ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

DETAILED SITE INVESTIGATION AT 2B WEST STREET, LEWISHAM

ARTAZAN PROPERTY GROUP PTY LTD

10 JUNE 2020
118085
VERSION 2

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

10 June 2020

Artazan Property Group PTY LTD
Level 8
210 George Street
Sydney NSW 2000

Attention: **Cian Fitzgerald**

Detailed Site Investigation at 2B West Street, Lewisham, NSW

Please find enclosed a copy of our report entitled as above. Thank you for the opportunity to undertake this work.

Note that version 1 of this report (118085_V1) was prepared in 2018 with this update (118085_V2) including changes to adopted criteria as they have become available and deemed more appropriate.

Should you have any queries, please do not hesitate to contact us on (02) 9922 1777.

For and on behalf of
Environmental Earth Sciences NSW

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118085_V2

EXECUTIVE SUMMARY

Environmental Earth Sciences NSW (Environmental Earth Sciences) was commissioned by Artazan Property Group Pty Ltd (APG) to undertake a Stage 2 Detailed Site Investigation (DSI) to support the Development Application (DA) of a new multi-storey residential development with a basement level for the property located at 2B West Street, Lewisham, NSW (the site).

The Preliminary Site Investigation (PSI) prepared for the site concluded that contamination was likely present at the site due to its historical use and associated development and recommended a DSI for the evaluation of both soil and groundwater contamination for the contaminants of potential concern identified.

Works undertaken to ascertain the contamination status of the site included the following:

- Review of previous environmental reports prepared for the site and provided by APG;
- Fieldworks involving soil sampling from accessible locations across the site and groundwater sampling at existing wells onsite;
- Laboratory analysis for potential contaminants of concern; and
- Provision of a report detailing the works completed and recommendations additional assessment and/or remediation should contamination be identified at unacceptable levels.

Findings

Environmental Earth Sciences undertook intrusive assessment of the site on 16 August 2018 by advancing five test pits (TP1 - TP5) and eight boreholes (BH1 - BH8) in the accessible areas. Areas covered by buildings, approximately 50% of the site, were not assessed and it is recommended that assessment of soil conditions within building footprints are conducted at the development stage, once buildings, structures and hardstand areas are removed / demolished. Groundwater was assessed on 21 August 2018 by sampling three existing monitoring wells.

Based on observations and findings of the soil assessment at 13 locations onsite, residual contamination in fill material soil was reported above the applicable HIL A criterion for carcinogenic PAHs (as BaP TEQ) at two locations across the site. However, based on results from PAH source analysis undertaken, the exceedances are likely to be associated with ash present within the fill material and therefore posing a low risk for leachability. Furthermore, statistical assessment was undertaken (including calculation of the 95% $UCL_{AVERAGE}$) for the dataset for Carcinogenic PAHs results in order to ascertain if certain exceedances were representative of the population dataset. A representative value of 3.0 mg/kg was determined for fill material soils assessed across accessible areas of the site. Soils onsite are therefore considered low risk for human receptors as this does not exceed the adopted value for residential land use.

Groundwater results reported concentration either below the laboratory LOR and/or below adopted interim criteria, except for some heavy metals exceedances for freshwater

ecosystems at two locations. Based on observations and findings of the groundwater assessment, exceedances detected in groundwater are considered to be likely due to background levels (potentially natural) and not from potential sources of contamination at the site.

Conclusion and recommendations

In the areas assessed, it is considered that the site will be suitable for residential land use, pending appropriate assessment and management (if required) of fill material in currently inaccessible areas of site.

Based upon the findings of this report and the low risk associated with the contamination identified at the site, Environmental Earth Sciences make the following recommendations for consideration:

- Undertake the intrusive soil investigation at the remaining 12 locations to achieve compliance with the guidelines during the proposed development works. These locations must be within the footprints of existing buildings and structures.
- Installation of one additional groundwater monitoring well within the northern portion of the site to assess for any potential impacts to groundwater coming from this area of site.
- If soil is required to be disposed offsite during future development works, then characterisation of this soil should be undertaken by a suitably qualified environmental consultant and transported to an appropriate waste disposal facility.

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1 INTRODUCTION

Environmental Earth Sciences NSW (Environmental Earth Sciences) was commissioned by Artazan Property Group Pty Ltd (APG) to undertake a Stage 2 Detailed Site Investigation (DSI) to support the Development Application (DA) of a new multi-storey residential development with a basement level for the property located at 2B West Street, Lewisham, NSW (the site).

This report should be read in conjunction with the limitations and appendices contained within the proposal (ref: PO118133, 1 August 2018) and the limitations detailed in Section 13 of this report.

2 BACKGROUND

Based on information supplied by APG, previous environmental and geotechnical assessments were prepared for the site by Douglas Partners (DP). The Preliminary Site Investigation (PSI) prepared by DP concluded that contamination was likely present at the site due to its historical use and associated development, and recommended a DSI for the evaluation of both soil and groundwater contamination for the contaminants of potential concern (CoPC) identified in their assessment (described in Section 2.1).

2.1 Contaminants of potential concern

The potential sources of contamination, potential contaminating activities and CoPCs identified in the PSI include:

- The impact on soils due to incorrect demolition / removal of former onsite structures and building alterations / deteriorations, which mainly concern hazardous building materials such as asbestos, metals (in particular lead) and polychlorinated biphenyl (PCB).
- Use of uncontrolled fill to level the site and addition of foreign materials into the filling during the site's previous use as cemetery has raised concerns for contaminants such as asbestos, heavy metals, total recoverable hydrocarbons (TRH), benzene, toluene, ethyl benzene and xylene compounds (BTEX), polycyclic aromatic hydrocarbons (PAH), organochlorine pesticide (OCP), organophosphorus pesticide (OPP), PCB, phenols and pathogens.
- Uncontrolled disposal of waste generated from the burning fuels at the former boiler or incinerator, concerning contaminants such as TRH, BTEX, PAH and heavy metals.

3 OBJECTIVES

The primary objective of this assessment was to address requirements of Council as part of the pre-DA discussions, which included the provision of a DSI to accompany the DA to be submitted for the proposed aged care and seniors living facility.

Findings of this DSI will inform if contamination in soil and groundwater present unacceptable risks to human health and the ecology in the context of the proposed residential land use. Recommendations will be provided for additional assessment and/or remediation should contamination be identified at unacceptable levels.

4 SITE IDENTIFICATION AND SETTING

The information described in the following sections is provided based upon review of the DP PSI (2016) and Report on Geotechnical Investigation (DP, 2018). Additional site information, such as historical aerial photographs and land titles, can be located in the DP PSI (2016).

4.1 Location and property description

The site is formally identified as Lot 1 Deposited Plan 1116995, with site details summarised in **Table 1**. The site location is detailed in **Figure 1**, with site features and sampling locations illustrated in **Figure 2**.

Table 1: Site identification

Item	Details
Site owner	Catholic Healthcare Ltd
Address	2B West Street, Lewisham, NSW
Lot and plan number	Lot 1 DP 1116995
Area	Approx. 12,100 m^2
Investigation area	Limited to accessible outdoor areas with no building coverage (refer to Section 5.2).
Proposed land use	Residential
Site location	**Figure 1**
Sampling locations	**Figure 2**

4.2 Surrounding land uses

The following land uses were observed at the time of site inspection and intrusive works:

- North-west: Multi-purpose properties including residential, offices, a church and school / care facilities, with a trainline to the west.
- North-east: Petersham Park.
- South: Trainline with residential properties beyond.
- East: Residential housing with a local swimming pool and bowling greens beyond.

4.3 Sensitive receptors

The nearest human receptors are the residents living onsite, their carers' and visitors.

There is no significant ecological receptor which would be affected by this site. The localised flora and fauna would be affected by potential contamination.

4.4 Regional topography, geology, hydrogeology and drainage

The site slopes towards the north on a local rise, falling approximately 8 m across the site. The regional topography generally falls to the west in the direction of Hawthorne Canal, although, it is noted that the slope is not uniform. Reference to the Sydney 1:100,000 Series Geological Sheet indicates that the site is underlain by Ashfield Shale from the Wianamatta Group. Bringelly Shale typically comprises grey shale and laminate (DP, 2016).

Geotechnical coring of site soil and parent rock material proves the geological sheets correct. It also provides information on groundwater direction flowing to the north-east following the slope of the ground onsite (DP, 2018).

A search on the NSW Department of Primary Industries Office of Water website indicated that there are no registered groundwater wells or monitoring bores within 500 m of the site.

5 PRELIMINARY WORKS

The preliminary works completed by Environmental Earth Sciences as part of this DSI are described in the following sections.

5.1 Review of past environmental reports

The following known environmental and geotechnical investigations have been undertaken and reported at the site, with available reports supplied to Environmental Earth Sciences for review:

- Douglas Partners (2016) - *Preliminary Site (Contamination) Investigation, Proposed Aged Care and Seniors Living Facility, 2B West Street, Lewisham, NSW* (Project 85469; May 2016).

- Douglas Partners (2018) - *Geotechnical Investigation, Proposed Residential Aged Care Facility Upgrade, 2B West Street Lewisham* (Project: 85469.01; July 2018).

The PSI undertaken by DP indicated that further investigations were necessary to ascertain the extent of potential impacts to both soil and groundwater for the CoPC, so the site can be made suitable for the proposed residential development.

It is noted that the following reports are referenced in DP PSI but were not reviewed by Environmental Earth Sciences:

- Stokes Perna Building Compliance Pty Ltd, '*HAZMAT Asbestos and Lead Paint Risk Assessment Audit, Lewisham Retirement Hostel - 1c Thomas Street, Lewisham*', December 2013, Job Number 8580.

- Stokes Safety Pty Ltd, '*HAZMAT Asbestos and Lead Paint Risk Assessment Update, Lewisham Nursing Home, 1b Thomas Street, Lewisham*', December 2015, Job Number 8580.14.

The relevant findings from these reports are understood to have been included and discussed in the DP PSI.

5.2 Proposed scope for this investigation

The PSI recommended a DSI for the evaluation of both soil and groundwater contamination for the CoPC identified, as defined in the National Environment Protection Council (NEPC) - *National Environmental Protections (Assessment of Site Contamination) Amendment Measure No.1 2013* (ASC NEPM, 2013).

For the assessment of potential contamination within soil, The NSW EPA (1995) - *Contaminated Sites: Sampling Design Guidelines* requires assessment at 25 locations over an area of 12,100 m^2 to detect a potential contamination hotspot of approximate 28 m diameter with 95% confidence. However, as the site has approximately 50% coverage with buildings and therefore resulting in multiple access constraints, it is recommended that assessment of soil conditions within building footprints are conducted at the development stage, once buildings, structures and hardstand areas are removed / demolished, therefore allowing access to these areas.

Based on the available accessible areas of the site at the time of this investigation, a total of 13 locations across open areas of the site are proposed to be assessed by the advancement of test pits (except for one location) as part of this DSI, with the remaining 12 locations required to achieve compliance with the guidelines to be completed during the development works.

For the assessment of potential contamination in groundwater, it is proposed to sample the three existing wells at the site (located within the southern portion of the site), with one new additional groundwater monitoring well proposed to be installed in the northern portion of the site and sampled.

5.3 Work health and safety

Work Health and Safety (WH&S) documentation prepared included a safe work method statement (SWMS) to mitigate against known hazards during intrusive investigation works.

5.4 Site walkover and initial observations

Environmental Earth Sciences undertook a site walkover on 13 August 2018 to confirm the proposed locations for soil and groundwater investigation. A licensed service locator from Hunter Smith Pty Ltd, was also present to assess for potential services at the proposed locations.

The utility clearance was undertaken using Ground Penetrating Radar (GPR) and Electromagnetic Field (EMF) instruments. Locations were marked out in spray paint to indicate areas which were clear of underground pipes and wires to ensure that intrusive works would not damage any services.

As a result of the site walkover and service location, the following changes to the proposed scope were required:

- Intrusive assessment methodology at seven locations was changed to hand auger as there was no access for the excavator; and

The location proposed for the monitoring well in the north-east corner of the site was not accessible and nearby alternative locations had underground services identified. Therefore, additional monitoring wells were not installed.

The final proposed investigation locations following the site walkover are presented in **Figure 2**.

6 FIELD PROGRAM

6.1 Rationale for assessment locations

Rationale for sampling and investigation is provided in **Table 2**, with sampling locations illustrated in **Figure 2**.

Table 2: Rationale for sampling locations

Media	ID	Notes
Soil	TP-1	Assess potential fill material likely used to raise a carpark located in the western portion of site.
	TP-2	Assess potential fill material likely used to raise a carpark located in the western portion of site.
	TP-3	Assess potential fill material likely used to raise a carpark located in the western portion of site.

Media	ID	Notes
	TP-4	General assessment of soil quality in southern portion of site.
	TP-5	General assessment of soil quality in eastern portion of site.
	BH1	General assessment of soil quality in northern portion of site.
	BH2	General assessment of soil quality in northern portion of site.
	BH3	General assessment of soil quality in southern-central portion of site.
	BH4	General assessment of soil quality in central portion of site.
	BH5	General assessment of soil quality in central portion of site.
	BH6	General assessment of soil quality in eastern portion of site.
	BH7	General assessment of soil quality in south-eastern portion of site.
	BH8	General assessment of soil quality in north-eastern portion of site.
Groundwater	GW1	General assessment of background groundwater quality flowing from south-western locations offsite.
	GW2	General assessment of background groundwater quality flowing from south-western locations offsite.
	GW3	General assessment of groundwater quality flowing through the southern portion of site.

6.2 Soil investigation

6.2.1 Intrusive works

Test pitting was undertaken on 16 August 2018 using a subcontractor from Ken Coles Excavations Pty Ltd under the supervision of a qualified Environmental Earth Sciences representative. Five test pits were advanced (TP1 - TP5) using a 4-tonne excavator which employed a pneumatic hammer and various gauge toothed-buckets.

Hand augering was also undertaken on 16 August 2018 by a qualified Environmental Earth Sciences representative in areas which were inaccessible to the excavator. Eight boreholes were hand augered (BH1 - BH8) using heads specific for clay soils.

The test pits and boreholes were advanced to either three metres below ground level (mBGL), one metre into natural material or until refusal was met, whichever occurred first.

Combined, a total of 13 locations were assessed as part of the soil investigation program, with locations indicated on **Figure 2**.

6.2.2 Soil sampling

Logging of soil profiles at all locations was undertaken describing the soil characteristics including lithology, extent of lithology, colour, odour, moisture content (dry, moist, wet), and other inclusions. Detailed logs for soil bore locations are presented in **Appendix A**.

Representative soil samples were collected from fill material, with discrete sampling being undertaken to target areas of suspected impact. For test pitting, soil was either sampled from the centre of the excavator bucket, or directly from the test pit wall. When using the hand auger, soil was collected from the centre auger head.

In addition to the collected primary samples, one field duplicate soil sample was taken for Quality Assurance and Quality Control (QA/QC) purposes. The samples were placed into laboratory supplied glass jars and transported to the laboratory in a chilled container under full chain-of-custody documentation.

6.3 Groundwater investigation

6.3.1 Groundwater sampling

Groundwater was sampled by a qualified Environmental Earth Sciences representative on 21 August 2018. Three existing groundwater monitoring wells (GW1-GW3) were sampled, with locations indicated on **Figure 2**.

Groundwater monitoring wells were screened with a photoionization detector (PID) for volatile compounds following removal of the caps and then dipped to ascertain standing water level (SWL). Purging of the wells was conducted until the geochemical field parameters included below were stable so representative groundwater samples could be collected (refer to **Appendix B** for calibration certification). Refer to **Table 3** for a summary of groundwater field parameters.

- Temperature;
- pH;
- Dissolved oxygen (DO);
- Electrical conductivity (EC); and
- Oxygen reduction potential (ORP).

Based upon the groundwater levels measured during this assessment, groundwater flow direction is inferred to be flowing north-west, as indicated in **Figure 2**.

Table 3: Summary of groundwater field data

Bore ID	Sample date	Time sampled	SWL (mTOC)	Elevation (mAHD)	EOH (m)	Volume purged (L)	DO (ppm)	EC (µs/cm)	pH	ORP (mV)	Temp (ºC)	Odour	Colour	Comments
GW1	21/07/2018	12:00pm	6.11	21.92	11.68	25	2.2	756.5	6.96	77.8	21.3	Slight H_2S	Cloudy brown	PID reading when cap was first removed was 0.5 (same as ambient air).
GW2	21/07/2018	1:00pm	5.49	2.10	11.92	30	0.67	756.0	7.14	64.6	20.8	----	Slight cloudy brown	PID reading when cap was first removed was 0.9 (same as ambient air).
GW3	21/07/2018	2:00pm	7.82	15.21	9.4	15	0.38	755.9	6.10	111.5	20.8	----	Light brown	PID reading when cap was first removed was 0.8 (same as ambient air).

Notes:
1. SWL – Standing water level;
2. mTOC - Metres below top of well casing;
3. mAHD – Metres Australian Height Datum;
4. EOH – End of hole;
5. DO - Dissolved oxygen;
6. EC - Electrical conductivity;
7. ORP - Oxygen reduction potential

7 LABORATORY ANALYSIS

The following soil and groundwater samples were analysed by Envirolab Services Pty Ltd (Envirolab, primary laboratory) and ALS Environmental (ALS, secondary laboratory), both National Association of Testing Authorities (NATA) accredited laboratories for the methods used. An inter-laboratory duplicate was scheduled for analysis as part of our standard QA/QC procedure.

7.1 Soil analyses

Selected soil samples were submitted to the laboratory for the following analysis:

- Heavy metals (As, Cd, Cu, Cr_{TOTAL}, Pb, Hg, Ni, Zn);
- TRH;
- BTEX;
- PAH;
- OCP, OPP and PCB;
- Phenols;
- Pathogens (salmonella and *E. coli*); and
- Asbestos.

7.2 Groundwater analyses

Groundwater samples were submitted to the laboratory for the following analysis:

- Dissolved heavy metals (As, Cd, Cu, Cr_{TOTAL}, Pb, Hg, Ni, Zn);
- TRH;
- BTEX;
- PAH;
- OCP, OPP and PCB;
- Phenols; and
- Pathogens (salmonella and *E. coli*).

7.3 Procedures for quality control and quality assurance

Quality control is achieved by using NATA registered laboratories using American Society for Testing and Materials (ASTM) standard methods supported by internal duplicates, the checking of high, abnormal or otherwise anomalous results against background and other chemical results for the sample concerned.

Quality assurance is achieved by confirming that field results, or anticipated results based upon comparison with field observations, are consistent with laboratory results. Also, that sampling methods are uniform, and decontamination is thorough. In addition, the laboratory undertakes additional duplicate analysis as part of their internal quality assurance program on the basis of one duplicate analysis for every 20 samples analysed.

Field observations are compared with laboratory results when they are not as expected. Confirmation, re-sampling and re-analysis of a sample are undertaken if the results are not consistent with field observations and/or measurements. In addition, field duplicate sample results have to be within the acceptable range of reproducibility. A discussion of the QAQC is presented in **Appendix C**.

8 INVESTIGATION CRITERIA

Site investigation criteria have been selected to provide an appropriate indication of the environmental status of the site with consideration given to the proposed residential land use. In accordance with current legislation, Environmental Earth Sciences refers to the ASC NEPM (2013) guidelines for interim site assessment criteria. Typically for contaminant concentration to be considered acceptable for the respective land use criteria, the data set must conform to the following requirements:

- The 95% upper confidence limit (UCL) of the arithmetic mean of analytical results is below the site criteria;
- The arithmetic (or geometric in cases where the data is log normally distributed) mean is below the site criteria;
- The standard deviation is less than 50% of the site criteria; and
- No single sample analytical result is greater than 250% of the site criteria.

A range of threshold guidelines will be adopted from ASC NEPM (2013) as interim remediation criteria for the assessment of acceptable concentrations of contaminants in soils and groundwater. For soil, these investigation levels are derived from toxicity of substances and estimated exposure of humans under various land use scenarios.

8.1 Soil investigation criteria

8.1.1 Health investigation levels (HILs)

Appropriate health-based investigation levels (HILs) will be applied to the site used for current and future residential purposes. These HILs are taken from the ASC NEPM (2013), and are presented for reference in **Table 4**. The applicable HILs for this investigation will include the following:

- HIL A - Residential with garden / accessible soil (home grown produce <10% fruit and vegetable intake (no poultry), also includes childcare centres, preschools and primary schools.

Table 4: Health investigation levels for soil contaminants

Analyte	Health-based investigation levels (mg/kg) [1]
	Residential A
Metals and Inorganics	
Arsenic [1]	100
Cadmium	20
Chromium (VI)	100
Copper	6,000
Lead [2]	300
Mercury (inorganic)	40
Nickel	400
Zinc	7,400
Polycyclic Aromatic Hydrocarbons (PAHs)	
Carcinogenic PAHs (as BaP TEQ) [3]	3
Total PAHs	300
Phenol	
Phenol	3,000
Organochlorine Pesticides	
DDT + DDE + DDD	240
Aldrin and dieldrin	6
Chlordane	50
Endosulfan	270
Endrin	10
Heptachlor	6
HCB	10

Analyte	Health-based investigation levels (mg/kg) [1]
	Residential A
Methoxychlor	300
Other Organics	
PCBs	1
Asbestos	
Bonded ACM	0.01 % (w/w)
Friable asbestos	0.001 % (w/w)

Notes:

8. Arsenic: HIL assumes 70% oral bioavailability. Site-specific bioavailability may be important and should be considered where appropriate (refer Schedule B7).
9. Lead: HIL is based on blood lead models (IEUBK for HILs A, B and C and adult lead model for HIL D where 50% oral bioavailability has been considered. Site-specific bioavailability may be important and should be considered where appropriate.
10. Carcinogenic PAHs: HIL is based on the 8 carcinogenic PAHs and their TEFs (potency relative to B(a)P) adopted by CCME 2008 (refer Schedule B7). The B(a)P TEQ is calculated by multiplying the concentration of each carcinogenic PAH in the sample by its B(a)P TEF.
11. Total PAHs: HIL is based on the sum of the 16 PAHs most commonly reported for contaminated sites (WHO 1998).

8.1.2 Ecological investigation levels (EILs)

The ecological investigation levels (EILs) assigned by the ASC NEPC (2013) *Schedule B5c – EILs for As, Cr, Cu, DDT, Pb, Naphthalene, Ni and Zn* are adopted for this assessment. This guideline presents the methodology for deriving terrestrial EILs using both fresh and aged (i.e. > 2 years old) contamination for soil with “urban residential / public open space” land use scenario. This land use is described within the guidelines as being lands are not pristine, rather, they are extensively modified, but they still retain many important functions and species with expectation that there is growth of both ornamental and native plant species.

The methodology has been developed to protect soil processes, soil biota (flora and fauna) and terrestrial invertebrates and vertebrates. The approved land use on the site is urban residential and where necessary has been allocated a suburb type; Lewisham being “old suburb, high traffic”. Hence, these EILs have been adopted for this assessment.

The EIL is calculated from summing the added contaminant limit (ACL) and the ambient background concentration (ABC) to derive the site-specific soil quality guideline (SQG).

A summary of the EILs for aged contamination in soil (>2 years) for the adopted land use are presented in **Table 5**.

Table 5: Site specific EILs

Analyte	ABC	ACL	EIL – Urban residential
Arsenic	5	40	**45**
Naphthalene	----	----	**170**
Chromium III	15	85	**100**
Copper	30	50	**80**
DDT	----	----	**180**
Lead	160	530	**690**
Nickel	5	15	**20**
Zinc (mg/kg)	120	400	**520**

Notes:

12. Where CEC and pH are necessary to calculate EILs, the most conservative option was chosen as we did not request analysis for CEC and pH;
13. Where there were no aged analyte values then the fresh values were utilised to calculate EILs.

8.1.3 Health screening levels (HSLs)

For petroleum hydrocarbons, health screening levels (HSLs) have been derived in ASC NEPM (2013) based upon fraction ranges of hydrocarbons together with soil texture classes. The actual soil texture class applied will be determined during description of soil in the field assessment.

The HSL criteria, whilst non-limiting (NL) for vapour intrusion, are provided to prevent the occurrence of phase-separated hydrocarbons (PSH).

Health screening levels for HSL-A for clay soil were used to screen petroleum hydrocarbons in soil for potential vapour intrusion risk. Values for coil texture “clay” with depth criterion of 0 – 1 m was used as this was the type and depth of the soil where samples were collected. The HSL criteria are summarised below in **Table 6**.

Table 6: Health screening levels for soil contaminants

Analyte	HSL – A (mg/kg)
Toluene	480
Ethylbenzene	NL
Xylenes	110
Naphthalene	5
Benzene	0.7
F1	50
F2	280

8.1.4 Ecological screening levels (ESLs)

For petroleum hydrocarbons, ESLs have been derived in ASC NEPM (2013) based upon fraction ranges of hydrocarbons, BTEXN component and benzo(a)pyrene (BaP) together with soil texture classes. These ESLs are of low reliability except for the volatile and semi-volatile hydrocarbon fractions which are of moderate reliability. Nonetheless the ESLs will be adopted for the investigation to be protective of soils in a residential land use scenario.

The adopted ESLs are designed to be protective of soil fauna, soil processes plants. The ASC NEPM (2013) states that these factors only apply within the rhizome (i.e. zone in the top two metres of soil) and as such ESL criteria need not be applied to chemical results below this depth. ESL threshold criteria are summarised in **Table 7.**

It should be noted that the ASC NEPM (2013) ESL for BaP are low-reliability values and as such are considered over conservative. To develop the ESL thresholds in ASC NEPM (2013), a review of Canadian soil quality guidelines was undertaken for BTEX and BaP, with the Australian methodology applied to the ecotoxicological data as far as possible to derive equivalent ESLs.

It is recognised that the bioavailability of BaP and hence toxicity can reduce through sorption to organic material in the soil, with ageing, and with certain soil properties and other factors. However, methods have not yet been developed that can reliably measure the bioavailability of BaP and using bioavailability or bio-accessibility measures to derive site-specific criteria for organic contaminants is not well established in Australia (CRC Care, 2017).

With respect to the ESLs, the ASC NEPM (2013) did not consider bioavailability, and therefore, there is a concern that the value for BaP may be overly conservative, hence the CRC Care (2017) threshold value of 33 mg/kg has been adopted.

8.1.5 Management limits for hydrocarbon fractions

Applicable management limits (MLs) have been set for TRH fractions in soil for residential land use scenario (ASC NEPM, 2013). These MLs are primarily for protection of human health through the direct contact pathway, with applicable criteria detailed in **Table 7**.

Table 7: Ecological screening levels for soil contaminants

Analyte	Soil Texture	Management Limits	ESL (mg/kg dry Soil)
F1 (C_6- C_{10})	Coarse	700	180 *
	Fine	800	
F2 (>C_{10}-C_{16})	Coarse	1,000	120 *
	Fine	1,000	
Benzene	Coarse	----	50
	Fine	----	65
Toluene	Coarse	----	85
	Fine	----	105
Ethyl-benzene	Coarse	----	70
	Fine	----	125
Xylenes	Coarse	----	105
	Fine	----	45
Naphthalene	Coarse	----	----
	Fine	----	
Benzo(a)pyrene	Coarse	----	33
	Fine	----	33

Notes:
14. * indicates that the ELS is of moderate reliability.

8.2 Groundwater investigation criteria

8.2.1 Human health

Water analytical results were compared to the ASC NEPM (2013) HSLs for groundwater within clayey soils as summarised in **Table 8**. The ASC NEPM (2013) groundwater investigation levels (GILs) adopt the drinking water criteria for protection of human health in accordance with the National Health and Medical Research Council (NHMRC) (2011) - *Australian Drinking Water Guidelines* as summarised in **Table 9**.

Table 8: Health screening levels for groundwater for vapour intrusion

Analyte	HSL – A (mg/L)
Toluene	NL
Ethylbenzene	NL
Xylenes	NL
Naphthalene	NL
Benzene	5
F1	NL
F2	NL

Table 9: Groundwater investigation levels

Analyte	Groundwater Investigation Levels	
	Fresh Waters (mg/L)	Drinking Water (mg/L)
Metals and Inorganics		
Arsenic	0.013	0.01
Cadmium	0.0002	0.002
Chromium (VI)	0.001	0.05
Copper	0.0014	2
Lead	0.0034	0.01
Mercury (inorganic)	0.00006	0.001
Nickel	0.011	0.02
Zinc	0.008	----
Polycyclic Aromatic Hydrocarbons (PAHs)		
Benzo (a) pyrene	0.05	0.00001
Phenol		
Phenol	0.32	----
Organochlorine Pesticides		
DDT	0.000006	0.009
Aldrin and dieldrin	----	0.0003
Chlordane	0.00003	0.02
Endosulfan	0.00003	0.02
Endrin	0.00001	----
Heptachlor	0.00001	----

Analyte	Groundwater Investigation Levels	
	Fresh Waters (mg/L)	Drinking Water (mg/L)
Methoxychlor	----	0.30
Organophosphorous Pesticides		
Azinophos methyl	----	0.03
Chlorfenvinphos	----	0.002
Chlorpyrifos	0.00001	0.01
Diazinon	0.00001	0.004
Dichlorvos	----	0.005
Dimethoate	0.00015	0.007
Ethion	----	0.004
Fenamiphos	----	0.0005
Fenitrothion	0.0002	0.007
Fenthion	----	0.007
Malathion	0.00005	0.07
Methyl parathion	----	0.0007
Parathion	0.000004	0.02
Polychlorinated Biphenyls		
Arochlor 1242	0.0003	----
Arochlor 1254	0.00001	----
BTEX		
Benzene	0.95	0.001
Toluene	----	0.8
Ethylbenzene	----	0.3
Xylene total	0.35	0.6
Naphthalene	0.016	----

Notes:
15. These values are adopted from NEPM 2013 and all converted to mg/L.

Microbial assessment levels for *E. coli* was adopted from the Department of Environment and Conservation (2010) - *Assessment levels for Soil, Sediment and Water*. The values presented in **Table 10** are indicative for irrigative purposes in urban recreational area, open spaces, parks and gardens land use.

Australian Drinking Water Guidelines (NHMRC & ARMC 2011) recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1 colony forming unit (cfu) / 100mL.

Table 10: Microbial assessment levels for irrigation water

Analyte	Urban recreational areas, open spaces, parks and gardens (cfu / 100mL)	Drinking water (cfu / 100mL)
E. coli	< 1	< 1

8.2.2 Ecological criteria

Water analytical results were compared to ASC NEPM (2013) *Schedule B(1): Groundwater investigation levels* (GILs) for freshwater ecosystems to be protective of 95% of species and summarised in **Table 9**. These ecological criteria have been adapted from Australian and New Zealand Environment and Conservation Council (ANZECC) and Agriculture and Resource Management Council of Australia (ARMCANZ) (2000) - *Australian and New Zealand guidelines for fresh and marine water quality* (ANZECC / ARMCANZ, 2000).

9 RESULTS

9.1 Site observations

No visual or olfactory indications of contamination were noted throughout soil or groundwater sampling except for sampling locations (TP1 - TP3), which were located within a raised carpark area composed of fill material, and sampling location GW1, which had slight H_2S odour.

No indication of contamination was noted on the ground surface upon completion of the site walkover.

9.1.1 Extent of fill and natural material

Stratigraphy encountered across the site during intrusive works comprised of the following features:

- Depth of fill material was observed at the site at depths varying between just below the surface to 2.6 mBGL. It included a variety of building rubble (particularly in TP1 – TP3) such as concrete and brick cobbles, terracotta tile fragments, plastic piping, metal and asphalt gravels. The soil matrix was comprised of a soft brown silty clay topsoil covering the majority of site, with the exception of the western portion which included additional sand.

- Natural material was exposed at varying depths across the site from approximately 0.2 – 1.75 mBGL being a firm orange clay with grey mottles, overlying white / grey shale bedrock. In some locations there was no clay soil and the natural material encountered was exclusively shale.

Refer to **Appendix A** for detailed borelogs.

9.1.2 Soil

Soil results were either reported below the laboratory limit of reporting (LOR) and/or below adopted interim criteria except for exceedances summarised in **Table 11**. For full laboratory results see the results table section at the end of this report and for complete laboratory transcripts please see **Appendix D**.

Table 11: Soil guideline exceedances

Location ID	Sample Depth	Material Type	Analyte	Criteria (mg/kg)	Result (mg/kg)
BH1	0 - 0.4 m	Fill	Carcinogenic PAHs (as BaP TEQ)	3	4.043
BH8	0 - 0.4 m	Fill	Carcinogenic PAHs (as BaP TEQ)	3	7.24

Based upon the assessment tool, PAH source analyst (results provided in **Appendix E**), exceedances are likely to be associated with ashes present within the fill material. As such, exhibiting characteristics such as low leach potential and non-bioavailability to soil organisms.

