PROGRESSIVE RISK MANAGEMENT

Contamination Assessment

North Narrabeen Deep Creek Submain (MS000123)

4 Bellara Avenue, North Narrabeen NSW

Sydney Water

January 2019

Document Control

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Executive Summary:

Introduction

Progressive Risk Management Pty Ltd (PRM) were engaged by Sydney Water to undertake a Contamination Assessment (CA) at 4 Bellara Avenue, North Narrabeen NSW (the site).

Background

The site has been nominated for potential divestment for future low-density residential land use. Prior to the potential divestment, Sydney Water require a CA to evaluate the condition of the site with regard to potential contamination.

Objectives and Scope of Works

The objective of the CA was to identify potential contamination issues at the site and assess the potential risks to human health and the environment.

The CA was designed to assess whether the site is suitable for the proposed divestment option (low-density residential), and if required, advise on remediation and/or management requirements to render the site suitable for the preferred divestment option.

The following scope of works was undertaken as part of the project:

- Preparation of relevant health and safety documentation, inclusive of Project Safety and Environmental Plan, Safe Works Method Statement and Dial Before You Dig.
- Preparation of a detailed Sampling, Analysis and Quality Plan (SAQP) for the investigation of potential contamination at the site.
- Review of Sydney Water Contaminated Land Risk Ranking (CLRR) screening documentation, historical aerial imagery and online NSW EPA Contaminated Land Database.
- Site walkover to determine investigation locations and any site-specific constraints (e.g access) or areas of suspected contamination (e.g. distressed vegetation, filling etc)
- Soil sampling from six investigation locations using hand tools (hand auger / shovel).
- Screening of soil samples using a calibrated photoionisation detector (PID).
- Laboratory analysis of soil samples using a National Association of Testing Authority (NATA) accredited laboratory.
- Provision of a CA report detailing findings and recommendations, including quantification of extent of impacted material and volume (if required).

The scope of works was limited to soil contamination only and did not include sampling of groundwater.

Conclusions

Field observations and the data collected during the CA at the site support the following conclusions:

- Fill consisting of silty sand and clayey silty sand of variable depth was identified across the site. Minimal anthropogenic inclusions (including glass, ceramics, plastic and steel) were observed on the surface at each investigation location. These anthropogenic materials are not likely to present risk to current or future land users and are of low concern (aesthetic) for the proposed divestment of the site for residential land use.
- No suspected asbestos containing materials (ACM), malodourous odours, soil staining or visible signs of potential gross contamination were observed during the CA.
- The soil analytical results and field observation were below the adopted site assessment criteria (SAC) for the proposed potential divestment for future low-density residential land use.

Based on the findings of the CA PRM considers that the site's soils do not present an unacceptable risk with respect to impacts on the environment and/or human health and

conclude that the site is suitable for the proposed divestment for low-density residential land use and the current open space land use.

This Executive Summary should be read in conjunction with the report from which it originated in its entirety.

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Attachments and Appendices

1. Introduction

Progressive Risk Management Pty Ltd (PRM) were engaged by Sydney Water to undertake a Contamination Assessment (CA) for a Sydney Water property located at 4 Bellara Avenue, North Narrabeen NSW (the site). The regional site location is provided in **Figure 1**.

The CA involved the sampling and analysis of soil at the site to determine the extent and significance of contamination (if any) with respect to the potential divestment of the site for future low-density residential land use. This report provides the results of the CA completed at the site by PRM on 30 October 2018.

1.1. Background

The site has been nominated for potential divestment for future low-density residential land use. Prior to the potential divestment Sydney Water require a CA to evaluate the condition of the site with regards to potential contamination.

As part of the CA, PRM prepared a detailed Sampling, Analysis and Quality Plan (SAQP) for the investigation of potential contamination at the site. The SAQP was provided to the nominated site auditor, Andrew Lau of JBS&G Australia Pty Ltd (JBS&G), in October 2018 for review and approval.

1.2. Purpose and Objectives

The purpose of the CA was to assess whether the site is suitable for the current open space land use and the proposed divestment option (low-density residential), and if required, advise on remediation or management requirements (including indicative volumes of impacted material) to render the site suitable for the current land use and the preferred divestment option.

The objective of the CA was to identify potential contamination issues at the site and assess the potential risks to human health and the environment.

1.3. Scope of Works Completed

The following scope of works was undertaken as part of the CA:

- Preparation of relevant health and safety documentation, inclusive of Project Safety and Environmental Plan, Safe Works Method Statement and Dial Before You Dig.
- Preparation of a detailed Sampling, Analysis and Quality Plan (SAQP) for the investigation of potential contamination at the site. The SAQP was provided to the nominated site auditor for review and approval.
- Review of Sydney Water Contaminated Land Risk Ranking (CLRR) screening documentation, historical aerial imagery and online NSW EPA Contaminated Land Database.
- Site walkover to determine investigation locations and any site-specific constraints (e.g access) or areas of suspected contamination (e.g. distressed vegetation, filling etc).
- Soil sampling from six investigation locations using hand tools (hand auger / shovel).
- Screening of soil samples using a calibrated photoionisation detector (PID).
- Laboratory analysis of soil samples using a National Association of Testing Authority (NATA) accredited laboratory.
- Provision of a CA report detailing findings and recommendations, including quantification of extent of impacted material and volume (if required).

The scope of works was limited to soil contamination only and did not include sampling of groundwater.

1.4. Approach under Regulatory Framework

The standards and methodologies that have been used for the development of the SAQP (PRM, 2018) and this CA are those endorsed by the NSW Environmental Protection Agency (EPA) and comply with the provisions of the NSW Contaminated Land Management Act 1997. The documents where these standards and methodologies are described comprise:

- Australian Standards 4482.1 Guide to the Sampling and Investigation of Potentially Contaminated Soil Part 1: Non-Volatile and Semi-Volatile Substances 2005.
- CRC Care Technical Report No. 10, Health screening levels for petroleum hydrocarbons in soil and groundwater Summary, 2011 (CRC Care, 2011).
- CRC Care Technical Report No. 39, Risk-based management and remediation guidance for benzo(a)pyrene, 2017 (CRC Care, 2017).
- Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia, May 2009 (WA DoH Guidelines).
- NSW Contaminated Land Management Act 1997 (CLM Act, 1997).
- National Environmental Protection Council National Environmental Protection (Assessment of Contaminated Sites) Measure (Amendment No. 1), 2013 (NEPM, 2013).
- NSW EPA, Guideline on the Duty to Report Contamination under the Contaminated Land Management Act 1997 (NSW EPA, 2015)
- NSW EPA endorsed Guidelines for the NSW Site Auditor Scheme (3rd Edition), 2017 (NSW EPA, 2017).
- NSW EPA endorsed Guidelines for Consultants Reporting on Contaminated Sites, 2011 (NSW EPA, 2011).
- NSW EPA Sampling Design Guidelines (EPA,1995).
- Protection of the Environment Operations Act 1997 (POEO Act, 1997).

2. Site Information and Environmental Setting

2.1. Site Details

A summary of site details is provided in **Table 1**.

Table 1: Site Details	
Site Address:	4 Bellara Avenue, North Narrabeen NSW
CLRR Site ID:	LT002845
Sydney Water Master Site ID:	MS000123
Lot Parcel:	Lot 26 DP236548
Site Area:	~563m^2
Local Council:	Northern Beaches Council
Current Zoning:	SP2 Infrastructure
Future Zoning:	R2 Low Density Residential
Current site use	Vacant accessible site with below-ground pipeline. In consideration of the site setting and accessibility, an open space land use was considered most appropriate to describe the current land use.
Proposed future use:	Low density residential with garden / accessible soil
Surrounding Land Use	The site is a vacant lot located on the northern side of Bellara Avenue. The surrounding land use at the site include: • North: Low density residential properties • East: Low density residential properties. • South: Bellara Avenue and low-density residential properties. • West: Low density residential properties.

2.2. Current Site Condition

The site consists of a vacant block in a residential setting. At the time of the CA the site was accessible from the south (Bellara Ave) and observed to be unfenced, grass covered with minor established vegetation (trees and shrubs) primarily around the north and eastern site boundary. The vegetation was observed to be in good condition. No buildings or above ground structures were identified at the site. A large service pit was overserved centrally along the eastern boundary of the site along with a smaller service pit located in the southern portion of the western boundary.

The site is currently zoned as SP2 Infrastructure due to the presence of a Deep Creek Submain which traverses the site below ground. In consideration of the site setting and accessibility (unfenced), an open space land use was considered most appropriate to describe the current land use.

2.3. Environmental Setting

The site environmental setting is summarised in **Table 2**.

Table 2: Environmental Setting	
Soils Landscape:	Based on review of on-line mapping on the eSPADE1 web site, residual soil at the

[1] The data accessible through eSPADE is mainly sourced from the NSW Soil and Land Information System, including soil landscape mapping data.

Table 2: Environmental Setting	
	site would be part Warriwood soil landscape. Soils of the Warriwood landscape are typically deep, well sorted sandy Humus Podzols and dark, mottled Siliceous Sands overlying Acid Peats in depressions (in poorly drained areas). Dominant soil materials in well drained areas would expect to include loose, speckled, dark-grey loamy sand and bleached massive sand. Loose, speckled, dark-grey loamy sand overlain dark brown soft organic pan and Silaceous Sand and Acid Peats would be expected in poorly drained areas.
Acid Sulfate Soils:	A review of the National Acid Sulphate Soil map (Australian Soil Resource Information System, CSIRO) indicated there is no known occurrence of Acid Sulphate Soils at the site. It is noted that land within 100m to the south east of the site is mapped as 'Low Probability 1-3m below ground level (bgl)', followed by a portion of land further south east towards Narrabeen lagoon (<200m from the site) of 'high probability (<1m bgl)'. These mapped areas are considerably lower in elevation than the site.
Geology / Hydrogeology:	A review of the Sydney 1:100,000 Geological Map (Geological Series Sheet 9130 (Edition 1), 1983, Department of Mineral Resources) indicated the site is part of the Newport Formation and Garie Formation, with Narrabeen Group interbedded laminate, shale and quartz, to lithic-quartz sandstone and minor red claystone. A search of the NSW Department of Primary Industries (online) identified six registered groundwater bores within 2 km of the site. No registered wells were identified within the Site. The nearest registered groundwater bore, located approximately 140m south of the site, indicates groundwater is at a depth of 1.5 m. It is noted that this GW bore is located significantly lower than the site and not likely indicative of the depth to groundwater at the site.
Topography / Drainage:	The site slopes steeply from the northeast corner towards the southwestern corner of the site. Surface water is expected to either infiltrate the site surface or drain off the site surface and into the local stormwater located in Bellara Avenue. Local stormwater is expected to flow into the open unnamed tributary located approximately 200 m southeast of the site which in turn flows to South Creek and Narrabeen Lagoon located approximately 1 km to the southeast. A review of the Soil Profile Report (2018) (NSW Soil and Land information System) states that the soil hydrology is moderate to well drained, run-on is moderate, and run-off is high.

3. Site History Review

3.1. Review of Available Information

3.1.1. Previous Investigations

Information provided by Sydney Water indicates that no previous investigations have been undertaken at the site.

3.1.2. Sydney Water CLRR Screening Summary

The Sydney Water CLRR is an in-house contaminated land risk screening tool developed to provide a snapshot of potential contamination risk across the Sydney Water property portfolio. The CLRR screening for the site indicated that the site was acquired by Sydney Water in 1970 to accommodate the construction of the Deep Creek Submain (1,500 mm sewer trunk main) which runs through the site.

A review of the historical aerial imagery by Sydney Water as part of the CLRR screening identified no previous developments or activities of concern onsite.

In regard to surrounding land use, the CLRR screening noted:

'Large earthworks has occurred. Cut and fill may have been used for backfill on properties on surrounding land (cuttings on hill to the north east), and possibly following installation of SW infrastructure'.

3.1.3. Sydney Water HYDRA Plans

The Sydney Water HYDRA plans provide figures and imagery overlain with survey data of Sydney Water assets and utilities for all Sydney Water sites. The HYDRA plans for the site indicate that the Deep Creek Submain passes through the site in a northeast and southeast direction. The plans indicate that the depth to the invert of the submain at the maintenance hole located centrally along the eastern boundary is 8.2 m and the depth to the invert at the maintenance hole located within Bellara Avenue is 4.4 m. An internal search of the HYDRA GIS by Sydney Water Project Manager, Amy Dobson, has indicated that the submain was laid in 1977. The method of installation is not known, however it is likely that the submain was installed using top down excavation techniques.

3.2. Historical Aerial Photographs

Historical aerial imagery available on the Sydney Water CLRR Web-GIS were reviewed as part of this CA.

Table 3 provides a summary of the aerial photos reviewed.

Table 3: Summary of Historical Aerial Photographs	
1940s:	The site appears to be vacant and located within the northeastern extremes of a larger property potentially used for agricultural purposes. Vegetation was visible on the site. The surrounding areas generally appeared to be bushland, with the agricultural property the site appears to form part of visible to the south and west.
1950s:	The site generally appeared similar to the 1940s imagery however the agricultural land use which the site formed part of appeared to have ceased. Vegetation appears to have been cleared and two bowling greens constructed in the former adjoining agricultural land use. A small water course was visible close to the southern property boundary. The remaining surrounding areas generally appeared similar to the 1940s imagery.
1960s:	The site and its immediate surrounds appear similar to the 1950s imagery. Vegetation coverage at the site appears to have increased.

Table 3: Summary of Historical Aerial Photographs	
1970s:	The site and its immediate surrounds appear to form part of a wider area undergoing residential development. Vegetation was no longer visible at the site with a disturbed surface visible. The vegetation visible in the surrounding areas to the north and east appear to have been cleared with earthworks appearing to have been undertaken. The watercourse visible in the early imagery appears to have been filled in. Bellara Avenue is visible to the south along with Tatiara Crescent to the southwest and west. Residential properties appeared to have been constructed in the neighbouring properties to the west of the site and surrounding areas.
1980s:	The site appeared to be grassed with trees visible along the eastern boundary. Residential properties had increased in density in the surrounding areas.
1990s:	The lot remained primarily unchanged with varying tree coverage.
2000s:	The site and its immediate surrounds generally appeared similar to the 1990s imagery.
2010s:	The site and its immediate surrounds generally appeared similar to the 2000s imagery.
2018*:	The lot remained primarily unchanged with varying tree coverage until present day.

* Image sourced from SixMaps (https://maps.six.nsw.gov.au/), accessed 17 October 2018.

3.3. Regulatory Searches

The NSW EPA records available online and on the Sydney Water CLRR Web-GIS were reviewed as part of this CA and indicated the following:

- There were no records for the site or any properties within a 500 m radius in relation to contaminated land under Section 58 of the Contaminated Land Management Act 1997 (CLM Act 1997).
- The site has not been notified under Section 60 of the CLM Act 1997.
- There were no records of licenced activities under the Protection of the Environment Operations Act (1997).

4. Identified Potential Contamination Issues

Following a review of the site condition, historical information and the nature of the site as an undeveloped parcel of land within a residential setting, the potential contamination sources and contaminants of potential concern (CoPC) have been identified and summarised in **Table 4**.

No off-site sources of potential contamination have been identified for the site.

Table 4: Potential Contamination Sources and Contaminants of Concern

Source	Description	CoPC	Potential for contamination source
Cut and fill earthworks during the Deep Creek Sub Main tunnelling works.	There is some uncertainty as to if the sub-main tunnel has been directionally drilled or excavated. Potential for onsite reuse of excavated natural soils. Possibly filling with imported fill.	• Heavy metals (Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Zinc). • Total Recoverable Hydrocarbons (TRH). • Benzene, Toluene, Ethylbenzene, Xylene (BTEX). • Polycyclic Aromatic Hydrocarbons (PAH). • Organochloro- and Organophosphorus Pesticides (OCP/OPP). • Polychlorinated biphenyl (PCB). • Asbestos.	Moderate
Historic agricultural land use activities including use of pesticides.	Aerial phots indicate potential historical agricultural land use.		Low
Small-scale fly-tipping of demolition/ building waste during suburb development.	Potential impacts to upper soil horizon from illegal fly-tipping.		Low
Small-scale spraying of pesticides for vegetation maintenance purposes.	Potential impacts to upper soil horizon from pesticide spraying.	• Heavy metals • OCPs/OPPs	Low

5. Preliminary Conceptual Site Model

The preliminary Conceptual Site Model (CSM) aims to provide an understanding of the potential for exposure to CoPC and land use exposure scenarios at the site. The CSM enables an assessment of the potential source – pathway – receptor (SPR) linkages. In developing this CSM, PRM have relied on information provided in the Sydney Water CLRR screening summary for the site, and the information obtained from the investigation. The preliminary CSM is detailed in **Table 5**.

Table 5: Preliminary Conceptual Site Model

Potential Source	CoPC	Transport mechanisms	Exposure Pathway	Potential Receptors
Historic agricultural land use activities including use of pesticides. Cut and fill earthworks during the Deep Creek Sub Main tunnelling works. Small-scale fly-tipping of demolition/ building waste during suburb development.	• Heavy metals • TRH/BTEX • PAH • OCP/OPP • PCBs • Asbestos	• Direct release to soils. • Offsite migration via surface water run-off. • Aerial dispersion of dust and asbestos fines through the erosion/degradation and the disturbance of ACM during site use or site maintenance works.	• Direct contact with soil. • Ingestion or inhalation of soils or soil derived dust • Inhalation of fibres.	• Sydney Water grounds maintenance staff. • Future contractors during re-development works. • Future residential land users • Onsite flora and fauna.
Small-scale spraying of pesticides for vegetation maintenance purposes.	• Heavy metals • OCPs/OPPs	• Direct release to soils. • Offsite migration via surface water run-off.	• Direct contact with soil. • Ingestion or inhalation of soils or soil derived dust.	

6. Data Quality Objectives

The SAQP (PRM, 2018) outlined a Data Quality Objective (DQO) process to be adopted during the CA. The DQO process, endorsed by the NSW EPA as described in the NSW EPA (2017) and AS4482.1-2005, is a seven-step planning approach to develop sampling designs for data collection activities that support decision making. This process uses systematic planning and statistical hypothesis testing to differentiate between two or more clearly defined alternatives. The DQOs defined in the SAQP (PRM, 2018) and adopted during the CA are included below.

Step 1 - Define the problem; identify the planning team; examine budget, schedule:

This step summarises the problem, develops the conceptual site model and identifies the project team.	
Objective	Determine the presence, level, extent, and potential risks to human health and the environment due to contamination at the site in the context of the proposed residential land use.
Contamination Issue	The risk of contamination being present at the site which needs to be remediated to make the site suitable for the proposed residential land use.
Project Driver	The site has been nominated by Sydney Water for potential divestment for future low-density residential land use. Prior to the potential divestment Sydney Water require a CA to evaluate the condition of the site with regards to potential contamination.
Project Team	Sydney Water Project Manager: Amy Dobson Site Auditor: Andrew Lau (JBS&G) PRM Technical Reviewer: Jonathan Coffey PRM Project Director: Nick Passlow PRM Project Manager: Geoff Fletcher PRM Field Team: Geoff Fletcher, Sarah Dale and Emma McAndrew.
Competency of PRM Project Team	All field work conducted by appropriately trained and experience PRM environmental scientist in accordance with standard operating procedures for the assessment of contaminated land (including asbestos in soil) based on NEPM (2013) and WA DOH (2009)
Conceptual Model	The preliminary CSM is discussed in the SAQP (PRM, 2018) and **Section 5** of this report.
Resources & Project Timeframes	The PRM project team and resources are listed above. The fieldwork and reporting components of the investigation phase are required to be completed by December 2018.
Community Concerns	The scope of works planned for this investigation is unlikely to draw attention from the local community.
Regulatory Authorities & Local Government	Office of Environmental and Heritage (OEH), the NSW Environmental Protection Authority (EPA) and Northern Beaches Council.

Step 2 - Identify the decision:

The decisions that will address the problem as noted in Step 1 are:	
Site Use (Historical and Current)	• What are the previous site uses (on and adjacent to the site)? • What are the current site uses (on and adjacent to the site)? • Were there any previous/current uses or activities at the site our surrounding sites that could potentially cause contamination?
Chemicals of Concern	• What are the major CoPC?
Media and Receptors	• Are contaminant concentrations within soil at the site significantly above background levels? • Are contaminants causing an aesthetic impact to the environment?

The decisions that will address the problem as noted in Step 1 are:	
	• Does a contaminant pose a human health or ecological risk to the receptors of concern? • Is there any evidence of or potential for, migration of contaminants from the site which may impact offsite receptors?
Guidelines	Does the concentration of contaminants exceed NSW EPA-endorsed investigation criteria: • NEPC, 2013. • CRC Care, 2011 • CRC Care, 2017 • WA DoH Guidelines. Does the investigation comply with the relevant NSW EPA-endorsed guidelines listed in **Section 9**? **Aesthetic** Does the site exceed the aesthetic criteria nominated in NEPC (2013)?
End Use	Does the contamination affect the suitability of site for residential land use?

Step 3 - Identify the inputs:

The main types of information needed to resolve the decision statement (as noted in Step 2) are:	
Site Condition	• Review of previous investigation data for the site. • Use of field investigation techniques to identify previously undocumented areas of contamination (e.g. detailed site walkover and surface and subsurface soil sampling). • Visual observation of condition of sub soil. • PID screening to assess potential volatile contamination present. • Visual observation of vegetation and evidence of stress. • Visual observation of soil erosion or land instability.
Aesthetic Condition	Aesthetic impacts at the site with the potential to cause contamination (i.e. fly tipped waste, rubbish, odour, discolouration, stained materials).
Nature and Extent of Contamination	Identification of contaminant sources, types and distribution at the site and surrounding areas.
Assessment Criteria	NSW EPA-endorsed investigation criteria as outlined in Step 2 (and **Section 9**).
Field Work – PID Screening	PID screening will be used to assess the need to analyse for hydrocarbon contaminants. See **Table 6** for more information.
Laboratory Analytical Methods	Laboratory analytical methods will be undertaken in accordance with NATA certification requirements. Laboratory method detection limits will be below the assessment criteria selected. In accordance with NSW EPA (2007), where the detection limits are above the assessment criterion selected then the detection limit will be substituted as the assessment criterion.

Step 4 - Define the boundaries of the study:

The geographic and temporal boundaries are identified together with any economic and practical constraints.	
Geographical Limit	The spatial boundary of the investigation will be the portion of the site as indicated in **Figure 2**.
Investigation Limit	• The limit of the investigation extent is defined by the site boundary as indicated in **Figure 2**. • The depth of potential soil contamination (if present) is expected to be near-surface (<0.5mbgl).

	• Matrix: soil.
Constraints	No site access issues are foreseen for the CA.
Receptors of Concern	Potential receptors of concern that need to be considered by the study include: • Sydney water maintenance worker. • Residential neighbours. • Future residential site users. • Onsite flora and fauna.

Step 5 – Develop a decision rule:

A decision rule based on qualitative and quantitative information about the site contamination with a measurable assessment criteria based on the land use at the site is developed.	
Assessment Criteria	The study area would be considered suitable for the proposed use if the soil concentrations meet the appropriate nominated EPA-endorsed guideline values and adopted aesthetic criteria as noted in Step 2. In the event that contamination from the Site is found to exceed the adopted assessment criteria, the approach adopted for the CA is to assess the need for additional risk assessment, remediation, or management controls.
Decision Rule	The assessment criteria are noted above. Decisions relating to the nature and extent of contamination will be as follows: If the 95% Upper Confidence Limit of the mean is greater than the assessment criteria: • Then further assessment and / or investigation will be needed. This may include segregation of data according to type (i.e. fill and natural material) or location (by identifying sub-areas within the site) • If not, then no further assessment is needed. **Aesthetic criteria:** All exceedances of the aesthetic criteria for the site will be remediated /managed where practicable. Note that further assessment will include, but not be limited to, further assessment of trends, statistical assessment of data, geospatial assessment of data, zoning of the site, development of site-specific assessment criteria, etc or may include proposing further investigations and assessment.

