



Environmental Site Assessment: Detailed Site Investigation for Proposed Plan Change and Future Development at Fonterra Hautapu, 185 Swayne Road, Cambridge

Rev B 11 March 2024 Job No. 230599



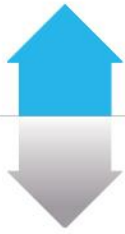
Auckland
(09) 835 1740

Northland
(09) 982 8053



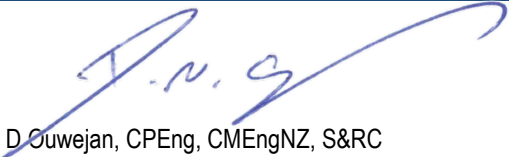
Wellington
(04) 896 0675

Christchurch
(03) 352 4519

www.soilandrock.co.nz



ENVIRONMENTAL SITE ASSESSMENT: DETAILED SITE INVESTIGATION FOR PROPOSED PLAN CHANGE AND FUTURE DEVELOPMENT AT 185 SWAYNE ROAD, CAMBRIDGE

Job Number:	230599
Name of Project:	Fonterra Hautapu, 185 Swayne Road, Cambridge
Client:	Fonterra Co-operative Group Limited
Author:	Aaron Thorburn, Senior Environmental Advisor, BAppSc
Reviewer:	Garry Cepe, Senior Environmental Engineer, BEng Civil
Authoriser:	Jordan Vaughn, Technical Director – Contaminated Land, MSc Geology, CEnvP
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Author Signature:	PP B Smith, S&RC 
Reviewer Signature:	PP L Windross, WWLA 
Authoriser Signature:	PP D Ouwejan, CPEng, CMEngNZ, S&RC 

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Executive Summary

Soil & Rock Consultants (S&RC) completed a field investigation and prepared a Detailed Site Investigation for the proposed plan change and future commercial / industrial development at Fonterra Hautapu, 185 Swayne Road, Cambridge.

Soil samples were collected from across the site and analysed for Contaminants of Concern, including Heavy Metals, Organochlorine Pesticides, Polycyclic Aromatic Hydrocarbons and Asbestos.

Groundwater samples were also collected from across the site and analysed for Contaminants of Concern, including Dissolved Metals, Carbonaceous Biochemical Oxygen Demand, Chloride, Total Kjeldahl Nitrogen, Nitrite and Nitrate, Total Phosphorus and Cation Profile. Laboratory analytical results reported:

Soil:

- There are no identified exceedances of applicable Human Health and Environmental Discharge criteria,
- Asbestos was not detected in any of the soil samples,
- Most metal concentrations are at background levels, or within the expected range of variability for the datasets used. The exception is some metals in isolated areas around buildings and the substation in the southeast of the site.
- Similarly, Polycyclic Aromatic Hydrocarbons concentrations are very slightly elevated above detection levels (and therefore above background) around one shed.
- No organochlorine pesticides were detected in samples tested.

Groundwater:

- Total Phosphorus concentrations were detected in all groundwater samples above applicable criteria for irrigation and general water use,
- Sodium concentration in one sample was detected above the Drinking Water Standards criteria,
- Heavy Metals concentrations were detected in all groundwater samples, but at concentrations below applicable criteria,
- Chloride was detected in all groundwater samples, but at concentrations below applicable criteria, and
- Nitrite and Nitrate Nitrogen were detected in three of the four groundwater samples, but at concentrations below applicable criteria.

Findings from this report and our 2023 Preliminary Site Investigation are suitable to support the proposed Plan Change.

Prior to earthworks or future redevelopment:

- A Site Management Plan will be prepared for the site. This will set out earthworks management requirements with regard to contaminated land, soil disposal options for surplus soils, and set out the contingency procedure should unexpected contamination be identified,
- All soils can be reused from a contamination perspective. In terms of surplus soil disposal, most topsoil and natural ground is expected to be suitable for cleanfill disposal. Isolated areas of topsoil around the dwelling and sheds will require disposal to a managed fill site if surplus to site needs.
- Shallow groundwater beneath the site is not intended for potable use and the anticipated future redevelopment of the site comprises commercial / industrial use. However, in the event that groundwater is intercepted by earthworks the potential risk presented by its phosphorus content will need to be evaluated further before discharge to surface water can be undertaken.

Our findings, conclusion and recommendations are detailed in the following report and appendices.

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1.0 Introduction

Soil & Rock Consultants (S&RC) were engaged by Fonterra Co-operative Group Limited to undertake a Detailed Site Investigation (DSI) in association with the proposed plan change and future commercial / industrial development at Fonterra Hautapu, 185 Swayne Road, Cambridge. The 'site' is shown in Figure 1 below and in S&RC Drawing 230599 / 1 provided in Appendix A.

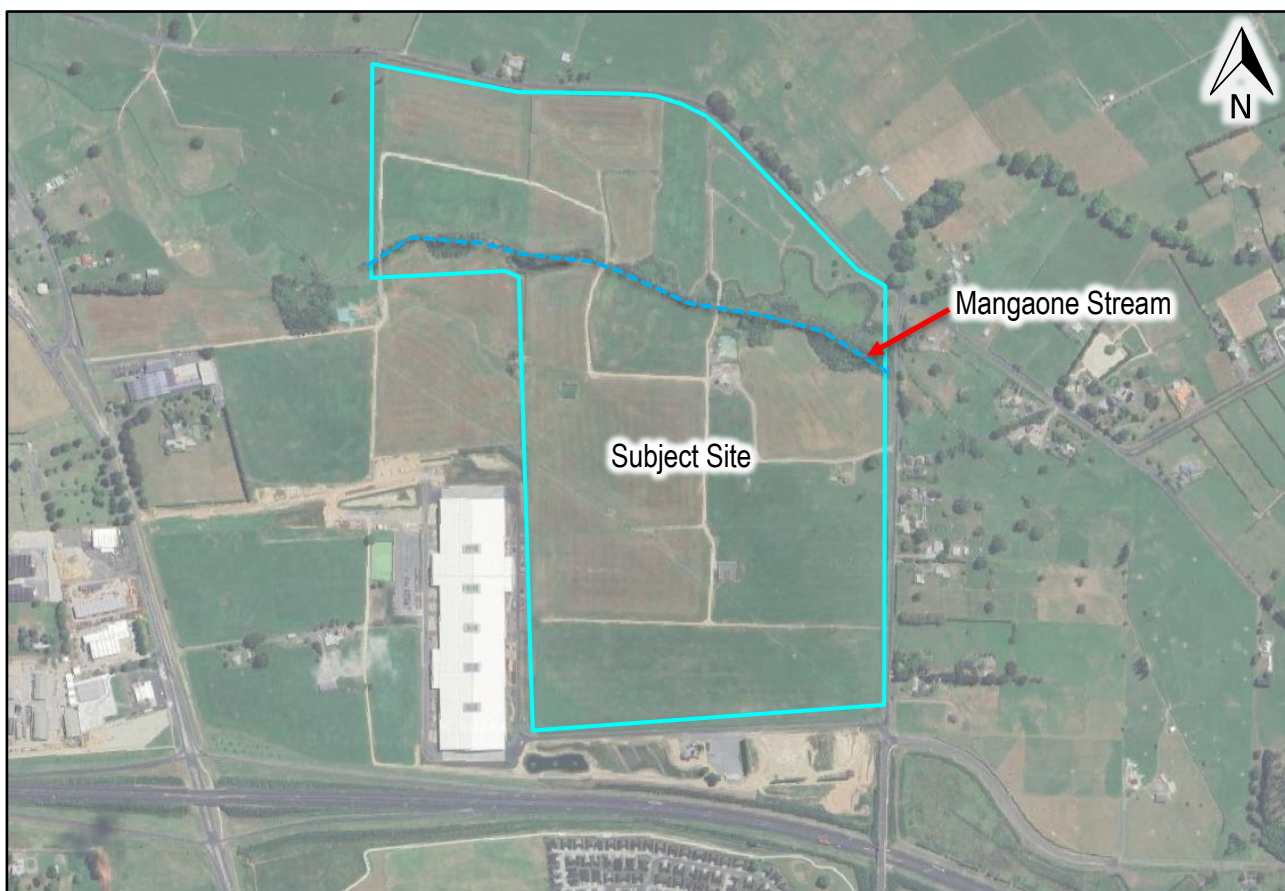


Figure 1: Site Location (Waikato Regional Council GeoMaps Website)

This report comprises a DSI prepared in accordance with Ministry for the Environment's (MfE) guidelines for contaminated site investigations, National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES) Regulations 2011 for contaminated sites and Waipa District Council and Waikato Regional Council requirements.

The investigation and reporting have been prepared, reviewed, and authorised by Suitably Qualified and Experienced Practitioners (SQEP), as required under the NES.

1.1 Limitations

This report has been prepared by S&RC for the sole benefit of Fonterra Co-operative Group Limited (the client), with respect to the proposed plan change at Fonterra Hautapu, 185 Swayne Road, Cambridge and the brief given to us.

This report may be used by Waipa District Council and / or Waikato Regional Council or their appointed Consultants, if required, and may be relied upon when considering a Resource Consent application in association with the with the proposed plan change and future commercial / industrial development.

The data and / or opinions contained in this report may not be used in other contexts or for any other purpose or by any other party without our prior review and agreement. This report may only be read or transmitted in its entirety, including the appendices.

1.2 Site Description

The subject site is legally described as Lot 2 DP 529042, covering an area of 713,759m². Under the Waipa District Plan, the site is zoned 'Rural'.

The site is predominantly undeveloped with a dwelling and associated structures on the eastern boundary, a water treatment facility and storage / laydown area in the centre of the site and a recently constructed substation facility towards the southern boundary. The balance of the site is pastureland.

1.3 Proposed Development

Based on information provided to us the proposed plan change is to allow for the future development of the site for commercial / industrial purposes. Development plans are not available at this time.

1.4 Project Scope

This investigation comprises a DSI, including the following:

- Review from S&RC's previous environmental investigation (Ref. 221000, *Environmental Site Assessment – Preliminary Site Investigation for Proposed Plan Change and Future Development at 185 Swayne Road, Cambridge*, S&RC, 17 July 2023),
- Collection and laboratory analysis of soil samples for identified Contaminants of Concern (CoC),
- Collection and laboratory analysis of groundwater samples from groundwater monitoring wells installed across the site in June 2023,
- Interpretation of laboratory analytical results and DSI reporting (this report).

2.0 Geology, Surface Water and Groundwater

According to the GNS Science New Zealand Geology Web Map, 1:250,000 Scale, the site is underlain by river deposits of the Hinuera Formation of the Tauranga Group, running east to west near the northern boundary of the site is underlain by Holocene river deposits. A geologic map of the site and surrounding area is provided in Figure 2 below.

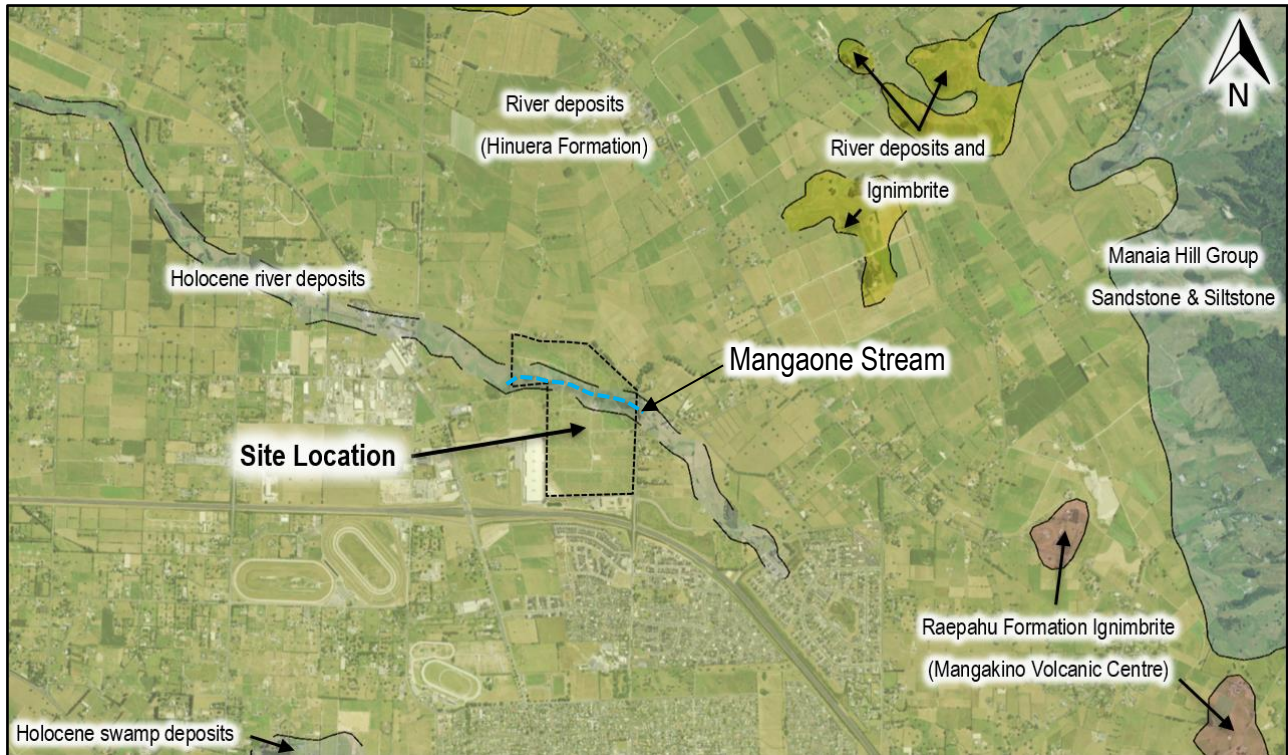


Figure 2: Geological Map (Source: GNS WebMaps Website)

S&RC undertook a geotechnical investigation in June 2023, topsoil was encountered to a maximum depth of 0.3m below ground level (bgl). Fill was encountered in the northern portion of the site near the banks of the floodplain (Mangaone Stream) to 0.5m bgl, underlain by alluvial deposits of the Hinuera Formation (Ref. 230322, *Geotechnical Investigation for Proposed Private Plan Change at Fonterra Hautapu, 195 Swayne Road, Cambridge*, S&RC, 1 September 2023).

The site surface and surrounding area are near level with a gradual slope towards the northwest. Surface water runoff from the site is expected to dissipate naturally through the vegetated area, flow into the Mangaone Stream or into the roadside drains alongside Zig Zag and Swayne roads to the north and east of the site. Surface water ponding was observed across the site following heavy rainfall in the days preceding the DSI investigation.

Mangaone Stream is located on the northern part of the site flowing east to west across the site, the stream then flows northwest discharging to the Waikato River in the southern suburbs of Hamilton. The Waikato River flows north to northwest discharging into the Tasman Sea and south to southeast discharging into Lake Taupo.

During S&RC's geotechnical investigation / groundwater assessment completed in June and July 2023, groundwater was encountered from depths ranging between 0.1m and 3.2m bgl. Based on the site and surrounding topography, groundwater flow direction beneath the site is expected to be to the north to northwest towards Mangaone Stream.

3.0 Previous Environmental Investigation

In July 2023, S&RC completed a Preliminary Site Investigation (PSI) for the site (Ref. 220599, *Environmental Site Assessment – Preliminary Site Investigation for Proposed Plan Change and Future Development at 185 Swayne Road, Cambridge*, S&RC, 17 July 2023). The following Hazardous Activities and Industries List (HAIL) potential activities/industries were identified for the site:

- Potential bulk storage or use of pesticides / potential overspray of pesticides from nearby properties (HAIL Cat. A.10 and H),
- Potential contamination from possible Asbestos / ACM in historical buildings (HAIL Cat. E.1),
- Wastewater irrigation onto site from nearby Fonterra Hautapu facility (HAIL Cat. H), and
- Potential contamination from Lead-based paint use on historical buildings (HAIL Cat. I).

Based on findings from S&RC's July 2023 PSI, a DSI (this investigation) was recommended for the site.

4.0 Contamination Investigation

4.1 Identified Contaminants of Concern

The site was identified for potential soil contamination through the desktop phase of this investigation (Ref. 220599, *Environmental Site Assessment – Preliminary Site Investigation for Proposed Plan Change and Future Development at 185 Swayne Road, Cambridge*, S&RC, 17 July 2023). Of relevance to the site history, it was concluded that potential Contaminants of Concern (CoC) for the site included:

- Heavy Metals
- Organochlorine Pesticides (OCP)
- Polycyclic Aromatic Hydrocarbons (PAH)
- Asbestos

4.2 Soil Investigation

Soil sampling was completed at the site on 29 June 2023. Forty-seven soil samples (41 shallow soil samples [16 shallow soil samples analysed as five composite samples and 25 shallow samples collected as individual samples and Quality Assurance / Quality Control (QA / QC) purposes] and six individual deeper soil samples) were collected. All soil samples were submitted to the laboratory (Eurofins) for analysis of Heavy Metals, OCP, PAH and / or Asbestos.

Soil sampling details are described in Table 1 below. Sampling locations are shown on S&RC Drawings 230599 / 2 through 230599 / 4 provided in Appendix A. Photographic documentation from the investigation is provided in Appendix B.

Table 1 – Sample Descriptions

Date	Sample ID	Sample Description	Depth (m bgl)	Soil Description	Analyses Performed
29 June 2023	SWA-SS01		0 - 0.1	SILT w/ trace clay and sand, brown, moist (Topsoil)	Heavy Metals and OCP
29 June 2023	SWA-SS02		0 - 0.1	SILT w/ trace clay and sand, brown, moist (Topsoil)	Heavy Metals and OCP
29 June 2023	SWA-SS03		0 - 0.1	Sandy SILT, dark brown w/ white streaks, moist (Topsoil)	Heavy Metals and OCP
29 June 2023	SWA-SS04		0 - 0.1	Sandy SILT w/ trace clay, brown, moist (Topsoil)	Heavy Metals and OCP
29 June 2023	SWA-SS05		0 - 0.1	Sandy SILT, dark brown w/ white speckles, moist (Topsoil)	Heavy Metals and OCP
29 June 2023	SWA-SS06		0 - 0.1	SILT w/ trace clay and sand, brown w/ white speckles, saturated (Topsoil)	Heavy Metals and OCP
29 June 2023	SWA-SS07		0 - 0.1	SILT w/ trace clay and sand, brown w/ white speckles, moist (Topsoil)	Heavy Metals and OCP
29 June 2023	SWA-SS08		0 - 0.1	Sandy SILT, dark brown w/ white speckles, moist (Topsoil)	Heavy Metals and OCP
29 June 2023	SWA-SS09		0 - 0.1	Sandy SILT, dark brown w/ white speckles, moist (Topsoil)	Heavy Metals and OCP
29 June 2023	SWA-SS10		0 - 0.1	SILT w/ trace clay and sand, brown, moist (Topsoil)	Heavy Metals and OCP
29 June 2023	SWA-SS11		0 - 0.1	SILT w/ trace clay and sand, brown, moist (Topsoil)	Heavy Metals and OCP
29 June 2023	SWA-SS12		0 - 0.1	SILT w/ trace clay and sand, brown w/ white speckles, moist (Topsoil)	Heavy Metals and OCP
29 June 2023	SWA-SS13		0 - 0.1	SILT w/ trace clay and sand, brown orange w/ white speckles, moist (Topsoil)	Heavy Metals and OCP

Date	Sample ID	Sample Description	Depth (m bgl)	Soil Description	Analyses Performed
29 June 2023	SWA-SS14		0 - 0.1	SAND w/ some silt and trace clay, dark brown w/ white speckles, moist (Topsoil)	Heavy Metals and OCP
29 June 2023	SWA-SS15		0 - 0.1	Sandy SILT, dark brown w/ white speckles, moist (Topsoil)	Heavy Metals and OCP
29 June 2023	SWA-SS16		0 - 0.1	SILT w/ some clay, brown orange, moist (Topsoil)	Heavy Metals and OCP
29 June 2023	SWA-SS17		0 - 0.1	Sandy SILT, dark brown w/ white speckles, moist (Topsoil)	Heavy Metals and OCP
29 June 2023	SWA-SS18		0 - 0.1	Sandy SILT, dark brown w/ white speckles, moist (Topsoil)	Heavy Metals and OCP
29 June 2023	SWA-SS19		0 - 0.1	SILT w/ some clay and sand, brown w/ white speckles, moist (Topsoil)	Heavy Metals and OCP
29 June 2023	SWA-SS20		0 - 0.1	SAND w/ some silt and trace clay, dark brown w/ white speckles, moist (Topsoil)	Heavy Metals and OCP
29 June 2023	SWA-SS21 (duplicate)		0 - 0.1	SAND w/ some silt and trace clay, dark brown w/ white speckles, moist (Topsoil)	Heavy Metals and OCP
29 June 2023	SWA-SS22	Composite # 1	0 - 0.1	Sandy SILT, grey brown, moist (Natural)	Heavy Metals, OCP, PAH and Asbestos
	SWA-SS24		0 - 0.1	Sandy SILT w/ some clay, brown, moist (Topsoil)	Heavy Metals, OCP, PAH and Asbestos
	SWA-SS25		0 - 0.1	Sandy SILT w/ some clay, brown w/ white speckles, moist (Topsoil)	Heavy Metals, OCP, PAH and Asbestos
29 June 2023	SWA-SS23		0.5	SAND w/ some silt and trace clay, grey, moist (Natural)	Heavy Metals, OCP, PAH and Asbestos
29 June 2023	SWA-SS26	Composite # 2	0 - 0.1	Sandy SILT, brown grey w/ white speckles, moist (Topsoil)	Heavy Metals, OCP, PAH and Asbestos
	SWA-SS27		0 - 0.1	SILT w/ some sand, brown orange w/ white speckles, moist (Topsoil)	Heavy Metals, OCP, PAH and Asbestos
	SWA-SS29		0 - 0.1	Sandy SILT, grey brown w/ white speckles, moist (Topsoil)	Heavy Metals, OCP, PAH and Asbestos
	SWA-SS30		0 - 0.1	SAND w/ some silt, brown orange w/ white speckles, moist (Topsoil)	Heavy Metals, OCP, PAH and Asbestos
29 June 2023	SWA-SS28		0.5	SAND w/ some silt, brown orange w/ white speckles, moist (Natural)	Heavy Metals, OCP, PAH and Asbestos
29 June 2023	SWA-SS31		0 - 0.1	Sandy SILT w/ some clay, dark orange w/ white speckles, moist (Topsoil)	Heavy Metals and OCP
29 June 2023	SWA-SS32 (duplicate)		0 - 0.1	Sandy SILT w/ some clay, dark orange w/ white speckles, moist (Topsoil)	Heavy Metals and OCP
29 June 2023	SWA-SS33	Composite # 3	0 - 0.1	SILT w/ some clay, brown grey, moist (Topsoil)	Heavy Metals, OCP, PAH and Asbestos

Date	Sample ID	Sample Description	Depth (m bgl)	Soil Description	Analyses Performed
	SWA-SS35		0 - 0.1	SILT w/ some clay, brown, moist (Topsoil)	Heavy Metals, OCP, PAH and Asbestos
	SWA-SS36		0 - 0.1	Sandy SILT w/ trace clay, brown w/ white speckles, moist (Topsoil)	Heavy Metals, OCP, PAH and Asbestos
	SWA-SS38		0 - 0.1	Sandy SILT w/ trace clay, brown w/ white speckles, moist (Topsoil)	Heavy Metals, OCP, PAH and Asbestos
29 June 2023	SWA-SS34		0.5	SILT w/ some clay, brown grey, dry (Natural)	Heavy Metals, OCP, PAH and Asbestos
29 June 2023	SWA-SS37		0.5	SAND w/ some silt, brown w/ white speckles, moist (Natural)	Heavy Metals, OCP, PAH and Asbestos
29 June 2023	SWA-SS39	Composite # 4	0 - 0.1	SAND w/ some silt and trace clay, brownish grey w/ white speckles, moist (Topsoil)	Heavy Metals, OCP, PAH and Asbestos
29 June 2023	SWA-SS42		0 - 0.1	SAND w/ some silt and trace clay, brown w/ white speckles, moist (Topsoil)	Heavy Metals, OCP, PAH and Asbestos
29 June 2023	SWA-SS41		0.1	SAND w/ some silt and trace clay, orange brown w/ white speckles, moist (Natural)	Heavy Metals, OCP, PAH and Asbestos
29 June 2023	SWA-SS43	Composite # 5	0 - 0.1	SILT w/ some clay, brown w/ white speckles, moist (Topsoil)	Heavy Metals, OCP, PAH and Asbestos
29 June 2023	SWA-SS44		0 - 0.1	SILT w/ some clay and sand, brown, moist (Topsoil)	Heavy Metals, OCP, PAH and Asbestos
29 June 2023	SWA-SS46		0 - 0.1	SILT w/ some clay and sand, brown orange w/ white speckles, moist (Topsoil)	Heavy Metals, OCP, PAH and Asbestos
29 June 2023	SWA-SS45		0.5	SAND w/ some silt and trace clay, grey orange, moist (Topsoil)	Heavy Metals, OCP, PAH and Asbestos
29 June 2023	SWA-SS47		0 - 0.1	SILT w/ some clay and sand, brown w/ white speckles, moist (Topsoil)	Heavy Metals, OCP, PAH and Asbestos
29 June 2023	SWA-SS48 (duplicate)		0 - 0.1	Sandy SILT w/ trace clay, orange w/ white speckles, moist (Topsoil)	Heavy Metals, OCP, PAH and Asbestos

ID = Identifier

OCP = Organochlorine Pesticides

m bgl = metres below ground level

PAH = Polycyclic Aromatic Hydrocarbons

4.3 Soil Sampling Protocol

Soil samples were collected using a hand auger or trowel. Soil sampling equipment was decontaminated between sampling locations and disposable nitrile gloves were used and replaced between sampling locations in order to prevent cross contamination. All samples were collected in accordance with strict environmental sampling protocols to ensure reliable and representative results.

All sample containers and preservatives, where applicable, were supplied by the subcontract laboratory and were consistent with the specifications provided in Section 6.4 – Sample Handling, of the Contaminated Land Management Guidelines No. 5 – Site Investigation and Analysis of Soils (MfE, Revised 2021). All samples were labelled with unique identifiers indicating the sampling location. Samples were couriered directly to the laboratory (Eurofins) under continuous Chain of Custody (COC) documentation. Each COC form had a unique laboratory number.