A statistical assessment was undertaken (including calculation of the 95% $UCL_{AVERAGE}$) for the dataset for Carcinogenic PAHs results in order to ascertain if certain exceedances were representative of the population dataset. Summary of statistical values is provided in **Table 12**, with calculation output presented in **Appendix F**.

Table 12: Statistical calculations summary

Analyte	Count	Minimum	Maximum	Mean	Standard Deviation	Coefficient of Variation	95% $UCL_{AVERAGE}$
CT/SCC (mg/kg)							
Carcinogenic PAHs (as BaP TEQ	14	0.1	7.2	1.4	2.0	1.4	3.0

Notes:
1. With values of Carcinogenic PAHs (as BaP TEQ) below the LOR, then the LOR value of 0.172 was used.

As the 95% UCL average for Carcinogenic PAHs within soil onsite is 3.0 mg/kg this does not exceed the adopted value for residential land use.

9.2 Groundwater

Groundwater results were either reported below the laboratory limit of reporting (LOR) and/or below adopted interim criteria except for exceedances summarised in **Table 13**. For full

laboratory results see the results table section at the end of this report and for complete laboratory transcripts please see **Appendix D**.

Table 13: Groundwater guideline exceedances

Location ID	Analyte	Criteria (mg/L)	Result (mg/L)
GW1	Nickel	0.011	0.015
	Zinc	0.008	0.048
GW3	Nickel	0.011	0.015
	Zinc	0.008	0.024
	Copper	0.0014	0.002

10 CONCEPTUAL SITE MODEL

A key component of the investigation/ risk assessment process is the development of a Conceptual Site Model (CSM) as this drives the risk management and remediation process. This identifies potential sources of contamination, potential migration pathways along which identified contaminants could migrate and potential receptors which may become exposed.

The CSM considers all plausible pollutant linkages associated with the identified contamination. By evaluating these linkages proposed controls can be outlined and recommendations developed for appropriate remediation or management.

The CSM described within the following sections has been updated from the DP PSI (2016) based upon the review of the results from this assessment.

10.1 Sources of contamination

No primary sources of contamination (e.g. bulk chemical storage, underground tanks, etc.) were observed.

Based upon the assessment tool, PAH source analyst (results provided in **Appendix E**), exceedances of PAHs in soil are likely to be associated with ashes present within the fill material.

Uncontrolled fill material is identified as a potential source of contamination. As the buildings remain on site, associated CoPCs remain as potential contamination sources, even though these were not detected in soil during this assessment.

Heavy metal exceedances detected in groundwater are likely due to background levels (potentially natural) and therefore groundwater is not considered as a potential source of contamination.

10.2 Potential pathways

The potential pathways by which the contamination could reach potential receptors are considered to be:

- Ingestion or dermal contact of contaminated soil;
- Inhalation of dust;
- Leaching and vertical migration of contaminants from fill material into natural soil and groundwater; and
- Direct contact with terrestrial ecology.

10.3 Potential receptors

10.3.1 Human

The potential human receptors are considered to be:

- Current and future onsite residents, carers, visitors and maintenance workers;
- Offsite residents of the residential properties within the vicinity of the site; and
- Recreational users and maintenance workers of the Petersham Park to the north-east.

10.3.2 Ecological

The potential ecological receptors are considered to be:

- Terrestrial ecology.
- Soil flora and fauna.

10.4 Completed risk linkages

Ashes were identified as the main source of PAHs within soil and as such, exhibiting characteristics such as low leach potential and non-bioavailability to soil organisms. Therefore, risk to ecological receptors is considered low.

Based upon the evaluation of completed receptor-impact risk linkages and considering the low leach potential and non-bioavailability characteristics of the exceedances detected in soil, the only identified risk linkages are ingestion or dermal contact of contaminated soil by onsite receptors and inhalation of dust by onsite and immediate offsite receptors.

11 CONCLUSION

Environmental Earth Sciences undertook intrusive assessment of the site on 16 August 2018 by advancing five test pits (TP1 - TP5) and eight boreholes (BH1 - BH8) in the accessible areas. Areas covered by buildings, approximately 50% of the site, were not assessed and it is recommended that assessment of soil conditions within building footprints are conducted at the development stage, once buildings, structures and hardstand areas are removed / demolished. Groundwater was assessed on 21 August 2018 by sampling three existing monitoring wells.

Based on observations and findings of the soil assessment at 13 locations onsite, residual contamination in fill material soil was reported above the applicable HIL A criterion for carcinogenic PAHs (as BaP TEQ) at two locations across the site. However, based on results from PAH source analysis undertaken, the exceedances are likely to be associated with ash present within the fill material and therefore posing a low risk for leachability. Furthermore, statistical assessment was undertaken (including calculation of the 95% $UCL_{AVERAGE}$) for the dataset for Carcinogenic PAHs results in order to ascertain if certain exceedances were representative of the population dataset. A representative value of 3.0 mg/kg was determined for fill material soils assessed across accessible areas of the site. Soils onsite are therefore considered low risk for human receptors as this does not exceed the adopted value for residential land use.

Groundwater results reported concentration either below the laboratory LOR and/or below adopted interim criteria, except for some heavy metals exceedances for freshwater ecosystems at two locations. Based on observations and findings of the groundwater assessment, exceedances detected in groundwater are considered to be likely due to background levels (potentially natural) and not from potential sources of contamination at the site.

Hence in the areas assessed, it is considered that the site will be suitable for residential land use, pending appropriate management and assessment of fill material in currently inaccessible areas of site.

12 RECOMMENDATIONS

Based upon the findings of this report and the low risk associated with the contamination identified at the site, Environmental Earth Sciences make the following recommendations for consideration:

- Undertake the intrusive soil investigation at the remaining 12 locations to achieve compliance with the guidelines during the proposed development works. These locations must be within the footprints of existing buildings and structures.

- Installation of one additional groundwater monitoring well within the northern portion of the site to assess for any potential impacts to groundwater coming from this area of site.

- If soil is required to be disposed offsite during future development works, then characterisation of this soil should be undertaken by a suitably qualified environmental consultant and transported to an appropriate waste disposal facility.

13 LIMITATIONS

This report has been prepared by Environmental Earth Sciences NSW ACN 109 404 006 in response to and subject to the following limitations:

1. The specific instructions received from Artazan Property Group PTY LTD;

2. The specific scope of works set out in PO118133 issued by Environmental Earth Sciences NSW for and on behalf of Artazan Property Group PTY LTD, is included in Section 3 (Scope of Work) of this report;

3. May not be relied upon by any third party not named in this report for any purpose except with the prior written consent of Environmental Earth Sciences NSW (which consent may or may not be given at the discretion of Environmental Earth Sciences NSW);

4. This report comprises the formal report, documentation sections, tables, figures and appendices as referred to in the index to this report and must not be released to any third party or copied in part without all the material included in this report for any reason;

5. The report only relates to the site referred to in the scope of works being located at 2B West Street, Lewisham, NSW, ("the site");

6. The report relates to the site as at the date of the report as conditions may change thereafter due to natural processes and/or site activities;

7. No warranty or guarantee is made in regard to any other use than as specified in the scope of works and only applies to the depth tested and reported in this report;

8. Fill, soil, groundwater and rock to the depth tested on the site may be fit for the use specified in this report. Unless it is expressly stated in this report, the fill, soil and/or rock may not be suitable for classification as clean fill, excavated natural material (ENM) or virgin excavated natural material (VENM) if deposited off site;

9. This report is not a geotechnical or planning report suitable for planning or zoning purposes; and

10. Our General Limitations set out at the back of the body of this report.

14 REFERENCES

Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000) - *The Guidelines* - Volume 1 - Chapter 5

Douglas Partners (2016), *Preliminary Site (Contamination) Investigation, Proposed Aged Care and Seniors Living Facility, 2B West Street, Lewisham, NSW* (Project 85469; May 2016).

Douglas Partners (2018), *Geotechnical Investigation, Proposed Residential Aged Care Facility Upgrade, 2B West Street Lewisham* (Project: 85469.01; July 2018).

National Health and Medical Research Council (NHMRC)/ Natural Resource Management Ministerial Council (NRMMC) (2011). *Australian drinking water guidelines,* National Water Quality Management Strategy.

NSW Department of Environment and Conservation (DEC) (2007) - *Contaminated sites: guidelines for the assessment and management of groundwater contamination*.

NSW Environment Protection Authority (EPA) (1995) - *Contaminated Sites: Sampling design guidelines.*

National Environment Protection Council (NEPC) (2013). *National Environment Protection (Assessment of Site Contamination) Amendment Measure*, Adelaide, SA.

Assessment of Site Contamination National Environment Protection Measure (ASC NEPM) 2013, Schedule B(1): *Guidelines on the Investigation Levels for Soil and Groundwater.*

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

ENVIRONMENTAL EARTH SCIENCES GENERAL LIMITATIONS

Scope of services
The work presented in this report is Environmental Earth Sciences response to the specific scope of works requested by, planned with and approved by the client. It cannot be relied on by any other third party for any purpose except with our prior written consent. Client may distribute this report to other parties and in doing so warrants that the report is suitable for the purpose it was intended for. However, any party wishing to rely on this report should contact us to determine the suitability of this report for their specific purpose.

Data should not be separated from the report
A report is provided inclusive of all documentation sections, limitations, tables, figures and appendices and should not be provided or copied in part without all supporting documentation for any reason, because misinterpretation may occur.

Subsurface conditions change
Understanding an environmental study will reduce exposure to the risk of the presence of contaminated soil and or groundwater. However, contaminants may be present in areas that were not investigated, or may migrate to other areas. Analysis cannot cover every type of contaminant that could possibly be present. When combined with field observations, field measurements and professional judgement, this approach increases the probability of identifying contaminated soil and or groundwater. Under no circumstances can it be considered that these findings represent the actual condition of the site at all points.

Environmental studies identify actual sub-surface conditions only at those points where samples are taken, when they are taken. Actual conditions between sampling locations differ from those inferred because no professional, no matter how qualified, and no sub-surface exploration program, no matter how comprehensive, can reveal what is hidden below the ground surface. The actual interface between materials may be far more gradual or abrupt than an assessment indicates. Actual conditions in areas not sampled may differ from that predicted. Nothing can be done to prevent the unanticipated. However, steps can be taken to help minimize the impact. For this reason, site owners should retain our services.

Problems with interpretation by others
Advice and interpretation is provided on the basis that subsequent work will be undertaken by Environmental Earth Sciences NSW. This will identify variances, maintain consistency in how data is interpreted, conduct additional tests that may be necessary and recommend solutions to problems encountered on site. Other parties may misinterpret our work and we cannot be responsible for how the information in this report is used. If further data is collected or comes to light we reserve the right to alter their conclusions.

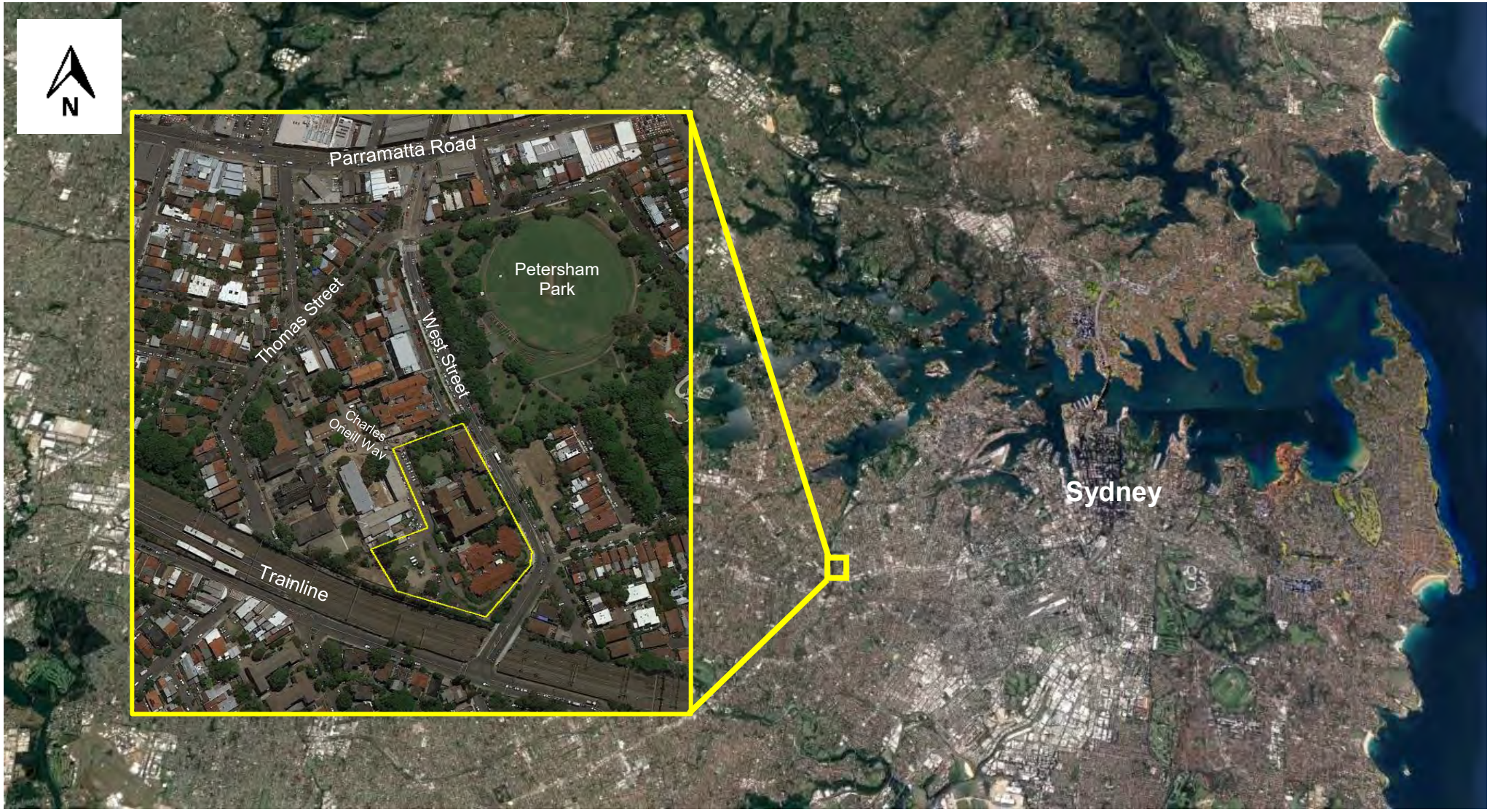
Obtain regulatory approval
The investigation and remediation of contaminated sites is a field in which legislation and interpretation of legislation is changing rapidly. Our interpretation of the investigation findings should not be taken to be that of any other party. When approval from a statutory authority is required for a project, that approval should be directly sought by the client.

Limit of liability
This study has been carried out to a particular scope of works at a specified site and should not be used for any other purpose. This report is provided on the condition that Environmental Earth Sciences NSW disclaims all liability to any person or entity other than the client in respect of anything done or omitted to be done and of the consequence of anything done or omitted to be done by any such person in reliance, whether in whole or in part, on the contents of this report. Furthermore, Environmental Earth Sciences NSW disclaims all liability in respect of anything done or omitted to be done and of the consequence of anything done or omitted to be done by the client, or any such person in reliance, whether in whole or any part of the contents of this report of all matters not stated in the brief outlined in Environmental Earth Sciences NSW's proposal number and according to Environmental Earth Sciences general terms and conditions and special terms and conditions for contaminated sites.

To the maximum extent permitted by law, we exclude all liability of whatever nature, whether in contract, tort or otherwise, for the acts, omissions or default, whether negligent or otherwise for any loss or damage whatsoever that may arise in any way in connection with the supply of services. Under circumstances where liability cannot be excluded, such liability is limited to the value of the purchased service.

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

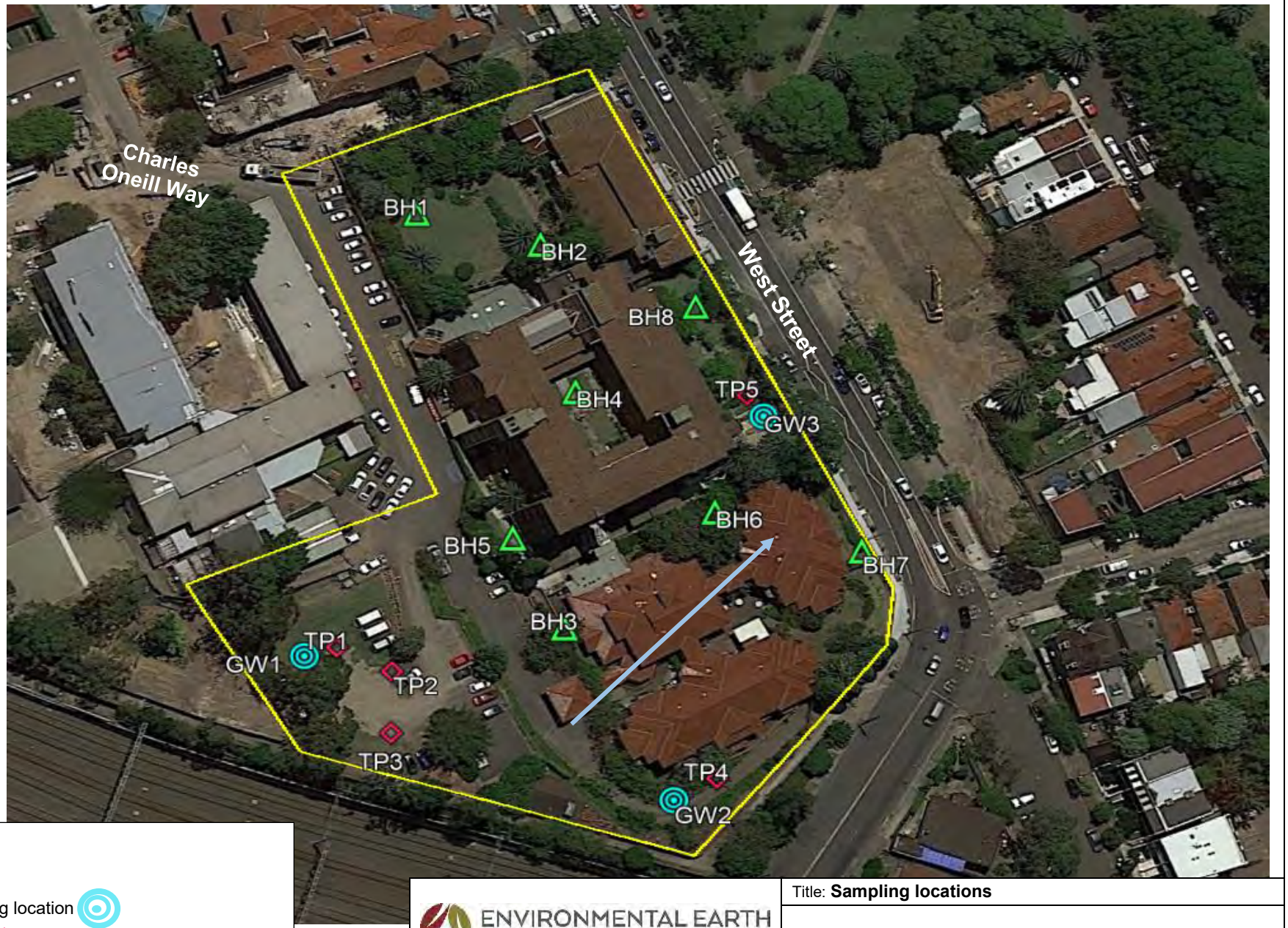
FIGURES



Legend:

Site Location

ENVIRONMENTAL EARTH SCIENCES	Title: **Site Locality Map**	
	Location: **2B West Street, Lewisham, NSW**	
Client: **APG**		Job No: **118085**
Drawn By: **NE**	Scale: **Not to scale**	Source: **Google**
Proj Man: **TS**	Date: **September 2018**	**Figure 1**



Legend:

Site Boundary

Groundwater sampling location

Test pitting location

Borehole location

Inferred groundwater direction

ENVIRONMENTAL EARTH SCIENCES

Title: **Sampling locations**

Location: **2B West Street, Lewisham, NSW**

Client: **APG**		Job No: **118080**
Drawn By: **NE**	Scale: **Not to scale**	Source: **Google**
Proj Man: **TS**	Date: **September 2018**	**Figure 2**

ENVIRONMENTAL EARTH SCIENCES
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RESULTS SUMMARY TABLES

SOIL RESULTS SUMMARY TABLE

Sample ID:			NEPM 2013 Table 1A(1) HILs Res A Soil	NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Clay	NEPM 2013 Table 7 HSL for asbestos contamination in soil	NEPM 2013 Schedule 5bc site specific EILs	NEPM 2013 Table 1B(6) ESLs for Urban Res, Fine Soil	BH1	BH2	BH3	BH4	BH5	BH6	BH7	BH8	TP1-1	TP2-1	TP3-1	TP4-1	TP5-1	FD1
Sample type:								Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Duplicate
Sample depth (m):								0 - 0.4	0.3 - 0.8	0.6 - 1.1	0.35 - 0.9	0 - 0.5	0.2 - 0.6	0 - 0.2	0 - 0.4	0.5	0.4 - 0.6	0.4 - 0.8	0.15 - 0.3	0 - 0.4	
Matrix type:								Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date sampled:	Units	LOR		0-1m				16/08/2018	16/08/2018	16/08/2018	16/08/2018	16/08/2018	16/08/2018	16/08/2018	16/08/2018	16/08/2018	16/08/2018	16/08/2018	16/08/2018	16/08/2018	16/08/2018
Moisture Content																					
Moisture	%	0.1						17	16	9.5	17	10	12	7.8	14	16	10	10	6.7	17	18.9
Heavy Metals																					
Arsenic	mg/kg	4	100			45		10	8	7	6	6	10	10	6	10	7	7	<4	9	13
Cadmium	mg/kg	0.4	20					<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	0.6	0.7	<0.4	<0.4	<0.4	<0.4	<1
Chromium (III+VI)	mg/kg	1				100		22	19	8	15	15	16	12	17	16	9	12	8	18	14
Copper	mg/kg	1	6000			80		19	4	19	14	27	46	22	50	45	20	32	4	5	<5
Lead	mg/kg	1	300			690		91	38	43	250	85	170	65	280	290	100	130	11	19	21
Mercury	mg/kg	0.1	40					1.4	<0.1	<0.1	0.2	0.1	0.2	<0.1	0.2	0.8	0.1	0.2	<0.1	<0.1	<0.1
Nickel	mg/kg	1	400			20		3	2	3	3	5	6	5	9	9	6	6	7	<1	<2
Zinc	mg/kg	1	7400			520		39	15	27	22	45	460	97	270	270	38	91	18	3	<5
TPH (NEPM, 1999)																					
TPH C6-C9 Fraciton	mg/kg	10						<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<10
TPH C10 - C14 Fraction	mg/kg	50						<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
TPH C15-C28 Fraction	mg/kg	100						<100	<100	<100	<100	<100	<100	<100	120	<100	<100	<100	<100	<100	<100
TPH C29-C36 Fraction	mg/kg	100						<100	<100	<100	<100	<100	<100	<100	100	<100	<100	<100	<100	<100	<100
TPH C10 - C36 (Sum of total)	mg/kg	50						-	-	-	-	-	-	-	-	-	-	-	-	-	<50
TRH (NEPM, 2013)																					
TRH C6-C10 Fraction	mg/kg	10						<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<10
TRH C6-C10 less BTEX (F1)	mg/kg	10		50			180	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<10
TRH >C10-C16 Fraction	mg/kg	50						<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
TRH >C10 - C16 Fraction minus Naphthalene (F2)	mg/kg	50		280			120	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
TRH >C16-C34 Fraction	mg/kg	100					1300	<100	<100	<100	<100	<100	<100	<100	180	<100	<100	<100	<100	<100	<100
TRH >C34-C40 Fraction	mg/kg	100					5600	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
TRH C10 - C40 (Sum of total)	mg/kg	50						<50	<50	<50	<50	<50	<50	<50	180	<50	<50	<50	<50	<50	<50
BTEX																					
Benzene	mg/kg	0.2		0.7			65	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	0.5		480			105	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	0.5		NL			125	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5
Xylene (m & p)	mg/kg	0.5						<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<0.5
Xylene (o)	mg/kg	0.5						<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5
Xylene Total	mg/kg	0.5		110			45	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5
Total BTEX	mg/kg	0.2						-	-	-	-	-	-	-	-	-	-	-	-	-	<0.2
Naphthalene	mg/kg	0.1		5		170		<1 - 0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1 - 0.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5
PAH																					
Acenaphthylene	mg/kg	0.1						0.8	<0.1	0.1	<0.1	0.1	0.3	<0.1	2.4	0.4	0.2	0.2	<0.1	<0.1	<0.5
Acenaphthene	mg/kg	0.1						<0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5
Fluorene	mg/kg	0.1						0.3	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	0.8	0.1	<0.1	<0.1	<0.1	<0.1	<0.5
Phenanthrene	mg/kg	0.1						4.7	<0.1	0.2	0.1	2.3	1	0.2	9	1.8	0.3	0.6	<0.1	<0.1	<0.5
Anthracene	mg/kg	0.1						1.4	<0.1	<0.1	<0.1	0.7	0.2	<0.1	2.8	0.4	0.1	0.2	<0.1	<0.1	<0.5
Fluoranthene	mg/kg	0.1						7.2	<0.1	0.6	0.4	3.5	2.4	0.3	13	3	0.7	1.3	<0.1	<0.1	<0.5
Pyrene	mg/kg	0.1						6.6	<0.1	0.6	0.4	3	2.4	0.3	11	2.9	0.7	1.3	<0.1	<0.1	<0.5
Benz(a)anthracene	mg/kg	0.1						3.7	<0.1	0.3	0.2	1.7	1.3	0.2	6.4	1.4	0.4	0.7	<0.1	<0.1	<0.5
Chrysene	mg/kg	0.1						2.9	<0.1	0.3	0.2	1.3	1.2	0.2	4.5	1.3	0.4	0.6	<0.1	<0.1	<0.5
Benzo(b+j)fluoranthene	mg/kg	0.5						-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
Benzo(k)fluoranthene	mg/kg	0.5						-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
Benzo(b+j+k)fluoranthene	mg/kg	0.2						4.9	<0.2	0.5	0.4	2.2	2.5	0.3	8.5	2.5	0.9	1	<0.2	<0.2	-
Benzo(a) pyrene	mg/kg	0.05					33	3.2	<0.05	0.3	0.2	1.4	1.5	0.2	5.8	1.5	0.64	0.81	<0.05	<0.05	<0.5
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1						1.3	<0.1	0.1	0.1	0.5	0.7	<0.1	2.3	0.7	0.4	0.4	<0.1	<0.1	<0.5
Dibenz(a,h)anthracene	mg/kg	0.1						0.3	<0.1	<0.1	<0.1	0.1	0.2	<0.1	0.5	0.2	<0.1	<0.1	<0.1	<0.1	<0.5
Benzo(g,h,i)perylene	mg/kg	0.1						1.4	<0.1	0.2	0.2	0.6	0.8	0.1	2.5	0.8	0.5	0.4	<0.1	<0.1	<0.5
PAHs (Sum of total)	mg/kg	0.5	300					-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
Benzo(a)pyrene TEQ calc (Zero)	mg/kg	0.5						4.5	<0.5	<0.5	<0.5	2	2.2	<0.5	8.1	2.2	0.8	1.1	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc (Half)	mg/kg	0.5						4.5	<0.5	<0.5	<0.5	2	2.2	<0.5	8.1	2.2	0.9	1.1	<0.5	<0.5	0.6
Benzo(a)pyrene TEQ (LOR)	mg/kg	0.5						4.5	<0.5	0.5	<0.5	2	2.2	<0.5	8.1	2.2	0.9	1.2	<0.5	<0.5	1.2
Carcinogenic PAHs (as B(a)P TPEQ)	mg/kg		3					4.043	<0.172	0.395	0.284	1.739	1.92	0.278	7.24	1.931	0.779	0.98	<0.172	<0.172	<1.21
Total Positive PAHs	mg/kg	0.05						39	<0.05	3.3	2.3	18	15	1.7	70	17	5.1	7.7	<0.05	<0.05	-
Organochlorine Pesticides																					
4,4-DDE	mg/kg	0.05						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
a-BHC	mg/kg	0.05						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
Aldrin	mg/kg	0.05						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
Aldrin + Dieldrin	mg/kg	0.05	6					-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05
b-BHC	mg/kg	0.05						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
chlordane	mg/kg	0.05	50					-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05
Chlordane (cis)	mg/kg	0.05						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
Chlordane (trans)	mg/kg	0.05						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
d-BHC	mg/kg	0.05						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
DDD	mg/kg	0.05						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
DDT	mg/kg	0.1				180		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2
DDT+DDE+DDD	mg/kg	0.05	240					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
Dieldrin	mg/kg	0.05						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
Endosulfan	mg/kg	0.05	270					-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05
Endosulfan I	mg/kg	0.05						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05

SOIL RESULTS SUMMARY TABLE

				NEPM 2013 Table 1A(1) HILs Res A Soil	NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Clay	NEPM 2013 Table 7 HSL for asbestos contamination in soil	NEPM 2013 Schedule 5bc site specific EILs	NEPM 2013 Table 1B(6) ESLs for Urban Res, Fine Soil	BH1	BH2	BH3	BH4	BH5	BH6	BH7	BH8	TP1-1	TP2-1	TP3-1	TP4-1	TP5-1	FD1
Sample ID:									BH1	BH2	BH3	BH4	BH5	BH6	BH7	BH8	TP1-1	TP2-1	TP3-1	TP4-1	TP5-1	FD1
Sample type:									Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Duplicate
Sample depth (m):									0 - 0.4	0.3 - 0.8	0.6 - 1.1	0.35 - 0.9	0 - 0.5	0.2 - 0.6	0 - 0.2	0 - 0.4	0.5	0.4 - 0.6	0.4 - 0.8	0.15 - 0.3	0 - 0.4	
Matrix type:									Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date sampled:		Units	LOR		0-1m				16/08/2018	16/08/2018	16/08/2018	16/08/2018	16/08/2018	16/08/2018	16/08/2018	16/08/2018	16/08/2018	16/08/2018	16/08/2018	16/08/2018	16/08/2018	16/08/2018
	Endosulfan II	mg/kg	0.05						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
	Endosulfan sulphate	mg/kg	0.05						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
	Endrin	mg/kg	0.05	10					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
	Endrin aldehyde	mg/kg	0.05						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
	Endrin ketone	mg/kg	0.05						-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05
	g-BHC (Lindane)	mg/kg	0.05						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
	Heptachlor	mg/kg	0.05	6					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
	Heptachlor epoxide	mg/kg	0.05						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
	Methoxychlor	mg/kg	0.1	300					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2
	Hexachlorobenzene	mg/kg	0.05	10					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
Organophosphorous Pesticides																						
	Azinophos methyl	mg/kg	0.05						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
	Bromophos-ethyl	mg/kg	0.05						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
	Carbophenothion	mg/kg	0.05						-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05
	Chlorfenvinphos	mg/kg	0.05						-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05
	Chlorpyrifos	mg/kg	0.05	160					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
	Chlorpyrifos-methyl	mg/kg	0.05						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
	Demeton-S-methyl	mg/kg	0.05						-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05
	Diazinon	mg/kg	0.05						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
	Dichlorvos	mg/kg	0.05						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
	Dimethoate	mg/kg	0.05						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
	Ethion	mg/kg	0.05						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
	Fenamiphos	mg/kg	0.05						-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05
	Fenitrothion	mg/kg	0.1						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-
	Fenthion	mg/kg	0.05						-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05
	Malathion	mg/kg	0.05						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
	Methyl parathion	mg/kg	0.2						-	-	-	-	-	-	-	-	-	-	-	-	-	<0.2
	Monocrotophos	mg/kg	0.2						-	-	-	-	-	-	-	-	-	-	-	-	-	<0.2
	Parathion	mg/kg	0.1						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2
	Pirimphos-ethyl	mg/kg	0.05						-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05
	Prothiofos	mg/kg	0.05						-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05
	Ronnel	mg/kg	0.1						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-
Polychlorinated Biphenyls																						
	Arochlor 1016	mg/kg	0.1						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-
	Arochlor 1221	mg/kg	0.1						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-
	Arochlor 1232	mg/kg	0.1						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-
	Arochlor 1242	mg/kg	0.1						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-
	Arochlor 1248	mg/kg	0.1						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-
	Arochlor 1254	mg/kg	0.1						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-
	Arochlor 1260	mg/kg	0.1						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-
	PCBs (Sum of total)	mg/kg	0.1	1					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenols																						
	Phenolics Total	mg/kg	5	3000					<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<0.5
Micro testing in soil																						
	Salmonella (presence / absence)	50g	0						0	0	0	0	0	0	0	0	0	0	0	0	0	0
	E. Coli	cfu/100g	200						<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<12
Asbestos																						
	Asbestos fibres	g	-			*0.001%*			0	0	0	0	0	0	0	0	0	0	0	0	0	0

