

Environmental Service & Design

ABN: 97 107 517 144



11 August 2019

Andrew Tilt
Unify SDA Housing Pty Ltd
22-24 Paterson St
Launceston, TAS 7250

Dear Andrew,

RE: Preliminary Site Investigation – 1A Georgetown Rd, Newnham 7248

Environmental Service and Design (ES&D) has investigated the site at 1A George Town Rd in relation to any potentially contaminating activities formerly conducted thereon, including risk to potential receptors and other potential environmental issues which may arise due to development activities.

The assessment was guided by the principles and requirements contained within the National Environmental (Assessment of Site Contamination) Measure, 1999 (as amended) (NEPM) according to its status as a state policy.

The investigation comprised a Preliminary Site Investigation as defined in NEPM Schedule B2, Section 2.1:

“Preliminary site investigations (PSI’s) usually include a desktop study to collect basic site information and identify the site characteristics (site location, land use, site layout, building construction, geological and hydrogeological setting, historical land uses and activities at the site), a site inspection and interviews with current and past owners, operators and occupiers of the site and nearby sites.

The preliminary investigation should be sufficient to:

- identify potential sources of contamination and determine potential contaminants of concern;
- identify areas of potential contamination;
- identify potential human and ecological receptors;

- identify feasible pathways by which contaminants and receptors may be linked;
- identify potentially affected media (soil, sediment, groundwater, surface water, indoor and ambient air)
- identify environmental issues which may arise because of development activities, or due to the change of use (increased disturbance due to increase in human activity).

With respect to contamination, if thorough preliminary investigation shows a history of non-contaminating activities and there is no other evidence or suspicion of contamination, further investigation is not required.”

It was concluded that the development does not present a significant risk to potential receptors identified in the Conceptual Site Model (CSM).

As per Section E2.4.3 of the Launceston Interim Planning Scheme 2015:

- the site history and site visit confirmed that potentially contaminating activities did not impact the development.

As per NEPM Schedule B2, Section 2.1, it was concluded that:

- No further investigation is required.

The details of the required investigation are documented in the following pages.

Yours sincerely,



Rod Cooper

Principal Consultant and CEnvP Site Contamination Specialist



Preliminary Site Investigation

1A George Town
Rd, Newnham
7248

Project No: 6787
July 2019



ABN: 97 107 517 144
74 Minna Rd
Heybridge TAS 7320
Ph: (03) 6431 2999

ACN: 107 517 144
PO Box 651
Burnie TAS 7320
Fax: (03) 6431 2933

6787 PSI – 1A George Town Rd, Newnham 7248

3

Document Control

Prepared & Published by: ES&D
Version: Final
File: 6775
Contact: Ariel Pascoe
Phone No: (03) 6431 2999
Prepared For: Unify SDA Housing

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DRAFT 1	A Pascoe	ES&D	22/07/2019
FINAL	R Cooper	ES&D	11/08/2019

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1 Introduction

Environmental Service and Design (ES&D) were commissioned by their client Commercial Project Delivery to undertake a Preliminary Site Investigation (PSI) on the proposed development at 1A George Town Rd, Newnham. Property ID Lot 2 SP137221 (5664m²)

The aim of the PSI is to determine whether activities have occurred on or near the site which may have resulted in contamination of the land and if so, whether the level of risk will increase with the proposed or future development.

Code E2 (Potentially Contaminated Land Code) of the Launceston Interim Planning Scheme 2015 stipulates that use or development of potentially contaminated land must not adversely impact on human health or the environment. **The following use and development are exempt for the code:**

E2.4.1 The following use and development is exempt from this Code.

E2.4.2 Development:

(a) to investigate potentially contaminated land; or

(b) in accordance with a notice issued in accordance with Part 5A of the Environmental Management and Pollution Control Act 1994.

E2.4.3 Any use or development where a site history prepared by a suitably qualified person has been provided to the planning authority that confirms potentially contaminating activities did not impact the site.

E2.4.4 Development that does not involve disturbance of more than 1m² of land.

E2.4.5 Any use or development that the Director, or a person approved by the Director for the purpose of this Code, having regard to the objective stated in all applicable standards in this Code, has issued a certificate stating that there is insufficient increase in risk from contamination to warrant any specific remediation and protection measures.

The Launceston Interim Planning Scheme 2015 specifies that environmental site assessments in relation to potentially contaminating activities must be prepared by a suitably qualified person. Council indicated that suitably qualified persons include CEnvP Site Contamination Specialist. Consequently, Mr. Rod Cooper of Environmental Service and Design (CEnvP Site Contamination Specialist certification no. SC40091) was engaged to perform the assessment.

This report will comprise a summary of investigation pursuant to E2.4.3 above, to establish if potentially contaminating activities are likely to have impacted the site and quantification of the potential risk associated with the proposed development.

2 Scope of Works

The scope of the preliminary site investigation included:

- Desktop review of the site and surrounding land use history;
- Obtaining information from Work Safe Tasmania (WST) regarding potential storage of dangerous substances in the area surrounding the property;
- Determination of potential contaminants of concern;
- Field investigations and site visit;
- Consideration of the site's environmental setting;
- Identification of potential human and ecological receptors and consideration of risks to identified receptors;
- Development of a Conceptual Site Model (CSM); and,
- Preparation of the assessment report.