4.4 Groundwater Monitoring Event

In order to assess the potential for groundwater contamination beneath the site at 185 Swayne Road, Cambridge, a groundwater monitoring event (GME) was completed on 2 August 2023. Nine groundwater monitoring wells were identified and gauged. Four of the monitoring wells (PZ02, PZ06, PZ08 and PZ09) were dipped for depth to groundwater and sampled. At five of the monitoring wells (PZ01, PZ03, PZ04, PZ05 and PZ07) groundwater was not encountered (monitoring wells were dry) on the day of monitoring.

Groundwater samples collected were analysed for Dissolved Metals, Carbonaceous Biochemical Oxygen Demand (cBOD), Chloride, Total Kjeldahl Nitrogen (TKN), Nitrite and Nitrate Nitrogen, Total Phosphorus and Cation Profile (Sodium, Calcium, Potassium and Magnesium).

Groundwater sampling details are summarised in Table 2 below. Groundwater monitoring wells are shown on S&RC Drawing 230599 / 5 provided in Appendix A.

Table 2 – Groundwater Sample Descriptions

Sample ID	Date	Analyses Performed
PZ02	2 August 2023	Heavy Metals, cBOD, Chloride, TKN, Nitrite and Nitrate Nitrogen, Total Phosphorus and Cation Profile
PZ06	2 August 2023	
PZ08	2 August 2023	
PZ09	2 August 2023	

ID = Identifier

cBOD = Carbonaceous Biochemical Oxygen Demand

TKN = Total Kjeldahl Nitrogen

Prior to groundwater sample collection, depths to groundwater and monitoring well total depths were measured using an interface probe. Monitoring well data is presented in Table 3 below:

Table 3 – August 2023 Monitoring Well Gauging

Monitoring Well ID	Date	DTW (m BTOC)	Well Depth (m BTOC)
PZ01	2 August 2023	dry	
PZ02	2 August 2023	1.28	3.63
PZ03	2 August 2023	dry	
PZ04	2 August 2023	dry	
PZ05	2 August 2023	dry	
PZ06	2 August 2023	1.97	3.74
PZ07	2 August 2023	dry	
PZ08	2 August 2023	3.59	3.91
PZ09	2 August 2023	2.49	2.91

ID = Identifier DTW = Depth to water m BTOC = metres below top of casing

Monitoring wells were purged using a peristaltic pump. Groundwater parameters (temperature, pH, Conductivity, Oxidation-Reduction Potential [ORP] and Dissolved Oxygen [DO]) were measured along the sample line using a flow-through cell and YSI ProPlus water quality meter.

Final groundwater quality parameters (i.e. final readings before groundwater parameters stabilised or monitoring wells were purged dry) are provided in Table 4. Well purging / sampling forms are provided in Appendix C.

Table 4 – August 2023 Groundwater Parameters

Well ID	Temperature (°C)	pH	Conductivity (µS/cm)	ORP (mV)	DO (mg/L)	Comments
PZ02	12.0	6.5	906	78.1	0.33	Parameters close to stabilising prior to well going dry – 1.75L purged
PZ06	13.8	5.78	556.1	237.7	0.92	Parameters close to stabilising prior to well going dry – 2L purged
PZ08	14.8	6.75	35.9	253.3	3.54	Parameters not stabilised prior to well going dry – 0.5L purged
PZ09	12.4	7.69	133.8	147.7	5.09	Parameters not stabilised prior to well going dry – 0.5L purged

Monitoring wells were either dry or were purged dry as part of the low-flow sampling technique undertaken. Groundwater samples were collected after adequate recharge time was given to allow for groundwater sampling to be undertaken.

Monitoring and sampling equipment (interface probe and water quality meter) were decontaminated between sampling locations and disposable nitrile gloves, sample tubing and filters (for dissolved metals analysis) were used and replaced between sampling locations in order to prevent cross contamination. All samples were collected in accordance with strict environmental protocols to ensure reliability and representative results.

All sample containers and preservatives, where applicable, were supplied by the subcontractor laboratory and were consistent with the specifications provided in Section 6.4 – Sample Handling, of the Contaminated Land Management Guidelines No. 5 – Site Investigation and Analysis of Soils (MfE, Revised 2021).

All samples were labelled with unique identifiers indicating the sampling locations. Samples were couriered directly to the laboratory (Hill Laboratories) under continuous COC documentation. Each COC form had a unique laboratory number.

5.0 Regulations

Within the Waikato Region, investigations of contaminated and potentially contaminated sites are governed by rules under:

- MfE NES: National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (MfE, 2012), and
- New Zealand Guidelines for Assessing and Managing Asbestos in Soil (2017).

Background values (derived from Landcare Research's Predicted Background Concentrations database) are also used in determining if the NES applies to a site, and also the options for offsite soil disposal.

While part of our report assesses potential planning and Resource Consent requirements from relevant authorities, these sections are provided for reference only. Guidance / clarification should be sought from an Environmental Planning Specialist.

National Environmental Standard – Contaminants in Soil

The Resource Management Regulations 2011, National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES) came into force on 1 January 2012, with Contaminated Land Management Guidelines revised in 2011 (No. 2) and 2021 (No. 1 and 5).

The NES for contaminants in soil incorporates by reference MfE contaminated land documents, including MfE Contaminated Land Management Guidelines for the investigation, assessment, and reporting of contaminated land within New Zealand. These documents are aimed to provide national consistency in the reporting of contaminated site information. These documents are:

- Contaminated Land Management Guidelines (No. 1, 2 and 5),
- HAIL,
- Methodology of Deriving Soil Guideline Values Protective of Human Health, and
- Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand (MfE, revised 2011).

Copies of the above guideline documents are available at www.mfe.govt.nz.

New Zealand Guidelines for Assessing and Managing Asbestos in Soil

The New Zealand Guidelines for Assessing and Managing Asbestos in Soil were published in 2017. The guidelines provide direction around identifying, assessing and managing Asbestos in soil in New Zealand and establish Human Health Soil Guideline Values (SGV).

6.0 Soil Assessment Criteria

The site is zoned 'Rural' and predominantly undeveloped with a dwelling and associated structures on the eastern boundary, a water treatment facility and storage / laydown area in the centre of the site, and a recently constructed substation facility towards the southern boundary.

Based on information provided to us the proposed plan change is to allow for the future development of the site for commercial / industrial purposes. For this assessment, soil analytical results were compared against:

- NES Human Health criteria for Commercial / Industrial use,
- PHG Human Health criteria for Commercial / Industrial use, and
- Asbestos SGV for Commercial and Industrial sites.

As alluvial deposits of the Hinuera Formation (Tauranga Group) were encountered, soil analytical results were also compared against:

- Upper 95% Predicted Soil Concentrations for Sandstone soils.

7.0 Soil Analytical Results

Forty-seven soil samples (41 shallow soil samples [16 shallow soil samples analysed as five composite samples and 25 shallow samples collected for individual and QA / QC purposes] and six individual deeper soil samples) were collected.

All soil samples were submitted to the laboratory (Eurofins) for analysis of Heavy Metals, OCP, PAH and Asbestos. Following receipt of laboratory results a further nine soil samples were analysed for Heavy Metals and PAH due to Composite # 2, 3 and 4 exceeding applicable Background Level criteria.

Laboratory analytical results reported:

- All CoC concentrations complied with MfE NES and / or PHG Human Health criteria,
- Asbestos was not detected in any of the soil samples, and
- Heavy Metals and/or PAH concentrations were slightly above Background Levels in topsoil around the dwelling and sheds in the south of the site, and also in fill placed around the substation footprint. None of these exceedances present a human health or environmental risk.
- There are other minor exceedances of background criteria for some metals in topsoil across paddocks. However, the exceedances are very minor and are more likely to reflect variability in natural background conditions than impact by contaminating activities.
- A single detection of DDT (SWA-SS16) is at the laboratory limit of reporting and is therefore considered insignificant in the context of the wider dataset.

Laboratory analytical results are summarised in Table 5 below. Soil sampling locations are shown on S&RC Drawing 230599 / 2 provided in Appendix A. Laboratory analytical results and COC documentation are provided in Appendix C.

Table 5 – Soil Analytical Results

		Test Analysis Levels (mg/kg)						MfE	Background Soil Concentrations ⁴
Sample Reference		SWA-SS01	SWA-SS02	SWA-SS03	SWA-SS04	SWA-SS05	SWA-SS06	NES ¹	
Sample Soil Type		SILT	SILT	Sandy SILT	Sandy SILT	Sandy SILT	SILT		
Sample Date		29 June 2023							
Sample Depth (m)		0 - 0.1	0 - 0.1	0 - 0.1	0 - 0.1	0 - 0.1	0 - 0.1		
Heavy Metals	As	11	9.7	8.1	12	11	3.7	70	12.67
	Cd	0.18	0.23	0.29	0.51	0.37	0.24	1,300	0.28
	Cr	14	10	8.5	11	14	13	6,300	60.5
	Cu	11	11	7.5	8.1	23	8.2	10,000	40.17
	Pb	13	12	17	23	20	9.8	3,300	30.08
	Hg	0.48	0.12	0.13	0.16	0.48	0.13	4,200	0.45
	Ni	6.3	4.3	3.7	4.5	4.1	5.7	3,000 ⁵	32.88
	Zn	84	64	48	56	82	78	35,000 ⁵	101.8
OCP	ΣDDT	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	1,000	-
	Aldrin	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	160	-
	Dieldrin	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	160	-
	Lindane	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	14,180 ⁶	-

		Test Analysis Levels (mg/kg)						MfE	Background Soil Concentrations ⁴
Sample Reference		SWA-SS07	SWA-SS08	SWA-SS09	SWA-SS10	SWA-SS11	SWA-SS12	NES ¹	
Sample Soil Type		SILT	Sandy SILT	Sandy SILT	SILT	SILT	Sandy SILT		
Sample Date		29 June 2023							
Sample Depth (m)		0 - 0.1	0 - 0.1	0 - 0.1	0 - 0.1	0 - 0.1	0 - 0.1		
Heavy Metals	As	6.4	9.5	9	4.4	6	6.9	70	12.67
	Cd	0.29	0.39	0.39	0.22	0.24	0.52	1,300	0.28
	Cr	11	12	12	10	13	14	6,300	60.5
	Cu	10	15	14	14	24	29	10,000	40.17
	Pb	18	14	13	16	16	16	3,300	30.08
	Hg	0.3	0.11	0.13	0.53	0.7	0.43	4,200	0.45
	Ni	5.3	4.9	5.1	4.4	7.3	9	3,000 ⁵	32.88
	Zn	68	78	79	78	130	150	35,000 ⁵	101.8
OCP	ΣDDT	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	1,000	-
	Aldrin	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	160	-
	Dieldrin	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	160	-
	Lindane	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	14,180 ⁶	-

		Test Analysis Levels (mg/kg)						MfE	Background Soil Concentrations ⁴
Sample Reference		SWA-SS13	SWA-SS14	SWA-SS15	SWA-SS16	SWA-SS17	SWA-SS18	NES ¹	
Sample Soil Type		SILT	SAND	Sandy SILT	SILT	Sandy SILT	Sandy SILT		
Sample Date		29 June 2023							
Sample Depth (m)		0 - 0.1	0 - 0.1	0 - 0.1	0 - 0.1	0 - 0.1	0 - 0.1		
Heavy Metals	As	4.9	6.7	9.2	5.1	8.4	5.3	70	12.67
	Cd	0.21	0.12	0.34	0.19	0.38	0.25	1,300	0.28
	Cr	15	7.3	15	15	16	14	6,300	60.5
	Cu	26	9.4	30	21	30	27	10,000	40.17
	Pb	13	12	15	14	20	14	3,300	30.08
	Hg	0.86	0.29	0.72	0.83	0.9	0.81	4,200	0.45
	Ni	5.7	2.6	7.7	5.4	8	7.2	3,000 ⁵	32.88
Zn	130	52	150	120	150	130	35,000 ⁵	101.8	
OCP	ΣDDT	<MDL	<MDL	<MDL	0.02	<MDL	<MDL	1,000	-
	Aldrin	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	160	-
	Dieldrin	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	160	-
	Lindane	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	14,180 ⁶	-

Sample Reference	Test Analysis Levels (mg/kg)				NES ¹	MfE		Asbestos SGV ³	Background Soil Concentrations ⁴	
	SWA-SS19	SWA-SS20	SWA-SS21 (dup of SWA-SS20)	Composite # 1 (SS22, SS24 & SS25)		PHG ²				
Sample Soil Type	SILT	SAND		SAND / SILT / Sandy SILT	Sand	Sandy Silt				
Guideline Soil Type	-	SAND		SAND / Sandy SILT						
Sample Date	29 June 2023									
Sample Depth (m)	0 - 0.1	0 - 0.1	0 - 0.1	0 - 0.1	<1m	<1m				
Heavy Metals	As	5.3	13	9.9	12	70	-	-	-	12.67
	Cd	0.23	0.35	0.65	0.11	1,300	-	-	-	0.28
	Cr	17	14	13	8.5	6,300	-	-	-	60.5
	Cu	23	21	18	14	10,000	-	-	-	40.17
	Pb	15	15	16	8.7	3,300	-	-	-	30.08
	Hg	0.75	0.47	0.45	0.05	4,200	-	-	-	0.45
	Ni	6.4	7.9	6.1	3	3,000 ⁵	-	-	-	32.88
	Zn	140	140	120	57	35,000 ⁵	-	-	-	101.8
OCP	ΣDDT	<MDL	0.02	<MDL	<MDL	1,000	-	-	-	-
	Aldrin	<MDL	<MDL	<MDL	<MDL	160	-	-	-	-
	Dieldrin	<MDL	<MDL	<MDL	<MDL	160	-	-	-	-
	Lindane	<MDL	<MDL	<MDL	<MDL	14,180 ⁶	-	-	-	-
PAH	BaP Eq.	-	-	-	<MDL	35	- ⁷	- ⁷	-	-
	Naphthalene	-	-	-	<MDL	-	(190) ^v	(210) ^v	-	-
	Pyrene	-	-	-	<MDL	-	(20,000)	(20,000)	-	-
Asbestos	ND/D	ND	ND	ND	ND	-	-	-	-	-
	ACM	-	-	-	-	-	-	-	0.05	-
	FA/AF	-	-	-	-	-	-	-	0.001	-

Sample Reference		Test Analysis Levels (mg/kg)				MfE			Asbestos SGV ³	Background Soil Concentrations ⁴
		Composite # 2 (SS26, SS27, SS29 & SS30)	Composite # 4 (SS39 & SS42)	Composite # 4 (individual sample re-tests)		PHG ²				
Sample Soil Type	SAND			SWA-SS39	SWA-SS42	Sand	Sandy Silt	NES ¹		
		Guideline Soil Type	SAND	SAND	SAND					
Sample Date		29 June 2023								
Sample Depth (m)		0 - 0.1	0 - 0.1	0 - 0.1	0 - 0.1	<1m	<1m			
Heavy Metals	As	8.6	18	24	14	70	-	-	-	12.67
	Cd	0.26	0.78	1.1	0.36	1,300	-	-	-	0.28
	Cr	16	22	23	19	6,300	-	-	-	60.5
	Cu	15	40	57	21	10,000	-	-	-	40.17
	Pb	11	360	330	350	3,300	-	-	-	30.08
	Hg	0.11	0.27	0.36	0.32	4,200	-	-	-	0.45
	Ni	6.7	8.9	11	6.8	3,000 ⁵	-	-	-	32.88
	Zn	100	410	550	290	35,000 ⁵	-	-	-	101.8
OCP	ΣDDT	<MDL	<MDL	-	-	1,000	-	-	-	-
	Aldrin	<MDL	<MDL	-	-	160	-	-	-	-
	Dieldrin	<MDL	<MDL	-	-	160	-	-	-	-
	Lindane	<MDL	<MDL	-	-	14,180 ⁶	-	-	-	-
PAH	BaP Eq.	<MDL	0.05	<MDL	<MDL	35	- ⁷	- ⁷	-	-
	Naphthalene	<MDL	<MDL	<MDL	<MDL	-	(190) ^v	(210) ^v	-	-
	Pyrene	<MDL	<MDL	0.12 ⁸	<MDL	-	(20,000)	(20,000)	-	-
Asbestos	ND/D	ND	ND	-	-	-	-	-	-	-
	ACM	-	-	-	-	-	-	-	0.05	-
	FA/AF	-	-	-	-	-	-	-	0.001	-

		Test Analysis Levels (mg/kg)					MfE			Asbestos SGV ³	Background Soil Concentrations ⁴
Sample Reference	Composite # 3 (SS33, SS35, SS36 & SS38)	Composite # 3 (individual sample re-tests)				NES ¹	PHG ²				
		SWA-SS33	SWA-SS35	SWA-SS36	SWA-SS38		Sand	Sandy Silt			
Sample Soil Type	SILT / Sandy SILT										
Guideline Soil Type	Sandy SILT	Sandy SILT	Sandy SILT	Sandy SILT	Sandy SILT						
Sample Date	29 June 2023										
Sample Depth (m)	0 - 0.1	0 - 0.1	0 - 0.1	0 - 0.1	0 - 0.1		<1m	<1m			
Heavy Metals	As	11	11	17	4.6	9.2	70	-	-	-	12.67
	Cd	0.36	0.23	0.17	0.4	0.33	1,300	-	-	-	0.28
	Cr	8.3	7.1	7.6	6.9	6.5	6,300	-	-	-	60.5
	Cu	11	8.5	5.6	8.9	9.4	10,000	-	-	-	40.17
	Pb	14	11	11	13	12	3,300	-	-	-	30.08
	Hg	0.21	0.2	0.27	0.23	0.17	4,200	-	-	-	0.45
	Ni	3.4	2.7	2.7	2.7	2.5	3,000 ⁵	-	-	-	32.88
Zn	67	55	43	68	51	35,000 ⁵	-	-	-	101.8	
OCP	ΣDDT	<MDL	-	-	-	-	1,000	-	-	-	-
	Aldrin	<MDL	-	-	-	-	160	-	-	-	-
	Dieldrin	<MDL	-	-	-	-	160	-	-	-	-
	Lindane	<MDL	-	-	-	-	14,180 ⁶	-	-	-	-
PAH	BaP Eq.	<MDL	-	-	-	-	35	- ⁷	- ⁷	-	-
	Naphthalene	<MDL	-	-	-	-	-	(190) ^v	(210) ^v	-	-
	Pyrene	<MDL	-	-	-	-	-	(20,000)	(20,000)	-	-
Asbestos	ND/D	ND	-	-	-	-	-	-	-	-	-
	ACM	-	-	-	-	-	-	-	-	0.05	-
	FA/AF	-	-	-	-	-	-	-	-	0.001	-

Sample Reference		Test Analysis Levels (mg/kg)				MfE			Asbestos SGV ³	Background Soil Concentrations ⁴
		Composite # 5 (SS43, SS44 & SS46)	Composite # 5 (individual sample re-tests)			NES ¹	PHG ²			
Sample Soil Type	SWA-SS43		SWA-SS44	SWA-SS46	Sand		Sandy Silt			
Guideline Soil Type	SILT	SILT	SILT	SILT						
Sample Date	29 June 2023									
Sample Depth (m)	Sandy SILT	Sandy SILT	Sandy SILT	Sandy SILT	<1m	<1m				
Heavy Metals	As	17	18	9.8	4.2	70	-	-	-	12.67
	Cd	0.69	41	28	66	1,300	-	-	-	0.28
	Cr	19	7.1	7.2	6.8	6,300	-	-	-	60.5
	Cu	37	7.9	6.3	8.6	10,000	-	-	-	40.17
	Pb	120	13	10	12	3,300	-	-	-	30.08
	Hg	0.17	0.16	0.23	0.22	4,200	-	-	-	0.45
	Ni	11	2.4	2.6	2.8	3,000 ⁵	-	-	-	32.88
	Zn	190	52	40	62	35,000 ⁵	-	-	-	101.8
OCP	ΣDDT	<MDL	-	-	-	1,000	-	-	-	-
	Aldrin	<MDL	-	-	-	160	-	-	-	-
	Dieldrin	<MDL	-	-	-	160	-	-	-	-
	Lindane	<MDL	-	-	-	14,180 ⁶	-	-	-	-
PAH	BaP Eq.	<MDL	-	-	-	35	- ⁷	- ⁷	-	-
	Naphthalene	<MDL	-	-	-	-	(190) ^v	(210) ^v	-	-
	Pyrene	<MDL	-	-	-	-	(20,000)	(20,000)	-	-
Asbestos	ND/D	ND	-	-	-	-	-	-	-	-
	ACM	-	-	-	-	-	-	-	0.05	-
	FA/AF	-	-	-	-	-	-	-	0.001	-

Sample Reference		Test Analysis Levels (mg/kg)				MfE			Asbestos SGV ³	Background Soil Concentrations ⁴
		SWA-SS23	SWA-SS28	SWA-SS31	SWA-SS32 (dup of SWA-SS31)	NES ¹	PHG ²			
Sample Soil Type		SAND	SAND	Sandy SILT			Sand	Sandy Silt		
Guideline Soil Type		SAND	SAND	Sandy SILT						
Sample Date		29 June 2023								
Sample Depth (m)		0.5	0.5	0 - 0.1		<1m	<1m			
Heavy Metals	As	6	6.5	6.4	7.6	70	-	-	-	12.67
	Cd	0.03	0.07	0.71	0.83	1,300	-	-	-	0.28
	Cr	8.4	9.8	12	14	6,300	-	-	-	60.5
	Cu	5.1	10	45	55	10,000	-	-	-	40.17
	Pb	12	8.9	41	36	3,300	-	-	-	30.08
	Hg	0.08	0.08	0.34	0.37	4,200	-	-	-	0.45
	Ni	3.3	5.9	6.9	9.7	3,000 ⁵	-	-	-	32.88
	Zn	32	43	290	360	35,000 ⁵	-	-	-	101.8
OCP	ΣDDT	<MDL	<MDL	<MDL	<MDL	1,000	-	-	-	-
	Aldrin	<MDL	<MDL	<MDL	<MDL	160	-	-	-	-
	Dieldrin	<MDL	<MDL	<MDL	<MDL	160	-	-	-	-
	Lindane	<MDL	<MDL	<MDL	<MDL	14,180 ⁶	-	-	-	-
PAH	BaP Eq.	<MDL	<MDL	-	-	35	- ⁷	- ⁷	-	-
	Naphthalene	<MDL	<MDL	-	-	-	(190) ^v	(210) ^v	-	-
	Pyrene	<MDL	<MDL	-	-	-	(20,000)	(20,000)	-	-
Asbestos	ND/D	ND	ND	ND	ND	-	-	-	-	-
	ACM	-	-	-	-	-	-	-	0.05	-
	FA/AF	-	-	-	-	-	-	-	0.001	-

Sample Reference		Test Analysis Levels (mg/kg)				MfE			Asbestos SGV ³	Background Soil Concentrations ⁴
		SWA-SS34	SWA-SS37	SWA-SS41	SWA-SS45	NES ¹	PHG ²			
Sample Soil Type		SILT	SAND	SAND	SAND		Sand	Sandy Silt		
Guideline Soil Type		Sandy SILT	SAND	SAND	SAND					
Sample Date		29 June 2023								
Sample Depth (m)		0.5	0.5	0.1	0.5	<1m	<1m			
Heavy Metals	As	18	21	11	9.6	70	-	-	-	12.67
	Cd	0.04	0.1	0.59	0.07	1,300	-	-	-	0.28
	Cr	12	10	17	14	6,300	-	-	-	60.5
	Cu	8.4	6.2	26	14	10,000	-	-	-	40.17
	Pb	14	23	97	34	3,300	-	-	-	30.08
	Hg	0.21	0.27	0.17	0.15	4,200	-	-	-	0.45
	Ni	3.5	4.7	6	7	3,000 ⁵	-	-	-	32.88
	Zn	41	63	200	69	35,000 ⁵	-	-	-	101.8
OCP	ΣDDT	<MDL	<MDL	<MDL	<MDL	1,000	-	-	-	-
	Aldrin	<MDL	<MDL	<MDL	<MDL	160	-	-	-	-
	Dieldrin	<MDL	<MDL	0.03	<MDL	160	-	-	-	-
	Lindane	<MDL	<MDL	<MDL	<MDL	14,180 ⁶	-	-	-	-
PAH	BaP Eq.	<MDL	<MDL	0.09	<MDL	35	- ⁷	- ⁷	-	-
	Naphthalene	<MDL	<MDL	<MDL	<MDL	-	(190) ^v	(210) ^v	-	-
	Pyrene	<MDL	<MDL	0.15	<MDL	-	(20,000)	(20,000)	-	-
Asbestos	ND/D	ND	ND	ND	ND	-	-	-	-	-
	ACM	-	-	-	-	-	-	-	0.05	-
	FA/AF	-	-	-	-	-	-	-	0.001	-

Sample Reference		Test Analysis Levels (mg/kg)		MfE		Asbestos SGV ³	Background Soil Concentrations ⁴
		SWA-SS47	SWA-SS48 (dup of SWA-SS47)	NES ¹	PHG ²		
Sample Soil Type		SILT			NES ¹	Sandy Silt	Asbestos SGV ³
Guideline Soil Type		Sandy SILT					
Sample Date		29 June 2023					
Sample Depth (m)		0 - 0.1		NES ¹	<1m	Asbestos SGV ³	Background Soil Concentrations ⁴
Heavy Metals	As	14	15		70		
	Cd	0.67	0.61	1,300	-	-	0.28
	Cr	19	20	6,300	-	-	60.5
	Cu	46	47	10,000	-	-	40.17
	Pb	290	280	3,300	-	-	30.08
	Hg	0.3	0.29	4,200	-	-	0.45
	Ni	7.9	8.4	3,000 ⁵	-	-	32.88
	Zn	310	300	35,000 ⁵	-	-	101.8
OCP	ΣDDT	<MDL	<MDL	1,000	-	-	-
	Aldrin	<MDL	<MDL	160	-	-	-
	Dieldrin	<MDL	<MDL	160	-	-	-
	Lindane	<MDL	<MDL	14,180 ⁶	-	-	-
PAH	BaP Eq.	<MDL	0.07	35	- ⁷	-	-
	Naphthalene	<MDL	<MDL	-	(210) ^v	-	-
	Pyrene	<MDL	0.04	-	(20,000)	-	-
Asbestos	ND/D	ND	ND	-	-	-	-
	ACM	-	-	-	-	0.05	-
	FA/AF	-	-	-	-	0.001	-

Notes: **Concentration:** Values below accepted Background Levels (Heavy Metals) and / or laboratory MDL (OCP and PAH)
Concentration: Values above accepted Background Levels and / or laboratory MDL but in compliance with relevant criteria
Concentration: Values above relevant acceptance criteria
ND = Asbestos Not Detected
D = Asbestos Detected
dup = Duplicate sample (QA / QC purposes)

¹ NES – MfE NES Human Health Criteria for Commercial / Industrial Use (MfE, 2012)

² PHG – Soil MfE Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand (2011) Tier 1 Soil Acceptance Criteria for Commercial / Industrial Use (All Pathways), 'Sand' and 'Sandy Silt' soil types, <1m. Brackets denote values exceed threshold likely to correspond to formation of residual separate phase hydrocarbons. At 20,000 mg/kg, residual separate phase is expected to have formed in soil matrix. The following notes indicate the limiting pathway for each criterion: v = volatilisation, s = soil ingestion, d = dermal, p = produce, m = maintenance/excavation, x = PAH surrogate

³ Asbestos SGV – Asbestos Soil Guidelines Values (%w/w) for Asbestos Containing Material (ACM) and Fibrous Asbestos/Asbestos Fines (FA / AF) for Commercial and Industrial sites, New Zealand Guidelines for Assessing and Managing Asbestos in Soil (2017).