GROUNDWATER RESULTS
SUMMARY TABLE

Sample ID:			NEPM 2013 Table 1A(4) Res HSL A & B GW for Vapour Intrusion, Clay	NEPM 2013 Table 1C GILs, Fresh Waters	NEPM 2013 Table 1C GILs, Drinking Water	DEC 2010 Table 5, Microbial Assessment Levels	GW1	GW2	FD1	GW3
Sample type:							Primary	Primary	Duplicate	Primary
Matrix type:							Water	Water	Water	Water
Date sampled:	Units	LOR	4-8m				21/08/2018	21/08/2018	21/08/2018	21/08/2018
Heavy Metals										
Arsenic (Filtered)	mg/L	0.001			**0.01**		0.003	0.001	0.002	<0.001
Cadmium (Filtered)	mg/L	0.0001		0.0002	**0.002**		<0.0001	<0.0001	<0.0001	<0.0001
Chromium (III+VI) (Filtered)	mg/L	0.001					<0.001	<0.001	<0.001	<0.001
Copper (Filtered)	mg/L	0.001		0.0014	**2**		<0.001	<0.001	<0.001	0.002
Lead (Filtered)	mg/L	0.001		0.0034	**0.01**		<0.001	<0.001	<0.001	<0.001
Mercury (Filtered)	mg/L	0.00005		0.00006	**0.001**		<0.00005	<0.00005	<0.0001	<0.00005
Nickel (Filtered)	mg/L	0.001		0.011	**0.02**		0.015	0.006	0.005	0.015
Zinc (Filtered)	mg/L	0.001		0.008			0.048	<0.001	<0.005	0.025
TRH (NEPM, 2013)										
TRH C6-C10 Fraction	µg/L	10					18	22	<20	<10
TRH C6-C10 less BTEX (F1)	µg/L	10	NL				15	22	<20	<10
TRH >C10-C16 Fraction	µg/L	50					<50	<50	<100	<50
TRH >C10 - C16 Fraction minus Naphthalene (F2)	µg/L	50	NL				<50	<50	<100	<50
TRH >C16-C34 Fraction	µg/L	100					<100	<100	<100	260
TRH >C34-C40 Fraction	µg/L	100					<100	<100	<100	<100
TRH C10 - C40 (Sum of total)	µg/L	100					-	-	<100	-
BTEX										
Benzene	µg/L	1	5000	950	**1**		<1	<1	<1	<1
Toluene	µg/L	1	NL		**800**		<1	<1	<2	<1
Ethylbenzene	µg/L	1	NL		**300**		<1	<1	<2	<1
Xylene (m & p)	µg/L	2					2	<2	<2	<2
Xylene (o)	µg/L	1		350			1	<1	<2	<1
Xylene Total	µg/L	2	NL		**600**		-	-	<2	-
Total BTEX	µg/L	1					-	-	<1	-
Naphthalene	µg/L	1	NL	16			<1	<1	<1	<1
PAH										
Acenaphthylene	µg/L	1					<1	<1	<1	<1
Acenaphthene	µg/L	1					<1	<1	<1	<1
Fluorene	µg/L	1					<1	<1	<1	<1
Phenanthrene	µg/L	1					<1	<1	<1	<1
Anthracene	µg/L	1					<1	<1	<1	<1
Fluoranthene	µg/L	1					<1	<1	<1	<1
Pyrene	µg/L	1					<1	<1	<1	<1
Benz(a)anthracene	µg/L	1					<1	<1	<1	<1
Chrysene	µg/L	1					<1	<1	<1	<1
Benzo(b+j)fluoranthene	µg/L	1					-	-	<1	-
Benzo(k)fluoranthene	µg/L	1					-	-	<1	-
Benzo(b+j+k)fluoranthene	µg/L	2					<2	<2	-	<2
Benzo(a) pyrene	µg/L	0.5			**0.01**		<1	<1	<0.5	<1
Indeno(1,2,3-c,d)pyrene	µg/L	1					<1	<1	<1	<1
Dibenz(a,h)anthracene	µg/L	1					<1	<1	<1	<1
Benzo(g,h,i)perylene	µg/L	1					<1	<1	<1	<1
PAHs (Sum of total)	µg/L	0.5					-	-	<0.5	-
Benzo(a)pyrene TEQ calc (Zero)	µg/L	0.5					-	-	<0.5	-
Benzo(a)pyrene TEQ	µg/L	5					<5	<5	-	<5
Organochlorine Pesticides										
4,4-DDE	mg/L	0.0002					<0.0002	<0.0002	<0.0005	<0.0002
a-BHC	mg/L	0.0002					<0.0002	<0.0002	<0.0005	<0.0002
Aldrin	mg/L	0.0002					<0.0002	<0.0002	<0.0005	<0.0002
Aldrin + Dieldrin	mg/L	0.0005			**0.0003**		-	-	<0.0005	-
b-BHC	mg/L	0.0002					<0.0002	<0.0002	<0.0005	<0.0002
chlordane	mg/L	0.0005		0.00003	**0.002**		-	-	<0.0005	-
Chlordane (cis)	mg/L	0.0002					<0.0002	<0.0002	<0.0005	<0.0002
Chlordane (trans)	mg/L	0.0002					<0.0002	<0.0002	<0.0005	<0.0002
d-BHC	mg/L	0.0002					<0.0002	<0.0002	<0.0005	<0.0002
DDD	mg/L	0.0002					<0.0002	<0.0002	<0.0005	<0.0002
DDT	mg/L	0.0002		0.000006	**0.009**		<0.0002	<0.0002	<0.002	<0.0002
DDT+DDE+DDD	mg/L	0.0005					-	-	<0.0005	-

GROUNDWATER RESULTS
SUMMARY TABLE

Sample ID:			NEPM 2013 Table 1A(4) Res HSL A & B GW for Vapour Intrusion, Clay	NEPM 2013 Table 1C GILs, Fresh Waters	NEPM 2013 Table 1C GILs, Drinking Water	DEC 2010 Table 5, Microbial Assessment Levels	GW1	GW2	FD1	GW3
Sample type:							Primary	Primary	Duplicate	Primary
Matrix type:							Water	Water	Water	Water
Date sampled:	Units	LOR	4-8m				21/08/2018	21/08/2018	21/08/2018	21/08/2018
Dieldrin	mg/L	0.0002					<0.0002	<0.0002	<0.0005	<0.0002
Endosulfan I	mg/L	0.0002					<0.0002	<0.0002	<0.0005	<0.0002
Endosulfan II	mg/L	0.0002					<0.0002	<0.0002	<0.0005	<0.0002
Endosulfan sulphate	mg/L	0.0002					<0.0002	<0.0002	<0.0005	<0.0002
Endrin	mg/L	0.0002		0.00001			<0.0002	<0.0002	<0.0005	<0.0002
Endrin aldehyde	mg/L	0.0002					<0.0002	<0.0002	<0.0005	<0.0002
Endrin ketone	mg/L	0.0005					-	-	<0.0005	-
g-BHC (Lindane)	mg/L	0.0002		0.0002	**0.01**		<0.0002	<0.0002	<0.0005	<0.0002
Heptachlor	mg/L	0.0002		0.00001			<0.0002	<0.0002	<0.0005	<0.0002
Heptachlor epoxide	mg/L	0.0002			**0.0003**		<0.0002	<0.0002	<0.0005	<0.0002
Methoxychlor	mg/L	0.0002					<0.0002	<0.0002	<0.002	<0.0002
Hexachlorobenzene	mg/L	0.0002					<0.0002	<0.0002	<0.0005	<0.0002
Organophosphorous Pesticides										
Azinophos methyl	mg/L	0.0002			**0.03**		<0.0002	<0.0002	<0.0005	<0.0002
Bromophos-ethyl	mg/L	0.0002					<0.0002	<0.0002	<0.0005	<0.0002
Carbophenothion	mg/L	0.0005					-	-	<0.0005	-
Chlorfenvinphos	mg/L	0.0005			**0.002**		-	-	<0.0005	-
Chlorpyrifos	mg/L	0.0002		0.00001	**0.01**		<0.0002	<0.0002	<0.0005	<0.0002
Chlorpyrifos-methyl	mg/L	0.0002					<0.0002	<0.0002	<0.0005	<0.0002
Demeton-S-methyl	mg/L	0.0005					-	-	<0.0005	-
Diazinon	mg/L	0.0002		0.00001	**0.004**		<0.0002	<0.0002	<0.0005	<0.0002
Dichlorvos	mg/L	0.0002			**0.005**		<0.0002	<0.0002	<0.0005	<0.0002
Dimethoate	mg/L	0.0002		0.00015	**0.007**		<0.0002	<0.0002	<0.0005	<0.0002
Ethion	mg/L	0.0002			**0.004**		<0.0002	<0.0002	<0.0005	<0.0002
Fenamiphos	mg/L	0.0005			**0.0005**		-	-	<0.0005	-
Fenitrothion	mg/L	0.0002		0.0002	**0.007**		<0.0002	<0.0002	-	<0.0002
Fenthion	mg/L	0.0005			**0.007**		-	-	<0.0005	-
Malathion	mg/L	0.0002		0.00005	**0.07**		<0.0002	<0.0002	<0.0005	<0.0002
Methyl parathion	mg/L	0.002			**0.0007**		-	-	<0.002	-
Monocrotophos	mg/L	0.002					-	-	<0.002	-
Parathion	mg/L	0.0002		0.000004	**0.02**		<0.0002	<0.0002	<0.002	<0.0002
Pirimphos-ethyl	mg/L	0.0005					-	-	<0.0005	-
Prothiofos	mg/L	0.0005					-	-	<0.0005	-
Ronnel	mg/L	0.0002					<0.0002	<0.0002	-	<0.0002
Polychlorinated Biphenyls										
Arochlor 1016	mg/L	0.002					<0.002	<0.002	-	<0.002
Arochlor 1221	mg/L	0.002					<0.002	<0.002	-	<0.002
Arochlor 1232	mg/L	0.002					<0.002	<0.002	-	<0.002
Arochlor 1242	mg/L	0.002		0.0003			<0.002	<0.002	-	<0.002
Arochlor 1248	mg/L	0.002					<0.002	<0.002	-	<0.002
Arochlor 1254	mg/L	0.002		0.00001			<0.002	<0.002	-	<0.002
Arochlor 1260	mg/L	0.002					<0.002	<0.002	-	<0.002
PCBs (Sum of total)	mg/L	0.001					-	-	<0.001	-
Phenolic Compounds										
Phenol	mg/L	<0.05		0.32			<0.05	<0.05	<1	<0.05
Microbes										
Salmonella (presence / absence)	100mL						0	0	0	0
E. Coli	cfu/mL				**1 cfu / 100mL**	*1 cfu / 100mL*	<1	<10	<2	<1

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

APPENDIX A: TEST PIT AND BOREHOLE LOGS

Geological Borelog

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

LOCATION: 2B West Street, Lewisham, NSW		**Borehole Log: BH1**	**Logged by:** LD
SURFACE ELEVATION:	**JOB NUMBER:** 118085		
GROUNDWATER:	**DATUM:**	**PROJECT:** APG Lewisham	**Proj. Manager:** TS
DRILL METHOD: Hand Auger	**DATE DRILLED:** 16/08/18		

STRATIGRAPHY	GRAPHIC LOG	Depth metres	Sample Depth	Moisture Content	PID/FID Background	PID/FID Reading	pH - soil	pH - water	Construction Details	Comments
FILL Soft, brown, sandy clay silt.										
End of hole ~ 0.43 m Refusal on natural rock.		0.5 1.0 1.5 2.0 2.5 3.0								

NOTE: This bore log is for environmental purposes only and is not intended to provide geotechnical information.

Geological Borelog

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

LOCATION: 2B West Street, Lewisham, NSW		**Borehole Log: BH2**	**Logged by:** LD
SURFACE ELEVATION:	**JOB NUMBER:** 118085		
GROUNDWATER:	**DATUM:**	**PROJECT:** APG Lewisham	**Proj. Manager:** TS
DRILL METHOD: Hand Auger	**DATE DRILLED:** 16/08/18		

STRATIGRAPHY	GRAPHIC LOG	Depth metres	Sample Depth	Moisture Content	PID/FID Background	PID/FID Reading	pH - soil	pH - water	Construction Details	Comments
FILL Soft, light brown, silty clay, with shale gravels.										Grass overlying.
FILL Soft, brown, silty clay.		0.5								
NATURAL Stiff, orange / brown, CLAY, becoming grey / brown with orange mottles.		1.0								
End of hole at ~ 1.5 m depth Refusal on natural clay.		1.5								
		2.0								
		2.5								
		3.0								

NOTE: This bore log is for environmental purposes only and is not intended to provide geotechnical information.

Geological Borelog

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

LOCATION: 2B West Street, Lewisham, NSW		**Borehole Log: BH3**	**Logged by:** LD
SURFACE ELEVATION:	**JOB NUMBER:** 118085		
GROUNDWATER:	**DATUM:**	**PROJECT:** APG Lewisham	**Proj. Manager:** TS
DRILL METHOD: Hand Auger	**DATE DRILLED:** 16/08/18		

STRATIGRAPHY	GRAPHIC LOG	Depth metres	Sample Depth	Moisture Content	PID/FID Background	PID/FID Reading	pH - soil	pH - water	Construction Details	Comments
FILL Loose, brown, sandy silt, with rootlets.										
FILL Stiff, grey / brown brown silty clay, with shale gravels.		0.5								
FILL Stiff, brown, silty clay, with gravels of shales and fine gravels of charcoal.		1.0	■							
End of hole at ~ 1.1 m Refusal		1.5								
		2.0								
		2.5								
		3.0								

NOTE: This bore log is for environmental purposes only and is not intended to provide geotechnical information.

Geological Borelog

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

LOCATION: 2B West Street, Lewisham, NSW		**Borehole Log: BH4**	**Logged by:** LD
SURFACE ELEVATION:	**JOB NUMBER:** 118085		
GROUNDWATER:	**DATUM:**	**PROJECT:** APG Lewisham	**Proj. Manager:** TS
DRILL METHOD: Hand Auger	**DATE DRILLED:** 16/08/18		

STRATIGRAPHY	GRAPHIC LOG	Depth metres	Sample Depth	Moisture Content	PID/FID Background	PID/FID Reading	pH - soil	pH - water	Construction Details	Comments
FILL Loose, light brown / grey, silty clay, with shale gravels.										Grass overlying.
FILL Firm, orange / yellow / brown clay.		0.5								
FILL Firm, grey clay with white and grey shale gravels.		1.0								
NATURAL / FILL Soft, dark brown, silty clay.										
NATURAL Stiff, orange CLAY with brown and grey mottles.		1.5								
End of hole at ~ 1.5m Refusal on natural clay.		2.0 2.5 3.0								

NOTE: This bore log is for environmental purposes only and is not intended to provide geotechnical information.

Geological Borelog

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

LOCATION: 2B West Street, Lewisham, NSW		**Borehole Log: BH5**	**Logged by:** LD
SURFACE ELEVATION:	**JOB NUMBER:** 118085		
GROUNDWATER:	**DATUM:**	**PROJECT:** APG Lewisham	**Proj. Manager:** TS
DRILL METHOD: Hand Auger	**DATE DRILLED:** 16/08/18		

STRATIGRAPHY	GRAPHIC LOG	Depth metres	Sample Depth	Moisture Content	PID/FID Background	PID/FID Reading	pH - soil	pH - water	Construction Details	Comments
FILL Loose, light brown, silty clay with shale gravels.										
		0.5								
NATURAL Very stiff, dark orange, CLAY. .										
End of hole at ~ 0.85 m depth Refusal on natural clay.		1.0 1.5 2.0 2.5 3.0								

NOTE: This bore log is for environmental purposes only and is not intended to provide geotechnical information.

Geological Borelog

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

LOCATION: 2B West Street, Lewisham, NSW		**Borehole Log: BH6**	**Logged by:** LD
SURFACE ELEVATION:	**JOB NUMBER:** 118085		
GROUNDWATER:	**DATUM:**	**PROJECT:** APG Lewisham	**Proj. Manager:** TS
DRILL METHOD: Hand Auger	**DATE DRILLED:** 16/08/18		

STRATIGRAPHY	GRAPHIC LOG	Depth metres	Sample Depth	Moisture Content	PID/FID Background	PID/FID Reading	pH - soil	pH - water	Construction Details	Comments
FILL Loose, light brown, silty clay with shale gravels.										
FILL Firm, brown silty clay with shale gravels and red clay inclusions.		0.5								
NATURAL Hard, grey / brown, CLAY, with shale gravels and cobbles.		1.0								
NATURAL Stiff, pale orange CLAY with shale gravels.										
End of hole at ~ 1.3m Refusal on natural clay.		1.5 2.0 2.5 3.0								

NOTE: This bore log is for environmental purposes only and is not intended to provide geotechnical information.

Geological Borelog

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

LOCATION: 2B West Street, Lewisham, NSW		**Borehole Log: BH7**	**Logged by:** LD
SURFACE ELEVATION:	**JOB NUMBER:** 118085		
GROUNDWATER:	**DATUM:**	**PROJECT:** APG Lewisham	**Proj. Manager:** TS
DRILL METHOD: Hand Auger	**DATE DRILLED:** 16/08/18		

STRATIGRAPHY	GRAPHIC LOG	Depth metres	Sample Depth	Moisture Content	PID/FID Background	PID/FID Reading	pH - soil	pH - water	Construction Details	Comments
FILL Loose, light brown silty clay.										
End of hole at ~ 0.2 m depth Refusal on natural shale.		0.5 1.0 1.5 2.0 2.5 3.0								

NOTE: This bore log is for environmental purposes only and is not intended to provide geotechnical information.

Geological Borelog

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

LOCATION: 2B West Street, Lewisham, NSW		**Borehole Log: BH8**	**Logged by:** NE
SURFACE ELEVATION:	**JOB NUMBER:** 118085		
GROUNDWATER:	**DATUM:**	**PROJECT:** APG Lewisham	**Proj. Manager:** TS
DRILL METHOD: Hand Auger	**DATE DRILLED:** 16/08/18		

STRATIGRAPHY	GRAPHIC LOG	Depth metres	Sample Depth	Moisture Content	PID/FID Background	PID/FID Reading	pH - soil	pH - water	Construction Details	Comments
FILL Soft, brown silty clay.										
NATURAL Firm, orange CLAY.		0.5								
NATURAL Stiff, orange CLAY with grey mottles.		1.0								
End of hole at ~ 1.2 m depth. Refusal on natural clay.		1.5 2.0 2.5 3.0								

NOTE: This bore log is for environmental purposes only and is not intended to provide geotechnical information.

Geological Borelog

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

LOCATION: 2B West Street, Lewisham, NSW		**Borehole Log: TP1**	**Logged by:** LD
SURFACE ELEVATION:	**JOB NUMBER:** 118085		
GROUNDWATER:	**DATUM:**	**PROJECT:** APG Lewisham	**Proj. Manager:** TS
DRILL METHOD: Excavator test pit	**DATE DRILLED:** 16/08/18		

STRATIGRAPHY	GRAPHIC LOG	Depth metres	Sample Depth	Moisture Content	PID/FID Background	PID/FID Reading	pH - soil	pH - water	Construction Details	Comments
FILL Loose, brown silty clay, with rootlets and building rubble including; shale gravels and cobbles, brick cobbles.										Located on raised carpark.
FILL Firm, brown, silty clay, with building rubble including; brick, tile, timber, concrete, terracotta fragments and asphalt gravels and boulders.		0.5	■							
FILL Firm, dark brown, silty clay, glass fragments and decomposed rootlets.		1.0	■							
FILL Hard, light brown / grey clay, with boulders of grey / while shale, whole bricks, terracotta pipe pieces and asphalt fragments.		1.5								
NATURAL Very firm, orange / light brown CLAY, with light orange mottles.		2.0								
NATURAL Very firm, white / grey CLAY, with red and yellow mottles.		2.5								
End of hole at ~ 2.6 m depth. Refusal on natural shale.		3.0								

NOTE: This bore log is for environmental purposes only and is not intended to provide geotechnical information.

Geological Borelog

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

LOCATION: 2B West Street, Lewisham, NSW.		**Borehole Log: TP2**	**Logged by:** NE
SURFACE ELEVATION:	**JOB NUMBER:** 118085		
GROUNDWATER:	**DATUM:**	**PROJECT:** APG Lewisham	**Proj. Manager:** TS
DRILL METHOD: Excavator test pit	**DATE DRILLED:** 16/08/18		

STRATIGRAPHY	GRAPHIC LOG	Depth metres	Sample Depth	Moisture Content	PID/FID Background	PID/FID Reading	pH - soil	pH - water	Construction Details	Comments
FILL Stiff, brown, sandy clay, with building rubble including; 100 mm PVC pipe, concrete boulders, terracotta tiles and piping, multi-coloured gravels (50%), bricks, metal rods and sandstone boulders.		0.5 1.0	■							Located on raised carpark.
FILL Concrete hardstand.										
FILL Brown, sandy clay with building rubble including; concrete boulders, terracotta pipe fragments, brick fragments, gravels and orange clay.		1.5	■							
NATURAL While / grey shale.		2.0								
End of hole at ~ 2.1 m depth. Refusal on natural shale.		2.5 3.0								

NOTE: This bore log is for environmental purposes only and is not intended to provide geotechnical information.

Geological Borelog

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

LOCATION: 2B West Street, Lewisham, NSW		**Borehole Log: TP3**	**Logged by:** NE
SURFACE ELEVATION:	**JOB NUMBER:** 118085		
GROUNDWATER:	**DATUM:**	**PROJECT:** APG Lewisham	**Proj. Manager:** TS
DRILL METHOD: Excavator test pit	**DATE DRILLED:** 16/08/18		

STRATIGRAPHY	GRAPHIC LOG	Depth metres	Sample Depth	Moisture Content	PID/FID Background	PID/FID Reading	pH - soil	pH - water	Construction Details	Comments
FILL Soft, brown sandy clay, with building rubble including; brick fragments, terracotta fragments, gravels and cobbles (50%) and metal pipe pieces.		0.5								Located on raised carpark.
NATURAL Hard, orange / grey, CLAY.		1.0 1.5 2.0								
End of hole at ~ 2.2 m depth Target depth reached.		2.5 3.0								

NOTE: This bore log is for environmental purposes only and is not intended to provide geotechnical information.

Geological Borelog

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

LOCATION: 2B West Street, Lewisham		**Borehole Log: TP4**	**Logged by:** NE
SURFACE ELEVATION:	**JOB NUMBER:** 118085		
GROUNDWATER:	**DATUM:**	**PROJECT:** APG Lewisham	**Proj. Manager:** TS
DRILL METHOD: Excavator test pit	**DATE DRILLED:** 16/08/18		

STRATIGRAPHY	GRAPHIC LOG	Depth metres	Sample Depth	Moisture Content	PID/FID Background	PID/FID Reading	pH - soil	pH - water	Construction Details	Comments
FILL Gravel roadbase.										
FILL Loose, black sand.										
FILL Loose, orange sand.										
NATURAL White / grey shale.		0.5								
End of hole at ~ 0.5 m depth. Refusal on natural shale.										
		1.0								
		1.5								
		2.0								
		2.5								
		3.0								

NOTE: This bore log is for environmental purposes only and is not intended to provide geotechnical information.

Geological Borelog

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

LOCATION: 2B West Street, Lewisham, NSW		**Borehole Log: TP5**	**Logged by:** NE
SURFACE ELEVATION:	**JOB NUMBER:** 118085		
GROUNDWATER:	**DATUM:**	**PROJECT:** APG Lewisham	**Proj. Manager:** TS
DRILL METHOD: Excavator test pit	**DATE DRILLED:** 16/08/18		

STRATIGRAPHY	GRAPHIC LOG	Depth metres	Sample Depth	Moisture Content	PID/FID Background	PID/FID Reading	pH - soil	pH - water	Construction Details	Comments
FILL Soft, brown silty clay.										
NATURAL Firm, orange CLAY with grey mottles.		0.5								
		1.0								
NATURAL Stiff, grey CLAY.										
End of hole at ~ 1.4 m depth Target depth reached.		1.5								
		2.0								
		2.5								
		3.0								

NOTE: This bore log is for environmental purposes only and is not intended to provide geotechnical information.

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

APPENDIX B: CALIBRATION CERTIFICATION

PID Calibration Certificate

airmet

Air-Met Scientific Pty Ltd
1300 137 067

Instrument PhoCheck Tiger
Serial No. T-111096

Item	Test	Pass	Comments			
Battery	Charge Condition	✓				
	Fuses	✓				
	Capacity	✓				
	Recharge OK?	✓				
Switch/keypad	Operation	✓				
Display	Intensity	✓				
	Operation (segments)	✓				
Grill Filter	Condition	✓				
	Seal	✓				
Pump	Operation	✓				
	Filter	✓				
	Flow	✓				
	Valves, Diaphragm	✓				
PCB	Condition	✓				
Connectors	Condition	✓				
Sensor	PID	✓	10.6 ev			
Alarms	Beeper	✓	**Low**	**High**	**TWA**	**STEL**
	Settings	✓	50ppm	100ppm		
Software	Version	✓				
Data logger	Operation	✓				
Download	Operation	✓				
Other tests:						

Certificate of Calibration

This is to certify that the above instrument has been calibrated to the following specifications:

Sensor	Serial no	Calibration gas and concentration	Certified	Gas bottle No		Instrument Reading
PID Lamp		98ppm Isobutylene	NATA	SY137		97.9ppm

Calibrated by: SB. **Sophie Boler**

Calibration date: **20/08/2018**

Next calibration due: **19/09/2018**

Multi Parameter Water Meter

Instrument YSI Quatro Pro Plus
Serial No. 15E101199

airmet
Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments
Battery	Charge Condition	✓	
	Fuses	✓	
	Capacity	✓	
Switch/keypad	Operation	✓	
Display	Intensity	✓	
	Operation (segments)	✓	
Grill Filter	Condition	✓	
	Seal	✓	
PCB	Condition	✓	
Connectors	Condition	✓	
Sensor	1. pH	✓	
	2. mV	✓	
	3. EC	✓	
	4. D.O	✓	
	5. Temp	✓	
Alarms	Beeper		
	Settings		
Software	Version		
Data logger	Operation		
Download	Operation		
Other tests:			

Certificate of Calibration

This is to certify that the above instrument has been calibrated to the following specifications:

Sensor	Serial no	Standard Solutions	Certified	Solution Bottle Number	Instrument Reading
1. pH 10.00		pH 10.00		320322	pH 9.71
2. pH 7.00		pH 7.00		307928	pH 7.01
3. pH 4.00		pH 4.00		307927	pH 4.11
4. mV		231.8mV		311902/311901	233.2mV
5. EC		2.76mS		306341	2.77mS
6. D.O		0.00ppm		5656	0.00ppm
7. Temp		21.0°C		MultiTherm	20.1°C

Calibrated by: M.W. **Michelle Wagner**

Calibration date: **20/08/2018**

Next calibration due: **19/09/2018**

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

APPENDIX C: QUALITY ASSURANCE AND QUALITY CONTROL

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

TABLE OF CONTENTS

Tables

1 INTRODUCTION AND BACKGROUND

1.1 Introduction

The aim of quality control and quality assurance (QA/QC) is to deliver data that is:

- representative of what is sampled;
- precise;
- accurate; and
- reproducible.

As investigations involve both field and laboratory QA/QC, these are similarly divided. The objective of this document is to evaluate and identify the data quality objectives (DQOs) and the data quality indicators (DQIs), which are used to assess whether the DQOs have been met.

All surface water, groundwater and soil sampling procedures to be followed are described in full in our Soil, gas and groundwater sampling manual (Environmental Earth Sciences Pty Ltd 2011). This document should be referred to for field procedures for sampling and conveyance. Copies are available for inspection if required.

The NSW EPA endorsed guideline documents used in the evaluation of the data set for this investigation are:

- National Environment Protection Council (NEPC) (2013) - *National Environment Protection (Assessment of Site Contamination) Amendment Measure* (ASC NEPM, 2013).
- NSW Environment Protection Authority (EPA) (2017) - *Contaminated sites: Guidelines for NSW Site Auditors Scheme (3nd edition)*.
- NSW EPA (1995) - *Contaminated Sites: Sampling design guidelines*.
- NSW Office of Environment and Heritage (OEH) (2011) - *Contaminated sites: Guidelines for consultants reporting on contaminated sites*.
- Standards Australia (2005). Guide to the investigation and sampling of sites with potentially contaminated soil, Part 1: Non-volatile and semi-volatile compounds (AS 4482.1); and
- Standards Australia (1999). Guide to the investigation and sampling of sites with potentially contaminated soil, Part 2: Volatile substances (AS4482.2).

Data quality is typically discussed in terms of precision, accuracy, representativeness, comparability and completeness. These are referred to as the PARCC parameters. The PARCC (and additional QA) parameters are discussed within this report.

The following items form part of the QA/QC appendix:

- repeatability;
- precision;
- accuracy;
- representativeness;
- completeness;
- comparability;
- sensitivity;
- holding times;
- blanks; and
- procedures for anomalous samples and confirmation checking.

1.2 Background

Quality Assurance (QA) is “a set of activities intended to establish confidence that quality requirements will be met” (AS/NZS ISO 9000:2005). This encompasses all actions, procedures, checks and decisions undertaken to ensure the accuracy and reliability of analysis results. It includes routine procedures which ensure proper sample control, data transfer, instrument calibration, the decisions required to select and properly train staff, select equipment and analytical methods, and the day to day judgements resulting from regular scrutiny and maintenance of the laboratory system.

Quality Control (QC) is “a set of activities intended to ensure that quality requirements are actually being met” (AS/NZS ISO 9000:2005). In other words, the operational techniques and activities used to fulfil the requirements for quality.

These are the components of QA which serve to monitor and measure the effectiveness of other QA procedures by comparison with previously decided objectives. They include measurement of the quality of reagents, cleanliness of apparatus, accuracy and precision of methods and instrumentation, and reliability of all of these factors as implemented in a given laboratory from day to day.

A complete discussion of either of these terms or the steps for implementing them is beyond the scope of this document. It is widely recognised, however, that adoption of sound laboratory QA and QC procedures is essential, and readers are referred to documentation available from the National Association of Testing Authorities (NATA), if further information is required.

2 DATA QUALITY OBJECTIVES

Development of data quality objectives (DQOs) for each project is a requirement of the ASCNEPC (2013). This is based on a DQO process formulated by the USEPA for contaminated land assessment and remediation and provides sound guidance for a consistent approach in understanding site assessment and remediation. The DQOs are defined in a series of seven steps. Table 1 outlines the seven steps and refers to the sections of the report which address these quality objectives.

Table 1: Data quality objectives

Step	Description	Comment	Location in main report
1	State the problem	The site requires additional investigation to ascertain soil and groundwater quality conditions arising from former site use as a cemetery, a boiler / incinerator previously existing onsite, uncontrolled fill and disposal of demolished building materials (Douglas Partners 2016).	Section 1 and Section 2
2	Identify the decision	Preparation of a robust Detailed Site Investigation (DSI) to delineate if there is contamination onsite and whether there is requirement for further investigation or remediation action plan (RAP) to ensure that the site can be made suitable for the proposed future residential use. Use Douglas Partners (2016) and the findings from this assessment.	Section 3
3	Identify the inputs for the decision	Findings from Douglas Partners (2016) assessment with review of their initial CSM. Selection of appropriate validation criteria for soil and groundwater in accordance with ASC NEPM (2013). Collection and laboratory analysis of soil and groundwater samples to determine if the site is suitable for the proposed development as an upgraded aged and seniors living facility.	Section 2 and 5 Section 8 Section 6 and 7
4	Define the boundaries for the study	The site is located at 2B West Street, Lewisham NSW, and is comprised of one lot (Lot 1 DP 1116995). The area of the site is approximately 12,100 m^2, with the vertical extent of investigation defined by fill material depth (soil), and the depth to groundwater (wells). The investigation area is approximately 50% of the defined site area due to site buildings creating inaccessibility.	Section 5 Figure 2
5	Develop a decision rule	All analytical data will be compared and evaluated against appropriate published criteria. The NEPC (2013) will be used as the primary guidance document in decision making on action levels. Dependent upon the sampling and analysis design, statistical parameters such as arithmetic mean, standard deviation and 95% upper confidence limits (95% UCLs) may be applied to designated soil populations for particular analytes. In the event that action levels are exceeded, recommendations will be provided. These procedures constitute the alternative action plan.	Section 8 Section 9

Step	Description	Comment	Location in main report
6	Specify tolerable limits on decision error	Acceptable limits for field data analysis (relative percent differences for primary and duplicate results) are between 50 and 150 percent (depending on the origin of the sample and volatility of the chemicals present). Acceptable limits for laboratory duplicate analysis may be affected by the heterogeneity of soil and will be set based on site specific information such as background concentrations. These are summarised in Table 2 as the measurement data quality indicators (MDQIs), which will be used to establish whether the DQOs have been met.	Appendix H
7	Optimise the design for obtaining data	The optimum design for obtaining data in order to achieve the Data Quality Objectives is as follows: • Only NATA-accredited environmental testing laboratories will be commissioned to analyse soil and groundwater samples conforming to the ASC NEPM (2013) - Schedule B(3) Guidelines on Laboratory Analysis of Potentially Contaminated Soils. • Review of previous contaminated land reports relevant to the site (Douglas Partners 2016). • Assessment of the Data Quality Indicators (DQIs) to determine if the field procedures and laboratory analytical results are reliable. Collection of QA/QC samples at frequencies prescribed in the ASC NEPM (2013).	Section 7 Section 2 and 5 Appendix H

Based on the DQOs the following measurement data quality indicators (MDQIs) are provided in Table 2 below.

