/L	<10	<10	<10	<10	[NA]
Benzene	µg/L	<1	<1	<1	<1	<1
Toluene	µg/L	<1	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1	<1
m+p-xylene	µg/L	<2	<2	<2	<2	<2
o-xylene	µg/L	<1	<1	<1	<1	<1
Naphthalene	µg/L	<1	<1	<1	<1	[NA]
Surrogate Dibromofluoromethane	%	108	106	106	107	105
Surrogate toluene-d8	%	102	100	100	102	103
Surrogate 4-BFB	%	116	105	115	115	115

vTRH(C6-C10)/BTEXN in Water		
Our Reference		235447-6
Your Reference	UNITS	TS-W1
Date Sampled		28/01/2020
Type of sample		Water
Date extracted	-	29/01/2020
Date analysed	-	30/01/2020
Benzene	µg/L	120%
Toluene	µg/L	122%
Ethylbenzene	µg/L	109%
m+p-xylene	µg/L	105%
o-xylene	µg/L	111%
Surrogate Dibromofluoromethane	%	107
Surrogate toluene-d8	%	106
Surrogate 4-BFB	%	112

svTRH (C10-C40) in Water					
Our Reference		235447-1	235447-2	235447-3	235447-4
Your Reference	UNITS	MW1	MW3	MW5	GWDUP1
Date Sampled		28/01/2020	28/01/2020	28/01/2020	28/01/2020
Type of sample		Water	Water	Water	Water
Date extracted	-	30/01/2020	30/01/2020	30/01/2020	30/01/2020
Date analysed	-	31/01/2020	31/01/2020	31/01/2020	31/01/2020
TRH C ₁₀ - C ₁₄	µg/L	<50	79	58	<50
TRH C ₁₅ - C ₂₈	µg/L	<100	<100	<100	<100
TRH C ₂₉ - C ₃₆	µg/L	<100	<100	<100	<100
TRH >C ₁₀ - C ₁₆	µg/L	54	81	60	<50
TRH >C ₁₀ - C ₁₆ less Naphthalene (F2)	µg/L	54	81	60	<50
TRH >C ₁₆ - C ₃₄	µg/L	<100	<100	<100	<100
TRH >C ₃₄ - C ₄₀	µg/L	<100	<100	<100	<100
Surrogate o-Terphenyl	%	67	71	77	65

PAHs in Water - Low Level					
Our Reference		235447-1	235447-2	235447-3	235447-4
Your Reference	UNITS	MW1	MW3	MW5	GWDUP1
Date Sampled		28/01/2020	28/01/2020	28/01/2020	28/01/2020
Type of sample		Water	Water	Water	Water
Date extracted	-	30/01/2020	30/01/2020	30/01/2020	30/01/2020
Date analysed	-	30/01/2020	30/01/2020	30/01/2020	30/01/2020
Naphthalene	µg/L	<0.2	<0.2	<0.2	<0.2
Acenaphthylene	µg/L	<0.1	<0.1	<0.1	<0.1
Acenaphthene	µg/L	<0.1	<0.1	<0.1	<0.1
Fluorene	µg/L	<0.1	<0.1	<0.1	<0.1
Phenanthrene	µg/L	<0.1	<0.1	<0.1	<0.1
Anthracene	µg/L	<0.1	<0.1	<0.1	<0.1
Fluoranthene	µg/L	<0.1	<0.1	<0.1	<0.1
Pyrene	µg/L	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1
Chrysene	µg/L	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	µg/L	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	µg/L	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	µg/L	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	µg/L	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ	µg/L	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	µg/L	<0.1	<0.1	<0.1	<0.1
Surrogate p-Terphenyl-d14	%	77	66	71	68

HM in water - dissolved					
Our Reference		235447-1	235447-2	235447-3	235447-4
Your Reference	UNITS	MW1	MW3	MW5	GWDUP1
Date Sampled		28/01/2020	28/01/2020	28/01/2020	28/01/2020
Type of sample		Water	Water	Water	Water
Date prepared	-	29/01/2020	29/01/2020	29/01/2020	29/01/2020
Date analysed	-	29/01/2020	29/01/2020	29/01/2020	29/01/2020
Arsenic-Dissolved	µg/L	<1	<1	<1	<1
Cadmium-Dissolved	µg/L	<0.1	0.3	<0.1	<0.1
Chromium-Dissolved	µg/L	<1	<1	<1	<1
Copper-Dissolved	µg/L	3	2	<1	<1
Lead-Dissolved	µg/L	<1	<1	<1	<1
Mercury-Dissolved	µg/L	<0.05	<0.05	<0.05	<0.05
Nickel-Dissolved	µg/L	3	27	6	6
Zinc-Dissolved	µg/L	23	160	36	35

Miscellaneous Inorganics				
Our Reference		235447-1	235447-2	235447-3
Your Reference	UNITS	MW1	MW3	MW5
Date Sampled		28/01/2020	28/01/2020	28/01/2020
Type of sample		Water	Water	Water
Date prepared	-	28/01/2020	28/01/2020	28/01/2020
Date analysed	-	28/01/2020	28/01/2020	28/01/2020
pH	pH Units	7.0	6.4	5.0
Electrical Conductivity	µS/cm	1,200	3,500	1,600

Method ID	Methodology Summary
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-002	Conductivity and Salinity - measured using a conductivity cell at 25°C in accordance with APHA latest edition 2510 and Rayment & Lyons.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Metals-022	Determination of various metals by ICP-MS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-012/017	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-013	Water samples are analysed directly by purge and trap GC-MS.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.

Client Reference: E32889B, Sutherland

QUALITY CONTROL: VOCs in water				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			29/01/2020	[NT]	[NT]	[NT]	[NT]	29/01/2020	[NT]
Date analysed	-			30/01/2020	[NT]	[NT]	[NT]	[NT]	30/01/2020	[NT]
Dichlorodifluoromethane	µg/L	10	Org-013	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chloromethane	µg/L	10	Org-013	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Vinyl Chloride	µg/L	10	Org-013	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromomethane	µg/L	10	Org-013	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chloroethane	µg/L	10	Org-013	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Trichlorofluoromethane	µg/L	10	Org-013	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1-Dichloroethene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Trans-1,2-dichloroethene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1-dichloroethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	121	[NT]
Cis-1,2-dichloroethene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromochloromethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chloroform	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	122	[NT]
2,2-dichloropropane	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dichloroethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	120	[NT]
1,1,1-trichloroethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	120	[NT]
1,1-dichloropropene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Cyclohexane	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Carbon tetrachloride	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibromomethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dichloropropane	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Trichloroethene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromodichloromethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	111	[NT]
trans-1,3-dichloropropene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
cis-1,3-dichloropropene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1,2-trichloroethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Toluene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,3-dichloropropane	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibromochloromethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	100	[NT]
1,2-dibromoethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Tetrachloroethene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	116	[NT]
1,1,1,2-tetrachloroethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chlorobenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ethylbenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromoform	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
m+p-xylene	µg/L	2	Org-013	<2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Styrene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1,2,2-tetrachloroethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]

Client Reference: E32889B, Sutherland

QUALITY CONTROL: VOCs in water					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
o-xylene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,3-trichloropropane	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Isopropylbenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromobenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
n-propyl benzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
2-chlorotoluene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
4-chlorotoluene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,3,5-trimethyl benzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Tert-butyl benzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,4-trimethyl benzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,3-dichlorobenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Sec-butyl benzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,4-dichlorobenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
4-isopropyl toluene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dichlorobenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
n-butyl benzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dibromo-3-chloropropane	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,4-trichlorobenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Hexachlorobutadiene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,3-trichlorobenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-013	111	[NT]	[NT]	[NT]	[NT]	102	[NT]
Surrogate toluene-d8	%		Org-013	98	[NT]	[NT]	[NT]	[NT]	101	[NT]
Surrogate 4-BFB	%		Org-013	113	[NT]	[NT]	[NT]	[NT]	104	[NT]

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			29/01/2020	[NT]	[NT]	[NT]	[NT]	29/01/2020	[NT]
Date analysed	-			30/01/2020	[NT]	[NT]	[NT]	[NT]	30/01/2020	[NT]
TRH C ₆ - C ₉	µg/L	10	Org-016	<10	[NT]	[NT]	[NT]	[NT]	121	[NT]
TRH C ₆ - C ₁₀	µg/L	10	Org-016	<10	[NT]	[NT]	[NT]	[NT]	121	[NT]
Benzene	µg/L	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	121	[NT]
Toluene	µg/L	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	128	[NT]
Ethylbenzene	µg/L	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	118	[NT]
m+p-xylene	µg/L	2	Org-016	<2	[NT]	[NT]	[NT]	[NT]	120	[NT]
o-xylene	µg/L	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	117	[NT]
Naphthalene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-016	111	[NT]	[NT]	[NT]	[NT]	102	[NT]
Surrogate toluene-d8	%		Org-016	98	[NT]	[NT]	[NT]	[NT]	101	[NT]
Surrogate 4-BFB	%		Org-016	113	[NT]	[NT]	[NT]	[NT]	104	[NT]

Client Reference: E32889B, Sutherland

QUALITY CONTROL: svTRH (C10-C40) in Water					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W5	235447-2
Date extracted	-			30/01/2020	1	30/01/2020	30/01/2020		30/01/2020	30/01/2020
Date analysed	-			31/01/2020	1	31/01/2020	31/01/2020		31/01/2020	31/01/2020
TRH C ₁₀ - C ₁₄	µg/L	50	Org-003	<50	1	<50	80	46	81	93
TRH C ₁₅ - C ₂₈	µg/L	100	Org-003	<100	1	<100	<100	0	84	97
TRH C ₂₉ - C ₃₆	µg/L	100	Org-003	<100	1	<100	<100	0	82	125
TRH >C ₁₀ - C ₁₆	µg/L	50	Org-003	<50	1	54	90	50	81	93
TRH >C ₁₆ - C ₃₄	µg/L	100	Org-003	<100	1	<100	<100	0	84	97
TRH >C ₃₄ - C ₄₀	µg/L	100	Org-003	<100	1	<100	<100	0	82	125
Surrogate o-Terphenyl	%		Org-003	96	1	67	78	15	130	71

