Vales Point Additional Baseline Contamination Assessment

Delta

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Executive Summary

Introduction

Jacobs Group (Australia) Pty Ltd (Jacobs) was commissioned by Sunset Power International Pty Ltd t/as Delta Electricity (Delta) to undertake an Additional Baseline Study at the Vales Point Power Station (referred to hereinafter as the site) to support the agreement with the NSW Government to indemnify Delta against certain losses suffered or incurred in connection with “Pre-Existing Contamination”, “Legacy Contamination” and “Ash Dam Contamination” on site.

Objectives and Scope of Works

The objective of the baseline contamination investigation was to assess the existing contamination (if identified) at the site which may have occurred as a result of activities undertaken by Delta associated with the Vales Point Power Station.

Specific objectives also included:

- The vertical extent of potential contamination associated with the historical and current use of the site and adjoining areas as a power station, specifically within the ash dams and sediments of Wyee Bay.
- Identify a baseline for contamination (if present) to specify ‘pre-existing’ and ‘legacy’ contamination at the site.

The scope of works included test pitting and sample collection within the ash dam capping material and the investigation and sediment sampling and analysis in Wyee Bay.

Results

Capping material:

The capping investigation results identified the following:

- The sub-surface material encountered in the test pits (TP01 to TP46) generally consisted of sandy clays and clayey sand fill materials. Depths of fill materials ranged from a minimum depth of 0.05 m bgl (TP06, TP11, TP18) to a maximum depth of 2.0 m bgl at TP43. The average depth of fill material across each of the ponds was 0.145 m bgl in Pond 1, 0.227 m bgl in Pond 2 and 0.56 m bgl in Pond 3. These materials were underlain by deposited waste fly ash from the Ash dam. No natural material was encountered during the investigation.
- Soil samples from test pits were selected for analysis based generally on providing vertical and lateral coverage of potential contaminant extents within the capping material and on visual observations. All soil samples recorded contaminant concentrations below the adopted Site Assessment Criteria (SAC).
- No asbestos was detected within samples analysed or observed within soil samples or within capping material and was not observed on the surface with the exception of one fragment located 20 m north of TP01.
- Preliminary waste classification of the samples analysed indicated that the material sampled during the investigation would be classified as General Solid Waste (non-putrescible).

Sediment results:

The sediment investigation results identified the following:

- Sediment textures vary greatly in the southern section of Lake Macquarie from muds, to gravels composed of shells and lithic fragments.
- Coal is present in sediment to the west and northwest of Vales Point Power Station. The distribution of coal in sediment west and northwest of the Vales Point Power Station is not clearly defined by the current sampling locations.
- The highest concentrations of PAHs and higher TOC content in sediment were consistent with coal particles observed in sediment.
- Concentrations of total, normalised PAHs in sediment did not exceed relevant sediment quality guideline values.
- Trace metal concentrations in sediment are generally below the SAC with the exception of mercury and cadmium which marginally exceeded the relevant sediment quality guidelines values at two locations (J5 and J8).
- Selenium concentrations in sediment exceeded the adopted screening value at six of the eight sample locations and in twelve of the sixteen primary sediment samples analysed.
- All eight sediment sample locations returned analytical results for per- and poly-fluoroalkyl substances (PFAS) below the limits of reporting for all the compounds tested.

Conclusions

Based on the field and analytical result, Jacobs concludes the following:

- Contamination above the SAC was not identified within Pond 1, 2 and 3 for the applied analytical regime at the locations tested. Pre-existing or legacy contamination within the sampled capping material was not present within the pond capping material at the locations tested. Contamination exposure risks associated with current use for the currently industrial site usage and risks to site users in the form of workers and to ecological receptors is considered to be low.
- Elevated selenium concentrations above the adopted guideline value were reported in samples from six of the eight sediment sample locations in Wyee Bay. Based on the results from Jacobs investigations and comparison to ERM's 2014 ESA, there is evidence to suggest inputs from the ash dam and operation of the power station in the form of licenced discharges and run-off, along with other land uses in the area such as mines and industry may have contributed to the selenium concentrations in sediments within Wyee Bay. Comparisons between the results reported in ERM 2014 to results from this investigation indicate similar concentrations between the two. Furthermore there does not appear to have been an increase in concentrations since ERM completed their investigation in 2014. The selenium concentrations reported in the sediments of Wyee Bay have potential to have adverse impacts on marine organisms within Wyee Bay and surrounding water bodies. Subsequently there is an additional health risk to consumers of fish taken from the bay, as elevated concentrations may be present within the fish.

- Coal is present in sediment to the west and northwest of Vales Point Power Station. The distribution of coal in sediment west and northwest of the Vales Point Power Station is not clearly defined by the current sampling locations.

1. Introduction

Jacobs Group (Australia) Pty Ltd (Jacobs) was commissioned by Sunset Power International Pty Ltd t/as Delta Electricity (Delta) to undertake an Additional Baseline Study at the Vales Point Power Station (referred to hereinafter as the site) to support the agreement with the NSW Government to indemnify Delta against certain losses suffered or incurred in connection with "Pre-Existing Contamination", "Legacy Contamination" and "Ash Dam Contamination" on site.

The location of the site is presented as **Figure 1** and **Figure 2**.

This report details the works undertaken during the contamination investigation, field observations and the results of sampling and analysis in comparison to the applicable guidelines detailed within the National Environment Protection Council *National Environment Protection (Assessment of Site Contamination) Measure 1999* as revised in 2013 (NEPC, 2013) as endorsed by the NSW Environmental Protection Authority (NSW EPA) and other relevant guidelines. The report has been prepared in general accordance with the NSW EPA Guidelines, the National Environment Protection (Assessment of Site Contamination) Measure 1999 as amended 2013 (ASC NEPM) and relevant Australian Standards.

The investigation was undertaken in general accordance with the Jacobs *Sampling, Analysis and Quality Plan (SAQP): Vales Point Power Station – Additional Baseline* dated 20 February 2017.

1.1 Project background

Delta acquired the Vales Point Power Station from the NSW Government in December, 2015. As part of the transaction, the NSW Government agreed to indemnify Delta against certain losses suffered or incurred by Delta in connection with "Pre-Existing Contamination", "Legacy Contamination" and "Ash Dam Contamination". Delta also agreed to indemnify the NSW Government against certain losses suffered or incurred by the NSW Government in connection with "Operating Period Contamination." The terms of these indemnities are set out in the "Vales Point Closure and Put and Call Option Deed" (the Handback Deed).

The Handback Deed defined Pre-Existing Contamination as contamination identified in the "Baseline Study" as well as a relatively new category of contaminants referred to as Per- and Polyfluoroalkyl Substances (PFAS), regardless of when the presence of the PFAS contamination is identified. The Baseline Study included several investigations undertaken by Environmental Resource Management Australia (ERM). The Handback Deed also provided Delta with an option to undertake an Additional Baseline Study to further define Pre-Existing Contamination.

The Additional Baseline Study needs to be notified to the NSW Government within 12 months of the Completion Date (understood by Jacobs to be 17 December, 2015). The draft Additional Baseline Study report must then be submitted to the NSW Government within 6 months of the notice date.

At any time during Delta's operation of the Vales Point Power Station or at the end of the "Operating Period", the NSW Government may choose to undertake an "Operating Period Contamination Study". Delta can potentially be held liable for costs to remedy contamination that is identified to have occurred during the Operating Period.

Delta has reviewed the Baseline Study reports prepared by ERM and has found two areas requiring additional investigation:

- Capping material used for ash ponds 1, 2 and 3; and
- Sediments in Wyee Bay.

These two aforementioned areas form the basis for the following baseline contamination investigation.

1.1.1 Ash pond capping material

In relation to the capping material for the ash ponds, ash from the power station was transported to the ash ponds as a slurry and allowed to settle. As the ponds reach their capacity, the ash was allowed to dry out and was then capped with capping material of approximately 0.5 metre thickness, with some variation. A topsoil layer was then applied and the area was vegetated.

In recent years, Virgin Excavated Natural Material (VENM) as defined in the Protection of the Environment Operations Act 1997 or Excavated Natural Material (ENM) as defined in the Excavated Natural Material Order under Part 9, Clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014 has been specified for the capping material. Delta currently has procedures in place requiring suppliers of material to provide certification that the material is VENM or ENM and visual inspections of the material are performed on all trucks entering the site.

However, there have been numerous examples in industry where material certified as VENM or ENM has contained contaminants or other materials which do not meet the requirements of the respective legislation. The procedures currently employed to check the material by Delta may not have been employed as rigorously in the past as they are now. Furthermore, Jacobs understands that capping of the ponds commenced in the 1990's before the VENM and ENM framework was introduced.

The capping material was not investigated by ERM as part of the existing Baseline Studies and therefore Delta proposed an investigation of this material as part of the Additional Baseline Study. The primary objective of this investigation was to determine if the capping material contains contaminants at selected locations across the capped areas, in order to identify this contamination as "Pre-Existing Contamination".

1.1.2 Sediments in Wyee Bay

The ERM Stage 2 Environmental Site Assessment (ERM, 2014a) included sampling of sediment from Wyee Bay, Chain Valley Bay, Wyee Creek and the Wyee Creek diversion, and Mannering Bay. Concentrations of cadmium, copper, selenium and Polycyclic Aromatic Hydrocarbons (PAH) in certain sediment samples exceeded ERM's adopted screening values. The most significant exceedance appears to be in relation to selenium with a maximum concentration of 26 mg/kg in one sample versus a screening value of 2 mg/kg.

ERM noted that elevated selenium concentrations in sediment throughout Lake Macquarie are well documented and the concentrations identified by ERM were of the same order of magnitude as those identified in previous investigations. ERM noted that the sources of the elevated selenium concentrations are likely to be discharges from the Vales Point Ash Dam and potentially other sources in the catchment such as mines, other power stations and other industries. Delta proposed the collection of sediment samples at a minimum of eight locations including seven locations previously sampled by ERM and one additional background location. The purpose of this investigation was to collect additional data to better understand the existing sediment impacts identified by ERM.

2. Objectives and Scope of Works

The objective of the baseline contamination investigation was to assess the existing contamination (if identified) at the site which may have occurred as a result of activities undertaken during the Vales Point Power Station's operation prior to sale to Delta (Sunset Power International) in 2015

Specific objectives also included:

- The vertical extent of potential contamination associated with the historical and current use of the site and adjoining areas as a power station, specifically within the ash dams and sediments of Wyee Bay.
- Provide additional data to the ERM 2014 ESA baseline for contamination that will augment and support a broader understanding of 'pre-existing' and 'legacy' contamination at the site.

The scope of works undertaken to address the objectives are detailed below. Sampling locations for the ash pond capping investigation and sediment investigation are presented on **Figure 1** and **Figure 2** respectively.

2.1 Ash dam investigation

Investigation works included, in order of occurrence:

- Dial Before You Dig Search and completion of an 'Authority To Dig Form'.
- Mobilisation to sampling locations using a non-differential GPS.
- Scraping of vegetation and top soil layer using excavator.
- Test pit excavation and sample collection.
- Logging of test pit and physical characteristics, including photograph log.
- Test pit reinstatement - Excavated material was placed back in the test pit in the approximate order in which it was excavated. The excavator will then be used to compact the material (bucket compaction and / or track or wheel rolling).
- Samples placed in an esky with cooling media for transport to the laboratory.

2.2 Sediment investigation

Investigation works included, in order of occurrence:

- Sampling locations were located using non-differential GPS.
- A piston corer was used to collect sediment cores. The acceptability of the core following collection and the criteria for acceptance of the core included:

  i. No obvious loss of surficial sediment.

  ii. The core must have entered the profile vertically.

  iii. There must be no gaps in the stratigraphy.

  iv. There must be no disturbance of the sediment stratigraphy.

  v. The core would ideally penetrate the entire thickness of unconsolidated material and reach refusal at rock, densely packed sand or clay.

d) The collected samples were placed on clean trays, logged, photographed and subsampled as appropriate. Rigorous decontamination procedures were followed to minimize sample contamination.

2.3 Reporting

Preparation of a report incorporating the results of the fieldwork and laboratory analysis and an assessment as to the suitability of the site for commercial/industrial land use (considered to be the most appropriate land use setting based on current/former activities) and potential impacts to environmental receptors.

Specific information includes:

- An account of the investigation methodology, of soil and sediment conditions including the accurate locations of the investigation points and detailed results of laboratory and field assessment.
- Identification of potentially significant contamination issues at the site (where applicable).
- The lateral and vertical extent of any fill material identified.
- The risk posed by the determined contaminant concentrations within soils and sediment against relevant human health and ecological investigation levels.
- A conceptual site model which clearly identifies any unresolved issues, potential contaminant pathways and data gaps which may require action.
- A section outlining the appropriate quality control measures adopted throughout the investigation and assessment against the relevant data quality objectives and indicators.
- Conclusions and recommendations.

3. Previous Site Investigations

Prior to 2014, Vales Point Power Station had undergone limited investigations, with works generally complete to meet compliance requirements with site Environmental Protection Licence (EPL). A summary of the investigations undertaken included:

- Groundwater monitoring including well installation undertaken by Aurecon in 2013 to assist with compliance to the Pollution Reduction Programme notice on the EPL
- Surface water monitoring as part of licensed discharged under the site EPL
- Investigations associated with the Environment Operations (Underground Petroleum Storage Systems) Regulation 2008.
- A preliminary phase 1 contamination assessment by GHD in 2012 to assess contaminations issues associated with the site operations and recommendations relating to need for further investigations, remediation and/or management.

3.1 Project Symphony – Vales Point Power Station: *Stage 2 Environmental Site Assessment*, ERM 2014.

In 2014, ERM was commissioned by Delta Electricity to undertake a 'Preliminary and Stage 2 Environmental Site Assessment (ESA)' (ERM,2014a) at the Vales Point Power Station.

The objective of the ESA was to establish the baseline environmental conditions at the site as part of the proposed sale of the site.

To achieve the objective, ERM undertook a regime of soil, sediment, surface water and groundwater sample collection and environmental laboratory analysis of samples for contaminates of concern identified in a conceptual site model (CSM) developed during the Preliminary ESA. Following the completion of the site investigation and following receipt of laboratory analytical, the CSM was revised and analytical data was screened against adopted screening criteria.

The ERM (2014a) included sampling of sediment from Wyee Bay, Chain Valley Bay, Wyee Creek, Wyee Creek diversions and Mannering Bay. A summary of the key outcomes and results relevant to this investigation is provided below.

- Concentrations of cadmium, copper, selenium and PAH in certain sediment samples exceeded ERM's adopted screening criteria.
- The most significant of these exceedances was selenium which had a highest concentration of 26 mg/kg.
- It was reported that concentrations of selenium were potentially the result of inputs from the power stations and ash dam.
- It was noted that selenium concentrations had the potential to have significant adverse impacts on marine organisms in these waters and that uptake of selenium in these marine organism could represent a subsequent health risks to consumers of fish taken from the Bay.

Following a review of the Baseline Study reports prepared by ERM (2014a), Delta identified two areas which required additional investigation:

- Capping material used for ash ponds 1, 2 and 3.
- Sediments in Wyee Bay.

In relation to capping material used in ash ponds 1, 2 and 3, it was identified that the capping material was not investigated as part of ERM's investigations.

With regards to sediments in Wyee Bay, it was found that concentrations of cadmium, copper, selenium and Polycyclic Aromatic Hydrocarbons (PAH), in certain sediment samples, exceeded ERM's adopted screening values. The most significant exceedance appeared to be in relation to selenium, with a maximum concentration of 26 mg/kg in one sample compared the screening value of 2 mg/kg.

4. Data Quality Objectives

Jacobs has followed the Data Quality Objective (DQO) process presented in the National Environmental Protection Measure (NEPM 2013), which in turn references relevant guidelines published by the NSW EPA, Australia and New Zealand Environment and Conservation Council/Agriculture and Resource Management Council of Australia and New Zealand (ANZECC/ARMCANZ) and the National Environmental Protection Council (NEPC).

The DQO process is recommended when site contamination data is being relied on to make a risk-based decision as part of a detailed site investigation, although a simplified planning process may be appropriate for straight forward screening assessments.

At the investigation level, DQOs are qualitative and quantitative statements, developed in the first six steps of the DQO process that define the purpose of the site assessment to be undertaken and the type, quantity and quality of data needed to inform decisions relating to the assessment of site contamination. In the seventh step of the DQO process, the SAQP is developed to generate data to meet the DQOs. Specific to this Data Gap Study, Delta has added an eighth step to the DQO Process; Risk Characterisation and evaluation of possible future works and obligations. This eighth step is included to assist in the planning process for immediate and subsequent actions in the short term and long term for environmental management under the existing site operations.

The SAQP should document the criteria that a sample design should satisfy, including when, where and how to collect samples or measurements and the relevant acceptance (performance) criteria.

The preferred approach for sampling is that it be conducted within the general framework of a human health and environmental risk assessment. This process is consistent with guidance published jointly by ANZECC and the National Medical Health Research Council (NHMRC, 1992) *Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites*, and guidance published by the NEPC for assessment of contaminated land.

The advantages in using the DQO approach for site assessment include:

- Data collection activities are designed to acquire the information needed to make, or assist in making decisions
- Resources are used effectively
- It provides a framework that is transparent and readily defensible

The investigation and sampling methodology presented in this investigation has been designed to identify and assess the presence, level and extent of potential contamination associated with pre-existing conditions at the Site.

The steps in the DQO process are outlined in the following **Sections 4.1** to **4.7**.

4.1 Step 1 - State the Problem

Table 4.1 summarises the problem, develops the conceptual site model and identifies the project team.

Table 4.1 : Step 1 - State the Problem

Project Drivers	Delta acquired the Vales Point Power Station from the NSW Government in December, 2015. As part of the transaction, the NSW Government agreed to indemnify Delta against certain losses suffered or incurred by Delta in connection with "Pre-Existing Contamination", "Legacy Contamination" and "Ash Dam Contamination". Delta also agreed to indemnify the NSW Government against certain losses suffered or incurred by the NSW Government in connection with "Operating Period Contamination." The terms of these indemnities are set out in the "Vales Point Closure and Put and Call Option Deed" (the Handback Deed). Jacobs understands that Delta has reviewed the Baseline Study reports prepared by ERM and has found two areas requiring additional investigation: **1) Capping material used for ash ponds 1, 2 and 3; and,** **2) Sediments in Wyee Bay.**	
Objectives	The overall goal for the site investigation was to collect sufficient data to identify and assess the presence, level and extent of potential contamination associated with pre-existing conditions at the Site, in accordance with the requirements of the "Vales Point Closure and Put and Call Option Deed" (the Handback Deed).	
Project team	Jacobs Project Director:	Matt Davies
	Jacobs Project Manager	Robert Gauthier
	Jacobs Fieldwork Lead	Kyle McLean
	Sub-contractors	
	Excavation Contractor:	Ken Coles
	Sediment Contractor:	Geochemical Assessments
	Analytical Laboratories:	Primary – ALS, Secondary - Envirolab
Conceptual Site Model	The conceptual model for the Vales Point site is provided within the ERM (January 2014), *Stage 2 ESA*.	

4.2 Step 2 - Identify the Decision Statement

The decisions that will address the problem as noted in **Step 1** are summarised in **Table 4.2**.

Table 4.2: Step 2 - Identify the decision

Schedule 9 Contamination Provisions	Decisions on the presence, extent and significance of Pre-Existing Contamination require additional Pre-Existing Contamination Studies, including more data relating to soil and sediment contamination distribution and behaviour.
Site history	The site history of the separate Areas of Environmental Concern (AEC's) at the Vales Point Power Station are discussed within the ERM (January 2014).
Media of Concern	Based on the previous investigations undertaken by ERM, the additional investigation targeted the shallow soils with the cap areas for pond 1, 2 and 3, and the near-surface sediment samples within Wyee Bay (alluvial sediments) typically to a depth <.5m depth.
Transport and Migration	The potential migration pathways at the Vales Point site include: · Overland runoff.

	· Surface water drainage lines. · Underground trenches/pipelines. · Regional groundwater flow. · Sediment suspension and dispersion. · Sediment pore water.
Contaminants of Concern	The contaminants of concern are listed for each study area under Section 10 and 11 of this report.
Receptors	The potential sensitive receptors of contaminants at the Site include: · Workers undertaking excavation works at the site. · Wyee Bay · Mannering Bay. · Flora and Fauna within the surrounding area.
Guideline criteria	The guideline criteria are listed in Section 14 – Site Assessment Criteria. Contamination at the site which would pose an unacceptable risk to current and future land use and on-site and off-site environmental and human health receptors as defined by the following guidelines: · National Environment Protection Council (NEPC) *National Environment Protection (Assessment of Site Contamination) Measure 1999* as revised 2013 (NEPM, 2013). · Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC Care), *Technical Report No. 10 – Health Screening Levels for Petroleum Hydrocarbons in Soil and Groundwater,* September 2011 (Friebel and Nadebaum 2011) · Government of Western Australia Department of Environmental Regulation, *Assessment and management of contaminated sites, Contaminated sites guidelines*, December 2014 (WADOH, 2014). · Australia and New Zealand Environment and Conservation Council (2000) *Australian and New Zealand guidelines for fresh and marine water quality guidelines* (ANZECC 2000).
Decision statements	· Are there unidentified or unquantified contamination issues at the two site areas? · What is the nature and extent of soil and sediment contamination at the site areas, in relation to trigger levels? · What is the nature and extent of sediment movement at the Wyee Bay locations? Is it likely to cause contamination to migrate? · Is contamination present at the site areas that require remediation and/or management in order to bring the site areas to a condition suitable for its current land use? · Is contamination present at the two site areas that can trigger an Authority or Court Order?

4.3 Step 3 - Identify inputs to the decision

The main types of information needed to resolve the decision statements (as presented in Step 2) are provided in **Table 4.3.**

Table 4.3: Step 3 – Identify the inputs

Site condition	· Previous environmental assessments and investigation data for the site. · Use of field investigation techniques to identify previously undocumented areas of potential contamination

	(e.g. environmental sampling and analysis). · Visual observations of condition of soils and sediment. · Screening with a photo-ionisation detector (PID) to assess potential presence of volatile contaminants. · Visual observations of local flora and evidence of stress.
Target media	Observations, descriptions, photographs, logging and sample data to describe the type, extent and distribution of contaminated soils and groundwater at the locations tested at the site
Assessment criteria	Contamination investigation level criteria as outlined in **Step 2** and **Section 14**
Field work	A PID was used to screen soil samples in the field. The results of the PID screening assisted the field team to select which samples within the soil profile are most likely to be contaminated; and thus determine which samples should be analysed. Site observations recorded during the fieldwork was also used to determine which samples should be analysed.
Laboratory analytical method	Laboratory analytical methods will be undertaken in accordance with National Association of Testing Authorities (NATA) certification requirements, where possible.

4.4 Step 4 - Define the Boundaries of the Study

The geographic and temporal boundaries are identified together with any economic and practical constraints are described in **Table 4.4**.

Table 4.4: Step 4 - Define the boundaries of the study

Geographical limit	The study boundary of the ash pond investigation is illustrated in **Figure 1.** The sediment sample locations are presented in **Figure 2**. The geographical limits of Ponds 1, 2 and 3 are defined by the topographical features and assumed limits of ash deposition within each pond, and this is approximately illustrated by the blue outline surrounding each pond on **Figure 1**. The sediment sampling locations were defined by Delta as part of the study boundary locations for sediments, and were based on the approximate previous sample locations established by ERM (2014). Sediment sample locations are not within the property boundaries of the Vales Point Power Station land holdings.
Investigation limits	· The depth of potential soil contamination will be related to the maximum depth achievable by the excavation equipment, and/or when the extent of capping material is established. · Environmental media of concern: soils and sediment. · Qualitative measurements for soil vapour and odour.
Constraints	Access to some areas of capping samples was restricted due to overgrown or unstable areas and the presence of site infrastructure including utilities and services. Sediment sample locations had potential to be constrained by depths and weather conditions during sampling.

4.5 Step 5 - Develop a Decision Rule

This Step involves the defining the parameters of interest and integrating the information from **Steps 1** to **4** into statements that give a logical basis for choosing between alternative actions. The decision rules that were imposed on the investigations analytical results are detailed in **Table 4.5**.

Table 4.5: Step 5 – Develop a decision rule

Decision rule	· If the maximum observed contaminant concentration exceeds the adopted assessment criteria, then the results will trigger further investigation of the accuracy of the result. · The field and laboratory quality control procedures and limits that are discussed in Section 3 will be imposed on the analytical data. If the results are outside the specified limits, then the results will be reviewed to determine whether there is a significant impact on the acceptability of the results. Further investigation may be required if the results are not considered to be acceptable. · The results will be assessed against the Precision, Accuracy, Representativeness, Completeness and Comparability (PARCC) parameters to determine their acceptability for use in the investigation. A discussion of the PARCC parameters assessment is included in Section 3. · An assessment of the appropriate laboratory detection limits required to compare against the adopted assessment criteria (listed in Section 3) has been completed.

4.6 Step 6 - Specify Acceptable Limits on Decision Errors

The performance criteria for the sampling design is as follows:

· **Precision** - Precision refers to the degree of mutual agreement between duplicate measurements and provides an estimate of random error. Precision was assessed through the calculation of relative percentage differences (RPD's) between primary and duplicate (or triplicate samples) to provide an estimate of random error. The acceptable RPD limits are summarised in Section 12.

· **Accuracy** – Accuracy refers to the difference between a samples analytical result and the true value of the sample. Accuracy was assessed for the primary and secondary laboratories by evaluating reagent blank results, laboratory duplicates, and the percent recoveries of matrix spike samples, surrogate spikes and laboratory control samples. A description of these procedures is included in Section 12.

· **Representativeness** - Representativeness refers to the degree to which data accurately and precisely measures the conditions and characteristics of the parameter of interest. Representativeness was ensured by executing consistent sample collection procedures, storage, shipping, equipment decontamination and proper laboratory sample handling procedures (eg Chain of Custody procedures). Representativeness was be assessed by evaluating calibration standards, rinsate blank samples, method blank samples, duplicate samples and compliance with the sampling methodology (described in Section 10 and 11) and the field QA/QC procedures (described in Section 12).

· **Completeness** - Completeness refers to the amount of actual data collected throughout the sampling event compared to the amount expected in the SAQP scope.

· **Comparability** - Comparability refers to the confidence with which one data set can be compared to another. Comparability for the sampling results was achieved through the use of the Standard Operating Procedures, published guidance for sampling and investigation methodologies, comparison of QC sample results including duplicate samples, triplicate samples, reagent blank samples, matrix spike samples, surrogate spikes and laboratory control samples.

· **Sample design** - The sampling design strategy is based on a targeted inspection, field screening, logging and sampling approach. The extent of environmental sampling was based on field observations and judgement by field personnel with experience in contaminated site investigations and assessments.

4.7 Step 7 - Optimising the Design for Obtaining Data

Table 4.6 optimises the design implemented throughout the investigation.

Table 4.6: Step 7 - Optimise the design for obtaining data

Review of DQO outputs	The inputs and assessments of the previous investigations have allowed for the determination of an effective sampling and analysis design. The sampling scope and methodology have been outlined within **Section 9, 10** and **11.**
Consideration of SAQP results with Baseline results	The results of the assessment program to form the basis for the Additional Baseline Assessment Study, in accordance with the Handback agreement. Specifically, the optimization of the study outcomes will address the following data gaps: 1. Spatial Studies – The Delta review of the ERM Report identified areas where analytical data was lacking and more locations were required to define the extent and significance of pre-existing contamination at the capped pond areas; 2. Characterisation Studies – The Delta Review of the ERM report identified additional works to further characterize the sediment analytical results reported in the ERM Study. This includes completion of an additional round of sediment sample capture, analysis and reporting for compounds that were previously and also not previously tested during the ERM study, and testing samples at a lower detection level for selected analytes. If additional studies do not identify new areas of soil and sediment contamination, then no further soil and sediment contamination assessment works will be recommended.

4.8 Step 8 - Risk Characterisation and Evaluation of possible future steps and obligations

Step 8 sets out the platform to interrogate 'where to from here' after the data has been gathered, reduced and considered. Essentially, this Step is used to address the decision statements in Step 2, in comparison with the obligations and requirements under the Handback Deed, NSW EPA Triggers, and the ongoing operational use of the site as approved under the planning regime.

- **Risk Criteria** - Guideline criteria under Step 2 and CLM Act established a process to determine whether a site is contaminated and whether that contamination is significant enough to warrant regulation. The Act does not define the nature or level of contamination that requires regulation, as this is determined on a case-by-case basis. Risk Characterisation included: the type, nature, quantity and concentration of contaminants, how they manifest themselves, the characteristics they display, and the nature of their impacts in a particular medium. This includes the current use of the site, who might be exposed to the contaminants, and the exposure scenario.
- **Future Steps** - Exposure risk scenario considerations were applied to any soil and sediment contamination issues to determine if formalised management processes (remediation, removal, treatment) are required. Additional environmental monitoring and reporting are often needed to assess whether management actions are achieving goals that are protective of human health and the environment. The processes for reviewing monitoring data and ways in which the data will feed into decisions about the contamination and management strategy were articulated. The length of time for which monitoring is expected to continue and the regulatory reporting to authorities and management inputs were defined. Qualitative and if necessary Quantitative health risk assessment works are likely future steps to allow consideration of management options under the CLM Act, or, if necessary for groundwater pollution, under the POEO Act.

5. Site description

5.1 General

Vales Point power station is located on the NSW Central Coast and operated by Delta. The station currently comprises two 660 MW units, fired with black coal from surrounding mines. To cover any shortfall, limited supplies of black coal are sourced from outside the area and delivered to site by rail. The combustion of coal produces around 21% ash of which about 10% is furnace ash and 90% is fly ash. At present the power station is producing around 650,000 tonnes of ash per year.

5.2 Site history

The construction of Vales Point Power Station began in 1963. Initially commissioned as a 875 megawatt (MW) 4 unit station, known as A Station, in 1978 and additional two units of 660 MW each, known as Station B were added, making the combined capacity of 2195 Megawatts which at the time made it the largest power station in Australia. In 1989, Station A was decommissioned reducing the capacity to 1320 MW. Since 1989, the stations has undergone various phases of decommissioning with the Station A turbines removed in 1997 and boilers and buildings of Station A removed over 2011 to 2014. In December 2015 the NSW Government sold Vales Point Power Station to Sunset Power International who currently trade as Delta Electricity.

5.3 Site identification

The site is divided between two local government areas (LGA) with Wyee Bay, the entirety of Pond 2, the majority on Pond 1 and the western portion of Pond 3 located in LGA of the Lake Macquarie and the majority of Pond 3 and the eastern portion of Pond 1 located in the LGA of the Shire of Wyong.

The legal description of the portions of the site subject to the contamination investigations were:

- Lot 1 in Deposited Plan (DP) 1166358
- Lot 7497 in DP 1165634
- Lot 4 in DP 911564
- Lot 1 in DP 28898
- Lot 7 in DP 15257
- Lot 102 in DP 1196330
- Lot 29A in DP 755242
- Lot 22 in DP 755242
- Lot 7077 in DP 1056107
- Lot 1 in DP 1195160
- Lot 102 in DP 1170291
- Lot 12 in DP 1091396

- Lot 150 in DP 755266

Note, no lot or deposited plan identifiers exist for the Wyee Bay site and as such the Lot and DP numbers listed above are for land based portions (Ash Dam, Ponds 1,2 and 3) of the site that were subject to investigation.

5.4 Site zoning and land use

The current zoning of the site with respect to the Ash Dam storage ponds (Ponds 1,2 and 3) was Electricity Generating Works (SP2) under the Lake Macquarie Local Environmental Plan (LEP) (2014) and the Wyong Local Environmental Plan (2013). The current zoning of Wyee Bay was Natural Waterways (W1) under the Lake Macquarie LEP (2014).

5.5 Geology

A review of the Gosford – Lake Macquarie 1:100 000 Provisional Geology Sheet (Geological Survey of New South Wales 2003) indicates the Ash Dam storage Ponds 1,2 and 3 is comprised of 'man-made fill' (mf) overlaying the late Permian to early Triassic, Munmorah Conglomerate formation (Rnm). The Munmorah Conglomerate formation is made up of conglomerate, pebbly sandstone and grey to green shale. The geology underlying Wyee Bay is identified as mud, sandy mud (Qm) overlying the Munmorah Conglomerate formation.

5.6 Regional hydrogeology and hydrology

The site is located in the Lake Macquarie catchment. The primary regional hydrological feature within the catchment is Lake Macquarie. Local water bodies in the area and surrounding the site (Wyee Bay and Vales Point Ash Dam) include:

- Mannering Bay immediately to the north of Pond 1 and immediately south of Wyee Bay
- Vales Point Ash Dam reservoir immediately to the south and south of the Vales Point Ash Dam (part of the Ash Dam)
- Wyee Bay approximately 900 m north of Pond 1.
- Wyee Creek approximately 900 m north west of Pond 2
- Lake Munmorah Ash Dam reservoir and Lake Munmorah approximately 1300 m to the south east of Vales Point Ash Dam
- Chain Valley Bay approximately 2000 m to the north east of Pond 1 and Pond

With respect to surface flows within the Ash Dam, site drainage which includes an unnamed constructed creek intersecting Pond 2 and the Ash Dam overflow system, generally flows in a north and north east direction towards Mannering Bay which subsequently filters into Wyee Bay.

In terms of surface flows into Wyee Bay, Wyee Bay is noted to receive water from the Vales Point Ash Dam at the licenced discharge point 2 (LDP 2) into the outlet canal and via the overflow system via Mannering Bay and Wyee Creek after extreme weather events. Other sources include Coral Creek (north east of Wyee Creek) and storm water flows from surrounding land uses including residential and industrial.

Regional groundwater flow is expected to flow towards Lake Macquarie to the north / north east. Given the low lying nature of the area, a tidal influence of the surrounding waterbodies localised variates is expected. Based

on site observations groundwater is expected to flow in a north / north west directions towards Mannering and Wyee Bay.

5.7 Acid sulfate soils

Acid sulfate soils (ASS) are the common name given to naturally occurring sediments and soils containing iron sulfides (principally iron sulfide or iron disulfide or their precursors). The exposure of the sulfide in these soils to oxygen by drainage or excavation leads to the generation of sulfuric acid. Areas of ASS can typically be found in low lying and flat locations which are often swampy or prone to flooding.

ASS Risk Maps from the CSIRO Australian Soil Resource Information System (ASRIS) database were reviewed to ascertain the probability of ASS being present across the proposal area. Based on this information, the site is assessed as having a high probability of ASS occurrence to the north of the site between Pond 1 and Mannering Bay and a low probability to extremely low probability of ASS presence surrounding the remainder of the site.

No suspected ASS was observed in the material excavated during the capping investigation because fill and natural soil did not exhibit the following characteristics (as defined in the ASS Management Advisory Committee 1998):

- Fill and soils did not exhibit a sulphurous smell.
- There was no evidence of shell.
- No jarositic horizons or substantial iron oxide mottling was observed.
- Fill and soils were not classified as unripe muds (soft, buttery, blue grey or dark greenish grey) or estuarine silty sands or sands (mid to dark grey) or bottom sediments of estuaries or tidal lakes (dark grey to black).

6. Conceptual Site Model

The following Conceptual Site Model (CSM) is based on the risk items detailed in the ERM (January 2014) Project Symphony- Vales Point Power Station: Stage 2 Environmental Assessment and potential risks associated with potential contaminants associated with fill material used for capping the deposited ash in Ponds 1, 2 and 3 of the Ash Dam which was not part of ERM's investigations.

Based on site information and an understanding of potential areas of interest, the following conceptual site model (CSM) was developed identifying source-pathway-receptor linkages which were to be tested during the investigation to assess the risk of contamination (if present) impacting upon human health and environmental receptors in the context of the current and future land uses.

The CSM for the site is presented as **Table 6.1**.

Table 6.1 : Conceptual site model

Source	Pathway	Receptor	ERM (2014) Risk Ranking	Jacobs Risk Ranking
Vales Point Ash Dam – Ponds 1,2,3 Imported capping material	Infiltration & leaching	Groundwater beneath the site	Not assessed as part of investigation	Low to moderate
	Dermal absorption	Human receptors (site workers) .	Not assessed as part of investigation.	Low to moderate
	Inhalation of asbestos fibres	Human receptors (site workers) .	Not assessed as part of investigation.	Moderate to high
	Ingestion (direct contact)	Human receptors (site workers)	Not assessed as part of investigation.	Low to moderate
	Inhalation of vapours (on-site)	Human receptors (on-site users / workers)	Not assessed as part of investigation.	Low
	Ecological Exposure	Terrestrial fauna	Not assessed as part of investigation.	Low
Sediments in Wyee Bay: Discharges from Vales Point Ash Dam and/or Vales Point Power Station Discharged from off-site 3rd party land uses,	Dermal absorption	Human receptors (recreation users)	Potential source pathway linkages discounted based on data collected.	Low
	Ingestion (direct contact)	Human receptors (recreation users)	Potential source pathway linkages for human health receptors discounted based on data collected.	Low
	Ecological Exposure	Aquatic fauna / benthic organisms	Potential source pathway linkages not able to be discounted on collected data.	Moderate to High
	Seafood consumption	Human receptors (fishers and consumers)	Potential source pathway linkages for human health receptors discounted based on data collected.	Low

7. Fieldwork

Jacobs undertook the contamination investigation works at the site between the following dates:

- 27 to 28 February 2017 (capping investigations in Ponds 1. 2 and 3).
- 3 March 2017 (sediment sampling in Wyee Bay).

The capping investigation and sediment sampling was undertaken in general accordance with the SAQP (Jacobs, February 2017). Departures from the SAQP and justification for the departures are detailed in **Table 7.1**. All works were supervised by an experienced Jacobs environmental scientist.

Table 7.1: Departures from the SAQP

SAQP	Departure	Justification
Sediment sampling: We will also collect one field duplicate, one triplicate sample and one rinsate samples for QA/QC purposes.	Two intra-lab duplicates were collected and analysed as part of the sediment investigation however no inter-lab triplicate or rinsate sample was collected.	A second intra-lab duplicated was collected from a second sample location and submitted for analysis. This was considered sufficient for QA/QC purposes and the assessment data usability and the representativeness of sampling techniques employed during sampling. Thorough cleaning and decontaminating of sampling equipment was undertaken between each sample location with Decon 90 solution and as such a rinsate sample was considered unnecessary.

8. Ash Dam Capping Investigation

8.1 Soil sampling program

The soil sampling program undertaken for the contamination investigation is detailed in **Table 8.1**.

Table 8.1: Sampling program

Contamination item	Investigation strategy	Investigation depth	Investigation type	Comments
Soil investigation	46 test pits	Vertical extent of capping material	General contamination	Pond 1 – 6 test pits (TP01 to TP06) Pond 2 – 14 test pits (TP07 to TP20) Pond 3 – 16 test pits (TP21 to TP46)

Sampling locations are presented on **Figure 1**.

8.2 Depth intervals of sampling

For the ash dam capping investigation, soil samples were collected as grab samples from excavated material taken from the capping material overlying deposited ash or at other discrete locations where there was evidence of potential contamination (odorous or discoloured soils, erroneous waste or fill) within the capping material. Sample depths varied based on the vertical extent of capping material encountered.

8.3 Method of sample collection

All soil samples at depth were collected as grab samples excavated from the capping material. Samples were transferred to sample containers by Jacobs field staff by hand using disposable nitrile gloves.

Care was taken to ensure that representative samples were obtained from the depth required and that the integrity was maintained, particularly when dealing with potentially volatile and semi-volatile components.

Where there was sufficient sample volume, part of the sample was placed in a re-sealable polyethylene bag for measurement of volatile soil gases using the closed headspace Photoionisation Detector (PID) method. The procedure for soil screening using a PID is summarised as follows:

1. A corresponding sample to that selected for possible laboratory analysis is placed into a “snap-lock” or re-sealable plastic bag until half filled, then sealed.

2. The bag is then hand warmed (or left in sunlight) for ten minutes with occasional agitation to maximise the release of Volatile Organic Compounds (VOC) into the bag.

3. Measure background VOC concentrations in ambient air prior to each reading in order to account for sensor drift. Record on a field data sheet along with date, location details, depth and method (HS for headspace method).

4. Use the point of the PID or a knife to punch a small hole in the top the plastic bag. Place the tip of the PID in the bag and monitor the readout and note the maximum and minimum concentration during the recording period.

5. Note the concentrations in field data sheets.

6. Repeat process outlined above for each sample (i.e., background reading followed by sample reading).

7. Check that samples with high concentrations of VOCs in headspace gases have been included for VOC testing at the laboratory.

The PID is a non-specific detector, as such, the instrument provides a measure of concentrations of total combustible and ionisable compounds reported as equivalents of a calibration span gas. Therefore, the data are used to compare Volatile Organic Compounds (VOC) concentrations between samples without an understanding of the specific compounds present.

VOC concentrations detected by PIDs are dependent on a number of factors including:

- The concentration and type of VOCs present in soil samples;
- Soil texture and compaction largely influence the potential for VOCs to be released from samples;
- Time since sample collection; and
- Temperature. These strongly affect the level of volatilisation of VOCs from soil and fill samples. In fact, temperature changes may result in differences of up to one order of magnitude in levels of VOCs detected using PIDs. Consequently, field screening for VOCs should be undertaken at the same time for all samples in order to produce representative results. Generally, it is recommended that samples be stored on ice and returned to base. Screening should be carried out after allowing samples to equilibrate to ambient air temperatures.

8.4 Sample containers, method of sample storage and handling

All soil samples for the soil investigation were placed in jars provided by the primary laboratory Australian Laboratory Service (ALS). All sample jars were fitted with Teflon lined lids. The jars were completely filled with soil, labelled with the date, unique sampling point identification and sampler information.

For asbestos identification additional sample was collected and placed into a laboratory supplied 500ml zip log bag. The zip lock bags were labelled with the date, unique sampling point identification and sampler information.

The soil jars and zip lock bags once filled with sample and sealed, were immediately placed in an esky/cool box in which a cooling medium had been added to keep the samples below a temperature of approximately 4 ^{o}C. At the end of the sampling program the samples in the cool box were transported to the laboratory. Custody seals were placed on the esky / cool box for delivery to the laboratory.

8.5 Decontamination procedures

Samples from test pits and surface samples were collected as grab samples from material at the centre of the excavator bucket or directly from the surface of the site using new disposable nitrile gloves, changed between sample locations. As such, decontamination measures were not required based on the sampling methods adopted for the soil investigation.

8.6 Sample logging and documentation

Experienced Jacobs field staff completed soil logs during the field investigation. The logs recorded the following data:

- Sample number
- Soil classification, colour, consistency or density, moisture content and obvious indications of contamination.
- Depth of excavation.
- Excavation refusal (if encountered)
- Method of excavation

In addition, the physical attributes of samples such as soil/fill characteristics, obvious signs of contamination such as discolouration and/or odour were noted on the logs.

All samples, including quality assurance (QA) samples, were transported to the primary laboratory under Chain of Custody (CoC) procedures and maintained in an ice-filled cool box. The CoC detailed the following information:

- Site identification.
- The sampler.
- Nature of the sample.
- Collection time and date.
- Analyses to be performed.
- Sample preservation method.

8.7 Reinstatement

Test pits location were reinstated with excavated material and compacted using the excavator bucket and tracks. Excavated material was reinstated into the excavations in the order in which they were excavated (i.e. deep materials to the base of the excavation and shallow materials to the surface).

8.8 Laboratory analysis

Soil samples were selected for analysis based generally on providing vertical and lateral coverage of the site and on visual observations. Samples were dispatched to a laboratory accredited by the National Association of Testing Authorities (NATA).

The analytical schedule for the capping investigation included submission of 46 primary and 3 blind / split QC samples for the following parameters:

- Metals and metalloids (arsenic, cadmium, chromium, copper, nickel, lead, mercury and zinc);
- pH and electrical conductivity (EC);
- Total Petroleum Hydrocarbons and Total Recoverable Hydrocarbons;
- Polycyclic Aromatic Hydrocarbons (PAHs), including benzo(a)pyrene;
- Benzene, Toluene, Ethylbenzene and Xylenes (BTEX);
- Polychlorinated Biphenyls (PCBs); and
- Asbestos (absence / presence)

In addition to the primary and duplicate/replicate QC samples, 1 laboratory trip blank and 1 trip spike sample was also submitted and analysed for BTEX as part of field QA/QC

Analysis of 10 samples was also undertaken for %clay, pH and Cation Exchange Capacity in order to assess contaminant concentrations against ecological investigation levels in accordance with the ASC NEPM.

Note that the asbestos analysis undertaken was to confirm the presence or absence of ACM and asbestos fibres only. If present, quantification of the concentration of ACM, fibrous asbestos and asbestos fibres was to be undertaken.

8.9 Analytical parameters and methods

Jacobs commissioned ALS as the primary laboratory and Envirolab as the secondary laboratory. MPL and Eurofins are NATA accredited for the testing undertaken.

Where appropriate, the soil samples were analysed in accordance with NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended 2013* (NEPC, 2013) guidelines using methods based on US Environment Protection Agency (US EPA) and American Public Health Association (APHA) approved analytical methods.

9. Sediments in Wyee Bay Investigation

9.1 Sediment sampling program

The sediment sampling program undertaken for the contamination investigation is detailed in **Table 9.1**.

Table 9.1: Sampling program

Contamination item	Investigation strategy	Investigation depth	Investigation type	Comments
Sediment investigation	8 sample locations	2m	General contamination	Two samples per sample location at two intervals for primary potential contaminants of concern. One sample per sample location at the upper interval for secondary contaminants of concern.

Sampling locations are presented on **Figure 2**.

9.2 Depth intervals of sampling

For the sediment investigation, 2 samples were collected per sample location generally at 0.5 metre intervals. For cores at Locations J2, J3, J5, J7 and J8 the 2 intervals were 0.0-0.5 m and 0.5 to 1.0 m. At location J6, closest to the Vales Point Power Station, the core was sampled in three intervals to a depth of 1.5 m (i.e. 0.0-0.5 m, 0.5 to 1.0 m and 1.0 to 1.5 m). The core at location J4 terminated with hard refusal at 0.4 m and was subsampled in a single interval (0.0-0.4 m). At location J1, the core met refusal at 0.8 m and was subsampled from 0.0 to 0.4 m and 0.4 to 0.8 m.

9.3 Method of sample collection

Sediment samples were collected using Geochemical Assessments custom built 5 m sampling vessel. A piston corer containing a 50.8 mm diameter stainless steel core barrel was used to collect core samples from unconsolidated sediments. Samples were collected by lowering and recovering the piston corer using aluminium rods. As the barrel was pushed into the sediment a partial vacuum was created to reduce core compaction and enable good core recovery. The collected core samples were extruded onto clean trays, accessed for acceptability, logged, photographed, subsampled and transferred directly to sample containers by Jacobs field staff using disposable nitrile gloves.

The acceptance criteria to determine each sediment cores' acceptability was as follows:

- No obvious loss of surficial sediment;
- The core must have entered the profile vertically;
- There must be no gaps in the stratigraphy;
- There must be no disturbance of the sediment stratigraphy
- The core would ideally penetrate the entire thickness of unconsolidated material and reach refusal at rock, densely packed sand or clay.

Care was taken to ensure that representative samples were obtained from required depths and that the integrity was maintained, particularly when dealing with potentially volatile and semi-volatile components.

9.4 Sample containers, method of sample storage and handling

All sediment samples for the soil investigation were placed in jars provided by the primary laboratory ALS. All sample jars were fitted with Teflon lined lids. The jars were completely filled with soil, labelled with the date, unique sampling point identification and sampler information.

The sediment jars, once filled with sample and sealed, were immediately placed in an esky/cool box in which a cooling medium had been added to keep the samples below a temperature of approximately 4 ^{o}C. At the end of the sampling program the samples in the cool box were transported to the laboratory. Custody seals were placed on the esky / cool box for delivery to the laboratory.

9.5 Decontamination procedures

Sediment samples were extracted from a decontaminated piston corer and taking care to keep the core intact placed on decontaminated trays prior to being placed into laboratory sample containers. The piston corer and sample trays were decontaminated using a phosphate free decontaminating liquid between each sampling depth. New disposable nitrile gloves were used between sample depths.

9.6 Sample logging and documentation

Experienced Jacobs field staff completed logs during the field investigation. The logs recorded the following data:

- Sample number and depth.
- Soil classification, colour, consistency or density, moisture content and obvious indications of contamination.
- Depth of coring
- Core refusal.
- Method of coring.

In addition, the physical attributes of samples such as sediment characteristics, obvious signs of contamination such as discolouration and/or odour were noted on the logs.

All samples, including quality assurance (QA) samples, were transported to the primary laboratory under Chain of Custody (CoC) procedures and maintained in an ice-filled cool box. The CoC detailed the following information:

- Site identification.
- The sampler.
- Nature of the sample.
- Collection time and date.
- Analyses to be performed.
- Sample preservation method.

9.7 Laboratory analysis

Sediment samples were selected for analysis based generally on providing vertical and lateral coverage of the site and on visual observations.

9.7.1 Primary chemical analysis

Sediment samples were selected for analysis based generally on providing vertical and lateral coverage of the site. Samples were dispatched to a laboratory accredited by the National Association of Testing Authorities (NATA).

The analytical schedule for the sediment investigation included submission of 16 primary and 2 blind / QC samples for the following parameters:

- PAH (ultra-low trace)
- Trace metals (arsenic, cadmium, cobalt, chromium, copper, nickel, lead, zinc, mercury and selenium);
- Total Organic Carbon (TOC)

As cobalt is a common contaminant in sediment, cobalt has been added to the analysis. TOC was also added in order to provide an indication of the presence of coal sediments and to provide a comparison of contaminant concentrations to screening values.

9.7.2 Secondary chemical analysis

A total of eight shallow sediment samples (existing sediment bed down to 0.5m below bed sediment surface) were collected and analysed for:

- 15 samples (13 primary + 2 QA/QC) for PFAS

9.7.3 Sediment particle size determination

In addition to chemical analysis subsamples were also subject to sediment particle size distribution analysis in which sediment subsamples were wet and dry sieved (<63 mm; 63-125 mm; 125-250 mm; 250-500 mm; 500-1,000 mm; 1,000-2,000 mm, 2,000-4,000 mm and >4,000 mm fractions) in Geochemical Assessments' dedicated grainsize laboratory. Laboratory QAQC included analysis of two duplicate samples.

9.7.4 Microscopic examination of coarse sediment fraction

The presence of coal particles in the sediment samples was semi-quantitatively assessed, by examination of the coarse fractions of sediment in which the >63 µm fraction of sediment was dried at 60^{o}C and examined under a digital stereoscopic microscope (magnification 7.5x to 40x).

9.8 Analytical parameters and methods

Jacobs commissioned ALS as the primary laboratory for chemical analysis. ALS is a NATA accredited for the testing undertaken. Geochemical Assessment was commissioned to undertake particle size distribution analysis and microscopic examination of sediment subsamples.

Where appropriate, the soil samples were analysed in accordance with NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended 2013* (NEPC, 2013) guidelines using methods based on US Environment Protection Agency (US EPA) and American Public Health Association (APHA) approved analytical methods.

10. Quality Control Plan

Field and laboratory QA/QC requirements compliant with NEPC (2013) requirements (where applicable) were undertaken as part of the field work program as outlined below.