Table 2: Measurement data quality indicators (MDQIS)

Parameter	Procedure	Minimum Frequency	Criteria	
			(5 to 10x LOR[4])	>10x LOR
Precision	Field Duplicates	1 in 20 - metals	<80 RPD	<50 RPD
		1 in 20 - semi-volatiles	<100 RPD	<80 RPD
		1 in 20 - volatiles	<150 RPD	<130 RPD
	Lab Duplicate*	1 in 20	<50 RPD	<30 RPD
Accuracy*	Reference Material	1 in 10	60% to 140%R	80% to 120%R
	Matrix spikes			
	Surrogate spikes			
Representativeness*	Reagent Blanks	1 per batch	No detection	
	Holding Times*	Every sample	-	

Parameter	Procedure	Minimum Frequency	Criteria
Sensitivity	Limit of Reporting	Every sample	LOR < ½ site criteria

Notes:
1. RPD – relative percentage difference;
2. %R – percent recovery;
3. LOR – limit of reporting;
4. no limit at <5x LOR;
5. * the MDQI is usually specified in the standard method. If not, use the default values set out in this table; and
6. ** only necessary when measuring dissolved metals and volatile organic compounds in water samples.

It should be noted that Standards Australia (AS4482.1) specify that typical MDQIs for precision should be ≤50% RPD, however also acknowledge that low concentrations and organic compounds in particular can be acceptably outside this range. The standard suggests that ≤50% RPD be used as a 'trigger' and values above this level of repeatability need to be noted and explained.

Our adopted MDQIs for precision acknowledge the intrinsic heterogeneity of metal and semi volatile chemical concentrations in disturbed soil that may potentially cause large variations in results between laboratory subsamples (although all efforts are made to homogenise non-volatile duplicate samples). Similarly, large variations in volatile chemical concentrations between duplicates may be unavoidable even when using best practice sampling methodology, especially as we seek to minimise the disturbance to the sample while splitting it which means a high degree of inherent heterogeneity is expected.

As such, our adopted RPD criteria are considered to be a suitable measure for the reproducibility of results within a naturally heterogeneous media such as soil. A ≤50% RPD trigger value will be used, with any exceedance discussed and assessed for acceptability.

3 QUALITY CONTROL AND QUALITY ASSURANCE

3.1 Data quality objectives

Step 7 of the DQO process (Section 2.0) is a focus on the quality of the information by measurement. The aim of a quality control and quality assurance (QA/QC) is to deliver data that is representative of what is sampled, precise, accurate and reproducible. As investigations involve both field and laboratory QA/QC, these are similarly divided. The objective of this section is to provide the MDQOs and the measurement data quality indicators (MDQIs), which will be used to establish whether the DQOs have been met.

All surface water, groundwater and soil sampling procedures need to be undertaken according to a standard procedure, for example those procedures set out in:

- NSW EPA (1995).
- NSW OEH (2011).

- AS 4482.1 and AS 4482.2.

3.2 Field QAQC

3.2.1 Details of sampling team

Intrusive soil fieldworks and a GME were conducted by the following sampling teams:

- Test pitting and associated soil sampling on 16 August 2018 (Natalie Eldridge and Lachlan Desailly); and
- GME on 21 August 2018 (Natalie Eldridge).

3.2.2 Sampling controls

Soil

During test pitting, soil samples were collected from the centre of the excavator bucket with the field scientist exposing a fresh face using disposable nitrile gloves. Gloves were changed at least between every sample location. As such, no equipment was used which could have led to cross contamination.

During hand augering, soil samples were collected from the centre of the auger with the field scientist using disposable nitrile gloves. As such no equipment was used which could have led to cross contamination.

During this process the field scientist would also determine the colour and texture of the soil sample.

Groundwater

For groundwater sampling a submersible pump, flow cell and water quality meter were employed. Between each location these pieces of equipment were rinsed using a mixture of orange-based surfactant and distilled water, followed by a rinse with distilled water. Groundwater samples were collected directly from the tubing and did not pass through the flow cell. The field scientist used a fresh pair of disposable nitrile gloves at each location. As such, no equipment was used which could have led to cross contamination.

Sample notation details:

The test pit and borehole log details for each sample collected (including, location, initials of sampler, duplicate locations, duplicate type and field screening details) are presented in Appendix A. The chemical analyses performed on each sample are presented on the chain of custody documentation (Appendix C) which also identified for each sample – the sampler, nature of the sample, collection date, analyses to be performed, sample preservation method (if any), departure time from the site and dispatch courier.

Primary samples for this project was completed by Envirolab Chatswood and inter-laboratory field duplicate sample analysis was completed by ALS Smithfield.

The inter (split) duplicate samples were collected at a rate of one duplicate per twenty samples collected (5%).

For this project the sample analyses schedule is summarised in Table 3.

Table 3: Analytical schedule

Soil	Primary Sample Count	No. of inter-lab duplicates	Total
Moisture content	13	1	14
Heavy metals (As, Cd, Cu, Cr_{TOTAL}, Pb, Hg, Ni, Zn)	13	1	14
TRH (C_6 - C_{40})	13	1	14
BTEX	13	1	14
PAH	13	1	14
OCP / OPP / PCB	13	1	14
Phenols (total)	13	1	14
Selected pathogens (salmonella and E. coli)	13	1	14
Asbestos presence / absence	13	1	14
Groundwater	**Primary Sample Count**	**No. of inter-lab duplicates**	**Total**
Dissolved heavy metals (As, Cd, Cu, Cr_{TOTAL}, Pb, Hg, Ni, Zn)	3	1	4
TRH (C_6 - C_{40})	3	1	4
BTEX	3	1	4
PAH	3	1	4
OCP / OPP / PCB	3	1	4
Phenols (total)	3	1	4
Selected pathogens (salmonella and E. coli)	3	1	4

Field duplicate samples

For soil, duplicate samples were split by collecting soil out of the centre of the excavator bucket, from a fresh face of representative soil, then scraped and placed immediately in glass jars.

For groundwater, duplicate samples were collected by alternating between sample bottles and partially filling with the pump tubing until all are completely full. This would ensure a representative duplicate is collected.

Results of soil field duplicate analyses and associated RPDs are presented in Table 4. Results of groundwater field duplicate analyses and associated RPDs are presented in Table 5.

Table 4: Field soil duplicate analyses and RPD values

Sample ID:			TP5-1	FD1	
Sample type:			Primary	Duplicate	
Sample depth (m):			0 - 0.4		RPD (%)
Matrix type:			Soil	Soil	
Date sampled:	Units	LOR	16/08/2018	16/08/2018	
Moisture Content					
Moisture	%	0.1	17	18.9	10.58496
Heavy Metals					
Arsenic	mg/kg	4	9	13	36.36364
Cadmium	mg/kg	0.4	<0.4	<1	NC
Chromium (III+VI)	mg/kg	1	18	14	25
Copper	mg/kg	1	5	<5	NC
Lead	mg/kg	1	19	21	10
Mercury	mg/kg	0.1	<0.1	<0.1	NC
Nickel	mg/kg	1	<1	<2	NC
Zinc	mg/kg	1	3	<5	NC
TPH (NEPM, 1999)					
TPH C6-C9 Fraciton	mg/kg	10	<25	<10	NC
TPH C10 - C14 Fraction	mg/kg	50	<50	<50	NC
TPH C15-C28 Fraction	mg/kg	100	<100	<100	NC
TPH C29-C36 Fraction	mg/kg	100	<100	<100	NC
TPH C10 - C36 (Sum of total)	mg/kg	50	-	<50	NC
TRH (NEPM, 2013)					
TRH C6-C10 Fraction	mg/kg	10	<25	<10	NC
TRH C6-C10 less BTEX (F1)	mg/kg	10	<25	<10	NC
TRH >C10-C16 Fraction	mg/kg	50	<50	<50	NC
TRH >C10 - C16 Fraction minus Naphthalene (F2)	mg/kg	50	<50	<50	NC
TRH >C16-C34 Fraction	mg/kg	100	<100	<100	NC
TRH >C34-C40 Fraction	mg/kg	100	<100	<100	NC
TRH C10 - C40 (Sum of total)	mg/kg	50	<50	<50	NC
BTEX					
Benzene	mg/kg	0.2	<0.2	<0.2	NC
Toluene	mg/kg	0.5	<0.5	<0.5	NC
Ethylbenzene	mg/kg	0.5	<1	<0.5	NC
Xylene (m & p)	mg/kg	0.5	<2	<0.5	NC
Xylene (o)	mg/kg	0.5	<1	<0.5	NC
Xylene Total	mg/kg	0.5	<1	<0.5	NC
Total BTEX	mg/kg	0.2	-	<0.2	NC
Naphthalene	mg/kg	0.1	<0.1	<0.5	NC
PAH					
Acenaphthylene	mg/kg	0.1	<0.1	<0.5	NC
Acenaphthene	mg/kg	0.1	<0.1	<0.5	NC
Fluorene	mg/kg	0.1	<0.1	<0.5	NC
Phenanthrene	mg/kg	0.1	<0.1	<0.5	NC
Anthracene	mg/kg	0.1	<0.1	<0.5	NC
Fluoranthene	mg/kg	0.1	<0.1	<0.5	NC
Pyrene	mg/kg	0.1	<0.1	<0.5	NC
Benz(a)anthracene	mg/kg	0.1	<0.1	<0.5	NC
Chrysene	mg/kg	0.1	<0.1	<0.5	NC
Benzo(b+j)fluoranthene	mg/kg	0.5	-	<0.5	NC
Benzo(k)fluoranthene	mg/kg	0.5	-	<0.5	NC
Benzo(b+j+k)fluoranthene	mg/kg	0.2	<0.2	-	NC
Benzo(a) pyrene	mg/kg	0.05	<0.05	<0.5	NC
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	<0.1	<0.5	NC
Dibenz(a,h)anthracene	mg/kg	0.1	<0.1	<0.5	NC
Benzo(g,h,i)perylene	mg/kg	0.1	<0.1	<0.5	NC
PAHs (Sum of total)	mg/kg	0.5	-	<0.5	NC
Benzo(a)pyrene TEQ calc (Zero)	mg/kg	0.5	<0.5	<0.5	NC
Benzo(a)pyrene TEQ calc (Half)	mg/kg	0.5	<0.5	0.6	NC
Benzo(a)pyrene TEQ (LOR)	mg/kg	0.5	<0.5	1.2	NC
Carcinogenic PAHs (as B(a)P TPE)	mg/kg		<0.172	<1.21	NC
Total Positive PAHs	mg/kg	0.05	<0.05	-	NC
Organochlorine Pesticides					
4,4-DDE	mg/kg	0.05	<0.1	<0.05	NC
a-BHC	mg/kg	0.05	<0.1	<0.05	NC
Aldrin	mg/kg	0.05	<0.1	<0.05	NC
Aldrin + Dieldrin	mg/kg	0.05	-	<0.05	NC

b-BHC	mg/kg	0.05	<0.1	<0.05	NC
chlordane	mg/kg	0.05	-	<0.05	NC
Chlordane (cis)	mg/kg	0.05	<0.1	<0.05	NC
Chlordane (trans)	mg/kg	0.05	<0.1	<0.05	NC
d-BHC	mg/kg	0.05	<0.1	<0.05	NC
DDD	mg/kg	0.05	<0.1	<0.05	NC
DDT	mg/kg	0.1	<0.1	<0.2	NC
DDT+DDE+DDD	mg/kg	0.05	<0.1	<0.05	NC
Dieldrin	mg/kg	0.05	<0.1	<0.05	NC
Endosulfan	mg/kg	0.05	-	<0.05	NC
Endosulfan I	mg/kg	0.05	<0.1	<0.05	NC
Endosulfan II	mg/kg	0.05	<0.1	<0.05	NC
Endosulfan sulphate	mg/kg	0.05	<0.1	<0.05	NC
Endrin	mg/kg	0.05	<0.1	<0.05	NC
Endrin aldehyde	mg/kg	0.05	<0.1	<0.05	NC
Endrin ketone	mg/kg	0.05	-	<0.05	NC
g-BHC (Lindane)	mg/kg	0.05	<0.1	<0.05	NC
Heptachlor	mg/kg	0.05	<0.1	<0.05	NC
Heptachlor epoxide	mg/kg	0.05	<0.1	<0.05	NC
Methoxychlor	mg/kg	0.1	<0.1	<0.2	NC
Hexachlorobenzene	mg/kg	0.05	<0.1	<0.05	NC
Organophosphorous Pesticides					
Azinophos methyl	mg/kg	0.05	<0.1	<0.05	NC
Bromophos-ethyl	mg/kg	0.05	<0.1	<0.05	NC
Carbophenothion	mg/kg	0.05	-	<0.05	NC
Chlorfenvinphos	mg/kg	0.05	-	<0.05	NC
Chlorpyrifos	mg/kg	0.05	<0.1	<0.05	NC
Chlorpyrifos-methyl	mg/kg	0.05	<0.1	<0.05	NC
Demeton-S-methyl	mg/kg	0.05	-	<0.05	NC
Diazinon	mg/kg	0.05	<0.1	<0.05	NC
Dichlorvos	mg/kg	0.05	<0.1	<0.05	NC
Dimethoate	mg/kg	0.05	<0.1	<0.05	NC
Ethion	mg/kg	0.05	<0.1	<0.05	NC
Fenamiphos	mg/kg	0.05	-	<0.05	NC
Fenitrothion	mg/kg	0.1	<0.1	-	NC
Fenthion	mg/kg	0.05	-	<0.05	NC
Malathion	mg/kg	0.05	<0.1	<0.05	NC
Methyl parathion	mg/kg	0.2	-	<0.2	NC
Monocrotophos	mg/kg	0.2	-	<0.2	NC
Parathion	mg/kg	0.1	<0.1	<0.2	NC
Pirimphos-ethyl	mg/kg	0.05	-	<0.05	NC
Prothiofos	mg/kg	0.05	-	<0.05	NC
Ronnel	mg/kg	0.1	<0.1	-	NC
Polychlorinated Biphenyls					
Arochlor 1016	mg/kg	0.1	<0.1	-	NC
Arochlor 1221	mg/kg	0.1	<0.1	-	NC
Arochlor 1232	mg/kg	0.1	<0.1	-	NC
Arochlor 1242	mg/kg	0.1	<0.1	-	NC
Arochlor 1248	mg/kg	0.1	<0.1	-	NC
Arochlor 1254	mg/kg	0.1	<0.1	-	NC
Arochlor 1260	mg/kg	0.1	<0.1	-	NC
PCBs (Sum of total)	mg/kg	0.1	<0.1	<0.1	NC
Phenols					
Phenolics Total	mg/kg	5	<5	<0.5	NC
Micro testing in soil					
Salmonella (presence / absence)	50g	0	0	0	NC
E. Coli	cfu/100g	200	<200	<12	NC
Asbestos					
Asbestos fibres	g	-	0	0	NC

Notes:

Duplicate pair PASS criteria

Duplicate pair FAIL criteria

LOR	Laboritory limit of reporting
mg / L	Milligrams per litre
RPD	Relative percent difference (%)
NC	RPD not able to be calculated due to at least one result < LOR
-	Analyte not tested

Table 5: Field groundwater duplicate analyses and RPD values

Sample ID:			GW2	FD1	RPD (%)
Sample type:			Primary	Duplicate	
Matrix type:			Water	Water	
Date sampled:	Units	LOR	21/08/2018	21/08/2018	
Heavy Metals					
Arsenic (Filtered)	mg/L	0.001	0.001	0.002	66.66667
Cadmium (Filtered)	mg/L	0.0001	<0.0001	<0.0001	NC
Chromium (III+VI) (Filtered)	mg/L	0.001	<0.001	<0.001	NC
Copper (Filtered)	mg/L	0.001	<0.001	<0.001	NC
Lead (Filtered)	mg/L	0.001	<0.001	<0.001	NC
Mercury (Filtered)	mg/L	0.00005	<0.00005	<0.0001	NC
Nickel (Filtered)	mg/L	0.001	0.006	0.005	18.18182
Zinc (Filtered)	mg/L	0.001	<0.001	<0.005	NC
TRH (NEPM, 2013)					
TRH C6-C10 Fraction	µg/L	10	22	<20	NC
TRH C6-C10 less BTEX (F1)	µg/L	10	22	<20	NC
TRH >C10-C16 Fraction	µg/L	50	<50	<100	NC
TRH >C10 - C16 Fraction minus Naphthalene (F2)	µg/L	50	<50	<100	NC
TRH >C16-C34 Fraction	µg/L	100	<100	<100	NC
TRH >C34-C40 Fraction	µg/L	100	<100	<100	NC
TRH C10 - C40 (Sum of total)	µg/L	100	-	<100	NC
BTEX					
Benzene	µg/L	1	<1	<1	NC
Toluene	µg/L	1	<1	<2	NC
Ethylbenzene	µg/L	1	<1	<2	NC
Xylene (m & p)	µg/L	2	<2	<2	NC
Xylene (o)	µg/L	1	<1	<2	NC
Xylene Total	µg/L	2	-	<2	NC
Total BTEX	µg/L	1	-	<1	NC
Naphthalene	µg/L	1	<1	<1	NC
PAH					
Acenaphthylene	µg/L	1	<1	<1	NC
Acenaphthene	µg/L	1	<1	<1	NC
Fluorene	µg/L	1	<1	<1	NC
Phenanthrene	µg/L	1	<1	<1	NC
Anthracene	µg/L	1	<1	<1	NC
Fluoranthene	µg/L	1	<1	<1	NC
Pyrene	µg/L	1	<1	<1	NC
Benz(a)anthracene	µg/L	1	<1	<1	NC
Chrysene	µg/L	1	<1	<1	NC
Benzo(b+j)fluoranthene	µg/L	1	-	<1	NC
Benzo(k)fluoranthene	µg/L	1	-	<1	NC
Benzo(b+j+k)fluoranthene	µg/L	2	<2	-	NC
Benzo(a) pyrene	µg/L	0.5	<1	<0.5	NC
Indeno(1,2,3-c,d)pyrene	µg/L	1	<1	<1	NC
Dibenz(a,h)anthracene	µg/L	1	<1	<1	NC
Benzo(g,h,i)perylene	µg/L	1	<1	<1	NC
PAHs (Sum of total)	µg/L	0.5	-	<0.5	NC
Benzo(a)pyrene TEQ calc (Zero)	µg/L	0.5	-	<0.5	NC
Benzo(a)pyrene TEQ	µg/L	5	<5	-	NC
Organochlorine Pesticides					
4,4-DDE	mg/L	0.0002	<0.0002	<0.0005	NC
a-BHC	mg/L	0.0002	<0.0002	<0.0005	NC
Aldrin	mg/L	0.0002	<0.0002	<0.0005	NC
Aldrin + Dieldrin	mg/L	0.0005	-	<0.0005	NC
b-BHC	mg/L	0.0002	<0.0002	<0.0005	NC
chlordane	mg/L	0.0005	-	<0.0005	NC
Chlordane (cis)	mg/L	0.0002	<0.0002	<0.0005	NC
Chlordane (trans)	mg/L	0.0002	<0.0002	<0.0005	NC
d-BHC	mg/L	0.0002	<0.0002	<0.0005	NC

DDD	mg/L	0.0002	<0.0002	<0.0005	NC
DDT	mg/L	0.0002	<0.0002	<0.002	NC
DDT+DDE+DDD	mg/L	0.0005	-	<0.0005	NC
Dieldrin	mg/L	0.0002	<0.0002	<0.0005	NC
Endosulfan I	mg/L	0.0002	<0.0002	<0.0005	NC
Endosulfan II	mg/L	0.0002	<0.0002	<0.0005	NC
Endosulfan sulphate	mg/L	0.0002	<0.0002	<0.0005	NC
Endrin	mg/L	0.0002	<0.0002	<0.0005	NC
Endrin aldehyde	mg/L	0.0002	<0.0002	<0.0005	NC
Endrin ketone	mg/L	0.0005	-	<0.0005	NC
g-BHC (Lindane)	mg/L	0.0002	<0.0002	<0.0005	NC
Heptachlor	mg/L	0.0002	<0.0002	<0.0005	NC
Heptachlor epoxide	mg/L	0.0002	<0.0002	<0.0005	NC
Methoxychlor	mg/L	0.0002	<0.0002	<0.002	NC
Hexachlorobenzene	mg/L	0.0002	<0.0002	<0.0005	NC
Organophosphorous Pesticides					
Azinophos methyl	mg/L	0.0002	<0.0002	<0.0005	NC
Bromophos-ethyl	mg/L	0.0002	<0.0002	<0.0005	NC
Carbophenothion	mg/L	0.0005	-	<0.0005	NC
Chlorfenvinphos	mg/L	0.0005	-	<0.0005	NC
Chlorpyrifos	mg/L	0.0002	<0.0002	<0.0005	NC
Chlorpyrifos-methyl	mg/L	0.0002	<0.0002	<0.0005	NC
Demeton-S-methyl	mg/L	0.0005	-	<0.0005	NC
Diazinon	mg/L	0.0002	<0.0002	<0.0005	NC
Dichlorvos	mg/L	0.0002	<0.0002	<0.0005	NC
Dimethoate	mg/L	0.0002	<0.0002	<0.0005	NC
Ethion	mg/L	0.0002	<0.0002	<0.0005	NC
Fenamiphos	mg/L	0.0005	-	<0.0005	NC
Fenitrothion	mg/L	0.0002	<0.0002	-	NC
Fenthion	mg/L	0.0005	-	<0.0005	NC
Malathion	mg/L	0.0002	<0.0002	<0.0005	NC
Methyl parathion	mg/L	0.002	-	<0.002	NC
Monocrotophos	mg/L	0.002	-	<0.002	NC
Parathion	mg/L	0.0002	<0.0002	<0.002	NC
Pirimphos-ethyl	mg/L	0.0005	-	<0.0005	NC
Prothiofos	mg/L	0.0005	-	<0.0005	NC
Ronnel	mg/L	0.0002	<0.0002	-	NC
Polychlorinated Biphenyls					
Arochlor 1016	mg/L	0.002	<0.002	-	NC
Arochlor 1221	mg/L	0.002	<0.002	-	NC
Arochlor 1232	mg/L	0.002	<0.002	-	NC
Arochlor 1242	mg/L	0.002	<0.002	-	NC
Arochlor 1248	mg/L	0.002	<0.002	-	NC
Arochlor 1254	mg/L	0.002	<0.002	-	NC
Arochlor 1260	mg/L	0.002	<0.002	-	NC
PCBs (Sum of total)	mg/L	0.001	-	<0.001	NC
Phenolic Compounds					
Phenol	mg/L	<0.05	<0.05	<1	NC
Microbes					
Salmonella (presence / absence)	100mL		0	0	NC
E. Coli	cfu/mL		<10	<2	NC

Notes:

Duplicate pair PASS criteria

Duplicate pair FAIL criteria

LOR	Laboritory limit of reporting
mg / L	Milligrams per litre
RPD	Relative percent difference (%)
NC	RPD not able to be calculated due to at least one result < LOR
-	Analyte not tested

3.2.3 Field instrument calibration

The following field instruments were calibrated for the groundwater sampling program:

- PID – PhoCheck Tiger
- Water quality meter – YSI Quatro Pro Plus.

Field equipment used for the soil and groundwater investigations was appropriate for the required works and was used in the appropriate manner. The instruments were calibrated in accordance with the manufacturer specifications and Environmental Earth Sciences field procedure and QA/QC documentation. Calibration records are provided in Appendix B.

3.3 Laboratory QAQC

Laboratory analysis of primary samples for this project were completed by Envirolab and inter (split) duplicate analysis was completed by ALS. Both laboratories are accredited by NATA for the methods used, details of this accreditation can be viewed at http://www.nata.asn.au/, while details of the samples sent to each laboratory and the analysis requested are contained in the chain of custody documentation held in Appendix C. The analytical methods are noted on the laboratory transcripts.

The collection date of samples, laboratory extraction date and allowable holding times are presented in the laboratory quality reports. All analysis was completed within the allowable holding times with the exception of sample FD1 (ES1824749) as an inter-laboratory groundwater duplicate sample for salmonella presence / absence. This analysis had a holding time breach by one day and a note from ALS mentions that consequently, the results for this analyte as indicative.

Laboratory quality reports include details of surrogates and spikes used, percent recoveries of surrogates and spikes used, the instrument detection limits, the method detection limits, the practical quantification limits and the reference samples results. Other laboratory QC evaluation and results include:

- Envirolab and ALS completed laboratory duplicate samples, with RPDs for all results being reported within 0 – 50 % RPD control limits except for those listed in Table 6.
- Envirolab and ALS completed surrogate spike analyses, with all results being reported within the control limits set by the respective laboratory.
- Envirolab and ALS completed matrix spikes analyses as part of their internal quality procedures, with all results being reported within the acceptance control limits.
- Laboratory blanks reported by Envirolab and ALS were within the acceptance criteria set by the laboratory.
- Envirolab and ALS completed laboratory control samples within the acceptance control limits set by the respective laboratory.

Table 6: Laboratory duplicate sample RPD outliers

Report ID	Medium	Analyte	Lab sample ID	Client sample ID	RPD (%)	Control limits (%)	Comment
198720	Soil	Dibenzo(a, h)anthracene	198720-1	TP1-1	67	0 - 50	RPD > LOR limit
198720	Soil	Dibenzo(a, h)anthracene	198720-16	BH6	67	0 - 50	RPD > LOR limit

3.4 QAQC data evaluation

The overall assessment of the data quality is as follows:

- All samples were analysed within recommended holding times with the exception of the inter-laboratory duplicate samples for salmonella in water (ES1824749). Note that the analyses for pathogens in primary samples was undertaken within acceptable holding times. This is not expected to invalidate the dataset. As inter-laboratory duplicated samples are a measure of inter-laboratory proficiency, evidence can be obtained to demonstrate the general comparability of results between ALS and Envirolab using the same laboratory methods.
- There was only one outlier for field duplicate RPDs as shown in table 5. As the values are < 5x LOR this is regarded as acceptable, passing the criteria in table 2. Therefore, this result is not expected to invalidate the dataset.
- Outliers for laboratory duplicate RPDs were generally high for PAHs. This is primarily due to the low concentrations of the affected analyte (Dibenzo (a, h) anthracene) which were reported. The results for the laboratory duplicates were within the same magnitude and therefore are not expected to invalidate the dataset.
- Field observations and measurements were generally comparable to laboratory data.
- The use of field instruments was acceptable.
- Decontamination procedures for the water quality meter were considered acceptable.
- The dataset as a whole is considered reliable.

Based on information presented in Sections 3.1, 3.2 and 3.3 of this appendix it can be confidently stated that the MDQO's for this project have been met and the data set is considered to be reliable.

4 QAQC APPENDIX REFERENCES

Australian/New Zealand Standard (AS/NZS) (2008). Quality management systems - Requirements (AS/NZS ISO 9001:2008). Standards Australia/Standards New Zealand, Sydney/Wellington.

Environmental Earth Sciences Pty Ltd (2011). Soil, gas and groundwater sampling manual. 7th Edition (Unpublished).

International Organisation for Standardisation (2005). Quality management systems – Fundamentals and vocabulary. (ISO 9000:2005).

National Environment Protection Council (NEPC) (2013). National Environment Protection (Assessment of Site Contamination) Amendment Measure, Adelaide, SA.

NSW Department of Environment and Conservation (DEC) (2006). Contaminated sites: Guidelines for NSW Site Auditors Scheme (2nd edition).

NSW Environment Protection Authority (EPA) (1995). Contaminated Sites: Sampling design guidelines.

NSW Office of Environment & Heritage (OEH) (2011). Contaminated sites: Guidelines for consultants reporting on contaminated sites.

Standards Australia (2005). Guide to the investigation and sampling of sites with potentially contaminated soil, Part 1: Non-volatile and semi-volatile compounds (AS 4482.1).

Standards Australia (1999). Guide to the investigation and sampling of sites with potentially contaminated soil, Part 2: Volatile substances (AS4482.2).