3 Basis for Assessment

As a State Policy for the purposes of State policies and Procedures Act 1993, the National Environmental Protection (Assessment of Site Contamination) Measure 1999 (NEPM) was the guideline used for the assessment.

The assessment included elements of a Preliminary Environmental Site Assessment as defined in NEPM Schedule B2. NEPM advises that if a thorough preliminary investigation shows a history of non-contaminating activities and there is no other evidence or suspicion of contamination, further investigation is not required (Schedule B2 and Section 2.1).

4 Information Sources

- Historic Dangerous Substances license information associated with Worksafe Tasmania, Department of Justice.
- (the LIST) Land Information System Tasmania (www.thelist.tas.gov.au), accessed 9/7/2019;
- (GIP) DPIPWE Groundwater Information Portal (<http://wrt.tas.gov.au/groundwater-info>);
- Launceston Interim Planning Scheme 2015 (www.iplan.tas.gov.au), accessed 9/7/2019;
- National Environment Protection (assessment of Site Contamination) Amendment Measure 2013 (no. 1).
- Google Earth Pro, accessed 9/7/19

5 Site Details

5.1 Ownership and Location

The property at 1A George Town Rd ('The Site,' **Error! Reference source not found.**), the former Mowbray Bowls Club, is owned by the North Launceston Bowls Club who operate from the adjacent property at 1B George Town Road, rendering 1A George Town Rd vacant.



Figure 1: Site Plan

5.2 Proposed Development

The proposed development involves the construction of NDIS housing units. A preliminary plan is shown below in Figure 2 (c/o Unify Design, subject to change).



1 Site
1 : 500

Figure 2: Proposed Development

The existing club rooms are to remain on site to be refurbished for use as a day-respite facility or community centre.

5.3 Zoning

The Site is currently zoned 18.0 Recreation (Launceston Interim Planning Scheme 2015) with 11.0 Inner Residential zoning to the south, 10.0 General Residential and 15.0 Urban Mixed Use to the east, and 36.0 Particular Purpose (PPZ 5 – University of Tasmania Newnham Campus) to the south. The development will include rezoning of The Site from Recreation to Inner Residential.

447 Invermay Rd, currently occupied by a pizza business, is zoned 20.0 Local Business, and the Telstra exchange immediately opposite The Site at 338 Invermay Rd is zoned 28.0 Utilities. Additionally, despite residential zoning, a tattoo studio operates from the adjacent property to the south at 451 Invermay Road.

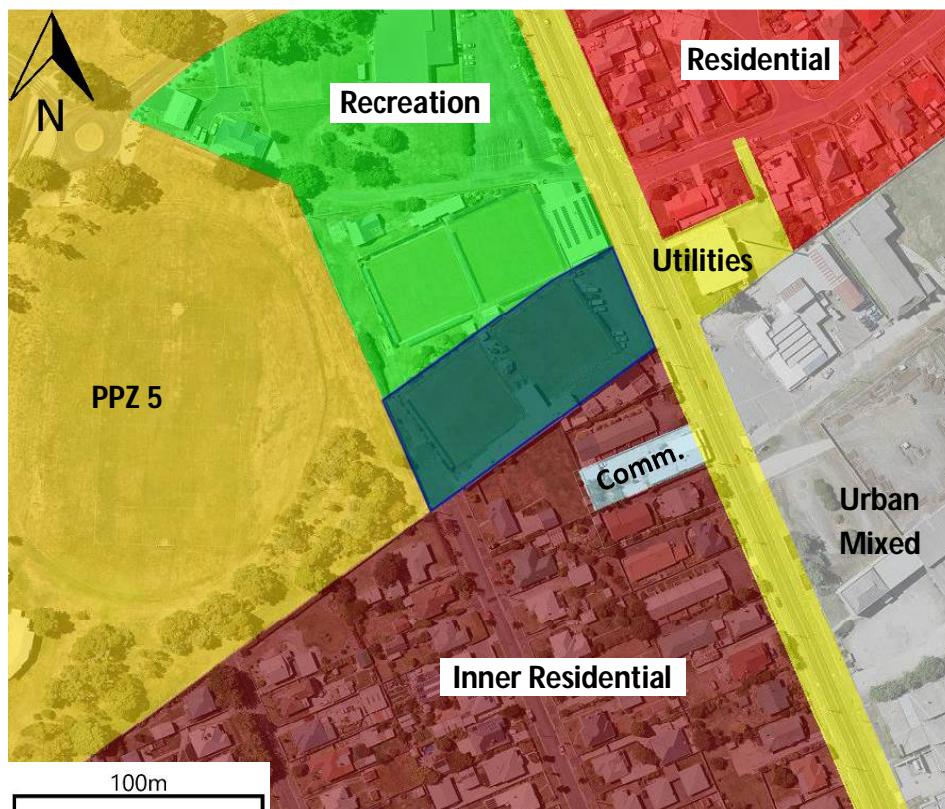


Figure 3: Zoning

6 Geology, Hydrology and Hydrogeology

6.1 Topography

A review of Google Earth and the LIST (Land Information System Tasmania) indicate that The Site slopes gently towards the Newnham Creek north with elevations between 25-20m (Figure 4).