10.1 Field QA/QC program

Field QA/QC for this project consisted of the collection of blind replicate, split replicate, trip blank and trip spike samples.

10.1.1 Environmental samples

Environmental samples or field samples were the representative soil and sediment samples collected for analysis to determine aspects of their chemical composition.

10.1.2 Blind replicate samples

Blind replicate samples were provided by the collection of two environmental samples from the same location. These samples were preserved, stored, transported, prepared and analysed in an identical manner. As a minimum, the results of analyses on the blind replicate sample pair were assessed by calculating the Relative Percentage Differences (RPDs) between the results. The RPD was calculated as the difference between the results divided by their mean value and expressed as a percentage. If the RPD exceeded the value adopted for any analytes, additional investigation would be required, or justification provided for not conducting additional investigation.

Blind replicate samples were generally collected at a rate of one duplicate for every 20 environmental samples in accordance with AS 4482.1-2005.

10.1.3 Split replicate samples

Split samples provided a check on the analytical proficiency of the laboratories. Split samples were provided by the collection of two environmental samples from the same location. These samples were preserved, stored and transported in an identical manner. The spilt samples were analysed by the secondary laboratory. As a minimum, the results of analyses on the split replicate sample pair were assessed by calculating the RPDs between the results. The RPD was calculated as the difference between the results divided by their mean value and expressed as a percentage. If the RPD exceeded the value adopted for any analytes, additional investigation would be required, or justification provided for not conducting additional investigation.

Split replicate samples were generally collected at a rate of one duplicate for every 20 environmental samples in accordance with AS 4482.1-2005.

10.1.4 Trip blanks

The trip blank consisted of laboratory-supplied clean sand (for soil samples). The purpose of trip blanks was to detect potential contamination during sample transport. These samples were kept within eskies during sampling activities and were not opened in the field. Trip blanks were analysed at the laboratory as regular samples for BTEX compounds only.

The trip blank was submitted with the batch of soil samples delivered to the respective primary laboratory. No trip blank was submitted with the batch of sediment samples submitted to the primary laboratory.

10.1.5 Laboratory-prepared trip spike

The laboratory-prepared trip spike consisted of sand (for soil samples) spiked with known concentrations of BTEX. The trip spike was submitted for BTEX analysis with the results compared with the known additions. Generally, samples were spiked with concentrations of 15, 15, 15 and 30 ppm of benzene, toluene, ethylbenzene and total xylenes respectively. The purpose of these samples was to monitor VOC losses during transit.

A trip spike was submitted with the batch of soil samples delivered to the respective primary laboratory. No trip spike was submitted with the batch of sediment samples submitted to the primary laboratory.

10.2 Laboratory QA/QC program

The reliability of test results from the analytical laboratories was monitored according to the QA/QC procedures used by the NATA accredited laboratory. The QA/QC programme employed by ALS (the primary laboratory) specified holding times, extraction dates, method descriptions, Chain of Custody (COC) requirements, analysis, LORs and acceptance criteria for the results. Laboratory QA/QC requirements undertaken by ALS and Eurofins are based on NEPM requirements and are outlined below (NEPC, 2013).

10.2.1 Laboratory duplicate samples

Laboratory duplicates provided data on analytical precision for each batch of samples.

Laboratory duplicates were performed at a rate of one duplicate for batches of 8-10 samples with an additional duplicate for each subsequent ten samples.

10.2.2 Laboratory control samples

Laboratory control samples consisted of a clean matrix (de-ionised water or clean sand) spiked with a known concentration of the analyte being measured. These samples monitored method recovery in clean samples and were used (where required) to evaluate matrix interference by comparison with matrix spikes.

10.2.3 Surrogates

For organic analyses, a surrogate was added at the extraction stage in order to verify method effectiveness. The surrogate was then analysed with the batch of samples and percentage recovery calculated.

10.2.4 Matrix spike

Matrix spikes consisted of samples spiked with a known concentration of the analyte being measured, in order to identify properties of the matrix that may hinder method effectiveness. Samples were spiked with concentrations equivalent to 5 to 10 times the LOR and percentage recovery calculated.

10.2.5 Method blanks

Method blanks (de-ionised water or clean sand) were carried through all stages of sample preparation and analysis at a rate of approximately 10%. Analyte concentrations in blanks should be less than the stated LOR. Reagent blanks were run if the method blank exceeded the LOR. The purpose of method blanks was to detect laboratory contamination.

10.3 Data Acceptance Criteria

The QA/QC Data will be assessed against the Data Acceptance Criteria (DAC) provided in **Table 10.1**.

Table 10.1 QA/QC Compliance Assessment

QA/QC Sample Type	Method of Assessment	Acceptable Range
Field QA/QC		
Blind Replicates and Split Samples	The assessment of split replicate is undertaken by calculating the Relative Percent Difference (RPD) of the replicate concentration compared with the original sample concentration. The RPD is defined as: $RPD = 100 \times \frac{\lvert X1 - X2 \rvert}{Average}$ Where: X1 and X2 are the concentration of the original and replicate samples.	The acceptable range depends upon the levels detected: · 0 – 100% RPD (When the average concentration is < 5 times the LOR) · 0 – 75% RPD (When the average concentration is 5 to 10 times the LOR) · 0 – 50% RPD (When the average concentration is > 10 times the LOR)
Blanks (Rinsate and Trip Blanks)	Each blank is analysed as per the original samples.	Analytical Result < LOR
Laboratory-prepared Trip Spike	The trip spike is analysed after returning from the field and the % recovery of the known spike is calculated.	70% - 130%
Laboratory QA/QC		
Laboratory Duplicates	Assessment as per Blind Replicates and Split Samples.	The acceptable range depends upon the levels detected: · 0 – 100% RPD (When the average concentration is < 4 times the LOR) · 0 – 50% RPD (When the average concentration is 4 to 10 times the LOR) · 0 – 30% RPD (When the average concentration is > 10 times the LOR)
Surrogates Matrix Spikes Laboratory Control Samples	Assessment is undertaken by determining the percent recovery of the known spike or addition to the sample. $\%\ Recovery = 100 \times \frac{C - A}{B}$ Where: A = Concentration of analyte determined in the original sample; B = Added Concentration; C = Calculated Concentration.	· 70% - 130% (General Analytes) · 50% - 130% (Phenols) · 60% - 130% (OP Pesticides)
Method Blanks	Each blank is analysed as per the original samples.	Analytical Result < LOR
Note: LOR = Laboratory Level of Reporting (LOR) or the minimum detection limit for a particular analyte.		

11. Quality Assurance and Quality Control

For the purpose of assessing the quality of data presented in this report, Jacobs collected and analysed various Quality Control (QC) samples (blind duplicate and blind triplicate sample), trip spike and trip blank samples, while the laboratory completed their own internal QC. The current section of this report is focused on the presentation of the results of these QC samples, adherence to Quality Assurance (QA) systems and discussion of deviations, if any from the DAC.

11.1 Field quality assurance

All samples were collected by experienced Jacobs environmental scientists, under established Jacobs protocols and in general accordance with the SAQP (January 2017). Adherence to Jacobs protocols by experienced field staff trained in sample collection and handling techniques ensures the quality and representativeness of the samples collected.

11.2 Field quality control

The following QC samples were collected for laboratory analysis:

- Blind duplicate (soil): DUP-A (duplicate of soil sample TP04).
- Blind duplicate (soil): DUP-B (duplicate of soil sample TP31)
- Blind duplicate (soil): DUP-C (duplicate of soil sample TP44)
- Split replicate (soil): TRIP-A (duplicate of soil sample TP04)
- Split replicate (soil): TRIP-B (duplicate of soil sample TP31).
- Split replicate (soil): TRIP-C (duplicate of soil sample TP44).
- Blind duplicate (sediment): J3_Dup 0.5 (duplicate of water sample J3-0.5).
- Blind duplicate (sediment): J5-0.5_Dup (duplicate of water sample J5-0.5).
- Trip Blank sample for soil investigation: TRIP BLANK (soil).
- Trip Spike sample for soil investigation: TRIP SPIKE (soil).

11.2.1 Blind duplicate samples

Five blind duplicate samples (three soil sample and two sediment samples) were analysed to assess the quality control during the field sampling program. This equates to 6.5% blind duplicate soil analysis and 12.5% blind duplicate sediment analysis. This blind duplicate analysis exceeds and therefore conforms to the Australian Standard (AS 4482.1 - 2005) *Guide to the sampling and investigation of potentially contaminated soil. Part 1: Non-volatile and semi-volatile compounds* requirement of 5%.

The Relative Percentage Differences (RPDs) for all analytes for the blind duplicates taken during the soil and sediment sampling program conformed to the DAC with the exception of:

- Cadmium (59% RPD) between the primary sediment sample J5-0.5 (1.8 mg/kg) and the blind duplicate J5-0.5 DUP (3.3 mg/kg).
- Chrysene (51% RPD) between the primary sediment sample J5-0.5 (204 mg/kg) and the blind duplicate J5-0.5 DUP (344 mg/kg).

RPDs calculate the difference in magnitude between the two samples and do not take into account the minor differences in actual concentrations.

The cadmium RPD returned a slight exceedance of the guideline of 50% RPD. With respect to cadmium concentrations reported in samples J5-0.5 and J5-0.5 DUP, the concentrations reported values with minor exceedances of the SAC (SQG-low). For cadmium concentrations reported between the primary and duplicate, the difference in the concentration of cadmium is not understood. However based on sediment results from the sediment investigation as well as ERM's Stage 2 ESA, cadmium is known to be present in the sediment of Wyee Bay. Considering this the slight exceedance of the RPD for cadmium is not expected to affect the overall usability of the data set.

With respect to the chrysene RPD between J5-0.5 and J5-0.5 DUP, a slight exceedance of 51% above the guideline of 50% RPD was reported. Considering the RPD between the primary and duplicate samples only exceeded the RPD guideline by 1% and no SAC is available for Chrysene, the slight exceedance of the RPD for Chrysene is not expected to affect the overall usability of the data set.

RPD results for the soil and sediment investigations are presented in **Table C** and **Table D** respectively.

11.2.2 Split replicate samples

Three split replicate samples (three soil sample sample) were analysed to assess the quality control during the field sampling program. This equates to 4.8% split replicate soil and sediment analysis. This split replicate analysis is marginally less than the Australian Standard (AS 4482.1 - 2005) *Guide to the sampling and investigation of potentially contaminated soil. Part 1: Non-volatile and semi-volatile compounds* requirement of 5%.

The RPDs for all analytes for the split replicates taken during the soil sampling program conformed to the DAC with the exception of:

- Electrical conductivity (53% RPD) between primary soil sample TP31 (29 µg/L) and split replicate TRIP B (50 µg/L).
- Lead (67% RPD) between primary soil sample TP31 (15 mg/L) and split replicate TRIP B (30 mg/L).

RPDs calculate the difference in magnitude between two samples and do not take into account the minor differences in actual concentrations.

The electrical conductivity RPD returned a slight exceedance of 53% above the guideline of 50%. Considering that electrical conductivity is not considered a contaminant but a parameter for the measuring the saline nature of water, soil and sediment and is often naturally variable, the slight exceedance of the RPD between TP31 and TRIP-A, is not expected to affect the overall usability of the data set.

With respect to lead concentrations reported in samples TP31 and TRIP-B, the concentrations reported represent values lower than the SAC. Considering lead concentrations in all samples are below the SAC and

heavy metals are known to occur in the sediments, the RPD exceedance of 67% above the RPD guideline of 50% is not likely to affect the overall usability of the data set.

RPD results for the soil and sediment investigations are presented in **Table C** and **Table D** respectively.

11.2.3 Trip blanks

One trip blank was submitted with samples delivered to the laboratory for analysis. The trip blank sample was analysed for BTEX only. The concentrations of BTEX compounds in the trip blank were below the respective laboratory LOR demonstrating that no cross contamination occurred during sample handling and therefore conformed to the DAC.

Trip blank results are presented in **Table E**.

11.2.1 Trip spikes

One trip spike was submitted with samples delivered to the laboratory for analysis. The trip spike sample was analysed for BTEX only. The concentrations of BTEX compounds were within the acceptable ranges (70% - 130%) for the percentage recoveries as outlined in the DAC.

Trip spike results are presented in **Table F**.

11.3 Laboratory QA

All analysis was undertaken by a NATA accredited laboratory using NATA accredited analytical methods.

11.4 Laboratory QC

Laboratory QC data is presented in full in the laboratory certificates in **Appendix B.**

11.4.1 Laboratory duplicates

RPDs for all laboratory duplicates for soil and sediment samples conformed to the DAC.

11.4.2 Laboratory control samples

Recoveries for all laboratory control samples for soil and sediment conformed to the DAC.

11.4.3 Surrogates

Recoveries for all laboratory surrogate samples for soil and sediment conformed to the DAC.

11.4.4 Matrix spikes

Recoveries for all matrix spike control samples for soil and sediment conformed to the DAC.

11.4.5 Method blanks

All method blanks for soil and sediment reported analyte concentrations below the laboratory LOR and therefore conformed to the DAC.

11.4.6 Sample holding times

All soil and sediment samples were extracted and analysed within the specified holding times with the exception of TP01, TP05, TP08 and TP15 for pH. Although the samples were submitted within holding times and the samples were due for extraction (6 March 2017) within holding times, extraction did not occur until the 7 March 2017 (the day after). It is unknown why extractions occurred after the due date, however as the analysis occurred within the holding times following extraction and considering the samples were of soil, it is unlikely that exceedance of the holding times for pH in TP01, TP05, TP08 and TP15 will affect the useability of the results.

11.4.7 Sample condition

All samples were received by the analytical laboratories in correctly preserved and chilled containers with no reported breakages. The individual sample receipts are presented with the laboratory reports in **Appendix B.**

11.5 Data Quality Indicators (DQI)

11.5.1 Precision

For all field and laboratory duplicates, the nominated QA/QC acceptance criteria was generally met with the exception of recoveries in two analytes in one blind duplicate and two analytes in one split replicate sample which were outside the DAC. The variations are not considered to affect the precision of the data for reasons discussed in **Section 13.2** and therefore analytical precision provided confidence of limited variability and high reproducibility of the data set.

11.5.2 Accuracy

Laboratory accuracy was assessed by the analysis of laboratory control samples and method blanks and percent recoveries of matrix spikes and surrogates.

The assessment of the results of these laboratory control samples indicated the accuracy of the analytical results were acceptable and represent an accurate measure of the reported data.

11.5.3 Representativeness

Jacobs consider the samples collected from the site to be representative of the materials being targeted as part of this monitoring program. Jacobs staff ensured that samples collected were representative of the material observed in each groundwater well and surface water location.

11.5.4 Completeness

All samples were collected and analysed in accordance with the Jacobs work instructions. All other required QA/QC data, including both field and laboratory data, as outlined in the sampling and analysis program, is also provided and complete.

11.5.5 Comparability

Samples were collected by experienced Jacobs environmental scientists in accordance with the sampling and analysis program using appropriate Jacobs protocols and analysed in accordance with NATA accredited laboratory methods. The comparability of the data should be consistent as sampling protocols were employed throughout the duration of the fieldwork and analysis was undertaken by NATA registered laboratories using accredited analytical methods.

11.6 Assessment

Despite some minor non-conformances within the ratio of split replicate analysis to primary analysis, split replicate RPDs and holding times for one sample, it is concluded that laboratory data are of acceptable quality and are considered useable in making conclusions and recommendations regarding the site.

12. Site Assessment Criteria

To address potential health and environmental impacts within the site, Jacobs compared the analytical test results against a set of health and ecological based soil and sediment investigation levels to be referred to as Site Assessment Criteria (SAC) considered to be appropriate for the current land use and main potential receptors of concern (i.e. commercial/industrial guidelines, given the current and future land use and that any potential exposure times to possible contaminants during construction activities or disturbance have been considered as short term).

That is, the SAC have been set at levels that provide confidence that contaminant concentrations below the SAC will not adversely affect human health or terrestrial/aquatic ecosystems.

The SAC developed for the investigation was derived (where applicable) from the following guidelines:

- National Environment Protection Council (NEPC) *National Environment Protection (Assessment of Site Contamination) Measure 1999* as revised 2013 (NEPM, 2013).
- Australia and New Zealand Environment and Conservation Council (2000) *Australian and New Zealand guidelines for fresh and marine water quality guidelines* (ANZECC 2000).
- enHealth (June 2016) *Guidance Statements on Perfluorinated Chemicals – Interim Values* (enHealth, 2016)
- CRC Care (January 2017) *Technical Report No.38 – Assessment, management and remediation for PFOS and PFOA* (CRC Care, 2017)
- Australian Government Department of Health (3 April 2017) *Australian guidance values for assessing exposure to perfluorooctane sulfonate (PFOS) and perfluorooctane acid (PFOA)* (DoH, 2017)

12.1 Aesthetics

Aesthetics on sites relates to the presence of observable odours, discoloration and erroneous wastes materials in soil which could possibly indicate contamination. Such olfactory evidence can point to how receptors can be impacted by vapours on and migrating from the site. Odour threshold for organic substances can be exceeded in off-site settings (through groundwater transmission of hydrocarbons) and whilst may not represent a direct health risk, could possibly prompt civil action. Aesthetics was continually assessed during the investigation and reported on the field logs (where present).

12.2 Ecological Investigation Levels

Based on the current and future land use for commercial/industrial purposes and given potential exposure times to possible contaminants during disturbance have been considered to be short term, ecological investigation levels (EILs) were considered for a commercial/industrial land use as part of the capping investigation.

EILs were generated using the NEPC (2013) – Volume 2 – Table 1B (1-7). For the Project, it has been assessed that the EILs will apply to contaminants within the top 2 metres of soil at the surface / ground level which corresponds to the root zone and habitation zone of many species. Additionally, typical background concentrations were required to be calculated in order to derive selected EILs. To generate the EILs for the investigation, Jacobs have used the methodology as summarised below.

EILs were generated for heavy metals and naphthalene. 10 samples were selected to determine the 'background concentrations' for soils within the site. As the investigation was limited to site capping material, did not extend into natural soils and the depth of sample was typically less than 0.5 m bgl, an average of the 10 samples has been applied to calculate the EILs. The EILs were calculated (where appropriate) using the NEPC (2013) equation:

EIL = ABC[1] + ACL[2]

A summary of the adopted EILs is presented as **Table 12.1**

Table 12.1: Ecological Investigation Levels (expressed as mg/kg).

Substance	Ecological Investigation Levels
Arsenic	160 [1]
Cadmium	3 [2]
Chromium	430 [3]
Copper	190 [3]
Lead	1,800 [3]
Mercury	1 [2]
Nickel	100 [3]
Zinc	510 [3]
Naphthalene	370 [1]

[1] Generic EILs for aged arsenic/Naphthalene from **Table 1B (5).**

[2] EILs from NEPM 1999 (no EILs specified for contaminants in NEPM 2013).

[3] EILs derived from NEPM 2013 equation ABC+ACL.

12.3 Ecological screening levels

Ecological Screening Levels (ESLs) are focused on petroleum hydrocarbon and total recoverable hydrocarbon (TRH) compounds and are compared against actual site conditions (sub-surface materials and depth) to assess the potential risk to terrestrial ecosystems. For the purposes of calculating the ESLs, the generic soil type (i.e. three broad classes of sands, silts or clays) and land use need to be defined.

For the purposes of this assessment Jacobs, as a conservative measure and considering the variable nature of encountered material from clayey sands to sandy clays, have adopted sands as the most representative for the soil profile at the site.

Given the proposed land use of commercial/industrial, the corresponding land use and associated ESL were used to determine the assessment criteria.

[1] ABC is ambient background concentration (the soil concentration in a specified locality that is the sum of the naturally occurring background level and the contaminant levels that have been introduced from diffuse or non-point sources by general anthropogenic activity).

[2] ACL is added contaminant limit (the added concentration (above the ABC) of a contaminant above which further appropriate investigation and valuation of the impact on ecological values is required).

Table 12.2 summarises the ESL criteria for soils that have been adopted.

Table 12.2: ESLs for Petroleum Based Fractions (expressed as mg/kg)

Compound / Fraction	Ecological Screening Level
F1 (C6 – C10)	215
F2 (>C10 – C16)	170
F3 (>C16 – C34)	1700
F4 (>C34 – C40)	3300
Benzene	75
Toluene	135
Ethylbenzene	165
Xylenes	180
Benzo(a)pyrene	0.7

[1] Table 1B(6) ESLs for TPH fractions F1 – F4, BTEX and Benzo(a)pyrene in soils - NEPM (2013).

12.4 Health investigation levels

To address potential health impacts at the site, Jacobs compared the analytical testing results for the capping investigation against a set of health based Soil Investigation Levels (SILs) appropriate for commercial/industrial land use in context of the current and future land use of the site and in consideration of the potential for contamination in soil to impact upon human receptors. The health based SILs have been derived from the NEPC (2013) guidelines. The adopted SILs are summarised in **Table 12.3**

Health Investigation Levels (HILs) have been developed for a broad range of metals and organic substances. The HILs are applicable for assessing human health risk via all relevant pathways of exposure. The HILs are generic to all soil types and apply generally to a depth of three metres below the surface for residential use.

Health Screening Levels (HSLs) have been developed for selected petroleum compounds and fractions and are applicable to assessing human health risk via the inhalation and direct contact pathways. The HSLs depend on specific soil physio-chemical properties, land use scenarios, and the characteristics of building structures. They apply to different soil types, and depths below surface to >4 metres. Further details on their use are provided in Friebel and Nadebaum (2011a, 2011b & 2011c).

The HSLs defined within the NEPC (2013) relate only to the volatile fractions of the petroleum hydrocarbons range i.e. BTEX, naphthalene and TRH C6 – C10, TRH C10 – C16.

Jacobs has adopted the lower value from the following criteria given that exposure times to contamination (if present) during any disturbance and/or construction activities are expected to be short term:

- NEPC (2013) Health Investigation Level recommended from exposure setting ‘D’ which includes premises such as shops, offices, factories and industrial sites (i.e. sites with minimal exposure opportunities).

- Friebel, E & Nadebaum, P (September 2011) Technical Report No.10, Health screening levels for petroleum hydrocarbons in soil and groundwater. Part 1: Technical development document - HSL-D Commercial / Industrial Criteria and Intrusive Maintenance Worker (Table A4).

Table 12.3 Soil Investigation Levels (expressed mg/kg)

Substance	Soil Investigation Levels			
Metals / Metalloids				
Arsenic (total)	3,000 [1]			
Cadmium	900 [1]			
Chromium (VI)	3,600 [1]			
Copper	240,000 [1]			
Lead	1,500 [1]			
Mercury (inorganic)	730[1]			
Nickel	6,000 [1]			
Zinc	400,000 [1]			
Polychlorinated Biphenyls (PCB)				
PCBs	7 [1]			
Polycyclic Aromatic Hydrocarbons (PAH)				
Naphthalene	NL [2]			
BaP TEQ	40 [1]			
Total PAH	4,000 [1]			
Asbestos				
Fibrous asbestos and asbestos fibres	No detectable asbestos			
Organochlorine Pesticides[1]				
DDT+DDE+DDD	3,600			
Aldrin and dieldrin	45			
Chlordane	530			
Endosulfan	2,000			
Endrin	100			
Heptachlor	50			
HCB	80			
Methoxychlor	2,500			
Mirex	100			
Toxaphene	160			
F1, F2 and BTEX *(based on sand soil type)* [#]				
Depth (m)	***0 – <1***	***1 – <2***	***2 – <4***	***>4***
F1 (C_6-C_{10} minus sum of BTEX concentrations)	260 [2]	370 [2]	630 [2]	NL [2]
F2 (>C_{10}-C_{16} minus napthalene)	NL [2]	NL [2]	NL [2]	NL [2]
Benzene	3 [2]	3 [2]	3 [2]	3 [2]
Toluene	99,000 [3]			
Ethylbenzene	NL	N	NL	NL

Substance	Soil Investigation Levels			
Xylenes	230 [2]	81,000 [3]		
Naphthalene	11,000 [3]			

[1] NEPC (2013) Table 1 A(1) Health investigations levels for soil contaminants – Commercial / Industrial D.

[2] NEPC (2013) Table 1 A(3) Soil HSLs for vapour intrusion – commercial/industrial, 0 to <1, 1 - <2, 2 - <4, >4 m Sand.

[3] HSL-D Commercial / Industrial Criteria and Intrusive Maintenance Workers detailed within Table A4, Friebel, E & Nadebaum, P 2011, Soil Health screening levels for direct contact, Technical Report 10.

NL – NL indicates the HSL is not limiting (see Footnote 5, Table 1A(3)).

TEQ – Toxic Equivalent.

[#] Soil Vapour as the primary Exposure Pathway to impact potential receptors.

12.5 Asbestos

NEPM (2013) provides health based screening levels for different forms of asbestos contamination in soil. To apply these screening levels, significant investigations, excavation and sample volumes are required to assess the volume of asbestos relative to soil. Jacobs have adopted a high level criterion to assess the presence / absence of asbestos in soil samples and to determine whether additional investigations are required to assess the risk to site users. The high level criterion adopted by Jacobs is no asbestos in any form present in soil samples or observed on surface soils and in excavated materials.

12.6 ANZECC Sediment Guidelines

The sediment screening values adopted for the project to assess the presence of contaminants in sediments have been adopted from the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC/ARMCANZ (2000)). The purpose of these guidelines in relation to sediments in aquatic environments are:

- to identify sediments where contaminant concentrations are likely to result in adverse effects on sediment ecological health;
- to facilitate decisions about the potential remobilisation of contaminants into the water column and/or into aquatic food chains;
- to identify and enable protection of uncontaminated sediments.

The ANZECC/ARMCANZ (2000) guidelines provided sediment quality guideline (SQG) values (a Trigger/Screening value and a High value) for a range of common contaminants. These SQG values were intended for use in the screening level assessment and to assist decisions when accompanied by additional lines of evidence, e.g. bioavailability and ecotoxicology data.

The ANZECC/ARMCANZ (2000) SQG values are based on the effects of sediment contaminants on benthic organisms. The interim SQG trigger value (TV or ISQG-Low) is based on the lower 10th percentile of an effects database (ANZECC/ARMCANZ, 2000). The application of sediment guidelines involves a tiered, decision-tree approach in which the total concentrations of contaminants are compared to SQG values. The initial comparison is usually made with the ISQG-Low values. If the contaminant concentrations exceed the TVs, further investigations should be initiated to determine whether there is indeed an environmental risk associated with the exceedance. Importantly the TVs were not intended for use as a pass/fail basis, but as a means of identifying contaminants of potential concern (COPCs). A second upper guideline value, the ISQG-high, was also derived from the median of the effects data. This value has no particular significance except as being indicative of a

value above which there is a high probability of toxicity to benthic organisms. In 2013 the interim ANZECC (2000) guidelines for sediment quality were finalised.

The sediment quality investigation included sampling of surficial sediment; and comparison of analytical results to the Agriculture and Resources Management Council of Australia and New Zealand (ARMCANZ) and the Australian and New Zealand Environment and Conservation Council (ANZECC) (2013) sediment quality guideline values (SQGV).

Table 12.4 summarised assessment criteria for sediments that have been adopted from the ANZECC (2013) SQGV:

Table 12.4 : Adopted SQG - Low and SQG – High guideline values

Contaminant	SQG – Low (mg/kg)	SQG – High (mg/kg)
Arsenic (As)	20	70
Cadmium (Cd)	1.5	10
Chromium (Cr)	80	370
Copper (Cu)	65	270
Lead (Pb)	50	220
Nickel (Ni)	21	52
Mercury	0.15	1
Zinc (Zn)	200	410
Total PAHs	10	50

12.7 Selenium in sediments

No ANZECC screening criteria exists for selenium in sediments. In the absence of ANZECC screening criteria for selenium in sediment and in order to provide a comparison between the results of this investigation with that undertaken by ERM in 2014, the marine sediment screening value of 2 mg/kg, from the British Columbia Ministry of Environment (2001) *Ambient Water Quality Guideline,* for selenium has been adopted for the purposes of the investigation. As the guideline value has no regulatory standing in NSW, this value has been adopted for the sole purpose of providing a guideline for assessment of potential ecological risk, bioaccumulation in the food chain and selenium direct toxicity, and considered protective of selenium bioaccumulation into the food chain and its direct toxicity.

12.8 PFAS in sediments

The NSW EPA have advised the there are no suitable values for sediments for either human health or ecological protection at the time of issuing this report. EPA have taken advice from The Office of Environment and Heritage (OEH), specifically that OEH do not support the use of soil values for sediments. Consideration of PFAS concentrations sediments is important and useful to understand if there may be closed pathways to humans or ecological receptors. Accordingly, in the absence of specific sediment criteria, all screening values should only be used in conjunction with other investigations (soil, water, sediment) to account for potential leaching, off-site transport and bioaccumulation/secondary exposure.

Jacobs has referenced the most recent draft guidance from EPA and OEH for soil, water and biota for comparison purposes:

- PFAS Screening Criteria (May 2017) *Prepared by Contaminants and Risk, Environment Protection Science Branch, OEH Science DOC17/239693*

13. Results

13.1 Ash pond capping investigation

13.1.1 Site stratigraphy

The sub-surface material encountered in the test pits (TP01 to TP46) generally consisted of sandy clays and clayey sand fill materials. Depths of fill materials ranged from a minimum depth of 0.05 m bgl (TP06, TP11, TP18) to a maximum depth of 2.0 m bgl at TP43. The average depth of fill material across each of the ponds was 0.145 m bgl in Pond 1, 0.227 m bgl in Pond 2 and 0.56 m bgl in Pond 3. These materials were underlain by deposited waste fly ash from the Ash dam. No natural material was encountered during the investigation.

A summary of the nature and depth of capping material encountered during the excavation of each test pit, along with details of each test pit location is detailed in **Table 13.1.** A photo log showing the depth to ash is presented as **Appendix B**

Table 13.1: Test pit capping material descriptions

Test pit ID	Pond	Coordinates		Capping material description
		eastings	northings	
TP01	Pond 1	363068	6329013	Depth – 0.15 m bgl (PID 2.6ppm) Surface description - Gravels and shale . ACM observed on surface approximately 20 metres north of TP01 Fill - 0.15 m bgl – Gravelly clay, cream and orange with red mottling, overlying ash.
TP02	Pond 1	362953	6329001	Depth – 0.2 m bgl m bgl (PID 2.7ppm) Surface description – Gravels and shell Fill - 0.0 to 0.2 m bgl – Sandy gravelly clay with rock, overlying ash.
TP03	Pond 1	362829	6328988	Depth – 0.10 m bgl (PID 2.6ppm) Surface description – Gravel with shale, cement / concrete and fabric Fill – 0.0 to 0.1 m bgl – Gravelly clayey sand some clays and tile piece present, overlying ash.
TP04	Pond 1	362728	6328977	Depth –0.12 m bgl (PID 2.4ppm) Surface description – Clayey silt with gravel and rock fragments Fill – 0.0 to 12 m bgl – Silty sandy clay with occasional gravel and pebbles, overlying ash.
TP05	Pond 1	362554	6328929	Depth – 0.25 m bgl (PID 2.2ppm) Surface description – Grass Fill – 0.0 to 0.25 m bgl – Gravelly sandy clay with shells and pieces of concrete, overly ash.
TP06	Pond 1	362399	6328877	Depth – 0.05 m bgl (PID 1.2ppm) Surface description – Grass Fill – 0 to 0.05 m bgl – Gravelly clayey sands and sandy clays with fine gravels and occasional coarse gravels present, overly ash.
TP07	Pond 2	362241	6328770	Depth – 0.15 m bgl (PID 1.7ppm) Surface description – Grass

Test pit ID	Pond	Coordinates		Capping material description
		eastings	northings	
				Fill -0 to 0.15 m bgl – Clayey sand with occasional medium coarse gravel. Clay/sandy clay from 0.05. Plastic pipe and wood observed. Ash from 0.15 m bgl.
TP08	Pond 2	362307	6328639	Depth – 0.5 m bgl (PID 2.2ppm) Surface description – Grass Fill –0.0 to 0.5 m bgl - Clayey sands with fine gravels and occasional ferruginous rock (pebbles), overlying ash.
TP09	Pond 2	362140	6328643	Depth – 0.1 m bgl (PID 2.8ppm) Surface description – Grass Fill –0.0 to 0.1 m bgl - Clayey sand with occasional fine gravel and rock fragments, overlying ash.
TP10	Pond 2	362117	6328713	Depth – 0.0 to 0.15 m bgl (PID 2.0ppm) Surface description – Grass Fill – Clay.0 to 0.15 m bgl - Clayey sand / sandy clay, overlying ash
TP11	Pond 2	361816	6328509	Depth – 0.05 m bgl (PID 3.6ppm) Surface description – Silty clay with sparse marsh Fill – 0.0 to 0.05 m bgl – Silty Clay with occasional fine to coarse gravel, overlying ash.
TP12	Pond 2	361974	6328472	Depth – 0.15 m bgl (PID 2.5ppm) Surface description – Gravelly sand Fill – 0.0 to 0.15 – Clayey sands with some variable gravels (becoming sandy clay at 0.10 m bgl), overly ash.
TP13	Pond 2	362131	6328493	Depth – 0.2 m bgl (PID 3.0ppm) Surface description – Gravelly clayey sand Fill – 0.0 to 0.1 m bgl – Clayey sand with gravels / 0.1 to 0.2 – Clay /clayey sand, overly ash.
TP14	Pond 2	362250	6328475	Depth – 0.6 m.bgl (PID 1.3ppm) Surface description – grass/plant Fill – 0.0 to 0.4 m bgl; – Gravelly clayey sand, medium coarse with gravels (variable) and decaying wood present / 0.4 to 0.6 m bgl – Sandy clay, firm, medium dense, overlying ash.
TP15	Pond 2	362139	6328318	Depth – 0.45 m bgl (PID 2.5ppm) Surface description – Grass / Marsh Fill – 0.0 to 0.45 m bgl Sandy clay with rare coarse gravels/pebble, overlying ash.
TP16	Pond 2	361979	6328358	Depth – 0.4 m bgl (PID 1.5ppm) Surface description – Silt Fill – 0.0 to 0.4 m bgl – Heterogeneous material (clay, sandy clay, clayey sands and rock), variable colours, overlying ash.
TP17	Pond 2	361829	6328340	Depth – 0.08 m bgl (1.7ppm) Surface description – Sand Fill – 0.0 to 0.08 – Clayey sand, brown with light pale brown, medium coarse, medium dense, overlying ash.

Test pit ID	Pond	Coordinates		Capping material description
		eastings	northings	
TP18	Pond 2	361676	6328336	Depth –0.05 m bgl (PID 2.2ppm) Surface description – Grass Fill – 0.0 to 0.05 m bgl – Clayey sand, brown, medium coarse, medium dense overlying ash.
TP19	Pond 2	361668	6328164	Depth – 0.15 m bgl (PID 2.1ppm) Surface description – Grass Fill – 0.0 to 0.15 m bgl – Clayey sand, brown, medium coarse, soft, loose, overlying ash.
TP20	Pond 2	361836	6328181	Depth – 0.15 m bgl (PID 1.8ppm) Surface description – Clayey sand Fill – 0.0 to 0.15 mbgl – Clayey sands to sandy clays, heterogeneous, brown, grey, white, orange, red, soft to firm with some weathered rock, overlying ash.
TP21	Pond 3	362414	6328673	Depth -0.5 m bgl (PID 3.2ppm) Surface conditions – Grass / sandy clay Fill – 0.0 to 0.1 m bgl – Sandy clay with some gravels (fine), brown, dense, soft. 0.1 to 0.5 m bgl – Clayey sands / sandy clays / clay, brown with some light grey, medium dense, soft with gravels, overlying ash.
TP22	Pond 3	362440	6328787	Depth –0.45 m bgl (PID 1.3ppm) Surface description – Rock, moss, grass Fill – 0.0 to 0.45 m bgl – Clayey gravelly sand to 0.1 m bgl with clay with rock and sandy clay, brown, dense from 0.1 m bgl, overlying ash.
TP23	Pond 3	362629	6328789	Depth – 0.45 m bgl (PID 1.4ppm) Surface description – Grass / swamp Fill – 0.0 to 0.1 m bgl – Clayey sands, brown with occasional gravel, soft. 0.1 to 0.45 m bgl – Clay, heterogeneous, grey, brown, red, orange, very dense, stiff with sandstone rubble, overlying ash.
TP24	Pond 3	362654	6328650	Depth –0.4 m bgl (PID 1.7ppm) Surface conditions – Grass Fill – Gravelly sandy clay / clayey gravels, brown, soft. Gravels variable, overlying ash.
TP25	Pond 3	362761	6328762	Depth – 0.5 m bgl (PID 0.8ppm) Surface conditions – Grass, clayey sands, bricks and rubble. Fill – 0.0 to 0.15 m bgl – Clayey sand with coarse gravel, brown, fine grained, soft. Some brick fragments 0.15 to 0.5 m bgl – Sandy clay, cream with some grey, light brown, yellow and orange, very dense, stiff, overlying ash.
TP26	Pond 3	362776	6328661	Depth - 0.5 m bgl (PID1.4ppm) Surface conditions – Grass Fill – 0.0 to 0.5 m bgl – Gravelly sandy clay, very dense, soft, fine grained, overlying ash.
TP27	Pond 3	362765	6328500	Depth – 0.6 m bgl (PID 1.4ppm) Surface conditions – Grass

Test pit ID	Pond	Coordinates		Capping material description
		eastings	northings	
				Fill – 0.0 to 0.2 m bgl – Gravelly clayey sands, brown, medium coarse. 0.2 to 0.6 m bgl – Gravelly clayey sands / sandy clay, brown, medium coarse, dense to very dense. Brick, wood and bitumen present. Ash from 0.6 m bgl.
TP28	Pond 3	362941	6328469	Depth – 0.55 m bgl (PID 1.7ppm) Surface conditions – Grass Fill – 0.0 to 0.55 m bgl - Clayey sand with occasional gravel and rock (50mm), light brown / grey with some pale lime green inclusions, hard. Occasional clay. Ash from 0.55 m bgl.
TP29	Pond 3	362195	6328643	Depth – 0.5 m bgl (PID 3.1ppm) Surface conditions – Grass Fill – 0.0 to 0.25 m bgl - Clayey sand with occasional gravel, brown, fine to medium coarse, soft. 0.25 to 0.5 m bgl – Clay, heterogeneous, brown, light brown, orange, light grey, red, dense to very dense, overlying ash.
TP30	Pond 3	362940	6328799	Depth – 0.9 m bgl (PID 4.2ppm) Surface conditions – Grass Fill – 0.0 to 0.1 m bgl - Sandy / silty clay, brown soft, medium dense, fine grained sands. 0.1 to 0.9 m bgl – Sandy clay with weathered sandstone, medium coarse to coarse, light brown, yellow, orange and red with occasional light grey and black (weathered rock), overlying ash.
TP31	Pond 3	363080	6328795	Depth – 0.4 m bgl (PID 4.7ppm) Surface conditions – Grass Fill – 0.0 to 0.25 m bgl – Clayey sand with occasional brick, brown, soft. 0.25 to 0.4 m bgl – Clayey sand, brown, soft with 70% weathered sandstone, medium coarse, overlying ash.
TP32	Pond 3	363088	6328643	Depth – 0.45 m bgl (PID 4.7ppm) Surface conditions – Grass Fill – 0.0 to 0.25 m bgl - Clayey sand to sandy clay, brown, medium dense to dense, soft. 0.25 to 0.45 m bgl – Weathered coal / coal ash, black, overlying ash.
TP33	Pond 3	363097	6328468	Depth – 0.5 m bgl (PID 2.7ppm) Surface conditions – Grass Fill – 0.0 to 0.1 m bgl – Clay sand, silt, brown, fine, very soft. 0.1 to 0.5 m bgl – Weathered sandstone / sandy clay, light grey with pale orange, medium coarse, soft to firm, overlying ash.
TP34	Pond 3	363108	6328327	Depth – 0.45 m bgl (PID 2.7ppm) Surface conditions – Grass Fill – 0.0 to 0.45 m bgl – Silty clay to clay with rare gravel, fine to medium coarse, dense to very dense, overlying ash.
TP35	Pond 3	363248	6328160	Depth – 0.45 m bgl (PID 2.4ppm) Surface conditions – Grass Fill – 0.0 to 0.45 m bgl - Sandy gravelly clay, brown, soft, medium dense.

Test pit ID	Pond	Coordinates		Capping material description
		eastings	northings	
				Concrete and brick present. Ash from 0.45 m bgl.
TP36	Pond 3	363248	6328346	Depth – 0.55 m bgl (PID 3.3ppm) Surface conditions – Grass Fill – 0.0 to 0.55 m bgl - Clay, heterogeneous, brown, grey, white, yellow, orange, red, medium dense to dense, soft. Crushed rock, gravel and sandy clay present, overlying ash.
TP37	Pond 3	363264	6328475	Depth – 0.6 m bgl (PID 2.9ppm) Surface conditions – Grass / gravelly silt Fill – 0.0 to 0.15 m bgl – Clayey sand, brown, fine to medium coarse with occasional gravel (fine). 0.15 to 0.6 m bgl – Sandy clay with some gravel and crushed weathered sandstone, soft to firm, dense. Decaying timber present. Ash from 0.6 m bgl.
TP38	Pond 3	363282	6328659	Depth – 0.3 m bgl (PID 4.1ppm) Surface conditions – Grass / moss / gravel Fill – 0.0 to 0.3 m bgl – Sandy clay with weathered sandstone, brown with orange and yellow bands (sandstone), medium dense to very dense, fine to medium coarse, overlying ash.
TP39	Pond 3	363275	6328805	Depth – 0.75 m bgl (PID 0.9ppm) Surface conditions – Grass Fill – 0.0 to 0.1 m bgl – Clayey sand to sandy clay, brown, medium dense to dense, soft, medium coarse. 0.1 to 0.75 m bgl – Sandy clay with highly weathered ferruginous rock (turned clay), brown and grey, very dense and soft, overlying ash.
TP40	Pond 3	363413	6328600	Depth – 0.65 m bgl (PID 1.5ppm) Surface conditions – Grass Fill – 0.0 to 0.1m bgl – Silty clay, dark grey, soft. 0.1 to 0.65 m bgl – Clay with fine gravels, heterogeneous, brown with light grey, red, orange, very dense to compact, soft, overlying ash.
TP41	Pond 3	363418	6328461	Depth – 0.6 m bgl (PID 2.7ppm) Surface conditions – Grass / plants Fill – 0.0 to 0.15 m bgl – Clayey sand, brown, very soft. 0.15 to 0.6 m bgl – Sandy clay with weathered sandstone and sands, light grey with cream and orange, red, medium coarse, dense, soft, overlying ash.
TP42	Pond 3	363391	6328337	Depth – 0.4 m bgl (PID 2.4ppm) Surface conditions – Rocky sand Fill – 0.0 to 0.4 m bgl – Heterogeneous (sandy clay with rock rumble (various) and sandstone), grey, red, orange, light brown, soft, dense, overlying ash.
TP43	Pond 3	363381	6328141	Depth – 2.0 m bgl (PID 1.9ppm) Surface conditions – Gravel Fill – 0.0 to 0.15 m bgl – Gravelly sand with crushed sandstone, medium coarse to coarse, soft. Gravel variable. 0.15 to 2.0 m bgl – Clay, heterogeneous, white, orange, red, light brown, very dense, soft to stiff. Brick present within 0.0 to 1.0 m bgl. Test pit terminated at

Test pit ID	Pond	Coordinates		Capping material description
		eastings	northings	
				2.0 m bgl.
TP44	Pond 3	363532	6328152	Depth – 0.45 m bgl (PID 2.1ppm) Surface condition– Grass Fill – 0.0 to 0.05 – Clayey sand, brown with gravels, coarse, soft, loose. 0.05 to 0.45 m bgl – Heterogeneous (clay, sandy clay, rock), brown, grey, light brown, orange, red, medium dense, soft, overly ash.
TP45	Pond 3	363583	6328328	Depth – 0.0 to 0.1 m bgl (PID 2.3ppm) Surface condition – Grass Fill – 0.0 to 0.1 m bgl – Sandy clay, white, cream, medium dense, soft. Gravels present. 0.1 to 0.65 m bgl – Clayey sand with crushed weathered rock rubble, brown, coarse grained, medium dense, soft, overlying ash.
TP46	Pond 3	363577	6328479	Depth – 0.5 m bgl (PID 2.4ppm) Surface condition - Grass Fill – 0.0 to 0.15 m bgl – Clayey sand, brown, fine grained, soft, loose to medium dense. 0.15 to 0.5 m bgl – Clay with sandy clay, rock and gravel, heterogeneous, brown, orange, red, light brown and light grey, dense to very dense, overlying ash.

13.1.2 Aesthetics

A number of aesthetic issues (i.e. presence of erroneous wastes) were observed during the capping investigation at the Ash Ponds, as detailed in **Table 13.2**.

Table 13.2 Aesthetic issues

Investigation Location	Depth (m bgl)	Aesthetic Issues
TP01	Surface	ACM located approximately 20m north of sample location
TP03	0.0 to 0.15	Tile fragment observed within fill material
TP05	0.0 to 0.1	Concrete observed within fill material
TP07	0.0 to 0.15	Plastic pipe and wood/timber observed in fill material
TP14	0.0 to 0.4	Decaying wood/timber observed in fill material
TP27	0.0 to 0.6	Brick, wood/timber and bitumen observed in fill material
TP32	0.25 to 0.45	Weathered coal / ash observed in fill material
TP35	0.0 to 0.45	Concrete and brick observed within fill material
TP37	0.15 to 0.6	Decaying wood/timber observed within fill material
TP43	0.15 to 2.0	Brick observed within fill material.

In addition to the aesthetic issues summarised in **Table 13.2,** heterogeneous material was noted in a number of test pits. These test pits included TP16, TP20, TP29, TP42, TP43, TP44 and TP46.

In conjunction with visual observations, observable odours and VOC concentrations were monitored at all locations during the investigation. No notable foreign odours were observed at any of the locations and VOC concentrations measured using a PID were low.

No evidence of stress was noted in the observed flora within the Ponds. Vegetation where present appeared in good health.

13.2 Soil analytical results

Soil analytical results from samples collected from boreholes (TP01 to TP46) are presented below and in **Table A.** Laboratory certificates of analysis are presented in **Appendix D.**

13.2.1 Heavy metals

Concentrations of all heavy metals in all soil samples analysed were below the adopted SAC.

13.2.2 Total recoverable hydrocarbons (TRH)

The concentrations of TRH compounds in all soil samples analysed were below the LOR and SAC.

13.2.3 Benzene Toluene Ethylbenzene Xylenes (BTEX)

The concentrations of BTEX compounds in all soil samples analysed were below the LOR and below the SAC.

13.2.4 Polycyclic aromatic hydrocarbons (PAH)

The concentrations of all PAH compounds in all soil samples were below the SAC.

13.2.5 Polychlorinated biphenyls (PCB)

The concentrations of PCB compounds in all soil samples analysed were below the LOR and the SAC.

13.2.6 Asbestos

A visual inspection of surface soils for potential ACM fragments was undertaken at each of the test pit locations (where possible) prior to the commencement of drilling. Where the surface of the site and surface soils were visible, no potential ACM fragments were observed at or in the near vicinity of the sampling locations.

Asbestos was not detected in any of the samples submitted for analysis.

13.2.7 pH

The lowest reported pH was 4.6 and the maximum reported pH was 8.5. Comparison with the discharge limits for discharge to waters prescribed in the site's environment protection license (EPL 761) for Point 18 (Overboarding of Ash Dam) indicated 26 samples which reported pH levels outside of the discharge limit of 6.5 to 9.0. Of the samples with pH levels outside of the discharge limits, all were below 6.5 units indicating soils were slightly to moderately acidic in nature.

13.2.8 Electrical conductivity

The lowest recorded electrical conductivity was 19 µs/cm and the highest reported electrical conductivity was 5450 µs/cm. Only one location, TP11 (5450 µs/cm) had a concentration indicative of saline soil. No SAC has been identified for electrical conductivity.

13.3 Sediment investigation

13.3.1 Stratigraphy and sediment particle size determinations

Sediments were cored and sampled at 8 sample locations as part of the sediment investigation. Sediment at location J1 was gravelly silty sand with bivalve shells. Sediments from locations J2 and J4 was typically gravelly silts which included bivalve shells (approximately 47.9% gravel. At locations J3 and J5 sediments were composed of sandy silts with a gravel component and at locations J6, J7 and J8 sediment cores presented cores composed of sandy silts with a maximum gravel component of 9.3%.

The maximum depth of sediments sampled was 1.5 m in 3 intervals (0.0 to 0.5 m, 0.5 to 1.0 m and 1.0 to 1.5 m) at J6. Sediment cores from locations J2, J3, J5, J7 and J8 were sample to a maximum depth of 1m at two intervals (0.0-0.5 m to 0.5 to 1.0 m). Refusal of the piston corer was encountered at two locations, J1 at 0.8 m and J4 at 0.4 m. From J1 samples were collected in two intervals (0.0 to 0.4 m and 0.4 to 0.8 m) and from J4 a sample was collected at one interval (0.0 to 0.4 m).

Results of the sediment particle size determinations are detailed in Geochemical Assessments', Vales Point Sediment Assessment Report provided in **Appendix A**. A photo log of sub-samples collected from the sediment sample locations is presented in **Appendix C.**

13.3.2 Microscopic examination of sediment coarse fractions

Microscopic examination undertaken by Geochemical Assessment of sediment samples indicated the coarse fraction of most samples was comprised of abundant quartz, quartzite and shells/shell fragments. Many samples also contained black, carbonaceous material, or aggregates of brown, organic material.

Coal was observed in sediments from locations J5, J6 and J8. The highest percentage of coal was observed in the surficial (0.0-0.5 m) samples at locations J5 (up to 40%) and J8 (~20%). Note that coal particles may be present in the fine (<63 µm) fraction of sediment, but this fraction was not examined as the particles would be too small to be positively identified.

Coke was observed only in sample, J7 0.5-1.0 and charcoal common in sample J7 0.0-0.5, but not observed in other samples.

Results of the sediment particle size determinations are detailed in Geochemical Assessments', Vales Point Sediment Assessment Report provided in **Appendix A**

13.3.3 Sediment analytical results

Sediment analytical results from samples collected from sample locations (J1 to J8) are presented below and in **Table B.** Laboratory certificates of analysis are presented in **Appendix B.**

13.3.4 PAH (ultra low trace)

The concentrations of all PAH (ultra low trace) compounds in all sediment samples were below the SAC.

