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ENVIRONMENTAL SITE ASSESSMENT

(Targeted Phase II Site investigation)

173 Kinghorne Street, NOWRA NSW

PREPARED FOR:	Bill Zervos
OUR REFERENCE:	REP-277015-A
ISSUE DATE:	1st March 2016

CONTROLLED DOCUMENT

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EXECUTIVE SUMMARY

Envirotech Pty Ltd has been commissioned by Bill Zervos to undertake a targeted Phase 2 Contamination Assessment for the proposed development of residential complex with single level basement located at 173 Kinghorne Street, NOWRA NSW (hereafter referred to as the site). The site covers a total area of approximately 3500 m2 and situated within the local government area of Shoalhaven City Council. The area of investigation has targeted areas around the UPSS Tank, fuel bowser and across the open access areas across the rest of the site. The proposed development is considered as a residential site with minimal opportunities for soil access (HIL B) in regards to the appropriate Health Investigation Levels (HILs).

A sampling plan to address the areas of concern was established including eighteen (18) surface and subsurface samples for 8 Metals and hydrocarbons including (BTEX, PAH's, Phenols and TPH). The eighteen (18) samples are 100% of the recommended sampling density for the size of the subject investigation area. This was to gain an accurate reflection of the characterisation of the earthworks and residual soil as specified within the NSW EPA Sampling Design Guidelines (1994). It is considered the sampling design is considered adequate as all areas of concern located within the area of investigation have been addressed as per NSW EPA Sampling Design Guidelines (1994). Samples were taken down to depth of up to 3m below the ground level.

Soil sample results were compared to the Health Investigation Levels (HILs) Guidelines and Ecological Screening Levels (ESLs) for standard residential allotments (NEPM 2013). Chemically the results meet the criteria of the Health Investigation Limits for all of the analysed contaminants across the site.

In relation to the area of investigation this area is deemed suitable for the proposed development.

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1. INTRODUCTION

1.1 General

Envirotech Pty Ltd has been commissioned by Bill Zervos to undertake a targeted Phase 2 Contamination Assessment for the proposed development of residential complex with single level basement located at 173 Kinghorne Street, NOWRA NSW (hereafter referred to as the site). The site covers a total area of approximately 3500 m2 and situated within the local government area of Shoalhaven City Council. The area of investigation has targeted areas around the UPSS Tank, fuel bowser and across the open access areas across the rest of the site. The proposed development is considered as a residential site with minimal opportunities for soil access (HIL B) in regards to the appropriate Health Investigation Levels (HILs).

The proposed site is occupied by car service and there is a fuel browser and underground fuel tank at the site which possess the potential risk for contamination. In accordance with the provisions of State Environmental Planning policy, Council requests a Phase 2 Site Assessment to demonstrate that the land is suitable for residential complex development.

Soil sampling and analysis were undertaken using the NEPM 2013 guidelines and the NSW EPA technical note investigation of service station sites with a sampling density of 100% of the recommended sampling density. Results were then compared against appropriate guidance values including Health Investigation Levels (HILs) and Ecological Investigation Levels (EILs). The following report outlines the findings.

1.2 Objectives

The objectives of the investigation were to:

- Identify all past and present potentially contaminating activities;
- Identify potential contaminants of concern;
- Assess the site in the context of the proposed development against the Health Investigation Levels (HILs) within the National Environmental Protection Measures (amended 2013),
- Determine the extent of contamination (if present),
- Undertake limited site characterization and 100% sampling for identified potential contaminants,
- Draw conclusions regarding the suitability of the site for its proposed use.

1.3 Scope of Work

The **Scope of Works** included the following:

- Completion of a specialized Safety, Health & Environment Work Method Statement (SH&EWMS);
- Site inspection and investigations by an experienced environmental scientist;
- Collection of subsurface eighteen (18) samples from a total of fourteen (14) drilled boreholes using hydraulic rig to depth down to 3 m of the soil surface;
- Cold storage of all samples collected;
- Submission to a NATA Accredited laboratory for analysis under chain of custody conditions;
- Laboratory analysis of eighteen (18) samples for 8 Metals and hydrocarbons including (BTEX, PAH's, Phenols and TPH).
- Preparation of a report outlining the investigation methodology, interpretation of the site data (results), and conclusions.

1.4 Legislative Requirements

The investigation was conducted in accordance with:

- *Guidelines for Consultants Reporting on Contaminated Sites*, NSW EPA, 2000.
- *Assessment of Site Contamination, National Environment Protection Measure, 2013 amendment.*
- Australian Standard AS 4482.1 *Guide to the sampling and investigation of potentially contaminated soil. Part 1: Non-volatile and semi-volatile compounds.*
- Australian Standard AS 4482.2 *Guide to the sampling and investigation of potentially contaminated soil. Part 2: Volatile substances.*
- *Sampling Design Guidelines* – NSW EPA, 1995.
- *Waste Classification Guidelines Part 1: Classifying Waste,* DECC, 2009.
- *Guidelines for the Assessment and Management of Groundwater Contamination*, NSW DEC, 2007.
- *Technical Note: Investigation of Service Station Sites*, NSW EPA, 2014.

1.5 Report overview

This report should be read as a complete document and should not be read in sections. Each section is to be read concurrently with the rest of the report including any appendices.

A summary of the site specific details are provided in Table 1 below:

Table 1. Site specific details

Site specific details	
Site Address	173 Kinghorne Street, NOWRA
Date of field work	20/02/2016
Investigation area	Area around UPSS Tank, fuel bowser, following fuel line and across the open access areas across the rest of the site
Local Government Area	Shoalhaven City Council
Proposed Development	Residential complex with single level basement
Sample size	eighteen (18) samples for 8 Metals and hydrocarbons including (BTEX, PAH's, Phenols and TPH)

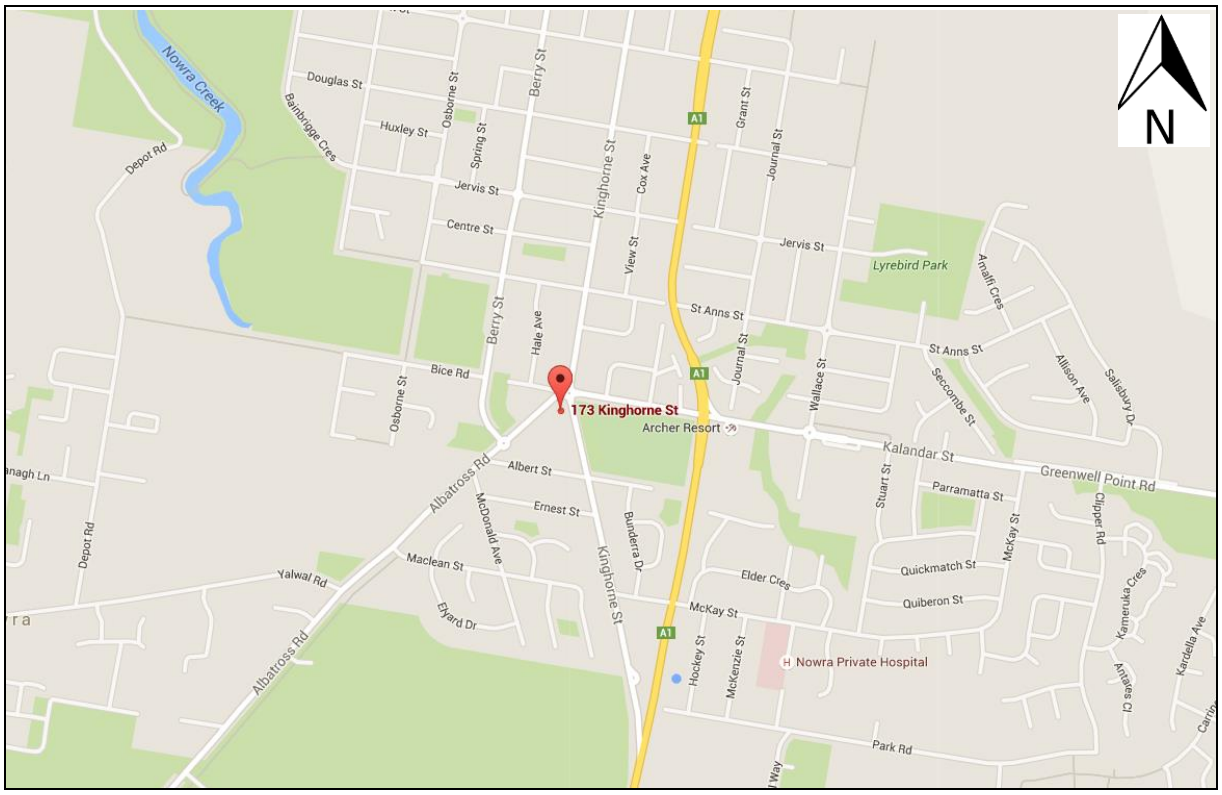

Figure 1. Site location map (sourced from http://www.google.com.au/maps, accessed on the 11/02/2016)

Figure 2. Aerial Image location of boreholes, sample type and locations.