Client Reference: E32889B, Sutherland

QUALITY CONTROL: PAHs in Water - Low Level						Duplicate		Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	235447-2
Date extracted	-			30/01/2020	1	30/01/2020	30/01/2020		30/01/2020	30/01/2020
Date analysed	-			30/01/2020	1	30/01/2020	30/01/2020		30/01/2020	30/01/2020
Naphthalene	µg/L	0.2	Org-012/017	<0.2	1	<0.2	<0.2	0	112	110
Acenaphthylene	µg/L	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	µg/L	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluorene	µg/L	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	106	104
Phenanthrene	µg/L	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	106	116
Anthracene	µg/L	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	µg/L	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	92	88
Pyrene	µg/L	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	96	106
Benzo(a)anthracene	µg/L	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chrysene	µg/L	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	124	96
Benzo(b,j+k)fluoranthene	µg/L	0.2	Org-012/017	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	µg/L	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	84	72
Indeno(1,2,3-c,d)pyrene	µg/L	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	µg/L	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	µg/L	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012/017	72	1	77	70	10	75	68

Client Reference: E32889B, Sutherland

QUALITY CONTROL: HM in water - dissolved				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W5	235447-2
Date prepared	-			29/01/2020	1	29/01/2020	29/01/2020		29/01/2020	29/01/2020
Date analysed	-			29/01/2020	1	29/01/2020	29/01/2020		29/01/2020	29/01/2020
Arsenic-Dissolved	µg/L	1	Metals-022	<1	1	<1	<1	0	96	94
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	1	<0.1	<0.1	0	91	97
Chromium-Dissolved	µg/L	1	Metals-022	<1	1	<1	<1	0	97	88
Copper-Dissolved	µg/L	1	Metals-022	<1	1	3	3	0	101	84
Lead-Dissolved	µg/L	1	Metals-022	<1	1	<1	<1	0	103	94
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	1	<0.05	<0.05	0	105	[NT]
Nickel-Dissolved	µg/L	1	Metals-022	<1	1	3	3	0	96	80
Zinc-Dissolved	µg/L	1	Metals-022	<1	1	23	24	4	96	#

Client Reference: E32889B, Sutherland

QUALITY CONTROL: Miscellaneous Inorganics				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			28/01/2020	[NT]	[NT]	[NT]	[NT]	28/01/2020	[NT]
Date analysed	-			28/01/2020	[NT]	[NT]	[NT]	[NT]	28/01/2020	[NT]
pH	pH Units		Inorg-001	[NT]	[NT]	[NT]	[NT]	[NT]	102	[NT]
Electrical Conductivity	µS/cm	1	Inorg-002	<1	[NT]	[NT]	[NT]	[NT]	105	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.
<p>Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.</p>	

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

8 HM in water - dissolved - # Percent recovery is not possible to report due to the high concentration of the element/s in the sample/s. However an acceptable recovery was obtained for the LCS.

SAMPLE RECEIPT ADVICE

Client Details

Client	Environmental Investigation Services
Attention	Vittal Boggaram

Sample Login Details

Your reference	E32889B, Sutherland
Envirolab Reference	235447
Date Sample Received	28/01/2020
Date Instructions Received	28/01/2020
Date Results Expected to be Reported	04/02/2020

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	6 Water
Turnaround Time Requested	2 days
Temperature on Receipt (°C)	13.8
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie

Phone: 02 9910 6200
Fax: 02 9910 6201
Email: ahie@envirolab.com.au

Jacinta Hurst

Phone: 02 9910 6200
Fax: 02 9910 6201
Email: jhurst@envirolab.com.au

Analysis Underway, details on the following page:



Sample ID	VOCs in water	VTRH(C6-C10)/BTEXN in Water	svTRH (C10-C40) in Water	PAHs in Water - Low Level	HM in water - dissolved	pH	Electrical Conductivity
MW1	✓	✓	✓	✓	✓	✓	✓
MW3	✓	✓	✓	✓	✓	✓	✓
MW5	✓	✓	✓	✓	✓	✓	✓
GWDUP1	✓	✓	✓	✓	✓		
TB-W1		✓					
TS-W1		✓					

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.

Requests for longer term sample storage must be received in writing.

Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.

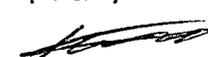
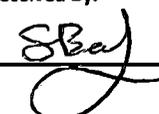
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

SAMPLE AND CHAIN OF CUSTODY FORM

TO: ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen	EIS Job Number: E32889B Date Results Required: STANDARD Page: 1 of 1	FROM:  JK Environments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Vittal Boggaram vboggaram@jkenvironments.com.au
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Location: Sutherland						Sample Preserved in Esky on Ice														
Sampler: HW						Tests Required														
Date Sampled	Lab Ref:	Sample Number	Sample Containers	PID	Sample Description	Combo 2	Combo 3L	VOCs	pH / EC	8 Metals	PAHs	TRH/BTEX	BTEX	Hardness						
28.1.20	1	MW1	2xG1, 6xV, H, PVC	0.5	Water		X	X	X											
28.1.20	2	MW3	2xG1, 6xV, H, PVC	5.7	Water		X	X	X											
28.1.20	3	MW5	2xG1, 6xV, H	1.1	Water		X	X	X											
28.1.20	4	GWDUP1	2xG1, 6xV, H	NA	Water		X	X												
28.1.20	—	GWDUP2	2xG1, 6xV, H	NA	Water		X	X												
28.1.20	5	TB-W1	V	NA	Water									X						
28.1.20	6	TS-W1	V	NA	Water									X						


Envirolab Services
 12 Ashley St
 Chatswood NSW 2067
 Ph: (02) 9910 6200
 Job No: 235447
 Date Received: 28/01/20
 Time Received: 1528
 Received by: SB
 Temp: Cool/Ambient
 Cooling: Ice/Repack
 Security: Intact/Broken/None

Remarks (comments/detection limits required): All analysis PQLs to ANZECC (2000) Detection Limits Please		Sample Containers: G1 - 500mL Amber Glass Bottle V - BTEX Vial H - HNO3 Wash PVC PVC - HDPE Plastic Bottles	
Relinquished By: 	Date: 28/1/2020	Time: 1528	Received By: 
		Date: 28/01/20	



CERTIFICATE OF ANALYSIS 19779

Client Details

Client	JK Environments
Attention	Vittal Boggaram
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	<u>E32889B</u>
Number of Samples	1 Soil
Date samples received	29/01/2020
Date completed instructions received	29/01/2020

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date results requested by	04/02/2020
Date of Issue	04/02/2020
NATA Accreditation Number 2901. This document shall not be reproduced except in full.	
Accredited for compliance with ISO/IEC 17025 - Testing. Tests not covered by NATA are denoted with *	

Results Approved By

Chris De Luca, Operations Manager

Authorised By

Pamela Adams, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil		
Our Reference		19779-1
Your Reference	UNITS	SDUP5
Date Sampled		22/01/2020
Type of sample		Soil
Date extracted	-	30/01/2020
Date analysed	-	30/01/2020
vTRH C ₆ - C ₉	mg/kg	<25
vTRH C ₆ - C ₁₀	mg/kg	<25
TRH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25
Benzene	mg/kg	<0.2
Toluene	mg/kg	<0.5
Ethylbenzene	mg/kg	<1
m+p-xylene	mg/kg	<2
o-Xylene	mg/kg	<1
Naphthalene	mg/kg	<1
Total +ve Xylenes	mg/kg	<1
Surrogate aaa-Trifluorotoluene	%	79

TRH Soil C10-C40 NEPM		
Our Reference		19779-1
Your Reference	UNITS	SDUP5
Date Sampled		22/01/2020
Type of sample		Soil
Date extracted	-	30/01/2020
Date analysed	-	31/01/2020
TRH C ₁₀ - C ₁₄	mg/kg	<50
TRH C ₁₅ - C ₂₈	mg/kg	<100
TRH C ₂₉ - C ₃₆	mg/kg	180
Total +ve TRH (C10-C36)	mg/kg	180
TRH >C ₁₀ -C ₁₆	mg/kg	<50
TRH >C ₁₀ - C ₁₆ less Naphthalene (F2)	mg/kg	<50
TRH >C ₁₆ -C ₃₄	mg/kg	180
TRH >C ₃₄ -C ₄₀	mg/kg	100
Total +ve TRH (>C10-C40)	mg/kg	280
Surrogate o-Terphenyl	%	82

PAHs in Soil		
Our Reference		19779-1
Your Reference	UNITS	SDUP5
Date Sampled		22/01/2020
Type of sample		Soil
Date extracted	-	30/01/2020
Date analysed	-	03/02/2020
Naphthalene	mg/kg	<0.1
Acenaphthylene	mg/kg	<0.1
Acenaphthene	mg/kg	<0.1
Fluorene	mg/kg	<0.1
Phenanthrene	mg/kg	<0.1
Anthracene	mg/kg	<0.1
Fluoranthene	mg/kg	<0.1
Pyrene	mg/kg	<0.1
Benzo(a)anthracene	mg/kg	<0.1
Chrysene	mg/kg	<0.1
Benzo(b,j&k)fluoranthene	mg/kg	<0.2
Benzo(a)pyrene	mg/kg	0.06
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1
Total +ve PAH's	mg/kg	0.06
Benzo(a)pyrene TEQ calc (Zero)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc (Half)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc (PQL)	mg/kg	<0.5
Surrogate <i>p</i> -Terphenyl-d ₁₄	%	106

Acid Extractable metals in soil		
Our Reference		19779-1
Your Reference	UNITS	SDUP5
Date Sampled		22/01/2020
Type of sample		Soil
Date digested	-	30/01/2020
Date analysed	-	30/01/2020
Arsenic	mg/kg	7
Cadmium	mg/kg	<0.4
Chromium	mg/kg	23
Copper	mg/kg	28
Lead	mg/kg	74
Mercury	mg/kg	<0.1
Nickel	mg/kg	14
Zinc	mg/kg	110

Moisture		
Our Reference		19779-1
Your Reference	UNITS	SDUP5
Date Sampled		22/01/2020
Type of sample		Soil
Date prepared	-	30/01/2020
Date analysed	-	31/01/2020
Moisture	%	13

Method ID	Methodology Summary
Inorg-008	Moisture content determined by heating at 105 deg C for a minimum of 12 hours.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL' values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero' values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL' values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