13.3.5 Trace heavy metals (As, Cd, Co, Cr, Cu, Ni, Pb, Zn, Hg and Se)

The concentrations of all heavy metals in all sediment samples analysed were below the adopted SAC with the exception of:

- Cadmium concentrations detected in samples J5-0.5 (1.8 mg/kg), J5.0.5_DUP (3.3 mg/kg) and J8_0.8 (2.3 mg/kg) which exceeds the SQG-Low guideline value of 1.5 mg/kg)

- Mercury concentrations detected in sample J5-0.5 (0.16 mg/kg) and in sample J5.0.5_DUP (0.21 mg/kg) which exceeds the SQG-Low guideline value of 1.5 mg/kg)
- Selenium concentrations detected in twelve of sixteen samples which exceeds the adopted screening value of 2 mg/kg. Samples were:
  - J2-0.5 (3.3 mg/kg)
  - J2-1.0 (3.2 mg/kg)
  - J3-0.5 (5.3 mg/kg) / J3-DUP 0.5 (3.5 mg/kg)
  - J3-1.0 (3.2 mg/kg)
  - J5-0.5 (2.8 mg/kg) / J5-0.5 DUP (3.9 mg/kg)
  - J5-1.0 (2.9 mg/kg)
  - J6-0.5 (2.5 mg/kg)
  - J6-1.0 (2.6 mg/kg)
  - J6-1.5 (2.7 mg/kg)
  - J7-1.0 (2.7 mg/kg)
  - J8-0.8 (5.9 mg/kg)
  - J8-1.0 (2.7 mg/kg)

For samples where a primary and duplicate sample was taken, the sample with the highest recorded concentration of specific contaminants has been adopted for the consideration of chemical analysis results.

13.3.6 Total Organic Carbon (TOC)

The total organic carbon contents of sediment subsamples varied from 0.3% to 6.05%.

13.3.7 PFAS

The concentrations of PFAS compounds in all sediment samples analysed were below the laboratory limits of reporting.

13.4 Preliminary waste classification

To assess the waste classification of the material encountered during the investigations into the capping material in ponds 1, 2 and, a review of the laboratory analytical results was undertaken in accordance with the appropriate specific contaminant concentrations (SCC) detailed in the NSW EPA (November 2014) Waste Classification Guidelines – Part 1: Classification of wastes (NSW EPA, 2014). Based on the review, no exceedances of the CT1 criteria detailed in Table 1 of the NSW EPA (2014) guidelines for general solid waste.

14. Discussion

14.1 Capping material

Samples of soil / capping material collected from the test pits were analysed for contaminants of concern which may be present within the capping material used in Pond 1, Pond 2 and Pond 3 and which indicate general contamination.

No natural materials were observed within test pit locations. With the exception of TP43, ash was found underlying the capping layer at all locations. The depth and vertical extent of the capping layer varied vertically and laterally across the site with capping material generally less than the 0.5m in thickness. The shallowest ash was encountered was at 0.05 m bgl (TP06, TP11 and TP18) with the deepest at 0.9 m bgl (TP30).

The following aesthetic issues were identified at the site:

- ACM located on the surface approximately 20 north of sample location, TP01.
- Deleterious materials (brick, concrete, plastic pipe etc.) observed within TP03, TP05, TP07, TP14, TP27, TP32, TP35, TP37, TP43.
- Heterogeneous material observed within TP16, TP20, TP29, TP42, TP43, TP44 and TP46.

Soil samples from test pits were selected for analysis based generally on providing vertical and lateral coverage of potential contaminant extents within the capping material and on visual observations. All soil samples recorded contaminant concentrations below the adopted SAC.

Although the analytical results indicate a lack of pre-existing contamination, the presence of deleterious material as well as heterogeneous material within select test pits locations indicates that capping material at these locations was likely either not sourced from a VENM or ENM source or has experienced disturbance and / or undergone mixing with non VENM or ENM material during or following placement of capping material.

No asbestos was detected within samples analysed or observed within soil samples or within capping material and was not observed on the surface with the exception of one fragment located 20 m north of TP01.

Preliminary waste classification of the samples analysed indicated that the material sampled during the investigation would be classified as General Solid (non-putrescible)

Based on comparison with discharge limits (pH 6.5 to 9.0) identified in the site's EPL, 26 sample locations which had pH levels outside (below pH 6.5) the discharge limits. The pH levels at these locations indicated soils were slightly to moderately acidic in nature. Electrical conductivity results indicated soils for the majority were not saline in nature, with the exception of one location, TP11 which had an electrical conductivity of 5450 µS/cm. Based on the electrical conductivity concentrations and pH levels, risk of acid sulphate soils being present within the capping material is low.

14.2 Sediment

Sediment samples collected from the sediments cores taken from Wyee Bay were analysed to determine the presence and extent of contaminants of concern which may be present within sediments and to provide a better understanding of existing impacts which had previously identified by ERM in 2014 as part of a Stage 2 ESA.

Sediment samples from the sediment cores were selected for analysis based generally on providing vertical coverage of contamination and potential contaminant extents. The majority of sediment samples recorded contaminant concentrations below the adopted SAC with a small of samples reporting concentrations of contaminant compounds above the SAC for cadmium, mercury and selenium.

The results of laboratory analysis indicated elevated concentrations above the ANZECC SQG-low criteria for cadmium concentrations at J5 and J8 sample locations and mercury concentrations at J5 sample location. Selenium concentrations were reported above the adopted guideline value at six of the eight sample locations (J2, J3, J5, J6, J7 and J8).

The SQG-Low values which were exceeded for cadmium and mercury represent concentrations where the likelihood of adverse biological impacts are expected to be very low, whereas the SQG-High value represents concentrations where the likelihood of adverse impacts are more likely to occur. In consideration of this if exceedance of the SQG values occurs it does not necessarily indicate adverse biological impact are likely to occur but rather, indicates that additional investigations/assessment may be required to determine if there is indeed a risk to posed by the exceedance. With this in mind, based on the location of both sample locations, the exceedance of cadmium at J5 and J8 and the marginal exceedance of mercury at J5 are unlikely to indicate the impacts are the result of inputs from the Vales Point Power Station or Ash Dam.

Exceedances of the adopted selenium screening criteria were identified at the majority of sediment sample locations, the highest of which was at J5 with 3.9 mg/kg in J5-0.5 DUP. Based on the exceedances and comparisons to results reported by ERM in 2014, the concentrations of selenium may be the result of inputs from the operation of the power station as well as from the Ash Dam, urban run-off and other land uses. Comparison between the locations sampled as part of this investigation to the corresponding locations sampled as part of ERM (2014) indicates similar concentrations between the two. Although Mannering Creek and Mannering Bay, in which the highest concentrations were previously reported by ERM in 2014,were not sampled as part of this investigation, there is a potential that the selenium concentrations reported in sample locations in Wyee Bay, especially J6 to J8 can be attributed to inputs from the ash dam as both Mannering Creek and Mannering Bay feed into Wyee Bay.

An assessment of the distribution of coal in Wyee Bay was undertaken by Geochemical Assessments (2017) as part of the sediment investigation undertaken by Jacobs. The results of that assessment identified coal in the coarse fraction of sediment subsamples at locations J5, J6 and J8 situated west of the Vales Point Power Station.

TOC contents over 5% are uncommon in sediment samples. TOC contents (>6%) in subsamples J5 0.0-0.5 and J8 0.0-0.5 correlated with the highest observed contents of coal particles in sediment subsamples and suggests a significant contribution to TOC values from coal.

Concentrations of total PAH which were normalised to 1% TOC in sediments, did not exceed the SQG – Low values (4 mg/kg). The highest concentration of total PAHs was 3.19 mg/kg.

Comparison between PAH concentrations reported in the Jacobs additional baseline investigation (Jacobs 2017) with PAH concentrations reported in ERM (2014), indicate concentrations reported in Jacobs additional baseline investigation were typically lower than concentrations reported in ERM 2014. A correlation does appear to exist when concentrations of individual PAHs have been reported above the LOR in comparable sample locations. For example, comparisons between sample locations, J5 (Jacobs 2017) to VR_W_SS04 (ERM 2014) and J8 (Jacobs 2017) to VR_W_SS03 (ERM 2014) all report concentration above the LOR for Acenaphthylene, Naphthalene, Fluroene and Phenanthrene.

Although there were no exceedances of the applied SQG guideline (5 mg/kg) for Total PAHs in Jacobs (2017) additional baseline investigation and there were two exceedances of the ISQG-Low (4 mg/kg) for Total PAHs reported at two sample locations in ERM (2014), it should be noted the sediment quality guidelines applied in ERM (2014) are different to guidelines applied by Jacobs for the additional baseline investigation. Where ERM in 2014 applied the ANZECC (2000) interim sediment quality guidelines (ISQG), Jacobs has applied the ANZECC (2000) sediment quality guidelines (SQG) which were revised in Simpson SL, Batley GB and Chariton AA (2013), *Revision of the ANZECC/ARMCANZ Sediment Quality Guidelines.* As such there is a limited comparability between the two data sets for PAHs when considering the adopted guideline values in ERM (2014) and Jacobs (2017)

Concentrations of total PAHs exceeded 0.25 mg/kg in sediment at locations J3 0.0-0.5 and J6 0.5 -1.0, however coal was not observed in the coarse fraction of sediment. This suggested that coal particles may be present in the fine fraction of sediment.

The percentage of coal estimated (semi-quantitatively) by microscopic examination (see **Appendix A – Vales Point Sediment Assessment (Geochemical Assessments, 2017) – Table 4** for details) refers to the proportion of coal in the coarse (>63 µm) fraction of sediment. The proportion of coal in whole sediment calculated assuming nil coal in the fine sediment fraction (J5 0.0-0.5, 3.8%; J6-0.5, 0.4%; J8 0.0-0.5, 2.6% and J8 0.5-1.0, 1.7%) would likely underestimate the actual percentage of coal in sediment.

The highest concentrations of PAHs in sediment were consistent with the presence of coal fragments in the coarse fraction of sediment subsamples. Concentrations of PAHs in surficial subsamples J5 0.0-0.5 and J8 0.0-0.5 (2.86 and 3.19 mg/kg, respectively) correlated with the highest observed content of coal particles in sediment and suggests a significant contribution by coal to these PAH concentrations.

Concentrations of inorganic contaminants are generally low in comparison to relevant sediment quality guideline values, and waterways in other urbanised and industrial areas in NSW.

14.3 Revised conceptual site model

Based on the results of the capping investigation undertaken in Ponds 1,2 and 3 of the Vales Point Ash Dam and sediment investigation in Wyee Bay the following revised CSM was developed identifying source-pathway-receptor linkages which were tested during the investigation to assess the risk of contamination (if present) impacting upon human health and environmental receptors in the context of the proposed road construction works and current status of the site (site occupied but not an operational service station).

The revised CSM for the site is presented as **Table 14.1**.

Table 14.1: Revised conceptual site model

Source	Pathway	Receptor	Contamination Investigation results	Jacobs Risk Ranking
Vales Point Ash Dam – Ponds 1,2,3 Imported capping material	Infiltration & leaching	Groundwater beneath the site	Groundwater was not encountered. Results were either below the SAC and/or the LOR. Infiltration of potential contaminants through underlying ash unlikely.	Very Low
	Dermal absorption	Terrestrial fauna Human receptors (site	Results were either below the SAC and/or the LOR. The concentrations of contaminant compounds detected in samples are unlikely to significantly impact upon terrestrial	Very Low

Source	Pathway	Receptor	Contamination Investigation results	Jacobs Risk Ranking
		workers)	fauna or on-site workers at the site.	
	Inhalation of asbestos fibres	Human receptors (site workers) .	No asbestos fibres were identified in the samples analysed. Asbestos (as ACM) was not encountered within test pits during sampling or analysis. Known asbestos dump present in the south east of Pond 3. Area demarcated. If disturbed risks associated with exposure would increase.	Low
	Ingestion (direct contact)	Terrestrial fauna Human receptors (site workers)	Results for heavy metals, hydrocarbons (TRH, BTEX, PAH), OCP, PCBs were either below the SAC and/or the LOR with the exception of a localised exceedance of the zinc EIL reported within the surface fill at one location in the vicinity of the fertiliser storage sheds. The concentrations of contaminant compounds detected in samples are unlikely to significantly impact upon terrestrial fauna at the site.	Low
	Inhalation of vapours (on-site)	Human receptors (on-site users / workers)	Results were either below the SAC and/or the LOR. The concentrations of contaminant compounds detected in samples are unlikely to significantly impact upon terrestrial fauna or on-site workers at the site.	Very Low
Sediments in Wyee Bay - Discharges from Vales Point Ash Dam and/or Vales Point Power Stations	Dermal absorption	Human receptors (recreation users)	Results indicated heavy metal exceedance above the SAC of cadmium, mercury and selenium in sediments samples. The concentrations of contaminant compounds detected in samples are unlikely to represent a significant risk to human health via dermal contact.	Low
	Ingestion (direct contact)	Human receptors (recreation users)	Results indicated heavy metal exceedance above the SAC of cadmium, mercury and selenium in sediments samples. The concentrations of contaminant compounds detected in samples are unlikely to represent a significant risk to human health via ingestion.	Low
	Ecological Exposure	Aquatic fauna / benthic organisms	Results indicated heavy metal exceedance above the SAC of cadmium, mercury and selenium in sediments samples. The concentrations of contaminant compounds detected in samples have the potential to adversely impact marine organisms exposed to the sediments.	Moderate
	Seafood consumption	Human receptors (fishers and consumers)	Results indicated heavy metal exceedance above the SAC of cadmium, mercury and selenium in sediments samples. Considering the potential of impacts to marine organisms which may come into contact with sediments, there is a potential for fish to have elevated concentrations of contaminants such as selenium. Subsequently consumption of fish taken from Wyee Bay and surrounding water bodies may increase the risk of human health impacts.	Moderate

15. Conclusions and Recommendations

Jacobs have undertaken the baseline contamination assessment of the capping material in Pond 1, 2 and 3 of the Vales Point Ash Dam and sediments in Wyee Bay surrounding the Vales Point Power Stations located in Mannering Park, NSW. Conclusions and recommendations following the investigation are detailed in the following sub-sections.

15.1 Conclusions

15.1.1 Capping Investigation

Based the results of the laboratory analysis, contamination above the SAC was not identified within Pond 1, 2 and 3. Thus, pre-existing or legacy contamination within the sampled capping material was not present within the pond capping material. Risks associated with current and future uses and risks to site users in the form of constructions workers and to ecological receptors is considered low.

In consideration of the presence of heterogeneous and deleterious material within capping materials at select locations in each of the ponds, as well as the uncertainties around the source of capping materials and that capping of ponds commenced in 1990's prior to the introduction of the VENM framework, the capping material is not considered suitable for classification as VENM or ENM. Although the capping material cannot be classified as VENM or ENM, preliminary waste classification indicates the material is suitable for classification as general solid waste (non-putrescible).

15.1.2 Sediment Investigation

Based on the field and analytical result, Jacobs concludes the following:

- Sediment textures vary greatly in the southern section of Lake Macquarie from muds, to gravels composed of shells and lithic fragments.
- Coal is present in sediment to the west and northwest of Vales Point Power Station. The distribution of coal in sediment west and northwest of the Vales Point Power Station is not clearly defined by the current sampling locations.
- The highest concentrations of PAHs and higher TOC content in sediment were consistent with coal particles observed in sediment.
- Concentrations of total, normalised PAHs in sediment did not exceed relevant sediment quality guideline values.
- Trace metal concentrations in sediment are generally below the SAC with the exception of mercury and cadmium which marginally exceeded the relevant sediment quality guidelines values at two locations (J5 and J8).
- PFAS compounds were reported as below the limits of reporting at all eight sediment sample locations.

Elevated selenium concentrations above the adopted guideline value were reported in samples from six of the eight sample locations. Based on the results from Jacobs investigations and comparison to ERM (2014) there is evidence to suggest inputs from the ash dam and operation of the power station in the form of licenced

discharges and run-off, along with other land uses in the area such as mines and industry may have contributed to the selenium concentrations in sediments within Wyee Bay.

Comparisons between the results reported in ERM 2014 to results from this investigation indicate similar concentrations between the two. Furthermore there does not appear to have been an increase in concentrations since ERM completed their investigation in 2014. The selenium concentrations reported in the sediments of Wyee Bay have potential to have adverse impacts on marine organisms within Wyee Bay and surrounding water bodies. Subsequently there is an additional health risk to consumers of fish taken from the bay, as elevated concentrations may be present within the fish.

16. References

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Limitations

The sole purpose of this report and the associated services performed by Jacobs is to assess the condition of the site (with respect to soil and groundwater contamination) in accordance with the scope of services set out in the contract between Jacobs and Delta Electricity (the Client). That scope of services, as described in this report, was developed with the Client.

In preparing this report, Jacobs has relied upon, and presumed accurate, any information (or confirmation of the absence thereof) provided by the Client and/or from other sources. Except as otherwise stated in the report, Jacobs has not attempted to verify the accuracy or completeness of any such information. If the information is subsequently determined to be false, inaccurate or incomplete then it is possible that our observations and conclusions as expressed in this report may change.

Jacobs derived the data in this report from information sourced from the Client (if any), from observations made during the investigations and data from analytical laboratories. The passage of time, manifestation of latent conditions or impacts of future events may require further examination of the project and subsequent data analysis, and re-evaluation of the data, findings, observations and conclusions expressed in this report. Jacobs has prepared this report in accordance with the usual care and thoroughness of the consulting profession, for the sole purpose described above and by reference to applicable standards, guidelines, procedures and practices at the date of issue of this report. For the reasons outlined above, however, no other warranty or guarantee, whether expressed or implied, is made as to the data, observations and findings expressed in this report, to the extent permitted by law.

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Figures

JACOBS NSW SPATIAL - GIS MAP file : IA137000_NSW_GIS_F001_Capping_r1v2 | 26/04/2017 | DRAWN BY: WG | NSWSpatialGIS@jacobs.com

Legend

- Test pit sample locations
- Pond

0 150 300m

1:6,000 @ A3

N

Figure 1 | Vales Point Ash Damn capping investigation

Data sources

Jacobs 2017
Ausimage 2015
LPI 2017

JACOBS NSW SPATIAL - GIS MAP file : IA137000_NSW_GIS_F002_Sediment_r1v2 | 26/04/2017 | DRAWN BY: WG | NSWSpatialGIS@jacobs.com

Legend

- Sediment sample location

0 300 600m

1:13,500 @ A3

N

Figure 2 | Wyee Bay sediment investigation

Data sources

Jacobs 2017
Ausimage 2015
LPI 2017

Tables

Table A: Soil Analytical Results – Capping Investigation

Table B: Sediment Analytical Results

Table C: QA/QC Duplicates – Capping Investigation

Table D: QA/QC Duplicates – Sediment Investigation

Table E & F: QA/QC Trip Blanks and Trip Spikes

										Field_ID	TP01	TP02	TP03	TP04	TP05	TP06	TP07	TP08	TP09	TP10	TP11	TP12	TP13
										LocCode	TP01	TP02	TP03	TP04	TP05	TP06	TP07	TP08	TP09	TP10	TP11	TP12	TP13
										Sampled_Date-Time	27/02/2017	27/02/2017	27/02/2017	27/02/2017	27/02/2017	27/02/2017	27/02/2017	27/02/2017	27/02/2017	27/02/2017	27/02/2017	27/02/2017	27/02/2017
										Lab_Report_Number	ES1704772	ES1704772	ES1704772	ES1704772	ES1704772	ES1704772	ES1704772	ES1704772	ES1704772	ES1704772	ES1704772	ES1704772	ES1704772
										Matrix_Description	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
				NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil	NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Silt		NEPM 2013 Table 1B(6) ESLs for Comm/Ind	NEPM 2013 EILs - Urban residential & open public spaces / Commercial Industrial	CRC Care Table B4 Intrusive Maintenance Worker	NSW 2008 General Solid Waste (CT1 & SCC1)													
Method_Type	**ChemName**	**Units**	**EQL**		0-1m	1-2m	0-2m																	
Inorganics	Moisture Content	%	1								21.3	12.4	18.3	17.4	13.9	20	22	13.9	30.4	43	31.6	14.3	18.2
	EC_lab	µS/cm	0.1								801	2100	3640	1500	116	322	174	88	27	42	5450	1350	1990
	pH (Lab)	pH_Units	0.1								8.5	7	5.2	7.8	7.8	8.2	5.9	5.4	6.1	6.2	7.6	8.2	7.9
	pH (CaCl2)	pH Unit	0.1								7.9	-	-	-	7	-	-	4.6	-	-	-	-	-
	Density (clay/silt/sand)	g/cm3	0.01								2.59	-	-	-	2.59	-	-	2.64	-	-	-	-	-
CEC, pH, % Clay	Exchangable Calcium	meq/100g	0.2								3.3	-	-	-	3.6	-	-	0.4	-	-	-	-	-
	Exchangable Magnesium	meq/100g	0.2								0.9	-	-	-	1.1	-	-	1.8	-	-	-	-	-
	Exchangable Potassium	meq/100g	0.2								<0.2	-	-	-	0.2	-	-	0.1	-	-	-	-	-
	Exchangeable Sodium	meq/100g	0.2								1	-	-	-	<0.2	-	-	0.7	-	-	-	-	-
	Cation Exchange Capacity	meq/100g	0.2								5.3	-	-	-	5.1	-	-	3.0	-	-	-	-	-
	Clay (<2 µm)	%	1								26	-	-	-	18	-	-	18	-	-	-	-	-
	Iron	%	0.005								4.65	-	-	-	0.852	-	-	3.6	-	-	-	-	-
Organics	Total Organic Carbon (TOC)	%	0.5								<0.5	-	-	-	0.8	-	-	<0.5	-	-	-	-	-
	Organic Matter	%	0.5								<0.5	-	-	-	1.4	-	-	<0.5	-	-	-	-	-
Asbestos Identification in Soils	Asbestos Detected	g/kg	0.1								ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Asbestos Type	-	-								-	-	-	-	-	-	-	-	-	-	-	-	-
	Sample weight (dry)	g	0.01								24.6	330	366	356	37	354	380	36.9	352	398	284	492	365
PAH/Phenols (SIM)	Benzo(a)pyrene TEQ (LOR)	mg/kg	0.5								1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
	Benzo(b+j)fluoranthene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)pyrene TEQ calc (Half)	mg/kg	0.5								0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Benzo(a)pyrene TEQ calc (Zero)	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Acenaphthene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Acenaphthylene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Anthracene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benz(a)anthracene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a) pyrene	mg/kg	0.5				0.7			0.8 | 10	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(g,h,i)perylene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(k)fluoranthene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Chrysene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Dibenz(a,h)anthracene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Fluoranthene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Fluorene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Naphthalene	mg/kg	0.5		NL	NL		170 | 370			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	PAHs (Sum of total)	mg/kg	0.5	4000							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Phenanthrene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Pyrene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	PAHs (Sum of total)	mg/kg	0.5	4000							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Polychlorinated Biphenyls (PCB)	PCBs (Sum of total)	mg/kg	0.1	7						50	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Metals by ICP-AES	Arsenic	mg/kg	5	3000				100 | 160		100 | 500	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
	Cadmium	mg/kg	1	900				3		20 | 100	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Chromium (III+VI)	mg/kg	2					490 | 810			16	8	10	4	6	5	6	6	3	4	8	3	7
	Copper	mg/kg	5	240000				140 | 190			<5	<5	<5	<5	17	<5	<5	<5	<5	<5	<5	<5	<5
	Lead	mg/kg	5	1500				1100 | 1800		100 |1500	6	8	6	<5	34	6	<5	13	14	8	8	<5	7
	Nickel	mg/kg	2	6000				60 | 100		40 | 1050	<2	<2	<2	<2	2	<2	<2	<2	<2	<2	<2	<2	<2
	Zinc	mg/kg	5	400000				490 |510			<5	38	11	<5	318	<5	<5	<5	5	11	9	<5	8
Total Mercury by FIMS	Mercury	mg/kg	0.1	730				1		4 | 50	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TRH - Semivolatile Fraction	C10-C16	mg/kg	50						62,000		<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
	C10-C16 less Naphthalene (F2)	mg/kg	50		NL	NL	170				<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
	C16-C34	mg/kg	100				1700|2500		85,000		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
	C34-C40	mg/kg	100				3300|6600		120,000		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
	C10 - C40 (Sum of total)	mg/kg	50								<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
	C10 - C14	mg/kg	50								<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
	C15 - C28	mg/kg	100								<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
	C29-C36	mg/kg	100								<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
	+C10 - C36 (Sum of total)	mg/kg	50							1000	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
TRH Volatiles/BTEX	C6 - C9	mg/kg	10							650	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	C6-C10 less BTEX (F1)	mg/kg	10		250	360	215				<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	C6-C10	mg/kg	10						82,000		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	Benzene	mg/kg	0.2		4	4	75 | 95		1100	10 | 18	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Ethylbenzene	mg/kg	0.5		NL	NL	165 | 185		85,000	600 | 1080	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Toluene	mg/kg	0.5		NL	NL	135		120,000	288 |518	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Xylene (m & p)	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Xylene (o)	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Xylene Total	mg/kg	0.5		NL	NL	95 | 180		130,000	1000 | 1800	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Total BTEX	mg/kg	0.2								<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Naphthalene	mg/kg	1		NL	NL		170 | 370	29,000		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1

										Field_ID	TP14	TP15	TP16	TP17	TP18	TP19	TP20	TP21	TP22	TP23	TP24	TP25
										LocCode	TP14	TP15	TP16	TP17	TP18	TP19	TP20	TP21	TP22	TP23	TP24	TP25
										Sampled_Date-Time	27/02/2017	27/02/2017	27/02/2017	27/02/2017	27/02/2017	27/02/2017	27/02/2017	28/02/2017	28/02/2017	28/02/2017	28/02/2017	28/02/2017
										Lab_Report_Number	ES1704772	ES1704772	ES1704772	ES1704772	ES1704772	ES1704772	ES1704772	ES1704772	ES1704772	ES1704772	ES1704772	ES1704772
										Matrix_Description	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
				NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil	NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Silt		NEPM 2013 Table 1B(6) ESLs for Comm/Ind	NEPM 2013 EILs - Urban residential & open public spaces / Commercial Industrial	CRC Care Table B4 Intrusive Maintenance Worker	NSW 2008 General Solid Waste (CT1 & SCC1)												
Method_Type	**ChemName**	**Units**	**EQL**		0-1m	1-2m	0-2m																
Inorganics	Moisture Content	%	1								15.4	26.4	12	20.5	18.4	17.3	21.2	20.9	17.5	14.6	17.4	17.8
	EC_lab	µS/cm	0.1								125	934	2540	2900	530	48	3000	143	87	601	43	27
	pH (Lab)	pH_Units	0.1								5.3	6.1	4.6	6.5	8.1	7.4	5.8	8.2	7.7	5.4	6.1	6
	pH (CaCl2)	pH Unit	0.1								-	5.7	-	-	-	-	-	7.4	-	-	-	-
	Density (clay/silt/sand)	g/cm3	0.01								-	2.6	-	-	-	-	-	2.5	-	-	-	-
CEC, pH, % Clay	Exchangable Calcium	meq/100g	0.2								-	2.8	-	-	-	-	-	5.4	-	-	-	-
	Exchangable Magnesium	meq/100g	0.2								-	<0.1	-	-	-	-	-	2.2	-	-	-	-
	Exchangable Potassium	meq/100g	0.2								-	0.2	-	-	-	-	-	0.3	-	-	-	-
	Exchangeable Sodium	meq/100g	0.2								-	<0.1	-	-	-	-	-	<0.2	-	-	-	-
	Cation Exchange Capacity	meq/100g	0.2								-	3.3	-	-	-	-	-	8.0	-	-	-	-
	Clay (<2 µm)	%	1								-	12.0	-	-	-	-	-	12.0	-	-	-	-
	Iron	%	0.005								-	0.4	-	-	-	-	-	1.2	-	-	-	-
Organics	Total Organic Carbon (TOC)	%	0.5								-	0.8	-	-	-	-	-	1.6	-	-	-	-
	Organic Matter	%	0.5								-	1.4	-	-	-	-	-	2.7	-	-	-	-
Asbestos Identification in Soils	Asbestos Detected	g/kg	0.1								ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Asbestos Type	-	-								-	-	-	-	-	-	-	-	-	-	-	-
	Sample weight (dry)	g	0.01								453	30.2	538	512	334	347	428	28	395	387	412	447
PAH/Phenols (SIM)	Benzo(a)pyrene TEQ (LOR)	mg/kg	0.5								1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
	Benzo(b+j)fluoranthene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)pyrene TEQ calc (Half)	mg/kg	0.5								0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Benzo(a)pyrene TEQ calc (Zero)	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Acenaphthene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Acenaphthylene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Anthracene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benz(a)anthracene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a) pyrene	mg/kg	0.5				0.7			0.8 | 10	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(g,h,i)perylene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(k)fluoranthene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Chrysene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Dibenz(a,h)anthracene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Fluoranthene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	<0.5	<0.5	<0.5	<0.5
	Fluorene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Naphthalene	mg/kg	0.5		NL	NL		170 | 370			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	PAHs (Sum of total)	mg/kg	0.5	4000							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.5	<0.5	<0.5	<0.5	<0.5
	Phenanthrene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	<0.5	<0.5	<0.5	<0.5
	Pyrene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	<0.5	<0.5	<0.5	<0.5
	PAHs (Sum of total)	mg/kg	0.5	4000							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.5	<0.5	<0.5	<0.5	<0.5
Polychlorinated Biphenyls (PCB)	PCBs (Sum of total)	mg/kg	0.1	7						50	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Metals by ICP-AES	Arsenic	mg/kg	5	3000				100 | 160		100 | 500	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	11	<5
	Cadmium	mg/kg	1	900				3		20 | 100	<1	<1	<1	<1	<1	<1	<1	1	<1	<1	<1	<1
	Chromium (III+VI)	mg/kg	2					490 | 810			3	3	2	3	2	3	26	9	7	6	11	5
	Copper	mg/kg	5	240000				140 | 190			<5	<5	<5	<5	<5	<5	<5	9	12	5	6	<5
	Lead	mg/kg	5	1500				1100 | 1800		100 |1500	5	<5	<5	<5	<5	<5	14	36	17	8	10	6
	Nickel	mg/kg	2	6000				60 | 100		40 | 1050	<2	<2	<2	<2	<2	<2	<2	5	14	<2	3	2
	Zinc	mg/kg	5	400000				490 |510			5	<5	<5	<5	<5	<5	<5	75	102	13	21	9
Total Mercury by FIMS	Mercury	mg/kg	0.1	730				1		4 | 50	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TRH - Semivolatile Fraction	C10-C16	mg/kg	50						62,000		<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
	C10-C16 less Naphthalene (F2)	mg/kg	50		NL	NL	170				<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
	C16-C34	mg/kg	100				1700|2500		85,000		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
	C34-C40	mg/kg	100				3300|6600		120,000		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
	C10 - C40 (Sum of total)	mg/kg	50								<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
	C10 - C14	mg/kg	50								<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
	C15 - C28	mg/kg	100								<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
	C29-C36	mg/kg	100								<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
	+C10 - C36 (Sum of total)	mg/kg	50							1000	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
TRH Volatiles/BTEX	C6 - C9	mg/kg	10							650	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	C6-C10 less BTEX (F1)	mg/kg	10		250	360	215				<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	C6-C10	mg/kg	10						82,000		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	Benzene	mg/kg	0.2		4	4	75 | 95		1100	10 | 18	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Ethylbenzene	mg/kg	0.5		NL	NL	165 | 185		85,000	600 | 1080	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Toluene	mg/kg	0.5		NL	NL	135		120,000	288 |518	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Xylene (m & p)	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Xylene (o)	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Xylene Total	mg/kg	0.5		NL	NL	95 | 180		130,000	1000 | 1800	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Total BTEX	mg/kg	0.2								<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Naphthalene	mg/kg	1		NL	NL		170 | 370	29,000		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1

										Field_ID	TP26	TP27	TP28	TP29	TP30	TP31	TP32	TP33	TP34	TP35	TP36	TP37
										LocCode	TP26	TP27	TP28	TP29	TP30	TP31	TP32	TP33	TP34	TP35	TP36	TP37
										Sampled_Date-Time	28/02/2017	28/02/2017	28/02/2017	28/02/2017	28/02/2017	28/02/2017	28/02/2017	28/02/2017	28/02/2017	28/02/2017	28/02/2017	28/02/2017
										Lab_Report_Number	ES1704772	ES1704772	ES1704772	ES1704772	ES1704772	ES1704772	ES1704772	ES1704772	ES1704772	ES1704772	ES1704772	ES1704772
										Matrix_Description	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
				NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil	NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Silt		NEPM 2013 Table 1B(6) ESLs for Comm/Ind	NEPM 2013 EILs - Urban residential & open public spaces / Commercial Industrial	CRC Care Table B4 Intrusive Maintenance Worker	NSW 2008 General Solid Waste (CT1 & SCC1)												
Method_Type	**ChemName**	**Units**	**EQL**		0-1m	1-2m	0-2m																
Inorganics	Moisture Content	%	1								20.4	16.5	18.8	18	18.3	21.5	12.2	20.1	17.2	21.6	15.7	18.8
	EC_lab	µS/cm	0.1								71	24	65	42	32	29	19	57	125	92	460	74
	pH (Lab)	pH_Units	0.1								6.2	6.4	6.6	5.5	5.5	6.6	5.4	6.4	5.7	6.3	5.7	5.9
	pH (CaCl2)	pH Unit	0.1								5.1	-	-	-	4.4	-	-	-	-	5.8	-	-
	Density (clay/silt/sand)	g/cm3	0.01								2.53	-	-	-	2.63	-	-	-	-	2.61	-	-
CEC, pH, % Clay	Exchangable Calcium	meq/100g	0.2								2.3	-	-	-	2	-	-	-	-	5.2	-	-
	Exchangable Magnesium	meq/100g	0.2								5.2	-	-	-	2.1	-	-	-	-	0.9	-	-
	Exchangable Potassium	meq/100g	0.2								0.2	-	-	-	0.2	-	-	-	-	0.1	-	-
	Exchangeable Sodium	meq/100g	0.2								1.3	-	-	-	0.2	-	-	-	-	0.6	-	-
	Cation Exchange Capacity	meq/100g	0.2								9	-	-	-	4.6	-	-	-	-	6.9	-	-
	Clay (<2 µm)	%	1								22	-	-	-	20	-	-	-	-	12	-	-
	Iron	%	0.005								0.576	-	-	-	0.987	-	-	-	-	0.696	-	-
Organics	Total Organic Carbon (TOC)	%	0.5								1.2	-	-	-	<0.5	-	-	-	-	2.0	-	-
	Organic Matter	%	0.5								2.0	-	-	-	<0.5	-	-	-	-	3.4	-	-
Asbestos Identification in Soils	Asbestos Detected	g/kg	0.1								ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Asbestos Type	-	-								-	-	-	-	-	-	-	-	-	-	-	-
	Sample weight (dry)	g	0.01								30.9	346	445	439	31.6	279	430	411	326	20.6	359	385
PAH/Phenols (SIM)	Benzo(a)pyrene TEQ (LOR)	mg/kg	0.5								1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
	Benzo(b+j)fluoranthene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)pyrene TEQ calc (Half)	mg/kg	0.5								0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Benzo(a)pyrene TEQ calc (Zero)	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Acenaphthene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Acenaphthylene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Anthracene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benz(a)anthracene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a) pyrene	mg/kg	0.5				0.7			0.8 | 10	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(g,h,i)perylene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(k)fluoranthene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Chrysene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Dibenz(a,h)anthracene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Fluoranthene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Fluorene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Naphthalene	mg/kg	0.5		NL	NL		170 | 370			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	PAHs (Sum of total)	mg/kg	0.5	4000							<0.5	<0.5	<0.5	<0.5	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Phenanthrene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Pyrene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	PAHs (Sum of total)	mg/kg	0.5	4000							<0.5	<0.5	<0.5	<0.5	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Polychlorinated Biphenyls (PCB)	PCBs (Sum of total)	mg/kg	0.1	7						50	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Metals by ICP-AES	Arsenic	mg/kg	5	3000				100 | 160		100 | 500	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
	Cadmium	mg/kg	1	900				3		20 | 100	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Chromium (III+VI)	mg/kg	2					490 | 810			3	9	<2	4	5	9	5	8	10	4	4	4
	Copper	mg/kg	5	240000				140 | 190			<5	<5	<5	7	<5	8	<5	<5	<5	5	<5	<5
	Lead	mg/kg	5	1500				1100 | 1800		100 |1500	8	7	7	6	<5	15	6	5	6	13	<5	7
	Nickel	mg/kg	2	6000				60 | 100		40 | 1050	2	3	<2	3	2	5	<2	3	3	<2	<2	<2
	Zinc	mg/kg	5	400000				490 |510			21	20	<5	21	8	25	6	15	8	89	6	37
Total Mercury by FIMS	Mercury	mg/kg	0.1	730				1		4 | 50	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TRH - Semivolatile Fraction	C10-C16	mg/kg	50						62,000		<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
	C10-C16 less Naphthalene (F2)	mg/kg	50		NL	NL	170				<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
	C16-C34	mg/kg	100				1700|2500		85,000		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
	C34-C40	mg/kg	100				3300|6600		120,000		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
	C10 - C40 (Sum of total)	mg/kg	50								<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
	C10 - C14	mg/kg	50								<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
	C15 - C28	mg/kg	100								<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
	C29-C36	mg/kg	100								<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
	+C10 - C36 (Sum of total)	mg/kg	50							1000	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
TRH Volatiles/BTEX	C6 - C9	mg/kg	10							650	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	C6-C10 less BTEX (F1)	mg/kg	10		250	360	215				<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	C6-C10	mg/kg	10						82,000		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	Benzene	mg/kg	0.2		4	4	75 | 95		1100	10 | 18	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Ethylbenzene	mg/kg	0.5		NL	NL	165 | 185		85,000	600 | 1080	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Toluene	mg/kg	0.5		NL	NL	135		120,000	288 |518	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Xylene (m & p)	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Xylene (o)	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Xylene Total	mg/kg	0.5		NL	NL	95 | 180		130,000	1000 | 1800	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Total BTEX	mg/kg	0.2								<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Naphthalene	mg/kg	1		NL	NL		170 | 370	29,000		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1

										Field_ID	TP38	TP39	TP40	TP41	TP42	TP43	TP44	TP45	TP46	DUP-A	DUP-B	DUP-C
										LocCode	TP38	TP39	TP40	TP41	TP42	TP43	TP44	TP45	TP46	TP04	TP31	TP44
										Sampled_Date-Time	28/02/2017	28/02/2017	28/02/2017	28/02/2017	28/02/2017	28/02/2017	28/02/2017	28/02/2017	28/02/2017	27/02/2017	28/02/2017	28/02/2017
										Lab_Report_Number	ES1704772	ES1704772	ES1704772	ES1704772	ES1704772	ES1704772	ES1704772	ES1704772	ES1704772	ES1704772	ES1704772	ES1704772
										Matrix_Description	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
				NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil	NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Silt		NEPM 2013 Table 1B(6) ESLs for Comm/Ind	NEPM 2013 EILs - Urban residential & open public spaces / Commercial Industrial	CRC Care Table B4 Intrusive Maintenance Worker	NSW 2008 General Solid Waste (CT1 & SCC1)												
Method_Type	**ChemName**	**Units**	**EQL**		0-1m	1-2m	0-2m																
Inorganics	Moisture Content	%	1								18.2	17.8	17.6	19.4	18.1	14.9	17.8	13.4	18	13.6	15.9	15.3
	EC_lab	µS/cm	0.1								163	160	130	146	776	85	216	118	496	1570	32	181
	pH (Lab)	pH_Units	0.1								5.4	6.6	7	5.2	7.9	6.8	5	5.3	5.1	7.6	6.9	5
	pH (CaCl2)	pH Unit	0.1								-	6	-	-	-	6.2	-	-	-	-	-	-
	Density (clay/silt/sand)	g/cm3	0.01								-	2.65	-	-	-	2.6	-	-	-	-	-	-
CEC, pH, % Clay	Exchangable Calcium	meq/100g	0.2								-	4.4	-	-	-	1.9	-	-	-	-	-	-
	Exchangable Magnesium	meq/100g	0.2								-	3	-	-	-	5.2	-	-	-	-	-	-
	Exchangable Potassium	meq/100g	0.2								-	0.1	-	-	-	0.2	-	-	-	-	-	-
	Exchangeable Sodium	meq/100g	0.2								-	0.5	-	-	-	2	-	-	-	-	-	-
	Cation Exchange Capacity	meq/100g	0.2								-	8.1	-	-	-	9.2	-	-	-	-	-	-
	Clay (<2 µm)	%	1								-	27	-	-	-	10	-	-	-	-	-	-
	Iron	%	0.005								-	1.21	-	-	-	0.858	-	-	-			
Organics	Total Organic Carbon (TOC)	%	0.5								-	<0.5	-	-	-	0.5	-	-	-	-	-	-
	Organic Matter	%	0.5								-	0.7	-	-	-	0.9	-	-	-	-	-	-
Asbestos Identification in Soils	Asbestos Detected	g/kg	0.1								ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Asbestos Type	-	-								-	-	-	-	-	-	-	-	-	-	-	-
	Sample weight (dry)	g	0.01								391	33	357	374	327	44.7	413	377	400	346	265	294
PAH/Phenols (SIM)	Benzo(a)pyrene TEQ (LOR)	mg/kg	0.5								1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
	Benzo(b+j)fluoranthene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)pyrene TEQ calc (Half)	mg/kg	0.5								0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Benzo(a)pyrene TEQ calc (Zero)	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Acenaphthene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Acenaphthylene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Anthracene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benz(a)anthracene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a) pyrene	mg/kg	0.5				0.7			0.8 | 10	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(g,h,i)perylene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(k)fluoranthene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Chrysene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Dibenz(a,h)anthracene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Fluoranthene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Fluorene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Naphthalene	mg/kg	0.5		NL	NL		170 | 370			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	PAHs (Sum of total)	mg/kg	0.5	4000							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Phenanthrene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Pyrene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	PAHs (Sum of total)	mg/kg	0.5	4000							<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Polychlorinated Biphenyls (PCB)	PCBs (Sum of total)	mg/kg	0.1	7						50	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Metals by ICP-AES	Arsenic	mg/kg	5	3000				100 | 160		100 | 500	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
	Cadmium	mg/kg	1	900				3		20 | 100	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Chromium (III+VI)	mg/kg	2					490 | 810			13	4	11	4	6	4	<2	3	3	<2	5	4
	Copper	mg/kg	5	240000				140 | 190			6	<5	<5	15	13	<5	<5	<5	<5	<5	<5	<5
	Lead	mg/kg	5	1500				1100 | 1800		100 |1500	8	9	6	12	13	5	7	6	6	<5	14	7
	Nickel	mg/kg	2	6000				60 | 100		40 | 1050	9	<2	2	<2	11	<2	<2	<2	<2	<2	<2	<2
	Zinc	mg/kg	5	400000				490 |510			29	<5	5	16	46	5	<5	<5	6	<5	17	<5
Total Mercury by FIMS	Mercury	mg/kg	0.1	730				1		4 | 50	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TRH - Semivolatile Fraction	C10-C16	mg/kg	50						62,000		<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
	C10-C16 less Naphthalene (F2)	mg/kg	50		NL	NL	170				<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
	C16-C34	mg/kg	100				1700|2500		85,000		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
	C34-C40	mg/kg	100				3300|6600		120,000		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
	C10 - C40 (Sum of total)	mg/kg	50								<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
	C10 - C14	mg/kg	50								<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
	C15 - C28	mg/kg	100								<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
	C29-C36	mg/kg	100								<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
	+C10 - C36 (Sum of total)	mg/kg	50							1000	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
TRH Volatiles/BTEX	C6 - C9	mg/kg	10							650	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	C6-C10 less BTEX (F1)	mg/kg	10		250	360	215				<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	C6-C10	mg/kg	10						82,000		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	Benzene	mg/kg	0.2		4	4	75 | 95		1100	10 | 18	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Ethylbenzene	mg/kg	0.5		NL	NL	165 | 185		85,000	600 | 1080	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Toluene	mg/kg	0.5		NL	NL	135		120,000	288 |518	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Xylene (m & p)	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Xylene (o)	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Xylene Total	mg/kg	0.5		NL	NL	95 | 180		130,000	1000 | 1800	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Total BTEX	mg/kg	0.2								<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Naphthalene	mg/kg	1		NL	NL		170 | 370	29,000		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1

						Field_ID	J1-0.4	J1-0.8	J2-0.5	J2-1.0	J3-0.5	J3-1.0	J3-DUP0.5	J4-0.5	J5-0.5	J5-0.5 DUP	J5-1.0	J6-0.5	J6-1.0	J6-1.5	J7-0.5	J7-1.0	J8-0.8	J8-1.0
						LocCode	J1	J1	J2	J2	J3	J3	J3	J4	J5	J5	J5	J6	J6	J6	J7	J7	J8	J8
						Sample_Depth_Range	0.4	0.8	0.5	1.0	0.5	1.0	0.5	0.5	0.5	0.5	1.0	0.5	1.0	1.5	0.5	1.0	0.8	1.0
						Sampled_Date-Time	3/03/2017	3/03/2017	3/03/2017	3/03/2017	3/03/2017	3/03/2017	3/03/2017	3/03/2017	3/03/2017	3/03/2017	3/03/2017	3/03/2017	3/03/2017	3/03/2017	3/03/2017	3/03/2017	3/03/2017	3/03/2017
						Lab_Report_Number	ES1705151	ES1705151	ES1705151	ES1705151	ES1705151	ES1705151	ES1705151	ES1705151	ES1705151	ES1705151	ES1705151	ES1705151	ES1705151	ES1705151	ES1705151	ES1705151	ES1705151	ES1705151
						Matrix_Description	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
				British Columbia Ministry of Environment (2001) Ambient Water Quality Guideline	ANZECC 2000 Sediment Quality Guidelines - SQG-Low	ANZECC 2000 Sediment Quality Guidelines SQG-HIGH																			
Chem_Group	**ChemName**	**Units**	**EQL**																						
Inorganics	Moisture	%	1				25	29.3	64	56.3	65	63.4	67.1	31	48.8	67	56.6	50.2	54.8	57.4	43.4	53.3	57.2	52.6
	TOC	%	0.02				0.67	0.62	1.1	1.6	2.22	1.44	2.38	0.3	6.05	5.8	1.33	2.38	2.99	3.09	2.2	4.3	6	3.29
Metals	Arsenic	mg/kg	1		20	70	4.78	6.62	14.8	13.5	12.9	14.7	13.4	9.35	7.31	11.7	15	8.41	6.52	8.62	5.58	6.96	8.95	10.3
	Cadmium	mg/kg	0.1		1.5	10	0.1	<0.1	0.2	0.1	0.6	0.2	0.7	0.3	1.8	3.3	0.1	0.2	0.1	0.1	0.2	<0.1	2.3	1
	Chromium (III+VI)	mg/kg	1		80	370	4.1	3.5	12.6	12.7	14	10.1	14.4	4.9	10.7	15.4	11.1	7.9	10.2	11.9	4.2	8	22.7	11
	Cobalt	mg/kg	0.5		65	270	2.5	2.7	7	5.2	6.2	5.5	6.7	2.1	3.1	4.8	4.6	4.1	4.4	4.7	2.6	5.2	3.8	5.4
	Lead	mg/kg	1		50	220	4	2.4	8.9	6.2	15.2	42.4	15.7	3.2	13.1	18.2	7.2	5.1	6	6.6	2.9	4.9	17	10
	Mercury	mg/kg	0.01		0.15	1	0.06	0.02	0.06	0.03	0.12	0.04	0.09	0.06	0.16	0.21	0.1	0.07	0.06	0.06	0.05	0.06	0.22	0.09
	Nickel	mg/kg	1		21	52	1.7	1.8	6.7	7.3	6.6	6.2	6.9	2.8	4.6	8.3	6.7	5.7	6.6	7.2	2.9	5.1	6.2	6.1
	Selenium	mg/kg	0.1	2			1.3	1.2	3.3	3.2	3.3	3.2	3.5	1.8	2.8	3.9	2.9	2.5	2.6	2.7	1.6	2.7	5.9	2.7
	Zinc	mg/kg	1		200	410	21.4	8.3	38.4	20.5	91.4	25.6	94.9	9.7	85.8	125	20.9	18.6	19.5	21.4	12.6	17.6	126	47.9
PAH/Phenols	Benzo(b+j)fluoranthene	mg/kg	0.004				0.004	<0.004	<0.004	0.017	0.042	<0.004	0.043	<0.004	0.141	0.235	<0.004	0.006	37.000	<0.004	<0.004	<0.004	0.145	0.078
	2-methylnaphthalene	mg/kg	0.005				<0.005	<0.005	<0.005	<0.005	0.049	<0.005	0.062	<0.005	0.291	0.457	<0.005	0.016	<0.005	<0.005	0.006	<0.005	0.479	0.290
	Acenaphthene	mg/kg	0.004				<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.004	<0.004	0.037	0.056	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.038	0.022
	Acenaphthylene	mg/kg	0.004				<0.004	<0.004	<0.004	0.005	0.007	<0.004	0.005	<0.004	0.016	0.023	<0.004	<0.004	0.007	<0.004	<0.004	<0.004	0.016	0.012
	Anthracene	mg/kg	0.004				<0.004	<0.004	<0.004	<0.004	0.001	<0.004	0.022	<0.004	0.114	0.187	<0.004	<0.004	0.005	<0.004	<0.004	<0.004	0.119	0.075
	Benz(a)anthracene	mg/kg	0.004				<0.004	<0.004	<0.004	0.010	0.038	<0.004	0.042	<0.004	0.231	0.339	<0.004	0.007	0.021	<0.004	<0.004	<0.004	0.200	0.121
	Benzo(a) pyrene	mg/kg	0.004				<0.004	<0.004	<0.004	0.012	0.028	<0.004	0.029	<0.004	0.109	0.177	<0.004	<0.004	0.026	<0.004	<0.004	<0.004	0.093	0.062
	Benzo(e)pyrene	mg/kg	0.004				<0.004	<0.004	<0.004	0.010	0.024	<0.004	0.023	<0.004	0.101	0.161	<0.004	<0.004	0.021	<0.004	<0.004	<0.004	0.087	0.052
	Benzo(g,h,i)perylene	mg/kg	0.004				<0.004	<0.004	<0.004	0.013	0.027	<0.004	0.031	<0.004	0.096	0.156	<0.004	<0.004	0.025	<0.004	<0.004	<0.004	0.083	0.050
	Benzo(k)fluoranthene	mg/kg	0.004				<0.004	<0.004	<0.004	0.010	0.012	<0.004	0.018	<0.004	0.032	0.042	<0.004	<0.004	0.017	<0.004	<0.004	<0.004	0.026	0.024
	Chrysene	mg/kg	0.004				<0.004	<0.004	<0.004	0.009	0.027	<0.004	0.036	<0.004	0.204	0.344	<0.004	0.005	0.018	<0.004	<0.004	<0.004	0.189	0.107
	Coronene	mg/kg	0.005				<0.005	<0.005	<0.005	<0.005	0.009	<0.005	0.008	<0.005	0.032	0.053	<0.005	<0.005	0.007	<0.005	<0.005	<0.005	0.032	0.019
	Dibenz(a,h)anthracene	mg/kg	0.004				<0.004	<0.004	<0.004	<0.004	0.006	<0.004	0.013	<0.004	0.025	0.046	<0.004	<0.004	0.006	<0.004	<0.004	<0.004	0.022	0.012
	Fluoranthene	mg/kg	0.004				0.007	<0.004	0.006	0.016	0.069	0.006	0.072	0.006	0.374	0.557	<0.004	0.014	0.037	<0.004	0.005	<0.004	0.409	0.184
	Fluorene	mg/kg	0.004				<0.004	<0.004	<0.004	<0.004	0.008	<0.004	0.009	<0.004	0.057	0.089	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.062	0.340
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.004				<0.004	<0.004	<0.004	0.010	0.019	<0.004	0.022	<0.004	0.046	0.072	<0.004	<0.004	0.020	<0.004	<0.004	<0.004	0.038	0.026
	Naphthalene	mg/kg	0.005				<0.005	<0.005	<0.005	<0.005	0.022	<0.005	0.028	<0.005	0.013	0.199	<0.005	0.009	<0.005	<0.005	<0.005	<0.005	0.183	0.125
	PAHs (Sum of total)	mg/kg	0.004		10	50	0.025	<0.004	0.017	0.128	0.531	0.019	0.621	0.012	2.860	4.430	<0.004	0.088	0.291	<0.004	0.018	0.011	3.190	1.790
	Perylene	mg/kg	0.004				<0.004	<0.004	<0.004	<0.004	0.008	<0.004	0.006	0.621	0.018	0.028	<0.004	<0.004	0.010	<0.004	<0.004	0.011	0.036	0.029
	Phenanthrene	mg/kg	0.004				0.008	<0.004	0.005	<0.004	0.066	0.006	0.081	<0.004	0.520	0.785	<0.004	0.019	<0.004	<0.004	0.007	<0.004	0.633	0.324
	Pyrene	mg/kg	0.004				0.006	<0.004	0.006	0.016	0.060	0.007	0.067	0.060	0.288	0.421	<0.004	0.012	0.034	<0.004	<0.004	<0.004	0.296	0.144