2. LEGISLATIVE FRAMEWORK AND ASSESSMENT GUIDELINES

2.1 Contaminated Land Management Act (1997)

In 1997 the NSW Government introduced the CLM Act. This act has been amended by the *Contaminated Land Management Amendment Act* (2008). The CLM Act 1997, associated regulations, *State Environmental Planning Policy No.55* (1997) and NSW OEH guidelines, were designed to provide uniform state-wide control of the management, investigation and remediation of contaminated land.

Prior to granting consent for any proposed rezoning or development, SEPP55 requires the consent authority to:

- Consider whether the land is contaminated;
- Consider whether the site is suitable, or if contaminated, can be made suitable by remediation, for the proposed land use; and
- Be satisfied that remediation works will be undertaken prior to use of the site for the proposed use.

Should the assessment indicate that the site poses a risk to human health or the environment, remediation of the site may be required prior to occupation of the proposed development. SEPP55 requires that the relevant local council be notified of all remediation works, whether or not development consent is required. Where development consent is not required, 30 days written notice of the proposed works must be provided to council.

Details of validation of remediation work must also be submitted to Council within one month of completion of remediation works. The consent authority may request that a site audit be undertaken during, or following the completion of the site assessment process.

Under the terms of the CLM Act 1997 the NSW OEH Site Auditor Scheme was developed to provide a system of independent review for assessment reports. An accredited Contaminated Site Auditor is engaged to review reports prepared by suitably qualified consultants to ensure that the investigation has been undertaken in accordance with the guidelines and confirm that the sites are suitable for their intended use.

Section 59(2) of the CLM Act 1997 states that specific notation relating to contaminated land issues must be included on Section149 (s149) planning certificates prepared by Council where the land to which the certificate relates is:

- Within an investigation or remediation area;
- Subject to an investigation or remediation order by the OEH;
- The subject of a voluntary investigation or remediation proposal; and/or
- The subject of a site audit statement.

Submission of contaminated site investigation and validation reports to council as part of rezoning or development application submissions may also result in notation of actual or potential site contamination on future s149 certificates prepared for the site. Section 60 of the CLM Amendment Act 2008 sets out a positive duty on a land owner, or person whose activities have caused contamination, to notify the OEH if they are or become aware that contamination exists on a site that generally poses "*an unacceptable risk to human health or the environment, given the site's current or approved use*". This duty to report is based on trigger values, above which notification is required.

2.2 The National Environmental Protections Measure

The National Environmental Protections Measures are a set of national environmental objectives negotiated by agreement between the Commonwealth and the Australian states and territories through the Council of Australia Governments (COAG). Each measure is supported by model legislation at the Commonwealth level then incorporated into state and territory jurisdiction. The measures focus on environmental issues that have a trans-boundary dimension where uniformity between jurisdictions is desirable.

Asbestos characterization and contamination assessment is a new focus of the NEPM, which addresses asbestos characterisation in the context of soil contamination. The inclusion of a specific asbestos assessment method (Vol 2, s 4; Vol'3, s 11) is based largely on Western Australia's asbestos soil guidelines and may also provide a useful compliance guide for the day to day management of site operations. The NEPM approach is very pragmatic with the primary method being based on inspection of visual fragments on the soil surface from materials that commonly contain asbestos, including cement sheeting and piping and components of electrical equipment such as power boards.

The NEPM also provides updated Health Investigation Levels (HILs) and Ecological Investigation Levels (EILs). Excerpts of HILS and EILs are provided below (NEPM 2013).

Health Investigation Levels (HILs) for Soil Contaminants are detailed in Appendix II – Health Investigation Levels (HILs) & Ecological Investigation Levels (EILs).

3. ENVIRONMENTAL CHARACTERISTICS OF THE SITE

The following summarizes details of the sites environmental characteristics, compiled during the initial Phase 1 assessment.

3.1 Topography and Geology

The Soil Landscape Map of Kiama (Soil Landscape Series, Scale 1:100,000, 9028), prepared by the Soil Conservation of NSW, indicates that the site is located within the Nowra landscape area which is associated within the Nowra sandstone formation and consists of sandy topsoil and clayey sand, light clay and sandy clay subsoil. These soils are with rock outcrop, stoniness, low permeability, and low wet bearing strength.

Topography of these landscape is characterised by moderately to gently undulating rises to low hills on Nowra sandstone with slopes less than 5%. However, the proposed site is located over a gently southerly facing sloping with slope of about 2%-4%.

The Geological Map of Wollongong (Geological Series Sheet SI/56-09, Scale 1:250,000), published by the Department of Industry Resources and Energy, indicates the residual soils within the site to be underlain by Nowra sandstone, which is part of the Shoalhaven Group and comprises Quartz sandstone.

3.2 Surface Water Hydrology

Since the proposed site is mainly paved by concrete slabs, stormwater run-off and surface water is anticipated to flow down the normal topography towards drainage system and infiltrate into sub soil profile.

3.3 Hydrogeology

A site-specific groundwater analysis was outside the scope of this assessment. A search carried out through the DNR website found no bores within a 500m radius of area of investigation. However, the reginal groundwater in the vicinity of the site is expected to be confined or partly confined water- bearing zones within the bedrock formation, considering the proximity of Nowra Creek (approximately 88m to the west) groundwater may also be found within the soil profile.

3.6 Receptors and Sensitive Environments

The closest environmental receptors include native vegetation within the site, the green area at immediate east and west of the site and woodlands approximately 88m to the west. Also, Nowra Creek to the west of the site has potential to be a sensitive environment. Occupants of the proposed property, the surrounding residential properties and construction contractors during the construction process are the main receptors for the site.

4. METHODOLOGY

4.1 Site Conceptual Model

4.1.1 Contaminants of Concern (COC)

Results obtained from council correspondence indicated that the primary area of concern is as follows:

- The area around UPSS Tank,
- The area around bowser/dispenser, and
- The open access areas across the rest of the site.

4.1.2 Exposure and receptors

Based upon the potential types of chemicals present at the site and the media in which the chemicals are present, the following mechanisms for chemical transport have been identified for the site:

- leaching of contaminants of potential concern from soil into ground water;
- Transport of contaminants of potential concern in ground water via ground water flow; and
- Transport of contaminants of potential concern via overland flow and divert to stormwater system.

The following potential human exposure routes for chemicals have been identified for the site:

- Dermal contact inhalation and incidental ingestion of soil particulates.

These have the potential to affect both construction workers during the construction phase, and users of the industrial facility upon completion of the works.

The site ground water is not currently used for or planned to be used for domestic purposes in the future.

In regards to potential ecological exposure routes for chemicals it is not expected that any species with the exception of localized birds would be exposed to potential contaminants, this would be limited to the soil on the surface of the site except for during works which will disturb the soil.

4.2 Sampling and Analysis Plan

A sampling plan to address the areas of concern was established including eighteen (18) surface and subsurface samples for 8 Metals and hydrocarbons including (BTEX, PAH's, Phenols and TPH). The eighteen (18) samples are 100% of the recommended sampling density for the size of the subject investigation area. This was to gain an accurate reflection of the characterisation of the earthworks and residual soil as specified within the NSW EPA Sampling Design Guidelines (1994). It is considered the sampling design is considered adequate as all areas of concern located within the area of

investigation have been addressed as per NSW EPA Sampling Design Guidelines (1994). Samples were taken down to depth of up to 3m below the ground level.

4.3 Documentation

A field observation log was kept by sampling personnel. Details recorded in the log included:

- Location and sample number;
- Soil profile notes;
- Sampling method;
- Sample identification;
- Sample description; and
- Sample point measurements.

A comprehensive master sample register was maintained. As samples were received, they were given a unique sequential number from the sample register into which details from the labels were entered. Before packing and dispatch of samples for analysis, a Chain of Custody form was completed. This form recorded details of the individual samples being dispatched and the type of analysis required for each sample.