Step 6 - Specify tolerable limits on decision errors:

In this step the performance criteria for the sampling design are defined.	
Documentation and data completeness	• Site conditions properly described. • Sampling locations properly described and located. • Completion of field records, chain of custody documentation, laboratory test certificates from NATA-registered laboratories. • Samples are collected from all areas of potential environmental concern. • Samples are tested for all potential contaminants of concern. • Sampling events encounter samples most likely to be contaminated on more than one occasion.
Data Comparability	• Use of appropriate techniques for the sampling, storage and transportation of samples. • Use of laboratories with NATA certification for the analyses conducted and undertaken using NEPM procedures. • Use of secondary laboratories with NATA certification for the analyses conducted.
Data representativeness	• Collection of representative samples from each sampling location. • Collection of representative samples across the site. • Use of appropriate techniques for the sampling, storage and transportation of samples.
Precision for sampling and analysis	• Samples extracted and analysed within holding times. • Achieve laboratory QC criteria. • Blanks returned with no contamination.

In this step the performance criteria for the sampling design are defined.	
	• All matrix and surrogates returned acceptable results. • All laboratory duplicates within acceptable ranges. • All split duplicates within acceptable ranges. • All control results within acceptable ranges. • All practical quantification limits (PQLs) within acceptable ranges.
Accuracy for sampling and analysis	• Use of properly trained and qualified field personnel. • Use of blind field duplicate samples to be collected at a minimum rate of 1 in 20. • RPDs to be less than 50%. • Acceptable quality of rinsate samples. • Acceptable quality of trip blank samples. • Acceptable quality of trip spike samples. • Acceptable quality of split duplicates.
Sampling design	A total of 6 test pit locations completed across the site in a rough herringbone grid-based pattern to provide site coverage. This is slightly more than the minimum sample number (5) defined in the Sampling Design Guidelines. The sampling rationale and investigation design/methodology is summarised in **Section 7.**

Step 7 - Optimise the Design for Obtaining Data:

Optimisation of the design has been implemented by the detailed site investigation through the following means:	
Review of DQO Outputs	With consideration to NSW EPA (1995), review of existing data and the evaluation of operational decision rules, a resource-effective sampling and analysis plan was prepared with details provided in the following sections.

7. Sampling and Quality Analysis Plan

7.1. Sampling Rationale

A sampling plan comprising a combination of grid-based and targeted locations was adopted to sufficiently assess the site. For grid-spaced sampling, Table A in the NSW EPA 1995, Sampling Design Guidelines provides the recommended minimum number of sampling points required for site characterisation based on detecting circular hot spots. The guidelines indicate that a minimum of five sampling points are recommended for a 500m^2 site, which would allow for detection of a hot spot of 11.8 m diameter with 95% confidence. As the site covers a slightly larger area of approximately 560 m^2, a slightly higher density was adopted for grid-spaced investigation at the site (6 locations).

7.2. Sampling Methodology

7.2.1. Investigation Locations

A total of six hand excavated test pits were completed (TP01-TP06) in a general herringbone grid-based pattern to provide site coverage across the site. Two of the test pits (TP04 and TP06) targeted the Deep Creek Submain alignment.

During the CA field works, a decision was made in the field to deviate from the SAQP (PRM, 2018) in order to further asses the soils on and adjacent to the Deep Creek Submain alignment. Four additional observational excavations were undertaken within 2 m either side of TP06 to assess subsurface conditions in the vicinity of the alignment.

All locations were surveyed using a Trimble – R1 Handheld GNSS Receiver and latitudes and longitudes recorded on Test Pit logs (WGS84).

A Photographic Log is included in **Appendix A**, with investigation locations shown in **Figure 2**.

7.2.2. Sample Collection

A decontaminated hand auger and shovel was utilised for the intrusive works, with a target depth of natural soils or method refusal. Samples were generally collected from near surface (0 m) and then every 0.5 m or where field observations warranted sampling.

During the collection of soil samples, features such as discolouration, staining, odours and other indicators of contamination were noted. Sample depths and any indicators of contamination are provided in the test pit logs. included in **Appendix B**.

Soil samples were collected by hand using fresh nitrile gloves and placed into laboratory supplied 250 mL Teflon-lined jars and clip-lock bags, each with a unique sample ID. Collected samples were immediately stored on ice in an esky and sent to NATA-accredited analytical laboratories under chain of custody conditions for analysis. Standard sampling procedures for contaminated site investigations were adhered to at all times, and standard documentation, such as chain of custody forms, were adopted.

The following sample collection procedure for potential ACM was utilised at each sample location as outlined in the WA DoH Guidelines:

- The surface of each sample location was initially inspected for any ACMs >7 mm. Where evident, surficial ACMs were collected, weighed and recorded.
- One 10 L sample of the relevant stratum to be assessed was collected from spoil at each sample location, weighed and recorded.
- Each 10 L sample was manually screened on site through a 7 mm sieve into a bucket.
- Materials if evident which did not pass through the sieve were examined for any ACM and/or suspect material. Sieving was conducted in batches so material retained on the

sieve could be adequately inspected.

- Once the 10 L sample had been screened, all ACM and suspected material retained on the sieve (i.e. >7 mm) is collected, weighed and recorded.
- Where evident, a fragment of retained suspected ACM is collected and sealed in a clip lock plastic bag for analysis (as required).
- To target any Asbestos Fines (AF) and/or Friable Asbestos (FA) within soil, a 500 mL wetted sample was collected from the sieved 10 L sample and sealed in a clip-lock plastic bag for analysis (as required).
- Once sampling had been completed at each location, hand tools and sampling equipment including buckets, sieves and shovels was wet wiped down and any excess soil was removed.
- Disposable nitrile gloves were also utilised throughout the investigation to limit human and equipment contact with soils.

7.2.3. Field Screening

Photoionisation Detector (PID)

A calibrated PID was used in the field to screen for any potential volatile compounds within the soil during initial field works. The presence of volatiles is assessed by sealing a representative sample of soil in a bag and testing the head space for volatiles using the PID. The results obtained in the field also informed the decision for which samples to analyse at the laboratory for quantitative assessment.

The screening of samples was based upon the criteria outlined in **Table 6**.

Table 6: PID Screening Criteria

PID Reading	Generalised Soil Volatiles Content
<20 ppm	Negligible
20 – 60ppm	Low
60 – 300ppm	Moderate
>300 ppm	Significant

7.3. Analytical schedule

All samples collected during the investigation were transported under Chain of Custody to external NATA accredited laboratories (Envirolab Services Pty Ltd and ALS Environmental) for analysis.

Samples were analysed for a combination of the following CoPC:

- Heavy metals.
- TRH.
- BTEX.
- PAH.
- OCP/OPP.
- PCBs.
- Asbestos.
- pH/cation exchange capacity (CEC) /clay content/total organic carbon (TOC).

The adopted analytical schedule is provided in **Table 7**.

Table 7: Sample analysis				
Matrix	**Soil**	**QC Field Duplicates**	**QC Rinsate**	**QC Trip Spikes/Blanks**
Initial Assessment				
Soil	11	2	-	2
Water	-	-	1	-

8. Quality Assurance / Quality Control Plan

8.1. Field Quality Assurance and Quality Control

8.1.1. Sample Collection

The following field quality assurance procedures were adopted during the investigation:

- All fieldwork was undertaken and supervised by suitably qualified and experienced environmental consultants from PRM.
- Logs and/or field notes for each sampling location were recorded in the field including: sample number, depth, location, initials of sampler, duplicate locations, duplicate type and relevant site observations.
- Analysis to be performed was recorded on a chain-of-custody (COC) and all samples were analysed within designated holding times, at a NATA accredited laboratory.
- All samples were stored in an ice-cool esky and taken directly to the laboratory on the day of sampling under Chain of Custody conditions.
- All equipment used for sampling were decontaminated prior to fieldwork and between each investigation location, by scraping and scrubbing with brushes and Decon-90 solution and rinsing with de-ionised water.
- Single use materials and equipment (e.g. nitrile gloves) were changed between each sample.
- PID meter was appropriately calibrated by the provider (Airmet) prior to use. Calibration certificates are provided in **Appendix E**.
- All soil samples taken were discrete samples to minimise the potential for volatile loss and to provide precision in spatial representation (both lateral and vertical) in sampling data.
- The QA/QC field samples were collected during the course of sampling including intra- and inter- laboratory duplicate samples, rinsate, trip spike and trip blank.

8.1.2. Field Duplicate Samples

Duplicates samples are prepared in the field by replicating the original sample and placing equivalent portions into separate containers. The purpose of this process is to assess the overall precision of the analytical data resulting from the laboratory process, as well as other secondary factors such as sampling methodology. Duplicate samples (intra- and inter-laboratory) were collected and analysed at a rate of no less than 1 per 20 primary samples, across the project. Once results are received, relative percent difference (RPD) calculations should be undertaken on the data set, for comparison.

An assessment of field quality control samples was completed by calculating the RPD of duplicate samples. An RPD of +/- 50 % for inorganic and organic analytes is generally considered acceptable by NSW EPA.

RPD was not reported in the following circumstances:

- Where the laboratory limit of reporting (LOR) are different and both samples are below the LOR.
- One sample is below the LOR and the other has a recorded detection below the other laboratory LOR.
- Both results are less than or equal to 5 times the LOR.

8.1.3. Field Trip Spike and Trip Blank

The purpose of a trip spike is to assess the potential loss of volatile analytes that may have occurred between the time of collection and transfer of the sample to the laboratory.

Laboratory prepared soil trip blanks are subjected to the same preservation methods as the field samples, then analysed for the purposes of determining whether transfer of contaminants into the blank sample had occurred prior to reaching the laboratory. If this is confirmed, then there is also a potential for other samples in the batch to have been impacted.

Trip spikes and trip blanks were taken into the field during soil sampling where volatile components were being analysed and dispatched with the batch sampling run. The storage and transport techniques were the same for primary samples and trip blanks/spikes, this is considered sufficient to give a representation of storage and transport quality.

8.1.4. Rinsate

Rinsate samples are collected in the field by passing laboratory prepared deionised water over cleaned/decontaminated sampling equipment. The purpose of a rinsate sample is to detect any potential sample cross-contamination from sampling equipment occurring due to poor decontamination procedures undertaken between sampling locations.

8.2. Laboratory QA/QC

Laboratory analyses were conducted in accordance with the standard test methods outlined in NEPM 2013 Schedule B3. The LOR were established at levels that the laboratory can practicably analyse to. Laboratories selected for the assessment program were NATA accredited for the analyses required.

The following QA/QC procedures were conducted by the laboratories.

8.2.1. Laboratory Duplicates

The laboratory collects duplicate sub-samples from a sample submitted for analysis. Analyses of these duplicate pairs are completed at a rate of 1 sample per 20 samples submitted for analysis, or one sample per batch. The purpose of the laboratory duplicate is to assess the analytical precision (repeatability) of the test result.

The laboratory acceptance criteria for duplicate samples is:

- In cases where the level is < 5xLOR – any RPD is acceptable; and
- In cases where the level is > 5xLOR – 0-50% RPD is acceptable.

8.2.2. Laboratory Control Sample (LCS)

This sample comprises spiking either a standard reference material or a control matrix (such as a blank of sand) with a known concentration of specific analytes. It is simply a check sample. LCSs are analysed at a frequency of 1 in 20, with a minimum of one analysed per batch.

The laboratory acceptance criteria for LCS samples is generally 70-130% for inorganic/ metals; and 60-140% for organics; and 10-140% for SVOC.

8.2.3. Matrix Spiked Samples

Samples submitted to the laboratory are spiked by adding an aliquot of known concentration of the target analyte prior to extraction and analysis. Matrix spikes are completed at a rate of 1 sample per 20 samples submitted for analysis, or one sample per batch. A spike documents the effect of the sample matrix on the extraction and analytical techniques.

The laboratory acceptance criteria for matrix spike samples is generally 70-130% for inorganic/metals; and 60-140% for organics; and 10-140% for semi-volatiles.

8.2.4. Laboratory Blank Results

The laboratory blank, is the sample prepared and analysed at the beginning of every analytical run, following calibration of the analytical apparatus. This is the component of the analytical signal which is not derived from the sample but from reagents e.g. glassware. It can be determined by processing solvents and reagents in exactly the same manner as for samples.

8.2.5. Surrogate Spikes

Samples submitted to the laboratory are spiked with a known amount of surrogate, which is similar to the analyte of interest in terms of chemical composition and extractability. The recovery of surrogates provides an assessment of analytical accuracy on a sample by sample basis.

The laboratory acceptance criteria for surrogate samples is generally 60-140% for organics.

9. Site Assessment Criteria

9.1. Soil

The site assessment criteria (SAC) for soil have been derived from NEPM (2013) guidelines and CRC Care (2011). The SAC adopted has been selected based on the proposed divestment of the site for low density residential land use. The various SAC adopted for the site are summarised in **Table 8**. Guideline values for individual contaminants analysed for this assessment are presented in the attached laboratory summary tables.

Table 8: Site Assessment Criteria Summary

SAC	Applicability
Health Investigation Level (HIL) A – Residential land use with Access to Soil	HIL A has been selected to assess risk to possible future site receptors.
Health Screening Levels (HSL) A – Residential land use for coarse soils.	In accordance with NEPM (2013) methodology, HSL A for petroleum hydrocarbon compounds have been adopted for coarse soils due to the predominantly sandy soil profiles encountered during the subsurface investigation. As all samples analysed were less than 1m below ground level, HSL for 0m to <1m will applied. Chemicals in the >C16-C34 and >C34-C40 fractions are non-volatile and therefore not of concern for vapour intrusion, however, exposure can be via direct contact pathways (dermal contact and incidental ingestion and inhalation of soil particles). HSLs for the TRH C16 – C40 petroleum fractions have been adopted from CRC CARE Technical Document (Friebel and Nadebaum 2011) for both residential land use.
Asbestos in soil	In accordance with NEPM (2013) methodology, the following Residential A HSL criteria for asbestos in soil has been adopted: • 0.01% (w/w) bonded asbestos containing material (ACM). • 0.001% (w/w) asbestos fines/fibrous asbestos (AF/FA). • No visible asbestos for surface soils (designated as 0-0.1 m bgl).
Ecological Investigation Levels (EILs) for Urban residential and public open space	EILs for organic (Naphthalene, DDT) and inorganic (heavy metals) analytes were derived on methodology outlined in NEPM (2013) and using site soil physicochemical properties. Metal EILs were adopted for Cu, Ni and Zn using the Interactive *(Excel) Calculation Spreadsheet* provided in the ASC NEPM Toolbox available on the National Environment Protection Council (NEPC) website (http://www. nepc.gov.au/nepms/assessment-site-contamination/toolbox). The following physiochemical properties were applied based on the average of laboratory testing results: • 6.0 pH • CEC value of 15.50 cmol/kg • Clay content of 12% • Organic Carbon content of 4.6% The following conservative assumptions were also utilised: • Contamination is considered as "aged" (>2 years) • The site is in the state of NSW and from an area of "low" traffic volumes. Calculation Spreadsheets are included in **Appendix C.**
Ecological Screening Levels (ESLs) for Urban residential and public open space.	ESLs for selected hydrocarbon analytes have been adopted for coarse grained material due to the predominantly sandy soil profiles encountered during subsurface investigation.

Table 8: Site Assessment Criteria Summary	
SAC	**Applicability**
Management Limits (ML) for residential/parkland land use with coarse soil	In addition to the HSLs and ESLs the NEPM also includes 'Management Limits' that are designed to avoid or minimise the potential effects of petroleum hydrocarbons such as formation of observable light non-aqueous phase liquids (LNAPL), fire and explosive hazards and effects on buried infrastructure e.g. penetration of, or damage to, in-ground services by hydrocarbons. The application of the management limits requires consideration of the depth of building basements and services and depth to groundwater.

9.2. Aesthetic Impact

As per NSW EPA, 2017 and NEPM, 2013 the aesthetic condition of a site is required to be taken into account. An assessment of the site aesthetics requires consideration of the natural state of soil on any given site, and a comparison between it and the soil encountered during investigation works. In particular, soils on a site should not exhibit the following:

- Discolouration (staining).
- A malodorous nature (odours).
- Abnormal consistency (anthropogenic contaminants – eg rubble and asbestos).

Where any of these were observed the area was photographed and the extent of the objectionable materials was determined if possible.

10. Results

The following sections summarise the results of the CA. Please refer to **Figure 2** for site layout and investigation locations discussed herein.

10.1. Field Observations / Screening

10.1.1. Site Walkover

The following general observations were made during the assessment works:

- The site is an accessible vacant grassed and vegetated parcel of land located adjacent to residential properties. A fence was located along the western boundary and the majority of the eastern boundary. No fence was observed on the northern and southern boundaries.
- Medium to large sized trees were observed in the north and eastern portions of the site. A healthy coverage of grass was observed across the site with minor surface disturbance (animal borrows) observed towards the centre of the site.
- A timber retaining structure was observed along the northern site boundary of the site, which retained the soils of the neighbouring residential property.
- The site slopes steeply down from the northern boundary towards Bellara Avenue.

A maintenance hole for the Sydney Water Deep Creek Submain was observed centrally along the eastern site boundary. Other underground service covers were observed along the western boundary. Relevant images are shown in the attached Photographic Log included in **Appendix A**.

10.1.2. Subsurface Ground Conditions

The following observations were made during the intrusive works:

- Fill was identified in all six test pits (TP01-TP06). The fill was generally observed to be a sandy within the surface layers containing minor inclusions of anthropogenic materials (tile, plastic, concrete, steel, glass) observed at all locations. Gravels and rootlets were observed as inclusions within the fill profiles underlying the surficial fill.
- The depth of fill varied across the site with natural soils (yellow brown silty clay) only encountered in TP01 at a depth of 0.5 mbgl. Method refusal in fill material was encountered at depths ranging from 0.25 mbgl (TP06) to 1.2 mbgl (TP03) in the remaining five test pits.
- The four additional observation locations that were excavated within 2 m either side of TP06 encountered similar subsurface conditions to TP06 including refusal depths ranging from 0.2-0.3 mbgl.
- No potential ACM was observed during the test pit excavations or the 7mm sieving processes.
- An organic odour was noted between depths of 0.3-0.4 mbgl in TP03. No other odours were noted during the investigation in the test pits.
- All PID results were found to be 0 ppm (negligible, as per **Table 6**).

Subsurface details, including PID readings, are summarised in the attached Test Pit logs included in **Appendix B**.

10.2. Laboratory Analytical Results

10.2.1. Soil Analytical Results

Results from the soil analysis are provided in the attached **Analytical Tables** and are summarised in **Table 9**. NATA accredited Laboratory Certificates are shown in **Appendix D.**

Table 9: Summary of Soil Analytical Results

Analyte	Results
Heavy metals	Concentrations were below the adopted SAC.
TRH	Concentrations of TRH in soils were generally below the laboratory detection limits and the adopted SAC. A TRH (C16-C34) concentration of 330 mg/kg in the TP04 (0-0.1 m) sample was marginally exceeded the adopted ESL-A coarse grained criteria for urban residential and public open space of 300 mg/kg.
BTEX	Concentrations were below the laboratory detection limits and the adopted SAC.
PAH	Concentrations of Total PAHs, B(a)P, and B(a)P TEQ in soils were below the adopted site criteria.
OCP	Concentrations were below the laboratory detection limits and the adopted SAC.
OPPs	Concentrations were below the laboratory detection limits and the adopted SAC.
PCBs	Concentrations were below the laboratory detection limits and the adopted SAC.
Asbestos	No potential ACM was visually observed during the intrusive work. AF/FA asbestos concentrations were not detected at or above the laboratory limit of reporting.

10.3. Aesthetic Considerations

Minor amounts of anthropogenic material (tile, plastic, concrete, steel, glass) were observed in surficial soils at the site. These materials are not likely to present health hazards and are of low concern for the proposed divestment of the site for residential land use.

10.4. Quality Assurance / Quality Control

All calibration records for relevant equipment are shown in **Appendix E.**

The results of the laboratory analysis for field QC samples are shown in the attached **Analytical Tables**, and summarised as follows:

- One intra-laboratory and one inter laboratory duplicates were obtained as part of the CA. The duplicates were collected and analysed at a rate of 11% which achieves/exceeds the minimum 5 %, compared to primary data.
- The calculated RPD values were within the acceptable range of +/- 50 % for inorganic and organic analytes.
- The sampling was undertaken over one sampling event (30 October 2018). One trip blank (TB) and one trip spike (TS) were utilised for the CA. Concentrations of selected volatile CoPC for the TB were all below detection limits indicating that the potential for significant cross contamination had not occurred during the course of the round trip from the site to the laboratory. The TS analytical results indicated that the percentage loss for BTEX during the CA and transport to the laboratory was minimal, indicating that appropriate preservation techniques were employed.
- A field rinsate sample for each of the hand tools (hand auger and shovel) utilised for this CA was obtained. All field rinsate results were below the laboratory detection limits.
- All DQOs, as stated above, were achieved during field works.

Detailed laboratory QA/QC results are presented on the laboratory testing certificates in **Appendix D** and summarised in **Appendix F.**

Based on the information referenced above, it was concluded that data generated during the CA is of an acceptable quality to achieve the objectives of the CA with the following comment:

- Envirolab Report 204389 comments that for the laboratory RPD acceptance criteria had been exceeded in sample 204389-1 (TP01_0.0-0.1) for Pb (lead). Therefore, a triplicate result was issued as laboratory sample number 204389-24.

Overall, the number of QC failures were minor compared to the QC data and they are not considered to have significantly impacted the quality of the results. It is considered that an acceptable level of precision and consistency was achieved. On this basis, the laboratory data sets are considered to be reliable and useable for this assessment.

11. Discussion

The soil analytical results were below the adopted SAC, with the exception of one minor exceedance of the adopted ESL criteria identified for TRH.

The TRH C16-C34 concentration of 330 mg/kg in the TP04 (0-0.1 m) sample marginally exceeded the adopted ESL-A criteria (300 mg/kg) for coarse grained soils in an urban residential and public open space setting. Sample inspection and review of chromatography for the sample indicates that the elevated TRH concentration in the TP04 (0-0.1 m) sample is likly to be associated with naturally occurring hydrocarbon sources such as leaves/bark which were present in the sample. The chromatography assessment is provided with the laboratory reports in **Appendix D**. Furthermore, the marginal nature of the exceedance and no evidence of distressed vegetation in the area of TP04 suggests the slightly elevated TRH concentration identified are likely to pose a low risk to potential receptors.

Method refusal in stiff fill material restricted the full extent of the fill profile at the site being characterised and assessed. However, the likelihood of gross soil contamination being present at depth across the site is considered to be low because:

- The fill material encountered at the site was consistent in nature with minimal anthropogenic inclusions identified (with exception of surficial soils).
- The laboratory analytical results returned concentrations of all major CoPC either below the LOR or below the adopted SAC.
- No visual or olfactory indications of contamination were identified during the CA.
- It is considered likely that the deeper fill material identified at the site is associated with residual soils won during localised earthworks during the suburb development and/or the deep excavations required for the installation of the Deep Creek Submain.

In addition, the minor anthropogenic inclusions identified in near surface soils are not considered to represent a significant aesthetic issue and are unlikely to impact the proposed divestment for future low-density residential land use.