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

APPENDIX D: LABORATORY TRANSCRIPTS

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	Environmental & Earth Sciences
Attention	M Bressan, Natalie Eldrige, Tanya Stanton

Sample Login Details

Your reference	118085, Lewisham
Envirolab Reference	198720
Date Sample Received	17/08/2018
Date Instructions Received	17/08/2018
Date Results Expected to be Reported	27/08/2018

Sample Condition

Samples received in appropriate condition for analysis	YES
No. of Samples Provided	18 SOIL
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	1.2
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticidesin soil	Organophosphorus Pesticides	PCBsin Soil	Acid Extractable metalsin soil	Misc Soil - Inorg	Asbestos ID - soils	Micro testing in soil	On Hold
TP1-1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
TP1-2											✓
TP1-3											✓
TP2-1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
TP2-2											✓
TP2-3											✓
TP3-1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
TP3-2											✓
TP4-1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
TP5-1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
BH1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
BH2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
BH3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
BH4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
BH5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
BH6	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
BH7	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
BH8	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

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

Additional Info

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

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

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

CERTIFICATE OF ANALYSIS 198720

Client Details

Client	Environmental & Earth Sciences
Attention	M Bressan, Natalie Eldrige, Tanya Stanton
Address	PO Box 380, North Sydney, NSW, 2059

Sample Details

Your Reference	**118085, Lewisham**
Number of Samples	18 SOIL
Date samples received	17/08/2018
Date completed instructions received	17/08/2018

Analysis Details

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

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

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

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

Report Details

Date results requested by	27/08/2018
Date of Issue	27/08/2018

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

Asbestos Approved By
Analysed by Asbestos Approved Identifier: Aida Marner
Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By
Jeremy Faircloth, Organics Supervisor
Ken Nguyen, Senior Chemist
Long Pham, Team Leader, Metals
Lucy Zhu, Asbsestos Analyst
Nancy Zhang, Assistant Lab Manager
Nick Sarlamis, Inorganics Supervisor
Steven Luong, Senior Chemist

Authorised By

Jacinta Hurst, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		198720-1	198720-4	198720-7	198720-9	198720-10
Your Reference	UNITS	TP1-1	TP2-1	TP3-1	TP4-1	TP5-1
Date Sampled		16/08/2018	16/08/2018	16/08/2018	16/08/2018	16/08/2018
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	20/08/2018	20/08/2018	20/08/2018	20/08/2018	20/08/2018
Date analysed	-	21/08/2018	21/08/2018	21/08/2018	21/08/2018	21/08/2018
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	96	99	100	101	102

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		198720-11	198720-12	198720-13	198720-14	198720-15
Your Reference	UNITS	BH1	BH2	BH3	BH4	BH5
Date Sampled		16/08/2018	16/08/2018	16/08/2018	16/08/2018	16/08/2018
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	20/08/2018	20/08/2018	20/08/2018	20/08/2018	20/08/2018
Date analysed	-	21/08/2018	21/08/2018	21/08/2018	21/08/2018	21/08/2018
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	97	92	99	94	102

vTRH(C6-C10)/BTEXN in Soil				
Our Reference		198720-16	198720-17	198720-18
Your Reference	UNITS	BH6	BH7	BH8
Date Sampled		16/08/2018	16/08/2018	16/08/2018
Type of sample		SOIL	SOIL	SOIL
Date extracted	-	20/08/2018	20/08/2018	20/08/2018
Date analysed	-	21/08/2018	21/08/2018	21/08/2018
TRH C_6 - C_9	mg/kg	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	100	101	103

svTRH (C10-C40) in Soil						
Our Reference		198720-1	198720-4	198720-7	198720-9	198720-10
Your Reference	UNITS	TP1-1	TP2-1	TP3-1	TP4-1	TP5-1
Date Sampled		16/08/2018	16/08/2018	16/08/2018	16/08/2018	16/08/2018
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	20/08/2018	20/08/2018	20/08/2018	20/08/2018	20/08/2018
Date analysed	-	21/08/2018	21/08/2018	21/08/2018	21/08/2018	21/08/2018
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	100	98	98	98	99

svTRH (C10-C40) in Soil						
Our Reference		198720-11	198720-12	198720-13	198720-14	198720-15
Your Reference	UNITS	BH1	BH2	BH3	BH4	BH5
Date Sampled		16/08/2018	16/08/2018	16/08/2018	16/08/2018	16/08/2018
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	20/08/2018	20/08/2018	20/08/2018	20/08/2018	20/08/2018
Date analysed	-	21/08/2018	21/08/2018	21/08/2018	21/08/2018	21/08/2018
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	100	98	96	97	97

svTRH (C10-C40) in Soil				
Our Reference		198720-16	198720-17	198720-18
Your Reference	UNITS	BH6	BH7	BH8
Date Sampled		16/08/2018	16/08/2018	16/08/2018
Type of sample		SOIL	SOIL	SOIL
Date extracted	-	20/08/2018	20/08/2018	20/08/2018
Date analysed	-	21/08/2018	21/08/2018	21/08/2018
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	120
TRH C_{29} - C_{36}	mg/kg	<100	<100	100
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	180
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	180
Surrogate o-Terphenyl	%	96	98	99

PAHs in Soil						
Our Reference		198720-1	198720-4	198720-7	198720-9	198720-10
Your Reference	UNITS	TP1-1	TP2-1	TP3-1	TP4-1	TP5-1
Date Sampled		16/08/2018	16/08/2018	16/08/2018	16/08/2018	16/08/2018
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	20/08/2018	20/08/2018	20/08/2018	20/08/2018	20/08/2018
Date analysed	-	21/08/2018	21/08/2018	21/08/2018	21/08/2018	21/08/2018
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.4	0.2	0.2	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	1.8	0.3	0.6	<0.1	<0.1
Anthracene	mg/kg	0.4	0.1	0.2	<0.1	<0.1
Fluoranthene	mg/kg	3.0	0.7	1.3	<0.1	<0.1
Pyrene	mg/kg	2.9	0.7	1.3	<0.1	<0.1
Benzo(a)anthracene	mg/kg	1.4	0.4	0.7	<0.1	<0.1
Chrysene	mg/kg	1.3	0.4	0.6	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	2.5	0.9	1	<0.2	<0.2
Benzo(a)pyrene	mg/kg	1.5	0.64	0.81	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	0.7	0.4	0.4	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	0.2	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	0.8	0.5	0.4	<0.1	<0.1
Total +ve PAH's	mg/kg	17	5.1	7.7	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	2.2	0.8	1.1	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	2.2	0.9	1.1	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	2.2	0.9	1.2	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	99	97	97	98	94

PAHs in Soil						
Our Reference		198720-11	198720-12	198720-13	198720-14	198720-15
Your Reference	UNITS	BH1	BH2	BH3	BH4	BH5
Date Sampled		16/08/2018	16/08/2018	16/08/2018	16/08/2018	16/08/2018
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	20/08/2018	20/08/2018	20/08/2018	20/08/2018	20/08/2018
Date analysed	-	21/08/2018	21/08/2018	21/08/2018	21/08/2018	21/08/2018
Naphthalene	mg/kg	0.2	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.8	<0.1	0.1	<0.1	0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.2
Fluorene	mg/kg	0.3	<0.1	<0.1	<0.1	0.2
Phenanthrene	mg/kg	4.7	<0.1	0.2	0.1	2.3
Anthracene	mg/kg	1.4	<0.1	<0.1	<0.1	0.7
Fluoranthene	mg/kg	7.2	<0.1	0.6	0.4	3.5
Pyrene	mg/kg	6.6	<0.1	0.6	0.4	3.0
Benzo(a)anthracene	mg/kg	3.7	<0.1	0.3	0.2	1.7
Chrysene	mg/kg	2.9	<0.1	0.3	0.2	1.3
Benzo(b,j+k)fluoranthene	mg/kg	4.9	<0.2	0.5	0.4	2.2
Benzo(a)pyrene	mg/kg	3.2	<0.05	0.3	0.2	1.4
Indeno(1,2,3-c,d)pyrene	mg/kg	1.3	<0.1	0.1	0.1	0.5
Dibenzo(a,h)anthracene	mg/kg	0.3	<0.1	<0.1	<0.1	0.1
Benzo(g,h,i)perylene	mg/kg	1.4	<0.1	0.2	0.2	0.6
Total +ve PAH's	mg/kg	39	<0.05	3.3	2.3	18
Benzo(a)pyrene TEQ calc (zero)	mg/kg	4.5	<0.5	<0.5	<0.5	2.0
Benzo(a)pyrene TEQ calc(half)	mg/kg	4.5	<0.5	<0.5	<0.5	2.0
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	4.5	<0.5	0.5	<0.5	2.0
Surrogate p-Terphenyl-d14	%	99	95	97	96	101

PAHs in Soil				
Our Reference		198720-16	198720-17	198720-18
Your Reference	UNITS	BH6	BH7	BH8
Date Sampled		16/08/2018	16/08/2018	16/08/2018
Type of sample		SOIL	SOIL	SOIL
Date extracted	-	20/08/2018	20/08/2018	20/08/2018
Date analysed	-	21/08/2018	21/08/2018	21/08/2018
Naphthalene	mg/kg	<0.1	<0.1	0.4
Acenaphthylene	mg/kg	0.3	<0.1	2.4
Acenaphthene	mg/kg	<0.1	<0.1	0.2
Fluorene	mg/kg	<0.1	<0.1	0.8
Phenanthrene	mg/kg	1.0	0.2	9.0
Anthracene	mg/kg	0.2	<0.1	2.8
Fluoranthene	mg/kg	2.4	0.3	13
Pyrene	mg/kg	2.4	0.3	11
Benzo(a)anthracene	mg/kg	1.3	0.2	6.4
Chrysene	mg/kg	1.2	0.2	4.5
Benzo(b,j+k)fluoranthene	mg/kg	2.5	0.3	8.5
Benzo(a)pyrene	mg/kg	1.5	0.2	5.8
Indeno(1,2,3-c,d)pyrene	mg/kg	0.7	<0.1	2.3
Dibenzo(a,h)anthracene	mg/kg	0.2	<0.1	0.5
Benzo(g,h,i)perylene	mg/kg	0.8	0.1	2.5
Total +ve PAH's	mg/kg	15	1.7	70
Benzo(a)pyrene TEQ calc (zero)	mg/kg	2.2	<0.5	8.1
Benzo(a)pyrene TEQ calc(half)	mg/kg	2.2	<0.5	8.1
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	2.2	<0.5	8.1
Surrogate p-Terphenyl-d14	%	98	95	99

Organochlorine Pesticides in soil						
Our Reference		198720-1	198720-4	198720-7	198720-9	198720-10
Your Reference	UNITS	TP1-1	TP2-1	TP3-1	TP4-1	TP5-1
Date Sampled		16/08/2018	16/08/2018	16/08/2018	16/08/2018	16/08/2018
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	20/08/2018	20/08/2018	20/08/2018	20/08/2018	20/08/2018
Date analysed	-	21/08/2018	21/08/2018	21/08/2018	21/08/2018	21/08/2018
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	97	98	97	96	99

Organochlorine Pesticides in soil						
Our Reference		198720-11	198720-12	198720-13	198720-14	198720-15
Your Reference	UNITS	BH1	BH2	BH3	BH4	BH5
Date Sampled		16/08/2018	16/08/2018	16/08/2018	16/08/2018	16/08/2018
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	20/08/2018	20/08/2018	20/08/2018	20/08/2018	20/08/2018
Date analysed	-	21/08/2018	21/08/2018	21/08/2018	21/08/2018	21/08/2018
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	95	113	100	94	94

Organochlorine Pesticides in soil				
Our Reference		198720-16	198720-17	198720-18
Your Reference	UNITS	BH6	BH7	BH8
Date Sampled		16/08/2018	16/08/2018	16/08/2018
Type of sample		SOIL	SOIL	SOIL
Date extracted	-	20/08/2018	20/08/2018	20/08/2018
Date analysed	-	21/08/2018	21/08/2018	21/08/2018
HCB	mg/kg	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	94	93	92

Organophosphorus Pesticides						
Our Reference		198720-1	198720-4	198720-7	198720-9	198720-10
Your Reference	UNITS	TP1-1	TP2-1	TP3-1	TP4-1	TP5-1
Date Sampled		16/08/2018	16/08/2018	16/08/2018	16/08/2018	16/08/2018
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	20/08/2018	20/08/2018	20/08/2018	20/08/2018	20/08/2018
Date analysed	-	21/08/2018	21/08/2018	21/08/2018	21/08/2018	21/08/2018
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	97	98	97	96	99

Organophosphorus Pesticides						
Our Reference		198720-11	198720-12	198720-13	198720-14	198720-15
Your Reference	UNITS	BH1	BH2	BH3	BH4	BH5
Date Sampled		16/08/2018	16/08/2018	16/08/2018	16/08/2018	16/08/2018
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	20/08/2018	20/08/2018	20/08/2018	20/08/2018	20/08/2018
Date analysed	-	21/08/2018	21/08/2018	21/08/2018	21/08/2018	21/08/2018
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	95	113	100	94	94

Organophosphorus Pesticides				
Our Reference		198720-16	198720-17	198720-18
Your Reference	UNITS	BH6	BH7	BH8
Date Sampled		16/08/2018	16/08/2018	16/08/2018
Type of sample		SOIL	SOIL	SOIL
Date extracted	-	20/08/2018	20/08/2018	20/08/2018
Date analysed	-	21/08/2018	21/08/2018	21/08/2018
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	94	93	92

PCBs in Soil						
Our Reference		198720-1	198720-4	198720-7	198720-9	198720-10
Your Reference	UNITS	TP1-1	TP2-1	TP3-1	TP4-1	TP5-1
Date Sampled		16/08/2018	16/08/2018	16/08/2018	16/08/2018	16/08/2018
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	20/08/2018	20/08/2018	20/08/2018	20/08/2018	20/08/2018
Date analysed	-	21/08/2018	21/08/2018	21/08/2018	21/08/2018	21/08/2018
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	97	98	97	96	99

PCBs in Soil						
Our Reference		198720-11	198720-12	198720-13	198720-14	198720-15
Your Reference	UNITS	BH1	BH2	BH3	BH4	BH5
Date Sampled		16/08/2018	16/08/2018	16/08/2018	16/08/2018	16/08/2018
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	20/08/2018	20/08/2018	20/08/2018	20/08/2018	20/08/2018
Date analysed	-	21/08/2018	21/08/2018	21/08/2018	21/08/2018	21/08/2018
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	95	113	100	94	94

PCBs in Soil				
Our Reference		198720-16	198720-17	198720-18
Your Reference	UNITS	BH6	BH7	BH8
Date Sampled		16/08/2018	16/08/2018	16/08/2018
Type of sample		SOIL	SOIL	SOIL
Date extracted	-	20/08/2018	20/08/2018	20/08/2018
Date analysed	-	21/08/2018	21/08/2018	21/08/2018
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1
Surrogate TCLMX	%	94	93	92

Acid Extractable metals in soil						
Our Reference		198720-1	198720-4	198720-7	198720-9	198720-10
Your Reference	UNITS	TP1-1	TP2-1	TP3-1	TP4-1	TP5-1
Date Sampled		16/08/2018	16/08/2018	16/08/2018	16/08/2018	16/08/2018
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	20/08/2018	20/08/2018	20/08/2018	20/08/2018	20/08/2018
Date analysed	-	20/08/2018	20/08/2018	20/08/2018	20/08/2018	20/08/2018
Arsenic	mg/kg	10	7	7	<4	9
Cadmium	mg/kg	0.7	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	16	9	12	8	18
Copper	mg/kg	45	20	32	4	5
Lead	mg/kg	290	100	130	11	19
Mercury	mg/kg	0.8	0.1	0.2	<0.1	<0.1
Nickel	mg/kg	9	6	6	7	<1
Zinc	mg/kg	270	38	91	18	3

Acid Extractable metals in soil						
Our Reference		198720-11	198720-12	198720-13	198720-14	198720-15
Your Reference	UNITS	BH1	BH2	BH3	BH4	BH5
Date Sampled		16/08/2018	16/08/2018	16/08/2018	16/08/2018	16/08/2018
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	20/08/2018	20/08/2018	20/08/2018	20/08/2018	20/08/2018
Date analysed	-	20/08/2018	20/08/2018	20/08/2018	20/08/2018	20/08/2018
Arsenic	mg/kg	10	8	7	6	6
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	22	19	8	15	15
Copper	mg/kg	19	4	19	14	27
Lead	mg/kg	91	38	43	250	85
Mercury	mg/kg	1.4	<0.1	<0.1	0.2	0.1
Nickel	mg/kg	3	2	3	3	5
Zinc	mg/kg	39	15	27	22	45

Acid Extractable metals in soil				
Our Reference		198720-16	198720-17	198720-18
Your Reference	UNITS	BH6	BH7	BH8
Date Sampled		16/08/2018	16/08/2018	16/08/2018
Type of sample		SOIL	SOIL	SOIL
Date prepared	-	20/08/2018	20/08/2018	20/08/2018
Date analysed	-	20/08/2018	20/08/2018	20/08/2018
Arsenic	mg/kg	10	10	6
Cadmium	mg/kg	<0.4	<0.4	0.6
Chromium	mg/kg	16	12	17
Copper	mg/kg	46	22	50
Lead	mg/kg	170	65	280
Mercury	mg/kg	0.2	<0.1	0.2
Nickel	mg/kg	6	5	9
Zinc	mg/kg	460	97	270

Misc Soil - Inorg						
Our Reference		198720-1	198720-4	198720-7	198720-9	198720-10
Your Reference	UNITS	TP1-1	TP2-1	TP3-1	TP4-1	TP5-1
Date Sampled		16/08/2018	16/08/2018	16/08/2018	16/08/2018	16/08/2018
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	20/08/2018	20/08/2018	20/08/2018	20/08/2018	20/08/2018
Date analysed	-	20/08/2018	20/08/2018	20/08/2018	20/08/2018	20/08/2018
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Misc Soil - Inorg						
Our Reference		198720-11	198720-12	198720-13	198720-14	198720-15
Your Reference	UNITS	BH1	BH2	BH3	BH4	BH5
Date Sampled		16/08/2018	16/08/2018	16/08/2018	16/08/2018	16/08/2018
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	20/08/2018	20/08/2018	20/08/2018	20/08/2018	20/08/2018
Date analysed	-	20/08/2018	20/08/2018	20/08/2018	20/08/2018	20/08/2018
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Misc Soil - Inorg				
Our Reference		198720-16	198720-17	198720-18
Your Reference	UNITS	BH6	BH7	BH8
Date Sampled		16/08/2018	16/08/2018	16/08/2018
Type of sample		SOIL	SOIL	SOIL
Date prepared	-	20/08/2018	20/08/2018	20/08/2018
Date analysed	-	20/08/2018	20/08/2018	20/08/2018
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5

Moisture						
Our Reference		198720-1	198720-4	198720-7	198720-9	198720-10
Your Reference	UNITS	TP1-1	TP2-1	TP3-1	TP4-1	TP5-1
Date Sampled		16/08/2018	16/08/2018	16/08/2018	16/08/2018	16/08/2018
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	20/08/2018	20/08/2018	20/08/2018	20/08/2018	20/08/2018
Date analysed	-	21/08/2018	21/08/2018	21/08/2018	21/08/2018	21/08/2018
Moisture	%	16	10	10	6.7	17

Moisture						
Our Reference		198720-11	198720-12	198720-13	198720-14	198720-15
Your Reference	UNITS	BH1	BH2	BH3	BH4	BH5
Date Sampled		16/08/2018	16/08/2018	16/08/2018	16/08/2018	16/08/2018
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	20/08/2018	20/08/2018	20/08/2018	20/08/2018	20/08/2018
Date analysed	-	21/08/2018	21/08/2018	21/08/2018	21/08/2018	21/08/2018
Moisture	%	17	16	9.5	17	10

Moisture				
Our Reference		198720-16	198720-17	198720-18
Your Reference	UNITS	BH6	BH7	BH8
Date Sampled		16/08/2018	16/08/2018	16/08/2018
Type of sample		SOIL	SOIL	SOIL
Date prepared	-	20/08/2018	20/08/2018	20/08/2018
Date analysed	-	21/08/2018	21/08/2018	21/08/2018
Moisture	%	12	7.8	14

Asbestos ID - soils						
Our Reference		198720-1	198720-4	198720-7	198720-9	198720-10
Your Reference	UNITS	TP1-1	TP2-1	TP3-1	TP4-1	TP5-1
Date Sampled		16/08/2018	16/08/2018	16/08/2018	16/08/2018	16/08/2018
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date analysed	-	27/08/2018	27/08/2018	27/08/2018	27/08/2018	27/08/2018
Sample mass tested	g	Approx. 25g	Approx. 40g	Approx. 30g	Approx. 45g	Approx. 30g
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Beige sandy soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - soils						
Our Reference		198720-11	198720-12	198720-13	198720-14	198720-15
Your Reference	UNITS	BH1	BH2	BH3	BH4	BH5
Date Sampled		16/08/2018	16/08/2018	16/08/2018	16/08/2018	16/08/2018
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date analysed	-	27/08/2018	27/08/2018	27/08/2018	27/08/2018	27/08/2018
Sample mass tested	g	Approx. 40g	Approx. 35g	Approx. 35g	Approx. 30g	Approx. 35g
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - soils				
Our Reference		198720-16	198720-17	198720-18
Your Reference	UNITS	BH6	BH7	BH8
Date Sampled		16/08/2018	16/08/2018	16/08/2018
Type of sample		SOIL	SOIL	SOIL
Date analysed	-	27/08/2018	27/08/2018	27/08/2018
Sample mass tested	g	Approx. 30g	Approx. 20g	Approx. 30g
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected

Micro testing in soil						
Our Reference		198720-1	198720-4	198720-7	198720-9	198720-10
Your Reference	UNITS	TP1-1	TP2-1	TP3-1	TP4-1	TP5-1
Date Sampled		16/08/2018	16/08/2018	16/08/2018	16/08/2018	16/08/2018
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date testing started	-	17/08/2018	17/08/2018	17/08/2018	17/08/2018	17/08/2018
Date testing completed	-	18/08/2018	18/08/2018	18/08/2018	18/08/2018	18/08/2018
Salmonella*	50g	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
E Coli in soil	MPN/100g	<200	<200	<200	<200	<200

Micro testing in soil						
Our Reference		198720-11	198720-12	198720-13	198720-14	198720-15
Your Reference	UNITS	BH1	BH2	BH3	BH4	BH5
Date Sampled		16/08/2018	16/08/2018	16/08/2018	16/08/2018	16/08/2018
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date testing started	-	17/08/2018	17/08/2018	17/08/2018	17/08/2018	17/08/2018
Date testing completed	-	18/08/2018	18/08/2018	18/08/2018	18/08/2018	18/08/2018
Salmonella*	50g	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
E Coli in soil	MPN/100g	<200	<200	<200	<200	<200

Micro testing in soil				
Our Reference		198720-16	198720-17	198720-18
Your Reference	UNITS	BH6	BH7	BH8
Date Sampled		16/08/2018	16/08/2018	16/08/2018
Type of sample		SOIL	SOIL	SOIL
Date testing started	-	17/08/2018	17/08/2018	17/08/2018
Date testing completed	-	18/08/2018	18/08/2018	18/08/2018
Salmonella*	50g	Not Detected	Not Detected	Not Detected
E Coli in soil	MPN/100g	<200	<200	<200

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
Ext-008	Subcontracted to Sonic Food & Water Testing. NATA Accreditation No. 4034.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-008	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.

Method ID	Methodology Summary
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	198720-4
Date extracted	-			20/08/2018	1	20/08/2018	20/08/2018		20/08/2018	20/08/2018
Date analysed	-			21/08/2018	1	21/08/2018	21/08/2018		21/08/2018	21/08/2018
TRH C_6 - C_9	mg/kg	25	Org-016	<25	1	<25	<25	0	101	92
TRH C_6 - C_{10}	mg/kg	25	Org-016	<25	1	<25	<25	0	101	92
Benzene	mg/kg	0.2	Org-016	<0.2	1	<0.2	<0.2	0	102	94
Toluene	mg/kg	0.5	Org-016	<0.5	1	<0.5	<0.5	0	99	91
Ethylbenzene	mg/kg	1	Org-016	<1	1	<1	<1	0	96	87
m+p-xylene	mg/kg	2	Org-016	<2	1	<2	<2	0	104	94
o-Xylene	mg/kg	1	Org-016	<1	1	<1	<1	0	100	91
naphthalene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	105	1	96	94	2	102	92

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	16	20/08/2018	20/08/2018		[NT]	[NT]
Date analysed	-			[NT]	16	21/08/2018	21/08/2018		[NT]	[NT]
TRH C_6 - C_9	mg/kg	25	Org-016	[NT]	16	<25	<25	0	[NT]	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-016	[NT]	16	<25	<25	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-016	[NT]	16	<0.2	<0.2	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-016	[NT]	16	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-016	[NT]	16	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-016	[NT]	16	<2	<2	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-016	[NT]	16	<1	<1	0	[NT]	[NT]
naphthalene	mg/kg	1	Org-014	[NT]	16	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	[NT]	16	100	102	2	[NT]	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	198720-4
Date extracted	-			20/08/2018	1	20/08/2018	20/08/2018		20/08/2018	20/08/2018
Date analysed	-			21/08/2018	1	21/08/2018	21/08/2018		21/08/2018	21/08/2018
TRH C_{10} - C_{14}	mg/kg	50	Org-003	<50	1	<50	<50	0	106	98
TRH C_{15} - C_{28}	mg/kg	100	Org-003	<100	1	<100	<100	0	88	82
TRH C_{29} - C_{36}	mg/kg	100	Org-003	<100	1	<100	<100	0	90	106
TRH >C_{10} -C_{16}	mg/kg	50	Org-003	<50	1	<50	<50	0	106	98
TRH >C_{16} -C_{34}	mg/kg	100	Org-003	<100	1	<100	<100	0	88	82
TRH >C_{34} -C_{40}	mg/kg	100	Org-003	<100	1	<100	<100	0	90	106
Surrogate o-Terphenyl	%		Org-003	97	1	100	99	1	104	98

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	16	20/08/2018	20/08/2018		[NT]	[NT]
Date analysed	-			[NT]	16	21/08/2018	21/08/2018		[NT]	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-003	[NT]	16	<50	<50	0	[NT]	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-003	[NT]	16	<100	<100	0	[NT]	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-003	[NT]	16	<100	<100	0	[NT]	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-003	[NT]	16	<50	<50	0	[NT]	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-003	[NT]	16	<100	<100	0	[NT]	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-003	[NT]	16	<100	<100	0	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-003	[NT]	16	96	96	0	[NT]	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	198720-4
Date extracted	-			20/08/2018	1	20/08/2018	20/08/2018		20/08/2018	20/08/2018
Date analysed	-			21/08/2018	1	21/08/2018	21/08/2018		21/08/2018	21/08/2018
Naphthalene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	109	98
Acenaphthylene	mg/kg	0.1	Org-012	<0.1	1	0.4	0.3	29	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012	<0.1	1	0.1	<0.1	0	103	88
Phenanthrene	mg/kg	0.1	Org-012	<0.1	1	1.8	1.3	32	112	103
Anthracene	mg/kg	0.1	Org-012	<0.1	1	0.4	0.3	29	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012	<0.1	1	3.0	2.6	14	112	109
Pyrene	mg/kg	0.1	Org-012	<0.1	1	2.9	2.6	11	105	102
Benzo(a)anthracene	mg/kg	0.1	Org-012	<0.1	1	1.4	1.3	7	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012	<0.1	1	1.3	1.2	8	95	90
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-012	<0.2	1	2.5	2.4	4	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012	<0.05	1	1.5	1.5	0	110	106
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	<0.1	1	0.7	0.7	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	<0.1	1	0.2	0.1	67	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	<0.1	1	0.8	0.8	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	98	1	99	98	1	128	123

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	16	20/08/2018	20/08/2018		[NT]	[NT]
Date analysed	-			[NT]	16	21/08/2018	21/08/2018		[NT]	[NT]
Naphthalene	mg/kg	0.1	Org-012	[NT]	16	<0.1	<0.1	0	[NT]	[NT]
Acenaphthylene	mg/kg	0.1	Org-012	[NT]	16	0.3	0.2	40	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-012	[NT]	16	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012	[NT]	16	<0.1	<0.1	0	[NT]	[NT]
Phenanthrene	mg/kg	0.1	Org-012	[NT]	16	1.0	1.0	0	[NT]	[NT]
Anthracene	mg/kg	0.1	Org-012	[NT]	16	0.2	0.3	40	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012	[NT]	16	2.4	2.1	13	[NT]	[NT]
Pyrene	mg/kg	0.1	Org-012	[NT]	16	2.4	2.0	18	[NT]	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-012	[NT]	16	1.3	1.1	17	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012	[NT]	16	1.2	1.0	18	[NT]	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-012	[NT]	16	2.5	2.0	22	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012	[NT]	16	1.5	1.2	22	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	[NT]	16	0.7	0.6	15	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	[NT]	16	0.2	0.1	67	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	[NT]	16	0.8	0.7	13	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	[NT]	16	98	99	1	[NT]	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	198720-4
Date extracted	-			20/08/2018	1	20/08/2018	20/08/2018		20/08/2018	20/08/2018
Date analysed	-			21/08/2018	1	21/08/2018	21/08/2018		21/08/2018	21/08/2018
HCB	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	86	96
gamma-BHC	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	75	78
Heptachlor	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	72	80
delta-BHC	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	82	83
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	81	82
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	89	91
Dieldrin	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	92	93
Endrin	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	75	84
pp-DDD	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	81	86
Endosulfan II	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	73	93
Methoxychlor	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-005	100	1	97	96	1	111	112

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	16	20/08/2018	20/08/2018		[NT]	[NT]
Date analysed	-			[NT]	16	21/08/2018	21/08/2018		[NT]	[NT]
HCB	mg/kg	0.1	Org-005	[NT]	16	<0.1	<0.1	0	[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-005	[NT]	16	<0.1	<0.1	0	[NT]	[NT]
gamma-BHC	mg/kg	0.1	Org-005	[NT]	16	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-005	[NT]	16	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-005	[NT]	16	<0.1	<0.1	0	[NT]	[NT]
delta-BHC	mg/kg	0.1	Org-005	[NT]	16	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-005	[NT]	16	<0.1	<0.1	0	[NT]	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-005	[NT]	16	<0.1	<0.1	0	[NT]	[NT]
gamma-Chlordane	mg/kg	0.1	Org-005	[NT]	16	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-005	[NT]	16	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-005	[NT]	16	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-005	[NT]	16	<0.1	<0.1	0	[NT]	[NT]
Dieldrin	mg/kg	0.1	Org-005	[NT]	16	<0.1	<0.1	0	[NT]	[NT]
Endrin	mg/kg	0.1	Org-005	[NT]	16	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-005	[NT]	16	<0.1	<0.1	0	[NT]	[NT]
Endosulfan II	mg/kg	0.1	Org-005	[NT]	16	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-005	[NT]	16	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-005	[NT]	16	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-005	[NT]	16	<0.1	<0.1	0	[NT]	[NT]
Methoxychlor	mg/kg	0.1	Org-005	[NT]	16	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-005	[NT]	16	94	95	1	[NT]	[NT]

QUALITY CONTROL: Organophosphorus Pesticides						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	198720-4
Date extracted	-			20/08/2018	1	20/08/2018	20/08/2018		20/08/2018	20/08/2018
Date analysed	-			21/08/2018	1	21/08/2018	21/08/2018		21/08/2018	21/08/2018
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	88	94
Chlorpyriphos-methyl	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	96	94
Dimethoate	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	93	98
Fenitrothion	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	113	104
Malathion	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	79	85
Parathion	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	92	95
Ronnel	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	99	105
Surrogate TCMX	%		Org-008	100	1	97	96	1	96	97

QUALITY CONTROL: Organophosphorus Pesticides						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	16	20/08/2018	20/08/2018		[NT]	[NT]
Date analysed	-			[NT]	16	21/08/2018	21/08/2018		[NT]	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-008	[NT]	16	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-008	[NT]	16	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos	mg/kg	0.1	Org-008	[NT]	16	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-008	[NT]	16	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-008	[NT]	16	<0.1	<0.1	0	[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-008	[NT]	16	<0.1	<0.1	0	[NT]	[NT]
Dimethoate	mg/kg	0.1	Org-008	[NT]	16	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-008	[NT]	16	<0.1	<0.1	0	[NT]	[NT]
Fenitrothion	mg/kg	0.1	Org-008	[NT]	16	<0.1	<0.1	0	[NT]	[NT]
Malathion	mg/kg	0.1	Org-008	[NT]	16	<0.1	<0.1	0	[NT]	[NT]
Parathion	mg/kg	0.1	Org-008	[NT]	16	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-008	[NT]	16	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-008	[NT]	16	94	95	1	[NT]	[NT]

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	198720-4
Date extracted	-			20/08/2018	1	20/08/2018	20/08/2018		20/08/2018	20/08/2018
Date analysed	-			21/08/2018	1	21/08/2018	21/08/2018		21/08/2018	21/08/2018
Aroclor 1016	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	102	107
Aroclor 1260	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCLMX	%		Org-006	100	1	97	96	1	96	97

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	16	20/08/2018	20/08/2018		[NT]	[NT]
Date analysed	-			[NT]	16	21/08/2018	21/08/2018		[NT]	[NT]
Aroclor 1016	mg/kg	0.1	Org-006	[NT]	16	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-006	[NT]	16	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-006	[NT]	16	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-006	[NT]	16	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-006	[NT]	16	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-006	[NT]	16	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1260	mg/kg	0.1	Org-006	[NT]	16	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCLMX	%		Org-006	[NT]	16	94	95	1	[NT]	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	198720-4
Date prepared	-			20/08/2018	1	20/08/2018	20/08/2018		20/08/2018	20/08/2018
Date analysed	-			20/08/2018	1	20/08/2018	20/08/2018		20/08/2018	20/08/2018
Arsenic	mg/kg	4	Metals-020	<4	1	10	11	10	116	103
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	0.7	0.6	15	103	91
Chromium	mg/kg	1	Metals-020	<1	1	16	19	17	112	105
Copper	mg/kg	1	Metals-020	<1	1	45	49	9	115	120
Lead	mg/kg	1	Metals-020	<1	1	290	240	19	109	110
Mercury	mg/kg	0.1	Metals-021	<0.1	1	0.8	1.1	32	109	114
Nickel	mg/kg	1	Metals-020	<1	1	9	8	12	109	97
Zinc	mg/kg	1	Metals-020	<1	1	270	200	30	107	96

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	16	20/08/2018	20/08/2018		[NT]	[NT]
Date analysed	-			[NT]	16	20/08/2018	20/08/2018		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	16	10	7	35	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	16	<0.4	<0.4	0	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	16	16	15	6	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	16	46	45	2	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	16	170	200	16	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	16	0.2	0.2	0	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	16	6	4	40	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	16	460	370	22	[NT]	[NT]

QUALITY CONTROL: Misc Soil - Inorg						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	198720-4
Date prepared	-			20/08/2018	1	20/08/2018	20/08/2018		20/08/2018	20/08/2018
Date analysed	-			20/08/2018	1	20/08/2018	20/08/2018		20/08/2018	20/08/2018
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	<5	1	<5	<5	0	101	102

QUALITY CONTROL: Misc Soil - Inorg						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	11	20/08/2018	20/08/2018		[NT]	[NT]
Date analysed	-			[NT]	11	20/08/2018	20/08/2018		[NT]	[NT]
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	[NT]	11	<5	<5	0	[NT]	[NT]

Result Definitions

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

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

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

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

Report Comments

E.Coli analysed by Sonic Food & Water Testing. Report No W1816047 & W1816046

Asbestos: A portion of the supplied samples were sub-sampled for asbestos analysis according to Envirolab procedures.
We cannot guarantee that these sub-samples are indicative of the entire sample.
Envirolab recommends supplying 40-50g of sample in its own container.
Note: Samples requested for asbestos testing were sub-sampled from jars provided by the client.

