

Preliminary Site Investigation

Proposed Stella Maris College Extension
48-50 Eurobin Avenue,
Manly NSW 2095

Project No. 22246
Version 2

9 December 2022

Reditus Consulting Pty Ltd
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Preliminary Site Investigation

48-50 Eurobin Avenue, Manly NSW 2095

DOCUMENT CONTROL

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Abbreviations

TERM	DEFINITION
° C	Degrees Celsius
ACM	Asbestos Containing Material
AEC	Area of Environmental Concern
AFFF	Aqueous Film Forming Foam
AHD	Australian Height Datum
ASC	Assessment of Site Contamination
BGL	Below Ground Level
BTEX	Benzene Toluene Ethylbenzene Xylene
BTOC	Below Top Of Casing
CEC	Cation Exchange Capacity
COC	Chain of Custody
COPC	Contaminants of Potential Concern
CSM	Conceptual Site Model
DA	Development Application
DO	Dissolved Oxygen
DQO	Data Quality Objective
EIL	Ecological Investigation Level
EPA	Environment Protection Authority
ESG	Environmental Services Group
ESL	Ecological Screening Level
GDE	Groundwater Dependant Ecosystem
HIL	Health Investigation Level
HSL	Health Screening Level
LGA	Local Government Area
LIR	Land Insight and Resources
LOR	Limit-Of-Reporting
ML	Management Limits



TERM	DEFINITION
NATA	National Association of Testing Authorities
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measure (2013)
NPI	National Pollutant Inventory
NSW	New South Wales
PAH	Polycyclic Aromatic Hydrocarbons
OC	Organic Carbon
OCP	Organochloride Pesticides
OPP	Organophosphorus Pesticides
PACM	Potentially Asbestos Containing Material
PCB	Polychlorinated Biphenyls
PFAS	Per- and polyfluoroalkyl Substances
PID	Photoionisation Detector
PPM	Parts Per Million
PQL	Practical Quantification Limit
PSI	Preliminary Site Investigation
QA/QC	Quality Assurance / Quality Control
RAP	Remedial Action Plan
RPD	Relative Percentage Difference
SAC	Soil Assessment Criteria
SD	Standard Deviation
SWL	Standing Water Level
TOC	Top-of-Casing
TPH	Total Petroleum hydrocarbons
TRH	Total Recoverable Hydrocarbons
UPSS	Underground Petroleum Storage Systems
USCS	Unified Soil Classification System
UST	Underground Storage Tank
VOC	Volatile Organic Compounds



Executive Summary

Reditus Consulting Pty Ltd (Reditus) was engaged by Mostyn Cooper Group Pty Ltd (the client) c/ Stella Maris College to undertake a Preliminary Site Investigation (PSI) to support the development application (DA) for the extension of Stella Maris College to 48-50 Eurobin Avenue, Manly NSW 2095 (herein referred to as 'the Site').

The Site has a total area of approximately 956m² (0.096 hectares) and encompasses the following cadastral lots:

- Lot 42 DP14521 – 48 Eurobin Avenue – 482m².
- SP12627 – 50 Eurobin Avenue – 474m².

The Site is currently occupied has as low-density residential land use. A one-storey dwelling was present on 48 Eurobin Avenue, and a two-story subdivided dwelling was present on 50 Eurobin Avenue.

Based on the above and in accordance with State Environmental Planning Policy (Resilience and Hazards) 2021, this PSI was completed to define the nature, extent and degree of contamination (if any); to assess potential risk posed by contaminants to health and the environment (if any); and to obtain sufficient information to develop a remedial action plan (RAP) to render the Site suitable (if required) for the proposed development.

The overarching objective of the PSI was to evaluate the possibility for contamination to be present at the Site because of current and former land use activities both on the Site and surrounding area. If any contamination was present the magnitude, distribution, and extent of contaminants of potential concern (COPC) were to be assessed to enable a determination of the suitability of the Site for the proposed development. The specific objectives of the PSI were to:

- Evaluate the possibility for contamination to be present at the Site as a result of current and former land use activities.
- Assess the nature and extent of potential contamination in the areas of environmental concern (AEC) identified in the desktop review and site inspection.
- Assess whether Contaminants of Potential Concern (COPC) (if detected above site assessment criteria) present an unacceptable risk of exposure to human health and/or the environment, in the context of proposed educational land use.
- Provide advice on whether the land is suitable or could be made suitable (from a contamination perspective) for the proposed educational land use.
- Provide recommendations for further investigation, management, or remediation (if required).
- Conform to the requirements of the National Environmental Protection Council (Assessment of Site Contamination) National Environment Protection Measure 1999 (as amended in 2013) ('ASC NEPM, 2013') and the NSW Environmental Protection Authority (NSW EPA 2020) Guidelines for Consultants Reporting on Contaminated Land.

Based on a review of the site history, observations made during fieldwork, results of laboratory analysis and the proposed land use scenario, Reditus concludes the following:

- The Site is situated in an area of Class 4 Acid Sulfate Soils, and as such the outcomes of the Acid Sulfate Soils Assessment report being concurrently prepared by Reditus for the Site should be considered.
- Fill material was encountered on the Site and exceedances of adopted ecological investigation and screening criteria were reported, however Reditus does not consider that these exceedances preclude the Site from the proposed development.
- Concentration of potential concern including TRH, BTEX, OCP/OPP and PCB were reported below the adopted assessment criteria in all soil samples analysed.
- No asbestos in soil was observed, however a piece of potentially asbestos containing material in the form of fibrous cement sheeting was observed leaning on a fence on 50 Eurobin Avenue.
- Hydrocarbon odours were not observed or identified in any of the boreholes during intrusive works.



- The redefined conceptual site model (CSM), based on the findings of the investigation works completed at the Site to date, identified that fill material underneath building footprints is yet uncharacterised.

Based on the results of the investigation, Reditus recommends the following to assess the Site in accordance with relevant planning guidelines:

- Reditus considers that the Site is suitable for the proposed development. Additional soil sampling beneath building footprints following the demolition of present residential dwellings of the Site is recommended. In addition to further site characterisation, further sampling will help inform the waste classification of soil material which is proposed for removal from the Site.

1 Introduction

Reditus Consulting Pty Ltd (Reditus) was engaged by Mostyn Cooper Group Pty Ltd (the client) c/ Stella Maris College to undertake a Preliminary Site Investigation (PSI) to support the development application (DA) for the extension of Stella Maris College to 48-50 Eurobin Avenue, Manly NSW 2095 (herein referred to as 'the Site'). The location and layout of the Site is presented in **Figure 1, Appendix A**.

The Site has a total area of approximately 956m² (0.096 hectares) and encompasses the following cadastral lots:

- Lot 42 DP14521 – 48 Eurobin Avenue – 482m².
- SP12627 – 50 Eurobin Avenue – 474m².

The Site is currently occupied has as low-density residential land use. A one-storey dwelling was present on 48 Eurobin Avenue, and a two-story subdivided dwelling was present on 50 Eurobin Avenue.

Based on the above and in accordance with State Environmental Planning Policy (Resilience and Hazards) 2021, this PSI was completed to define the nature, extent and degree of contamination (if any); to assess potential risk posed by contaminants to health and the environment (if any); and to obtain sufficient information to develop a remedial action plan (RAP) to render the Site suitable (if required) for the proposed development.

It is noted that a PSI with Limited Soil Assessment has historically been conducted for 48 Eurobin Avenue, Manly (Ref: Reditus, 2021, 21082RP01), which will be reviewed as a part of this PSI for 48-50 Eurobin Avenue, Manly.

Reditus notes that this report, including its conclusions and recommendations, must be read in conjunction with the Statement of Limitations provided in **Section 13**.

1.1 Objectives

The overarching objective of the PSI was to evaluate the possibility for contamination to be present at the Site because of current and former land use activities both on the Site and surrounding area. If any contamination was present the magnitude, distribution, and extent of contaminants of potential concern (COPC) were to be assessed to enable a determination of the suitability of the Site for the proposed development. The specific objectives of the PSI were to:

- Evaluate the possibility for contamination to be present at the Site as a result of current and former land use activities.
- Assess the nature and extent of potential contamination in the areas of environmental concern (AEC) identified in the desktop review and site inspection.
- Assess whether Contaminants of Potential Concern (COPC) (if detected above site assessment criteria) present an unacceptable risk of exposure to human health and/or the environment, in the context of proposed educational land use.
- Provide advice on whether the land is suitable or could be made suitable (from a contamination perspective) for the proposed educational land use.
- Provide recommendations for further investigation, management, or remediation (if required).
- Conform to the requirements of the National Environmental Protection Council (Assessment of Site Contamination) National Environment Protection Measure 1999 (as amended in 2013) ('ASC NEPM, 2013') and the NSW Environmental Protection Authority (NSW EPA 2020) Guidelines for Consultants Reporting on Contaminated Land.

1.2 Scope of Works

To achieve the objectives outlined above, Reditus completed the following:

- A review of available zoning plans and council documents to determine potentially contaminating activities that may have occurred on the Site.



- An evaluation of aerial photographs to assist in assessing historical land uses and conditions on and adjacent to the Site.
- A review of the environmental setting with regards to geology, topography, hydrology and hydrogeology.
- A site walkover to characterise the property setting, including inspection of the Site surface for obvious signs of potential contamination and/or contaminant sources.
- An evaluation of surrounding land uses to identify any neighbouring activities which may have affected or present a potential risk to the environmental quality of the Site.
- Completion four (4) boreholes using a combination of hand auger and drill rig techniques to a maximum depth of 8m below ground level (m bgl).
- Samples were collected at regular intervals throughout the soil profile, at zones of gross contamination and at changes in lithology.
- Each soil sample location was logged in general accordance with the Unified Soil Classification System (USCS) and each sample was screened in the field using a Photo-ionisation Detector (PID) to detect the potential presence of volatile organic compounds (VOC).
- Two (2) soil samples were submitted for analysis from each borehole, nominally of the near-surface materials (typically fill materials) and one representative soil sample from the underlying natural material. These soil samples were submitted to a NATA-accredited laboratory for analysis of the following analytes:
 - Total recoverable hydrocarbons (TRH).
 - Benzene, toluene, ethylbenzene, xylenes (BTEX).
 - Polycyclic aromatic hydrocarbons (PAH).
 - Eight priority metals (including arsenic, cadmium, chromium, copper, lead, mercury, nickel, and zinc).
 - Organochlorine pesticides (OCP) and organophosphate pesticides (OPP).
 - Polychlorinated biphenyls (PCB).
 - Asbestos identification (ID) in soil.
- Soil results were compared against the NEPC (2013) NEPM Health Investigation Level (HIL), Health Screening Level (HSL), Ecological Investigation Level (EIL), Ecological Screening Level (ESL) and Management Limits (ML) guidelines, as well as the CRC Care (2011) Direct Contact HSLs.
- The results of this investigation are presented in an Environmental Investigation report that is prepared in general accordance with the NSW EPA (2020) Consultants Reporting on Contaminated Land.

2 Site Identification

The site identification details for the Site have been prepared in general accordance with the NSW EPA (2020) Consultants Reporting on Contaminated Land guidelines and the ASC NEPM (2013) Field Checklist for 'site Information'. The site identification information has been summarised in **Table 1** below.

Table 1. Site Identification

ITEM	DETAIL
Address	48-50 Eurobin Avenue, Manly NSW 2095
Title and Land Information	Lot 42 DP14521 – 48 Eurobin Avenue – 482m ² SP12627 – 50 Eurobin Avenue – 474m ²
Site Area	Total approximate area of 956m ² <ul style="list-style-type: none"> • 48 Eurobin Avenue – 482m² • 50 Eurobin Avenue – 474m²
Local Government Area	Northern Beaches Council
Site Coordinates – Approximate centre of the Site (GDA2020 MGA Zone 56)	Easting: 341180 Northing: 6260259
Zoning	R1 – General Residential under the Manly Local Environmental Plan 2013
Current Owner	Stella Maris College, leased to residential tenants
Current Land Use	Low-density residential housing
Future Land Use	Extension to Stella Maris College of single-storey demountable classrooms
Trigger for Assessment	To support the Campus Masterplan Stage 1 DA
Surrounding Land Uses	The land uses currently surrounding the Site include: <ul style="list-style-type: none"> • North: Eurobin Avenue, followed by low-density residential properties, Lagoon Park and Manly Creek. • South: Low-density residential properties and Stella Maris College, followed by Iluka Avenue. • East: Stella Maris College (Main Campus), followed by low- and high-density residential dwellings and Queenscliff Beach. • West: Low-density residential properties, followed by Stella Maris College (Benedict Campus) and Pittwater Road.
Site Layout	Figure 1, Appendix A



2.1 Site Condition

A site visit was completed by Reditus' Senior Environmental Scientist Jack Palma during intrusive fieldworks on 15th November 2022. The following site description was recorded during the fieldworks:

- The Site is located in a primarily residential area of Manly close to Manly Creek.
- A one-storey low-density residential dwelling constructed from brick was established on 48 Eurobin Avenue, and a two-storey low-density residential dwelling was established on 50 Eurobin Avenue. Both dwellings appeared to be of mid to late 20th century construction.
- Both properties were accessed from Eurobin Avenue.
- The Site was flat with no significant change in surface elevation observed.
- A basement was observed immediately adjacent the Site to the east.
- Each residential property was bounded by fences on each side.
- Vegetation including grass and trees were observed on both properties, and no obvious signs of vegetation stress were observed.
- No bulk storage of liquid chemicals was observed on the Site.
- A piece of asbestos containing material (ACM) in the form of fibrous cement sheeting was observed leaning against a fence along the western driveway on 50 Eurobin Avenue.
- No other olfactory signs of contamination including odours or staining were noted during the inspection.

Relevant photographs from the Site inspection are provided in **Appendix B**.

3 Site Setting and Surrounding Environment

A summary of the site setting surrounding environment obtained from publicly available databases is provided in **Table 2** below.

Table 2. Site Setting and Surrounding Environment

ITEM	DETAIL
Topography	The Site is relatively flat with an elevation of approximately 4m relative to Australian Height Datum (AHD).
Hydrology	Surface water from the property is likely to flow into on-site stormwater drains on the Site and on Eurobin Avenue. Stormwater likely flows towards Manly Creek based on the regional topography.
Regional Geology and Soils	<p>The 1:100,000 Sydney Geological Series Sheet 9130 (Edition 1, 1983) indicates that the Site is underlain by Hawkesbury Sandstone, a Middle-Triassic aged formation described as medium to coarse grained quartz sandstone, with very minor shale and laminate lenses.</p> <p>The NSW Soil Landscapes map indicates that the Site is situated within the Newport soil landscape (9130np). The Newport soil landscape is an aeolian deposit characterised by well sorted siliceous sands overlying yellow podzolic soils in gently undulating plains to rolling rises mantling other soil materials or bedrock.</p>
Acid Sulfate Soils (ASS)	<p>The NSW Acid Sulfate Soils Risk Map – Sydney 1:25,000 notes that there is a low probability of occurrence in soils <3m bgl on the Site.</p> <p>A review of the Manly Local Environmental Plan 2013 Acid sulfate soil risk maps indicates that the Site is located entirely with an area of Class 4 Acid Sulfate Soils. Class 4 Acid Sulfate Soils are areas in which acid sulfate soils are likely to be found beyond 2 metres below the natural ground surface.</p> <p>Reditus notes that the proposed development for the Site does not include a basement. As such, it is unlikely that potential/actual acid sulfate soils will be encountered during the proposed development.</p> <p>Additionally, an Acid Sulfate Soils Assessment report is being prepared concurrently for the Site to support the DA (Ref: Reditus (2022), 22246LR02).</p>
Registered Groundwater Bore Search	<p>A review of Bureau of Meteorology's Australian Groundwater Explorer indicated that there are fifteen (15) groundwater monitoring bores within a 500m radius of the Site. Of these boreholes, thirteen (13) bores are used for domestic water supply purposes with the remainder classified as 'other'. Of the bores, only seven (7) are identified as functional with the remaining marked as 'unknown'.</p> <p>Standing water level (SWL) was reported at between the depths of 2.5m bgl to 12m bgl in these registered bores.</p>
Regional Hydrogeology	A review of Hydrogeology map of Australia (Geoscience Australia) indicates that site aquifers are porous, extensive aquifers of low to moderate productivity.
Inferred Groundwater Flow Direction	Groundwater is inferred to flow in an easterly direction towards Queenscliff Beach.
Depth to Water Table	Depth to the top of the groundwater table was reported during the intrusive investigation completed as part of this PSI at 1.8m bgl in borehole BH02 and BH03 and 2.8m bgl in borehole BH01.

ITEM	DETAIL
Yield and Inferred Groundwater Quality	<p>Groundwater yield and salinity was available for several of the registered groundwater bores, with the following yield and salinity ranges reported:</p> <ul style="list-style-type: none"> • Yield – 0.5 to 1 L/s. • Salinity – 300 to 430 mg/L. <p>Other groundwater quality parameters were not available at the time of reporting.</p>
Groundwater Dependant Ecosystems	<p>A review of the Groundwater Dependant Ecosystem Atlas indicated that the Site is not located within an identified Groundwater Dependant Ecosystem (GDE). The following GDEs were identified surrounding the Site:</p> <ul style="list-style-type: none"> • Manly Lagoon, a wetland located approximately 100m to the north of the Site was identified as an aquatic 'High potential GDE – from national assessment'. This indicates that aquatic species in Manly Lagoon may have a high potential for interaction with groundwater. • A small portion of Manly Lagoon was also identified as a terrestrial 'High potential GDE – from national assessment'. This indicates that terrestrial species in this area may have a high potential for interaction with groundwater. • Portions of Manly Creek located further upstream were identified as aquatic 'Moderate potential GDE – from national assessment'.
Groundwater Embargoes	No groundwater embargoes applying to the Site were identified.
Sensitive Environments	<p>The nearest identified sensitive environments to the Site are summarised as follows:</p> <ul style="list-style-type: none"> • Local stormwater network. • Stella Maris College located 20m to the East (main campus) and 250m to the south-west (Benedict Campus) of the Site. • Manly Creek located 100m to the north of the Site. Manly Creek drains to Queenscliff Beach. • Residential dwellings located adjacent to the Site to the south, west and north of the Site.

4 Site History

4.1 Historical Aerial Photographs

Historical aerial images of the Site and surrounding area were sourced from the NSW Spatial Services Historical Imagery Viewer and were reviewed for the following years; 1943, 1955, 1965, 1971, 1975, 1978, 1982, 1986, 1991, 1996, 2004, 2011 and 2022. Any notable observations throughout the course of these years are listed below.

- **Onsite:** The Site has historically been used as private residential dwellings since at least 1943. No major changes to the Site have occurred since its initial construction, and it appears based on the imagery that the present residential dwellings may be original.
- **Surrounding Area:** The surrounding area has predominately adopted a residential land use since at least 1943. Minor commercial developments and expansion of Stella Maris College has occurred throughout the latter half of the 20th century. Expansion of the western portion of Stella Maris occurred between 2011 and 2022.

The historical imagery comparison is provided in **Appendix C**.

4.2 Title Deed Searches

A title deed search was obtained from Land Insight and Resource Pty Ltd (LIR) for 50 Eurobin Avenue. The results of the title search are as follows:

- The property title deed has been held by residential owners since 1918.
- 50 Eurobin Avenue was converted to Stata Plan (SP12627) in 1978.

A title search for 48 Eurobin Avenue was not included in the scope of works for the Site. Due to the Site's historical residential land use based on historical imagery and site walkover, Reditus does not consider that a Title Deed is likely to have identified any potentially contaminating activity.

4.3 Previous Investigations

Reditus are concurrently preparing a Hazardous Materials Survey report, a Preliminary Waste Classification and Acid Sulfate Soils Assessment report for the Site. The outcomes of these investigations are not available at the time of reporting of this PSI. Reditus are aware of the following historical environmental investigations relevant to the Site:

- Reditus, 2021 - Preliminary Site Investigation with limited Soil Assessment, 48 Eurobin Avenue, Manly NSW, 6th August 2021

The investigation is summarised in the following section.

4.3.1 REDITUS, 2021 - PRELIMINARY SITE INVESTIGATION WITH LIMITED SOIL ASSESSMENT, 48 EUROBIN AVENUE, MANLY NSW

Reditus was engaged by Stella Maris to complete a PSI with limited soil assessment in August of 2021 to support a DA for change of land use at 48 Eurobin Avenue, Manly. The report is summarised as follows:

- The Site has been in use as a residential property since at least 1943.
- The Site comprises a residential dwelling with an ancillary shed, timber deck and some landscapes areas.
- Potentially asbestos containing material (PACM) was observed within the building structure during site inspection. The external eaves of the residential dwelling and the external walls were composed of bonded fibre sheeting. As the residence was constructed prior to 1943, it was assumed that the bonded fibre sheeting is not likely to contain asbestos.
- Paint was observed to be flaking on doors and window frames of the dwelling and the external shed. The report considered it likely that the external paint might contain lead.
- No evidence of underground petroleum storage systems (UPSS) was observed at the Site.
- No evidence for the use and/or storage of materials containing per- and polyfluoroalkyl substances (PFAS) was observed.

- No stockpiled waste, hazardous chemicals, chemicals, dangerous goods, odours or visual signs of contamination were observed during the site inspection.
- Three (3) surface soil samples (S1, S2 and S3) were collected from judgemental soil sample locations across the Site, with no hydrocarbon odours or staining observed during the investigation.
- Concentrations of COPC were reported below the adopted NEPM (2013) soil assessment criteria in all soil samples analysed, with exception to a marginal exceedance of ecological screening criteria (ESL) for Benzo(a)pyrene in one sample. It was reported that this exceedance was not likely to preclude the Site from the proposed development.
- The Site was considered suitable for the proposed change in land use from residential to educational land use, however a hazardous materials survey was recommended for the Site prior to development.

4.4 Regulatory Searches

A search of regulated sites within 1km of the Site was conducted as part of the PSI. The results of this search are summarised as follows:

- A search of NSW EPA Contaminated Land Records of Notice and List of NSW Notified Sites (as of 24th November 2022) in relation to Section 58 and 60 of the Contaminated Land Management Act 1997 was undertaken for the Site and surrounding area, which noted that there were two (2) notified sites within 1 km of the Site:
 - Caltex Service Station, located at 86 Pittwater Road, approximately 775m to the south of the Site. This site is listed as 'Regulation under CLM Act not required'. This means that The EPA has completed an assessment of the contamination and decided that regulation under the Contaminated Land Management Act 1997 is not required.
 - Former Landfill Addiscombe Road, located at Addiscombe Road, approximately 940m to the north-west of the Site. This site is listed as 'Contamination currently regulated under CLM Act'. This means that The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation under the Contaminated Land Management Act 1997 (CLM Act). Management of the contamination is regulated by the EPA under the CLM Act. Regulatory notices are available on the EPA's Contaminated Land Public Record.
 - Reditus considers that, due both to the proximity of these contaminated sites to the Site, and the regional topography, it is unlikely that identified contamination on these sites has affected the Site.
- A search of licenced activities under the Protection of the Environment Operations Act (1997) did not identify any listings within a 1 km radius of the Site.
- No regulated sites under the National Pollutant Inventory (NPI) were reported within 1km of the Site.

4.5 SafeWork NSW Dangerous Goods Records

A SafeWork NSW Dangerous Goods Records search was not undertaken for the Site as it is unlikely that bulk fuel storage has historically occurred based on the historical aerial imagery, historically residential land use and the site walkover.

4.6 Potentially Contaminating Processes

Potentially contaminating processes are listed below in **Table 3**.

Table 3. Potentially Contaminating Processes

ITEM	DETAIL
Past Industrial Processes	A review of historical imagery, the Site's historical residential land use along with notes made during the site inspection and walkover completed by Reditus indicates that industrial processes are unlikely to have historically occurred on the Site.