A total of eighteen (18) samples were submitted to The Australian Laboratory Services Pty Ltd, a NATA accredited laboratory for analytical testing. A copy of the completed Chain of Custody forms were retained on the Central Filing System and the original was sent to the analytical laboratory together with the samples.

4.4 Soil Sampling Program

Since the proposed residential development comprises single level basement, samples were to be collected at a depth of 0.0 – 3.0 m and samples sent for analysis at a NATA accredited laboratory. A total of eighteen (18) samples for metals and hydrocarbons were allowed for in the scope of works. The area around the existing UPSS Tank and fuel bowser were targeted at a greater density as per guidelines.

Samples from the bored holes via hydraulic rig were collected using a clean plastic glove for each sample and placed in glass jars with plastic caps and teflon seals with minimal headspace. The samples were labelled with the job number, sampling location, sampling depth and date.

During the investigation, soil samples were preserved by immediate storage in an insulated sample container with ice in accordance with AS 4482.1-200528 and AS 4482.2-199929. The original Chain of Custody form was enclosed in the Esky that was then sealed and dispatched to a NATA accredited analytical laboratories.

Standard decontamination procedures were undertaken before collecting each of the samples to avoid the possibility of cross-contamination. The soil sampling equipment and items likely to come into contact with soil samples were thoroughly washed. Due care was taken with the disposal of any washings and residues from such cleaning operations.

4.5 Laboratory Analysis

All samples collected were submitted to Australian Laboratory Services PTY LTD for the analytical techniques required.

Eighteen (18) samples of soil were tested for a range of analytes including:

- 8 Metals
- TRH
- BTEX,
- PAH,
- Phenols

The sampling and analytical program is outlined below in **Table 2 and 3.**

Refer to **Appendix II – Analytical Results** for the analytical methods used by The Environmental OH&S Laboratory.

4.6 Sampling Plan, Methodology and Investigation Pattern

Eighteen (18) soil samples were collected for chemical analysis. All samples were collected based on a judgmental pattern. Refer to **Figure 2** for sampling locations.

Test pits 1 through 4 had two samples taken from them. These samples were concentrated around the four aspects of the decommissioned UPSS tank.

Table 2: Soils sample ID, depth, and targeted contaminants for stockpile spread area

Sample ID	Depth	Contaminants
1, 2, 3, 4	Subsurface samples Approx. 1.5 m bgl Subsurface samples Approx. 3.0 m bgl	Heavy metals, BTEXN, PAH, TRH, Phenols

Table 2: Soils sample ID, depth, and targeted contaminants for stockpile spread area

Sample ID	Depth	Contaminants
5, 8, 11, 13 **7, 10, 12, 14** **6, 9**	Subsurface samples Approx. 50 cms bgl Subsurface samples Approx. 1.5 m bgl Subsurface samples Approx. 2.5 m bgl	Heavy metals, BTEXN, PAH, TRH, Phenols

5. ASSESSMENT CRITERIA

5.1 National Environmental Protection Measure (Amended 2013)

The soil samples collected were assessed against the Health Investigation Levels (HILs) for a standard residential allotment i.e. HIL A outlined within the *National Environmental Protection Measure.*

Ground water was not assessed in the investigation as it was not considered relevant to the scope of works in regards to the proposed depth of excavation or expected depth of local groundwater.

5.2 Data Quality Objectives:

Table 4 provides a list of the data quality indicators adopted for this Phase 2 contamination assessment and the methods used to ensure quality indicators were met.

Table 3. QA/QC Evaluation

Data Quality Indicator	• **Method(s) of Achievement**
Data Precision and Accuracy	• Use of qualified field staff for sampling and investigation. • Appropriate sampling method used, minimising the opportunity for cross-contamination. This included the decontamination of sampling equipment using Decon 90 (phosphate free detergent) followed by rinsing with potable water. • Use of analytical laboratories (ALS) experienced in the analyses undertaken, with appropriate NATA accreditation. NATA accreditation requires use of adequately trained and experienced analytical staff. • Appropriate and validated laboratory test methods used. • Adequate laboratory performance based on results of the blank samples, matrix spike samples, control samples, duplicates and surrogate spike samples.
Data Representativeness	• Coverage of the identified potential contaminants, based on history, site activities and site features. • Adequate laboratory internal quality control and quality assurance methods, complying with the NEPM.
Data Quality Indicator	• **Method(s) of Achievement**
Documentation Completeness	• Preparation of a sample location plan and chain of custody records. • Laboratory sample receipt information received confirming receipt of samples intact and appropriateness of the chain-of-custody. • NATA accredited laboratories results certificates provided.
Data Completeness	• Review of documented information pertaining to site history. • Analysis for potential contaminants.
Data Comparability	• Using appropriate techniques for sample recovery given

	access and sampling limitations. • Experienced sampler used. • Using appropriate sample storage and transportation methods. • Use of NATA accredited laboratories. • Test methods consistent for each sample.

Based on the above information, the current assessment has generally achieved the quality assurance and quality control data quality indicators. As such, it is concluded that the laboratory test data obtained are reliable and useable for this assessment.

The results of the assessment of laboratory QA/QC are shown in Appendix III. Chain of Custody is provided in Appendix III.

6. RESULTS

The following table presents the calculations of the Maximum concentration detected, Average concentration detected, and where appropriate (if adequate sample numbers are available) arithmetic average contaminant concentration of only those analytes that returned unacceptable test results. A 95% UCL implies that there is a 95% probability that the true arithmetic average contaminant concentration within the sampling area will not exceed the value determined by this method.

For the site to be considered uncontaminated, the typical minimum requirement is that the 95% upper confidence limit of the arithmetic average concentration of the contaminants is less than the acceptable limit. Highlighted results indicate breaches of HILs or EILs.

7.1 Health Investigation Levels and Ecological Investigation Levels (EILs)

Table 3 below provides a comparative analysis of the soil sampling results, weighed against acceptable limits for HILs – HIL B Residential with minimal opportunities for soil access such as apartments.

The laboratory reports are presented in Appendix II. The results have been assessed against the NEPM Guidelines, adopted for this investigation.

Table 4. **Summary of results from site investigation**

Analyte	NSW DEC Health-based Investigation Levels, HIL D (mg/kg)	Ecological Screening Level – urban residential and public open space	Maximum concentration detected (mg/kg)	Average concentration detected (mg/kg)	95% UCL	Acceptability
Metals and inorganics						
Arsenic	**500**	N/A	16	9	N/A	**Acceptable**
Cadmium	**150**	N/A	ND	ND	N/A	**Acceptable**
Chromium (IV)	**500**	N/A	36	25	N/A	**Acceptable**
Copper	**30 000**	N/A	27	13	N/A	**Acceptable**
Lead	**1200**	N/A	90	18	N/A	**Acceptable**
Mercury	**120**	N/A	0.1	0.1	N/A	**Acceptable**
Nickel	**1200**	N/A	10	4	N/A	**Acceptable**
Zinc	**60 000**	N/A	54	41.6	N/A	**Acceptable**
Total Recoverable Hydrocarbons (TRH) – Direct Contact						
TPH C6-C10	**5600**	215	ND	ND	N/A	**Acceptable**
TPH C10-C16	**4200**	170	ND	ND	N/A	**Acceptable**
TPH C16-C34	**5800**	2500	770	153	N/A	**Acceptable**
TPH C34-C40	**8100**	2500	130	104	N/A	**Acceptable**
C10-C40 Fraction (sum)	**18 100**	5170	770	137	N/A	**Acceptable**
BTEX – Direct contact						
Benzene	**140**	95	ND	ND	N/A	**Acceptable**
Toulene	**21 000**	135	ND	ND	N/A	**Acceptable**
Ethylbenzene	**5900**	185	ND	ND	N/A	**Acceptable**
Xylenes (total)	**17000**	95	ND	ND	N/A	**Acceptable**
Polyaromatic Hydrocarbons (PAHs)						
Benzo(a)pyrene	**4**	**1.4**	1.2	1.2	N/A	**Acceptable**
"Carcinogenic PAHs (as BaP TEQ)"	**4**	N/A	1.2	1.2	N/A	**Acceptable**
Total PAH	**400**	N/A	ND	ND	N/A	**Acceptable**
Dieldrin	**10**	N/A	ND	ND	N/A	**Acceptable**
Chlordane	**90**	N/A	ND	ND	N/A	**Acceptable**

Table 4. Continued…

Analyte	NSW DEC Health-based Investigation Levels, HIL D (mg/kg)	Ecological Screening Level Commercial and Industrial	Maximum concentration detected (mg/kg)	Average concentration detected (mg/kg)	95% UCL	Acceptability
Phenolic Compounds						
Phenol	**45 000**	N/A	ND	ND	N/A	**Acceptable**

ND = Non Detect
N/A = Not Applicable

7. DISCUSSION

7.1 Field Observations

During the course of the field investigation no building materials were seen within the soil samples. There was some visible and olfactory signs of hydrocarbon noted during the investigation within some of the samples. Just under the slab onsite was a layer of asphalt.