6.2 Surface Water

The closest surface water body to the site is Newnham Creek, which is approximately 175m north. This flows for approximately 1.4km westward before it reaches the Tamar River.

6.3 Geology

The LIST and 1:25,000 geological map (Launceston, MRT) indicate that the site, and the majority of the Newnham/Mowbray area between the Mowbray Link Rd and Newnham Creek, is underlain by Cainozoic terrace deposits (TQac). TQac terrace deposits would be permeable to groundwater.

6.4 Regional Hydrogeology

Contours indicate that groundwater likely flows north or northwest towards Newnham Creek. (Figure 4). Groundwater is not extracted for drinking purposes in the area, as water is supplied from TasWater infrastructure.



Figure 4: Inferred Groundwater Flow Direction showing AHD contours

Reference to the Department of Primary Industries, Parks, Water and Environment (DPIPWE) Groundwater Information Access Portal indicates there is a registered bore approximately 780 m NE at the Mowbray Golf Club (Bore ID 31490). This bore is located upgradient from The Site, so any contamination from the site via groundwater would be unlikely to affect it.

6.5 Acid Sulphate Soils

Acid sulphate soils (ASS) are soils which contain naturally occurring sulphides. If left undisturbed and waterlogged they are harmless, however, exposure to air can cause oxidation which allows subsequent rain events to produce sulfuric acid. A review of The LIST indicates that acid sulphate soils are unlikely to occur above geological unit TQac.

7 Site History

7.1 Site and Surrounding Land uses

A site history has been compiled by Unify SDA (Specialist Disability Accommodation) Housing, a summary of this is as follows: The Railways Bowls Club moved next door to the Mowbray Bowls Club when their site at 298-308 Invermay Rd was sold to James Nelson Pty Ltd in c.1951. In 1966 the Railways Club built the current club rooms, and in 2003 the two clubs merged to form the North Launceston Bowls and Community Club (NLBCC). The NLBCC operated from the 1A George Town Rd site, leasing the 1B site to various community groups, but had to sell the 1B site as it was under-utilised.

According to the tattoo studio owner who is a long-time resident, the studio was the site of a HEC substation/transformer which served the Mowbray trolley bus service (ended in 1968, *Companion to Tasmanian History*). The HEC substation predates the bowling green and is still intact, located along the property boundary between the Site and studio. The studio owner also recalled that the Allenby Oval and trees at the end of Mangin St were there at the time of the HEC substation (pers. comm. 12/7/19).

Brooks High School occupied the current UTas Newnham Campus site from 1948 to 1990.

The area southeast of the Site, zoned urban mixed use has a long history of industrial/commercial operations dating back to at least 1973 (see aerial photos in Chapter 7.3), and to 1951 in the case of the James Nelson textile mill. This area currently home to many light industrial and commercial businesses including ACL Bearings, Pro Scaff, Fastway Couriers and T&G Floor Sanding.

7.2 Worksafe Tasmania Dangerous Goods Licences

A WorkSafe Tasmania search request for the Site was not lodged due to potentially contaminating activities being unlikely to have occurred at a long-established bowling green. However, a search of the WorkSafe database on surrounding properties revealed three potentially contaminated sites upgradient.

Table 1: Nearby Contaminated Sites

Address	File	Description
451 Invermay Rd	C640	Gas cylinder/tank at Clark's Plumbers, 1977-1986.
330 Invermay Rd	A249	Gas cylinder/tank at Ambassador Caravans 1971-1973
	P294	Underground Shell storage tank/s at Parkco Freight Lines/AR Park and Son
316-320 Invermay Rd	1578	Gas cylinder/tank at MTM Industries, 1978

7.3 Historical Aerial photography

A review of historical aerial photographs available on the LIST and Google Earth was undertaken to identify any historical potentially contaminating land uses in the area. Photographs from 1973, 1978, 1981, 1984, 1992, 1998, 2004 (the LIST), 2008, 2013 and 2018 (Google Earth) are shown in Figures 5-14 below. The development of the clubrooms and James Nelson mill are not shown as historical aerial photos are not readily available for the area prior to 1973.



Figure 5: Aerial 1973



Figure 6: Aerial 1978



Figure 7: Aerial 1981



Figure 8: Aerial 1984



Figure 9: Aerial 1992



Figure 10: Aerial 1998



Figure 11: Aerial 2004



Figure 12: Aerial 2008



Figure 13: Aerial 2013



Figure 14: Aerial 2018

7.4 Site History Summary

Site history is summarised below.