12. Revised Conceptual Site Model

A revised CSM, based on the preliminary CSM presented in **Section 5**, was developed following completion of the CA. For a contaminant to represent a risk to a receptor, the following three conditions must be present:

- Source – The presence of a contaminant.
- Pathway – A mechanism or action by which a receptor can become exposed to the contaminant.
- Receptor – The human or ecological entity which may be adversely impacted following exposure to contamination.

If one of the above components is missing, the potential for adverse risks is relatively low.

This CA has identified concentrations of all CoPC below the adopted SAC. The results of this CA indicate that there no SPR linkages, and as such PRM consider the risk posed to the identified receptors (in regard to contamination) to be low.

13. Conclusions

Field observations and the data collected during the CA at the site support the following conclusions:

- Fill consisting of silty sand and clayey silty sand of variable depth was identified across the site. Minimal anthropogenic inclusions (including glass, ceramics, plastic and steel) were observed on the surface at each investigation location. These anthropogenic materials are not likely to present risk to current or future land users and are of low concern (aesthetic) for the proposed divestment of the site for residential land use.
- No suspected ACM, malodourous odours, soil staining or visible signs of potential heavy contamination were observed during the CA.
- The soil analytical results and field observation were below the adopted SAC for the proposed potential divestment for future low-density residential land use.

Based on the findings of the CA PRM considers that the site's soils do not present an unacceptable risk with respect to impacts on the environment and/or human health and conclude that the site is suitable for the proposed divestment for low-density residential land uses and the current open space land use.

14. Limitations

This report is confidential and has been prepared by Progressive Risk Management Pty Ltd (PRM) for Sydney Water (the client). This report may only be used and relied upon by the client and must not be copied to, used by or relied upon by any person other than the client. If a third party (limited to only the first purchaser of the property from Sydney Water) wishes to rely on this report, they will need to enter into a *Third Party Reliance Deed* with PRM.

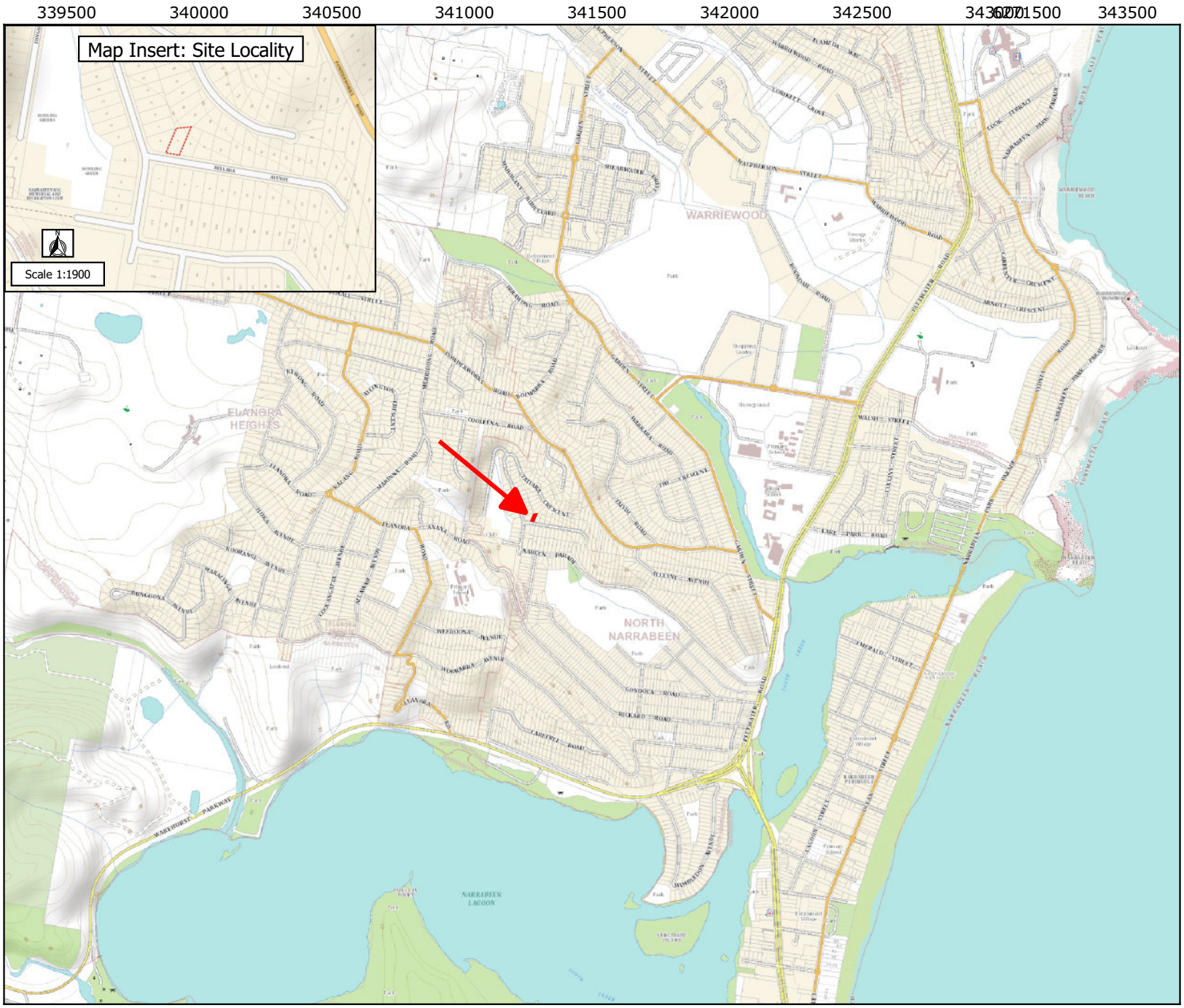
This report is limited to the observations made by PRM during the Contamination Assessment, and was limited to the assessment of contamination in soils only, as detailed in the *Scope of Works*.

All results, conclusions and recommendations presented should be reviewed by a competent person before being used for any other purpose. PRM accepts no liability for use of, interpretation of or reliance upon this report by any person or body other than the client. Third parties must make their own independent inquiries.

This report should not be altered amended or abbreviated, issued in part or issued incomplete without prior checking and approval by PRM. PRM accepts no liability that may arise from the alteration, amendment, abbreviation or part-issue or incomplete issue of this report. To the maximum extent permitted by law, all implied warranties and conditions in relation to the services provided by PRM and this report are expressly excluded (save as agreed otherwise with the client).

PRM shall bear no liability in relation to any change to site conditions after the date of this report. This report does not provide a complete assessment of the environmental status of the site, and it is limited to the scope and limitations defined herein (*Scope of Works*). Should information become available regarding conditions at the site including previously unknown sources of contamination, PRM reserves the right to review the report in the context of the additional information.

Figures



Project Reference	P033802.002
Report Name	Contamination Assessment
Client	Sydney Water

4 Bellara Aveune, North Narrabeen NSW

Figure 1 - Regional Site Locality

PROGRESSIVE RISK MANAGEMENT

Scale: 1:25000

Coor. Sys: GDA 1994 MGA Zone56

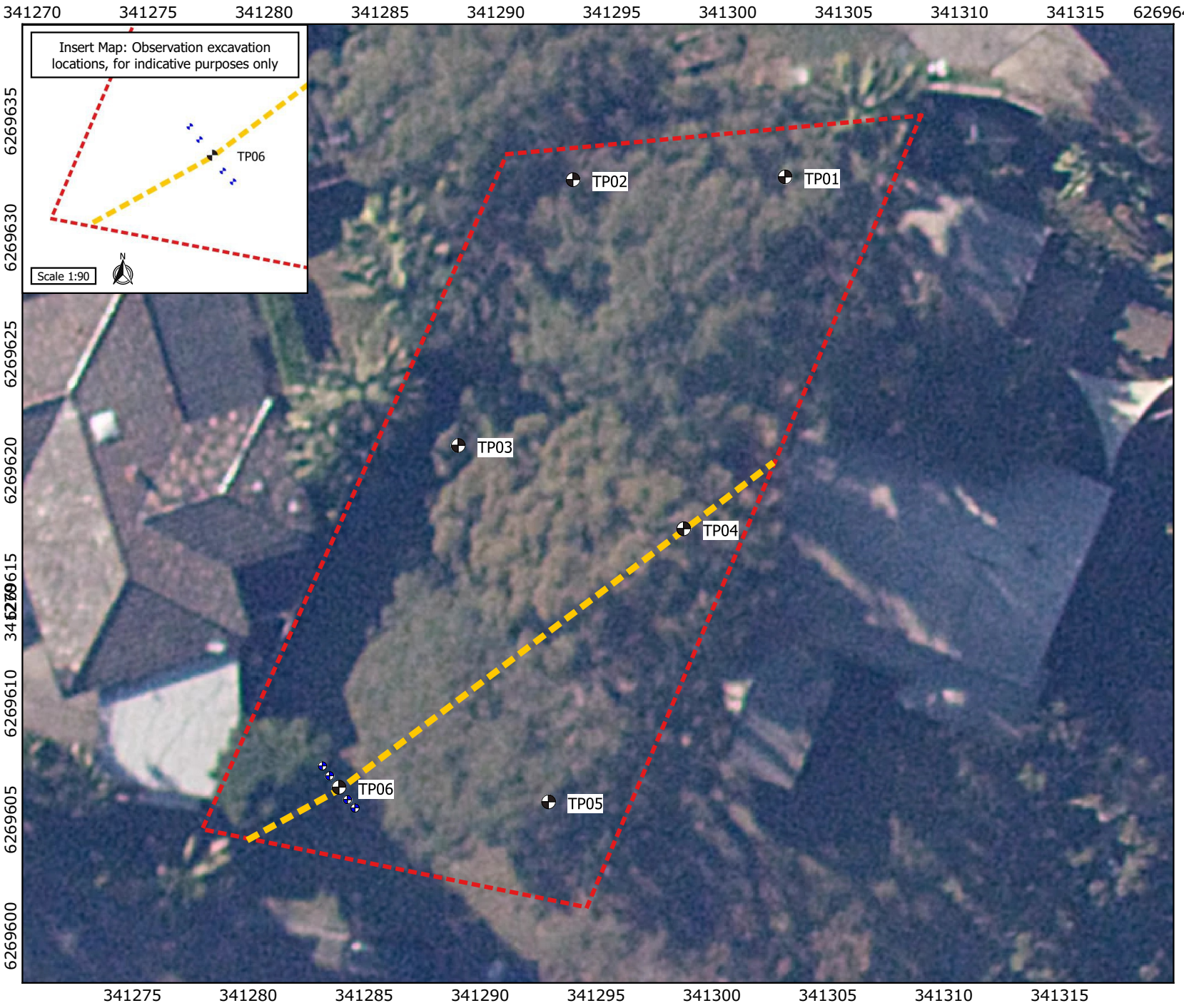
Legend

Site Location

N

0 200 400 600 800 m

Image Source: Sixmaps (2017)



Project Reference	P033802.002
Report Name	Contamination Assessment
Client	Sydney Water

4 Bellara Aveune, North Narrabeen NSW

Figure 2 - Investigation Locations

PROGRESSIVE RISK MANAGEMENT

Scale: 1:280

Coor. Sys: GDA 1994 MGA Zone56

Legend

- Test Pit Locations
- Additional Observation Excavation
- Approximate Location of Submain Easement
- Approximate Site Boundary

N

0 2 4 6 8 m

Image Source: Sixmaps (2017)

Analytical Tables

	Acid Extractable metals in soil								Asbestos ID - soils NEPM		PCBs in Soil							
	Arsenic	Cadmium	Chromium (III+VI)	Copper	Lead	Mercury	Nickel	Zinc	Asbestos (ACM >7mm) Estimation	Asbestos in soil (<2mm AF/FA)	Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260	PCBs (Sum of total)
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%w/w	%w/w	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	4	0.4	1	1	1	0.1	1	1			0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
NEPM 2013 Table 1B(5) Generic & site specific EIL - Urban Res & Public Open Space	100		430	210	1,100		230	480										
NEPM 2013 HSL Asbestos Res A									0.01	0.001								
NEPM 2013 Table 1A(1) HILs Res A Soil	100	20		6,000	300	40	400	7,400										1
Field ID	**Date**	**Depth**																
TP01	**30/10/2018**	**0 - 0.1**	9	0.5	14	25	120	<0.1	6	100	<0.01	<0.001	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP02	**30/10/2018**	**0 - 0.1**	6	<0.4	19	<1	23	<0.1	<1	14	<0.01	<0.001	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP02	**30/10/2018**	**0.5 - 0.6**	5	<0.4	20	2	17	<0.1	<1	15	<0.01	<0.001	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP03	**30/10/2018**	**0 - 0.1**	<4	<0.4	13	28	190	<0.1	2	57	<0.01	<0.001	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP03	**30/10/2018**	**0.5 - 0.6**	8	<0.4	15	2	27	<0.1	4	87	<0.01	<0.001	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP04	**30/10/2018**	**0 - 0.1**	<4	<0.4	6	4	15	<0.1	2	32	<0.01	<0.001	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP05	**30/10/2018**	**0 - 0.1**	<4	<0.4	6	6	18	<0.1	2	33	<0.01	<0.001	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP05	**30/10/2018**	**0.3 - 0.4**	<4	<0.4	9	2	9	<0.1	3	8	<0.01	<0.001	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP06	**30/10/2018**	**0 - 0.1**	4	<0.4	13	12	39	<0.1	4	49	<0.01	<0.001	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

	Organochlorine Pesticides in soil																					Organophosphorus Pesticides											
	4,4-DDE	a-BHC	Aldrin	b-BHC	Chlordane (cis)	Chlordane (trans)	d-BHC	DDD	DDT	DDT+DDE+DDD	Dieldrin	Endosulfan I	Endosulfan II	Endosulfan sulphate	Endrin	Endrin aldehyde	g-BHC (Lindane)	Heptachlor	Heptachlor epoxide	Hexachlorobenzene	Methoxychlor	Azinophos methyl	Bromophos-ethyl	Chlorpyrifos	Chlorpyrifos-methyl	Diazinon	Dichlorvos	Dimethoate	Ethion	Fenitrothion	Malathion	Parathion	Ronnel
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
NEPM 2013 Table 1B(5) Generic EIL - Urban Res & Public Open Space									180																									
NEPM 2013 Table 1A(1) HILs Res A Soil										240					10			6		10	300			160									
Field ID	**Date**	**Depth**																																
TP01	**30/10/2018**	**0 - 0.1**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP02	**30/10/2018**	**0 - 0.1**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP02	**30/10/2018**	**0.5 - 0.6**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP03	**30/10/2018**	**0 - 0.1**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP03	**30/10/2018**	**0.5 - 0.6**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP04	**30/10/2018**	**0 - 0.1**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP05	**30/10/2018**	**0 - 0.1**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP05	**30/10/2018**	**0.3 - 0.4**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP06	**30/10/2018**	**0 - 0.1**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

	PAHs in Soil																			svTRH (C10-C40) in Soil								vTRH(C6-C10)/BTEXN in Soil								
	Benzo(b+j+k)fluoranthene	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a) pyrene	Benzo(g,h,i)perylene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	Benzo(a)pyrene TEQ calc (half)	Benzo(a)pyrene TEQ (LOR)	Benzo(a)pyrene TEQ calc (zero)	PAHs (Sum of positives)	C10-C14	C15-C28	C29-C36	C10-C16	C10-C16 (F2 minus Naphthalene)	C16-C34	C34-C40	C10-C40 (Sum of total)	C6-C9	C6-C10	C6-C10 (F1 minus BTEX)	Naphthalene	Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)	Xylene Total
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.2	0.1	0.1	0.1	0.1	0.05	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.5	0.5	0.5	0.05	50	100	100	50	50	100	100	50	25	25	25	1	0.2	0.5	1	2	1	1
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Sand																																					
0-1m													3											110						45	3	0.5	160	55			40
1-2m																								240						70		0.5	220				60
2-4m																								440						110		0.5	310				95
>=4m																														200		0.5	540				170
NEPM 2013 Table 1B(5) Generic EIL - Urban Res & Public Open Space													170																		170						
NEPM 2013 Table 1B(6) ESLs for Urban Res, Coarse Soil 0-2m						0.7																		120	300	2,800				180		50	85	70			105
NEPM 2013 Table 1B(7) Management Limits in Res / Parkland, Coarse Soil																								1,000	2,500	10,000				700							
NEPM 2013 Table 1A(1) HILs Res A Soil																3	3	3	300																		
Field ID	**Date**	**Depth**																																			
TP01	**30/10/2018**	**0 - 0.1**	<0.2	<0.1	<0.1	<0.1	<0.1	0.08	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.5	<0.5	<0.5	0.3	<50	<100	<100	<50	<50	<100	<100	<50	<25	<25	<25	<1	<0.2	<0.5	<1	<2	<1	<1
TP02	**30/10/2018**	**0 - 0.1**	<0.2	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.05	<50	<100	<100	<50	<50	<100	<100	<50	<25	<25	<25	<1	<0.2	<0.5	<1	<2	<1	<1
TP02	**30/10/2018**	**0.5 - 0.6**	<0.2	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.05	<50	<100	<100	<50	<50	<100	<100	<50	<25	<25	<25	<1	<0.2	<0.5	<1	<2	<1	<1
TP03	**30/10/2018**	**0 - 0.1**	<0.2	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.05	<50	<100	<100	<50	<50	<100	<100	<50	<25	<25	<25	<1	<0.2	<0.5	<1	<2	<1	<1
TP03	**30/10/2018**	**0.5 - 0.6**	<0.2	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.05	<50	<100	<100	<50	<50	<100	<100	<50	<25	<25	<25	<1	<0.2	<0.5	<1	<2	<1	<1
TP04	**30/10/2018**	**0 - 0.1**	<0.2	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.05	<50	130	240	<50	<50	330	100	430	<25	<25	<25	<1	<0.2	<0.5	<1	<2	<1	<1
TP05	**30/10/2018**	**0 - 0.1**	<0.2	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.05	<50	<100	110	<50	<50	120	<100	120	<25	<25	<25	<1	<0.2	<0.5	<1	<2	<1	<1
TP05	**30/10/2018**	**0.3 - 0.4**	<0.2	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.05	<50	<100	<100	<50	<50	<100	<100	<50	<25	<25	<25	<1	<0.2	<0.5	<1	<2	<1	<1
TP06	**30/10/2018**	**0 - 0.1**	<0.2	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.05	<50	<100	<100	<50	<50	<100	<100	<50	<25	<25	<25	<1	<0.2	<0.5	<1	<2	<1	<1

		Lab Report Number	204389	204389		204389	ES1832437	
		Field ID	TP05	Dup A		TP05	Dup B	
		Matrix Type	soil	soil		soil	soil	
		Date	30/10/2018	30/10/2018		30/10/2018	30/10/2018	
		Sample Type	Normal	Intra Field_D	RPD	Normal	Inter Field_D	RPD
	Unit	Envirolab EQL						
Acid Extractable metals in soil								
Arsenic	mg/kg	4	<4	<4	0	<4	<5	0
Cadmium	mg/kg	0.4	<0.4	<0.4	0	<0.4	<1	0
Chromium (III+VI)	mg/kg	1	6	7	15	6	7	15
Copper	mg/kg	1	6	7	15	6	7	15
Lead	mg/kg	1	18	19	5	18	21	15
Mercury	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0
Nickel	mg/kg	1	2	3	40	2	2	0
Zinc	mg/kg	1	33	38	14	33	40	19
Organochlorine Pesticides in soil								
4,4-DDE	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.05	0
a-BHC	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.05	0
Aldrin	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.05	0
b-BHC	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.05	0
Chlordane (cis)	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.05	0
Chlordane (trans)	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.05	0
d-BHC	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.05	0
DDD	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.05	0
DDT	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.05	0
DDT+DDE+DDD	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.05	0
Dieldrin	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.05	0
Endosulfan I	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.05	0
Endosulfan II	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.05	0
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.05	0
Endrin	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.05	0
Endrin aldehyde	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.05	0
g-BHC (Lindane)	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.05	0
Heptachlor	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.05	0
Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.05	0
Hexachlorobenzene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.05	0
Methoxychlor	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.2	0
Organophosphorus Pesticides								
Azinophos methyl	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.05	0
Bromophos-ethyl	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.05	0
Chlorpyrifos	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.05	0
Chlorpyrifos-methyl	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.05	0
Diazinon	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.05	0
Dichlorvos	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.05	0
Dimethoate	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.05	0
Ethion	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.05	0
Fenitrothion	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.05	0
Malathion	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.05	0
Parathion	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.2	0
Ronnel	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.05	0
PAHs in Soil								
Benzo(b+j+k)fluoranthene	mg/kg	0.2	<0.2	<0.2	0	<0.2	<0.5	0
Acenaphthene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.5	0
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.5	0
Anthracene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.5	0
Benz(a)anthracene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.5	0
Benzo(a) pyrene	mg/kg	0.05	<0.05	<0.05	0	<0.05	<0.5	0
Benzo(g,h,i)perylene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.5	0
Chrysene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.5	0
Dibenz(a,h)anthracene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.5	0
Fluoranthene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.5	0
Fluorene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.5	0
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.5	0
Naphthalene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.5	0
Phenanthrene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.5	0
Pyrene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.5	0
Benzo(a)pyrene TEQ calc (Zero)	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
PAHs (Sum of positives)	mg/kg	0.05	<0.05	<0.05	0	<0.05	<0.05	0
PCBs in Soil								
PCBs (Sum of total)	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0
svTRH (C10-C40) in Soil								
C10-C14	mg/kg	50	<50	<50	0	<50	<50	0
C15-C28	mg/kg	100	<100	<100	0	<100	<100	0
C29-C36	mg/kg	100	110	110	0	110	<100	0
C10-C16	mg/kg	50	<50	<50	0	<50	<50	0
C10-C16 (F2 minus Naphthalene)	mg/kg	50	<50	<50	0	<50	<50	0
C16-C34	mg/kg	100	120	130	8	120	<100	0
C34-C40	mg/kg	100	<100	<100	0	<100	<100	0
C10-C40 (Sum of total)	mg/kg	50	120	130	8	120	<50	0
vTRH(C6-C10)/BTEXN in Soil								
C6-C9	mg/kg	25	<25	<25	0	<25	<10	0
C6-C10	mg/kg	25	<25	<25	0	<25	<10	0
C6-C10 (F1 minus BTEX)	mg/kg	25	<25	<25	0	<25	<10	0
BTEXN in Soil								
Benzene	mg/kg	0.2	<0.2	<0.2	0	<0.2	<0.2	0
Toluene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
Ethylbenzene	mg/kg	1	<1	<1	0	<1	<0.5	0
Xylene (m & p)	mg/kg	2	<2	<2	0	<2	<0.5	0
Xylene (o)	mg/kg	1	<1	<1	0	<1	<0.5	0
Xylene Total	mg/kg	1	<1	<1	0	<1	<0.5	0
Naphthalene	mg/kg	1	<1	<1	0	<1	<1	0

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

****Elevated RPDs are highlighted as per QAQC Profile settings (Acceptable RPDs for each EQL multiplier range are: 81 (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**

			BTEX in Soil											
			Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)	Xylene Total	Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)	Xylene Total
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	% Recovery	% Recovery	% Recovery	% Recovery	% Recovery	% Recovery
EQL			0.2	0.5	1	2	1	1	-	-	-	-	-	-
Field ID	**Date**	**Sample Type**												
TB	**30/10/2018**	**Trip Blank**	<0.2	<0.5	<1	<2	<1	<1	-	-	-	-	-	-
TS	**30/10/2018**	**Trip Spike**	-	-	-	-	-	-	86%	89%	92%	93%	94%	-