ITEM	DETAIL
Manufacturing Processes	<p>A review of historical imagery, the Site's historical residential land use along with notes made during the site inspection and walkover completed by Reditus indicates that manufacturing processes are unlikely to have historically occurred on the Site.</p>
Hazardous Materials	<p>It is possible that the residential dwellings made use of hazardous materials (i.e., lead paint, asbestos containing material) in their construction.</p> <p>A sheet of PACM fibrous cement sheeting was observed leaning against the fence line ahead of the western carport on 50 Eurobin Avenue. The PSI conducted for 50 Eurobin Avenue by Reditus (2021) identified that flaking lead paint on the external of the dwelling was likely to contain lead.</p> <p>A separate Hazardous Materials Survey Report is being concurrently prepared for the Site (Red: Reditus, 2022, 22246RP01).</p>
Storage Tanks	<p>No evidence of the underground petroleum storage systems (UPSS) was observed during the site walkover, within the LIR report or historical imagery. As such, it is unlikely that the underground storage of fuel has occurred at the Site.</p> <p>The Site is located within a UPSS Environmentally Sensitive Zone, per the Manly Council (2010) UPSS Regulation – Sensitive Zones Map.</p>
Discharges to Land, Water and Air	<p>A review of historical imagery, the Site's historical residential land use along with notes made during the site inspection and walkover completed by Reditus indicates that discharges to land, water and air are unlikely to have historically occurred on the Site.</p>
Visible Signs of Contamination	<p>The following visible signs of contamination were observed during the intrusive works completed as part of this PSI:</p> <ul style="list-style-type: none">• A piece of PACM fibrous cement sheeting located leaning against a fence ahead of the western carport at 50 Eurobin Avenue.• Fill material in boreholes BH03 and BH04.
Presence of Drums and Wastes	<p>No bulk storage of liquid chemicals was observed on the Site at the time of the site walkover on 15th November 2022.</p>
Fill Material	<p>During intrusive works, fill materials were encountered in each borehole, with a maximum thickness of 0.5m recorded in BH03. Anthropogenic material included glass in borehole BH04 and a metal fragment in borehole BH03. No other obvious signs of filling were observed on the Site at the time of the site walkover on 15th November 2022.</p>
Odours	<p>No olfactory odours indicative of contamination were encountered during the site walkover and intrusive works completed by Reditus.</p>

4.7 PFAS Investigation Sites

Per- and poly-fluorinated substances (PFAS) have more recently been highlighted as a persistent and mobile contaminant of significant toxicity. The potential risk posed by PFAS contamination has been evaluated by using available site history information with a preliminary decision tree assessment matrix. The potential risk presented by PFAS contamination is presented in **Table 4**.

Table 4. Summary of PFAS Preliminary Risk Assessment

ITEM	PROBABILITY	DETAIL
Did fire training occur on-site?	Low	Historical aerial imagery and title deed searches deem it unlikely that fire training occurred at the Site.
Is an airport or fire station up gradient of or adjacent to the Site? ²	Low	The closest fire station (Manly Fire Station 024) is located approximately 1.24km to the south-west of the Site. Due to its proximity from the Site, Reditus considers the risk of potential fire training activities at Manly Fire Station having led to contamination on the Site being low.
Have “fuel” fires ever occurred on-site? e.g., ignition of fuel (solvent, petrol, diesel, kerosene) tanks.	Low	No evidence of fuel fires occurring on the Site was observed during the site walkover.
Have PFAS been used in manufacturing or stored on-site?	Low	There is no evidence of manufacturing having occurred at the Site, nor is there evidence of PFAS containing materials historically being stored on the Site.

Notes:

1. Runoff from fire training areas may impact surface water, sediment, and groundwater.
2. PFAS is used in a wide range of industrial processes and consumer products
(<https://www.industrialchemicals.gov.au/consumers-and-community/and-poly-fluorinated-substances-pfas>)

5 Preliminary Conceptual Site Model

Based on the information presented in Sections 1-4 of this report, a Conceptual site Model (CSM) has been prepared for the Site. The ASC NEPM 2013 defines a CSM as:

“A representation of site-related information regarding contamination sources, receptors and exposure pathways between those sources and receptors”

The essential elements of the CSM, as required by the ASC NEPM (NEPC, 2013), include an understanding of:

- Known and potential sources of contamination and contaminants of concern including the mechanism(s) of contamination (e.g., ‘top down’ spill or sub-surface release from corroded tank or pipe).
- Potentially affected media (soil, sediment, groundwater, surface water, indoor and ambient air) and human and ecological receptors.
- Potential and complete exposure pathways.

A tabular CSM provided in **Table 5** identifies the complete and potential pathways between the known or potential source(s) of contamination and receptor(s).

5.1 Potential Sources of Contamination

The potential sources of contamination identified during this PSI are summarised in **Table 5**.

Table 5. Potential Sources of Contamination

SOURCE	LOCATION	DESCRIPTION	CONTAMINANTS OF POTENTIAL CONCERN
Historical use of fill	Onsite	Importation of fill of unknown origin for cut and fill activities associated with construction of on-site residential dwellings.	Metals, TRH, BTEX, PAH, OCP/OPP, PCB, asbestos.

5.2 Potentially Affected Media

The potentially affected media at the Site includes:

- Soil.
- Groundwater.

5.3 Potential Receptors and Pathways

5.3.1 PROPOSED LAND USE SCENARIO AND POTENTIAL RECEPTORS

Based on the proposed land use (educational facility), which for conservatism was assumed to be the highest sensitivity land use (HIL-A), potential receptors include the following:

- Site users.
- Construction/maintenance workers.
- Offsite residents.

5.3.2 HUMAN HEALTH – DIRECTION CONTACT PATHWAY

It is considered appropriate to assess whether a direct contact source may be present on the Site for construction and maintenance workers and future site users. Health impacts should be taken into consideration since there are accessible soils.

5.3.3 HUMAN HEALTH – INHALATION / VAPOUR INTRUSION PATHWAY

It is considered necessary to assess whether a vapour source may be present on the Site for construction and maintenance workers in a trench (i.e., for the construction/maintenance of service trenches), and for basement users.

5.3.4 HUMAN HEALTH – INGESTION

It is considered necessary to assess whether a source-pathway-receptor linkage is present for the ingestion of potential contaminated soils at the surface or subsurface for future site users, offsite residents and construction/maintenance workers.

5.3.5 AESTHETICS

A visual assessment of aesthetics was undertaken for the Site to determine if staining or other visual indicators of contamination might preclude the Site from the proposed land use.

5.3.6 ECOLOGICAL – TERRESTRIAL ECOSYSTEMS

As assessment of risk of potential contamination to nearby ecological receptors was deemed necessary due to both the Site's proximity to Manly Creek and to Terrestrial and Aquatic GDEs (see **Table 2** for more detail).

5.3.7 GROUNDWATER

Assessment of groundwater was not considered warranted due to the preliminary nature of the investigation. Reditus will recommend the preparation of a Dewatering Management Plan (DMP) which may involve further characterisation of groundwater on the Site.

5.4 Potential Transport Mechanisms and Exposure Pathways

Potential transport mechanisms of contamination relevant to the Site include:

- Potential historical placement of fill materials.
- Leaching of fill materials to underlying soil and groundwater table.

Potential exposure pathways and receptors relevant to the Site may include:

- Direct contact with contaminated soils at the surface by current and future site users.
- Ingestion or Inhalation of disturbed contaminated soil as dust by site users or by offsite workers.
- Direct contact with contaminated soils at the surface or sub-surface by construction and maintenance workers (i.e., during excavation for service trenches and the ongoing maintenance of such structures).
- Ingestion or direct contact of potentially contaminated groundwater by on-site or off-site users of extracted groundwater.

5.5 Source, Pathway and Receptor Linkages

A tabular CSM has been prepared for the Site based on the outcomes of the PSI (



Table 6). The tabular CSM describes potential linkages and assesses each of the linkages as probably, possible, or unlikely based on the likelihood of occurrence and availability of data.

Table 6. Exposure Pathway Assessment

SOURCE	EXPOSURE PATHWAY	RECEPTOR	EXPOSURE
Historical use of fill <i>Potential Importation of fill from unknown sources.</i>	<ul style="list-style-type: none"> • Direct contact with contaminated soil. • Inhalation or dust and/or vapour. • Ingestion of mobilised dust. • Ingestion or direct contact with potentially contaminated groundwater. 	<ul style="list-style-type: none"> • Site Users. • Construction Workers. • Maintenance workers. • Offsite residents. 	Possible Potential source-pathway-receptor linkages have been identified with relation to the potential historical usage of fill and as such assessment of these linkages is warranted.

6 Data Quality Objectives

The Data Quality Objective (DQO) process is a systematic planning tool based on the scientific method for establishing criteria for data quality and for developing data collection designs. The DQO defines the experimental process required to test a hypothesis. The DQO process has been developed to ensure that efforts relating to data collection are cost effective, by eliminating unnecessary, duplicative or overly precise data whilst at the same time, ensuring the data collected is of sufficient quality and quantity to support defensible decision making.

It is recognised that the most efficient way to accomplish these goals is to establish criteria for defensible decision making before data collection begins and develop a data collection design based on these criteria. By using the DQO process to plan the investigation effort, the relevant parties can improve the effectiveness, efficiency and defensibility of a decision in a resource and cost-effective manner.

The DQO process consists of seven steps, which are designed to clarify the study objectives, define the appropriate type of data and specify tolerable levels of potential decision errors. The seven-step DQO process adopted for this PSI can be summarised as:

- **Step 1: State the Problem** – concisely describe the problem to be studied. Review prior studies and existing information to gain a sufficient understanding to define the problem.
- **Step 2: Identify the Decision** – identify what questions the study will attempt to resolve, and what actions may result.
- **Step 3: Identify the Inputs to the Decision** – identify the information that needs to be obtained and the measurements that need to be taken to resolve the decision statement.
- **Step 4: Define the Study Boundaries** – specify the time periods and spatial area to which decisions will apply. Determine when and where data should be collected.
- **Step 5: Develop a Decision Rule** – define the statistical parameter of interest, specify the action level, and integrate the previous DQO outputs into a single statement that describes the logical basis for choosing among alternative actions.
- **Step 6: Specify Tolerable Limits on Decision Errors** – define the decision maker's tolerable decision error rates based on a consideration of the consequences of making an incorrect decision; and
- **Step 7: Optimise the Design** – evaluate information from the previous steps and generate alternative data collection designs. Choose the most resource-effective design that meets all DQOs.

The DQOs are provided in **Table 7** below and were derived in accordance with Australian Standard 4482.1-2005 'Guide to the investigation and sampling of sites with potentially contaminated soil. Part 1: Non-volatile and semi-volatile compounds' (AS 4482.1-1997).

Table 7. Data Quality Objectives

ITEM	DETAIL
Step 1: State the problem	A Preliminary Site Investigation has been required for 48-50 Eurobin Avenue to support the Development Application for the Site which includes the construction of a basement to 3m bgl.

ITEM	DETAIL
Step 2: Identify the decision/goal of the study	<p>If elevated concentrations of COPCs are identified at the Site:</p> <ul style="list-style-type: none"> • Have potentially contaminating activities occurred on the Site? If so, what level of site investigation is required to define the nature, extent and degree of contamination (if any); to assess potential risk posed by contaminants to health and the environment (if any)? • What is the extent of the impact? • Does any COPC at the Site occur at concentrations that pose or may pose an unacceptable liability or risk to the environment and/or human health to persons who will utilise the future development? • If so, what is the order of priority to minimise the risk and what additional measures are required to mitigate, remediate, or manage the risk? • Is the Site suitable for the proposed land use setting, in the context of land contamination?
Step 3: Identify the information inputs	<p>Key data required to resolve the project problem included concentrations of COPC in the soil collected in the study area and the structure and depth of the underlying site geology.</p> <p>The COPC selected were based on the historical assessment and the current site condition observed during fieldworks. The regulatory guidelines adopted by Reditus to assess concentrations of COPC in analytical results are listed below.</p> <p>Soil – Site Suitability – Human Health</p> <ul style="list-style-type: none"> • NEPC (as amended 2013) NEPM ASC <ul style="list-style-type: none"> – HIL-A – Residential. – HSL-A/B – Residential – Sand. – ML – Residential, Parkland and Open Space – Coarse Soil Texture. • CRC Care (2011) <ul style="list-style-type: none"> – Direct Contact HSL – Residential. – Direct Contact HSL – Intrusive Maintenance Worker. <p>Soil – Site Suitability – Ecological Health</p> <ul style="list-style-type: none"> • NEPC (as amended 2013) NEPM ASC <ul style="list-style-type: none"> – EIL – Urban Residential/Public Open Space. – ESL – Urban Residential and Public Open Space – Coarse Soil Texture – 0 to <2m.
Step 4: Define the boundaries of the study	<p>This investigation was restricted to the physical site boundaries, as shown in Figure 2, Appendix A. The vertical extent of the study boundaries was limited to a maximum depth of 4.0m bgl. The temporal boundaries of the study were limited to the date that the investigations were completed.</p>
Step 5: Develop a decision rule	<p>If the concentrations of COPC in the soil are reported to be below the relevant adopted tier 1 assessment guidelines, then the soil will be deemed suitable, and no management/remediation options will be proposed for the proposed land use at the Site.</p> <p>If, however, the concentration of one or more COPC are greater than the guidelines, then further investigation will be required to laterally and vertically delineate the extent of the impact and/or recommendations made for the remediation/management of contamination to render the Site suitable for the proposed use.</p>



ITEM	DETAIL
Step 6: Specify tolerable limits on decision errors	<p>The acceptable limits for samples are as follows:</p> <ul style="list-style-type: none">• % RPD for laboratory duplicates for TPH and BTEX analysis is less than 60%; and• Recovery of matrix spikes and surrogate spikes is as per the laboratory's Quality Assurance targets accepted under their National Association of Testing Authorities (NATA) accreditation. <p>Precision is measured using the standard deviation 'SD' or Relative Percent Difference '%RPD'. Replicate data for field duplicates of organics is expected to be as follows:</p> <ul style="list-style-type: none">• RPD criteria of 50% or less, for concentrations \geq 10 times practical quantitation limits (PQL);• RPD criteria of 75% or less, for concentrations between 5 and 10 times the EQL; and• RPD criteria of 100% or less, for concentrations $<$ 5 times PQL. <p>Replicate data for field duplicates for inorganics, including metals is expected to be as follows:</p> <ul style="list-style-type: none">• RPD criteria of 30% or less, for concentrations \geq 10 times PQL;• RPD criteria of 75% or less, for concentrations between 5 and 10 times the EQL; and• RPD criteria of 100% or less, for concentrations $<$ 5 times PQL. <p>Where acceptable limits for field duplicates were not met, a discussion on low biased error will be provided.</p> <p>For this investigation, a decision error of 5% will be considered acceptable. This error rate is in accordance with Appendix B of Schedule B(2) of the ASC NEPM. In order to achieve this level of confidence, the investigation has been designed as described below.</p>
Step 7: Optimise the design	<p>Soil samples were collected on combination of a judgemental (targeted) and systematic grid-based sampling design program (in areas of accessible soil and away from underground services), with COPC analysis based on the known areas of environmental concern (AECs).</p> <p>Soil samples were collected at relevant intervals, changes in geology or in zones of gross contamination and locations selected for efficient and representative sampling.</p> <p>All media sampling was completed in accordance with Reditus standard operating procedures (SOPs) and relevant industry guidelines.</p>

7 Tier 1 Assessment Criteria

Tier 1 assessment involves the comparison of monitoring data to published guideline criteria (typically presented as screening levels). Relevant criteria are selected based on the identified viable exposure pathways and COPCs and proposed land use.

In Australia, appropriate HILs (including interim HILs for vapour intrusion and, where applicable, HSLs for petroleum hydrocarbons and assessment criteria for asbestos) are used for Tier 1 screening to provide a rapid assessment of whether the site contamination may be of concern with respect to human health. Should contaminant concentrations at a site occur at levels that are below the Tier 1 levels, this implies that for the majority of the people in the population there is no significant health risk from contamination and that remedial action may not be required to protect human health.

Exceedances of the tier 1 HILs should be identified and considered. Tier 1 HIL exceedances do not imply that a risk is necessarily present, but that further assessment may be justified. Tier 1 HILs are not intended to indicate a clear demarcation between acceptable and unacceptable. Marginal exceedances may not require quantitative Tier 2 risk assessment to conclude that further assessment is not necessary. The magnitude of the exceedance should be considered in the context of the CSM (that is, whether the exposure pathways are plausible and whether exposure will result in harm).

Tier 1 screening criteria (including HILs and HSLs) should only be used where there has been adequate characterisation of a site (that is, appropriate representative sampling has been carried out). For this investigation, the maximum reported concentrations for each sample and analyte will be compared against the tier 1 criteria. Should any individual sample exceedance of the tier 1 criteria exist, the 95% Upper Confidence Limit (UCL) of the analyte for the site data set was calculated and compared to relevant Tier 1 screening criteria. However, the implications of localised elevated values should also be considered. In order to adopt the 95% UCL result, the analyte data set must also meet the following criteria:

- The standard deviation (SD) of the results should be less than 50% of the Tier 1 screening criteria.
- No single value exceeds 250% of the relevant Tier 1 screening criteria (characterised as a 'hot-spot').

Where site data exceeds the screening levels or suitable screening levels cannot be identified, further consideration (Tier 2 assessment) is required.

7.1 Soil Assessment Criteria

Tier 1 assessment involves the comparison of monitoring data to published guideline criteria (typically presented as screening levels). Relevant criteria are selected based on the identified viable exposure routes and the available data. Where site data exceeds the screening levels or suitable screening levels cannot be identified, further consideration (Tier 2 assessment) is required.

The tier 1 assessment criteria were adopted from:

- National Environment Protection Council (NEPC) 1999, 'Schedule B(1) Guideline on Investigation Levels for Soil and Groundwater, National Environment Protection (Assessment of site Contamination) Measure (NEPM), as amended in 2013'.
- CRC Care (2011) Health screening levels for petroleum hydrocarbons in soil and groundwater. Part 1: Technical development document.

The soil assessment criteria (SAC) adopted for this PSI were:

- NEPC (2013) NEPM HIL-A criteria values have been adopted to assess concentrations of COPC in soil for site suitability and human health in an educational scenario, noting that HIL-A represents the most sensitive criteria.
- NEPC (2013) NEPM HSL-A/B guidelines for vapour intrusion have been adopted to evaluate the risk posed from vapour intrusion in a residential scenario. The soil HSLs are based on depth of impacts, overlying soil type and land use. The selection of HSL-A/B was based on the applicable ground floor land use (educational), the potential receptor/s onsite and the exposure that may be experienced (noting that the proposed development includes a basement to 3m bgl). After a review of subsurface conditions, the guidelines for sand were selected.

- NEPC (2013) NEPM ML (coarse soil texture) guidelines have been adopted and are used to consider the potential formation of light non-aqueous phase liquids, fire and explosion risks and damage to buried infrastructure. A coarse-grained soil type was selected following a review of bore logs which indicated that the predominant soil type was sand, suggesting a coarse-grained soil matrix. The residential, parkland and open space ML criteria has been selected as it represents the most conservative criteria.
- NEPC (2013) NEPM ESLs and EILs were both selected to determine the risk of potential contamination to identified ecological receptors close to the Site. Both ESL and EIL criteria values are applicable for the first 2m of the soil profile. The ESL and EIL values for Urban residential and public open space have been adopted for this investigation.
- EIL criteria values were derived using academic values where appropriate using the NEPM EIL Interactive Calculation Worksheet available at <http://www.nepc.gov.au/nepms/assessment-site-contamination/toolbox>. The output from the EIL calculation is available in **Appendix H**. The following input parameters were adopted from the NSW Government eSpade viewer to derive EILs, noting that where a range of values were given, the average of those two values was selected as an input:
 - **Cation exchange capacity (CEC):** 2.5 cmol_e/kg
 - **Clay (%):** 2.5%
 - **pH (CaCl₂):** 4.25
 - **Soil organic carbon (OC %):** 1.25
- The CRC Care (2011) Soil HSLs for Direct Contact were selected to evaluate the risk of soil contamination to identified human receptors via the direct contact exposure pathway in the residential, public open space land and intrusive maintenance worker scenarios.

Soil analytical results are tabulated in **Table 1, Appendix D**, and guideline criteria are presented below in **Table 8**.



Table 8. Adopted Soil Assessment Criteria (mg/kg)

CHEMICAL GROUP	ANALYTE	HIL-A	HSL-A/B				EIL URBAN RES & PUBLIC OPEN SPACE, AGED SOIL	ESL URBAN RES 0M TO <2M	ML RES/PARKLAND COARSE SOIL	DIRECT CONTACT HSL-A	DIRECT CONTACT INTRUSIVE MAINTENANCE WORKER
			>=0M, <1M	>=1M, <2M	>=2M, <4M	>=4 M					
BTEX	Naphthalene (BTEX)	-	3	NL	NL	NL	-	-	-	-	-
	Benzene	-	0.5	0.5	0.5	0.5	-	50	100	-	1100
	Toluene	-	160	220	310	540	-	85	14000	-	120000
	Ethylbenzene	-	55	NL	NL	NL	-	70	4500	-	85000
	Xylene Total	-	40	60	95	170	-	105	12000	-	130000
TRH	C ₆ -C ₁₀ Fraction (F1)	-	-	-	-	-	-	-	700	4400	82000
	C ₆ -C ₁₀ (F1 minus BTEX)	-	45	70	110	200	-	180	-	-	-
	>C ₁₀ -C ₁₆ Fraction (F2)	-	-	-	-	-	-	120	1,000	3300	62000
	>C ₁₀ -C ₁₆ Fraction (F2 minus Naphthalene)	-	110	240	440	NL	-	120	-	-	-
	>C ₁₆ -C ₃₄ Fraction (F3)	-	-	-	-	-	-	300	2,500	4500	85000
	>C ₃₄ -C ₄₀ Fraction (F4)	-	-	-	-	-	-	2,800	10,000	6300	120000
PAH	Benzo(a) pyrene	-	-	-	-	-	-	0.7	-	-	-
	Naphthalene	-	3	NL	NL	NL	-	170	-	1400	29000
	Benzo(a)pyrene TEQ calc (Half)	3	-	-	-	-	-	-	-	-	-
	Benzo(a)pyrene TEQ (LOR)	3	-	-	-	-	-	-	-	-	-
	PAHs (Sum of total)	300	-	-	-	-	-	-	-	-	-
Metals	Arsenic	100	-	-	-	-	100	-	-	-	-
	Cadmium	20	-	-	-	-	-	-	-	-	-
	Chromium (III+VI)	100 ¹	-	-	-	-	260 ²	-	-	-	-



CHEMICAL GROUP	ANALYTE	HIL-A	HSL-A/B				EIL URBAN RES & PUBLIC OPEN SPACE, AGED SOIL	ESL URBAN RES 0M TO <2M	ML RES/PARKLAND COARSE SOIL	DIRECT CONTACT HSL-A	DIRECT CONTACT INTRUSIVE MAINTENANCE WORKER
			>=0M, <1M	>=1M, <2M	>=2M, <4M	>=4 M					
	Copper	6,000	-	-	-	-	60	-	-	-	-
	Lead	300	-	-	-	-	1100	-	-	-	-
	Mercury	40	-	-	-	-	-	-	-	-	-
	Nickel	400	-	-	-	-	10	-	-	-	-
	Zinc	7,400	-	-	-	-	130	-	-	-	-
Organochlorine Pesticides	Aldrin + Dieldrin	6	-	-	-	-	-	-	-	-	-
	Chlordane	50	-	-	-	-	-	-	-	-	-
	DDT	-	-	-	-	-	180	-	-	-	-
	DDT+DDE+DDD	240	-	-	-	-	-	-	-	-	-
	Endosulfan	270	-	-	-	-	-	-	-	-	-
	Endrin	10	-	-	-	-	-	-	-	-	-
	Heptachlor	6	-	-	-	-	-	-	-	-	-
	Hexachlorobenzene	10	-	-	-	-	-	-	-	-	-
	Methoxychlor	300	-	-	-	-	-	-	-	-	-
Organophosphorous Pesticides	Chlorpyrifos	160	-	-	-	-	-	-	-	-	-
PCBs	PCBs (Sum of total)	1	-	-	-	-	-	-	-	-	-

¹Chromium (VI) HIL criteria has been applied to concentrations of Chromium (III+VI) for conservatism.

²Chromium (III) EIL criteria has been applied to concentrations of Chromium (III+VI) for conservatism.

8 Methodology

The methods used for the collection of field data are presented in the following sections.

8.1 Schedule of Works

Fieldworks including site inspection, drilling supervision, hand augering and soil sampling were completed on 15th November 2022 by Reditus' Environmental Scientist Sophie McAlpine and Senior Environmental Scientist Jack Palma.

Each borehole was logged in general accordance with the USCS, with soil samples collected at regular intervals, changes in geology or in zones of gross contamination.

8.2 Sampling Analysis Plan and Sampling Rationale

The intention of the sampling plan was to attain the objectives stated in **Section 1.1**. A judgemental or targeted approach to sample design was adopted for this PSI. The targeted sampling pattern seeks to assess areas of highest environmental concern, such as areas of obvious filling. Note that sample locations were limited by access to soil and the proximity of underground services.

The sampling plan was based on a historical desktop investigation, site observations, and had the goal of providing sufficient data to allow for in-situ soil assessment.

Locations of soil sample locations are presented on **Figure 2, Appendix A**. A total of four (4) boreholes were advanced across the Site (BH01 to BH04), with BH01 and BH02 being drilled on 48 Eurobin Avenue, and BH03 and BH04 being drilled on 50 Eurobin Avenue.