Table 2: Site History

Year	Activity
1951	Railways Bowls Club moved next door to Mowbray Bowls Club
1966	Railways Bowls Club built current club rooms
1968	End of trolley bus service, adjacent HEC substation not required
1990	UTas acquires adjacent property from Brooks High School, starts development
2003	Railways and Mowbray combined to form NLBCC and put the Site for lease
2019	NLBCC put site for tender

8 Site Visit

Rod Cooper from ES&D visited the site and neighbouring tattoo studio on the 17/7/19. Andrew Tilt from Unify SDA also interviewed the owner of the tattoo studio, and the occupant of the neighbouring residence at 22-24 Mangin St, comments from this interview are summarised in Chapter 7.1.



Figure 15: Driveway, former clubrooms and adjacent tattoo studio



Figure 16: Disused bowling green



Figure 17: Looking west towards Allenby Oval and the UTas campus



Figure 18: Northern boundary property, Mowbray Indoor Sport and Skate, at 1C George Town Road



Figure 19: Looking southeast towards the Charity Shop, T&G Flooring, ACL Bearings and the former James Nelson building.

9 Potential Site Contamination

9.1 Onsite contamination

Before the Bowls Club, the site was a paddock (pers. comm. tattoo studio owner, 11/7/19). The EPA's list of potentially contaminating activities does not contain anything that would relate to a bowling green, and there are no records for 1A George Town Rd on Worksafe Tasmania's database.

9.2 Offsite Sources

9.2.1 HEC Transformer, 451 Invermay Rd

451 Invermay Rd is on Worksafe's contaminated sites list due to the location of a gas cylinder or tank from 1977-1986 when it was occupied by a plumbing business. A removed, decommissioned or otherwise empty gas cylinder/tank is unlikely to cause contamination, especially given that it has not been in operation for 33 years.

The HEC transformer on the other hand presents a contamination risk. It would've been in operation during the time of the trolley bus service, c.1952-1968, and would have contained PCB's (Poly Chlorinated Biphenyls). PCBs are toxic, persistent and bio-accumulative organic

liquids/resins which were used in transformers until their phase out in 1975 (npi.gov.au). The HEC substation is directly adjacent to the Site and upgradient, so any PCB spillage would have reached the Site, see Figure 20.



Figure 20: HEC substation location

Substation location is shown in red, site boundary in yellow, possible inferred groundwater directions in blue.

Actual groundwater flow direction can only be determined with water table elevation measurements from a series of wells, however, the contours in Figure 4 show that the general direction must be N/NW towards Newnham Creek. Figure 20 shows that if the groundwater travels anywhere between 270° W to $\sim 10^{\circ}$ NE under the Site, any contamination at the former HEC substation will be carried onto the Site.

9.2.2 Former James Nelson site, 298-314 Invermay Rd

The James Nelson Pty Ltd textile mill operated between 1951 until recently, although it may not have been operating in full capacity after c.2008 (according to Google Maps Street View historical imagery, ACL Bearings were occupying their current site at 310-314 Invermay Rd in Jan 2008). Although dying was done offsite (*The Argus*, 21/4/51, accessed on Trove), “textile operations” are on the EPA’s list of potentially contaminating activities.

Current tenants of the site are the civil plant, labour and truck hire company Streetwise Developments at 298-308 Invermay Rd, and automotive engine bearing manufacturers ACL Bearings at 310-314 Invermay Rd. Contaminating activities have the potential to be undertaken at both sites. Additionally, an Origin gas tank is located next to the Invermay Rd entrance to ACL Bearings, see Figure 21.



Figure 21: LPG gas tank at ACL Bearings

From Google Maps Street View, 2018.

9.2.3 Warehouses, 316-320 Invermay Rd

The warehouses located at 316-320 Invermay Rd are on Worksafe's contaminated sites list due to the location of a gas cylinder/tank belonging to MTM Industries in 1978. The licence was not cancelled.

The current tenants of this site are My Charity Shop, T&G floor sanding and sealing, with Duggans and Statewide Glass occupying the warehouses before them. T&G supply timber for flooring and decking (yellowpages.com.au), so may have a timber yard and/or treat timber on site.

9.2.4 Former Ambassador Caravans, 330-336 Invermay Rd

330 Invermay Rd is on the contaminated site register due to the location of a gas cylinder/tank in 1971-1973 at the then Ambassador Caravans. This site is currently occupied by Vinnies.

10 Sampling

Assessment of an initial risk assessment determined that the soil close to the HEC Transformer, 451 Invermay Road. Contamination from ACL Bearings and the other industrial sites are unlikely to impact the site due to distance and attenuation /time.

PCB contamination is possible and being up gradient and close to the Site needs to be investigated. The transformer building was reviewed and found to have a solid floor with no cracks or leakage points. The properties of PCB s suggest that should there have been a spill, the oil would fix to the soil and move laterally and potentially vertically. A hotspot would form, experience being that it would be more laterally than vertical once the oil contacts moist soil the oil fixes and moves laterally. There are several Canadian studies comparing sand and clay soils.

Sample points (Figure 22) close to the transformer building were selected down gradient and deep enough to detect any old oil (300 mm). This selection was effective as the soil samples did detect low levels of heavy oils.