		Field ID	FR_HA	FR_SH
		Date	30/10/2018	30/10/2018
		Sample Type	Rinsate	Rinsate
	Unit	EQL		
Metals in Water - Dissolved				
Arsenic (filtered)	mg/L	0.05	<0.05	<0.05
Cadmium (filtered)	mg/L	0.01	<0.01	<0.01
Chromium (III+VI) (filtered)	mg/L	0.01	<0.01	<0.01
Copper (filtered)	mg/L	0.01	<0.01	<0.01
Lead (filtered)	mg/L	0.03	<0.03	<0.03
Mercury (filtered)	mg/L	0.0005	<0.0005	<0.0005
Nickel (filtered)	mg/L	0.02	<0.02	<0.02
Zinc (filtered)	mg/L	0.02	<0.02	<0.02
OCP in water				
4,4-DDE	µg/L	0.2	<0.2	<0.2
a-BHC	µg/L	0.2	<0.2	<0.2
Aldrin	µg/L	0.2	<0.2	<0.2
b-BHC	µg/L	0.2	<0.2	<0.2
Chlordane (cis)	µg/L	0.2	<0.2	<0.2
Chlordane (trans)	µg/L	0.2	<0.2	<0.2
d-BHC	µg/L	0.2	<0.2	<0.2
DDD	µg/L	0.2	<0.2	<0.2
DDT	µg/L	0.2	<0.2	<0.2
Dieldrin	µg/L	0.2	<0.2	<0.2
Endosulfan I	µg/L	0.2	<0.2	<0.2
Endosulfan II	µg/L	0.2	<0.2	<0.2
Endosulfan sulphate	µg/L	0.2	<0.2	<0.2
Endrin	µg/L	0.2	<0.2	<0.2
Endrin aldehyde	µg/L	0.2	<0.2	<0.2
g-BHC (Lindane)	µg/L	0.2	<0.2	<0.2
Heptachlor	µg/L	0.2	<0.2	<0.2
Heptachlor epoxide	µg/L	0.2	<0.2	<0.2
Hexachlorobenzene	µg/L	0.2	<0.2	<0.2
Methoxychlor	µg/L	0.2	<0.2	<0.2
OP Pesticides in water				
Azinophos methyl	µg/L	0.2	<0.2	<0.2
Bromophos-ethyl	µg/L	0.2	<0.2	<0.2
Chlorpyrifos	µg/L	0.2	<0.2	<0.2
Chlorpyrifos-methyl	mg/L	0.0002	<0.0002	<0.0002
Diazinon	µg/L	0.2	<0.2	<0.2
Dichlorvos	µg/L	0.2	<0.2	<0.2
Dimethoate	µg/L	0.2	<0.2	<0.2
Ethion	µg/L	0.2	<0.2	<0.2
Fenitrothion	µg/L	0.2	<0.2	<0.2
Malathion	µg/L	0.2	<0.2	<0.2
Parathion	µg/L	0.2	<0.2	<0.2
Ronnel	µg/L	0.2	<0.2	<0.2
PAHs in Water				
Benzo(b+j+k)fluoranthene	mg/L	0.002	<0.002	<0.002
Acenaphthene	µg/L	1	<1	<1
Acenaphthylene	µg/L	1	<1	<1
Anthracene	µg/L	1	<1	<1
Benz(a)anthracene	µg/L	1	<1	<1
Benzo(a) pyrene	µg/L	1	<1	<1
Benzo(g,h,i)perylene	µg/L	1	<1	<1
Chrysene	µg/L	1	<1	<1
Dibenz(a,h)anthracene	µg/L	1	<1	<1
Fluoranthene	µg/L	1	<1	<1
Fluorene	µg/L	1	<1	<1
Indeno(1,2,3-c,d)pyrene	µg/L	1	<1	<1
Naphthalene	µg/L	1	<1	<1
Phenanthrene	µg/L	1	<1	<1
Pyrene	µg/L	1	<1	<1
Benzo(a)pyrene TEQ	mg/L	0.005	<0.005	<0.005
PAHs (Sum of positives)	mg/L	0.001	0	0
PCBs in Water				
Arochlor 1016	µg/L	2	<2	<2
Arochlor 1221	µg/L	2	<2	<2
Arochlor 1232	µg/L	2	<2	<2
Arochlor 1242	µg/L	2	<2	<2
Arochlor 1248	µg/L	2	<2	<2
Arochlor 1254	µg/L	2	<2	<2
Arochlor 1260	µg/L	2	<2	<2
svTRH (C10-C40) in Water				
C10-C14	µg/L	50	<50	<50
C15-C28	µg/L	100	<100	<100
C29-C36	µg/L	100	<100	<100
C10-C16	µg/L	50	<50	<50
C10-C16 (F2 minus Naphthalene)	µg/L	50	<50	<50
C16-C34	µg/L	100	<100	<100
C34-C40	µg/L	100	<100	<100
vTRH(C6-C10)/BTEXN in Water				
C6-C9	µg/L	10	<10	<10
C6-C10	µg/L	10	<10	<10
C6-C10 (F1 minus BTEX)	µg/L	10	<10	<10
Naphthalene	µg/L	1	<1	<1
Benzene	µg/L	1	<1	<1
Toluene	µg/L	1	<1	<1
Ethylbenzene	µg/L	1	<1	<1
Xylene (m & p)	µg/L	2	<2	<2
Xylene (o)	µg/L	1	<1	<1

Appendix A: Photographic Log

Photolog	
Report Name:	Contamination Assessment
Project Reference:	P033802.002 / C0151
Site Details:	North Narrabeen Deep Creek Submain - 4 Bellara Avenue, North Narrabeen, NSW

Photo 1: Image of TP01 test pit

Photo 2: Image of TP01, natural encountered at end of test pit

Photo 3: Image of TP02 test pit

Photo 4: Image of TP02 test pit

Photo 5: Image of TP03, root and organic layer

Photo 6: Image of TP03 test pit

Photo 7: Image of TP04 test pit

Photo 8: Image of TP04 test pit

Photolog	
Report Name:	Contamination Assessment
Project Reference:	P033802.002 / C0151
Site Details:	North Narrabeen Deep Creek Submain - 4 Bellara Avenue, North Narrabeen, NSW

Photo 9: Image of TP05 test pit

Photo 10: Image of TP05 refusal on sandstone rock

Photo 11: Image of TP06 additional observation test pits

Photo 12: Image of TP06

Photo 13: Image of TP06 at refusal on sandstone rock

Photo 14: Image of the site facing north from Bellara Avenue

End of Photolog

Appendix B: Test Pit logs

TP01

PROJECT NUMBER P033802
PROJECT NAME SW CA North Narrabeen
CLIENT Sydney Water
ADDRESS 4 Bellara Ave, North Narrabeen NSW

METHOD Hand Tools
TOTAL DEPTH 0.6 mbgl
DATE 30/10/2018
LOGGED BY SD

COORDINATES 341302, 6269633
COORD SYS WGS84
SURFACE ELEVATION -
CHECKED BY GF

COMMENTS Surface coverage: Grass and leaf

Depth (m)	Method	Samples	Sample Type	PID	Graphic Log	Material Description	Additional Observations
0.1	Shovel	0.0-0.1	Jar Bag 10L Bulk - 12.56kg	0.0		FILL: Silty sand, brown, moist, rootlets, sandstone gravels, slate and ceramic tile, and concrete	No ACM observed during excavation and/or during 7mm sieving process of 10L bulk sample
0.2							
0.3		0.2-0.4	Jar Bag 10L Bulk - 13.08kg	0.0		FILL: Clayey silty sand, brown, moist, sandstone gravels	No ACM observed during excavation and/or during 7mm sieving process of 10L bulk sample
0.4							
0.5		0.5-0.6	Jar	0.0		NATURAL: Silty clay, yellow brown, moist, roots and rootlets	
0.6						END OF TEST PIT AT 0.6 m - Natural encountered	
0.7							
0.8							
0.9							
1							
1.1							
1.2							
1.3							
1.4							

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TP02

PROJECT NUMBER P033802	**METHOD** Hand Tools	**COORDINATES** 341293, 6269632
PROJECT NAME SW CA North Narrabeen	**TOTAL DEPTH** 1.0 mbgl	**COORD SYS** WGS84
CLIENT Sydney Water	**DATE** 30/10/2018	**SURFACE ELEVATION** -
ADDRESS 4 Bellara Ave, North Narrabeen NSW	**LOGGED BY** SD	**CHECKED BY** GF

COMMENTS Surface coverage: Grass and leaf

Depth (m)	Method	Samples	Sample Type	PID	Graphic Log	Material Description	Additional Observations
0	Shovel	0.0-0.1	Jar Bag 10L Bulk - 13.18kg	0.0		FILL: Silty clay, red brown and grey, slightly moist, rootlets, sandstone gravels, steel, concrete and slate tile	Clay soil to cohesive for 7mm sieve process. No ACM observed during excavation and/or during screening of 10L bulk sample.
0.1							
0.2						FILL: Silty sand, brown, slightly moist, clay nodules, rootlets, sandstone gravels, shell and glass	No ACM observed during excavation and/or during 7mm sieving process of 10L bulk sample
0.3							
0.4							
0.5		0.5-0.6	Jar Bag 10L Bulk - 13.86kg	0.0			
0.6							
0.7	Hand Auger						Use of hand auger from 0.7 m depth prevented sufficient volume being obtained for 7mm sieving process. No ACM observed during excavation.
0.8							
0.9		0.9-1.0	Jar Bag	0.0			
1						END OF TEST PIT AT 1.0 m - Method refusal	
1.1							
1.2							
1.3							
1.4							

Disclaimer This bore log is intended for environmental not geotechnical purposes.

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TP03

PROJECT NUMBER P033802	**METHOD** Hand Tools	**COORDINATES** 341288, 6269621
PROJECT NAME SW CA North Narrabeen	**TOTAL DEPTH** 1.2 mbgl	**COORD SYS** WGS84
CLIENT Sydney Water	**DATE** 30/10/2018	**SURFACE ELEVATION** -
ADDRESS 4 Bellara Ave, North Narrabeen NSW	**LOGGED BY** SD	**CHECKED BY** GF

COMMENTS Surface coverage: Grass

Depth (m)	Method	Samples	Sample Type	PID	Graphic Log	Material Description	Additional Observations
0	Shovel	0.0-0.1	Jar Bag 10L Bulk - 11.94kg	0.0		FILL: Clayey silty sand, brown, moist, rootlets, sandstone and ironstone gravels, glass, plastic and ash	No ACM observed during excavation and/or during 7mm sieving process of 10L bulk samples
0.1							
0.2							
0.3		0.3-0.4	Jar Bag 10L Bulk - 12.34kg	0.0			
0.4							Rootlets throughout (hair like), decomposing organic matter odour
0.5		0.5-0.6	Jar Bag 10L Bulk - 13.03kg	0.0		FILL: Silty sandy clay, orange and brown, slightly moist, roots and ironstone gravels	No ACM observed during excavation and/or during 7mm sieving process of 10L bulk sample
0.6							
0.7	Hand Auger						Use of hand auger from 0.7 m depth prevented sufficient volume being obtained for 7mm sieving process. No ACM observed during excavation.
0.8							
0.9							
1		1.0-1.1	Jar Bag	0.0			
1.1							
1.2						END OF TEST PIT AT 1.2 m - Method refusal	
1.3							
1.4							

Disclaimer This bore log is intended for environmental not geotechnical purposes.

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TP04

PROJECT NUMBER P033802	**METHOD** Hand Tools	**COORDINATES** 341298, 6269617
PROJECT NAME SW CA North Narrabeen	**TOTAL DEPTH** 0.8 mbgl	**COORD SYS** WGS84
CLIENT Sydney Water	**DATE** 30/10/2018	**SURFACE ELEVATION** -
ADDRESS 4 Bellara Ave, North Narrabeen NSW	**LOGGED BY** SD	**CHECKED BY** GF

COMMENTS Surface coverage: Grass and leaf. TP located beneath canopy of large tree near tree base

Depth (m)	Drilling Method	Samples	Sample Type	PID	Graphic Log	Material Description	Additional Observations
0	Shovel	0.0-0.1	Jar Bag 10L Bulk - 10.16kg	0.0		FILL: Silty sand, brown, dry, bark, leaves, rootlets, sandstone gravels, ash	No ACM observed during excavation and/or during 7mm sieving process of 10L bulk samples
0.1							
0.2							
0.3	Hand Auger						Test pit sides collapsing at 0.3 m. Hand auger use from 0.3 m
0.4						FILL: Silty sand, orange brown, slightly moist, roots, ironstone gravels	Use of hand auger prevented sufficient volume being obtained for 7mm sieving process. No ACM observed during excavation.
0.5		0.5-0.6	Jar Bag	0.0			
0.6							
0.7		0.7-0.8	Jar Bag	0.0		FILL: Gravelly silty sand, light brown, slightly moist, sandstone gravel	Use of hand auger prevented sufficient volume being obtained for 7mm sieving process. No ACM observed during excavation.
0.8						END OF TEST PIT AT 0.8 m - Method refusal	
0.9							
1							
1.1							
1.2							
1.3							
1.4							

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TP05

PROJECT NUMBER P033802
PROJECT NAME SW CA North Narrabeen
CLIENT Sydney Water
ADDRESS 4 Bellara Ave, North Narrabeen NSW

METHOD Hand Tools
TOTAL DEPTH 0.4 mbgl
DATE 30/10/2018
LOGGED BY SD

COORDINATES 341292, 6269606
COORD SYS WGS84
SURFACE ELEVATION -
CHECKED BY GF

COMMENTS Surface coverage: Grass and leaf. TP located beneath canopy of large trees

Depth (m)	Drilling Method	Samples	Sample Type	PID	Graphic Log	Material Description	Additional Observations
0.1	Shovel	0.0-0.1	Jar Bag 10L Bulk - 11.68kg	0.0		FILL: Silty sand, brown, slightly moist, bark, leaves, roots, rootlets, ash, sandstone and igneous gravels	No ACM observed during excavation and/or during 7mm sieving process of 10L bulk samples
0.2							
0.3		0.3-0.4	Jar Bag	0.0		FILL: Gravelly silty sand, light brown, slightly moist, sandstone gravel	No ACM observed during excavation. Insufficient volume obtained for 7mm sieving process
0.4						END OF TEST PIT AT 0.4 m - Method refusal	
0.5							
0.6							
0.7							
0.8							
0.9							
1							
1.1							
1.2							
1.3							
1.4							

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TP06

PROJECT NUMBER P033802
PROJECT NAME SW CA North Narrabeen
CLIENT Sydney Water
ADDRESS 4 Bellara Ave, North Narrabeen NSW

METHOD Hand Tools
TOTAL DEPTH 0.25 mbgl
DATE 30/10/2018
LOGGED BY SD

COORDINATES 341283, 6269606
COORD SYS WGS84
SURFACE ELEVATION -
CHECKED BY GF

COMMENTS Surface coverage: Grass

Depth (m)	Drilling Method	Samples	Sample Type	PID	Graphic Log	Material Description	Additional Observations
0.1	Shovel	0.0-0.1	Jar Bag 10L Bulk - 11.69kg	0.0		FILL: Clayey silty sand, brown, moist, roots, rootlets, ash, sandstone gravels, clay nodules, tile, glass, plastic	No ACM observed during excavation and/or during 7mm sieving process of 10L bulk sample. Four additional observational test pits excavated within 2m each side of TP06 with similar profiles and refusal depths.
0.2		0.2-0.25	Jar	0.0		FILL: Gravelly silty sand, light brown, slightly moist, sandstone gravel	
0.3						END OF TEST PIT AT 0.25 m - Method refusal	
0.4							
0.5							
0.6							
0.7							
0.8							
0.9							
1							
1.1							
1.2							
1.3							
1.4							

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Appendix C: EIL Calculation Spreadsheets

Inputs
Select contaminant from list below
Cu
Below needed to calculate fresh and aged ACLs
Enter cation exchange capacity (silver thiourea method) (values from 0 to 100 cmolc/kg dwt)
15.5
Enter soil pH (calcium chloride method) (values from 1 to 14)
6
Enter organic carbon content (%OC) (values from 0 to 50%)
4.6
Below needed to calculate fresh and aged ABCs
Measured background concentration (mg/kg). Leave blank if no measured value
or for fresh ABCs only
Enter iron content (aqua regia method) (values from 0 to 50%) to obtain estimate of background concentration
-
or for aged ABCs only
Enter State (or closest State)
NSW
Enter traffic volume (high or low)
low

Outputs		
Land use	Cu soil-specific EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	#VALUE!	80
Urban residential and open public spaces	#VALUE!	210
Commercial and industrial	#VALUE!	300

Inputs
Select contaminant from list below
Cr_III
Below needed to calculate fresh and aged ACLs
Enter % clay (values from 0 to 100%)
12
Below needed to calculate fresh and aged ABCs
Measured background concentration (mg/kg). Leave blank if no measured value
or for fresh ABCs only
Enter iron content (aqua regia method) (values from 0 to 50%) to obtain estimate of background concentration
-
or for aged ABCs only
Enter State (or closest State)
NSW
Enter traffic volume (high or low)
low

Outputs		
Land use	Cr III soil-specific EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	#VALUE!	140
Urban residential and open public spaces	#VALUE!	430
Commercial and industrial	#VALUE!	710

Inputs
Select contaminant from list below
Ni
Below needed to calculate fresh and aged ACLs
Enter cation exchange capacity (silver thiourea method) (values from 0 to 100 cmolc/kg dwt)
15.5
Below needed to calculate fresh and aged ABCs
Measured background concentration (mg/kg). Leave blank if no measured value
or for fresh ABCs only
Enter iron content (aqua regia method) (values from 0 to 50%) to obtain estimate of background concentration
-
or for aged ABCs only
Enter State (or closest State)
NSW
Enter traffic volume (high or low)
low

Outputs		
Land use	Ni soil-specific EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	#VALUE!	45
Urban residential and open public spaces	#VALUE!	230
Commercial and industrial	#VALUE!	390

Inputs
Select contaminant from list below
Zn
Below needed to calculate fresh and aged ACLs
Enter cation exchange capacity (silver thiourea method) (values from 0 to 100 cmolc/kg dwt)
15.5
Enter soil pH (calcium chloride method) (values from 1 to 14)
6
Below needed to calculate fresh and aged ABCs
Measured background concentration (mg/kg). Leave blank if no measured value
or for fresh ABCs only
Enter iron content (aqua regia method) (values from 0 to 50%) to obtain estimate of background concentration
-
or for aged ABCs only
Enter State (or closest State)
NSW
Enter traffic volume (high or low)
low

Outputs		
Land use	Zn soil-specific EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	#VALUE!	170
Urban residential and open public spaces	#VALUE!	480
Commercial and industrial	#VALUE!	700

Appendix D: NATA accredited Laboratory Analysis Certificates

CHAIN OF CUSTODY - Client

ENVIROLAB GROUP - National phone number 1300 424 344

Sydney Lab - Envirolab Services
12 Ashley St, Chatswood, NSW 2067
Ph: 02 9910 6200 / sydney@envirolab.com.au

Perth Lab - MPL Laboratories
16-18 Hayden Crt Myaree, WA 6154
Ph: 08 9317 2505 / lab@mpl.com.au

Melbourne Lab - Envirolab Services
1A Dalmore Drive Scoresby VIC 3179
Ph: 03 9763 2500 / melbourne@envirolab.com.au

Adelaide Office - Envirolab Services
7a The Parade, Norwood, SA 5067
Ph: 08 7087 6800 / adelaide@envirolab.com.au

Brisbane Office - Envirolab Services
20a, 10-20 Depot St, Banyo, QLD 4014
Ph: 07 3266 9532 / brisbane@envirolab.com.au

Darwin Office - Envirolab Services
Unit 7, 17 Willes Rd, Berrimah, NT 0820
Ph: 08 8967 1201 / darwin@envirolab.com.au

Client: Progressive Risk Management	**Client Project Name / Number / Site etc (ie report title):** SW CA P033802 North Narrabeen
Contact Person: Sarah Dale, Geoff Fletcher	
Project Mgr: Geoff Fletcher	**PO No.:**
Sampler: Sarah Dale	**Envirolab Quote No. :** Q18510781
Address:	**Date results required:** Or choose: (standard) / same day / 1 day / 2 day / 3 day *Note: Inform lab in advance if urgent turnaround is required - surcharges apply*
Phone: **Mob:** 0420692608	**Additional report format:** (esdat) / equis /
Email: sarah.dale@progressiverm.com.au, geoff.fletcher@progressiverm.com.au, jonathan.coffey@progressiverm.com.au	**Lab Comments:**

Sample Information					Tests Required		Comments
Envirolab Sample ID	Client Sample ID or information	Depth	Date sampled	Type of sample	Combo 6	Asbestos (NEPM)	Provide as much information about the sample as you can
1	TP01	0.0-0.1	30/10/18	Jar + Bag	X	X	
2	↓	0.2-0.4	↓	↓			
3	↓	0.5-0.6	↓	Jar			
4	TP02	0.0-0.1	↓	Jar + Bag	X	X	
5	↓	0.5-0.6	↓	↓	X	X	
6	↓	0.9-1.0	↓	↓			
7	TP03	0.0-0.1	↓	Jar + Bag	X	X	
8	↓	0.3-0.4	↓	↓			
9	↓	0.5-0.6	↓	↓	X	X	
10	↓	1.0-1.1	↓	↓			
11	TP04	0.0-0.1	↓	↓	X	X	
12	↓	0.5-0.6	↓	↓			
13	↓	0.7-0.8	↓	↓			

Relinquished by (Company):	PRM	**Received by (Company):**	ELS
Print Name:	Geoff Fletcher	**Print Name:**	Angly Zhang
Date & Time:	4:36pm 30/10/18	**Date & Time:**	30/10 16:40
Signature:		**Signature:**	

Lab Use Only

Job number: 204389	**Cooling:** (Ice / Ice pack) / None
Temperature: 17.4	**Security seal:** (Intact) / Broken / None
TAT Req - SAME day / 1 / 2 / 3 / 4 (STD)	

CHAIN OF CUSTODY - Client

ENVIROLAB GROUP - National phone number 1300 424 344

Sydney Lab - Envirolab Services
12 Ashley St, Chatswood, NSW 2067
Ph: 02 9910 6200 / sydney@envirolab.com.au

Perth Lab - MPL Laboratories
16-18 Hayden Crt Myaree, WA 6154
Ph: 08 9317 2505 / lab@mpl.com.au

Melbourne Lab - Envirolab Services
1A Dalmore Drive Scoresby VIC 3179
Ph: 03 9763 2500 / melbourne@envirolab.com.au

Adelaide Office - Envirolab Services
7a The Parade, Norwood, SA 5067
Ph: 08 7087 6800 / adelaide@envirolab.com.au

Brisbane Office - Envirolab Services
20a, 10-20 Depot St, Banyo, QLD 4014
Ph: 07 3266 9532 / brisbane@envirolab.com.au

Darwin Office - Envirolab Services
Unit 7, 17 Willes Rd, Berrimah, NT 0820
Ph: 08 8967 1201 / darwin@envirolab.com.au

Client: Progressive Risk Management	**Client Project Name / Number / Site etc (ie report title):** SW CA P033802 North Narrabeen
Contact Person: Sarah Dale, Geoff Fletcher	
Project Mgr: Geoff Fletcher	**PO No.:**
Sampler: Sarah Dale	**Envirolab Quote No.:** Q18570 81
Address:	**Date results required:** Or choose: standard / same day / 1 day / 2 day / 3 day *Note: Inform lab in advance if urgent turnaround is required - surcharges apply*
Phone: **Mob:** 0420692608	**Additional report format:** esdat / equis /
Email: sarah.dale@progressiverm.com.au, geoff.fletcher@progressiverm.com.au, jonathan.coffey@progressiverm.com.au	**Lab Comments:**