Client Reference: E32889B

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	19779-1
Date extracted	-			30/01/2020	[NT]	[NT]	[NT]	[NT]	30/01/2020	30/01/2020
Date analysed	-			30/01/2020	[NT]	[NT]	[NT]	[NT]	30/01/2020	30/01/2020
vTRH C ₆ - C ₉	mg/kg	25	Org-016	<25	[NT]	[NT]	[NT]	[NT]	87	79
vTRH C ₆ - C ₁₀	mg/kg	25	Org-016	<25	[NT]	[NT]	[NT]	[NT]	87	79
Benzene	mg/kg	0.2	Org-016	<0.2	[NT]	[NT]	[NT]	[NT]	86	76
Toluene	mg/kg	0.5	Org-016	<0.5	[NT]	[NT]	[NT]	[NT]	82	77
Ethylbenzene	mg/kg	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	87	78
m+p-xylene	mg/kg	2	Org-016	<2	[NT]	[NT]	[NT]	[NT]	90	81
o-Xylene	mg/kg	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	89	81
Naphthalene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	82	[NT]	[NT]	[NT]	[NT]	81	72

Client Reference: E32889B

QUALITY CONTROL: TRH Soil C10-C40 NEPM					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	19779-1
Date extracted	-			30/01/2020	[NT]	[NT]	[NT]	[NT]	30/01/2020	30/01/2020
Date analysed	-			31/01/2020	[NT]	[NT]	[NT]	[NT]	31/01/2020	31/01/2020
TRH C ₁₀ - C ₁₄	mg/kg	50	Org-003	<50	[NT]	[NT]	[NT]	[NT]	92	85
TRH C ₁₅ - C ₂₈	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	106	110
TRH C ₂₉ - C ₃₆	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	107	101
TRH >C ₁₀ -C ₁₆	mg/kg	50	Org-003	<50	[NT]	[NT]	[NT]	[NT]	92	85
TRH >C ₁₆ -C ₃₄	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	106	110
TRH >C ₃₄ -C ₄₀	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	107	101
Surrogate o-Terphenyl	%		Org-003	82	[NT]	[NT]	[NT]	[NT]	81	79

QUALITY CONTROL: PAHs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			30/01/2020	[NT]	[NT]	[NT]	[NT]	30/01/2020	[NT]
Date analysed	-			03/02/2020	[NT]	[NT]	[NT]	[NT]	03/02/2020	[NT]
Naphthalene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	116	[NT]
Acenaphthylene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	108	[NT]
Acenaphthene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	116	[NT]
Phenanthrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	122	[NT]
Anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	112	[NT]
Pyrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	116	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	118	[NT]
Benzo(b,j&k)fluoranthene	mg/kg	0.2	Org-012	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012	<0.05	[NT]	[NT]	[NT]	[NT]	88	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d ₁₄	%		Org-012	100	[NT]	[NT]	[NT]	[NT]	100	[NT]

Client Reference: E32889B

QUALITY CONTROL: Acid Extractable metals in soil				Duplicate			Spike Recovery %			
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date digested	-			30/01/2020	1	30/01/2020	30/01/2020		30/01/2020	[NT]
Date analysed	-			30/01/2020	1	30/01/2020	30/01/2020		30/01/2020	[NT]
Arsenic	mg/kg	4	Metals-020 ICP-AES	<4	1	7	8	13	95	[NT]
Cadmium	mg/kg	0.4	Metals-020 ICP-AES	<0.4	1	<0.4	<0.4	0	96	[NT]
Chromium	mg/kg	1	Metals-020 ICP-AES	<1	1	23	27	16	93	[NT]
Copper	mg/kg	1	Metals-020 ICP-AES	<1	1	28	27	4	93	[NT]
Lead	mg/kg	1	Metals-020 ICP-AES	<1	1	74	78	5	93	[NT]
Mercury	mg/kg	0.1	Metals-021 CV-AAS	<0.1	1	<0.1	<0.1	0	88	[NT]
Nickel	mg/kg	1	Metals-020 ICP-AES	<1	1	14	18	25	94	[NT]
Zinc	mg/kg	1	Metals-020 ICP-AES	<1	1	110	130	17	93	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.
<p>Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.</p>	

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.



Envirolab Services Pty Ltd
ABN 37 112 535 645 - 002
25 Research Drive Croydon South VIC 3136
ph 03 9763 2500 fax 03 9763 2633
melbourne@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	JK Environments
Attention	Vittal Boggaram

Sample Login Details

Your reference	E32889B
Envirolab Reference	19779
Date Sample Received	29/01/2020
Date Instructions Received	29/01/2020
Date Results Expected to be Reported	04/02/2020

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	1 Soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	22.1
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Pamela Adams

Phone: 03 9763 2500

Fax: 03 9763 2633

Email: padams@envirolab.com.au

Analisa Mathrick

Phone: 03 9763 2500

Fax: 03 9763 2633

Email: amathrick@envirolab.com.au

Analysis Underway, details on the following page:



Envirolab Services Pty Ltd

ABN 37 112 535 645 - 002

25 Research Drive Croydon South VIC 3136

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Sample ID	VTRH(C6-C10)/BTEXN in Soil	TRH Soil C10-C40 NEPM	PAHs in Soil	Acid Extractable metals in soil
SDUP5	✓	✓	✓	✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.

Requests for longer term sample storage must be received in writing.

Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.

235189.

SAMPLE AND CHAIN OF CUSTODY FORM

TO: ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen	EIS Job Number: E32889B Date Results Required: STANDARD Page: 2 of 2	FROM:  JK Environments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: vboggaram@jkenvironments.com.au
---	---	---

Location:		Sutherland					Sample Preserved in Esky on Ice									
Sampler:		MMP					Tests Required									
Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 3	Combo 3a	Combo 6	Combo 6a	8 Metals	PAHS	TRH/BTEX	BTEX	Asbestos	
22.1.20	26	BH5	1.3-1.5	G	0	Silty clay										
22.1.20	27	BH5	1.8-2	G	0	Extremely weathered siltstone										
22.1.20	28	BH6	0.14-0.3	G, A	0	F: Clayey sand				X						
22.1.20	29	BH6	0.4-0.5	G, A	0	F: Sand										
22.1.20	30	BH6	0.9-1.0	G, A	0	F: Sand										
22.1.20	31	BH6	1.1-1.3	G	0	Silty clay										
22.1.20	32	BH7	0-0.2	G, A	0	F: Silty clayey sand				X						
22.1.20	33	BH7	0.5-0.7	G	0	Silty clay										
22.1.20	34	BH7	1.3-1.5	G	0	Extremely weathered siltstone										
22.1.20	35	BH8	0-0.1	G, A	0	F: Silty sand				X						
22.1.20	36	BH8	0.1-0.2	G, A	0	F: Sandy clay		X								
22.1.20	37	SDUP1	-	G	-	Soil		X	X							
22.1.20	38	SDUP2	-	G	-	Soil			X							
22.1.20	39	SDUP3	-	G	-	Soil			X							
22.1.20	40	SDUP4	-	G	-	Soil										
22.1.20	-	SDUP5	-	G	-	Soil	X									
22.1.20	41	TS-S1	-	V	-	Soil								X		
22.1.20	42	TB-S1	-	G	-	Soil								X		
	43	BH5	0.5-0.7													

Remarks (comments/detection limits required):		Sample Containers: G - 250mg Glass Jar A - Ziplock Asbestos Bag P - Plastic Bag	
Relinquished By: EW Sydney CLARE MCKENZIE CM.	Date: 28/1/20 1200	Time:	Received By: _____ Date: _____


 Envirolab Services
 25 Research Drive
 Croydon South VIC 3136
 Ph: (03) 9763 2500

Job No: 19 779
 Date Received: 29/1/20
 Time Received: 1Pm
 Received By: AS
 Temp: Cool/Ambient 22.1
 Cooling: Ice/Icepack
 Security: Intact/Broken/None

SAMPLE AND CHAIN OF CUSTODY FORM

TO: ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen	EIS Job Number: E32889B Date Results Required: STANDARD Page: 1 of 2	FROM: JK Environments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: VITTAL vboggaram@jkenvironments.com.au
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Location: Sutherland							Sample Preserved in Esky on Ice													
Sampler: MMP							Tests Required													
Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 2	Combo 3a	Combo 6	Combo 6a	8 Metals	PAHs	TRI/BTEX	BTEX	Asbestos					
22.1.20	1	BH1	0.14-0.3	G, A	0.3	F: Silty clayey sand				X										
22.1.20	2	BH1	0.7-0.8	G, A	0	F: Silty sandy clay		X												
22.1.20	3	BH1	1.0-1.2	G, A	0	F: Silty clay														
22.1.20	4	BH1	1.3-1.4	G	0	Silty clay														
22.1.20	5	BH1	1.7-1.9	G	0	Weathered siltstone														
22.1.20	6	BH1	2.6-2.8	G	0	Weathered siltstone														
22.1.20	7	BH2	0-0.1	G, A	0	F: Silty sand				X										
22.1.20	8	BH2	0.7-0.95	G, A	0.1	F: Sandy clay														
22.1.20	9	BH2	1-1.2	G, A	0.9	F: Silty clay														
22.1.20	10	BH2	1.6-1.8	G, A	0	F: Silty clay														
22.1.20	11	BH2	2.1-2.3	G	0	Silty clay														
22.1.20	12	BH2	2.7-2.8	G	0	Silty clay														
22.1.20	13	BH3	0.2-0.3	G, A	2.5	F: Silty sand				X										
22.1.20	14	BH3	0.4-0.6	G, A	1.3	F: Silty clay		X												
22.1.20	15	BH3	0.85-0.95	G	0	Silty clay														
22.1.20	16	BH3	1.7-1.8	G	0	Extremely weathered siltstone														
22.1.20	17	BH4	0-0.1	G, A	0	F: Clayey sand				X										
22.1.20	18	BH4	0.3-0.4	G, A	0	F: Sandy clay														
22.1.20	19	BH4	0.8-0.95	G, A	0	F: Sandy clay														
22.1.20	20	BH4	1.3-1.5	G, A	0	F: Sandy clay														
22.1.20	21	BH4	1.7-1.9	G, A	0	F: Silty sandy clay		X												
22.1.20	22	BH4	2.1-2.3	G	0	Silty clay														
22.1.20	23	BH4	2.8-2.9	G	0	Extremely weathered siltstone														
22.1.20	24	BH5	0-0.2	G, A	0	F: Silty sand				X										
22.1.20	25	BH5	0.3-0.5	G, A	0	F: Silty clay														

Remarks (comments/detection limits required):	Sample Containers: G - 250mg Glass Jar A - Ziplock Asbestos Bag P - Plastic Bag
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Relinquished By: Vittal B-S	Date: 23/01/2020	Time:	Received By:	Date:
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Relinquished by: **EU Sydney**
CAINE molenae
28/1/20 1200
em.