			Lab Report Number	ES1704772	ES1704772		ES1704772	162817		ES1704772	ES1704772		ES1704772	162817		ES1704772	ES1704772		ES1704772	162817	
			Field ID	TP04	DUP-A	**RPD**	TP04	Trip -A	**RPD**	TP31	DUP-B	**RPD**	TP31	Trip -B	**RPD**	TP44	DUP-C	**RPD**	TP44	Trip -C	**RPD**
			Sampled Date/Time	27/02/2017 16:12	27/02/2017 16:12		27/02/2017 16:12	27/02/2017		28/02/2017 16:12	28/02/2017 16:12		28/02/2017 16:12	28/02/2017		28/02/2017 16:12	28/02/2017 16:12		28/02/2017 16:12	28/02/2017	
Method_Type	**ChemName**	**Units**	**EQL**																			
Asbestos ID - soils	Asbestos fibres	-	0 Detect	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Misc Inorg Soil - DRY 50g	Electrical Conductivity (Non Compensat	µS/cm	1	1500	1570	5	1500	1400	7	29	32	10	**29**	**50.0**	**53**	216	181	17	216	270	22
pH (1:5)	pH (Lab)	pH_Units	0.1	7.8	7.6	3	7.8	8.2	3	6.6	6.9	4	6.6	7.3	10	5.0	5.0	0	5.0	5.2	4
8 metals in soil	Arsenic	mg/kg	5 / 4	<5.0	<5.0	0	<5.0	<4.0	0	<5.0	<5.0	0	<5.0	5.0	0	<5.0	<5.0	0	<5.0	<4.0	0
	Cadmium	mg/kg	1 / 0.4	<1.0	<1.0	0	<1.0	<0.4	0	<1.0	<1.0	0	<1.0	<0.4	0	<1.0	<1.0	0	<1.0	<0.4	0
	Chromium (III+VI)	mg/kg	2 / 1	4.0	<2.0	67	4.0	4.0	0	9.0	5.0	57	9.0	8.0	12	<2.0	4.0	67	<2.0	5.0	86
	Copper	mg/kg	5 / 1	<5.0	<5.0	0	<5.0	1.0	133	8.0	<5.0	46	8.0	7.0	13	<5.0	<5.0	0	<5.0	3.0	50
	Lead	mg/kg	5 / 1	<5.0	<5.0	0	<5.0	4.0	22	15.0	14.0	7	**15.0**	**30.0**	**67**	7.0	7.0	0	7.0	8.0	13
	Mercury	mg/kg	0.1 / 0.1	<0.1	<0.1	0	<0.1	<1.0	0	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<1.0	0
	Nickel	mg/kg	2 / 1	<2.0	<2.0	0	<2.0	<0.1	0	5.0	<2.0	86	5.0	3	50	<2.0	<2.0	0	<2.0	<0.1	0
	Zinc	mg/kg	5 / 1	<5.0	<5.0	0	<5.0	3.0	50	25.0	17.0	38	25.0	36.0	36	<5.0	<5.0	0	<5.0	6.0	18
PAH in Soil	Acenaphthene	mg/kg	0.5 / 0.1	<0.5	<0.5	0	<0.5	<0.1	0	<0.5	<0.5	0	<0.5	<0.1	0	<0.5	<0.5	0	<0.5	<0.1	0
	Acenaphthylene	mg/kg	0.5 / 0.1	<0.5	<0.5	0	<0.5	<0.1	0	<0.5	<0.5	0	<0.5	<0.1	0	<0.5	<0.5	0	<0.5	<0.1	0
	Anthracene	mg/kg	0.5 / 0.1	<0.5	<0.5	0	<0.5	<0.1	0	<0.5	<0.5	0	<0.5	<0.1	0	<0.5	<0.5	0	<0.5	<0.1	0
	Benz(a)anthracene	mg/kg	0.5 / 0.1	<0.5	<0.5	0	<0.5	<0.1	0	<0.5	<0.5	0	<0.5	<0.1	0	<0.5	<0.5	0	<0.5	<0.1	0
	Benzo(a) pyrene	mg/kg	0.5 / 0.05	<0.5	<0.5	0	<0.5	<0.05	0	<0.5	<0.5	0	<0.5	<0.05	0	<0.5	<0.5	0	<0.5	<0.05	0
	Benzo(a)pyrene TEQ (LOR)	mg/kg	0.5	1.2	1.2	0	1.2	<0.5	82	1.2	1.2	0	1.2	<0.5	82	1.2	1.2	0	1.2	<0.5	82
	Benzo(a)pyrene TEQ calc (Half)	mg/kg	0.5	0.6	0.6	0	0.6	<0.5	18	0.6	0.6	0	0.6	<0.5	18	0.6	0.6	0	0.6	<0.5	18
	Benzo(a)pyrene TEQ calc (Zero)	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0
	Benzo(g,h,i)perylene	mg/kg	0.5 / 0.1	<0.5	<0.5	0	<0.5	<0.1	0	<0.5	<0.5	0	<0.5	<0.1	0	<0.5	<0.5	0	<0.5	<0.1	0
	Benzo(k)fluoranthene	mg/kg	0.5	<0.5	<0.5	0	<0.5	-	-	<0.5	<0.5	0	<0.5	-	-	<0.5	<0.5	0	<0.5	-	-
	Benzo(b+j)fluoranthene	mg/kg	0.5	<0.5	<0.5	0	<0.5	-	-	<0.5	<0.5	0	<0.5	-	-	<0.5	<0.5	0	<0.5	-	-
	Benzo(b+j+k)fluoranthene	mg/kg	0.2					<0.2						<0.2						<0.2	
	Chrysene	mg/kg	0.5 / 0.1	<0.5	<0.5	0	<0.5	<0.1	0	<0.5	<0.5	0	<0.5	<0.1	0	<0.5	<0.5	0	<0.5	<0.1	0
	Dibenz(a,h)anthracene	mg/kg	0.5 / 0.1	<0.5	<0.5	0	<0.5	<0.1	0	<0.5	<0.5	0	<0.5	<0.1	0	<0.5	<0.5	0	<0.5	<0.1	0
	Fluoranthene	mg/kg	0.5 / 0.1	<0.5	<0.5	0	<0.5	<0.1	0	<0.5	<0.5	0	<0.5	<0.1	0	<0.5	<0.5	0	<0.5	<0.1	0
	Fluorene	mg/kg	0.5 / 0.1	<0.5	<0.5	0	<0.5	<0.1	0	<0.5	<0.5	0	<0.5	<0.1	0	<0.5	<0.5	0	<0.5	<0.1	0
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5 / 0.1	<0.5	<0.5	0	<0.5	<0.1	0	<0.5	<0.5	0	<0.5	<0.1	0	<0.5	<0.5	0	<0.5	<0.1	0
	Naphthalene	mg/kg	0.5 / 0.1	<0.5	<0.5	0	<0.5	<0.1	0	<0.5	<0.5	0	<0.5	<0.1	0	<0.5	<0.5	0	<0.5	<0.1	0
	PAHs (Sum of total)	mg/kg	0.5	<0.5	<0.5	0	<0.5		0	<0.5	<0.5	0	<0.5		0	<0.5	<0.5	0	<0.5		0
	Phenanthrene	mg/kg	0.5 / 0.1	<0.5	<0.5	0	<0.5	<0.1	0	<0.5	<0.5	0	<0.5	<0.1	0	<0.5	<0.5	0	<0.5	<0.1	0
	Pyrene	mg/kg	0.5 / 0.1	<0.5	<0.5	0	<0.5	<0.1	0	<0.5	<0.5	0	<0.5	<0.1	0	<0.5	<0.5	0	<0.5	<0.1	0
	Total Positive PAHs	mg/kg	0.5 / 0.05	<0.5	<0.5	0	<0.5	<0.05	0	<0.5	<0.5	0	<0.5	<0.05	0	<0.5	<0.5	0	<0.5	<0.05	0
PCBs in Soil	PCBs (Sum of total)	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0
vTRH & BTEXN in Soil NEPM	C10-C16	mg/kg	50	<50.0	<50.0	0	<50.0	<50.0	0	<50.0	<50.0	0	<50.0	<50.0	0	<50.0	<50.0	0	<50.0	<50.0	0
	C16-C34	mg/kg	100	<100.0	<100.0	0	<100.0	<100.0	0	<100.0	<100.0	0	<100.0	<100.0	0	<100.0	<100.0	0	<100.0	<100.0	0
	C34-C40	mg/kg	100	<100.0	<100.0	0	<100.0	<100.0	0	<100.0	<100.0	0	<100.0	<100.0	0	<100.0	<100.0	0	<100.0	<100.0	0
	F2-NAPHTHALENE	mg/kg	50	<50.0	<50.0	0	<50.0	<50.0	0	<50.0	<50.0	0	<50.0	<50.0	0	<50.0	<50.0	0	<50.0	<50.0	0
	C10 - C14	mg/kg	50	<50.0	<50.0	0	<50.0	<50.0	0	<50.0	<50.0	0	<50.0	<50.0	0	<50.0	<50.0	0	<50.0	<50.0	0
	C15 - C28	mg/kg	100	<100.0	<100.0	0	<100.0	<100.0	0	<100.0	<100.0	0	<100.0	<100.0	0	<100.0	<100.0	0	<100.0	<100.0	0
	C29-C36	mg/kg	100	<100.0	<100.0	0	<100.0	<100.0	0	<100.0	<100.0	0	<100.0	<100.0	0	<100.0	<100.0	0	<100.0	<100.0	0
	+C10 - C36 (Sum of total)	mg/kg	50	<50.0	<50.0	0	<50.0	-	0	<50.0	<50.0	0	<50.0	-	0	<50.0	<50.0	0	<50.0	-	0
	C10 - C40 (Sum of total)	mg/kg	50	<50.0	<50.0	0	<50.0	<50.0	0	<50.0	<50.0	0	<50.0	<50.0	0	<50.0	<50.0	0	<50.0	<50.0	0
	Naphthalene	mg/kg	1	<1.0	<1.0	0	<1.0	<1.0	0	<1.0	<1.0	0	<1.0	<1.0	0	<1.0	<1.0	0	<1.0	<1.0	0
vTRH & BTEXN in Soil NEPM	C6 - C9	mg/kg	10 / 25	<10.0	<10.0	0	<10.0	<25.0	0	<10.0	<10.0	0	<10.0	<25.0	0	<10.0	<10.0	0	<10.0	<25.0	0
	C6-C10	mg/kg	10 / 25	<10.0	<10.0	0	<10.0	<25.0	0	<10.0	<10.0	0	<10.0	<25.0	0	<10.0	<10.0	0	<10.0	<25.0	0
TRH Volatiles/BTEX	Benzene	mg/kg	0.2	<0.2	<0.2	0	<0.2	<0.2	0	<0.2	<0.2	0	<0.2	<0.2	0	<0.2	<0.2	0	<0.2		0
	Ethylbenzene	mg/kg	0.5 /1	<0.5	<0.5	0	<0.5	<1.0	0	<0.5	<0.5	0	<0.5	<1.0	0	<0.5	<0.5	0	<0.5	<0.2	0
	Toluene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<1.0	0
	Xylene (m & p)	mg/kg	0.5 / 2	<0.5	<0.5	0	<0.5	<2.0	0	<0.5	<0.5	0	<0.5	<2.0	0	<0.5	<0.5	0	<0.5	<0.5	0
	Xylene (o)	mg/kg	0.5 / 1	<0.5	<0.5	0	<0.5	<1.0	0	<0.5	<0.5	0	<0.5	<1.0	0	<0.5	<0.5	0	<0.5	<2.0	0
	Xylene Total	mg/kg	0.5 / 1	<0.5	<0.5	0	<0.5	<1.0	0	<0.5	<0.5	0	<0.5	<1.0	0	<0.5	<0.5	0	<0.5	<1.0	0
	C6-C10 less BTEX (F1)	mg/kg	10 / 25	<10.0	<10.0	0	<10.0	<25.0	0	<10.0	<10.0	0	<10.0	<25.0	0	<10.0	<10.0	0	<10.0	<1.0	0
	Total BTEX	mg/kg	0.2	<0.2	<0.2	0	<0.2	-		<0.2	<0.2	0	<0.2	-		<0.2	<0.2	0	<0.2	-	-

*RPDs have only been considered where a concentration is greater than 1 times the EQL.
**High RPDs are in bold (Acceptable RPDs for each EQL multiplier range are: 80 (1-10 x EQL); 50 (10-30 x EQL); 30 (> 30 x EQL))
***Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any methods in the row header relate to those used in the primary laboratory

	SDG	ALSE-Sydney 06-Mar-17	ALSE-Sydney 06-Mar-17		ALSE-Sydney 06-Mar-17	ALSE-Sydney 06-Mar-17	
	Field ID	J3-0.5	J3-DUP0.5	**RPD**	J5-0.5	J5-0.5 DUP	**RPD**
	Sampled Date/Time	3/03/2017 15:00	3/03/2017 15:00		3/03/2017 15:00	3/03/2017 15:00	
Chem_Group	**ChemName**	**Units**	**EQL**				
Inorganics	Moisture	%	1	65.0	67.1	3	48.8	67.0	31
	TOC	%	0.02	2.22	2.38	7	6.05	5.8	4
Lead	Lead	mg/kg	1	15.2	15.7	3	13.1	18.2	33
Metals	Arsenic	mg/kg	1	12.9	13.4	4	7.31	11.7	46
	Cadmium	mg/kg	0.1	0.6	0.7	15	**1.8**	**3.3**	**59**
	Chromium (III+VI)	mg/kg	1	14.0	14.4	3	10.7	15.4	36
	Cobalt	mg/kg	0.5	6.2	6.7	8	3.1	4.8	43
	Mercury	mg/kg	0.01	0.12	0.09	29	0.16	0.21	27
	Nickel	mg/kg	1	6.6	6.9	4	4.6	8.3	57
	Selenium	mg/kg	0.1	3.3	3.5	6	2.8	3.9	33
	Zinc	mg/kg	1	91.4	94.9	4	85.8	125.0	37
PAH/Phenols	2-methylnaphthalene	mg/kg	5	49	62	23	291	457	44
	Acenaphthene	mg/kg	4	<4	4	0	37	56	41
	Acenaphthylene	mg/kg	4	7	5	33	16	23	36
	Anthracene	mg/kg	4	10	22	75	114	187	49
	Benz(a)anthracene	mg/kg	4	38	42	10	231	339	38
	Benzo(a) pyrene	mg/kg	4	28	29	4	109	177	48
	Benzo(e)pyrene	mg/kg	4	24	23	4	101	161	46
	Benzo(g,h,i)perylene	mg/kg	4	27	31	14	96	156	48
	Benzo(b+j)fluoranthene	mg/kg	4	42	43	2	141	235	50
	Benzo(k)fluoranthene	mg/kg	4	12	18	40	32	42	27
	Chrysene	mg/kg	4	27	36	29	**204**	**344**	**51**
	Coronene	mg/kg	5	9	8	12	32	53	49
	Dibenz(a,h)anthracene	mg/kg	4	6	13	74	25	46	59
	Fluoranthene	mg/kg	4	69	72	4	374	557	39
	Fluorene	mg/kg	4	8	9	12	57	89	44
	Indeno(1,2,3-c,d)pyrene	mg/kg	4	19	22	15	46	72	44
	Naphthalene	mg/kg	5	22	28	24	128	199	43
	PAHs (Sum of total)	mg/kg	4	531	621	16	2860	4430	43
	Perylene	mg/kg	4	8	6	29	18	28	43
	Phenanthrene	mg/kg	4	66	81	20	520	785	41
	Pyrene	mg/kg	4	60	67	11	288	421	38

*RPDs have only been considered where a concentration is greater than 1 times the EQL.

**High RPDs are in bold (Acceptable RPDs for each EQL multiplier range are: 80 (1-10 x EQL); 50 (10-30 x EQL); 30 (> 30 x EQL))

***Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any methods in the row header relate to those used in the primary laboratory

Table E - QAQC_Field Spike

Lab Report Number	ES1704772-050
Field ID	Trip Blank
Sampled_Date/Time	21/02/2017 15:00
Sample Type	Trip_B

Method_Type	ChemName	Units	EQL	
BTEXN	Benzene	mg/kg	0.2	<0.2
	Ethylbenzene	mg/kg	0.5	<0.5
	Naphthalene	mg/kg	1	<1
	Toluene	mg/kg	0.5	<0.5
	Total BTEX	mg/kg	0.2	<0.2
	Xylene (m & p)	mg/kg	0.5	<0.5
	Xylene (o)	mg/kg	0.5	<0.5
	Xylene Total	mg/kg	0.5	<0.5

Table F- QAQC_Field Spike

SDG	ES1704772-051	ES1704772-051
Field ID	Trip Spike	TSC
Sampled_Date/Time	21/02/2017	21/02/2017
Sample Type	Trip_S	Trip_S

Method_Type	ChemName	Units	EQL		
BTEXN	Benzene	mg/kg	0.2	<0.2	<0.2
	Ethylbenzene	mg/kg	0.5	1.9	1.6
	Naphthalene	mg/kg	1	<1	<1
	Toluene	mg/kg	0.5	10.4	8.9
	Total BTEX	mg/kg	0.2	27.2	23.0
	Xylene (m & p)	mg/kg	0.5	10.5	8.8
	Xylene (o)	mg/kg	0.5	4.4	3.7
	Xylene Total	mg/kg	0.5	14.9	12.5

Appendix A. Sediment Assessment

WORKING DRAFT REPORT

VALES POINT SEDIMENT ASSESSMENT

Prepared for

Jacobs

Level 7, 177 Pacific Highway

North Sydney, NSW, 2060

Date: 10 April 2017

Status: DRAFT

Geochemical Assessments Pty Ltd

ABN: 14125331053

Unit 22, 28 Barcoo Street

Roseville, NSW, 2069

Director,

Date: 10 March 2017
Reference: Vales Point Sediment Assessment
Status: Working Draft

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Appendix A Sediment Particle Size Determinations

Appendix B Microscopic Examination of Sediment Coarse Fraction

1 Introduction

Geochemical Assessments Pty Ltd (Geochemical Assessments) prepared this Report on the physical and chemical properties of sediment in the southern section of Lake Macquarie, near Wyee, NSW for Jacobs. The Vales Point Power Station is adjacent to Lake Macquarie, a large coastal lake on the central NSW coast. This report summaries outcomes of a sediment quality investigation in the shallow waters of the lake near the Vales Point Power Station.

2 Scope of Works

The scope of works reported here includes:

- Collection of core samples at eight locations in the southern section of Lake Macquarie;
- Subsampling of the sediment profile;
- Particle size distribution and analysis;
- Chemical analyses;
- Microscopic examination sediment subsamples; and
- Assessment of contaminant concentrations and the presence of coal particles in sediment.

The resultant data on presence/absence of coal fragments are correlated with concentrations of PAHs and total organic carbon contents of sediment in this report.

3 Methods

3.1 Sediment Sampling

Sediment samples were collected in Wyee Bay using Geochemical Assessments' custom-built 5 m sampling vessel. Sampling at eight locations was completed in a single day of fieldwork on 3 March 2017. Sampling locations are provided in Figure 2 of Jacobs (2016) Vales Point Additional Baseline Contamination Assessment.

A piston coring technique was to collect cores of unconsolidated sediment to a maximum length of 2 m. The technique achieves minimal core disturbance, low compaction and good recovery in muds or sandy muds. Thick shell and/or gravel horizons and clay units are typically impenetrable. The stainless steel piston coring head unit held a 50.8 mm diameter stainless steel core barrel. The piston was constructed from loosely fitting polyethylene discs with rubber 'O" rings and was held together by a stainless steel bolt with a rope attachment point. The assembled piston corer was lowered and recovered from the bed using aluminium rods. As the barrel was pushed into the sediment, the piston creates a partial vacuum that reduces core compaction and enables good core recovery.

The collected core samples were extruded onto clean trays, logged, photographed and subsampled. Decontamination procedures involved scrubbing with Decon 90 solution and cleaning between each sampling location to minimize the possibility of sample contamination.

Cores at Locations J2, J3, J5, J7 and J8 were subsampled at two intervals (0.0-0.5 m and 0.5 to 1.0 m). At location J6, closest to the Vales Point Power Station, the core was sampled in three intervals to a depth of 1.5 m (i.e. 0.0-0.5 m, 0.5 to 1.0 m and 1.0 to 1.5 m). The core at location J4 terminated with hard refusal at 0.4 m and was subsampled in a single interval (0.0-0.4 m). At location J1, the core met refusal at 0.8 m and was subsampled from 0.0 to 0.4 m and 0.4 to 0.8 m.

3.2 Chemical Analyses

All samples were analysed for a suite of trace metals (cadmium, chromium, cobalt, lead, nickel, mercury, selenium and zinc), metalloid arsenic, polycyclic aromatic hydrocarbons (PAH) and total organic carbon (TOC) content.

3.3 Sediment Particle Size Determinations

Sediment subsamples were wet and dry sieved (<63 μm; 63-125 μm; 125-250 μm; 250-500 μm; 500-1,000 μm; 1,000-2,000 μm, 2,000-4,000 μm and >4,000 μm fractions) in Geochemical Assessments' dedicated grainsize laboratory. Laboratory QAQC included analysis of two duplicate samples

3.4 Microscopic Examination of the Coarse Sediment Fraction

Sediment subsamples were wet sieved using a nylon mesh (63 μm). The >63 μm fraction of sediment was dried at 60^{o}C and examined under a stereoscopic microscope. The fine (<63 μm) fraction of sediment was not examined.

The microscope used was an Optex, stereoscopic, trinocular, microscope (magnification 7.5 to 40x).

4 Results

4.1 Sediment Particle Size Determinations

Results of the particle size determinations of sediment are provided in Appendix A.

Sediments at location J1 were (gravelly) muddy sands with a highly variable gravel component of bivalve shells. Sediment at locations J2, J3, J4 and J5 were generally gravelly muds with a gravel component (comprising bivalve shells) up to 47.9%, but surficial (0.0-0.5 m) sediment at locations J3 and J5 were sandy muds. Sediment textures represented by cores at locations J6, J7 and J8 were sandy muds (or muddy sand i.e. J7 0.0-0.5) with a maximum gravel content of 9.3%.

4.2 Chemical Analyses

4.2.1 Inorganic Analyses

Concentrations of trace metals and arsenic in sediment are summarised in Table 1.

Concentrations of arsenic in sediment varied from 4.8 to 15.0 mg/kg. Concentrations of chromium were low and varied from 3.5 to 22.7 mg/kg. Maximum concentrations of cadmium and mercury were 2.3 and 0.22 mg/kg. Concentrations of cobalt, nickel and selenium varied little in all subsamples. Maximum concentrations of lead and zinc were 42.4 and 126.0 mg/kg, respectively. Subsample J8 0.0-0.5 contained the highest concentrations of cadmium, chromium, mercury, selenium and zinc.

4.2.2 Organic Analyses

Concentrations of PAHs and TOC are summarised in Table 2 The highest concentration of individual PAHs and total PAHs were present in subsamples J5 0.0-0.5 and J8 0.0-0.5 (total PAHs were 2,860 μg/kg and 3,190 μg/kg, respectively). Concentrations of total PAHs in samples J8 0.5-1.0 and J3 0-0.5 were 1790 μg/kg and 531 μg/kg, respectively, but concentrations were less than 300 μg/kg in all other samples.

The total organic carbon contents of sediment subsamples varied from 0.3% to 6.05%.

4.3 Microscopic Examination of Sediment Coarse Fraction

Results of the microscopic examination of sediment coarse fraction are provided in Appendix B and summarised in Table 2.

The coarse fraction of most samples comprised abundant quartz, quartzite and shells/shell fragments. Many samples also contained black, carbonaceous material, or aggregates of brown, organic material.

Coal was observed in subsamples collected at locations J5, J6 and J8. The highest percentage of coal in the coarse sediment fraction was observed in surficial (0.0-0.5 m) subsamples at locations J5 (up to 40%) and J8 (~20%). Note that coal particles may be present in the fine

(<63 μm) fraction of sediment, but this fraction was not examined as the particles would be too small to be positively identified.

Coke was observed only in subsample J7 0.5-1.0. Charcoal was common in subsample J7 0.0-0.5, but not observed in other samples.

5 Discussion

5.1 Distribution of Coal in Sediment

Coal was identified in the coarse fraction of sediment subsamples at locations J5, J6 and J8 (but not location J7) to the west of the Vales Point Power Station.

TOC contents over 5% are uncommon in sediment samples. TOC contents (>6%) in subsamples J5 0.0-0.5 and J8 0.0-0.5 correlated with the highest observed contents of coal particles in sediment subsamples and suggests a significant contribution to TOC values from coal.

Concentrations of total PAHs exceeded 250 μg/kg in sediment at locations J3 0.0-0.5 and J6 0.5 -1.0, however coal was not observed in the coarse fraction of sediment. This suggests that coal particles may be present in the fine fraction of sediment.

The percentage of coal estimated (semi-quantitatively) by microscopic examination in Table 3 refers to the proportion of coal in the coarse (>63 μm) fraction of sediment. The proportion of coal in whole sediment calculated assuming nil coal in the fine sediment fraction (J5 0.0-0.5, 3.8%; J6-0.5, 0.4%; J8 0.0-0.5, 2.6% and J8 0.5-1.0, 1.7%) would likely underestimate the actual percentage of coal in sediment.

5.2 PAH Concentrations and Coal Particles

The highest concentrations of PAHs in sediment were consistent with the presence of coal fragments in the coarse fraction of sediment subsamples. Concentrations of PAHs in surficial subsamples J5 0.0-0.5 and J8 0.0-0.5 (2,860 and 3,190 mg/kg, respectively) correlated with the highest observed content of coal particles in sediment and suggests a significant contribution by coal to these PAH concentrations.

5.3 Contaminant Concentration and Sediment Quality Guidelines

Concentrations of cadmium and mercury in subsample J8 0.0-0.5 and J5 0.0-0.5 marginally exceeded the ANZECC/ARMANZC (2000) Interim Sediment Quality Guideline (ISQG) Low (but

not High) value. Concentrations of trace metals in the other subsamples did not exceed the ISQG - Low value.

Concentrations of metalloid arsenic did not exceed the ISQG - Low value in any sediment subsample.

Concentrations of inorganic contaminants are generally low in comparison to relevant sediment quality guideline values, and waterways in other urbanised and industrial areas in NSW.

Concentrations of total PAHs normalised to 1% TOC in sediment (maximum 3,190 μg/kg) approached, but did not exceed the ISQG -Low value (4,000 μg/kg). Similarly the revised guideline value for total PAHs normalised to 1% TOC (Simpson et al., 2013) of 10,000 μg/kg was not exceeded.

6 Conclusions

Sediment textures vary greatly in the southern section of Lake Macquarie from muds, to gravels composed of shells and lithic fragments.

Coal is present in sediment to the west and northwest of Vales Point Power Station.

The highest concentrations of PAHs and higher TOC content in sediment were consistent with coal particles observed in sediment.

Trace metal concentrations in sediment are generally low except for mercury and cadmium which marginally exceeded relevant sediment quality guidelines values in two samples.

Concentrations of total, normalised PAHs in sediment did not exceed relevant sediment quality guideline values.

7 Recommendations

The distribution of coal in sediment west and northwest of the Vales Point Power Station is not clearly defined by the current sampling locations. Additional sampling between current locations J3, J5, J6 and J8 would be useful to better define the presence of coal in the southern section of Lake Macquarie.

8 References

ANZECC/ARMCANZ, (2000). Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Australian and New Zealand Environment and Conservation Council/Agriculture and Resource Management Council of Australia and New Zealand, October 2000.

Simpson S.L., Batley G.B. and Chariton A.A., (2013). Revision of the ANZECC/ARMCANZ Sediment Quality Guidelines. CSIRO Land and Water Science Report 08/07. CSIRO Land and Water.

9 Limitations

Geochemical Assessments has prepared this Report for Jacobs with the usual care and thoroughness of the consulting profession. The document is based on generally accepted practices and standards at the time it was prepared (April 2017) and it is based on information reviewed at the time of preparation. Geochemical Assessments disclaims responsibility for any changes that may have occurred after this time.

The sources of information used by Geochemical Assessments are outlined in this document. No indications were found during the investigation that information provided to Geochemical Assessments and contained in this document was false.

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Tables

Table 2 Concentrations of Trace Metals and Arsenic in Sediment

Sample ID	Arsenic	Cadmium	Chromium	Cobalt	Lead	Nickel	Selenium	Zinc	Mercury
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR	1	0.1	1	0.5	1	1	0.1	1	0.01
J1-0.4	4.78	0.1	4.1	2.5	4	1.7	1.3	21.4	0.06
J1-0.8	6.62	<0.1	3.5	2.7	2.4	1.8	1.2	8.3	0.02
J2-0.5	14.8	0.2	12.6	7	8.9	6.7	3.3	38.4	0.06
J2-1.0	13.5	0.1	12.7	5.2	6.2	7.3	3.2	20.5	0.03
J3-0.5	12.9	0.6	14	6.2	15.2	6.6	3.3	91.4	0.12
J3-1.0	14.7	0.2	10.1	5.5	42.4	6.2	3.2	25.6	0.04
J4-0.5	9.35	0.3	4.9	2.1	3.2	2.8	1.8	9.7	0.06
J5 0-0.5	7.31	1.8	10.7	3.1	13.1	4.6	2.8	85.8	0.16
J5-1.0	15	0.1	11.1	4.6	7.2	6.7	2.9	20.9	0.1
J6-0.5	8.41	0.2	7.9	4.1	5.1	5.7	2.5	18.6	0.07
J6-1.0	6.52	0.1	10.2	4.4	6	6.6	2.6	19.5	0.06
J6-1.5	8.62	0.1	11.9	4.7	6.6	7.2	2.7	21.4	0.06
J7-0.5	5.58	0.2	4.2	2.6	2.9	2.9	1.6	12.6	0.05
J7-1.0	6.96	<0.1	8	5.2	4.9	5.1	2.7	17.6	0.06
J8-0.8	8.95	2.3	22.7	3.8	17	6.2	5.9	126	0.22
J8-1.0	10.3	1.0	11	5.4	10	6.1	2.7	47.9	0.09

Exceeds ANZECC/ARMANZC (2000) Interim Sediment Quality Guideline - Low value

Table 3 Concentrations of PAHs and TOC in Sediment

Sample ID	Naphth-alene	2-Methylnaphth-alene	Acenaphthylene	Acenaphthene	Fluorene	Phen-anthrene	Anthracene	Fluor-anthene	Pyrene	Benz(a)anthra-cene	Chrysene	Benzo (b+j) fluoran-thene
Units	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
LOR	5	5	4	4	4	4	4	4	4	4	4	4
J1-0.4	<5	<5	<4	<4	<4	8	<4	7	6	<4	<4	4
J1-0.8	<5	<5	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
J2-0.5	<5	<5	<4	<4	<4	5	<4	6	6	<4	<4	<4
J2-1.0	<5	<5	5	<4	<4	<4	<4	16	16	10	9	17
J3-0.5	22	49	7	<4	8	66	10	69	60	38	27	42
J3-1.0	<5	<5	<4	<4	<4	6	<4	6	7	<4	<4	<4
J4-0.5	<5	<5	<4	<4	<4	<4	<4	6	6	<4	<4	<4
J5 0-0.5	128	291	16	37	57	520	114	374	288	231	204	141
J5-1.0	<5	<5	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
J6-0.5	9	16	<4	<4	<4	19	<4	14	12	7	5	6
J6-1.0	<5	<5	7	<4	<4	<4	5	37	34	21	18	37
J6-1.5	<5	<5	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
J7-0.5	<5	6	<4	<4	<4	7	<4	5	<4	<4	<4	<4
J7-1.0	<5	<5	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
J8-0.8	183	479	16	38	62	633	119	409	296	200	189	145
J8-1.0	125	290	12	22	34	324	75	184	144	121	107	78

Table 3 Concentrations of PAHs and TOC in Sediment

Sample ID	Benzo(k)fluor-anthene	Benzo(e)pyrene	Benzo(a)pyrene	Perylene	Benzo(g.h.i)perylene	Dibenz(a.h)anthracene	Indeno (1.2.3.cd) pyrene	Coronene	Sum of PAHs	Total PAHs Normalised to 1% TOC	Total Organic Carbon
Units	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg/TOC	%
LOR	4	4	4	4	4	4	4	5	4		0.02
J1-0.4	<4	<4	<4	<4	<4	<4	<4	<5	25	37.3	0.67
J1-0.8	<4	<4	<4	<4	<4	<4	<4	<5	<4	<6.5	0.62
J2-0.5	<4	<4	<4	<4	<4	<4	<4	<5	17	15.5	1.1
J2-1.0	10	10	12	<4	13	<4	10	<5	128	80.0	1.6
J3-0.5	12	24	28	8	27	6	19	9	531	239	2.22
J3-1.0	<4	<4	<4	<4	<4	<4	<4	<5	19	13.2	1.44
J4-0.5	<4	<4	<4	<4	<4	<4	<4	<5	12	40.0	0.3
J5 0-0.5	32	101	109	18	96	25	46	32	2860	473	6.05
J5-1.0	<4	<4	<4	<4	<4	<4	<4	<5	<4	<4	1.33
J6-0.5	<4	<4	<4	<4	<4	<4	<4	<5	88	37.0	2.38
J6-1.0	17	21	26	10	25	6	20	7	291	97.3	2.99
J6-1.5	<4	<4	<4	<4	<4	<4	<4	<5	<4	<4	3.09
J7-0.5	<4	<4	<4	<4	<4	<4	<4	<5	18	8.2	2.2
J7-1.0	<4	<4	<4	11	<4	<4	<4	<5	11	2.6	4.3
J8-0.8	26	87	93	36	83	22	38	32	3190	532	6.0
J8-1.0	24	52	62	29	50	12	26	19	1790	544	3.29

Table 4 Summary of Microscopic Examination of Sediment Coarse Fraction

Sample ID	Coal	Coke	Charcoal	Organic/ Carbonaceous Material	Shells and Foramanifera	Lithic Fragments	Quartz	Other
J1 0-0.4	-	-	-	Minor	Minor	Quartzite and igneous rocks	Abundant	-
J1 0.4-0.8	-	-	-	-	Abundant	Abundant quartzite, igneous rocks	Abundant	-
J2 0.0-0.5	-	-	-	<0.1%	Abundant	<1%	Abundant	-
J2 0.5-1.0	-	-	-	Minor, plant material	Abundant	<1%	Abundant	-
J3 0.0-0.5	-	-	-	Abundant black friable material	Abundant	<1%	Common	Sponge spicules
J3 0.5-1.0	-	-	-	Individual grains of black friable material	Common	<1%	Common	Fish vertebrae
J4 0.0-0.5	-	-	-	-	Minor	Abundant, basalt, quartzite and granite	Abundant	-
J5 0.0-0.5	20-40%	-	-	-	Minor	Minor	Minor	Faecal pellets, sponge spicules
J5 0.5-1.0	-	-	-	Minor, plant derived	Abundant	<1%	Abundant	-
J6 0.0-0.5	~1%	-	-	Abundant brown organic aggregates<1%	Minor	Quartzite and igneous rocks	Abundant	Black eggs
J6 0.5-1.0	Rare grains (<0.1 mm)	-	-	Brown organic material and rare grains of black friable material	Abundant	Common	Abundant	Black eggs
J6 1.0-1.5	-	-	-	Brown organic material and rare grains of black friable material	Minor	Rare	Abundant	Black eggs
J7 0.0-0.5	-	-	Common	Common aggregates of brown, organic material	Abundant	Abundant quartzite	Abundant	Woody vegetative material
J7 0.5-1.0	-	One grain (10 mm)	-	Common aggregates of brown, organic material	Minor	Abundant quartzite	Abundant	Woody vegetative material
J8 0.0-0.5	~20%	-	-	Common aggregates of brown, organic material	Abundant Foraminifera	-	Abundant	-
J8 0.5-1.0	~15%	-	Common	Abundant organic and black carbonaceous material	Common	-	Abundant	Sponge spicules

Appendix B. Photo Log: Ash Capping Investigation

	
TP01 - Pond 1	TP02 – Pond 1
	
TP03 – Pond 1	TP04 – Pond 1
	
TP05 – Pond 1	TP06 – Pond 1

	
TP07 – Pond 2	TP08 – Pond 2
	
TP09 – Pond 2	TP10 – Pond 2
	
TP12 – Pond 2	TP13 – Pond 2

	
TP14 – Pond 2	TP15 – Pond 2
	
TP16 – Pond 2	TP17 – Pond 2
	
TP18 – Pond 2	TP19– Pond 2

TP20 – Pond 2

TP21 – Pond 3

TP22 – Pond 3

TP23 – Pond 3

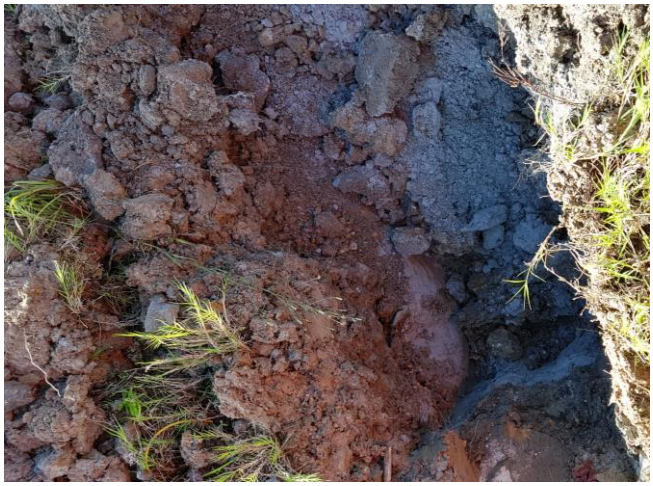
TP24 – Pond 3

TP25 – Pond 3

TP26 – Pond 3

	
TP27– Pond 3	TP28 – Pond 3
	
TP29 – Pond 3	TP30– Pond 3
	
TP31 – Pond 3	TP32 – Pond 3

	
TP33 – Pond 3	TP34 – Pond 3
	
TP35 – Pond 3	TP36 – Pond 3
	
TP37– Pond 3	TP38– Pond 3

	
TP39 – Pond 3	TP40– Pond 3
	
TP41 – Pond 3	TP42 – Pond 3
	
TP44 – Pond 3	TP45 – Pond 3

Appendix C. Photo Log: Sediment Investigation

Sediment sample J1 – full length core

Sediment sample J1 – 0.5

J1 location to Vales Point

Sediment sample J2 – full length core

Sediment sample J3

Sediment sample J4

Sediment sample J5

Sediment sample J6

	
J7 Location	Sediment sample J7
	
Sediment sample J8	J8 location to Vales Point

Appendix D. Laboratory Certificates

UPDATED COC

RECEIVED 2-3-17 @ 1650

CHAIN OF CUSTODY

ALS Laboratory: please tick →

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

ALICE SPRINGS 32 Shore Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com

DARWIN 27 Sydney Road Windsor NSW 2756 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com

EMU NORTH 4/13 Geary Place North Nowra NSW 2541 Ph: 02 4421 2800 E: nowra@alsglobal.com

GEELONG 48 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 4971 5600 E: gladstone@alsglobal.com

HOBART 6 Redwood Way Rokeby TAS 7019 Ph: 03 6243 7222 E: samples.hobart@alsglobal.com

LAUNCESTON 27 Sydney Road Windsor NSW 2756 Ph: 02 6323 2733 E: launceston@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

NEWCASTLE 5/19 Mailand Rd Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@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: townsville@alsglobal.com

WAGGA WAGGA 2 Dalman Place Wagga Wagga NSW 2650 Ph: 02 6971 9696 E: wagga@alsglobal.com

CLIENT:	Delta	TURNAROUND REQUIREMENTS: (Standard TAT may be longer for some tests e.g. Ultra Trace Organics)	☑ Standard TAT (List due date): 8/3/17
OFFICE:	Sydney		☐ Non Standard or urgent TAT (List due date):
PROJECT:	IA137000	ALS QUOTE NO.:	COC SEQUENCE NUMBER (Circle)
ORDER NUMBER:			COC: 1 2 3 4 5 6 7
PROJECT MANAGER:	Robert Gauthier	CONTACT PH:	OF: 1 2 3 4 5 6 7
SAMPLER:	Kyle Mclean	SAMPLER MOBILE: 0402536796	
COC emailed to ALS? (YES / NO)		EDD FORMAT (or default):	
Email Reports to (will default to PM if no other addresses are listed):	Robert.Gauthier@jacobs.com		
Email Invoice to (will default to PM if no other addresses are listed):	Kyle.mclean@jacobs.com		

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
K. Mclean			
DATE/TIME: 7/3/17	DATE/TIME:	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (codes below)	TOTAL CONTAINERS	Heavy Metals	pH, EC	TPH / TRH	PAH	BTEX	PCB	Asbestos (P&A)	pH, CEC, % Clay, TOC, Iron	Additional Information
1	TP01	27/2	S	NA	1x Jar 1x Bag	X	X	X	X	X	X	X	X	Heavy Metals (8) (As, Cd, Cr, Cu, Ni, Pb, Hg, Zn)
2	TP02													
3	TP03													
4	TP04													Asbestos Presence/ Absence
5	TP05												X	
6	TP06													
7	TP07													
8	TP08												X	
9	TP09													
10	TP10													
11	TP11													
12	TP12	27/2	S	NA	1x Jar 1x Bag	X	X	X	X	X	X	X		
				TOTAL		X	X	X	X	X	X	X		

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 Bottle; ST = Sterile Bottle; ASB = Plastic Bag for Acid Soluble Asbestos; B = Unpreserved Bag

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).

page 1 of 5

Environmental Division
Sydney
Work Order Reference
ES1704772

Telephone : +61-2-8784 8555

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 5/585 Maitland Rd Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com

NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 02 4421 2053 E: nowra@alsglobal.com

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

SYDNEY 27 / 277 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: townsville.environmental@alsglobal.com

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

CLIENT:	Delta	TURNAROUND REQUIREMENTS: (Standard TAT may be longer for some tests e.g. Ultra Trace Organics)	☑ Standard TAT (List due date): 6/2/17 ☐ Non Standard or urgent TAT (List due date):
OFFICE:	Sydney		
PROJECT:	IA137000	ALS QUOTE NO.:	
ORDER NUMBER:			
PROJECT MANAGER:	Robert Gauthier	CONTACT PH:	
SAMPLER:	Kyle McLean	SAMPLER MOBILE:	
COC emailed to ALS? (YES / NO)		EDD FORMAT (or default):	
Email Reports to (will default to PM if no other addresses are listed):	Robert.Gauthier@jacobs.com		
Email Invoice to (will default to PM if no other addresses are listed):	Kyle.Mclean@jacobs.com		

COC SEQUENCE NUMBER (Circle): COC: 1 2 3 4 5 6 7; OF: 1 2 3 4 5 6 7

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
K. MCLEAN			
DATE/TIME: 29/2/17	DATE/TIME:	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	Heavy Metals	pH, EC	TRH / TPH	PAH	BTEX	PCB	Asbestos (14+)	pH, CEC TOC, % Clay (1:5 ratio)	Additional Information
13	TP13	27/2	S	N/A	1x 6oz 1x Bag	X	X	X	X	X	X	X		Heavy Metals (8) (As, Cd, Cr, Cu, Ni, Pb, Hg, Zn)
14	TP14													
15	TP15												X	
16	TP16													Asbestos Presence/ Absence
17	TP17													
18	TP18													
19	TP19													
20	TP20	27/2	S											
21	TP21	28/2											X	
22	TP22													
23	TP23													
24	TP24	28/2	S	NA	1x 6oz 1x Bag	X	X	X	X	X	X	X		
					TOTAL									

Water Container Suffix: 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: samples@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 24 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com

LAUNCESTON 27 Sydney Road Mudgee NSW 2850 Ph: 02 5372 8735 E: ex.dgee.mail@alsglobal.com

NEWCASTLE 5/585 Maitland Rd Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com

ORANGE 62/64 Hill Way Place North Nowra NSW 2541 Ph: 02 4423 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: townsville.admin@alsglobal.com

WAGGA WAGGA 50 Gordon Street Wagga Wagga NSW 2650 Ph: 02 6971 9700 E: samples.wagga@alsglobal.com

CLIENT:	Delta	TURNAROUND REQUIREMENTS: (standard TAT may be longer for some tests e.g. Ultra Trace Organics)	☑ Standard TAT (List due date): 6/5/17 ☐ Non Standard or urgent TAT (List due date):
OFFICE:	Sydney / Jacobs	ALS QUOTE NO.:	
PROJECT:	IA187000		COC SEQUENCE NUMBER (Circle) COC: 1 2 3 4 5 6 7 SP: 1 2 3 4 5 6 7
ORDER NUMBER:			
PROJECT MANAGER:	Robert Gauthier	CONTACT PH:	
SAMPLER:	Kyle McLean	SAMPLER MOBILE:	
COC emailed to ALS? (YES / NO)		EDD FORMAT (or default):	
Email Reports to (will default to PM if no other addresses are listed):	Robert.Gauthier@jacobs.com		
Email Invoice to (will default to PM if no other addresses are listed):	Kyle.mclean@jacobs.com		

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
K MCLEAN			
DATE/TIME: 28/2/17	DATE/TIME:	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	Heavy Metals	pH/EC	TPH & TRH	PAHs	BTEX	PCB	Asbestos (P/A)	pH, CEC, 0.10 Cl, Ign. Loss, %OC	Additional Information
15	TP25	28/2	S	NA	1x Jar 1x Bag	X	X	X	X	X	X	X		Heavy Metals (8)
16	TP26												X	
17	TP27													Asbestos Presence/ Absence
18	TP28													
19	TP29													
20	TP30												X	
31	TP31													
32	TP32													
33	TP33													
34	TP34													
35	TP35												X	
36	TP36	28/2	S	NA	1x Jar 1x Bag	X	X	X	X	X	X	X		
				TOTAL										

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; VS = VOA Vial Sodium Bisulphate Preserved; VA = 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 Bottle; 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 5699 E: gladstone@alsglobal.com
KINGAROY 78 Harbour Road Kingaroy QLD 4610 Ph: 07 4941 9172 E: marketing@alsglobal.com
MELBOURNE 24 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com
SMOOTHS 21 Spring Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com
NEWCASTLE 5/585 Maitland Rd Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com
ORANGE A/13 Geary Place North Orange NSW 2800 Ph: 02 6393 2600 E: orange@alsglobal.com
PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7500 E: alsenviro.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: townsville.environmental@alsglobal.com
WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: Delta	TURNAROUND REQUIREMENTS: ☑ Standard TAT (List due date): 6/3/17		
OFFICE: Sydney, Jacobs	(Standard TAT may be longer for some tests e.g. Ultra Trace Organics) ☐ Non Standard or Urgent TAT (List due date):		
PROJECT: JA137000	ALS QUOTE NO.:	COC SEQUENCE NUMBER (Circle) COC: 1 2 3 4 5 6 7	
ORDER NUMBER:		OF: 1 2 3 4 5 6 7	
PROJECT MANAGER: Robert Gauthier	CONTACT PH:		
SAMPLER: Kyle McLean	SAMPLER MOBILE:	RELINQUISHED BY: K. McLean	RECEIVED BY:
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default):	DATE/TIME: 1/3/17	DATE/TIME:
Email Reports to (will default to PM if no other addresses are listed): Robert.Gauthier@jacobs.com			
Email Invoice to (will default to PM if no other addresses are listed): Kyle.McLean@jacobs.com			

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	Heavy Metals	pH CEC	TPH / TRH	PAH	BTEX	PCB	Asbestos (PCA)	OC/OP, CEC TOC Ion	Additional Information
37	TP37	28/2	S	NA	1 Jar / 1 Bag	X	X	X	X	X	X	X		Heavy Metals (8)
38	TP38													
39	TP39												X	Asbestos Presence / Absence
40	TP40													
41	TP41													
42	TP42													
43	TP43												X	
44	TP44													
45	TP45													
46	TP46	28/2	S											
47	DUP-A	27/2	S											*
48	TRIP-A	27/2	S	NA	1 Jar / 1 Bag	X	X	X	X	X	X	X		TRIPA to Envirolab.

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 Environmental — ALS Laboratory: please tick →

CLIENT: Delta	TURNAROUND REQUIREMENTS: (Standard TAT may be longer for some tests e.g. Ultra Trace Organics)	☑ Standard TAT (List due date): 6/3/17	
OFFICE: Sydney Jacobs		☐ Non Standard or urgent TAT (List due date):	
PROJECT: IA137000	ALS QUOTE NO.:	COC SEQUENCE NUMBER (Circle)	
ORDER NUMBER:		COC: 1 2 3 4 5 6 7	
PROJECT MANAGER: Robert Gauthier	CONTACT PH:	OF: 1 2 3 4 5 6 7	
SAMPLER: Kyle McLean	SAMPLER MOBILE:	RELINQUISHED BY:	RECEIVED BY: / RELINQUISHED BY: / RECEIVED BY:
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default):		
Email Reports to (will default to PM if no other addresses are listed):	Robert.Gauthier@jacobs.com	DATE/TIME:	DATE/TIME: / DATE/TIME: / DATE/TIME:
Email Invoice to (will default to PM if no other addresses are listed):	Kyle.McLean@jacobs.com		

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	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). Heavy Metals	pH, EC	TPH / TRH	PAH	BTEX	PCB	Asbestos (PCA)	Additional Information
48	DUP-B	28/2	S	NA	1x Jar 1x Bag	X	X	X	X	X	X	X	Heavy Metals (~~For~~ 8)
	TRIP-B	↓	↓	↓	↓	↓	↓	↓	↓	X	↓	↓	
49	DUP-C	↓	↓	↓	↓	↓	↓	↓	↓	X	↓	↓	
	TRIP-C	28/2	S	NA	1x Jar 1x Bag	X	X	X	X	X	X	X	Asbestos Presence/ Absence
50	Trip Blank		S		1x Jar					X			
51	Trip Spike		S		1x Jar					X			
52													* TRIP B → Send to TRIP C Envirolab.
													♣ Analysis of only one of the Trip B & S required
					TOTAL								

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 Bottle; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order	: **ES1704772**		
Client	: **JACOBS GROUP (AUSTRALIA) PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: ROBERT GAUTHIER	Contact	: Customer Services ES
Address	: 100 CHRISTIE STREET P O BOX 164 ST LEONARDS NSW, AUSTRALIA 2065	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: robert.gauthier@jacobs.com	E-mail	: ALSEnviro.Sydney@alsglobal.com
Telephone	: +61 02 9928 2100	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 9928 2272	Facsimile	: +61-2-8784 8500
Project	: IA137000	Page	: 1 of 3
Order number	: ----	Quote number	: EM2016SINKNI0001 (EN/003/16 Pri BQ)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: KYLE MCLEAN		

Dates

Date Samples Received	: 01-Mar-2017 15:10	Issue Date	: 01-Mar-2017
Client Requested Due Date	: 07-Mar-2017	Scheduled Reporting Date	: **07-Mar-2017**

Delivery Details

Mode of Delivery	: Undefined	Security Seal	: Not intact.
No. of coolers/boxes	: 5	Temperature	: 4'C - Ice present
Receipt Detail	:	No. of samples received / analysed	: 52 / 52

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Samples TRIP-A, TRIP-B, TRIP-C will be sent to Envirolab as per coc request**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- **Sample(s) requiring volatile organic compound analysis received in airtight containers (ZHE).**
- **Asbestos analysis will be conducted by ALS Newcastle.**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (14 days), Solid (60 days) from date of completion of work order.