Sample information					Tests Required														Comments
Envirolab Sample ID	Client Sample ID or information	Depth	Date sampled	Type of sample	Combo 6	Asbestos (WA/PA)	BTEX	Combo 3											Provide as much information about the sample as you can
14	TP05	0.0-0.1	30/10/18	Jar + Bag	X	X													
15	↓	0.3-0.4		↓	X	X													
16	TP06	0.0-0.1			X	X													
17	↓	0.2-0.25		Jar															
18	Dup A	—		↓	X														
19	Dup B	—		↓	X	←													+ Please Send to ALS
20	TB	—		Vial			X												
21	TS	—		↓			X												
22	FR-HA	—		Amber, Vial HNO_3	X														Rinsate
23	FR-SH	—	↓	↓	X														Rinsate

Relinquished by (Company): PRM	**Received by (Company):** ALS	*Lab Use Only*	
Print Name: Geoff Fletcher	**Print Name:** Andy Zhang	**Job number:** 204380	**Cooling:** Ice / Ice pack / None
Date & Time: 4:36pm 30/10/18	**Date & Time:** 30/10 16:40	**Temperature:** 7.4	**Security seal:** Intact / Broken / None
Signature:	**Signature:**	**TAT Req - SAME day / 1 / 2 / 3 / 4 / STD**	

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

SAMPLE RECEIPT ADVICE

Client Details

Client	Progressive Risk Management Pty Ltd
Attention	Jonathan Coffey, Sarah Dale, Geoff Fletcher

Sample Login Details

Your reference	P033802, SW CA North Narrabeen
Envirolab Reference	204389
Date Sample Received	30/10/2018
Date Instructions Received	30/10/2018
Date Results Expected to be Reported	06/11/2018

Sample Condition

Samples received in appropriate condition for analysis	YES
No. of Samples Provided	21 Soil, 2 Water
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	17.4
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

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

Analysis Underway, details on the following page:

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

Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticidesin soil	Organophosphorus Pesticides	PCBsin Soil	Acid Extractable metalsin soil	Asbestos ID - soils NEPM - ASB-001	vTRH(C6-C10)/BTEXN in Water	svTRH (C10-C40) in Water	PAHsin Water	OCP in water	OP Pesticides in water	PCBs in Water	Metals in Water - Dissolved	On Hold
TP01-0.0-0.1	✓	✓	✓	✓	✓	✓	✓	✓								
TP01-0.2-0.4																✓
TP01-0.5-0.6																✓
TP02-0.0-0.1	✓	✓	✓	✓	✓	✓	✓	✓								
TP02-0.5-0.6	✓	✓	✓	✓	✓	✓	✓	✓								
TP02-0.9-1.0																✓
TP03-0.0-0.1	✓	✓	✓	✓	✓	✓	✓	✓								
TP03-0.3-0.4																✓
TP03-0.5-0.6	✓	✓	✓	✓	✓	✓	✓	✓								
TP03-1.0-1.1																✓
TP04-0.0-0.1	✓	✓	✓	✓	✓	✓	✓	✓								
TP04-0.5-0.6																✓
TP04-0.7-0.8																✓
TP05-0.0-0.1	✓	✓	✓	✓	✓	✓	✓	✓								
TP05-0.3-0.4	✓	✓	✓	✓	✓	✓	✓	✓								
TP06-0.0-0.1	✓	✓	✓	✓	✓	✓	✓	✓								
TP06-0.2-0.25																✓
Dup A	✓	✓	✓	✓	✓	✓	✓									
Dup B																✓
TB	✓															
TS	✓															
FR_HA									✓	✓	✓	✓	✓	✓	✓	
FR_SH									✓	✓	✓	✓	✓	✓	✓	

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

Additional Info

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

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CERTIFICATE OF ANALYSIS 204389

Client Details

Client	Progressive Risk Management Pty Ltd
Attention	Jonathan Coffey, Sarah Dale, Geoff Fletcher
Address	14/76 Reserve Road, ARTARMON, NSW, 2064

Sample Details

Your Reference	**P033802, SW CA North Narrabeen**
Number of Samples	21 Soil, 2 Water
Date samples received	30/10/2018
Date completed instructions received	30/10/2018

Analysis Details

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

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

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

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

Report Details

Date results requested by	06/11/2018
Date of Issue	06/11/2018

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

Results Approved By
Jeremy Faircloth, Organics Supervisor
Long Pham, Team Leader, Metals
Lucy Zhu, Asbsestos Analyst
Steven Luong, Senior Chemist

Authorised By

Jacinta Hurst, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		204389-1	204389-4	204389-5	204389-7	204389-9
Your Reference	UNITS	TP01	TP02	TP02	TP03	TP03
Depth		0.0-0.1	0.0-0.1	0.5-0.6	0.0-0.1	0.5-0.6
Date Sampled		30/10/2018	30/10/2018	30/10/2018	30/10/2018	30/10/2018
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	01/11/2018	01/11/2018	01/11/2018	01/11/2018	01/11/2018
Date analysed	-	02/11/2018	02/11/2018	02/11/2018	02/11/2018	02/11/2018
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	82	80	79	86	82

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		204389-11	204389-14	204389-15	204389-16	204389-18
Your Reference	UNITS	TP04	TP05	TP05	TP06	Dup A
Depth		0.0-0.1	0.0-0.1	0.3-0.4	0.0-0.1	-
Date Sampled		30/10/2018	30/10/2018	30/10/2018	30/10/2018	30/10/2018
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	01/11/2018	01/11/2018	01/11/2018	01/11/2018	01/11/2018
Date analysed	-	02/11/2018	02/11/2018	02/11/2018	02/11/2018	02/11/2018
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	86	81	82	80	88

vTRH(C6-C10)/BTEXN in Soil			
Our Reference		204389-20	204389-21
Your Reference	UNITS	TB	TS
Depth		-	-
Date Sampled		30/10/2018	30/10/2018
Type of sample		Soil	Soil
Date extracted	-	01/11/2018	01/11/2018
Date analysed	-	02/11/2018	02/11/2018
Benzene	mg/kg	<0.2	86%
Toluene	mg/kg	<0.5	89%
Ethylbenzene	mg/kg	<1	92%
m+p-xylene	mg/kg	<2	93%
o-Xylene	mg/kg	<1	94%
Total +ve Xylenes	mg/kg	<1	[NA]
Surrogate aaa-Trifluorotoluene	%	81	83

svTRH (C10-C40) in Soil						
Our Reference		204389-1	204389-4	204389-5	204389-7	204389-9
Your Reference	UNITS	TP01	TP02	TP02	TP03	TP03
Depth		0.0-0.1	0.0-0.1	0.5-0.6	0.0-0.1	0.5-0.6
Date Sampled		30/10/2018	30/10/2018	30/10/2018	30/10/2018	30/10/2018
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	01/11/2018	01/11/2018	01/11/2018	01/11/2018	01/11/2018
Date analysed	-	05/11/2018	05/11/2018	05/11/2018	05/11/2018	05/11/2018
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	86	83	80	96	85

svTRH (C10-C40) in Soil						
Our Reference		204389-11	204389-14	204389-15	204389-16	204389-18
Your Reference	UNITS	TP04	TP05	TP05	TP06	Dup A
Depth		0.0-0.1	0.0-0.1	0.3-0.4	0.0-0.1	-
Date Sampled		30/10/2018	30/10/2018	30/10/2018	30/10/2018	30/10/2018
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	01/11/2018	01/11/2018	01/11/2018	01/11/2018	01/11/2018
Date analysed	-	05/11/2018	05/11/2018	05/11/2018	05/11/2018	05/11/2018
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	130	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	240	110	<100	<100	110
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	330	120	<100	<100	130
TRH >C_{34} -C_{40}	mg/kg	100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	430	120	<50	<50	130
Surrogate o-Terphenyl	%	85	84	81	88	74

PAHs in Soil						
Our Reference		204389-1	204389-4	204389-5	204389-7	204389-9
Your Reference	UNITS	TP01	TP02	TP02	TP03	TP03
Depth		0.0-0.1	0.0-0.1	0.5-0.6	0.0-0.1	0.5-0.6
Date Sampled		30/10/2018	30/10/2018	30/10/2018	30/10/2018	30/10/2018
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	01/11/2018	01/11/2018	01/11/2018	01/11/2018	01/11/2018
Date analysed	-	06/11/2018	06/11/2018	06/11/2018	06/11/2018	06/11/2018
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	0.08	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	0.3	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	96	97	97	99	99

PAHs in Soil						
Our Reference		204389-11	204389-14	204389-15	204389-16	204389-18
Your Reference	UNITS	TP04	TP05	TP05	TP06	Dup A
Depth		0.0-0.1	0.0-0.1	0.3-0.4	0.0-0.1	-
Date Sampled		30/10/2018	30/10/2018	30/10/2018	30/10/2018	30/10/2018
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	01/11/2018	01/11/2018	01/11/2018	01/11/2018	01/11/2018
Date analysed	-	06/11/2018	06/11/2018	06/11/2018	06/11/2018	06/11/2018
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	101	100	102	96	115

Organochlorine Pesticides in soil						
Our Reference		204389-1	204389-4	204389-5	204389-7	204389-9
Your Reference	UNITS	TP01	TP02	TP02	TP03	TP03
Depth		0.0-0.1	0.0-0.1	0.5-0.6	0.0-0.1	0.5-0.6
Date Sampled		30/10/2018	30/10/2018	30/10/2018	30/10/2018	30/10/2018
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	01/11/2018	01/11/2018	01/11/2018	01/11/2018	01/11/2018
Date analysed	-	02/11/2018	02/11/2018	02/11/2018	02/11/2018	02/11/2018
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	99	98	100	95	93

Organochlorine Pesticides in soil						
Our Reference		204389-11	204389-14	204389-15	204389-16	204389-18
Your Reference	UNITS	TP04	TP05	TP05	TP06	Dup A
Depth		0.0-0.1	0.0-0.1	0.3-0.4	0.0-0.1	-
Date Sampled		30/10/2018	30/10/2018	30/10/2018	30/10/2018	30/10/2018
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	01/11/2018	01/11/2018	01/11/2018	01/11/2018	01/11/2018
Date analysed	-	02/11/2018	02/11/2018	02/11/2018	02/11/2018	02/11/2018
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	95	84	95	96	91

Organophosphorus Pesticides						
Our Reference		204389-1	204389-4	204389-5	204389-7	204389-9
Your Reference	UNITS	TP01	TP02	TP02	TP03	TP03
Depth		0.0-0.1	0.0-0.1	0.5-0.6	0.0-0.1	0.5-0.6
Date Sampled		30/10/2018	30/10/2018	30/10/2018	30/10/2018	30/10/2018
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	01/11/2018	01/11/2018	01/11/2018	01/11/2018	01/11/2018
Date analysed	-	02/11/2018	02/11/2018	02/11/2018	02/11/2018	02/11/2018
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	99	98	100	95	93

Organophosphorus Pesticides						
Our Reference		204389-11	204389-14	204389-15	204389-16	204389-18
Your Reference	UNITS	TP04	TP05	TP05	TP06	Dup A
Depth		0.0-0.1	0.0-0.1	0.3-0.4	0.0-0.1	-
Date Sampled		30/10/2018	30/10/2018	30/10/2018	30/10/2018	30/10/2018
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	01/11/2018	01/11/2018	01/11/2018	01/11/2018	01/11/2018
Date analysed	-	02/11/2018	02/11/2018	02/11/2018	02/11/2018	02/11/2018
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	95	84	95	96	91

PCBs in Soil						
Our Reference		204389-1	204389-4	204389-5	204389-7	204389-9
Your Reference	UNITS	TP01	TP02	TP02	TP03	TP03
Depth		0.0-0.1	0.0-0.1	0.5-0.6	0.0-0.1	0.5-0.6
Date Sampled		30/10/2018	30/10/2018	30/10/2018	30/10/2018	30/10/2018
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	01/11/2018	01/11/2018	01/11/2018	01/11/2018	01/11/2018
Date analysed	-	02/11/2018	02/11/2018	02/11/2018	02/11/2018	02/11/2018
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	99	98	100	95	93

PCBs in Soil						
Our Reference		204389-11	204389-14	204389-15	204389-16	204389-18
Your Reference	UNITS	TP04	TP05	TP05	TP06	Dup A
Depth		0.0-0.1	0.0-0.1	0.3-0.4	0.0-0.1	-
Date Sampled		30/10/2018	30/10/2018	30/10/2018	30/10/2018	30/10/2018
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	01/11/2018	01/11/2018	01/11/2018	01/11/2018	01/11/2018
Date analysed	-	02/11/2018	02/11/2018	02/11/2018	02/11/2018	02/11/2018
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	95	84	95	96	91

Acid Extractable metals in soil						
Our Reference		204389-1	204389-4	204389-5	204389-7	204389-9
Your Reference	UNITS	TP01	TP02	TP02	TP03	TP03
Depth		0.0-0.1	0.0-0.1	0.5-0.6	0.0-0.1	0.5-0.6
Date Sampled		30/10/2018	30/10/2018	30/10/2018	30/10/2018	30/10/2018
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	01/11/2018	01/11/2018	01/11/2018	01/11/2018	01/11/2018
Date analysed	-	02/11/2018	02/11/2018	02/11/2018	02/11/2018	02/11/2018
Arsenic	mg/kg	9	6	5	<4	8
Cadmium	mg/kg	0.5	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	14	19	20	13	15
Copper	mg/kg	25	<1	2	28	2
Lead	mg/kg	120	23	17	190	27
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	6	<1	<1	2	4
Zinc	mg/kg	100	14	15	57	87

Acid Extractable metals in soil						
Our Reference		204389-11	204389-14	204389-15	204389-16	204389-18
Your Reference	UNITS	TP04	TP05	TP05	TP06	Dup A
Depth		0.0-0.1	0.0-0.1	0.3-0.4	0.0-0.1	-
Date Sampled		30/10/2018	30/10/2018	30/10/2018	30/10/2018	30/10/2018
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	01/11/2018	01/11/2018	01/11/2018	01/11/2018	01/11/2018
Date analysed	-	02/11/2018	02/11/2018	02/11/2018	02/11/2018	02/11/2018
Arsenic	mg/kg	<4	<4	<4	4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	6	6	9	13	7
Copper	mg/kg	4	6	2	12	7
Lead	mg/kg	15	18	9	39	19
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	2	2	3	4	3
Zinc	mg/kg	32	33	8	49	38

Acid Extractable metals in soil		
Our Reference		204389-24
Your Reference	UNITS	TP01 - [TRIPLICATE]
Depth		0.0-0.1
Date Sampled		30/10/2018
Type of sample		Soil
Date prepared	-	01/11/2018
Date analysed	-	02/11/2018
Arsenic	mg/kg	10
Cadmium	mg/kg	0.5
Chromium	mg/kg	15
Copper	mg/kg	28
Lead	mg/kg	62
Mercury	mg/kg	<0.1
Nickel	mg/kg	7
Zinc	mg/kg	120

Moisture						
Our Reference		204389-1	204389-4	204389-5	204389-7	204389-9
Your Reference	UNITS	TP01	TP02	TP02	TP03	TP03
Depth		0.0-0.1	0.0-0.1	0.5-0.6	0.0-0.1	0.5-0.6
Date Sampled		30/10/2018	30/10/2018	30/10/2018	30/10/2018	30/10/2018
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	01/11/2018	01/11/2018	01/11/2018	01/11/2018	01/11/2018
Date analysed	-	02/11/2018	02/11/2018	02/11/2018	02/11/2018	02/11/2018
Moisture	%	16	18	16	15	14

Moisture						
Our Reference		204389-11	204389-14	204389-15	204389-16	204389-18
Your Reference	UNITS	TP04	TP05	TP05	TP06	Dup A
Depth		0.0-0.1	0.0-0.1	0.3-0.4	0.0-0.1	-
Date Sampled		30/10/2018	30/10/2018	30/10/2018	30/10/2018	30/10/2018
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	01/11/2018	01/11/2018	01/11/2018	01/11/2018	01/11/2018
Date analysed	-	02/11/2018	02/11/2018	02/11/2018	02/11/2018	02/11/2018
Moisture	%	7.3	14	7.7	18	13

Asbestos ID - soils NEPM - ASB-001						
Our Reference		204389-1	204389-4	204389-5	204389-7	204389-9
Your Reference	UNITS	TP01	TP02	TP02	TP03	TP03
Depth		0.0-0.1	0.0-0.1	0.5-0.6	0.0-0.1	0.5-0.6
Date Sampled		30/10/2018	30/10/2018	30/10/2018	30/10/2018	30/10/2018
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	01/11/2018	01/11/2018	01/11/2018	01/11/2018	01/11/2018
Sample mass tested	g	571.15	652.66	646.91	555.03	583.03
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–	–	–
FA and AF Estimation*	g	–	–	–	–	–
ACM >7mm Estimation*	%(w/w)	<0.01	<0.01	<0.01	<0.01	<0.01
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001	<0.001

Asbestos ID - soils NEPM - ASB-001					
Our Reference		204389-11	204389-14	204389-15	204389-16
Your Reference	UNITS	TP04	TP05	TP05	TP06
Depth		0.0-0.1	0.0-0.1	0.3-0.4	0.0-0.1
Date Sampled		30/10/2018	30/10/2018	30/10/2018	30/10/2018
Type of sample		Soil	Soil	Soil	Soil
Date analysed	-	01/11/2018	01/11/2018	01/11/2018	01/11/2018
Sample mass tested	g	617.28	564.24	895.98	584.08
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos#1	g/kg	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–	–
FA and AF Estimation*	g	–	–	–	–
ACM >7mm Estimation*	%(w/w)	<0.01	<0.01	<0.01	<0.01
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001

vTRH(C6-C10)/BTEXN in Water			
Our Reference	UNITS	204389-22	204389-23
Your Reference		FR_HA	FR_SH
Depth		-	-
Date Sampled		30/10/2018	30/10/2018
Type of sample		Water	Water
Date extracted	-	01/11/2018	01/11/2018
Date analysed	-	02/11/2018	02/11/2018
TRH C_6 - C_9	µg/L	<10	<10
TRH C_6 - C_{10}	µg/L	<10	<10
TRH C_6 - C_{10} less BTEX (F1)	µg/L	<10	<10
Benzene	µg/L	<1	<1
Toluene	µg/L	<1	<1
Ethylbenzene	µg/L	<1	<1
m+p-xylene	µg/L	<2	<2
o-xylene	µg/L	<1	<1
Naphthalene	µg/L	<1	<1
Surrogate Dibromofluoromethane	%	98	100
Surrogate toluene-d8	%	91	98
Surrogate 4-BFB	%	118	119

svTRH (C10-C40) in Water			
Our Reference		204389-22	204389-23
Your Reference	UNITS	FR_HA	FR_SH
Depth		-	-
Date Sampled		30/10/2018	30/10/2018
Type of sample		Water	Water
Date extracted	-	02/11/2018	02/11/2018
Date analysed	-	03/11/2018	03/11/2018
TRH C_{10} - C_{14}	µg/L	<50	<50
TRH C_{15} - C_{28}	µg/L	<100	<100
TRH C_{29} - C_{36}	µg/L	<100	<100
TRH >C_{10} - C_{16}	µg/L	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	µg/L	<50	<50
TRH >C_{16} - C_{34}	µg/L	<100	<100
TRH >C_{34} - C_{40}	µg/L	<100	<100
Surrogate o-Terphenyl	%	88	84

PAHs in Water			
Our Reference		204389-22	204389-23
Your Reference	UNITS	FR_HA	FR_SH
Depth		-	-
Date Sampled		30/10/2018	30/10/2018
Type of sample		Water	Water
Date extracted	-	02/11/2018	02/11/2018
Date analysed	-	05/11/2018	05/11/2018
Naphthalene	µg/L	<1	<1
Acenaphthylene	µg/L	<1	<1
Acenaphthene	µg/L	<1	<1
Fluorene	µg/L	<1	<1
Phenanthrene	µg/L	<1	<1
Anthracene	µg/L	<1	<1
Fluoranthene	µg/L	<1	<1
Pyrene	µg/L	<1	<1
Benzo(a)anthracene	µg/L	<1	<1
Chrysene	µg/L	<1	<1
Benzo(b,j+k)fluoranthene	µg/L	<2	<2
Benzo(a)pyrene	µg/L	<1	<1
Indeno(1,2,3-c,d)pyrene	µg/L	<1	<1
Dibenzo(a,h)anthracene	µg/L	<1	<1
Benzo(g,h,i)perylene	µg/L	<1	<1
Benzo(a)pyrene TEQ	µg/L	<5	<5
Total +ve PAH's	µg/L	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	91	93

OCP in water			
Our Reference		204389-22	204389-23
Your Reference	UNITS	FR_HA	FR_SH
Depth		-	-
Date Sampled		30/10/2018	30/10/2018
Type of sample		Water	Water
Date extracted	-	02/11/2018	02/11/2018
Date analysed	-	02/11/2018	02/11/2018
HCB	µg/L	<0.2	<0.2
alpha-BHC	µg/L	<0.2	<0.2
gamma-BHC	µg/L	<0.2	<0.2
beta-BHC	µg/L	<0.2	<0.2
Heptachlor	µg/L	<0.2	<0.2
delta-BHC	µg/L	<0.2	<0.2
Aldrin	µg/L	<0.2	<0.2
Heptachlor Epoxide	µg/L	<0.2	<0.2
gamma-Chlordane	µg/L	<0.2	<0.2
alpha-Chlordane	µg/L	<0.2	<0.2
Endosulfan I	µg/L	<0.2	<0.2
pp-DDE	µg/L	<0.2	<0.2
Dieldrin	µg/L	<0.2	<0.2
Endrin	µg/L	<0.2	<0.2
pp-DDD	µg/L	<0.2	<0.2
Endosulfan II	µg/L	<0.2	<0.2
pp-DDT	µg/L	<0.2	<0.2
Endrin Aldehyde	µg/L	<0.2	<0.2
Endosulfan Sulphate	µg/L	<0.2	<0.2
Methoxychlor	µg/L	<0.2	<0.2
Surrogate TCMX	%	95	97

OP Pesticides in water			
Our Reference		204389-22	204389-23
Your Reference	UNITS	FR_HA	FR_SH
Depth		-	-
Date Sampled		30/10/2018	30/10/2018
Type of sample		Water	Water
Date extracted	-	02/11/2018	02/11/2018
Date analysed	-	02/11/2018	02/11/2018
Azinphos-methyl (Guthion)	µg/L	<0.2	<0.2
Bromophos ethyl	µg/L	<0.2	<0.2
Chlorpyriphos	µg/L	<0.2	<0.2
Chlorpyriphos-methyl	µg/L	<0.2	<0.2
Diazinon	µg/L	<0.2	<0.2
Dichlorovos	µg/L	<0.2	<0.2
Dimethoate	µg/L	<0.2	<0.2
Ethion	µg/L	<0.2	<0.2
Fenitrothion	µg/L	<0.2	<0.2
Malathion	µg/L	<0.2	<0.2
Parathion	µg/L	<0.2	<0.2
Ronnel	µg/L	<0.2	<0.2
Surrogate TCMX	%	95	97

PCBs in Water			
Our Reference		204389-22	204389-23
Your Reference	UNITS	FR_HA	FR_SH
Depth		-	-
Date Sampled		30/10/2018	30/10/2018
Type of sample		Water	Water
Date extracted	-	02/11/2018	02/11/2018
Date analysed	-	02/11/2018	02/11/2018
Aroclor 1016	µg/L	<2	<2
Aroclor 1221	µg/L	<2	<2
Aroclor 1232	µg/L	<2	<2
Aroclor 1242	µg/L	<2	<2
Aroclor 1248	µg/L	<2	<2
Aroclor 1254	µg/L	<2	<2
Aroclor 1260	µg/L	<2	<2
Surrogate TCLMX	%	95	97

Metals in Water - Dissolved			
Our Reference		204389-22	204389-23
Your Reference	UNITS	FR_HA	FR_SH
Depth		-	-
Date Sampled		30/10/2018	30/10/2018
Type of sample		Water	Water
Date digested	-	01/11/2018	01/11/2018
Date analysed	-	01/11/2018	01/11/2018
Arsenic - Dissolved	mg/L	<0.05	<0.05
Cadmium - Dissolved	mg/L	<0.01	<0.01
Chromium - Dissolved	mg/L	<0.01	<0.01
Copper - Dissolved	mg/L	<0.01	<0.01
Lead - Dissolved	mg/L	<0.03	<0.03
Mercury - Dissolved	mg/L	<0.0005	<0.0005
Nickel - Dissolved	mg/L	<0.02	<0.02
Zinc - Dissolved	mg/L	<0.02	<0.02

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
ASB-001	Asbestos ID - Identification of asbestos in soil samples using Polarised Light Microscopy and Dispersion Staining Techniques. Minimum 500mL soil sample was analysed as recommended by "National Environment Protection (Assessment of site contamination) Measure, Schedule B1 and "The Guidelines from the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia - May 2009" with a reporting limit of 0.1g/kg (0.01% w/w) as per Australian Standard AS4964-2004. Results reported denoted with * are outside our scope of NATA accreditation. **NOTE** #1 Total Asbestos g/kg was analysed and reported as per Australian Standard AS4964 (This is the sum of ACM >7mm, <7mm and FA/AF) **NOTE** #2 The screening level of 0.001% w/w asbestos in soil for FA and AF only applies where the FA and AF are able to be quantified by gravimetric procedures. This screening level is not applicable to free fibres. Estimation = Estimated asbestos weight Results reported with "--" is equivalent to no visible asbestos identified using Polarised Light microscopy and Dispersion Staining Techniques.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.