CERTIFICATE OF ANALYSIS 19796

Client Details

Client	JK Environments
Attention	Vittal Boggaram
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	E32889B
Number of Samples	1 Water
Date samples received	30/01/2020
Date completed instructions received	30/01/2020

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	05/02/2020
Date of Issue	05/02/2020

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Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Results Approved By

Chris De Luca, Operations Manager

Authorised By

Pamela Adams, Laboratory Manager

VOCs in water		
Our Reference		19796-1
Your Reference	UNITS	GWDUP2
Date Sampled		28/01/2020
Type of sample		Water
Date extracted	-	04/02/2020
Date analysed	-	04/02/2020
Dichlorodifluoromethane	µg/L	<10
Chloromethane	µg/L	<10
Vinyl Chloride	µg/L	<10
Bromomethane	µg/L	<10
Chloroethane	µg/L	<10
Trichlorofluoromethane	µg/L	<10
1,1-Dichloroethene	µg/L	<1
Trans-1,2-dichloroethene	µg/L	<1
1,1-dichloroethane	µg/L	<1
Cis-1,2-dichloroethene	µg/L	<1
Bromochloromethane	µg/L	<1
Chloroform	µg/L	<1
2,2-dichloropropane	µg/L	<1
1,2-dichloroethane	µg/L	<1
1,1,1-trichloroethane	µg/L	<1
1,1-dichloropropene	µg/L	<1
Cyclohexane	µg/L	<1
Carbon tetrachloride	µg/L	<1
Benzene	µg/L	<1
Dibromomethane	µg/L	<1
1,2-dichloropropane	µg/L	<1
Trichloroethene	µg/L	<1
Bromodichloromethane	µg/L	<1
trans-1,3-dichloropropene	µg/L	<1
cis-1,3-dichloropropene	µg/L	<1
1,1,2-trichloroethane	µg/L	<1
Toluene	µg/L	<1
1,3-dichloropropane	µg/L	<1
Dibromochloromethane	µg/L	<1
1,2-dibromoethane	µg/L	<1
Tetrachloroethene	µg/L	<1
1,1,1,2-tetrachloroethane	µg/L	<1
Chlorobenzene	µg/L	<1
Ethylbenzene	µg/L	<1

VOCs in water		
Our Reference		19796-1
Your Reference	UNITS	GWDUP2
Date Sampled		28/01/2020
Type of sample		Water
Bromoform	µg/L	<1
m+p-xylene	µg/L	<2
Styrene	µg/L	<1
1,1,2,2-tetrachloroethane	µg/L	<1
o-xylene	µg/L	<1
1,2,3-trichloropropane	µg/L	<1
Isopropylbenzene	µg/L	<1
Bromobenzene	µg/L	<1
n-propyl benzene	µg/L	<1
2-chlorotoluene	µg/L	<1
4-chlorotoluene	µg/L	<1
1,3,5-trimethyl benzene	µg/L	<1
Tert-butyl benzene	µg/L	<1
1,2,4-trimethyl benzene	µg/L	<1
1,3-dichlorobenzene	µg/L	<1
Sec-butyl benzene	µg/L	<1
1,4-dichlorobenzene	µg/L	<1
4-isopropyl toluene	µg/L	<1
1,2-dichlorobenzene	µg/L	<1
n-butyl benzene	µg/L	<1
1,2-dibromo-3-chloropropane	µg/L	<1
1,2,4-trichlorobenzene	µg/L	<1
Hexachlorobutadiene	µg/L	<1
1,2,3-trichlorobenzene	µg/L	<1
Surrogate Dibromofluoromethane	%	96
Surrogate toluene-d8	%	96
Surrogate 4-BFB	%	95

vTRH(C6-C10)/BTEXN in Water		
Our Reference		19796-1
Your Reference	UNITS	GWDUP2
Date Sampled		28/01/2020
Type of sample		Water
Date extracted	-	04/02/2020
Date analysed	-	04/02/2020
TRH C ₆ - C ₉	µg/L	<10
TRH C ₆ - C ₁₀	µg/L	<10
TRH C ₆ -C ₁₀ less BTEX (F1)	µg/L	<10
Benzene	µg/L	<1
Toluene	µg/L	<1
Ethylbenzene	µg/L	<1
m+p-xylene	µg/L	<2
o-xylene	µg/L	<1
Naphthalene	µg/L	<1
Total +ve Xylenes	µg/L	<1
Surrogate Dibromofluoromethane	%	105
Surrogate toluene-d8	%	101
Surrogate 4-BFB	%	98

TRH Water(C10-C40) NEPM		
Our Reference		19796-1
Your Reference	UNITS	GWDUP2
Date Sampled		28/01/2020
Type of sample		Water
Date extracted	-	31/01/2020
Date analysed	-	31/01/2020
TRH C ₁₀ - C ₁₄	µg/L	<50
TRH C ₁₅ - C ₂₈	µg/L	<100
TRH C ₂₉ - C ₃₆	µg/L	<100
Total +ve TRH (C10-C36)	µg/L	<50
TRH >C ₁₀ - C ₁₆	µg/L	<50
TRH >C ₁₀ - C ₁₆ less Naphthalene (F2)	µg/L	<50
TRH >C ₁₆ - C ₃₄	µg/L	<100
TRH >C ₃₄ - C ₄₀	µg/L	<100
Total +ve TRH (>C10-C40)	µg/L	<50
Surrogate o-Terphenyl	%	89

PAHs in Water - Low Level		
Our Reference		19796-1
Your Reference	UNITS	GWDUP2
Date Sampled		28/01/2020
Type of sample		Water
Date extracted	-	31/01/2020
Date analysed	-	05/02/2020
Naphthalene	µg/L	<0.1
Acenaphthylene	µg/L	<0.1
Acenaphthene	µg/L	<0.1
Fluorene	µg/L	<0.1
Phenanthrene	µg/L	<0.1
Anthracene	µg/L	<0.1
Fluoranthene	µg/L	<0.1
Pyrene	µg/L	<0.1
Benzo(a)anthracene	µg/L	<0.1
Chrysene	µg/L	<0.1
Benzo(b,j&k)fluoranthene	µg/L	<0.2
Benzo(a)pyrene	µg/L	<0.1
Indeno(1,2,3-c,d)pyrene	µg/L	<0.1
Dibenzo(a,h)anthracene	µg/L	<0.1
Benzo(g,h,i)perylene	µg/L	<0.1
Total +ve PAH's	µg/L	NIL (+)VE PAH
Benzo(a)pyrene TEQ	µg/L	<0.5
Surrogate <i>p</i> -Terphenyl-d ₁₄	%	104

HM in water - dissolved		
Our Reference		19796-1
Your Reference	UNITS	GWDUP2
Date Sampled		28/01/2020
Type of sample		Water
Date prepared	-	31/01/2020
Date analysed	-	31/01/2020
Arsenic-Dissolved	µg/L	<1
Cadmium-Dissolved	µg/L	<0.1
Chromium-Dissolved	µg/L	<1
Copper-Dissolved	µg/L	3
Lead-Dissolved	µg/L	<1
Nickel-Dissolved	µg/L	3
Zinc-Dissolved	µg/L	28
Mercury-Dissolved	µg/L	<0.05

Method ID	Methodology Summary
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Metals-022 ICP-MS	Determination of various metals by ICP-MS.
Org-003	<p>Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID.</p> <p>F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.</p> <p>Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).</p>
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater 2013.
Org-013	Water samples are analysed directly by purge and trap GC-MS.
Org-016	<p>Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.</p> <p>Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.</p>

QUALITY CONTROL: VOCs in water				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			04/02/2020	1	04/02/2020	04/02/2020		04/02/2020	[NT]
Date analysed	-			04/02/2020	1	04/02/2020	04/02/2020		04/02/2020	[NT]
Dichlorodifluoromethane	µg/L	10	Org-013	<10	1	<10	<10	0	[NT]	[NT]
Chloromethane	µg/L	10	Org-013	<10	1	<10	<10	0	[NT]	[NT]
Vinyl Chloride	µg/L	10	Org-013	<10	1	<10	<10	0	[NT]	[NT]
Bromomethane	µg/L	10	Org-013	<10	1	<10	<10	0	[NT]	[NT]
Chloroethane	µg/L	10	Org-013	<10	1	<10	<10	0	[NT]	[NT]
Trichlorofluoromethane	µg/L	10	Org-013	<10	1	<10	<10	0	[NT]	[NT]
1,1-Dichloroethene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Trans-1,2-dichloroethene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
1,1-dichloroethane	µg/L	1	Org-013	<1	1	<1	<1	0	94	[NT]
Cis-1,2-dichloroethene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Bromochloromethane	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Chloroform	µg/L	1	Org-013	<1	1	<1	<1	0	95	[NT]
2,2-dichloropropane	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
1,2-dichloroethane	µg/L	1	Org-013	<1	1	<1	<1	0	89	[NT]
1,1,1-trichloroethane	µg/L	1	Org-013	<1	1	<1	<1	0	93	[NT]
1,1-dichloropropene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Cyclohexane	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Carbon tetrachloride	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Benzene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Dibromomethane	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
1,2-dichloropropane	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Trichloroethene	µg/L	1	Org-013	<1	1	<1	<1	0	97	[NT]
Bromodichloromethane	µg/L	1	Org-013	<1	1	<1	<1	0	89	[NT]
trans-1,3-dichloropropene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
cis-1,3-dichloropropene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
1,1,2-trichloroethane	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Toluene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
1,3-dichloropropane	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Dibromochloromethane	µg/L	1	Org-013	<1	1	<1	<1	0	91	[NT]
1,2-dibromoethane	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Tetrachloroethene	µg/L	1	Org-013	<1	1	<1	<1	0	97	[NT]
1,1,1,2-tetrachloroethane	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Chlorobenzene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Ethylbenzene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Bromoform	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
m+p-xylene	µg/L	2	Org-013	<2	1	<2	<2	0	[NT]	[NT]
Styrene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
1,1,2,2-tetrachloroethane	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]

QUALITY CONTROL: VOCs in water						Duplicate		Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
o-xylene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
1,2,3-trichloropropane	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Isopropylbenzene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Bromobenzene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
n-propyl benzene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
2-chlorotoluene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
4-chlorotoluene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
1,3,5-trimethyl benzene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Tert-butyl benzene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
1,2,4-trimethyl benzene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
1,3-dichlorobenzene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Sec-butyl benzene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
1,4-dichlorobenzene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
4-isopropyl toluene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
1,2-dichlorobenzene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
n-butyl benzene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
1,2-dibromo-3-chloropropane	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
1,2,4-trichlorobenzene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Hexachlorobutadiene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
1,2,3-trichlorobenzene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-013	95	1	96	97	1	94	[NT]
Surrogate toluene-d8	%		Org-013	97	1	96	96	0	101	[NT]
Surrogate 4-BFB	%		Org-013	94	1	95	95	0	94	[NT]