Samples were taken to meet the (Australian Standards) NEPM guidelines and placed in laboratory supplied sample jars. Samples were placed on ice and dispatched to a NATA laboratory.



Figure 22 Sample Points

Table 3 NATA Results

TABLE	UNITS	LOR	5/08/2019			5/08/2019		HSL A&B Sand - surface
			Sample A	Sample B	Sample C	Sample D		
PCB								
Total Polychlorinated biphenyls	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	1	
TRH								
C6 - C10 Fraction	mg/kg	10	<10	<10	<10	<10		
C6 - C10 Fraction minus BTEX (F1)	mg/kg	10	<10	<10	<10	<10	45	
>C10 - C16 Fraction	mg/kg	50	<50	<50	<50	<50		
>C16 - C34 Fraction	mg/kg	100	<100	320	310	120		
>C34 - C40 Fraction	mg/kg	100	<100	150	190	<100		
>C10 - C40 Fraction (sum)	mg/kg	50	<50	470	500	120		
>C10 - C16 Fraction minus Naphthalene (F2)	mg/kg	50	<50	<50	<50	<50	110	
BTEX								
Benzene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	0.5	
Toluene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	160	
Ethylbenzene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	55	
meta- & para-Xylene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5		
ortho-Xylene	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5		
Total Xylenes	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	40	
Sum of BTEX	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2		
Naphthalene	mg/kg	1	<1	<1	<1	<1	3	

11 Results

Results confirm that although there was low level contamination with heavier oils, PCB's were below detection limits. PCB levels in the impacted soil are not above HSL.

All other potential contaminants were below the HSL's for residential living and so acceptable for the proposed development.

12 Discussion

Surrounding sites were investigated and from the data that is available, and additional data from WST, it is evident that the general groundwater is not contaminated.

Due to the proximity of the HEC Transformer room, and the position directly up gradient of the proposed development, a sampling plan was devised to determine risk.

4 samples on the boundary sampled at 300 mm depth determined a minor historic spill, but all potential contaminants were below the HSL's for residential development. The results confirm that the sampling methodology was justified.

Results allow us to conclude that no further investigation is required, although there may be dermal risk off site closer to the source.

13 Potential Receptors

A preliminary Conceptual Site Model (CSM) (Table 5) was developed after consideration of risks to potential human receptors as outlined below.

Risks to human health from hydrocarbon contamination can arise via the inhalation route when people are exposed to vapours for extended periods, including from vapour intrusion into built spaces. Hydrocarbon and heavy metal exposure can occur by direct contact with contaminated soil, surface water or groundwater (e.g., ingestion, dermal contact).

Future workers involved in the construction of the development were considered in the preliminary CSM, along with subsurface workers.

14 Conclusions and Recommendations

ES&D investigated each potential contamination source based on the usage, inferred groundwater flow direction (both locally and regionally) and distance to offsite sources.

The only realistic risk source was the old HEC Transformer. Soil tests were conducted and concluded that risk was acceptable for the development to proceed.

A CSM was constructed and is shown in Table 4. A risk assessment was then conducted according to the principles and methodology contained within the NEPM and found no significant risk, and no increased risk to human health receptors associated with the development. Therefore requirements under section (E2.4.3) of the Launceston Interim Planning Scheme 2015 are met.



Rod Cooper.

Site Contamination Specialist



Table 4: Final Conceptual Site Model

Contamination Source	COPC	Pathway	Receptor
HEC Transformer. Leaks to the environment over a long period of	<ul style="list-style-type: none"> ● PCB' ● Petroleum- ● Volatile and semi-volatile organic ● Benzene, toluene, ethylbenzene xylene and naphthalene (BTEXN) 	<p>Dermal contact of soil and potentially groundwater</p> <p>No Pathway, Oil that may have leaked from the transformer did not impact the site.</p>	<ul style="list-style-type: none"> ● Workers involved in any construction directly on top of soil, or the movement ● ● ● Surrounding site users
Other offsite	<ul style="list-style-type: none"> ● Petroleum- ● Volatile and semi-volatile organic ● Benzene, toluene, ethylbenzene xylene ● 	<p>Impacts to groundwater are outside the zone of influence, considering typical spills and leaks that may have occurred.</p>	<ul style="list-style-type: none"> ● Workers involved in any construction directly on top of soil, or the movement ● ● ● Surrounding site users

15 Limitations

ES&D has prepared this report in accordance with the care and thoroughness of the consulting profession for D.J. McCulloch Surveying. It was based on accepted practices and standards at the time it was prepared. No other warranty, expressed or implied, is made as to the professional advice included in this report. It is prepared in accordance with the scope of work and for the purpose outlined.

This report was prepared during June and July 2018 and is based on the conditions encountered and information reviewed at the time of preparation. ES&D disclaims the responsibility for any changes that may have occurred after this time.

This report should be read in full. No responsibility is accepted for any use of any part of this report in any other context or for any other purpose or by third parties. This report does not purport to give legal advice.

Subsurface conditions can vary across a site and cannot be explicitly defined by these investigations. It is unlikely therefore that the results and estimations expressed in this report will represent the extreme conditions within the site.