Sample Container(s)/Preservation Non-Compliances

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

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

Summary of Sample(s) and Requested Analysis

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

Matrix: **SOIL**

Laboratory sample ID	Client sampling date / time	Client sample ID	SOIL - EA055-103 Moisture Content	SOIL - EA200 Asbestos Identification in Soils -	SOIL - EP066 (solids) Polychlorinated Biphenyls by GCMS	SOIL - EP080 BTEXN	SOIL - IN-4S pH plus EC (1:5)	SOIL - S-26 8 metals/TRH/BTEXN/PAH
ES1704772-001	[27-Feb-2017]	TP01	✓	✓	✓		✓	✓
ES1704772-002	[27-Feb-2017]	TP02	✓	✓	✓		✓	✓
ES1704772-003	[27-Feb-2017]	TP03	✓	✓	✓		✓	✓
ES1704772-004	[27-Feb-2017]	TP04	✓	✓	✓		✓	✓
ES1704772-005	[27-Feb-2017]	TP05	✓	✓	✓		✓	✓
ES1704772-006	[27-Feb-2017]	TP06	✓	✓	✓		✓	✓
ES1704772-007	[27-Feb-2017]	TP07	✓	✓	✓		✓	✓
ES1704772-008	[27-Feb-2017]	TP08	✓	✓	✓		✓	✓
ES1704772-009	[27-Feb-2017]	TP09	✓	✓	✓		✓	✓
ES1704772-010	[27-Feb-2017]	TP10	✓	✓	✓		✓	✓
ES1704772-011	[27-Feb-2017]	TP11	✓	✓	✓		✓	✓
ES1704772-012	[27-Feb-2017]	TP12	✓	✓	✓		✓	✓
ES1704772-013	[27-Feb-2017]	TP13	✓	✓	✓		✓	✓
ES1704772-014	[27-Feb-2017]	TP14	✓	✓	✓		✓	✓
ES1704772-015	[27-Feb-2017]	TP15	✓	✓	✓		✓	✓
ES1704772-016	[27-Feb-2017]	TP16	✓	✓	✓		✓	✓
ES1704772-017	[27-Feb-2017]	TP17	✓	✓	✓		✓	✓
ES1704772-018	[27-Feb-2017]	TP18	✓	✓	✓		✓	✓
ES1704772-019	[27-Feb-2017]	TP19	✓	✓	✓		✓	✓
ES1704772-020	[27-Feb-2017]	TP20	✓	✓	✓		✓	✓
ES1704772-021	[28-Feb-2017]	TP21	✓	✓	✓		✓	✓
ES1704772-022	[28-Feb-2017]	TP22	✓	✓	✓		✓	✓
ES1704772-023	[28-Feb-2017]	TP23	✓	✓	✓		✓	✓
ES1704772-024	[28-Feb-2017]	TP24	✓	✓	✓		✓	✓
ES1704772-025	[28-Feb-2017]	TP25	✓	✓	✓		✓	✓
ES1704772-026	[28-Feb-2017]	TP26	✓	✓	✓		✓	✓
ES1704772-027	[28-Feb-2017]	TP27	✓	✓	✓		✓	✓
ES1704772-028	[28-Feb-2017]	TP28	✓	✓	✓		✓	✓
ES1704772-029	[28-Feb-2017]	TP29	✓	✓	✓		✓	✓
ES1704772-030	[28-Feb-2017]	TP30	✓	✓	✓		✓	✓
ES1704772-031	[28-Feb-2017]	TP31	✓	✓	✓		✓	✓
ES1704772-032	[28-Feb-2017]	TP32	✓	✓	✓		✓	✓
ES1704772-033	[28-Feb-2017]	TP33	✓	✓	✓		✓	✓
ES1704772-034	[28-Feb-2017]	TP34	✓	✓	✓		✓	✓
ES1704772-035	[28-Feb-2017]	TP35	✓	✓	✓		✓	✓

			SOIL - EA055-103 Moisture Content	SOIL - EA200 Asbestos Identification in Soils -	SOIL - EP066 (solids) Polychlorinated Biphenyls by GCMS	SOIL - EP080 BTEXN	SOIL - IN-4S pH plus EC (1:5)	SOIL - S-26 8 metals/TRH/BTEXN/PAH
ES1704772-036	[28-Feb-2017]	TP36	✓	✓	✓		✓	✓
ES1704772-037	[28-Feb-2017]	TP37	✓	✓	✓		✓	✓
ES1704772-038	[28-Feb-2017]	TP38	✓	✓	✓		✓	✓
ES1704772-039	[28-Feb-2017]	TP39	✓	✓	✓		✓	✓
ES1704772-040	[28-Feb-2017]	TP40	✓	✓	✓		✓	✓
ES1704772-041	[28-Feb-2017]	TP41	✓	✓	✓		✓	✓
ES1704772-042	[28-Feb-2017]	TP42	✓	✓	✓		✓	✓
ES1704772-043	[28-Feb-2017]	TP43	✓	✓	✓		✓	✓
ES1704772-044	[28-Feb-2017]	TP44	✓	✓	✓		✓	✓
ES1704772-045	[28-Feb-2017]	TP45	✓	✓	✓		✓	✓
ES1704772-046	[28-Feb-2017]	TP46	✓	✓	✓		✓	✓
ES1704772-047	[27-Feb-2017]	DUP-A	✓	✓	✓		✓	✓
ES1704772-048	[28-Feb-2017]	DUP-B	✓	✓	✓		✓	✓
ES1704772-049	[28-Feb-2017]	DUP-C	✓	✓	✓		✓	✓
ES1704772-050	21-Feb-2017 00:00	Trip Blank				✓		
ES1704772-051	21-Feb-2017 00:00	Trip Spike				✓		
ES1704772-052	21-Feb-2017 00:00	TSC				✓		

Proactive Holding Time Report

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

Requested Deliverables

ACCOUNTS PAYABLE (Brisbane)

- A4 - AU Tax Invoice (INV) — Email — au-ap@jacobs.com

INVOICE ONLY (JACOBS)

- A4 - AU Tax Invoice (INV) — Email — au-ap@jacobs.com

KYLE MCLEAN

- *AU Certificate of Analysis - NATA (COA) — Email — kyle.mclean@jacobs.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI) — Email — kyle.mclean@jacobs.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC) — Email — kyle.mclean@jacobs.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN) — Email — kyle.mclean@jacobs.com
- A4 - AU Tax Invoice (INV) — Email — kyle.mclean@jacobs.com
- Chain of Custody (CoC) (COC) — Email — kyle.mclean@jacobs.com
- EDI Format - ESDAT (ESDAT) — Email — kyle.mclean@jacobs.com
- EDI Format - XTab (XTAB) — Email — kyle.mclean@jacobs.com

ROBERT GAUTHIER

- *AU Certificate of Analysis - NATA (COA) — Email — robert.gauthier@jacobs.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI) — Email — robert.gauthier@jacobs.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC) — Email — robert.gauthier@jacobs.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN) — Email — robert.gauthier@jacobs.com
- A4 - AU Tax Invoice (INV) — Email — robert.gauthier@jacobs.com
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- EDI Format - ESDAT (ESDAT) — Email — robert.gauthier@jacobs.com
- EDI Format - XTab (XTAB) — Email — robert.gauthier@jacobs.com

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order	: **ES1704772**		
Client	: **JACOBS GROUP (AUSTRALIA) PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: ROBERT GAUTHIER	Contact	: Customer Services ES
Address	: 100 CHRISTIE STREET P O BOX 164 ST LEONARDS NSW, AUSTRALIA 2065	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: robert.gauthier@jacobs.com	E-mail	: ALSEnviro.Sydney@alsglobal.com
Telephone	: +61 02 9928 2100	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 9928 2272	Facsimile	: +61-2-8784 8500
Project	: IA137000	Page	: 1 of 4
Order number	: ----	Quote number	: EM2016SINKNI0001 (EN/003/16 Pri BQ)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: KYLE MCLEAN		

Dates

Date Samples Received	: 01-Mar-2017 15:10	Issue Date	: 02-Mar-2017
Client Requested Due Date	: 07-Mar-2017	Scheduled Reporting Date	: **07-Mar-2017**

Delivery Details

Mode of Delivery	: Undefined	Security Seal	: Not intact.
No. of coolers/boxes	: 5	Temperature	: 4'C - Ice present
Receipt Detail	:	No. of samples received / analysed	: 52 / 52

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Samples TRIP-A, TRIP-B, TRIP-C will be sent to Envirolab as per coc request**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- **Sample(s) requiring volatile organic compound analysis received in airtight containers (ZHE).**
- **Asbestos analysis will be conducted by ALS Newcastle.**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (14 days), Solid (60 days) from date of completion of work order.

Sample Container(s)/Preservation Non-Compliances

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

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

Summary of Sample(s) and Requested Analysis

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

Matrix: **SOIL**

Laboratory sample ID	Client sampling date / time	Client sample ID	SOIL - EA055-103 Moisture Content	SOIL - EA200 Asbestos Identification in Soils -	SOIL - EP066 (solids) Polychlorinated Biphenyls by GCMS	SOIL - EP080 BTEXN	SOIL - IN-4S pH plus EC (1:5)	SOIL - P-22 (WA/SYD) NEPM Screen for Soil Classification WA	SOIL - S-26 8 metals/TRH/BTEXN/PAH
ES1704772-001	[27-Feb-2017]	TP01	✓	✓	✓		✓	✓	✓
ES1704772-002	[27-Feb-2017]	TP02	✓	✓	✓		✓		✓
ES1704772-003	[27-Feb-2017]	TP03	✓	✓	✓		✓		✓
ES1704772-004	[27-Feb-2017]	TP04	✓	✓	✓		✓		✓
ES1704772-005	[27-Feb-2017]	TP05	✓	✓	✓		✓	✓	✓
ES1704772-006	[27-Feb-2017]	TP06	✓	✓	✓		✓		✓
ES1704772-007	[27-Feb-2017]	TP07	✓	✓	✓		✓		✓
ES1704772-008	[27-Feb-2017]	TP08	✓	✓	✓		✓	✓	✓
ES1704772-009	[27-Feb-2017]	TP09	✓	✓	✓		✓		✓
ES1704772-010	[27-Feb-2017]	TP10	✓	✓	✓		✓		✓
ES1704772-011	[27-Feb-2017]	TP11	✓	✓	✓		✓		✓
ES1704772-012	[27-Feb-2017]	TP12	✓	✓	✓		✓		✓
ES1704772-013	[27-Feb-2017]	TP13	✓	✓	✓		✓		✓
ES1704772-014	[27-Feb-2017]	TP14	✓	✓	✓		✓		✓
ES1704772-015	[27-Feb-2017]	TP15	✓	✓	✓		✓	✓	✓
ES1704772-016	[27-Feb-2017]	TP16	✓	✓	✓		✓		✓
ES1704772-017	[27-Feb-2017]	TP17	✓	✓	✓		✓		✓
ES1704772-018	[27-Feb-2017]	TP18	✓	✓	✓		✓		✓
ES1704772-019	[27-Feb-2017]	TP19	✓	✓	✓		✓		✓
ES1704772-020	[27-Feb-2017]	TP20	✓	✓	✓		✓		✓
ES1704772-021	[28-Feb-2017]	TP21	✓	✓	✓		✓	✓	✓
ES1704772-022	[28-Feb-2017]	TP22	✓	✓	✓		✓		✓
ES1704772-023	[28-Feb-2017]	TP23	✓	✓	✓		✓		✓
ES1704772-024	[28-Feb-2017]	TP24	✓	✓	✓		✓		✓
ES1704772-025	[28-Feb-2017]	TP25	✓	✓	✓		✓		✓
ES1704772-026	[28-Feb-2017]	TP26	✓	✓	✓		✓	✓	✓
ES1704772-027	[28-Feb-2017]	TP27	✓	✓	✓		✓		✓
ES1704772-028	[28-Feb-2017]	TP28	✓	✓	✓		✓		✓
ES1704772-029	[28-Feb-2017]	TP29	✓	✓	✓		✓		✓
ES1704772-030	[28-Feb-2017]	TP30	✓	✓	✓		✓	✓	✓
ES1704772-031	[28-Feb-2017]	TP31	✓	✓	✓		✓		✓
ES1704772-032	[28-Feb-2017]	TP32	✓	✓	✓		✓		✓
ES1704772-033	[28-Feb-2017]	TP33	✓	✓	✓		✓		✓
ES1704772-034	[28-Feb-2017]	TP34	✓	✓	✓		✓		✓
ES1704772-035	[28-Feb-2017]	TP35	✓	✓	✓		✓	✓	✓

			SOIL - EA055-103 Moisture Content	SOIL - EA200 Asbestos Identification in Soils -	SOIL - EP066 (solids) Polychlorinated Biphenyls by GCMS	SOIL - EP080 BTEXN	SOIL - IN-4S pH plus EC (1:5)	SOIL - P-22 (WA/SYD) NEPM Screen for Soil Classification WA	SOIL - S-26 8 metals/TRH/BTEXN/PAH
ES1704772-036	[28-Feb-2017]	TP36	✓	✓	✓		✓		✓
ES1704772-037	[28-Feb-2017]	TP37	✓	✓	✓		✓		✓
ES1704772-038	[28-Feb-2017]	TP38	✓	✓	✓		✓		✓
ES1704772-039	[28-Feb-2017]	TP39	✓	✓	✓		✓	✓	✓
ES1704772-040	[28-Feb-2017]	TP40	✓	✓	✓		✓		✓
ES1704772-041	[28-Feb-2017]	TP41	✓	✓	✓		✓		✓
ES1704772-042	[28-Feb-2017]	TP42	✓	✓	✓		✓		✓
ES1704772-043	[28-Feb-2017]	TP43	✓	✓	✓		✓	✓	✓
ES1704772-044	[28-Feb-2017]	TP44	✓	✓	✓		✓		✓
ES1704772-045	[28-Feb-2017]	TP45	✓	✓	✓		✓		✓
ES1704772-046	[28-Feb-2017]	TP46	✓	✓	✓		✓		✓
ES1704772-047	[27-Feb-2017]	DUP-A	✓	✓	✓		✓		✓
ES1704772-048	[28-Feb-2017]	DUP-B	✓	✓	✓		✓		✓
ES1704772-049	[28-Feb-2017]	DUP-C	✓	✓	✓		✓		✓
ES1704772-050	21-Feb-2017 00:00	Trip Blank				✓			
ES1704772-051	21-Feb-2017 00:00	Trip Spike				✓			
ES1704772-052	21-Feb-2017 00:00	TSC				✓			

Proactive Holding Time Report

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

Requested Deliverables

ACCOUNTS PAYABLE (Brisbane)		
- A4 - AU Tax Invoice (INV)	Email	au-ap@jacobs.com
INVOICE ONLY (JACOBS)		
- A4 - AU Tax Invoice (INV)	Email	au-ap@jacobs.com
KYLE MCLEAN		
- *AU Certificate of Analysis - NATA (COA)	Email	kyle.mclean@jacobs.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	kyle.mclean@jacobs.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	kyle.mclean@jacobs.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	kyle.mclean@jacobs.com
- A4 - AU Tax Invoice (INV)	Email	kyle.mclean@jacobs.com
- Attachment - Report (SUBCO)	Email	kyle.mclean@jacobs.com
- Chain of Custody (CoC) (COC)	Email	kyle.mclean@jacobs.com
- EDI Format - ESDAT (ESDAT)	Email	kyle.mclean@jacobs.com
- EDI Format - XTab (XTAB)	Email	kyle.mclean@jacobs.com
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- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	robert.gauthier@jacobs.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	robert.gauthier@jacobs.com
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- EDI Format - ESDAT (ESDAT)	Email	robert.gauthier@jacobs.com
- EDI Format - XTab (XTAB)	Email	robert.gauthier@jacobs.com

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1704772**	Page	: 1 of 36
Client	: **JACOBS GROUP (AUSTRALIA) PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: ROBERT GAUTHIER	Contact	: Customer Services ES
Address	: 100 CHRISTIE STREET P O BOX 164 ST LEONARDS NSW, AUSTRALIA 2065	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9928 2100	Telephone	: +61-2-8784 8555
Project	: IA137000	Date Samples Received	: 01-Mar-2017 15:10
Order number	: ----	Date Analysis Commenced	: 02-Mar-2017
C-O-C number	: ----	Issue Date	: 08-Mar-2017 15:36
Sampler	: KYLE MCLEAN		
Site	: ----		
Quote number	: EN/003/16 Pri BQ		
No. of samples received	: 52		
No. of samples analysed	: 52		

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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Descriptive Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Ashesh Patel	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Dian Dao		Sydney Inorganics, Smithfield, NSW
Dianne Blane	Laboratory Coordinator (2IC)	Newcastle - Inorganics, Mayfield West, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Sanjeshni Jyoti	Senior Chemist Volatiles	Sydney Organics, Smithfield, NSW
Shaun Spooner	Asbestos Identifier	Newcastle - Asbestos, Mayfield West, 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 no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component.

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

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EP080: The trip spike and its control have been analysed for volatile TPH and BTEX only. The trip spike and control were prepared in the lab using reagent grade sand spiked with petrol. The spike was dispatched from the lab and the control retained. Results have been confirmed by re-extraction and re-analysis.
- EA200 'Am' Amosite (brown asbestos)
- EA200 'Cr' Crocidolite (blue asbestos)
- EA200 'Trace' - Asbestos fibres ("Free Fibres") detected by trace analysis per AS4964. The result can be interpreted that the sample contains detectable 'respirable' asbestos fibres
- EA200: Asbestos Identification Samples were analysed by Polarised Light Microscopy including dispersion staining.
- EA200 Legend
- EA200 'Ch' Chrysotile (white asbestos)
- EA200: 'UMF' Unknown Mineral Fibres. "-" indicates fibres detected may or may not be asbestos fibres. Confirmation by alternative techniques is recommended.
- EA200: Negative results for vinyl tiles should be confirmed by an independent analytical technique.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EA200: For samples larger than 30g, the <2mm fraction may be sub-sampled prior to trace analysis as outlined in ISO23909:2008(E) Sect 6.3.2-2
- ED007 and ED008: When Exchangeable Al is reported from these methods, it should be noted that Rayment & Lyons (2011) suggests Exchange Acidity by 1M KCl - Method 15G1 (ED005) is a more suitable method for the determination of exchange acidity (H+ + Al3+).
- EA200: 'Yes' - Asbestos detected by polarised light microscopy including dispersion staining.
- EA200: 'No*' - No asbestos found, at the reporting limit of 0.1g/kg, by polarised light microscopy including dispersion staining. Asbestos material was detected and positively identified at concentrations estimated to be below 0.1g/kg.
- EA200: 'No' - No asbestos found at the reporting limit 0.1g/kg, by polarised light microscopy including dispersion staining.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP01	TP02	TP03	TP04	TP05
			Client sampling date / time	[27-Feb-2017]	[27-Feb-2017]	[27-Feb-2017]	[27-Feb-2017]	[27-Feb-2017]
Compound	CAS Number	LOR	Unit	ES1704772-001	ES1704772-002	ES1704772-003	ES1704772-004	ES1704772-005
				Result	Result	Result	Result	Result
EA001: pH in soil using 0.01M CaCl extract								
pH (CaCl2)	----	0.1	pH Unit	7.9	----	----	----	7.0
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	8.5	7.0	5.2	7.8	7.8
EA010: Conductivity								
Electrical Conductivity @ 25°C	----	1	µS/cm	801	2100	3640	1500	116
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	21.3	12.4	18.3	17.4	13.9
EA150: Soil Classification based on Particle Size								
Clay (<2 µm)	----	1	%	26	----	----	----	18
EA152: Soil Particle Density								
ø Soil Particle Density (Clay/Silt/Sand)	----	0.01	g/cm3	2.59	----	----	----	2.59
EA200: AS 4964 - 2004 Identification of Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	No	No	No	No	No
Asbestos Type	1332-21-4	-	--	-	-	-	-	-
Sample weight (dry)	----	0.01	g	24.6	330	366	356	37.0
APPROVED IDENTIFIER:	----	-	--	G.MORGAN	G.MORGAN	G.MORGAN	G.MORGAN	G.MORGAN
ED006: Exchangeable Cations on Alkaline Soils								
Exchangeable Calcium	----	0.2	meq/100g	3.3	----	----	----	3.6
Exchangeable Magnesium	----	0.2	meq/100g	0.9	----	----	----	1.1
Exchangeable Potassium	----	0.2	meq/100g	<0.2	----	----	----	0.2
Exchangeable Sodium	----	0.2	meq/100g	1.0	----	----	----	<0.2
Cation Exchange Capacity	----	0.2	meq/100g	5.3	----	----	----	5.1
EG005T: Total Metals by ICP-AES								
Iron	7439-89-6	0.005	%	4.65	----	----	----	0.852
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	16	8	10	4	6
Copper	7440-50-8	5	mg/kg	<5	<5	<5	<5	17
Lead	7439-92-1	5	mg/kg	6	8	6	<5	34
Nickel	7440-02-0	2	mg/kg	<2	<2	<2	<2	2
Zinc	7440-66-6	5	mg/kg	<5	38	11	<5	318
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP01	TP02	TP03	TP04	TP05
				Client sampling date / time	[27-Feb-2017]	[27-Feb-2017]	[27-Feb-2017]	[27-Feb-2017]	[27-Feb-2017]
Compound	CAS Number	LOR	Unit		ES1704772-001	ES1704772-002	ES1704772-003	ES1704772-004	ES1704772-005
					Result	Result	Result	Result	Result
EP004: Organic Matter									
Organic Matter	----	0.5	%		<0.5	----	----	----	1.4
Total Organic Carbon	----	0.5	%		<0.5	----	----	----	0.8
EP066: Polychlorinated Biphenyls (PCB)									
Total Polychlorinated biphenyls	----	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
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
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		<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<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

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP01	TP02	TP03	TP04	TP05
				Client sampling date / time	[27-Feb-2017]	[27-Feb-2017]	[27-Feb-2017]	[27-Feb-2017]	[27-Feb-2017]
Compound	CAS Number	LOR	Unit		ES1704772-001	ES1704772-002	ES1704772-003	ES1704772-004	ES1704772-005
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ **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	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ **>C10 - C40 Fraction (sum)**	----	50	mg/kg		<50	<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
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		**106**	**93.0**	**98.6**	**110**	**98.5**
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**87.7**	**88.6**	**95.6**	**86.2**	**95.3**
2-Chlorophenol-D4	93951-73-6	0.5	%		**81.6**	**81.4**	**93.0**	**80.7**	**92.3**
2.4.6-Tribromophenol	118-79-6	0.5	%		**101**	**97.1**	**103**	**93.0**	**104**
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**99.0**	**102**	**107**	**94.8**	**104**
Anthracene-d10	1719-06-8	0.5	%		**109**	**108**	**110**	**104**	**109**
4-Terphenyl-d14	1718-51-0	0.5	%		**92.9**	**92.7**	**94.2**	**88.4**	**93.3**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**85.1**	**83.3**	**86.2**	**85.4**	**87.2**
Toluene-D8	2037-26-5	0.2	%		**85.3**	**81.9**	**86.6**	**89.3**	**86.2**
4-Bromofluorobenzene	460-00-4	0.2	%		**79.0**	**76.8**	**79.1**	**81.6**	**79.0**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP06	TP07	TP08	TP09	TP10
			Client sampling date / time	[27-Feb-2017]	[27-Feb-2017]	[27-Feb-2017]	[27-Feb-2017]	[27-Feb-2017]
Compound	CAS Number	LOR	Unit	ES1704772-006	ES1704772-007	ES1704772-008	ES1704772-009	ES1704772-010
				Result	Result	Result	Result	Result
EA001: pH in soil using 0.01M CaCl extract								
pH (CaCl2)	----	0.1	pH Unit	----	----	4.6	----	----
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	8.2	5.9	5.4	6.1	6.2
EA010: Conductivity								
Electrical Conductivity @ 25°C	----	1	µS/cm	322	174	88	27	42
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	20.0	22.0	13.9	30.4	43.0
EA150: Soil Classification based on Particle Size								
Clay (<2 µm)	----	1	%	----	----	18	----	----
EA152: Soil Particle Density								
ø Soil Particle Density (Clay/Silt/Sand)	----	0.01	g/cm3	----	----	2.64	----	----
EA200: AS 4964 - 2004 Identification of Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	No	No	No	No	No
Asbestos Type	1332-21-4	-	--	-	-	-	-	-
Sample weight (dry)	----	0.01	g	354	380	36.9	352	398
APPROVED IDENTIFIER:	----	-	--	G.MORGAN	S.SPOONER	S.SPOONER	G.MORGAN	G.MORGAN
ED007: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	----	----	0.4	----	----
Exchangeable Magnesium	----	0.1	meq/100g	----	----	1.8	----	----
Exchangeable Potassium	----	0.1	meq/100g	----	----	0.1	----	----
Exchangeable Sodium	----	0.1	meq/100g	----	----	0.7	----	----
Cation Exchange Capacity	----	0.1	meq/100g	----	----	3.0	----	----
EG005T: Total Metals by ICP-AES								
Iron	7439-89-6	0.005	%	----	----	3.59	----	----
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	5	6	6	3	4
Copper	7440-50-8	5	mg/kg	<5	<5	<5	<5	<5
Lead	7439-92-1	5	mg/kg	6	<5	13	14	8
Nickel	7440-02-0	2	mg/kg	<2	<2	<2	<2	<2
Zinc	7440-66-6	5	mg/kg	<5	<5	<5	5	11
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP06	TP07	TP08	TP09	TP10
				Client sampling date / time	[27-Feb-2017]	[27-Feb-2017]	[27-Feb-2017]	[27-Feb-2017]	[27-Feb-2017]
Compound	CAS Number	LOR	Unit		ES1704772-006	ES1704772-007	ES1704772-008	ES1704772-009	ES1704772-010
					Result	Result	Result	Result	Result
EP004: Organic Matter									
Organic Matter	----	0.5	%		----	----	<0.5	----	----
Total Organic Carbon	----	0.5	%		----	----	<0.5	----	----
EP066: Polychlorinated Biphenyls (PCB)									
Total Polychlorinated biphenyls	----	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
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
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		<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<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

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP06	TP07	TP08	TP09	TP10
				Client sampling date / time	[27-Feb-2017]	[27-Feb-2017]	[27-Feb-2017]	[27-Feb-2017]	[27-Feb-2017]
Compound	CAS Number	LOR	Unit		ES1704772-006	ES1704772-007	ES1704772-008	ES1704772-009	ES1704772-010
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ **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	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ **>C10 - C40 Fraction (sum)**	----	50	mg/kg		<50	<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
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		**112**	**122**	**103**	**102**	**107**
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**90.3**	**91.9**	**91.0**	**91.4**	**89.2**
2-Chlorophenol-D4	93951-73-6	0.5	%		**89.0**	**88.6**	**85.2**	**87.2**	**87.3**
2.4.6-Tribromophenol	118-79-6	0.5	%		**99.7**	**102**	**100**	**106**	**99.0**
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**96.4**	**98.3**	**96.8**	**97.8**	**101**
Anthracene-d10	1719-06-8	0.5	%		**109**	**108**	**110**	**114**	**104**
4-Terphenyl-d14	1718-51-0	0.5	%		**92.5**	**92.6**	**94.2**	**97.8**	**88.8**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**86.3**	**87.9**	**87.6**	**79.8**	**73.1**
Toluene-D8	2037-26-5	0.2	%		**92.2**	**87.4**	**86.4**	**81.7**	**76.9**
4-Bromofluorobenzene	460-00-4	0.2	%		**83.7**	**81.2**	**78.0**	**74.1**	**75.7**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP11	TP12	TP13	TP14	TP15
			Client sampling date / time	[27-Feb-2017]	[27-Feb-2017]	[27-Feb-2017]	[27-Feb-2017]	[27-Feb-2017]
Compound	CAS Number	LOR	Unit	ES1704772-011	ES1704772-012	ES1704772-013	ES1704772-014	ES1704772-015
				Result	Result	Result	Result	Result
EA001: pH in soil using 0.01M CaCl extract								
pH (CaCl2)	----	0.1	pH Unit	----	----	----	----	5.7
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	7.6	8.2	7.9	5.3	6.1
EA010: Conductivity								
Electrical Conductivity @ 25°C	----	1	µS/cm	5450	1350	1990	125	934
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	31.6	14.3	18.2	15.4	26.4
EA150: Soil Classification based on Particle Size								
Clay (<2 µm)	----	1	%	----	----	----	----	12
EA152: Soil Particle Density								
ø Soil Particle Density (Clay/Silt/Sand)	----	0.01	g/cm3	----	----	----	----	2.60
EA200: AS 4964 - 2004 Identification of Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	No	No	No	No	No
Asbestos Type	1332-21-4	-	--	-	-	-	-	-
Sample weight (dry)	----	0.01	g	284	492	365	453	30.2
APPROVED IDENTIFIER:	----	-	--	S.SPOONER	S.SPOONER	C.OWLER	C.OWLER	G.MORGAN
ED008: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	----	----	----	----	2.8
Exchangeable Magnesium	----	0.1	meq/100g	----	----	----	----	<0.1
Exchangeable Potassium	----	0.1	meq/100g	----	----	----	----	0.2
Exchangeable Sodium	----	0.1	meq/100g	----	----	----	----	<0.1
Cation Exchange Capacity	----	0.1	meq/100g	----	----	----	----	3.3
EG005T: Total Metals by ICP-AES								
Iron	7439-89-6	0.005	%	----	----	----	----	0.406
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	8	3	7	3	3
Copper	7440-50-8	5	mg/kg	<5	<5	<5	<5	<5
Lead	7439-92-1	5	mg/kg	8	<5	7	5	<5
Nickel	7440-02-0	2	mg/kg	<2	<2	<2	<2	<2
Zinc	7440-66-6	5	mg/kg	9	<5	8	5	<5
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP11	TP12	TP13	TP14	TP15
				Client sampling date / time	[27-Feb-2017]	[27-Feb-2017]	[27-Feb-2017]	[27-Feb-2017]	[27-Feb-2017]
Compound	CAS Number	LOR	Unit		ES1704772-011	ES1704772-012	ES1704772-013	ES1704772-014	ES1704772-015
					Result	Result	Result	Result	Result
EP004: Organic Matter									
Organic Matter	----	0.5	%		----	----	----	----	1.4
Total Organic Carbon	----	0.5	%		----	----	----	----	0.8
EP066: Polychlorinated Biphenyls (PCB)									
Total Polychlorinated biphenyls	----	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
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
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		<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<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

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP11	TP12	TP13	TP14	TP15
				Client sampling date / time	[27-Feb-2017]	[27-Feb-2017]	[27-Feb-2017]	[27-Feb-2017]	[27-Feb-2017]
Compound	CAS Number	LOR	Unit		ES1704772-011	ES1704772-012	ES1704772-013	ES1704772-014	ES1704772-015
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ **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	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ **>C10 - C40 Fraction (sum)**	----	50	mg/kg		<50	<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
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		**98.6**	**92.8**	**91.6**	**96.4**	**95.5**
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**91.2**	**85.3**	**91.6**	**89.3**	**82.8**
2-Chlorophenol-D4	93951-73-6	0.5	%		**88.6**	**75.3**	**82.3**	**88.8**	**74.1**
2.4.6-Tribromophenol	118-79-6	0.5	%		**100**	**99.6**	**104**	**97.0**	**102**
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**101**	**92.0**	**101**	**100**	**92.0**
Anthracene-d10	1719-06-8	0.5	%		**108**	**107**	**113**	**104**	**110**
4-Terphenyl-d14	1718-51-0	0.5	%		**92.0**	**91.2**	**95.6**	**88.5**	**93.1**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**78.6**	**84.3**	**83.5**	**86.8**	**82.6**
Toluene-D8	2037-26-5	0.2	%		**77.9**	**88.0**	**86.7**	**83.2**	**81.7**
4-Bromofluorobenzene	460-00-4	0.2	%		**73.2**	**78.7**	**78.9**	**76.8**	**73.8**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP16	TP17	TP18	TP19	TP20
			Client sampling date / time	[27-Feb-2017]	[27-Feb-2017]	[27-Feb-2017]	[27-Feb-2017]	[27-Feb-2017]
Compound	CAS Number	LOR	Unit	ES1704772-016	ES1704772-017	ES1704772-018	ES1704772-019	ES1704772-020
				Result	Result	Result	Result	Result
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	4.6	6.5	8.1	7.4	5.8
EA010: Conductivity								
Electrical Conductivity @ 25°C	----	1	µS/cm	2540	2900	530	48	3000
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	12.0	20.5	18.4	17.3	21.2
EA200: AS 4964 - 2004 Identification of Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	No	No	No	No	No
Asbestos Type	1332-21-4	-	--	-	-	-	-	-
Sample weight (dry)	----	0.01	g	538	512	334	347	428
APPROVED IDENTIFIER:	----	-	--	G.MORGAN	S.SPOONER	S.SPOONER	G.MORGAN	G.MORGAN
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	2	3	2	3	26
Copper	7440-50-8	5	mg/kg	<5	<5	<5	<5	<5
Lead	7439-92-1	5	mg/kg	<5	<5	<5	<5	14
Nickel	7440-02-0	2	mg/kg	<2	<2	<2	<2	<2
Zinc	7440-66-6	5	mg/kg	<5	<5	<5	<5	<5
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
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
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

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP16	TP17	TP18	TP19	TP20
				Client sampling date / time	[27-Feb-2017]	[27-Feb-2017]	[27-Feb-2017]	[27-Feb-2017]	[27-Feb-2017]
Compound	CAS Number	LOR	Unit		ES1704772-016	ES1704772-017	ES1704772-018	ES1704772-019	ES1704772-020
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
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		<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<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		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<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
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP16	TP17	TP18	TP19	TP20
				Client sampling date / time	[27-Feb-2017]	[27-Feb-2017]	[27-Feb-2017]	[27-Feb-2017]	[27-Feb-2017]
Compound	CAS Number	LOR	Unit		ES1704772-016	ES1704772-017	ES1704772-018	ES1704772-019	ES1704772-020
					Result	Result	Result	Result	Result
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		99.4	97.5	90.4	105	86.9
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		91.0	85.0	77.1	97.8	83.4
2-Chlorophenol-D4	93951-73-6	0.5	%		85.8	72.8	74.2	90.8	74.1
2.4.6-Tribromophenol	118-79-6	0.5	%		96.3	96.3	85.0	111	91.8
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		104	99.2	81.4	94.2	85.6
Anthracene-d10	1719-06-8	0.5	%		105	108	97.1	119	103
4-Terphenyl-d14	1718-51-0	0.5	%		90.4	92.9	82.8	102	88.3
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		94.6	86.4	85.5	91.3	86.8
Toluene-D8	2037-26-5	0.2	%		91.6	86.8	82.4	89.3	87.4
4-Bromofluorobenzene	460-00-4	0.2	%		85.8	79.1	74.0	81.1	78.1

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP21	TP22	TP23	TP24	TP25
			Client sampling date / time	[28-Feb-2017]	[28-Feb-2017]	[28-Feb-2017]	[28-Feb-2017]	[28-Feb-2017]
Compound	CAS Number	LOR	Unit	ES1704772-021	ES1704772-022	ES1704772-023	ES1704772-024	ES1704772-025
				Result	Result	Result	Result	Result
EA001: pH in soil using 0.01M CaCl extract								
pH (CaCl2)	----	0.1	pH Unit	7.4	----	----	----	----
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	8.2	7.7	5.4	6.1	6.0
EA010: Conductivity								
Electrical Conductivity @ 25°C	----	1	µS/cm	143	87	601	43	27
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	20.9	17.5	14.6	17.4	17.8
EA150: Soil Classification based on Particle Size								
Clay (<2 µm)	----	1	%	12	----	----	----	----
EA152: Soil Particle Density								
ø Soil Particle Density (Clay/Silt/Sand)	----	0.01	g/cm3	2.50	----	----	----	----
EA200: AS 4964 - 2004 Identification of Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	No	No	No	No	No
Asbestos Type	1332-21-4	-	--	-	-	-	-	-
Sample weight (dry)	----	0.01	g	28.0	395	387	412	447
APPROVED IDENTIFIER:	----	-	--	S.SPOONER	S.SPOONER	C.OWLER	C.OWLER	G.MORGAN
ED006: Exchangeable Cations on Alkaline Soils								
Exchangeable Calcium	----	0.2	meq/100g	5.4	----	----	----	----
Exchangeable Magnesium	----	0.2	meq/100g	2.2	----	----	----	----
Exchangeable Potassium	----	0.2	meq/100g	0.3	----	----	----	----
Exchangeable Sodium	----	0.2	meq/100g	<0.2	----	----	----	----
Cation Exchange Capacity	----	0.2	meq/100g	8.0	----	----	----	----
EG005T: Total Metals by ICP-AES								
Iron	7439-89-6	0.005	%	1.22	----	----	----	----
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	11	<5
Cadmium	7440-43-9	1	mg/kg	1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	9	7	6	11	5
Copper	7440-50-8	5	mg/kg	9	12	5	6	<5
Lead	7439-92-1	5	mg/kg	36	17	8	10	6
Nickel	7440-02-0	2	mg/kg	5	14	<2	3	2
Zinc	7440-66-6	5	mg/kg	75	102	13	21	9
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP21	TP22	TP23	TP24	TP25
				Client sampling date / time	[28-Feb-2017]	[28-Feb-2017]	[28-Feb-2017]	[28-Feb-2017]	[28-Feb-2017]
Compound	CAS Number	LOR	Unit		ES1704772-021	ES1704772-022	ES1704772-023	ES1704772-024	ES1704772-025
					Result	Result	Result	Result	Result
EP004: Organic Matter									
Organic Matter	----	0.5	%		2.7	----	----	----	----
Total Organic Carbon	----	0.5	%		1.6	----	----	----	----
EP066: Polychlorinated Biphenyls (PCB)									
Total Polychlorinated biphenyls	----	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
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
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		1.5	<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		<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<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

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP21	TP22	TP23	TP24	TP25
				Client sampling date / time	[28-Feb-2017]	[28-Feb-2017]	[28-Feb-2017]	[28-Feb-2017]	[28-Feb-2017]
Compound	CAS Number	LOR	Unit		ES1704772-021	ES1704772-022	ES1704772-023	ES1704772-024	ES1704772-025
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ **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	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ **>C10 - C40 Fraction (sum)**	----	50	mg/kg		<50	<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
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		**109**	**82.0**	**81.0**	**93.9**	**86.0**
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**97.4**	**96.3**	**95.5**	**97.0**	**96.0**
2-Chlorophenol-D4	93951-73-6	0.5	%		**96.8**	**95.4**	**94.0**	**93.5**	**93.2**
2.4.6-Tribromophenol	118-79-6	0.5	%		**106**	**111**	**107**	**104**	**109**
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**108**	**105**	**106**	**105**	**104**
Anthracene-d10	1719-06-8	0.5	%		**113**	**114**	**115**	**115**	**118**
4-Terphenyl-d14	1718-51-0	0.5	%		**95.9**	**97.0**	**97.0**	**99.3**	**101**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**106**	**93.3**	**96.0**	**92.7**	**92.0**
Toluene-D8	2037-26-5	0.2	%		**98.9**	**90.1**	**91.3**	**88.1**	**87.8**
4-Bromofluorobenzene	460-00-4	0.2	%		**89.9**	**77.9**	**77.8**	**77.2**	**76.8**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP26	TP27	TP28	TP29	TP30
			Client sampling date / time	[28-Feb-2017]	[28-Feb-2017]	[28-Feb-2017]	[28-Feb-2017]	[28-Feb-2017]
Compound	CAS Number	LOR	Unit	ES1704772-026	ES1704772-027	ES1704772-028	ES1704772-029	ES1704772-030
				Result	Result	Result	Result	Result
EA001: pH in soil using 0.01M CaCl extract								
pH (CaCl2)	----	0.1	pH Unit	5.1	----	----	----	4.4
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	6.2	6.4	6.6	5.5	5.5
EA010: Conductivity								
Electrical Conductivity @ 25°C	----	1	µS/cm	71	24	65	42	32
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	20.4	16.5	18.8	18.0	18.3
EA150: Soil Classification based on Particle Size								
Clay (<2 µm)	----	1	%	22	----	----	----	20
EA152: Soil Particle Density								
ø Soil Particle Density (Clay/Silt/Sand)	----	0.01	g/cm3	2.53	----	----	----	2.63
EA200: AS 4964 - 2004 Identification of Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	No	No	No	No	No
Asbestos Type	1332-21-4	-	--	-	-	-	-	-
Sample weight (dry)	----	0.01	g	30.9	346	445	439	31.6
APPROVED IDENTIFIER:	----	-	--	G.MORGAN	S.SPOONER	S.SPOONER	G.MORGAN	G.MORGAN
ED007: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	2.3	----	----	----	2.0
Exchangeable Magnesium	----	0.1	meq/100g	5.2	----	----	----	2.1
Exchangeable Potassium	----	0.1	meq/100g	0.2	----	----	----	0.2
Exchangeable Sodium	----	0.1	meq/100g	1.3	----	----	----	0.2
Cation Exchange Capacity	----	0.1	meq/100g	9.0	----	----	----	4.6
EG005T: Total Metals by ICP-AES								
Iron	7439-89-6	0.005	%	0.576	----	----	----	0.987
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	3	9	<2	4	5
Copper	7440-50-8	5	mg/kg	<5	<5	<5	7	<5
Lead	7439-92-1	5	mg/kg	8	7	7	6	<5
Nickel	7440-02-0	2	mg/kg	2	3	<2	3	2
Zinc	7440-66-6	5	mg/kg	21	20	<5	21	8
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP26	TP27	TP28	TP29	TP30
				Client sampling date / time	[28-Feb-2017]	[28-Feb-2017]	[28-Feb-2017]	[28-Feb-2017]	[28-Feb-2017]
Compound	CAS Number	LOR	Unit		ES1704772-026	ES1704772-027	ES1704772-028	ES1704772-029	ES1704772-030
					Result	Result	Result	Result	Result
EP004: Organic Matter									
Organic Matter	----	0.5	%		**2.0**	**----**	**----**	**----**	<0.5
Total Organic Carbon	----	0.5	%		**1.2**	**----**	**----**	**----**	<0.5
EP066: Polychlorinated Biphenyls (PCB)									
Total Polychlorinated biphenyls	----	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
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	**1.2**
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
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	**1.2**
^ 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		<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<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

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP26	TP27	TP28	TP29	TP30
				Client sampling date / time	[28-Feb-2017]	[28-Feb-2017]	[28-Feb-2017]	[28-Feb-2017]	[28-Feb-2017]
Compound	CAS Number	LOR	Unit		ES1704772-026	ES1704772-027	ES1704772-028	ES1704772-029	ES1704772-030
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ **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	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ **>C10 - C40 Fraction (sum)**	----	50	mg/kg		<50	<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
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		**95.6**	**82.4**	**90.6**	**90.7**	**88.4**
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**112**	**90.5**	**95.5**	**99.9**	**123**
2-Chlorophenol-D4	93951-73-6	0.5	%		**104**	**85.8**	**94.8**	**96.3**	**116**
2.4.6-Tribromophenol	118-79-6	0.5	%		**106**	**105**	**107**	**108**	**109**
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**103**	**99.4**	**107**	**109**	**104**
Anthracene-d10	1719-06-8	0.5	%		**113**	**114**	**115**	**119**	**112**
4-Terphenyl-d14	1718-51-0	0.5	%		**96.0**	**98.0**	**98.9**	**101**	**96.6**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**91.9**	**110**	**91.9**	**97.4**	**87.9**
Toluene-D8	2037-26-5	0.2	%		**85.6**	**103**	**84.7**	**89.2**	**85.0**
4-Bromofluorobenzene	460-00-4	0.2	%		**75.5**	**86.7**	**73.1**	**77.3**	**80.2**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP31	TP32	TP33	TP34	TP35
			Client sampling date / time	[28-Feb-2017]	[28-Feb-2017]	[28-Feb-2017]	[28-Feb-2017]	[28-Feb-2017]
Compound	CAS Number	LOR	Unit	ES1704772-031	ES1704772-032	ES1704772-033	ES1704772-034	ES1704772-035
				Result	Result	Result	Result	Result
EA001: pH in soil using 0.01M CaCl extract								
pH (CaCl2)	----	0.1	pH Unit	----	----	----	----	5.8
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	6.6	5.4	6.4	5.7	6.3
EA010: Conductivity								
Electrical Conductivity @ 25°C	----	1	µS/cm	29	19	57	125	92
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	21.5	12.2	20.1	17.2	21.6
EA150: Soil Classification based on Particle Size								
Clay (<2 µm)	----	1	%	----	----	----	----	12
EA152: Soil Particle Density								
ø Soil Particle Density (Clay/Silt/Sand)	----	0.01	g/cm3	----	----	----	----	2.61
EA200: AS 4964 - 2004 Identification of Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	No	No	No	No	No
Asbestos Type	1332-21-4	-	--	-	-	-	-	-
Sample weight (dry)	----	0.01	g	279	430	411	326	20.6
APPROVED IDENTIFIER:	----	-	--	S.SPOONER	S.SPOONER	G.MORGAN	G.MORGAN	C.OWLER
ED007: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	----	----	----	----	5.2
Exchangeable Magnesium	----	0.1	meq/100g	----	----	----	----	0.9
Exchangeable Potassium	----	0.1	meq/100g	----	----	----	----	0.1
Exchangeable Sodium	----	0.1	meq/100g	----	----	----	----	0.6
Cation Exchange Capacity	----	0.1	meq/100g	----	----	----	----	6.9
EG005T: Total Metals by ICP-AES								
Iron	7439-89-6	0.005	%	----	----	----	----	0.696
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	9	5	8	10	4
Copper	7440-50-8	5	mg/kg	8	<5	<5	<5	5
Lead	7439-92-1	5	mg/kg	15	6	5	6	13
Nickel	7440-02-0	2	mg/kg	5	<2	3	3	<2
Zinc	7440-66-6	5	mg/kg	25	6	15	8	89
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP31	TP32	TP33	TP34	TP35
				Client sampling date / time	[28-Feb-2017]	[28-Feb-2017]	[28-Feb-2017]	[28-Feb-2017]	[28-Feb-2017]
Compound	CAS Number	LOR	Unit		ES1704772-031	ES1704772-032	ES1704772-033	ES1704772-034	ES1704772-035
					Result	Result	Result	Result	Result
EP004: Organic Matter									
Organic Matter	----	0.5	%		----	----	----	----	3.4
Total Organic Carbon	----	0.5	%		----	----	----	----	2.0
EP066: Polychlorinated Biphenyls (PCB)									
Total Polychlorinated biphenyls	----	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
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
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		<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<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

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP31	TP32	TP33	TP34	TP35
				Client sampling date / time	[28-Feb-2017]	[28-Feb-2017]	[28-Feb-2017]	[28-Feb-2017]	[28-Feb-2017]
Compound	CAS Number	LOR	Unit		ES1704772-031	ES1704772-032	ES1704772-033	ES1704772-034	ES1704772-035
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ **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	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ **>C10 - C40 Fraction (sum)**	----	50	mg/kg		<50	<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
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		**64.0**	**78.1**	**89.6**	**89.3**	**62.2**
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**83.2**	**97.7**	**98.4**	**96.4**	**94.4**
2-Chlorophenol-D4	93951-73-6	0.5	%		**86.2**	**93.6**	**91.3**	**96.4**	**94.2**
2.4.6-Tribromophenol	118-79-6	0.5	%		**83.5**	**109**	**107**	**107**	**103**
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**104**	**107**	**105**	**109**	**106**
Anthracene-d10	1719-06-8	0.5	%		**105**	**116**	**116**	**119**	**117**
4-Terphenyl-d14	1718-51-0	0.5	%		**90.5**	**98.9**	**99.2**	**101**	**99.2**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**89.4**	**95.3**	**98.6**	**96.7**	**87.7**
Toluene-D8	2037-26-5	0.2	%		**88.4**	**90.3**	**92.0**	**91.2**	**84.2**
4-Bromofluorobenzene	460-00-4	0.2	%		**83.1**	**79.4**	**77.0**	**76.4**	**78.8**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP36	TP37	TP38	TP39	TP40
			Client sampling date / time	[28-Feb-2017]	[28-Feb-2017]	[28-Feb-2017]	[28-Feb-2017]	[28-Feb-2017]
Compound	CAS Number	LOR	Unit	ES1704772-036	ES1704772-037	ES1704772-038	ES1704772-039	ES1704772-040
				Result	Result	Result	Result	Result
EA001: pH in soil using 0.01M CaCl extract								
pH (CaCl2)	----	0.1	pH Unit	----	----	----	6.0	----
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	5.7	5.9	5.4	6.6	7.0
EA010: Conductivity								
Electrical Conductivity @ 25°C	----	1	µS/cm	460	74	163	160	130
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	15.7	18.8	18.2	17.8	17.6
EA150: Soil Classification based on Particle Size								
Clay (<2 µm)	----	1	%	----	----	----	27	----
EA152: Soil Particle Density								
ø Soil Particle Density (Clay/Silt/Sand)	----	0.01	g/cm3	----	----	----	2.65	----
EA200: AS 4964 - 2004 Identification of Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	No	No	No	No	No
Asbestos Type	1332-21-4	-	--	-	-	-	-	-
Sample weight (dry)	----	0.01	g	359	385	391	33.0	357
APPROVED IDENTIFIER:	----	-	--	C.OWLER	S.SPOONER	S.SPOONER	G.MORGAN	G.MORGAN
ED007: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	----	----	----	4.4	----
Exchangeable Magnesium	----	0.1	meq/100g	----	----	----	3.0	----
Exchangeable Potassium	----	0.1	meq/100g	----	----	----	0.1	----
Exchangeable Sodium	----	0.1	meq/100g	----	----	----	0.5	----
Cation Exchange Capacity	----	0.1	meq/100g	----	----	----	8.1	----
EG005T: Total Metals by ICP-AES								
Iron	7439-89-6	0.005	%	----	----	----	1.21	----
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	4	4	13	4	11
Copper	7440-50-8	5	mg/kg	<5	<5	6	<5	<5
Lead	7439-92-1	5	mg/kg	<5	7	8	9	6
Nickel	7440-02-0	2	mg/kg	<2	<2	9	<2	2
Zinc	7440-66-6	5	mg/kg	6	37	29	<5	5
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP36	TP37	TP38	TP39	TP40
				Client sampling date / time	[28-Feb-2017]	[28-Feb-2017]	[28-Feb-2017]	[28-Feb-2017]	[28-Feb-2017]
Compound	CAS Number	LOR	Unit		ES1704772-036	ES1704772-037	ES1704772-038	ES1704772-039	ES1704772-040
					Result	Result	Result	Result	Result
EP004: Organic Matter									
Organic Matter	----	0.5	%		----	----	----	0.7	----
Total Organic Carbon	----	0.5	%		----	----	----	<0.5	----
EP066: Polychlorinated Biphenyls (PCB)									
Total Polychlorinated biphenyls	----	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
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
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		<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<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