Reditus notes that the sampling density does not meet the required sample density for site characterisation for a site that is 0.096 ha in area which is eight (8) sample locations per NSW EPA (2022) Sampling Design Part 1 - application, Table 2. Due to the preliminary nature of the investigation, Reditus does not consider that the adopted density has affected the outcomes of the investigation. Additional sampling may be recommended for waste classification purposes and further soil characterisation.

8.3 Soil Sampling Methodology

Based on the CSM, soil samples were collected from the near-surface (0-0.1m), at changes in lithology or zones with any visual (staining or discolouration) or olfactory signs of contamination.

The soil samples were collected directly from the hand auger or solid flight augers attached to the tracked drill rig. Efforts were made to minimise disturbance of the material being sampled to the extent practicable. Such techniques included removing the outside layer of material and collecting from the centre of the recovered drill cuttings, to prevent cross-contamination and minimise the potential for loss of volatile organic compounds (VOCs).

The soil samples were placed directly into a laboratory prepared 250 mL glass jar with the details of the sample, including the sample name, the job number, the date of sample and the sample depth. Samples for asbestos ID were placed into a dedicated 60mL plastic bag.

Sample preservation was undertaken in accordance with NEPC (2013) NEPM, with samples immediately placed and stored in an ice filled esky to keep them chilled, prior to being couriered to the laboratory under a signed chain of custody (COC) form filled out with the required analysis.

Each soil sample was described in general accordance with the Unified Soil Classification System (USCS) and details of any discolouration, staining, odours or other indicators of contamination were also noted.

- Samples were collected with clean new nitrile gloves to prevent cross-contamination.
- Samples were placed in an ice-filled esky to keep them below 4°C in accordance with US EPA SW-846 method.
- Samples will be transferred to the laboratory under a completed chain-of-custody.



In summary, soil samples were collected in accordance with Reditus standard operating procedures which are based on the NEPC (2013) NEPM, Australian Standard AS4482.1-2005 and AS4482.2-1999 and EPA requirements.

8.4 Laboratory Analysis and Methods

Laboratory analytical methods and analyte PQLs are shown in the analytical certificates provided in **Appendix F**. Furthermore, the analytical suites performed during this investigation are provided in **Section 1.2**.

9 Quality Assurance and Quality Control (QA/QC)

9.1 Field Quality Assurance

9.1.1 DETAILS OF SAMPLING TEAM

Fieldworks including site inspection, drilling supervision, hand augering and soil sampling were on 15th November 2022 by Reditus' Environmental Scientist Sophie McAlpine and Senior Scientist Jack Palma, both of whom are suitably qualified and experienced in the collection of environmental samples.

9.1.2 DECONTAMINATION PROCEDURES CARRIED OUT BETWEEN SAMPLING EVENTS

The hand auger and solid flight augers were brushed clean with a wire brush and washed with laboratory-supplied deionised water between sampling events. Reditus considers this to be a suitable method to prevent cross contamination during soil sampling.

9.1.3 CHAIN OF CUSTODY DETAILS

Soil samples were transported to the laboratory under a chain of custody (COC). Information on the COC included the sampler, sample identifier, sample matrix, collection date, analyses to be performed, sample preservation method, sample release date and sample received date. COCs are provided in **Appendix F** along with the laboratory reports.

9.1.4 SAMPLING SPLITTING TECHNIQUES

A soil duplicate (DUP1) and triplicate (TRIP1) were collected by taking representative samples of the soil at the same depth interval. Due to the potential loss of volatiles, samples were not mixed or homogenised during collection or splitting.

9.1.5 STATEMENT OF DUPLICATE FREQUENCY

Field duplicates and triplicates were collected within a rate of 1:20 for soil samples. This rate is within the Australian Standard 4482.1-2005 'Guide to the investigation and sampling of sites with potentially contaminated soil. Part 1: Non-volatile and semi-volatile compounds and Reditus' QA frequency ranges.

The following soil QA/QC samples were collected:

- DUP1 and TRIP1 were respectively soil intra-laboratory and inter-laboratory duplicates of sample BH03-0.1.

9.2 Laboratory QA/QC

9.2.1 SAMPLE HOLDING TIMES

All holding times were reported as being within specified ranges.

9.2.2 LABORATORY ACCREDITATION AND ANALYTICAL METHODS USED

The primary laboratory used for soil samples was Envirolab Services Pty Ltd (Envirolab), while the secondary laboratory was Australian Laboratory Services Pty Ltd (ALS).

Envirolab is accredited by NATA to ISO/IEC 17025 with the accreditation number 1261, while ALS is also accredited to this standard with the accreditation number 825.

Laboratory QA/QC is provided on the laboratory reports in **Appendix F**.

9.2.3 LABORATORY CONTROL SAMPLES

Laboratory control samples were reported within acceptable ranges, with exception to a non-applicable spike recovery for lead in BH02-0.1. The recovery was non-applicable due to the concentration of the analyte in the sample. An acceptable recovery was obtained for the Laboratory Control Spike, however. As such, Reditus does not believe that this has affected the integrity of the dataset.

Detailed laboratory QA/QC are found in the laboratory report in **Appendix F**.

9.3 Evaluation of the QA/QC Information Compared to the DQOs

Documentation completeness:

- Soil logs, chain-of-custody forms, calibration were complete and appropriate.

Data completeness:

- All samples were received by the laboratories and analytical results reported including laboratory QA/QC.

Data comparability:

- Reditus standard operating procedures, Australian Standards and industry best practice were followed during sampling.
- Consistent field conditions and similarly trained staff were used during sampling.
- The limits of reporting are appropriate and generally consistent from each laboratory.

Data representativeness:

- Reditus is confident that cross contamination has not occurred, and primary samples are representative of actual soil conditions.
- The frequency of laboratory blanks was acceptable, and the results were within specified ranges.

Precision:

- Intra-laboratory and inter-laboratory duplicates were collected at the following rates:
 - Soil Intra-laboratory and inter-laboratory duplicates frequency were collected at least 1:20.
- QA/QC sample collection rate follows the guidance provided in the Australian Standard Field procedures (AS1482.1 1997).

9.3.1 RELATIVE PERCENT DIFFERENCE

Refer to **Table 2, Appendix E** for Relative Percent Differences (RPDs) calculations. Reditus notes that RPDs were only calculated for groups of compounds with detections above the laboratory detection limits. RPDs for soil were reported within acceptable ranges, with exception to the following:

- BH3-0.1 and DUP1
 - Benzo(a)pyrene – 52%.
 - PAHs (Sum of Positives) – 43%.
 - Copper – 32%.

Reditus considers that these RPD exceedances are likely to be due to the heterogeneity of sampled soil, noting that the QA/QC sample was collected from within an interval of fill material. Reditus hence does not consider that these RPD exceedances have affected the integrity of the analytical results.

10 Results

10.1 Field Observations

Soil samples collected from the boreholes were logged in general accordance with the USCS. Drafted borelogs are presented in **Appendix G**. The soils encountered during the intrusive investigation are summarised below:

- **Fill**
 - Fill materials were encountered in each borehole, with a maximum thickness of 0.5m recorded in BH03.
 - Fill material generally consisted of grey/brown sand, slightly moist, coarse sand, trace silt, with grass and rootlets. Fill material appeared to be reworked natural material.
 - Anthropogenic material included glass in borehole BH04 and a metal fragment in borehole BH03.
- **Natural**
 - Predominately silty sand, yellow to grey to brown, moist, soft, slightly plastic, fine to coarse grained.
 - No bedrock was encountered during the investigation.
- Groundwater was encountered in the boreholes BH01 at 2.8m bgl and BH02 and BH03 at 1.8m bgl.
- No PACM was observed in any of the boreholes.
- An organic odour was observed in the borehole BH01 from a depth of 2.0m bgl to 4.0m bgl and in BH04 from a depth of 1.0m bgl to 2.1m bgl. No other olfactory odours were noted in soils during sample collection.
- A piece of PACM fibrous cement sheeting located leaning against a fence ahead of the western carport at 50 Eurobin Avenue.

10.2 Soil Analytical Results

A summary of the soil analytical results can be found in **Table 1, Appendix D**. The following section outlines the key findings of the comparison between laboratory results and the site assessment criteria. Discussion of analytical results is provided in **Section 10.3** below.

Soil sample locations are presented on **Figure 2, Appendix A**.

10.2.1 HEAVY METALS

Concentration of heavy metals were reported below the adopted assessment criteria in all soil samples submitted for analysis with exception to the following:

- Nickel – EIL Criteria (10 mg/kg)
 - BH01-01 – 13 mg/kg
- Zinc – EIL Criteria (130 mg/kg)
 - BH02-0.1 – 240 mg/kg

10.2.2 TRH

Concentration of TRH were reported below the adopted assessment criteria in all soil samples submitted for analysis.

10.2.3 BTEX

Concentration of BTEX were reported below the laboratory limit-of-reporting (LOR) and hence below adopted assessment criteria in all soil samples submitted for analysis.

10.2.4 PAH

Concentrations of PAHs were reported below the adopted assessment criteria in all soil samples submitted for analysis with exception to the following:

- Benzo(a)pyrene – ESL Criteria (0.7 mg/kg)

- BH02-0.1 – 1.1 mg/kg
- DUP1 (BH03-0.1) – 0.89 mg/kg

10.2.5 OCP & OPP

Concentration of OCP and OPP were reported below the adopted assessment criteria in all soil samples submitted for analysis.

10.2.6 PCB

Concentrations of PCB were reported below the laboratory limit-of-reporting (LOR) and hence below adopted assessment criteria in all soil samples submitted for analysis.

10.2.7 ASBESTOS

No asbestos was reported in any samples submitted for analysis.

10.2.8 SUMMARY OF EXCEEDANCES

A summary of the samples which exceeded adopted soil assessment criteria is presented below in **Table 9**.

Table 9. Exceedance Summary

SAMPLE	DEPTH (M BGL)	ANALYTE	EXCEEDING CRITERIA
BH01 – 0.1	0.1	Nickel	EIL
		Zinc	EIL
BH02 – 0.1	0.1	Benzo(a)pyrene	ESL
DUP1 (BH03)	0.1		ESL

10.3 Discussion of Soil Results

10.3.1 HEALTH INVESTIGATION LEVELS (HIL-A)

The results of the laboratory analysis indicate that concentrations of contaminants of potential concern in each soil sample submitted for analysis were reported below applicable adopted NEPC (2013) NEPM HIL-A guidelines.

10.3.2 HEALTH SCREENING LEVELS FOR VAPOUR INTRUSION (HSL-A/B AND)

The results of the laboratory analysis indicate that concentrations of contaminants of potential concern in each soil sample submitted for analysis were reported below applicable adopted NEPC (2013) NEPM HSL-A guidelines for vapour intrusion.

10.3.3 MANAGEMENT LIMITS (ML RES/PARKLAND)

The results of the laboratory analysis indicate that the concentrations of contaminants of potential concern in soil at each sample location were reported below applicable adopted NEPC (2013) NEPM ML Residential, parkland and public open space guidelines.

10.3.4 DIRECT CONTACT HSLS (HSL-A AND INTRUSIVE MAINTENANCE WORKER)

The results of the laboratory analysis indicate that concentrations of contaminants of potential concern in each soil sample submitted for analysis were reported below applicable adopted CRC Care (2011) Direct Contact HSL-A Intrusive Maintenance Worker guidelines.

10.3.5 ECOLOGICAL SCREENING LEVELS

Two (2) marginal exceedances of the NEPC (2013) NEPM ESL guidelines were reported for Benzo(a)pyrene at BH02-0.1 and BH03-0.1 (in the duplicate sample DUP1, and not in the primary sample). Reditus posits that these exceedances do not preclude the Site from the proposed development as these areas of exceeding Benzo(a)pyrene are likely to be removed via waste classification during bulk earthworks for the development. Furthermore, identified

ecological receptors are approximately 100m to the north of the Site and as such the risk of exceeding material contacting ecological receptors is low. It is additionally noted that no signs of vegetation stress were observed on the Site.

All other samples submitted for analysis were reported below the adopted ESL criteria.

10.3.6 ECOLOGICAL INVESTIGATION LEVELS

Nickel and zinc exceeded adopted generic EIL criteria for the sample BH01-0.1. Reditus considers that the EIL criteria for this investigation are indicative in nature as the criteria was derived using generic/academic inputs. Furthermore, identified ecological receptors are approximately 100m to the north of the Site and as such the risk of exceeding material contacting ecological receptors is low. Identified exceeding soil material is also likely to be removed from the Site under waste classification during bulk earthworks. As such, Reditus does not consider that these exceedances preclude the Site from the proposed development.

All other samples submitted for analysis were reported below the adopted EIL criteria.

10.4 Extent of Uncertainties in the Results

The sampling methodologies used by Reditus during this investigation has been designed to limit uncertainty in the results. Reditus is confident that the results of this investigation give an accurate representation of the current status of the surface soils onsite but note that in all subsurface investigations the potential remains for variability between sampling points and for conditions to be different on site from the conditions reported herein.

11 Refined Conceptual Site Model

Based on the results of the investigation and the preliminary CSM presented in **Section 5** has been refined to identify complete and potential pathways between the known or potential source(s) and the receptor(s).

Analytical results indicate that the primary identified risk to human and ecological health at the Site is the presence of fill material. Reditus notes that fill beneath building footprints has not yet been characterised and as such the fill 'source' cannot be resolved as having no significant risk to identified receptors. Reditus recommends sampling of fill material beneath building footprints.

Table 10. Refined Conceptual Site Model

SOURCE	EXPOSURE PATHWAY	RECEPTOR	EXPOSURE
Historical use of fill <i>Importation of fill from unknown sources, with particular reference to fill material beneath building footprints.</i>	<ul style="list-style-type: none"> • Direct contact with contaminated soil. • Inhalation or dust and/or vapour. • Ingestion of mobilised dust. • Ingestion or direct contact with potentially contaminated groundwater. 	<ul style="list-style-type: none"> • Site Users. • Construction Workers. • Maintenance workers. • Offsite residents. 	Possible Potential source-pathway-receptor linkages have been resolved however fill material beneath building footprints remains uncharacterised.

12 Conclusions and Recommendations

The following conclusions and recommendations are made based on the key findings of this PSI.

12.1 Conclusions

Based on a review of the site history, observations made during fieldwork, results of laboratory analysis and the proposed land use scenario, Reditus concludes the following:

- The Site is situated in an area of Class 4 Acid Sulfate Soils, and as such the outcomes of the Acid Sulfate Soils Assessment report being concurrently prepared by Reditus for the Site should be considered.
- Fill material was encountered on the Site and exceedances of adopted ecological investigation and screening criteria were reported, however Reditus does not consider that these exceedances preclude the Site from the proposed development.
- Concentration of potential concern including TRH, BTEX, OCP/OPP and PCB were reported below the adopted assessment criteria in all soil samples analysed.
- No asbestos in soil was observed, however a piece of potentially asbestos containing material in the form of fibrous cement sheeting was observed leaning on a fence on 50 Eurobin Avenue.
- Hydrocarbon odours were not observed or identified in any of the boreholes during intrusive works.
- The redefined conceptual site model (CSM), based on the findings of the investigation works completed at the Site to date, identified that fill material underneath building footprints is yet uncharacterised.

12.2 Recommendations

Based on the results of the investigation, Reditus recommends the following to assess the Site in accordance with relevant planning guidelines:

- Reditus considers that the Site is suitable for the proposed development. Additional sampling of soil beneath building footprints following the demolition of present residential dwellings of the Site is recommended. In addition to further site characterisation, further sampling will help inform the waste classification of soil material which is proposed for removal from the Site.



13 Limitations

This report has been prepared in accordance with the scope of services described in the **Section 1.2**. The letter has been prepared for the sole use of the client and has been prepared in accordance with a scope of work agreed by the client.

The report or document does not purport to provide legal advice and any conclusions or recommendations made should not be relied upon as a substitute for such advice.

The report does not constitute a recommendation by Reditus for the client or any other party to engage in any commercial or financial transaction and any decision by the client or other party to engage in such activities is strictly a matter for the client.

The report relies upon data, surveys, measurements and results taken at or under the Site at particular times and conditions specified herein. Any findings, conclusions or recommendations only apply to the aforementioned circumstances and no greater reliance should be assumed or drawn by the client. Furthermore, the report has been prepared solely for use by the client and Reditus accepts no responsibility for its use by other parties. The client agrees that Reditus' report or associated correspondence will not be used or reproduced in full or in part for promotional purposes and cannot be used or relied upon by any other individual, party, group or company in any prospectus or offering. Any individual, party, group or company seeking to rely on this report cannot do so and should seek their own independent advice.

No warranties, express or implied, are made. Subject to the scope of work undertaken, Reditus assessment is limited strictly to identifying typical environmental conditions associated with the subject property based on the scope of work and testing undertaken and does not include and evaluation of the structural conditions of any buildings on the subject property or any other issues that relate to the operation of the Site and operational compliance of the Site with state or federal laws, guidelines, standards or other industry recommendations or best practice. Scope of work undertaken for assessments are agreed in advance with the client and may not necessarily comply with state or federal laws or industry guidelines for the type of assessment conducted.

Additionally, unless otherwise stated Reditus did not conduct soil, air or wastewater analyses including asbestos or perform contaminated sampling of any kind. Nor did Reditus investigate any waste material from the property that may have been disposed off-site or undertake and assessment or review of related site waste management practices.

The results of this assessment are based upon (if undertaken as part of the scope work) a site inspection conducted by Reditus personnel and/or information from interviews with people who have knowledge of site conditions and/or information provided by regulatory agencies. All conclusions and recommendations regarding the property are the professional opinions of the Reditus personnel involved with the project, subject to the qualifications made above.

While normal assessments of data reliability have been made, Reditus assumes no responsibility or liability for errors in any data obtained from regulatory agencies, statements from sources outside of Reditus, or developments resulting from situations outside the scope of this project/assessment.

Reditus is not engaged in environmental auditing and/or reporting of any kind for the purpose of advertising sales promoting, or endorsement of any client's interests, including raising investment capital, recommending investment decisions, or other publicity purposes. Reditus assumes no responsibility or liability for errors in any data obtained from regulatory agencies, statements from sources outside of Reditus, or developments resulting from situations outside the scope of this project.

In relation the conduct of asbestos inspections or the preparation of hazardous materials reports Reditus has conducted inspections and the identification of hazardous material within the constraints presented by the property. Whilst efforts are made to access areas not normally accessed during normal use of the Site to identify the presence of asbestos or other hazardous material, unless explicitly tested no guarantee can be provided that such material is or is not present.

Reditus' professional opinions are based upon its professional judgment, experience, and training. These opinions are also based upon data derived from the limited testing and analysis described in this report or reports reviewed. It is possible that additional testing and analysis might produce different results and/or different opinions or other opinions. Reditus has limited its investigation(s) to the scope agreed upon with its client. Reditus believes that its opinions are reasonably supported by the testing and analysis that has been undertaken (if any), and that those opinions have been developed according to the professional standard of care for the environmental consulting



profession in this area at this time. Other opinions and interpretations may be possible. That standard of care may change and new methods and practices of exploration, testing and analysis may develop in the future, which might produce different results.



14 References

Site Specific

Reditus Consulting Pty Ltd (2021) *Preliminary Site Investigation with Limited Soil Assessment*, 48 Eurobin Avenue Manly NSW. 6th August 2021

Environmental Planning

NSW Environmental Planning and Assessment Act (the EP&A Act 1979).

NSW State Environmental Planning Policy Number (SEPP) Resilience and Hazards 2021. Superseding SEPP55 – Remediation of Land, 1998.

Site Contamination

CRC Care (2011) Health screening levels for petroleum hydrocarbons in soil and groundwater. Part 1: Technical development document.

NSW Contaminated Land Management Act (the CLM Act 1997).

NSW EPA statutory guidelines made or approved under section 105 of the CLM Act, including:

- *NSW EPA Guidelines for the NSW Site Auditor Scheme (3rd Edition), 2017.*
- *NSW EPA Guidelines for Consultants Reporting on Contaminated Land, 2020.*
- *NSW EPA Sampling Design Guidelines, August 2022.*
- *NSW EPA Guidelines for the Assessment and Management of Groundwater Contamination, 2007.*
- *NSW EPA Guidelines for Assessment and Management of Hazardous Ground Gases, 2020.*

National Environment Protection Council (1999, Revised 2013) National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 – Schedule B1 Guideline on Investigation levels for Soil and Groundwater (NEPC, 2013).

Australian and New Zealand Governments Guidelines for Fresh and Marine Water Quality 2018.

Australian Standard AS4482.1-2005. Guide to the Investigation and Sampling of sites with Potentially Contaminated Soil. Part 1: Non-volatile and Semi-volatile Compounds, 2005.

Australian Standard AS4482.2-1999. Guide to the Investigation and Sampling of sites with Potentially Contaminated Soil. Part 2: Volatile Substances, 1999.

PFAS National Environmental Management Plan version 2.0 (the PFAS NEMP 2.0), 2020.

Acid Sulfate Soils

The Acid Sulfate Soil Management Advisory Committee (ASSMAC) Acid Sulfate Soils Assessment Guidelines 1998 (Also referred to as the "Acid Sulfate Soils Manual").

Waste

NSW Protection of the Environment Operations Act (POEO Act) 1997.

NSW Protection of the Environment Operations (Waste) Regulations 2014.

NSW EPA Waste Classification Guidelines, Part 1 Classifying Waste, 2014.

NSW EPA Resource Recovery Order, Excavated Natural Material Order under Part 9, Clause 93 of POEO Waste Regulation 2014 (the ENM Order 2014).

Asbestos

NSW Work Health and Safety Act, 2011 (WHS Act 2011).

NSW Work Health and Safety Regulations, 2017 (WHS Reg 2017), Chapter 8 Asbestos, 2017 (NSW WHS Reg 2017).

NSW EPA Managing Asbestos in or on Soil, 2014 (NSW EPA 2014).



Western Australia Department of Health Guidelines for the Assessment Remediation and Management of Asbestos Contaminated Sites in Western Australia 2009 (WA DoH, 2009) as referred to by NEPM 2013

A

Figures





Overview



Inset



Map 22246_rp02_f01_siteloc_v01		Legend <div><div><div><div></div></div><div>Site Boundary</div></div><div><div></div></div><div>Lot Boundaries</div><div><div></div></div><div>Surface Water</div><div><div></div></div><div>Major Roads</div></div> <div><div><div></div></div><div>Railways</div><div><div></div></div><div>Rivers</div><div><div></div></div><div>Streams</div><div><div></div></div><div>Minor Channels</div></div>
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Map 22246_rp02_f02_samples_v01		Legend <div><div></div> Site Boundary</div> <div><div></div> Lot Boundaries</div> <div><div></div> Sample Locations</div>	Figure 2 - Sampling Locations 48-52 Eurobin Avenue, Manly NSW 2095 22246 - Preliminary Site Investigation Mostyn Cooper Group Pty Ltd
Date of Export 24/11/2022	Map Scale (approx. at A3) 1:250		
Author JP	Approver MB		
Data Source Metromap, Google Maps, Open Street Map, Geoscience Australia			


B

Photo Board



APPENDIX B SITE PHOTOGRAPHS		
Report Title Preliminary Site Investigation		
Client Name Mostyn Cooper Group Pty Ltd	Site Location 48-50 Eurobin Avenue, Manly NSW 2095	Project Number 22246

Photo No.	Date	
1	15/11/2022	
Direction Facing		
-		
Description		
BH01 – soil from surface to 1m bgl.		