The information in this report is accurate at the date of issue and is in accordance with conditions at the site at the dates sampled.

This document and the information contained herein should only be regarded as validly representing the site conditions at the time of the investigation unless otherwise explicitly stated in a preceding section of the report.

No warranty or guarantee of property conditions is given or intended.

References

Launceston City Council Interim Planning Scheme 2015

National Environmental Protection (Assessment of Site Contamination) Measure, *Guideline on the Investigation Levels for Soil and Groundwater*, Schedule B (1), (1999) as amended 2013

Land Information System Tasmania (the List): www.thelist.tas.gov.au

Department of Primary Industries, Parks, Water and Environment (DPIPWE) Groundwater Information Access Portal: <http://wrt.tas.gov.au/groundwater-info/>

Mineral Resources Tasmania 1:25,000 digital geological map database

EPA list of Potentially Contaminating Activities <https://epa.tas.gov.au/regulation/contaminated-sites/identification-and-assessment-of-contaminated-land/potentially-contaminating-activities-industries-and-land-uses>

Trove (<https://trove.nla.gov.au/>) accessed on 15/7/19

Companion to Tasmanian History, accessed on 23/7/19

https://www.utas.edu.au/library/companion_to_tasmanian_history/T/Trolley%20bus.htm

<http://www.npi.gov.au/resource/polychlorinated-biphenyls-pcbs>, accessed 23/7/19

APPENDIX 1 NATA CERTS



Environmental

CERTIFICATE OF ANALYSIS

Work Order : : Page : 1 of 4
Client : ENVIRONMENTAL SERVICE AND DESIGN PTY LTD :
Contact : MIR ROD COOPER :
Address : 80 MINNA ROAD PO BOX 651 :
 HEYBRIDGE TASMANIA, AUSTRALIA 7316 :
Telephone : :
Project : :
Order number : :
C-O-C number : :
Sampler : :
Site : :
Quote number : EN/222 :
No. of samples received : :
No. of samples analysed : :



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ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	<i>Position</i>
Nikki Stepniewski	Senior Inorganic Instrument Chemist
Xing Lin	Senior Organic Chemist

<i>Accreditation Category</i>
Melbourne Inorganics, Springvale, VIC



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Work Order : EM1912626
Client :
Project :

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

Ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- EP071: EM1912642_006 Poor duplicate precision due to sample heterogeneity. Confirmed by re-extraction and re-analysis.



Analytical Results

Compound	CAS Number	Client sample ID		Sample B	Sample C	Sample D	Result
		Client sampling date / time	Unit				
EA055: Moisture Content (Dried @ 105-110°C)	---	1.0	%	5.7	12.7	12.8	---
EP066: Polychlorinated Biphenyls (PCB)	---	0.1	mg/kg	<0.1	<0.1	<0.1	---
EP080/071: Total Petroleum Hydrocarbons							
C6 - C9 Fraction	---	10	mg/kg	<10	<10	<10	---
C10 - C14 Fraction	---	50	mg/kg	<50	<50	<50	---
C15 - C28 Fraction	---	100	mg/kg	180	160	<100	---
C29 - C36 Fraction	---	100	mg/kg	220	240	<100	---
^Λ	---	50	mg/kg	400	400	<50	---
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	<10	---
^Λ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10	<10	<10	---
>C10 - C16 Fraction	---	50	mg/kg	<50	<50	<50	---
>C16 - C34 Fraction	---	100	mg/kg	320	310	120	---
>C34 - C40 Fraction	---	100	mg/kg	150	190	<100	---
^Λ >C10 - C40 Fraction (sum)	---	50	mg/kg	470	500	120	---
^Λ >C10 - C16 Fraction minus Naphthalene	---	50	mg/kg	<50	<50	<50	---
EP080: BTEXN							
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	---
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	<0.5	---
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	<0.5	---
meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	<0.5	<0.5	---
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	<0.5	---
^Λ Sum of BTEX	---	0.2	mg/kg	<0.2	<0.2	<0.2	---
^Λ Total Xylenes	---	0.5	mg/kg	<0.5	<0.5	<0.5	---
Naphthalene	---	1	mg/kg	<1	<1	<1	---
EP066S: PCB Surrogate							
Decachlorobiphenyl	---	0.1	%	96.6	93.2	86.8	---
EP080S: TPH(V)/BTEX Surrogates							
1,2-Dichloroethane-D4	17060-07-0	0.2	%	84.2	68.4	72.5	---
Toluene-D8	2037-26-5	0.2	%	86.2	69.3	67.7	---
4-Bromofluorobenzene	460-00-4	0.2	%	89.3	77.7	81.0	---



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Surrogate Control Limits

Compound	CAS Number	Recovery Limits (%)	
		Low	High
EP066S: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	36	
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	51	125
Toluene-D8	2037-26-5	55	125
4-Bromofluorobenzene	460-00-4	56	124



Environmental

QUALITY CONTROL REPORT

Work Order :
 Client :
 Contact :
 Address : 80 MINNA ROAD PO BOX 651
 Telephone : +61 03 6442 4037
 Project :
 Order number :
 C-O-C number :
 Sampler :
 Site :
 Quote number :
 No. of samples received :
 No. of samples analysed :