Salmonella analysed by Sonic Food & Water Testing. Report No W1816048 & W1816049

CHAIN OF CUSTODY - ANALYSIS REQUEST FORM

Job No: 118085 | Laboratory: Envirolab

Project Manager: TS | Sampler: NE/LD | Site Location: Lewisham | **Sheet:** 1 **of** 1

	No. of samples	Sample ID/ Depth	Anticipated Result (PID)/EC reading	Date sampled	Time sampled	Soil	Water	Sediment	Combination 8a	Salmonella	Ecoli	Hold										Sample-specific instructions/ notes
						Sample Matrix			Analysis Required													
1	1	TP1_1		16/08/2018		X			X	X	X											
2	1	TP1_2 0.5(kein)		16/08/2018		X						X										
3	1	TP1_3		16/08/2018		X						X										
4	1	TP2_1		16/08/2018		X			X	X	X											
5	1	TP2_2		16/08/2018		X						X										
6	1	TP2_3		16/08/2018		X						X										
7	1	TP3_1		16/08/2018		X			X	X	X											
8	1	TP3_2		16/08/2018		X						X										
9	1	TP4_1		16/08/2018		X			X	X	X											
10	1	TP5_1		16/08/2018		X			X	X	X											
11	1	BH1		16/08/2018		X			X	X	X											
12	1	BH2		16/08/2018		X			X	X	X											
13	1	BH3		16/08/2018		X			X	X	X											
14	1	BH4		16/08/2018		X			X	X	X											
15	1	BH5		16/08/2018		X			X	X	X											
16	1	BH6		16/08/2018		X			X	X	X											
17	1	BH7		16/08/2018		X			X	X	X											
18	1	BH8		16/08/2018		X			X	X	X											
		TOTAL	18			18			13	13	13	5										

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 198720
Date Received: 17/8/18
Time Received: 16:00
Received By: [signature]
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Turn Around *(circle)*: **Standard**

Comments/ Instructions:

Lab Quotation No. *(if applicable)*: EN/010/17

Send report to *(email address)*: neldridge@eesigroup.com

Cc: report to *(email address)*: tstanton@eesigroup ; mbressan@eesigroup.com

Cc: invoice to *(email address)*: accounts@eesigroup.com

	Name	Signature	Date	Time
Sent off Site/Office by:	Nat Eldridge	[signature]	17/08/2018	
Receiving Lab:	Envirolab	[signature]	17/8/18	16:00
Receiving Lab:				

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED
Phone: (02) 9922 1777
Fax: (02) 9922 1010
PO Box: 380, North Sydney NSW 2059
Email: eesNSW@eesigroup.com

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	Environmental & Earth Sciences
Attention	Nat Eldridge, Tanya Stanton

Sample Login Details

Your reference	118085, Lewisham
Envirolab Reference	198943
Date Sample Received	22/08/2018
Date Instructions Received	22/08/2018
Date Results Expected to be Reported	29/08/2018

Sample Condition

Samples received in appropriate condition for analysis	YES
No. of Samples Provided	3 Water
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	10.9
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

Sample ID	vTRH(C6-C10)/BTEXN in Water	svTRH (C10-C40) in Water	PAHsin Water	OCP in water	OP Pesticides in water	PCBs in Water	Total Phenolicsin Water	HM in water - dissolved	Microbiologocal Testing
GW1	✓	✓	✓	✓	✓	✓	✓	✓	✓
GW2	✓	✓	✓	✓	✓	✓	✓	✓	✓
GW3	✓	✓	✓	✓	✓	✓	✓	✓	✓

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

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

CERTIFICATE OF ANALYSIS 198943

Client Details

Client	Environmental & Earth Sciences
Attention	Nat Eldridge, Tanya Stanton
Address	PO Box 380, North Sydney, NSW, 2059

Sample Details

Your Reference	**118085, Lewisham**
Number of Samples	3 Water
Date samples received	22/08/2018
Date completed instructions received	22/08/2018

Analysis Details

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

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

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

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

Report Details

Date results requested by	29/08/2018
Date of Issue	28/08/2018

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

Results Approved By
Diego Bigolin, Team Leader, Inorganics
Giovanni Agosti, Group Technical Manager
Jeremy Faircloth, Organics Supervisor
Ken Nguyen, Senior Chemist
Steven Luong, Senior Chemist

Authorised By

Jacinta Hurst, Laboratory Manager

vTRH(C6-C10)/BTEXN in Water				
Our Reference	UNITS	198943-1	198943-2	198943-3
Your Reference		GW1	GW2	GW3
Date Sampled		21/08/2018	21/08/2018	21/08/2018
Type of sample		Water	Water	Water
Date extracted	-	23/08/2018	23/08/2018	23/08/2018
Date analysed	-	24/08/2018	24/08/2018	24/08/2018
TRH C_6 - C_9	µg/L	<10	10	<10
TRH C_6 - C_{10}	µg/L	18	22	<10
TRH C_6 - C_{10} less BTEX (F1)	µg/L	15	22	<10
Benzene	µg/L	<1	<1	<1
Toluene	µg/L	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1
m+p-xylene	µg/L	2	<2	<2
o-xylene	µg/L	1	<1	<1
Naphthalene	µg/L	<1	<1	<1
Surrogate Dibromofluoromethane	%	100	101	102
Surrogate toluene-d8	%	96	98	97
Surrogate 4-BFB	%	97	96	99

svTRH (C10-C40) in Water				
Our Reference		198943-1	198943-2	198943-3
Your Reference	UNITS	GW1	GW2	GW3
Date Sampled		21/08/2018	21/08/2018	21/08/2018
Type of sample		Water	Water	Water
Date extracted	-	23/08/2018	23/08/2018	23/08/2018
Date analysed	-	23/08/2018	23/08/2018	23/08/2018
TRH C_{10} - C_{14}	µg/L	<50	<50	<50
TRH C_{15} - C_{28}	µg/L	<100	<100	150
TRH C_{29} - C_{36}	µg/L	<100	<100	160
TRH >C_{10} - C_{16}	µg/L	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	µg/L	<50	<50	<50
TRH >C_{16} - C_{34}	µg/L	<100	<100	260
TRH >C_{34} - C_{40}	µg/L	<100	<100	<100
Surrogate o-Terphenyl	%	81	87	80

PAHs in Water				
Our Reference		198943-1	198943-2	198943-3
Your Reference	UNITS	GW1	GW2	GW3
Date Sampled		21/08/2018	21/08/2018	21/08/2018
Type of sample		Water	Water	Water
Date extracted	-	23/08/2018	23/08/2018	23/08/2018
Date analysed	-	24/08/2018	24/08/2018	24/08/2018
Naphthalene	µg/L	<1	<1	<1
Acenaphthylene	µg/L	<1	<1	<1
Acenaphthene	µg/L	<1	<1	<1
Fluorene	µg/L	<1	<1	<1
Phenanthrene	µg/L	<1	<1	<1
Anthracene	µg/L	<1	<1	<1
Fluoranthene	µg/L	<1	<1	<1
Pyrene	µg/L	<1	<1	<1
Benzo(a)anthracene	µg/L	<1	<1	<1
Chrysene	µg/L	<1	<1	<1
Benzo(b,j+k)fluoranthene	µg/L	<2	<2	<2
Benzo(a)pyrene	µg/L	<1	<1	<1
Indeno(1,2,3-c,d)pyrene	µg/L	<1	<1	<1
Dibenzo(a,h)anthracene	µg/L	<1	<1	<1
Benzo(g,h,i)perylene	µg/L	<1	<1	<1
Benzo(a)pyrene TEQ	µg/L	<5	<5	<5
Total +ve PAH's	µg/L	NIL (+)VE	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	98	111	100

OCP in water				
Our Reference		198943-1	198943-2	198943-3
Your Reference	UNITS	GW1	GW2	GW3
Date Sampled		21/08/2018	21/08/2018	21/08/2018
Type of sample		Water	Water	Water
Date extracted	-	23/08/2018	23/08/2018	23/08/2018
Date analysed	-	23/08/2018	23/08/2018	23/08/2018
HCB	µg/L	<0.2	<0.2	<0.2
alpha-BHC	µg/L	<0.2	<0.2	<0.2
gamma-BHC	µg/L	<0.2	<0.2	<0.2
beta-BHC	µg/L	<0.2	<0.2	<0.2
Heptachlor	µg/L	<0.2	<0.2	<0.2
delta-BHC	µg/L	<0.2	<0.2	<0.2
Aldrin	µg/L	<0.2	<0.2	<0.2
Heptachlor Epoxide	µg/L	<0.2	<0.2	<0.2
gamma-Chlordane	µg/L	<0.2	<0.2	<0.2
alpha-Chlordane	µg/L	<0.2	<0.2	<0.2
Endosulfan I	µg/L	<0.2	<0.2	<0.2
pp-DDE	µg/L	<0.2	<0.2	<0.2
Dieldrin	µg/L	<0.2	<0.2	<0.2
Endrin	µg/L	<0.2	<0.2	<0.2
pp-DDD	µg/L	<0.2	<0.2	<0.2
Endosulfan II	µg/L	<0.2	<0.2	<0.2
pp-DDT	µg/L	<0.2	<0.2	<0.2
Endrin Aldehyde	µg/L	<0.2	<0.2	<0.2
Endosulfan Sulphate	µg/L	<0.2	<0.2	<0.2
Methoxychlor	µg/L	<0.2	<0.2	<0.2
Surrogate TCMX	%	96	103	103

OP Pesticides in water				
Our Reference	UNITS	198943-1	198943-2	198943-3
Your Reference		GW1	GW2	GW3
Date Sampled		21/08/2018	21/08/2018	21/08/2018
Type of sample		Water	Water	Water
Date extracted	-	23/08/2018	23/08/2018	23/08/2018
Date analysed	-	23/08/2018	23/08/2018	23/08/2018
Azinphos-methyl (Guthion)	µg/L	<0.2	<0.2	<0.2
Bromophos ethyl	µg/L	<0.2	<0.2	<0.2
Chlorpyriphos	µg/L	<0.2	<0.2	<0.2
Chlorpyriphos-methyl	µg/L	<0.2	<0.2	<0.2
Diazinon	µg/L	<0.2	<0.2	<0.2
Dichlorovos	µg/L	<0.2	<0.2	<0.2
Dimethoate	µg/L	<0.2	<0.2	<0.2
Ethion	µg/L	<0.2	<0.2	<0.2
Fenitrothion	µg/L	<0.2	<0.2	<0.2
Malathion	µg/L	<0.2	<0.2	<0.2
Parathion	µg/L	<0.2	<0.2	<0.2
Ronnel	µg/L	<0.2	<0.2	<0.2
Surrogate TCMX	%	96	103	103

PCBs in Water				
Our Reference		198943-1	198943-2	198943-3
Your Reference	UNITS	GW1	GW2	GW3
Date Sampled		21/08/2018	21/08/2018	21/08/2018
Type of sample		Water	Water	Water
Date extracted	-	23/08/2018	23/08/2018	23/08/2018
Date analysed	-	23/08/2018	23/08/2018	23/08/2018
Aroclor 1016	µg/L	<2	<2	<2
Aroclor 1221	µg/L	<2	<2	<2
Aroclor 1232	µg/L	<2	<2	<2
Aroclor 1242	µg/L	<2	<2	<2
Aroclor 1248	µg/L	<2	<2	<2
Aroclor 1254	µg/L	<2	<2	<2
Aroclor 1260	µg/L	<2	<2	<2
Surrogate TCLMX	%	96	103	103

Total Phenolics in Water				
Our Reference		198943-1	198943-2	198943-3
Your Reference	UNITS	GW1	GW2	GW3
Date Sampled		21/08/2018	21/08/2018	21/08/2018
Type of sample		Water	Water	Water
Date extracted	-	23/08/2018	23/08/2018	23/08/2018
Date analysed	-	23/08/2018	23/08/2018	23/08/2018
Total Phenolics (as Phenol)	mg/L	<0.05	<0.05	<0.05

HM in water - dissolved				
Our Reference		198943-1	198943-2	198943-3
Your Reference	UNITS	GW1	GW2	GW3
Date Sampled		21/08/2018	21/08/2018	21/08/2018
Type of sample		Water	Water	Water
Date prepared	-	24/08/2018	24/08/2018	24/08/2018
Date analysed	-	24/08/2018	24/08/2018	24/08/2018
Arsenic-Dissolved	µg/L	3	1	<1
Cadmium-Dissolved	µg/L	<0.1	<0.1	<0.1
Chromium-Dissolved	µg/L	<1	<1	<1
Copper-Dissolved	µg/L	<1	<1	2
Lead-Dissolved	µg/L	<1	<1	<1
Mercury-Dissolved	µg/L	<0.05	<0.05	<0.05
Nickel-Dissolved	µg/L	15	6	15
Zinc-Dissolved	µg/L	48	<1	25

Microbiologocal Testing				
Our Reference		198943-1	198943-2	198943-3
Your Reference	UNITS	GW1	GW2	GW3
Date Sampled		21/08/2018	21/08/2018	21/08/2018
Type of sample		Water	Water	Water
Date of testing	-	23/08/2018	23/08/2018	23/08/2018
E. coli	cfu/mL	<1	<10	<1
Salmonella*	100mL	Not Detected	Not Detected	Not Detected

Method ID	Methodology Summary
Ext-008	Subcontracted to Sonic Food & Water Testing. NATA Accreditation No. 4034.
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Metals-022	Determination of various metals by ICP-MS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-008	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-013	Water samples are analysed directly by purge and trap GC-MS.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			23/08/2018	1	23/08/2018	23/08/2018		23/08/2018	[NT]
Date analysed	-			24/08/2018	1	24/08/2018	24/08/2018		24/08/2018	[NT]
TRH C_6 - C_9	µg/L	10	Org-016	<10	1	<10	<10	0	105	[NT]
TRH C_6 - C_{10}	µg/L	10	Org-016	<10	1	18	17	6	105	[NT]
Benzene	µg/L	1	Org-016	<1	1	<1	<1	0	98	[NT]
Toluene	µg/L	1	Org-016	<1	1	<1	<1	0	101	[NT]
Ethylbenzene	µg/L	1	Org-016	<1	1	<1	<1	0	110	[NT]
m+p-xylene	µg/L	2	Org-016	<2	1	2	2	0	109	[NT]
o-xylene	µg/L	1	Org-016	<1	1	1	<1	0	110	[NT]
Naphthalene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-016	100	1	100	102	2	104	[NT]
Surrogate toluene-d8	%		Org-016	97	1	96	97	1	99	[NT]
Surrogate 4-BFB	%		Org-016	99	1	97	97	0	96	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	198943-2
Date extracted	-			23/08/2018	1	23/08/2018	23/08/2018		23/08/2018	23/08/2018
Date analysed	-			23/08/2018	1	23/08/2018	23/08/2018		23/08/2018	23/08/2018
TRH C_{10} - C_{14}	µg/L	50	Org-003	<50	1	<50	<50	0	112	111
TRH C_{15} - C_{28}	µg/L	100	Org-003	<100	1	<100	<100	0	94	88
TRH C_{29} - C_{36}	µg/L	100	Org-003	<100	1	<100	<100	0	100	115
TRH >C_{10} - C_{16}	µg/L	50	Org-003	<50	1	<50	<50	0	112	111
TRH >C_{16} - C_{34}	µg/L	100	Org-003	<100	1	<100	<100	0	94	88
TRH >C_{34} - C_{40}	µg/L	100	Org-003	<100	1	<100	<100	0	100	115
Surrogate o-Terphenyl	%		Org-003	82	1	81	86	6	106	87

QUALITY CONTROL: PAHs in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	198943-2
Date extracted	-			23/08/2018	1	23/08/2018	23/08/2018		23/08/2018	23/08/2018
Date analysed	-			24/08/2018	1	24/08/2018	24/08/2018		24/08/2018	24/08/2018
Naphthalene	µg/L	1	Org-012	<1	1	<1	<1	0	72	87
Acenaphthylene	µg/L	1	Org-012	<1	1	<1	<1	0	[NT]	[NT]
Acenaphthene	µg/L	1	Org-012	<1	1	<1	<1	0	[NT]	[NT]
Fluorene	µg/L	1	Org-012	<1	1	<1	<1	0	87	81
Phenanthrene	µg/L	1	Org-012	<1	1	<1	<1	0	96	97
Anthracene	µg/L	1	Org-012	<1	1	<1	<1	0	[NT]	[NT]
Fluoranthene	µg/L	1	Org-012	<1	1	<1	<1	0	94	94
Pyrene	µg/L	1	Org-012	<1	1	<1	<1	0	87	86
Benzo(a)anthracene	µg/L	1	Org-012	<1	1	<1	<1	0	[NT]	[NT]
Chrysene	µg/L	1	Org-012	<1	1	<1	<1	0	91	96
Benzo(b,j+k)fluoranthene	µg/L	2	Org-012	<2	1	<2	<2	0	[NT]	[NT]
Benzo(a)pyrene	µg/L	1	Org-012	<1	1	<1	<1	0	100	101
Indeno(1,2,3-c,d)pyrene	µg/L	1	Org-012	<1	1	<1	<1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	µg/L	1	Org-012	<1	1	<1	<1	0	[NT]	[NT]
Benzo(g,h,i)perylene	µg/L	1	Org-012	<1	1	<1	<1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	98	1	98	88	11	96	92

QUALITY CONTROL: OCP in water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	198943-2
Date extracted	-			23/08/2018	1	23/08/2018	23/08/2018		23/08/2018	23/08/2018
Date analysed	-			23/08/2018	1	23/08/2018	23/08/2018		23/08/2018	23/08/2018
HCB	µg/L	0.2	Org-005	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
alpha-BHC	µg/L	0.2	Org-005	<0.2	1	<0.2	<0.2	0	128	106
gamma-BHC	µg/L	0.2	Org-005	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
beta-BHC	µg/L	0.2	Org-005	<0.2	1	<0.2	<0.2	0	115	97
Heptachlor	µg/L	0.2	Org-005	<0.2	1	<0.2	<0.2	0	108	97
delta-BHC	µg/L	0.2	Org-005	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Aldrin	µg/L	0.2	Org-005	<0.2	1	<0.2	<0.2	0	113	96
Heptachlor Epoxide	µg/L	0.2	Org-005	<0.2	1	<0.2	<0.2	0	117	99
gamma-Chlordane	µg/L	0.2	Org-005	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
alpha-Chlordane	µg/L	0.2	Org-005	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Endosulfan I	µg/L	0.2	Org-005	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
pp-DDE	µg/L	0.2	Org-005	<0.2	1	<0.2	<0.2	0	121	110
Dieldrin	µg/L	0.2	Org-005	<0.2	1	<0.2	<0.2	0	126	115
Endrin	µg/L	0.2	Org-005	<0.2	1	<0.2	<0.2	0	129	111
pp-DDD	µg/L	0.2	Org-005	<0.2	1	<0.2	<0.2	0	121	96
Endosulfan II	µg/L	0.2	Org-005	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
pp-DDT	µg/L	0.2	Org-005	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Endrin Aldehyde	µg/L	0.2	Org-005	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Endosulfan Sulphate	µg/L	0.2	Org-005	<0.2	1	<0.2	<0.2	0	129	110
Methoxychlor	µg/L	0.2	Org-005	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Surrogate TCMX	%		Org-005	73	1	96	94	2	116	91

QUALITY CONTROL: OP Pesticides in water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	198943-3
Date extracted	-			23/08/2018	1	23/08/2018	23/08/2018		23/08/2018	23/08/2018
Date analysed	-			23/08/2018	1	23/08/2018	23/08/2018		23/08/2018	23/08/2018
Azinphos-methyl (Guthion)	µg/L	0.2	Org-008	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Bromophos ethyl	µg/L	0.2	Org-008	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Chlorpyriphos	µg/L	0.2	Org-008	<0.2	1	<0.2	<0.2	0	102	88
Chlorpyriphos-methyl	µg/L	0.2	Org-008	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Diazinon	µg/L	0.2	Org-008	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Dichlorovos	µg/L	0.2	Org-008	<0.2	1	<0.2	<0.2	0	103	87
Dimethoate	µg/L	0.2	Org-008	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Ethion	µg/L	0.2	Org-008	<0.2	1	<0.2	<0.2	0	112	93
Fenitrothion	µg/L	0.2	Org-008	<0.2	1	<0.2	<0.2	0	109	105
Malathion	µg/L	0.2	Org-008	<0.2	1	<0.2	<0.2	0	88	74
Parathion	µg/L	0.2	Org-008	<0.2	1	<0.2	<0.2	0	101	100
Ronnel	µg/L	0.2	Org-008	<0.2	1	<0.2	<0.2	0	102	97
Surrogate TCMX	%		Org-008	73	1	96	94	2	99	83

QUALITY CONTROL: PCBs in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	198943-3
Date extracted	-			23/08/2018	1	23/08/2018	23/08/2018		23/08/2018	23/08/2018
Date analysed	-			23/08/2018	1	23/08/2018	23/08/2018		23/08/2018	23/08/2018
Aroclor 1016	µg/L	2	Org-006	<2	1	<2	<2	0	[NT]	[NT]
Aroclor 1221	µg/L	2	Org-006	<2	1	<2	<2	0	[NT]	[NT]
Aroclor 1232	µg/L	2	Org-006	<2	1	<2	<2	0	[NT]	[NT]
Aroclor 1242	µg/L	2	Org-006	<2	1	<2	<2	0	[NT]	[NT]
Aroclor 1248	µg/L	2	Org-006	<2	1	<2	<2	0	[NT]	[NT]
Aroclor 1254	µg/L	2	Org-006	<2	1	<2	<2	0	89	71
Aroclor 1260	µg/L	2	Org-006	<2	1	<2	<2	0	[NT]	[NT]
Surrogate TCLMX	%		Org-006	73	1	96	94	2	99	83

QUALITY CONTROL: Total Phenolics in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			23/08/2018	[NT]	[NT]	[NT]	[NT]	23/08/2018	[NT]
Date analysed	-			23/08/2018	[NT]	[NT]	[NT]	[NT]	23/08/2018	[NT]
Total Phenolics (as Phenol)	mg/L	0.05	Inorg-031	<0.05	[NT]	[NT]	[NT]	[NT]	104	[NT]

QUALITY CONTROL: HM in water - dissolved						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	198943-3
Date prepared	-			24/08/2018	1	24/08/2018	24/08/2018		24/08/2018	24/08/2018
Date analysed	-			24/08/2018	1	24/08/2018	24/08/2018		24/08/2018	24/08/2018
Arsenic-Dissolved	µg/L	1	Metals-022	<1	1	3	[NT]		99	[NT]
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	1	<0.1	[NT]		100	[NT]
Chromium-Dissolved	µg/L	1	Metals-022	<1	1	<1	[NT]		99	[NT]
Copper-Dissolved	µg/L	1	Metals-022	<1	1	<1	[NT]		108	[NT]
Lead-Dissolved	µg/L	1	Metals-022	<1	1	<1	[NT]		101	[NT]
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	1	<0.05	<0.05	0	97	70
Nickel-Dissolved	µg/L	1	Metals-022	<1	1	15	[NT]		97	[NT]
Zinc-Dissolved	µg/L	1	Metals-022	<1	1	48	[NT]		96	[NT]

Result Definitions

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

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

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

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

Report Comments

Dissolved Metals: no preserved sample was received, therefore
the unpreserved sample was filtered through 0.45um filter at the lab.
Note: there is a possibility some elements may be underestimated.

Microbiologocal Testing analysed by Silliker Australia. Report number Syd-51188319-0

CHAIN OF CUSTODY - ANALYSIS REQUEST FORM

Job No: 118085

Laboratory: Envirolab

Project Manager: TS

Sampler: NE

Site Location: Lewisham

Sheet: 1 of 1

No. of samples	Sample ID/ Depth		Anticipated Result (PID)/EC reading	Date sampled	Time sampled	Sample Matrix: Soil	Water	Sediment	Analysis Required: Combination 8	Salmonella	Ecoli	Sample-specific instructions/ notes
1	GW1	1		21/08/2018			X		X	X	X	} please filter 500mL plastic bottles before ~~[illegible]~~ analysis for dissolved metals (or alternatively use allocated metals bottles → these are also NOT field filtered.)
1	GW2	2		21/08/2018			X		X	X	X	
1	GW3	3		21/08/2018			X		X	X	X	
	TOTAL						3		3	3	3	

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 198943

Date Received: 22.08.2018

Time Received: 0930

Received By: KA

Temp: Cool/Ambient (Cool circled)

Cooling: Ice/Icepack (Ice circled)

Security: Intact/Broken/None (Intact circled)

Turn Around *(circle)*: **Standard**

Comments/ Instructions:

Lab Quotation No. *(if applicable)*:

Send report to *(email address)*: neldridge@eesigroup.com

Cc: report to *(email address)*: tstanton@eesigroup ; mbressan@eesigroup.com

Cc: invoice to *(email address)*: accounts@eesigroup.com

	Name	Signature	Date	Time
Sent off Site/Office by:	Nat Eldridge	[signature]	22/08/2018	0930
Receiving Lab:	Envirolab	[signature]	22/08/18	~~[illegible]~~
Receiving Lab:				

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED
Phone: (02) 9922 1777
Fax: (02) 9922 1010
PO Box: 380, North Sydney NSW 2059
Email: eesNSW@eesigroup.com

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **ES1824416**

Client	: **ENVIRONMENTAL EARTH SCIENCES**	Laboratory	: Environmental Division Sydney
Contact	: TANYA STANTON	Contact	: Peter Ravlic
Address	: 82-84 Dickson Avenue ARTARMON NSW, AUSTRALIA 2064	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: tstanton@eesigroup.com	E-mail	: peter.ravlic@alsglobal.com
Telephone	: ----	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: 118085	Page	: 1 of 2
Order number	:	Quote number	: ES2015ENVEAR0001 (EN/010/18)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: LEWISHAM		
Sampler	: NE/LD		

Dates

Date Samples Received	: 17-Aug-2018 16:15	Issue Date	: 18-Aug-2018
Client Requested Due Date	: 24-Aug-2018	Scheduled Reporting Date	: **24-Aug-2018**

Delivery Details

Mode of Delivery	: Samples On Hand	Security Seal	: Not Available
No. of coolers/boxes	: 1	Temperature	: 7.7'C - Ice present
Receipt Detail	:	No. of samples received / analysed	: 1 / 1

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Micro analysis will be conducted by ALS Scoresby.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- **Asbestos analysis will be conducted by ALS Newcastle.**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **SOIL**

Laboratory sample ID	Client sampling date / time	Client sample ID	SOIL - EA055-103 Moisture Content	SOIL - EA200 Asbestos Identification in Soils -	SOIL - MM804 (EC) (Subcontracted) E.Coli MPN in Soil	SOIL - MM823 (Subcontracted) Salmonella (absence / presence)	SOIL - S-19 TRH/BTEXN/PAH/Ph/OC/OP/PCB/8 metals
ES1824416-001	16-Aug-2018 00:00	FD1	✓	✓	✓	✓	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

ALL INVOICES MELB ADDRESS

- A4 - AU Tax Invoice (INV)	Email	accounts@eesigroup.com

M BRESSAN

- *AU Certificate of Analysis - NATA (COA)	Email	mbressan@eesigroup.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	mbressan@eesigroup.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	mbressan@eesigroup.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	mbressan@eesigroup.com
- Chain of Custody (CoC) (COC)	Email	mbressan@eesigroup.com
- EDI Format - ENMRG (ENMRG)	Email	mbressan@eesigroup.com
- EDI Format - ESDAT (ESDAT)	Email	mbressan@eesigroup.com

Natalie Eldridge

- *AU Certificate of Analysis - NATA (COA)	Email	neldridge@eesigroup.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	neldridge@eesigroup.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	neldridge@eesigroup.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	neldridge@eesigroup.com
- Chain of Custody (CoC) (COC)	Email	neldridge@eesigroup.com
- EDI Format - ENMRG (ENMRG)	Email	neldridge@eesigroup.com
- EDI Format - ESDAT (ESDAT)	Email	neldridge@eesigroup.com

TANYA STANTON

- *AU Certificate of Analysis - NATA (COA)	Email	tstanton@eesigroup.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	tstanton@eesigroup.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	tstanton@eesigroup.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	tstanton@eesigroup.com
- Chain of Custody (CoC) (COC)	Email	tstanton@eesigroup.com
- EDI Format - ENMRG (ENMRG)	Email	tstanton@eesigroup.com
- EDI Format - ESDAT (ESDAT)	Email	tstanton@eesigroup.com

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1824416**	Page	: 1 of 8
Client	: **ENVIRONMENTAL EARTH SCIENCES**	Laboratory	: Environmental Division Sydney
Contact	: TANYA STANTON	Contact	: Peter Ravlic
Address	: 82-84 Dickson Avenue ARTARMON NSW, AUSTRALIA 2064	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: 118085	Date Samples Received	: 17-Aug-2018 16:15
Order number	:	Date Analysis Commenced	: 20-Aug-2018
C-O-C number	: ----	Issue Date	: 29-Aug-2018 16:10
Sampler	: NE/LD		
Site	: LEWISHAM		
Quote number	: EN/010/18		
No. of samples received	: 1		
No. of samples analysed	: 1		

ilac-MRA NATA
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 Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Descriptive 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	*Position*	*Accreditation Category*
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Shaun Spooner	Asbestos Identifier	Newcastle - Asbestos, Mayfield West, NSW
Tony DeSouza	Senior Microbiologist	WRG Subcontracting, Smithfield, NSW

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.