Photo No. 2	Date 15/11/2022	
Direction Facing West		
Description BH01		

APPENDIX B SITE PHOTOGRAPHS		
Report Title Preliminary Site Investigation		
Client Name Mostyn Cooper Group Pty Ltd	Site Location 48-50 Eurobin Avenue, Manly NSW 2095	Project Number 22246

Photo No. 3	Date 15/11/2022	
Direction Facing -		
Description BH03 – 1.0 – 2.0m bgl		

Photo No.	Date	
4	15/11/2022	
Direction Facing East		
Description BH02 location		

APPENDIX B SITE PHOTOGRAPHS		
Report Title Preliminary Site Investigation		
Client Name Mostyn Cooper Group Pty Ltd	Site Location 48-50 Eurobin Avenue, Manly NSW 2095	Project Number 22246




Photo No. 5	Date 15/11/2022	
Direction Facing South		
Description 50 Eurobin Ave – western driveway		

Photo No. 6	Date 15/11/2022	
Direction Facing South		
Description 50 Eurobin Ave – BH04		

APPENDIX B SITE PHOTOGRAPHS		
Report Title Preliminary Site Investigation		
Client Name Mostyn Cooper Group Pty Ltd	Site Location 48-50 Eurobin Avenue, Manly NSW 2095	Project Number 22246

Photo No. 7	Date 15/11/2022	
Direction Facing North		
Description 50 Eurobin Ave – BH04		

Photo No. 8	Date 15/11/2022	
Direction Facing West		
Description 48 Eurobin Ave front yard and approx. BH01 location		

APPENDIX B
SITE PHOTOGRAPHS



Report Title
Preliminary Site Investigation

Client Name
Mostyn Cooper Group Pty Ltd

Site Location
48-50 Eurobin Avenue, Manly NSW 2095

Project Number
22246

Photo No.	Date	
9	15/11/2022	
Direction Facing		
West		
Description		
48 Eurobin Ave front yard		

Photo No.	Date	
10	15/11/2022	
Direction Facing		
North-east		
Description		
50 Eurobin Ave - BH03		

APPENDIX B SITE PHOTOGRAPHS		
Report Title Preliminary Site Investigation		
Client Name Mostyn Cooper Group Pty Ltd	Site Location 48-50 Eurobin Avenue, Manly NSW 2095	Project Number 22246

Photo No.	Date	
11	15/11/2022	
Direction Facing South		
Description 50 Eurobin Ave		

Photo No. 12	Date 15/11/2022	
Direction Facing South		
Description 50 Eurobin Ave		


APPENDIX B SITE PHOTOGRAPHS		
Report Title Preliminary Site Investigation		
Client Name Mostyn Cooper Group Pty Ltd	Site Location 48-50 Eurobin Avenue, Manly NSW 2095	Project Number 22246

Photo No.	Date	
13	15/11/2022	
Direction Facing		
South		
Description		
50 Eurobin Ave		

Photo No.	Date	
14	15/11/2022	
Direction Facing		
North		
Description		
50 Eurobin Ave		

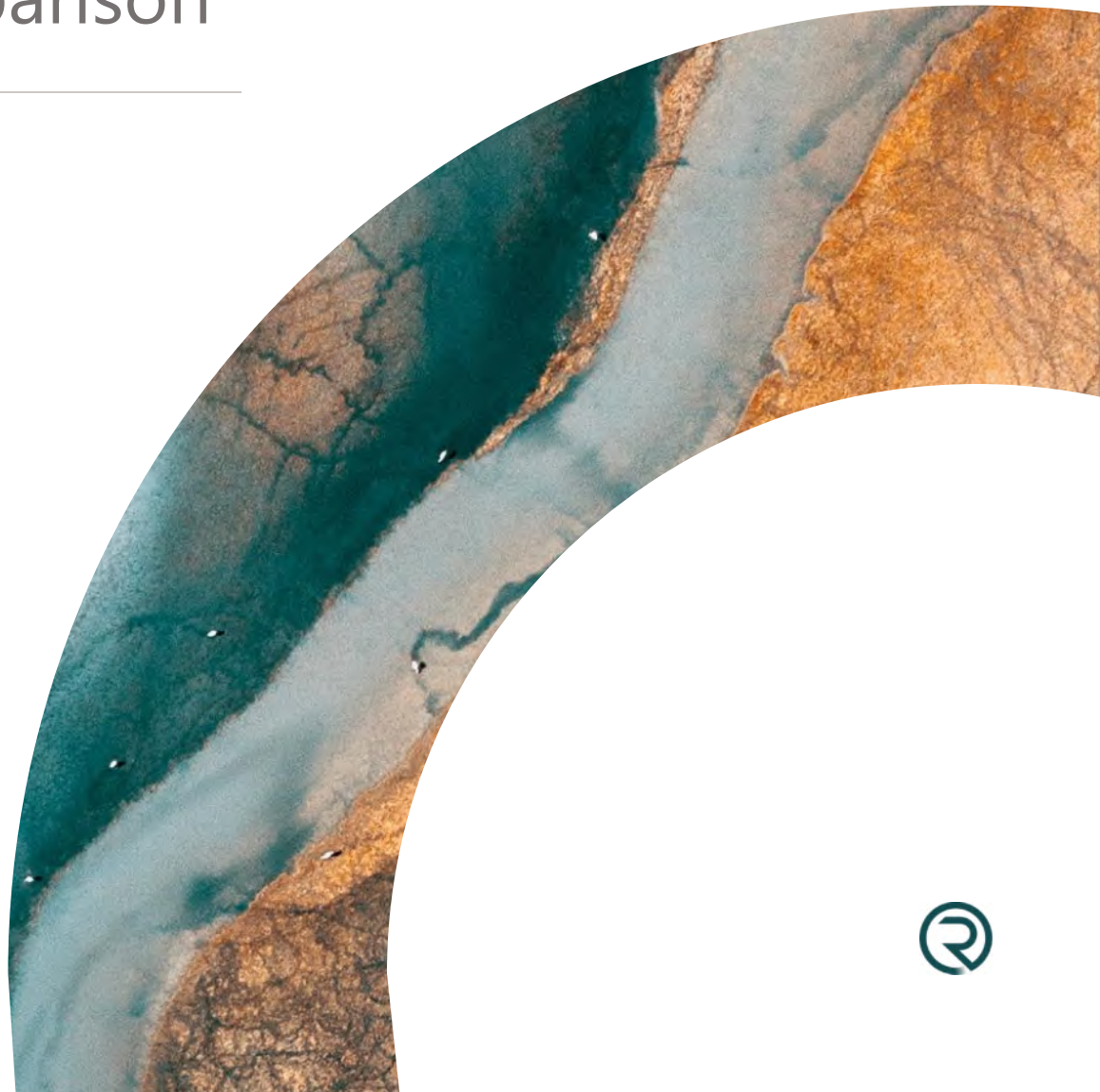
APPENDIX B SITE PHOTOGRAPHS		
Report Title Preliminary Site Investigation		
Client Name Mostyn Cooper Group Pty Ltd	Site Location 48-50 Eurobin Avenue, Manly NSW 2095	Project Number 22246

Photo No. 15	Date 15/11/2022	
Direction Facing South		
Description 48 Eurobin Ave		

Photo No.	Date	
16	15/11/2022	
Direction Facing		
East		
Description		
48 Eurobin Ave		

C

Historical Imagery Comparison





Map 22246_rp01_historical_v01		Legend <div><div></div> Site Boundary</div> <div><div></div> Railways</div> <div><div></div> Rivers</div> <div><div></div> Streams</div> <div><div></div> Minor Channels</div> <div><div></div> Surface Water</div>	<div><div>N</div><div></div></div> <div>1:5,500</div>	Figure 3 - Historical Imagery Comparison 48-50 Eurobin Avenue, Manly NSW 2095 22246 - Preliminary Site Investigation Mostyn Cooper Group Pty Ltd
Date of Export 24/11/2022				
Author JP	Approver MB			
Data Source Metromap, Google Maps, NSW Government, Geoscience Australia				



<div>Map</div> <div>22246_rp01_historical_v01</div>		<div>Legend</div> <div><div><div></div></div> Site Boundary</div> <div><div></div> Railways</div> <div><div></div> Rivers</div> <div><div></div> Streams</div> <div><div></div> Minor Channels</div> <div><div></div> Surface Water</div>	<div><div>N</div></div> <div>1:5,500</div>	<div>Figure 3 - Historical Imagery Comparison</div> <div>48-50 Eurobin Avenue, Manly NSW 2095</div> <div>22246 - Preliminary Site Investigation</div> <div>Mostyn Cooper Group Pty Ltd</div>
<div>Date of Export</div> <div>24/11/2022</div>				
<div>Author</div> <div>JP</div>	<div>Approver</div> <div>MB</div>			
<div>Data Source</div> <div>Metromap, Google Maps, NSW Government, Geoscience Australia</div>				



<div>Map</div> <div>22246_rp01_historical_v01</div>		<div>Legend</div> <div><div><div></div></div> Site Boundary</div> <div><div><div></div></div> Railways</div> <div><div><div></div></div> Rivers</div> <div><div><div></div></div> Streams</div> <div><div><div></div></div> Minor Channels</div> <div><div><div></div></div> Surface Water</div> <div><div><div></div></div> N</div> <div>1:5,500</div>	<div>Figure 3 - Historical Imagery Comparison</div> <div>48-50 Eurobin Avenue, Manly NSW 2095</div> <div>22246 - Preliminary Site Investigation</div> <div>Mostyn Cooper Group Pty Ltd</div>
<div>Date of Export</div> <div>24/11/2022</div>			
<div>Author</div> <div>JP</div>	<div>Approver</div> <div>MB</div>		
<div>Data Source</div> <div>Metromap, Google Maps, NSW Government, Geoscience Australia</div>			



Map 22246_rp01_historical_v01		Legend <div><div></div> Site Boundary</div> <div><div></div> Railways</div> <div><div></div> Rivers</div> <div><div></div> Streams</div> <div><div></div> Minor Channels</div> <div><div></div> Surface Water</div>	<div><div>N</div><div>1:5,500</div></div>	Figure 3 - Historical Imagery Comparison	
Date of Export 24/11/2022				48-50 Eurobin Avenue, Manly NSW 2095	
Author JP	Approver MB			22246 - Preliminary Site Investigation	
Data Source Metromap, Google Maps, NSW Government, Geoscience Australia				Mostyn Cooper Group Pty Ltd	



Figure 3 - Historical Imagery Comparison







48-50 Eurobin Avenue, Manly NSW 2095

22246 - Preliminary Site Investigation

Mostyn Cooper Group Pty Ltd

<p>Map</p> <p>22246_rp01_historical_v01</p>	
<p>Date of Export</p> <p>24/11/2022</p>	
<p>Author</p> <p>JP</p>	<p>Approver</p> <p>MB</p>
<p>Data Source</p> <p>Metromap, Google Maps, NSW Government, Geoscience Australia</p>	

Legend

-  Site Boundary
-  Railways
-  Rivers
-  Streams
-  Minor Channels
-  Surface Water



1:5,500



<div>Map</div> <div>22246_rp01_historical_v01</div>		<div>Legend</div> <div><div><div></div></div> Site Boundary</div> <div><div></div> Railways</div> <div><div></div> Rivers</div> <div><div></div> Streams</div> <div><div></div> Minor Channels</div> <div><div></div> Surface Water</div>	<div><div>N</div></div> <div>1:5,500</div>	<div>Figure 3 - Historical Imagery Comparison</div> <div>48-50 Eurobin Avenue, Manly NSW 2095</div> <div>22246 - Preliminary Site Investigation</div> <div>Mostyn Cooper Group Pty Ltd</div>
<div>Date of Export</div> <div>24/11/2022</div>				
<div>Author</div> <div>JP</div>	<div>Approver</div> <div>MB</div>			
<div>Data Source</div> <div>Metromap, Google Maps, NSW Government, Geoscience Australia</div>				



<div>Map</div> <div>22246_rp01_historical_v01</div>		<div>Legend</div> <div><div><div></div></div> Site Boundary</div> <div><div><div></div></div> Railways</div> <div><div><div></div></div> Rivers</div> <div><div><div></div></div> Streams</div> <div><div><div></div></div> Minor Channels</div> <div><div><div></div></div> Surface Water</div>	<div><div>N</div></div> <div>1:5,500</div>	<div>Figure 3 - Historical Imagery Comparison</div> <div>48-50 Eurobin Avenue, Manly NSW 2095</div> <div>22246 - Preliminary Site Investigation</div> <div>Mostyn Cooper Group Pty Ltd</div>
<div>Date of Export</div> <div>24/11/2022</div>				
<div>Author</div> <div>JP</div>	<div>Approver</div> <div>MB</div>			
<div>Data Source</div> <div>Metromap, Google Maps, NSW Government, Geoscience Australia</div>				



Map	
22246_rp01_historical_v01	
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24/11/2022	
Author	Approver
JP	MB
Data Source	
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Legend	
	Site Boundary
	Railways
	Rivers
	Streams
	Minor Channels
	Surface Water

N

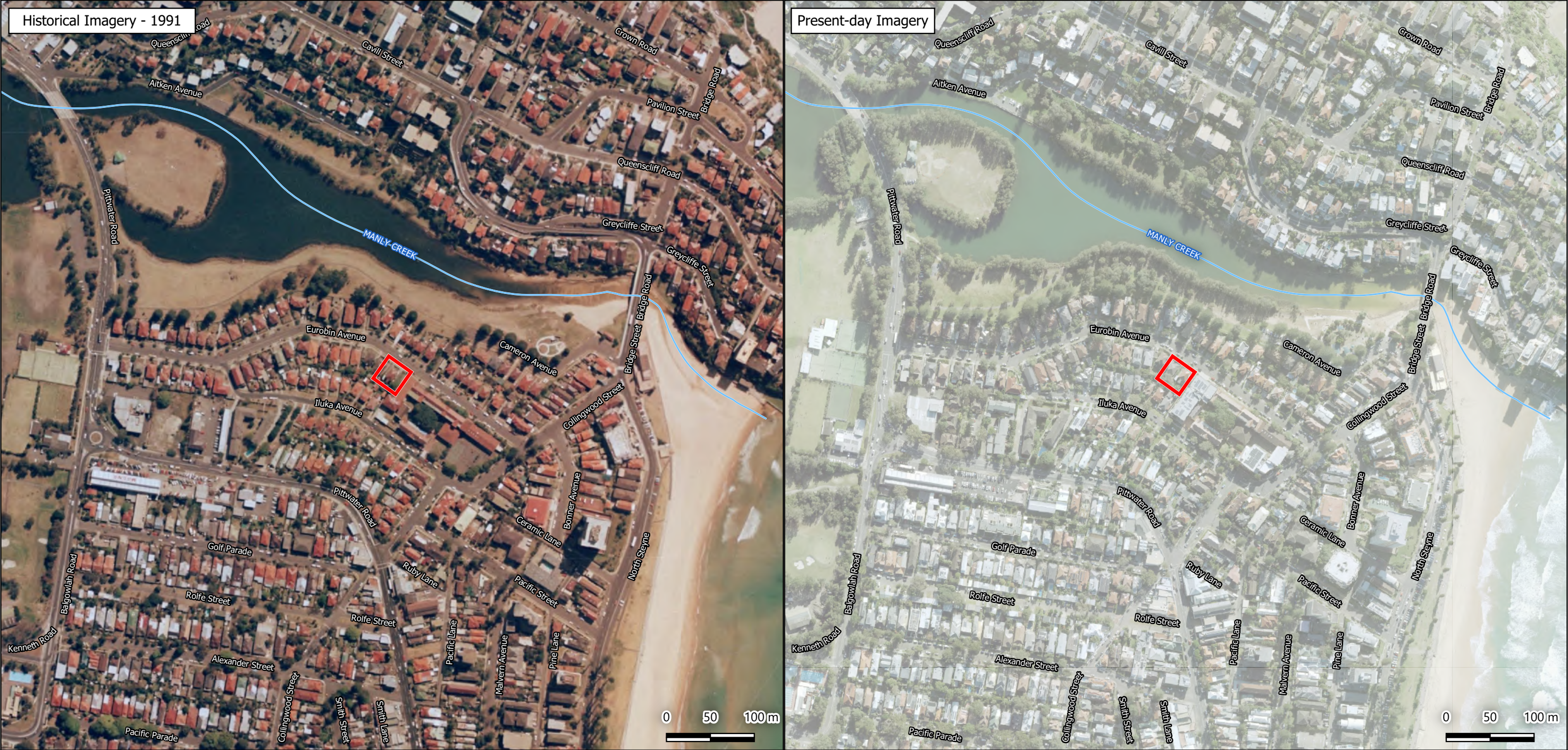
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Figure 3 - Historical Imagery Comparison

48-50 Eurobin Avenue, Manly NSW 2095

22246 - Preliminary Site Investigation

Mostyn Cooper Group Pty Ltd



Map		<div>Legend</div> <div><div><div></div></div> Site Boundary</div> <div><div></div> Railways</div> <div><div></div> Rivers</div> <div><div></div> Streams</div> <div><div></div> Minor Channels</div> <div><div></div> Surface Water</div>	<div><div>N</div></div> <div>1:5,500</div>	<div>Figure 3 - Historical Imagery Comparison</div> <div>48-50 Eurobin Avenue, Manly NSW 2095</div> <div>22246 - Preliminary Site Investigation</div> <div>Mostyn Cooper Group Pty Ltd</div>
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24/11/2022				
Author	Approver			
JP	MB			
Data Source				
Metromap, Google Maps, NSW Government, Geoscience Australia				



Map 22246_rp01_historical_v01		Legend <div><div></div> Site Boundary</div> <div><div></div> Railways</div> <div><div></div> Rivers</div> <div><div></div> Streams</div> <div><div></div> Minor Channels</div> <div><div></div> Surface Water</div>	<div><div>N</div><div></div></div> <div>1:5,500</div>	<div>Figure 3 - Historical Imagery Comparison</div> <div>48-50 Eurobin Avenue, Manly NSW 2095</div> <div>22246 - Preliminary Site Investigation</div> <div>Mostyn Cooper Group Pty Ltd</div>
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Author JP	Approver MB			
Data Source Metromap, Google Maps, NSW Government, Geoscience Australia				



<div>Map</div> <div>22246_rp01_historical_v01</div>		<div>Legend</div> <div><div><div></div></div> Site Boundary</div> <div><div><div></div></div> Railways</div> <div><div><div></div></div> Rivers</div> <div><div><div></div></div> Streams</div> <div><div><div></div></div> Minor Channels</div> <div><div><div></div></div> Surface Water</div> <div><div><div></div></div><div>N</div><div>1:5,500</div></div>	<div>Figure 3 - Historical Imagery Comparison</div> <div>48-50 Eurobin Avenue, Manly NSW 2095</div> <div>22246 - Preliminary Site Investigation</div> <div>Mostyn Cooper Group Pty Ltd</div>
<div>Date of Export</div> <div>24/11/2022</div>			
<div>Author</div> <div>JP</div>	<div>Approver</div> <div>MB</div>		
<div>Data Source</div> <div>Metromap, Google Maps, NSW Government, Geoscience Australia</div>			

D

Analytical Results Summary Table

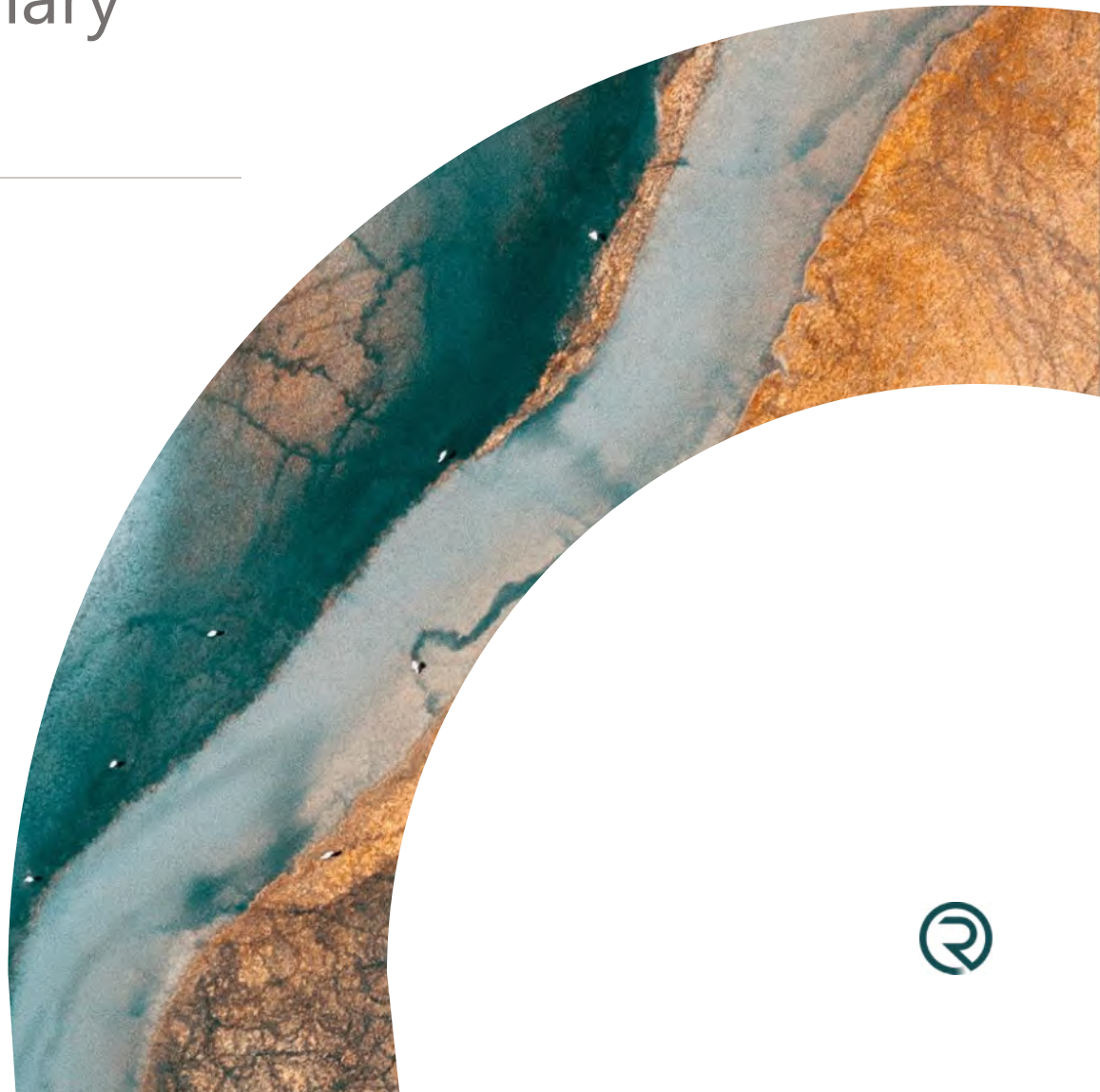


Table 1
Soil Analytical Results Summary



	Asbestos		BTEX							TRH							
	Asbestos fibres	Detect	Naphthalene (BTEX)	Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)	Xylene Total	Total BTEX	C6-C10 Fraction (F1)	C6-C10 (F1 minus BTEX)	>C10-C16 Fraction (F2)	>C10-C16 Fraction (F2 minus Naphthalene)	>C16-C34 Fraction (F3)	>C34-C40 Fraction (F4)	>C10-C40 Fraction (Sum)
			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			1	0.2	0.5	0.5	0.5	0.5	0.5	0.2	10	10	50	50	100	100	50
NEPM 2013 Table 1A(1) HILs Res A Soil																	
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Sand																	
>=0m, <1m			3	0.5	160	55			40			45		110			
>=1m, <2m			NL	0.5	220	NL			60			70		240			
>=2m, <4m			NL	0.5	310	NL			95			110		440			
>=4m			NL	0.5	540	NL			170			200		NL			
NEPM 2013 Table 1B(1-5) EILs for Urban Res, Coarse Soil >=0m, <2m																	
NEPM 2013 Table 1B(6) ESLs for Urban Res, Coarse Soil >=0m, <2m				50	85	70			105			180	120	120	300	2,800	
NEPM 2013 Table 1B(7) Management Limits in Res / Parkland, Coarse Soil				100	14,000	4,500			12,000		700		1,000		2,500	10,000	
CRC Care (2011) Table A4 Direct Contact HSL-A (Low-Density Residential)											4,400		3,300		4,500	6,300	
CRC Care (2011) Table A4 Direct Contact Intrusive Maintenance Worker				1,100	120,000	85,000			130,000		82,000		62,000		85,000	120,000	

Field ID	Depth	Date	Sample Type	Lab Report Number																
BH01	0.1	16 Nov 2022	Fill	310803	ND	<1	<0.2	<0.5	<1	<2	<1	<1	-	<25	<25	<50	<50	<100	<100	<50
BH01	0.5	16 Nov 2022	Natural	310803-A	-	<1	<0.2	<0.5	<1	<2	<1	<1	-	<25	<25	<50	<50	<100	<100	<50
BH02	0.1	16 Nov 2022	Fill	310803	ND	<1	<0.2	<0.5	<1	<2	<1	<1	-	<25	<25	<50	<50	<100	<100	<50
BH02	1.5	16 Nov 2022	Natural	310803-A	-	<1	<0.2	<0.5	<1	<2	<1	<1	-	<25	<25	<50	<50	<100	<100	<50
BH03	0.1	16 Nov 2022	Fill	310803	ND	<1	<0.2	<0.5	<1	<2	<1	<1	-	<25	<25	<50	<50	<100	<100	<50
BH03	1	16 Nov 2022	Natural	310803-A	-	<1	<0.2	<0.5	<1	<2	<1	<1	-	<25	<25	<50	<50	<100	<100	<50
BH04	0.1	16 Nov 2022	Fill	310803	ND	<1	<0.2	<0.5	<1	<2	<1	<1	-	<25	<25	<50	<50	<100	<100	<50
BH04	0.5	16 Nov 2022	Natural	310803-A	-	<1	<0.2	<0.5	<1	<2	<1	<1	-	<25	<25	<50	<50	<100	<100	<50
DUP1 (BH03-0.1)	0.1	16 Nov 2022	Fill	310803	ND	<1	<0.2	<0.5	<1	<2	<1	<1	-	<25	<25	<50	<50	<100	<100	<50
TRIP1 (BH03-0.1)	0.1	16 Nov 2022	Fill	ES2241682	-	<1	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<10	<10	<50	<50	<100	<100	<50

ND = Non-detection at 0.1g/kg limit of reporting.