Method ID	Methodology Summary
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-008	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-013	Water samples are analysed directly by purge and trap GC-MS.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	[NT]
Date extracted	-			01/11/2018	1	01/11/2018	01/11/2018		01/11/2018	[NT]
Date analysed	-			02/11/2018	1	02/11/2018	02/11/2018		02/11/2018	[NT]
TRH C_6 - C_9	mg/kg	25	Org-016	<25	1	<25	<25	0	82	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-016	<25	1	<25	<25	0	82	[NT]
Benzene	mg/kg	0.2	Org-016	<0.2	1	<0.2	<0.2	0	77	[NT]
Toluene	mg/kg	0.5	Org-016	<0.5	1	<0.5	<0.5	0	81	[NT]
Ethylbenzene	mg/kg	1	Org-016	<1	1	<1	<1	0	84	[NT]
m+p-xylene	mg/kg	2	Org-016	<2	1	<2	<2	0	83	[NT]
o-Xylene	mg/kg	1	Org-016	<1	1	<1	<1	0	84	[NT]
naphthalene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	84	1	82	83	1	91	[NT]

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	18	01/11/2018	01/11/2018		[NT]	[NT]
Date analysed	-			[NT]	18	02/11/2018	02/11/2018		[NT]	[NT]
TRH C_6 - C_9	mg/kg	25	Org-016	[NT]	18	<25	<25	0	[NT]	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-016	[NT]	18	<25	<25	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-016	[NT]	18	<0.2	<0.2	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-016	[NT]	18	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-016	[NT]	18	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-016	[NT]	18	<2	<2	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-016	[NT]	18	<1	<1	0	[NT]	[NT]
naphthalene	mg/kg	1	Org-014	[NT]	18	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	[NT]	18	88	80	10	[NT]	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	[NT]
Date extracted	-			01/11/2018	1	01/11/2018	01/11/2018		01/11/2018	[NT]
Date analysed	-			05/11/2018	1	05/11/2018	05/11/2018		05/11/2018	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-003	<50	1	<50	<50	0	102	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-003	<100	1	<100	<100	0	100	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-003	<100	1	<100	<100	0	93	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-003	<50	1	<50	<50	0	102	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-003	<100	1	<100	<100	0	100	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-003	<100	1	<100	<100	0	93	[NT]
Surrogate o-Terphenyl	%		Org-003	87	1	86	83	4	89	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	18	01/11/2018	01/11/2018		[NT]	[NT]
Date analysed	-			[NT]	18	05/11/2018	05/11/2018		[NT]	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-003	[NT]	18	<50	<50	0	[NT]	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-003	[NT]	18	<100	<100	0	[NT]	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-003	[NT]	18	110	130	17	[NT]	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-003	[NT]	18	<50	<50	0	[NT]	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-003	[NT]	18	130	150	14	[NT]	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-003	[NT]	18	<100	100	0	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-003	[NT]	18	74	85	14	[NT]	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	[NT]
Date extracted	-			01/11/2018	1	01/11/2018	01/11/2018		01/11/2018	[NT]
Date analysed	-			06/11/2018	1	06/11/2018	06/11/2018		06/11/2018	[NT]
Naphthalene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	99	[NT]
Acenaphthylene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	100	[NT]
Phenanthrene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	111	[NT]
Anthracene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012	<0.1	1	0.1	0.1	0	106	[NT]
Pyrene	mg/kg	0.1	Org-012	<0.1	1	0.1	0.1	0	96	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	108	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-012	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012	<0.05	1	0.08	0.07	13	99	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	98	1	96	95	1	98	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	18	01/11/2018	01/11/2018		[NT]	[NT]
Date analysed	-			[NT]	18	06/11/2018	06/11/2018		[NT]	[NT]
Naphthalene	mg/kg	0.1	Org-012	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Acenaphthylene	mg/kg	0.1	Org-012	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-012	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Phenanthrene	mg/kg	0.1	Org-012	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Anthracene	mg/kg	0.1	Org-012	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Pyrene	mg/kg	0.1	Org-012	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-012	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-012	[NT]	18	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012	[NT]	18	<0.05	<0.05	0	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	[NT]	18	115	94	20	[NT]	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	[NT]
Date extracted	-			01/11/2018	1	01/11/2018	01/11/2018		01/11/2018	[NT]
Date analysed	-			02/11/2018	1	02/11/2018	02/11/2018		02/11/2018	[NT]
HCB	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	85	[NT]
gamma-BHC	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	104	[NT]
Heptachlor	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	98	[NT]
delta-BHC	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	83	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	101	[NT]
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	108	[NT]
Dieldrin	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	106	[NT]
Endrin	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	104	[NT]
pp-DDD	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	103	[NT]
Endosulfan II	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	96	[NT]
Methoxychlor	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-005	95	1	99	91	8	120	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	18	01/11/2018	01/11/2018		[NT]	[NT]
Date analysed	-			[NT]	18	02/11/2018	02/11/2018		[NT]	[NT]
HCB	mg/kg	0.1	Org-005	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-005	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
gamma-BHC	mg/kg	0.1	Org-005	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-005	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-005	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
delta-BHC	mg/kg	0.1	Org-005	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-005	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-005	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
gamma-Chlordane	mg/kg	0.1	Org-005	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-005	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-005	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-005	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Dieldrin	mg/kg	0.1	Org-005	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Endrin	mg/kg	0.1	Org-005	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-005	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Endosulfan II	mg/kg	0.1	Org-005	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-005	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-005	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-005	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Methoxychlor	mg/kg	0.1	Org-005	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-005	[NT]	18	91	85	7	[NT]	[NT]

QUALITY CONTROL: Organophosphorus Pesticides						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	[NT]
Date extracted	-			01/11/2018	1	01/11/2018	01/11/2018		01/11/2018	[NT]
Date analysed	-			02/11/2018	1	02/11/2018	02/11/2018		02/11/2018	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	76	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	95	[NT]
Dimethoate	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	89	[NT]
Fenitrothion	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	99	[NT]
Malathion	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	78	[NT]
Parathion	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	92	[NT]
Ronnel	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	85	[NT]
Surrogate TCMX	%		Org-008	95	1	99	91	8	85	[NT]

QUALITY CONTROL: Organophosphorus Pesticides						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	18	01/11/2018	01/11/2018		[NT]	[NT]
Date analysed	-			[NT]	18	02/11/2018	02/11/2018		[NT]	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-008	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-008	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos	mg/kg	0.1	Org-008	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-008	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-008	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-008	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Dimethoate	mg/kg	0.1	Org-008	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-008	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Fenitrothion	mg/kg	0.1	Org-008	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Malathion	mg/kg	0.1	Org-008	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Parathion	mg/kg	0.1	Org-008	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-008	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-008	[NT]	18	91	85	7	[NT]	[NT]

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	[NT]
Date extracted	-			01/11/2018	1	01/11/2018	01/11/2018		01/11/2018	[NT]
Date analysed	-			02/11/2018	1	02/11/2018	02/11/2018		02/11/2018	[NT]
Aroclor 1016	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	97	[NT]
Aroclor 1260	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCLMX	%		Org-006	95	1	99	91	8	85	[NT]

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	18	01/11/2018	01/11/2018		[NT]	[NT]
Date analysed	-			[NT]	18	02/11/2018	02/11/2018		[NT]	[NT]
Aroclor 1016	mg/kg	0.1	Org-006	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-006	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-006	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-006	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-006	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-006	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1260	mg/kg	0.1	Org-006	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCLMX	%		Org-006	[NT]	18	91	85	7	[NT]	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	[NT]
Date prepared	-			01/11/2018	1	01/11/2018	01/11/2018		01/11/2018	[NT]
Date analysed	-			02/11/2018	1	02/11/2018	02/11/2018		02/11/2018	[NT]
Arsenic	mg/kg	4	Metals-020	<4	1	9	10	11	104	[NT]
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	0.5	0.5	0	98	[NT]
Chromium	mg/kg	1	Metals-020	<1	1	14	15	7	101	[NT]
Copper	mg/kg	1	Metals-020	<1	1	25	29	15	103	[NT]
Lead	mg/kg	1	Metals-020	<1	1	120	66	58	101	[NT]
Mercury	mg/kg	0.1	Metals-021	<0.1	1	<0.1	<0.1	0	109	[NT]
Nickel	mg/kg	1	Metals-020	<1	1	6	5	18	103	[NT]
Zinc	mg/kg	1	Metals-020	<1	1	100	120	18	100	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	18	01/11/2018	01/11/2018		[NT]	[NT]
Date analysed	-			[NT]	18	02/11/2018	02/11/2018		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	18	<4	<4	0	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	18	<0.4	<0.4	0	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	18	7	8	13	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	18	7	7	0	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	18	19	18	5	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	18	<0.1	<0.1	0	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	18	3	3	0	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	18	38	37	3	[NT]	[NT]

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			01/11/2018	[NT]	[NT]	[NT]	[NT]	01/11/2018	[NT]
Date analysed	-			02/11/2018	[NT]	[NT]	[NT]	[NT]	02/11/2018	[NT]
TRH C_6 - C_9	µg/L	10	Org-016	<10	[NT]	[NT]	[NT]	[NT]	111	[NT]
TRH C_6 - C_{10}	µg/L	10	Org-016	<10	[NT]	[NT]	[NT]	[NT]	111	[NT]
Benzene	µg/L	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	105	[NT]
Toluene	µg/L	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	109	[NT]
Ethylbenzene	µg/L	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	113	[NT]
m+p-xylene	µg/L	2	Org-016	<2	[NT]	[NT]	[NT]	[NT]	115	[NT]
o-xylene	µg/L	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	110	[NT]
Naphthalene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-016	98	[NT]	[NT]	[NT]	[NT]	104	[NT]
Surrogate toluene-d8	%		Org-016	97	[NT]	[NT]	[NT]	[NT]	107	[NT]
Surrogate 4-BFB	%		Org-016	115	[NT]	[NT]	[NT]	[NT]	105	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			02/11/2018	[NT]	[NT]	[NT]	[NT]	02/11/2018	[NT]
Date analysed	-			03/11/2018	[NT]	[NT]	[NT]	[NT]	03/11/2018	[NT]
TRH C_{10} - C_{14}	µg/L	50	Org-003	<50	[NT]	[NT]	[NT]	[NT]	95	[NT]
TRH C_{15} - C_{28}	µg/L	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	92	[NT]
TRH C_{29} - C_{36}	µg/L	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	118	[NT]
TRH >C_{10} - C_{16}	µg/L	50	Org-003	<50	[NT]	[NT]	[NT]	[NT]	95	[NT]
TRH >C_{16} - C_{34}	µg/L	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	92	[NT]
TRH >C_{34} - C_{40}	µg/L	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	118	[NT]
Surrogate o-Terphenyl	%		Org-003	95	[NT]	[NT]	[NT]	[NT]	127	[NT]

QUALITY CONTROL: PAHs in Water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			02/11/2018	[NT]	[NT]	[NT]	[NT]	02/11/2018	[NT]
Date analysed	-			05/11/2018	[NT]	[NT]	[NT]	[NT]	05/11/2018	[NT]
Naphthalene	µg/L	1	Org-012	<1	[NT]	[NT]	[NT]	[NT]	67	[NT]
Acenaphthylene	µg/L	1	Org-012	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	µg/L	1	Org-012	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluorene	µg/L	1	Org-012	<1	[NT]	[NT]	[NT]	[NT]	85	[NT]
Phenanthrene	µg/L	1	Org-012	<1	[NT]	[NT]	[NT]	[NT]	88	[NT]
Anthracene	µg/L	1	Org-012	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	µg/L	1	Org-012	<1	[NT]	[NT]	[NT]	[NT]	91	[NT]
Pyrene	µg/L	1	Org-012	<1	[NT]	[NT]	[NT]	[NT]	80	[NT]
Benzo(a)anthracene	µg/L	1	Org-012	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	µg/L	1	Org-012	<1	[NT]	[NT]	[NT]	[NT]	81	[NT]
Benzo(b,j+k)fluoranthene	µg/L	2	Org-012	<2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	µg/L	1	Org-012	<1	[NT]	[NT]	[NT]	[NT]	80	[NT]
Indeno(1,2,3-c,d)pyrene	µg/L	1	Org-012	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	µg/L	1	Org-012	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	µg/L	1	Org-012	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	82	[NT]	[NT]	[NT]	[NT]	81	[NT]

QUALITY CONTROL: OCP in water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			02/11/2018	[NT]	[NT]	[NT]	[NT]	02/11/2018	[NT]
Date analysed	-			02/11/2018	[NT]	[NT]	[NT]	[NT]	02/11/2018	[NT]
HCB	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
alpha-BHC	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	[NT]	[NT]	76	[NT]
gamma-BHC	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
beta-BHC	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	[NT]	[NT]	78	[NT]
Heptachlor	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	[NT]	[NT]	78	[NT]
delta-BHC	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aldrin	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	[NT]	[NT]	72	[NT]
Heptachlor Epoxide	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	[NT]	[NT]	78	[NT]
gamma-Chlordane	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
alpha-Chlordane	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan I	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDE	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	[NT]	[NT]	87	[NT]
Dieldrin	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	[NT]	[NT]	82	[NT]
Endrin	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	[NT]	[NT]	86	[NT]
pp-DDD	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	[NT]	[NT]	97	[NT]
Endosulfan II	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDT	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endrin Aldehyde	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan Sulphate	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	[NT]	[NT]	97	[NT]
Methoxychlor	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCMX	%		Org-005	93	[NT]	[NT]	[NT]	[NT]	87	[NT]

QUALITY CONTROL: OP Pesticides in water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			02/11/2018	[NT]	[NT]	[NT]	[NT]	02/11/2018	[NT]
Date analysed	-			02/11/2018	[NT]	[NT]	[NT]	[NT]	02/11/2018	[NT]
Azinphos-methyl (Guthion)	µg/L	0.2	Org-008	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromophos ethyl	µg/L	0.2	Org-008	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chlorpyriphos	µg/L	0.2	Org-008	<0.2	[NT]	[NT]	[NT]	[NT]	84	[NT]
Chlorpyriphos-methyl	µg/L	0.2	Org-008	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Diazinon	µg/L	0.2	Org-008	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dichlorovos	µg/L	0.2	Org-008	<0.2	[NT]	[NT]	[NT]	[NT]	94	[NT]
Dimethoate	µg/L	0.2	Org-008	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ethion	µg/L	0.2	Org-008	<0.2	[NT]	[NT]	[NT]	[NT]	89	[NT]
Fenitrothion	µg/L	0.2	Org-008	<0.2	[NT]	[NT]	[NT]	[NT]	96	[NT]
Malathion	µg/L	0.2	Org-008	<0.2	[NT]	[NT]	[NT]	[NT]	85	[NT]
Parathion	µg/L	0.2	Org-008	<0.2	[NT]	[NT]	[NT]	[NT]	102	[NT]
Ronnel	µg/L	0.2	Org-008	<0.2	[NT]	[NT]	[NT]	[NT]	92	[NT]
Surrogate TCMX	%		Org-008	93	[NT]	[NT]	[NT]	[NT]	102	[NT]

QUALITY CONTROL: PCBs in Water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			02/11/2018	[NT]	[NT]	[NT]	[NT]	02/11/2018	[NT]
Date analysed	-			02/11/2018	[NT]	[NT]	[NT]	[NT]	02/11/2018	[NT]
Aroclor 1016	µg/L	2	Org-006	<2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1221	µg/L	2	Org-006	<2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1232	µg/L	2	Org-006	<2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1242	µg/L	2	Org-006	<2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1248	µg/L	2	Org-006	<2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1254	µg/L	2	Org-006	<2	[NT]	[NT]	[NT]	[NT]	96	[NT]
Aroclor 1260	µg/L	2	Org-006	<2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCLMX	%		Org-006	93	[NT]	[NT]	[NT]	[NT]	102	[NT]

QUALITY CONTROL: Metals in Water - Dissolved						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date digested	-			01/11/2018	22	01/11/2018	01/11/2018		01/11/2018	[NT]
Date analysed	-			01/11/2018	22	01/11/2018	01/11/2018		01/11/2018	[NT]
Arsenic - Dissolved	mg/L	0.05	Metals-020	<0.05	22	<0.05	<0.05	0	98	[NT]
Cadmium - Dissolved	mg/L	0.01	Metals-020	<0.01	22	<0.01	<0.01	0	102	[NT]
Chromium - Dissolved	mg/L	0.01	Metals-020	<0.01	22	<0.01	<0.01	0	100	[NT]
Copper - Dissolved	mg/L	0.01	Metals-020	<0.01	22	<0.01	<0.01	0	101	[NT]
Lead - Dissolved	mg/L	0.03	Metals-020	<0.03	22	<0.03	<0.03	0	103	[NT]
Mercury - Dissolved	mg/L	0.0005	Metals-021	<0.0005	22	<0.0005	[NT]		95	[NT]
Nickel - Dissolved	mg/L	0.02	Metals-020	<0.02	22	<0.02	<0.02	0	107	[NT]
Zinc - Dissolved	mg/L	0.02	Metals-020	<0.02	22	<0.02	<0.02	0	101	[NT]

Result Definitions

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

Quality Control Definitions

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

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

Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

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

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

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

Report Comments

Asbestos-ID in soil: NEPM
This report is consistent with the reporting recommendations in the National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013.
This is reported outside our scope of NATA accreditation.

Acid Extractable Metals in Soil: The laboratory RPD acceptance criteria has been exceeded for 204389-1 for Pb. Therefore a triplicate result has been issued as laboratory sample number 204389-24.

Envirolab Services Pty Ltd
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12 Ashley St Chatswood NSW 2067
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SAMPLE RECEIPT ADVICE

Client Details

Client	Progressive Risk Management Pty Ltd
Attention	Sarah Dale, Geoff Fletcher

Sample Login Details

Your reference	P033802, SW CA North Narrabeen
Envirolab Reference	204389-A
Date Sample Received	30/10/2018
Date Instructions Received	12/11/2018
Date Results Expected to be Reported	19/11/2018

Sample Condition

Samples received in appropriate condition for analysis	YES
No. of Samples Provided	21 Soil, 2 Water
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	17.4
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

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

Analysis Underway, details on the following page:

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
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Sample ID	Misc Inorg - Soil	CEC	Clay 50-120g	On Hold
TP01-0.0-0.1	✓	✓	✓	
TP01-0.2-0.4				✓
TP01-0.5-0.6				✓
TP02-0.0-0.1				✓
TP02-0.5-0.6				✓
TP02-0.9-1.0				✓
TP03-0.0-0.1				✓
TP03-0.3-0.4				✓
TP03-0.5-0.6				✓
TP03-1.0-1.1				✓
TP04-0.0-0.1				✓
TP04-0.5-0.6				✓
TP04-0.7-0.8				✓
TP05-0.0-0.1	✓	✓	✓	
TP05-0.3-0.4				✓
TP06-0.0-0.1				✓
TP06-0.2-0.25				✓
Dup A				✓
Dup B				✓
TB				✓
TS				✓
FR_HA				✓
FR_SH				✓
TP01 - [TRIPLICATE]-0.0-0.1				✓

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

Additional Info

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

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

Envirolab Services Pty Ltd
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CERTIFICATE OF ANALYSIS 204389-A

Client Details

Client	Progressive Risk Management Pty Ltd
Attention	Sarah Dale, Geoff Fletcher
Address	14/76 Reserve Road, ARTARMON, NSW, 2064

Sample Details

Your Reference	**P033802, SW CA North Narrabeen**
Number of Samples	21 Soil, 2 Water
Date samples received	30/10/2018
Date completed instructions received	12/11/2018

Analysis Details

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

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

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

Report Details

Date results requested by	19/11/2018
Date of Issue	16/11/2018

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

Results Approved By
Leon Ow, Chemist
Nick Sarlamis, Inorganics Supervisor
Priya Samarawickrama, Senior Chemist

Authorised By

Jacinta Hurst, Laboratory Manager

Misc Inorg - Soil			
Our Reference		204389-A-1	204389-A-14
Your Reference	UNITS	TP01	TP05
Depth		0.0-0.1	0.0-0.1
Date Sampled		30/10/2018	30/10/2018
Type of sample		Soil	Soil
Date prepared	-	14/11/2018	14/11/2018
Date analysed	-	14/11/2018	14/11/2018
pH 1:5 soil:$CaCl_2$	pH Units	6.4	5.6
Total Organic Carbon (Walkley Black)	mg/kg	34,000	58,000

CEC			
Our Reference		204389-A-1	204389-A-14
Your Reference	UNITS	TP01	TP05
Depth		0.0-0.1	0.0-0.1
Date Sampled		30/10/2018	30/10/2018
Type of sample		Soil	Soil
Date prepared	-	15/11/2018	15/11/2018
Date analysed	-	15/11/2018	15/11/2018
Exchangeable Ca	meq/100g	14	11
Exchangeable K	meq/100g	0.3	0.3
Exchangeable Mg	meq/100g	1.8	2.9
Exchangeable Na	meq/100g	<0.1	<0.1
Cation Exchange Capacity	meq/100g	16	15

Clay 50-120g			
Our Reference		204389-A-1	204389-A-14
Your Reference	UNITS	TP01	TP05
Depth		0.0-0.1	0.0-0.1
Date Sampled		30/10/2018	30/10/2018
Type of sample		Soil	Soil
Date prepared	-	15/11/2018	15/11/2018
Date analysed	-	15/11/2018	15/11/2018
Clay in soils <2µm	% (w/w)	15	9

Method ID	Methodology Summary
AS1289.3.6.3	Determination Particle Size Analysis using AS1289.3.6.3 and AS1289.3.6.1 and in house method INORG-107. Clay fraction at <2µm reported.
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-036	Total Organic Carbon or Matter - A titrimetric method that measures the oxidisable organic content of soils.
Metals-009	Determination of exchangeable cations and cation exchange capacity in soils using 1M Ammonium Chloride exchange and ICP-AES analytical finish.