7.2 Chemical analysis - Health Investigation Levels (HILs) & Health Screening Levels (HSLs)

All areas required for the contamination assessment of heavy metals and hydrocarbons analysis, indicated chemical concentrations below the relevant health Investigation levels. These results indicate that those areas identified as having the potential for contamination were determined to be acceptable chemically. The results returning acceptable concentrations for the proposed land use within areas of concern which had been identified. It appears that the site from a chemical analysis is appropriate for the proposed land use.

7.3 Ecological Screening Levels (ESLs)

Analysis of Site Specific Ecological Screening Levels, across the site recorded no exceedances of the Ecological Screening Levels (EILs).

7.4 Past Reports

Network Geotechnics Pty Ltd: W21195/1-A, 03/10/2001

Focusing on the contamination section of the past report. Testing was focused around the UPSS within two boreholes and was conducted down to 1m of depth. The contaminated analysed in the past report where lead, TPH and BTEX. The lead levels within the past report are comparable to the lead levels reported within the current report. The BTEX levels where the same in both reports with no detectable limits. TPH levels within the past report where slightly higher than the TRH levels within the current report. One of the samples spiked significantly within the past report but if

matched to relevant NEPM 2013 HILs the level would still be acceptable for the proposal. Several hypothesis can be suggested for the increase in TPH levels. The older report was conducted in 2001. Some bioremediation may have occurred within this time if there where areas of oxygen under the slab. Reporting has changed from TPH to TRH since NEPM 2013 release including HIL levels. Also the past report only tested to 1m bgl. The current report as specified within the guidelines tested to up to 3m bgl.

7.5 Waste Classification

Based on the contaminates analysed the waste classification for the underlying soil can be classified as general solid waste. This is based on Table 1: CT1 & CT2 values for classifying waste by chemical assessment without the TCLP test, within the waste classification guidelines.

8. RECOMMENDATIONS – UPSS TANK DECOMMISSION AND REMOVAL

It is recommended that the decommissioned UPSS tank be removed and disposed off site. The NSW EPA UPSS Technical Note: Decommissioning, abandonment and removal of UPSS shall be used as a guideline for the removal of the UPSS tank. Removal of the tank must be undertaken in accordance with NSW legislation and guidance, relevant Australian Standards and applicable work health and safety legislation.

9 CONCLUSIONS

EnviroTech Pty. Ltd. has been engaged by the client to undertake a Phase 2 Contamination Assessment for the site of the proposed development in line with the scope detailed in section 1.3 of the body of this report.

Soil sample results were compared to the Health Investigation Levels (HILs) Guidelines and Ecological Screening Levels (ESLs) for residential allotments with limited soil access (NEPM 2013). Chemically the results meet the criteria of the Health Investigation Limits for all of the analysed contaminants across the site.

In relation to the area of investigation this area is deemed suitable for the proposed development.

10 REFERENCES

- *Assessment of Site Contamination, National Environment Protection Measure, 2013 amendment.*
- Australian Standard AS 4482.1 *Guide to the sampling and investigation of potentially contaminated soil. Part 1: Non-volatile and semi-volatile compounds.*
- Australian Standard AS 4482.2 *Guide to the sampling and investigation of potentially contaminated soil. Part 2: Volatile substances*
- *Guidelines for the Assessment and Management of Groundwater Contamination*, NSW DEC, 2007.
- *Guidelines for Assessing Service Stations*, NSW EPA, 1994
- *Guidelines for Consultants Reporting on Contaminated Sites*, NSW EPA, 2000.
- *Guidelines for the NSW Site Auditor Scheme*, NSW DEC (NSW DECC), Second Edition, April 2006.
- *Sampling Design Guidelines* - NSW EPA, 1995.
- *Waste Classification Guidelines - Part 1: Classifying Waste*, NSW OEH, December 2009

11 LIMITATIONS

The information contained within this report have been prepared exclusively for the client. Envirotech has carried out the investigation with a degree of care and skill ordinarily exercised in similar investigations by reputable members of the environmental industry in Australia. No other warranty, expressed or implied, is made or intended. This report is to be read in its entirety including attachments and appendixes and should not read in individual sections.

A third party should not rely upon the information prior to making an assessment that the scope of work conducted meets their specific needs. Envirotech cannot be held liable for third party reliance on this document.

The sub-surface environment can vary greatly across an individual site. The conclusions presented in this report are based on limited investigation of conditions at specific sampling locations chosen to be as representative as possible under the given circumstances. However, it is possible that this investigation may not have encountered all areas of contamination at the site due to the limited sampling and testing program undertaken.

Envirotech's professional opinions are based upon its professional judgment, experience, training and results from analytical data. In some cases further testing and analysis may be required, thus producing different results and/or opinions. ADE has limited its investigation to the scope agreed upon with its client.

APPENDIX I – HEALTH INVESTIGATION LEVELS (HILS)

Table 5 Health Investigation Levels (HILs) for Soil Contaminants

Chemical	Health-based investigation levels (mg/kg)			
	Residential [1] A	Residential[1] B	Recreational [1] C	Commercial/ industrial[1] D
Metals and Inorganics				
Arsenic[2]	100	500	300	3 000
Beryllium	60	90	90	500
Boron	4500	40 000	20 000	300 000
Cadmium	20	150	90	900
Chromium (VI)	100	500	300	3600
Cobalt	100	600	300	4000
Copper	6000	30 000	17 000	240 000
Lead[3]	300	1200	600	1 500
Manganese	3800	14 000	19 000	60 000
Mercury (inorganic)[5]	40	120	80	730
Methyl mercury[4]	10	30	13	180
Nickel	400	1200	1200	6 000
Selenium	200	2033	700	10 000
Zinc	7400	60 000	30 000	400 000
Cyanide (free)	250	300	240	1 500
Polycyclic Aromatic Hydrocarbons (PAHs)				
Carcinogenic PAHs (as BaP TEQ)[6]	3	4	3	40
Total PAHs[7]	300	400	300	4000
Phenols				
Phenol	3000	45 000	40 000	240 000
Pentachlorophenol	100	130	120	660
Cresols	400	4 700	4 000	25 000
Organochlorine Pesticides				
DDT+DDE+DDD	240	600	400	3600
Aldrin and dieldrin	6	10	10	45
Chlordane	50	90	70	530
Endosulfan	270	400	340	2000
Endrin	10	20	20	100
Heptachlor	6	10	10	50
HCB	10	15	10	80
Methoxychlor	300	500	400	2500
Mirex	10	20	20	100
Toxaphene	20	30	30	160
Herbicides				
2,4,5-T	600	900	800	5000
2,4-D	900	1600	1300	9000
MCPA	600	900	800	5000
MCPB	600	900	800	5000
Mecoprop	600	900	800	5000
Picloram	4500	6600	5700	35000

Chemical	Health-based investigation levels (mg/kg)			
	Residential [1] A	**Residential[1] B**	**Recreational [1] C**	**Commercial/ industrial[1] D**
Other Pesticides				
Atrazine	320	470	400	2500
Chlorpyrifos	160	340	250	2000
Bifenthrin	600	840	730	4500
Other Organics				
PCBs[8]	1	1	1	7
PBDE Flame Retardants (Br1–Br9)	1	2	2	10

APPENDIX II – ANALYTICAL RESULTS

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1603935**	Page	: 1 of 14
Client	: **ENVIROTECH P/L**	Laboratory	: Environmental Division Sydney
Contact	: MR SIMON DOBERER	Contact	:
Address	: PO BOX 3086 EAST BLAXLAND NSW, AUSTRALIA 2774	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: simon@envirotech.com.au	E-mail	:
Telephone	: +61 02 47399232	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 47392421	Facsimile	: +61-2-8784 8500
Project	: Kinghorne Street, NOWRA	QC Level	: NEPM 2013 B3 & ALS QC Standard
Order number	: 277015	Date Samples Received	: 22-Feb-2016 14:45
C-O-C number	: ----	Date Analysis Commenced	: 23-Feb-2016
Sampler	: SIMON DOBERER	Issue Date	: 29-Feb-2016 13:15
Site	: ----		
		No. of samples received	: 18
Quote number	: ----	No. of samples analysed	: 18

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

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

Signatories	*Position*	*Accreditation Category*
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Pabi Subba	Senior Organic Chemist	Sydney Inorganics, Smithfield, NSW
Pabi Subba	Senior Organic Chemist	Sydney Organics, Smithfield, NSW
Shobhna Chandra	Metals Coordinator	Sydney Inorganics, 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.