Client Reference: E32889B

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water							Duplicate		Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			04/02/2020	1	04/02/2020	04/02/2020		04/02/2020	[NT]
Date analysed	-			04/02/2020	1	04/02/2020	04/02/2020		04/02/2020	[NT]
TRH C ₆ - C ₉	µg/L	10	Org-016	<10	1	<10	<10	0	94	[NT]
TRH C ₆ - C ₁₀	µg/L	10	Org-016	<10	1	<10	<10	0	92	[NT]
Benzene	µg/L	1	Org-016	<1	1	<1	<1	0	92	[NT]
Toluene	µg/L	1	Org-016	<1	1	<1	<1	0	90	[NT]
Ethylbenzene	µg/L	1	Org-016	<1	1	<1	<1	0	97	[NT]
m+p-xylene	µg/L	2	Org-016	<2	1	<2	<2	0	95	[NT]
o-xylene	µg/L	1	Org-016	<1	1	<1	<1	0	85	[NT]
Naphthalene	µg/L	1	Org-013	<1	1	<1	<1	0	110	[NT]
Surrogate Dibromofluoromethane	%		Org-016	104	1	105	107	2	101	[NT]
Surrogate toluene-d8	%		Org-016	102	1	101	101	0	100	[NT]
Surrogate 4-BFB	%		Org-016	98	1	98	98	0	98	[NT]

Client Reference: E32889B

QUALITY CONTROL: TRH Water(C10-C40) NEPM					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			31/01/2020	[NT]	[NT]	[NT]	[NT]	31/01/2020	[NT]
Date analysed	-			31/01/2020	[NT]	[NT]	[NT]	[NT]	03/02/2020	[NT]
TRH C ₁₀ - C ₁₄	µg/L	50	Org-003	<50	[NT]	[NT]	[NT]	[NT]	68	[NT]
TRH C ₁₅ - C ₂₈	µg/L	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	102	[NT]
TRH C ₂₉ - C ₃₆	µg/L	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	120	[NT]
TRH >C ₁₀ - C ₁₆	µg/L	50	Org-003	<50	[NT]	[NT]	[NT]	[NT]	68	[NT]
TRH >C ₁₆ - C ₃₄	µg/L	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	102	[NT]
TRH >C ₃₄ - C ₄₀	µg/L	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	120	[NT]
Surrogate o-Terphenyl	%		Org-003	87	[NT]	[NT]	[NT]	[NT]	88	[NT]

QUALITY CONTROL: PAHs in Water - Low Level					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			31/01/2020	[NT]	[NT]	[NT]	[NT]	31/01/2020	[NT]
Date analysed	-			05/02/2020	[NT]	[NT]	[NT]	[NT]	05/02/2020	[NT]
Naphthalene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	60	[NT]
Acenaphthylene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Acenaphthene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluorene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	110	[NT]
Phenanthrene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	122	[NT]
Anthracene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	126	[NT]
Pyrene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	126	[NT]
Benzo(a)anthracene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	120	[NT]
Benzo(b,j&k)fluoranthene	µg/L	0.2	Org-012	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	114	[NT]
Indeno(1,2,3-c,d)pyrene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d ₁₄	%		Org-012	98	[NT]	[NT]	[NT]	[NT]	100	[NT]

Client Reference: E32889B

QUALITY CONTROL: HM in water - dissolved				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	19796-1
Date prepared	-			31/01/2020	[NT]	[NT]	[NT]	[NT]	31/01/2020	31/01/2020
Date analysed	-			31/01/2020	[NT]	[NT]	[NT]	[NT]	31/01/2020	31/01/2020
Arsenic-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	[NT]	[NT]	108	113
Cadmium-Dissolved	µg/L	0.1	Metals-022 ICP-MS	<0.1	[NT]	[NT]	[NT]	[NT]	111	103
Chromium-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	[NT]	[NT]	110	119
Copper-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	[NT]	[NT]	109	105
Lead-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	[NT]	[NT]	108	110
Nickel-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	[NT]	[NT]	109	106
Zinc-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	[NT]	[NT]	111	100
Mercury-Dissolved	µg/L	0.05	Metals-021 CV-AAS	<0.05	[NT]	[NT]	[NT]	[NT]	110	#

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.
Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.	
The recommended maximums for analytes in urine are taken from "2018 TLVs and BEIs", as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.	
Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2	

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

METALS: # Low spike recovery was obtained for Mercury for this sample. The sample was re-digested and re-spiked and the low recovery was confirmed. This is due to matrix interferences. However, an acceptable recovery was obtained for the LCS.



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SAMPLE RECEIPT ADVICE

Client Details

Client	JK Environments
Attention	Vittal Boggaram

Sample Login Details

Your reference	E32889B
Envirolab Reference	19796
Date Sample Received	30/01/2020
Date Instructions Received	30/01/2020
Date Results Expected to be Reported	05/02/2020

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	1 Water
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	23.6
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Pamela Adams

Phone: 03 9763 2500

Fax: 03 9763 2633

Email: padams@envirolab.com.au

Analisa Mathrick

Phone: 03 9763 2500

Fax: 03 9763 2633

Email: amathrick@envirolab.com.au

Analysis Underway, details on the following page:



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Sample ID	VOCs in water	VTRH(C6-C10)/BTEXN in Water	TRH Water(C10-C40) NEPM	PAHs in Water - Low Level	HM in water - dissolved
GWDUP2	✓	✓	✓	✓	✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.

Requests for longer term sample storage must be received in writing.

Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.

SAMPLE AND CHAIN OF CUSTODY FORM

TO: ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen	EIS Job Number: E32889B Date Results Required: STANDARD Page: 1 of 1	FROM: REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Vittal Boggaram vboggaram@jkenvironments.com.au
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Location:	Sutherland	Sample Preserved in Esky on Ice
Sampler:	HW	Tests Required

Date Sampled	Lab Ref:	Sample Number	Sample Containers	PID	Sample Description	Tests Required												
						Combo 2	Combo 3L	VOCs	pH / EC	8 Metals	PAHs	TRH/BTEX	BTEX	Hardness				
28.1.20	1	MW1	2xG1, 6xV, H, PVC	0.5	Water		X	X	X									
28.1.20	2	MW3	2xG1, 6xV, H, PVC	5.7	Water		X	X	X									
28.1.20	3	MW5	2xG1, 6xV, H	1.1	Water		X	X	X									
28.1.20	4	GWDUP1	2xG1, 6xV, H	NA	Water		X	X										
28.1.20	—	GWDUP2	2xG1, 6xV, H	NA	Water		X	X										
28.1.20	5	TB-W1	V	NA	Water													X
28.1.20	6	TS-W1	V	NA	Water													X
Envirolab Services 25 Research Drive Croydon South VIC 3136 Ph: (03) 9763 2500 Job No: 19796 Date Received: 30/1/20 Time Received: 1pm Received By: GS Temp: Cool/Ambient Cooling: Ice/Icepack 23.6 Security: Intact/Broken/None						Envirolab Services 12 Ashley St Chatswood NSW 2067 Ph: (02) 9910 6200 Job No: 235447 Date Received: 28/01/20 Time Received: 1528 Received by: SB Temp: Cool/Ambient Cooling: Ice/Icepack Security: Intact/Broken/None												

Remarks (comments/detection limits required):	Sample Containers:
All analysis PQLs to ANZECC (2000) Detection Limits Please	G1 - 500mL Amber Glass Bottle V - BTEX Vial H - HNO3 Wash PVC PVC - HDPE Plastic Bottles

Relinquished By:	Date:	Time:	Received By:
	28/1/2020	1528	

Relinquished by: EIS S40
 CLAIMER mak.
 29/1/20 1230
 cm



Appendix F: Report Explanatory Notes



Standard Sampling Procedure

These protocols specify the basic procedures to be used when sampling soils or groundwater for environmental site assessments undertaken by JKE. The purpose of these protocols is to provide standard methods for: sampling, decontamination procedures for sampling equipment, sample preservation, sample storage and sample handling. Deviations from these procedures must be recorded.

A. Soil Sampling

- Prepare a borehole/test pit log or made a note of the sample description for stockpiles.
- Layout sampling equipment on clean plastic sheeting to prevent direct contact with ground surface. The work area should be at a distance from the drill rig/excavator such that the machine can operate in a safe manner.
- Ensure all sampling equipment has been decontaminated prior to use.
- Remove any surface debris from the immediate area of the sampling location.
- Collect samples and place in glass jar with a Teflon seal. This should be undertaken as quickly as possible to prevent the loss of any volatiles. If possible, fill the glass jars completely.
- Collect samples for asbestos analysis and place in a zip-lock plastic bag.
- Label the sampling containers with the JKE job number, sample location (eg. BH1), sampling depth interval and date. If more than one sample container is used, this should also be indicated (eg. 2 = Sample jar 1 of 2 jars).
- Photoionisation detector (PID) screening of volatile organic compounds (VOCs) should be undertaken on samples using the soil sample headspace method. Headspace measurements are taken following equilibration of the headspace gasses in partly filled zip-lock plastic bags. PID headspace data is recorded on the borehole/test pit log and the chain of custody forms.
- Record the lithology of the sample and sample depth on the borehole/test pit log generally in accordance with AS1726-2017¹⁹.
- Store the sample in a sample container cooled with ice or chill packs. On completion of the sampling the sample container should be delivered to the lab immediately or stored in the refrigerator prior to delivery to the lab. All samples are preserved in accordance with the standards outlined in the report.
- Check for the presence of groundwater after completion of each borehole using an electronic dip metre or water whistle. Boreholes should be left open until the end of fieldwork where it is safe to do so. All groundwater levels in the boreholes should be rechecked on the completion of the fieldwork.
- Backfill the boreholes/test pits with the excavation cuttings or clean sand prior to leaving the site.

B. Decontamination Procedures for Soil Sampling Equipment

- All sampling equipment should be decontaminated between every sampling location. This excludes single use PVC tubing used for push tubes etc. Equipment and materials required for the decontamination include:
 - Phosphate free detergent (Decon 90);
 - Potable water;
 - Stiff brushes; and
 - Plastic sheets.
- Ensure the decontamination materials are clean prior to proceeding with the decontamination.
- Fill both buckets with clean potable water and add phosphate free detergent to one bucket.
- In the bucket containing the detergent, scrub the sampling equipment until all the material attached to the equipment has been removed.
- Rinse sampling equipment in the bucket containing potable water.
- Place cleaned equipment on clean plastic sheets.