- EA200 'Am' Amosite (brown asbestos)
- EA200 'Cr' Crocidolite (blue asbestos)
- EA200 'Trace' - Asbestos fibres ("Free Fibres") detected by trace analysis per AS4964. The result can be interpreted that the sample contains detectable 'respirable' asbestos fibres
- EA200: Asbestos Identification Samples were analysed by Polarised Light Microscopy including dispersion staining.
- EA200 Legend
- EA200 'Ch' Chrysotile (white asbestos)
- EA200: 'UMF' Unknown Mineral Fibres. "-" indicates fibres detected may or may not be asbestos fibres. Confirmation by alternative techniques is recommended.
- EA200: Negative results for vinyl tiles should be confirmed by an independent analytical technique.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EA200: For samples larger than 30g, the <2mm fraction may be sub-sampled prior to trace analysis as outlined in ISO23909:2008(E) Sect 6.3.2-2
- EA200: 'Yes' - Asbestos detected by polarised light microscopy including dispersion staining.
- EA200: 'No*' - No asbestos found, at the reporting limit of 0.1g/kg, by polarised light microscopy including dispersion staining. Asbestos material was detected and positively identified at concentrations estimated to be below 0.1g/kg.
- EA200: 'No' - No asbestos found at the reporting limit 0.1g/kg, by polarised light microscopy including dispersion staining.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	FD1	----	----	----	----
			Client sampling date / time	16-Aug-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1824416-001	--------	--------	--------	--------
				Result	----	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	**18.9**	----	----	----	----
EA200: AS 4964 - 2004 Identification of Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	**No**	----	----	----	----
Asbestos (Trace)	1332-21-4	5	Fibres	**No**	----	----	----	----
Asbestos Type	1332-21-4	-	--	**-**	----	----	----	----
Sample weight (dry)	----	0.01	g	**11.0**	----	----	----	----
APPROVED IDENTIFIER:	----	-	--	**S.SPOONER**	----	----	----	----
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	**13**	----	----	----	----
Cadmium	7440-43-9	1	mg/kg	<1	----	----	----	----
Chromium	7440-47-3	2	mg/kg	**14**	----	----	----	----
Copper	7440-50-8	5	mg/kg	<5	----	----	----	----
Lead	7439-92-1	5	mg/kg	**21**	----	----	----	----
Nickel	7440-02-0	2	mg/kg	<2	----	----	----	----
Zinc	7440-66-6	5	mg/kg	<5	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	----	----	----	----
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	----	----	----	----
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	----	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	----	----	----	----
beta-BHC	319-85-7	0.05	mg/kg	<0.05	----	----	----	----
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	----	----	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	----	----	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	----	----	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	----	----	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	----	----	----	----
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	----	----	----	----
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	----	----	----	----
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	----	----	----	----
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	----	----	----	----
Dieldrin	60-57-1	0.05	mg/kg	<0.05	----	----	----	----
4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	FD1	----	----	----	----
				Client sampling date / time	16-Aug-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1824416-001	--------	--------	--------	--------
					Result	----	----	----	----
EP068A: Organochlorine Pesticides (OC) - Continued									
Endrin	72-20-8	0.05	mg/kg		<0.05	----	----	----	----
beta-Endosulfan	33213-65-9	0.05	mg/kg		<0.05	----	----	----	----
^ **Endosulfan (sum)**	115-29-7	0.05	mg/kg		<0.05	----	----	----	----
4.4`-DDD	72-54-8	0.05	mg/kg		<0.05	----	----	----	----
Endrin aldehyde	7421-93-4	0.05	mg/kg		<0.05	----	----	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg		<0.05	----	----	----	----
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	----	----	----	----
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	----	----	----	----
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	----	----	----	----
^ **Sum of Aldrin + Dieldrin**	309-00-2/60-57-1	0.05	mg/kg		<0.05	----	----	----	----
^ **Sum of DDD + DDE + DDT**	72-54-8/72-55-9/50-2	0.05	mg/kg		<0.05	----	----	----	----
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg		<0.05	----	----	----	----
Demeton-S-methyl	919-86-8	0.05	mg/kg		<0.05	----	----	----	----
Monocrotophos	6923-22-4	0.2	mg/kg		<0.2	----	----	----	----
Dimethoate	60-51-5	0.05	mg/kg		<0.05	----	----	----	----
Diazinon	333-41-5	0.05	mg/kg		<0.05	----	----	----	----
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		<0.05	----	----	----	----
Parathion-methyl	298-00-0	0.2	mg/kg		<0.2	----	----	----	----
Malathion	121-75-5	0.05	mg/kg		<0.05	----	----	----	----
Fenthion	55-38-9	0.05	mg/kg		<0.05	----	----	----	----
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	----	----	----	----
Parathion	56-38-2	0.2	mg/kg		<0.2	----	----	----	----
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		<0.05	----	----	----	----
Chlorfenvinphos	470-90-6	0.05	mg/kg		<0.05	----	----	----	----
Bromophos-ethyl	4824-78-6	0.05	mg/kg		<0.05	----	----	----	----
Fenamiphos	22224-92-6	0.05	mg/kg		<0.05	----	----	----	----
Prothiofos	34643-46-4	0.05	mg/kg		<0.05	----	----	----	----
Ethion	563-12-2	0.05	mg/kg		<0.05	----	----	----	----
Carbophenothion	786-19-6	0.05	mg/kg		<0.05	----	----	----	----
Azinphos Methyl	86-50-0	0.05	mg/kg		<0.05	----	----	----	----
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	0.5	mg/kg		<0.5	----	----	----	----
2-Chlorophenol	95-57-8	0.5	mg/kg		<0.5	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	FD1	----	----	----	----
				Client sampling date / time	16-Aug-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1824416-001	--------	--------	--------	--------
					Result	----	----	----	----
EP075(SIM)A: Phenolic Compounds - Continued									
2-Methylphenol	95-48-7	0.5	mg/kg		<0.5	----	----	----	----
3- & 4-Methylphenol	1319-77-3	1	mg/kg		<1	----	----	----	----
2-Nitrophenol	88-75-5	0.5	mg/kg		<0.5	----	----	----	----
2.4-Dimethylphenol	105-67-9	0.5	mg/kg		<0.5	----	----	----	----
2.4-Dichlorophenol	120-83-2	0.5	mg/kg		<0.5	----	----	----	----
2.6-Dichlorophenol	87-65-0	0.5	mg/kg		<0.5	----	----	----	----
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg		<0.5	----	----	----	----
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg		<0.5	----	----	----	----
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg		<0.5	----	----	----	----
Pentachlorophenol	87-86-5	2	mg/kg		<2	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	----	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	----	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	----	----	----	----
Fluorene	86-73-7	0.5	mg/kg		<0.5	----	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	----	----	----	----
Anthracene	120-12-7	0.5	mg/kg		<0.5	----	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	----	----	----	----
Pyrene	129-00-0	0.5	mg/kg		<0.5	----	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	----	----	----	----
Chrysene	218-01-9	0.5	mg/kg		<0.5	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**0.6**	----	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.2**	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	----	----	----	----
C10 - C14 Fraction	----	50	mg/kg		<50	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	FD1	----	----	----	----
				Client sampling date / time	16-Aug-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1824416-001	--------	--------	--------	--------
					Result	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons - Continued									
C15 - C28 Fraction	----	100	mg/kg		<100	----	----	----	----
C29 - C36 Fraction	----	100	mg/kg		<100	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	----	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	----	----	----	----
>C10 - C16 Fraction	----	50	mg/kg		<50	----	----	----	----
>C16 - C34 Fraction	----	100	mg/kg		<100	----	----	----	----
>C34 - C40 Fraction	----	100	mg/kg		<100	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	----	----	----	----
Toluene	108-88-3	0.5	mg/kg		<0.5	----	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	----	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	----	----	----	----
^ Sum of BTEX	----	0.2	mg/kg		<0.2	----	----	----	----
^ Total Xylenes	----	0.5	mg/kg		<0.5	----	----	----	----
Naphthalene	91-20-3	1	mg/kg		<1	----	----	----	----
MM802: E.coli and Coliforms by Colilert									
Escherichia coli (Colilert)	----	10	orgs/g		<12	----	----	----	----
MM823: Salmonella (absence / presence)									
Salmonella spp.	----	-	-		Not Detected	----	----	----	----
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		94.7	----	----	----	----
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		116	----	----	----	----
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		88.3	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		89.8	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	FD1	----	----	----	----
				Client sampling date / time	16-Aug-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1824416-001	--------	--------	--------	--------
					Result	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates - Continued									
2-Chlorophenol-D4	93951-73-6	0.5	%		**81.2**	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%		**68.2**	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**87.7**	----	----	----	----
Anthracene-d10	1719-06-8	0.5	%		**87.5**	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%		**81.0**	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**84.0**	----	----	----	----
Toluene-D8	2037-26-5	0.2	%		**85.6**	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.2	%		**87.8**	----	----	----	----

Analytical Results

Descriptive Results

Sub-Matrix: **SOIL**

Method: Compound	Client sample ID - Client sampling date / time	Analytical Results
EA200: AS 4964 - 2004 Identification of Asbestos in Soils		
EA200: Description	FD1 - 16-Aug-2018 00:00	Mid brown clay soil.

Surrogate Control Limits

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%) Low	High
EP066S: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	39	149
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	49	147
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	35	143
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2.4.6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	73	133
Toluene-D8	2037-26-5	74	132
4-Bromofluorobenzene	460-00-4	72	130

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **ES1824416**	Page	: 1 of 11
Client	: **ENVIRONMENTAL EARTH SCIENCES**	Laboratory	: Environmental Division Sydney
Contact	: TANYA STANTON	Contact	: Peter Ravlic
Address	: 82-84 Dickson Avenue ARTARMON NSW, AUSTRALIA 2064	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: 118085	Date Samples Received	: 17-Aug-2018
Order number	:	Date Analysis Commenced	: 20-Aug-2018
C-O-C number	: ----	Issue Date	: 29-Aug-2018
Sampler	: NE/LD		
Site	: LEWISHAM		
Quote number	: EN/010/18		
No. of samples received	: 1		
No. of samples analysed	: 1		

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	*Position*	*Accreditation Category*
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Shaun Spooner	Asbestos Identifier	Newcastle - Asbestos, Mayfield West, NSW
Tony DeSouza	Senior Microbiologist	WRG Subcontracting, Smithfield, NSW

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 : Anonymous = 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: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 1888058)									
EP1809478-001	Anonymous	EA055: Moisture Content	----	0.1	%	9.2	8.8	4.16	0% - 20%
ES1824289-006	Anonymous	EA055: Moisture Content	----	0.1	%	5.4	5.5	1.99	0% - 20%
EG005T: Total Metals by ICP-AES (QC Lot: 1892180)									
ES1824413-009	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	3	3	0.00	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	3	3	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	5	<5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	232	262	12.3	0% - 20%
		EG005T: Lead	7439-92-1	5	mg/kg	209	188	10.7	0% - 20%
		EG005T: Zinc	7440-66-6	5	mg/kg	243	224	7.91	0% - 20%
ES1824425-003	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	23	16	37.2	0% - 50%
		EG005T: Nickel	7440-02-0	2	mg/kg	14	18	25.2	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	8	6	21.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	22	24	8.09	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	20	18	10.4	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	47	64	31.7	0% - 50%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 1892181)									
ES1824413-009	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	0.3	0.3	0.00	No Limit
ES1824425-003	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EP066: Polychlorinated Biphenyls (PCB) (QC Lot: 1883708)									
ES1824321-003	Anonymous	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EP068A: Organochlorine Pesticides (OC) (QC Lot: 1883705)									
ES1824416-001	FD1	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP068A: Organochlorine Pesticides (OC) (QC Lot: 1883705) - continued									
ES1824416-001	FD1	EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
ES1824321-003	Anonymous	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP068A: Organochlorine Pesticides (OC) (QC Lot: 1883705) - continued									
ES1824321-003	Anonymous	EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 1883705)									
ES1824416-001	FD1	EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
ES1824321-003	Anonymous	EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP075(SIM)A: Phenolic Compounds (QC Lot: 1883707)									
ES1824321-003	Anonymous	EP075(SIM): Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	<1	0.00	No Limit
		EP075(SIM): Pentachlorophenol	87-86-5	2	mg/kg	<2	<2	0.00	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 1883707)									
ES1824321-003	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1883258)									
ES1824165-009	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
ES1824418-001	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1883706)									
ES1824321-003	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	120	<100	17.2	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1883258)									
ES1824165-009	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
ES1824418-001	Anonymous	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: 1883706)									
ES1824321-003	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	130	<100	27.5	No Limit
		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
EP080: BTEXN (QC Lot: 1883258)									
ES1824165-009	Anonymous	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	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		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
ES1824418-001	Anonymous	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	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		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: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005T: Total Metals by ICP-AES (QCLot: 1892180)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	95.6	86	126
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	97.3	83	113
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	87.9	76	128
EG005T: Copper	7440-50-8	5	mg/kg	<5	32 mg/kg	99.8	86	120
EG005T: Lead	7439-92-1	5	mg/kg	<5	40 mg/kg	94.8	80	114
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55 mg/kg	99.5	87	123
EG005T: Zinc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	103	80	122
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1892181)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	73.6	70	105
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 1883708)								
EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	1 mg/kg	104	62	126
EP068A: Organochlorine Pesticides (OC) (QCLot: 1883705)								
EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.5 mg/kg	85.5	69	113
EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	0.5 mg/kg	88.5	65	117
EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	0.5 mg/kg	89.4	67	119
EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	0.5 mg/kg	88.4	68	116
EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	89.5	65	117
EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.5 mg/kg	88.1	67	115
EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	0.5 mg/kg	92.1	69	115
EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.5 mg/kg	93.8	62	118
EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	0.5 mg/kg	93.2	63	117
EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	0.5 mg/kg	92.2	66	116
EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	0.5 mg/kg	94.5	64	116
EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	0.5 mg/kg	92.4	66	116
EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	0.5 mg/kg	92.3	67	115
EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	0.5 mg/kg	89.4	67	123
EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	0.5 mg/kg	93.2	69	115
EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	0.5 mg/kg	98.1	69	121
EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	0.5 mg/kg	92.9	56	120
EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.5 mg/kg	98.3	62	124
EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	0.5 mg/kg	88.7	66	120
EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	0.5 mg/kg	98.3	64	122
EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	0.5 mg/kg	78.8	54	130
EP068B: Organophosphorus Pesticides (OP) (QCLot: 1883705)								

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP068B: Organophosphorus Pesticides (OP) (QCLot: 1883705) - continued								
EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	0.5 mg/kg	78.4	59	119
EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	84.6	62	128
EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	0.5 mg/kg	72.1	54	126
EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	0.5 mg/kg	96.1	67	119
EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	0.5 mg/kg	85.8	70	120
EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	0.5 mg/kg	88.0	72	120
EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	0.5 mg/kg	77.3	68	120
EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	0.5 mg/kg	83.4	68	122
EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	0.5 mg/kg	88.7	69	117
EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	0.5 mg/kg	91.4	76	118
EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	0.5 mg/kg	81.8	64	122
EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	0.5 mg/kg	90.3	70	116
EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	0.5 mg/kg	82.5	69	121
EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	0.5 mg/kg	89.1	66	118
EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	0.5 mg/kg	86.4	68	124
EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	0.5 mg/kg	90.1	62	112
EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	0.5 mg/kg	89.1	68	120
EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	0.5 mg/kg	93.6	65	127
EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	0.5 mg/kg	63.4	41	123
EP075(SIM)A: Phenolic Compounds (QCLot: 1883707)								
EP075(SIM): Phenol	108-95-2	0.5	mg/kg	<0.5	6 mg/kg	92.8	71	125
EP075(SIM): 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	6 mg/kg	93.0	72	124
EP075(SIM): 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	6 mg/kg	89.2	71	123
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	12 mg/kg	98.6	67	127
EP075(SIM): 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	6 mg/kg	90.2	54	114
EP075(SIM): 2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	6 mg/kg	88.8	68	126
EP075(SIM): 2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	6 mg/kg	96.5	66	120
EP075(SIM): 2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	6 mg/kg	90.1	70	120
EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	6 mg/kg	93.1	70	116
EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	6 mg/kg	93.6	54	114
EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	6 mg/kg	85.2	60	114
EP075(SIM): Pentachlorophenol	87-86-5	2	mg/kg	<2	12 mg/kg	30.7	10	57
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1883707)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	93.7	77	125
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	94.8	72	124
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	95.0	73	127
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	95.0	72	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	98.2	75	127
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	91.5	77	127

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1883707) - continued								
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	97.6	73	127
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	92.7	74	128
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	98.2	69	123
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	93.4	75	127
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	6 mg/kg	97.1	68	116
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	94.0	74	126
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	90.5	70	126
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	83.7	61	121
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	92.3	62	118
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	88.9	63	121
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1883258)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	83.2	68	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1883706)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	300 mg/kg	114	75	129
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	450 mg/kg	116	77	131
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	300 mg/kg	102	71	129
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1883258)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	85.9	68	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1883706)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	375 mg/kg	115	77	125
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	525 mg/kg	111	74	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	225 mg/kg	120	63	131
EP080: BTEXN (QCLot: 1883258)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	93.2	62	116
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	95.0	67	121
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	90.9	65	117
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	89.3	66	118
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	93.2	68	120
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	96.6	63	119

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: **SOIL**

Matrix Spike (MS) Report		
Spike	SpikeRecovery(%)	Recovery Limits (%)

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG005T: Total Metals by ICP-AES (QCLot: 1892180)							
ES1824413-009	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	95.7	70	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	102	70	130
		EG005T: Chromium	7440-47-3	50 mg/kg	101	70	130
		EG005T: Copper	7440-50-8	250 mg/kg	94.6	70	130
		EG005T: Lead	7439-92-1	250 mg/kg	91.1	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	101	70	130
		EG005T: Zinc	7440-66-6	250 mg/kg	99.7	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1892181)							
ES1824413-009	Anonymous	EG035T: Mercury	7439-97-6	5 mg/kg	87.4	70	130
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 1883708)							
ES1824321-003	Anonymous	EP066: Total Polychlorinated biphenyls	----	1 mg/kg	110	70	130
EP068A: Organochlorine Pesticides (OC) (QCLot: 1883705)							
ES1824321-003	Anonymous	EP068: gamma-BHC	58-89-9	0.5 mg/kg	102	70	130
		EP068: Heptachlor	76-44-8	0.5 mg/kg	93.3	70	130
		EP068: Aldrin	309-00-2	0.5 mg/kg	72.4	70	130
		EP068: Dieldrin	60-57-1	0.5 mg/kg	99.0	70	130
		EP068: Endrin	72-20-8	2 mg/kg	78.1	70	130
		EP068: 4.4`-DDT	50-29-3	2 mg/kg	75.5	70	130
EP068B: Organophosphorus Pesticides (OP) (QCLot: 1883705)							
ES1824321-003	Anonymous	EP068: Diazinon	333-41-5	0.5 mg/kg	101	70	130
		EP068: Chlorpyrifos-methyl	5598-13-0	0.5 mg/kg	93.4	70	130
		EP068: Pirimphos-ethyl	23505-41-1	0.5 mg/kg	95.3	70	130
		EP068: Bromophos-ethyl	4824-78-6	0.5 mg/kg	96.6	70	130
		EP068: Prothiofos	34643-46-4	0.5 mg/kg	82.1	70	130
EP075(SIM)A: Phenolic Compounds (QCLot: 1883707)							
ES1824321-003	Anonymous	EP075(SIM): Phenol	108-95-2	10 mg/kg	96.9	70	130
		EP075(SIM): 2-Chlorophenol	95-57-8	10 mg/kg	91.6	70	130
		EP075(SIM): 2-Nitrophenol	88-75-5	10 mg/kg	93.0	60	130
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	10 mg/kg	92.6	70	130
		EP075(SIM): Pentachlorophenol	87-86-5	10 mg/kg	86.2	20	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1883707)							
ES1824321-003	Anonymous	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	91.8	70	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	91.8	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1883258)							
ES1824165-009	Anonymous	EP080: C6 - C9 Fraction	----	32.5 mg/kg	88.3	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1883706)							

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1883706) - continued							
ES1824321-003	Anonymous	EP071: C10 - C14 Fraction	----	523 mg/kg	111	73	137
		EP071: C15 - C28 Fraction	----	2319 mg/kg	124	53	131
		EP071: C29 - C36 Fraction	----	1714 mg/kg	82.9	52	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1883258)							
ES1824165-009	Anonymous	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	86.9	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1883706)							
ES1824321-003	Anonymous	EP071: >C10 - C16 Fraction	----	860 mg/kg	115	73	137
		EP071: >C16 - C34 Fraction	----	3223 mg/kg	104	53	131
		EP071: >C34 - C40 Fraction	----	1058 mg/kg	73.1	52	132
EP080: BTEXN (QCLot: 1883258)							
ES1824165-009	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	84.2	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	85.6	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	85.3	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	83.2	70	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	87.8	70	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	86.3	70	130

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES1824416**	Page	: 1 of 6
Client	: **ENVIRONMENTAL EARTH SCIENCES**	Laboratory	: Environmental Division Sydney
Contact	: TANYA STANTON	Telephone	: +61-2-8784 8555
Project	: 118085	Date Samples Received	: 17-Aug-2018
Site	: LEWISHAM	Issue Date	: 29-Aug-2018
Sampler	: NE/LD	No. of samples received	: 1
Order number	:	No. of samples analysed	: 1

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 Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **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.**

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: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content (Dried @ 105-110°C)							
Soil Glass Jar - Unpreserved (EA055)							
FD1	**16-Aug-2018**	**----**	----	----	**21-Aug-2018**	30-Aug-2018	✓
EA200: AS 4964 - 2004 Identification of Asbestos in Soils							
Snap Lock Bag - Friable Asbestos/PSD Bag (EA200)							
FD1	**16-Aug-2018**	**----**	----	----	**22-Aug-2018**	12-Feb-2019	✓
EG005T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T)							
FD1	**16-Aug-2018**	**23-Aug-2018**	12-Feb-2019	✓	**23-Aug-2018**	12-Feb-2019	✓
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T)							
FD1	**16-Aug-2018**	**23-Aug-2018**	13-Sep-2018	✓	**23-Aug-2018**	13-Sep-2018	✓
EP066: Polychlorinated Biphenyls (PCB)							
Soil Glass Jar - Unpreserved (EP066)							
FD1	**16-Aug-2018**	**20-Aug-2018**	30-Aug-2018	✓	**22-Aug-2018**	29-Sep-2018	✓
EP068A: Organochlorine Pesticides (OC)							
Soil Glass Jar - Unpreserved (EP068)							
FD1	**16-Aug-2018**	**20-Aug-2018**	30-Aug-2018	✓	**22-Aug-2018**	29-Sep-2018	✓
EP068B: Organophosphorus Pesticides (OP)							
Soil Glass Jar - Unpreserved (EP068)							
FD1	**16-Aug-2018**	**20-Aug-2018**	30-Aug-2018	✓	**22-Aug-2018**	29-Sep-2018	✓
EP075(SIM)A: Phenolic Compounds							
Soil Glass Jar - Unpreserved (EP075(SIM))							
FD1	**16-Aug-2018**	**20-Aug-2018**	30-Aug-2018	✓	**21-Aug-2018**	29-Sep-2018	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075(SIM))							
FD1	**16-Aug-2018**	**20-Aug-2018**	30-Aug-2018	✓	**21-Aug-2018**	29-Sep-2018	✓
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP071)							
FD1	**16-Aug-2018**	**20-Aug-2018**	30-Aug-2018	✓	**21-Aug-2018**	29-Sep-2018	✓
Soil Glass Jar - Unpreserved (EP080)							
FD1	**16-Aug-2018**	**20-Aug-2018**	30-Aug-2018	✓	**22-Aug-2018**	30-Aug-2018	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Soil Glass Jar - Unpreserved (EP071)							
FD1	**16-Aug-2018**	**20-Aug-2018**	30-Aug-2018	✓	**21-Aug-2018**	29-Sep-2018	✓
Soil Glass Jar - Unpreserved (EP080)							
FD1	**16-Aug-2018**	**20-Aug-2018**	30-Aug-2018	✓	**22-Aug-2018**	30-Aug-2018	✓
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080)							
FD1	**16-Aug-2018**	**20-Aug-2018**	30-Aug-2018	✓	**22-Aug-2018**	30-Aug-2018	✓

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: **SOIL**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Moisture Content	EA055	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	8	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	2	11	**18.18**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	4	**25.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	8	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
PAH/Phenols (SIM)	EP075(SIM)	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
PAH/Phenols (SIM)	EP075(SIM)	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
PAH/Phenols (SIM)	EP075(SIM)	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

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.

Analytical Methods	Method	Matrix	Method Descriptions
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).
Asbestos Identification in Soils	EA200	SOIL	AS 4964 - 2004 Method for the qualitative identification of asbestos in bulk samples Analysis by Polarised Light Microscopy including dispersion staining
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (2013) Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2) (Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
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)
Pesticides by GCMS	EP068	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 technique is compliant with NEPM (2013) Schedule B(3) (Method 504,505)
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.
PAH/Phenols (SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270D. Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 502 and 507)
TRH Volatiles/BTEX	EP080	SOIL	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.
E.coli and Coliforms by Colilert	MM802	SOIL	Microbiological analysis subcontracted to ALS Scoresby (NATA Accredited Laboratory No. 992).
Salmonella (absence / presence)	MM823	SOIL	Microbiological analysis subcontracted to ALS Scoresby (NATA Accredited Laboratory No. 992).

Preparation Methods	Method	Matrix	Method Descriptions
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM (2013) Schedule B(3) (Method 202)
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.

Preparation Methods	Method	Matrix	Method Descriptions
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.

CHAIN OF CUSTODY - ANALYSIS REQUEST FORM

Job No: 118085 | Laboratory: ALS

Project Manager: TS | Sampler: NE/LD | Site Location: Lewisham | **Sheet:** 1 of 1

No. of samples	Sample ID/ Depth	Anticipated Result (PID)/EC reading	Date sampled	Time sampled	Sample Matrix: Soil	Water	Sediment	Analysis Required: S-19	Asbestos Presence / absence	Salmonella	Ecoli									Sample-specific instructions/ notes
1	FD1		16/08/2018		x			x	x	x	x									Ecoli = Ecoli and total coliforms by Colilert.
	TOTAL				1			1	1	1	1									

Environmental Division Sydney
Work Order Reference
ES1824416
Telephone : +61-2-8784 8555

Turn Around *(circle)*: **Standard**

Comments/ Instructions:

Lab Quotation No. *(if applicable)* : EN/010/17

Send report to *(email address)* : neldridge@eesigroup.com

Cc: report to *(email address)* : tstanton@eesigroup ; mbressan@eesigroup.com

Cc: invoice to *(email address)*: accounts@eesigroup.com

	Name	Signature	Date	Time
Sent off Site/Office by:	Natalie Eldridge		17/08/2018	
Receiving Lab:	ALS		17/8/18	1615
Receiving Lab:				

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED
Phone: (02) 9922 1777
Fax: (02) 9922 1010
PO Box: 380, North Sydney NSW 2059
Email: eesNSW@eesigroup.com

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **ES1824749**

Client	: **ENVIRONMENTAL EARTH SCIENCES**	Laboratory	: Environmental Division Sydney
Contact	: MS TANYA STANTON	Contact	: Peter Ravlic
Address	: 82-84 Dickson Avenue ARTARMON NSW, AUSTRALIA 2064	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: tstanton@environmentalearthsciences.com	E-mail	: peter.ravlic@alsglobal.com
Telephone	: +61 02 99221777	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 99221010	Facsimile	: +61-2-8784 8500
Project	: 118085	Page	: 1 of 3
Order number	:	Quote number	: ES2015ENVEAR0001 (EN/010/18)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: Lewisham		
Sampler	: NE		

Dates

Date Samples Received	: 22-Aug-2018 11:35	Issue Date	: 22-Aug-2018
Client Requested Due Date	: 28-Aug-2018	Scheduled Reporting Date	: **27-Aug-2018**

Delivery Details

Mode of Delivery	: Undefined	Security Seal	: Not Available
No. of coolers/boxes	: 1	Temperature	: 2.2'C - Ice present
Receipt Detail	:	No. of samples received / analysed	: 1 / 1

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- (Salmonella) Analysis to be conducted by (ALS Scoresby)
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

Method *Client sample ID*	Sample Container Received	Preferred Sample Container for Analysis
Dissolved Mercury by FIMS : EG035F		
FD1	- Clear Plastic Bottle - Natural	- Clear Plastic Bottle - Nitric Acid; Filtered
Dissolved Metals by ICP-MS - Suite A : EG020A-F		
FD1	- Clear Plastic Bottle - Natural	- Clear Plastic Bottle - Nitric Acid; Filtered

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	*Client sampling date / time*	*Client sample ID*	WATER - MM532 (Subcontracted) Salmonella (absence / presence)	WATER - MW008 Thermotolerant Coliforms & E.coli by MPN in	WATER - W-19 TRH/BTEXN/PAH/Phenols/OC/OP/PCB/8 metals
ES1824749-001	21-Aug-2018 00:00	FD1	✓	✓	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

ALL INVOICES MELB ADDRESS

- A4 - AU Tax Invoice (INV)	Email	accounts@eesigroup.com

M BRESSAN

- *AU Certificate of Analysis - NATA (COA)	Email	mbressan@eesigroup.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	mbressan@eesigroup.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	mbressan@eesigroup.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	mbressan@eesigroup.com
- Attachment - Report (SUBCO)	Email	mbressan@eesigroup.com
- Chain of Custody (CoC) (COC)	Email	mbressan@eesigroup.com
- EDI Format - ENMRG (ENMRG)	Email	mbressan@eesigroup.com
- EDI Format - ESDAT (ESDAT)	Email	mbressan@eesigroup.com

Natalie Eldridge

- *AU Certificate of Analysis - NATA (COA)	Email	neldridge@eesigroup.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	neldridge@eesigroup.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	neldridge@eesigroup.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	neldridge@eesigroup.com
- Attachment - Report (SUBCO)	Email	neldridge@eesigroup.com
- Chain of Custody (CoC) (COC)	Email	neldridge@eesigroup.com
- EDI Format - ENMRG (ENMRG)	Email	neldridge@eesigroup.com
- EDI Format - ESDAT (ESDAT)	Email	neldridge@eesigroup.com

TANYA STANTON

- *AU Certificate of Analysis - NATA (COA)	Email	tstanton@environmentalearthsciences.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	tstanton@environmentalearthsciences.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	tstanton@environmentalearthsciences.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	tstanton@environmentalearthsciences.com
- Attachment - Report (SUBCO)	Email	tstanton@environmentalearthsciences.com
- Chain of Custody (CoC) (COC)	Email	tstanton@environmentalearthsciences.com
- EDI Format - ENMRG (ENMRG)	Email	tstanton@environmentalearthsciences.com
- EDI Format - ESDAT (ESDAT)	Email	tstanton@environmentalearthsciences.com

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1824749**	Page	: 1 of 7
Client	: **ENVIRONMENTAL EARTH SCIENCES**	Laboratory	: Environmental Division Sydney
Contact	: MS TANYA STANTON	Contact	: Peter Ravlic
Address	: 82-84 Dickson Avenue ARTARMON NSW, AUSTRALIA 2064	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 99221777	Telephone	: +61-2-8784 8555
Project	: 118085	Date Samples Received	: 22-Aug-2018 11:35
Order number	:	Date Analysis Commenced	: 22-Aug-2018
C-O-C number	: ----	Issue Date	: 29-Aug-2018 16:11
Sampler	: NE		
Site	: Lewisham		
Quote number	: EN/010/18		
No. of samples received	: 1		
No. of samples analysed	: 1		

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 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	*Position*	*Accreditation Category*
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Tony DeSouza	Senior Microbiologist	Sydney Microbiology, Smithfield, NSW
Tony DeSouza	Senior Microbiologist	WRG Subcontracting, Smithfield, NSW

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.