⁴ Upper 95% Predicted Background Soil Concentrations for Sandstone Soils (<http://iris.scinfo.org.nz>)

⁵ Australian Health Investigation Levels for Commercial / Industrial use (NEPC, 1999), applied in accordance with MfE Contaminated Land Guidelines No. 2

⁶ MfE Soil Guidelines for Former Sheep-Dip Sites for Commercial / Industrial Use (MfE, 2006)

⁷ Where NES and / or Regional Council acceptance criteria values are available, NES and/or Regional Council values are applied over PHG criteria

⁸ Laboratory result picked up Pyrene detection in individual sample and not the original composite sample due to a heterogeneity issue that was not picked up in the composite sample

8.0 Quality Assurance / Quality Control

Three duplicate soil sample sets (SWA-SS21, duplicate of SWA-SS20; SWA-SS31, duplicate of SWA-SS32; and SWA-SS47, duplicate of SWA-SS48) were collected for QA / QC purposes. The duplicate soil samples were collected using the same soil sampling procedures and analysed at the laboratory using the same sample preparation and analysis procedures as the original samples.

Relative Percentage Difference (RPD) calculations for analytes reported above the laboratory MDL ranged from 2.2% to 60%. RPD values for the duplicate pair mostly met S&RC QA/QC acceptance criteria of less than 50%.

Exceptions to S&RC QA/QC acceptance criteria are listed below (from duplicate pairing SWA-SS021 as a duplicate of SWA-SS20) with an RPD value of 60% for Cadmium.

RPD values above S&RC QA/QC acceptance criteria are inferred to be due to a minor laboratory result difference to an already low analytical result for Cadmium.

QA/QC results are presented in Table 6. Laboratory analytical results are provided in Appendix G.

Table 6 – Quality Assurance / Quality Control Results

Contaminant of Concern	Results (mg/kg)		RPD (%)	Results (mg/kg)		RPD (%)			RPD (%)	
	SWA-SS20	SWA-SS21		SWA-SS31	SWA-SS32		SWA-SS47	SWA-SS48		
Heavy Metals	As	13	9.9	27.1	6.4	7.6	17.1	14	15	6.9
	Cd	0.35	0.65	60.0	0.71	0.83	15.6	0.67	0.61	9.4
	Cr	14	13	7.4	12	14	15.4	19	20	5.1
	Cu	21	18	15.4	45	55	20.0	46	47	2.2
	Pb	15	16	6.5	41	36	13.0	290	280	3.5
	Hg	0.47	0.45	4.3	0.34	0.37	8.5	0.3	0.29	3.4
	Ni	7.9	6.1	25.7	6.9	9.7	33.7	7.9	8.4	6.1
Zn	140	120	15.4	290	360	21.5	310	300	3.3	
OCP	ΣDDT	0.02	<MDL	-	<MDL	<MDL	-	<MDL	<MDL	-
	Aldrin	<MDL	<MDL	-	<MDL	<MDL	-	<MDL	<MDL	-
	Dieldrin	<MDL	<MDL	-	<MDL	<MDL	-	<MDL	<MDL	-
	Lindane	<MDL	<MDL	-	<MDL	<MDL	-	<MDL	<MDL	-
PAH	BaP Eq.	-	-	-	-	-	-	<MDL	0.07	-
	Naphthalene	-	-	-	-	-	-	<MDL	<MDL	-
	Pyrene	-	-	-	-	-	-	<MDL	0.04	-
Asbestos	ND/D	ND	ND	-	ND	ND	-	ND	ND	-
	ACM	-	-	-	-	-	-	-	-	-
	FA/AF	-	-	-	-	-	-	-	-	-

MDL = Method Detection Limit

mg/kg = milligrams per kilogram

RPD = Relative Percentage Difference

9.0 Groundwater Assessment Criteria

Groundwater analytical results were assessed against:

- ANZG – Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG) (updated Australian and New Zealand Environmental and Conservation Council [ANZECC] Guidelines) 2018,
- Australian and New Zealand Environmental and Conservation Council [ANZECC] Guidelines) 2000 - Primary Industries (Volume 3), Irrigation and general water uses, and
- Water Services (Drinking Water Standards for New Zealand) Regulations 2022.

While part of our report assesses potential planning and Resource Consent requirements from relevant authorities, these sections are provided for reference only. Guidance / clarification should be sought from an Environmental Planning Specialist.

Australian and New Zealand Guidelines for Fresh and Marine Water Quality

The ANZG 2018 Guidelines are an update of the ANZECC 2000 Guidelines and are proposed to replace the ANZECC Guidelines.

The ANZG provide water managers with tools and guidance to assess, manage and monitor water quality. They complement the existing National Policy Statement for Freshwater Management (Freshwater NPS), which is the main direction to local government about how to manage freshwater in New Zealand.

The ANZG provide Default Guideline Values (DGV) considered protective of fresh and marine water ecosystems. However, the ANZG notes that there are “several errors and inconsistencies” in the published DGV; therefore, all DGV referenced in this investigation were checked against Table 3.4.1 and Section 8.3.7 of the ANZECC 2000 Guidelines.

Water Services (Drinking Water Standards for New Zealand)

The Water Services (Drinking Water Standards for New Zealand) Regulations 2022 provide water managers with tools and guidance to assess, manage and monitor drinking-water quality.

The standards are based in part on the World Health Organization Guidelines for drinking-water quality.

These standards revoke and replace the Drinking-water Standards for New Zealand 2005 (revised 2018).

10.0 Groundwater Analytical Results

Four groundwater samples were collected from the monitoring wells where groundwater was available. Five of the nine groundwater monitoring wells were dry during the groundwater monitoring event, and a QA/QC sample could not be collected due to the low amount of groundwater available for sampling.

Groundwater samples were analysed for Dissolved Metals, cBOD, Chloride, TKN, Nitrite and Nitrate Nitrogen, Total Phosphorus and Cation Profile (Sodium, Calcium, Potassium and Magnesium).

Laboratory analytical results reported:

- Total Phosphorus concentrations were detected in all groundwater samples above ANZECC criteria for irrigation and general water use. However, further analysis would be required to separate natural contributions of phosphorus from that which might be associated with irrigation of wastewater.
- Sodium (Na) concentration in one sample (PZ08) was detected above the Drinking Water Standards criteria.
- Heavy Metals concentrations were detected in all groundwater samples, but at concentrations below applicable ANZG DGV criteria.
- Chloride was detected in all groundwater samples, but at concentrations below applicable criteria.
- Nitrite Nitrogen and Nitrate Nitrogen were detected in three of the four groundwater samples, but at concentrations below applicable criteria.

Laboratory analytical results for groundwater samples collected at the site are summarised in Table 7. Monitoring well locations are shown on S&RC Drawing 230599 / 5 provided in Appendix A. Laboratory analytical results and COC documentation are provided in Appendix E.

Table 7 – Groundwater Analytical Results

Sample Reference		Test Analysis Levels (mg/L)				ANZG DGV ¹	ANZECC ²	Drinking Water Standards ³
		PZ02	PZ06	PZ08	PZ09			
Sample Date		2 August 2023						
Heavy Metals	As	0.0056	0.0075	0.0033	< MDL	0.140	-	0.01
	Cd	< MDL	< MDL	< MDL	< MDL	0.0008	-	0.004
	Cr	0.0017	< MDL	< MDL	< MDL	0.040	-	0.05
	Cu	0.0009	0.0069	0.0114	0.0113	0.0025	-	2
	Pb	< MDL	0.00012	0.00028	0.00055	0.0094	-	0.01
	Ni	0.0056	0.0028	0.0016	0.0010	0.017	-	0.08
	Zn	0.0073	0.0149	0.0087	0.0169	0.031	-	1.5
cBOD		ND	ND	< MDL	ND	-	15	-
Chloride		44	29	77	1.1	-	-	250
Total Kjeldahl Nitrogen		23	0.90	11	5.7	-	-	-
Nitrite-N		< MDL	0.006	0.059	0.004	-	-	0.913 ⁴
Nitrate-N		< MDL	0.039	8	0.134	0.065	-	11.3
Total Phosphorus		0.63	0.34	7	12.3	0.024	0.05	-
Cation Profile	Na	71	77	300	ND	-	-	200
	Ca	43	11.1	22	ND	-	-	100
	K	22	7.8	44	ND	-	-	-
	Mg	16	9.7	5.1	ND	-	-	100

Notes: Concentration: Values below laboratory Method Detection Limit (MDL)
Concentration: Values above MDL but in compliance with relevant criteria
Concentration: Values above relevant acceptance criteria
ND: No data

¹ ANZG DGV – Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG, August 2018) (80% protection of freshwater species [95% protection for Hg]). ANZG notes that there are 'several errors and inconsistencies' in the published DGV database. All values referenced in this investigation have been checked against Table 3.4.1 of the ANZECC 2000 Guidelines. Only chemical guidelines have been shown, not physical stress guidelines.

² ANZECC 2000 Guidelines – Primary Industries (Volume 3), Irrigation and general water uses.

³ Drinking Water Standards for New Zealand Regulations 2022. Maximum acceptable values for inorganic determinands of health significance.

⁴ Drinking Water Standards for New Zealand Regulations 2022. Maximum acceptable values for inorganic determinands of health significance, Nitrite guideline value provided as 3 mg/L, converted to Nitrite-N (multiplied by 3.284 [0.913mg/L]).

11.0 Conceptual Site Model

A Conceptual Site Model (CSM) was developed for the site to provide a preliminary assessment of potential effects on Human Health and the Environment. The CSM is presented in Table 8:

Table 8 – Conceptual Site Model

Source	Exposure Pathway	Potential Receptors	Risk Assessment	
<u>Contaminants in Soil</u>	<u>Human Health</u> Soil Ingestion, Inhalation (Dust), Dermal Contact, Produce	<u>During Construction</u> Subsurface Construction / Maintenance Workers	<ul style="list-style-type: none"> CoC concentrations in all soil samples were below MfE NES and PHG Human Health criteria, and Asbestos was not detected in the soil samples, Prior to earthworks, a Site Management Plan (SMP) should be prepared for the site, outlining control measures to be implemented prior to / during redevelopment. 	No risk to human health
		<u>After Construction</u> Subsurface Construction / Maintenance Workers, On-site Users		
<u>Contaminants in Soil</u>	<u>Environmental Discharge</u> Contaminant Migration	<u>During Construction</u> Groundwater, Flora / Fauna	<ul style="list-style-type: none"> Low levels of metals and PAH are present in isolated soils around buildings and the substation. The nearest surface water body is located onsite near the northern boundary of the site (Mangaone Stream), Groundwater was encountered at depths ranging between 0.1m and 3.2m bgl beneath the site, Prior to earthworks, a SMP should be prepared for the site, outlining control measures to be implemented prior to / during redevelopment, and Surplus soils requiring offsite disposal must be disposed of to a site authorised to take the levels of contamination present. 	Risk Must be Managed
		<u>After Construction</u> Groundwater, Flora / Fauna		
<u>Contaminants in Groundwater</u>	<u>Human Health</u> (Groundwater Use)	Groundwater and Surface Water Users	<ul style="list-style-type: none"> Groundwater beneath the site is used for irrigation purposes, Total Phosphorus concentrations were detected in all groundwater samples above ANZECC criteria for irrigation and general water use, Groundwater beneath the site is not used for potable use, Sodium (Na) concentrations in one sample (PZ08) were above the Drinking Water Standards criteria, and The nearest surface water body is located onsite near the northern boundary of the site (Mangaone Stream). 	No risk to human health so long as not used for potable purposes.
	<u>Environmental Discharge</u> (Contaminant Migration)	Freshwater Ecosystem Flora / Fauna	<ul style="list-style-type: none"> Dissolved Metals concentrations were below Environmental criteria. 	No Risk to the environment should be assessed further if discharge to surface water is required

12.0 Regulatory Implications

This section considers the potential regulatory implications in a future development scenario, following a successful plan change application. Soil disturbance is presumed to be required, with a change of land use (to commercial/ industrial) and potential subdivision. Based on findings of our investigation, Table 9 presents potential Resource Consent requirements for the proposed redevelopment under the provisions of the NES.

This investigation presents factual information for the site. Matters of control and discretion, however, rest with the consenting authority (Waipa District Council / Waikato Regional Council) based on their assessment of this report. It would be appropriate to seek clarification of Waipa District Council / Waikato Regional Council or an Environmental Planning Specialist for further information on resource consenting requirements.

The NES does not apply to large areas of the site, as contaminants are below background levels and/or no HAIL activity has been confirmed. The exception is the substation, which is a confirmed HAIL activity with associated contaminants above background levels. Low level contamination around the dwelling and sheds, does not meet the test for HAIL Activity I (“... contaminants present in sufficient quantity to present a risk to human health or the environment”) so the NES does not apply to these buildings. Similarly, the NES does not apply to the water treatment plant, or in relation to irrigation of wastewater or spray drift as contaminants are below background levels (NES Regulation 5(9)).

Table 9 sets out the consenting requirements for any soil disturbance involving land beneath or within the immediate vicinity of the substation.

A site management plan (SMP) would be required to support a consent application for soil disturbance involving the substation. However, it would be prudent for this to also cover wider site requirements such as soil disposal options for topsoil around buildings, to ensure that future contractors have a single document that is easy to follow and implement.

Table 9 – Current Regulations and Potential Resource Consent Requirements for the Substation

	Potential Applicable Planning Rules
National Environmental Standard (NES)	<p>CONTROLLED ACTIVITY, subject to requirements under Rule 9</p> <ul style="list-style-type: none"> • A DSI (this investigation) has been prepared for the site; • Concentrations of target contaminants complied with NES Human Health criteria; • Controlled Activity status assumes a SMP will be prepared for the site and the site will be managed; and • Conditions of Rule 9 must be complied with.

We note that the Waikato Regional Plan also contains rules regarding the management of contaminated soils. These are typically only triggered when “remediation” is required. As no remediation is required on this site, we consider the contamination rules in the Waikato Regional Plan do not apply to this site.

13.0 Conclusion

This DSI was carried out for the site in accordance with the scope of work and current applicable regulations. This report has been prepared in accordance with MfE’s Guidelines for Contaminated Site Investigations and Waipa District Council / Waikato Regional Council requirements. The investigation and reporting have been prepared, reviewed, and authorised by SQEP, as required under the NES.

Forty-seven soil samples (41 shallow soil samples [16 shallow soil samples analysed as five composite samples and 25 shallow samples collected for individual and QA/QC purposes] and six individual deeper soil samples) were collected. Thirty-six samples were analysed for CoC, including Heavy Metals, OCP, PAH and / or Asbestos.

Following receipt of laboratory results a further six soil samples were analysed for Heavy Metals and PAH due to Composite # 2, 3 and 4 exceeding applicable Background Levels.

Four groundwater samples were collected from the existing monitoring wells and analysed for Dissolved Metals, cBOD, Chloride, TKN, Nitrite and Nitrate Nitrogen, Total Phosphorus and Cation Profile (Sodium, Calcium, Potassium and Magnesium). Laboratory analytical results reported:

Soil:

- All CoC concentrations complied with MfE NES and / or PHG Human Health criteria,
- Asbestos was not detected in any of the soil samples, and
- Heavy Metal concentrations are generally at Background Levels, although there are minor exceedances in isolated soils around structures.

Groundwater:

- Total Phosphorus concentrations were detected in all groundwater samples above ANZECC criteria for irrigation and general water use,
- Sodium concentration in one sample (PZ08) was detected above the Drinking Water Standards criteria,
- Heavy Metals concentrations were detected in all groundwater samples, but at concentrations below applicable ANZG DGV criteria,
- Chloride was detected in all groundwater samples, but at concentrations below applicable criteria, and
- Nitrite and Nitrate Nitrogen were detected in three of the four groundwater samples, but at concentrations below applicable criteria.

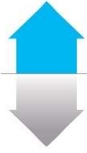
14.0 Recommendations

Findings from this report and S&RC's 2023 PSI (Ref. 221000, *Environmental Site Assessment – Preliminary Site Investigation for Proposed Plan Change and Future Development at 185 Swayne Road, Cambridge, S&RC, 17 July 2023*) are suitable to support the proposed Plan Change.

Prior to earthworks or future redevelopment:

- Prior to earthworks commencing, a SMP should be prepared to set out contamination-related control measures for the earthworks, and provide contingency procedures should unexpected contamination be identified,
- All soils can be reused on site from a contamination perspective. Surplus soils are largely suitable for cleanfill disposal, but there are isolated areas around the dwelling, sheds and substation where surplus topsoil would require disposal to a managed fill site. Findings from this report should be presented to the receiving facility for reference,
- Shallow groundwater beneath the site is not intended for potable use and the anticipated future redevelopment of the site comprises commercial / industrial use. However, in the event that groundwater is encountered or accumulates during earthworks the potential risk presented by its phosphorus content will need to be evaluated further before discharge to surface water can be undertaken,
- Depending on the nature of the eventual redevelopment of the site, further sampling may be required to delineate soils for managed fill disposal. This should be addressed at resource consent stage.

End of Report Text – Appendices Follow

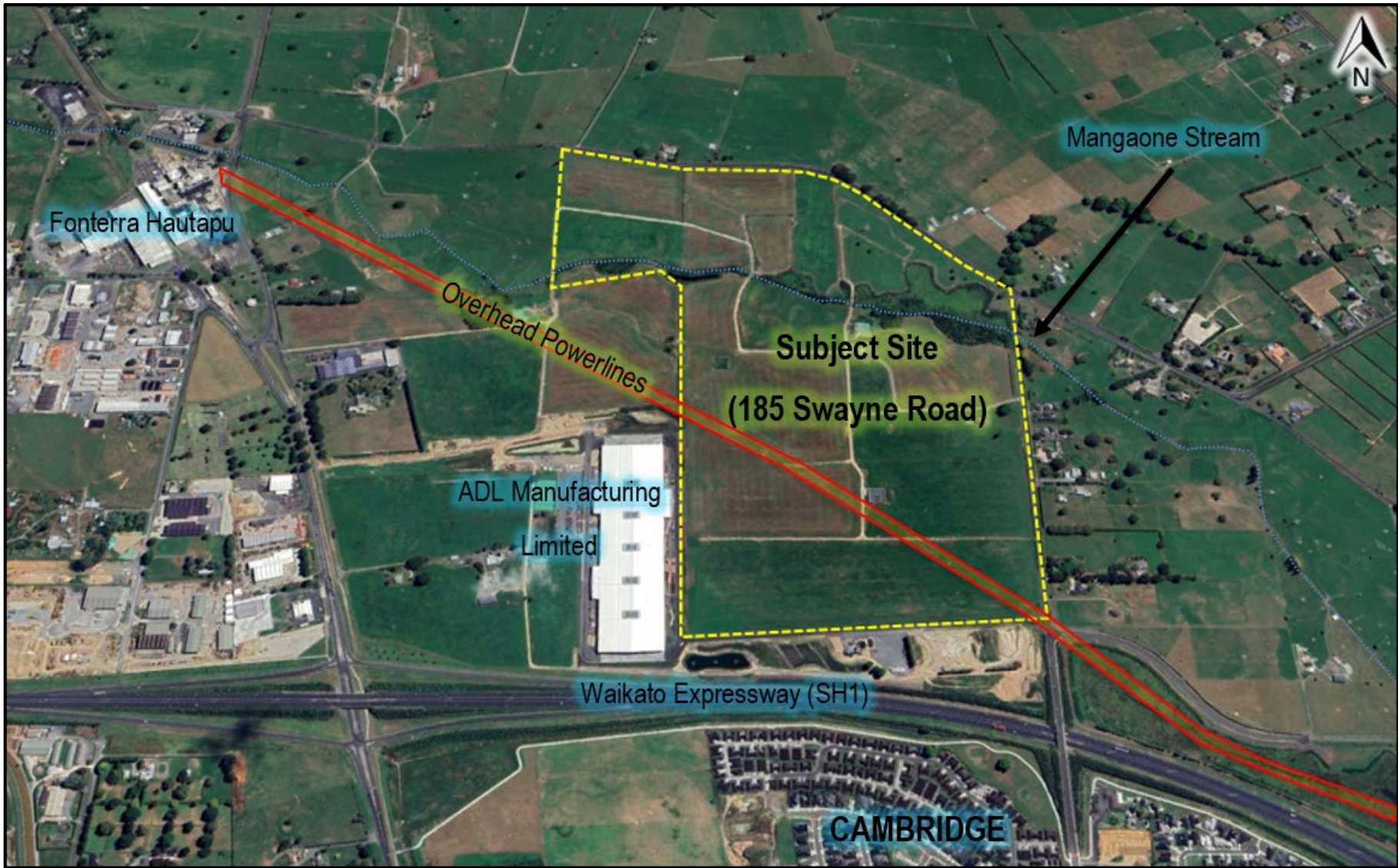


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Appendix A

Site Plan



Job No. 230599 / 1 – 185 Swayne Road, Cambridge





Job No. 230599 / 2 – 185 Swayne Road, Cambridge



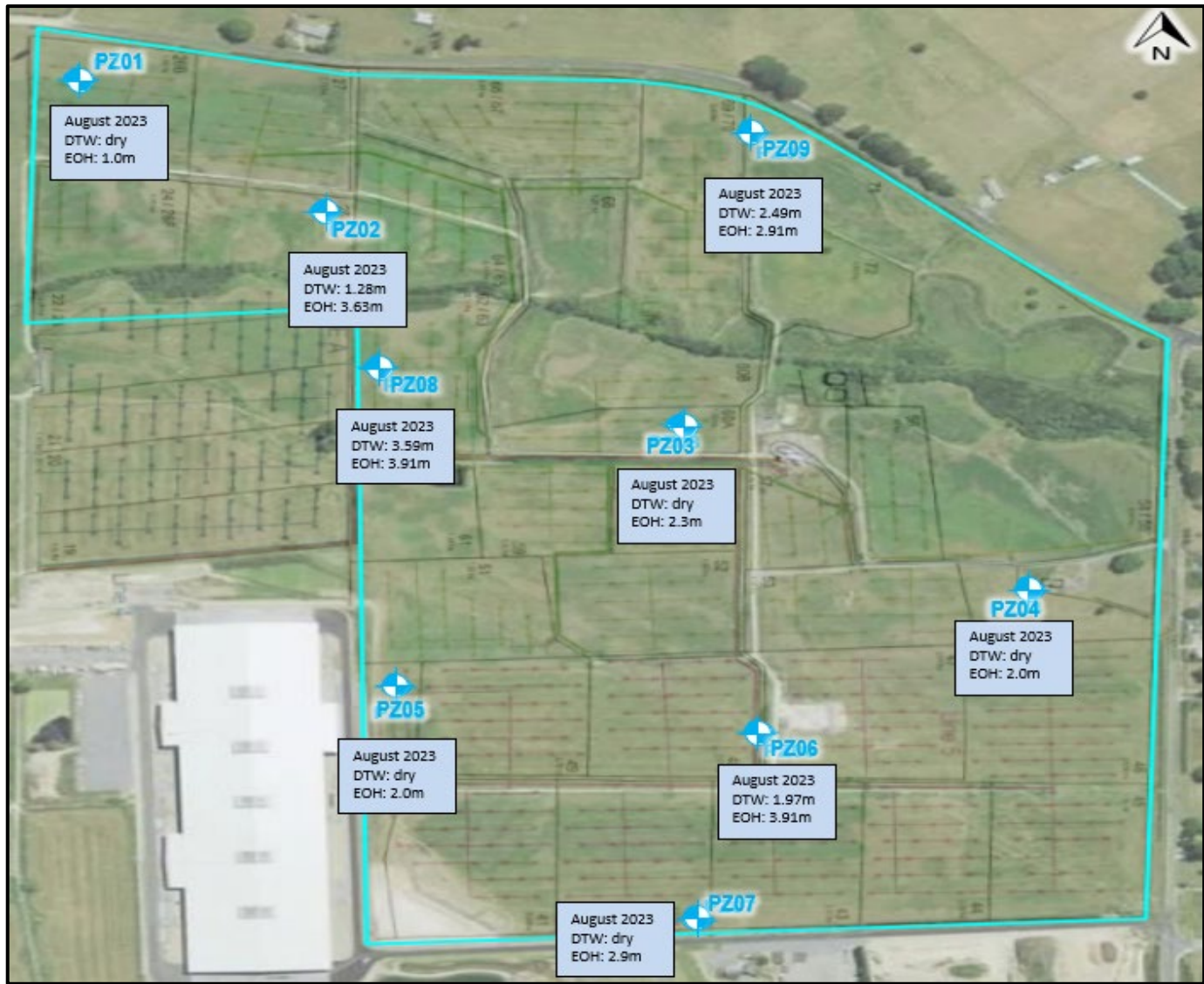


Job No. 230599 / 3 – 185 Swayne Road, Cambridge



Job No. 230599 / 4 – 185 Swayne Road, Cambridge





Job No. 230599 / 5 – 185 Swayne Road, Cambridge



Appendix B

Photographic Documentation



Photo 1: View from eastern boundary (Swayne Road) looking west across the southern part of the site towards the ADL Manufacturing Limited facility in the distance. The site is utilised as pastureland, powerlines are visible on the right side of the photograph running northwest to southeast across the centre of the site. Surface water ponding is visible to the right side of the photograph beneath the powerlines.