¹⁹ Standards Australia, (2017), *Geotechnical Site Investigations*. (AS1726-2017)



If all materials are not removed by this procedure, high-pressure water cleaning is recommended. If any equipment is not completely decontaminated by both these processes, then the equipment should not be used until it has been thoroughly cleaned.

C. Groundwater Sampling

Groundwater samples are more sensitive to contamination than soil samples and therefore adherence to this protocol is particularly important to obtain reliable, reproducible results. The recommendations detailed in AS/NZS 5667.1:1998 are considered to form a minimum standard.

The basis of this protocol is to maintain the security of the borehole and obtain accurate and representative groundwater samples. The following procedure should be used for collection of groundwater samples from previously installed groundwater monitoring wells.

- After monitoring well installation, at least three bore volumes should be pumped from the monitoring wells (well development) to remove any water introduced during the drilling process and/or the water that is disturbed during installation of the monitoring well. This should be completed prior to purging and sampling.
- Groundwater monitoring wells should then be left to recharge for at least three days before purging and sampling. Prior to purging or sampling, the condition of each well should be observed and any anomalies recorded on the field data sheets. The following information should be noted: the condition of the well, noting any signs of damage, tampering or complete destruction; the condition and operation of the well lock; the condition of the protective casing and the cement footing (raised or cracked); and, the presence of water between protective casing and well.
- Measure the groundwater level from the collar of the piezometer/monitoring well using an electronic dip meter. The collar level should be taken (if required) during the site visit using a dumpy level and staff.
- Purging and sampling of piezometers/monitoring wells is done on the same site visit when using micro-purge (or other low flow) techniques.
- Layout and organize all equipment associated with groundwater sampling in a location where they will not interfere with the sampling procedure and will not pose a risk of contaminating samples. Equipment generally required includes:
 - Stericup single-use filters (for heavy metals samples);
 - Bucket with volume increments;
 - Sample containers: teflon bottles with 1 ml nitric acid, 75mL glass vials with 1 mL hydrochloric acid, 1 L amber glass bottles;
 - Bucket with volume increments;
 - Flow cell;
 - pH/EC/Eh/Temperature meters;
 - Plastic drums used for transportation of purged water;
 - Esky and ice;
 - Nitrile gloves;
 - Distilled water (for cleaning);
 - Electronic dip meter;
 - Low flow peristaltic pump and associated tubing; and
 - Groundwater sampling forms.
- Ensure all non-disposable sampling equipment is decontaminated or that new disposable equipment is available prior to any work commencing at a new location. The procedure for decontamination of groundwater equipment is outlined at the end of this section.
- Disposable gloves should be used whenever samples are taken to protect the sampler and to assist in avoidance of contamination.
- Groundwater samples are obtained from the monitoring wells using low flow sampling equipment to reduce the disturbance of the water column and loss of volatiles.



- During pumping to purge the well, the pH, temperature, conductivity, dissolved oxygen, redox potential and groundwater levels are monitored (where possible) using calibrated field instruments to assess the development of steady state conditions. Steady state conditions are generally considered to have been achieved when the difference in the pH measurements is less than 0.2 units, the difference in conductivity is less than 10% and whilst the well is no longer in draw-down.
- All measurements are recorded on specific data sheets.
- Once steady state conditions are considered to have been achieved, groundwater samples are obtained directly from the pump tubing and placed in appropriate glass bottles, BTEX vials or plastic bottles.
- All samples are preserved in accordance with water sampling requirements specified by the laboratory and placed in an insulated container with ice. Groundwater samples are preserved by immediate storage in an insulated sample container with ice.
- At the end of each water sampling complete a chain of custody form for samples being sent to the laboratory.

D. Decontamination Procedures for Groundwater Sampling Equipment

- All equipment associated with the groundwater sampling procedure (other than single-use items) are decontaminated between every sampling location.
- The following equipment and materials are required for the decontamination procedure:
 - Phosphate free detergent;
 - Potable water;
 - Distilled water; and
 - Plastic Sheets or bulk bags (plastic bags).
- Fill one bucket with clean potable water and phosphate free detergent, and one bucket with distilled water.
- Flush potable water and detergent through pump head. Wash sampling equipment and pump head using brushes in the bucket containing detergent until all materials attached to the equipment are removed.
- Flush pump head with distilled water.
- Change water and detergent solution after each sampling location.
- Rinse sampling equipment in the bucket containing distilled water.
- Place cleaned equipment on clean plastic sheets.
- If all materials are not removed by this procedure that equipment should not be used until it has been thoroughly cleaned



QA/QC Definitions

The QA/QC terms used in this report are defined below. The definitions are in accordance with US EPA publication SW-846, entitled *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (1994)²⁰ methods and those described in *Environmental Sampling and Analysis, A Practical Guide*, (1991)²¹. The NEPM (2013) is consistent with these documents.

A. **Practical Quantitation Limit (PQL), Limit of Reporting (LOR) & Estimated Quantitation Limit (EQL)**

These terms all refer to the concentration above which results can be expressed with a minimum 95% confidence level. The laboratory reporting limits are generally set at ten times the standard deviation for the Method Detection Limit for each specific analyte. For the purposes of this report the LOR, PQL, and EQL are considered to be equivalent.

When assessing laboratory data it should be borne in mind that values at or near the PQL have two important limitations: *“The uncertainty of the measurement value can approach, and even equal, the reported value. Secondly, confirmation of the analytes reported is virtually impossible unless identification uses highly selective methods. These issues diminish when reliably measurable amounts of analytes are present. Accordingly, legal and regulatory actions should be limited to data at or above the reliable detection limit”* (Keith, 1991).

B. **Precision**

The degree to which data generated from repeated measurements differ from one another due to random errors. Precision is measured using the standard deviation or Relative Percent Difference (RPD).

C. **Accuracy**

Accuracy is a measure of the agreement between an experimental result and the true value of the parameter being measured (i.e. the proximity of an averaged result to the true value, where all random errors have been statistically removed). The assessment of accuracy for an analysis can be achieved through the analysis of known reference materials or assessed by the analysis of surrogates, field blanks, trip spikes and matrix spikes. Accuracy is typically reported as percent recovery.

D. **Representativeness**

Representativeness expresses the degree to which sample data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is primarily dependent upon the design and implementation of the sampling program. Representativeness of the data is partially ensured by the avoidance of contamination, adherence to sample handling and analysis protocols and use of proper chain-of-custody and documentation procedures.

E. **Completeness**

Completeness is a measure of the number of valid measurements in a data set compared to the total number of measurements made and overall performance against DQIs. The following information is assessed for completeness:

- Chain-of-custody forms;
- Sample receipt form;
- All sample results reported;
- All blank data reported;
- All laboratory duplicate and RPDs calculated;
- All surrogate spike data reported;

²⁰ US EPA, (1994). *SW-846: Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*. (US EPA SW-846)

²¹ Keith., H, (1991). *Environmental Sampling and Analysis, A Practical Guide*



- All matrix spike and lab control spike (LCS) data reported and RPDs calculated;
- Spike recovery acceptable limits reported; and
- NATA stamp on reports.

F. **Comparability**

Comparability is the evaluation of the similarity of conditions (e.g. sample depth, sample homogeneity) under which separate sets of data are produced. Data comparability checks include a bias assessment that may arise from the following sources:

- Collection and analysis of samples by different personnel; Use of different techniques;
- Collection and analysis by the same personnel using the same methods but at different times; and
- Spatial and temporal changes (due to environmental dynamics).

G. **Blanks**

The purpose of laboratory and field blanks is to check for artefacts and interferences that may arise during sampling, transport and analysis.

H. **Matrix Spikes**

Samples are spiked with laboratory grade standards to detect interactive effects between the sample matrix and the analytes being measured. Matrix Spikes are reported as a percent recovery and are prepared for 1 in every 20 samples. Sample batches that contain less than 20 samples may be reported with a Matrix Spike from another batch. The percent recovery is calculated using the formula below. Acceptable recovery limits are 70% to 130%.

$$\frac{(\text{Spike Sample Result} - \text{Sample Result}) \times 100}{\text{Concentration of Spike Added}}$$

I. **Surrogate Spikes**

Samples are spiked with a known concentration of compounds that are chemically related to the analyte being investigated but unlikely to be detected in the environment. The purpose of the Surrogate Spikes is to check the accuracy of the analytical technique. Surrogate Spikes are reported as percent recovery.

J. **Duplicates**

Laboratory duplicates measure precision, expressed as Relative Percent Difference. Duplicates are prepared from a single field sample and analysed as two separate extraction procedures in the laboratory. The RPD is calculated using the formula where D1 is the sample concentration and D2 is the duplicate sample concentration:

$$\frac{(D1 - D2) \times 100}{\{(D1 + D2)/2\}}$$



Appendix G: Data (QA/QC) Evaluation



Data (QA/QC) Evaluation

A. INTRODUCTION

This Data (QA/QC) Evaluation forms part of the validation process for the DQOs documented in Section 6.1 of this report. Checks were made to assess the data in terms of precision, accuracy, representativeness, comparability and completeness. These 'PARCC' parameters are referred to collectively as DQIs and are defined in the Report Explanatory Notes attached in the report appendices.

1. Field and Laboratory Considerations

The quality of the analytical data produced for this project has been considered in relation to the following:

- Sample collection, storage, transport and analysis;
- Laboratory PQLs;
- Field QA/QC results; and
- Laboratory QA/QC results.

2. Field QA/QC Samples and Analysis

A summary of the field QA/QC samples collected and analysed for this assessment is provided in the following table:

Sample Type	Sample Identification	Frequency (of Sample Type)	Analysis Performed
Intra-laboratory duplicate (soil)	SDUP1 (primary sample BH3 0.2-0.3m)	Approximately 17% of primary samples	Heavy metals, TRH/BTEX, PAHs, OCPs, OPPs and PCBs
Intra-laboratory duplicate (soil)	SDUP3 (primary sample BH5 0-0.2m)		As above
Inter-laboratory duplicate (soil)	SDUP5 (primary sample BH1 0.14-0.3m)	Approximately 7% of primary samples	Heavy metals, TRH/BTEX, PAHs
Intra-laboratory duplicate (groundwater)	GWDUP1 (primary sample MW5)	Approximately 33% of primary samples	Heavy metals, TRH/BTEX and PAHs
Inter-laboratory duplicate (groundwater)	GWDUP2 (primary sample MW1)	Approximately 33% of primary samples	Heavy metals, TRH/BTEX and PAHs
Trip spike	TS-S1 – soil spike of 22 January 2020 TS-W1 – groundwater spike of 28 January 2020	One for the assessment for each medium to demonstrate adequacy of preservation, storage and transport methods	BTEX
Trip blank	TB-S1 – soil blank of 22 January 2020 TB-W1 – groundwater blank of 28 January 2020	One for the assessment for each medium to demonstrate adequacy of storage and transport methods	BTEX



The results for the field QA/QC samples are detailed in the laboratory summary tables (Table Q1 to Q6 inclusive) attached to the assessment report and are discussed in the subsequent sections of this Data (QA/QC) Evaluation report.