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP36	TP37	TP38	TP39	TP40
				Client sampling date / time	[28-Feb-2017]	[28-Feb-2017]	[28-Feb-2017]	[28-Feb-2017]	[28-Feb-2017]
Compound	CAS Number	LOR	Unit		ES1704772-036	ES1704772-037	ES1704772-038	ES1704772-039	ES1704772-040
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ **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	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ **>C10 - C40 Fraction (sum)**	----	50	mg/kg		<50	<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
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		**84.2**	**64.6**	**74.8**	**77.9**	**67.8**
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**93.1**	**88.2**	**99.8**	**89.4**	**97.7**
2-Chlorophenol-D4	93951-73-6	0.5	%		**89.8**	**89.8**	**94.0**	**91.2**	**93.6**
2.4.6-Tribromophenol	118-79-6	0.5	%		**102**	**99.7**	**103**	**98.6**	**100**
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**104**	**105**	**111**	**104**	**109**
Anthracene-d10	1719-06-8	0.5	%		**118**	**115**	**117**	**114**	**116**
4-Terphenyl-d14	1718-51-0	0.5	%		**101**	**98.7**	**100**	**96.8**	**98.7**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**89.0**	**91.1**	**92.4**	**97.0**	**97.4**
Toluene-D8	2037-26-5	0.2	%		**83.2**	**83.5**	**88.9**	**87.0**	**87.8**
4-Bromofluorobenzene	460-00-4	0.2	%		**72.7**	**72.8**	**82.5**	**75.3**	**75.4**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP41	TP42	TP43	TP44	TP45
			Client sampling date / time	[28-Feb-2017]	[28-Feb-2017]	[28-Feb-2017]	[28-Feb-2017]	[28-Feb-2017]
Compound	CAS Number	LOR	Unit	ES1704772-041	ES1704772-042	ES1704772-043	ES1704772-044	ES1704772-045
				Result	Result	Result	Result	Result
EA001: pH in soil using 0.01M CaCl extract								
pH (CaCl2)	----	0.1	pH Unit	----	----	6.2	----	----
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	5.2	7.9	6.8	5.0	5.3
EA010: Conductivity								
Electrical Conductivity @ 25°C	----	1	µS/cm	146	76	85	216	118
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	19.4	18.1	14.9	17.8	13.4
EA150: Soil Classification based on Particle Size								
Clay (<2 µm)	----	1	%	----	----	10	----	----
EA152: Soil Particle Density								
ø Soil Particle Density (Clay/Silt/Sand)	----	0.01	g/cm3	----	----	2.60	----	----
EA200: AS 4964 - 2004 Identification of Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	No	No	No	No	No
Asbestos Type	1332-21-4	-	--	-	-	-	-	-
Sample weight (dry)	----	0.01	g	374	327	44.7	413	377
APPROVED IDENTIFIER:	----	-	--	G.MORGAN	G.MORGAN	S.SPOONER	S.SPOONER	G.MORGAN
ED007: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	----	----	1.9	----	----
Exchangeable Magnesium	----	0.1	meq/100g	----	----	5.2	----	----
Exchangeable Potassium	----	0.1	meq/100g	----	----	0.2	----	----
Exchangeable Sodium	----	0.1	meq/100g	----	----	2.0	----	----
Cation Exchange Capacity	----	0.1	meq/100g	----	----	9.2	----	----
EG005T: Total Metals by ICP-AES								
Iron	7439-89-6	0.005	%	----	----	0.858	----	----
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	4	6	4	<2	3
Copper	7440-50-8	5	mg/kg	15	13	<5	<5	<5
Lead	7439-92-1	5	mg/kg	12	13	5	7	6
Nickel	7440-02-0	2	mg/kg	<2	11	<2	<2	<2
Zinc	7440-66-6	5	mg/kg	16	46	5	<5	<5
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP41	TP42	TP43	TP44	TP45
				Client sampling date / time	[28-Feb-2017]	[28-Feb-2017]	[28-Feb-2017]	[28-Feb-2017]	[28-Feb-2017]
Compound	CAS Number	LOR	Unit		ES1704772-041	ES1704772-042	ES1704772-043	ES1704772-044	ES1704772-045
					Result	Result	Result	Result	Result
EP004: Organic Matter									
Organic Matter	----	0.5	%		----	----	0.9	----	----
Total Organic Carbon	----	0.5	%		----	----	0.5	----	----
EP066: Polychlorinated Biphenyls (PCB)									
Total Polychlorinated biphenyls	----	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
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
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		<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<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

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP41	TP42	TP43	TP44	TP45
				Client sampling date / time	[28-Feb-2017]	[28-Feb-2017]	[28-Feb-2017]	[28-Feb-2017]	[28-Feb-2017]
Compound	CAS Number	LOR	Unit		ES1704772-041	ES1704772-042	ES1704772-043	ES1704772-044	ES1704772-045
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ **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	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ **>C10 - C40 Fraction (sum)**	----	50	mg/kg		<50	<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
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		**110**	**124**	**112**	**129**	**112**
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**101**	**102**	**101**	**102**	**102**
2-Chlorophenol-D4	93951-73-6	0.5	%		**104**	**105**	**104**	**103**	**104**
2.4.6-Tribromophenol	118-79-6	0.5	%		**103**	**106**	**104**	**107**	**109**
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**118**	**119**	**118**	**117**	**117**
Anthracene-d10	1719-06-8	0.5	%		**116**	**119**	**117**	**116**	**117**
4-Terphenyl-d14	1718-51-0	0.5	%		**100**	**102**	**101**	**100**	**100**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**96.7**	**93.5**	**99.8**	**101**	**94.5**
Toluene-D8	2037-26-5	0.2	%		**82.0**	**82.9**	**89.5**	**85.2**	**81.1**
4-Bromofluorobenzene	460-00-4	0.2	%		**76.8**	**79.0**	**82.7**	**78.3**	**75.2**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP46	DUP-A	DUP-B	DUP-C	Trip Blank
			Client sampling date / time	[28-Feb-2017]	[27-Feb-2017]	[28-Feb-2017]	[28-Feb-2017]	21-Feb-2017 00:00
Compound	CAS Number	LOR	Unit	ES1704772-046	ES1704772-047	ES1704772-048	ES1704772-049	ES1704772-050
				Result	Result	Result	Result	Result
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	5.1	7.6	6.9	5.0	----
EA010: Conductivity								
Electrical Conductivity @ 25°C	----	1	µS/cm	496	1570	32	181	----
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	18.0	13.6	15.9	15.3	----
EA200: AS 4964 - 2004 Identification of Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	No	No	No	No	----
Asbestos Type	1332-21-4	-	--	-	-	-	-	----
Sample weight (dry)	----	0.01	g	400	346	265	294	----
APPROVED IDENTIFIER:	----	-	--	G.MORGAN	S.SPOONER	S.SPOONER	G.MORGAN	----
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	----
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	----
Chromium	7440-47-3	2	mg/kg	3	<2	5	4	----
Copper	7440-50-8	5	mg/kg	<5	<5	<5	<5	----
Lead	7439-92-1	5	mg/kg	6	<5	14	7	----
Nickel	7440-02-0	2	mg/kg	<2	<2	<2	<2	----
Zinc	7440-66-6	5	mg/kg	6	<5	17	<5	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	----
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Pyrene	129-00-0	0.5	mg/kg	<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	----
Chrysene	218-01-9	0.5	mg/kg	<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	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP46	DUP-A	DUP-B	DUP-C	Trip Blank
				Client sampling date / time	[28-Feb-2017]	[27-Feb-2017]	[28-Feb-2017]	[28-Feb-2017]	21-Feb-2017 00:00
Compound	CAS Number	LOR	Unit		ES1704772-046	ES1704772-047	ES1704772-048	ES1704772-049	ES1704772-050
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<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	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<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	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<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	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<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**	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.2**	**1.2**	**1.2**	**1.2**	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	----
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	----
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	----
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	----
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	----
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	<100	<100	----
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<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
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP46	DUP-A	DUP-B	DUP-C	Trip Blank
				Client sampling date / time	[28-Feb-2017]	[27-Feb-2017]	[28-Feb-2017]	[28-Feb-2017]	21-Feb-2017 00:00
Compound	CAS Number	LOR	Unit		ES1704772-046	ES1704772-047	ES1704772-048	ES1704772-049	ES1704772-050
					Result	Result	Result	Result	Result
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		124	118	126	108	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		100	99.1	95.8	105	----
2-Chlorophenol-D4	93951-73-6	0.5	%		104	104	99.6	106	----
2.4.6-Tribromophenol	118-79-6	0.5	%		105	101	103	110	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		117	118	113	121	----
Anthracene-d10	1719-06-8	0.5	%		115	117	112	120	----
4-Terphenyl-d14	1718-51-0	0.5	%		99.1	101	97.1	103	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		102	107	94.8	95.4	102
Toluene-D8	2037-26-5	0.2	%		89.8	91.4	79.1	77.9	87.8
4-Bromofluorobenzene	460-00-4	0.2	%		82.1	83.8	73.6	75.3	81.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	Trip Spike	TSC	----	----	----
				Client sampling date / time	21-Feb-2017 00:00	21-Feb-2017 00:00	----	----	----
Compound	CAS Number	LOR	Unit		ES1704772-051	ES1704772-052	--------	--------	--------
					Result	Result	----	----	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	----	----	----
Toluene	108-88-3	0.5	mg/kg		**10.4**	**8.9**	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		**1.9**	**1.6**	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		**10.5**	**8.8**	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg		**4.4**	**3.7**	----	----	----
^ **Sum of BTEX**	----	0.2	mg/kg		**27.2**	**23.0**	----	----	----
^ **Total Xylenes**	1330-20-7	0.5	mg/kg		**14.9**	**12.5**	----	----	----
Naphthalene	91-20-3	1	mg/kg		<1	<1	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**90.1**	**81.8**	----	----	----
Toluene-D8	2037-26-5	0.2	%		**97.5**	**87.8**	----	----	----
4-Bromofluorobenzene	460-00-4	0.2	%		**96.9**	**88.2**	----	----	----

Analytical Results

Descriptive Results

Sub-Matrix: **SOIL**

Method: Compound	Client sample ID - Client sampling date / time	Analytical Results
EA200: AS 4964 - 2004 Identification of Asbestos in Soils		
EA200: Description	TP01 - [27-Feb-2017]	Pale brown clay soil.
EA200: Description	TP02 - [27-Feb-2017]	Mid brown clay soil.
EA200: Description	TP03 - [27-Feb-2017]	Pale brown clay soil.
EA200: Description	TP04 - [27-Feb-2017]	Pale brown clay soil.
EA200: Description	TP05 - [27-Feb-2017]	Pale brown clay soil.
EA200: Description	TP06 - [27-Feb-2017]	Pale brown clay soil.
EA200: Description	TP07 - [27-Feb-2017]	Mid brown sandy soil.
EA200: Description	TP08 - [27-Feb-2017]	Mid brown sandy soil.
EA200: Description	TP09 - [27-Feb-2017]	Pale brown clay soil.
EA200: Description	TP10 - [27-Feb-2017]	Pale brown clay soil.
EA200: Description	TP11 - [27-Feb-2017]	Pale brown clay soil.
EA200: Description	TP12 - [27-Feb-2017]	Mid brown sandy soil.
EA200: Description	TP13 - [27-Feb-2017]	Pale brown clay soil.
EA200: Description	TP14 - [27-Feb-2017]	Pale brown clay soil.
EA200: Description	TP15 - [27-Feb-2017]	Mid brown clay soil.
EA200: Description	TP16 - [27-Feb-2017]	Pale brown sandy soil.
EA200: Description	TP17 - [27-Feb-2017]	Mid brown sandy soil.
EA200: Description	TP18 - [27-Feb-2017]	Mid brown sandy soil.
EA200: Description	TP19 - [27-Feb-2017]	Mid brown sandy soil.
EA200: Description	TP20 - [27-Feb-2017]	Mid brown sandy soil.
EA200: Description	TP21 - [28-Feb-2017]	Mid brown sandy soil.
EA200: Description	TP22 - [28-Feb-2017]	Mid brown sandy soil.
EA200: Description	TP23 - [28-Feb-2017]	Pale brown clay soil.
EA200: Description	TP24 - [28-Feb-2017]	Mid brown clay soil.
EA200: Description	TP25 - [28-Feb-2017]	Mid brown sandy soil.
EA200: Description	TP26 - [28-Feb-2017]	Mid brown clay soil.
EA200: Description	TP27 - [28-Feb-2017]	Mid brown sandy soil.
EA200: Description	TP28 - [28-Feb-2017]	Mid brown sandy soil.
EA200: Description	TP29 - [28-Feb-2017]	Mid brown clay soil.
EA200: Description	TP30 - [28-Feb-2017]	Pale brown clay soil.
EA200: Description	TP31 - [28-Feb-2017]	Mid brown sandy soil.
EA200: Description	TP32 - [28-Feb-2017]	Mid brown sandy soil.
EA200: Description	TP33 - [28-Feb-2017]	Pale brown sandy soil.
EA200: Description	TP34 - [28-Feb-2017]	Mid brown clay soil.
EA200: Description	TP35 - [28-Feb-2017]	Mid brown clay soil.
EA200: Description	TP36 - [28-Feb-2017]	Mid brown clay soil.
EA200: Description	TP37 - [28-Feb-2017]	Mid brown sandy soil.
EA200: Description	TP38 - [28-Feb-2017]	Mid brown sandy soil.

Sub-Matrix: **SOIL**

Method: Compound	*Client sample ID - Client sampling date / time*	*Analytical Results*
EA200: Description	TP39 - [28-Feb-2017]	Pale brown clay soil.
EA200: Description	TP40 - [28-Feb-2017]	Mid brown clay soil.
EA200: Description	TP41 - [28-Feb-2017]	Pale brown clay soil.
EA200: Description	TP42 - [28-Feb-2017]	Pale brown clay soil.
EA200: Description	TP43 - [28-Feb-2017]	Mid brown sandy soil.
EA200: Description	TP44 - [28-Feb-2017]	Mid brown sandy soil.
EA200: Description	TP45 - [28-Feb-2017]	Mid brown clay soil.
EA200: Description	TP46 - [28-Feb-2017]	Pale brown clay soil.
EA200: Description	DUP-A - [27-Feb-2017]	Mid brown sandy soil.
EA200: Description	DUP-B - [28-Feb-2017]	Mid brown sandy soil.
EA200: Description	DUP-C - [28-Feb-2017]	Pale brown clay soil.

Surrogate Control Limits

Sub-Matrix: **SOIL**

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

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **ES1704772**	Page	: 1 of 19
Client	: **JACOBS GROUP (AUSTRALIA) PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: ROBERT GAUTHIER	Contact	: Customer Services ES
Address	: 100 CHRISTIE STREET P O BOX 164 ST LEONARDS NSW, AUSTRALIA 2065	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9928 2100	Telephone	: +61-2-8784 8555
Project	: IA137000	Date Samples Received	: 01-Mar-2017
Order number	: ----	Date Analysis Commenced	: 02-Mar-2017
C-O-C number	: ----	Issue Date	: 08-Mar-2017
Sampler	: KYLE MCLEAN		
Site	: ----		
Quote number	: EN/003/16 Pri BQ		
No. of samples received	: 52		
No. of samples analysed	: 52		

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

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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Ashesh Patel	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Dian Dao		Sydney Inorganics, Smithfield, NSW
Dianne Blane	Laboratory Coordinator (2IC)	Newcastle - Inorganics, Mayfield West, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Sanjeshni Jyoti	Senior Chemist Volatiles	Sydney Organics, Smithfield, NSW
Shaun Spooner	Asbestos Identifier	Newcastle - Asbestos, Mayfield West, 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 (%)*
EA001: pH in soil using 0.01M CaCl extract (QC Lot: 780819)									
ES1704772-001	TP01	EA001: pH (CaCl2)	----	0.1	pH Unit	7.9	7.9	0.00	0% - 20%
ES1704982-010	Anonymous	EA001: pH (CaCl2)	----	0.1	pH Unit	6.8	6.8	0.00	0% - 20%
EA002 : pH (Soils) (QC Lot: 777347)									
ES1704772-001	TP01	EA002: pH Value	----	0.1	pH Unit	8.5	8.6	0.00	0% - 20%
ES1704772-011	TP11	EA002: pH Value	----	0.1	pH Unit	7.6	7.8	3.24	0% - 20%
EA002 : pH (Soils) (QC Lot: 777350)									
ES1704772-021	TP21	EA002: pH Value	----	0.1	pH Unit	8.2	7.7	5.55	0% - 20%
ES1704772-031	TP31	EA002: pH Value	----	0.1	pH Unit	6.6	7.0	4.56	0% - 20%
EA002 : pH (Soils) (QC Lot: 777352)									
ES1704772-041	TP41	EA002: pH Value	----	0.1	pH Unit	5.2	5.3	0.00	0% - 20%
EA010: Conductivity (QC Lot: 777348)									
ES1704772-001	TP01	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	801	664	18.7	0% - 20%
ES1704772-011	TP11	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	5450	4620	16.4	0% - 20%
EA010: Conductivity (QC Lot: 777349)									
ES1704772-021	TP21	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	143	118	18.9	0% - 20%
ES1704772-031	TP31	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	29	30	5.93	0% - 20%
EA010: Conductivity (QC Lot: 777351)									
ES1704772-041	TP41	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	146	156	6.81	0% - 20%
EA055: Moisture Content (QC Lot: 775444)									
ES1704733-004	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	16.0	15.0	6.56	0% - 50%
ES1704743-002	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	22.3	21.8	2.26	0% - 20%
EA055: Moisture Content (QC Lot: 775445)									
ES1704772-004	TP04	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	17.4	19.4	11.2	0% - 50%

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: 775445) - continued									
ES1704772-015	TP15	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	26.4	26.8	1.44	0% - 20%
EA055: Moisture Content (QC Lot: 775446)									
ES1704772-024	TP24	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	17.4	16.0	8.44	0% - 50%
ES1704772-035	TP35	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	21.6	21.4	0.988	0% - 20%
EA055: Moisture Content (QC Lot: 775447)									
ES1704772-044	TP44	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	17.8	15.8	12.3	0% - 50%
ES1704808-003	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	18.4	18.0	1.92	0% - 50%
ED006: Exchangeable Cations on Alkaline Soils (QC Lot: 782740)									
ES1704772-001	TP01	ED006: Exchangeable Calcium	----	0.1	meq/100g	3.3	3.6	10.2	0% - 50%
		ED006: Exchangeable Magnesium	----	0.1	meq/100g	0.9	1.0	11.4	No Limit
		ED006: Exchangeable Potassium	----	0.1	meq/100g	<0.2	<0.2	0.00	No Limit
		ED006: Exchangeable Sodium	----	0.1	meq/100g	1.0	1.0	0.00	No Limit
		ED006: Cation Exchange Capacity	----	0.1	meq/100g	5.3	5.9	10.0	0% - 20%
ED007: Exchangeable Cations (QC Lot: 782741)									
ES1704772-008	TP08	ED007: Exchangeable Calcium	----	0.1	meq/100g	0.4	0.4	0.00	No Limit
		ED007: Exchangeable Magnesium	----	0.1	meq/100g	1.8	1.8	0.00	0% - 50%
		ED007: Exchangeable Potassium	----	0.1	meq/100g	0.1	0.1	0.00	No Limit
		ED007: Exchangeable Sodium	----	0.1	meq/100g	0.7	0.7	0.00	No Limit
		ED007: Cation Exchange Capacity	----	0.1	meq/100g	3.0	3.0	0.00	0% - 20%
ED008: Exchangeable Cations (QC Lot: 779867)									
ES1704772-015	TP15	ED008: Exchangeable Calcium	----	0.1	meq/100g	2.8	2.9	0.00	0% - 20%
		ED008: Exchangeable Magnesium	----	0.1	meq/100g	<0.1	<0.1	0.00	0% - 20%
		ED008: Exchangeable Potassium	----	0.1	meq/100g	0.2	0.2	0.00	0% - 20%
		ED008: Exchangeable Sodium	----	0.1	meq/100g	<0.1	0.1	0.00	0% - 20%
		ED008: Cation Exchange Capacity	----	0.1	meq/100g	3.3	3.3	0.00	0% - 20%
EG005T: Total Metals by ICP-AES (QC Lot: 777339)									
ES1704772-001	TP01	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	16	12	29.0	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	<2	<2	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	6	5	0.00	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Iron	7439-89-6	50	mg/kg	4.65	40800	12.9	0% - 20%
ES1704772-011	TP11	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	8	8	0.00	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	<2	<2	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	<5	<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 (%)*
EG005T: Total Metals by ICP-AES (QC Lot: 777339) - continued									
ES1704772-011	TP11	EG005T: Lead	7439-92-1	5	mg/kg	8	8	0.00	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	9	11	13.8	No Limit
		EG005T: Iron	7439-89-6	50	mg/kg	16000	15900	0.804	0% - 20%
EG005T: Total Metals by ICP-AES (QC Lot: 777341)									
ES1704772-021	TP21	EG005T: Cadmium	7440-43-9	1	mg/kg	1	1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	9	13	38.4	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	5	5	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	9	10	10.9	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	36	36	0.00	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	75	47	45.8	0% - 50%
		EG005T: Iron	7439-89-6	50	mg/kg	1.22	13600	11.0	0% - 20%
ES1704772-031	TP31	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	9	8	13.7	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	5	4	31.2	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	8	8	0.00	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	15	17	14.0	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	25	26	0.00	No Limit
		EG005T: Iron	7439-89-6	50	mg/kg	7430	7320	1.58	0% - 20%
EG005T: Total Metals by ICP-AES (QC Lot: 777343)									
ES1704772-041	TP41	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	4	3	0.00	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	<2	<2	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	15	10	40.1	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	12	9	27.7	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	16	13	21.6	No Limit
		EG005T: Iron	7439-89-6	50	mg/kg	6190	6150	0.545	0% - 20%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 777340)									
ES1704772-001	TP01	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
ES1704772-011	TP11	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 777342)									
ES1704772-021	TP21	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
ES1704772-031	TP31	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 777344)									
ES1704772-041	TP41	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EP004: Organic Matter (QC Lot: 778483)									
ES1704735-001	Anonymous	EP004: Organic Matter	----	0.5	%	2.7	2.8	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 (%)*
EP004: Organic Matter (QC Lot: 778483) - continued									
ES1704735-001	Anonymous	EP004: Total Organic Carbon	----	0.5	%	1.6	1.6	0.00	No Limit
ES1704772-001	TP01	EP004: Organic Matter	----	0.5	%	<0.5	<0.5	0.00	No Limit
		EP004: Total Organic Carbon	----	0.5	%	<0.5	<0.5	0.00	No Limit
EP066: Polychlorinated Biphenyls (PCB) (QC Lot: 774646)									
ES1704772-001	TP01	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
ES1704772-011	TP11	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EP066: Polychlorinated Biphenyls (PCB) (QC Lot: 774741)									
ES1704772-021	TP21	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
ES1704772-031	TP31	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EP066: Polychlorinated Biphenyls (PCB) (QC Lot: 775086)									
ES1704772-041	TP41	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 774644)									
ES1704772-001	TP01	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
ES1704772-011	TP11	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

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: 774644) - continued									
ES1704772-011	TP11	EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 774740)									
ES1704772-021	TP21	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	0.5	0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	0.5	0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	0.5	0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	1.5	1.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
ES1704772-031	TP31	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

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: 774740) - continued									
ES1704772-031	TP31	EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 775085)									
ES1704808-002	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
ES1704772-041	TP41	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

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: 775085) - continued									
ES1704772-041	TP41	EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 774590)									
ES1704772-001	TP01	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
ES1704772-011	TP11	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 774591)									
ES1704772-021	TP21	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
ES1704772-031	TP31	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 774595)									
ES1704733-001	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
ES1704772-043	TP43	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 774645)									
ES1704772-001	TP01	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
ES1704772-011	TP11	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: 774739)									
ES1704772-021	TP21	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
ES1704772-031	TP31	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: 775084)									
ES1704808-002	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	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 Petroleum Hydrocarbons (QC Lot: 775084) - continued									
ES1704808-002	Anonymous	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
ES1704772-041	TP41	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 Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 774590)									
ES1704772-001	TP01	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
ES1704772-011	TP11	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 774591)									
ES1704772-021	TP21	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
ES1704772-031	TP31	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 774595)									
ES1704733-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
ES1704772-043	TP43	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 774645)									
ES1704772-001	TP01	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	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
ES1704772-011	TP11	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	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: 774739)									
ES1704772-021	TP21	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	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
ES1704772-031	TP31	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	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: 775084)									
ES1704808-002	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	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
ES1704772-041	TP41	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080: BTEXN (QC Lot: 774590)									
ES1704772-001	TP01	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

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: BTEXN (QC Lot: 774590) - continued									
ES1704772-001	TP01	EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
ES1704772-011	TP11	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
EP080: BTEXN (QC Lot: 774591)									
ES1704772-021	TP21	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
ES1704772-031	TP31	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
EP080: BTEXN (QC Lot: 774595)									
ES1704733-001	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
ES1704772-043	TP43	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

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: BTEXN (QC Lot: 774595) - continued									
ES1704772-043	TP43	EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit

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

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

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA010: Conductivity (QCLot: 777348)								
EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1412 µS/cm	98.7	92	108
EA010: Conductivity (QCLot: 777349)								
EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1412 µS/cm	102	92	108
EA010: Conductivity (QCLot: 777351)								
EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1412 µS/cm	96.3	92	108
ED006: Exchangeable Cations on Alkaline Soils (QCLot: 782740)								
ED006: Exchangeable Calcium	----	0.1	meq/100g	<0.1	2.5 meq/100g	105	80	110
ED006: Exchangeable Magnesium	----	0.1	meq/100g	<0.1	4.17 meq/100g	90.8	80	110
ED006: Exchangeable Potassium	----	0.1	meq/100g	<0.1	1.28 meq/100g	107	80	110
ED006: Exchangeable Sodium	----	0.1	meq/100g	<0.1	2.17 meq/100g	99.1	80	110
ED006: Cation Exchange Capacity	----	0.1	meq/100g	<0.1	----	----	----	----
ED007: Exchangeable Cations (QCLot: 782741)								
ED007: Exchangeable Calcium	----	0.1	meq/100g	<0.1	1 meq/100g	98.6	76	122
ED007: Exchangeable Magnesium	----	0.1	meq/100g	<0.1	1.67 meq/100g	94.5	76	118
ED007: Exchangeable Potassium	----	0.1	meq/100g	<0.1	0.51 meq/100g	106	80	120
ED007: Exchangeable Sodium	----	0.1	meq/100g	<0.1	0.87 meq/100g	105	80	120
ED007: Cation Exchange Capacity	----	0.1	meq/100g	<0.1	----	----	----	----
ED008: Exchangeable Cations (QCLot: 779867)								
ED008: Exchangeable Calcium	----	0.1	meq/100g	<0.1	1 meq/100g	99.0	82	128
ED008: Exchangeable Magnesium	----	0.1	meq/100g	<0.1	1.67 meq/100g	94.0	82	120
ED008: Exchangeable Potassium	----	0.1	meq/100g	<0.1	0.51 meq/100g	107	70	140
ED008: Exchangeable Sodium	----	0.1	meq/100g	<0.1	0.87 meq/100g	107	78	136
ED008: Cation Exchange Capacity	----	0.1	meq/100g	<0.1	----	----	----	----
EG005T: Total Metals by ICP-AES (QCLot: 777339)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	105	86	126
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	95.6	83	113
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	90.0	76	128
EG005T: Copper	7440-50-8	5	mg/kg	<5	32 mg/kg	99.7	86	120
EG005T: Iron	7439-89-6	50	mg/kg	<50	8400 mg/kg	73.7	70	130
EG005T: Lead	7439-92-1	5	mg/kg	<5	40 mg/kg	94.2	80	114
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55 mg/kg	98.8	87	123
EG005T: Zinc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	101	80	122
EG005T: Total Metals by ICP-AES (QCLot: 777341)								

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
EG005T: Total Metals by ICP-AES (QCLot: 777341) - continued								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	103	86	126
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	99.6	83	113
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	92.5	76	128
EG005T: Copper	7440-50-8	5	mg/kg	<5	32 mg/kg	104	86	120
EG005T: Iron	7439-89-6	50	mg/kg	<50	8400 mg/kg	76.6	70	130
EG005T: Lead	7439-92-1	5	mg/kg	<5	40 mg/kg	100	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	104	80	122
EG005T: Total Metals by ICP-AES (QCLot: 777343)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	101	86	126
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	95.7	83	113
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	88.0	76	128
EG005T: Copper	7440-50-8	5	mg/kg	<5	32 mg/kg	95.6	86	120
EG005T: Iron	7439-89-6	50	mg/kg	<50	8400 mg/kg	72.0	70	130
EG005T: Lead	7439-92-1	5	mg/kg	<5	40 mg/kg	96.9	80	114
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55 mg/kg	96.9	87	123
EG005T: Zinc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	103	80	122
EG035T: Total Recoverable Mercury by FIMS (QCLot: 777340)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	86.7	70	105
EG035T: Total Recoverable Mercury by FIMS (QCLot: 777342)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	89.6	70	105
EG035T: Total Recoverable Mercury by FIMS (QCLot: 777344)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	80.0	70	105
EP004: Organic Matter (QCLot: 778483)								
EP004: Organic Matter	----	0.5	%	<0.5	2.53 %	95.3	82	98
EP004: Total Organic Carbon	----	0.5	%	<0.5	1.46 %	95.6	81	99
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 774646)								
EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	1 mg/kg	95.0	62	126
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 774741)								
EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	1 mg/kg	117	62	126
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 775086)								
EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	1 mg/kg	114	62	126
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 774644)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	111	77	125
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	111	72	124
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	114	73	127
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	112	72	126

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: 774644) - continued								
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	108	75	127
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	109	77	127
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	109	73	127
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	110	74	128
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	95.6	69	123
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	96.3	75	127
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	6 mg/kg	90.3	68	116
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	100	74	126
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	99.8	70	126
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	95.6	61	121
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	98.2	62	118
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	93.5	63	121
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 774740)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	114	77	125
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	114	72	124
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	118	73	127
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	116	72	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	111	75	127
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	112	77	127
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	111	73	127
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	112	74	128
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	97.9	69	123
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	99.9	75	127
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	6 mg/kg	91.8	68	116
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	103	74	126
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	102	70	126
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	96.8	61	121
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	99.8	62	118
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	94.4	63	121
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 775085)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	116	77	125
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	115	72	124
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	119	73	127
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	117	72	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	113	75	127
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	114	77	127
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	113	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: 775085) - continued								
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	115	74	128
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	101	69	123
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	101	75	127
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	6 mg/kg	91.6	68	116
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	106	74	126
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	104	70	126
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	99.3	61	121
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	102	62	118
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	97.4	63	121
EP080/071: Total Petroleum Hydrocarbons (QCLot: 774590)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	75.1	68	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 774591)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	103	68	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 774595)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	75.9	68	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 774645)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	200 mg/kg	94.5	75	129
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	300 mg/kg	103	77	131
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	200 mg/kg	101	71	129
EP080/071: Total Petroleum Hydrocarbons (QCLot: 774739)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	200 mg/kg	93.8	75	129
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	300 mg/kg	98.4	77	131
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	200 mg/kg	90.9	71	129
EP080/071: Total Petroleum Hydrocarbons (QCLot: 775084)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	200 mg/kg	107	75	129
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	300 mg/kg	106	77	131
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	200 mg/kg	98.6	71	129
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 774590)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	75.0	68	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 774591)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	102	68	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 774595)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	74.7	68	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 774645)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	250 mg/kg	102	77	125
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	350 mg/kg	106	74	138

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 774645) - continued								
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	150 mg/kg	91.6	63	131
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 774739)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	250 mg/kg	96.6	77	125
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	350 mg/kg	102	74	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	150 mg/kg	102	63	131
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 775084)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	250 mg/kg	100	77	125
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	350 mg/kg	105	74	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	150 mg/kg	106	63	131
EP080: BTEXN (QCLot: 774590)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	86.9	62	116
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	83.0	67	121
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	70.9	65	117
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	77.7	66	118
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	72.2	68	120
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	87.1	63	119
EP080: BTEXN (QCLot: 774591)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	99.1	62	116
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	99.7	67	121
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	93.4	65	117
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	96.8	66	118
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	95.9	68	120
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	93.0	63	119
EP080: BTEXN (QCLot: 774595)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	77.3	62	116
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	79.3	67	121
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	75.5	65	117
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	80.2	66	118
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	82.9	68	120
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	88.6	63	119

Matrix Spike (MS) Report

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

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG005T: Total Metals by ICP-AES (QCLot: 777339)							
ES1704772-001	TP01	EG005T: Arsenic	7440-38-2	50 mg/kg	91.1	70	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	96.4	70	130
		EG005T: Chromium	7440-47-3	50 mg/kg	84.8	70	130
		EG005T: Copper	7440-50-8	250 mg/kg	95.2	70	130
		EG005T: Lead	7439-92-1	250 mg/kg	95.5	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	96.1	70	130
		EG005T: Zinc	7440-66-6	250 mg/kg	96.8	70	130
EG005T: Total Metals by ICP-AES (QCLot: 777341)							
ES1704772-021	TP21	EG005T: Arsenic	7440-38-2	50 mg/kg	95.7	70	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	95.5	70	130
		EG005T: Chromium	7440-47-3	50 mg/kg	97.4	70	130
		EG005T: Copper	7440-50-8	250 mg/kg	95.4	70	130
		EG005T: Lead	7439-92-1	250 mg/kg	93.3	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	95.7	70	130
		EG005T: Zinc	7440-66-6	250 mg/kg	86.1	70	130
EG005T: Total Metals by ICP-AES (QCLot: 777343)							
ES1704772-041	TP41	EG005T: Arsenic	7440-38-2	50 mg/kg	91.8	70	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	98.0	70	130
		EG005T: Chromium	7440-47-3	50 mg/kg	94.3	70	130
		EG005T: Copper	7440-50-8	250 mg/kg	93.0	70	130
		EG005T: Lead	7439-92-1	250 mg/kg	97.0	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	95.5	70	130
		EG005T: Zinc	7440-66-6	250 mg/kg	98.4	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 777340)							
ES1704772-001	TP01	EG035T: Mercury	7439-97-6	5 mg/kg	99.9	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 777342)							
ES1704772-021	TP21	EG035T: Mercury	7439-97-6	5 mg/kg	96.7	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 777344)							
ES1704772-041	TP41	EG035T: Mercury	7439-97-6	5 mg/kg	89.7	70	130
EP004: Organic Matter (QCLot: 778483)							
ES1704735-001	Anonymous	EP004: Organic Matter	----	4.58 %	104	70	130
		EP004: Total Organic Carbon	----	2.66 %	103	70	130
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 774646)							
ES1704772-001	TP01	EP066: Total Polychlorinated biphenyls	----	1 mg/kg	104	70	130
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 774741)							
ES1704772-021	TP21	EP066: Total Polychlorinated biphenyls	----	1 mg/kg	101	70	130

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
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 775086)							
ES1704772-041	TP41	EP066: Total Polychlorinated biphenyls	----	1 mg/kg	127	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 774644)							
ES1704772-001	TP01	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	99.5	70	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	107	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 774740)							
ES1704772-021	TP21	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	97.1	70	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	106	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 775085)							
ES1704772-041	TP41	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	98.1	70	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	107	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 774590)							
ES1704772-001	TP01	EP080: C6 - C9 Fraction	----	32.5 mg/kg	101	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 774591)							
ES1704772-021	TP21	EP080: C6 - C9 Fraction	----	32.5 mg/kg	112	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 774595)							
ES1704733-001	Anonymous	EP080: C6 - C9 Fraction	----	32.5 mg/kg	75.8	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 774645)							
ES1704772-001	TP01	EP071: C10 - C14 Fraction	----	523 mg/kg	93.4	73	137
		EP071: C15 - C28 Fraction	----	2319 mg/kg	108	53	131
		EP071: C29 - C36 Fraction	----	1714 mg/kg	109	52	132
EP080/071: Total Petroleum Hydrocarbons (QCLot: 774739)							
ES1704772-021	TP21	EP071: C10 - C14 Fraction	----	523 mg/kg	79.4	73	137
		EP071: C15 - C28 Fraction	----	2319 mg/kg	94.4	53	131
		EP071: C29 - C36 Fraction	----	1714 mg/kg	95.0	52	132
EP080/071: Total Petroleum Hydrocarbons (QCLot: 775084)							
ES1704772-041	TP41	EP071: C10 - C14 Fraction	----	523 mg/kg	79.2	73	137
		EP071: C15 - C28 Fraction	----	2319 mg/kg	94.3	53	131
		EP071: C29 - C36 Fraction	----	1714 mg/kg	99.1	52	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 774590)							
ES1704772-001	TP01	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	100	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 774591)							
ES1704772-021	TP21	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	112	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 774595)							
ES1704733-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	75.9	70	130

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 Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 774645)							
ES1704772-001	TP01	EP071: >C10 - C16 Fraction	----	860 mg/kg	97.5	73	137
		EP071: >C16 - C34 Fraction	----	3223 mg/kg	106	53	131
		EP071: >C34 - C40 Fraction	----	1058 mg/kg	111	52	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 774739)							
ES1704772-021	TP21	EP071: >C10 - C16 Fraction	----	860 mg/kg	84.2	73	137
		EP071: >C16 - C34 Fraction	----	3223 mg/kg	93.0	53	131
		EP071: >C34 - C40 Fraction	----	1058 mg/kg	96.6	52	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 775084)							
ES1704772-041	TP41	EP071: >C10 - C16 Fraction	----	860 mg/kg	89.5	73	137
		EP071: >C16 - C34 Fraction	----	3223 mg/kg	97.5	53	131
		EP071: >C34 - C40 Fraction	----	1058 mg/kg	101	52	132
EP080: BTEXN (QCLot: 774590)							
ES1704772-001	TP01	EP080: Benzene	71-43-2	2.5 mg/kg	98.4	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	94.0	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	89.0	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	89.1	70	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	87.4	70	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	92.7	70	130
EP080: BTEXN (QCLot: 774591)							
ES1704772-021	TP21	EP080: Benzene	71-43-2	2.5 mg/kg	96.2	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	92.2	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	90.8	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	90.4	70	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	91.6	70	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	92.0	70	130
EP080: BTEXN (QCLot: 774595)							
ES1704733-001	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	73.2	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	72.9	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	76.7	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	77.1	70	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	80.1	70	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	86.0	70	130

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES1704772**	Page	: 1 of 19
Client	: **JACOBS GROUP (AUSTRALIA) PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: ROBERT GAUTHIER	Telephone	: +61-2-8784 8555
Project	: IA137000	Date Samples Received	: 01-Mar-2017
Site	: ----	Issue Date	: 08-Mar-2017
Sampler	: KYLE MCLEAN	No. of samples received	: 52
Order number	: ----	No. of samples analysed	: 52

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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

Outliers : Analysis Holding Time Compliance

Matrix: **SOIL**

Method / Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA001: pH in soil using 0.01M CaCl extract						
Soil Glass Jar - Unpreserved						
TP01, TP05, TP08, TP15	07-Mar-2017	06-Mar-2017	1	----	----	----

Analysis Holding Time Compliance

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

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

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

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

Matrix: **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
EA001: pH in soil using 0.01M CaCl extract							
Soil Glass Jar - Unpreserved (EA001)							
TP01, TP05, TP08, TP15	**27-Feb-2017**	**07-Mar-2017**	06-Mar-2017	×	**07-Mar-2017**	07-Mar-2017	✓
Soil Glass Jar - Unpreserved (EA001)							
TP21, TP26, TP30, TP35, TP39, TP43	**28-Feb-2017**	**07-Mar-2017**	07-Mar-2017	✓	**07-Mar-2017**	07-Mar-2017	✓

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
EA002 : pH (Soils)							
Soil Glass Jar - Unpreserved (EA002)							
TP01, TP02, TP03, TP04, TP05, TP06, TP07, TP08, TP09, TP10, TP11, TP12, TP13, TP14, TP15, TP16, TP17, TP18, TP19, TP20, DUP-A	**27-Feb-2017**	**06-Mar-2017**	06-Mar-2017	✓	**06-Mar-2017**	06-Mar-2017	✓
Soil Glass Jar - Unpreserved (EA002)							
TP21, TP22, TP23, TP24, TP25, TP26, TP27, TP28, TP29, TP30, TP31, TP32, TP33, TP34, TP35, TP36, TP37, TP38, TP39, TP40, TP41, TP42, TP43, TP44, TP45, TP46, DUP-B, DUP-C	**28-Feb-2017**	**06-Mar-2017**	07-Mar-2017	✓	**06-Mar-2017**	06-Mar-2017	✓

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
EA010: Conductivity							
Soil Glass Jar - Unpreserved (EA010)							
TP01, TP02, TP03, TP04, TP05, TP06, TP07, TP08, TP09, TP10, TP11, TP12, TP13, TP14, TP15, TP16, TP17, TP18, TP19, TP20, DUP-A	**27-Feb-2017**	**06-Mar-2017**	06-Mar-2017	✓	**06-Mar-2017**	03-Apr-2017	✓
Soil Glass Jar - Unpreserved (EA010)							
TP21, TP22, TP23, TP24, TP25, TP26, TP27, TP28, TP29, TP30, TP31, TP32, TP33, TP34, TP35, TP36, TP37, TP38, TP39, TP40, TP41, TP42, TP43, TP44, TP45, TP46, DUP-B, DUP-C	**28-Feb-2017**	**06-Mar-2017**	07-Mar-2017	✓	**06-Mar-2017**	03-Apr-2017	✓

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)							
TP01, TP02, TP03, TP04, TP05, TP06, TP07, TP08, TP09, TP10, TP11, TP12, TP13, TP14, TP15, TP16, TP17, TP18, TP19, TP20, DUP-A	**27-Feb-2017**	**----**	----	----	**02-Mar-2017**	13-Mar-2017	✓
Soil Glass Jar - Unpreserved (EA055-103)							
TP21, TP22, TP23, TP24, TP25, TP26, TP27, TP28, TP29, TP30, TP31, TP32, TP33, TP34, TP35, TP36, TP37, TP38, TP39, TP40, TP41, TP42, TP43, TP44, TP45, TP46, DUP-B, DUP-C	**28-Feb-2017**	**----**	----	----	**02-Mar-2017**	14-Mar-2017	✓
EA150: Soil Classification based on Particle Size							
Snap Lock Bag - Subsampled by ALS (EA150H)							
TP15	**27-Feb-2017**	**----**	----	----	**07-Mar-2017**	26-Aug-2017	✓
Snap Lock Bag - Subsampled by ALS (EA150H)							
TP21	**28-Feb-2017**	**----**	----	----	**07-Mar-2017**	27-Aug-2017	✓
Snap Lock Bag: Separate bag received (EA150H)							
TP01, TP05, TP08	**27-Feb-2017**	**----**	----	----	**07-Mar-2017**	26-Aug-2017	✓
Snap Lock Bag: Separate bag received (EA150H)							
TP26, TP30, TP35, TP39, TP43	**28-Feb-2017**	**----**	----	----	**07-Mar-2017**	27-Aug-2017	✓

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
EA152: Soil Particle Density							
Snap Lock Bag - Subsampled by ALS (EA152) TP15	**27-Feb-2017**	**----**	----	----	**07-Mar-2017**	26-Aug-2017	✓
Snap Lock Bag - Subsampled by ALS (EA152) TP21	**28-Feb-2017**	**----**	----	----	**07-Mar-2017**	27-Aug-2017	✓
Snap Lock Bag: Separate bag received (EA152) TP01, TP05, TP08	**27-Feb-2017**	**----**	----	----	**07-Mar-2017**	26-Aug-2017	✓
Snap Lock Bag: Separate bag received (EA152) TP26, TP30, TP35, TP39, TP43	**28-Feb-2017**	**----**	----	----	**07-Mar-2017**	27-Aug-2017	✓
EA200: AS 4964 - 2004 Identification of Asbestos in Soils							
Snap Lock Bag - Subsampled by ALS (EA200) TP01, TP05, TP08	**27-Feb-2017**	**----**	----	----	**03-Mar-2017**	26-Aug-2017	✓
Snap Lock Bag - Subsampled by ALS (EA200) TP26, TP30, TP35, TP39, TP43	**28-Feb-2017**	**----**	----	----	**03-Mar-2017**	27-Aug-2017	✓
Snap Lock Bag: Separate bag received (EA200) TP02, TP03, TP04, TP06, TP07, TP09, TP10, TP11, TP12, TP13, TP14, TP15, TP16, TP17, TP18, TP19, TP20, DUP-A	**27-Feb-2017**	**----**	----	----	**03-Mar-2017**	26-Aug-2017	✓
Snap Lock Bag: Separate bag received (EA200) TP21, TP22, TP23, TP24, TP25, TP27, TP28, TP29, TP31, TP32, TP33, TP34, TP36, TP37, TP38, TP40, TP41, TP42, TP44, TP45, TP46, DUP-B, DUP-C	**28-Feb-2017**	**----**	----	----	**03-Mar-2017**	27-Aug-2017	✓

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
ED006: Exchangeable Cations on Alkaline Soils							
Soil Glass Jar - Unpreserved (ED006)							
TP01, TP05	**27-Feb-2017**	**08-Mar-2017**	27-Mar-2017	✓	**08-Mar-2017**	27-Mar-2017	✓
Soil Glass Jar - Unpreserved (ED006)							
TP21	**28-Feb-2017**	**08-Mar-2017**	28-Mar-2017	✓	**08-Mar-2017**	28-Mar-2017	✓
ED007: Exchangeable Cations							
Soil Glass Jar - Unpreserved (ED007)							
TP08	**27-Feb-2017**	**08-Mar-2017**	27-Mar-2017	✓	**08-Mar-2017**	27-Mar-2017	✓
Soil Glass Jar - Unpreserved (ED007)							
TP26, TP30, TP35, TP39, TP43	**28-Feb-2017**	**08-Mar-2017**	28-Mar-2017	✓	**08-Mar-2017**	28-Mar-2017	✓
ED008: Exchangeable Cations							
Soil Glass Jar - Unpreserved (ED008)							
TP15	**27-Feb-2017**	**06-Mar-2017**	27-Mar-2017	✓	**06-Mar-2017**	27-Mar-2017	✓
EG005T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T)							
TP01, TP02, TP03, TP04, TP05, TP06, TP07, TP08, TP09, TP10, TP11, TP12, TP13, TP14, TP15, TP16, TP17, TP18, TP19, TP20, DUP-A	**27-Feb-2017**	**03-Mar-2017**	26-Aug-2017	✓	**06-Mar-2017**	26-Aug-2017	✓
Soil Glass Jar - Unpreserved (EG005T)							
TP21, TP22, TP23, TP24, TP25, TP26, TP27, TP28, TP29, TP30, TP31, TP32, TP33, TP34, TP35, TP36, TP37, TP38, TP39, TP40, TP41, TP42, TP43, TP44, TP45, TP46, DUP-B, DUP-C	**28-Feb-2017**	**03-Mar-2017**	27-Aug-2017	✓	**06-Mar-2017**	27-Aug-2017	✓

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)							
TP01, TP02, TP03, TP04, TP05, TP06, TP07, TP08, TP09, TP10, TP11, TP12, TP13, TP14, TP15, TP16, TP17, TP18, TP19, TP20, DUP-A	**27-Feb-2017**	**03-Mar-2017**	27-Mar-2017	✓	**06-Mar-2017**	27-Mar-2017	✓
Soil Glass Jar - Unpreserved (EG035T)							
TP21, TP22, TP23, TP24, TP25, TP26, TP27, TP28, TP29, TP30, TP31, TP32, TP33, TP34, TP35, TP36, TP37, TP38, TP39, TP40, TP41, TP42, TP43, TP44, TP45, TP46, DUP-B, DUP-C	**28-Feb-2017**	**03-Mar-2017**	28-Mar-2017	✓	**06-Mar-2017**	28-Mar-2017	✓
EP004: Organic Matter							
Soil Glass Jar - Unpreserved (EP004)							
TP01, TP05, TP08, TP15	**27-Feb-2017**	**06-Mar-2017**	27-Mar-2017	✓	**06-Mar-2017**	27-Mar-2017	✓
Soil Glass Jar - Unpreserved (EP004)							
TP21, TP26, TP30, TP35, TP39, TP43	**28-Feb-2017**	**06-Mar-2017**	28-Mar-2017	✓	**06-Mar-2017**	28-Mar-2017	✓

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
EP066: Polychlorinated Biphenyls (PCB)							
Soil Glass Jar - Unpreserved (EP066)							
TP01, TP02, TP03, TP04, TP05, TP06, TP07, TP08, TP09, TP10, TP11, TP12, TP13, TP14, TP15, TP16, TP17, TP18, TP19, TP20, DUP-A	**27-Feb-2017**	**02-Mar-2017**	13-Mar-2017	✓	**03-Mar-2017**	11-Apr-2017	✓
Soil Glass Jar - Unpreserved (EP066)							
TP41, TP42, TP43, TP44, TP45, TP46, DUP-B, DUP-C	**28-Feb-2017**	**02-Mar-2017**	14-Mar-2017	✓	**03-Mar-2017**	11-Apr-2017	✓
Soil Glass Jar - Unpreserved (EP066)							
TP21, TP22, TP23, TP24, TP25, TP26, TP27, TP28, TP29, TP30, TP31, TP32, TP33, TP34, TP35, TP36, TP37, TP38, TP39, TP40	**28-Feb-2017**	**03-Mar-2017**	14-Mar-2017	✓	**05-Mar-2017**	12-Apr-2017	✓

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
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075(SIM))							
TP01, TP02, TP03, TP04, TP05, TP06, TP07, TP08, TP09, TP10, TP11, TP12, TP13, TP14, TP15, TP16, TP17, TP18, TP19, TP20, DUP-A	**27-Feb-2017**	**02-Mar-2017**	13-Mar-2017	✓	**03-Mar-2017**	11-Apr-2017	✓
Soil Glass Jar - Unpreserved (EP075(SIM))							
TP41, TP42, TP43, TP44, TP45, TP46, DUP-B, DUP-C	**28-Feb-2017**	**02-Mar-2017**	14-Mar-2017	✓	**03-Mar-2017**	11-Apr-2017	✓
Soil Glass Jar - Unpreserved (EP075(SIM))							
TP21, TP22, TP23, TP24, TP25, TP26, TP27, TP28, TP29, TP30, TP31, TP32, TP33, TP34, TP35, TP36, TP37, TP38, TP39, TP40	**28-Feb-2017**	**03-Mar-2017**	14-Mar-2017	✓	**05-Mar-2017**	12-Apr-2017	✓