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.

- 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.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP1 1.5	TP1 3.0	TP2 1.5	TP2 3.0	TP3 1.5
				Client sampling date / time	[20-Feb-2016]	[20-Feb-2016]	[20-Feb-2016]	[20-Feb-2016]	[20-Feb-2016]
Compound	CAS Number	LOR	Unit		ES1603935-001	ES1603935-002	ES1603935-003	ES1603935-004	ES1603935-005
					Result	Result	Result	Result	Result
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1	%		13.1	26.3	17.4	10.1	16.6
EG005T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		6	8	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg		<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg		16	36	10	21	9
Copper	7440-50-8	5	mg/kg		6	13	6	<5	8
Lead	7439-92-1	5	mg/kg		16	18	6	10	6
Nickel	7440-02-0	2	mg/kg		2	2	10	<2	10
Zinc	7440-66-6	5	mg/kg		43	56	34	<5	33
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	0.1	<0.1	<0.1	<0.1
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2-Chlorophenol	95-57-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2-Methylphenol	95-48-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
3- & 4-Methylphenol	1319-77-3	1	mg/kg		<1	<1	<1	<1	<1
2-Nitrophenol	88-75-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.4-Dimethylphenol	105-67-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.4-Dichlorophenol	120-83-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.6-Dichlorophenol	87-65-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Pentachlorophenol	87-86-5	2	mg/kg		<2	<2	<2	<2	<2
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP1 1.5	TP1 3.0	TP2 1.5	TP2 3.0	TP3 1.5
				Client sampling date / time	[20-Feb-2016]	[20-Feb-2016]	[20-Feb-2016]	[20-Feb-2016]	[20-Feb-2016]
Compound	CAS Number	LOR	Unit		ES1603935-001	ES1603935-002	ES1603935-003	ES1603935-004	ES1603935-005
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**0.6**	**0.6**	**0.6**	**0.6**	**0.6**
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.2**	**1.2**	**1.2**	**1.2**	**1.2**
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		**120**	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		**120**	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		**110**	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		**120**	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		**230**	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	1330-20-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP1 1.5	TP1 3.0	TP2 1.5	TP2 3.0	TP3 1.5
				Client sampling date / time	[20-Feb-2016]	[20-Feb-2016]	[20-Feb-2016]	[20-Feb-2016]	[20-Feb-2016]
Compound	CAS Number	LOR	Unit		ES1603935-001	ES1603935-002	ES1603935-003	ES1603935-004	ES1603935-005
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**121**	**120**	**112**	**121**	**123**
2-Chlorophenol-D4	93951-73-6	0.5	%		**103**	**103**	**110**	**104**	**107**
2.4.6-Tribromophenol	118-79-6	0.5	%		**106**	**120**	**113**	**115**	**112**
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**115**	**116**	**120**	**116**	**114**
Anthracene-d10	1719-06-8	0.5	%		**121**	**122**	**124**	**124**	**109**
4-Terphenyl-d14	1718-51-0	0.5	%		**122**	**122**	**121**	**121**	**118**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**84.0**	**75.5**	**95.4**	**105**	**88.9**
Toluene-D8	2037-26-5	0.2	%		**97.7**	**85.6**	**93.0**	**102**	**95.2**
4-Bromofluorobenzene	460-00-4	0.2	%		**86.6**	**78.5**	**93.9**	**98.6**	**87.9**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP3 3.0	TP4 1.5	TP4 3.0	TP5	TP6
				Client sampling date / time	[20-Feb-2016]	[20-Feb-2016]	[20-Feb-2016]	[20-Feb-2016]	[20-Feb-2016]
Compound	CAS Number	LOR	Unit		ES1603935-006	ES1603935-007	ES1603935-008	ES1603935-009	ES1603935-010
					Result	Result	Result	Result	Result
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1	%		19.1	12.1	15.0	24.2	21.9
EG005T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		10	9	6	11	11
Cadmium	7440-43-9	1	mg/kg		<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg		36	31	21	31	30
Copper	7440-50-8	5	mg/kg		12	11	21	10	9
Lead	7439-92-1	5	mg/kg		14	19	90	13	11
Nickel	7440-02-0	2	mg/kg		<2	<2	7	<2	2
Zinc	7440-66-6	5	mg/kg		18	17	242	8	7
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2-Chlorophenol	95-57-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2-Methylphenol	95-48-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
3- & 4-Methylphenol	1319-77-3	1	mg/kg		<1	<1	<1	<1	<1
2-Nitrophenol	88-75-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.4-Dimethylphenol	105-67-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.4-Dichlorophenol	120-83-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.6-Dichlorophenol	87-65-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Pentachlorophenol	87-86-5	2	mg/kg		<2	<2	<2	<2	<2
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP3 3.0	TP4 1.5	TP4 3.0	TP5	TP6
				Client sampling date / time	[20-Feb-2016]	[20-Feb-2016]	[20-Feb-2016]	[20-Feb-2016]	[20-Feb-2016]
Compound	CAS Number	LOR	Unit		ES1603935-006	ES1603935-007	ES1603935-008	ES1603935-009	ES1603935-010
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**0.6**	**0.6**	**0.6**	**0.6**	**0.6**
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.2**	**1.2**	**1.2**	**1.2**	**1.2**
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	**130**	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	**170**	**200**	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	**170**	**330**	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	**170**	**260**	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	**130**	**110**	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	**300**	**370**	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	1330-20-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP3 3.0	TP4 1.5	TP4 3.0	TP5	TP6
				Client sampling date / time	[20-Feb-2016]	[20-Feb-2016]	[20-Feb-2016]	[20-Feb-2016]	[20-Feb-2016]
Compound	CAS Number	LOR	Unit		ES1603935-006	ES1603935-007	ES1603935-008	ES1603935-009	ES1603935-010
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**119**	**114**	**123**	**118**	**113**
2-Chlorophenol-D4	93951-73-6	0.5	%		**99.2**	**109**	**103**	**105**	**99.9**
2.4.6-Tribromophenol	118-79-6	0.5	%		**85.5**	**104**	**127**	**110**	**105**
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**110**	**116**	**117**	**113**	**112**
Anthracene-d10	1719-06-8	0.5	%		**120**	**116**	**119**	**114**	**118**
4-Terphenyl-d14	1718-51-0	0.5	%		**121**	**120**	**124**	**118**	**123**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**82.5**	**88.9**	**74.6**	**78.4**	**78.4**
Toluene-D8	2037-26-5	0.2	%		**89.6**	**105**	**85.2**	**87.2**	**91.0**
4-Bromofluorobenzene	460-00-4	0.2	%		**81.9**	**89.2**	**75.7**	**80.1**	**78.4**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP7	TP8	TP9	TP10	TP11
				Client sampling date / time	[20-Feb-2016]	[20-Feb-2016]	[20-Feb-2016]	[20-Feb-2016]	[20-Feb-2016]
Compound	CAS Number	LOR	Unit		ES1603935-011	ES1603935-012	ES1603935-013	ES1603935-014	ES1603935-015
					Result	Result	Result	Result	Result
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1	%		23.6	14.6	16.3	21.3	15.7
EG005T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		10	5	9	9	9
Cadmium	7440-43-9	1	mg/kg		<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg		34	18	29	30	20
Copper	7440-50-8	5	mg/kg		14	7	14	14	13
Lead	7439-92-1	5	mg/kg		11	10	12	11	11
Nickel	7440-02-0	2	mg/kg		2	3	5	2	<2
Zinc	7440-66-6	5	mg/kg		10	8	23	16	10
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2-Chlorophenol	95-57-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2-Methylphenol	95-48-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
3- & 4-Methylphenol	1319-77-3	1	mg/kg		<1	<1	<1	<1	<1
2-Nitrophenol	88-75-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.4-Dimethylphenol	105-67-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.4-Dichlorophenol	120-83-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.6-Dichlorophenol	87-65-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Pentachlorophenol	87-86-5	2	mg/kg		<2	<2	<2	<2	<2
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP7	TP8	TP9	TP10	TP11
				Client sampling date / time	[20-Feb-2016]	[20-Feb-2016]	[20-Feb-2016]	[20-Feb-2016]	[20-Feb-2016]
Compound	CAS Number	LOR	Unit		ES1603935-011	ES1603935-012	ES1603935-013	ES1603935-014	ES1603935-015
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**0.6**	**0.6**	**0.6**	**0.6**	**0.6**
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.2**	**1.2**	**1.2**	**1.2**	**1.2**
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	**510**
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	**350**
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	**860**
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		**130**	<100	<100	<100	**770**
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		**130**	<50	<50	<50	**770**
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	1330-20-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP7	TP8	TP9	TP10	TP11
				Client sampling date / time	[20-Feb-2016]	[20-Feb-2016]	[20-Feb-2016]	[20-Feb-2016]	[20-Feb-2016]
Compound	CAS Number	LOR	Unit		ES1603935-011	ES1603935-012	ES1603935-013	ES1603935-014	ES1603935-015
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**114**	**118**	**119**	**117**	**121**
2-Chlorophenol-D4	93951-73-6	0.5	%		**97.3**	**105**	**102**	**107**	**98.8**
2.4.6-Tribromophenol	118-79-6	0.5	%		**109**	**115**	**112**	**104**	**98.7**
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**111**	**116**	**121**	**120**	**115**
Anthracene-d10	1719-06-8	0.5	%		**113**	**121**	**120**	**120**	**122**
4-Terphenyl-d14	1718-51-0	0.5	%		**122**	**124**	**121**	**121**	**117**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**89.6**	**89.0**	**82.9**	**95.8**	**97.2**
Toluene-D8	2037-26-5	0.2	%		**100**	**93.0**	**93.2**	**103**	**110**
4-Bromofluorobenzene	460-00-4	0.2	%		**87.6**	**82.2**	**83.8**	**90.4**	**93.9**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP12	TP13	TP14	----	----
			Client sampling date / time	[20-Feb-2016]	[20-Feb-2016]	[20-Feb-2016]	----	----
Compound	CAS Number	LOR	Unit	ES1603935-016	ES1603935-017	ES1603935-018	--------	--------
				Result	Result	Result	Result	Result
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	17.8	19.6	15.4	----	----
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	6	10	16	----	----
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	----	----
Chromium	7440-47-3	2	mg/kg	23	33	17	----	----
Copper	7440-50-8	5	mg/kg	14	27	19	----	----
Lead	7439-92-1	5	mg/kg	8	37	13	----	----
Nickel	7440-02-0	2	mg/kg	8	4	<2	----	----
Zinc	7440-66-6	5	mg/kg	60	39	20	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	----	----
EP075(SIM)A: Phenolic Compounds								
Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	<1	<1	----	----
2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Pentachlorophenol	87-86-5	2	mg/kg	<2	<2	<2	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	<0.5	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP12	TP13	TP14	----	----
				Client sampling date / time	[20-Feb-2016]	[20-Feb-2016]	[20-Feb-2016]	----	----
Compound	CAS Number	LOR	Unit		ES1603935-016	ES1603935-017	ES1603935-018	--------	--------
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**0.6**	**0.6**	**0.6**	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.2**	**1.2**	**1.2**	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	----	----
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	----	----
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	----	----
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	----	----
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	----	----
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	<100	----	----
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	<50	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	----	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	----	----
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	----	----
^ Total Xylenes	1330-20-7	0.5	mg/kg		<0.5	<0.5	<0.5	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP12	TP13	TP14	----	----
				Client sampling date / time	[20-Feb-2016]	[20-Feb-2016]	[20-Feb-2016]	----	----
Compound	CAS Number	LOR	Unit		ES1603935-016	ES1603935-017	ES1603935-018	--------	--------
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**122**	**116**	**114**	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%		**100**	**102**	**96.9**	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%		**97.2**	**93.7**	**85.1**	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**113**	**113**	**110**	----	----
Anthracene-d10	1719-06-8	0.5	%		**111**	**111**	**118**	----	----
4-Terphenyl-d14	1718-51-0	0.5	%		**116**	**123**	**113**	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**82.8**	**78.0**	**85.4**	----	----
Toluene-D8	2037-26-5	0.2	%		**94.2**	**88.0**	**95.4**	----	----
4-Bromofluorobenzene	460-00-4	0.2	%		**82.5**	**78.2**	**83.7**	----	----