¹ Chromium (VI) HIL criteria has been applied to concentrations of Chromium (III+VI) for conservatism.

² Chromium (III) EIL criteria has been applied to concentrations of Chromium (III+VI) for conservatism.

Table 1
Soil Analytical Results Summary



	PAH																				
	Benzo(b+j+k)fluoranthene	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a) pyrene	Benzo(b+i)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	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)	PAHs (Sum of total)	PAHs (Sum of positives)
EQL	0.2	0.1	0.1	0.1	0.1	0.05	0.5	0.1	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.5	0.5	0.5	0.05
NEPM 2013 Table 1A(1) HILs Res A Soil																		3	3	300	
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Sand																					
>=0m, <1m															3						
>=1m, <2m															NL						
>=2m, <4m															NL						
>=4m															NL						
NEPM 2013 Table 1B(1-5) EILs for Urban Res, Coarse Soil >=0m, <2m																					
NEPM 2013 Table 1B(6) ESLs for Urban Res, Coarse Soil >=0m, <2m						0.7									170						
NEPM 2013 Table 1B(7) Management Limits in Res / Parkland, Coarse Soil																					
CRC Care (2011) Table A4 Direct Contact HSL-A (Low-Density Residential)															1,400						
CRC Care (2011) Table A4 Direct Contact Intrusive Maintenance Worker															29,000						

Field ID	Depth	Date	Sample Type	Benzo(b+j+k)fluoranthene	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a) pyrene	Benzo(b+i)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	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)	PAHs (Sum of total)	PAHs (Sum of positives)
BH01	0.1	16 Nov 2022	Fill	0.5	<0.1	<0.1	<0.1	0.2	0.5	-	0.3	-	0.3	<0.1	0.6	<0.1	0.3	<0.1	0.2	0.6	0.7	0.7	-	3.5
BH01	0.5	16 Nov 2022	Natural	<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	-	<0.05
BH02	0.1	16 Nov 2022	Fill	1	<0.1	<0.1	0.1	0.4	1.1	-	0.4	-	0.6	<0.1	1.4	<0.1	0.5	<0.1	0.7	1.3	1.3	1.4	-	7.6
BH02	1.5	16 Nov 2022	Natural	<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	-	<0.05
BH03	0.1	16 Nov 2022	Fill	0.5	<0.1	<0.1	<0.1	0.2	0.52	-	0.4	-	0.3	<0.1	0.5	<0.1	0.2	<0.1	0.2	0.5	0.7	0.7	-	3.3
BH03	1	16 Nov 2022	Natural	<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	-	<0.05
BH04	0.1	16 Nov 2022	Fill	0.5	<0.1	<0.1	<0.1	0.2	0.5	-	0.3	-	0.3	<0.1	0.5	<0.1	0.2	<0.1	0.2	0.5	0.7	0.7	-	3.2
BH04	0.5	16 Nov 2022	Natural	<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	-	<0.05
DUP1 (BH03-0.1)	0.1	16 Nov 2022	Fill	0.8	<0.1	<0.1	<0.1	0.3	0.89	-	0.5	-	0.4	<0.1	0.7	<0.1	0.4	<0.1	0.3	0.7	1.1	1.2	-	5.1
TRIP1 (BH03-0.1)	0.1	16 Nov 2022	Fill	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	-

ND = Non-detection at 0.1g/kg limit of reporting.

¹ Chromium (VI) HIL criteria has been applied to concentrations of Chromium (III+V)

² Chromium (III) EIL criteria has been applied to concentrations of Chromium (III+V)

Table 1
Soil Analytical Results Summary



	Metals								SVOCs	Organochlorine Pes													
	Arsenic	Cadmium	Chromium (III+VI)	Copper	Lead	Mercury	Nickel	Zinc		Fenamiphos	4,4-DDE	a-BHC	Aldrin	Dieldrin	Aldrin + Dieldrin	b-BHC	Chlordane	Chlordane (cis)	Chlordane (trans)	d-BHC	DDD	DDT	DDT+DDE+DDD
	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	4	0.4	1	1	1	0.1	1	1	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.1	0.05	
NEPM 2013 Table 1A(1) HILs Res A Soil	100	20	100 ¹	6,000	300	40	400	7,400						6		50							240
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Sand																							
>=0m, <1m																							
>=1m, <2m																							
>=2m, <4m																							
>=4m																							
NEPM 2013 Table 1B(1-5) EILs for Urban Res, Coarse Soil >=0m, <2m	100		260 ²	60	1,100		10	130													180		
NEPM 2013 Table 1B(6) ESLs for Urban Res, Coarse Soil >=0m, <2m																							
NEPM 2013 Table 1B(7) Management Limits in Res / Parkland, Coarse So																							
CRC Care (2011) Table A4 Direct Contact HSL-A (Low-Density Residential)																							
CRC Care (2011) Table A4 Direct Contact Intrusive Maintenance Worker																							

Field ID	Depth	Date	Sample Type																				
BH01	0.1	16 Nov 2022	Fill	<4	<0.4	5	13	42	<0.1	13	41	-	<0.1	<0.1	<0.1	<0.1	-	<0.1	-	<0.1	<0.1	<0.1	<0.1
BH01	0.5	16 Nov 2022	Natural	<4	<0.4	2	1	2	<0.1	1	3	-	-	-	-	-	-	-	-	-	-	-	-
BH02	0.1	16 Nov 2022	Fill	<4	<0.4	8	22	220	<0.1	4	240	-	<0.1	<0.1	<0.1	0.2	-	<0.1	-	<0.1	<0.1	<0.1	<0.1
BH02	1.5	16 Nov 2022	Natural	<4	<0.4	<1	<1	1	<0.1	<1	3	-	-	-	-	-	-	-	-	-	-	-	-
BH03	0.1	16 Nov 2022	Fill	<4	<0.4	3	13	70	<0.1	2	77	-	<0.1	<0.1	<0.1	<0.1	-	<0.1	-	<0.1	<0.1	<0.1	<0.1
BH03	1	16 Nov 2022	Natural	<4	<0.4	<1	3	11	<0.1	<1	13	-	-	-	-	-	-	-	-	-	-	-	-
BH04	0.1	16 Nov 2022	Fill	<4	<0.4	4	17	42	<0.1	2	60	-	<0.1	<0.1	<0.1	<0.1	-	<0.1	-	<0.1	<0.1	<0.1	<0.1
BH04	0.5	16 Nov 2022	Natural	<4	<0.4	2	1	3	<0.1	<1	5	-	-	-	-	-	-	-	-	-	-	-	-
DUP1 (BH03-0.1)	0.1	16 Nov 2022	Fill	<4	<0.4	4	18	76	<0.1	2	100	-	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TRIP1 (BH03-0.1)	0.1	16 Nov 2022	Fill	<5	<1	3	11	53	0.1	<2	80	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05

ND = Non-detection at 0.1g/kg limit of reporting.

¹ Chromium (VI) HIL criteria has been applied to concentrations of Chromium (III+V)

² Chromium (III) EIL criteria has been applied to concentrations of Chromium (III+V)

Table 1
Soil Analytical Results Summary



	Pesticides												Organophosphorous Pesticides											
	Endosulfan	Endosulfan I	Endosulfan II	Endosulfan sulphate	Endrin	Endrin aldehyde	Endrin ketone	γ-BHC (Lindane)	Heptachlor	Heptachlor epoxide	Hexachlorobenzene	Methoxychlor	Azinophos methyl	Bromophos-ethyl	Carbophenothion	Chlorfenvinphos	Chlorpyrifos	Chlorpyrifos-methyl	Diazinon	Dichlorvos	Dimethoate	Ethion		
	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	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.1	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05		
NEPM 2013 Table 1A(1) HILs Res A Soil	270				10				6		10	300					160							
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Sand																								
>=0m, <1m																								
>=1m, <2m																								
>=2m, <4m																								
>=4m																								
NEPM 2013 Table 1B(1-5) EILs for Urban Res, Coarse Soil >=0m, <2m																								
NEPM 2013 Table 1B(6) ESLs for Urban Res, Coarse Soil >=0m, <2m																								
NEPM 2013 Table 1B(7) Management Limits in Res / Parkland, Coarse Soil																								
CRC Care (2011) Table A4 Direct Contact HSL-A (Low-Density Residential)																								
CRC Care (2011) Table A4 Direct Contact Intrusive Maintenance Worker																								

Field ID	Depth	Date	Sample Type	Endosulfan	Endosulfan I	Endosulfan II	Endosulfan sulphate	Endrin	Endrin aldehyde	Endrin ketone	γ-BHC (Lindane)	Heptachlor	Heptachlor epoxide	Hexachlorobenzene	Methoxychlor	Azinophos methyl	Bromophos-ethyl	Carbophenothion	Chlorfenvinphos	Chlorpyrifos	Chlorpyrifos-methyl	Diazinon	Dichlorvos	Dimethoate	Ethion
BH01	0.1	16 Nov 2022	Fill	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH01	0.5	16 Nov 2022	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH02	0.1	16 Nov 2022	Fill	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH02	1.5	16 Nov 2022	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH03	0.1	16 Nov 2022	Fill	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH03	1	16 Nov 2022	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH04	0.1	16 Nov 2022	Fill	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH04	0.5	16 Nov 2022	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DUP1 (BH03-0.1)	0.1	16 Nov 2022	Fill	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TRIP1 (BH03-0.1)	0.1	16 Nov 2022	Fill	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

ND = Non-detection at 0.1g/kg limit of reporting.

¹ Chromium (VI) HIL criteria has been applied to concentrations of Chromium (III+V)

² Chromium (III) EIL criteria has been applied to concentrations of Chromium (III+V)

Table 1
Soil Analytical Results Summary



es	Fenitrothion	Fenthion	Malathion	Methyl parathion	Monocrotophos	Parathion	Prothiofos	Ronnol	Pesticides		PCBs							
									Demeton-S-methyl	Pirimphos-ethyl	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	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.1	0.05	0.05	0.2	0.2	0.1	0.05	0.1	0.05	0.05	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
NEPM 2013 Table 1A(1) HILs Res A Soil																		1
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Sand																		
>=0m, <1m																		
>=1m, <2m																		
>=2m, <4m																		
>=4m																		
NEPM 2013 Table 1B(1-5) EILs for Urban Res, Coarse Soil >=0m, <2m																		
NEPM 2013 Table 1B(6) ESLs for Urban Res, Coarse Soil >=0m, <2m																		
NEPM 2013 Table 1B(7) Management Limits in Res / Parkland, Coarse So																		
CRC Care (2011) Table A4 Direct Contact HSL-A (Low-Density Residential)																		
CRC Care (2011) Table A4 Direct Contact Intrusive Maintenance Worker																		

Field ID	Depth	Date	Sample Type																	
BH01	0.1	16 Nov 2022	Fill	<0.1	-	<0.1	-	-	<0.1	-	<0.1	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH01	0.5	16 Nov 2022	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH02	0.1	16 Nov 2022	Fill	<0.1	-	<0.1	-	-	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH02	1.5	16 Nov 2022	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH03	0.1	16 Nov 2022	Fill	<0.1	-	<0.1	-	-	<0.1	-	<0.1	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH03	1	16 Nov 2022	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH04	0.1	16 Nov 2022	Fill	<0.1	-	<0.1	-	-	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH04	0.5	16 Nov 2022	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DUP1 (BH03-0.1)	0.1	16 Nov 2022	Fill	<0.1	-	<0.1	-	-	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TRIP1 (BH03-0.1)	0.1	16 Nov 2022	Fill	-	<0.05	<0.05	<0.2	<0.2	<0.2	<0.05	-	<0.05	<0.05	-	-	-	-	-	-	<0.1

ND = Non-detection at 0.1g/kg limit of reporting.

¹ Chromium (VI) HIL criteria has been applied to concentrations of Chromium (III+V)

² Chromium (III) EIL criteria has been applied to concentrations of Chromium (III+V)

E

QA/QC Summary Table



Table 2
QA/QC - RPDs



				BTEX								TRH						
				Naphthalene (BTEX)	Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)	Xylene Total	Total BTEX	C6-C10 Fraction (F1)	C6-C10 (F1 minus BTEX)	>C10-C16 Fraction (F2)	>C10-C16 Fraction (F2 minus Naphthalene)	>C16-C34 Fraction (F3)	>C34-C40 Fraction (F4)	>C10-C40 Fraction (Sum)
				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				1	0.2	0.5	0.5	0.5	0.5	0.5	0.2	10	10	50	50	100	100	50
Field ID	Date	Lab Report Number	Matrix Type															
BH03 - 0.1	16 Nov 2022	310803	Soil	<1	<0.2	<0.5	<1	<2	<1	<1	-	<25	<25	<50	<50	<100	<100	<50
DUP1	16 Nov 2022	310803	Soil	<1	<0.2	<0.5	<1	<2	<1	<1	-	<25	<25	<50	<50	<100	<100	<50
RPD				0	0	0	0	0	0	0	-	0	0	0	0	0	0	0
BH03 - 0.1	16 Nov 2022	310803	Soil	<1	<0.2	<0.5	<1	<2	<1	<1	-	<25	<25	<50	<50	<100	<100	<50
TRIP1	16 Nov 2022	ES2241682	Soil	<1	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<10	<10	<50	<50	<100	<100	<50
RPD				0	0	0	0	0	0	0	-	0	0	0	0	0	0	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: 100 (0 - 5 x EQL); 75 (5 - 10 x EQL); 30 (> 10 x EQL))

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

Table 2
QA/QC - RPDs



				PAH																					
				Benzo(b+j+k)fluoranthene	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a) pyrene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	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)	PAHs (Sum of total)	PAHs (Sum of positives)	
				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	0.5	0.1	0.5	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
Field ID	Date	Lab Report Number	Matrix Type																						
BH03 - 0.1	16 Nov 2022	310803	Soil	0.5	<0.1	<0.1	<0.1	0.2	0.52	-	0.4	-	0.3	<0.1	0.5	<0.1	0.2	<0.1	0.2	0.5	0.7	0.7	-	3.3	
DUP1	16 Nov 2022	310803	Soil	0.8	<0.1	<0.1	<0.1	0.3	0.89	-	0.5	-	0.4	<0.1	0.7	<0.1	0.4	<0.1	0.3	0.7	1.1	1.2	-	5.1	
RPD				46	0	0	0	40	52	-	22	-	29	0	33	0	67	0	40	33	44	53	-	43	
BH03 - 0.1	16 Nov 2022	310803	Soil	0.5	<0.1	<0.1	<0.1	0.2	0.52	-	0.4	-	0.3	<0.1	0.5	<0.1	0.2	<0.1	0.2	0.5	0.7	0.7	-	3.3	
TRIP1	16 Nov 2022	ES2241682	Soil	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5	-	
RPD				-	0	0	0	0	4	-	0	-	0	0	0	0	0	0	0	0	15	53	-	-	

*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: 100 (0 - 5 x EQL); 75 (5 - 10 x EQL); 30 (> 10 x EQL))

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

Table 2
QA/QC - RPDs



				Metals								SVOCs	Organ												
				Arsenic	Cadmium	Chromium (III+VI)	Copper	Lead	Mercury	Nickel	Zinc	Fenamiphos	4,4-DDE	a-BHC	Aldrin	Dieldrin	Aldrin + Dieldrin	b-BHC	Chlordane	Chlordane (cis)	Chlordane (trans)	d-BHC	DDD	DDT	
				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				4	0.4	1	1	1	0.1	1	1	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.1
Field ID	Date	Lab Report Number	Matrix Type																						
BH03 - 0.1	16 Nov 2022	310803	Soil	<4	<0.4	3	13	70	<0.1	2	77	-	<0.1	<0.1	<0.1	<0.1	-	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	
DUP1	16 Nov 2022	310803	Soil	<4	<0.4	4	18	76	<0.1	2	100	-	<0.1	<0.1	<0.1	<0.1	-	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	
RPD				0	0	29	32	8	0	0	26	-	0	0	0	0	-	0	-	0	0	0	0	0	
BH03 - 0.1	16 Nov 2022	310803	Soil	<4	<0.4	3	13	70	<0.1	2	77	-	<0.1	<0.1	<0.1	<0.1	-	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	
TRIP1	16 Nov 2022	ES2241682	Soil	<5	<1	3	11	53	0.1	<2	80	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	
RPD				0	0	0	17	28	0	0	4	-	0	0	0	0	-	0	-	0	0	0	0	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: 100 (0 - 5 x EQL); 75 (5 - 10 x EQL); 30 (> 10 x EQL))

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Table 2
QA/QC - RPDs



				bchlorine Pesticides																					
				DDT+DDE+DDD	Endosulfan	Endosulfan I	Endosulfan II	Endosulfan sulphate	Endrin	Endrin aldehyde	Endrin ketone	γ-BHC (Lindane)	Heptachlor	Heptachlor epoxide	Hexachlorobenzene	Methoxychlor	Azinophos methyl	Bromophos-ethyl	Carbophenothion	Chlorfenvinphos	Chlorpyrifos	Chlorpyrifos-methyl	Diazinon	Dichlorvos	
				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				0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.1	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05

Field ID	Date	Lab Report Number	Matrix Type																					
BH03 - 0.1	16 Nov 2022	310803	Soil	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	<0.1	<0.1	<0.1	<0.1
DUP1	16 Nov 2022	310803	Soil	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	<0.1	<0.1	<0.1	<0.1
RPD				0	-	0	0	0	0	0	-	0	0	0	0	0	0	0	-	-	0	0	0	0
BH03 - 0.1	16 Nov 2022	310803	Soil	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	<0.1	<0.1	<0.1	<0.1
TRIP1	16 Nov 2022	ES2241682	Soil	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
RPD				0	-	0	0	0	0	0	-	0	0	0	0	0	0	0	-	-	0	0	0	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: 100 (0 - 5 x EQL); 75 (5 - 10 x EQL); 30 (> 10 x EQL))

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Table 2
QA/QC - RPDs



				ganophosphorous Pesticides										Pesticides		PCBs							
				Dimethoate	Ethion	Fenitrothion	Fenthion	Malathion	Methyl parathion	Monocrotophos	Parathion	Prothiofos	Ronnel	Demeton-S-methyl	Pirimphos-ethyl	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	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				0.05	0.05	0.1	0.05	0.05	0.2	0.2	0.1	0.05	0.1	0.05	0.05	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Field ID	Date	Lab Report Number	Matrix Type																				
BH03 - 0.1	16 Nov 2022	310803	Soil	<0.1	<0.1	<0.1	-	<0.1	-	-	<0.1	-	<0.1	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
DUP1	16 Nov 2022	310803	Soil	<0.1	<0.1	<0.1	-	<0.1	-	-	<0.1	-	<0.1	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
RPD				0	0	0	-	0	-	-	0	-	0	-	-	0	0	0	0	0	0	0	
BH03 - 0.1	16 Nov 2022	310803	Soil	<0.1	<0.1	<0.1	-	<0.1	-	-	<0.1	-	<0.1	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
TRIP1	16 Nov 2022	ES2241682	Soil	<0.05	<0.05	-	<0.05	<0.05	<0.2	<0.2	<0.2	<0.05	-	<0.05	<0.05	-	-	-	-	-	-	<0.1	
RPD				0	0	-	-	0	-	-	0	-	-	-	-	-	-	-	-	-	-	0	

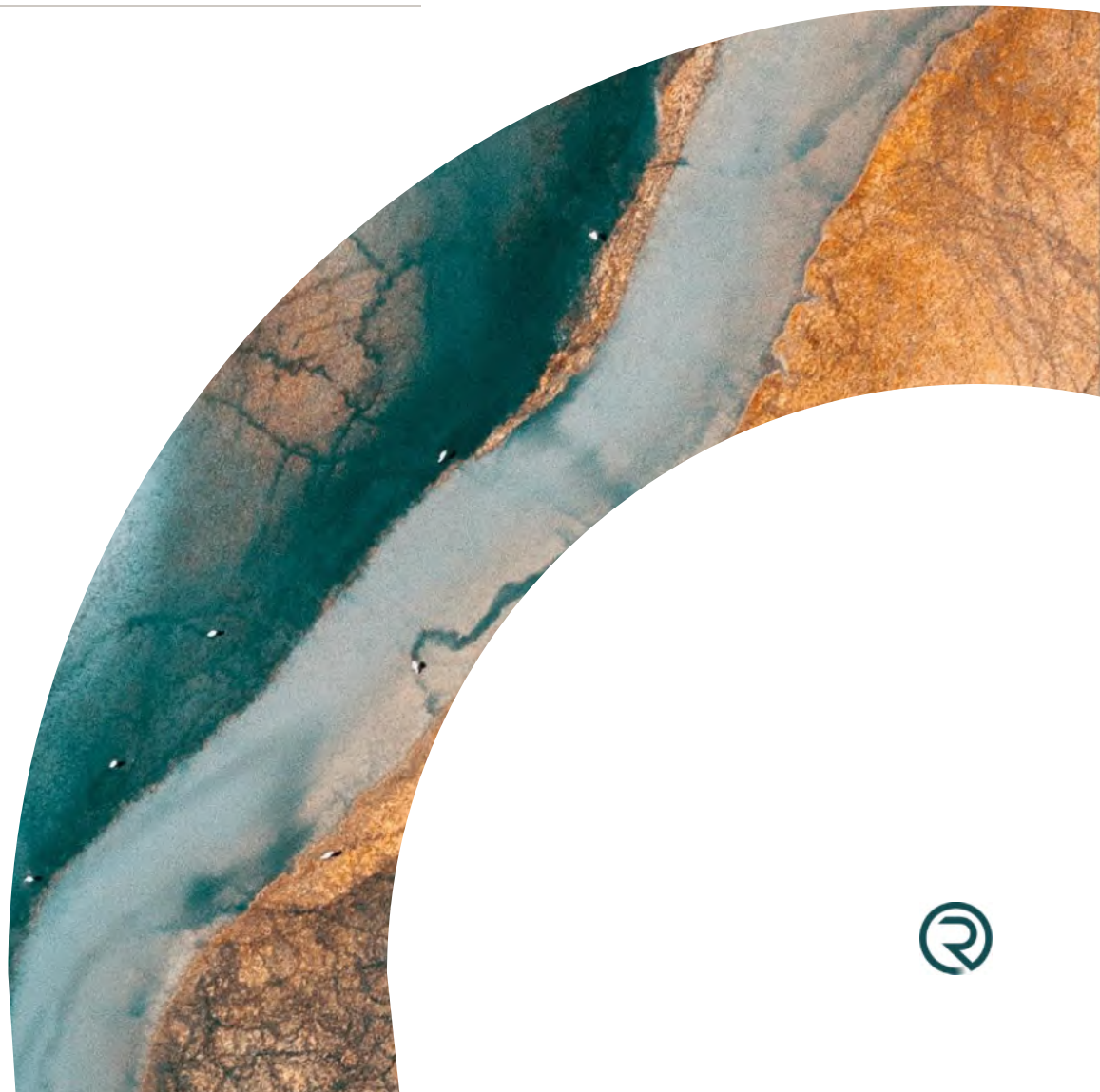
*RPDs have only been considered where a concentration is greater than 1 times the EQL.