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)							
TP01, TP02, TP03, TP04, TP05, TP06, TP07, TP08, TP09, TP10, TP11, TP12, TP13, TP14, TP15, TP16, TP17, TP18, TP19, TP20, DUP-A	**27-Feb-2017**	**02-Mar-2017**	13-Mar-2017	✓	**02-Mar-2017**	13-Mar-2017	✓
Soil Glass Jar - Unpreserved (EP071)							
TP01, TP02, TP03, TP04, TP05, TP06, TP07, TP08, TP09, TP10, TP11, TP12, TP13, TP14, TP15, TP16, TP17, TP18, TP19, TP20, DUP-A	**27-Feb-2017**	**02-Mar-2017**	13-Mar-2017	✓	**03-Mar-2017**	11-Apr-2017	✓
Soil Glass Jar - Unpreserved (EP080)							
TP21, TP22, TP23, TP24, TP25, TP26, TP27, TP28, TP29, TP30, TP31, TP32, TP33, TP34, TP35, TP36, TP37, TP38, TP39, TP40, TP41, TP42, TP43, TP44, TP45, TP46, DUP-B, DUP-C	**28-Feb-2017**	**02-Mar-2017**	14-Mar-2017	✓	**02-Mar-2017**	14-Mar-2017	✓
Soil Glass Jar - Unpreserved (EP071)							

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 - Continued								
TP41,	TP42,	**28-Feb-2017**	**02-Mar-2017**	14-Mar-2017	✓	**03-Mar-2017**	11-Apr-2017	✓
TP43,	TP44,							
TP45,	TP46,							
DUP-B,	DUP-C							
Soil Glass Jar - Unpreserved (EP071)								
TP21,	TP22,	**28-Feb-2017**	**03-Mar-2017**	14-Mar-2017	✓	**06-Mar-2017**	12-Apr-2017	✓
TP23,	TP24,							
TP25,	TP26,							
TP27,	TP28,							
TP29,	TP30,							
TP31,	TP32,							
TP33,	TP34,							
TP35,	TP36,							
TP37,	TP38,							
TP39,	TP40							

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Soil Glass Jar - Unpreserved (EP080)							
TP01, TP02, TP03, TP04, TP05, TP06, TP07, TP08, TP09, TP10, TP11, TP12, TP13, TP14, TP15, TP16, TP17, TP18, TP19, TP20, DUP-A	**27-Feb-2017**	**02-Mar-2017**	13-Mar-2017	✓	**02-Mar-2017**	13-Mar-2017	✓
Soil Glass Jar - Unpreserved (EP071)							
TP01, TP02, TP03, TP04, TP05, TP06, TP07, TP08, TP09, TP10, TP11, TP12, TP13, TP14, TP15, TP16, TP17, TP18, TP19, TP20, DUP-A	**27-Feb-2017**	**02-Mar-2017**	13-Mar-2017	✓	**03-Mar-2017**	11-Apr-2017	✓
Soil Glass Jar - Unpreserved (EP080)							
TP21, TP22, TP23, TP24, TP25, TP26, TP27, TP28, TP29, TP30, TP31, TP32, TP33, TP34, TP35, TP36, TP37, TP38, TP39, TP40, TP41, TP42, TP43, TP44, TP45, TP46, DUP-B, DUP-C	**28-Feb-2017**	**02-Mar-2017**	14-Mar-2017	✓	**02-Mar-2017**	14-Mar-2017	✓
Soil Glass Jar - Unpreserved (EP071)							

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued								
TP41,	TP42,	**28-Feb-2017**	**02-Mar-2017**	14-Mar-2017	✓	**03-Mar-2017**	11-Apr-2017	✓
TP43,	TP44,							
TP45,	TP46,							
DUP-B,	DUP-C							
Soil Glass Jar - Unpreserved (EP071)								
TP21,	TP22,	**28-Feb-2017**	**03-Mar-2017**	14-Mar-2017	✓	**06-Mar-2017**	12-Apr-2017	✓
TP23,	TP24,							
TP25,	TP26,							
TP27,	TP28,							
TP29,	TP30,							
TP31,	TP32,							
TP33,	TP34,							
TP35,	TP36,							
TP37,	TP38,							
TP39,	TP40							

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: BTEXN							
Soil Glass Jar - Unpreserved (EP080)							
Trip Blank, Trip Spike, TSC	**21-Feb-2017**	**02-Mar-2017**	07-Mar-2017	✓	**02-Mar-2017**	07-Mar-2017	✓
Soil Glass Jar - Unpreserved (EP080)							
TP01, TP02, TP03, TP04, TP05, TP06, TP07, TP08, TP09, TP10, TP11, TP12, TP13, TP14, TP15, TP16, TP17, TP18, TP19, TP20, DUP-A	**27-Feb-2017**	**02-Mar-2017**	13-Mar-2017	✓	**02-Mar-2017**	13-Mar-2017	✓
Soil Glass Jar - Unpreserved (EP080)							
TP21, TP22, TP23, TP24, TP25, TP26, TP27, TP28, TP29, TP30, TP31, TP32, TP33, TP34, TP35, TP36, TP37, TP38, TP39, TP40, TP41, TP42, TP43, TP44, TP45, TP46, DUP-B, DUP-C	**28-Feb-2017**	**02-Mar-2017**	14-Mar-2017	✓	**02-Mar-2017**	14-Mar-2017	✓

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)							
Electrical Conductivity (1:5)	EA010	5	49	**10.20**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations	ED007	1	8	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations on Alkaline Soils	ED006	1	3	**33.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations with pre-treatment	ED008	1	1	**100.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Moisture Content	EA055-103	8	80	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organic Matter	EP004	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	6	57	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH (1:5)	EA002	5	49	**10.20**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH in soil using a 0.01M CaCl2 extract	EA001	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	5	49	**10.20**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	5	49	**10.20**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	5	49	**10.20**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	6	57	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	6	60	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Electrical Conductivity (1:5)	EA010	3	49	**6.12**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations	ED007	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations on Alkaline Soils	ED006	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations with pre-treatment	ED008	1	1	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organic Matter	EP004	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	3	57	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	3	49	**6.12**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	3	49	**6.12**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	3	49	**6.12**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	3	57	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	3	60	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Electrical Conductivity (1:5)	EA010	3	49	**6.12**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations	ED007	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations on Alkaline Soils	ED006	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations with pre-treatment	ED008	1	1	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organic Matter	EP004	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	3	57	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	3	49	**6.12**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	3	49	**6.12**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	3	49	**6.12**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

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*	
Method Blanks (MB) - Continued							
TRH - Semivolatile Fraction	EP071	3	57	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	3	60	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Organic Matter	EP004	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	3	57	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	3	49	**6.12**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	3	49	**6.12**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	3	49	**6.12**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	3	57	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	3	60	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
pH in soil using a 0.01M CaCl2 extract	EA001	SOIL	In house: Referenced to Rayment and Higginson 4B1 (mod.) 10 g of soil is mixed with 50 mL of 0.01M CaCl2 and tumbled end over end for 1 hour. pH is measured from the continuous suspension. This method is compliant with NEPM (2013) Schedule B(3) (Method 103)
pH (1:5)	EA002	SOIL	In house: Referenced to APHA 4500H+. pH is determined on soil samples after a 1:5 soil/water leach. This method is compliant with NEPM (2013) Schedule B(3) (Method 103)
Electrical Conductivity (1:5)	EA010	SOIL	In house: Referenced to APHA 2510. Conductivity is determined on soil samples using a 1:5 soil/water leach. This method is compliant with NEPM (2013) Schedule B(3) (Method 104)
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).
Particle Size Analysis by Hydrometer	EA150H	SOIL	Particle Size Analysis by Hydrometer according to AS1289.3.6.3 - 2003
Soil Particle Density	* EA152	SOIL	Soil Particle Density by AS 1289.3.5.1-2006 : Methods of testing soils for engineering purposes - Soil classification tests - Determination of the soil particle density of a soil - Standard method
Asbestos Identification in Soils	EA200	SOIL	AS 4964 - 2004 Method for the qualitative identification of asbestos in bulk samples Analysis by Polarised Light Microscopy including dispersion staining
Exchangeable Cations on Alkaline Soils	ED006	SOIL	In house: Referenced to Soil Survey Test Method C5. Soluble salts are removed from the sample prior to analysis. Cations are exchanged from the sample by contact with alcoholic ammonium chloride at pH 8.5. They are then quantitated in the final solution by ICPAES and reported as meq/100g of original soil.
Exchangeable Cations	ED007	SOIL	In house: Referenced to Rayment & Lyons (2011) Method 15A1. Cations are exchanged from the sample by contact with Ammonium Chloride. They are then quantitated in the final solution by ICPAES and reported as meq/100g of original soil. This method is compliant with NEPM (2013) Schedule B(3) (Method 301)
Exchangeable Cations with pre-treatment	ED008	SOIL	In house: Referenced to Rayment & Higginson (2011) Method 15A2. Soluble salts are removed from the sample prior to analysis. Cations are exchanged from the sample by contact with Ammonium Chloride. They are then quantitated in the final solution by ICPAES and reported as meq/100g of original soil. This method is compliant with NEPM (2013) Schedule B(3) (Method 301)
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)
Organic Matter	EP004	SOIL	In house: Referenced to AS1289.4.1.1 - 1997., Dichromate oxidation method after Walkley and Black. This method is compliant with NEPM (2013) Schedule B(3)

Analytical Methods	Method	Matrix	Method Descriptions
Polychlorinated Biphenyls (PCB)	EP066	SOIL	In house: Referenced to USEPA SW 846 - 8270D Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 504)
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015A Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40.
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
pH in soil using a 0.01M CaCl2 extract	EA001-PR	SOIL	In house: Referenced to Rayment and Higginson 4B1, 10 g of soil is mixed with 50 mL of 0.01M CaCl2 and tumbled end over end for 1 hour. pH is measured from the continuous suspension. This method is compliant with NEPM (2013) Schedule B(3) (Method 103)
Exchangeable Cations Preparation Method (Alkaline Soils)	ED006PR	SOIL	In house: Referenced to Rayment and Lyons 2011 method 15C1.
Exchangeable Cations Preparation Method	ED007PR	SOIL	In house: Referenced to Rayment & Higginson (1992) method 15A1. A 1M NH4Cl extraction by end over end tumbling at a ratio of 1:20. There is no pretreatment for soluble salts. Extracts can be run by ICP for cations.
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of distilled water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM (2013) Schedule B(3) (Method 202)
Organic Matter	EP004-PR	SOIL	In house: Referenced to AS1289.4.1.1 - 1997. Dichromate oxidation method after Walkley and Black. This method is compliant with NEPM (2013) Schedule B(3) (Method 105)
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.

Envirolab Services Pty Ltd
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www.envirolabservices.com.au

SAMPLE RECEIPT ADVICE

Client Details	
Client	Jacobs Group (Australia) Pty Ltd
Attention	K McLean, R Gauther

Sample Login Details	
Your Reference	IA137000
Envirolab Reference	**162817**
Date Sample Received	02/03/2017
Date Instructions Received	02/03/2017
Date Results Expected to be Reported	**09/03/2017**

Sample Condition	
Samples received in appropriate condition for analysis	YES
No. of Samples Provided	3 SOILS
Turnaround Time Requested	Standard
Temperature on receipt (°C)	18
Cooling Method	Ice
Sampling Date Provided	YES

Comments
Samples will be held for 1 month for water samples and 2 months for soil samples from date of receipt of samples

Please direct any queries to:

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

Sample and Testing Details on following page

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

Sample Id	*vTRH(C6-C10)/BTEXN in Soil*	*svTRH (C10-C40) in Soil*	*PAHs in Soil*	*PCBs in Soil*	*Acid Extractable metals in soil*	*Electrical Conductivity 1:5 soil:water*	*pH 1:5 soil:water*	*Asbestos ID - soils*
Trip -A	✓	✓	✓	✓	✓	✓	✓	✓
Trip -B	✓	✓	✓	✓	✓	✓	✓	✓
Trip -C	✓	✓	✓	✓	✓	✓	✓	✓

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

12 Ashley Street, Chatswood, NSW 2067
tel: +61 2 9910 6200

email: sydney@envirolab.com.au
envirolab.com.au

Envirolab Services Pty Ltd - Sydney | ABN 37 112 535 645

CERTIFICATE OF ANALYSIS 162817

Client:

Jacobs Group (Australia) Pty Ltd
Level 7
177 Pacific Highway
North Sydney
NSW 2060

Attention: K McLean, R Gauther

Sample log in details:

Your Reference:	**IA137000**		
No. of samples:	3 SOILS		
Date samples received / completed instructions received	02/03/17	/	02/03/17

Analysis Details:

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

Report Details:

Date results requested by: / Issue Date:	9/03/17	/	7/03/17
Date of Preliminary Report:	Not Issued		

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

Results Approved By:

David Springer
General Manager

vTRH(C6-C10)/BTEXN in Soil				
Our Reference:	UNITS	162817-1	162817-2	162817-3
Your Reference	---------- -	Trip -A	Trip -B	Trip -C
Date Sampled	----------	27/02/2017	28/02/2017	28/02/2017
Type of sample		soil	soil	soil
Date extracted	-	03/03/2017	03/03/2017	03/03/2017
Date analysed	-	06/03/2017	06/03/2017	06/03/2017
TRHC$_6$ - C$_9$	mg/kg	<25	<25	<25
TRHC$_6$ - C$_{10}$	mg/kg	<25	<25	<25
vTPHC$_6$ - C$_{10}$ less BTEX (F1)	mg/kg	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	95	101	109

svTRH (C10-C40) in Soil				
Our Reference:	UNITS	162817-1	162817-2	162817-3
Your Reference	---------- -	Trip -A	Trip -B	Trip -C
Date Sampled	----------	27/02/2017	28/02/2017	28/02/2017
Type of sample		soil	soil	soil
Date extracted	-	03/03/2017	03/03/2017	03/03/2017
Date analysed	-	04/03/2017	04/03/2017	04/03/2017
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	<50	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	<100	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	<100	<100	<100
TRH>C$_{10}$-C$_{16}$	mg/kg	<50	<50	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	<50	<50	<50
TRH>C$_{16}$-C$_{34}$	mg/kg	<100	<100	<100
TRH>C$_{34}$-C$_{40}$	mg/kg	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50
Surrogate o-Terphenyl	%	89	86	91

PAHs in Soil Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- - ---------- 	162817-1 Trip -A 27/02/2017 soil	162817-2 Trip -B 28/02/2017 soil	162817-3 Trip -C 28/02/2017 soil
Date extracted	-	03/03/2017	03/03/2017	03/03/2017
Date analysed	-	03/03/2017	03/03/2017	03/03/2017
Naphthalene	mg/kg	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05
Surrogate p-Terphenyl-d14	%	109	94	101

PCBs in Soil Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- - ---------- 	162817-1 Trip -A 27/02/2017 soil	162817-2 Trip -B 28/02/2017 soil	162817-3 Trip -C 28/02/2017 soil
Date extracted	-	03/03/2017	03/03/2017	03/03/2017
Date analysed	-	03/03/2017	03/03/2017	03/03/2017
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1
Surrogate TCLMX	%	96	94	95

Acid Extractable metals in soil Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- - ---------- 	162817-1 Trip -A 27/02/2017 soil	162817-2 Trip -B 28/02/2017 soil	162817-3 Trip -C 28/02/2017 soil	162817-4 Trip -B - [TRIPLICATE] 28/02/2017 soil
Date prepared	-	03/03/2017	03/03/2017	03/03/2017	03/03/2017
Date analysed	-	03/03/2017	03/03/2017	03/03/2017	03/03/2017
Arsenic	mg/kg	<4	5	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	4	8	5	8
Copper	mg/kg	1	7	3	10
Lead	mg/kg	4	30	8	15
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	<1	3	<1	9
Zinc	mg/kg	3	36	6	29

Misc Inorg - Soil				
Our Reference:	UNITS	162817-1	162817-2	162817-3
Your Reference	---------- -	Trip -A	Trip -B	Trip -C
Date Sampled	----------	27/02/2017	28/02/2017	28/02/2017
Type of sample		soil	soil	soil
Date prepared	-	03/03/2017	03/03/2017	03/03/2017
Date analysed	-	03/03/2017	03/03/2017	03/03/2017
pH 1:5 soil:water	pH Units	8.2	7.3	5.2
Electrical Conductivity 1:5 soil:water	µS/cm	1,400	50	270

Moisture Our Reference: Your Reference	UNITS ----------	162817-1 Trip -A	162817-2 Trip -B	162817-3 Trip -C
	-			
Date Sampled	----------	27/02/2017	28/02/2017	28/02/2017
Type of sample		soil	soil	soil
Date prepared	-	03/03/2017	03/03/2017	03/03/2017
Date analysed	-	06/03/2017	06/03/2017	06/03/2017
Moisture	%	14	22	19

Asbestos ID - soils				
Our Reference:	UNITS	162817-1	162817-2	162817-3
Your Reference	---------- -	Trip -A	Trip -B	Trip -C
Date Sampled	----------	27/02/2017	28/02/2017	28/02/2017
Type of sample		soil	soil	soil
Date analysed	-	6/03/2017	6/03/2017	6/03/2017
Sample mass tested	g	Approx. 70g	Approx. 20g	Approx. 35g
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected

Method ID	Methodology Summary
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'TEQ PQL' values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'TEQ zero' values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'TEQ half PQL' values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-002	Conductivity and Salinity - measured using a conductivity cell at 25°C in accordance with APHA latest edition 2510 and Rayment & Lyons.

Method ID	Methodology Summary
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			03/03/2017	[NT]	[NT]	LCS-5	03/03/2017
Date analysed	-			06/03/2017	[NT]	[NT]	LCS-5	06/03/2017
$TRHC_6$ - C_9	mg/kg	25	Org-016	<25	[NT]	[NT]	LCS-5	120%
$TRHC_6$ - C_{10}	mg/kg	25	Org-016	<25	[NT]	[NT]	LCS-5	120%
Benzene	mg/kg	0.2	Org-016	<0.2	[NT]	[NT]	LCS-5	90%
Toluene	mg/kg	0.5	Org-016	<0.5	[NT]	[NT]	LCS-5	120%
Ethylbenzene	mg/kg	1	Org-016	<1	[NT]	[NT]	LCS-5	128%
m+p-xylene	mg/kg	2	Org-016	<2	[NT]	[NT]	LCS-5	130%
o-Xylene	mg/kg	1	Org-016	<1	[NT]	[NT]	LCS-5	125%
naphthalene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%		Org-016	107	[NT]	[NT]	LCS-5	106%

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			03/03/2017	[NT]	[NT]	LCS-5	03/03/2017
Date analysed	-			04/03/2017	[NT]	[NT]	LCS-5	04/03/2017
$TRHC_{10}$ - C_{14}	mg/kg	50	Org-003	<50	[NT]	[NT]	LCS-5	121%
$TRHC_{15}$ - C_{28}	mg/kg	100	Org-003	<100	[NT]	[NT]	LCS-5	106%
$TRHC_{29}$ - C_{36}	mg/kg	100	Org-003	<100	[NT]	[NT]	LCS-5	76%
$TRH>C_{10}$-C_{16}	mg/kg	50	Org-003	<50	[NT]	[NT]	LCS-5	121%
$TRH>C_{16}$-C_{34}	mg/kg	100	Org-003	<100	[NT]	[NT]	LCS-5	106%
$TRH>C_{34}$-C_{40}	mg/kg	100	Org-003	<100	[NT]	[NT]	LCS-5	76%
Surrogate o-Terphenyl	%		Org-003	93	[NT]	[NT]	LCS-5	88%

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			03/03/2017	[NT]	[NT]	LCS-5	03/03/2017
Date analysed	-			03/03/2017	[NT]	[NT]	LCS-5	03/03/2017
Naphthalene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	LCS-5	100%
Acenaphthylene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Acenaphthene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Fluorene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	LCS-5	108%
Phenanthrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	LCS-5	99%
Anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Fluoranthene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	LCS-5	116%
Pyrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	LCS-5	122%
Benzo(a)anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Chrysene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	LCS-5	99%
Benzo(b,j+k) fluoranthene	mg/kg	0.2	Org-012	<0.2	[NT]	[NT]	[NR]	[NR]

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Benzo(a)pyrene	mg/kg	0.05	Org-012	<0.05	[NT]	[NT]	LCS-5	86%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012	119	[NT]	[NT]	LCS-5	119%
QUALITY CONTROL PCBs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			03/03/2017	[NT]	[NT]	LCS-4	03/03/2017
Date analysed	-			03/03/2017	[NT]	[NT]	LCS-4	03/03/2017
Aroclor 1016	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Aroclor 1221	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Aroclor 1232	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Aroclor 1242	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Aroclor 1248	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Aroclor 1254	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	LCS-4	102%
Aroclor 1260	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Surrogate TCLMX	%		Org-006	99	[NT]	[NT]	LCS-4	98%
QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			03/03/2017	162817-2	03/03/2017 || 03/03/2017	LCS-5	03/03/2017
Date analysed	-			03/03/2017	162817-2	03/03/2017 || 03/03/2017	LCS-5	03/03/2017
Arsenic	mg/kg	4	Metals-020	<4	162817-2	5 || <4	LCS-5	116%
Cadmium	mg/kg	0.4	Metals-020	<0.4	162817-2	<0.4 || <0.4	LCS-5	107%
Chromium	mg/kg	1	Metals-020	<1	162817-2	8 || 9 || RPD: 12	LCS-5	114%
Copper	mg/kg	1	Metals-020	<1	162817-2	7 || 16 || RPD: 78	LCS-5	112%
Lead	mg/kg	1	Metals-020	<1	162817-2	30 || 29 || RPD: 3	LCS-5	109%
Mercury	mg/kg	0.1	Metals-021	<0.1	162817-2	<0.1 || <0.1	LCS-5	113%
Nickel	mg/kg	1	Metals-020	<1	162817-2	3 || 5 || RPD: 50	LCS-5	104%
Zinc	mg/kg	1	Metals-020	<1	162817-2	36 || 42 || RPD: 15	LCS-5	105%

Client Reference: IA137000

QUALITY CONTROL Misc Inorg - Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			03/02/2017	[NT]	[NT]	LCS-5	03/02/2017
Date analysed	-			03/03/2017	[NT]	[NT]	LCS-5	03/03/2017
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	[NT]	[NT]	LCS-5	102%
Electrical Conductivity 1:5 soil:water	µS/cm	1	Inorg-002	<1	[NT]	[NT]	LCS-5	101%

Report Comments:

Asbestos: Excessive sample volumes were provided for asbestos analysis.
A portion of the supplied samples were sub-sampled according to Envirolab procedures.
We cannot guarantee that these sub-samples are indicative of the entire sample.
Envirolab recommends supplying 40-50g (50mL) of sample in its own container as per AS4964-2004.
Note: Samples 162817-1, 2 & 3 were sub-sampled from bags provided by the client.

Acid Extractable Metals in Soil: The laboratory RPD acceptance criteria has been exceeded for 162817-2 for Cu. Therefore a triplicate result has been issued as laboratory sample number 162817-4.

Asbestos ID was analysed by Approved Identifier: Matt Tang
Asbestos ID was authorised by Approved Signatory: Paul Ching

INS: Insufficient sample for this test
NR: Test not required
<: Less than
PQL: Practical Quantitation Limit
RPD: Relative Percent Difference
>: Greater than
NT: Not tested
NA: Test not required
LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

CHAIN OF CUSTODY

ALS Environmental

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 5/585 Maitland Rd Mayfield West NSW 2304 Ph: 02 4014 2500 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: townsville.environmental@alsglobal.com
☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: Jacobs	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: N. Syd		☐ Non Standard or urgent TAT (List due date):	Custody Seal Intact? Yes / No / N/A
PROJECT: VP Baseline	ALS QUOTE NO.:	COC SEQUENCE NUMBER (Circle)	Free ice / frozen ice bricks present upon receipt? Yes / No / N/A
ORDER NUMBER: IA137000		COC: ① 2 3 4 5 6 7	Random Sample Temperature on Receipt: 22.7 °C
PROJECT MANAGER: R Gauthier	CONTACT PH: 0407 464 578	OF: 1 ② 3 4 5 6 7	Other comment:
SAMPLER: R Gauthier	SAMPLER MOBILE:		
COC emailed to ALS? (YES / (NO)	EDD FORMAT (or default):		
Email Reports to (will default to PM if no other addresses are listed): Robert.Gauthier@Jacobs.com			
Email Invoice to (will default to PM if no other addresses are listed):			

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
DATE/TIME: 06/03/17	DATE/TIME: 6/3/17 9:45	DATE/TIME: 6/3/17 17:00	DATE/TIME: 6/3/17 19:20

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	PAH ultra low trace	Trace metals As Cd Cr Ni Pb Zn Hg Se	Total Organic Carbon		Comments on likely contaminant levels, dilutions, samples requiring specific QC analysis etc.
1	J1 - 0.4	03/03/17	S	Jar	1	✓	✓	✓		
2	J1 - 0.8				1	✓	✓	✓		
3	J2 - 0.5				1	✓	✓	✓		
4	J2 - 1.0				1	✓	✓	✓		
5	J3 - 0.5				1	✓	✓	✓		
6	J3 Dup 0.5				1	✓	✓	✓		
7	J3 - 1.0				1	✓	✓	✓		
8	J4 - 0.5				1	✓	✓	✓		
9	J5 - 0.5				1	✓	✓	✓		
10	J5 - 0.5 Dup				1	✓	✓	✓		
11	J5 - 1.0				1	✓	✓	✓		
12	J6 - 0.5	↓	↓	↓	1	✓	✓	✓		
				TOTAL	12	12	12	12		

Subcontract Required: Lab / Analysis: TOC / As bonded
Organised By / Date:
Relinquished By / Date:
Courier:
WO No:
Attach Additional Sheet:

Environmental Division Sydney
Work Order Reference
ES1705151

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 Environmental

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 5/585 Maitland Rd Mayfield West NSW 2304 Ph: 02 4014 2500 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: townsville.environmental@alsglobal.com

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

CLIENT: Jacobs	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: N. Syd		☐ Non Standard or urgent TAT (List due date):	Custody Seal Intact? Yes No N/A
PROJECT: VP Baseline	ALS QUOTE NO.:	COC SEQUENCE NUMBER (Circle)	Free ice / frozen ice bricks present upon receipt? Yes No N/A
ORDER NUMBER: IA137000		COC: 1 2 3 4 5 6 7	Random Sample Temperature on Receipt: C
PROJECT MANAGER: R Gauthier	CONTACT PH: 0407 464 578	OF: 1 2 3 4 5 6 7	Other comments:
SAMPLER: R Gauthier	SAMPLER MOBILE:		
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default):		
Email Reports to (will default to PM if no other addresses are listed): Robert.Gauthier@Jacobs.com			
Email Invoice to (will default to PM if no other addresses are listed):			

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
DATE/TIME: 06/03/17	DATE/TIME: 6/3/17 9AM	DATE/TIME: 6/3/17 17:00	DATE/TIME: 6/3/17 19:33

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	PAH ultra low trace	Trace Metals As Cd Cr Ni Pb Zn Hg Se	TOC					Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
13	J6 - 1.0	03/03/17	S	Jar	1	✓	✓	✓					
14	J6 - 1.5	↓	↓	↓	1	✓	✓	✓					
15	J7 - 0.5				1	✓	✓	✓					
16	J7 - 1.0				1	✓	✓	✓					
17	J8 - 0.5				1	✓	✓	✓					
18	J8 - 1.0	↓	↓	↓	1	✓	✓	✓					
				TOTAL	6	6	6	6					

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.

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order	: **ES1706231**		
Client	: **JACOBS GROUP (AUSTRALIA) PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: ROBERT GAUTHIER	Contact	: Customer Services ES
Address	: 710 HUNTER STREET NEWCASTLE WEST NSW, AUSTRALIA 2302	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: robert.gauthier@jacobs.com	E-mail	: ALSEnviro.Sydney@alsglobal.com
Telephone	: +61 02 9928 2100	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 9928 2272	Facsimile	: +61-2-8784 8500
Project	: IA008200	Page	: 1 of 2
Order number	: ----	Quote number	: EM2016SINKNI0001 (EN/003/16 Pri BQ)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	:		

Dates

Date Samples Received	: 16-Mar-2017 14:30	Issue Date	: 16-Mar-2017
Client Requested Due Date	: 21-Mar-2017	Scheduled Reporting Date	: **21-Mar-2017**

Delivery Details

Mode of Delivery	: Undefined	Security Seal	: Not Available
No. of coolers/boxes	: ----	Temperature	: 4.1' C
Receipt Detail	:	No. of samples received / analysed	: 1 / 1

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **This is a rebatch of ES1705350.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (14 days), Solid (60 days) from date of completion of work order.

Sample Container(s)/Preservation Non-Compliances

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

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

Summary of Sample(s) and Requested Analysis

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

Matrix: **SOIL**

Laboratory sample ID	Client sampling date / time	Client sample ID	SOIL - EG005C Leachable Metals by ICPAES	SOIL - EN33a TCLP Leachate
ES1706231-001	06-Mar-2017 00:00	WCS05	✓	✓

Proactive Holding Time Report

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

Requested Deliverables

ACCOUNTS PAYABLE (Brisbane)		
- A4 - AU Tax Invoice (INV)	Email	au-ap@jacobs.com
INVOICE ONLY (JACOBS)		
- A4 - AU Tax Invoice (INV)	Email	au-ap@jacobs.com
KYLE MCLEAN		
- *AU Certificate of Analysis - NATA (COA)	Email	kyle.mclean@jacobs.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	kyle.mclean@jacobs.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	kyle.mclean@jacobs.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	kyle.mclean@jacobs.com
- Chain of Custody (CoC) (COC)	Email	kyle.mclean@jacobs.com
- EDI Format - ESDAT (ESDAT)	Email	kyle.mclean@jacobs.com
- EDI Format - XTab (XTAB)	Email	kyle.mclean@jacobs.com
ROBERT GAUTHIER		
- *AU Certificate of Analysis - NATA (COA)	Email	robert.gauthier@jacobs.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	robert.gauthier@jacobs.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	robert.gauthier@jacobs.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	robert.gauthier@jacobs.com
- A4 - AU Tax Invoice (INV)	Email	robert.gauthier@jacobs.com
- Chain of Custody (CoC) (COC)	Email	robert.gauthier@jacobs.com
- EDI Format - ESDAT (ESDAT)	Email	robert.gauthier@jacobs.com
- EDI Format - XTab (XTAB)	Email	robert.gauthier@jacobs.com

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order	: **ES1705151**		
Client	: **JACOBS GROUP (AUSTRALIA) PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: ROBERT GAUTHIER	Contact	: Customer Services ES
Address	: 710 HUNTER STREET NEWCASTLE WEST NSW, AUSTRALIA 2302	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: robert.gauthier@jacobs.com	E-mail	: ALSEnviro.Sydney@alsglobal.com
Telephone	: +61 02 9928 2100	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 9928 2272	Facsimile	: +61-2-8784 8500
Project	: VP BASELINE	Page	: 1 of 2
Order number	: 1A137000	Quote number	: EM2016SINKNI0001 (EN/003/16 Pri BQ)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: ROBERT GAUTHIER		

Dates

Date Samples Received	: 06-Mar-2017 09:47	Issue Date	: 07-Mar-2017
Client Requested Due Date	: 15-Mar-2017	Scheduled Reporting Date	: **15-Mar-2017**

Delivery Details

Mode of Delivery	: Undefined	Security Seal	: Not Available
No. of coolers/boxes	: 1	Temperature	: 22.7
Receipt Detail	:	No. of samples received / analysed	: 18 / 18

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- **TOC analysis will be conducted by ALS Brisbane.**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (14 days), Solid (60 days) from date of completion of work order.

Sample Container(s)/Preservation Non-Compliances

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

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

Summary of Sample(s) and Requested Analysis

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

Matrix: **SOIL**

Laboratory sample ID	Client sampling date / time	Client sample ID	SOIL - EA055-103 Moisture Content	SOIL - EG020-SD Total Metals in Sediments by ICPMS (NODG)	SOIL - EG035-SD Mercury in Sediments by FIMS (NODG-required	SOIL - EP003 Total Organic Carbon (TOC) in Soil	SOIL - EP132B-SD Ultra-trace PAHs in Sediments
ES1705151-001	03-Mar-2017 00:00	J1-0.4	✓	✓	✓	✓	✓
ES1705151-002	03-Mar-2017 00:00	J1-0.8	✓	✓	✓	✓	✓
ES1705151-003	03-Mar-2017 00:00	J2-0.5	✓	✓	✓	✓	✓
ES1705151-004	03-Mar-2017 00:00	J2-1.0	✓	✓	✓	✓	✓
ES1705151-005	03-Mar-2017 00:00	J3-0.5	✓	✓	✓	✓	✓
ES1705151-006	03-Mar-2017 00:00	J3-DUP0.5	✓	✓	✓	✓	✓
ES1705151-007	03-Mar-2017 00:00	J3-1.0	✓	✓	✓	✓	✓
ES1705151-008	03-Mar-2017 00:00	J4-0.5	✓	✓	✓	✓	✓
ES1705151-009	03-Mar-2017 00:00	J5-0.5	✓	✓	✓	✓	✓
ES1705151-010	03-Mar-2017 00:00	J5-0.5 DUP	✓	✓	✓	✓	✓
ES1705151-011	03-Mar-2017 00:00	J5-1.0	✓	✓	✓	✓	✓
ES1705151-012	03-Mar-2017 00:00	J6-0.5	✓	✓	✓	✓	✓
ES1705151-013	03-Mar-2017 00:00	J6-1.0	✓	✓	✓	✓	✓
ES1705151-014	03-Mar-2017 00:00	J6-1.5	✓	✓	✓	✓	✓
ES1705151-015	03-Mar-2017 00:00	J7-0.5	✓	✓	✓	✓	✓
ES1705151-016	03-Mar-2017 00:00	J7-1.0	✓	✓	✓	✓	✓
ES1705151-017	03-Mar-2017 00:00	J8-0.8	✓	✓	✓	✓	✓
ES1705151-018	03-Mar-2017 00:00	J8-1.0	✓	✓	✓	✓	✓

Proactive Holding Time Report

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

Requested Deliverables

ACCOUNTS PAYABLE (Brisbane)

- A4 - AU Tax Invoice (INV)	Email	au-ap@jacobs.com

INVOICE ONLY (JACOBS)

- A4 - AU Tax Invoice (INV)	Email	au-ap@jacobs.com

ROBERT GAUTHIER

- *AU Certificate of Analysis - NATA (COA)	Email	robert.gauthier@jacobs.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	robert.gauthier@jacobs.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	robert.gauthier@jacobs.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	robert.gauthier@jacobs.com
- A4 - AU Tax Invoice (INV)	Email	robert.gauthier@jacobs.com
- Chain of Custody (CoC) (COC)	Email	robert.gauthier@jacobs.com
- EDI Format - ESDAT (ESDAT)	Email	robert.gauthier@jacobs.com
- EDI Format - XTab (XTAB)	Email	robert.gauthier@jacobs.com

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1705151**	Page	: 1 of 11
Client	: **JACOBS GROUP (AUSTRALIA) PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: ROBERT GAUTHIER	Contact	: Customer Services ES
Address	: 710 HUNTER STREET NEWCASTLE WEST NSW, AUSTRALIA 2302	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9928 2100	Telephone	: +61-2-8784 8555
Project	: VP BASELINE	Date Samples Received	: 06-Mar-2017 09:47
Order number	: 1A137000	Date Analysis Commenced	: 08-Mar-2017
C-O-C number	: ----	Issue Date	: 16-Mar-2017 11:24
Sampler	: ROBERT GAUTHIER		
Site	: ----		
Quote number	: EN/003/16 Pri BQ		
No. of samples received	: 18		
No. of samples analysed	: 18		

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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

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 no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component.

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

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EP132B-SD : Results for samples #J5-0.5 and # J5-0.5DUP confirmed by re-extraction and re-analysis.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	J1-0.4	J1-0.8	J2-0.5	J2-1.0	J3-0.5
				Client sampling date / time	03-Mar-2017 00:00	03-Mar-2017 00:00	03-Mar-2017 00:00	03-Mar-2017 00:00	03-Mar-2017 00:00
Compound	CAS Number	LOR	Unit		ES1705151-001	ES1705151-002	ES1705151-003	ES1705151-004	ES1705151-005
					Result	Result	Result	Result	Result
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1	%		25.0	29.3	64.0	56.3	65.0
EG020-SD: Total Metals in Sediments by ICPMS									
Arsenic	7440-38-2	1	mg/kg		4.78	6.62	14.8	13.5	12.9
Cadmium	7440-43-9	0.1	mg/kg		0.1	<0.1	0.2	0.1	0.6
Chromium	7440-47-3	1	mg/kg		4.1	3.5	12.6	12.7	14.0
Cobalt	7440-48-4	0.5	mg/kg		2.5	2.7	7.0	5.2	6.2
Lead	7439-92-1	1	mg/kg		4.0	2.4	8.9	6.2	15.2
Nickel	7440-02-0	1	mg/kg		1.7	1.8	6.7	7.3	6.6
Selenium	7782-49-2	0.1	mg/kg		1.3	1.2	3.3	3.2	3.3
Zinc	7440-66-6	1	mg/kg		21.4	8.3	38.4	20.5	91.4
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.01	mg/kg		0.06	0.02	0.06	0.03	0.12
EP003: Total Organic Carbon (TOC) in Soil									
Total Organic Carbon	----	0.02	%		0.67	0.62	1.10	1.60	2.22
EP132B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	5	µg/kg		<5	<5	<5	<5	22
2-Methylnaphthalene	91-57-6	5	µg/kg		<5	<5	<5	<5	49
Acenaphthylene	208-96-8	4	µg/kg		<4	<4	<4	5	7
Acenaphthene	83-32-9	4	µg/kg		<4	<4	<4	<4	<4
Fluorene	86-73-7	4	µg/kg		<4	<4	<4	<4	8
Phenanthrene	85-01-8	4	µg/kg		8	<4	5	<4	66
Anthracene	120-12-7	4	µg/kg		<4	<4	<4	<4	10
Fluoranthene	206-44-0	4	µg/kg		7	<4	6	16	69
Pyrene	129-00-0	4	µg/kg		6	<4	6	16	60
Benz(a)anthracene	56-55-3	4	µg/kg		<4	<4	<4	10	38
Chrysene	218-01-9	4	µg/kg		<4	<4	<4	9	27
Benzo(b+j)fluoranthene	205-99-2 205-82-3	4	µg/kg		4	<4	<4	17	42
Benzo(k)fluoranthene	207-08-9	4	µg/kg		<4	<4	<4	10	12
Benzo(e)pyrene	192-97-2	4	µg/kg		<4	<4	<4	10	24
Benzo(a)pyrene	50-32-8	4	µg/kg		<4	<4	<4	12	28
Perylene	198-55-0	4	µg/kg		<4	<4	<4	<4	8
Benzo(g.h.i)perylene	191-24-2	4	µg/kg		<4	<4	<4	13	27
Dibenz(a.h)anthracene	53-70-3	4	µg/kg		<4	<4	<4	<4	6
Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg		<4	<4	<4	10	19

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	J1-0.4	J1-0.8	J2-0.5	J2-1.0	J3-0.5
				Client sampling date / time	03-Mar-2017 00:00	03-Mar-2017 00:00	03-Mar-2017 00:00	03-Mar-2017 00:00	03-Mar-2017 00:00
Compound	CAS Number	LOR	Unit		ES1705151-001	ES1705151-002	ES1705151-003	ES1705151-004	ES1705151-005
					Result	Result	Result	Result	Result
EP132B: Polynuclear Aromatic Hydrocarbons - Continued									
Coronene	191-07-1	5	µg/kg		<5	<5	<5	<5	**9**
^ Sum of PAHs	----	4	µg/kg		**25**	<4	**17**	**128**	**531**
EP132T: Base/Neutral Extractable Surrogates									
2-Fluorobiphenyl	321-60-8	10	%		**94.6**	**82.5**	**99.1**	**92.5**	**94.6**
Anthracene-d10	1719-06-8	10	%		**115**	**102**	**117**	**108**	**119**
4-Terphenyl-d14	1718-51-0	10	%		**105**	**95.5**	**109**	**103**	**110**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	J3-DUP0.5	J3-1.0	J4-0.5	J5-0.5	J5-0.5 DUP
				Client sampling date / time	03-Mar-2017 00:00	03-Mar-2017 00:00	03-Mar-2017 00:00	03-Mar-2017 00:00	03-Mar-2017 00:00
Compound	CAS Number	LOR	Unit		ES1705151-006	ES1705151-007	ES1705151-008	ES1705151-009	ES1705151-010
					Result	Result	Result	Result	Result
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1	%		67.1	63.4	31.0	48.8	67.0
EG020-SD: Total Metals in Sediments by ICPMS									
Arsenic	7440-38-2	1	mg/kg		13.4	14.7	9.35	7.31	11.7
Cadmium	7440-43-9	0.1	mg/kg		0.7	0.2	0.3	1.8	3.3
Chromium	7440-47-3	1	mg/kg		14.4	10.1	4.9	10.7	15.4
Cobalt	7440-48-4	0.5	mg/kg		6.7	5.5	2.1	3.1	4.8
Lead	7439-92-1	1	mg/kg		15.7	42.4	3.2	13.1	18.2
Nickel	7440-02-0	1	mg/kg		6.9	6.2	2.8	4.6	8.3
Selenium	7782-49-2	0.1	mg/kg		3.5	3.2	1.8	2.8	3.9
Zinc	7440-66-6	1	mg/kg		94.9	25.6	9.7	85.8	125
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.01	mg/kg		0.09	0.04	0.06	0.16	0.21
EP003: Total Organic Carbon (TOC) in Soil									
Total Organic Carbon	----	0.02	%		2.38	1.44	0.30	6.05	5.80
EP132B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	5	µg/kg		28	<5	<5	128	199
2-Methylnaphthalene	91-57-6	5	µg/kg		62	<5	<5	291	457
Acenaphthylene	208-96-8	4	µg/kg		5	<4	<4	16	23
Acenaphthene	83-32-9	4	µg/kg		4	<4	<4	37	56
Fluorene	86-73-7	4	µg/kg		9	<4	<4	57	89
Phenanthrene	85-01-8	4	µg/kg		81	6	<4	520	785
Anthracene	120-12-7	4	µg/kg		22	<4	<4	114	187
Fluoranthene	206-44-0	4	µg/kg		72	6	6	374	557
Pyrene	129-00-0	4	µg/kg		67	7	6	288	421
Benz(a)anthracene	56-55-3	4	µg/kg		42	<4	<4	231	339
Chrysene	218-01-9	4	µg/kg		36	<4	<4	204	344
Benzo(b+j)fluoranthene	205-99-2 205-82-3	4	µg/kg		43	<4	<4	141	235
Benzo(k)fluoranthene	207-08-9	4	µg/kg		18	<4	<4	32	42
Benzo(e)pyrene	192-97-2	4	µg/kg		23	<4	<4	101	161
Benzo(a)pyrene	50-32-8	4	µg/kg		29	<4	<4	109	177
Perylene	198-55-0	4	µg/kg		6	<4	<4	18	28
Benzo(g.h.i)perylene	191-24-2	4	µg/kg		31	<4	<4	96	156
Dibenz(a.h)anthracene	53-70-3	4	µg/kg		13	<4	<4	25	46
Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg		22	<4	<4	46	72

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	J3-DUP0.5	J3-1.0	J4-0.5	J5-0.5	J5-0.5 DUP
				Client sampling date / time	03-Mar-2017 00:00	03-Mar-2017 00:00	03-Mar-2017 00:00	03-Mar-2017 00:00	03-Mar-2017 00:00
Compound	CAS Number	LOR	Unit		ES1705151-006	ES1705151-007	ES1705151-008	ES1705151-009	ES1705151-010
					Result	Result	Result	Result	Result
EP132B: Polynuclear Aromatic Hydrocarbons - Continued									
Coronene	191-07-1	5	µg/kg		**8**	<5	<5	**32**	**53**
^ **Sum of PAHs**	----	4	µg/kg		**621**	**19**	**12**	**2860**	**4430**
EP132T: Base/Neutral Extractable Surrogates									
2-Fluorobiphenyl	321-60-8	10	%		**107**	**95.4**	**93.7**	**92.2**	**75.3**
Anthracene-d10	1719-06-8	10	%		**123**	**119**	**105**	**125**	**121**
4-Terphenyl-d14	1718-51-0	10	%		**122**	**108**	**98.4**	**121**	**108**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	J5-1.0	J6-0.5	J6-1.0	J6-1.5	J7-0.5
			Client sampling date / time	03-Mar-2017 00:00	03-Mar-2017 00:00	03-Mar-2017 00:00	03-Mar-2017 00:00	03-Mar-2017 00:00
Compound	CAS Number	LOR	Unit	ES1705151-011	ES1705151-012	ES1705151-013	ES1705151-014	ES1705151-015
				Result	Result	Result	Result	Result
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	56.6	50.2	54.8	57.4	43.4
EG020-SD: Total Metals in Sediments by ICPMS								
Arsenic	7440-38-2	1	mg/kg	15.0	8.41	6.52	8.62	5.58
Cadmium	7440-43-9	0.1	mg/kg	0.1	0.2	0.1	0.1	0.2
Chromium	7440-47-3	1	mg/kg	11.1	7.9	10.2	11.9	4.2
Cobalt	7440-48-4	0.5	mg/kg	4.6	4.1	4.4	4.7	2.6
Lead	7439-92-1	1	mg/kg	7.2	5.1	6.0	6.6	2.9
Nickel	7440-02-0	1	mg/kg	6.7	5.7	6.6	7.2	2.9
Selenium	7782-49-2	0.1	mg/kg	2.9	2.5	2.6	2.7	1.6
Zinc	7440-66-6	1	mg/kg	20.9	18.6	19.5	21.4	12.6
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.01	mg/kg	0.10	0.07	0.06	0.06	0.05
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	1.33	2.38	2.99	3.09	2.20
EP132B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	5	µg/kg	<5	9	<5	<5	<5
2-Methylnaphthalene	91-57-6	5	µg/kg	<5	16	<5	<5	6
Acenaphthylene	208-96-8	4	µg/kg	<4	<4	7	<4	<4
Acenaphthene	83-32-9	4	µg/kg	<4	<4	<4	<4	<4
Fluorene	86-73-7	4	µg/kg	<4	<4	<4	<4	<4
Phenanthrene	85-01-8	4	µg/kg	<4	19	<4	<4	7
Anthracene	120-12-7	4	µg/kg	<4	<4	5	<4	<4
Fluoranthene	206-44-0	4	µg/kg	<4	14	37	<4	5
Pyrene	129-00-0	4	µg/kg	<4	12	34	<4	<4
Benz(a)anthracene	56-55-3	4	µg/kg	<4	7	21	<4	<4
Chrysene	218-01-9	4	µg/kg	<4	5	18	<4	<4
Benzo(b+j)fluoranthene	205-99-2 205-82-3	4	µg/kg	<4	6	37	<4	<4
Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	17	<4	<4
Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	21	<4	<4
Benzo(a)pyrene	50-32-8	4	µg/kg	<4	<4	26	<4	<4
Perylene	198-55-0	4	µg/kg	<4	<4	10	<4	<4
Benzo(g.h.i)perylene	191-24-2	4	µg/kg	<4	<4	25	<4	<4
Dibenz(a.h)anthracene	53-70-3	4	µg/kg	<4	<4	6	<4	<4
Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	<4	<4	20	<4	<4

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	J5-1.0	J6-0.5	J6-1.0	J6-1.5	J7-0.5
				Client sampling date / time	03-Mar-2017 00:00	03-Mar-2017 00:00	03-Mar-2017 00:00	03-Mar-2017 00:00	03-Mar-2017 00:00
Compound	CAS Number	LOR	Unit		ES1705151-011	ES1705151-012	ES1705151-013	ES1705151-014	ES1705151-015
					Result	Result	Result	Result	Result
EP132B: Polynuclear Aromatic Hydrocarbons - Continued									
Coronene	191-07-1	5	µg/kg		<5	<5	**7**	<5	<5
^ **Sum of PAHs**	----	4	µg/kg		<4	**88**	**291**	<4	**18**
EP132T: Base/Neutral Extractable Surrogates									
2-Fluorobiphenyl	321-60-8	10	%		**108**	**99.2**	**91.1**	**84.4**	**95.6**
Anthracene-d10	1719-06-8	10	%		**118**	**124**	**112**	**112**	**120**
4-Terphenyl-d14	1718-51-0	10	%		**118**	**108**	**95.1**	**95.4**	**102**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	J7-1.0	J8-0.8	J8-1.0	----	----
			Client sampling date / time	03-Mar-2017 00:00	03-Mar-2017 00:00	03-Mar-2017 00:00	----	----
Compound	CAS Number	LOR	Unit	ES1705151-016	ES1705151-017	ES1705151-018	--------	--------
				Result	Result	Result	----	----
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	53.3	57.2	52.6	----	----
EG020-SD: Total Metals in Sediments by ICPMS								
Arsenic	7440-38-2	1	mg/kg	6.96	8.95	10.3	----	----
Cadmium	7440-43-9	0.1	mg/kg	<0.1	2.3	1.0	----	----
Chromium	7440-47-3	1	mg/kg	8.0	22.7	11.0	----	----
Cobalt	7440-48-4	0.5	mg/kg	5.2	3.8	5.4	----	----
Lead	7439-92-1	1	mg/kg	4.9	17.0	10.0	----	----
Nickel	7440-02-0	1	mg/kg	5.1	6.2	6.1	----	----
Selenium	7782-49-2	0.1	mg/kg	2.7	5.9	2.7	----	----
Zinc	7440-66-6	1	mg/kg	17.6	126	47.9	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.01	mg/kg	0.06	0.22	0.09	----	----
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	4.30	6.00	3.29	----	----
EP132B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	5	µg/kg	<5	183	125	----	----
2-Methylnaphthalene	91-57-6	5	µg/kg	<5	479	290	----	----
Acenaphthylene	208-96-8	4	µg/kg	<4	16	12	----	----
Acenaphthene	83-32-9	4	µg/kg	<4	38	22	----	----
Fluorene	86-73-7	4	µg/kg	<4	62	34	----	----
Phenanthrene	85-01-8	4	µg/kg	<4	633	324	----	----
Anthracene	120-12-7	4	µg/kg	<4	119	75	----	----
Fluoranthene	206-44-0	4	µg/kg	<4	409	184	----	----
Pyrene	129-00-0	4	µg/kg	<4	296	144	----	----
Benz(a)anthracene	56-55-3	4	µg/kg	<4	200	121	----	----
Chrysene	218-01-9	4	µg/kg	<4	189	107	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	4	µg/kg	<4	145	78	----	----
Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	26	24	----	----
Benzo(e)pyrene	192-97-2	4	µg/kg	<4	87	52	----	----
Benzo(a)pyrene	50-32-8	4	µg/kg	<4	93	62	----	----
Perylene	198-55-0	4	µg/kg	11	36	29	----	----
Benzo(g.h.i)perylene	191-24-2	4	µg/kg	<4	83	50	----	----
Dibenz(a.h)anthracene	53-70-3	4	µg/kg	<4	22	12	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	<4	38	26	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	J7-1.0	J8-0.8	J8-1.0	----	----
				Client sampling date / time	03-Mar-2017 00:00	03-Mar-2017 00:00	03-Mar-2017 00:00	----	----
Compound	CAS Number	LOR	Unit		ES1705151-016	ES1705151-017	ES1705151-018	--------	--------
					Result	Result	Result	----	----
EP132B: Polynuclear Aromatic Hydrocarbons - Continued									
Coronene	191-07-1	5	µg/kg		<5	**32**	**19**	**----**	**----**
^ Sum of PAHs	----	4	µg/kg		**11**	**3190**	**1790**	**----**	**----**
EP132T: Base/Neutral Extractable Surrogates									
2-Fluorobiphenyl	321-60-8	10	%		**83.2**	**107**	**112**	**----**	**----**
Anthracene-d10	1719-06-8	10	%		**118**	**115**	**116**	**----**	**----**
4-Terphenyl-d14	1718-51-0	10	%		**99.0**	**105**	**108**	**----**	**----**