APPENDIX III – LABORATORY QA/QC

CHAIN OF CUSTODY

ALS Laboratory: please tick →

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☐MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com

☐MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com

☐NEWCASTLE 5 Rose Gum Road Warabrook NSW 2304 Ph: 02 4968 9433 E: samples.newcastle@alsglobal.com

☐NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 024423 2063 E: nowra@alsglobal.com

☐PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com

☐SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com

☐TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townesville.environmental@alsglobal.com

☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: Envirotech PTY LTD	**TURNAROUND REQUIREMENTS :** ☐ Standard TAT **(List due date):**	**FOR LABORATORY USE ONLY (Circle)**	
OFFICE: Blaxland	(Standard TAT may be longer for some tests e.g.. Ultra Trace Organics) ☐ Non Standard or urgent TAT **(List due date):**	Custody Seal Intact?	Yes No N/A
PROJECT: Kinghorne Street, NOWRA	**ALS QUOTE NO.:**	Free ice / frozen ice bricks present upon receipt?	Yes No N/A
ORDER NUMBER: 277015	**COC SEQUENCE NUMBER (Circle)** COC: 1 2 3 4 5 6 7 OF: 1 2 3 4 5 6 7	Random Sample Temperature on Receipt:	°C
PROJECT MANAGER: Simon Doberer	**CONTACT PH:** 0247 399232	Other comment:	
SAMPLER: Simon Doberer	**SAMPLER MOBILE:**	**RELINQUISHED BY:** *Simon Doberer*	**RECEIVED BY:** Toni
COC emailed to ALS? (YES / NO)	**EDD FORMAT (or default):**	DATE/TIME: 22/02/2016	DATE/TIME: 22/2/16 2:49p
Email Reports to (will default to PM if no other addresses are listed): simon@envirotech.com.au		**RELINQUISHED BY:** DATE/TIME:	**RECEIVED BY:** DATE/TIME:
Email Invoice to (will default to PM if no other addresses are listed):			

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where **Metals** are required, specify **Total** (unfiltered bottle required) or **Dissolved** (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE *(refer to codes below)*	TOTAL CONTAINERS	S-27								
1	TP1 1.5	20/02/2016	S		1	✓								
2	TP1 3.0	20/02/2016	S		1	✓								
3	TP2 1.5	20/02/2016	S		1	✓								
4	TP2 3.0	20/02/2016	S		1	✓								
5	TP3 1.5	20/02/2016	S		1	✓								
6	TP3 3.0	20/02/2016	S		1	✓								
7	TP4 1.5	20/02/2016	S		1	✓								
8	TP4 3.0	20/02/2016	S		1	✓								
9	TP5	20/02/2016	S		1	✓								
10	TP6	20/02/2016	S		1	✓								
11	TP7	20/02/2016	S		1	✓								
12	TP8	20/02/2016	S		1	✓								
				TOTAL										

Environmental Division
Sydney
Work Order Reference
ES1603935

Telephone : + 61-2-8784 8555

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

CHAIN OF CUSTODY

ALS Laboratory: please tick →

❑ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com

❑BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com

❑GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com

❑MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com

❑MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com

❑MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com

❑NEWCASTLE 5 Rose Gum Road Warabrook NSW 2304 Ph: 02 4968 9433 E: samples.newcastle@alsglobal.com

❑NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 024423 2063 E: nowra@alsglobal.com

❑PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com

❑SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com

❑TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townesville.environmental@alsglobal.com

❑WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: Envirotech PTY LTD	**TURNAROUND REQUIREMENTS :** (Standard TAT may be longer for some tests e.g.. Ultra Trace Organics)	☐ Standard TAT **(List due date):**	**FOR LABORATORY USE ONLY (Circle)**
OFFICE: Blaxland		☐ Non Standard or urgent TAT **(List due date):**	Custody Seal Intact? Yes No N/A
PROJECT: Kinghorne Street, NOWRA	**ALS QUOTE NO.:**	**COC SEQUENCE NUMBER (Circle)**	Free ice / frozen ice bricks present upon receipt? Yes No N/A
ORDER NUMBER: 277015		COC: 1 2 3 4 5 6 7	Random Sample Temperature on Receipt: °C
PROJECT MANAGER: Simon Doberer	**CONTACT PH:** 0247 399232	OF: 1 2 3 4 5 6 7	Other comment:

SAMPLER: Simon Doberer	**SAMPLER MOBILE:**	**RELINQUISHED BY:**	**RECEIVED BY:**	**RELINQUISHED BY:** / **RECEIVED BY:**
COC emailed to ALS? (YES / NO)	**EDD FORMAT (or default):**	*Simon Doberer*	IAS	
Email Reports to (will default to PM if no other addresses are listed): simon@envirotech.com.au		DATE/TIME:	DATE/TIME: 22/2/16 2:45p	DATE/TIME: / DATE/TIME:
Email Invoice to (will default to PM if no other addresses are listed):		22/02/2016		

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where **Metals** are required, specify **Total** (unfiltered bottle required) or **Dissolved** (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE *(refer to codes below)*	TOTAL CONTAINERS	S-27								
13	TP9	20/02/2016	S		1	✓								
14	TP10	20/02/2016	S		1	✓								
15	TP11	20/02/2016	S		1	✓								
16	TP12	20/02/2016	S		1	✓								
17	TP13	20/02/2016	S		1	✓								
18	TP14	20/02/2016	S		1	✓								
				TOTAL	18									

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES1603935**	Page	: 1 of 6
Client	: **ENVIROTECH P/L**	Laboratory	: Environmental Division Sydney
Contact	: MR SIMON DOBERER	Telephone	: +61-2-8784 8555
Project	: Kinghorne Street, NOWRA	Date Samples Received	: 22-Feb-2016
Site	: ----	Issue Date	: 29-Feb-2016
Sampler	: SIMON DOBERER	No. of samples received	: 18
Order number	: 277015	No. of samples analysed	: 18

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EG005T: Total Metals by ICP-AES	ES1603953--007	Anonymous	**Zinc**	7440-66-6	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

Analysis Holding Time Compliance

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								
Soil Glass Jar - Unpreserved (EA055-103)								
TP1 1.5,	TP1 3.0,	**20-Feb-2016**	**----**	----	----	**24-Feb-2016**	05-Mar-2016	✓
TP2 1.5,	TP2 3.0,							
TP3 1.5,	TP3 3.0,							
TP4 1.5,	TP4 3.0,							
TP5,	TP6,							
TP7,	TP8,							
TP9,	TP10,							
TP11,	TP12,							
TP13,	TP14							
EG005T: Total Metals by ICP-AES								
Soil Glass Jar - Unpreserved (EG005T)								
TP1 1.5,	TP1 3.0,	**20-Feb-2016**	**24-Feb-2016**	18-Aug-2016	✓	**25-Feb-2016**	18-Aug-2016	✓
TP2 1.5,	TP2 3.0,							
TP3 1.5,	TP3 3.0,							
TP4 1.5,	TP4 3.0,							
TP5,	TP6,							
TP7,	TP8,							
TP9,	TP10,							
TP11,	TP12,							
TP13,	TP14							

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
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T)							
TP14	**20-Feb-2016**	**24-Feb-2016**	19-Mar-2016	✓	**25-Feb-2016**	19-Mar-2016	✓
Soil Glass Jar - Unpreserved (EG035T)							
TP1 1.5, TP1 3.0, TP2 1.5, TP2 3.0, TP3 1.5, TP3 3.0, TP4 1.5, TP4 3.0, TP5, TP6, TP7, TP8, TP9, TP10, TP11, TP12, TP13	**20-Feb-2016**	**24-Feb-2016**	19-Mar-2016	✓	**26-Feb-2016**	19-Mar-2016	✓
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP071)							
TP1 1.5, TP1 3.0, TP2 1.5, TP2 3.0, TP3 1.5, TP3 3.0, TP4 1.5, TP4 3.0, TP5, TP6, TP7, TP8, TP9, TP10, TP11, TP12, TP13, TP14	**20-Feb-2016**	**23-Feb-2016**	05-Mar-2016	✓	**24-Feb-2016**	03-Apr-2016	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075(SIM))							
TP1 1.5, TP1 3.0, TP2 1.5, TP2 3.0, TP3 1.5, TP3 3.0, TP4 1.5, TP4 3.0, TP5, TP6, TP7, TP8, TP9, TP10, TP11, TP12, TP13, TP14	**20-Feb-2016**	**23-Feb-2016**	05-Mar-2016	✓	**24-Feb-2016**	03-Apr-2016	✓

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 Petroleum Hydrocarbons								
Soil Glass Jar - Unpreserved (EP080)								
TP1 1.5,	TP1 3.0,	**20-Feb-2016**	**23-Feb-2016**	05-Mar-2016	✓	**25-Feb-2016**	05-Mar-2016	✓
TP2 1.5,	TP2 3.0,							
TP3 1.5,	TP3 3.0,							
TP4 1.5,	TP4 3.0,							
TP5,	TP6,							
TP7,	TP8,							
TP9,	TP10,							
TP11,	TP12,							
TP13,	TP14							

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	EA055-103	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	4	32	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
PAH/Phenols (SIM)	EP075(SIM)	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	32	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
PAH/Phenols (SIM)	EP075(SIM)	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	32	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
PAH/Phenols (SIM)	EP075(SIM)	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	32	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	18	**5.56**	**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	EA055-103	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (2013) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
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)
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.
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.

Preparation Methods	Method	Matrix	Method Descriptions
Methanolic Extraction of Soils for Purge and Trap	* ORG16	SOIL	In house: Referenced to USEPA SW 846 - 5030A. 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids	ORG17	SOIL	In house: Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **ES1603935**	Page	: 1 of 10
Client	: **ENVIROTECH P/L**	Laboratory	: Environmental Division Sydney
Contact	: MR SIMON DOBERER	Contact	:
Address	: PO BOX 3086 EAST BLAXLAND NSW, AUSTRALIA 2774	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: simon@envirotech.com.au	E-mail	:
Telephone	: +61 02 47399232	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 47392421	Facsimile	: +61-2-8784 8500
Project	: Kinghorne Street, NOWRA	QC Level	: NEPM 2013 B3 & ALS QC Standard
Order number	: 277015	Date Samples Received	: 22-Feb-2016
C-O-C number	: ----	Date Analysis Commenced	: 23-Feb-2016
Sampler	: SIMON DOBERER	Issue Date	: 29-Feb-2016
Site	: ----	No. of samples received	: 18
Quote number	: ----	No. of samples analysed	: 18

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

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

NATA WORLD RECOGNISED ACCREDITATION

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

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

Signatories	*Position*	*Accreditation Category*
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Pabi Subba	Senior Organic Chemist	Sydney Inorganics, Smithfield, NSW
Pabi Subba	Senior Organic Chemist	Sydney Organics, Smithfield, NSW
Shobhna Chandra	Metals Coordinator	Sydney Inorganics, 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 (QC Lot: 374247)									
ES1603935-001	TP1 1.5	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	13.1	13.8	5.56	0% - 50%
ES1603935-012	TP8	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	14.6	13.4	8.79	0% - 50%
EG005T: Total Metals by ICP-AES (QC Lot: 374478)									
ES1603892-001	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	14	14	0.00	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	3	5	54.5	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	10	12	14.3	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	28	30	7.87	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	520	510	2.02	0% - 20%
		EG005T: Zinc	7440-66-6	5	mg/kg	116	114	1.45	0% - 20%
ES1603935-008	TP4 3.0	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	21	20	0.00	0% - 50%
		EG005T: Nickel	7440-02-0	2	mg/kg	7	4	46.4	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	6	6	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	21	13	44.0	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	90	85	6.34	0% - 50%
		EG005T: Zinc	7440-66-6	5	mg/kg	242	228	6.09	0% - 20%
EG005T: Total Metals by ICP-AES (QC Lot: 374480)									
ES1603935-018	TP14	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	17	10	47.6	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	<2	<2	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	16	5	102	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	19	10	63.6	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	13	10	30.3	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	20	14	35.2	No Limit
ES1604119-001	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	14	14	0.00	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	11	13	12.2	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	6	25.8	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	75	76	0.00	0% - 50%
		EG005T: Lead	7439-92-1	5	mg/kg	11	13	11.7	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	97	96	1.68	0% - 50%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 374479)									
ES1603892-001	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	0.2	0.2	0.00	No Limit
ES1603935-008	TP4 3.0	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	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 (%)*
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 374481)									
ES1603935-018	TP14	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
ES1604119-001	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EP075(SIM)A: Phenolic Compounds (QC Lot: 371644)									
ES1603935-001	TP1 1.5	EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	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-Dichlorophenol	120-83-2	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): 2.6-Dichlorophenol	87-65-0	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): 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenol	108-95-2	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
ES1603935-011	TP7	EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	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-Dichlorophenol	120-83-2	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): 2.6-Dichlorophenol	87-65-0	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): 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenol	108-95-2	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: 371644)									
ES1603935-001	TP1 1.5	EP075(SIM): Acenaphthene	83-32-9	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): Anthracene	120-12-7	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): Benzo(a)pyrene	50-32-8	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
		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(g.h.i)perylene	191-24-2	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): Chrysene	218-01-9	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