3. Data Assessment Criteria

JKE adopted the following criteria for assessing the field and laboratory QA/QC analytical results:

Field Duplicates

Acceptable targets for precision of field duplicates in this report will be 30% or less, consistent with NEPM (2013). RPD failures will be considered qualitatively on a case-by-case basis taking into account factors such as the concentrations used to calculate the RPD (i.e. RPD exceedance where concentrations are close to the PQL are typically not as significant as those where concentrations are reported at least five or 10 times the PQL), sample type, collection methods and the specific analyte where the RPD exceedance was reported.

Trip Spikes

Acceptable targets for trip spike samples in this report will be 70% to 130%.

Laboratory QA/QC

The suitability of the laboratory data is assessed against the laboratory QA/QC criteria which is outlined in the laboratory reports. These criteria were developed and implemented in accordance with the laboratory's NATA accreditation and align with the acceptable limits for QA/QC samples as outlined in NEPM (2013) and other relevant guidelines.

A summary of the acceptable limits adopted by the primary laboratory (Envirolab) is provided below:

RPDs

- Results that are <5 times the PQL, any RPD is acceptable; and
- Results >5 times the PQL, RPDs between 0-50% are acceptable.

Laboratory Control Samples (LCS) and Matrix Spikes

- 70-130% recovery acceptable for metals and inorganics;
- 60-140% recovery acceptable for organics; and
- 10-140% recovery acceptable for VOCs.

Surrogate Spikes

- 60-140% recovery acceptable for general organics; and
- 10-140% recovery acceptable for VOCs.

Method Blanks

- All results less than PQL.

B. DATA EVALUATION



1. Sample Collection, Storage, Transport and Analysis

Samples were collected by trained field staff in accordance with the JKE SSP. The SSP was developed to be consistent with relevant guidelines, including NEPM (2013) and other guidelines made under the CLM Act 1997.

Appropriate sample preservation, handling and storage procedures were adopted. Laboratory analysis was undertaken within specified holding times in accordance with Schedule B(3) of NEPM (2013) and the laboratory NATA accredited methodologies.

Review of the project data also indicated that:

- COC documentation was adequately maintained;
- Sample receipt advice documentation was provided for all sample batches;
- All analytical results were reported; and
- Consistent units were used to report the analysis results.

2. Laboratory PQLs

Appropriate PQLs were adopted for the analysis and all PQLs were below the SAC, with the exception of the anthracene and vinyl chloride PQL for groundwater analysis which was 10 times and 33 times greater than the ecological SAC respectively.

In light of the PAH concentrations reported for soil and groundwater, JKE are of the opinion that anthracene PQL above the SAC is not significant, and it does not affect the quality of the dataset as a whole or the outcome of the assessment.

Vinyl chloride PQL for groundwater analysis was 33 times greater than the HSL criterion. In light of the VOC concentrations reported for groundwater, JKE are of the opinion that this is not significant, and it does not affect the quality of the dataset as a whole or the outcome of the assessment. In addition, significant concentrations of vinyl chloride would not be expected in the absence of other compounds such as tetra/perchloroethylene which was commonly used for dry cleaning, or trichloroethene (TCE) which was commonly used as a degreaser in mechanics workshops.

3. Field QA/QC Sample Results

Field Duplicates

The results indicated that field precision was acceptable. RPD non-conformances were reported for some analytes as discussed below:

- Elevated RPDs were reported for arsenic, chromium and TRH F3 compounds in SDUP1/BH3 (0.2-0.3m);
- Elevated RPDs were reported for mercury, nickel, benzo(a)pyrene and TRH F4 compounds in SDUP5/BH1 (0.14-0.3m);
- Elevated RPD was reported for TRH F2 compound in GWDUP1/MW5; and
- Elevated RPD was reported for TRH F2 compound in GWDUP2/MW1.

Values outside the acceptable limits have been attributed to results that are close to the PQLs and the difficulties associated with obtaining homogenous soil duplicate samples of heterogeneous matrices. Where applicable, the higher duplicate value has been adopted as a conservative measure (see attached report



tables). As both the primary and duplicate sample results were less than the SAC in the majority of the cases, the exceedances are not considered to have had an adverse impact on the data set as a whole.

Trip Blanks

During the investigation, one soil trip blank and one water trip blank was placed in the esky during sampling and transported back to the laboratory. The results were all less than the PQLs, therefore cross contamination between samples that may have significance for data validity did not occur.

Trip Spikes

The results ranged from 98% to 100% for soil and ranged from 105% to 122% for water indicated that field preservation methods during soil and groundwater sampling were appropriate.

4. Laboratory QA/QC

The analytical methods implemented by the laboratory were performed in accordance with their NATA accreditation and were consistent with Schedule B(3) of NEPM (2013). The frequency of data reported for the laboratory QA/QC (i.e. duplicates, spikes, blanks, LCS) was considered to be acceptable for the purpose of this assessment.

A review of the laboratory QA/QC data identified the following minor non-conformances:

- Report 235189, spike recovery for zinc in sample number 7 was at 69% which was outside the lab acceptance criteria of 70-130%. However, the LCS recovery was acceptable at 101%;
- Report 235447, percent recovery for heavy metal matrix spike in water was not possible due to high concentration of the elements in the sample. However, an acceptable recovery was obtained for the LCS; and
- Report 19796, low spike recovery was obtained for mercury in the groundwater sample GWDUP2. The sample was re-digested and re-spiked and the low recovery was confirmed. This was due to matrix interferences. However, an acceptable recovery was obtained for the LCS.

C. DATA QUALITY SUMMARY

JKE are of the opinion that the data are adequately precise, accurate, representative, comparable and complete to serve as a basis for interpretation to achieve the investigation objectives.

Non-conformances were reported for some field QA/QC samples and laboratory QA/QC analysis. These non-conformances were considered to be sporadic and minor, and were not considered to be indicative of systematic sampling or analytical errors. On this basis, these non-conformances are not considered to materially impact the report findings.

There was only one groundwater monitoring event undertaken for the assessment. On this basis there is some uncertainty around the representativeness of the groundwater data, particularly during different climatic conditions and after wet/dry periods. However, given the low contaminant concentrations reported, the site history and the surrounding land uses, this is not considered to alter the conclusions of the assessment. JKE also undertook a conservative approach to assessing risks posed by groundwater,



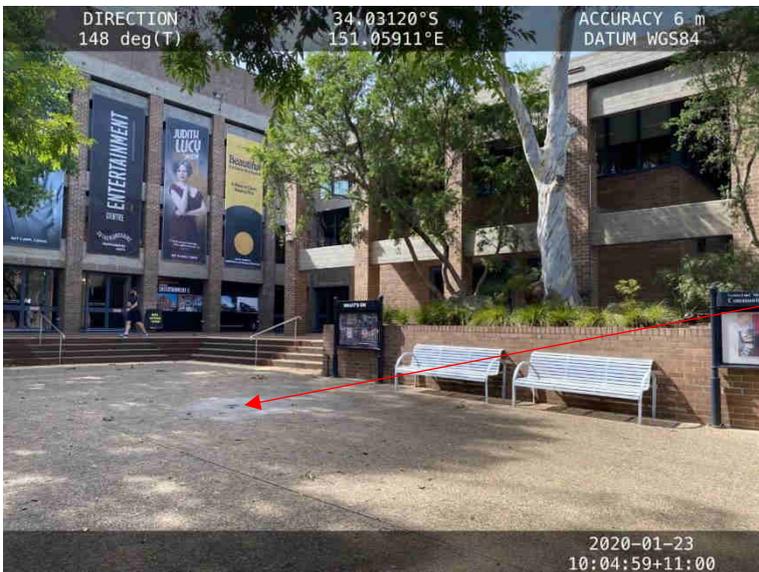
particularly in the context of human health risks from volatile contaminants. Therefore, the uncertainty is not considered to be unacceptable in the context of the proposed development.



Appendix H: Field Work Documents

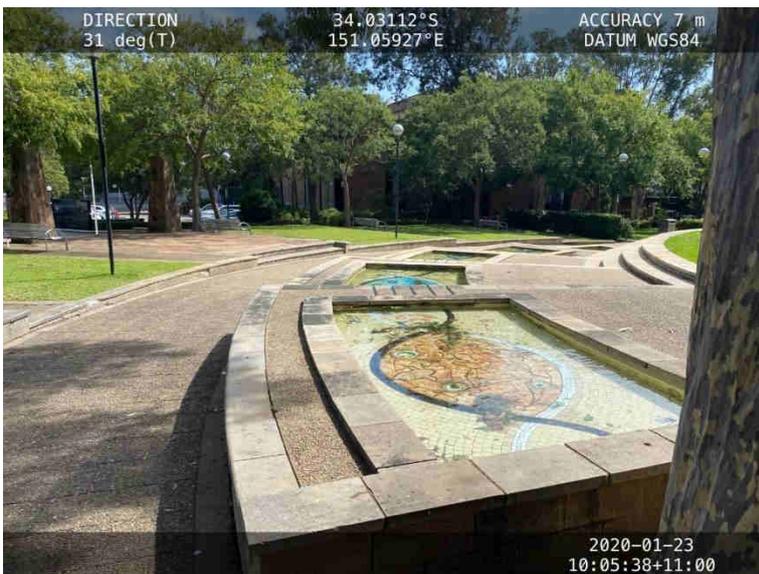


View of the site from Eton Street, looking east. Note the terraced lawn areas.



View of the Sutherland Entertainment Centre building from the southern part of the site, fronting Eton Street. Note the location of MW1.

MW1



Typical view of the water feature ponds located at the site.



View of the site from the Sutherland Entertainment Centre, overlooking Eton Street to the west.



View of the sandstone feature located centrally at the site.