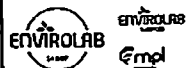
**Elevated RPDs are highlighted as per QAQC Profile settings (Acceptable RPDs for each EQL multiplier range are: 100 (0 - 5 x EQL); 75 (5 - 10 x EQL); 30 (> 10 x EQL))

***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

F

Laboratory Reports





CHAIN OF CUSTODY FORM - Client

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Client: Reditus Consulting

Contact Person: Jack Palma / Matthew Burchon

Project Mgr: Mathew Burcher

Sampler: Jack Palma

Address: Unit 1A, Level 1, Kirrawee NSW

Phone: 02 9521 8567

Mob: 0408 988 954 0423 858 305

Email:

accounts@reditusconsulting.com
jackpalma@reditus.com.au
mathewburcher@reditus.com.au

Client Project Name/Number/Site etc (to report title):

22246

PO No.: 22246

EnviroLab Quote No.:

Standard

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


Lab Comments:

Sample Information

Tests Required

Comments

Sample Information					Tests Required																		
Envirofab Sample ID	Client Sample ID or Information	Depth	Date sampled	Type of sample	Hold	Combo 6a	Chromium reducible	Chromium soluble	Chromium total	Fluoride	Iron	Manganese	Nickel	Phosphorus	Potassium	Sulfate	Sulfide	Sulfur	Vanadium	Zinc	Other	Provide as much information about the sample as you can	
1	BH01	0.1	16/11/2022	Soil		X																	
2	BH01	0.5	16/11/2022	Soil	X																		
3	BH01	1	16/11/2022	Soil	X																		
4	BH01	1.5	16/11/2022	Soil	X																		
5	BH01	2	16/11/2022	Soil	X																		
6	BH01	3	16/11/2022	Soil			X																
7	BH01	4	16/11/2022	Soil	X																		
8	BH02	0.1	16/11/2022	Soil		X	X																
9	BH02	0.5	16/11/2022	Soil	X																		
10	BH02	1	16/11/2022	Soil	X																		
11	BH02	1.5	16/11/2022	Soil	X																		
12	BH02	2	16/11/2022	Soil	X																		
13	BH03	0.1	16/11/2022	Soil		X																	
14	BH03	1	16/11/2022	Soil	X																		
15	BH03	1.5	16/11/2022	Soil	X																		
16	BH03	2	16/11/2022	Soil	X																		
17	BH03	3	16/11/2022	Soil			X																
18	BH03	4	16/11/2022	Soil	X																		
19	BH04	0.1	16/11/2022	Soil		X																	
20	BH04	0.5	16/11/2022	Soil	X																		
21	BH04	1	16/11/2022	Soil	X																		
22	BH04	1.5	16/11/2022	Soil	X																		
23	BH04	2	16/11/2022	Soil	X																		
24	BH04	3	16/11/2022	Soil			X																
25	BH04	4	16/11/2022	Soil	X																		
26	DUP1	-	16/11/2022	Soil		X																	
27	TRIP1	-	16/11/2022	Soil		X																	



Envirofab Services
12 Ashley St
Chatswood NSW 2087
Ph: (02) 9910 6200

JOB NO: 319803

Date Received: 16/11/22

Time Received: 11:50

Received By: Y.W.

Temp: Cool Ambient

Cooling: Ice/Refrac

Security: Intact/Broken/None

Please forward to ALS

Please tick the box if observed settled sediment present in water samples is to be included in the extraction and/or analysis

Relinquished by (Company): Roditus

Print Name: Jack Palma

Date & Time: 16/11/2022 14:35:00 PM

Signature: _____

Received by (Company): **ELS SYD**

Print Name: Katy Wayne

Date & Time: 16/11/22 11:50

Signature: 

Lab Use Only

Job number: 310803

Temperature: ~~50~~ 6 °C

TAT Req - SAME day / 1 / 2 / 3 / 4 (STD)

Cooling: Ice / Ice pack / None

Security seal: Intact / Broken / None

4 SEP

CERTIFICATE OF ANALYSIS 310803

Client Details

Client	Reditus Consulting
Attention	Matt Burcher
Address	Shop 1, 29-33 Waratah St, KIRRAWEE, NSW, 2232

Sample Details

Your Reference	<u>22246</u>
Number of Samples	26 Soil
Date samples received	16/11/2022
Date completed instructions received	16/11/2022

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	23/11/2022
Date of Issue	25/11/2022
Reissue Details	This report replaces R00 created on 23/11/2022 due to: revised report with some of results removed.
NATA Accreditation Number 2901. This document shall not be reproduced except in full.	
Accredited for compliance with ISO/IEC 17025 - Testing. Tests not covered by NATA are denoted with *	

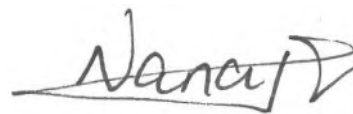
Asbestos Approved By

Analysed by Asbestos Approved Analyst: Lucy Zhu
 Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By

Giovanni Agosti, Group Technical Manager
 Josh Williams, Organics and LC Supervisor
 Kyle Gavrily, Senior Chemist
 Lucy Zhu, Asbestos Supervisor

Authorised By



Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		310803-1	310803-8	310803-13	310803-19	310803-26
Your Reference	UNITS	BH01	BH02	BH03	BH04	DUP1
Depth		0.1	0.1	0.1	0.1	-
Date Sampled		16/11/2022	16/11/2022	16/11/2022	16/11/2022	16/11/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	17/11/2022	17/11/2022	17/11/2022	17/11/2022	17/11/2022
Date analysed	-	21/11/2022	21/11/2022	21/11/2022	21/11/2022	21/11/2022
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	%	79	82	86	81	83

svTRH (C10-C40) in Soil						
Our Reference		310803-1	310803-8	310803-13	310803-19	310803-26
Your Reference	UNITS	BH01	BH02	BH03	BH04	DUP1
Depth		0.1	0.1	0.1	0.1	-
Date Sampled		16/11/2022	16/11/2022	16/11/2022	16/11/2022	16/11/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	17/11/2022	17/11/2022	17/11/2022	17/11/2022	17/11/2022
Date analysed	-	17/11/2022	17/11/2022	18/11/2022	18/11/2022	18/11/2022
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
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	<50	<50
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	%	73	72	73	73	75

PAHs in Soil						
Our Reference		310803-1	310803-8	310803-13	310803-19	310803-26
Your Reference	UNITS	BH01	BH02	BH03	BH04	DUP1
Depth		0.1	0.1	0.1	0.1	-
Date Sampled		16/11/2022	16/11/2022	16/11/2022	16/11/2022	16/11/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	17/11/2022	17/11/2022	17/11/2022	17/11/2022	17/11/2022
Date analysed	-	17/11/2022	17/11/2022	17/11/2022	17/11/2022	17/11/2022
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	0.2	0.7	0.2	0.2	0.3
Anthracene	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.6	1.4	0.5	0.5	0.7
Pyrene	mg/kg	0.6	1.3	0.5	0.5	0.7
Benzo(a)anthracene	mg/kg	0.2	0.4	0.2	0.2	0.3
Chrysene	mg/kg	0.3	0.6	0.3	0.3	0.4
Benzo(b,j+k)fluoranthene	mg/kg	0.5	1	0.5	0.5	0.8
Benzo(a)pyrene	mg/kg	0.5	1.1	0.52	0.5	0.89
Indeno(1,2,3-c,d)pyrene	mg/kg	0.3	0.5	0.2	0.2	0.4
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	0.3	0.4	0.4	0.3	0.5
Total +ve PAH's	mg/kg	3.5	7.6	3.3	3.2	5.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	0.6	1.3	0.6	0.6	1.1
Benzo(a)pyrene TEQ calc(half)	mg/kg	0.7	1.3	0.7	0.7	1.1
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	0.7	1.4	0.7	0.7	1.2
Surrogate <i>p</i> -Terphenyl-d14	%	81	82	81	80	81

PAHs in Soil		
Our Reference		310803-27
Your Reference	UNITS	DUP1 - [TRIPLICATE]
Depth		-
Date Sampled		16/11/2022
Type of sample		Soil
Date extracted	-	17/11/2022
Date analysed	-	22/11/2022
Naphthalene	mg/kg	<0.1
Acenaphthylene	mg/kg	<0.1
Acenaphthene	mg/kg	<0.1
Fluorene	mg/kg	<0.1
Phenanthrene	mg/kg	0.1
Anthracene	mg/kg	<0.1
Fluoranthene	mg/kg	0.4
Pyrene	mg/kg	0.4
Benzo(a)anthracene	mg/kg	0.2
Chrysene	mg/kg	0.2
Benzo(b,j+k)fluoranthene	mg/kg	0.4
Benzo(a)pyrene	mg/kg	0.3
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1
Total +ve PAH's	mg/kg	2.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5
Surrogate <i>p</i> -Terphenyl-d14	%	84

Organochlorine Pesticides in soil						
Our Reference		310803-1	310803-8	310803-13	310803-19	310803-26
Your Reference	UNITS	BH01	BH02	BH03	BH04	DUP1
Depth		0.1	0.1	0.1	0.1	-
Date Sampled		16/11/2022	16/11/2022	16/11/2022	16/11/2022	16/11/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	17/11/2022	17/11/2022	17/11/2022	17/11/2022	17/11/2022
Date analysed	-	17/11/2022	17/11/2022	17/11/2022	17/11/2022	17/11/2022
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
HCB	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
gamma-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	0.2	<0.1	<0.1	<0.1
Endrin	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-DDD	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
pp-DDT	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	%	87	88	88	88	87

Organophosphorus Pesticides in Soil						
Our Reference		310803-1	310803-8	310803-13	310803-19	310803-26
Your Reference	UNITS	BH01	BH02	BH03	BH04	DUP1
Depth		0.1	0.1	0.1	0.1	-
Date Sampled		16/11/2022	16/11/2022	16/11/2022	16/11/2022	16/11/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	17/11/2022	17/11/2022	17/11/2022	17/11/2022	17/11/2022
Date analysed	-	17/11/2022	17/11/2022	17/11/2022	17/11/2022	17/11/2022
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
Diazinon	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
Ronnel	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
Chlorpyriphos	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
Bromophos-ethyl	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
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	87	88	88	88	87

PCBs in Soil						
Our Reference		310803-1	310803-8	310803-13	310803-19	310803-26
Your Reference	UNITS	BH01	BH02	BH03	BH04	DUP1
Depth		0.1	0.1	0.1	0.1	-
Date Sampled		16/11/2022	16/11/2022	16/11/2022	16/11/2022	16/11/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	17/11/2022	17/11/2022	17/11/2022	17/11/2022	17/11/2022
Date analysed	-	17/11/2022	17/11/2022	17/11/2022	17/11/2022	17/11/2022
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 TCMX	%	87	88	88	88	87

Acid Extractable metals in soil						
Our Reference		310803-1	310803-8	310803-13	310803-19	310803-26
Your Reference	UNITS	BH01	BH02	BH03	BH04	DUP1
Depth		0.1	0.1	0.1	0.1	-
Date Sampled		16/11/2022	16/11/2022	16/11/2022	16/11/2022	16/11/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	21/11/2022	21/11/2022	21/11/2022	21/11/2022	21/11/2022
Date analysed	-	23/11/2022	23/11/2022	23/11/2022	23/11/2022	23/11/2022
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	5	8	3	4	4
Copper	mg/kg	13	22	13	17	18
Lead	mg/kg	42	220	70	42	76
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	13	4	2	2	2
Zinc	mg/kg	41	240	77	60	100

Acid Extractable metals in soil		
Our Reference		310803-27
Your Reference	UNITS	DUP1 - [TRIPLICATE]
Depth		-
Date Sampled		16/11/2022
Type of sample		Soil
Date prepared	-	21/11/2022
Date analysed	-	23/11/2022
Arsenic	mg/kg	<4
Cadmium	mg/kg	<0.4
Chromium	mg/kg	3
Copper	mg/kg	14
Lead	mg/kg	62
Mercury	mg/kg	<0.1
Nickel	mg/kg	2
Zinc	mg/kg	80

Moisture						
Our Reference		310803-1	310803-8	310803-13	310803-19	310803-26
Your Reference	UNITS	BH01	BH02	BH03	BH04	DUP1
Depth		0.1	0.1	0.1	0.1	-
Date Sampled		16/11/2022	16/11/2022	16/11/2022	16/11/2022	16/11/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	17/11/2022	17/11/2022	17/11/2022	17/11/2022	17/11/2022
Date analysed	-	18/11/2022	18/11/2022	18/11/2022	18/11/2022	18/11/2022
Moisture	%	9.2	7.4	8.0	6.8	9.3

Asbestos ID - soils						
Our Reference	UNITS	310803-1	310803-8	310803-13	310803-19	310803-26
Your Reference		BH01	BH02	BH03	BH04	DUP1
Depth		0.1	0.1	0.1	0.1	-
Date Sampled		16/11/2022	16/11/2022	16/11/2022	16/11/2022	16/11/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	22/11/2022	22/11/2022	22/11/2022	22/11/2022	22/11/2022
Sample mass tested	g	Approx. 55g	Approx. 60g	Approx. 50g	Approx. 25g	Approx. 35g
Sample Description	-	Brown sandy soil	Brown sandy soil	Brown sandy soil	Brown sandy soil	Brown sandy soil
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

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.
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-020	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-020	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-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-021	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-022	Determination of VOCs sampled onto coconut shell charcoal sorbent tubes, that can be desorbed using carbon disulphide, and analysed by GC-MS.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.
Org-022/025	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-MS/GC-MSMS. 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.

Method ID	Methodology Summary
Org-022/025	<p>Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.</p> <p>For soil results:-</p> <ol style="list-style-type: none"> 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. <p>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.</p>
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-023	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)-BTX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-023	<p>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)-BTX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.</p> <p>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.</p>

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-12	310803-8
Date extracted	-			17/11/2022	1	17/11/2022	17/11/2022		17/11/2022	17/11/2022
Date analysed	-			21/11/2022	1	21/11/2022	21/11/2022		21/11/2022	21/11/2022
TRH C ₆ - C ₉	mg/kg	25	Org-023	<25	1	<25	<25	0	86	97
TRH C ₆ - C ₁₀	mg/kg	25	Org-023	<25	1	<25	<25	0	86	97
Benzene	mg/kg	0.2	Org-023	<0.2	1	<0.2	<0.2	0	90	103
Toluene	mg/kg	0.5	Org-023	<0.5	1	<0.5	<0.5	0	85	96
Ethylbenzene	mg/kg	1	Org-023	<1	1	<1	<1	0	79	90
m+p-xylene	mg/kg	2	Org-023	<2	1	<2	<2	0	88	99
o-Xylene	mg/kg	1	Org-023	<1	1	<1	<1	0	87	100
Naphthalene	mg/kg	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	81	1	79	84	6	81	83

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]	26	17/11/2022	17/11/2022		[NT]	[NT]
Date analysed	-			[NT]	26	21/11/2022	21/11/2022		[NT]	[NT]
TRH C ₆ - C ₉	mg/kg	25	Org-023	[NT]	26	<25	<25	0	[NT]	[NT]
TRH C ₆ - C ₁₀	mg/kg	25	Org-023	[NT]	26	<25	<25	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-023	[NT]	26	<0.2	<0.2	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-023	[NT]	26	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-023	[NT]	26	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-023	[NT]	26	<2	<2	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-023	[NT]	26	<1	<1	0	[NT]	[NT]
Naphthalene	mg/kg	1	Org-023	[NT]	26	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	[NT]	26	83	81	2	[NT]	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-11	310803-8
Date extracted	-			17/11/2022	1	17/11/2022	17/11/2022		17/11/2022	17/11/2022
Date analysed	-			17/11/2022	1	17/11/2022	17/11/2022		17/11/2022	18/11/2022
TRH C ₁₀ - C ₁₄	mg/kg	50	Org-020	<50	1	<50	<50	0	105	103
TRH C ₁₅ - C ₂₈	mg/kg	100	Org-020	<100	1	<100	<100	0	97	92
TRH C ₂₉ - C ₃₆	mg/kg	100	Org-020	<100	1	<100	<100	0	86	108
TRH >C ₁₀ -C ₁₆	mg/kg	50	Org-020	<50	1	<50	<50	0	105	103
TRH >C ₁₆ -C ₃₄	mg/kg	100	Org-020	<100	1	<100	<100	0	97	92
TRH >C ₃₄ -C ₄₀	mg/kg	100	Org-020	<100	1	<100	<100	0	86	108
Surrogate o-Terphenyl	%		Org-020	70	1	73	72	1	77	75

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	26	17/11/2022	17/11/2022		[NT]	[NT]
Date analysed	-			[NT]	26	18/11/2022	18/11/2022		[NT]	[NT]
TRH C ₁₀ - C ₁₄	mg/kg	50	Org-020	[NT]	26	<50	<50	0	[NT]	[NT]
TRH C ₁₅ - C ₂₈	mg/kg	100	Org-020	[NT]	26	<100	<100	0	[NT]	[NT]
TRH C ₂₉ - C ₃₆	mg/kg	100	Org-020	[NT]	26	<100	<100	0	[NT]	[NT]
TRH >C ₁₀ -C ₁₆	mg/kg	50	Org-020	[NT]	26	<50	<50	0	[NT]	[NT]
TRH >C ₁₆ -C ₃₄	mg/kg	100	Org-020	[NT]	26	<100	160	46	[NT]	[NT]
TRH >C ₃₄ -C ₄₀	mg/kg	100	Org-020	[NT]	26	<100	<100	0	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-020	[NT]	26	75	74	1	[NT]	[NT]

QUALITY CONTROL: PAHs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-11	310803-8
Date extracted	-			17/11/2022	1	17/11/2022	17/11/2022		17/11/2022	17/11/2022
Date analysed	-			22/11/2022	1	17/11/2022	17/11/2022		22/11/2022	17/11/2022
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	97	99
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	93	93
Fluorene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	93	88
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	1	0.2	0.2	0	94	108
Anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	1	0.6	0.5	18	96	#
Pyrene	mg/kg	0.1	Org-022/025	<0.1	1	0.6	0.5	18	97	#
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	0.2	0.2	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	1	0.3	0.3	0	75	98
Benzo(b,j,k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	1	0.5	0.4	22	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	1	0.5	0.4	22	108	96
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	1	0.3	0.2	40	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	1	0.3	0.2	40	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	80	1	81	80	1	94	81

QUALITY CONTROL: PAHs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	26	17/11/2022	17/11/2022		[NT]	[NT]
Date analysed	-			[NT]	26	17/11/2022	17/11/2022		[NT]	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	[NT]	26	<0.1	<0.1	0	[NT]	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	[NT]	26	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	[NT]	26	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-022/025	[NT]	26	<0.1	<0.1	0	[NT]	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	[NT]	26	0.3	0.5	50	[NT]	[NT]
Anthracene	mg/kg	0.1	Org-022/025	[NT]	26	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	[NT]	26	0.7	1.4	67	[NT]	[NT]
Pyrene	mg/kg	0.1	Org-022/025	[NT]	26	0.7	1.3	60	[NT]	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	[NT]	26	0.3	0.6	67	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	[NT]	26	0.4	0.8	67	[NT]	[NT]
Benzo(b,j,k)fluoranthene	mg/kg	0.2	Org-022/025	[NT]	26	0.8	2	86	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	[NT]	26	0.89	1.6	57	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	[NT]	26	0.4	0.8	67	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	[NT]	26	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	[NT]	26	0.5	1.0	67	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	[NT]	26	81	84	4	[NT]	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-11	310803-8
Date extracted	-			17/11/2022	1	17/11/2022	17/11/2022		17/11/2022	17/11/2022
Date analysed	-			22/11/2022	1	17/11/2022	17/11/2022		22/11/2022	17/11/2022
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	96	98
HCB	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	102	90
gamma-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	101	107
delta-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	95	99
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	94	80
gamma-Chlordane	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	107	91
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	106	112
Endrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	113	115
Endosulfan II	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	98	94
Endrin Aldehyde	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	92	76
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	90	1	87	87	0	84	87

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	26	17/11/2022	17/11/2022		[NT]	[NT]
Date analysed	-			[NT]	26	17/11/2022	17/11/2022		[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-022/025	[NT]	26	<0.1	<0.1	0	[NT]	[NT]
HCB	mg/kg	0.1	Org-022/025	[NT]	26	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	[NT]	26	<0.1	<0.1	0	[NT]	[NT]
gamma-BHC	mg/kg	0.1	Org-022/025	[NT]	26	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	[NT]	26	<0.1	<0.1	0	[NT]	[NT]
delta-BHC	mg/kg	0.1	Org-022/025	[NT]	26	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	[NT]	26	<0.1	<0.1	0	[NT]	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	[NT]	26	<0.1	<0.1	0	[NT]	[NT]
gamma-Chlordane	mg/kg	0.1	Org-022/025	[NT]	26	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	[NT]	26	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	[NT]	26	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	[NT]	26	<0.1	<0.1	0	[NT]	[NT]
Dieldrin	mg/kg	0.1	Org-022/025	[NT]	26	<0.1	<0.1	0	[NT]	[NT]
Endrin	mg/kg	0.1	Org-022/025	[NT]	26	<0.1	<0.1	0	[NT]	[NT]
Endosulfan II	mg/kg	0.1	Org-022/025	[NT]	26	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	[NT]	26	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-022/025	[NT]	26	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	[NT]	26	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	[NT]	26	<0.1	<0.1	0	[NT]	[NT]
Methoxychlor	mg/kg	0.1	Org-022/025	[NT]	26	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	26	87	90	3	[NT]	[NT]

QUALITY CONTROL: Organophosphorus Pesticides in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-11	310803-8
Date extracted	-			17/11/2022	1	17/11/2022	17/11/2022		17/11/2022	17/11/2022
Date analysed	-			22/11/2022	1	17/11/2022	17/11/2022		22/11/2022	17/11/2022
Dichlorvos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	83	131
Dimethoate	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chlorpyrifos-methyl	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	89	85
Fenitrothion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	105	119
Malathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	120	128
Chlorpyrifos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	106	118
Parathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	101	125
Bromophos-ethyl	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	98	123
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	90	1	87	87	0	84	87

QUALITY CONTROL: Organophosphorus Pesticides in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	26	17/11/2022	17/11/2022		[NT]	[NT]
Date analysed	-			[NT]	26	17/11/2022	17/11/2022		[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-022/025	[NT]	26	<0.1	<0.1	0	[NT]	[NT]
Dimethoate	mg/kg	0.1	Org-022/025	[NT]	26	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	[NT]	26	<0.1	<0.1	0	[NT]	[NT]
Chlorpyrifos-methyl	mg/kg	0.1	Org-022/025	[NT]	26	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	[NT]	26	<0.1	<0.1	0	[NT]	[NT]
Fenitrothion	mg/kg	0.1	Org-022/025	[NT]	26	<0.1	<0.1	0	[NT]	[NT]
Malathion	mg/kg	0.1	Org-022/025	[NT]	26	<0.1	<0.1	0	[NT]	[NT]
Chlorpyrifos	mg/kg	0.1	Org-022/025	[NT]	26	<0.1	<0.1	0	[NT]	[NT]
Parathion	mg/kg	0.1	Org-022/025	[NT]	26	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-022	[NT]	26	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	[NT]	26	<0.1	<0.1	0	[NT]	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	[NT]	26	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	26	87	90	3	[NT]	[NT]

QUALITY CONTROL: PCBs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-11	310803-8
Date extracted	-			17/11/2022	1	17/11/2022	17/11/2022		17/11/2022	17/11/2022
Date analysed	-			22/11/2022	1	17/11/2022	17/11/2022		22/11/2022	17/11/2022
Aroclor 1016	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	100	80
Aroclor 1260	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	90	1	87	87	0	84	87

QUALITY CONTROL: PCBs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	26	17/11/2022	17/11/2022		[NT]	[NT]
Date analysed	-			[NT]	26	17/11/2022	17/11/2022		[NT]	[NT]
Aroclor 1016	mg/kg	0.1	Org-021	[NT]	26	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	[NT]	26	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	[NT]	26	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	[NT]	26	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	[NT]	26	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	[NT]	26	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1260	mg/kg	0.1	Org-021	[NT]	26	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	[NT]	26	87	90	3	[NT]	[NT]

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	310803-8
Date prepared	-			21/11/2022	1	21/11/2022	21/11/2022		21/11/2022	21/11/2022
Date analysed	-			23/11/2022	1	23/11/2022	23/11/2022		23/11/2022	23/11/2022
Arsenic	mg/kg	4	Metals-020	<4	1	<4	<4	0	96	106
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	<0.4	<0.4	0	93	83
Chromium	mg/kg	1	Metals-020	<1	1	5	6	18	96	95
Copper	mg/kg	1	Metals-020	<1	1	13	16	21	95	121
Lead	mg/kg	1	Metals-020	<1	1	42	44	5	94	#
Mercury	mg/kg	0.1	Metals-021	<0.1	1	<0.1	<0.1	0	90	81
Nickel	mg/kg	1	Metals-020	<1	1	13	17	27	96	91
Zinc	mg/kg	1	Metals-020	<1	1	41	39	5	95	112

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	26	21/11/2022	21/11/2022		[NT]	[NT]
Date analysed	-			[NT]	26	23/11/2022	23/11/2022		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	26	<4	<4	0	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	26	<0.4	<0.4	0	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	26	4	4	0	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	26	18	12	40	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	26	76	61	22	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	26	<0.1	<0.1	0	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	26	2	1	67	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	26	100	74	30	[NT]	[NT]

Result Definitions

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

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.
Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.	
The recommended maximums for analytes in urine are taken from "2018 TLVs and BEIs", as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.	
Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2	

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 (not SPOCAS); 60-140% for organics/SPOCAS (+/-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.

Where matrix spike recoveries fall below the lower limit of the acceptance criteria (e.g. for non-labile or standard Organics <60%), positive result(s) in the parent sample will subsequently have a higher than typical estimated uncertainty (MU estimates supplied on request) and in these circumstances the sample result is likely biased significantly low.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

Asbestos: A portion of the supplied sample was sub-sampled for asbestos according to ASB-001 asbestos subsampling procedure. We cannot guarantee that this sub-sample is indicative of the entire sample. Envirolab/MPL recommends supplying 40-60g or 500ml of sample in its own container.

Note: Sample 310803-26 was sub-sampled from a jar provided by the client.

Note: Samples 310803-1, 8, 13, 19 were sub-sampled from bags provided by the client.

PAHs in Soil - The laboratory RPD acceptance criteria has been exceeded for 310803-26. Therefore a triplicate result has been issued as laboratory sample number 310803-27.

Acid Extractable Metals in Soil:

-The laboratory RPD acceptance criteria has been exceeded for 310803-26 for Cu. Therefore a triplicate result has been issued as laboratory sample number 310803-27.

-# Percent recovery is not applicable due to the high concentration of the element/s in the sample/s. However an acceptable recovery was obtained for the LCS.

Ming To

From: Jack Palma <jackpalma@reditus.com.au>
Sent: Wednesday, 23 November 2022 10:14 AM
To: Samplereceipt; Login
Cc: mathewburcher@reditus.com.au
Subject: Re: Sample Receipt for 310803 22246

Ref: 310803-A
TAT: 1 day.
Due: 24/11/2022
M7

CAUTION: This email originated from outside of the organisation. Do not act on instructions, click links or open attachments unless you recognise the sender and know the content is authentic and safe.

Hi,

Could I please have the following samples from this report analysed on 24-hr turnaround time for Combo 3 if possible:

- 2. • BH01 - 0.5
- 11 • BH02 - 1.5
- 14 • BH03 - 1.0
- 20 • BH04 - 0.5

Any questions please give me a call
Thank you

Jack Palma
Senior Environmental Scientist

Unit 1A, Level 1
29-33 Waratah Street,
Kirrawee NSW 2232
jackpalma@reditus.com.au
+61 408 988 954



www.reditus.com.au

On Thu, 17 Nov 2022 at 12:49, Simon Song <ssong@envirolab.com.au> wrote:

Please refer to attached for:

a copy of the COC/paperwork received from you

a copy of our Sample Receipt Advice (SRA)

Please open and read the SRA as it contains important information.

Please let the lab know immediately if there are any issues.

Results will be available by 6.30pm on the date indicated.

PLEASE NOTE COMBO PRICES WILL ONLY APPLY IF COMBOS ARE SELECTED ON COC.

CERTIFICATE OF ANALYSIS 310803-A

Client Details

Client	Reditus Consulting
Attention	Jack Palma
Address	Shop 1, 29-33 Waratah St, KIRRAWEE, NSW, 2232

Sample Details

Your Reference	<u>22246</u>
Number of Samples	additional analysis
Date samples received	16/11/2022
Date completed instructions received	23/11/2022

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.

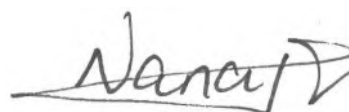
Report Details

Date results requested by	24/11/2022
Date of Issue	24/11/2022
NATA Accreditation Number 2901. This document shall not be reproduced except in full.	
Accredited for compliance with ISO/IEC 17025 - Testing. Tests not covered by NATA are denoted with *	

Results Approved By

Greta Petzold, Assistant Operation Manager
 Josh Williams, Organics and LC Supervisor
 Liam Timmins, Organic Instruments Team Leader
 Loren Bardwell, Development Chemist

Authorised By



Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil					
Our Reference		310803-A-2	310803-A-11	310803-A-14	310803-A-20
Your Reference	UNITS	BH01	BH02	BH03	BH04
Depth		0.5	1.5	1	0.5
Date Sampled		16/11/2022	16/11/2022	16/11/2022	16/11/2022
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	23/11/2022	23/11/2022	23/11/2022	23/11/2022
Date analysed	-	24/11/2022	24/11/2022	24/11/2022	24/11/2022
TRH C ₆ - C ₉	mg/kg	<25	<25	<25	<25
TRH C ₆ - C ₁₀	mg/kg	<25	<25	<25	<25
vTPH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	103	89	83	97

svTRH (C10-C40) in Soil					
Our Reference		310803-A-2	310803-A-11	310803-A-14	310803-A-20
Your Reference	UNITS	BH01	BH02	BH03	BH04
Depth		0.5	1.5	1	0.5
Date Sampled		16/11/2022	16/11/2022	16/11/2022	16/11/2022
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	23/11/2022	23/11/2022	23/11/2022	23/11/2022
Date analysed	-	24/11/2022	24/11/2022	24/11/2022	24/11/2022
TRH C ₁₀ - C ₁₄	mg/kg	<50	<50	<50	<50
TRH C ₁₅ - C ₂₈	mg/kg	<100	<100	<100	<100
TRH C ₂₉ - C ₃₆	mg/kg	<100	<100	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	<50
TRH >C ₁₀ -C ₁₆	mg/kg	<50	<50	<50	<50
TRH >C ₁₀ - C ₁₆ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50
TRH >C ₁₆ -C ₃₄	mg/kg	<100	<100	<100	<100
TRH >C ₃₄ -C ₄₀	mg/kg	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50
Surrogate o-Terphenyl	%	86	85	85	86

PAHs in Soil					
Our Reference		310803-A-2	310803-A-11	310803-A-14	310803-A-20
Your Reference	UNITS	BH01	BH02	BH03	BH04
Depth		0.5	1.5	1	0.5
Date Sampled		16/11/2022	16/11/2022	16/11/2022	16/11/2022
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	23/11/2022	23/11/2022	23/11/2022	23/11/2022
Date analysed	-	24/11/2022	24/11/2022	24/11/2022	24/11/2022
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<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
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5
Surrogate <i>p</i> -Terphenyl-d14	%	76	72	77	75

Acid Extractable metals in soil					
Our Reference		310803-A-2	310803-A-11	310803-A-14	310803-A-20
Your Reference	UNITS	BH01	BH02	BH03	BH04
Depth		0.5	1.5	1	0.5
Date Sampled		16/11/2022	16/11/2022	16/11/2022	16/11/2022
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	24/11/2022	24/11/2022	24/11/2022	24/11/2022
Date analysed	-	24/11/2022	24/11/2022	24/11/2022	24/11/2022
Arsenic	mg/kg	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	2	<1	<1	2
Copper	mg/kg	1	<1	3	1
Lead	mg/kg	2	1	11	3
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	1	<1	<1	<1
Zinc	mg/kg	3	3	13	5

Moisture					
Our Reference		310803-A-2	310803-A-11	310803-A-14	310803-A-20
Your Reference	UNITS	BH01	BH02	BH03	BH04
Depth		0.5	1.5	1	0.5
Date Sampled		16/11/2022	16/11/2022	16/11/2022	16/11/2022
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	23/11/2022	23/11/2022	23/11/2022	23/11/2022
Date analysed	-	24/11/2022	24/11/2022	24/11/2022	24/11/2022
Moisture	%	3.7	3.5	4.7	5.2

Method ID	Methodology Summary
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-020	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-020	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-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/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-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-023	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.

Method ID	Methodology Summary
Org-023	<p>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.</p> <p>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.</p>

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-15	[NT]
Date extracted	-			23/11/2022	[NT]	[NT]	[NT]	[NT]	23/11/2022	[NT]
Date analysed	-			24/11/2022	[NT]	[NT]	[NT]	[NT]	24/11/2022	[NT]
TRH C ₆ - C ₉	mg/kg	25	Org-023	<25	[NT]	[NT]	[NT]	[NT]	109	[NT]
TRH C ₆ - C ₁₀	mg/kg	25	Org-023	<25	[NT]	[NT]	[NT]	[NT]	109	[NT]
Benzene	mg/kg	0.2	Org-023	<0.2	[NT]	[NT]	[NT]	[NT]	117	[NT]
Toluene	mg/kg	0.5	Org-023	<0.5	[NT]	[NT]	[NT]	[NT]	109	[NT]
Ethylbenzene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	102	[NT]
m+p-xylene	mg/kg	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	108	[NT]
o-Xylene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	109	[NT]
Naphthalene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	85	[NT]	[NT]	[NT]	[NT]	90	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-15	[NT]
Date extracted	-			23/11/2022	[NT]	[NT]	[NT]	[NT]	23/11/2022	[NT]
Date analysed	-			23/11/2022	[NT]	[NT]	[NT]	[NT]	23/11/2022	[NT]
TRH C ₁₀ - C ₁₄	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	104	[NT]
TRH C ₁₅ - C ₂₈	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	98	[NT]
TRH C ₂₉ - C ₃₆	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	86	[NT]
TRH >C ₁₀ -C ₁₆	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	104	[NT]
TRH >C ₁₆ -C ₃₄	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	98	[NT]
TRH >C ₃₄ -C ₄₀	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	86	[NT]
Surrogate o-Terphenyl	%		Org-020	86	[NT]	[NT]	[NT]	[NT]	88	[NT]

QUALITY CONTROL: PAHs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-15	[NT]
Date extracted	-			23/11/2022	[NT]	[NT]	[NT]	[NT]	23/11/2022	[NT]
Date analysed	-			24/11/2022	[NT]	[NT]	[NT]	[NT]	24/11/2022	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	86	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	81	[NT]
Fluorene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	82	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	90	[NT]
Anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	76	[NT]
Pyrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	79	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	69	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	66	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	77	[NT]	[NT]	[NT]	[NT]	77	[NT]

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			24/11/2022	[NT]	[NT]	[NT]	[NT]	24/11/2022	[NT]
Date analysed	-			24/11/2022	[NT]	[NT]	[NT]	[NT]	24/11/2022	[NT]
Arsenic	mg/kg	4	Metals-020	<4	[NT]	[NT]	[NT]	[NT]	107	[NT]
Cadmium	mg/kg	0.4	Metals-020	<0.4	[NT]	[NT]	[NT]	[NT]	97	[NT]
Chromium	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	105	[NT]
Copper	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	114	[NT]
Lead	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	103	[NT]
Mercury	mg/kg	0.1	Metals-021	<0.1	[NT]	[NT]	[NT]	[NT]	104	[NT]
Nickel	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	104	[NT]
Zinc	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	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.	
The recommended maximums for analytes in urine are taken from "2018 TLVs and BEIs", as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.	
Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2	

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 (not SPOCAS); 60-140% for organics/SPOCAS (+/-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.

Where matrix spike recoveries fall below the lower limit of the acceptance criteria (e.g. for non-labile or standard Organics <60%), positive result(s) in the parent sample will subsequently have a higher than typical estimated uncertainty (MU estimates supplied on request) and in these circumstances the sample result is likely biased significantly low.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.



CHAIN OF CUSTODY FORM - Client

ENVIROLAB GROUP

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Client: Redius Consulting

Contact Person: Jack Palma / Mathew Bucher

Project Mgr: Mathew Bucher

Sampler: Jack Palma

Address: Unit 1A, Level 1, Kiriwae NSW

Phone: 02 9521 6567

Email: accounts@rediusconsulting.com
jackpalma@redius.com.au
mathewburcher@redius.com.au

Client Project Name/Number/Ref etc (ie report title):

PO No.: 22246

EnviroLab Quote No.:

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

Lab Comments:

Tests Required

Comments

Provide as much information about the sample as you can

EnviroLab Sample ID	Client Sample ID or Information	Depth	Date sampled	Type of sample	Hold	Combo 6a	Chromium reducible sulfur suite:	Tests Required	Comments
1	BH01	0.1	16/11/2022	Soil	X				
2	BH01	0.5	16/11/2022	Soil	X				
3	BH01	1	16/11/2022	Soil	X				
4	BH01	1.5	16/11/2022	Soil	X				
5	BH01	2	16/11/2022	Soil	X				
6	BH01	3	16/11/2022	Soil	X				
7	BH01	4	16/11/2022	Soil	X				
8	BH02	0.1	16/11/2022	Soil	X				
9	BH02	0.5	16/11/2022	Soil	X				
10	BH02	1	16/11/2022	Soil	X				
11	BH02	1.5	16/11/2022	Soil	X				
12	BH02	2	16/11/2022	Soil	X				
13	BH03	0.1	16/11/2022	Soil	X				
14	BH03	1	16/11/2022	Soil	X				
15	BH03	1.5	16/11/2022	Soil	X				
16	BH03	2	16/11/2022	Soil	X				
17	BH03	3	16/11/2022	Soil	X				
18	BH03	4	16/11/2022	Soil	X				
19	BH04	0.1	16/11/2022	Soil	X				
20	BH04	0.5	16/11/2022	Soil	X				
21	BH04	1	16/11/2022	Soil	X				
22	BH04	1.5	16/11/2022	Soil	X				
23	BH04	2	16/11/2022	Soil	X				
24	BH04	3	16/11/2022	Soil	X				
25	BH04	4	16/11/2022	Soil	X				
26	DUP1		16/11/2022	Soil	X				
27	TRP1		16/11/2022	Soil	X				

Please tick the box if observed sediment present in water samples to be included in the extraction and/or analysis

Received by (Company): **ES Sydney**
Print Name: **Mathew Bucher**
Date & Time: **16/11/22 14:35:00 PM**
Signature: *[Signature]*

Job number: **310803**
Cooling / Ice / Bagged / None
Temperature: **6°C**
Sealing / Intact / Broken / None
TAT Rec - SAME day / 1 / 2 / 3 / 4 (STD)

Telephone : + 61-2-8794 8555



Environmental Division
Sydney
Work Order Reference
ES2241682

Rec'd 17/11/22 14:55

CERTIFICATE OF ANALYSIS

Work Order : **ES2241682**
Client : **REDITUS CONSULTING PTY LTD.**
Contact : Mathew Burcher
Address : 1A/29-33 Waratah Street
 KIRRAWEE
Telephone : ----
Project : 22246
Order number : 22246
C-O-C number : ----
Sampler : JACK PALMA
Site :
Quote number : EN/222
No. of samples received : 1
No. of samples analysed : 1

Page : 1 of 7
Laboratory : Environmental Division Sydney
Contact : Customer Services ES
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone : +61-2-8784 8555
Date Samples Received : 17-Nov-2022 14:55
Date Analysis Commenced : 21-Nov-2022
Issue Date : 24-Nov-2022 17:48



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. 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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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 Contract 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) per the NEPM (2013) 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.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP068: Where reported, Total Chlordane (sum) is the sum of the reported concentrations of cis-Chlordane and trans-Chlordane at or above the LOR.
- EP068: Where reported, Total OCP is the sum of the reported concentrations of all Organochlorine Pesticides at or above LOR.
- EP075(SIM): Where reported, Total Cresol is the sum of the reported concentrations of 2-Methylphenol and 3- & 4-Methylphenol at or above the LOR.



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	TRIP1	----	----	----	----
Sampling date / time				16-Nov-2022 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2241682-001	-----	-----	-----	-----
Result				----	----	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	7.2	----	----	----	----
EG005(ED093)T: 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	3	----	----	----	----
Copper	7440-50-8	5	mg/kg	11	----	----	----	----
Lead	7439-92-1	5	mg/kg	53	----	----	----	----
Nickel	7440-02-0	2	mg/kg	<2	----	----	----	----
Zinc	7440-66-6	5	mg/kg	80	----	----	----	----
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)

Sample ID

				TRIP1	----	----	----	----
Sampling date / time				16-Nov-2022 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2241682-001	-----	-----	-----	-----
				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	72-54-8/72-55-9/5 0-2	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)				Sample ID	TRIP1	----	----	----	----
Sampling date / time					16-Nov-2022 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES2241682-001	-----	-----	-----	-----
					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)				Sample ID	TRIP1	----	----	----	----
Sampling date / time				16-Nov-2022 00:00	----	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2241682-001	-----	-----	-----	-----	-----
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	%	111	----	----	----	----	----
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%	127	----	----	----	----	----
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%	61.1	----	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%	87.9	----	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%	89.4	----	----	----	----	----
2,4,6-Tribromophenol	118-79-6	0.5	%	97.6	----	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%	85.6	----	----	----	----	----
Anthracene-d10	1719-06-8	0.5	%	97.4	----	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%	92.2	----	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	0.2	%	90.2	----	----	----	----	----
Toluene-D8	2037-26-5	0.2	%	98.1	----	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.2	%	94.8	----	----	----	----	----



Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	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

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES2241682	Page	: 1 of 5
Client	: REDITUS CONSULTING PTY LTD.	Laboratory	: Environmental Division Sydney
Contact	: Mathew Burcher	Telephone	: +61-2-8784 8555
Project	: 22246	Date Samples Received	: 17-Nov-2022
Site	:	Issue Date	: 24-Nov-2022
Sampler	: JACK PALMA	No. of samples received	: 1
Order number	: 22246	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	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content (Dried @ 105-110°C)							
Soil Glass Jar - Unpreserved (EA055) TRIP1	16-Nov-2022	----	----	----	21-Nov-2022	30-Nov-2022	✓
EG005(ED093)T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T) TRIP1	16-Nov-2022	21-Nov-2022	15-May-2023	✓	22-Nov-2022	15-May-2023	✓
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T) TRIP1	16-Nov-2022	21-Nov-2022	14-Dec-2022	✓	22-Nov-2022	14-Dec-2022	✓
EP066: Polychlorinated Biphenyls (PCB)							
Soil Glass Jar - Unpreserved (EP066) TRIP1	16-Nov-2022	21-Nov-2022	30-Nov-2022	✓	22-Nov-2022	31-Dec-2022	✓
EP068A: Organochlorine Pesticides (OC)							
Soil Glass Jar - Unpreserved (EP068) TRIP1	16-Nov-2022	21-Nov-2022	30-Nov-2022	✓	22-Nov-2022	31-Dec-2022	✓
EP068B: Organophosphorus Pesticides (OP)							
Soil Glass Jar - Unpreserved (EP068) TRIP1	16-Nov-2022	21-Nov-2022	30-Nov-2022	✓	22-Nov-2022	31-Dec-2022	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075(SIM)) TRIP1	16-Nov-2022	21-Nov-2022	30-Nov-2022	✓	21-Nov-2022	31-Dec-2022	✓
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP071) TRIP1	16-Nov-2022	21-Nov-2022	30-Nov-2022	✓	21-Nov-2022	31-Dec-2022	✓
Soil Glass Jar - Unpreserved (EP080) TRIP1	16-Nov-2022	21-Nov-2022	30-Nov-2022	✓	23-Nov-2022	30-Nov-2022	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Soil Glass Jar - Unpreserved (EP071) TRIP1	16-Nov-2022	21-Nov-2022	30-Nov-2022	✓	21-Nov-2022	31-Dec-2022	✓
Soil Glass Jar - Unpreserved (EP080) TRIP1	16-Nov-2022	21-Nov-2022	30-Nov-2022	✓	23-Nov-2022	30-Nov-2022	✓



Matrix: **SOIL** Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080) TRIP1	16-Nov-2022	21-Nov-2022	30-Nov-2022	✓	23-Nov-2022	30-Nov-2022	✓



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	16	12.50	10.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	10	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	7	14.29	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	6	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	9	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	9	22.22	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	11	18.18	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	11	18.18	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
PAH/Phenols (SIM)	EP075(SIM)	1	10	10.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	7	14.29	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	6	16.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	9	11.11	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	9	11.11	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	11	9.09	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	11	9.09	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
PAH/Phenols (SIM)	EP075(SIM)	1	10	10.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	7	14.29	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	6	16.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	9	11.11	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	9	11.11	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	11	9.09	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	11	9.09	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
PAH/Phenols (SIM)	EP075(SIM)	1	10	10.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	7	14.29	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	6	16.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	9	11.11	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	9	11.11	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	11	9.09	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	11	9.09	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 Schedule B(3).
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 Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl ₂) (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 SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3)
Polychlorinated Biphenyls (PCB)	EP066	SOIL	In house: Referenced to USEPA SW 846 - 8270 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 Schedule B(3).
Pesticides by GCMS	EP068	SOIL	In house: Referenced to USEPA SW 846 - 8270 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 Schedule B(3).
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015 Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40. Compliant with NEPM Schedule B(3).
PAH/Phenols (SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270. 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 Schedule B(3)
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260. Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. Compliant with NEPM Schedule B(3) amended.
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 Schedule B(3).
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, Na ₂ SO ₄ 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.

QUALITY CONTROL REPORT

Work Order	: ES2241682	Page	: 1 of 10
Client	: REDITUS CONSULTING PTY LTD.	Laboratory	: Environmental Division Sydney
Contact	: Mathew Burcher	Contact	: Customer Services ES
Address	: 1A/29-33 Waratah Street KIRRAWEE	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: 22246	Date Samples Received	: 17-Nov-2022
Order number	: 22246	Date Analysis Commenced	: 21-Nov-2022
C-O-C number	: ----	Issue Date	: 24-Nov-2022
Sampler	: JACK PALMA		
Site	:		
Quote number	: EN/222		
No. of samples received	: 1		
No. of samples analysed	: 1		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. 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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjjar	Organic Coordinator	Sydney Organics, Smithfield, NSW



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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.

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	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 4716098)									
ES2241473-053	Anonymous	EG005T: Zinc	7440-66-6	5	mg/kg	776	833	7.0	0% - 20%
ES2241473-053	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	12	11	0.0	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	2	8	104	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	17	45	91.8	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	26	46	56.2	No Limit
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 4716101)									
ES2241473-041	Anonymous	EA055: Moisture Content	----	0.1	%	16.7	19.9	17.5	0% - 50%
ES2241473-071	Anonymous	EA055: Moisture Content	----	0.1	%	17.7	20.0	12.1	0% - 20%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 4716096)									
ES2241473-053	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EP066: Polychlorinated Biphenyls (PCB) (QC Lot: 4712707)									
ES2241682-001	TRIP1	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EP068A: Organochlorine Pesticides (OC) (QC Lot: 4712706)									
ES2241682-001	TRIP1	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0	No Limit



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP068A: Organochlorine Pesticides (OC) (QC Lot: 4712706) - continued									
ES2241682-001	TRIP1	EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4,4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4,4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4,4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.0	No Limit		
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 4712706)									
ES2241682-001	TRIP1	EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 4712705)							
ES2241682-001	TRIP1	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 4712705) - continued									
ES2241682-001	TRIP1	EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
			205-82-3						
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4712704)									
ME2201966-004	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
ES2241682-001	TRIP1	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4714718)									
ES2241538-001	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
ES2241701-001	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4712704)									
ME2201966-004	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
ES2241682-001	TRIP1	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4714718)									
ES2241538-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
ES2241701-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EP080: BTEXN (QC Lot: 4714718)									
ES2241538-001	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit

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 Work Order : ES2241682
 Client : REDITUS CONSULTING PTY LTD.
 Project : 22246



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP080: BTEXN (QC Lot: 4714718) - continued									
ES2241538-001	Anonymous	EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit
ES2241701-001	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result		LCS	Low	High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 4716098)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	121.1 mg/kg	105	88.0	113
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	0.74 mg/kg	130	70.0	130
EG005T: Chromium	7440-47-3	2	mg/kg	<2	19.6 mg/kg	121	68.0	132
EG005T: Copper	7440-50-8	5	mg/kg	<5	52.9 mg/kg	111	89.0	111
EG005T: Lead	7439-92-1	5	mg/kg	<5	60.8 mg/kg	113	82.0	119
EG005T: Nickel	7440-02-0	2	mg/kg	<2	15.3 mg/kg	110	80.0	120
EG005T: Zinc	7440-66-6	5	mg/kg	<5	139.3 mg/kg	102	66.0	133
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4716096)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	0.087 mg/kg	94.8	70.0	125
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 4712707)								
EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	1 mg/kg	92.4	62.0	126
EP068A: Organochlorine Pesticides (OC) (QCLot: 4712706)								
EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.5 mg/kg	81.6	69.0	113
EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	0.5 mg/kg	81.2	65.0	117
EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	0.5 mg/kg	81.4	67.0	119
EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	0.5 mg/kg	82.9	68.0	116
EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	82.1	65.0	117
EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.5 mg/kg	82.6	67.0	115
EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	0.5 mg/kg	84.6	69.0	115
EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.5 mg/kg	84.4	62.0	118
EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	0.5 mg/kg	84.4	63.0	117
EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	0.5 mg/kg	88.1	66.0	116
EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	0.5 mg/kg	85.0	64.0	116
EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	0.5 mg/kg	82.3	66.0	116
EP068: 4,4`-DDE	72-55-9	0.05	mg/kg	<0.05	0.5 mg/kg	81.8	67.0	115
EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	0.5 mg/kg	85.7	67.0	123
EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	0.5 mg/kg	88.2	69.0	115
EP068: 4,4`-DDD	72-54-8	0.05	mg/kg	<0.05	0.5 mg/kg	85.2	69.0	121
EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	0.5 mg/kg	80.3	56.0	120
EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.5 mg/kg	84.9	62.0	124
EP068: 4,4`-DDT	50-29-3	0.2	mg/kg	<0.2	0.5 mg/kg	83.4	66.0	120
EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	0.5 mg/kg	84.7	64.0	122
EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	0.5 mg/kg	93.0	54.0	130
EP068B: Organophosphorus Pesticides (OP) (QCLot: 4712706)								



Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP068B: Organophosphorus Pesticides (OP) (QCLot: 4712706) - continued								
EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	0.5 mg/kg	103	59.0	119
EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	97.3	62.0	128
EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	0.5 mg/kg	89.9	54.0	126
EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	0.5 mg/kg	98.1	67.0	119
EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	0.5 mg/kg	89.7	70.0	120
EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	0.5 mg/kg	83.4	72.0	120
EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	0.5 mg/kg	95.5	68.0	120
EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	0.5 mg/kg	86.0	68.0	122
EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	0.5 mg/kg	84.3	69.0	117
EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	0.5 mg/kg	83.5	76.0	118
EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	0.5 mg/kg	77.4	64.0	122
EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	0.5 mg/kg	83.2	70.0	116
EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	0.5 mg/kg	90.5	69.0	121
EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	0.5 mg/kg	83.8	66.0	118
EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	0.5 mg/kg	84.0	68.0	124
EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	0.5 mg/kg	84.4	62.0	112
EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	0.5 mg/kg	84.5	68.0	120
EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	0.5 mg/kg	90.0	65.0	127
EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	0.5 mg/kg	71.8	41.0	123
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 4712705)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	97.1	77.0	125
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	98.1	72.0	124
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	100	73.0	127
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	98.4	72.0	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	95.2	75.0	127
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	95.0	77.0	127
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	96.7	73.0	127
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	96.6	74.0	128
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	90.0	69.0	123
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	92.7	75.0	127
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	0.5	mg/kg	<0.5	6 mg/kg	91.1	68.0	116
	205-82-3							
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	92.8	74.0	126
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	95.8	70.0	126
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	84.1	61.0	121
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	82.8	62.0	118
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	81.4	63.0	121
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4712704)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	300 mg/kg	108	75.0	129

Method Blank (MB) Report

Spike

Spike Recovery (%)

Acceptable Limits (%)

Matrix Spike (MS) Report

Sub-Matrix: **SOIL**

Matrix Spike (MS) Report

				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 4716098)							
ES2241473-053	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	96.0	70.0	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	88.1	70.0	130
		EG005T: Chromium	7440-47-3	50 mg/kg	99.9	68.0	132
		EG005T: Copper	7440-50-8	250 mg/kg	96.4	70.0	130
		EG005T: Lead	7439-92-1	250 mg/kg	101	70.0	130
		EG005T: Nickel	7440-02-0	50 mg/kg	97.8	70.0	130
		EG005T: Zinc	7440-66-6	250 mg/kg	85.5	66.0	133
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4716096)							
ES2241473-053	Anonymous	EG035T: Mercury	7439-97-6	5 mg/kg	101	70.0	130
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 4712707)							

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 Work Order : ES2241682
 Client : REDITUS CONSULTING PTY LTD.
 Project : 22246



Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 4712707) - continued							
ES2241682-001	TRIP1	EP066: Total Polychlorinated biphenyls	----	1 mg/kg	89.1	70.0	130
EP068A: Organochlorine Pesticides (OC) (QCLot: 4712706)							
ES2241682-001	TRIP1	EP068: gamma-BHC	58-89-9	0.5 mg/kg	82.7	70.0	130
		EP068: Heptachlor	76-44-8	0.5 mg/kg	80.4	70.0	130
		EP068: Aldrin	309-00-2	0.5 mg/kg	81.9	70.0	130
		EP068: Dieldrin	60-57-1	0.5 mg/kg	81.5	70.0	130
		EP068: Endrin	72-20-8	2 mg/kg	75.2	70.0	130
		EP068: 4,4'-DDT	50-29-3	2 mg/kg	74.3	70.0	130
EP068B: Organophosphorus Pesticides (OP) (QCLot: 4712706)							
ES2241682-001	TRIP1	EP068: Diazinon	333-41-5	0.5 mg/kg	79.5	70.0	130
		EP068: Chlorpyrifos-methyl	5598-13-0	0.5 mg/kg	83.1	70.0	130
		EP068: Pirimphos-ethyl	23505-41-1	0.5 mg/kg	75.5	70.0	130
		EP068: Bromophos-ethyl	4824-78-6	0.5 mg/kg	79.6	70.0	130
		EP068: Prothiofos	34643-46-4	0.5 mg/kg	79.0	70.0	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 4712705)							
ES2241682-001	TRIP1	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	99.6	70.0	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	99.5	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4712704)							
ES2241682-001	TRIP1	EP071: C10 - C14 Fraction	----	480 mg/kg	112	73.0	137
		EP071: C15 - C28 Fraction	----	3100 mg/kg	112	53.0	131
		EP071: C29 - C36 Fraction	----	2060 mg/kg	111	52.0	132
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4714718)							
ES2241538-001	Anonymous	EP080: C6 - C9 Fraction	----	32.5 mg/kg	92.1	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4712704)							
ES2241682-001	TRIP1	EP071: >C10 - C16 Fraction	----	860 mg/kg	110	73.0	137
		EP071: >C16 - C34 Fraction	----	4320 mg/kg	113	53.0	131
		EP071: >C34 - C40 Fraction	----	890 mg/kg	109	52.0	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4714718)							
ES2241538-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	99.3	70.0	130
EP080: BTEXN (QCLot: 4714718)							
ES2241538-001	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	88.5	70.0	130
		EP080: Toluene	108-88-3	2.5 mg/kg	88.4	70.0	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	91.1	70.0	130
		EP080: meta- & para-Xylene	108-38-3	2.5 mg/kg	91.5	70.0	130
			106-42-3				
	EP080: ortho-Xylene	95-47-6	2.5 mg/kg	92.4	70.0	130	

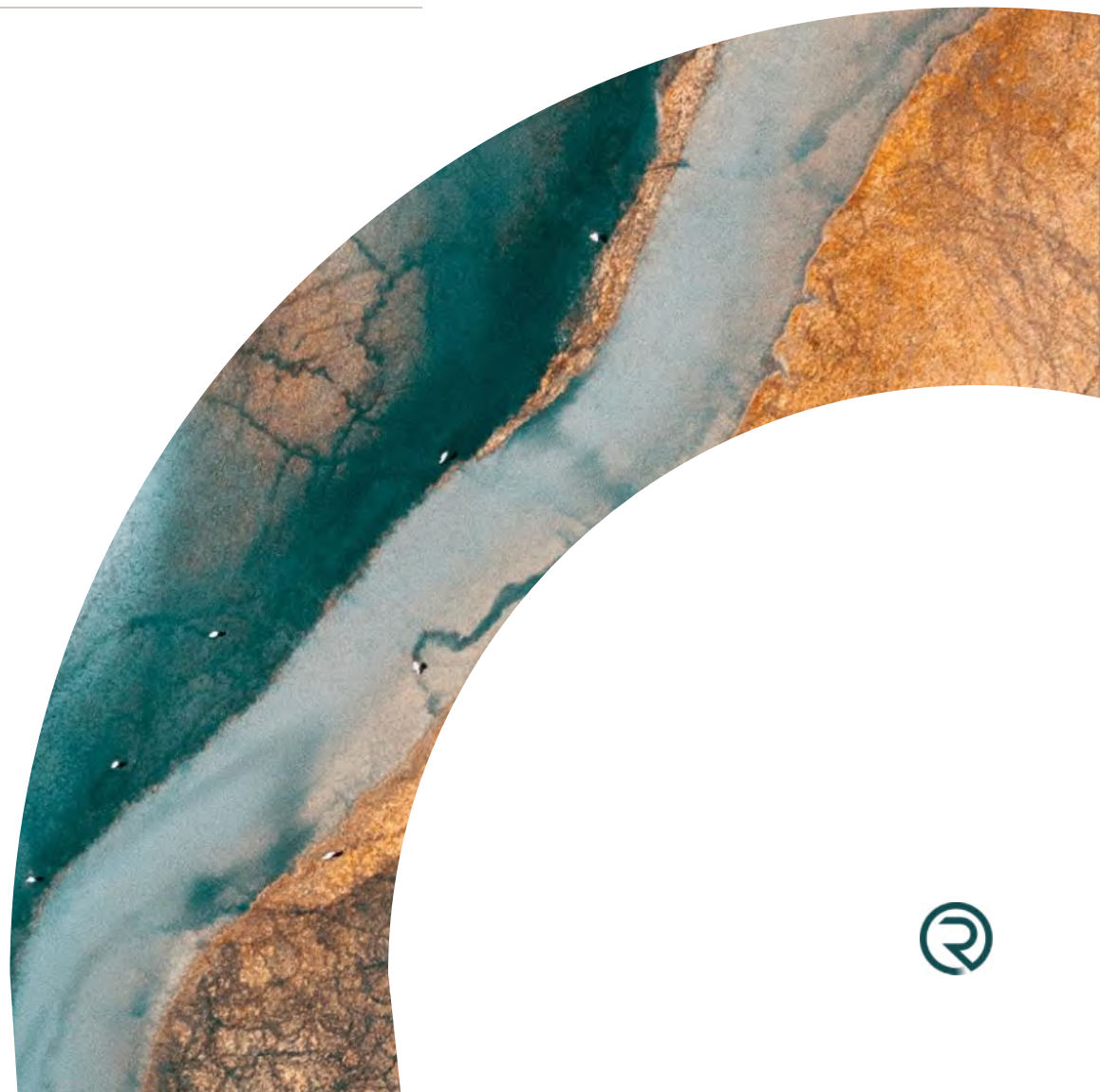


Sub-Matrix: SOIL

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080: BTEXN (QCLot: 4714718) - continued							
ES2241538-001	Anonymous	EP080: Naphthalene	91-20-3	2.5 mg/kg	84.6	70.0	130


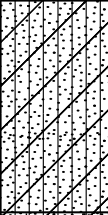
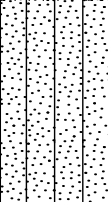

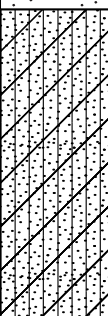
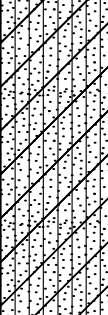
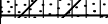
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Borelogs & Calibration



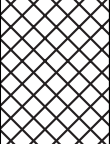
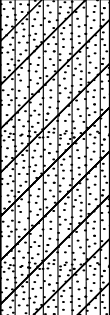
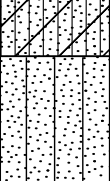
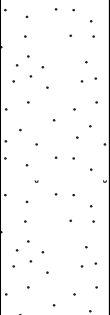
PROJECT NUMBER 22246	DRILLING DATE 15/11/22	LOGGED BY Jack Palma
PROJECT NAME Preliminary Site Investigation	DRILLING COMPANY Stratacore	CHECKED BY Dean Stafford
CLIENT Stella Maris College	DRILLING METHOD Drill Rig - SFA, PT. HA	
ADDRESS Stella Maris College, 52 Eurobin Ave, Manly NSW	TOTAL DEPTH 15m bgl	

COMMENTS HA = Hand Auger (0 to 1.8m) , PT = push tube (1.8m to EOH)

Depth (m)	Water Level	PID	Sample ID	Graphic Log	Material Type	Material Description	Additional Observations
		0.8 ppm	BH01_0.1		Fill	SAND w/ trace SILT/CLAY: grey/brown, slightly moist, coarse texture.	No odour, anthropogenic materials or staining. Rootlets present.
0.5		0.8 ppm	BH01_0.5		Natural	SAND w/ trace CLAY & SILT: yellow, low plasticity, coarse texture.	No odour, anthropogenic materials or staining.
1		0.8 ppm	BH01_1.0			SILTY SAND: grey/brown, moist, coarse texture, roots present.	No odour, anthropogenic materials or staining. Roots present.
1.5		0.8 ppm	BH01_1.5			SAND: fine grain, grey/white, slight plasticity.	
2		1.2 ppm	BH01_2.0			SAND w/ trace SILT/CLAY: moist, Brown/ grey.	No anthropogenic materials or staining. Organic odour.
3		1.4 ppm	BH01_3.0				
4		1.5 ppm	BH01_4.0			EOH @ 4.0m bgl for environmental purposes.	
4.5						Geotechnical investigation progressed to 15m (EOH). No samples or logging >4m bgl.	



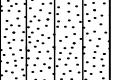
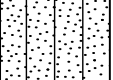

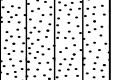
PROJECT NUMBER 22246	DRILLING DATE 15/11/22	LOGGED BY Jack Palma
PROJECT NAME Preliminary Site Investigation	DRILLING COMPANY Stratacore	CHECKED BY Dean Stafford
CLIENT Stella Maris College	DRILLING METHOD HA (Reditus)	
ADDRESS Stella Maris College, 52 Eurobin Ave, Manly NSW	TOTAL DEPTH 2.0 mbgl	

COMMENTS HA = Hand Auger

Depth (m)	Water Level	PID	Sample ID	Graphic Log	Material Type	Material Description	Additional Observations
		1.2 ppm	BH02_0.1		Fill	SAND w/ trace SILT: topsoil, brown, slightly moist.	No odour, anthropogenic materials or staining. Shells and roots present.
0.5		0.7 ppm	BH02_0.5		Natural	SAND w/ trace CLAY & SILT: yellow, low plasticity, coarse texture. Moist @ 1.0m bgl	No odour, anthropogenic materials or staining. Shells present.
1		0.7 ppm	BH02_1.0			SILTY SAND w/ trace CLAY: moist, grey/ slight brown, low plasticity.	No odour, anthropogenic materials or staining. Roots present.
1.5		0.7 ppm	BH02_1.5			SAND: fine grain, grey/white, slight plasticity.	No odour, anthropogenic materials or staining.
2		0.6 ppm	BH02_2.0			EOH @ 2.0m bgl	
2.5							

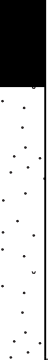


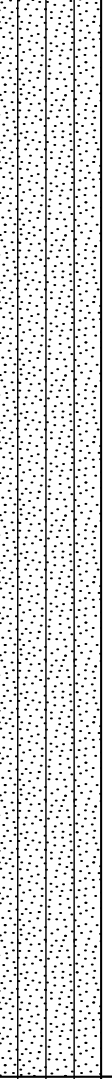
PROJECT NUMBER 22246	DRILLING DATE 15/11/22	LOGGED BY Jack Palma
PROJECT NAME Preliminary Site Investigation/ V	DRILLING COMPANY Stratacore	CHECKED BY Dean Stafford
CLIENT Stella Maris College	DRILLING METHOD SFA	
ADDRESS Stella Maris College, 52 Eurobin Ave, Manly NSW	TOTAL DEPTH 8.0 mbgl	

COMMENTS SFA = Solid flight auger

Depth (m)	Water Level	PID	Sample ID	Graphic Log	Material Type	Material Description	Additional Observations
0.5		0.6 ppm	BH03_0.1 DUP1 TRIP1		Fill	SILTY SAND w/ trace CLAY: slightly moist, low plasticity, brown/dark grey.	No odour, anthropogenic materials or staining. Metal fragments & roots @ 0.1m bgl.
1		0.6 ppm	BH03_1.0		Natural	SILTY SAND w/ trace CLAY: grey/white, slightly moist, slight plasticity.	No odour, anthropogenic materials or staining.
1.5		0.4 ppm	BH03_1.5				
2		0.5 ppm	BH03_2.0				
3		0.4 ppm	BH03_3.0			SILTY SAND w/ trace CLAY: brown/grey, wet, slight plasticity.	No odour, anthropogenic materials or staining.
4		0.4 ppm	BH03_4.0				
4.5						No samples >3m.	
5							
5.5							
6							
6.5							
7							
7.5							
8						EOH @ 8.0m bgl	
8.5							

PROJECT NUMBER 22246	DRILLING DATE 15/11/22	LOGGED BY Jack Palma
PROJECT NAME Preliminary Site Investigation	DRILLING COMPANY Stratacore	CHECKED BY Dean Stafford
CLIENT Stella Maris College	DRILLING METHOD Drill Rig - SFA. HA	
ADDRESS Stella Maris College, 52 Eurobin Ave, Manly NSW	TOTAL DEPTH 8.0 mbgl	

COMMENTS SFA = Solid flight auger

Depth (m)	PID	Sample ID	Well Graphic	Graphic Log	Material Type	Material Description	Additional Observations
0.4	0.4 ppm	BH04_0.1			Fill	SAND w/ trace SILT/CLAY: dark brown/yellow	No odour, asbestos materials or staining. Glass & Roots present
0.5	0.5 ppm	BH04_0.5			Natural	SAND: yellow, moist/wet, fine-coarse grain	No odour, anthropogenic materials or staining.
1.0	0.5 ppm	BH04_1.0					
1.5	0.5 ppm	BH04_1.5				SILTY SAND w/ trace CLAY: moist, light grey.	No anthropogenic materials or staining. Slight organic odour.
2.0	0.4 ppm	BH04_2.0					
2.5						SILTY SAND: dark grey/brown, coarse grain, moist, slight plasticity.	No odour, anthropogenic materials or staining.
3.0	0.4 ppm	BH04_3.0					
3.5							
4.0							
4.5							
5.0							
5.5							
6.0							
6.5							
7.0							
7.5							
8.0						EOH @ 8.0m bgl	

PID Calibration Certificate

Instrument **PhoCheck Tiger**
Serial No. **T-111093**



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	✓				
Alarms	Beeper	✓	Low	High	TWA	STEL
	Settings	✓	50ppm	100ppm		
Software	Version	✓				
Data logger	Operation	✓				
Download	Operation	✓				
Other tests:						

Certificate of Calibration

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

Diffusion mode Aspirated mode

Sensor	Serial no	Calibration gas and concentration	Certified	Gas bottle No	Instrument Reading	
PID Lamp		94.0ppm Isobutylene	NATA	SY506	94.1ppm	

Calibration date: **9/11/2022** **Evan Weller**

Next calibration due: **9/12/2022**

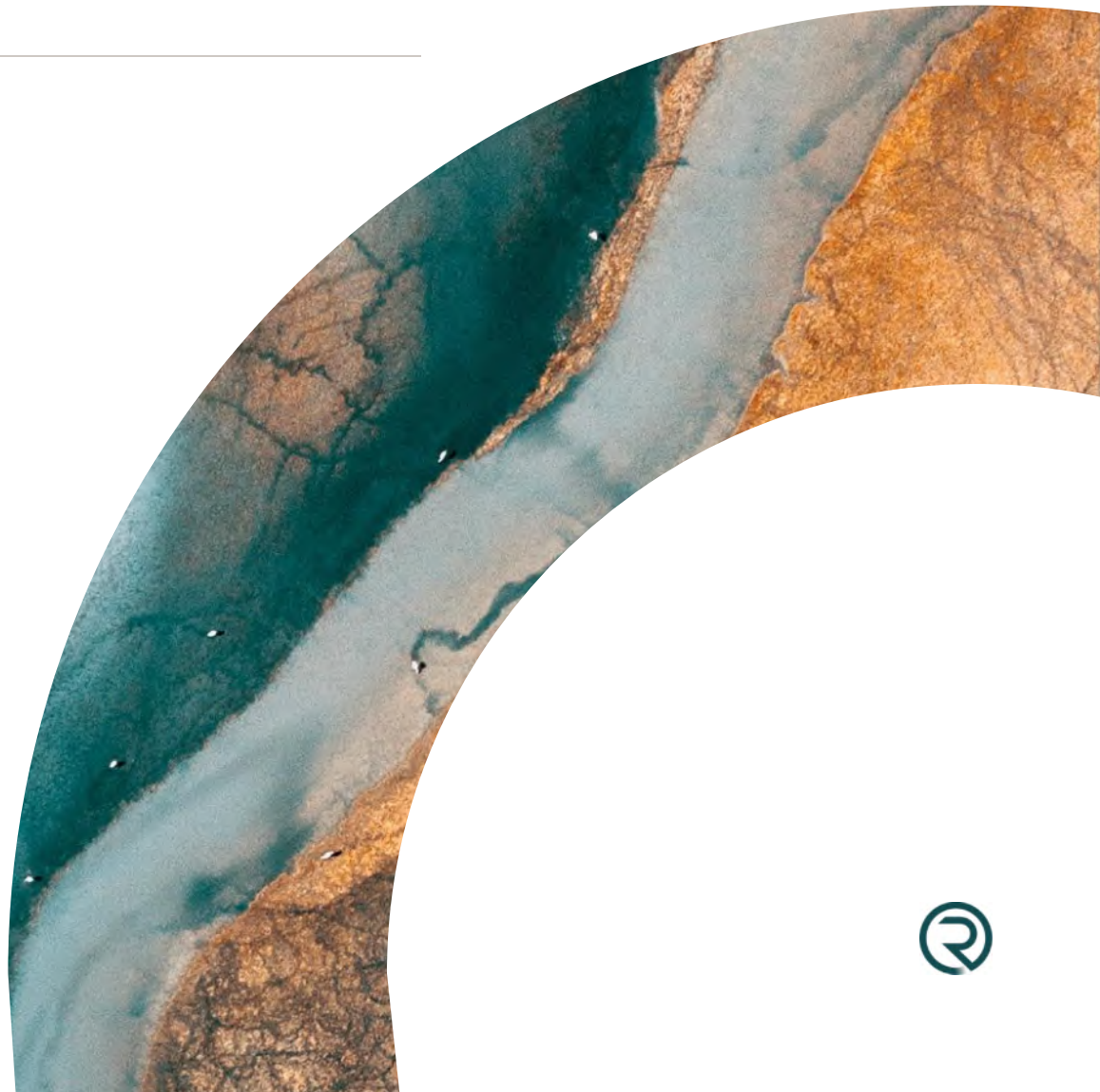
**Tiger PID
Calibration Booklet**



Date: 1/11/22 Time: 0924 Project No: 22246 Project Name: Manley PSF Calibration Gas: Isobutylene Calibrated to: 100ppm Air Reading: 0.6 ppm Gas Reading after Calibration: 100.1 ppm Personnel: Jg + SA Signed: [Signature]	Date: Time: Project No: Project Name: Calibration Gas: Isobutylene Calibrated to: 100ppm Air Reading: Gas Reading after Calibration: Personnel: Signed:
Date: Time: Project No: Project Name: Calibration Gas: Isobutylene Calibrated to: 100ppm Air Reading: Gas Reading after Calibration: Personnel: Signed:	Date: Time: Project No: Project Name: Calibration Gas: Isobutylene Calibrated to: 100ppm Air Reading: Gas Reading after Calibration: Personnel: Signed:
Date: Time: Project No: Project Name: Calibration Gas: Isobutylene Calibrated to: 100ppm Air Reading: Gas Reading after Calibration: Personnel: Signed:	Date: Time: Project No: Project Name: Calibration Gas: Isobutylene Calibrated to: 100ppm Air Reading: Gas Reading after Calibration: Personnel: Signed:
Date: Time: Project No: Project Name: Calibration Gas: Isobutylene Calibrated to: 100ppm Air Reading: Gas Reading after Calibration: Personnel: Signed:	Date: Time: Project No: Project Name: Calibration Gas: Isobutylene Calibrated to: 100ppm Air Reading: Gas Reading after Calibration: Personnel: Signed:

H

NEPM EIL Calculation Output



Inputs
Select contaminant from list below
As
Below needed to calculate fresh and aged ACLs
Below needed to calculate fresh and aged ABCs
or for fresh ABCs only
or for aged ABCs only

Outputs		
Land use	Arsenic generic EILs	
	(mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	20	40
Urban residential and open public spaces	50	100
Commercial and industrial	80	160

Inputs	
Select contaminant from list below	
Cr III	
Below needed to calculate fresh and aged ACLs	
Enter % clay (values from 0 to 100%)	
2.5	
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	
7	
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	110	90
Urban residential and open public spaces	180	260
Commercial and industrial	240	430

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)
2.5
Enter soil pH (calcium chloride method) (values from 1 to 14)
4.25
Enter organic carbon content (%OC) (values from 0 to 50%)
1.25
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
7
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	30	35
Urban residential and open public spaces	45	60
Commercial and industrial	55	85

Inputs
Select contaminant from list below
DDT
Below needed to calculate fresh and aged ACLs
Below needed to calculate fresh and aged ABCs
or for fresh ABCs only
or for aged ABCs only

Outputs		
Land use	DDT generic EILs	
	(mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	3	3
Urban residential and open public spaces	180	180
Commercial and industrial	640	640

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)
2.5
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
7
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	25	6
Urban residential and open public spaces	30	10
Commercial and industrial	30	15

Inputs
Select contaminant from list below
Pb
Below needed to calculate fresh and aged ACLs
Below needed to calculate fresh and aged ABCs
or for fresh ABCs only
or for aged ABCs only

Outputs		
Land use	Lead generic EILs	
	(mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	110	470
Urban residential and open public spaces	270	1100
Commercial and industrial	440	1800

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)
2.5
Enter soil pH (calcium chloride method) (values from 1 to 14)
4.25
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
7
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	40	90
Urban residential and open public spaces	55	130
Commercial and industrial	65	160



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