- MM625: Holding time was not met. Therefore result may be indicative.
- MW008 is ALS's internal code and is equivalent to AS4276.6.
- Salmonella - VIDAS (MM625) is conducted by ALS Scoresby NATA accreditation no. 992, site no. 989.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	FD1	----	----	----	----
				Client sampling date / time	21-Aug-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1824749-001	--------	--------	--------	--------
					Result	----	----	----	----
EG020F: Dissolved Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		**0.002**	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	----	----	----	----
Chromium	7440-47-3	0.001	mg/L		<0.001	----	----	----	----
Copper	7440-50-8	0.001	mg/L		<0.001	----	----	----	----
Nickel	7440-02-0	0.001	mg/L		**0.005**	----	----	----	----
Lead	7439-92-1	0.001	mg/L		<0.001	----	----	----	----
Zinc	7440-66-6	0.005	mg/L		<0.005	----	----	----	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	----	----	----	----
EP066: Polychlorinated Biphenyls (PCB)									
^ **Total Polychlorinated biphenyls**	----	1	µg/L		<1	----	----	----	----
EP068A: Organochlorine Pesticides (OC)									
alpha-BHC	319-84-6	0.5	µg/L		<0.5	----	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.5	µg/L		<0.5	----	----	----	----
beta-BHC	319-85-7	0.5	µg/L		<0.5	----	----	----	----
gamma-BHC	58-89-9	0.5	µg/L		<0.5	----	----	----	----
delta-BHC	319-86-8	0.5	µg/L		<0.5	----	----	----	----
Heptachlor	76-44-8	0.5	µg/L		<0.5	----	----	----	----
Aldrin	309-00-2	0.5	µg/L		<0.5	----	----	----	----
Heptachlor epoxide	1024-57-3	0.5	µg/L		<0.5	----	----	----	----
trans-Chlordane	5103-74-2	0.5	µg/L		<0.5	----	----	----	----
alpha-Endosulfan	959-98-8	0.5	µg/L		<0.5	----	----	----	----
cis-Chlordane	5103-71-9	0.5	µg/L		<0.5	----	----	----	----
Dieldrin	60-57-1	0.5	µg/L		<0.5	----	----	----	----
4.4`-DDE	72-55-9	0.5	µg/L		<0.5	----	----	----	----
Endrin	72-20-8	0.5	µg/L		<0.5	----	----	----	----
beta-Endosulfan	33213-65-9	0.5	µg/L		<0.5	----	----	----	----
4.4`-DDD	72-54-8	0.5	µg/L		<0.5	----	----	----	----
Endrin aldehyde	7421-93-4	0.5	µg/L		<0.5	----	----	----	----
Endosulfan sulfate	1031-07-8	0.5	µg/L		<0.5	----	----	----	----
4.4`-DDT	50-29-3	2.0	µg/L		<2.0	----	----	----	----
Endrin ketone	53494-70-5	0.5	µg/L		<0.5	----	----	----	----
Methoxychlor	72-43-5	2.0	µg/L		<2.0	----	----	----	----
^ **Total Chlordane (sum)**	----	0.5	µg/L		<0.5	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	FD1	----	----	----	----
				Client sampling date / time	21-Aug-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1824749-001	--------	--------	--------	--------
					Result	----	----	----	----
EP068A: Organochlorine Pesticides (OC) - Continued									
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.5	µg/L		<0.5	----	----	----	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.5	µg/L		<0.5	----	----	----	----
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.5	µg/L		<0.5	----	----	----	----
Demeton-S-methyl	919-86-8	0.5	µg/L		<0.5	----	----	----	----
Monocrotophos	6923-22-4	2.0	µg/L		<2.0	----	----	----	----
Dimethoate	60-51-5	0.5	µg/L		<0.5	----	----	----	----
Diazinon	333-41-5	0.5	µg/L		<0.5	----	----	----	----
Chlorpyrifos-methyl	5598-13-0	0.5	µg/L		<0.5	----	----	----	----
Parathion-methyl	298-00-0	2.0	µg/L		<2.0	----	----	----	----
Malathion	121-75-5	0.5	µg/L		<0.5	----	----	----	----
Fenthion	55-38-9	0.5	µg/L		<0.5	----	----	----	----
Chlorpyrifos	2921-88-2	0.5	µg/L		<0.5	----	----	----	----
Parathion	56-38-2	2.0	µg/L		<2.0	----	----	----	----
Pirimphos-ethyl	23505-41-1	0.5	µg/L		<0.5	----	----	----	----
Chlorfenvinphos	470-90-6	0.5	µg/L		<0.5	----	----	----	----
Bromophos-ethyl	4824-78-6	0.5	µg/L		<0.5	----	----	----	----
Fenamiphos	22224-92-6	0.5	µg/L		<0.5	----	----	----	----
Prothiofos	34643-46-4	0.5	µg/L		<0.5	----	----	----	----
Ethion	563-12-2	0.5	µg/L		<0.5	----	----	----	----
Carbophenothion	786-19-6	0.5	µg/L		<0.5	----	----	----	----
Azinphos Methyl	86-50-0	0.5	µg/L		<0.5	----	----	----	----
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	1.0	µg/L		<1.0	----	----	----	----
2-Chlorophenol	95-57-8	1.0	µg/L		<1.0	----	----	----	----
2-Methylphenol	95-48-7	1.0	µg/L		<1.0	----	----	----	----
3- & 4-Methylphenol	1319-77-3	2.0	µg/L		<2.0	----	----	----	----
2-Nitrophenol	88-75-5	1.0	µg/L		<1.0	----	----	----	----
2.4-Dimethylphenol	105-67-9	1.0	µg/L		<1.0	----	----	----	----
2.4-Dichlorophenol	120-83-2	1.0	µg/L		<1.0	----	----	----	----
2.6-Dichlorophenol	87-65-0	1.0	µg/L		<1.0	----	----	----	----
4-Chloro-3-methylphenol	59-50-7	1.0	µg/L		<1.0	----	----	----	----
2.4.6-Trichlorophenol	88-06-2	1.0	µg/L		<1.0	----	----	----	----
2.4.5-Trichlorophenol	95-95-4	1.0	µg/L		<1.0	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	FD1	----	----	----	----
				Client sampling date / time	21-Aug-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1824749-001	--------	--------	--------	--------
					Result	----	----	----	----
EP075(SIM)A: Phenolic Compounds - Continued									
Pentachlorophenol	87-86-5	2.0	µg/L		<2.0	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1.0	µg/L		<1.0	----	----	----	----
Acenaphthylene	208-96-8	1.0	µg/L		<1.0	----	----	----	----
Acenaphthene	83-32-9	1.0	µg/L		<1.0	----	----	----	----
Fluorene	86-73-7	1.0	µg/L		<1.0	----	----	----	----
Phenanthrene	85-01-8	1.0	µg/L		<1.0	----	----	----	----
Anthracene	120-12-7	1.0	µg/L		<1.0	----	----	----	----
Fluoranthene	206-44-0	1.0	µg/L		<1.0	----	----	----	----
Pyrene	129-00-0	1.0	µg/L		<1.0	----	----	----	----
Benz(a)anthracene	56-55-3	1.0	µg/L		<1.0	----	----	----	----
Chrysene	218-01-9	1.0	µg/L		<1.0	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L		<1.0	----	----	----	----
Benzo(k)fluoranthene	207-08-9	1.0	µg/L		<1.0	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L		<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L		<1.0	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	1.0	µg/L		<1.0	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	1.0	µg/L		<1.0	----	----	----	----
^ **Sum of polycyclic aromatic hydrocarbons**	----	0.5	µg/L		<0.5	----	----	----	----
^ **Benzo(a)pyrene TEQ (zero)**	----	0.5	µg/L		<0.5	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	----	----	----	----
C10 - C14 Fraction	----	50	µg/L		<50	----	----	----	----
C15 - C28 Fraction	----	100	µg/L		<100	----	----	----	----
C29 - C36 Fraction	----	50	µg/L		<50	----	----	----	----
^ **C10 - C36 Fraction (sum)**	----	50	µg/L		<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	----	----	----	----
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	20	µg/L		<20	----	----	----	----
>C10 - C16 Fraction	----	100	µg/L		<100	----	----	----	----
>C16 - C34 Fraction	----	100	µg/L		<100	----	----	----	----
>C34 - C40 Fraction	----	100	µg/L		<100	----	----	----	----
^ **>C10 - C40 Fraction (sum)**	----	100	µg/L		<100	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	FD1	----	----	----	----
				Client sampling date / time	21-Aug-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1824749-001	--------	--------	--------	--------
					Result	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	100	µg/L		<100	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	----	----	----	----
Toluene	108-88-3	2	µg/L		<2	----	----	----	----
Ethylbenzene	100-41-4	2	µg/L		<2	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	----	----	----	----
ortho-Xylene	95-47-6	2	µg/L		<2	----	----	----	----
^ **Total Xylenes**	----	2	µg/L		<2	----	----	----	----
^ **Sum of BTEX**	----	1	µg/L		<1	----	----	----	----
Naphthalene	91-20-3	5	µg/L		<5	----	----	----	----
MM625: Salmonella - VIDAS (absence / presence)									
***Salmonella* spp.**	----	-	-		**Not Detected**	----	----	----	----
MW008: Faecal Coliforms & E.coli by MPN									
Escherichia coli	----	2	MPN/100 mL		<2	----	----	----	----
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	1	%		**71.1**	----	----	----	----
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.5	%		**90.9**	----	----	----	----
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.5	%		**76.4**	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1.0	%		**20.4**	----	----	----	----
2-Chlorophenol-D4	93951-73-6	1.0	%		**58.5**	----	----	----	----
2.4.6-Tribromophenol	118-79-6	1.0	%		**50.6**	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1.0	%		**83.6**	----	----	----	----
Anthracene-d10	1719-06-8	1.0	%		**84.6**	----	----	----	----
4-Terphenyl-d14	1718-51-0	1.0	%		**90.0**	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		**92.8**	----	----	----	----
Toluene-D8	2037-26-5	2	%		**103**	----	----	----	----
4-Bromofluorobenzene	460-00-4	2	%		**94.0**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%) Low	High
EP066S: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	29	129
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	67	111
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	67	111
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10	44
2-Chlorophenol-D4	93951-73-6	14	94
2.4.6-Tribromophenol	118-79-6	17	125
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	20	104
Anthracene-d10	1719-06-8	27	113
4-Terphenyl-d14	1718-51-0	32	112
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **ES1824749**	Page	: 1 of 10
Client	: **ENVIRONMENTAL EARTH SCIENCES**	Laboratory	: Environmental Division Sydney
Contact	: MS TANYA STANTON	Contact	: Peter Ravlic
Address	: 82-84 Dickson Avenue ARTARMON NSW, AUSTRALIA 2064	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 99221777	Telephone	: +61-2-8784 8555
Project	: 118085	Date Samples Received	: 22-Aug-2018
Order number	:	Date Analysis Commenced	: 22-Aug-2018
C-O-C number	: ----	Issue Date	: 29-Aug-2018
Sampler	: NE		
Site	: Lewisham		
Quote number	: EN/010/18		
No. of samples received	: 1		
No. of samples analysed	: 1		

ilac-MRA NATA
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	*Position*	*Accreditation Category*
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Tony DeSouza	Senior Microbiologist	Sydney Microbiology, Smithfield, NSW
Tony DeSouza	Senior Microbiologist	WRG Subcontracting, Smithfield, NSW

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 : Anonymous = 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: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1895230)									
ES1824749-001	FD1	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.005	0.006	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 1895229)									
ES1824863-001	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
EP066: Polychlorinated Biphenyls (PCB) (QC Lot: 1892358)									
ES1824749-001	FD1	EP066: Total Polychlorinated biphenyls	----	1	µg/L	<1	<1	0.00	No Limit
EP068A: Organochlorine Pesticides (OC) (QC Lot: 1892356)									
ES1824749-001	FD1	EP068: alpha-BHC	319-84-6	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: beta-BHC	319-85-7	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: gamma-BHC	58-89-9	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: delta-BHC	319-86-8	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Heptachlor	76-44-8	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Aldrin	309-00-2	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: trans-Chlordane	5103-74-2	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: cis-Chlordane	5103-71-9	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Dieldrin	60-57-1	0.5	µg/L	<0.5	<0.5	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP068A: Organochlorine Pesticides (OC) (QC Lot: 1892356) - continued									
ES1824749-001	FD1	EP068: 4.4`-DDE	72-55-9	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Endrin	72-20-8	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: 4.4`-DDD	72-54-8	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Endrin ketone	53494-70-5	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: 4.4`-DDT	50-29-3	2	µg/L	<2.0	<2.0	0.00	No Limit
		EP068: Methoxychlor	72-43-5	2	µg/L	<2.0	<2.0	0.00	No Limit
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 1892356)									
ES1824749-001	FD1	EP068: Dichlorvos	62-73-7	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Demeton-S-methyl	919-86-8	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Dimethoate	60-51-5	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Diazinon	333-41-5	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Chlorpyrifos-methyl	5598-13-0	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Malathion	121-75-5	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Fenthion	55-38-9	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Chlorpyrifos	2921-88-2	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Pirimphos-ethyl	23505-41-1	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Chlorfenvinphos	470-90-6	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Bromophos-ethyl	4824-78-6	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Fenamiphos	22224-92-6	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Prothiofos	34643-46-4	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Ethion	563-12-2	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Carbophenothion	786-19-6	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Azinphos Methyl	86-50-0	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Monocrotophos	6923-22-4	2	µg/L	<2.0	<2.0	0.00	No Limit
		EP068: Parathion-methyl	298-00-0	2	µg/L	<2.0	<2.0	0.00	No Limit
		EP068: Parathion	56-38-2	2	µg/L	<2.0	<2.0	0.00	No Limit
EP075(SIM)A: Phenolic Compounds (QC Lot: 1892357)									
ES1824749-001	FD1	EP075(SIM): Phenol	108-95-2	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): 2-Chlorophenol	95-57-8	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): 2-Methylphenol	95-48-7	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): 2-Nitrophenol	88-75-5	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): 2.4-Dimethylphenol	105-67-9	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): 2.4-Dichlorophenol	120-83-2	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): 2.6-Dichlorophenol	87-65-0	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	1	µg/L	<1.0	<1.0	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP075(SIM)A: Phenolic Compounds (QC Lot: 1892357) - continued									
ES1824749-001	FD1	EP075(SIM): 3- & 4-Methylphenol	1319-77-3	2	µg/L	<2.0	<2.0	0.00	No Limit
		EP075(SIM): Pentachlorophenol	87-86-5	2	µg/L	<2.0	<2.0	0.00	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 1892357)									
ES1824749-001	FD1	EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	1	µg/L	<1.0	<1.0	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1892355)									
ES1824749-001	FD1	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1893192)									
ES1824617-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
ES1824617-013	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1892355)									
ES1824749-001	FD1	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1893192)									
ES1824617-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
ES1824617-013	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 1893192)									
ES1824617-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP080: BTEXN (QC Lot: 1893192) - continued									
ES1824617-001	Anonymous	EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
ES1824617-013	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	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: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 1895230)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	101	85	114
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	96.3	84	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	93.5	85	111
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	95.3	81	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	93.2	83	111
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	96.7	82	112
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	97.2	81	117
EG035F: Dissolved Mercury by FIMS (QCLot: 1895229)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	92.8	83	105
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 1892358)								
EP066: Total Polychlorinated biphenyls	----	1	µg/L	<1	10 µg/L	85.0	62	107
EP068A: Organochlorine Pesticides (OC) (QCLot: 1892356)								
EP068: alpha-BHC	319-84-6	0.5	µg/L	<0.5	5 µg/L	100.0	65	107
EP068: Hexachlorobenzene (HCB)	118-74-1	0.5	µg/L	<0.5	5 µg/L	76.8	58	111
EP068: beta-BHC	319-85-7	0.5	µg/L	<0.5	5 µg/L	107	69	117
EP068: gamma-BHC	58-89-9	0.5	µg/L	<0.5	5 µg/L	106	70	112
EP068: delta-BHC	319-86-8	0.5	µg/L	<0.5	5 µg/L	99.3	69	110
EP068: Heptachlor	76-44-8	0.5	µg/L	<0.5	5 µg/L	108	65	108
EP068: Aldrin	309-00-2	0.5	µg/L	<0.5	5 µg/L	103	66	109
EP068: Heptachlor epoxide	1024-57-3	0.5	µg/L	<0.5	5 µg/L	105	67	107
EP068: trans-Chlordane	5103-74-2	0.5	µg/L	<0.5	5 µg/L	82.0	64	110
EP068: alpha-Endosulfan	959-98-8	0.5	µg/L	<0.5	5 µg/L	85.9	67	112
EP068: cis-Chlordane	5103-71-9	0.5	µg/L	<0.5	5 µg/L	78.7	63	111
EP068: Dieldrin	60-57-1	0.5	µg/L	<0.5	5 µg/L	103	65	113
EP068: 4.4`-DDE	72-55-9	0.5	µg/L	<0.5	5 µg/L	96.0	66	112
EP068: Endrin	72-20-8	0.5	µg/L	<0.5	5 µg/L	104	65	113
EP068: beta-Endosulfan	33213-65-9	0.5	µg/L	<0.5	5 µg/L	107	67	114
EP068: 4.4`-DDD	72-54-8	0.5	µg/L	<0.5	5 µg/L	90.4	72	122
EP068: Endrin aldehyde	7421-93-4	0.5	µg/L	<0.5	5 µg/L	99.5	67	109
EP068: Endosulfan sulfate	1031-07-8	0.5	µg/L	<0.5	5 µg/L	93.8	65	112
EP068: 4.4`-DDT	50-29-3	2	µg/L	<2.0	5 µg/L	81.7	65	112
EP068: Endrin ketone	53494-70-5	0.5	µg/L	<0.5	5 µg/L	106	64	110
EP068: Methoxychlor	72-43-5	2	µg/L	<2.0	5 µg/L	106	61	114
EP068B: Organophosphorus Pesticides (OP) (QCLot: 1892356)								

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP068B: Organophosphorus Pesticides (OP) (QCLot: 1892356) - continued								
EP068: Dichlorvos	62-73-7	0.5	µg/L	<0.5	5 µg/L	90.4	66	114
EP068: Demeton-S-methyl	919-86-8	0.5	µg/L	<0.5	5 µg/L	88.3	64	113
EP068: Monocrotophos	6923-22-4	2	µg/L	<2.0	5 µg/L	22.9	20	48
EP068: Dimethoate	60-51-5	0.5	µg/L	<0.5	5 µg/L	85.8	70	110
EP068: Diazinon	333-41-5	0.5	µg/L	<0.5	5 µg/L	102	71	110
EP068: Chlorpyrifos-methyl	5598-13-0	0.5	µg/L	<0.5	5 µg/L	92.7	77	119
EP068: Parathion-methyl	298-00-0	2	µg/L	<2.0	5 µg/L	86.9	70	124
EP068: Malathion	121-75-5	0.5	µg/L	<0.5	5 µg/L	100	68	116
EP068: Fenthion	55-38-9	0.5	µg/L	<0.5	5 µg/L	91.6	69	112
EP068: Chlorpyrifos	2921-88-2	0.5	µg/L	<0.5	5 µg/L	89.9	75	119
EP068: Parathion	56-38-2	2	µg/L	<2.0	5 µg/L	95.5	67	121
EP068: Pirimphos-ethyl	23505-41-1	0.5	µg/L	<0.5	5 µg/L	88.5	69	121
EP068: Chlorfenvinphos	470-90-6	0.5	µg/L	<0.5	5 µg/L	102	72	110
EP068: Bromophos-ethyl	4824-78-6	0.5	µg/L	<0.5	5 µg/L	94.5	68	112
EP068: Fenamiphos	22224-92-6	0.5	µg/L	<0.5	5 µg/L	100	64	116
EP068: Prothiofos	34643-46-4	0.5	µg/L	<0.5	5 µg/L	86.6	68	114
EP068: Ethion	563-12-2	0.5	µg/L	<0.5	5 µg/L	89.8	74	120
EP068: Carbophenothion	786-19-6	0.5	µg/L	<0.5	5 µg/L	91.0	66	114
EP068: Azinphos Methyl	86-50-0	0.5	µg/L	<0.5	5 µg/L	83.8	52	128
EP075(SIM)A: Phenolic Compounds (QCLot: 1892357)								
EP075(SIM): Phenol	108-95-2	1	µg/L	<1.0	5 µg/L	33.2	25	62
EP075(SIM): 2-Chlorophenol	95-57-8	1	µg/L	<1.0	5 µg/L	68.6	52	90
EP075(SIM): 2-Methylphenol	95-48-7	1	µg/L	<1.0	5 µg/L	67.1	51	91
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	2	µg/L	<2.0	10 µg/L	62.6	44	88
EP075(SIM): 2-Nitrophenol	88-75-5	1	µg/L	<1.0	5 µg/L	76.4	48	100
EP075(SIM): 2.4-Dimethylphenol	105-67-9	1	µg/L	<1.0	5 µg/L	71.8	49	99
EP075(SIM): 2.4-Dichlorophenol	120-83-2	1	µg/L	<1.0	5 µg/L	68.5	53	105
EP075(SIM): 2.6-Dichlorophenol	87-65-0	1	µg/L	<1.0	5 µg/L	80.6	57	105
EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	1	µg/L	<1.0	5 µg/L	67.1	53	99
EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	1	µg/L	<1.0	5 µg/L	81.4	50	106
EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	1	µg/L	<1.0	5 µg/L	74.4	51	105
EP075(SIM): Pentachlorophenol	87-86-5	2	µg/L	<2.0	10 µg/L	39.2	10	95
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1892357)								
EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	5 µg/L	73.7	50	94
EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	5 µg/L	85.9	64	114
EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	5 µg/L	78.0	62	113
EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	5 µg/L	90.5	64	115
EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	5 µg/L	80.3	63	116
EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	5 µg/L	75.4	64	116

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report		
					Spike	Spike Recovery (%)	Recovery Limits (%)
				Result	Concentration	LCS	Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1892357) - continued								
EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	5 µg/L	101	64	118
EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	5 µg/L	89.4	63	118
EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	5 µg/L	69.4	64	117
EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	5 µg/L	69.0	63	116
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	5 µg/L	75.3	62	119
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	5 µg/L	83.4	63	115
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	5 µg/L	87.7	63	117
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	5 µg/L	81.8	60	118
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	5 µg/L	77.4	61	117
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	1	µg/L	<1.0	5 µg/L	75.6	59	118
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1892355)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	2000 µg/L	97.9	76	116
EP071: C15 - C28 Fraction	----	100	µg/L	<100	3000 µg/L	99.4	83	109
EP071: C29 - C36 Fraction	----	50	µg/L	<50	2000 µg/L	82.5	75	113
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1893192)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	95.8	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1892355)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	2500 µg/L	97.4	76	114
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	3500 µg/L	88.8	81	111
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	1500 µg/L	83.6	77	119
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1893192)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	98.0	75	127
EP080: BTEXN (QCLot: 1893192)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	99.7	70	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	102	69	123
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	104	70	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	103	69	121
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	104	72	122
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	107	70	120

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: **WATER**

Matrix Spike (MS) Report		
Spike	SpikeRecovery(%)	Recovery Limits (%)

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 1895230)							
ES1824863-001	Anonymous	EG020A-F: Arsenic	7440-38-2	1 mg/L	102	70	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	100	70	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	84.6	70	130
		EG020A-F: Copper	7440-50-8	1 mg/L	89.4	70	130
		EG020A-F: Lead	7439-92-1	1 mg/L	72.9	70	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	101	70	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	101	70	130
EG035F: Dissolved Mercury by FIMS (QCLot: 1895229)							
ES1824749-001	FD1	EG035F: Mercury	7439-97-6	0.01 mg/L	85.9	70	130
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 1892358)							
ES1824749-001	FD1	EP066: Total Polychlorinated biphenyls	----	10 µg/L	88.0	70	130
EP068A: Organochlorine Pesticides (OC) (QCLot: 1892356)							
ES1824749-001	FD1	EP068: gamma-BHC	58-89-9	5 µg/L	94.4	70	130
		EP068: Heptachlor	76-44-8	5 µg/L	88.8	70	130
		EP068: Aldrin	309-00-2	5 µg/L	102	70	130
		EP068: Dieldrin	60-57-1	5 µg/L	101	70	130
		EP068: Endrin	72-20-8	20 µg/L	101	70	130
		EP068: 4.4`-DDT	50-29-3	20 µg/L	100	70	130
EP068B: Organophosphorus Pesticides (OP) (QCLot: 1892356)							
ES1824749-001	FD1	EP068: Diazinon	333-41-5	5 µg/L	77.0	70	130
		EP068: Chlorpyrifos-methyl	5598-13-0	5 µg/L	85.2	70	130
		EP068: Pirimphos-ethyl	23505-41-1	5 µg/L	75.4	70	130
		EP068: Bromophos-ethyl	4824-78-6	5 µg/L	85.1	70	130
		EP068: Prothiofos	34643-46-4	5 µg/L	95.8	70	130
EP075(SIM)A: Phenolic Compounds (QCLot: 1892357)							
ES1824749-001	FD1	EP075(SIM): Phenol	108-95-2	20 µg/L	32.1	20	130
		EP075(SIM): 2-Chlorophenol	95-57-8	20 µg/L	74.9	60	130
		EP075(SIM): 2-Nitrophenol	88-75-5	20 µg/L	63.3	60	130
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	20 µg/L	74.5	70	130
		EP075(SIM): Pentachlorophenol	87-86-5	20 µg/L	53.4	20	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1892357)							
ES1824749-001	FD1	EP075(SIM): Acenaphthene	83-32-9	20 µg/L	73.4	70	130
		EP075(SIM): Pyrene	129-00-0	20 µg/L	76.5	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1892355)							
ES1824749-001	FD1	EP071: C10 - C14 Fraction	----	200 µg/L	92.3	74	150
		EP071: C15 - C28 Fraction	----	300 µg/L	118	77	153
		EP071: C29 - C36 Fraction	----	200 µg/L	126	67	153

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1893192)							
ES1824617-001	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	116	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1892355)							
ES1824749-001	FD1	EP071: >C10 - C16 Fraction	----	250 µg/L	103	74	150
		EP071: >C16 - C34 Fraction	----	350 µg/L	126	77	153
		EP071: >C34 - C40 Fraction	----	150 µg/L	111	67	153
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1893192)							
ES1824617-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	118	70	130
EP080: BTEXN (QCLot: 1893192)							
ES1824617-001	Anonymous	EP080: Benzene	71-43-2	25 µg/L	117	70	130
		EP080: Toluene	108-88-3	25 µg/L	116	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	119	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	118	70	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	119	70	130
		EP080: Naphthalene	91-20-3	25 µg/L	109	70	130

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES1824749**	Page	: 1 of 5
Client	: **ENVIRONMENTAL EARTH SCIENCES**	Laboratory	: Environmental Division Sydney
Contact	: MS TANYA STANTON	Telephone	: +61-2-8784 8555
Project	: 118085	Date Samples Received	: 22-Aug-2018
Site	: Lewisham	Issue Date	: 29-Aug-2018
Sampler	: NE	No. of samples received	: 1
Order number	:	No. of samples analysed	: 1

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 Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **Analysis Holding Time Outliers exist - please see following pages for full details.**

Outliers : Frequency of Quality Control Samples

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

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method / Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
MM625: Salmonella - VIDAS (absence / presence)						
Sterile Plastic Jar - Sodium Thiosulfate						
FD1	----	----	----	23-Aug-2018	22-Aug-2018	**1**

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: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Natural (EG020A-F)							
FD1	**21-Aug-2018**	**----**	----	----	**24-Aug-2018**	17-Feb-2019	✓
EG035F: Dissolved Mercury by FIMS							
Clear Plastic Bottle - Natural (EG035F)							
FD1	**21-Aug-2018**	**----**	----	----	**24-Aug-2018**	18-Sep-2018	✓
EP066: Polychlorinated Biphenyls (PCB)							
Amber Glass Bottle - Unpreserved (EP066)							
FD1	**21-Aug-2018**	**23-Aug-2018**	28-Aug-2018	✓	**24-Aug-2018**	02-Oct-2018	✓
EP068A: Organochlorine Pesticides (OC)							
Amber Glass Bottle - Unpreserved (EP068)							
FD1	**21-Aug-2018**	**23-Aug-2018**	28-Aug-2018	✓	**24-Aug-2018**	02-Oct-2018	✓
EP068B: Organophosphorus Pesticides (OP)							
Amber Glass Bottle - Unpreserved (EP068)							
FD1	**21-Aug-2018**	**23-Aug-2018**	28-Aug-2018	✓	**24-Aug-2018**	02-Oct-2018	✓
EP075(SIM)A: Phenolic Compounds							
Amber Glass Bottle - Unpreserved (EP075(SIM))							
FD1	**21-Aug-2018**	**23-Aug-2018**	28-Aug-2018	✓	**24-Aug-2018**	02-Oct-2018	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP075(SIM))							
FD1	**21-Aug-2018**	**23-Aug-2018**	28-Aug-2018	✓	**24-Aug-2018**	02-Oct-2018	✓

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071)							
FD1	**21-Aug-2018**	**23-Aug-2018**	28-Aug-2018	✓	**24-Aug-2018**	02-Oct-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
FD1	**21-Aug-2018**	**23-Aug-2018**	04-Sep-2018	✓	**23-Aug-2018**	04-Sep-2018	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071)							
FD1	**21-Aug-2018**	**23-Aug-2018**	28-Aug-2018	✓	**24-Aug-2018**	02-Oct-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
FD1	**21-Aug-2018**	**23-Aug-2018**	04-Sep-2018	✓	**23-Aug-2018**	04-Sep-2018	✓
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080)							
FD1	**21-Aug-2018**	**23-Aug-2018**	04-Sep-2018	✓	**23-Aug-2018**	04-Sep-2018	✓
MM625: Salmonella - VIDAS (absence / presence)							
Sterile Plastic Jar - Sodium Thiosulfate (MM625)							
FD1	**21-Aug-2018**	**----**	----	----	**23-Aug-2018**	22-Aug-2018	×
MW008: Faecal Coliforms & E.coli by MPN							
Sterile Plastic Bottle - Sodium Thiosulfate (MW008)							
FD1	**21-Aug-2018**	**----**	----	----	**22-Aug-2018**	22-Aug-2018	✓

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: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Dissolved Mercury by FIMS	EG035F	1	2	**50.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	2	**50.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	4	**25.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	3	**33.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	2	**50.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	3	**33.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Dissolved Mercury by FIMS	EG035F	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Dissolved Mercury by FIMS	EG035F	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Dissolved Mercury by FIMS	EG035F	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

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.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) Samples are 0.45µm filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Polychlorinated Biphenyls (PCB)	EP066	WATER	In house: Referenced to USEPA SW 846 - 8270D Sample 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)
Pesticides by GCMS	EP068	WATER	In house: Referenced to USEPA SW 846 - 8270D Sample 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)
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	In house: Referenced to USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
Salmonella - VIDAS (absence / presence)	MM625	WATER	Microbiological analysis subcontracted to ALS Scoresby (NATA Accredited Laboratory No. 992).
Thermotolerant Coliforms & E.coli by MPN	MW008	WATER	AS 4276.6 - 2007

Preparation Methods	Method	Matrix	Method Descriptions
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

CHAIN OF CUSTODY - ANALYSIS REQUEST FORM

Job No: 118085 | Laboratory: ALS

Project Manager: TS | Sampler: NE | Site Location: Lewisham | **Sheet:** 1 of 1

No. of samples	Sample ID/ Depth	Anticipated Result (PID)/EC reading	Date sampled	Time sampled	Sample Matrix: Soil	Water	Sediment	Analysis Required: W-19	Salmonella	Ecoli	Sample-specific instructions/ notes
1	FD1		21/08/2018			x		x	x	x	Please filter 500mL plastic bottle (or allocated metals bottle) before analysis for dissolved metals. They have not been field filtered.
	TOTAL										

Environmental Division
Sydney
Work Order Reference
ES1824749

Telephone : +61-2-8784 8555

Salmonella/ ALS Scoresby

Subcon / Forward Lab / Split WO:
Lab / Analysis: ALS
Organised By / Date:
Relinquished By / Date:
Connote / Courier:
WO No: ES1824749
Attached By PO / Internal Sheet:

URGENT

Turn Around *(circle)*: **Standard**

Comments/ Instructions:

Lab Quotation No. *(if applicable)*:

Send report to *(email address)*: neldridge@eesigroup.com

Cc: report to *(email address)*: tstanton@eesigroup ; mbressan@eesigroup.com

Cc: invoice to *(email address)*: accounts@eesigroup.com

	Name	Signature	Date	Time
Sent off Site/Office by:	Natalie Eldridge	Eldredge	22/08/2018	
Receiving Lab:	ALS Rasilca	per	24/8/18	11:35am
Receiving Lab:				

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED
Phone: (02) 9922 1777
Fax: (02) 9922 1010
PO Box: 380, North Sydney NSW 2059
Email: eesNSW@eesigroup.com

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

APPENDIX E: PAH SOURCE ANALYST RESULTS

PAH Source Analyst

Method 1:

Correlation Coefficient

Key:
- **Very Good** (>0.95)
- **Good** (0.85-0.95)
- **Reasonable** (0.75-0.85)
- **Poor** (<0.75)

Reference Material	BH1	BH8
Black Coal Tar 1	0.21	0.24
Black Coal Tar 2	0.69	0.69
Black Coal Tar 3	**0.96**	**0.97**
Brown Coal Tar	-0.16	-0.15
Steelworks Tar 1	0.59	0.63
Steelworks Tar 2	0.47	0.48
Weathered Coal Tar	0.52	0.56
Creosote 1	0.53	0.56
Creosote 2	0.13	0.15
Weathered Creosote	0.61	0.64
Ash form Black Coal 1	**0.95**	**0.93**
Ash from Black Coal 2	**0.99**	**0.99**
Ash from Black Coal 3	**0.95**	**0.93**
Ash from Brown Coal	**0.95**	**0.92**
Bitumen	0.17	0.14
Coke	**0.97**	**0.94**
Waste Oil Petrol	0.5	0.45
Waste Oil Diesel	**0.76**	0.71
Roadseal	**0.92**	**0.93**

Method 2:

Pyrene Normalised, Summed Difference

Key:
- **Very Good** (<1)
- **Good** (1-2)
- **Reasonable** (2-3)
- **Poor** (>3)

Reference Material	BH1	BH8
Black Coal Tar 1	9.02	8.64
Black Coal Tar 2	**2.76**	**2.7**
Black Coal Tar 3	**1.54**	**1.32**
Brown Coal Tar	15.94	15.9
Steelworks Tar 1	4.03	3.73
Steelworks Tar 2	4.03	3.9
Weathered Coal Tar	4.49	4.64
Creosote 1	6.54	6.45
Creosote 2	9.53	9.53
Weathered Creosote	4.75	4.68
Ash form Black Coal 1	**1.38**	**1.79**
Ash from Black Coal 2	**0.53**	**0.89**
Ash from Black Coal 3	**1.23**	**1.54**
Ash from Brown Coal	**1.44**	**1.82**
Bitumen	11.19	10.98
Coke	**0.91**	**1.24**
Waste Oil Petrol	4.81	5.18
Waste Oil Diesel	3.18	3.71
Roadseal	**1.74**	**1.85**

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

APPENDIX F: STATISTICAL OUTPUT

UCL Statistics for Carcinogenic PAHs within soil

General Statistics

Total Number of Observations	14	Number of Distinct Observations	11
		Number of Missing Observations	0
Minimum	0.172	Mean	1.448
Maximum	7.24	Median	0.587
SD	1.997	Std. Error of Mean	0.534
Coefficient of Variation	1.379	Skewness	2.242

Normal GOF Test

Shapiro Wilk Test Statistic	0.691	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.874	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.262	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.226	Data Not Normal at 5% Significance Level	

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	2.393	95% Adjusted-CLT UCL (Chen-1995)	2.668
		95% Modified-t UCL (Johnson-1978)	2.447

Gamma GOF Test

A-D Test Statistic	0.728	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.769	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.205	Kolmogorov-Smirnov Gamma GOF Test	
5% K-S Critical Value	0.237	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.778	k star (bias corrected MLE)	0.659
Theta hat (MLE)	1.862	Theta star (bias corrected MLE)	2.199
nu hat (MLE)	21.77	nu star (bias corrected)	18.44
MLE Mean (bias corrected)	1.448	MLE Sd (bias corrected)	1.785
		Approximate Chi Square Value (0.05)	9.711
Adjusted Level of Significance	0.0312	Adjusted Chi Square Value	8.881

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	2.751	95% Adjusted Gamma UCL (use when n<50)	3.000

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.895	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value	0.874	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.178	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0.226	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-1.76	Mean of logged Data	-0.396
Maximum of Logged Data	1.98	SD of logged Data	1.283

Assuming Lognormal Distribution

95% H-UCL	4.931	90% Chebyshev (MVUE) UCL	2.994
95% Chebyshev (MVUE) UCL	3.717	97.5% Chebyshev (MVUE) UCL	4.722
99% Chebyshev (MVUE) UCL	6.695		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	2.326	95% Jackknife UCL	2.393
95% Standard Bootstrap UCL	2.31	95% Bootstrap-t UCL	3.765

95% Hall's Bootstrap UCL	6.343	95% Percentile Bootstrap UCL	2.415
95% BCA Bootstrap UCL	2.722		
90% Chebyshev(Mean, Sd) UCL	3.049	95% Chebyshev(Mean, Sd) UCL	3.775
97.5% Chebyshev(Mean, Sd) UCL	4.781	99% Chebyshev(Mean, Sd) UCL	6.758

Suggested UCL to Use

95% Adjusted Gamma UCL	3.000

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.