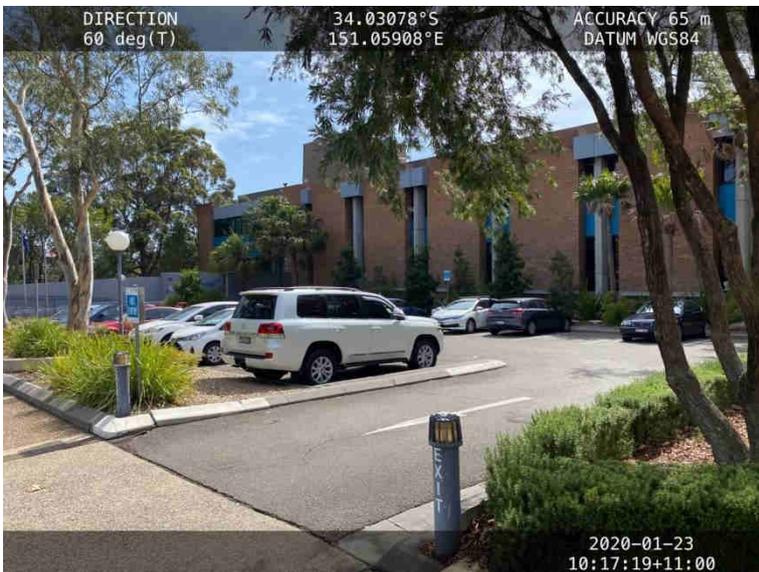


View of the northern part of the site, overlooking at the Japanese garden to the east. Note the location of MW5.

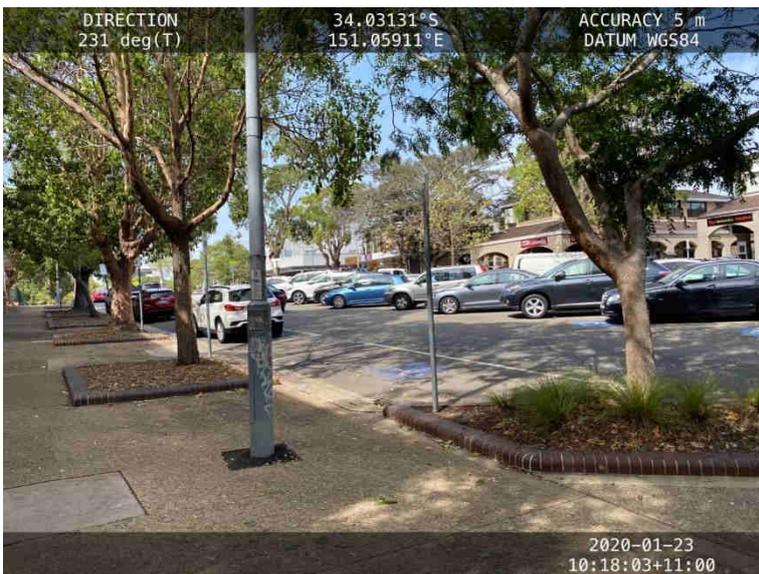
MW5



View of the electricity transformer located along the eastern site boundary.



Off-site: view of the Council chamber building and associated carpark to the north of the site.



Off-site: view of Eton Street, overlooking Eton Arcade and predominantly commercial and retail land use to the west of the site.

JOB NO: E328898
 LOCATION: 30 Eton Street, Sutherland, NSW

FIELD CALIBRATION FORM

Sampling

PID			
Make: MiniRAE	Model: 2000	Unit: <i>Green</i>	Date of last factory calibration: <i>20/7/2020</i>
Date of calibration: <i>24/1/2020</i>		Name of Calibrator: <i>HW</i>	
Calibration gas: Iso-butylene		Calibration Gas Concentration: 100.0 ppm	
Measured reading: <i>100</i> ppm	Error in measured reading: ± <i>0</i> ppm		
Measured reading Acceptable (Yes/No): <input checked="" type="checkbox"/> Yes			
DISSOLVED OXYGEN			
Make: <i>—</i>		Model: Aqua DY	
Date of calibration: <i>28/1/2020</i>		Name of Calibrator: <i>HW</i>	
Span value: 70% to 130%			
Measured value: <i>102%</i>			
Measured reading Acceptable (Yes/No): <input checked="" type="checkbox"/> Yes			
pH METER			
Make: Orion		Model: Four star	
Date of calibration: <i>28/1/2020</i>		Name of Calibrator: <i>HW</i>	
Buffer 1: Theoretical pH = 7.01 ± 0.01	Expiry date: <i>Nov 2020</i>	Lot No: <i>332234</i>	
Buffer 2: Theoretical pH = 4.01 ± 0.01	Expiry date: <i>Jun 2020</i>	Lot No: <i>325418</i>	
Measured reading of Buffer 1: <i>7.10</i>			
Measured reading of Buffer 2: <i>4.11</i>			
Slope: <i>—</i>		Measured reading Acceptable (Yes/No): <input checked="" type="checkbox"/> Yes	
CONDUCTIVITY METER			
Make: Orion		Model: Four star	
Date: <i>28/1/2020</i>	Name of Calibrator: <i>HW</i>	Temperature: <i>25.8</i> °C	
Calibration solution: <i>Conductivity Standard</i>	Expiry date: <i>Jun 2020</i>	Lot No: <i>331609</i>	
Theoretical conductivity at temperature (see solution container): <i>1440</i> μS/cm			
Measured conductivity: <i>1465</i> μS/cm	Measured reading Acceptable (Yes/No): <input checked="" type="checkbox"/> Yes		
REDOX METER			
Make: Orion		Model: Four star	
Date of calibration: <i>28/1/2020</i>		Name of Calibrator: <i>HW</i>	
Calibration solution: <i>ORP test solution</i>	Expiry date: <i>Jan 2024</i>	Lot No: <i>3822</i>	
Theoretical redox value: 240mV			
Measured redox reading: <i>242.4</i> mV	Measured reading Acceptable (Yes/No): <input checked="" type="checkbox"/> Yes		



PID FIELD CALIBRATION FORM

Client:		NBRS Architecture	
Project:		Proposed Refurbishments to Sutherland Entertainment Centre	
Location:		Lot 1 DP1253156, 30 Eton Street, SUTHERLAND, NSW	
Job Number:		E32889B	
PID			
Make: <i>Yellow</i>	Model:	Unit: <i>Yellow</i>	Date of last factory calibration: <i>20/1/20</i>
Date of calibration: <i>22/1/20</i>		Name of Calibrator: <i>MMP</i>	
Calibration gas: Iso-butylene		Calibration Gas Concentration: 100.0 ppm	
Measured reading: <i>100</i> ppm		Error in measured reading: ± <i>0</i> ppm	
Measured reading Acceptable (Yes/No): <input checked="" type="checkbox"/> Yes / <input type="checkbox"/> No			
PID			
Make: <i>Mini RAE</i>	Model: <i>Lite</i>	Unit: <i>Green</i>	Date of last factory calibration: <i>20/1/20</i>
Date of calibration: <i>28/1/20</i>		Name of Calibrator: <i>HW</i>	
Calibration gas: Iso-butylene		Calibration Gas Concentration: 100.0 ppm	
Measured reading: <i>100</i> ppm		Error in measured reading: ± 100 ppm	
Measured reading Acceptable (Yes/No): <input checked="" type="checkbox"/> Yes / <input type="checkbox"/> No			
PID			
Make:	Model:	Unit:	Date of last factory calibration:
Date of calibration:		Name of Calibrator:	
Calibration gas: Iso-butylene		Calibration Gas Concentration: 100.0 ppm	
Measured reading: ppm		Error in measured reading: ± ppm	
Measured reading Acceptable (Yes/No):			
PID			
Make:	Model:	Unit:	Date of last factory calibration:
Date of calibration:		Name of Calibrator:	
Calibration gas: Iso-butylene		Calibration Gas Concentration: 100.0 ppm	
Measured reading: ppm		Error in measured reading: ± ppm	
Measured reading Acceptable (Yes/No):			
PID			
Make:	Model:	Unit:	Date of last factory calibration:
Date of calibration:		Name of Calibrator:	
Calibration gas: Iso-butylene		Calibration Gas Concentration: 100.0 ppm	
Measured reading: ppm		Error in measured reading: ± ppm	
Measured reading Acceptable (Yes/No):			



Appendix I: Guidelines and Reference Documents



Acid Sulfate Soils Management Advisory Committee (ASSMAC), (1998). Acid Sulfate Soils Manual

Australian and New Zealand Environment Conservation Council (ANZECC), (2000). Australian and New Zealand Guidelines for Fresh and Marine Water Quality

Canadian Council of Ministers of the Environment, (1999). Canadian soil quality guidelines for the protection of environmental and human health: Benzo(a)Pyrene (1997)

CRC Care, (2011). Technical Report No. 10 – Health screening levels for hydrocarbons in soil and groundwater Part 1: Technical development document

Contaminated Land Management Act 1997 (NSW)

Department of Land and Water Conservation, (1997). 1:25,000 Acid Sulfate Soil Risk Map Series

Managing Land Contamination, Planning Guidelines SEPP55 – Remediation of Land (1998)

National Health and Medical Research Council (NHMRC), (2018). National Water Quality Management Strategy, Australian Drinking Water Guidelines 2011

NSW Department of Environment and Conservation, (2007). Guidelines for the Assessment and Management of Groundwater Contamination

NSW EPA, (1995). Contaminated Sites Sampling Design Guidelines

NSW EPA, (2014). Waste Classification Guidelines - Part 1: Classifying Waste

NSW EPA, (2015). Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997

NSW EPA, (2017). Guidelines for the NSW Site Auditor Scheme, 3rd Edition

NSW Office of Environment and Heritage (OEH), (2011). Guidelines for Consultants Reporting on Contaminated Sites

National Environment Protection Council (NEPC), (2013). National Environmental Protection (Assessment of Site Contamination) Measure 1999 as amended (2013)

Olszowy, H., Torr, P., and Imray, P., (1995). Trace Element Concentrations in Soils from Rural and Urban Areas of Australia. Contaminated Sites Monograph Series No. 4. Department of Human Services and Health, Environment Protection Agency, and South Australian Health Commission

Protection of the Environment Operations Act 1997 (NSW)

State Environmental Planning Policy No.55 – Remediation of Land 1998 (NSW)

World Health Organisation (WHO), (2008). Petroleum Products in Drinking-water, Background document for the development of WHO Guidelines for Drinking Water Quality

Western Australia Department of Health, (2009). Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia