idealgeotech
a division of idealcorp

Report on

Preliminary Contamination Assessment

Prepared for: SGCH

Address: 30 Ironbark Avenue, Casula

Job No: 32322

Date: March 2018

Accredited for compliance
With ISO/IEC 17025
NATA Accreditation No. 19226

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EXECUTIVE SUMMARY

This executive summary presents a synopsis of the Stage 1 Preliminary Contamination Report for 30 Ironbark Avenue, Casula

The object of the Stage 1 Preliminary Contamination Report was to ascertain whether the site presents a risk to human health and/or the environment arising from any past/present activities at the site or neighbouring properties. The scope of work included a documentary review of historical records, a site walkover, preliminary laboratory testing and the preparation of this report.

There were no obvious potential sources of contamination.

No history of dangerous manufacturing utilizing heavy chemicals was documented. No history of heavy chemicals storage was documented.

No records are held by the EPA of known or regulated contaminated sites in the vicinity (200m) of the subject site.

Search of Protection of the Environment Operations Public Register (POEO) revealed no licensed and delicensed premises in the vicinity (200m) of the subject site.

Preliminary limited laboratory testing was undertaken to determine if the soil is contaminated.

The results of the chemical analyses indicate that the site does not present a risk to human health or the environment in a 'resiendential with garden/accessible soil' ('A') setting and is considered suitable for the proposed development.

1.0 INTRODUCTION

Ideal Geotech have undertaken a Stage 1 Preliminary Contamination Report with limited testing and analysis at the site 30 Ironbark Avenue, Casula. It is understood the existing house is to be demolished and a multi storey residential complex is to be constructed over 30-38 Ironbark Avenue, Casula.

2.0 SCOPE OF WORK

The following scope of work was conducted:

- Desktop Study of the following to assist in identification of potential contamination issues:
  - Data from Environment Protection Authority
  - Data from the Protection of the Environment Operations Public Register (POEO)
  - Council records/ development and building applications
  - Council property files
  - Current and past zoning of the land
- Review of soils and geological maps
- Site walkover
- Chemical analysis of soil samples by a NATA accredited laboratory
- Preparation of a Stage 1 Preliminary Contamination Report.

3.0 SITE DESCRIPTION

The subject site is rectangular in shape and approximately 525m2 in area. The site is bound by Ironbark Avenue to the north, Kurrajong Road to the south and neighbouring residential properties to the east and west.

The site is currently occupied by an existing house and an above ground pool in the backyard. Vegetation consists of grass cover and a semi mature tree in the front yard while the backyard is mostly paved with a small patch of grass cover. The site is located on gently sloping terrain with slopes sloping downwards towards the north east at gradients of approximately 1-2º..

4.0 SITE HISTORY

The site is currently occupied by a residential dwelling and surrounded by residential dwellings. The site was vacant land and has been used for residential purposes since at least 1951.

4.1 Geology

Reference to the Penrith 1:100,000 geological map (Geological series sheet 9130) indicates that the site is underlain by Bringelly Shale of the Wianamatta Group consisting of shale, carbonaceous claystone, laminite and lithic sandstone along with soils derived from the weathering of these rocks.

4.2 Aerial Photographs

Aerial photographs from 1951, 1971 and 1986 were obtained and Google Earth was used to view the site from 2004 to 2018. The aerial photographs were reviewed to assess the likely past uses of the site. The findings are summarised below and a copy of historical photographs can be found in Appendix D.

1951 – The subject site appears to be used for residential use along with the neighbouring lots.

1971 – The subject site appears to be unchanged.

1986 – The subject site appears to be unchanged

2004 – The subject site appears to be unchanged

2018 – The subject site appears to be unchanged

In summary, the aerial photographs reveal that the site has been used for residential use since at least 1951 through to the present day.

4.3 Search of Contaminated Land Management Register (NSW EPA)

A summary of the search of the NSW EPA Contaminated Land Management record of notices for Auburn can be found in Appendix A. No notices have been issued to the subject site or on any sites within 200m of the subject site.

4.4 Search of Protection of the Environment Operations Public Register (POEO) of Licensed and Delicensed Premises

A search of the POEO public register of licensed and delicensed premises (DECC) indicated that no licensed or delicensed premises were located within the immediate surrounding area of the site (within 200m).

5.0 SITE WALKOVER AND SURROUNDING ENVIRONMENT

A site investigation was conducted on 23 March 2018. The field observations are summarised in Table 2 below.

Table 2: Summary of Field Observations

Parameter	Observation
Visible observations on soil contamination	No visible evidence of contamination was observed. No staining of the soils or odours was documented.
Signs of plant stress	None observed.
Presence of drums or waste materials	No drums observed. No visible indicators of underground fuel tanks (bowsers or venting pipes).
Presence of fill	None observed
Quality of surface waters	None observed.
Flood potential	Not evident.
Relevant sensitive environments	None observed.

6.0 SUMMARY OF POTENTIAL SOURCES OF CONTAMINATION

The potential for the site to be contaminated from on-site sources and off site sources was considered by Ideal Geotech. Based on the findings of our site inspection and site history review there were no obvious potential sources of contamination.

No history of dangerous manufacturing utilizing heavy chemicals was documented.

No history of heavy chemicals storage was documented.

The neighbouring properties are not considered to have posed a risk for potential contamination to the site.

7.0 SAMPLING METHODOLOGY

The desktop review and site inspection did not identify possible contamination associated with the site. Limited sampling was undertaken, with three samples taken from around the site.

Limited sampling and analysis was undertaken in order to assess the nature, location and likely distribution of any contamination present at the subject site, and also any potential risk posed to human health or the environment. Test results were compared to the relevant New South Wales Environment Protection Authority (NSW EPA) criteria.

Each sample location (refer to Figure 1) was excavated utilizing hand tools to a depth of 0.2m below ground surface. The samples were collected from the hole using a stainless steel trowel, which had been decontaminated prior to use to prevent cross contamination occurring.

The samples were placed in 250g laboratory prepared glass jars which were capped using Teflon-sealed screw caps and then placed in a chilled container. The sample jars were transported to our Smithfield office and placed in a refrigerator.

The following day the samples were forwarded to SGS environmental for analysis along with a Chain of Custody which was subsequently returned to confirm the receipt of all samples.

8.0 LABORATORY CHEMICAL TESTING RESULTS

It should be appreciated that the assessment was preliminary in nature and was very limited in scope. Chemical testing was carried out on soil samples using SGS laboratory services. SGS holds accreditation with the National Association of Testing Authorities, Australia (NATA). The initial testing of the soil was undertaken as a broad scale preliminary assessment

All testing was undertaken within the terms of their accreditation. Copies of the laboratory test reports are shown in Appendix E and summarised in the following tables.

Table 3 - Heavy Metal Test Results

		Heavy Metals (mg/kg)							
Sample No.	Depth (m)	Arsenic	Cadmium	Chromium	Copper	Lead	Nickel	Zinc	Mercury
E1	0 - 0.2	7	<0.3	15	21	12	2.8	25	<0.05
E2	0 - 0.2	6	<0.3	21	25	34	5.9	52	<0.05
E3	0 - 0.2	8	<0.3	17	19	15	2.6	20	<0.05
LOR		*3*	*0.3*	*0.3*	*0.5*	*1*	*0.5*	*0.5*	*0.05*
NEPM Health Investigation Level HILs (A)		**100**	**20**	**100**	**6000**	**300**	**400**	**7400**	**40**

LOR Limit of Reporting

Table 4: Organochlorine Pesticides (OCP) & Organophosphate Pesticides (OPP) Test Results

		OCP (mg/kg)						OPP (mg/kg)		
Sample No.	Depth (m)	Aldrin+ Dieldrin	Endrin	Hepta -chlor	DDD+ DDE+ DDT	DDT	Chlordane	Diazinon	Ethion	Chlorpyrifos
E1	0 - 0.2	<0.3	<0.2	<0.1	<0.3	<0.1	<0.2	<0.5	<0.2	<0.2
E2	0 - 0.2	<0.3	<0.2	<0.1	<0.3	<0.1	<0.2	<0.5	<0.2	<0.2
E3	0 - 0.2	<0.3	<0.2	<0.1	<0.3	<0.1	<0.2	<0.5	<0.2	<0.2

Practical Quantitation Limit	0.3	0.2	0.1	0.3	0.1	0.2	0.5	0.2	0.2
NEPM HILs for low density residential areas	6	10	6	240	NC	50	NC	NC	160

NC No Criteria.

Table 5: PAH and PCB Test Results

Sample No.	Depth (m)	PAH (mg/kg)			PCB
		Total	B(a)P	B(a)P TEQ (Upper)	Total
E1	0 - 0.2	<0.8	<0.1	<0.3	<1
E2	0 - 0.2	<0.8	<0.1	<0.3	<1
E3	0 - 0.2	<0.8	<0.1	<0.3	<1
Practical Quantitation Limit (PQL)		0.8	0.1	0.3	1
NEPM HILs for low density residential areas		300	NC	3	1

NC No Criteria.

Table 6 - Total Petroleum Hydrocarbon (TPH) and BTEX Test Results

Sample No.	Depth (m)	TRH (mg/kg)				BTEX (mg/kg)			
		C10-C14	C15-C28	C29-C36	Total	Benzene	Toluene	Ethyl Benzene	Total Xylenes
E1	0 - 0.2	<20	<45	<45	<210	<0.1	<0.1	<0.1	<0.3
E2	0 - 0.2	<20	<45	<45	<210	<0.1	<0.1	<0.1	<0.3
E3	0 - 0.2	<20	<45	<45	<210	<0.1	<0.1	<0.1	<0.3
LOR		*20*	*45*	*45*	*210*	*0.1*	*0.1*	*0.1*	*0.3*
NSW EPA (DECC) Threshold Concentrations 2009 ('Guidelines for Assessing Service Station Sites')		**NC**	**NC**	**NC**	**10000**	**10**	**135**	**185**	**95**

NC No Criteria
LOR Limit of Reporting

Table 7 - Asbestos Test Results

Sample No.	Depth (m)	Asbestos Detected	Type of Asbestos
E1	0 - 0.2	No Asbestos Found	NA
E2	0 - 0.2	No Asbestos Found	NA
E3	0 - 0.2	No Asbestos Found	NA

9.0 DISCUSSION OF CONTAMINATION RESULTS

9.1 Heavy Metals

The heavy metal concentrations, presented in Table 3, were less than the relevent assessment criteria adopted, and therefore the chemical analyses indicate that areas tested are not contaminated with heavy metals.

9.2 Organochlorine Pesticides (OCP) and Organophosphorus Pesticides (OPP)

The OCP and OPP concentrations, presented in Table 4, were less than the relevant assessment criteria adopted, and therefore the chemical analyses indicate that the areas tested are not contaminated with OCP or OPP.

9.3 Polycyclic Aromatic Hydrocarbons (PAH) and Polychlorinated Biphenyl (PCB)

The PAH and PCB concentrations, presented in Table 5, were less than the relevant assessment criteria adopted, and therefore the chemical analyses indicate that the site is not contaminated with PAH or PCB.

9.4 Total Petrolium Hydrocarbons (TPH) and BTEX

The TPH and BTEX concentrations, presented in Table 6, were less than the relecvent assessment criteria adopted, and therefore the chemical analysis indicate that areas tested are not contaminated with TPH or BTEX.

9.1 Asbestos

The presence of asbestos, presented in Table 7, were found to be nill, and therefore the chemical analyses indicate that areas tested are not contaminated with asbestos.

10.0 CONCLUSIONS AND RECOMMENDATIONS

The historical photographs indicate that the site was used for residential purposes since at least 1951.

There were no obvious potential sources of contamination.

No history of dangerous manufacturing utilizing heavy chemicals was documented. No history of heavy chemicals storage was documented.

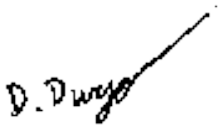
No records are held by the EPA of known or regulated contaminated sites in the vicinity (200m) of the subject site.

Search of Protection of the Environment Operations Public Register (POEO) revealed no licensed and delicensed premises in the vicinity (200m) of the subject site.

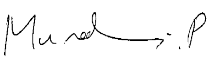
The results of the chemical analyses indicate that the site does not present a risk to human health or the environment in a 'resiendential with garden/accessible soil' ('A') setting.

The results of the preliminary contamination assessment of the site indicates that the site is suitable for the proposed residential use.

For and on behalf of
Ideal Geotech



D. Dwyer
Geotechnical Engineer



M. Pamu
Geotechnical Engineer

REFERENCES:

Contaminated Sites – Guidelines for Assessing Service Stations. NSW Environment Protection Authority (EPA) 1994

Contaminated Sites – Guidelines for Consultants Reporting on Contaminated Sites. NSW Environment Protection Authority (EPA) 2000.

Contaminated Sites – Sampling Design Guidelines. NSW Environment Protection Authority (EPA) 1995

Managing Land Contamination: Planning Guidelines SEPP55 – Remediation of Land - Department of Urban Affairs and Planning and Environment Protection Authority (DUAP and EPA) 1998.

National Environment Protection (Assessment of Site Contamination) Measure – National Environmental Protection Council 2013.

APPENDIX A

SEARCH RESULTS OF EPA CONTAMINATED LAND REGISTER

Search results

Your search for: Suburb: CASULA

[Search Again] [Refine Search]

did not find any records in our database.

Search TIP

To search for a specific site, search by LGA (local government area) and carefully review all sites listed.

more search tips

If a site does not appear on the record it may still be affected by contamination. For example:

- Contamination may be present but the site has not been regulated by the EPA under the Contaminated Land Management Act 1997 or the Environmentally Hazardous Chemicals Act 1985.
- The EPA may be regulating contamination at the site through a licence or notice under the Protection of the Environment Operations Act 1997 (POEO Act).
- Contamination at the site may be being managed under the planning process.

More information about particular sites may be available from:

- The POEO public register
- The appropriate planning authority: for example, on a planning certificate issued by the local council under section 149 of the Environmental Planning and Assessment Act

See What's in the record and What's not in the record

If you want to know whether a specific site has been the subject of notices issued by the EPA under the CLM Act, we suggest that you search by Local Government Area only and carefully review the sites that are listed.
This public record provides information about sites regulated by the EPA under the Contaminated Land Management Act 1997, including sites currently and previously regulated under the Environmentally Hazardous Chemicals Act 1985. Your inquiry using the above search criteria has not matched any record of current or former regulation. You should consider searching again using different criteria. The fact that a site does not appear on the record does not necessarily mean that it is not affected by contamination. The site may have been notified to the EPA but not yet assessed, or contamination may be present but the site is not yet being regulated by the EPA. Further information about particular sites may be available from the appropriate planning authority, for example, on a planning certificate issued by the local council under section 149 of the Environmental Planning and Assessment Act. In addition the EPA may be regulating contamination at the site through a licence under the Protection of the Environment Operations Act 1997. You may wish to search the POEO public register (OEH public register).

3 April 2018

APPENDIX B

SEARCH OF POEO REGISTER OF LICENSED AND DELICENSED PREMISES

Legislation and compliance | News and media

NSW EPA

Your environment | Reporting and incidents | Licensing and regulation | Working together | About us

Environment protection licences

- + Licensing under the POEO Act
- Guide to licensing
- eConnect EPA
- Licence forms
- Licence fees
- + Risk-based licensing
- + Load-based licensing
- + Emissions trading
- + POEO Public Register
  - Terms of use: POEO public register
  - Search for licences, applications and notices
  - Search for penalty notices
  - Search for prosecutions and civil proceedings
  - Enforceable undertakings
  - Exemptions and approvals
  - Licensing FAQs
  - List of licences
  - Unlicensed premises and activities regulated by the EPA
- National Pollutant Inventory
- + Compliance audit program
- + Reporting and managing incidents
- + Wind farm regulation
- NSW Gas Plan Regulation
- + Gas industry in NSW
- + Notice to act [illegible]
- + Authorised officers
- Regulation of railway systems activities

Home > Environment protection licences > POEO Public Register > Search for licences, applications and notices

Search results

Your search for: General Search with the following criteria

Suburb - casula

returned 3 results

Export to excel | 1 of 1 Pages | Search Again

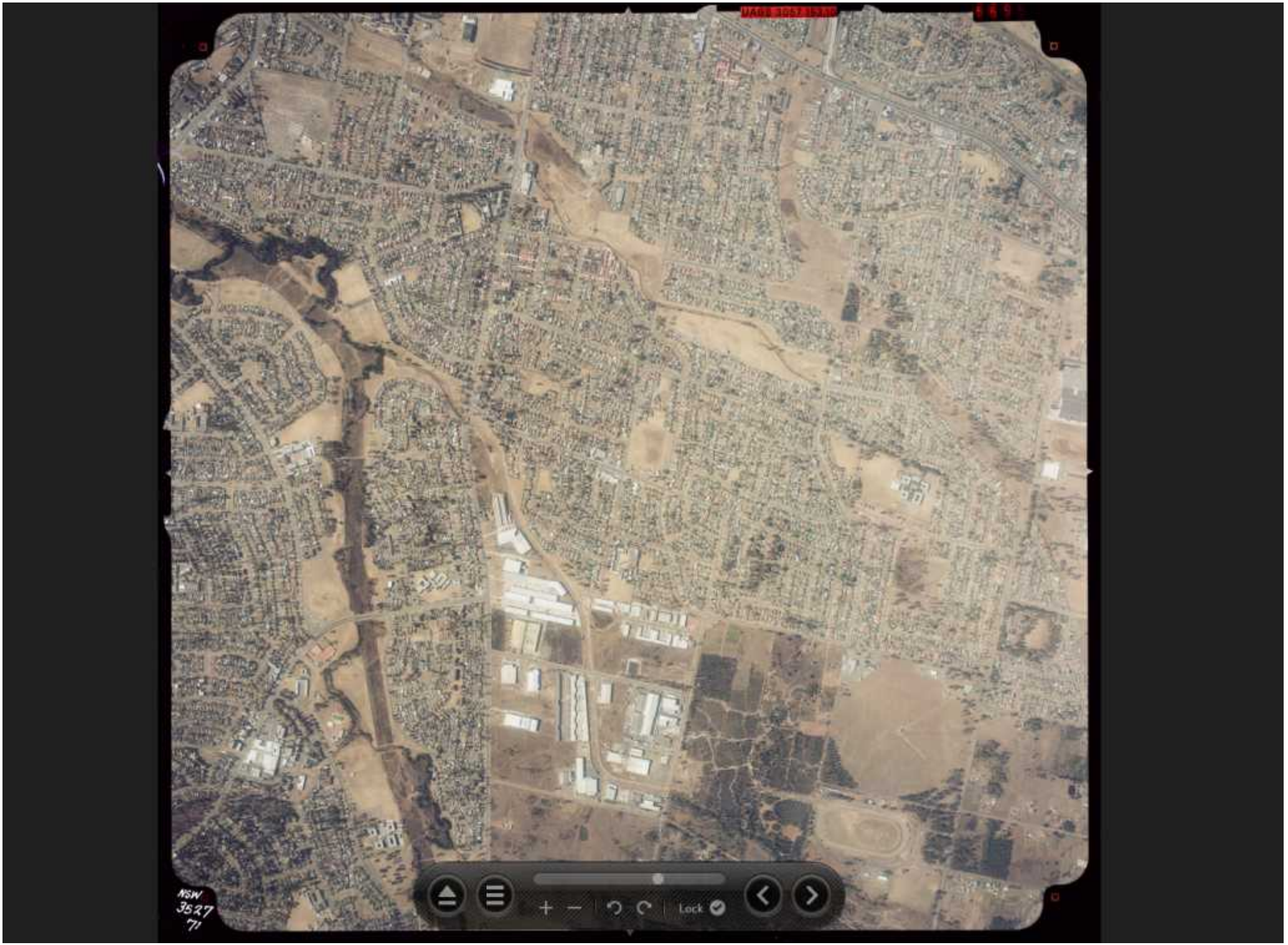
Number	Name	Location	Type	Status	Issued date
20720	COSTCO WHOLESALE AUSTRALIA PTY. LTD.	22 Parkers Farm Place, CASULA, NSW 2170	POEO licence	Issued	28 Nov 2012
1549256	LIVERPOOL CITY COUNCIL	Ryall Road, CASULA, NSW 2170	s.91 Clean Up Notice	Issued	17 Mar 2017
1559477	LIVERPOOL CITY COUNCIL	Ryall Road, CASULA, NSW 2170	s.110 Variation of Clean Up Notice	Issued	13 Dec 2017

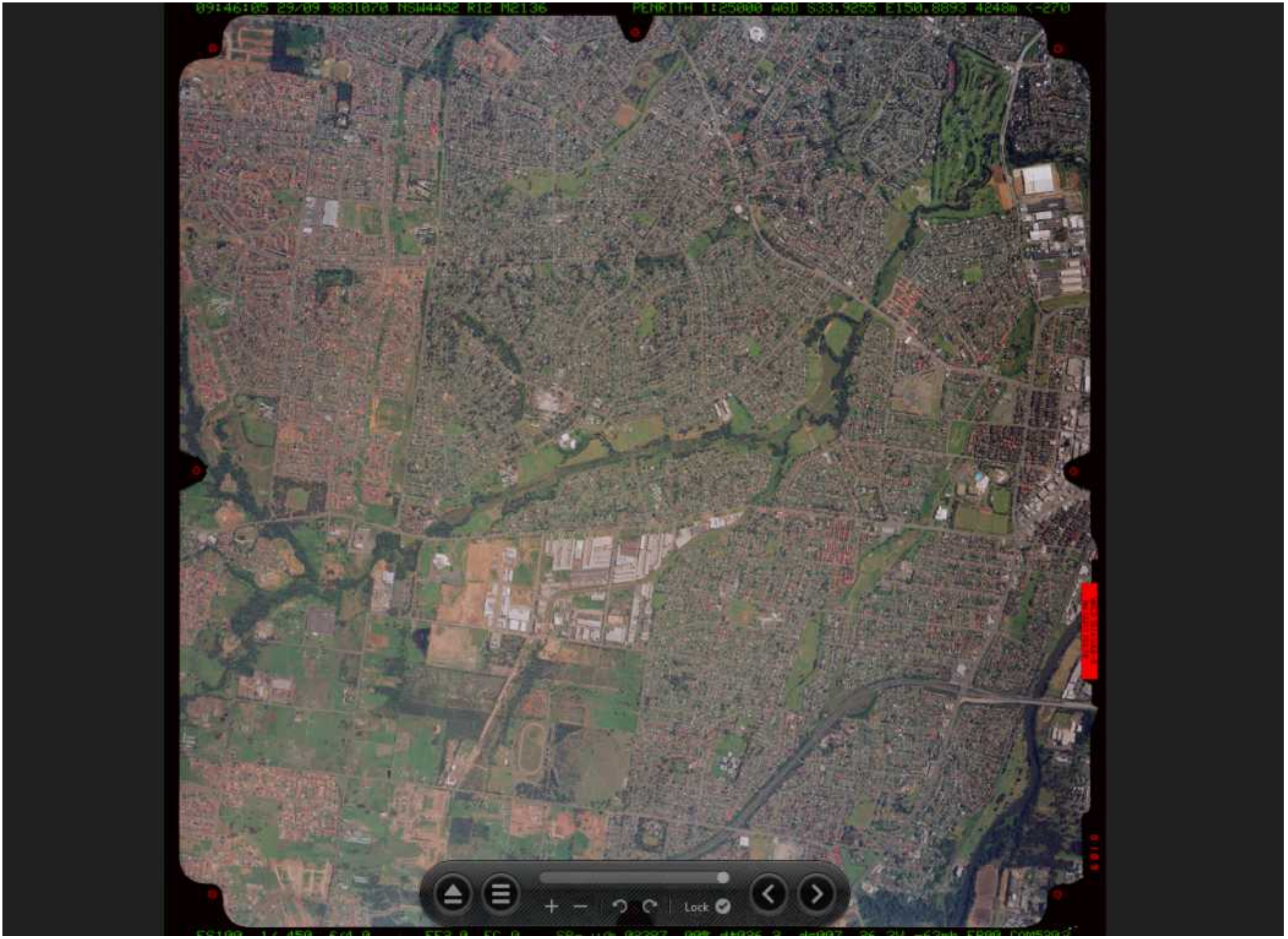
05 April 2018

APPENDIX C

AERIAL PHOTOGRAPHS


Lock
NSW
2200
51


NSW
3527
71
Lock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APPENDIX D

LABORATORY TEST RESULTS

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS		LABORATORY DETAILS	
Contact	Dane Dwyer	Manager	Huong Crawford
Client	IDEALCORP PTY LTD	Laboratory	SGS Alexandria Environmental
Address	PO BOX 2270 SMITHFIELD NSW 2164	Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	61 2 97255522	Telephone	+61 2 8594 0400
Facsimile	61 2 87866300	Facsimile	+61 2 8594 0499
Email	orders@idealfoundations.com.au	Email	au.environmental.sydney@sgs.com
Project	**32322**	SGS Reference	**SE177149 R0**
Order Number	(Not specified)	Date Received	23 Mar 2018
Samples	3	Date Reported	04 Apr 2018

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(4354).

No respirable fibres detected in all soil samples using trace analysis technique.

Asbestos analysed by Approved Identifier Yusuf Kuthpudin.

SIGNATORIES

Akheeqar Beniameen
Chemist

Huong Crawford
Production Manager

Kamrul Ahsan
Senior Chemist

Ly Kim Ha
Organic Section Head

Ravee Sivasubramaniam
Hygiene Team Leader

Parameter	Units	LOR	Sample Number: SE177149.001 Sample Matrix: Soil Sample Date: 23 Mar 2018 Sample Name: E1	SE177149.002 Soil 23 Mar 2018 E2	SE177149.003 Soil 23 Mar 2018 E3
VOC's in Soil Method: AN433 Tested: 26/3/2018					
Monocyclic Aromatic Hydrocarbons					
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1
Polycyclic VOCs					
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1
Surrogates					
Dibromofluoromethane (Surrogate)	%	-	**73**	**82**	**78**
d4-1,2-dichloroethane (Surrogate)	%	-	**70**	**82**	**77**
d8-toluene (Surrogate)	%	-	**82**	**103**	**89**
Bromofluorobenzene (Surrogate)	%	-	**74**	**80**	**78**
Totals					
Total Xylenes	mg/kg	0.3	<0.3	<0.3	<0.3
Total BTEX	mg/kg	0.6	<0.6	<0.6	<0.6
Volatile Petroleum Hydrocarbons in Soil Method: AN433 Tested: 26/3/2018					
TRH C6-C10	mg/kg	25	<25	<25	<25
TRH C6-C9	mg/kg	20	<20	<20	<20
Surrogates					
Dibromofluoromethane (Surrogate)	%	-	**73**	**82**	**78**
d4-1,2-dichloroethane (Surrogate)	%	-	**70**	**82**	**77**
d8-toluene (Surrogate)	%	-	**82**	**103**	**89**
Bromofluorobenzene (Surrogate)	%	-	**74**	**80**	**78**
VPH F Bands					
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25

Parameter	Units	LOR	Sample Number: SE177149.001 Sample Matrix: Soil Sample Date: 23 Mar 2018 Sample Name: E1	SE177149.002 Soil 23 Mar 2018 E2	SE177149.003 Soil 23 Mar 2018 E3
TRH (Total Recoverable Hydrocarbons) in Soil Method: AN403 Tested: 26/3/2018					
TRH C10-C14	mg/kg	20	<20	<20	<20
TRH C15-C28	mg/kg	45	<45	<45	<45
TRH C29-C36	mg/kg	45	<45	<45	<45
TRH C37-C40	mg/kg	100	<100	<100	<100
TRH C10-C36 Total	mg/kg	110	<110	<110	<110
TRH C10-C40 Total (F bands)	mg/kg	210	<210	<210	<210
TRH F Bands					
TRH >C10-C16	mg/kg	25	<25	<25	<25
TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120
PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420 Tested: 26/3/2018					
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	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)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1
Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3	<0.3	<0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2
Total PAH (18)	mg/kg	0.8	<0.8	<0.8	<0.8
Total PAH (NEPM/WHO 16)	mg/kg	0.8	<0.8	<0.8	<0.8
Surrogates					
d5-nitrobenzene (Surrogate)	%	-	**92**	**90**	**86**
2-fluorobiphenyl (Surrogate)	%	-	**98**	**96**	**92**
d14-p-terphenyl (Surrogate)	%	-	**94**	**90**	**86**
OC Pesticides in Soil Method: AN420 Tested: 26/3/2018					
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1	<0.1	<0.1
Lindane	mg/kg	0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	0.1	<0.1	<0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1	<0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	<0.1
o,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	<0.1
p,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	0.2	<0.2	<0.2	<0.2

Parameter	Units	LOR	Sample Number: SE177149.001 Sample Matrix: Soil Sample Date: 23 Mar 2018 Sample Name: E1	SE177149.002 Soil 23 Mar 2018 E2	SE177149.003 Soil 23 Mar 2018 E3
OC Pesticides in Soil Method: AN420 Tested: 26/3/2018 (continued)					
Endrin	mg/kg	0.2	<0.2	<0.2	<0.2
o,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1
Total CLP OC Pesticides	mg/kg	1	<1	<1	<1
Surrogates					
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	**127**	**109**	**109**
OP Pesticides in Soil Method: AN420 Tested: 26/3/2018					
Dichlorvos	mg/kg	0.5	<0.5	<0.5	<0.5
Dimethoate	mg/kg	0.5	<0.5	<0.5	<0.5
Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5	<0.5
Fenitrothion	mg/kg	0.2	<0.2	<0.2	<0.2
Malathion	mg/kg	0.2	<0.2	<0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2	<0.2
Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	<0.2
Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	<0.2
Methidathion	mg/kg	0.5	<0.5	<0.5	<0.5
Ethion	mg/kg	0.2	<0.2	<0.2	<0.2
Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	<0.2
Total OP Pesticides*	mg/kg	1.7	<1.7	<1.7	<1.7
Surrogates					
2-fluorobiphenyl (Surrogate)	%	-	**98**	**96**	**92**
d14-p-terphenyl (Surrogate)	%	-	**94**	**90**	**86**
PCBs in Soil Method: AN420 Tested: 26/3/2018					
Arochlor 1016	mg/kg	0.2	<0.2	<0.2	<0.2
Arochlor 1221	mg/kg	0.2	<0.2	<0.2	<0.2
Arochlor 1232	mg/kg	0.2	<0.2	<0.2	<0.2
Arochlor 1242	mg/kg	0.2	<0.2	<0.2	<0.2
Arochlor 1248	mg/kg	0.2	<0.2	<0.2	<0.2
Arochlor 1254	mg/kg	0.2	<0.2	<0.2	<0.2
Arochlor 1260	mg/kg	0.2	<0.2	<0.2	<0.2
Arochlor 1262	mg/kg	0.2	<0.2	<0.2	<0.2
Arochlor 1268	mg/kg	0.2	<0.2	<0.2	<0.2
Total PCBs (Arochlors)	mg/kg	1	<1	<1	<1

Parameter	Units	LOR	Sample Number: SE177149.001 Sample Matrix: Soil Sample Date: 23 Mar 2018 Sample Name: E1	SE177149.002 Soil 23 Mar 2018 E2	SE177149.003 Soil 23 Mar 2018 E3
PCBs in Soil Method: AN420 Tested: 26/3/2018 (continued)					
Surrogates					
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	**127**	**109**	**109**
Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES Method: AN040/AN320 Tested: 29/3/2018					
Arsenic, As	mg/kg	3	**7**	**6**	**8**
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.3	**15**	**21**	**17**
Copper, Cu	mg/kg	0.5	**21**	**25**	**19**
Lead, Pb	mg/kg	1	**12**	**34**	**15**
Nickel, Ni	mg/kg	0.5	**2.8**	**5.9**	**2.6**
Zinc, Zn	mg/kg	0.5	**25**	**52**	**20**
Mercury in Soil Method: AN312 Tested: 29/3/2018					
Mercury	mg/kg	0.05	<0.05	<0.05	<0.05
Moisture Content Method: AN002 Tested: 27/3/2018					
% Moisture	%w/w	0.5	**19**	**13**	**16**
Fibre Identification in soil Method: AN602 Tested: 29/3/2018					
FibreID					
Asbestos Detected	No unit	-	No	No	No
SemiQuant					
Estimated Fibres*	%w/w	0.01	<0.01	<0.01	<0.01

QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Mercury in Soil **Method: ME-(AU)-[ENV]AN312**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Mercury	LB144618	mg/kg	0.05	<0.05	0%	92%	93%