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)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 371644) - continued									
ES1603935-001	TP1 1.5	EP075(SIM): Fluoranthene	206-44-0	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): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Naphthalene	91-20-3	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): Pyrene	129-00-0	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
ES1603935-011	TP7	EP075(SIM): Acenaphthene	83-32-9	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): Anthracene	120-12-7	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): Benzo(a)pyrene	50-32-8	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
		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(g.h.i)perylene	191-24-2	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): Chrysene	218-01-9	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): Fluoranthene	206-44-0	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): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Naphthalene	91-20-3	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): Pyrene	129-00-0	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
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 371645)									
ES1603935-001	TP1 1.5	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	120	120	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
ES1603935-011	TP7	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 371646)									
ES1603935-001	TP1 1.5	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
ES1603935-011	TP7	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 371645)									
ES1603935-001	TP1 1.5	EP071: >C16 - C34 Fraction	----	100	mg/kg	110	110	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: 371645) - continued									
ES1603935-001	TP1 1.5	EP071: >C34 - C40 Fraction	----	100	mg/kg	120	120	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
ES1603935-011	TP7	EP071: >C16 - C34 Fraction	----	100	mg/kg	130	110	16.8	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
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 371646)									
ES1603935-001	TP1 1.5	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
ES1603935-011	TP7	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EP080: BTEXN (QC Lot: 371646)									
ES1603935-001	TP1 1.5	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	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: Toluene	108-88-3	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
ES1603935-011	TP7	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	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: Toluene	108-88-3	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 Sample (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: 374478)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	108	86	126
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	101	83	113
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	91.4	76	128
EG005T: Copper	7440-50-8	5	mg/kg	<5	32 mg/kg	114	86	120
EG005T: Lead	7439-92-1	5	mg/kg	<5	40 mg/kg	98.7	80	114
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55 mg/kg	99.9	87	123
EG005T: Zinc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	102	80	122
EG005T: Total Metals by ICP-AES (QCLot: 374480)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	111	86	126
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	105	83	113
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	94.0	76	128
EG005T: Copper	7440-50-8	5	mg/kg	<5	32 mg/kg	110	86	120
EG005T: Lead	7439-92-1	5	mg/kg	<5	40 mg/kg	107	80	114
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55 mg/kg	102	87	123
EG005T: Zinc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	107	80	122
EG035T: Total Recoverable Mercury by FIMS (QCLot: 374479)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	80.0	70	105
EG035T: Total Recoverable Mercury by FIMS (QCLot: 374481)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	86.7	70	105
EP075(SIM)A: Phenolic Compounds (QCLot: 371644)								
EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	6 mg/kg	76.9	60	114
EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	6 mg/kg	71.5	54	114
EP075(SIM): 2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	6 mg/kg	79.5	66	120
EP075(SIM): 2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	6 mg/kg	90.2	68	126
EP075(SIM): 2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	6 mg/kg	86.1	70	120
EP075(SIM): 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	6 mg/kg	93.5	72	124
EP075(SIM): 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	6 mg/kg	82.7	71	123
EP075(SIM): 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	6 mg/kg	75.7	54	114
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	12 mg/kg	82.2	67	127
EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	6 mg/kg	89.9	70	116
EP075(SIM): Pentachlorophenol	87-86-5	2	mg/kg	<2	12 mg/kg	16.6	10	57
EP075(SIM): Phenol	108-95-2	0.5	mg/kg	<0.5	6 mg/kg	107	71	125
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 371644)								
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	87.5	73	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: 371644) - continued								
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	88.9	72	124
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	92.1	77	127
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	93.0	69	123
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	90.1	70	126
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	6 mg/kg	93.9	68	116
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	86.8	63	121
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	97.8	74	126
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	94.4	75	127
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	82.7	62	118
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	86.5	73	127
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	82.6	72	126
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	84.8	61	121
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	90.5	77	125
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	90.9	75	127
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	85.9	74	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 371645)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	200 mg/kg	110	75	129
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	300 mg/kg	122	77	131
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	200 mg/kg	111	71	129
EP080/071: Total Petroleum Hydrocarbons (QCLot: 371646)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	83.8	68	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 371645)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	250 mg/kg	115	77	125
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	350 mg/kg	125	74	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	150 mg/kg	93.1	63	131
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 371646)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	81.1	68	128
EP080: BTEXN (QCLot: 371646)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	83.1	62	116
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	88.4	65	117
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	87.7	66	118
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	87.2	63	119
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	87.8	68	120
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	83.6	67	121

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 (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG005T: Total Metals by ICP-AES (QCLot: 374478)							
ES1603892-002	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	99.4	70	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	109	70	130
		EG005T: Chromium	7440-47-3	50 mg/kg	110	70	130
		EG005T: Copper	7440-50-8	250 mg/kg	107	70	130
		EG005T: Lead	7439-92-1	250 mg/kg	120	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	102	70	130
		EG005T: Zinc	7440-66-6	250 mg/kg	101	70	130
EG005T: Total Metals by ICP-AES (QCLot: 374480)							
ES1603953-007	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	110	70	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	111	70	130
		EG005T: Chromium	7440-47-3	50 mg/kg	102	70	130
		EG005T: Copper	7440-50-8	250 mg/kg	122	70	130
		EG005T: Lead	7439-92-1	250 mg/kg	83.4	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	99.3	70	130
		EG005T: Zinc	7440-66-6	250 mg/kg	# Not Determined	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 374479)							
ES1603892-001	Anonymous	EG035T: Mercury	7439-97-6	5 mg/kg	90.4	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 374481)							
ES1603935-018	TP14	EG035T: Mercury	7439-97-6	5 mg/kg	96.2	70	130
EP075(SIM)A: Phenolic Compounds (QCLot: 371644)							
ES1603935-001	TP1 1.5	EP075(SIM): 2-Chlorophenol	95-57-8	10 mg/kg	84.7	70	130
		EP075(SIM): 2-Nitrophenol	88-75-5	10 mg/kg	77.4	60	130
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	10 mg/kg	86.3	70	130
		EP075(SIM): Pentachlorophenol	87-86-5	10 mg/kg	34.7	20	130
		EP075(SIM): Phenol	108-95-2	10 mg/kg	95.0	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 371644)							
ES1603935-001	TP1 1.5	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	73.1	70	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	76.1	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 371645)							
ES1603935-001	TP1 1.5	EP071: C10 - C14 Fraction	----	523 mg/kg	91.9	73	137
		EP071: C15 - C28 Fraction	----	2319 mg/kg	102	53	131
		EP071: C29 - C36 Fraction	----	1714 mg/kg	124	52	132

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: 371646)							
ES1603935-001	TP1 1.5	EP080: C6 - C9 Fraction	----	32.5 mg/kg	91.2	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 371645)							
ES1603935-001	TP1 1.5	EP071: >C10 - C16 Fraction	----	860 mg/kg	92.9	73	137
		EP071: >C16 - C34 Fraction	----	3223 mg/kg	118	53	131
		EP071: >C34 - C40 Fraction	----	1058 mg/kg	112	52	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 371646)							
ES1603935-001	TP1 1.5	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	87.4	70	130
EP080: BTEXN (QCLot: 371646)							
ES1603935-001	TP1 1.5	EP080: Benzene	71-43-2	2.5 mg/kg	70.6	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	80.7	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	77.8	70	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	78.5	70	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	79.6	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	73.2	70	130

APPENDIX IV – SAMPLING PLAN


Underground
Storage Tank
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