Page : 1 of

Laboratory : Environmental Division Melbourne
 Contact :
 Address :
 Telephone :
 Date Samples Received :
 Date Analysis Commenced :
 Issue Date :



Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories
 Nikki Stepniewski
 Xing Lin

Accreditation Category

Melbourne Inorganics, Springvale, VIC



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key : Anonymus = Refers to samples which are not specifically part of this work order but formed part of the QC process lot

CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

RPD = Relative Percentage Difference

= Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix:

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Laboratory Duplicate (DUP) Report			Recovery Limits (%)
						Original Result	Duplicate Result	RPD (%)	
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 2511345)									
EM1912626-001	Sample A	EA055: Moisture Content	----	0.1	%	6.3	8.4	29.3	No Limit
	Anonymous	EA055: Moisture Content	----	0.1	%	22.9	20.5	11.2	0% - 20%
EP066: Polychlorinated Biphenyls (PCB) (QC Lot: 2511362)									
EM1912626-001	Sample A	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
	Anonymous	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 2511332)									
	Sample A	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 2511361)									
EM1912642-006	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	4530	3710	19.8	0% - 20%
		EP071: C29 - C36 Fraction	----	100	mg/kg	160	120	28.3	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	2410	2020	17.7	0% - 20%
		EP071: C10 - C36 Fraction (sum)	----	50	mg/kg	7100	5850	19.3	0% - 20%
EM1912626-001	Sample A	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
		EP071: C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 2511332)									
	Sample A	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 2511361)									
EM1912642-006	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	2990	# 2430	20.5	0% - 20%
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	3950	3290	18.4	0% - 20%
		EP071: >C10 - C40 Fraction (sum)	----	50	mg/kg	6940	5720	19.3	0% - 20%
EM1912626-001	Sample A	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit



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 Client : ENVIRONMENTAL SERVICE AND DESIGN PTY LTD
 Project :

Sub-Matrix:

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Laboratory Duplicate (DUP) Report			Recovery Limits (%)
						Original Result	Duplicate Result	RPD (%)	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 2511361) - continued									
EM1912626-001	Sample A	EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
		EP071: >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	0.00	No Limit
EP080: BTEXN (QC Lot: 2511332)									
EM1912626-001	Sample A	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		106-42-3	106-42-3						
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix:

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report		Laboratory Control Spike (LCS) Report			
				Result	Concentration	Spike Concentration	Spike Recovery (%)	LCS	Low
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 2511362)									
EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	1 mg/kg	85.9			115
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2511332)									
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	36 mg/kg	94.4			127
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2511361)									
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	688 mg/kg	119	72		122
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	3100 mg/kg	112	84		123
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	1490 mg/kg	111	79		119
EP071: C10 - C36 Fraction (sum)	----	50	mg/kg	<50	----	----	----		----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2511332)									
EP080: C6 - C10 Fraction		10	mg/kg	<10	45 mg/kg	92.0			125
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2511361)									
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	1050 mg/kg	114	77		121
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	3960 mg/kg	112	83		121
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	280 mg/kg	111	65		123
EP071: >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	----	----	----		----
EP080: BTEXN (QCLot: 2511332)									
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	2 mg/kg	79.4	63		119
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	2 mg/kg	82.8	67		126
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	2 mg/kg	87.8	66		124
EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	4 mg/kg	91.6	68		128
	106-42-3								
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	2 mg/kg	92.8	73		128
EP080: Naphthalene	91-20-3	1	mg/kg	<1	0.5 mg/kg	90.9	61		123

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix:

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	Matrix Spike (MS) Report		
					Spike	SpikeRecovery(%)	Recovery Limits (%)
				MS	Low	High	
EM1912626-003	Sample C	EP066: Polychlorinated Biphenyls (PCB) (QCLot: 2511362)	----	1 mg/kg	97.4	44	144
				EP066: Total Polychlorinated biphenyls			



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 Client : ENVIRONMENTAL SERVICE AND DESIGN PTY LTD
 Project :

Sub-Matrix:				Matrix Spike (MS) Report			
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Spike Concentration	Spike Recovery (%)	MS	Recovery Limits (%)
				Low	High		
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2511332)							
EM1912626-002	Sample B	EP080: C6 - C9 Fraction	----	28 mg/kg	73.3		131
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2511361)							
EM1912626-002	Sample B	EP071: C10 - C14 Fraction	----	688 mg/kg	122	53	123
		EP071: C15 - C28 Fraction	----	3100 mg/kg	111	70	124
		EP071: C29 - C36 Fraction	----	1490 mg/kg	106		118
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2511332)							
EM1912626-002	Sample B	EP080: C6 - C10 Fraction	C6_C10	33 mg/kg	70.1		129
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2511361)							
EM1912626-002	Sample B	EP071: >C10 - C16 Fraction	----	1050 mg/kg	116	65	123
		EP071: >C16 - C34 Fraction	----	3960 mg/kg	110	67	121
		EP071: >C34 - C40 Fraction	----	280 mg/kg	89.9		126
EP080: BTEXN (QCLot: 2511332)							
EM1912626-002	Sample B	EP080: Benzene	71-43-2	2 mg/kg	76.4	50	136
		EP080: Toluene	108-88-3	2 mg/kg	80.7	56	139



Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	:	Page	: 1 of
Client	:	Laboratory	: Environmental Division Melbourne
Contact	:	Telephone	:
Project	:	Date Samples Received	:
Site	:	Issue Date	: 09-Aug-2019
Sampler	:	No. of samples received	:
Order number	:	No. of samples analysed	:

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Laboratory Control outliers occur.
- **NO** Matrix Spike outliers occur.
- Duplicate outliers exist - please see following pages for full details.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- **NO** Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- **NO** Quality Control Sample Frequency Outliers exist.



Outliers : Quality Control Samples
 Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix:

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Duplicate (DUP) RPDs							
EP080/071: Total Recoverable Hydrocarbons - NEPM 2	EM1912642-006	Anonymous	>C16 - C34 Fraction	----	20.5 %	0% - 20%	RPD exceeds LOR based limits

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for **VOC in soils** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix:

Evaluation: x = Holding time breach ; ✓ = Within holding time.

Method	Sample Date	Extraction / Preparation		Analysis	
		Date extracted	Due for extraction	Evaluation	Due for analysis
Container / Client Sample ID(s)					
EA055: Moisture Content (Dried @ 105-110°C)					
Soil Glass Jar - Unpreserved (EA055)	05-Aug-2019	---	----		19-Aug-2019
Sample A, Sample C,					
Sample B, Sample D					07-Aug-2019
				✓	
EP066: Polychlorinated Biphenyls (PCB)					
Soil Glass Jar - Unpreserved (EP066)		07-Aug-2019	19-Aug-2019	✓	08-Aug-2019
Sample A, Sample C,					
Sample B, Sample D					16-Sep-2019
				✓	
EP080/071: Total Petroleum Hydrocarbons					
Soil Glass Jar - Unpreserved (EP080)		07-Aug-2019	19-Aug-2019	✓	07-Aug-2019
Sample A, Sample C,					
Sample B, Sample D					19-Aug-2019
				✓	
Soil Glass Jar - Unpreserved (EP071)		07-Aug-2019	19-Aug-2019	✓	08-Aug-2019
Sample A, Sample C,					
Sample B, Sample D					16-Sep-2019
				✓	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions					
Soil Glass Jar - Unpreserved (EP080)		07-Aug-2019	19-Aug-2019	✓	07-Aug-2019
Sample A, Sample C,					
Sample B, Sample D					19-Aug-2019
				✓	
Soil Glass Jar - Unpreserved (EP071)		07-Aug-2019	19-Aug-2019	✓	08-Aug-2019
Sample A, Sample C,					
Sample B, Sample D					16-Sep-2019
				✓	
EP080: BTEXN					
Soil Glass Jar - Unpreserved (EP080)		07-Aug-2019	19-Aug-2019	✓	07-Aug-2019
Sample A, Sample C,					
Sample B, Sample D					19-Aug-2019
				✓	



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix:

Evaluation: x = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)		Evaluation
		QC	Regular	Actual	Expected	
Analytical Methods						
Laboratory Duplicates (DUP)						
Moisture Content	EA055	2		11.76	10.00	✓
Polychlorinated Biphenyls (PCB)	EP066	2		16.67	10.00	✓
TRH - Semivolatle Fraction	EP071	2		11.76	10.00	✓
TRH Volatiles/BTEX		1		11.11	10.00	✓
Laboratory Control Samples (LCS)						
Polychlorinated Biphenyls (PCB)	EP066	1		8.33	5.00	✓
TRH - Semivolatle Fraction	EP071	1		5.88	5.00	✓
TRH Volatiles/BTEX		1		11.11	5.00	✓
Method Blanks (MB)						
Polychlorinated Biphenyls (PCB)	EP066	1		8.33	5.00	✓
TRH - Semivolatle Fraction	EP071	1		5.88	5.00	✓
TRH Volatiles/BTEX		1		11.11	5.00	✓
Matrix Spikes (MS)						
Polychlorinated Biphenyls (PCB)	EP066	1		8.33	5.00	✓
TRH - Semivolatle Fraction	EP071	1		5.88	5.00	✓
TRH Volatiles/BTEX	EP080	1		11.11	5.00	✓



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

<i>Analytical Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM (2013) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
Polychlorinated Biphenyls (PCB)	EP066	SOIL	In house: Referenced to USEPA SW 846 - 8270D Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 504)
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015A Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40. Compliant with NEPM amended 2013.
TRH Volatiles/BTEX	EP080		In house: Referenced to USEPA SW 846 - 8260B. Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. Compliant with NEPM amended 2013.
<i>Preparation Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Methanolic Extraction of Soils for Purge and Trap	ORG16	SOIL	In house: Referenced to USEPA SW 846 - 5030A. 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids	ORG17	SOIL	In house: Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.