Photo 2: View from the dwelling on the eastern boundary of the site looking towards the north, the Mangaone Stream is located amongst the vegetated area in the centre of the photograph, flowing west to east just inside the site's northern boundary.



Photo 3: View from the dwelling on the eastern boundary of the site looking towards the northwest, the water treatment plant is visible by the two silos in the centre of the photograph, the Fonterra Hautapu site is beyond to the northwest.



Photo 4: View from the water treatment plant looking east towards the dwelling and Swayne Road.



Photo 5: View from near the southern boundary of the site looking north towards the substation and the powerlines that run northwest to southeast across the centre of the site.



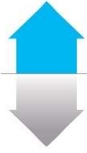
Photo 6: View of dwelling located on the eastern boundary of the site (Swayne Road). The sign (obscured) to the left of the photograph is the entry information to the Bardowie Farm irrigation site.



Photo 7: View of the associated structure (garage) to the dwelling above in Photo 6, located immediately west of the dwelling.



Photo 8: View of a section of the Mangaone Stream, the flow appears to be light and / or possibly impeded by vegetation growth in the watercourse. The banks of the stream are healthy with native plants abundant along the riparian margin.



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Appendix C

Laboratory Analytical Results and Chain of Custody Documentation

Ref No. 230599

September 2023

Soil & Rock Consultants
 Level 1, 131 Lincoln Rd Henderson
 Auckland
 NEW ZEALAND



All tests reported herein have been performed in accordance with the laboratory's scope of accreditation

Attention: **Aaron Thorburn**

Report **1004441-S**

Project name

Project ID **230599**

Received Date **Jul 03, 2023**

Client Sample ID			SS01	SS02	SS03	SS04
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			K23-JI0002905	K23-JI0002906	K23-JI0002907	K23-JI0002908
Date Sampled			Jun 29, 2023	Jun 29, 2023	Jun 29, 2023	Jun 29, 2023
Test/Reference	LOR	Unit				
Organochlorine Pesticides (NZ MfE)						
2.4'-DDD	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
2.4'-DDE	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
2.4'-DDT	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
4.4'-DDD	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
4.4'-DDE	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
4.4'-DDT	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
DDT + DDE + DDD (Total)*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
a-HCH	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aldrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
b-HCH	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Chlordanes - Total	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
cis-Chlordane	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
d-HCH	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Dieldrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan I	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan II	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan sulphate	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin aldehyde	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin ketone	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
g-HCH (Lindane)	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor epoxide	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobenzene	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Methoxychlor	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Toxaphene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
trans-Chlordane	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Dibutylchloroendate (surr.)	1	%	93	80	100	84
Tetrachloro-m-xylene (surr.)	1	%	124	123	140	124
Metals M8 (NZ MfE)						
Arsenic	0.1	mg/kg	11	9.7	8.1	12
Cadmium	0.01	mg/kg	0.18	0.23	0.29	0.51
Chromium	0.1	mg/kg	14	10	8.5	11
Copper	0.1	mg/kg	11	11	7.5	8.1
Lead	0.1	mg/kg	13	12	17	23

Client Sample ID			SS01	SS02	SS03	SS04
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			K23-JI0002905	K23-JI0002906	K23-JI0002907	K23-JI0002908
Date Sampled			Jun 29, 2023	Jun 29, 2023	Jun 29, 2023	Jun 29, 2023
Test/Reference	LOR	Unit				
Metals M8 (NZ MfE)						
Mercury	0.01	mg/kg	0.48	0.12	0.13	0.16
Nickel	0.1	mg/kg	6.3	4.3	3.7	4.5
Zinc	5	mg/kg	84	64	48	56
Sample Properties						
% Moisture	1	%	31	31	28	29

Client Sample ID			SS05	SS06	SS07	SS08
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			K23-JI0002909	K23-JI0002910	K23-JI0002911	K23-JI0002912
Date Sampled			Jun 29, 2023	Jun 29, 2023	Jun 29, 2023	Jun 29, 2023
Test/Reference	LOR	Unit				
Organochlorine Pesticides (NZ MfE)						
2,4'-DDD	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
2,4'-DDE	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
2,4'-DDT	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
4,4'-DDD	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
4,4'-DDE	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
4,4'-DDT	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
DDT + DDE + DDD (Total)*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
a-HCH	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aldrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
b-HCH	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Chlordanes - Total	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
cis-Chlordane	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
d-HCH	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Dieldrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan I	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan II	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan sulphate	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin aldehyde	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin ketone	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
g-HCH (Lindane)	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor epoxide	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobenzene	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Methoxychlor	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Toxaphene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
trans-Chlordane	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Dibutylchloroendate (surr.)	1	%	80	75	87	89
Tetrachloro-m-xylene (surr.)	1	%	122	120	124	122
Metals M8 (NZ MfE)						
Arsenic	0.1	mg/kg	11	3.7	6.4	9.5
Cadmium	0.01	mg/kg	0.37	0.24	0.29	0.39
Chromium	0.1	mg/kg	14	13	11	12
Copper	0.1	mg/kg	23	8.2	10	15
Lead	0.1	mg/kg	20	9.8	18	14
Mercury	0.01	mg/kg	0.48	0.13	0.30	0.11

Client Sample ID			SS05	SS06	SS07	SS08
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			K23-JI0002909	K23-JI0002910	K23-JI0002911	K23-JI0002912
Date Sampled			Jun 29, 2023	Jun 29, 2023	Jun 29, 2023	Jun 29, 2023
Test/Reference	LOR	Unit				
Metals M8 (NZ MfE)						
Nickel	0.1	mg/kg	4.1	5.7	5.3	4.9
Zinc	5	mg/kg	82	78	68	78
Sample Properties						
% Moisture	1	%	37	52	31	33

Client Sample ID			SS09	SS10	SS11	SS12
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			K23-JI0002913	K23-JI0002914	K23-JI0002915	K23-JI0002916
Date Sampled			Jun 29, 2023	Jun 29, 2023	Jun 29, 2023	Jun 29, 2023
Test/Reference	LOR	Unit				
Organochlorine Pesticides (NZ MfE)						
2,4'-DDD	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
2,4'-DDE	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
2,4'-DDT	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
4,4'-DDD	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
4,4'-DDE	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
4,4'-DDT	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
DDT + DDE + DDD (Total)*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
a-HCH	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aldrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
b-HCH	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Chlordanes - Total	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
cis-Chlordane	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
d-HCH	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Dieldrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan I	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan II	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan sulphate	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin aldehyde	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin ketone	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
g-HCH (Lindane)	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor epoxide	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobenzene	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Methoxychlor	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Toxaphene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
trans-Chlordane	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Dibutylchloroendate (surr.)	1	%	94	93	125	75
Tetrachloro-m-xylene (surr.)	1	%	119	120	INT	87
Metals M8 (NZ MfE)						
Arsenic	0.1	mg/kg	9.0	4.4	6.0	6.9
Cadmium	0.01	mg/kg	0.39	0.22	0.24	0.52
Chromium	0.1	mg/kg	12	10	13	14
Copper	0.1	mg/kg	14	14	24	29
Lead	0.1	mg/kg	13	16	16	16
Mercury	0.01	mg/kg	0.13	0.53	0.70	0.43
Nickel	0.1	mg/kg	5.1	4.4	7.3	9.0
Zinc	5	mg/kg	79	78	130	150

Client Sample ID			SS09	SS10	SS11	SS12
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			K23-JI0002913	K23-JI0002914	K23-JI0002915	K23-JI0002916
Date Sampled			Jun 29, 2023	Jun 29, 2023	Jun 29, 2023	Jun 29, 2023
Test/Reference	LOR	Unit				
Sample Properties						
% Moisture	1	%	32	39	54	51

Client Sample ID			SS13	SS14	SS15	SS16
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			K23-JI0002917	K23-JI0002918	K23-JI0002919	K23-JI0002920
Date Sampled			Jun 29, 2023	Jun 29, 2023	Jun 29, 2023	Jun 29, 2023
Test/Reference	LOR	Unit				
Organochlorine Pesticides (NZ MfE)						
2,4'-DDD	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
2,4'-DDE	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
2,4'-DDT	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
4,4'-DDD	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
4,4'-DDE	0.01	mg/kg	< 0.01	< 0.01	< 0.01	0.02
4,4'-DDT	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
DDT + DDE + DDD (Total)*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	0.02
a-HCH	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aldrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
b-HCH	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Chlordanes - Total	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
cis-Chlordane	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
d-HCH	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Dieldrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan I	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan II	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan sulphate	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin aldehyde	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin ketone	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
g-HCH (Lindane)	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor epoxide	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobenzene	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Methoxychlor	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Toxaphene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
trans-Chlordane	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Dibutylchloroendate (surr.)	1	%	83	71	83	75
Tetrachloro-m-xylene (surr.)	1	%	89	83	86	80
Metals M8 (NZ MfE)						
Arsenic	0.1	mg/kg	4.9	6.7	9.2	5.1
Cadmium	0.01	mg/kg	0.21	0.12	0.34	0.19
Chromium	0.1	mg/kg	15	7.3	15	15
Copper	0.1	mg/kg	26	9.4	30	21
Lead	0.1	mg/kg	13	12	15	14
Mercury	0.01	mg/kg	0.86	0.29	0.72	0.83
Nickel	0.1	mg/kg	5.7	2.6	7.7	5.4
Zinc	5	mg/kg	130	52	150	120
Sample Properties						
% Moisture	1	%	57	37	59	50

Client Sample ID			SS17	SS18	SS19	SS20
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			K23-JI0002921	K23-JI0002922	K23-JI0002923	K23-JI0002924
Date Sampled			Jun 29, 2023	Jun 29, 2023	Jun 29, 2023	Jun 29, 2023
Test/Reference	LOR	Unit				
Organochlorine Pesticides (NZ MfE)						
2.4'-DDD	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
2.4'-DDE	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
2.4'-DDT	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
4.4'-DDD	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
4.4'-DDE	0.01	mg/kg	< 0.01	< 0.01	< 0.01	0.02
4.4'-DDT	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
DDT + DDE + DDD (Total)*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	0.02
a-HCH	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aldrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
b-HCH	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Chlordanes - Total	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
cis-Chlordane	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
d-HCH	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Dieldrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan I	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan II	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan sulphate	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin aldehyde	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin ketone	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
g-HCH (Lindane)	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor epoxide	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobenzene	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Methoxychlor	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Toxaphene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
trans-Chlordane	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Dibutylchloroendate (surr.)	1	%	81	80	80	71
Tetrachloro-m-xylene (surr.)	1	%	86	83	83	79
Metals M8 (NZ MfE)						
Arsenic	0.1	mg/kg	8.4	5.3	5.3	13
Cadmium	0.01	mg/kg	0.38	0.25	0.23	0.35
Chromium	0.1	mg/kg	16	14	17	14
Copper	0.1	mg/kg	30	27	23	21
Lead	0.1	mg/kg	20	14	15	15
Mercury	0.01	mg/kg	0.90	0.81	0.75	0.47
Nickel	0.1	mg/kg	8.0	7.2	6.4	7.9
Zinc	5	mg/kg	150	130	140	140
Sample Properties						
% Moisture	1	%	49	55	57	34

Client Sample ID			SS21 Soil K23-JI0002925 Jun 29, 2023	COMPOSITE #1 (SS22 SS24 AND SS25) Soil K23-JI0002926 Jun 29, 2023	COMPOSITE #2 (SS26 SS27 SS29 AND SS30) Soil K23-JI0002927 Jun 29, 2023	SS23 Soil K23-JI0002928 Jun 29, 2023
Sample Matrix	LOR	Unit				
Eurofins Sample No.						
Date Sampled						
Test/Reference						
Organochlorine Pesticides (NZ MfE)						
2,4'-DDD	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
2,4'-DDE	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
2,4'-DDT	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
4,4'-DDD	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
4,4'-DDE	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
4,4'-DDT	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
DDT + DDE + DDD (Total)*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
a-HCH	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aldrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
b-HCH	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Chlordanes - Total	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
cis-Chlordane	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
d-HCH	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Dieldrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan I	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan II	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan sulphate	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin aldehyde	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin ketone	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
g-HCH (Lindane)	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor epoxide	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobenzene	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Methoxychlor	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Toxaphene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
trans-Chlordane	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Dibutylchloroendate (surr.)	1	%	81	80	72	INT
Tetrachloro-m-xylene (surr.)	1	%	76	78	77	76
Metals M8 (NZ MfE)						
Arsenic	0.1	mg/kg	9.9	12	8.6	6.0
Cadmium	0.01	mg/kg	0.65	0.11	0.26	0.03
Chromium	0.1	mg/kg	13	8.5	16	8.4
Copper	0.1	mg/kg	18	14	15	5.1
Lead	0.1	mg/kg	16	8.7	11	12
Mercury	0.01	mg/kg	0.45	0.05	0.11	0.08
Nickel	0.1	mg/kg	6.1	3.0	6.7	3.3
Zinc	5	mg/kg	120	57	100	32
Sample Properties						
% Moisture	1	%	44	27	23	29
Polycyclic Aromatic Hydrocarbons (NZ MfE)						
Acenaphthene	0.03	mg/kg	-	< 0.03	< 0.03	< 0.03
Acenaphthylene	0.03	mg/kg	-	< 0.03	< 0.03	< 0.03
Anthracene	0.03	mg/kg	-	< 0.03	< 0.03	< 0.03
Benz(a)anthracene	0.03	mg/kg	-	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene	0.03	mg/kg	-	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene TEQ (lower bound)*	0.03	mg/kg	-	< 0.03	< 0.03	< 0.03

Client Sample ID			SS21 Soil K23-JI0002925 Jun 29, 2023	COMPOSITE #1 (SS22 SS24 AND SS25) Soil K23-JI0002926 Jun 29, 2023	COMPOSITE #2 (SS26 SS27 SS29 AND SS30) Soil K23-JI0002927 Jun 29, 2023	SS23 Soil K23-JI0002928 Jun 29, 2023
Sample Matrix						
Eurofins Sample No.						
Date Sampled						
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons (NZ MfE)						
Benzo(a)pyrene TEQ (medium bound)*	0.03	mg/kg	-	0.04	0.04	0.04
Benzo(a)pyrene TEQ (upper bound)*	0.03	mg/kg	-	0.08	0.08	0.08
Benzo(b&j)fluoranthene ^{N07}	0.03	mg/kg	-	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	0.03	mg/kg	-	< 0.03	< 0.03	< 0.03
Benzo(k)fluoranthene	0.03	mg/kg	-	< 0.03	< 0.03	< 0.03
Chrysene	0.03	mg/kg	-	< 0.03	< 0.03	< 0.03
Dibenz(a,h)anthracene	0.03	mg/kg	-	< 0.03	< 0.03	< 0.03
Fluoranthene	0.03	mg/kg	-	< 0.03	< 0.03	< 0.03
Fluorene	0.03	mg/kg	-	< 0.03	< 0.03	< 0.03
Indeno(1.2.3-cd)pyrene	0.03	mg/kg	-	< 0.03	< 0.03	< 0.03
Naphthalene	0.1	mg/kg	-	< 0.1	< 0.1	< 0.1
Phenanthrene	0.03	mg/kg	-	< 0.03	< 0.03	< 0.03
Pyrene	0.03	mg/kg	-	< 0.03	< 0.03	< 0.03
Total PAH*	0.1	mg/kg	-	< 0.1	< 0.1	< 0.1
p-Terphenyl-d14 (surr.)	1	%	-	90	80	67
2-Fluorobiphenyl (surr.)	1	%	-	70	74	72

Client Sample ID			SS28 Soil K23-JI0002929 Jun 29, 2023	SS31 Soil K23-JI0002930 Jun 29, 2023	SS32 Soil K23-JI0002931 Jun 29, 2023	COMPOSITE #3 (SS33 SS35 SS36 AND SS38) Soil K23-JI0002932 Jun 29, 2023
Sample Matrix						
Eurofins Sample No.						
Date Sampled						
Test/Reference	LOR	Unit				
Organochlorine Pesticides (NZ MfE)						
2,4'-DDD	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
2,4'-DDE	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
2,4'-DDT	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
4,4'-DDD	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
4,4'-DDE	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
4,4'-DDT	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
DDT + DDE + DDD (Total)*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
a-HCH	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aldrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
b-HCH	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Chlordanes - Total	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
cis-Chlordane	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
d-HCH	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Dieldrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan I	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan II	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan sulphate	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin aldehyde	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin ketone	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
g-HCH (Lindane)	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01

Client Sample ID			SS28	SS31	SS32	COMPOSITE #3 (SS33 SS35 SS36 AND SS38)
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			K23-JI0002929	K23-JI0002930	K23-JI0002931	K23-JI0002932
Date Sampled			Jun 29, 2023	Jun 29, 2023	Jun 29, 2023	Jun 29, 2023
Test/Reference	LOR	Unit				
Organochlorine Pesticides (NZ MfE)						
Heptachlor	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor epoxide	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobenzene	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Methoxychlor	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Toxaphene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
trans-Chlordane	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Dibutylchlorodate (surr.)	1	%	INT	58	66	69
Tetrachloro-m-xylene (surr.)	1	%	71	74	73	70
Metals M8 (NZ MfE)						
Arsenic	0.1	mg/kg	6.5	6.4	7.6	11
Cadmium	0.01	mg/kg	0.07	0.71	0.83	0.36
Chromium	0.1	mg/kg	9.8	12	14	8.3
Copper	0.1	mg/kg	10	45	55	11
Lead	0.1	mg/kg	8.9	41	36	14
Mercury	0.01	mg/kg	0.08	0.34	0.37	0.21
Nickel	0.1	mg/kg	5.9	6.9	9.7	3.4
Zinc	5	mg/kg	43	290	360	67
Sample Properties						
% Moisture	1	%	25	43	43	39
Polycyclic Aromatic Hydrocarbons (NZ MfE)						
Acenaphthene	0.03	mg/kg	< 0.03	-	-	< 0.03
Acenaphthylene	0.03	mg/kg	< 0.03	-	-	< 0.03
Anthracene	0.03	mg/kg	< 0.03	-	-	< 0.03
Benz(a)anthracene	0.03	mg/kg	< 0.03	-	-	< 0.03
Benzo(a)pyrene	0.03	mg/kg	< 0.03	-	-	< 0.03
Benzo(a)pyrene TEQ (lower bound)*	0.03	mg/kg	< 0.03	-	-	< 0.03
Benzo(a)pyrene TEQ (medium bound)*	0.03	mg/kg	0.04	-	-	0.04
Benzo(a)pyrene TEQ (upper bound)*	0.03	mg/kg	0.08	-	-	0.08
Benzo(b&j)fluoranthene ^{N07}	0.03	mg/kg	< 0.03	-	-	< 0.03
Benzo(g,h,i)perylene	0.03	mg/kg	< 0.03	-	-	< 0.03
Benzo(k)fluoranthene	0.03	mg/kg	< 0.03	-	-	< 0.03
Chrysene	0.03	mg/kg	< 0.03	-	-	< 0.03
Dibenz(a,h)anthracene	0.03	mg/kg	< 0.03	-	-	< 0.03
Fluoranthene	0.03	mg/kg	< 0.03	-	-	< 0.03
Fluorene	0.03	mg/kg	< 0.03	-	-	< 0.03
Indeno(1.2.3-cd)pyrene	0.03	mg/kg	< 0.03	-	-	< 0.03
Naphthalene	0.1	mg/kg	< 0.1	-	-	< 0.1
Phenanthrene	0.03	mg/kg	< 0.03	-	-	< 0.03
Pyrene	0.03	mg/kg	< 0.03	-	-	< 0.03
Total PAH*	0.1	mg/kg	< 0.1	-	-	< 0.1
p-Terphenyl-d14 (surr.)	1	%	59	-	-	84
2-Fluorobiphenyl (surr.)	1	%	68	-	-	69

Client Sample ID			COMPOSITE #4 (SS39 AND SS42)	COMPOSITE #5 (SS43 SS44 AND SS46)	SS34	SS37
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			K23-JI0002933	K23-JI0002934	K23-JI0002935	K23-JI0002936
Date Sampled			Jun 29, 2023	Jun 29, 2023	Jun 29, 2023	Jun 29, 2023
Test/Reference	LOR	Unit				
Organochlorine Pesticides (NZ MfE)						
2.4'-DDD	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
2.4'-DDE	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
2.4'-DDT	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
4.4'-DDD	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
4.4'-DDE	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
4.4'-DDT	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
DDT + DDE + DDD (Total)*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
a-HCH	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aldrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
b-HCH	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Chlordanes - Total	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
cis-Chlordane	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
d-HCH	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Dieldrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan I	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan II	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan sulphate	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin aldehyde	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin ketone	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
g-HCH (Lindane)	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor epoxide	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobenzene	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Methoxychlor	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Toxaphene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
trans-Chlordane	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Dibutylchlorendate (surr.)	1	%	74	97	61	INT
Tetrachloro-m-xylene (surr.)	1	%	75	75	79	74
Metals M8 (NZ MfE)						
Arsenic	0.1	mg/kg	18	17	18	21
Cadmium	0.01	mg/kg	0.78	0.69	0.04	0.10
Chromium	0.1	mg/kg	22	19	12	10
Copper	0.1	mg/kg	40	37	8.4	6.2
Lead	0.1	mg/kg	360	120	14	23
Mercury	0.01	mg/kg	0.27	0.17	0.21	0.27
Nickel	0.1	mg/kg	8.9	11	3.5	4.7
Zinc	5	mg/kg	410	190	41	63
Sample Properties						
% Moisture	1	%	34	40	29	26
Polycyclic Aromatic Hydrocarbons (NZ MfE)						
Acenaphthene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Anthracene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benz(a)anthracene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene	0.03	mg/kg	0.03	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene TEQ (lower bound)*	0.03	mg/kg	0.03	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene TEQ (medium bound)*	0.03	mg/kg	0.05	0.04	0.04	0.04

Client Sample ID			COMPOSITE #4 (SS39 AND SS42)	COMPOSITE #5 (SS43 SS44 AND SS46)	SS34	SS37
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			K23-JI0002933	K23-JI0002934	K23-JI0002935	K23-JI0002936
Date Sampled			Jun 29, 2023	Jun 29, 2023	Jun 29, 2023	Jun 29, 2023
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons (NZ MfE)						
Benzo(a)pyrene TEQ (upper bound)*	0.03	mg/kg	0.08	0.08	0.08	0.08
Benzo(b&j)fluoranthene ^{N07}	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(k)fluoranthene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Chrysene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Dibenz(a,h)anthracene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Fluoranthene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Indeno(1,2,3-cd)pyrene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Naphthalene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Pyrene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Total PAH*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
p-Terphenyl-d14 (surr.)	1	%	83	91	75	63
2-Fluorobiphenyl (surr.)	1	%	69	71	76	65

Client Sample ID			SS41	SS45	SS47	SS48
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			K23-JI0002937	K23-JI0002938	K23-JI0002939	K23-JI0002940
Date Sampled			Jun 29, 2023	Jun 29, 2023	Jun 29, 2023	Jun 29, 2023
Test/Reference	LOR	Unit				
Organochlorine Pesticides (NZ MfE)						
2,4'-DDD	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
2,4'-DDE	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
2,4'-DDT	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
4,4'-DDD	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
4,4'-DDE	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
4,4'-DDT	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
DDT + DDE + DDD (Total)*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
a-HCH	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aldrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
b-HCH	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Chlordanes - Total	0.01	mg/kg	0.03	< 0.01	< 0.01	< 0.01
cis-Chlordane	0.01	mg/kg	0.03	< 0.01	< 0.01	< 0.01
d-HCH	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Dieldrin	0.01	mg/kg	0.03	< 0.01	< 0.01	< 0.01
Endosulfan I	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan II	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan sulphate	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin aldehyde	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin ketone	0.01	mg/kg	0.02	< 0.01	< 0.01	< 0.01
g-HCH (Lindane)	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor epoxide	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobenzene	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Methoxychlor	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01

Client Sample ID			SS41	SS45	SS47	SS48
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			K23-JI0002937	K23-JI0002938	K23-JI0002939	K23-JI0002940
Date Sampled			Jun 29, 2023	Jun 29, 2023	Jun 29, 2023	Jun 29, 2023
Test/Reference	LOR	Unit				
Organochlorine Pesticides (NZ MfE)						
Toxaphene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
trans-Chlordane	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Dibutylchlorodane (surr.)	1	%	131	68	81	77
Tetrachloro-m-xylene (surr.)	1	%	133	94	107	100
Metals M8 (NZ MfE)						
Arsenic	0.1	mg/kg	11	9.6	14	15
Cadmium	0.01	mg/kg	0.59	0.07	0.67	0.61
Chromium	0.1	mg/kg	17	14	19	20
Copper	0.1	mg/kg	26	14	46	47
Lead	0.1	mg/kg	97	34	290	280
Mercury	0.01	mg/kg	0.17	0.15	0.30	0.29
Nickel	0.1	mg/kg	6.0	7.0	7.9	8.4
Zinc	5	mg/kg	200	69	310	300
Sample Properties						
% Moisture	1	%	32	33	44	43
Polycyclic Aromatic Hydrocarbons (NZ MfE)						
Acenaphthene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Anthracene	0.03	mg/kg	0.09	< 0.03	< 0.03	0.04
Benzo(a)anthracene	0.03	mg/kg	0.12	< 0.03	0.04	0.04
Benzo(a)pyrene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.04
Benzo(a)pyrene TEQ (lower bound)*	0.03	mg/kg	0.06	< 0.03	< 0.03	0.05
Benzo(a)pyrene TEQ (medium bound)*	0.03	mg/kg	0.09	0.04	0.04	0.07
Benzo(a)pyrene TEQ (upper bound)*	0.03	mg/kg	0.12	0.08	0.08	0.09
Benzo(b&j)fluoranthene ^{N07}	0.03	mg/kg	0.09	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(k)fluoranthene	0.03	mg/kg	0.12	< 0.03	< 0.03	0.04
Chrysene	0.03	mg/kg	0.10	< 0.03	0.04	0.04
Dibenz(a,h)anthracene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Fluoranthene	0.03	mg/kg	0.13	< 0.03	< 0.03	0.04
Fluorene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Indeno(1,2,3-cd)pyrene	0.03	mg/kg	0.21	< 0.03	0.04	< 0.03
Naphthalene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	0.03	mg/kg	0.07	< 0.03	< 0.03	< 0.03
Pyrene	0.03	mg/kg	0.15	< 0.03	< 0.03	0.04
Total PAH*	0.1	mg/kg	1.1	< 0.1	0.1	0.3
p-Terphenyl-d14 (surr.)	1	%	123	88	94	87
2-Fluorobiphenyl (surr.)	1	%	130	66	64	65

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Organochlorine Pesticides (NZ MfE) - Method: LTM-ORG-2220 OCP & PCB in Soil and Water by GCMSMS	Auckland	Jul 04, 2023	14 Days
Polycyclic Aromatic Hydrocarbons (NZ MfE) - Method: LTM-ORG-2130 PAH and Phenols in Soil and Water by GC MSMS	Auckland	Jul 04, 2023	14 Days
Metals M8 (NZ MfE) - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Auckland	Jul 06, 2023	28 Days
% Moisture - Method: LTM-GEN-7080 Moisture Content in Soil by Gravimetry	Auckland	Jul 04, 2023	14 Days

Company Name:	Soil & Rock Consultants	Order No.:	230599	Received:	Jul 3, 2023 10:30 AM
Address:	Level 1, 131 Lincoln Rd Henderson Auckland NEW ZEALAND	Report #:	1004441	Due:	Jul 10, 2023
Project Name:		Phone:	0011 64 9 835 1740	Priority:	5 Day
Project ID:	230599	Fax:	0011 64 9 835 1847	Contact Name:	Aaron Thorburn

Eurofins Analytical Services Manager : Katyana Gausel

Sample Detail						Asbestos - AS4964	Asbestos - AS4964	HOLD	Moisture Set	Organochlorine Pesticides (NZ MfE)	Metals M8 (NZ MfE)	Polyyclic Aromatic Hydrocarbons (NZ MfE)	Eurofins Suite B21A-NZ: Asbestos, Metals (As,Cd,Cr,Cu,Ni,Pb,Zn,Hg) (NZ MfE)
Auckland Laboratory - IANZ# 1327							X	X	X	X	X	X	X
Christchurch Laboratory - IANZ# 1290						X							X
External Laboratory													
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID								
1	SS01	Jun 29, 2023		Soil	K23-JI0002905			X	X	X			
2	SS02	Jun 29, 2023		Soil	K23-JI0002906			X	X	X			
3	SS03	Jun 29, 2023		Soil	K23-JI0002907			X	X	X			
4	SS04	Jun 29, 2023		Soil	K23-JI0002908			X	X	X			
5	SS05	Jun 29, 2023		Soil	K23-JI0002909			X	X	X			
6	SS06	Jun 29, 2023		Soil	K23-JI0002910			X	X	X			
7	SS07	Jun 29, 2023		Soil	K23-JI0002911			X	X	X			
8	SS08	Jun 29, 2023		Soil	K23-JI0002912			X	X	X			
9	SS09	Jun 29, 2023		Soil	K23-JI0002913			X	X	X			
10	SS10	Jun 29, 2023		Soil	K23-JI0002914			X	X	X			
11	SS11	Jun 29, 2023		Soil	K23-JI0002915			X	X	X			
12	SS12	Jun 29, 2023		Soil	K23-JI0002916			X	X	X			

Auckland
35 O'Rorke Road
Penrose,
Auckland 1061
Tel: +64 9 526 4551
IANZ# 1327

Christchurch
43 Detroit Drive
Rolleston,
Christchurch 7675
Tel: +64 3 343 5201
IANZ# 1290

Melbourne
6 Monterey Road
Dandenong South
VIC 3175
Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
Tel: +61 3 8564 5000
NATA# 1261 Site# 25403

Sydney
179 Magowar Road
Girraween
NSW 2145
Tel: +61 2 9900 8400
NATA# 1261 Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
Tel: +61 2 6113 8091
NATA# 1261 Site# 25466

Brisbane
1/21 Smallwood Place
Murarrie
QLD 4172
Tel: +61 7 3902 4600
NATA# 1261 Site# 20794

Newcastle
1/2 Frost Drive
Mayfield West NSW 2304
Tel: +61 2 4968 8448
NATA# 1261
Site# 25079 & 25289

Perth
46-48 Banksia Road
Welshpool
WA 6106
Tel: +61 8 6253 4444
NATA# 2377 Site# 2370

web: www.eurofins.com.au
email: EnviroSales@eurofins.com

Company Name:	Soil & Rock Consultants	Order No.:	230599	Received:	Jul 3, 2023 10:30 AM
Address:	Level 1, 131 Lincoln Rd Henderson Auckland NEW ZEALAND	Report #:	1004441	Due:	Jul 10, 2023
Project Name:		Phone:	0011 64 9 835 1740	Priority:	5 Day
Project ID:	230599	Fax:	0011 64 9 835 1847	Contact Name:	Aaron Thorburn

Eurofins Analytical Services Manager : Katyana Gausel

Sample Detail						Asbestos - AS4964	Asbestos - AS4964	HOLD	Moisture Set	Organochlorine Pesticides (NZ MfE)	Metals M8 (NZ MfE)	Polycyclic Aromatic Hydrocarbons (NZ MfE)	Eurofins Suite B21A-NZ: Asbestos Metals (As,Cd,Cr,Cu,Ni,Pb,Zn,Hg) (NZ MfE)
Auckland Laboratory - IANZ# 1327							X	X	X	X	X	X	X
Christchurch Laboratory - IANZ# 1290						X							X
External Laboratory													
13	SS13	Jun 29, 2023		Soil	K23-JI0002917				X	X	X		
14	SS14	Jun 29, 2023		Soil	K23-JI0002918				X	X	X		
15	SS15	Jun 29, 2023		Soil	K23-JI0002919				X	X	X		
16	SS16	Jun 29, 2023		Soil	K23-JI0002920				X	X	X		
17	SS17	Jun 29, 2023		Soil	K23-JI0002921				X	X	X		
18	SS18	Jun 29, 2023		Soil	K23-JI0002922				X	X	X		
19	SS19	Jun 29, 2023		Soil	K23-JI0002923				X	X	X		
20	SS20	Jun 29, 2023		Soil	K23-JI0002924				X	X	X		
21	SS21	Jun 29, 2023		Soil	K23-JI0002925				X	X	X		
22	COMPOSITE #1 (SS22 SS24 AND SS25)	Jun 29, 2023		Soil	K23-JI0002926				X	X	X	X	
23	COMPOSITE #2 (SS26)	Jun 29, 2023		Soil	K23-JI0002927				X	X	X	X	

Auckland
35 O'Rorke Road
Penrose,
Auckland 1061
Tel: +64 9 526 4551
IANZ# 1327

Christchurch
43 Detroit Drive
Rolleston,
Christchurch 7675
Tel: +64 3 343 5201
IANZ# 1290

Melbourne
6 Monterey Road
Dandenong South
VIC 3175
Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
Tel: +61 3 8564 5000

Sydney
179 Magowar Road
Girraween
NSW 2145
Tel: +61 2 9900 8400

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
Tel: +61 2 6113 8091

Brisbane
1/21 Smallwood Place
Murarrie
QLD 4172
Tel: +61 7 3902 4600

Newcastle
1/2 Frost Drive
Mayfield West NSW 2304
Tel: +61 2 4968 8448
NATA# 1261
Site# 25079 & 25289

Perth
46-48 Banksia Road
Welshpool
WA 6106
Tel: +61 8 6253 4444
NATA# 2377 Site# 2370

web: www.eurofins.com.au
email: EnviroSales@eurofins.com

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Address:	Level 1, 131 Lincoln Rd Henderson Auckland NEW ZEALAND	Report #:	1004441	Due:	Jul 10, 2023
Project Name:		Phone:	0011 64 9 835 1740	Priority:	5 Day
Project ID:	230599	Fax:	0011 64 9 835 1847	Contact Name:	Aaron Thorburn

Eurofins Analytical Services Manager : Katyana Gausel

Sample Detail						Asbestos - AS4964	Asbestos - AS4964	HOLD	Moisture Set	Organochlorine Pesticides (NZ MfE)	Metals M8 (NZ MfE)	Polycyclic Aromatic Hydrocarbons (NZ MfE)	Eurofins Suite B21A-NZ: Asbestos Metals (As,Cd,Cr,Cu,Ni,Pb,Zn,Hg) (NZ MfE)
Auckland Laboratory - IANZ# 1327							X	X	X	X	X	X	X
Christchurch Laboratory - IANZ# 1290						X							X
External Laboratory													
	SS27 SS29 AND SS30)												
24	SS23	Jun 29, 2023		Soil	K23-JI0002928				X	X		X	X
25	SS28	Jun 29, 2023		Soil	K23-JI0002929				X	X		X	X
26	SS31	Jun 29, 2023		Soil	K23-JI0002930				X	X	X		
27	SS32	Jun 29, 2023		Soil	K23-JI0002931				X	X	X		
28	COMPOSITE #3 (SS33 SS35 SS36 AND SS38)	Jun 29, 2023		Soil	K23-JI0002932				X	X	X	X	
29	COMPOSITE #4 (SS39 AND SS42)	Jun 29, 2023		Soil	K23-JI0002933				X	X	X	X	
30	COMPOSITE #5 (SS43 SS44 AND SS46)	Jun 29, 2023		Soil	K23-JI0002934				X	X	X	X	

Auckland
35 O'Rorke Road
Penrose,
Auckland 1061
Tel: +64 9 526 4551
IANZ# 1327

Christchurch
43 Detroit Drive
Rolleston,
Christchurch 7675
Tel: +64 3 343 5201
IANZ# 1290

Melbourne
6 Monterey Road
Dandenong South
VIC 3175
Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
Tel: +61 3 8564 5000
NATA# 1261 Site# 25403

Sydney
179 Magowar Road
Girraween
NSW 2145
Tel: +61 2 9900 8400
NATA# 1261 Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
Tel: +61 2 6113 8091
NATA# 1261 Site# 25466

Brisbane
1/21 Smallwood Place
Murarie
QLD 4172
Tel: +61 7 3902 4600
NATA# 1261 Site# 20794

Newcastle
1/2 Frost Drive
Mayfield West NSW 2304
Tel: +61 2 4968 8448
NATA# 1261
Site# 25079 & 25289

Perth
46-48 Banksia Road
Welshpool
WA 6106
Tel: +61 8 6253 4444
NATA# 2377 Site# 2370

web: www.eurofins.com.au
email: EnviroSales@eurofins.com

Company Name:	Soil & Rock Consultants	Order No.:	230599	Received:	Jul 3, 2023 10:30 AM
Address:	Level 1, 131 Lincoln Rd Henderson Auckland NEW ZEALAND	Report #:	1004441	Due:	Jul 10, 2023
Project Name:		Phone:	0011 64 9 835 1740	Priority:	5 Day
Project ID:	230599	Fax:	0011 64 9 835 1847	Contact Name:	Aaron Thorburn

Eurofins Analytical Services Manager : Katyana Gausel

Sample Detail						Asbestos - AS4964	Asbestos - AS4964	HOLD	Moisture Set	Organochlorine Pesticides (NZ MfE)	Metals M8 (NZ MfE)	Polycyclic Aromatic Hydrocarbons (NZ MfE)	Eurofins Suite B21A-NZ: Asbestos, Metals (As,Cd,Cr,Cu,Ni,Pb,Zn,Hg) (NZ MfE)
Auckland Laboratory - IANZ# 1327							X	X	X	X	X	X	X
Christchurch Laboratory - IANZ# 1290						X							X
External Laboratory													
31	SS34	Jun 29, 2023		Soil	K23-JI0002935				X	X		X	X
32	SS37	Jun 29, 2023		Soil	K23-JI0002936				X	X		X	X
33	SS41	Jun 29, 2023		Soil	K23-JI0002937				X	X		X	X
34	SS45	Jun 29, 2023		Soil	K23-JI0002938				X	X		X	X
35	SS47	Jun 29, 2023		Soil	K23-JI0002939				X	X		X	X
36	SS48	Jun 29, 2023		Soil	K23-JI0002940				X	X		X	X
37	SS09 DUP	Jun 29, 2023		Soil	K23-JI0003362			X					
38	SS32 DUP	Jun 29, 2023		Soil	K23-JI0003363			X					
39	SS48 DUP	Jun 29, 2023		Soil	K23-JI0003364			X					
40	SS22	Jun 29, 2023		Soil	K23-JI0003365	X							
41	SS24	Jun 29, 2023		Soil	K23-JI0003366	X							
42	SS25	Jun 29, 2023		Soil	K23-JI0003367	X							
43	SS26	Jun 29, 2023		Soil	K23-JI0003368	X							
44	SS27	Jun 29, 2023		Soil	K23-JI0003369	X							

Auckland
 35 O'Rorke Road
 Penrose,
 Auckland 1061
 Tel: +64 9 526 4551
 IANZ# 1327

Christchurch
 43 Detroit Drive
 Rolleston,
 Christchurch 7675
 Tel: +64 3 343 5201
 IANZ# 1290

Melbourne
 6 Monterey Road
 Dandenong South
 VIC 3175
 Tel: +61 3 8564 5000
 NATA# 1261 Site# 1254

Geelong
 19/8 Lewalan Street
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 Tel: +61 3 8564 5000
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 179 Magowar Road
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 Tel: +61 7 3902 4600
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 46-48 Banksia Road
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 WA 6106
 Tel: +61 8 6253 4444
 NATA# 2377 Site# 2370

 web: www.eurofins.com.au
 email: EnviroSales@eurofins.com

Company Name: Soil & Rock Consultants
Address: Level 1, 131 Lincoln Rd Henderson
 Auckland
 NEW ZEALAND

Order No.: 230599
Report #: 1004441
Phone: 0011 64 9 835 1740
Fax: 0011 64 9 835 1847

Received: Jul 3, 2023 10:30 AM
Due: Jul 10, 2023
Priority: 5 Day
Contact Name: Aaron Thorburn

Project Name:
Project ID: 230599

Eurofins Analytical Services Manager : Katyana Gausel

Sample Detail						Asbestos - AS4964	Asbestos - AS4964	HOLD	Moisture Set	Organochlorine Pesticides (NZ MfE)	Metals M8 (NZ MfE)	Polycyclic Aromatic Hydrocarbons (NZ MfE)	Eurofins Suite B21A-NZ: Asbestos, Metals (As,Cd,Cr,Cu,Ni,Pb,Zn,Hg) (NZ MfE)
Auckland Laboratory - IANZ# 1327							X	X	X	X	X	X	X
Christchurch Laboratory - IANZ# 1290						X							X
External Laboratory													
45	SS29	Jun 29, 2023		Soil	K23-JI0003370	X							
46	SS30	Jun 29, 2023		Soil	K23-JI0003371	X							
47	SS33	Jun 29, 2023		Soil	K23-JI0003372	X							
48	SS35	Jun 29, 2023		Soil	K23-JI0003373	X							
49	SS36	Jun 29, 2023		Soil	K23-JI0003374	X							
50	SS38	Jun 29, 2023		Soil	K23-JI0003375	X							
51	SS39	Jun 29, 2023		Soil	K23-JI0003376		X						
52	SS40	Jun 29, 2023		Soil	K23-JI0003377		X						
53	SS42	Jun 29, 2023		Soil	K23-JI0003378		X						
54	SS43	Jun 29, 2023		Soil	K23-JI0003379		X						
55	SS44	Jun 29, 2023		Soil	K23-JI0003380		X						
56	SS46	Jun 29, 2023		Soil	K23-JI0003381		X						
Test Counts						17	17	3	36	36	28	13	8

Internal Quality Control Review and Glossary
General

- Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
- All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
- All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
- Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
- Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
- SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
- Samples were analysed on an 'as received' basis.
- Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
- This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

µg/L: micrograms per litre

ppm: parts per million

ppb: parts per billion

%: Percentage

org/100 mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

MPN/100 mL: Most Probable Number of organisms per 100 millilitres

CFU: Colony forming unit

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (<i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPa, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR: RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

- Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
- Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
- pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
- Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
- For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
- Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Organochlorine Pesticides (NZ MfE)							
2,4'-DDD	mg/kg	< 0.01			0.01	Pass	
2,4'-DDE	mg/kg	< 0.01			0.01	Pass	
2,4'-DDT	mg/kg	< 0.01			0.01	Pass	
4,4'-DDD	mg/kg	< 0.01			0.01	Pass	
4,4'-DDE	mg/kg	< 0.01			0.01	Pass	
4,4'-DDT	mg/kg	< 0.01			0.01	Pass	
a-HCH	mg/kg	< 0.01			0.01	Pass	
Aldrin	mg/kg	< 0.01			0.01	Pass	
b-HCH	mg/kg	< 0.01			0.01	Pass	
Chlordanes - Total	mg/kg	-			0.01	N/A	
cis-Chlordane	mg/kg	< 0.01			0.01	Pass	
d-HCH	mg/kg	< 0.01			0.01	Pass	
Dieldrin	mg/kg	< 0.01			0.01	Pass	
Endosulfan I	mg/kg	< 0.01			0.01	Pass	
Endosulfan II	mg/kg	< 0.01			0.01	Pass	
Endosulfan sulphate	mg/kg	< 0.01			0.01	Pass	
Endrin	mg/kg	< 0.01			0.01	Pass	
Endrin aldehyde	mg/kg	< 0.01			0.01	Pass	
Endrin ketone	mg/kg	< 0.01			0.01	Pass	
g-HCH (Lindane)	mg/kg	< 0.01			0.01	Pass	
Heptachlor	mg/kg	< 0.01			0.01	Pass	
Heptachlor epoxide	mg/kg	< 0.01			0.01	Pass	
Hexachlorobenzene	mg/kg	< 0.01			0.01	Pass	
Methoxychlor	mg/kg	< 0.01			0.01	Pass	
Toxaphene	mg/kg	< 0.5			0.5	Pass	
trans-Chlordane	mg/kg	< 0.01			0.01	Pass	
Method Blank							
Metals M8 (NZ MfE)							
Arsenic	mg/kg	< 0.1			0.1	Pass	
Cadmium	mg/kg	< 0.01			0.01	Pass	
Chromium	mg/kg	< 0.1			0.1	Pass	
Copper	mg/kg	< 0.1			0.1	Pass	
Lead	mg/kg	< 0.1			0.1	Pass	
Mercury	mg/kg	< 0.01			0.01	Pass	
Nickel	mg/kg	< 0.1			0.1	Pass	
Zinc	mg/kg	< 5			5	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons (NZ MfE)							
Acenaphthene	mg/kg	< 0.03			0.03	Pass	
Acenaphthylene	mg/kg	< 0.03			0.03	Pass	
Anthracene	mg/kg	< 0.03			0.03	Pass	
Benz(a)anthracene	mg/kg	< 0.03			0.03	Pass	
Benzo(a)pyrene	mg/kg	< 0.03			0.03	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.03			0.03	Pass	
Benzo(g,h,i)perylene	mg/kg	< 0.03			0.03	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.03			0.03	Pass	
Chrysene	mg/kg	< 0.03			0.03	Pass	
Dibenz(a,h)anthracene	mg/kg	< 0.03			0.03	Pass	
Fluoranthene	mg/kg	< 0.03			0.03	Pass	
Fluorene	mg/kg	< 0.03			0.03	Pass	

Test	Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
Indeno(1.2.3-cd)pyrene	mg/kg	< 0.03		0.03	Pass	
Naphthalene	mg/kg	< 0.1		0.1	Pass	
Phenanthrene	mg/kg	< 0.03		0.03	Pass	
Pyrene	mg/kg	< 0.03		0.03	Pass	
LCS - % Recovery						
Organochlorine Pesticides (NZ MfE)						
2.4'-DDD	%	86		70-130	Pass	
2.4'-DDE	%	109		70-130	Pass	
2.4'-DDT	%	104		70-130	Pass	
4.4'-DDD	%	96		70-130	Pass	
4.4'-DDE	%	95		70-130	Pass	
4.4'-DDT	%	108		70-130	Pass	
a-HCH	%	80		70-130	Pass	
Aldrin	%	123		70-130	Pass	
b-HCH	%	98		70-130	Pass	
cis-Chlordane	%	112		70-130	Pass	
d-HCH	%	83		70-130	Pass	
Dieldrin	%	88		70-130	Pass	
Endosulfan I	%	79		70-130	Pass	
Endosulfan II	%	75		70-130	Pass	
Endosulfan sulphate	%	90		70-130	Pass	
Endrin	%	91		70-130	Pass	
Endrin aldehyde	%	97		70-130	Pass	
Endrin ketone	%	90		70-130	Pass	
g-HCH (Lindane)	%	119		70-130	Pass	
Heptachlor	%	78		70-130	Pass	
Heptachlor epoxide	%	92		70-130	Pass	
Methoxychlor	%	98		70-130	Pass	
trans-Chlordane	%	100		70-130	Pass	
LCS - % Recovery						
Metals M8 (NZ MfE)						
Arsenic	%	96		80-120	Pass	
Cadmium	%	98		80-120	Pass	
Chromium	%	94		80-120	Pass	
Copper	%	95		80-120	Pass	
Lead	%	100		80-120	Pass	
Mercury	%	102		80-120	Pass	
Nickel	%	100		80-120	Pass	
Zinc	%	101		80-120	Pass	
LCS - % Recovery						
Polycyclic Aromatic Hydrocarbons (NZ MfE)						
Acenaphthene	%	100		70-130	Pass	
Acenaphthylene	%	90		70-130	Pass	
Anthracene	%	83		70-130	Pass	
Benz(a)anthracene	%	107		70-130	Pass	
Benzo(a)pyrene	%	100		70-130	Pass	
Benzo(b&j)fluoranthene	%	109		70-130	Pass	
Benzo(g,h,i)perylene	%	92		70-130	Pass	
Benzo(k)fluoranthene	%	101		70-130	Pass	
Chrysene	%	99		70-130	Pass	
Dibenz(a,h)anthracene	%	79		70-130	Pass	
Fluoranthene	%	74		70-130	Pass	
Fluorene	%	107		70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	101		70-130	Pass	

Test		Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Naphthalene		%	99			70-130	Pass	
Phenanthrene		%	76			70-130	Pass	
Pyrene		%	81			70-130	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery								
Organochlorine Pesticides (NZ MfE)				Result 1				
cis-Chlordane	K23-JI000784	NCP	%	103		70-130	Pass	
Endrin aldehyde	K23-JI000784	NCP	%	100		70-130	Pass	
Endrin ketone	K23-JI000881	NCP	%	96		70-130	Pass	
Hexachlorobenzene	K23-Jn0043994	NCP	%	2.0		70-130	Fail	
Spike - % Recovery								
Metals M8 (NZ MfE)				Result 1				
Cadmium	K23-JI0002906	CP	%	110		75-125	Pass	
Chromium	K23-JI0002906	CP	%	107		75-125	Pass	
Copper	K23-JI0002906	CP	%	107		75-125	Pass	
Lead	K23-JI0002906	CP	%	114		75-125	Pass	
Mercury	K23-JI0002906	CP	%	108		75-125	Pass	
Nickel	K23-JI0002906	CP	%	114		75-125	Pass	
Zinc	K23-JI0002906	CP	%	109		75-125	Pass	
Spike - % Recovery								
Polycyclic Aromatic Hydrocarbons (NZ MfE)				Result 1				
Acenaphthene	K23-JI0002906	CP	%	109		70-130	Pass	
Acenaphthylene	K23-JI0002906	CP	%	114		70-130	Pass	
Benzo(a)pyrene	K23-JI0002906	CP	%	113		70-130	Pass	
Benzo(g,h,i)perylene	K23-JI0002906	CP	%	116		70-130	Pass	
Benzo(k)fluoranthene	K23-JI0002906	CP	%	113		70-130	Pass	
Chrysene	K23-JI0002906	CP	%	123		70-130	Pass	
Dibenz(a,h)anthracene	K23-JI0002906	CP	%	118		70-130	Pass	
Fluoranthene	K23-JI0002906	CP	%	100		70-130	Pass	
Fluorene	K23-JI0002906	CP	%	107		70-130	Pass	
Naphthalene	K23-JI0002906	CP	%	101		70-130	Pass	
Phenanthrene	K23-JI0002906	CP	%	88		70-130	Pass	
Pyrene	K23-JI0002906	CP	%	106		70-130	Pass	
Spike - % Recovery								
Polycyclic Aromatic Hydrocarbons (NZ MfE)				Result 1				
Benz(a)anthracene	K23-JI0002916	CP	%	108		70-130	Pass	
Benzo(g,h,i)perylene	K23-JI0002916	CP	%	115		70-130	Pass	
Dibenz(a,h)anthracene	K23-JI0002916	CP	%	114		70-130	Pass	
Indeno(1,2,3-cd)pyrene	K23-JI0002916	CP	%	110		70-130	Pass	
Spike - % Recovery								
Organochlorine Pesticides (NZ MfE)				Result 1				
2,4'-DDD	K23-JI0002926	CP	%	79		70-130	Pass	
2,4'-DDE	K23-JI0002926	CP	%	123		70-130	Pass	
4,4'-DDE	K23-JI0002926	CP	%	106		70-130	Pass	
a-HCH	K23-JI0002926	CP	%	86		70-130	Pass	
b-HCH	K23-JI0002926	CP	%	105		70-130	Pass	
d-HCH	K23-JI0002926	CP	%	91		70-130	Pass	
Dieldrin	K23-JI0002926	CP	%	92		70-130	Pass	
Endosulfan I	K23-JI0002926	CP	%	77		70-130	Pass	
Endosulfan II	K23-JI0002926	CP	%	75		70-130	Pass	
Endrin	K23-JI0002926	CP	%	102		70-130	Pass	
Heptachlor epoxide	K23-JI0002926	CP	%	108		70-130	Pass	
trans-Chlordane	K23-JI0002926	CP	%	110		70-130	Pass	
Spike - % Recovery								

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Metals M8 (NZ MfE)				Result 1					
Arsenic	K23-JI0002926	CP	%	115			75-125	Pass	
Chromium	K23-JI0002926	CP	%	120			75-125	Pass	
Copper	K23-JI0002926	CP	%	119			75-125	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons (NZ MfE)				Result 1					
Acenaphthene	K23-JI0002926	CP	%	91			70-130	Pass	
Acenaphthylene	K23-JI0002926	CP	%	86			70-130	Pass	
Anthracene	K23-JI0002926	CP	%	75			70-130	Pass	
Benzo(b&j)fluoranthene	K23-JI0002926	CP	%	125			70-130	Pass	
Chrysene	K23-JI0002926	CP	%	91			70-130	Pass	
Fluorene	K23-JI0002926	CP	%	102			70-130	Pass	
Naphthalene	K23-JI0002926	CP	%	91			70-130	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons (NZ MfE)				Result 1					
Anthracene	K23-JI0003088	NCP	%	94			70-130	Pass	
Benz(a)anthracene	K23-JI0003088	NCP	%	96			70-130	Pass	
Benzo(b&j)fluoranthene	K23-JI0003088	NCP	%	97			70-130	Pass	
Chrysene	K23-JI0003088	NCP	%	84			70-130	Pass	
Spike - % Recovery									
Organochlorine Pesticides (NZ MfE)				Result 1					
2.4'-DDD	K23-JI0002938	CP	%	115			70-130	Pass	
2.4'-DDT	K23-JI0002938	CP	%	84			70-130	Pass	
4.4'-DDD	K23-JI0002938	CP	%	123			70-130	Pass	
4.4'-DDE	K23-JI0002938	CP	%	90			70-130	Pass	
a-HCH	K23-JI0002938	CP	%	103			70-130	Pass	
Aldrin	K23-JI0002938	CP	%	89			70-130	Pass	
d-HCH	K23-JI0002938	CP	%	109			70-130	Pass	
Dieldrin	K23-JI0002938	CP	%	106			70-130	Pass	
Endosulfan I	K23-JI0002938	CP	%	119			70-130	Pass	
Endosulfan II	K23-JI0002938	CP	%	100			70-130	Pass	
Endosulfan sulphate	K23-JI0002938	CP	%	111			70-130	Pass	
Heptachlor	K23-JI0002938	CP	%	106			70-130	Pass	
Heptachlor epoxide	K23-JI0002938	CP	%	117			70-130	Pass	
Methoxychlor	K23-JI0002938	CP	%	77			70-130	Pass	
trans-Chlordane	K23-JI0002938	CP	%	121			70-130	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons (NZ MfE)				Result 1					
Acenaphthene	K23-JI0002938	CP	%	106			70-130	Pass	
Acenaphthylene	K23-JI0002938	CP	%	115			70-130	Pass	
Benzo(a)pyrene	K23-JI0002938	CP	%	79			70-130	Pass	
Benzo(k)fluoranthene	K23-JI0002938	CP	%	99			70-130	Pass	
Fluoranthene	K23-JI0002938	CP	%	97			70-130	Pass	
Fluorene	K23-JI0002938	CP	%	114			70-130	Pass	
Naphthalene	K23-JI0002938	CP	%	120			70-130	Pass	
Phenanthrene	K23-JI0002938	CP	%	103			70-130	Pass	
Pyrene	K23-JI0002938	CP	%	102			70-130	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Organochlorine Pesticides (NZ MfE)				Result 1	Result 2	RPD			
2.4'-DDD	K23-JI0002905	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
2.4'-DDE	K23-JI0002905	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
2.4'-DDT	K23-JI0002905	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
4.4'-DDD	K23-JI0002905	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Organochlorine Pesticides (NZ MfE)				Result 1	Result 2	RPD			
4.4'-DDE	K23-JI0002905	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
4.4'-DDT	K23-JI0002905	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
a-HCH	K23-JI0002905	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Aldrin	K23-JI0002905	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
b-HCH	K23-JI0002905	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Chlordanes - Total	K23-JI0002905	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
cis-Chlordane	K23-JI0002905	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
d-HCH	K23-JI0002905	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Dieldrin	K23-JI0002905	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Endosulfan I	K23-JI0002905	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Endosulfan II	K23-JI0002905	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Endosulfan sulphate	K23-JI0002905	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Endrin	K23-JI0002905	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Endrin aldehyde	K23-JI0002905	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Endrin ketone	K23-JI0002905	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
g-HCH (Lindane)	K23-JI0002905	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Heptachlor	K23-JI0002905	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Heptachlor epoxide	K23-JI0002905	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Hexachlorobenzene	K23-JI0002905	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Methoxychlor	K23-JI0002905	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Toxaphene	K23-Jn0034680	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
trans-Chlordane	K23-JI0002905	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Duplicate									
Metals M8 (NZ MfE)				Result 1	Result 2	RPD			
Arsenic	K23-JI0002905	CP	mg/kg	11	10	7.9	30%	Pass	
Cadmium	K23-JI0002905	CP	mg/kg	0.18	0.16	9.3	30%	Pass	
Chromium	K23-JI0002905	CP	mg/kg	14	14	2.8	30%	Pass	
Copper	K23-JI0002905	CP	mg/kg	11	11	<1	30%	Pass	
Lead	K23-JI0002905	CP	mg/kg	13	13	5.0	30%	Pass	
Mercury	K23-JI0002905	CP	mg/kg	0.48	0.52	6.7	30%	Pass	
Nickel	K23-JI0002905	CP	mg/kg	6.3	6.5	3.1	30%	Pass	
Zinc	K23-JI0002905	CP	mg/kg	84	82	2.5	30%	Pass	
Duplicate									
Sample Properties				Result 1	Result 2	RPD			
% Moisture	K23-JI0002905	CP	%	31	32	<1	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons (NZ MfE)				Result 1	Result 2	RPD			
Acenaphthene	K23-JI0002905	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Acenaphthylene	K23-JI0002905	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Anthracene	K23-JI0002905	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Benz(a)anthracene	K23-JI0002905	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Benzo(a)pyrene	K23-JI0002905	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Benzo(b&i)fluoranthene	K23-JI0002905	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Benzo(g,h,i)perylene	K23-JI0002905	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Benzo(k)fluoranthene	K23-JI0002905	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Chrysene	K23-JI0002905	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Dibenz(a,h)anthracene	K23-JI0002905	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Fluoranthene	K23-JI0002905	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Fluorene	K23-JI0002905	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Indeno(1,2,3-cd)pyrene	K23-JI0002905	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Naphthalene	K23-JI0002905	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Phenanthrene	K23-JI0002905	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Pyrene	K23-JI0002905	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	

Duplicate								
Organochlorine Pesticides (NZ MfE)				Result 1	Result 2	RPD		
2,4'-DDD	K23-JI0002915	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
2,4'-DDE	K23-JI0002915	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
2,4'-DDT	K23-JI0002915	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
4,4'-DDD	K23-JI0002915	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
4,4'-DDE	K23-JI0002915	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
4,4'-DDT	K23-JI0002915	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
a-HCH	K23-JI0002915	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Aldrin	K23-JI0002915	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
b-HCH	K23-JI0002915	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Chlordanes - Total	K23-JI0002915	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
cis-Chlordane	K23-JI0002915	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
d-HCH	K23-JI0002915	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Dieldrin	K23-JI0002915	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Endosulfan I	K23-JI0002915	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Endosulfan II	K23-JI0002915	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Endosulfan sulphate	K23-JI0002915	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Endrin	K23-JI0002915	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Endrin aldehyde	K23-JI0002915	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Endrin ketone	K23-JI0002915	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
g-HCH (Lindane)	K23-JI0002915	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Heptachlor	K23-JI0002915	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Heptachlor epoxide	K23-JI0002915	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Hexachlorobenzene	K23-JI0002915	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Methoxychlor	K23-JI0002915	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
trans-Chlordane	K23-JI0002915	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Duplicate								
Metals M8 (NZ MfE)				Result 1	Result 2	RPD		
Arsenic	K23-JI0002915	CP	mg/kg	6.0	6.1	<1	30%	Pass
Cadmium	K23-JI0002915	CP	mg/kg	0.24	0.20	19	30%	Pass
Chromium	K23-JI0002915	CP	mg/kg	13	13	<1	30%	Pass
Copper	K23-JI0002915	CP	mg/kg	24	25	3.6	30%	Pass
Lead	K23-JI0002915	CP	mg/kg	16	16	1.8	30%	Pass
Mercury	K23-JI0002915	CP	mg/kg	0.70	0.74	5.9	30%	Pass
Nickel	K23-JI0002915	CP	mg/kg	7.3	6.3	15	30%	Pass
Zinc	K23-JI0002915	CP	mg/kg	130	130	1.6	30%	Pass
Duplicate								
Sample Properties				Result 1	Result 2	RPD		
% Moisture	K23-JI0002915	CP	%	54	54	<1	30%	Pass
Duplicate								
Polycyclic Aromatic Hydrocarbons (NZ MfE)				Result 1	Result 2	RPD		
Acenaphthene	K23-JI0002915	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass
Acenaphthylene	K23-JI0002915	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass
Anthracene	K23-JI0002915	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass
Benz(a)anthracene	K23-JI0002915	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass
Benzo(a)pyrene	K23-JI0002915	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass
Benzo(b&j)fluoranthene	K23-JI0002915	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass
Benzo(g,h,i)perylene	K23-JI0002915	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass
Benzo(k)fluoranthene	K23-JI0002915	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass
Chrysene	K23-JI0002915	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass
Dibenz(a,h)anthracene	K23-JI0002915	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass
Fluoranthene	K23-JI0002915	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass
Fluorene	K23-JI0002915	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass
Indeno(1,2,3-cd)pyrene	K23-JI0002915	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass
Naphthalene	K23-JI0002915	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass

Duplicate									
Polycyclic Aromatic Hydrocarbons (NZ MfE)				Result 1	Result 2	RPD			
Phenanthrene	K23-JI0002915	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Pyrene	K23-JI0002915	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Duplicate									
Metals M8 (NZ MfE)				Result 1	Result 2	RPD			
Arsenic	K23-JI0002925	CP	mg/kg	9.9	10	5.4	30%	Pass	
Cadmium	K23-JI0002925	CP	mg/kg	0.65	0.64	2.3	30%	Pass	
Chromium	K23-JI0002925	CP	mg/kg	13	13	4.6	30%	Pass	
Copper	K23-JI0002925	CP	mg/kg	18	19	7.0	30%	Pass	
Lead	K23-JI0002925	CP	mg/kg	16	17	7.5	30%	Pass	
Mercury	K23-JI0002925	CP	mg/kg	0.45	0.46	1.6	30%	Pass	
Nickel	K23-JI0002925	CP	mg/kg	6.1	6.5	6.7	30%	Pass	
Zinc	K23-JI0002925	CP	mg/kg	120	130	7.1	30%	Pass	
Duplicate									
Sample Properties				Result 1	Result 2	RPD			
% Moisture	K23-JI0002925	CP	%	44	45	<1	30%	Pass	
Duplicate									
Metals M8 (NZ MfE)				Result 1	Result 2	RPD			
Arsenic	K23-JI0002935	CP	mg/kg	18	22	22	30%	Pass	
Cadmium	K23-JI0002935	CP	mg/kg	0.04	0.04	2.2	30%	Pass	
Chromium	K23-JI0002935	CP	mg/kg	12	13	10	30%	Pass	
Copper	K23-JI0002935	CP	mg/kg	8.4	9.5	12	30%	Pass	
Lead	K23-JI0002935	CP	mg/kg	14	15	8.4	30%	Pass	
Mercury	K23-JI0002935	CP	mg/kg	0.21	0.23	10.0	30%	Pass	
Nickel	K23-JI0002935	CP	mg/kg	3.5	4.0	14	30%	Pass	
Zinc	K23-JI0002935	CP	mg/kg	41	45	9.2	30%	Pass	
Duplicate									
Sample Properties				Result 1	Result 2	RPD			
% Moisture	K23-JI0002935	CP	%	29	30	1.2	30%	Pass	
Duplicate									
Organochlorine Pesticides (NZ MfE)				Result 1	Result 2	RPD			
2,4'-DDD	K23-JI0002937	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
2,4'-DDE	K23-JI0002937	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
2,4'-DDT	K23-JI0002937	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
4,4'-DDD	K23-JI0002937	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
4,4'-DDE	K23-JI0002937	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
4,4'-DDT	K23-JI0002937	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
a-HCH	K23-JI0002937	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Aldrin	K23-JI0002937	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
b-HCH	K23-JI0002937	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
cis-Chlordane	K23-JI0002937	CP	mg/kg	0.03	< 0.01	200	30%	Fail	Q15
d-HCH	K23-JI0002937	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Dieldrin	K23-JI0002937	CP	mg/kg	0.03	< 0.01	160	30%	Fail	Q15
Endosulfan I	K23-JI0002937	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Endosulfan II	K23-JI0002937	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Endosulfan sulphate	K23-JI0002937	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Endrin	K23-JI0002937	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Endrin aldehyde	K23-JI0002937	CP	mg/kg	< 0.01	0.02	200	30%	Fail	Q15
Endrin ketone	K23-JI0002937	CP	mg/kg	0.02	< 0.01	130	30%	Fail	Q15
g-HCH (Lindane)	K23-JI0002937	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Heptachlor	K23-JI0002937	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Heptachlor epoxide	K23-JI0002937	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Hexachlorobenzene	K23-JI0002937	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Methoxychlor	K23-JI0002937	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
trans-Chlordane	K23-JI0002937	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	

Duplicate									
Polycyclic Aromatic Hydrocarbons (NZ MfE)				Result 1	Result 2	RPD			
Acenaphthene	K23-JI0002937	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Acenaphthylene	K23-JI0002937	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Anthracene	K23-JI0002937	CP	mg/kg	0.09	< 0.03	100	30%	Fail	Q15
Benzo(a)anthracene	K23-JI0002937	CP	mg/kg	0.12	< 0.03	130	30%	Fail	Q15
Benzo(a)pyrene	K23-JI0002937	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Benzo(b&j)fluoranthene	K23-JI0002937	CP	mg/kg	0.09	< 0.03	150	30%	Fail	Q15
Benzo(g,h,i)perylene	K23-JI0002937	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Benzo(k)fluoranthene	K23-JI0002937	CP	mg/kg	0.12	< 0.03	120	30%	Fail	Q15
Chrysene	K23-JI0002937	CP	mg/kg	0.10	< 0.03	95	30%	Fail	Q15
Dibenz(a,h)anthracene	K23-JI0002937	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Fluorene	K23-JI0002937	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Naphthalene	K23-JI0002937	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Phenanthrene	K23-JI0002937	CP	mg/kg	0.07	< 0.03	110	30%	Fail	Q15
Pyrene	K23-JI0002937	CP	mg/kg	0.15	0.04	110	30%	Fail	Q15

Comments
Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	No
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
Q15	The RPD reported passes Eurofins Environment Testing's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised by:

Katjana Gausel	Analytical Services Manager
Kate Stuart	Senior Analyst-Asbestos
Raymond Siu	Senior Analyst-Metal
Raymond Siu	Senior Analyst-Organic
Sophie Bush	Senior Analyst-Asbestos



Raymond Siu
Senior Instrument Chemist (Key Technical Personnel)

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates IANZ accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

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Soil & Rock Consultants
Level 1, 131 Lincoln Rd Henderson
Auckland
NEW ZEALAND



All tests reported herein have been performed in accordance with the laboratory's scope of accreditation

Attention: Aaron Thorburn
Report 1004441-AID
Project Name
Project ID 230599
Received Date Jul 03, 2023
Date Reported Jul 12, 2023

Methodology:

Asbestos Fibre Identification Conducted in accordance with the Australian Standard AS 4964 – 2004: Method for the Qualitative Identification of Asbestos in Bulk Samples and in-house Method LTM-ASB-8020 by polarised light microscopy (PLM) and dispersion staining (DS) techniques.
NOTE: Positive Trace Analysis results indicate the sample contains detectable respirable fibres.

Unknown Mineral Fibres Mineral fibres of unknown type, as determined by PLM with DS, may require another analytical technique, such as Electron Microscopy, to confirm unequivocal identity.
NOTE: While Actinolite, Anthophyllite and Tremolite asbestos may be detected by PLM with DS, due to variability in the optical properties of these materials, AS4964 requires that these are reported as UMF unless confirmed by an independent technique.

Subsampling Soil Samples The whole sample submitted is first dried and then passed through a 10mm sieve followed by a 2mm sieve. All fibrous matter greater than 10mm, greater than 2mm as well as the material passing through the 2mm sieve are retained and analysed for the presence of asbestos. If the sub 2mm fraction is greater than approximately 30 to 60g then a sub-sampling routine based on ISO 3082:2009(E) is employed.
NOTE: Depending on the nature and size of the soil sample, the sub-2 mm residue material may need to be sub-sampled for trace analysis, in accordance with AS 4964-2004.

Bonded asbestos-containing material (ACM) The material is first examined and any fibres isolated for identification by PLM and DS. Where required, interfering matrices may be removed by disintegration using a range of heat, chemical or physical treatments, possibly in combination. The resultant material is then further examined in accordance with AS 4964 - 2004.
NOTE: Even after disintegration it may be difficult to detect the presence of asbestos in some asbestos-containing bulk materials using PLM and DS. This is due to the low grade or small length or diameter of the asbestos fibres present in the material, or to the fact that very fine fibres have been distributed intimately throughout the materials. Vinyl/asbestos floor tiles, some asbestos-containing sealants and mastics, asbestos-containing epoxy resins and some ore samples are examples of these types of material, which are difficult to analyse.

Limit of Reporting The performance limitation of the AS 4964 (2004) method for non-homogeneous samples is around 0.1 g/kg (equivalent to 0.01% (w/w)). Where no asbestos is found by PLM and DS, including Trace Analysis, this is considered to be at the nominal reporting limit of 0.01% (w/w). The NEPM screening level of 0.001% (w/w) is intended as an on-site determination, not a laboratory Limit of Reporting (LOR), per se. Examination of a large sample size (e.g. 500 mL) may improve the likelihood of detecting asbestos, particularly AF, to aid assessment against the NEPM criteria. Gravimetric determinations to this level of accuracy are outside of AS 4964 and hence IANZ Accreditation does not cover the performance of this service (non-IANZ results shown with an asterisk).
NOTE: NATA News March 2014, p.7, states in relation to AS 4964: "This is a qualitative method with a nominal reporting limit of 0.01 % " and that currently in Australia "there is no validated method available for the quantification of asbestos". This report is consistent with the analytical procedures and reporting recommendations in the NEPM and the WA DoH.

Project Name

Project ID 230599

Date Sampled Jun 29, 2023

Report 1004441-AID

Client Sample ID	Eurofins Sample No.	Date Sampled	Sample Description	Result
SS23	23-JI0002928	Jun 29, 2023	Approximate Sample 478g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
SS28	23-JI0002929	Jun 29, 2023	Approximate Sample 393g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
SS34	23-JI0002935	Jun 29, 2023	Approximate Sample 330g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
SS37	23-JI0002936	Jun 29, 2023	Approximate Sample 341g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
SS41	23-JI0002937	Jun 29, 2023	Approximate Sample 365g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
SS45	23-JI0002938	Jun 29, 2023	Approximate Sample 454g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
SS47	23-JI0002939	Jun 29, 2023	Approximate Sample 353g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
SS48	23-JI0002940	Jun 29, 2023	Approximate Sample 336g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.

Client Sample ID	Eurofins Sample No.	Date Sampled	Sample Description	Result
SS22	23-JI0003365	Jun 29, 2023	Approximate Sample 371g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
SS24	23-JI0003366	Jun 29, 2023	Approximate Sample 373g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
SS25	23-JI0003367	Jun 29, 2023	Approximate Sample 393g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
SS26	23-JI0003368	Jun 29, 2023	Approximate Sample 526g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
SS27	23-JI0003369	Jun 29, 2023	Approximate Sample 484g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
SS29	23-JI0003370	Jun 29, 2023	Approximate Sample 657g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
SS30	23-JI0003371	Jun 29, 2023	Approximate Sample 343g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
SS33	23-JI0003372	Jun 29, 2023	Approximate Sample 344g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
SS35	23-JI0003373	Jun 29, 2023	Approximate Sample 321g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
SS36	23-JI0003374	Jun 29, 2023	Approximate Sample 279g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
SS38	23-JI0003375	Jun 29, 2023	Approximate Sample 292g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
SS39	23-JI0003376	Jun 29, 2023	Approximate Sample 207g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
SS40	23-JI0003377	Jun 29, 2023	Approximate Sample 131g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.

Client Sample ID	Eurofins Sample No.	Date Sampled	Sample Description	Result
SS42	23-JI0003378	Jun 29, 2023	Approximate Sample 202g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
SS43	23-JI0003379	Jun 29, 2023	Approximate Sample 192g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
SS44	23-JI0003380	Jun 29, 2023	Approximate Sample 285g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
SS46	23-JI0003381	Jun 29, 2023	Approximate Sample 287g Sample consisted of: Fine grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Asbestos - LTM-ASB-8020	Christchurch	Jul 12, 2023	Indefinite

Auckland
35 O'Rorke Road
Penrose,
Auckland 1061
Tel: +64 9 526 4551
IANZ# 1327

Christchurch
43 Detroit Drive
Rolleston,
Christchurch 7675
Tel: +64 3 343 5201
IANZ# 1290

Melbourne
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Dandenong South
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NATA# 1261 Site# 1254

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NATA# 1261 Site# 25403

Sydney
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Welshpool
WA 6106
Tel: +61 8 6253 4444
NATA# 2377 Site# 2370

web: www.eurofins.com.au
email: EnviroSales@eurofins.com

Company Name:	Soil & Rock Consultants	Order No.:	230599	Received:	Jul 3, 2023 10:30 AM
Address:	Level 1, 131 Lincoln Rd Henderson Auckland NEW ZEALAND	Report #:	1004441	Due:	Jul 10, 2023
Project Name:		Phone:	0011 64 9 835 1740	Priority:	5 Day
Project ID:	230599	Fax:	0011 64 9 835 1847	Contact Name:	Aaron Thorburn

Eurofins Analytical Services Manager : Katyana Gausel

Sample Detail						Asbestos - AS4964	Asbestos - AS4964	HOLD	Moisture Set	Organochlorine Pesticides (NZ MfE)	Metals M8 (NZ MfE)	Polycyclic Aromatic Hydrocarbons (NZ MfE)	Eurofins Suite B21A-NZ: Asbestos, Metals (As,Cd,Cr,Cu,Ni,Pb,Zn,Hg) (NZ MfE)
Auckland Laboratory - IANZ# 1327							X	X	X	X	X	X	X
Christchurch Laboratory - IANZ# 1290						X							X
External Laboratory													
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID								
1	SS01	Jun 29, 2023		Soil	K23-JI0002905			X	X	X			
2	SS02	Jun 29, 2023		Soil	K23-JI0002906			X	X	X			
3	SS03	Jun 29, 2023		Soil	K23-JI0002907			X	X	X			
4	SS04	Jun 29, 2023		Soil	K23-JI0002908			X	X	X			
5	SS05	Jun 29, 2023		Soil	K23-JI0002909			X	X	X			
6	SS06	Jun 29, 2023		Soil	K23-JI0002910			X	X	X			
7	SS07	Jun 29, 2023		Soil	K23-JI0002911			X	X	X			
8	SS08	Jun 29, 2023		Soil	K23-JI0002912			X	X	X			
9	SS09	Jun 29, 2023		Soil	K23-JI0002913			X	X	X			
10	SS10	Jun 29, 2023		Soil	K23-JI0002914			X	X	X			
11	SS11	Jun 29, 2023		Soil	K23-JI0002915			X	X	X			
12	SS12	Jun 29, 2023		Soil	K23-JI0002916			X	X	X			

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IANZ# 1290

Melbourne
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Dandenong South
VIC 3175
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NATA# 1261 Site# 1254

Geelong
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Grovedale
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Girraween
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Project Name:		Phone:	0011 64 9 835 1740	Priority:	5 Day
Project ID:	230599	Fax:	0011 64 9 835 1847	Contact Name:	Aaron Thorburn

Eurofins Analytical Services Manager : Katyana Gausel

Sample Detail						Asbestos - AS4964	Asbestos - AS4964	HOLD	Moisture Set	Organochlorine Pesticides (NZ MfE)	Metals M8 (NZ MfE)	Polycyclic Aromatic Hydrocarbons (NZ MfE)	Eurofins Suite B21A-NZ: Asbestos Metals (As,Cd,Cr,Cu,Ni,Pb,Zn,Hg) (NZ MfE)
Auckland Laboratory - IANZ# 1327							X	X	X	X	X	X	X
Christchurch Laboratory - IANZ# 1290						X							X
External Laboratory													
13	SS13	Jun 29, 2023		Soil	K23-JI0002917				X	X	X		
14	SS14	Jun 29, 2023		Soil	K23-JI0002918				X	X	X		
15	SS15	Jun 29, 2023		Soil	K23-JI0002919				X	X	X		
16	SS16	Jun 29, 2023		Soil	K23-JI0002920				X	X	X		
17	SS17	Jun 29, 2023		Soil	K23-JI0002921				X	X	X		
18	SS18	Jun 29, 2023		Soil	K23-JI0002922				X	X	X		
19	SS19	Jun 29, 2023		Soil	K23-JI0002923				X	X	X		
20	SS20	Jun 29, 2023		Soil	K23-JI0002924				X	X	X		
21	SS21	Jun 29, 2023		Soil	K23-JI0002925				X	X	X		
22	COMPOSITE #1 (SS22 SS24 AND SS25)	Jun 29, 2023		Soil	K23-JI0002926				X	X	X	X	
23	COMPOSITE #2 (SS26)	Jun 29, 2023		Soil	K23-JI0002927				X	X	X	X	

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Melbourne
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Dandenong South
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Girraween
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46-48 Banksia Road
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Project Name:		Phone:	0011 64 9 835 1740	Priority:	5 Day
Project ID:	230599	Fax:	0011 64 9 835 1847	Contact Name:	Aaron Thorburn

Eurofins Analytical Services Manager : Katyana Gausel

Sample Detail						Asbestos - AS4964	Asbestos - AS4964	HOLD	Moisture Set	Organochlorine Pesticides (NZ MfE)	Metals M8 (NZ MfE)	Polycyclic Aromatic Hydrocarbons (NZ MfE)	Eurofins Suite B21A-NZ: Asbestos Metals (As,Cd,Cr,Cu,Ni,Pb,Zn,Hg) (NZ MfE)
Auckland Laboratory - IANZ# 1327							X	X	X	X	X	X	X
Christchurch Laboratory - IANZ# 1290						X							X
External Laboratory													
	SS27 SS29 AND SS30)												
24	SS23	Jun 29, 2023		Soil	K23-JI0002928				X	X		X	X
25	SS28	Jun 29, 2023		Soil	K23-JI0002929				X	X		X	X
26	SS31	Jun 29, 2023		Soil	K23-JI0002930				X	X	X		
27	SS32	Jun 29, 2023		Soil	K23-JI0002931				X	X	X		
28	COMPOSITE #3 (SS33 SS35 SS36 AND SS38)	Jun 29, 2023		Soil	K23-JI0002932				X	X	X	X	
29	COMPOSITE #4 (SS39 AND SS42)	Jun 29, 2023		Soil	K23-JI0002933				X	X	X	X	
30	COMPOSITE #5 (SS43 SS44 AND SS46)	Jun 29, 2023		Soil	K23-JI0002934				X	X	X	X	

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IANZ# 1290

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Murarie
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Perth
46-48 Banksia Road
Welshpool
WA 6106
Tel: +61 8 6253 4444
NATA# 2377 Site# 2370

web: www.eurofins.com.au
email: EnviroSales@eurofins.com

Company Name: Soil & Rock Consultants
Address: Level 1, 131 Lincoln Rd Henderson
Auckland
NEW ZEALAND

Order No.: 230599
Report #: 1004441
Phone: 0011 64 9 835 1740
Fax: 0011 64 9 835 1847

Received: Jul 3, 2023 10:30 AM
Due: Jul 10, 2023
Priority: 5 Day
Contact Name: Aaron Thorburn

Project Name:
Project ID: 230599

Eurofins Analytical Services Manager : Katyana Gausel

Sample Detail						Asbestos - AS4964	Asbestos - AS4964	HOLD	Moisture Set	Organochlorine Pesticides (NZ MfE)	Metals M8 (NZ MfE)	Polycyclic Aromatic Hydrocarbons (NZ MfE)	Eurofins Suite B21A-NZ: Asbestos, Metals (As,Cd,Cr,Cu,Ni,Pb,Zn,Hg) (NZ MfE)
Auckland Laboratory - IANZ# 1327							X	X	X	X	X	X	X
Christchurch Laboratory - IANZ# 1290						X							X
External Laboratory													
31	SS34	Jun 29, 2023		Soil	K23-JI0002935				X	X		X	X
32	SS37	Jun 29, 2023		Soil	K23-JI0002936				X	X		X	X
33	SS41	Jun 29, 2023		Soil	K23-JI0002937				X	X		X	X
34	SS45	Jun 29, 2023		Soil	K23-JI0002938				X	X		X	X
35	SS47	Jun 29, 2023		Soil	K23-JI0002939				X	X		X	X
36	SS48	Jun 29, 2023		Soil	K23-JI0002940				X	X		X	X
37	SS09 DUP	Jun 29, 2023		Soil	K23-JI0003362			X					
38	SS32 DUP	Jun 29, 2023		Soil	K23-JI0003363			X					
39	SS48 DUP	Jun 29, 2023		Soil	K23-JI0003364			X					
40	SS22	Jun 29, 2023		Soil	K23-JI0003365	X							
41	SS24	Jun 29, 2023		Soil	K23-JI0003366	X							
42	SS25	Jun 29, 2023		Soil	K23-JI0003367	X							
43	SS26	Jun 29, 2023		Soil	K23-JI0003368	X							
44	SS27	Jun 29, 2023		Soil	K23-JI0003369	X							

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Contact Name: Aaron Thorburn

Project Name:
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Eurofins Analytical Services Manager : Katyana Gausel

Sample Detail						Asbestos - AS4964	Asbestos - AS4964	HOLD	Moisture Set	Organochlorine Pesticides (NZ MfE)	Metals M8 (NZ MfE)	Polycyclic Aromatic Hydrocarbons (NZ MfE)	Eurofins Suite B21A-NZ: Asbestos, Metals (As,Cd,Cr,Cu,Ni,Pb,Zn,Hg) (NZ MfE)
Auckland Laboratory - IANZ# 1327							X	X	X	X	X	X	X
Christchurch Laboratory - IANZ# 1290						X							X
External Laboratory													
45	SS29	Jun 29, 2023		Soil	K23-JI0003370	X							
46	SS30	Jun 29, 2023		Soil	K23-JI0003371	X							
47	SS33	Jun 29, 2023		Soil	K23-JI0003372	X							
48	SS35	Jun 29, 2023		Soil	K23-JI0003373	X							
49	SS36	Jun 29, 2023		Soil	K23-JI0003374	X							
50	SS38	Jun 29, 2023		Soil	K23-JI0003375	X							
51	SS39	Jun 29, 2023		Soil	K23-JI0003376		X						
52	SS40	Jun 29, 2023		Soil	K23-JI0003377		X						
53	SS42	Jun 29, 2023		Soil	K23-JI0003378		X						
54	SS43	Jun 29, 2023		Soil	K23-JI0003379		X						
55	SS44	Jun 29, 2023		Soil	K23-JI0003380		X						
56	SS46	Jun 29, 2023		Soil	K23-JI0003381		X						
Test Counts						17	17	3	36	36	28	13	8

Internal Quality Control Review and Glossary General

1. QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Samples were analysed on an 'as received' basis.
4. Information identified on this report with the colour blue indicates data provided by customer that may have an impact on the results.
5. This report replaces any interim results previously issued.

Holding Times

Please refer to the most recent version of the 'Sample Preservation and Container Guide' for holding times (QS3001).

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported. Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

Units

% w/w:	Percentage weight-for-weight basis, e.g. of asbestos in asbestos-containing finds in soil samples (% w/w)
F/fld	Airborne fibre filter loading as Fibres (N) per Fields counted (n)
F/mL	Airborne fibre reported concentration as Fibres per millilitre of air drawn over the sampler membrane (C)
g, kg	Mass, e.g. of whole sample (M) or asbestos-containing find within the sample (m)
g/kg	Concentration in grams per kilogram
L, mL	Volume, e.g. of air as measured in AFM (V = r x t)
L/min	Airborne fibre sampling Flowrate as litres per minute of air drawn over the sampler membrane (r)
min	Time (t), e.g. of air sample collection period

Calculations

Airborne Fibre Concentration: $C = \left(\frac{A}{a}\right) \times \left(\frac{N}{n}\right) \times \left(\frac{1}{r}\right) \times \left(\frac{1}{t}\right) = K \times \left(\frac{N}{n}\right) \times \left(\frac{1}{r}\right)$

Asbestos Content (as asbestos): $\% w/w = \frac{(m \times PA)}{M}$

Weighted Average (of asbestos): $\%_{WA} = \frac{\sum (m \times PA)_x}{x}$

Terms

%asbestos	Estimated percentage of asbestos in a given matrix. May be derived from knowledge or experience of the material, informed by HSG264 <i>Appendix 2</i> , else assumed to be 15% in accordance with WA DOH <i>Appendix 2 (PA)</i> .
ACM	Asbestos Containing Materials. Asbestos contained within a non-asbestos matrix, typically presented in bonded (non-friable) condition. For the purposes of the NEPM and WA DOH, ACM corresponds to material larger than 7 mm x 7 mm.
AF	Asbestos Fines. Asbestos contamination within a soil sample, as defined by WA DOH. Includes loose fibre bundles and small pieces of friable and non-friable material such as asbestos cement fragments mixed with soil. Considered under the NEPM as equivalent to "non-bonded / friable".
AFM	Airborne Fibre Monitoring, e.g. by the MFM.
Amosite	Amosite Asbestos Detected. Amosite may also refer to Fibrous Grunerite or Brown Asbestos. Identified in accordance with AS 4964-2004.
AS	Australian Standard.
Asbestos Content (as asbestos)	Total % w/w asbestos content in asbestos-containing finds in a soil sample (% w/w).
Chrysotile	Chrysotile Asbestos Detected. Chrysotile may also refer to Fibrous Serpentine or White Asbestos. Identified in accordance with AS 4964-2004.
COC	Chain of Custody.
Crocidolite	Crocidolite Asbestos Detected. Crocidolite may also refer to Fibrous Riebeckite or Blue Asbestos. Identified in accordance with AS 4964-2004.
Dry	Sample is dried by heating prior to analysis.
DS	Dispersion Staining. Technique required for Unequivocal Identification of asbestos fibres by PLM.
FA	Fibrous Asbestos. Asbestos containing material that is wholly or in part friable, including materials with higher asbestos content with a propensity to become friable with handling, and any material that was previously non-friable and in a severely degraded condition. For the purposes of the NEPM and WA DOH, FA generally corresponds to material larger than 7 mm x 7 mm, although FA may be more difficult to visibly distinguish and may be assessed as AF.
Fibre Count	Total of all fibres (whether asbestos or not) meeting the counting criteria set out in the NOHSC:3003
Fibre ID	Fibre Identification. Unequivocal identification of asbestos fibres according to AS 4964-2004. Includes Chrysotile, Amosite (Grunerite) or Crocidolite asbestos.
Friable	Asbestos-containing materials of any size that may be broken or crumbled by hand pressure. For the purposes of the NEPM, this includes both AF and FA. It is outside of the laboratory's remit to assess degree of friability.
HSG248	UK HSE HSG248, <i>Asbestos: The Analysts Guide</i> , 2nd Edition (2021).
HSG264	UK HSE HSG264, <i>Asbestos: The Survey Guide</i> (2012).
ISO (also ISO/IEC)	International Organization for Standardization / International Electrotechnical Commission.
K Factor	Microscope constant (K) as derived from the effective filter area of the given AFM membrane used for collecting the sample (A) and the projected eyepiece graticule area of the specific microscope used for the analysis (a).
LOR	Limit of Reporting.
MFM (also NOHSC:3003)	Membrane Filter Method. As described by the Australian Government National Occupational Health and Safety Commission, <i>Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres</i> , 2nd Edition [NOHSC:3003(2005)].
NEPM (also ASC NEPM)	National Environment Protection (Assessment of Site Contamination) Measure, (2013, as amended).
Organic	Organic Fibres Detected. Organic may refer to Natural or Man-Made Polymeric Fibres. Identified in accordance with AS 4964-2004.
PCM	Phase Contrast Microscopy. As used for Fibre Counting according to the MFM.
PLM	Polarised Light Microscopy. As used for Fibre Identification and Trace Analysis according to AS 4964-2004.
Sampling	Unless otherwise stated Eurofins are not responsible for sampling equipment or the sampling process.
SMF	Synthetic Mineral Fibre Detected. SMF may also refer to Man Made Vitreous Fibres. Identified in accordance with AS 4964-2004.
SRA	Sample Receipt Advice.
Trace Analysis	Analytical procedure used to detect the presence of respirable fibres (particularly asbestos) in a given sample matrix.
UK HSE HSG	United Kingdom, Health and Safety Executive, Health and Safety Guidance, publication.
UMF	Unidentified Mineral Fibre Detected. Fibrous minerals that are detected but have not been unequivocally identified by PLM with DS according the AS 4964-2004. May include (but not limited to) Actinolite, Anthophyllite or Tremolite asbestos.
WA DOH	Reference document for the NEPM. Government of Western Australia, <i>Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia</i> (updated 2021), including Appendix Four: <i>Laboratory analysis</i>
Weighted Average	Combined average % w/w asbestos content of all asbestos-containing finds in the given aliquot or total soil sample (% _{WA}).

Comments
Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	No
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Asbestos Counter/Identifier:

Laura Liu	Senior Analyst-Asbestos
Adelle Black	Senior Analyst-Asbestos
Kate Stuart	Senior Analyst-Asbestos

Authorised by:

Kate Stuart	Senior Analyst-Asbestos
Sophie Bush	Senior Analyst-Asbestos


Sophie Bush
Senior Analyst-Asbestos (Key Technical Personnel)

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates ISO/IEC 17025:2017 accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

Eurofins shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Eurofins be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.



CHAIN OF CUSTODY RECORD

ABN 50 005 085 521

Auckland Office
35 O'Rorke Road, Penrose, Auckland 1061, NZ
0800 856450 (free dial) OnurMehmet@eurofins.com

Wellington Office
85 Port Road, Seaview, Lower Hutt 5011, NZ
0800 856450 (free dial) OnurMehmet@eurofins.com

Christchurch Office
43 Detroit Drive Rolleston 7675, NZ
0800 856450 (free dial) OnurMehmet@eurofins.com

Melbourne Laboratory
2 Kingston Town Close, Oakleigh, VIC 3166, AU
+61 3 8564 5000 EnviroSampleVic@eurofins.com

Company		Soil & Rock Consultants			Purchase Order				230599				Project Manager				Aaron Thorburn				Project Name		185 Swayne Road, Cambridge					
Address		158a Bank Street, WHANGAREI 0112			Quote ID №								Project №				230599				Report Format		pdf, xls					
Contact Name		Aaron Thorburn			Analysis (Note: Where metals are requested, please specify "Total" or "Filtered")	Heavy Metals (MG)	OCP														Email for Results		aaron.thorburn@soilandrock.co.nz					
Phone №		021392097																			Turn Around Requirements		<input type="checkbox"/> 1 DAY* <input type="checkbox"/> 2 DAY* <input type="checkbox"/> 3 DAY* <input checked="" type="checkbox"/> 5 DAY (Std.) <input type="checkbox"/> Other ()		Containers		Method of Shipment	
Special Direction		If Asbestos detected, please undertake Quantitative Assessment on each individual sample.																			<input type="checkbox"/> 1 DAY* <input type="checkbox"/> 2 DAY* <input type="checkbox"/> 3 DAY* <input checked="" type="checkbox"/> 5 DAY (Std.) <input type="checkbox"/> Other ()		<input type="checkbox"/> Courier (#) <input type="checkbox"/> Hand Delivered <input type="checkbox"/> Postal		Sample Comments / DG Hazard Warning			
Relinquished by																												
(Signature)																												
(Time / Date)																												
№	Client Sample ID			Date	Matrix																							
1	SS01			29/06/23	Soil	X	X																					
2	SS02			29/05/23	Soil	X	X																					
3	SS03			29/05/23	Soil	X	X																					
4	SS04			29/05/23	Soil	X	X																					
5	SS05			29/05/23	Soil	X	X																					
6	SS06			29/05/23	Soil	X	X															#1004441						
7	SS07			29/05/23	Soil	X	X																					
8	SS08			29/05/23	Soil	X	X																					
9	SS09			29/05/23	Soil	X	X																					
10	SS10			29/05/23	Soil	X	X																					
Total Counts																												
Laboratory Use Only		Received By				AUCK WELL CHCH MELB				Date	__/__/__	Time	__:__	Signature			Temperature											
		Received By				AUCK WELL CHCH MELB				Date	__/__/__	Time	__:__	Signature			Report №											



Company	Soil & Rock Consultants			Purchase Order			230599				Project Manager				Aaron Thorburn				Project Name		185 Swayne Road, Cambridge						
Address	158a Bank Street, WHANGAREI 0112			Quote ID №														Report Format		pdf, xls							
Contact Name	Aaron Thorburn			Analysis <small>(Note: Where metals are requested, please specify "Total" or "Filtered")</small>																		Email for Results		aaron.thorburn@soilandrock.co.nz			
Phone №	021392097																					Turn Around Requirements		<input type="checkbox"/> 1 DAY* <input type="checkbox"/> 2 DAY* <input type="checkbox"/> 3 DAY* <input checked="" type="checkbox"/> 5 DAY (Std.) <input type="checkbox"/> Other ()			
Special Direction	If Asbestos detected, please undertake Quantitative Assessment on each individual sample.																					Containers		Method of Shipment			
Relinquished by				Heavy Metals (MG) OCP																		1L Plastic 250mL Plastic 125mL Plastic 200mL Amber Glass 40mL vial 125mL Amber Glass Jar Asbestos bag	<input checked="" type="checkbox"/> Courier (#) <input type="checkbox"/> Hand Delivered <input type="checkbox"/> Postal		Sample Comments / DG Hazard Warning		
(Signature)	_____																										
(Time / Date)	__/__/__																										

№	Client Sample ID	Date	Matrix																				
1	SS11	29/05/23	Soil	X	X																		
2	SS12	29/05/23	Soil	X	X																		
3	SS13	29/05/23	Soil	X	X																		
4	SS14	29/05/23	Soil	X	X																		
5	SS15	29/05/23	Soil	X	X																		
6	SS16	29/05/23	Soil	X	X																		
7	SS17	29/05/23	Soil	X	X																		
8	SS18	29/05/23	Soil	X	X																		
9	SS19	29/05/23	Soil	X	X																		
10	SS20	29/05/23	Soil	X	X																		
Total Counts																							

Laboratory Use Only	Received By		AUCK WELL CHCH MELB	Date	__/__/__	Time	__:__	Signature		Temperature	
	Received By		AUCK WELL CHCH MELB	Date	__/__/__	Time	__:__	Signature		Report №	



CHAIN OF CUSTODY RECORD

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Auckland Office
35 O'Rorke Road, Penrose, Auckland 1061, NZ
0800 856450 (free dial) OnurMehmet@eurofins.com

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85 Port Road, Seaview, Lower Hutt 5011, NZ
0800 856450 (free dial) OnurMehmet@eurofins.com

Christchurch Office
43 Detroit Drive Rolleston 7675, NZ
0800 856450 (free dial) OnurMehmet@eurofins.com

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2 Kingston Town Close, Oakleigh, VIC 3166, AU
+61 3 8564 5000 EnviroSampleVic@eurofins.com

Company		Soil & Rock Consultants			Purchase Order				230599				Project Manager				Aaron Thorburn				Project Name		185 Swayne Road, Cambridge			
Address		158a Bank Street, WHANGAREI 0112			Quote ID №								Project №				230599				Report Format		pdf, xls			
Contact Name		Aaron Thorburn			Analysis (Note: Where metals are requested, please specify "Total" or "Filtered")	Heavy Metals (M8)	OCP	PAH	Asbestos ID	B21A-NZ (HM [M8] and Asbestos ID)											Email for Results		aaron.thorburn@soilandrock.co.nz			
Phone №		021392097																			Turn Around Requirements		<input type="checkbox"/> 1 DAY* <input type="checkbox"/> 2 DAY* <input type="checkbox"/> 3 DAY* <input checked="" type="checkbox"/> 5 DAY (Std.) <input type="checkbox"/> Other ()		* Surcharges apply	
Special Direction		If Asbestos detected, please undertake Quantitative Assessment on each individual sample.																			Containers		Method of Shipment			
Relinquished by (Signature) (Time / Date)																					1L Plastic	250mL Plastic	125mL Plastic	200mL Amber Glass	40mL vial	125mL Amber Glass Jar
№	Client Sample ID			Date	Matrix																					
1	SS21			29/06/23	Soil	X	X																X			
2	Composite # 1 (SS22, SS24 and SS25)			29/06/23	Soil	X	X	X	X														X	X		
3	Composite # 2 (SS26, SS27, SS29 and SS30)			29/06/23	Soil	X	X	X	X														X	X		
4	SS23			29/06/23	Soil		X	X		X													X	X		
5	SS28			29/06/23	Soil		X	X		X													X	X		
6	SS31			29/06/23	Soil	X	X																X			
7	SS32			29/06/23	Soil	X	X																X			
8	Composite # 3 (SS33, SS35, SS36 and SS38)			29/06/23	Soil	X	X	X	X														X	X		
9	Composite # 4 (SS39 and SS42)			29/06/23	Soil	X	X	X	X														X	X		
10	Composite # 5 (SS43, SS44 and SS46)			29/06/23	Soil	X	X	X	X														X	X		
Total Counts																										
Laboratory Use Only		Received By				AUCK WELL CHCH MELB				Date	___/___/___	Time	___:___	Signature					Temperature							
		Received By				AUCK WELL CHCH MELB				Date	___/___/___	Time	___:___	Signature					Report №							



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Address		158a Bank Street, WHANGAREI 0112			Quote ID №								Project №				230599				Report Format		pdf, xls			
Contact Name		Aaron Thorburn			Analysis (Note: Where metals are requested, please specify "Total" or "Filtered") Heavy Metals (M8) OCP PAH Asbestos ID B21A-NZ (HM [M8] and Asbestos ID)																Email for Results		aaron.thorburn@soilandrock.co.nz			
Phone №		021392097																			Turn Around Requirements		<input type="checkbox"/> 1 DAY* <input type="checkbox"/> 2 DAY* <input type="checkbox"/> 3 DAY* <input checked="" type="checkbox"/> 5 DAY (Std.) <input type="checkbox"/> Other ()		* Surcharges apply	
Special Direction		If Asbestos detected, please undertake Quantitative Assessment on each individual sample.																			Containers		Method of Shipment			
Relinquished by (Signature) (Time / Date)																					1L Plastic	250mL Plastic	125mL Plastic	200mL Amber Glass	40mL vial	125mL Amber Glass
№	Client Sample ID			Date	Matrix																					
1	SS34			29/06/23	Soil		X	X		X							X	X								
2	SS37			29/06/23	Soil		X	X		X							X	X								
3	SS41			29/06/23	Soil		X	X		X							X	X								
4	SS45			29/06/23	Soil		X	X		X							X	X								
5	SS47			29/06/23	Soil		X	X		X							X	X								
6	SS48			29/06/23	Soil		X	X		X							X	X								
7																										
8																										
9																										
10																										
Total Counts																										
Laboratory Use Only		Received By				AUCK WELL CHCH MELB				Date	___/___/___	Time	___:___	Signature			Temperature									
		Received By				AUCK WELL CHCH MELB				Date	___/___/___	Time	___:___	Signature			Report №									

Certificate of Analysis

Page 1 of 2

Client: Soil & Rock Consultants	Lab No: 3335055	SPV1
Contact: Aaron Thorburn	Date Received: 02-Aug-2023	
C/- Soil & Rock Consultants	Date Reported: 15-Aug-2023	
PO Box 21424	Quote No: 125516	
Henderson	Order No:	
Auckland 0650	Client Reference: 230599 - Fonterra Hautapu - 185 Swayne Road, Cambridge (Contam)	
	Submitted By: Aaron Thorburn	

Sample Type: Aqueous

Sample Name:	PZ02	PZ06	PZ08	PZ09
Lab Number:	3335055.1	3335055.2	3335055.3	3335055.4

Individual Tests					
Chloride	g/m ³	44	29	77	1.1
Nitrite-N	g/m ³	< 0.10 #1	0.006	0.059	0.004
Nitrate-N	g/m ³	< 0.10	0.039	8.0	0.134
Nitrate-N + Nitrite-N	g/m ³	< 0.10 #1	0.045	8.0	0.138
Total Kjeldahl Nitrogen (TKN)	g/m ³	23	0.90	11.0	5.7
Total Phosphorus	g/m ³	0.63	0.34	7.0	12.3
Carbonaceous Biochemical Oxygen Demand (cBOD ₅)	g O ₂ /m ³	-	< 2 #2	-	-

Cation Profile					
Total Hardness	g/m ³ as CaCO ₃	174	68	75	11.1
Dissolved Calcium	g/m ³	43	11.1	22	2.0
Dissolved Magnesium	g/m ³	16.0	9.7	5.1	1.5
Dissolved Potassium	g/m ³	22	7.8	44	0.47
Dissolved Sodium	g/m ³	71	77	300	11.9

Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn					
Dissolved Arsenic	g/m ³	0.0056	0.0075	0.0033	< 0.0010
Dissolved Cadmium	g/m ³	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Dissolved Chromium	g/m ³	0.0017	< 0.0005	< 0.0005	< 0.0005
Dissolved Copper	g/m ³	0.0009	0.0069	0.0114	0.0113
Dissolved Lead	g/m ³	< 0.00010	0.00012	0.00028	0.00055
Dissolved Nickel	g/m ³	0.0056	0.0028	0.0016	0.0010
Dissolved Zinc	g/m ³	0.0073	0.0149	0.0087	0.0169

Analyst's Comments

#1 Due to the nature of this sample a dilution was performed prior to analysis, resulting in a detection limit higher than that normally achieved for the NO₂N, NO₃N and NO_xN analysis.

#2 The initial result for carbonaceous Biochemical Oxygen Demand (cBOD₅) was below detection limit due to over-dilution of the sample. In order to achieve a lower detection limit the cBOD₅ analysis was repeated on a sub-sample that had been stored frozen, using a larger volume.

Summary of Methods

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively simple matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis. A detection limit range indicates the lowest and highest detection limits in the associated suite of analytes. A full listing of compounds and detection limits are available from the laboratory upon request. Unless otherwise indicated, analyses were performed at Hill Labs, 28 Duke Street, Frankton, Hamilton 3204.

Sample Type: Aqueous			
Test	Method Description	Default Detection Limit	Sample No
Cation Profile		-	1-4
Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn	0.45µm Filtration, ICP-MS, trace level. APHA 3125 B 23 rd ed. 2017.	0.00005 - 0.0010 g/m ³	1-4



This Laboratory is accredited by International Accreditation New Zealand (IANZ), which represents New Zealand in the International Laboratory Accreditation Cooperation (ILAC). Through the ILAC Mutual Recognition Arrangement (ILAC-MRA) this accreditation is internationally recognised. The tests reported herein have been performed in accordance with the terms of accreditation, with the exception of tests marked * or any comments and interpretations, which are not accredited.

Sample Type: Aqueous			
Test	Method Description	Default Detection Limit	Sample No
Filtration, Unpreserved	Sample filtration through 0.45µm membrane filter.	-	1-4
Total Hardness	Calculation from Calcium and Magnesium. APHA 2340 B 23 rd ed. 2017.	1.0 g/m ³ as CaCO ₃	1-4
Dissolved Calcium	Filtered sample, ICP-MS, trace level. APHA 3125 B 23 rd ed. 2017.	0.05 g/m ³	1-4
Dissolved Magnesium	Filtered sample, ICP-MS, trace level. APHA 3125 B 23 rd ed. 2017.	0.02 g/m ³	1-4
Dissolved Potassium	Filtered sample, ICP-MS, trace level. APHA 3125 B 23 rd ed. 2017.	0.05 g/m ³	1-4
Dissolved Sodium	Filtered sample, ICP-MS, trace level. APHA 3125 B 23 rd ed. 2017.	0.02 g/m ³	1-4
Chloride	Filtered sample. Ion Chromatography. APHA 4110 B (modified) 23 rd ed. 2017.	0.5 g/m ³	1-4
Nitrite-N	Automated Azo dye colorimetry, Flow injection analyser. APHA 4500-NO ₂ ⁻ I (modified) 23 rd ed. 2017.	0.002 g/m ³	1-4
Nitrate-N	Calculation: (Nitrate-N + Nitrite-N) - NO ₂ N. In-House.	0.0010 g/m ³	1-4
Nitrate-N + Nitrite-N	Total oxidised nitrogen. Automated cadmium reduction, flow injection analyser. APHA 4500-NO ₃ ⁻ I (modified) 23 rd ed. 2017.	0.002 g/m ³	1-4
Total Kjeldahl Nitrogen (TKN)	Total Kjeldahl digestion, phenol/hypochlorite colorimetry. Discrete Analyser. APHA 4500-Norg D (modified) 4500 NH ₃ F (modified) 23 rd ed. 2017.	0.10 g/m ³	1-4
Total Phosphorus	Total phosphorus digestion, automated ascorbic acid colorimetry. Flow Injection Analyser. APHA 4500-P H (modified) 23 rd ed. 2017.	0.002 g/m ³	1-4
Carbonaceous Biochemical Oxygen Demand (cBOD ₅)	Incubation 5 days, DO meter, nitrification inhibitor added, seeded. APHA 5210 B (modified) 23 rd ed. 2017.	2 g O ₂ /m ³	2

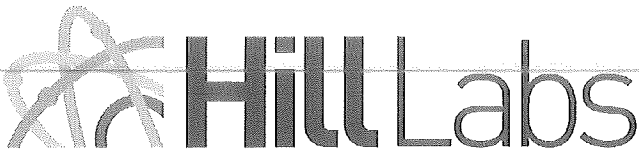
These samples were collected by yourselves (or your agent) and analysed as received at the laboratory.

Testing was completed between 04-Aug-2023 and 15-Aug-2023. For completion dates of individual analyses please contact the laboratory.

Samples are held at the laboratory after reporting for a length of time based on the stability of the samples and analytes being tested (considering any preservation used), and the storage space available. Once the storage period is completed, the samples are discarded unless otherwise agreed with the customer. Extended storage times may incur additional charges.

This certificate of analysis must not be reproduced, except in full, without the written consent of the signatory.

Ara Heron BSc (Tech)
Client Services Manager - Environmental



ANALYSIS REQUEST

R J Hill Laboratories Limited
 28 Duke Street Hamilton 3204
 Private Bag 3205
 Hamilton 3240, New Zealand

Job No: _____ Date Recv: 17-Aug-23 17:07

334 5115

Received by: Callum MacDonald

T 0508 HILL LAB (44 555 22)
 T +64 7 858 2000
 E mail@hill-labs.co.nz
 W www.hill-laboratories.com



Quote No 125516 **Lab Order No** _____
Primary Contact Aaron Thorburn 294301
Submitted By Aaron Thorburn 294301
Client Name Soil & Rock Consultants 48206

Address PO Box 21424, Henderson
 Auckland 0650, New Zealand

Phone 09 835 1740 **Mobile** _____

Email salen@soilandrock.co.nz

Charge To Geotechnical Engineering Limited 150289

Client Reference 230599 - Fonterra Hautapu - 185 Swayne Road, Cambridge (Contam)

Additional Client Ref _____

Order No _____

Results To *Reports will be emailed to Primary Contact by default. Additional Reports will be sent as specified below.*

- Email Primary Contact Email Submitter Email Client
 Email Other _____
 Other _____

Dates of testing are not routinely included in the Certificates of Analysis. Please inform the laboratory if you would like this information reported.

ADDITIONAL INFORMATION / KNOWN HAZARDS

CHAIN OF CUSTODY RECORD

Sent to Hill Laboratories **Date & Time:** _____

Name: _____

Tick if you require COC to be emailed back **Signature:** _____

Received at Hill Laboratories **Date & Time:** _____

Name: _____

Signature: _____

Condition **Temp:** _____

Room Temp Chilled Frozen 15.3

Sample & Analysis details checked
Signature: _____

Priority Low Normal High

Urgent (ASAP, extra charge applies, please contact lab first)

Requested Reporting Date: _____

Quoted Sample Types

No.	Sample Name	Sample Date/Time	Sample Type	Tests Required
1				
2				
3				
4				
5				
6				
7				
8				

Job Information Summary

Page 1 of 2

Client:	Soil & Rock Consultants	Lab No:	3345115
Contact:	Aaron Thorburn C/- Soil & Rock Consultants PO Box 21424 Henderson Auckland 0650	Date Registered:	17-Aug-2023 5:38 pm
		Priority:	High
		Quote No:	125516
		Order No:	
		Client Reference:	230599 - Fonterra Hautapu - 185 Swayne Road, Cambridge (Contam)
		Add. Client Ref:	
		Submitted By:	Aaron Thorburn
		Charge To:	Geotechnical Engineering Limited
		Target Date:	28-Aug-2023 4:30 pm

Samples

No	Sample Name	Sample Type	Containers	Tests Requested
1	PZ02	Ground Water	BOD, S100, FN100	
2	PZ04	Ground Water	UP1L, BOD, S100, FN100	Nitrate-N; Carbonaceous Biochemical Oxygen Demand (cBOD ₅); Cation Profile; Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn; Chloride; Nitrite-N; Total Kjeldahl Nitrogen (TKN); Total Phosphorus
3	PZ10	Ground Water	UP1L, BOD, S100, FN100	Nitrate-N; Carbonaceous Biochemical Oxygen Demand (cBOD ₅); Cation Profile; Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn; Chloride; Nitrite-N; Total Kjeldahl Nitrogen (TKN); Total Phosphorus

Summary of Methods

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively simple matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis. A detection limit range indicates the lowest and highest detection limits in the associated suite of analytes. A full listing of compounds and detection limits are available from the laboratory upon request. Unless otherwise indicated, analyses were performed at Hill Labs, 28 Duke Street, Frankton, Hamilton 3204.

Sample Type: Aqueous			
Test	Method Description	Default Detection Limit	Sample No
Cation Profile		-	2-3
Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn	0.45µm Filtration, ICP-MS, trace level. APHA 3125 B 23 rd ed. 2017.	0.00005 - 0.0010 g/m ³	2-3
Filtration, Unpreserved	Sample filtration through 0.45µm membrane filter.	-	2-3
Total Hardness	Calculation from Calcium and Magnesium. APHA 2340 B 23 rd ed. 2017.	1.0 g/m ³ as CaCO ₃	2-3
Dissolved Calcium	Filtered sample, ICP-MS, trace level. APHA 3125 B 23 rd ed. 2017.	0.05 g/m ³	2-3
Dissolved Magnesium	Filtered sample, ICP-MS, trace level. APHA 3125 B 23 rd ed. 2017.	0.02 g/m ³	2-3
Dissolved Potassium	Filtered sample, ICP-MS, trace level. APHA 3125 B 23 rd ed. 2017.	0.05 g/m ³	2-3
Dissolved Sodium	Filtered sample, ICP-MS, trace level. APHA 3125 B 23 rd ed. 2017.	0.02 g/m ³	2-3
Chloride	Filtered sample. Ion Chromatography. APHA 4110 B (modified) 23 rd ed. 2017.	0.5 g/m ³	2-3
Nitrite-N	Automated Azo dye colorimetry, Flow injection analyser. APHA 4500-NO ₂ ⁻ I (modified) 23 rd ed. 2017.	0.002 g/m ³	2-3
Nitrate-N	Calculation: (Nitrate-N + Nitrite-N) - NO ₂ N. In-House.	0.0010 g/m ³	2-3
Nitrate-N + Nitrite-N	Total oxidised nitrogen. Automated cadmium reduction, flow injection analyser. APHA 4500-NO ₃ ⁻ I (modified) 23 rd ed. 2017.	0.002 g/m ³	2-3
Total Kjeldahl Nitrogen (TKN)	Total Kjeldahl digestion, phenol/hypochlorite colorimetry. Discrete Analyser. APHA 4500-Norg D (modified) 4500 NH ₃ F (modified) 23 rd ed. 2017.	0.10 g/m ³	2-3

Sample Type: Aqueous

Test	Method Description	Default Detection Limit	Sample No
Total Phosphorus	Total phosphorus digestion, automated ascorbic acid colorimetry. Flow Injection Analyser. APHA 4500-P H (modified) 23 rd ed. 2017.	0.002 g/m ³	2-3
Carbonaceous Biochemical Oxygen Demand (cBOD ₅)	Incubation 5 days, DO meter, nitrification inhibitor added, seeded. APHA 5210 B (modified) 23 rd ed. 2017.	2 g O ₂ /m ³	2-3

Soil & Rock Consultants
 Level 1, 131 Lincoln Rd Henderson
 Auckland
 NEW ZEALAND



All tests reported herein have been performed in accordance with the laboratory's scope of accreditation

Attention: Aaron Thorburn

Report 1022943-S-V2
 Project name
 Project ID 230599
 Received Date Sep 05, 2023

Client Sample ID			SS33	SS35	SS36	SS38
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			K23- Se0007174	K23- Se0007175	K23- Se0007176	K23- Se0007177
Date Sampled			Jun 29, 2023	Jun 29, 2023	Jun 29, 2023	Jun 29, 2023
Test/Reference	LOR	Unit				
Metals M8 (NZ MfE)						
Arsenic	0.1	mg/kg	11	17	4.6	9.2
Cadmium	0.01	mg/kg	0.23	0.17	0.40	0.33
Chromium	0.1	mg/kg	7.1	7.6	6.9	6.5
Copper	0.1	mg/kg	8.5	5.6	8.9	9.4
Lead	0.1	mg/kg	11	11	13	12
Mercury	0.01	mg/kg	0.20	0.27	0.23	0.17
Nickel	0.1	mg/kg	2.7	2.7	2.7	2.5
Zinc	5	mg/kg	55	43	68	51
Sample Properties						
% Moisture	1	%	32	39	41	40

Client Sample ID			SS39	SS42	SS43	SS44
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			K23- Se0007178	K23- Se0007179	K23- Se0007180	K23- Se0007181
Date Sampled			Jun 29, 2023	Jun 29, 2023	Jun 29, 2023	Jun 29, 2023
Test/Reference	LOR	Unit				
Metals M8 (NZ MfE)						
Arsenic	0.1	mg/kg	24	14	9.3	16
Cadmium	0.01	mg/kg	1.1	0.36	1.4	0.36
Chromium	0.1	mg/kg	23	19	18	17
Copper	0.1	mg/kg	57	21	25	38
Lead	0.1	mg/kg	330	350	49	140
Mercury	0.01	mg/kg	0.36	0.32	0.25	0.23
Nickel	0.1	mg/kg	11	6.8	7.3	9.3
Zinc	5	mg/kg	550	290	170	180
Sample Properties						
% Moisture	1	%	42	31	39	41
Polycyclic Aromatic Hydrocarbons (NZ MfE)						
Acenaphthene	0.03	mg/kg	< 0.03	< 0.03	-	-
Acenaphthylene	0.03	mg/kg	< 0.03	< 0.03	-	-
Anthracene	0.03	mg/kg	< 0.03	< 0.03	-	-
Benz(a)anthracene	0.03	mg/kg	0.05	< 0.03	-	-
Benzo(a)pyrene	0.03	mg/kg	< 0.03	< 0.03	-	-

Client Sample ID			SS39	SS42	SS43	SS44
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			K23- Se0007178	K23- Se0007179	K23- Se0007180	K23- Se0007181
Date Sampled			Jun 29, 2023	Jun 29, 2023	Jun 29, 2023	Jun 29, 2023
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons (NZ MfE)						
Benzo(a)pyrene TEQ (lower bound)*	0.03	mg/kg	< 0.03	< 0.03	-	-
Benzo(a)pyrene TEQ (medium bound)*	0.03	mg/kg	0.04	0.04	-	-
Benzo(a)pyrene TEQ (upper bound)*	0.03	mg/kg	0.08	0.08	-	-
Benzo(b&j)fluoranthene ^{N07}	0.03	mg/kg	< 0.03	< 0.03	-	-
Benzo(g,h,i)perylene	0.03	mg/kg	< 0.03	< 0.03	-	-
Benzo(k)fluoranthene	0.03	mg/kg	0.03	< 0.03	-	-
Chrysene	0.03	mg/kg	0.09	< 0.03	-	-
Dibenz(a,h)anthracene	0.03	mg/kg	< 0.03	< 0.03	-	-
Fluoranthene	0.03	mg/kg	0.10	< 0.03	-	-
Fluorene	0.03	mg/kg	< 0.03	< 0.03	-	-
Indeno(1.2.3-cd)pyrene	0.03	mg/kg	< 0.03	< 0.03	-	-
Naphthalene	0.1	mg/kg	< 0.1	< 0.1	-	-
Phenanthrene	0.03	mg/kg	< 0.03	< 0.03	-	-
Pyrene	0.03	mg/kg	0.12	< 0.03	-	-
Total PAH*	0.1	mg/kg	0.4	< 0.1	-	-
p-Terphenyl-d14 (surr.)	1	%	105	95	-	-
2-Fluorobiphenyl (surr.)	1	%	99	93	-	-

Client Sample ID			SS46
Sample Matrix			Soil
Eurofins Sample No.			K23- Se0007182
Date Sampled			Jun 29, 2023
Test/Reference	LOR	Unit	
Metals M8 (NZ MfE)			
Arsenic	0.1	mg/kg	17
Cadmium	0.01	mg/kg	0.27
Chromium	0.1	mg/kg	16
Copper	0.1	mg/kg	33
Lead	0.1	mg/kg	51
Mercury	0.01	mg/kg	0.09
Nickel	0.1	mg/kg	15
Zinc	5	mg/kg	140
Sample Properties			
% Moisture	1	%	32

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Metals M8 (NZ MfE) - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Auckland	Sep 12, 2023	28 Days
Polycyclic Aromatic Hydrocarbons (NZ MfE) - Method: LTM-ORG-2130 PAH and Phenols in Soil and Water by GC MSMS	Auckland	Sep 06, 2023	14 Days
% Moisture - Method: LTM-GEN-7080 Moisture Content in Soil by Gravimetry	Auckland	Sep 05, 2023	14 Days

Auckland	Christchurch	Tauranga
35 O'Rorke Road Penrose, Auckland 1061 Tel: +64 9 526 4551 IANZ# 1327	43 Detroit Drive Rolleston, Christchurch 7675 Tel: +64 3 343 5201 IANZ# 1290	1277 Cameron Road, Gate Pa, Tauranga 3112 Tel: +64 9 525 0568 IANZ# 1402

Melbourne	Geelong	Sydney	Canberra	Brisbane	Newcastle
6 Monterey Road Dandenong South VIC 3175 Tel: +61 3 8564 5000 NATA# 1261 Site# 1254	19/8 Lewalan Street Grovedale VIC 3216 Tel: +61 3 8564 5000 NATA# 1261 Site# 25403	179 Magowar Road Girraween NSW 2145 Tel: +61 2 9900 8400 NATA# 1261 Site# 18217	Unit 1,2 Dacre Street Mitchell ACT 2911 Tel: +61 2 6113 8091 NATA# 1261 Site# 25466	1/21 Smallwood Place Murarrie QLD 4172 Tel: +61 7 3902 4600 NATA# 1261 Site# 20794	1/2 Frost Drive Mayfield West NSW 2304 Tel: +61 2 4968 8448 NATA# 1261 Site# 25079 & 25289

Perth
46-48 Banksia Road Welshpool WA 6106 Tel: +61 8 6253 4444 NATA# 2377 Site# 2370

web: www.eurofins.com.au
email: EnviroSales@eurofins.com

Company Name:	Soil & Rock Consultants	Order No.:	230599	Received:	Sep 5, 2023 12:00 AM
Address:	Level 1, 131 Lincoln Rd Henderson Auckland NEW ZEALAND	Report #:	1022943	Due:	Sep 6, 2023
Project Name:		Phone:	0011 64 9 835 1740	Priority:	1 Day
Project ID:	230599	Fax:	0011 64 9 835 1847	Contact Name:	Aaron Thorburn

Eurofins Analytical Services Manager : Katyana Gausel

Sample Detail						Moisture Set	Metals M8 (NZ M/E)	Polycyclic Aromatic Hydrocarbons (NZ M/E)
Auckland Laboratory - IANZ# 1327						X	X	X
Christchurch Laboratory - IANZ# 1290								
Tauranga Laboratory - IANZ# 1402								
External Laboratory								
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID			
1	SS33	Jun 29, 2023		Soil	K23-Se0007174	X	X	
2	SS35	Jun 29, 2023		Soil	K23-Se0007175	X	X	
3	SS36	Jun 29, 2023		Soil	K23-Se0007176	X	X	
4	SS38	Jun 29, 2023		Soil	K23-Se0007177	X	X	
5	SS39	Jun 29, 2023		Soil	K23-Se0007178	X	X	X
6	SS42	Jun 29, 2023		Soil	K23-Se0007179	X	X	X
7	SS43	Jun 29, 2023		Soil	K23-Se0007180	X	X	
8	SS44	Jun 29, 2023		Soil	K23-Se0007181	X	X	
9	SS46	Jun 29, 2023		Soil	K23-Se0007182	X	X	
Test Counts						9	9	2

Internal Quality Control Review and Glossary
General

- Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
- All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
- All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
- Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
- Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
- SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
- Samples were analysed on an 'as received' basis.
- Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
- This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	mg/L: milligrams per litre	µg/L: micrograms per litre
ppm: parts per million	ppb: parts per billion	%: Percentage
org/100 mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units	MPN/100 mL: Most Probable Number of organisms per 100 millilitres
CFU: Colony forming unit		

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (<i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR: RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

- Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
- Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
- pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
- Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
- For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
- Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
Method Blank						
Metals M8 (NZ MfE)						
Arsenic	mg/kg	< 0.1		0.1	Pass	
Cadmium	mg/kg	< 0.01		0.01	Pass	
Chromium	mg/kg	< 0.1		0.1	Pass	
Copper	mg/kg	< 0.1		0.1	Pass	
Lead	mg/kg	< 0.1		0.1	Pass	
Mercury	mg/kg	< 0.01		0.01	Pass	
Nickel	mg/kg	< 0.1		0.1	Pass	
Zinc	mg/kg	< 5		5	Pass	
Method Blank						
Polycyclic Aromatic Hydrocarbons (NZ MfE)						
Acenaphthene	mg/kg	< 0.03		0.03	Pass	
Acenaphthylene	mg/kg	< 0.03		0.03	Pass	
Anthracene	mg/kg	< 0.03		0.03	Pass	
Benz(a)anthracene	mg/kg	< 0.03		0.03	Pass	
Benzo(a)pyrene	mg/kg	< 0.03		0.03	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.03		0.03	Pass	
Benzo(g,h,i)perylene	mg/kg	< 0.03		0.03	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.03		0.03	Pass	
Chrysene	mg/kg	< 0.03		0.03	Pass	
Dibenz(a,h)anthracene	mg/kg	< 0.03		0.03	Pass	
Fluoranthene	mg/kg	< 0.03		0.03	Pass	
Fluorene	mg/kg	< 0.03		0.03	Pass	
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.03		0.03	Pass	
Naphthalene	mg/kg	< 0.1		0.1	Pass	
Phenanthrene	mg/kg	< 0.03		0.03	Pass	
Pyrene	mg/kg	< 0.03		0.03	Pass	
LCS - % Recovery						
Metals M8 (NZ MfE)						
Arsenic	%	93		80-120	Pass	
Cadmium	%	106		80-120	Pass	
Chromium	%	89		80-120	Pass	
Copper	%	93		80-120	Pass	
Lead	%	92		80-120	Pass	
Mercury	%	96		80-120	Pass	
Nickel	%	90		80-120	Pass	
Zinc	%	91		80-120	Pass	
LCS - % Recovery						
Polycyclic Aromatic Hydrocarbons (NZ MfE)						
Acenaphthene	%	102		70-130	Pass	
Acenaphthylene	%	103		70-130	Pass	
Anthracene	%	114		70-130	Pass	
Benz(a)anthracene	%	99		70-130	Pass	
Benzo(a)pyrene	%	92		70-130	Pass	
Benzo(b&j)fluoranthene	%	77		70-130	Pass	
Benzo(g,h,i)perylene	%	86		70-130	Pass	
Benzo(k)fluoranthene	%	75		70-130	Pass	
Chrysene	%	117		70-130	Pass	
Dibenz(a,h)anthracene	%	84		70-130	Pass	
Fluoranthene	%	104		70-130	Pass	
Fluorene	%	100		70-130	Pass	

Test				Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
Indeno(1.2.3-cd)pyrene				%	82		70-130	Pass	
Naphthalene				%	108		70-130	Pass	
Phenanthrene				%	87		70-130	Pass	
Pyrene				%	109		70-130	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Metals M8 (NZ MfE)					Result 1				
Cadmium	K23-Au0075352	NCP	%	107			75-125	Pass	
Spike - % Recovery									
Metals M8 (NZ MfE)					Result 1				
Arsenic	K23-Se0007175	CP	%	102			75-125	Pass	
Cadmium	K23-Se0007175	CP	%	112			75-125	Pass	
Chromium	K23-Se0007175	CP	%	113			75-125	Pass	
Copper	K23-Se0007175	CP	%	110			75-125	Pass	
Lead	K23-Se0007175	CP	%	110			75-125	Pass	
Mercury	K23-Se0007175	CP	%	115			75-125	Pass	
Nickel	K23-Se0007175	CP	%	106			75-125	Pass	
Zinc	K23-Se0007175	CP	%	113			75-125	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons (NZ MfE)					Result 1				
Acenaphthene	K23-Au0078552	NCP	%	106			70-130	Pass	
Acenaphthylene	K23-Au0078552	NCP	%	104			70-130	Pass	
Anthracene	K23-Au0078552	NCP	%	103			70-130	Pass	
Benz(a)anthracene	K23-Au0078540	NCP	%	101			70-130	Pass	
Benzo(a)pyrene	K23-Au0078552	NCP	%	107			70-130	Pass	
Benzo(b&j)fluoranthene	K23-Au0078552	NCP	%	108			70-130	Pass	
Benzo(g,h,i)perylene	K23-Au0078552	NCP	%	91			70-130	Pass	
Benzo(k)fluoranthene	K23-Au0078552	NCP	%	102			70-130	Pass	
Chrysene	K23-Au0078552	NCP	%	116			70-130	Pass	
Dibenz(a,h)anthracene	K23-Au0078552	NCP	%	94			70-130	Pass	
Fluoranthene	K23-Au0078552	NCP	%	98			70-130	Pass	
Fluorene	K23-Au0078552	NCP	%	91			70-130	Pass	
Indeno(1.2.3-cd)pyrene	K23-Au0078552	NCP	%	95			70-130	Pass	
Naphthalene	K23-Au0078552	NCP	%	108			70-130	Pass	
Phenanthrene	K23-Au0078552	NCP	%	77			70-130	Pass	
Pyrene	K23-Au0078552	NCP	%	105			70-130	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Metals M8 (NZ MfE)					Result 1	Result 2	RPD		
Arsenic	Z23-Se0006190	NCP	mg/kg	56	75	29	30%	Pass	
Cadmium	Z23-Se0006190	NCP	mg/kg	63	63	<1	30%	Pass	
Chromium	Z23-Se0006190	NCP	mg/kg	67	76	12	30%	Pass	
Copper	Z23-Se0006190	NCP	mg/kg	64	78	20	30%	Pass	
Lead	Z23-Se0006190	NCP	mg/kg	110	110	7.5	30%	Pass	
Mercury	Z23-Se0006190	NCP	mg/kg	0.02	0.02	10	30%	Pass	
Nickel	K23-Se0007174	CP	mg/kg	2.7	2.3	16	30%	Pass	
Zinc	Z23-Se0006190	NCP	mg/kg	260	360	30	30%	Pass	
Duplicate									
Sample Properties					Result 1	Result 2	RPD		
% Moisture	K23-Se0007174	CP	%	32	33	5.1	30%	Pass	

Duplicate								
Polycyclic Aromatic Hydrocarbons (NZ MfE)				Result 1	Result 2	RPD		
Acenaphthene	K23-Au0078551	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass
Acenaphthylene	K23-Au0078551	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass
Anthracene	K23-Au0078551	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass
Benz(a)anthracene	K23-Au0078551	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass
Benzo(a)pyrene	K23-Au0078551	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass
Benzo(b&j)fluoranthene	K23-Au0078551	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass
Benzo(g,h,i)perylene	K23-Au0078551	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass
Benzo(k)fluoranthene	K23-Au0078551	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass
Chrysene	K23-Au0078551	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass
Dibenz(a,h)anthracene	K23-Au0078551	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass
Fluoranthene	K23-Au0078551	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass
Fluorene	K23-Au0078551	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass
Indeno(1,2,3-cd)pyrene	K23-Au0078551	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass
Naphthalene	K23-Au0078551	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Phenanthrene	K23-Au0078551	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass
Pyrene	K23-Au0078551	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass

Comments

This report has been revised (V2) following repeat analysis. Metals results for all samples have now been replaced by the repeat results.

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	No
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs

Authorised by:

Katyana Gausel	Analytical Services Manager
Raymond Siu	Senior Analyst-Metal
Raymond Siu	Senior Analyst-Organic



Raymond Siu
Senior Instrument Chemist (Key Technical Personnel)

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates IANZ accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

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