Moisture Content **Method: ME-(AU)-[ENV]AN002**

Parameter	QC Reference	Units	LOR	DUP %RPD
% Moisture	LB144434	%w/w	0.5	0 - 3%

OC Pesticides in Soil **Method: ME-(AU)-[ENV]AN420**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Hexachlorobenzene (HCB)	LB144333	mg/kg	0.1	<0.1	0%	NA
Alpha BHC	LB144333	mg/kg	0.1	<0.1	0%	NA
Lindane	LB144333	mg/kg	0.1	<0.1	0%	NA
Heptachlor	LB144333	mg/kg	0.1	<0.1	0%	122%
Aldrin	LB144333	mg/kg	0.1	<0.1	0%	124%
Beta BHC	LB144333	mg/kg	0.1	<0.1	0%	NA
Delta BHC	LB144333	mg/kg	0.1	<0.1	0%	119%
Heptachlor epoxide	LB144333	mg/kg	0.1	<0.1	0%	NA
o,p'-DDE	LB144333	mg/kg	0.1	<0.1	0%	NA
Alpha Endosulfan	LB144333	mg/kg	0.2	<0.2	0%	NA
Gamma Chlordane	LB144333	mg/kg	0.1	<0.1	0%	NA
Alpha Chlordane	LB144333	mg/kg	0.1	<0.1	0%	NA
trans-Nonachlor	LB144333	mg/kg	0.1	<0.1	0%	NA
p,p'-DDE	LB144333	mg/kg	0.1	<0.1	0%	NA
Dieldrin	LB144333	mg/kg	0.2	<0.2	0%	118%
Endrin	LB144333	mg/kg	0.2	<0.2	0%	113%
o,p'-DDD	LB144333	mg/kg	0.1	<0.1	0%	NA
o,p'-DDT	LB144333	mg/kg	0.1	<0.1	0%	NA
Beta Endosulfan	LB144333	mg/kg	0.2	<0.2	0%	NA
p,p'-DDD	LB144333	mg/kg	0.1	<0.1	0%	NA
p,p'-DDT	LB144333	mg/kg	0.1	<0.1	0%	93%
Endosulfan sulphate	LB144333	mg/kg	0.1	<0.1	0%	NA
Endrin Aldehyde	LB144333	mg/kg	0.1	<0.1	0%	NA
Methoxychlor	LB144333	mg/kg	0.1	<0.1	0%	NA
Endrin Ketone	LB144333	mg/kg	0.1	<0.1	0%	NA
Isodrin	LB144333	mg/kg	0.1	<0.1	0%	NA
Mirex	LB144333	mg/kg	0.1	<0.1	0%	NA
Total CLP OC Pesticides	LB144333	mg/kg	1	<1	0%	NA

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Tetrachloro-m-xylene (TCMX) (Surrogate)	LB144333	%	-	105%	1%	106%

QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

OP Pesticides in Soil Method: ME-(AU)-[ENV]AN420

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Dichlorvos	LB144333	mg/kg	0.5	<0.5	0%	85%
Dimethoate	LB144333	mg/kg	0.5	<0.5	0%	NA
Diazinon (Dimpylate)	LB144333	mg/kg	0.5	<0.5	0%	77%
Fenitrothion	LB144333	mg/kg	0.2	<0.2	0%	NA
Malathion	LB144333	mg/kg	0.2	<0.2	0%	NA
Chlorpyrifos (Chlorpyrifos Ethyl)	LB144333	mg/kg	0.2	<0.2	0%	93%
Parathion-ethyl (Parathion)	LB144333	mg/kg	0.2	<0.2	0%	NA
Bromophos Ethyl	LB144333	mg/kg	0.2	<0.2	0%	NA
Methidathion	LB144333	mg/kg	0.5	<0.5	0%	NA
Ethion	LB144333	mg/kg	0.2	<0.2	0%	78%
Azinphos-methyl (Guthion)	LB144333	mg/kg	0.2	<0.2	0%	NA
Total OP Pesticides*	LB144333	mg/kg	1.7	<1.7	0%	NA

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
2-fluorobiphenyl (Surrogate)	LB144333	%	-	94%	2%	94%
d14-p-terphenyl (Surrogate)	LB144333	%	-	100%	2%	100%

PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: ME-(AU)-[ENV]AN420

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Naphthalene	LB144333	mg/kg	0.1	<0.1	0%	99%	99%
2-methylnaphthalene	LB144333	mg/kg	0.1	<0.1	0%	NA	NA
1-methylnaphthalene	LB144333	mg/kg	0.1	<0.1	0%	NA	NA
Acenaphthylene	LB144333	mg/kg	0.1	<0.1	0%	98%	95%
Acenaphthene	LB144333	mg/kg	0.1	<0.1	0%	99%	106%
Fluorene	LB144333	mg/kg	0.1	<0.1	0%	NA	NA
Phenanthrene	LB144333	mg/kg	0.1	<0.1	0%	110%	98%
Anthracene	LB144333	mg/kg	0.1	<0.1	0%	117%	106%
Fluoranthene	LB144333	mg/kg	0.1	<0.1	0%	118%	100%
Pyrene	LB144333	mg/kg	0.1	<0.1	0%	120%	100%
Benzo(a)anthracene	LB144333	mg/kg	0.1	<0.1	0%	NA	NA
Chrysene	LB144333	mg/kg	0.1	<0.1	0%	NA	NA
Benzo(b&j)fluoranthene	LB144333	mg/kg	0.1	<0.1	0%	NA	NA
Benzo(k)fluoranthene	LB144333	mg/kg	0.1	<0.1	0%	NA	NA
Benzo(a)pyrene	LB144333	mg/kg	0.1	<0.1	0%	108%	107%
Indeno(1,2,3-cd)pyrene	LB144333	mg/kg	0.1	<0.1	0%	NA	NA
Dibenzo(ah)anthracene	LB144333	mg/kg	0.1	<0.1	0%	NA	NA
Benzo(ghi)perylene	LB144333	mg/kg	0.1	<0.1	0%	NA	NA
Carcinogenic PAHs, BaP TEQ <LOR=0	LB144333	TEQ (mg/kg)	0.2	<0.2	0%	NA	NA
Carcinogenic PAHs, BaP TEQ <LOR=LOR	LB144333	TEQ (mg/kg)	0.3	<0.3	0%	NA	NA
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	LB144333	TEQ (mg/kg)	0.2	<0.2	0%	NA	NA
Total PAH (18)	LB144333	mg/kg	0.8	<0.8	0%	NA	NA
Total PAH (NEPM/WHO 16)	LB144333	mg/kg	0.8	<0.8			

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
d5-nitrobenzene (Surrogate)	LB144333	%	-	94%	0%	84%	90%
2-fluorobiphenyl (Surrogate)	LB144333	%	-	94%	2%	94%	100%
d14-p-terphenyl (Surrogate)	LB144333	%	-	100%	2 - 4%	100%	96%

QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

PCBs in Soil Method: ME-(AU)-[ENV]AN420

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Arochlor 1016	LB144333	mg/kg	0.2	<0.2	0%	NA
Arochlor 1221	LB144333	mg/kg	0.2	<0.2	0%	NA
Arochlor 1232	LB144333	mg/kg	0.2	<0.2	0%	NA
Arochlor 1242	LB144333	mg/kg	0.2	<0.2	0%	NA
Arochlor 1248	LB144333	mg/kg	0.2	<0.2	0%	NA
Arochlor 1254	LB144333	mg/kg	0.2	<0.2	0%	NA
Arochlor 1260	LB144333	mg/kg	0.2	<0.2	0%	122%
Arochlor 1262	LB144333	mg/kg	0.2	<0.2	0%	NA
Arochlor 1268	LB144333	mg/kg	0.2	<0.2	0%	NA
Total PCBs (Arochlors)	LB144333	mg/kg	1	<1	0%	NA

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Tetrachloro-m-xylene (TCMX) (Surrogate)	LB144333	%	-	105%	1%	101%

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES Method: ME-(AU)-[ENV]AN040/AN320

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Arsenic, As	LB144634	mg/kg	3	<3	8%	99%	67%
Cadmium, Cd	LB144634	mg/kg	0.3	<0.3	0%	105%	64%
Chromium, Cr	LB144634	mg/kg	0.3	<0.3	5%	104%	-23%
Copper, Cu	LB144634	mg/kg	0.5	<0.5	2%	106%	32%
Lead, Pb	LB144634	mg/kg	1	<1	9%	99%	-265%
Nickel, Ni	LB144634	mg/kg	0.5	<0.5	4%	101%	38%
Zinc, Zn	LB144634	mg/kg	0.5	<0.5	5%	103%	21%

TRH (Total Recoverable Hydrocarbons) in Soil Method: ME-(AU)-[ENV]AN403

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
TRH C10-C14	LB144333	mg/kg	20	<20	0%	95%	105%
TRH C15-C28	LB144333	mg/kg	45	<45	0%	98%	100%
TRH C29-C36	LB144333	mg/kg	45	<45	0%	95%	98%
TRH C37-C40	LB144333	mg/kg	100	<100	0%	NA	NA
TRH C10-C36 Total	LB144333	mg/kg	110	<110	0%	NA	NA
TRH C10-C40 Total (F bands)	LB144333	mg/kg	210	<210	0%	NA	NA

TRH F Bands

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
TRH >C10-C16	LB144333	mg/kg	25	<25	0%	98%	105%
TRH >C10-C16 - Naphthalene (F2)	LB144333	mg/kg	25	<25	0%	NA	NA
TRH >C16-C34 (F3)	LB144333	mg/kg	90	<90	0%	98%	98%
TRH >C34-C40 (F4)	LB144333	mg/kg	120	<120	0%	95%	NA

QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

VOC's in Soil Method: ME-(AU)-[ENV]AN433

Monocyclic Aromatic Hydrocarbons

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Benzene	LB144308	mg/kg	0.1	<0.1	0%	66%	63%
Toluene	LB144308	mg/kg	0.1	<0.1	0%	68%	67%
Ethylbenzene	LB144308	mg/kg	0.1	<0.1	0%	70%	67%
m/p-xylene	LB144308	mg/kg	0.2	<0.2	0%	70%	68%
o-xylene	LB144308	mg/kg	0.1	<0.1	0%	69%	67%

Polycyclic VOCs

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Naphthalene	LB144308	mg/kg	0.1	<0.1	0%	NA	NA

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Dibromofluoromethane (Surrogate)	LB144308	%	-	75%	4%	72%	71%
d4-1,2-dichloroethane (Surrogate)	LB144308	%	-	74%	7%	77%	70%
d8-toluene (Surrogate)	LB144308	%	-	86%	8%	103%	99%
Bromofluorobenzene (Surrogate)	LB144308	%	-	76%	5%	100%	96%

Totals

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Total Xylenes	LB144308	mg/kg	0.3	<0.3	0%	NA	NA
Total BTEX	LB144308	mg/kg	0.6	<0.6	0%	NA	NA

Volatile Petroleum Hydrocarbons in Soil Method: ME-(AU)-[ENV]AN433

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
TRH C6-C10	LB144308	mg/kg	25	<25	0%	80%	81%
TRH C6-C9	LB144308	mg/kg	20	<20	0%	70%	68%

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Dibromofluoromethane (Surrogate)	LB144308	%	-	75%	4%	72%	71%
d4-1,2-dichloroethane (Surrogate)	LB144308	%	-	74%	7%	77%	70%
d8-toluene (Surrogate)	LB144308	%	-	86%	8%	103%	99%
Bromofluorobenzene (Surrogate)	LB144308	%	-	76%	5%	100%	96%

VPH F Bands

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Benzene (F0)	LB144308	mg/kg	0.1	<0.1	0%	NA	NA
TRH C6-C10 minus BTEX (F1)	LB144308	mg/kg	25	<25	0%	108%	117%

METHOD SUMMARY

METHOD	METHODOLOGY SUMMARY
AN002	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.
AN040	A portion of sample is digested with Nitric acid to decompose organic matter and Hydrochloric acid to complete the digestion of metals and then filtered for analysis by ASS or ICP as per USEPA Method 200.8.
AN040/AN320	A portion of sample is digested with nitric acid to decompose organic matter and hydrochloric acid to complete the digestion of metals. The digest is then analysed by ICP OES with metals results reported on the dried sample basis. Based on USEPA method 200.8 and 6010C.
AN312	Mercury by Cold Vapour AAS in Soils: After digestion with nitric acid, hydrogen peroxide and hydrochloric acid, mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500
AN403	Total Recoverable Hydrocarbons: Determination of Hydrocarbons by gas chromatography after a solvent extraction. Detection is by flame ionisation detector (FID) that produces an electronic signal in proportion to the combustible matter passing through it. Total Recoverable Hydrocarbons (TRH) are routinely reported as four alkane groupings based on the carbon chain length of the compounds: C6-C9, C10-C14, C15-C28 and C29-C36 and in recognition of the NEPM 1999 (2013), >C10-C16 (F2), >C16-C34 (F3) and >C34-C40 (F4). F2 is reported directly and also corrected by subtracting Naphthalene (from VOC method AN433) where available.
AN403	Additionally, the volatile C6-C9 fraction may be determined by a purge and trap technique and GC/MS because of the potential for volatiles loss. Total Petroleum Hydrocarbons (TPH) follows the same method of analysis after silica gel cleanup of the solvent extract. Aliphatic/Aromatic Speciation follows the same method of analysis after fractionation of the solvent extract over silica with differential polarity of the eluent solvents .
AN403	The GC/FID method is not well suited to the analysis of refined high boiling point materials (ie lubricating oils or greases) but is particularly suited for measuring diesel, kerosene and petrol if care to control volatility is taken. This method will detect naturally occurring hydrocarbons, lipids, animal fats, phenols and PAHs if they are present at sufficient levels, dependent on the use of specific cleanup/fractionation techniques. Reference USEPA 3510B, 8015B.
AN420	(SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols (etc) in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN420	SVOC Compounds: Semi-Volatile Organic Compounds (SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN433	VOCs and C6-C9 Hydrocarbons by GC-MS P&T: VOC`s are volatile organic compounds. The sample is presented to a gas chromatograph via a purge and trap (P&T) concentrator and autosampler and is detected with a Mass Spectrometer (MSD). Solid samples are initially extracted with methanol whilst liquid samples are processed directly. References: USEPA 5030B, 8020A, 8260.
AN602	Qualitative identification of chrysotile, amosite and crocidolite in bulk samples by polarised light microscopy (PLM) in conjunction with dispersion staining (DS). AS4964 provides the basis for this document. Unequivocal identification of the asbestos minerals present is made by obtaining sufficient diagnostic `clues`, which provide a reasonable degree of certainty, dispersion staining is a mandatory `clue` for positive identification. If sufficient `clues` are absent, then positive identification of asbestos is not possible. This procedure requires removal of suspect fibres/bundles from the sample which cannot be returned.
AN602	Fibres/material that cannot be unequivocably identified as one of the three asbestos forms, will be reported as unknown mineral fibres (umf) The fibres detected may or may not be asbestos fibres.

METHOD SUMMARY

METHOD	METHODOLOGY SUMMARY
AN602	AS4964.2004 Method for the Qualitative Identification of Asbestos in Bulk Samples , Section 8.4, Trace Analysis Criteria, Note 4 states:"Depending upon sample condition and fibre type, the detection limit of this technique has been found to lie generally in the range of 1 in 1,000 to 1 in 10,000 parts by weight, equivalent to 1 to 0.1 g/kg."
AN602	The sample can be reported “no asbestos found at the reporting limit of 0.1 g/kg” (<0.01%w/w) where AN602 section 4.5 of this method has been followed, and if- (a) no trace asbestos fibres have been detected (i.e. no ‘respirable’ fibres): (b) the estimated weight of non-respirable asbestos fibre bundles and/or the estimated weight of asbestos in asbestos-containing materials are found to be less than 0.1g/kg: and (c) these non-respirable asbestos fibre bundles and/or the asbestos containing materials are only visible under stereo-microscope viewing conditions.

FOOTNOTES

IS	Insufficient sample for analysis.	LOR	Limit of Reporting
LNR	Sample listed, but not received.	↑↓	Raised or Lowered Limit of Reporting
*	NATA accreditation does not cover the performance of this service.	QFH	QC result is above the upper tolerance
		QFL	QC result is below the lower tolerance
**	Indicative data, theoretical holding time exceeded.	-	The sample was not analysed for this analyte
		NVL	Not Validated

Samples analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calcuated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the " Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.
Note that in terms of units of radioactivity:

a. 1 Bq is equivalent to 27 pCi
b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here : http://www.sgs.com.au/~/media/Local/Australia/Documents/Technical%20Documents/MP-AU-ENV-QU-022%20QA%20QC%20Plan.pdf

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Dane Dwyer
Client	IDEALCORP PTY LTD
Address	PO BOX 2270 SMITHFIELD NSW 2164
Telephone	61 2 97255522
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Email	orders@idealfoundations.com.au
Project	**32322**
Order Number	(Not specified)
Samples	3

LABORATORY DETAILS

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SGS Reference	**SE177149 R0**
Date Received	23 Mar 2018
Date Reported	04 Apr 2018

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(4354).

No respirable fibres detected in all soil samples using trace analysis technique.

Asbestos analysed by Approved Identifier Yusuf Kuthpudin .

SIGNATORIES

Akheeqar Beniameen
Chemist

Huong Crawford
Production Manager

Kamrul Ahsan
Senior Chemist

Ly Kim Ha
Organic Section Head

Ravee Sivasubramaniam
Hygiene Team Leader

RESULTS

Fibre Identification in soil — Method AN602

Laboratory Reference	Client Reference	Matrix	Sample Description	Date Sampled	Fibre Identification	Est.%w/w*
SE177149.001	E1	Soil	19g Clay,Rocks	23 Mar 2018	No Asbestos Found	<0.01
SE177149.002	E2	Soil	27g Clay,Rocks	23 Mar 2018	No Asbestos Found	<0.01
SE177149.003	E3	Soil	22g Clay,Rocks	23 Mar 2018	No Asbestos Found	<0.01

METHOD SUMMARY

METHOD	METHODOLOGY SUMMARY
AN602	Qualitative identification of chrysotile, amosite and crocidolite in bulk samples by polarised light microscopy (PLM) in conjunction with dispersion staining (DS). AS4964 provides the basis for this document. Unequivocal identification of the asbestos minerals present is made by obtaining sufficient diagnostic `clues`, which provide a reasonable degree of certainty, dispersion staining is a mandatory `clue` for positive identification. If sufficient `clues` are absent, then positive identification of asbestos is not possible. This procedure requires removal of suspect fibres/bundles from the sample which cannot be returned.
AN602	Fibres/material that cannot be unequivocably identified as one of the three asbestos forms, will be reported as unknown mineral fibres (umf) The fibres detected may or may not be asbestos fibres.
AN602	AS4964.2004 Method for the Qualitative Identification of Asbestos in Bulk Samples , Section 8.4, Trace Analysis Criteria, Note 4 states:"Depending upon sample condition and fibre type, the detection limit of this technique has been found to lie generally in the range of 1 in 1,000 to 1 in 10,000 parts by weight, equivalent to 1 to 0.1 g/kg."
AN602	The sample can be reported “no asbestos found at the reporting limit of 0.1 g/kg” (<0.01%w/w) where AN602 section 4.5 of this method has been followed, and if- (a) no trace asbestos fibres have been detected (i.e. no ‘respirable’ fibres): (b) the estimated weight of non-respirable asbestos fibre bundles and/or the estimated weight of asbestos in asbestos-containing materials are found to be less than 0.1g/kg: and (c) these non-respirable asbestos fibre bundles and/or the asbestos containing materials are only visible under stereo-microscope viewing conditions.

FOOTNOTES

Amosite	-	Brown Asbestos	NA	-	Not Analysed
Chrysotile	-	White Asbestos	LNR	-	Listed, Not Required
Crocidolite	-	Blue Asbestos	*	-	NATA accreditation does not cover the performance of this service .
Amphiboles	-	Amosite and/or Crocidolite	**	-	Indicative data, theoretical holding time exceeded.

(In reference to soil samples only) This report does not comply with the analytical reporting recommendations in the Western Australian Department of Health Guidelines for the Assessment and Remediation and Management of Asbestos Contaminated sites in Western Australia - May 2009.

Sampled by the client.

Where reported: 'Asbestos Detected': Asbestos detected by polarised light microscopy, including dispersion staining.
Where reported: 'No Asbestos Found': No Asbestos Found by polarised light microscopy, including dispersion staining.
Where reported: 'UMF Detected': Mineral fibres of unknown type detected by polarised light microscopy, including dispersion staining. Confirmation by another independent analytical technique may be necessary.

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

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here : http://www.sgs.com.au/~/media/Local/Australia/Documents/ Technical%20Documents/MP-AU-ENV-QU-022%20QA%20QC%20Plan.pdf

APPENDIX E

SAMPLING LOCATIONS

Figure 1 – Sampling Location Plan

30 Ironbark Avenue, Casula