Surrogate Control Limits

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%) Low	High
EP132T: Base/Neutral Extractable Surrogates			
2-Fluorobiphenyl	321-60-8	55	135
Anthracene-d10	1719-06-8	70	136
4-Terphenyl-d14	1718-51-0	57	127

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **ES1705151**	Page	: 1 of 7
Client	: **JACOBS GROUP (AUSTRALIA) PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: ROBERT GAUTHIER	Contact	: Customer Services ES
Address	: 710 HUNTER STREET NEWCASTLE WEST NSW, AUSTRALIA 2302	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9928 2100	Telephone	: +61-2-8784 8555
Project	: VP BASELINE	Date Samples Received	: 06-Mar-2017
Order number	: 1A137000	Date Analysis Commenced	: 08-Mar-2017
C-O-C number	: ----	Issue Date	: 16-Mar-2017
Sampler	: ROBERT GAUTHIER		
Site	: ----		
Quote number	: EN/003/16 Pri BQ		
No. of samples received	: 18		
No. of samples analysed	: 18		

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

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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

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: 784547)									
ES1705151-001	J1-0.4	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	25.0	26.2	4.80	0% - 20%
ES1705151-011	J5-1.0	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	56.6	57.4	1.33	0% - 20%
EA055: Moisture Content (QC Lot: 784548)									
ES1705350-002	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	6.5	5.6	15.1	No Limit
ES1705390-004	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	18.4	18.9	2.41	0% - 50%
EG020-SD: Total Metals in Sediments by ICPMS (QC Lot: 789281)									
ES1705151-001	J1-0.4	EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	0.1	0.1	0.00	No Limit
		EG020-SD: Selenium	7782-49-2	0.1	mg/kg	1.3	1.2	10.7	0% - 50%
		EG020-SD: Cobalt	7440-48-4	0.5	mg/kg	2.5	2.8	10.8	No Limit
		EG020-SD: Arsenic	7440-38-2	1	mg/kg	4.78	5.03	5.15	No Limit
		EG020-SD: Chromium	7440-47-3	1	mg/kg	4.1	3.5	16.5	No Limit
		EG020-SD: Lead	7439-92-1	1	mg/kg	4.0	4.2	3.75	No Limit
		EG020-SD: Nickel	7440-02-0	1	mg/kg	1.7	1.7	0.00	No Limit
		EG020-SD: Zinc	7440-66-6	1	mg/kg	21.4	22.4	4.11	0% - 20%
ES1705151-011	J5-1.0	EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	0.1	0.1	0.00	No Limit
		EG020-SD: Selenium	7782-49-2	0.1	mg/kg	2.9	2.8	0.00	0% - 20%
		EG020-SD: Cobalt	7440-48-4	0.5	mg/kg	4.6	4.4	3.40	No Limit
		EG020-SD: Arsenic	7440-38-2	1	mg/kg	15.0	14.9	1.00	0% - 50%
		EG020-SD: Chromium	7440-47-3	1	mg/kg	11.1	10.4	6.56	0% - 50%
		EG020-SD: Lead	7439-92-1	1	mg/kg	7.2	5.7	22.8	No Limit
		EG020-SD: Nickel	7440-02-0	1	mg/kg	6.7	6.6	1.72	No Limit
		EG020-SD: Zinc	7440-66-6	1	mg/kg	20.9	18.8	10.4	0% - 20%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 789279)									
ES1705151-001	J1-0.4	EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	0.06	0.06	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: 789279) - continued									
ES1705151-011	J5-1.0	EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	0.10	0.09	12.8	No Limit
EP003: Total Organic Carbon (TOC) in Soil (QC Lot: 790639)									
EB1703407-012	Anonymous	EP003: Total Organic Carbon	----	0.02	%	0.55	0.50	10.2	0% - 20%
EB1703407-031	Anonymous	EP003: Total Organic Carbon	----	0.02	%	0.28	0.28	0.00	0% - 50%
EP003: Total Organic Carbon (TOC) in Soil (QC Lot: 790640)									
ES1705151-010	J5-0.5 DUP	EP003: Total Organic Carbon	----	0.02	%	5.80	5.72	1.34	0% - 20%
EP132B: Polynuclear Aromatic Hydrocarbons (QC Lot: 781436)									
ES1705151-001	J1-0.4	EP132B-SD: Acenaphthylene	208-96-8	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Acenaphthene	83-32-9	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Fluorene	86-73-7	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Phenanthrene	85-01-8	4	µg/kg	8	8	0.00	No Limit
		EP132B-SD: Anthracene	120-12-7	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Fluoranthene	206-44-0	4	µg/kg	7	9	23.5	No Limit
		EP132B-SD: Pyrene	129-00-0	4	µg/kg	6	8	23.0	No Limit
		EP132B-SD: Benz(a)anthracene	56-55-3	4	µg/kg	<4	4	0.00	No Limit
		EP132B-SD: Chrysene	218-01-9	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Benzo(b+j)fluoranthene	205-99-2 205-82-3	4	µg/kg	4	6	39.5	No Limit
		EP132B-SD: Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Benzo(a)pyrene	50-32-8	4	µg/kg	<4	4	0.00	No Limit
		EP132B-SD: Perylene	198-55-0	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Benzo(g.h.i)perylene	191-24-2	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Dibenz(a.h)anthracene	53-70-3	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Sum of PAHs	----	4	µg/kg	25	# 45	57.1	0% - 50%
		EP132B-SD: Naphthalene	91-20-3	5	µg/kg	<5	<5	0.00	No Limit
		EP132B-SD: 2-Methylnaphthalene	91-57-6	5	µg/kg	<5	6	0.00	No Limit
		EP132B-SD: Coronene	191-07-1	5	µg/kg	<5	<5	0.00	No Limit
ES1705151-011	J5-1.0	EP132B-SD: Acenaphthylene	208-96-8	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Acenaphthene	83-32-9	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Fluorene	86-73-7	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Phenanthrene	85-01-8	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Anthracene	120-12-7	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Fluoranthene	206-44-0	4	µg/kg	<4	7	55.6	No Limit
		EP132B-SD: Pyrene	129-00-0	4	µg/kg	<4	8	66.8	No Limit
		EP132B-SD: Benz(a)anthracene	56-55-3	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Chrysene	218-01-9	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Benzo(b+j)fluoranthene	205-99-2 205-82-3	4	µg/kg	<4	8	61.7	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 (%)*
EP132B: Polynuclear Aromatic Hydrocarbons (QC Lot: 781436) - continued									
ES1705151-011	J5-1.0	EP132B-SD: Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Benzo(a)pyrene	50-32-8	4	µg/kg	<4	5	0.00	No Limit
		EP132B-SD: Perylene	198-55-0	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Benzo(g.h.i)perylene	191-24-2	4	µg/kg	<4	5	0.00	No Limit
		EP132B-SD: Dibenz(a.h)anthracene	53-70-3	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	<4	<4	0.00	No Limit
		EP132B-SD: Sum of PAHs	----	4	µg/kg	<4	33	157	No Limit
		EP132B-SD: Naphthalene	91-20-3	5	µg/kg	<5	<5	0.00	No Limit
		EP132B-SD: 2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	0.00	No Limit
		EP132B-SD: Coronene	191-07-1	5	µg/kg	<5	<5	0.00	No Limit

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

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

Sub-Matrix: **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
EG020-SD: Total Metals in Sediments by ICPMS (QCLot: 789281)								
EG020-SD: Arsenic	7440-38-2	1	mg/kg	<1.00	21.7 mg/kg	93.4	80	139
EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	<0.1	4.64 mg/kg	91.4	83	127
EG020-SD: Chromium	7440-47-3	1	mg/kg	<1.0	43.9 mg/kg	74.1	73	130
EG020-SD: Cobalt	7440-48-4	0.5	mg/kg	<0.5	16 mg/kg	93.7	81	130
EG020-SD: Lead	7439-92-1	1	mg/kg	<1.0	40 mg/kg	89.0	74	130
EG020-SD: Nickel	7440-02-0	1	mg/kg	<1.0	55 mg/kg	86.3	83	130
EG020-SD: Selenium	7782-49-2	0.1	mg/kg	<0.1	----	----	----	----
EG020-SD: Zinc	7440-66-6	1	mg/kg	<1.0	60.8 mg/kg	95.5	82	137
EG035T: Total Recoverable Mercury by FIMS (QCLot: 789279)								
EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	<0.01	0.11 mg/kg	112	72	116
EP003: Total Organic Carbon (TOC) in Soil (QCLot: 790639)								
EP003: Total Organic Carbon	----	0.02	%	<0.02	100 %	109	70	130
EP003: Total Organic Carbon (TOC) in Soil (QCLot: 790640)								
EP003: Total Organic Carbon	----	0.02	%	<0.02	100 %	101	70	130
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 781436)								
EP132B-SD: Naphthalene	91-20-3	5	µg/kg	<5	25 µg/kg	98.9	63	129
EP132B-SD: 2-Methylnaphthalene	91-57-6	5	µg/kg	<5	25 µg/kg	99.9	64	128
EP132B-SD: Acenaphthylene	208-96-8	4	µg/kg	<4	25 µg/kg	106	65	129
EP132B-SD: Acenaphthene	83-32-9	4	µg/kg	<4	25 µg/kg	100	68	132
EP132B-SD: Fluorene	86-73-7	4	µg/kg	<4	25 µg/kg	102	68	124
EP132B-SD: Phenanthrene	85-01-8	4	µg/kg	<4	25 µg/kg	99.6	64	134
EP132B-SD: Anthracene	120-12-7	4	µg/kg	<4	25 µg/kg	103	65	131
EP132B-SD: Fluoranthene	206-44-0	4	µg/kg	<4	25 µg/kg	100	64	130
EP132B-SD: Pyrene	129-00-0	4	µg/kg	<4	25 µg/kg	107	67	133
EP132B-SD: Benz(a)anthracene	56-55-3	4	µg/kg	<4	25 µg/kg	113	62	130
EP132B-SD: Chrysene	218-01-9	4	µg/kg	<4	25 µg/kg	110	65	133
EP132B-SD: Benzo(b+j)fluoranthene	205-99-2 205-82-3	4	µg/kg	<4	25 µg/kg	85.6	68	120
EP132B-SD: Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	25 µg/kg	82.5	61	133
EP132B-SD: Benzo(e)pyrene	192-97-2	4	µg/kg	<4	25 µg/kg	106	63	127
EP132B-SD: Benzo(a)pyrene	50-32-8	4	µg/kg	<4	25 µg/kg	94.0	66	118
EP132B-SD: Perylene	198-55-0	4	µg/kg	<4	25 µg/kg	84.3	69	119
EP132B-SD: Benzo(g.h.i)perylene	191-24-2	4	µg/kg	<4	25 µg/kg	84.5	66	120
EP132B-SD: Dibenz(a.h)anthracene	53-70-3	4	µg/kg	<4	25 µg/kg	83.4	64	122

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	LCS: Spike Recovery (%)	Recovery Limits (%): Low	Recovery Limits (%): High
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 781436) - continued								
EP132B-SD: Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	<4	25 µg/kg	86.4	64	120
EP132B-SD: Coronene	191-07-1	5	µg/kg	<5	25 µg/kg	87.2	68	136
EP132B-SD: Sum of PAHs	----	4	µg/kg	<4	----	----	----	----

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**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Recovery Limits (%): Low	Recovery Limits (%): High
EG020-SD: Total Metals in Sediments by ICPMS (QCLot: 789281)							
ES1705151-002	J1-0.8	EG020-SD: Arsenic	7440-38-2	50 mg/kg	94.2	70	130
		EG020-SD: Cadmium	7440-43-9	50 mg/kg	89.7	70	130
		EG020-SD: Chromium	7440-47-3	50 mg/kg	90.5	70	130
		EG020-SD: Lead	7439-92-1	250 mg/kg	106	70	130
		EG020-SD: Nickel	7440-02-0	50 mg/kg	92.6	70	130
		EG020-SD: Zinc	7440-66-6	250 mg/kg	90.0	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 789279)							
ES1705151-001	J1-0.4	EG035T-LL: Mercury	7439-97-6	0.05 mg/kg	87.2	70	130
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 781436)							
ES1705151-001	J1-0.4	EP132B-SD: Naphthalene	91-20-3	25 µg/kg	105	70	130
		EP132B-SD: 2-Methylnaphthalene	91-57-6	25 µg/kg	108	70	130
		EP132B-SD: Acenaphthylene	208-96-8	25 µg/kg	106	70	130
		EP132B-SD: Acenaphthene	83-32-9	25 µg/kg	96.7	70	130
		EP132B-SD: Fluorene	86-73-7	25 µg/kg	91.1	70	130
		EP132B-SD: Phenanthrene	85-01-8	25 µg/kg	95.9	70	130
		EP132B-SD: Anthracene	120-12-7	25 µg/kg	98.5	70	130
		EP132B-SD: Fluoranthene	206-44-0	25 µg/kg	95.3	70	130
		EP132B-SD: Pyrene	129-00-0	25 µg/kg	104	70	130
		EP132B-SD: Benz(a)anthracene	56-55-3	25 µg/kg	88.6	70	130
		EP132B-SD: Chrysene	218-01-9	25 µg/kg	82.3	70	130
		EP132B-SD: Benzo(b+j)fluoranthene	205-99-2 205-82-3	25 µg/kg	94.9	70	130
		EP132B-SD: Benzo(k)fluoranthene	207-08-9	25 µg/kg	79.7	70	130
		EP132B-SD: Benzo(e)pyrene	192-97-2	25 µg/kg	84.0	70	130
		EP132B-SD: Benzo(a)pyrene	50-32-8	25 µg/kg	100	70	130
		EP132B-SD: Perylene	198-55-0	25 µg/kg	97.6	70	130

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*
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 781436) - continued							
ES1705151-001	J1-0.4	EP132B-SD: Benzo(g.h.i)perylene	191-24-2	25 µg/kg	88.7	70	130
		EP132B-SD: Dibenz(a.h)anthracene	53-70-3	25 µg/kg	94.5	70	130
		EP132B-SD: Indeno(1.2.3.cd)pyrene	193-39-5	25 µg/kg	94.4	70	130
		EP132B-SD: Coronene	191-07-1	25 µg/kg	81.4	70	130

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES1705151**	Page	: 1 of 5
Client	: **JACOBS GROUP (AUSTRALIA) PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: ROBERT GAUTHIER	Telephone	: +61-2-8784 8555
Project	: VP BASELINE	Date Samples Received	: 06-Mar-2017
Site	: ----	Issue Date	: 16-Mar-2017
Sampler	: ROBERT GAUTHIER	No. of samples received	: 18
Order number	: 1A137000	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 Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **Duplicate outliers exist - please see following pages for full details.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Duplicate (DUP) RPDs							
EP132B: Polynuclear Aromatic Hydrocarbons	ES1705151--001	J1-0.4	**Sum of PAHs**	----	57.1 %	0% - 50%	**RPD exceeds LOR based limits**

Analysis Holding Time Compliance

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

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

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

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

Matrix: **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)								
J1-0.4,	J1-0.8,	**03-Mar-2017**	**----**	----	----	**09-Mar-2017**	17-Mar-2017	✓
J2-0.5,	J2-1.0,							
J3-0.5,	J3-DUP0.5,							
J3-1.0,	J4-0.5,							
J5-0.5,	J5-0.5 DUP,							
J5-1.0,	J6-0.5,							
J6-1.0,	J6-1.5,							
J7-0.5,	J7-1.0,							
J8-0.8,	J8-1.0							
EG020-SD: Total Metals in Sediments by ICPMS								
Soil Glass Jar - Unpreserved (EG020-SD)								
J1-0.4,	J1-0.8,	**03-Mar-2017**	**13-Mar-2017**	30-Aug-2017	✓	**14-Mar-2017**	30-Aug-2017	✓
J2-0.5,	J2-1.0,							
J3-0.5,	J3-DUP0.5,							
J3-1.0,	J4-0.5,							
J5-0.5,	J5-0.5 DUP,							
J5-1.0,	J6-0.5,							
J6-1.0,	J6-1.5,							
J7-0.5,	J7-1.0,							
J8-0.8,	J8-1.0							

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-LL)								
J1-0.4,	J1-0.8,	**03-Mar-2017**	**13-Mar-2017**	31-Mar-2017	✓	**14-Mar-2017**	31-Mar-2017	✓
J2-0.5,	J2-1.0,							
J3-0.5,	J3-DUP0.5,							
J3-1.0,	J4-0.5,							
J5-0.5,	J5-0.5 DUP,							
J5-1.0,	J6-0.5,							
J6-1.0,	J6-1.5,							
J7-0.5,	J7-1.0,							
J8-0.8,	J8-1.0							
EP003: Total Organic Carbon (TOC) in Soil								
Pulp Bag (EP003)								
J1-0.4,	J1-0.8,	**03-Mar-2017**	**14-Mar-2017**	31-Mar-2017	✓	**14-Mar-2017**	31-Mar-2017	✓
J2-0.5,	J2-1.0,							
J3-0.5,	J3-DUP0.5,							
J3-1.0,	J4-0.5,							
J5-0.5,	J5-0.5 DUP,							
J5-1.0,	J6-0.5,							
J6-1.0,	J6-1.5,							
J7-0.5,	J7-1.0,							
J8-0.8,	J8-1.0							
EP132B: Polynuclear Aromatic Hydrocarbons								
Soil Glass Jar - Unpreserved (EP132B-SD)								
J1-0.4,	J1-0.8,	**03-Mar-2017**	**08-Mar-2017**	17-Mar-2017	✓	**10-Mar-2017**	17-Apr-2017	✓
J2-0.5,	J2-1.0,							
J3-0.5,	J3-DUP0.5,							
J3-1.0,	J4-0.5,							
J5-0.5,	J5-0.5 DUP,							
J5-1.0,	J6-0.5,							
J6-1.0,	J6-1.5,							
J7-0.5,	J7-1.0,							
J8-0.8,	J8-1.0							

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	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAHs in Sediments by GCMS(SIM)	EP132B-SD	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS (Low Level)	EG035T-LL	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Sediments by ICPMS	EG020-SD	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP003	3	29	**10.34**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
PAHs in Sediments by GCMS(SIM)	EP132B-SD	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS (Low Level)	EG035T-LL	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Sediments by ICPMS	EG020-SD	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP003	2	29	**6.90**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
PAHs in Sediments by GCMS(SIM)	EP132B-SD	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS (Low Level)	EG035T-LL	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Sediments by ICPMS	EG020-SD	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP003	2	29	**6.90**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
PAHs in Sediments by GCMS(SIM)	EP132B-SD	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS (Low Level)	EG035T-LL	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Sediments by ICPMS	EG020-SD	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 in Sediments by ICPMS	EG020-SD	SOIL	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector. Analyte list and LORs per NODG.
Total Mercury by FIMS (Low Level)	EG035T-LL	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)
Total Organic Carbon	EP003	SOIL	In house C-IR17. Dried and pulverised sample is reacted with acid to remove inorganic Carbonates, then combusted in a LECO furnace in the presence of strong oxidants / catalysts. The evolved (Organic) Carbon (as CO2) is automaticaly measured by infra-red detector.
PAHs in Sediments by GCMS(SIM)	EP132B-SD	SOIL	In house: Referenced to USEPA 8270D GCMS Capillary column, SIM mode using large volume programmed temperature vaporisation injection.

Preparation Methods	Method	Matrix	Method Descriptions
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM (2013) Schedule B(3) (Method 202)
Dry and Pulverise (up to 100g)	GEO30	SOIL	#
Tumbler Extraction of Solids for LVI (Non-concentrating)	ORG17D	SOIL	In house: 10g of sample, Na2SO4 and surrogate are extracted with 50mL 1:1 DCM/Acetone by end over end tumbling. An aliquot is concentrated by nitrogen blowdown to a reduced volume for analysis if required.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1705151**	Page	: 1 of 11
Client	: **JACOBS GROUP (AUSTRALIA) PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: ROBERT GAUTHIER	Contact	: Customer Services ES
Address	: 710 HUNTER STREET NEWCASTLE WEST NSW, AUSTRALIA 2302	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9928 2100	Telephone	: +61-2-8784 8555
Project	: VP BASELINE	Date Samples Received	: 06-Mar-2017 09:47
Order number	: 1A137000	Date Analysis Commenced	: 08-Mar-2017
C-O-C number	: ----	Issue Date	: 16-Mar-2017 11:24
Sampler	: ROBERT GAUTHIER		
Site	: ----		
Quote number	: EN/003/16 Pri BQ		
No. of samples received	: 18		
No. of samples analysed	: 18		

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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

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 no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component.

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

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EP132B-SD : Results for samples #J5-0.5 and # J5-0.5DUP confirmed by re-extraction and re-analysis.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	J1-0.4	J1-0.8	J2-0.5	J2-1.0	J3-0.5
				Client sampling date / time	03-Mar-2017 00:00	03-Mar-2017 00:00	03-Mar-2017 00:00	03-Mar-2017 00:00	03-Mar-2017 00:00
Compound	CAS Number	LOR	Unit		ES1705151-001	ES1705151-002	ES1705151-003	ES1705151-004	ES1705151-005
					Result	Result	Result	Result	Result
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1	%		25.0	29.3	64.0	56.3	65.0
EG020-SD: Total Metals in Sediments by ICPMS									
Arsenic	7440-38-2	1	mg/kg		4.78	6.62	14.8	13.5	12.9
Cadmium	7440-43-9	0.1	mg/kg		0.1	<0.1	0.2	0.1	0.6
Chromium	7440-47-3	1	mg/kg		4.1	3.5	12.6	12.7	14.0
Cobalt	7440-48-4	0.5	mg/kg		2.5	2.7	7.0	5.2	6.2
Lead	7439-92-1	1	mg/kg		4.0	2.4	8.9	6.2	15.2
Nickel	7440-02-0	1	mg/kg		1.7	1.8	6.7	7.3	6.6
Selenium	7782-49-2	0.1	mg/kg		1.3	1.2	3.3	3.2	3.3
Zinc	7440-66-6	1	mg/kg		21.4	8.3	38.4	20.5	91.4
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.01	mg/kg		0.06	0.02	0.06	0.03	0.12
EP003: Total Organic Carbon (TOC) in Soil									
Total Organic Carbon	----	0.02	%		0.67	0.62	1.10	1.60	2.22
EP132B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	5	µg/kg		<5	<5	<5	<5	22
2-Methylnaphthalene	91-57-6	5	µg/kg		<5	<5	<5	<5	49
Acenaphthylene	208-96-8	4	µg/kg		<4	<4	<4	5	7
Acenaphthene	83-32-9	4	µg/kg		<4	<4	<4	<4	<4
Fluorene	86-73-7	4	µg/kg		<4	<4	<4	<4	8
Phenanthrene	85-01-8	4	µg/kg		8	<4	5	<4	66
Anthracene	120-12-7	4	µg/kg		<4	<4	<4	<4	10
Fluoranthene	206-44-0	4	µg/kg		7	<4	6	16	69
Pyrene	129-00-0	4	µg/kg		6	<4	6	16	60
Benz(a)anthracene	56-55-3	4	µg/kg		<4	<4	<4	10	38
Chrysene	218-01-9	4	µg/kg		<4	<4	<4	9	27
Benzo(b+j)fluoranthene	205-99-2 205-82-3	4	µg/kg		4	<4	<4	17	42
Benzo(k)fluoranthene	207-08-9	4	µg/kg		<4	<4	<4	10	12
Benzo(e)pyrene	192-97-2	4	µg/kg		<4	<4	<4	10	24
Benzo(a)pyrene	50-32-8	4	µg/kg		<4	<4	<4	12	28
Perylene	198-55-0	4	µg/kg		<4	<4	<4	<4	8
Benzo(g.h.i)perylene	191-24-2	4	µg/kg		<4	<4	<4	13	27
Dibenz(a.h)anthracene	53-70-3	4	µg/kg		<4	<4	<4	<4	6
Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg		<4	<4	<4	10	19

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	J1-0.4	J1-0.8	J2-0.5	J2-1.0	J3-0.5
				Client sampling date / time	03-Mar-2017 00:00	03-Mar-2017 00:00	03-Mar-2017 00:00	03-Mar-2017 00:00	03-Mar-2017 00:00
Compound	CAS Number	LOR	Unit		ES1705151-001	ES1705151-002	ES1705151-003	ES1705151-004	ES1705151-005
					Result	Result	Result	Result	Result
EP132B: Polynuclear Aromatic Hydrocarbons - Continued									
Coronene	191-07-1	5	µg/kg		<5	<5	<5	<5	**9**
^ Sum of PAHs	----	4	µg/kg		**25**	<4	**17**	**128**	**531**
EP132T: Base/Neutral Extractable Surrogates									
2-Fluorobiphenyl	321-60-8	10	%		**94.6**	**82.5**	**99.1**	**92.5**	**94.6**
Anthracene-d10	1719-06-8	10	%		**115**	**102**	**117**	**108**	**119**
4-Terphenyl-d14	1718-51-0	10	%		**105**	**95.5**	**109**	**103**	**110**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	J3-DUP0.5	J3-1.0	J4-0.5	J5-0.5	J5-0.5 DUP
				Client sampling date / time	03-Mar-2017 00:00	03-Mar-2017 00:00	03-Mar-2017 00:00	03-Mar-2017 00:00	03-Mar-2017 00:00
Compound	CAS Number	LOR	Unit		ES1705151-006	ES1705151-007	ES1705151-008	ES1705151-009	ES1705151-010
					Result	Result	Result	Result	Result
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1	%		67.1	63.4	31.0	48.8	67.0
EG020-SD: Total Metals in Sediments by ICPMS									
Arsenic	7440-38-2	1	mg/kg		13.4	14.7	9.35	7.31	11.7
Cadmium	7440-43-9	0.1	mg/kg		0.7	0.2	0.3	1.8	3.3
Chromium	7440-47-3	1	mg/kg		14.4	10.1	4.9	10.7	15.4
Cobalt	7440-48-4	0.5	mg/kg		6.7	5.5	2.1	3.1	4.8
Lead	7439-92-1	1	mg/kg		15.7	42.4	3.2	13.1	18.2
Nickel	7440-02-0	1	mg/kg		6.9	6.2	2.8	4.6	8.3
Selenium	7782-49-2	0.1	mg/kg		3.5	3.2	1.8	2.8	3.9
Zinc	7440-66-6	1	mg/kg		94.9	25.6	9.7	85.8	125
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.01	mg/kg		0.09	0.04	0.06	0.16	0.21
EP003: Total Organic Carbon (TOC) in Soil									
Total Organic Carbon	----	0.02	%		2.38	1.44	0.30	6.05	5.80
EP132B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	5	µg/kg		28	<5	<5	128	199
2-Methylnaphthalene	91-57-6	5	µg/kg		62	<5	<5	291	457
Acenaphthylene	208-96-8	4	µg/kg		5	<4	<4	16	23
Acenaphthene	83-32-9	4	µg/kg		4	<4	<4	37	56
Fluorene	86-73-7	4	µg/kg		9	<4	<4	57	89
Phenanthrene	85-01-8	4	µg/kg		81	6	<4	520	785
Anthracene	120-12-7	4	µg/kg		22	<4	<4	114	187
Fluoranthene	206-44-0	4	µg/kg		72	6	6	374	557
Pyrene	129-00-0	4	µg/kg		67	7	6	288	421
Benz(a)anthracene	56-55-3	4	µg/kg		42	<4	<4	231	339
Chrysene	218-01-9	4	µg/kg		36	<4	<4	204	344
Benzo(b+j)fluoranthene	205-99-2 205-82-3	4	µg/kg		43	<4	<4	141	235
Benzo(k)fluoranthene	207-08-9	4	µg/kg		18	<4	<4	32	42
Benzo(e)pyrene	192-97-2	4	µg/kg		23	<4	<4	101	161
Benzo(a)pyrene	50-32-8	4	µg/kg		29	<4	<4	109	177
Perylene	198-55-0	4	µg/kg		6	<4	<4	18	28
Benzo(g.h.i)perylene	191-24-2	4	µg/kg		31	<4	<4	96	156
Dibenz(a.h)anthracene	53-70-3	4	µg/kg		13	<4	<4	25	46
Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg		22	<4	<4	46	72

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	J3-DUP0.5	J3-1.0	J4-0.5	J5-0.5	J5-0.5 DUP
				Client sampling date / time	03-Mar-2017 00:00	03-Mar-2017 00:00	03-Mar-2017 00:00	03-Mar-2017 00:00	03-Mar-2017 00:00
Compound	CAS Number	LOR	Unit		ES1705151-006	ES1705151-007	ES1705151-008	ES1705151-009	ES1705151-010
					Result	Result	Result	Result	Result
EP132B: Polynuclear Aromatic Hydrocarbons - Continued									
Coronene	191-07-1	5	µg/kg		**8**	<5	<5	**32**	**53**
^ **Sum of PAHs**	----	4	µg/kg		**621**	**19**	**12**	**2860**	**4430**
EP132T: Base/Neutral Extractable Surrogates									
2-Fluorobiphenyl	321-60-8	10	%		**107**	**95.4**	**93.7**	**92.2**	**75.3**
Anthracene-d10	1719-06-8	10	%		**123**	**119**	**105**	**125**	**121**
4-Terphenyl-d14	1718-51-0	10	%		**122**	**108**	**98.4**	**121**	**108**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	J5-1.0	J6-0.5	J6-1.0	J6-1.5	J7-0.5
			Client sampling date / time	03-Mar-2017 00:00	03-Mar-2017 00:00	03-Mar-2017 00:00	03-Mar-2017 00:00	03-Mar-2017 00:00
Compound	CAS Number	LOR	Unit	ES1705151-011	ES1705151-012	ES1705151-013	ES1705151-014	ES1705151-015
				Result	Result	Result	Result	Result
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	56.6	50.2	54.8	57.4	43.4
EG020-SD: Total Metals in Sediments by ICPMS								
Arsenic	7440-38-2	1	mg/kg	15.0	8.41	6.52	8.62	5.58
Cadmium	7440-43-9	0.1	mg/kg	0.1	0.2	0.1	0.1	0.2
Chromium	7440-47-3	1	mg/kg	11.1	7.9	10.2	11.9	4.2
Cobalt	7440-48-4	0.5	mg/kg	4.6	4.1	4.4	4.7	2.6
Lead	7439-92-1	1	mg/kg	7.2	5.1	6.0	6.6	2.9
Nickel	7440-02-0	1	mg/kg	6.7	5.7	6.6	7.2	2.9
Selenium	7782-49-2	0.1	mg/kg	2.9	2.5	2.6	2.7	1.6
Zinc	7440-66-6	1	mg/kg	20.9	18.6	19.5	21.4	12.6
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.01	mg/kg	0.10	0.07	0.06	0.06	0.05
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	1.33	2.38	2.99	3.09	2.20
EP132B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	5	µg/kg	<5	9	<5	<5	<5
2-Methylnaphthalene	91-57-6	5	µg/kg	<5	16	<5	<5	6
Acenaphthylene	208-96-8	4	µg/kg	<4	<4	7	<4	<4
Acenaphthene	83-32-9	4	µg/kg	<4	<4	<4	<4	<4
Fluorene	86-73-7	4	µg/kg	<4	<4	<4	<4	<4
Phenanthrene	85-01-8	4	µg/kg	<4	19	<4	<4	7
Anthracene	120-12-7	4	µg/kg	<4	<4	5	<4	<4
Fluoranthene	206-44-0	4	µg/kg	<4	14	37	<4	5
Pyrene	129-00-0	4	µg/kg	<4	12	34	<4	<4
Benz(a)anthracene	56-55-3	4	µg/kg	<4	7	21	<4	<4
Chrysene	218-01-9	4	µg/kg	<4	5	18	<4	<4
Benzo(b+j)fluoranthene	205-99-2 205-82-3	4	µg/kg	<4	6	37	<4	<4
Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	17	<4	<4
Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	21	<4	<4
Benzo(a)pyrene	50-32-8	4	µg/kg	<4	<4	26	<4	<4
Perylene	198-55-0	4	µg/kg	<4	<4	10	<4	<4
Benzo(g.h.i)perylene	191-24-2	4	µg/kg	<4	<4	25	<4	<4
Dibenz(a.h)anthracene	53-70-3	4	µg/kg	<4	<4	6	<4	<4
Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	<4	<4	20	<4	<4

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	J5-1.0	J6-0.5	J6-1.0	J6-1.5	J7-0.5
				Client sampling date / time	03-Mar-2017 00:00	03-Mar-2017 00:00	03-Mar-2017 00:00	03-Mar-2017 00:00	03-Mar-2017 00:00
Compound	CAS Number	LOR	Unit		ES1705151-011	ES1705151-012	ES1705151-013	ES1705151-014	ES1705151-015
					Result	Result	Result	Result	Result
EP132B: Polynuclear Aromatic Hydrocarbons - Continued									
Coronene	191-07-1	5	µg/kg		<5	<5	**7**	<5	<5
^ **Sum of PAHs**	----	4	µg/kg		<4	**88**	**291**	<4	**18**
EP132T: Base/Neutral Extractable Surrogates									
2-Fluorobiphenyl	321-60-8	10	%		**108**	**99.2**	**91.1**	**84.4**	**95.6**
Anthracene-d10	1719-06-8	10	%		**118**	**124**	**112**	**112**	**120**
4-Terphenyl-d14	1718-51-0	10	%		**118**	**108**	**95.1**	**95.4**	**102**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	J7-1.0	J8-0.8	J8-1.0	----	----
			Client sampling date / time	03-Mar-2017 00:00	03-Mar-2017 00:00	03-Mar-2017 00:00	----	----
Compound	CAS Number	LOR	Unit	ES1705151-016	ES1705151-017	ES1705151-018	--------	--------
				Result	Result	Result	----	----
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	53.3	57.2	52.6	----	----
EG020-SD: Total Metals in Sediments by ICPMS								
Arsenic	7440-38-2	1	mg/kg	6.96	8.95	10.3	----	----
Cadmium	7440-43-9	0.1	mg/kg	<0.1	2.3	1.0	----	----
Chromium	7440-47-3	1	mg/kg	8.0	22.7	11.0	----	----
Cobalt	7440-48-4	0.5	mg/kg	5.2	3.8	5.4	----	----
Lead	7439-92-1	1	mg/kg	4.9	17.0	10.0	----	----
Nickel	7440-02-0	1	mg/kg	5.1	6.2	6.1	----	----
Selenium	7782-49-2	0.1	mg/kg	2.7	5.9	2.7	----	----
Zinc	7440-66-6	1	mg/kg	17.6	126	47.9	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.01	mg/kg	0.06	0.22	0.09	----	----
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	4.30	6.00	3.29	----	----
EP132B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	5	µg/kg	<5	183	125	----	----
2-Methylnaphthalene	91-57-6	5	µg/kg	<5	479	290	----	----
Acenaphthylene	208-96-8	4	µg/kg	<4	16	12	----	----
Acenaphthene	83-32-9	4	µg/kg	<4	38	22	----	----
Fluorene	86-73-7	4	µg/kg	<4	62	34	----	----
Phenanthrene	85-01-8	4	µg/kg	<4	633	324	----	----
Anthracene	120-12-7	4	µg/kg	<4	119	75	----	----
Fluoranthene	206-44-0	4	µg/kg	<4	409	184	----	----
Pyrene	129-00-0	4	µg/kg	<4	296	144	----	----
Benz(a)anthracene	56-55-3	4	µg/kg	<4	200	121	----	----
Chrysene	218-01-9	4	µg/kg	<4	189	107	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	4	µg/kg	<4	145	78	----	----
Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	26	24	----	----
Benzo(e)pyrene	192-97-2	4	µg/kg	<4	87	52	----	----
Benzo(a)pyrene	50-32-8	4	µg/kg	<4	93	62	----	----
Perylene	198-55-0	4	µg/kg	11	36	29	----	----
Benzo(g.h.i)perylene	191-24-2	4	µg/kg	<4	83	50	----	----
Dibenz(a.h)anthracene	53-70-3	4	µg/kg	<4	22	12	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	<4	38	26	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	J7-1.0	J8-0.8	J8-1.0	----	----
				Client sampling date / time	03-Mar-2017 00:00	03-Mar-2017 00:00	03-Mar-2017 00:00	----	----
Compound	CAS Number	LOR	Unit		ES1705151-016	ES1705151-017	ES1705151-018	--------	--------
					Result	Result	Result	----	----
EP132B: Polynuclear Aromatic Hydrocarbons - Continued									
Coronene	191-07-1	5	µg/kg		<5	**32**	**19**	**----**	**----**
^ Sum of PAHs	----	4	µg/kg		**11**	**3190**	**1790**	**----**	**----**
EP132T: Base/Neutral Extractable Surrogates									
2-Fluorobiphenyl	321-60-8	10	%		**83.2**	**107**	**112**	**----**	**----**
Anthracene-d10	1719-06-8	10	%		**118**	**115**	**116**	**----**	**----**
4-Terphenyl-d14	1718-51-0	10	%		**99.0**	**105**	**108**	**----**	**----**

Surrogate Control Limits

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%) Low	High
EP132T: Base/Neutral Extractable Surrogates			
2-Fluorobiphenyl	321-60-8	55	135
Anthracene-d10	1719-06-8	70	136
4-Terphenyl-d14	1718-51-0	57	127

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1705150**	Page	: 1 of 5
Client	: **JACOBS GROUP (AUSTRALIA) PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: ROBERT GAUTHIER	Contact	: Customer Services ES
Address	: 710 HUNTER STREET NEWCASTLE WEST NSW, AUSTRALIA 2302	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9928 2100	Telephone	: +61-2-8784 8555
Project	: LAKE MAC PFAS	Date Samples Received	: 06-Mar-2017 09:46
Order number	: 1A069200	Date Analysis Commenced	: 07-Mar-2017
C-O-C number	: ----	Issue Date	: 13-Mar-2017 12:29
Sampler	: ROBERT GAUTHIER		
Site	: ----		
Quote number	: EN/003/16 Pri BQ		
No. of samples received	: 8		
No. of samples analysed	: 8		

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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Dian Dao		Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Lana Nguyen	Senior LCMS Chemist	Sydney Organics, 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 no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component.

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

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	J1-0.5-PFAS	J2-0.5-PFAS	J3-0.5-PFAS	J4-0.5-PFAS	J5-0.5-PFAS
				Client sampling date / time	03-Mar-2017 00:00	03-Mar-2017 00:00	03-Mar-2017 00:00	03-Mar-2017 00:00	03-Mar-2017 00:00
Compound	CAS Number	LOR	Unit		ES1705150-001	ES1705150-002	ES1705150-003	ES1705150-004	ES1705150-005
					Result	Result	Result	Result	Result
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1	%		**26.7**	**57.4**	**68.4**	**22.7**	**66.1**
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg		<0.001	<0.001	<0.001	<0.001	<0.001
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231P: PFAS Sums									
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		**88.0**	**93.7**	**88.6**	**92.7**	**88.8**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	J6-0.5-PFAS	J7-0.5-PFAS	J8-0.5-PFAS	----	----
				Client sampling date / time	03-Mar-2017 00:00	03-Mar-2017 00:00	03-Mar-2017 00:00	----	----
Compound	CAS Number	LOR	Unit		ES1705150-006	ES1705150-007	ES1705150-008	--------	--------
					Result	Result	Result	----	----
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1	%		**45.6**	**48.3**	**59.1**	**----**	**----**
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	**----**	**----**
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	**----**	**----**
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	**----**	**----**
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg		<0.001	<0.001	<0.001	**----**	**----**
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	**----**	**----**
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	**----**	**----**
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	**----**	**----**
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	**----**	**----**
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	**----**	**----**
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	**----**	**----**
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	**----**	**----**
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	**----**	**----**
EP231P: PFAS Sums									
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	**----**	**----**
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	**----**	**----**
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		**88.8**	**84.6**	**87.1**	**----**	**----**

Surrogate Control Limits

Sub-Matrix: **SOIL**		Recovery Limits (%)	
Compound	*CAS Number*	*Low*	*High*
EP231S: PFAS Surrogate			
13C4-PFOS	----	70	130

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **ES1705150**	Page	: 1 of 5
Client	: **JACOBS GROUP (AUSTRALIA) PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: ROBERT GAUTHIER	Contact	: Customer Services ES
Address	: 710 HUNTER STREET NEWCASTLE WEST NSW, AUSTRALIA 2302	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9928 2100	Telephone	: +61-2-8784 8555
Project	: LAKE MAC PFAS	Date Samples Received	: 06-Mar-2017
Order number	: 1A069200	Date Analysis Commenced	: 07-Mar-2017
C-O-C number	: ----	Issue Date	: 13-Mar-2017
Sampler	: ROBERT GAUTHIER		
Site	: ----		
Quote number	: EN/003/16 Pri BQ		
No. of samples received	: 8		
No. of samples analysed	: 8		

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

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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Dian Dao		Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Lana Nguyen	Senior LCMS Chemist	Sydney Organics, 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: 780965)									
ES1705148-002	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	22.2	21.8	1.51	0% - 20%
ES1705150-002	J2-0.5-PFAS	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	57.4	59.2	3.14	0% - 20%
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 780069)									
ES1705150-001	J1-0.5-PFAS	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.0002	0.00	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
ES1705157-003	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	0.0004	0.0004	0.00	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 780069)									
ES1705150-001	J1-0.5-PFAS	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	0.00	No Limit
ES1705157-003	Anonymous	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	0.00	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 780069)									
ES1705150-001	J1-0.5-PFAS	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	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 (%)*
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 780069) - continued									
ES1705150-001	J1-0.5-PFAS	EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
ES1705157-003	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit

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

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

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 780069)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	0.00125 mg/kg		57	121
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	78.7	52	126
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	84.6	55	127
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 780069)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	0.00625 mg/kg	54.4	52	128
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg		54	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	102	58	127
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	68.4	57	128
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	102	60	134
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 780069)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	0.00125 mg/kg	95.8	54	130
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	0.00125 mg/kg	114	61	130
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	0.00125 mg/kg	83.6	62	130
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	0.00125 mg/kg	87.7	60	130

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
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 780069)							
ES1705150-001	J1-0.5-PFAS	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.00125 mg/kg	59.8	50	130
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00125 mg/kg	68.6	50	130
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.00125 mg/kg	90.6	50	130
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 780069)							
ES1705150-001	J1-0.5-PFAS	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.00625 mg/kg	77.0	30	130
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.00125 mg/kg	61.1	50	130
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.00125 mg/kg	52.2	50	130
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.00125 mg/kg	71.6	50	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.00125 mg/kg	54.7	50	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 780069)							

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*
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 780069) - continued							
ES1705150-001	J1-0.5-PFAS	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.00125 mg/kg	105	50	130
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.00125 mg/kg	70.0	50	130
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.00125 mg/kg	82.1	50	130
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.00125 mg/kg	77.1	50	130

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES1705150**	Page	: 1 of 4
Client	: **JACOBS GROUP (AUSTRALIA) PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: ROBERT GAUTHIER	Telephone	: +61-2-8784 8555
Project	: LAKE MAC PFAS	Date Samples Received	: 06-Mar-2017
Site	: ----	Issue Date	: 13-Mar-2017
Sampler	: ROBERT GAUTHIER	No. of samples received	: 8
Order number	: 1A069200	No. of samples analysed	: 8

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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

Analysis Holding Time Compliance

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

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

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

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

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content							
Soil Glass Jar - Unpreserved (EA055-103)							
J1-0.5-PFAS, J2-0.5-PFAS, J3-0.5-PFAS, J4-0.5-PFAS, J5-0.5-PFAS, J6-0.5-PFAS, J7-0.5-PFAS, J8-0.5-PFAS	**03-Mar-2017**	**----**	----	----	**07-Mar-2017**	17-Mar-2017	✓
EP231A: Perfluoroalkyl Sulfonic Acids							
Soil Glass Jar - Unpreserved (EP231X)							
J1-0.5-PFAS, J2-0.5-PFAS, J3-0.5-PFAS, J4-0.5-PFAS, J5-0.5-PFAS, J6-0.5-PFAS, J7-0.5-PFAS, J8-0.5-PFAS	**03-Mar-2017**	**07-Mar-2017**	30-Aug-2017	✓	**07-Mar-2017**	16-Apr-2017	✓
EP231B: Perfluoroalkyl Carboxylic Acids							
Soil Glass Jar - Unpreserved (EP231X)							
J1-0.5-PFAS, J2-0.5-PFAS, J3-0.5-PFAS, J4-0.5-PFAS, J5-0.5-PFAS, J6-0.5-PFAS, J7-0.5-PFAS, J8-0.5-PFAS	**03-Mar-2017**	**07-Mar-2017**	30-Aug-2017	✓	**07-Mar-2017**	16-Apr-2017	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
Soil Glass Jar - Unpreserved (EP231X)							
J1-0.5-PFAS, J2-0.5-PFAS, J3-0.5-PFAS, J4-0.5-PFAS, J5-0.5-PFAS, J6-0.5-PFAS, J7-0.5-PFAS, J8-0.5-PFAS	**03-Mar-2017**	**07-Mar-2017**	30-Aug-2017	✓	**07-Mar-2017**	16-Apr-2017	✓
EP231P: PFAS Sums							
Soil Glass Jar - Unpreserved (EP231X)							
J1-0.5-PFAS, J2-0.5-PFAS, J3-0.5-PFAS, J4-0.5-PFAS, J5-0.5-PFAS, J6-0.5-PFAS, J7-0.5-PFAS, J8-0.5-PFAS	**03-Mar-2017**	**07-Mar-2017**	30-Aug-2017	✓	**07-Mar-2017**	16-Apr-2017	✓

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
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	13	**15.38**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	13	**7.69**	**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).
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	SOIL	In-House. A portion of soil is extracted with MTBE. The extract is taken to dryness, made up in mobile phase. Analysis is by LC/MSMS, ESI Negative Mode using MRM. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers.

Preparation Methods	Method	Matrix	Method Descriptions
Sample Extraction for PFAS	EP231-PR	SOIL	In house

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☐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 5/585 Maitland Rd Mayfield West NSW 2304 Ph: 02 4014 2500 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: townsville.environmental@alsglobal.com
☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: Jacobs	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: N. Syd		☐ Non Standard or urgent TAT (List due date):	Custody Seal Intact? Yes / No / N/A
PROJECT: Lake Mac PFAS	ALS QUOTE NO.:	COC SEQUENCE NUMBER (Circle)	Free ice / frozen ice packs present upon receipt? Yes / No / N/A
ORDER NUMBER: IA069200		COC: 1 2 3 4 5 6 7	Random Sample Temperature on Receipt: 22.7 °C
PROJECT MANAGER: R. Gauthier	CONTACT PH: 0407 464 578	OF: 1 2 3 4 5 6 7	Other comments:
SAMPLER: R. Gauthier	SAMPLER MOBILE:		
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default):		
Email Reports to (will default to PM if no other addresses are listed): Robert.Gauthier@Jacobs.com			
Email Invoice to (will default to PM if no other addresses are listed):			

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
DATE/TIME: 06/03/17	DATE/TIME: 6/3/17 9:45	DATE/TIME: 6/3/17 17:00	DATE/TIME: 6/3/17

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	PFAS Soil	
1	J1 - 0.5 PFAS	03/03/17	S	Jar w/o teflon lid	1	✓	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
2	J2 - 0.5 PFAS				1	✓	E-MAIL
3	J3 - 0.5 PFAS				1	✓	
4	J4 - 0.5 PFAS				1	✓	
5	J5 - 0.5 PFAS				1	✓	
6	J6 - 0.5 PFAS				1	✓	
7	J7 - 0.5 PFAS				1	✓	
8	J8 - 0.5 PFAS	↓	↓	↓	1	✓	
				TOTAL	8	8	

Environmental Division Sydney
Work Order Reference
ES1705150

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.

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☐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 5/585 Maitland Rd Mayfield West NSW 2304 Ph: 02 4014 2500 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: townsville.environmental@alsglobal.com
☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: Jacobs	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: N. Syd		☐ Non Standard or urgent TAT (List due date):	Custody Seal Intact? Yes / No / N/A
PROJECT: Lake Mac PFAS	ALS QUOTE NO.:	COC SEQUENCE NUMBER (Circle)	Free ice / frozen ice bricks present upon receipt? Yes / No / N/A
ORDER NUMBER: IA069200		COC: 1 2 3 4 5 6 7	Random Sample Temperature on Receipt: 27.7 °C
PROJECT MANAGER: R. Gauthier	CONTACT PH: 0407 464 578	OF: 1 2 3 4 5 6 7	Other comment:
SAMPLER: R. Gauthier	SAMPLER MOBILE:	RELINQUISHED BY:	RECEIVED BY:
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default):	DATE/TIME: 06/03/17	DATE/TIME: 6/6/17 9:45
Email Reports to (will default to PM if no other addresses are listed): Robert.Gauthier@Jacobs.com		RELINQUISHED BY:	RECEIVED BY:
Email Invoice to (will default to PM if no other addresses are listed):		DATE/TIME: 6/3/17 17:00	DATE/TIME: 6/3/17

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	PFAS Soil	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	J1-0.5 PFAS	03/03/17	S	Jar w/o teflon lid	1	✓	EMAIL
2	J2-0.5 PFAS				1	✓	
3	J3-0.5 PFAS				1	✓	
4	J4-0.5 PFAS				1	✓	
5	J5-0.5 PFAS				1	✓	
6	J6-0.5 PFAS				1	✓	
7	J7-0.5 PFAS				1	✓	
8	J8-0.5 PFAS	↓	↓	↓	1	✓	
				TOTAL	8	8	

Environmental Division Sydney
Work Order Reference
ES1705150

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.

Appendix E. Calibration Certificates

PID Calibration Certificate

Instrument PhoCheck Tiger
Serial No. T-105923

airmet

Air-Met Scientific Pty Ltd
1300 137 067

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

Certificate of Calibration

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

Sensor	Serial no	Calibration gas and concentration	Certified	Gas bottle No		Instrument Reading
PID Lamp		98ppm Isobutylene	NATA	SY137		98.1ppm

Calibrated by: SB **Sophie Boler**

Calibration date: **24/02/2017**

Next calibration due: **26/03/2017**