QUALITY CONTROL: Misc Inorg - Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			14/11/2018	[NT]	[NT]	[NT]	[NT]	14/11/2018	[NT]
Date analysed	-			14/11/2018	[NT]	[NT]	[NT]	[NT]	14/11/2018	[NT]
pH 1:5 soil:$CaCl_2$	pH Units		Inorg-001	[NT]	[NT]	[NT]	[NT]	[NT]	102	[NT]
Total Organic Carbon (Walkley Black)	mg/kg	1000	Inorg-036	<1000	[NT]	[NT]	[NT]	[NT]	102	[NT]

QUALITY CONTROL: CEC					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			15/11/2018	[NT]	[NT]	[NT]	[NT]	15/11/2018	[NT]
Date analysed	-			15/11/2018	[NT]	[NT]	[NT]	[NT]	15/11/2018	[NT]
Exchangeable Ca	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	[NT]	[NT]	113	[NT]
Exchangeable K	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	[NT]	[NT]	122	[NT]
Exchangeable Mg	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	[NT]	[NT]	109	[NT]
Exchangeable Na	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	[NT]	[NT]	117	[NT]

Result Definitions

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

Quality Control Definitions

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

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

Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

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

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

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

CHAIN OF CUSTODY - Client

ENVIROLAB GROUP - National phone number 1300 424 344

Sydney Lab - Envirolab Services
12 Ashley St, Chatswood, NSW 2067
Ph: 02 9910 6200 / sydney@envirolab.com.au

Perth Lab - MPL Laboratories
16-18 Hayden Crt Myaree, WA 6154
Ph: 08 9317 2505 / lab@mpl.com.au

Melbourne Lab - Envirolab Services
1A Dalmore Drive Scoresby VIC 3179
Ph: 03 9763 2500 / melbourne@envirolab.com.au

Adelaide Office - Envirolab Services
7a The Parade, Norwood, SA 5067
Ph: 08 7087 6800 / adelaide@envirolab.com.au

Brisbane Office - Envirolab Services
20a, 10-20 Depot St, Banyo, QLD 4014
Ph: 07 3266 9532 / brisbane@envirolab.com.au

Darwin Office - Envirolab Services
Unit 7, 17 Willes Rd, Berrimah, NT 0820
Ph: 08 8967 1201 / darwin@envirolab.com.au

Client: Progressive Risk Management
Contact Person: Sarah Dale, Geoff Fletcher
Project Mgr: Geoff Fletcher
Sampler: Sarah Dale
Address:

Phone: **Mob:** 0420692608
Email: sarah.dale@progressiverm.com.au
geoff.fletcher@progressiverm.com.au
jonathan.coffey@progressiverm.com.au

Client Project Name / Number / Site etc (ie report title): SW CA P033802 North Narrabeen
PO No.:
Envirolab Quote No.: Q18S-081
Date results required:
Or choose: standard / same day / 1 day / 2 day / 3 day
Note: Inform lab in advance if urgent turnaround is required - surcharges apply
Additional report format: esdat / equis /
Lab Comments:

Envirolab Sample ID	Client Sample ID or information	Depth	Date sampled	Type of sample	Combo 6	Asbestos (WA)	BTEX	Combo 7											Comments
14	TP05	0.0-0.1	30/10/18	Jar + Bag	X	X													
15	↓	0.3-0.4		↓	X	X													
16	TP06	0.0-0.1		↓	X	X													
17	↓	0.2-0.25		Jar															
18	Dup A	—		↓	X														
(1) 19	Dup B	—		↓	X	←													+ Please send to ALS
20	TB	—		Vial			X												
21	TS	—		↓			X												
22	FR-HA	—		Amber, Vial x2	X														Rinsate
23	FR-SH	—	↓	↓	X														Rinsate

Environmental Division
Sydney
Work Order Reference
ES1832437

Telephone : +61-2-8784 8555

Relinquished by (Company):	FRM		
Print Name:	Geoff Fletcher	Kevin Ly	
Date & Time:	4:36pm 30/10/18	31/10/18	
Signature:		82	

Received by (Company):	ALS		
Print Name:	Andy Zhang		
Date & Time:	30/10 16:40		
Signature:			

Lab Use Only

Job number: 204389	**Cooling:** Ice / Ice pack / None
Temperature: 7.4	**Security seal:** Intact / Broken / None
TAT Req - SAME day / 1 / 2 / 3 / 4 / STD	

Rec - Soffpro 31/10/18 1420 10.9C

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **ES1832437**

Client	: **PROGRESSIVE RISK MANAGEMENT**	Laboratory	: Environmental Division Sydney
Contact	: GEOFF FLETCHER	Contact	: Customer Services ES
Address	: 17 RAVEL ST SEVEN HILLS NSW 2147	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: geoff.fletcher@progressiverm.com.au	E-mail	: ALSEnviro.Sydney@ALSGlobal.com
Telephone	: ----	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: SW CA P033802 North Narrabeen	Page	: 1 of 3
Order number	:	Quote number	: EB2017PRORIS0001 (EN/333)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: Sarah Dale		

Dates

Date Samples Received	: 31-Oct-2018 14:20	Issue Date	: 01-Nov-2018
Client Requested Due Date	: 07-Nov-2018	Scheduled Reporting Date	: **07-Nov-2018**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Not Available
No. of coolers/boxes	: 1	Temperature	: 10.9 - Ice Bricks present
Receipt Detail	:	No. of samples received / analysed	: 1 / 1

General Comments

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

Sample Container(s)/Preservation Non-Compliances

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

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

Summary of Sample(s) and Requested Analysis

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

Matrix: **SOIL**

Laboratory sample ID	*Client sampling date / time*	*Client sample ID*	SOIL - EA055-103 Moisture Content	SOIL - S-16 TRH/BTEXN/PAH/OC/OP/PCB/8Metals
ES1832437-001	30-Oct-2018 00:00	Dup B	✓	✓

Proactive Holding Time Report

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

Requested Deliverables

ACCOUNTS

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

GEOFF FLETCHER

- *AU Certificate of Analysis - NATA (COA)	Email	geoff.fletcher@progressiverm.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	geoff.fletcher@progressiverm.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	geoff.fletcher@progressiverm.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	geoff.fletcher@progressiverm.com.au
- Chain of Custody (CoC) (COC)	Email	geoff.fletcher@progressiverm.com.au
- EDI Format - ENMRG (ENMRG)	Email	geoff.fletcher@progressiverm.com.au
- EDI Format - XTab (XTAB)	Email	geoff.fletcher@progressiverm.com.au

JONATHAN COFFEY

- *AU Certificate of Analysis - NATA (COA)	Email	jonathan.coffey@progressiverm.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	jonathan.coffey@progressiverm.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	jonathan.coffey@progressiverm.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	jonathan.coffey@progressiverm.com.au
- Chain of Custody (CoC) (COC)	Email	jonathan.coffey@progressiverm.com.au
- EDI Format - ENMRG (ENMRG)	Email	jonathan.coffey@progressiverm.com.au
- EDI Format - XTab (XTAB)	Email	jonathan.coffey@progressiverm.com.au

Sarah Dale

- *AU Certificate of Analysis - NATA (COA)	Email	sarah.dale@progressiverm.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	sarah.dale@progressiverm.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	sarah.dale@progressiverm.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	sarah.dale@progressiverm.com.au
- Chain of Custody (CoC) (COC)	Email	sarah.dale@progressiverm.com.au
- EDI Format - ENMRG (ENMRG)	Email	sarah.dale@progressiverm.com.au
- EDI Format - XTab (XTAB)	Email	sarah.dale@progressiverm.com.au

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1832437**	Page	: 1 of 7
Client	: **PROGRESSIVE RISK MANAGEMENT**	Laboratory	: Environmental Division Sydney
Contact	: GEOFF FLETCHER	Contact	: Customer Services ES
Address	: 17 RAVEL ST SEVEN HILLS NSW 2147	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: SW CA P033802 North Narrabeen	Date Samples Received	: 31-Oct-2018 14:20
Order number	:	Date Analysis Commenced	: 02-Nov-2018
C-O-C number	: ----	Issue Date	: 07-Nov-2018 18:05
Sampler	: Sarah Dale		
Site	: ----		
Quote number	: EN/333		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- 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

General Comments

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

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

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

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

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

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

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

- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	Dup B	----	----	----	----
			Client sampling date / time	30-Oct-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1832437-001	--------	--------	--------	--------
				Result	----	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	**13.3**	----	----	----	----
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	----	----	----	----
Cadmium	7440-43-9	1	mg/kg	<1	----	----	----	----
Chromium	7440-47-3	2	mg/kg	**7**	----	----	----	----
Copper	7440-50-8	5	mg/kg	**7**	----	----	----	----
Lead	7439-92-1	5	mg/kg	**21**	----	----	----	----
Nickel	7440-02-0	2	mg/kg	**2**	----	----	----	----
Zinc	7440-66-6	5	mg/kg	**40**	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	----	----	----	----
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	----	----	----	----
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	----	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	----	----	----	----
beta-BHC	319-85-7	0.05	mg/kg	<0.05	----	----	----	----
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	----	----	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	----	----	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	----	----	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	----	----	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	----	----	----	----
^ **Total Chlordane (sum)**	----	0.05	mg/kg	<0.05	----	----	----	----
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	----	----	----	----
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	----	----	----	----
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	----	----	----	----
Dieldrin	60-57-1	0.05	mg/kg	<0.05	----	----	----	----
4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	----	----	----	----
Endrin	72-20-8	0.05	mg/kg	<0.05	----	----	----	----
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	----	----	----	----
^ **Endosulfan (sum)**	115-29-7	0.05	mg/kg	<0.05	----	----	----	----
4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	----	----	----	----
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	----	----	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	Dup B	----	----	----	----
				Client sampling date / time	30-Oct-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1832437-001	--------	--------	--------	--------
					Result	----	----	----	----
EP068A: Organochlorine Pesticides (OC) - Continued									
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	----	----	----	----
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	----	----	----	----
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	----	----	----	----
^ **Sum of Aldrin + Dieldrin**	309-00-2/60-57-1	0.05	mg/kg		<0.05	----	----	----	----
^ **Sum of DDD + DDE + DDT**	72-54-8/72-55-9/50-2	0.05	mg/kg		<0.05	----	----	----	----
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg		<0.05	----	----	----	----
Demeton-S-methyl	919-86-8	0.05	mg/kg		<0.05	----	----	----	----
Monocrotophos	6923-22-4	0.2	mg/kg		<0.2	----	----	----	----
Dimethoate	60-51-5	0.05	mg/kg		<0.05	----	----	----	----
Diazinon	333-41-5	0.05	mg/kg		<0.05	----	----	----	----
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		<0.05	----	----	----	----
Parathion-methyl	298-00-0	0.2	mg/kg		<0.2	----	----	----	----
Malathion	121-75-5	0.05	mg/kg		<0.05	----	----	----	----
Fenthion	55-38-9	0.05	mg/kg		<0.05	----	----	----	----
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	----	----	----	----
Parathion	56-38-2	0.2	mg/kg		<0.2	----	----	----	----
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		<0.05	----	----	----	----
Chlorfenvinphos	470-90-6	0.05	mg/kg		<0.05	----	----	----	----
Bromophos-ethyl	4824-78-6	0.05	mg/kg		<0.05	----	----	----	----
Fenamiphos	22224-92-6	0.05	mg/kg		<0.05	----	----	----	----
Prothiofos	34643-46-4	0.05	mg/kg		<0.05	----	----	----	----
Ethion	563-12-2	0.05	mg/kg		<0.05	----	----	----	----
Carbophenothion	786-19-6	0.05	mg/kg		<0.05	----	----	----	----
Azinphos Methyl	86-50-0	0.05	mg/kg		<0.05	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	----	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	----	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	----	----	----	----
Fluorene	86-73-7	0.5	mg/kg		<0.5	----	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	----	----	----	----
Anthracene	120-12-7	0.5	mg/kg		<0.5	----	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	----	----	----	----
Pyrene	129-00-0	0.5	mg/kg		<0.5	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	Dup B	----	----	----	----
				Client sampling date / time	30-Oct-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1832437-001	--------	--------	--------	--------
					Result	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	----	----	----	----
Chrysene	218-01-9	0.5	mg/kg		<0.5	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	----	----	----	----
^ **Sum of polycyclic aromatic hydrocarbons**	----	0.5	mg/kg		<0.5	----	----	----	----
^ **Benzo(a)pyrene TEQ (zero)**	----	0.5	mg/kg		<0.5	----	----	----	----
^ **Benzo(a)pyrene TEQ (half LOR)**	----	0.5	mg/kg		**0.6**	----	----	----	----
^ **Benzo(a)pyrene TEQ (LOR)**	----	0.5	mg/kg		**1.2**	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	----	----	----	----
C10 - C14 Fraction	----	50	mg/kg		<50	----	----	----	----
C15 - C28 Fraction	----	100	mg/kg		<100	----	----	----	----
C29 - C36 Fraction	----	100	mg/kg		<100	----	----	----	----
^ **C10 - C36 Fraction (sum)**	----	50	mg/kg		<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	----	----	----	----
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	10	mg/kg		<10	----	----	----	----
>C10 - C16 Fraction	----	50	mg/kg		<50	----	----	----	----
>C16 - C34 Fraction	----	100	mg/kg		<100	----	----	----	----
>C34 - C40 Fraction	----	100	mg/kg		<100	----	----	----	----
^ **>C10 - C40 Fraction (sum)**	----	50	mg/kg		<50	----	----	----	----
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	50	mg/kg		<50	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	----	----	----	----
Toluene	108-88-3	0.5	mg/kg		<0.5	----	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	----	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	Dup B	----	----	----	----
				Client sampling date / time	30-Oct-2018 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1832437-001	--------	--------	--------	--------
					Result	----	----	----	----
EP080: BTEXN - Continued									
^ **Sum of BTEX**	----	0.2	mg/kg		<0.2	----	----	----	----
^ **Total Xylenes**	----	0.5	mg/kg		<0.5	----	----	----	----
Naphthalene	91-20-3	1	mg/kg		<1	----	----	----	----
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		**110**	----	----	----	----
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		**95.8**	----	----	----	----
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		**91.8**	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**70.4**	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%		**77.3**	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%		**68.4**	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**87.1**	----	----	----	----
Anthracene-d10	1719-06-8	0.5	%		**88.7**	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%		**78.9**	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**83.5**	----	----	----	----
Toluene-D8	2037-26-5	0.2	%		**96.1**	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.2	%		**106**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **SOIL**

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

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **ES1832437**	Page	: 1 of 11
Client	: **PROGRESSIVE RISK MANAGEMENT**	Laboratory	: Environmental Division Sydney
Contact	: GEOFF FLETCHER	Contact	: Customer Services ES
Address	: 17 RAVEL ST SEVEN HILLS NSW 2147	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: SW CA P033802 North Narrabeen	Date Samples Received	: 31-Oct-2018
Order number	:	Date Analysis Commenced	: 02-Nov-2018
C-O-C number	: ----	Issue Date	: 07-Nov-2018
Sampler	: Sarah Dale		
Site	: ----		
Quote number	: EN/333		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	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 (Dried @ 105-110°C) (QC Lot: 2015975)									
ES1832343-048	Anonymous	EA055: Moisture Content	----	0.1	%	8.5	9.6	12.6	0% - 20%
ES1832343-061	Anonymous	EA055: Moisture Content	----	0.1	%	6.3	6.8	8.73	0% - 20%
EG005T: Total Metals by ICP-AES (QC Lot: 2020466)									
ES1832004-001	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	10	12	19.2	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	16	11	43.5	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	10	7	39.3	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	93	102	9.45	0% - 20%
		EG005T: Lead	7439-92-1	5	mg/kg	233	245	4.82	0% - 20%
		EG005T: Zinc	7440-66-6	5	mg/kg	239	279	15.4	0% - 20%
ES1832004-011	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	13	12	0.00	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	9	9	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	6	<5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	105	90	15.2	0% - 20%
		EG005T: Lead	7439-92-1	5	mg/kg	109	105	3.58	0% - 20%
		EG005T: Zinc	7440-66-6	5	mg/kg	180	212	16.1	0% - 20%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 2020467)									
ES1832004-001	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	0.3	0.3	0.00	No Limit
ES1832004-011	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	0.1	0.1	0.00	No Limit
EP066: Polychlorinated Biphenyls (PCB) (QC Lot: 2014816)									
ES1832437-001	Dup B	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
ES1832482-057	Anonymous	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EP068A: Organochlorine Pesticides (OC) (QC Lot: 2014815)									

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP068A: Organochlorine Pesticides (OC) (QC Lot: 2014815) - continued									
ES1832437-001	Dup B	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
ES1832482-057	Anonymous	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP068A: Organochlorine Pesticides (OC) (QC Lot: 2014815) - continued									
ES1832482-057	Anonymous	EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 2014815)									
ES1832437-001	Dup B	EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
ES1832482-057	Anonymous	EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	0.00	No Limit

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 (%)*
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 2014815) - continued									
ES1832482-057	Anonymous	EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 2014814)									
ES1832437-001	Dup B	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
ES1832482-057	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

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: 2014814) - continued									
ES1832482-057	Anonymous	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: 2014813)									
ES1832437-001	Dup B	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
ES1832482-057	Anonymous	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: 2015229)									
ES1832413-001	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
ES1832482-009	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 2014813)									
ES1832437-001	Dup B	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
ES1832482-057	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
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 2015229)									
ES1832413-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
ES1832482-009	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EP080: BTEXN (QC Lot: 2015229)									
ES1832413-001	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
ES1832482-009	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit

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

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

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005T: Total Metals by ICP-AES (QCLot: 2020466)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	100	86	126
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	99.8	83	113
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	93.8	76	128
EG005T: Copper	7440-50-8	5	mg/kg	<5	32 mg/kg	102	86	120
EG005T: Lead	7439-92-1	5	mg/kg	<5	40 mg/kg	98.2	80	114
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55 mg/kg	104	87	123
EG005T: Zinc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	109	80	122
EG035T: Total Recoverable Mercury by FIMS (QCLot: 2020467)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	91.8	70	105
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 2014816)								
EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	1 mg/kg	81.0	62	126
EP068A: Organochlorine Pesticides (OC) (QCLot: 2014815)								
EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.5 mg/kg	100	69	113
EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	0.5 mg/kg	97.6	65	117
EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	0.5 mg/kg	89.0	67	119
EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	0.5 mg/kg	104	68	116
EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	106	65	117
EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.5 mg/kg	108	67	115
EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	0.5 mg/kg	96.2	69	115
EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.5 mg/kg	96.7	62	118
EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	0.5 mg/kg	92.1	63	117
EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	0.5 mg/kg	95.2	66	116
EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	0.5 mg/kg	94.4	64	116
EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	0.5 mg/kg	93.0	66	116
EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	0.5 mg/kg	97.8	67	115
EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	0.5 mg/kg	88.7	67	123
EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	0.5 mg/kg	101	69	115
EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	0.5 mg/kg	96.7	69	121
EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	0.5 mg/kg	99.3	56	120
EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.5 mg/kg	109	62	124
EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	0.5 mg/kg	102	66	120
EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	0.5 mg/kg	107	64	122
EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	0.5 mg/kg	100	54	130
EP068B: Organophosphorus Pesticides (OP) (QCLot: 2014815)								

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP068B: Organophosphorus Pesticides (OP) (QCLot: 2014815) - continued								
EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	0.5 mg/kg	87.8	59	119
EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	104	62	128
EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	0.5 mg/kg	89.0	54	126
EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	0.5 mg/kg	89.7	67	119
EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	0.5 mg/kg	82.9	70	120
EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	0.5 mg/kg	89.8	72	120
EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	0.5 mg/kg	86.2	68	120
EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	0.5 mg/kg	89.7	68	122
EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	0.5 mg/kg	92.0	69	117
EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	0.5 mg/kg	90.3	76	118
EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	0.5 mg/kg	85.0	64	122
EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	0.5 mg/kg	92.8	70	116
EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	0.5 mg/kg	90.6	69	121
EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	0.5 mg/kg	89.0	66	118
EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	0.5 mg/kg	89.2	68	124
EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	0.5 mg/kg	95.5	62	112
EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	0.5 mg/kg	90.0	68	120
EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	0.5 mg/kg	91.7	65	127
EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	0.5 mg/kg	80.9	41	123
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 2014814)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	104	77	125
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	108	72	124
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	93.3	73	127
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	104	72	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	104	75	127
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	92.6	77	127
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	107	73	127
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	106	74	128
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	95.4	69	123
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	96.8	75	127
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	6 mg/kg	91.7	68	116
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	98.4	74	126
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	97.4	70	126
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	77.8	61	121
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	77.3	62	118
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	73.7	63	121
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2014813)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	300 mg/kg	110	75	129

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 Petroleum Hydrocarbons (QCLot: 2014813) - continued								
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	450 mg/kg	115	77	131
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	300 mg/kg	108	71	129
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2015229)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	90.4	68	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2014813)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	375 mg/kg	111	77	125
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	525 mg/kg	112	74	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	225 mg/kg	94.1	63	131
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2015229)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	93.6	68	128
EP080: BTEXN (QCLot: 2015229)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	89.4	62	116
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	94.5	67	121
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	96.0	65	117
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	96.0	66	118
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	101	68	120
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	103	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**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Recovery Limits (%): Low	Recovery Limits (%): High
EG005T: Total Metals by ICP-AES (QCLot: 2020466)							
ES1832004-001	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	93.5	70	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	101	70	130
		EG005T: Chromium	7440-47-3	50 mg/kg	97.9	70	130
		EG005T: Copper	7440-50-8	250 mg/kg	95.7	70	130
		EG005T: Lead	7439-92-1	250 mg/kg	70.3	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	86.4	70	130
		EG005T: Zinc	7440-66-6	250 mg/kg	88.4	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 2020467)							
ES1832004-001	Anonymous	EG035T: Mercury	7439-97-6	5 mg/kg	99.4	70	130
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 2014816)							

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: 2014816) - continued							
ES1832437-001	Dup B	EP066: Total Polychlorinated biphenyls	----	1 mg/kg	113	70	130
EP068A: Organochlorine Pesticides (OC) (QCLot: 2014815)							
ES1832437-001	Dup B	EP068: gamma-BHC	58-89-9	0.5 mg/kg	83.1	70	130
		EP068: Heptachlor	76-44-8	0.5 mg/kg	97.5	70	130
		EP068: Aldrin	309-00-2	0.5 mg/kg	96.9	70	130
		EP068: Dieldrin	60-57-1	0.5 mg/kg	105	70	130
		EP068: Endrin	72-20-8	2 mg/kg	98.1	70	130
		EP068: 4.4`-DDT	50-29-3	2 mg/kg	83.7	70	130
EP068B: Organophosphorus Pesticides (OP) (QCLot: 2014815)							
ES1832437-001	Dup B	EP068: Diazinon	333-41-5	0.5 mg/kg	97.6	70	130
		EP068: Chlorpyrifos-methyl	5598-13-0	0.5 mg/kg	98.2	70	130
		EP068: Pirimphos-ethyl	23505-41-1	0.5 mg/kg	88.8	70	130
		EP068: Bromophos-ethyl	4824-78-6	0.5 mg/kg	99.4	70	130
		EP068: Prothiofos	34643-46-4	0.5 mg/kg	102	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 2014814)							
ES1832437-001	Dup B	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	109	70	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	127	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2014813)							
ES1832437-001	Dup B	EP071: C10 - C14 Fraction	----	523 mg/kg	89.8	73	137
		EP071: C15 - C28 Fraction	----	2319 mg/kg	114	53	131
		EP071: C29 - C36 Fraction	----	1714 mg/kg	126	52	132
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2015229)							
ES1832413-001	Anonymous	EP080: C6 - C9 Fraction	----	32.5 mg/kg	81.0	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2014813)							
ES1832437-001	Dup B	EP071: >C10 - C16 Fraction	----	860 mg/kg	98.7	73	137
		EP071: >C16 - C34 Fraction	----	3223 mg/kg	118	53	131
		EP071: >C34 - C40 Fraction	----	1058 mg/kg	110	52	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2015229)							
ES1832413-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	82.5	70	130
EP080: BTEXN (QCLot: 2015229)							
ES1832413-001	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	75.5	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	79.0	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	80.2	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	80.7	70	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	84.7	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: BTEXN (QCLot: 2015229) - continued							
ES1832413-001	Anonymous	EP080: Naphthalene	91-20-3	2.5 mg/kg	86.0	70	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES1832437**	Page	: 1 of 4
Client	: **PROGRESSIVE RISK MANAGEMENT**	Laboratory	: Environmental Division Sydney
Contact	: GEOFF FLETCHER	Telephone	: +61-2-8784 8555
Project	: SW CA P033802 North Narrabeen	Date Samples Received	: 31-Oct-2018
Site	: ----	Issue Date	: 07-Nov-2018
Sampler	: Sarah Dale	No. of samples received	: 1
Order number	:	No. of samples analysed	: 1

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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

Analysis Holding Time Compliance

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

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

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

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

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content (Dried @ 105-110°C)							
Soil Glass Jar - Unpreserved (EA055)							
Dup B	**30-Oct-2018**	**----**	----	----	**02-Nov-2018**	13-Nov-2018	✓
EG005T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T)							
Dup B	**30-Oct-2018**	**06-Nov-2018**	28-Apr-2019	✓	**06-Nov-2018**	28-Apr-2019	✓
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T)							
Dup B	**30-Oct-2018**	**06-Nov-2018**	27-Nov-2018	✓	**06-Nov-2018**	27-Nov-2018	✓
EP066: Polychlorinated Biphenyls (PCB)							
Soil Glass Jar - Unpreserved (EP066)							
Dup B	**30-Oct-2018**	**02-Nov-2018**	13-Nov-2018	✓	**06-Nov-2018**	12-Dec-2018	✓
EP068A: Organochlorine Pesticides (OC)							
Soil Glass Jar - Unpreserved (EP068)							
Dup B	**30-Oct-2018**	**02-Nov-2018**	13-Nov-2018	✓	**06-Nov-2018**	12-Dec-2018	✓
EP068B: Organophosphorus Pesticides (OP)							
Soil Glass Jar - Unpreserved (EP068)							
Dup B	**30-Oct-2018**	**02-Nov-2018**	13-Nov-2018	✓	**06-Nov-2018**	12-Dec-2018	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075(SIM))							
Dup B	**30-Oct-2018**	**02-Nov-2018**	13-Nov-2018	✓	**05-Nov-2018**	12-Dec-2018	✓
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP080)							
Dup B	**30-Oct-2018**	**02-Nov-2018**	13-Nov-2018	✓	**05-Nov-2018**	13-Nov-2018	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Soil Glass Jar - Unpreserved (EP080)							
Dup B	**30-Oct-2018**	**02-Nov-2018**	13-Nov-2018	✓	**05-Nov-2018**	13-Nov-2018	✓
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080)							
Dup B	**30-Oct-2018**	**02-Nov-2018**	13-Nov-2018	✓	**05-Nov-2018**	13-Nov-2018	✓

Quality Control Parameter Frequency Compliance

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

Matrix: **SOIL**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Moisture Content	EA055	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
PAH/Phenols (SIM)	EP075(SIM)	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
PAH/Phenols (SIM)	EP075(SIM)	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
PAH/Phenols (SIM)	EP075(SIM)	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM (2013) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (2013) Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2) (Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Polychlorinated Biphenyls (PCB)	EP066	SOIL	In house: Referenced to USEPA SW 846 - 8270D Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 504)
Pesticides by GCMS	EP068	SOIL	In house: Referenced to USEPA SW 846 - 8270D Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This technique is compliant with NEPM (2013) Schedule B(3) (Method 504,505)
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015A Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40. Compliant with NEPM amended 2013.
PAH/Phenols (SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270D. Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 502 and 507)
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260B. Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. Compliant with NEPM amended 2013.

Preparation Methods	Method	Matrix	Method Descriptions
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM (2013) Schedule B(3) (Method 202)
Methanolic Extraction of Soils for Purge and Trap	ORG16	SOIL	In house: Referenced to USEPA SW 846 - 5030A. 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
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.

Geoff Fletcher <geoff.fletcher@progressiverm.com.au>

Results for Registration 204389 P033802, SW CA North Narrabeen

3 messages

Geoff Fletcher <geoff.fletcher@progressiverm.com.au> 23 November 2018 at 13:55
To: customerservice@envirolab.com.au

Hi Jess,

As discussed could i please get the following samples looked at for the presence of leaves/bark etc and also the TRH chromatograms with brief interpretation of likley hydrocarbon type:

- TP04 (0-0.1m)
- TP05 (0-0.1m)

Geoff Fletcher
Senior Consultant - Environmental Risk

E: geoff.fletcher@progressiverm.com.au
M: +61 424 353 705

Jessica Hie <JHie@envirolab.com.au> 23 November 2018 at 14:27
To: Geoff Fletcher <geoff.fletcher@progressiverm.com.au>
Cc: Jeremy Faircloth <JFaircloth@envirolab.com.au>, Steven Luong <SLuong@envirolab.com.au>, Customer Service <customerservice@envirolab.com.au>

Hi Geoff,

There's a small amount – please see the attached photos.

Jeremy – could you please help Geoff out with the chromatograms.

From: Geoff Fletcher <geoff.fletcher@progressiverm.com.au>
Sent: Friday, 23 November 2018 1:55 PM
To: Customer Service <customerservice@envirolab.com.au>
Subject: Results for Registration 204389 P033802, SW CA North Narrabeen

[Quoted text hidden]

Progressive Risk Management Pty Ltd

www.progressiverm.com.au

Unit 14/76 Reserve Road

Artarmon NSW 2064

PO Box 4001

Royal North Shore Hospital Post Office

NSW 2065

Regards,

Jessica Hie | Customer Service/Asbestos Analyst | Envirolab Services Pty Ltd

Great Science, Great Service.

12 Ashley Street Chatswood NSW 2067
T 612 9910 6200 **F** 612 9910 6201
E jhie@envirolab.com.au | **W** www.envirolab.com.au

---

2 attachments

IMG_1448.JPG
1718K

IMG_1450.JPG
2367K

Jeremy Faircloth <JFaircloth@envirolab.com.au> 23 November 2018 at 14:37
To: Jessica Hie <JHie@envirolab.com.au>, Geoff Fletcher <geoff.fletcher@progressiverm.com.au>
Cc: Steven Luong <SLuong@envirolab.com.au>, Customer Service <customerservice@envirolab.com.au>

Hi Geoff,

Please see attached.

I would attribute these kind of profiles to naturally occurring sources such as leaves/bark which is present in the samples.

Regards,

Jeremy Faircloth | Organics Supervisor | Envirolab Services Pty Ltd

Great Science, Great Service.

12 Ashley Street Chatswood NSW 2067
T 612 9910 6200 **F** 612 9910 6201
E jfaircloth@envirolab.com.au | **W** www.envirolab.com.au

From: Jessica Hie <JHie@envirolab.com.au>
Sent: Friday, 23 November 2018 2:27 PM
To: Geoff Fletcher <geoff.fletcher@progressiverm.com.au>
Cc: Jeremy Faircloth <JFaircloth@envirolab.com.au>; Steven Luong <SLuong@envirolab.com.au>; Customer Service <customerservice@envirolab.com.au>
Subject: RE: Results for Registration 204389 P033802, SW CA North Narrabeen

[Quoted text hidden]

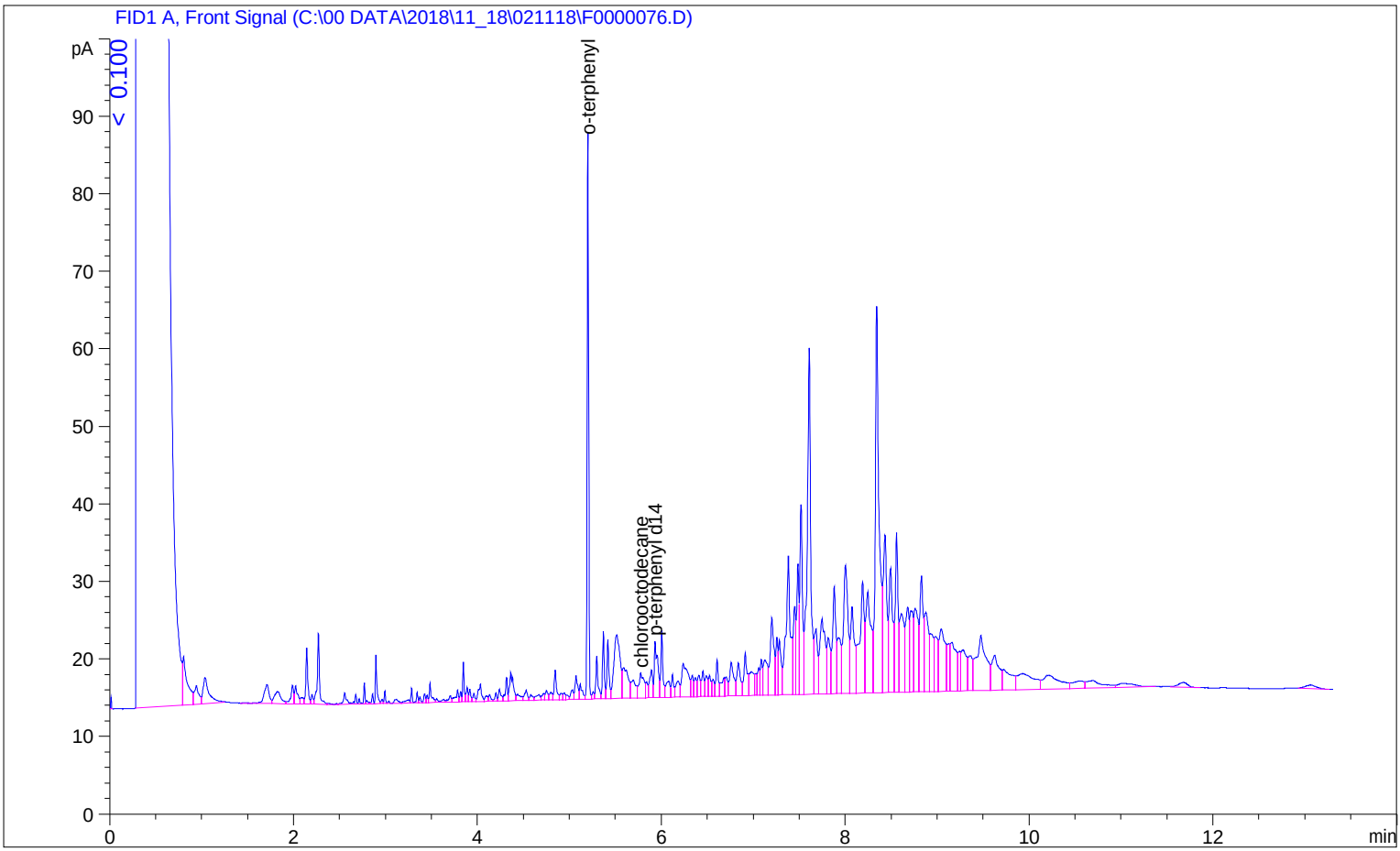
2 attachments

s204389-11.pdf
21K

s204389-14.pdf
19K

Data File C:\00 DATA\2018\11_18\021118\F0000076.D
Sample Name: s204389-11

```
==========================================================================
Acq. Operator   :                                  Seq. Line :  76
Acq. Instrument : gc6                               Location : Vial 1
Injection Date  : 05/11/2018 1:14:34 PM                  Inj :   1
                                                  Inj Volume : 1 µl
Acq. Method     : C:\CHEM32\1\METHODS\NEPM JF.M
Last changed    : 17/04/2018 11:43:00 AM
Analysis Method : C:\00 METHODS\2018\11_18\021118_TRH_F-PROCESSING-.M
Last changed    : 05/11/2018 10:28:41 AM
Method Info     : FAST TPH WITH 15M HP5 COLUMNS
```




```
==========================================================================
                      External Standard Report
==========================================================================

Sorted By             :      Signal
Calib. Data Modified  :      05/11/2018 10:28:29 AM
Multiplier:                   :      1.0000
Dilution:                     :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: FID1 A, Front Signal

RetTime  Type     Area     Amt/Area    Amount   Grp   Name
 [min]          [pA*s]                 [mg/L]
-------|------|----------|----------|----------|--|------------------
  5.203 VV    I   78.23149 1.08106e-1    8.45732    o-terphenyl
  5.777 VV        12.20949 1.36522e-1    1.66686    chlorooctodecane
  5.934 VV    I   18.46943    2.66912   49.29711    p-terphenyl d14
```

Data File C:\00 DATA\2018\11_18\021118\F0000076.D
Sample Name: s204389-11

Totals : 59.42129

==========
Summed Peaks Report
==========

Signal 1: FID1 A, Front Signal

Name	Start Time [min]	End Time [min]	Total Area [pA*s]	Amount [mg/L]
TRH C10-C14	1.570	3.760	96.74440	12.1833
NEPM >C10-C16	2.160	4.410	101.19365	12.7436
TRH C15-C28	3.761	7.460	522.67060	61.6689
NEPM >C16-C34	4.411	8.570	1289.95040	152.1987
TRH C29-C36	7.461	8.900	1012.75342	108.5510
NEPM >C34-C40	8.571	9.640	446.17028	47.8223

Totals : 395.1677

==========
Final Summed Peaks Report
==========

Signal 1: FID1 A, Front Signal

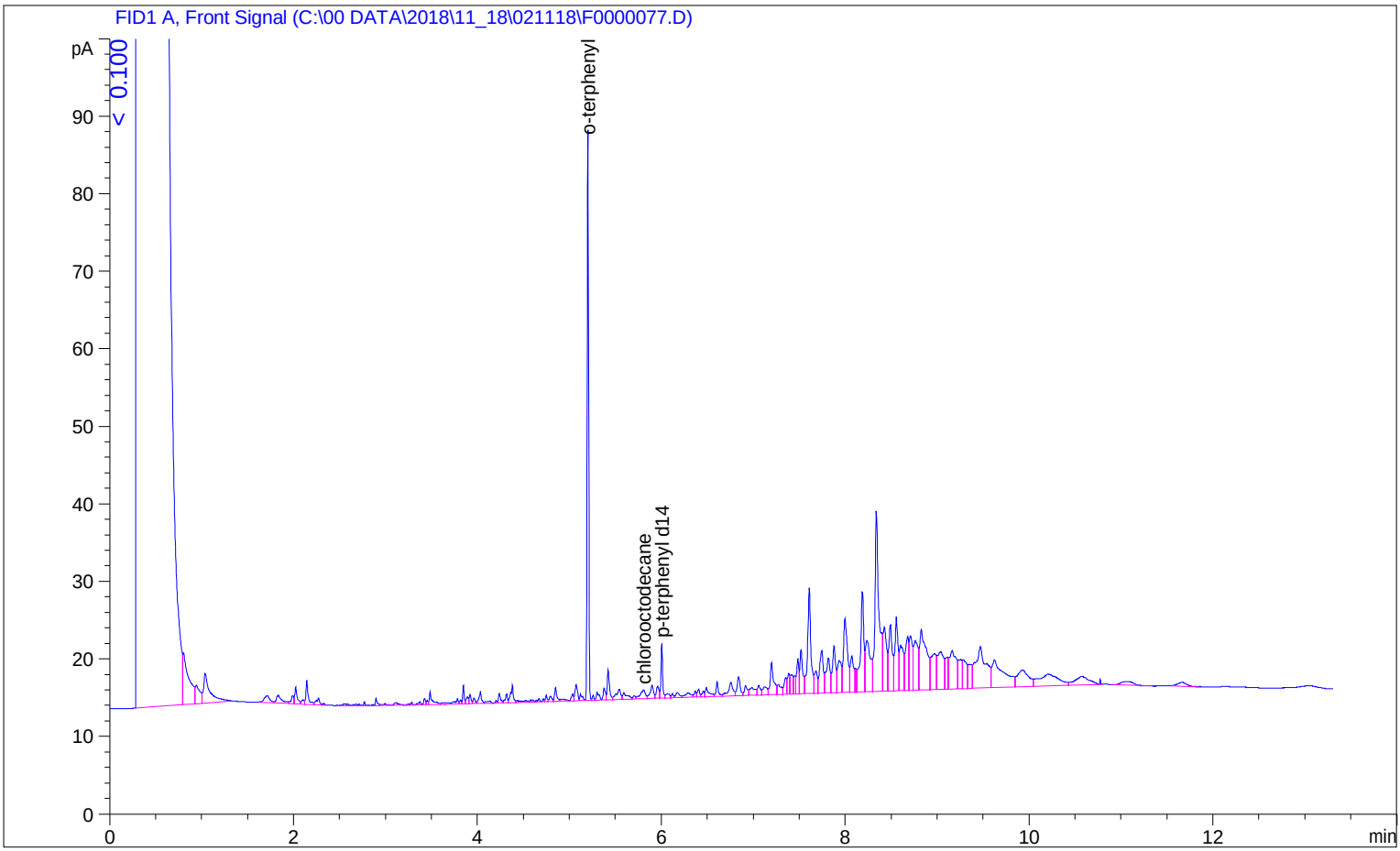
Name	Total Area [pA*s]	Amount [mg/L]
TRH C10-C14	96.74440	12.1833
NEPM >C10-C16	101.19365	12.7436
TRH C15-C28	522.67060	61.6689
NEPM >C16-C34	1289.95040	152.1987
TRH C29-C36	1012.75342	108.5510
NEPM >C34-C40	446.17028	47.8223
o-terphenyl	78.23149	8.4573
chlorooctodecan	12.20949	1.6669
p-terphenyl d14	18.46943	49.2971

Totals : 454.5890

*** End of Report ***

Data File C:\00 DATA\2018\11_18\021118\F0000077.D
Sample Name: s204389-14

```
==========================================================================
Acq. Operator   :                                  Seq. Line :  77
Acq. Instrument : gc6                               Location : Vial 2
Injection Date  : 05/11/2018 1:32:50 PM                  Inj :   1
                                                  Inj Volume : 1 µl
Acq. Method     : C:\CHEM32\1\METHODS\NEPM JF.M
Last changed    : 17/04/2018 11:43:00 AM
Analysis Method : C:\00 METHODS\2018\11_18\021118_TRH_F-PROCESSING-.M
Last changed    : 05/11/2018 10:28:41 AM
Method Info     : FAST TPH WITH 15M HP5 COLUMNS
```




```
==========================================================================
                      External Standard Report
==========================================================================

Sorted By             :      Signal
Calib. Data Modified  :      05/11/2018 10:28:29 AM
Multiplier:                   :      1.0000
Dilution:                     :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: FID1 A, Front Signal

RetTime  Type     Area     Amt/Area    Amount   Grp   Name
 [min]          [pA*s]                 [mg/L]
-------|------|----------|----------|----------|--|------------------
  5.203 VV    I   77.42359 1.08106e-1    8.36998    o-terphenyl
  5.807 VV        4.26491 1.36522e-1 5.82254e-1    chlorooctodecane
  6.006 VV    I    8.92541    2.66912   23.82298    p-terphenyl d14
```

Data File C:\00 DATA\2018\11_18\021118\F0000077.D
Sample Name: s204389-14

Totals : 32.77521

==========

Summed Peaks Report

==========

Signal 1: FID1 A, Front Signal

Name	Start Time [min]	End Time [min]	Total Area [pA*s]	Amount [mg/L]
TRH C10-C14	1.570	3.760	36.90406	4.6474
NEPM >C10-C16	2.160	4.410	37.78132	4.7579
TRH C15-C28	3.761	7.460	142.88686	16.8589
NEPM >C16-C34	4.411	8.570	482.50332	56.9296
TRH C29-C36	7.461	8.900	479.18583	51.3611
NEPM >C34-C40	8.571	9.640	305.16441	32.7087

Totals : 167.2637

==========

Final Summed Peaks Report

==========

Signal 1: FID1 A, Front Signal

Name	Total Area [pA*s]	Amount [mg/L]
TRH C10-C14	36.90406	4.6474
NEPM >C10-C16	37.78132	4.7579
TRH C15-C28	142.88686	16.8589
NEPM >C16-C34	482.50332	56.9296
TRH C29-C36	479.18583	51.3611
NEPM >C34-C40	305.16441	32.7087
o-terphenyl	77.42359	8.3700
chlorooctodecan	4.26491	0.5823
p-terphenyl d14	8.92541	23.8230

Totals : 200.0389

*** End of Report ***

Appendix E: Calibration Certificates

PID Calibration Certificate

Instrument PhoCheck Tiger
Serial No. T-113967

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: ; STEL:
	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		98.0ppm

Calibrated by: Sophie Boler

Calibration date: 29/10/2018

Next calibration due: 27/04/2019

Appendix F: Assessment of Laboratory QA/QC

Assessment of Laboratory QA/QC				
Data Quality Objectives	Frequency	Frequency Achieved?	DQI	DQI Met?
Precision				
Intra-laboratory field duplicates	1/20 samples	Yes	>5*LOR: 50% RPD	The results indicated that field precision was acceptable.
Inter-laboratory field duplicates	1/20 samples	Yes	>5*LOR: 50% RPD	The results indicated that field precision was acceptable.
Laboratory Duplicates	1/20 samples	Yes	>5*LOR: 50% RPD	Laboratory RPD acceptance criteria had been exceeded in sample 204389-1 (TP01_0.0-0.1) for Pb (lead). Therefore, a triplicate result was issued as laboratory sample number 204389-24.
Laboratory method blanks	1/10 samples	Yes	<LOR	Yes
Accuracy				
Laboratory Matrix Spikes	1/20 samples	Yes	Acceptable Recoveries: 70 – 130% for metals / inorganics. 60 – 140% for organics	Yes
Surrogate spikes	1/20 samples	Yes	Acceptable Recoveries: 70 – 130% for metals / inorganics. 60 – 140% for organics	Yes
Representativeness				
Samples handling, storage and transport appropriate for media	All samples	Yes	Received by laboratory cooled with containers in good condition	Yes: Laboratory SRA advice indicates samples were received by the laboratory in good condition. See Appendix D for copies of laboratory documentation.
Trip Spike	1 per day	Yes	70-130% recovery	Yes.
Trip blank	1 per day	Yes	<LOR	Yes
Rinsate	1 per reusable equipment per day when used	Yes	<LOR	Yes
Samples extracted and analysed within holding times	All samples	Yes	Hold times: 7 days organics 6 months inorganics	Yes

Assessment of Laboratory QA/QC				
Data Quality Objectives	Frequency	Frequency Achieved?	DQI	DQI Met?
Comparability				
Standard operating procedures used for samples collection and handling	All Samples	Yes	Approved methodology to be used for all sample collection and handling	Yes: All sample collection and handling were completed in accordance with PRM standard operating procedures.
Standard analytical methods used for all analyses	All Samples	Yes	Approved methodology to be used for all sample analysis	All samples were analysed by a NATA accredited laboratory using approved methodology.
Consistent field conditions and laboratory analysis	All Samples	Yes	Consistent field sampling and laboratory analysis.	Yes: Samples were collected in the field by the same PRM staff member. All primary samples were analysed by Envirolab Services.
Limits of reporting appropriate and consistent	All Samples	Yes	-	Yes
Completeness				
Soil description and COCs completed and appropriate	All Samples	Yes	Appropriate documentation to be provided	Yes: Material description presented in test pit logs in Appendix B and COC documentation is provided in Appendix B.
Summary				
In summary, the QA/QC undertaken as part of the CA works are considered suitable.				