

# Detailed Site Investigation (DSI)

1799a Great South Road, Bombay

ct: The Surveying Company

[www.sqn.co.nz](http://www.sqn.co.nz)

J240433-DSI-Jul24 | 19 July 2024

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**STATEMENT**

This Detailed Site Investigation has been prepared in accordance with the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011. It has been reviewed and authorised by a suitably qualified and experienced practitioner (SQEP); and reported on in accordance with the current edition of the Ministry for the Environment’s Contaminated Land Management Guidelines No.1 – Reporting on Contaminated Sites in New Zealand.

**SQEP CERTIFICATION**

I, Christopher Davies, of SQN Consulting Ltd (‘SQN GeoSciences’) certify that I meet the qualifications of a suitably qualified and experienced practitioner (SQEP) in contaminated land investigations, remediation, and management as outlined in Section 2.1.1 of the MfE’s (2012) *Users’ Guide National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health*. Evidence of qualifications and experience can be provided upon request.

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## EXECUTIVE SUMMARY

The Surveying Company (the client) engaged SQN GeoSciences (SQN) to conduct a detailed site investigation (DSI) of the property located at 1799a Great South Road, Bombay (the site) on behalf of the property owner (Vernon Developments). Vernon Developments received an abatement notice (ABT21680673) for the unconsented development of portions of the site, including placement of potentially non-compliant hardfill materials, and is subsequently applying for retrospective resource consent.

This DSI has therefore been prepared to satisfy the relevant portions of the abatement notice and support the retrospective resource consent. It is noted that the scope of this report is limited to the area of development in the north-western and central portions of the property (Investigation Area).

The DSI included a desktop review, and site inspection to identify potentially contaminating activities listed on the Ministry for the Environment's (MfE) Hazardous Activities and Industries List (HAIL). It was determined that the importation of uncertified fill material, and potential soil contamination resulting from the degradation and/or uncontrolled demolition of site structures may have occurred at the site, which qualifies as HAIL Item I: *Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment.*

Subsequent soil sampling, and laboratory analysis determined the following:

- The hardfill material has not resulted in contaminant concentrations above the applicable standards in underlying soil.
- The stripped topsoil bund, and clay soil in one discrete location beneath hardstand, contain arsenic and lead above the site's natural background levels, likely as a result of historic site use and not due to hardfill material importation.
- No exceedances of the human health or environmental criteria were reported.

Based on the findings of the investigation, it was subsequently concluded that:

- The assessed materials do not contain contaminants at concentrations that would present a risk to human health or the environment.
- The assessed hardfill material is considered suitable for classification as cleanfill material.
- While the soil bund materials do not meet the cleanfill definition, based on the findings of this DSI it is considered likely that this material (and the two soil stockpiles) are site-sourced topsoil materials removed during the placement of the hardfill material, and construction of the north and south sheds. Therefore, removal of this material is not considered necessary.
- As no exceedances of the applicable human health and environmental guidelines were reported, no remediation or specific site management controls are required.
- Based on the findings of this DSI, no 'non-compliant' materials have been identified, and the hardfill and soil bund materials are considered suitable for retention onsite.

Based on the above:

- The site is considered 'land covered' under Regulation 5(7), and retrospective resource consent will be required as a controlled activity under Regulation 9 of the NES,

- As no concentrations exceeded the *Auckland Unitary Plan (Operative in Part)* (AUP(OP)) permitted activity soil acceptance criteria, the contaminated land rules of Chapter E.30 of the AUP(OP) are not applicable to the development,
- The topsoil material across the Investigation Area is likely suitable for classification as managed fill. This material is considered suitable for retention and reuse onsite, and
- As this DSI did not identify contaminant concentrations above the applicable human health or environmental, remediation or management of the assessed materials is not required, and the site is considered suitable for commercial / industrial land use.

## 1 INTRODUCTION

SQN GeoSciences (SQN) has prepared the following report for The Surveying Company (the client) on behalf of the property owner (Vernon Developments) in accordance with the SQN proposal, Ref: Q240280, dated the 4<sup>th</sup> of April 2024.

This report has been prepared in accordance with the Ministry for the Environment (MfE) Contaminated Land Management Guidelines (CLMG) No. 1 *Guidelines for Reporting on Contaminated Sites in New Zealand* and No. 5 *Site Investigation and Analysis of Soils* (MfE 2021a & 2021b).

## 2 PROPERTY DETAILS

**TABLE 1** PROPERTY DETAILS

Address	Legal Description	Area	Zoning
1799a Great South Road, Bombay	Lot 6 DP 156089	8.6730 ha	Rural - Mixed Rural Zone
<b>Total Investigation Area</b>		3.265 ha	

The property at the above identifier, hereafter referred to as 'the site', is located in a predominantly rural area surrounded by pasture and agricultural land use. It lies approximately 7.4 km to the east of Pukekohe East (Figure 1). The site itself is predominantly pasture. The east of the site borders the southern motorway and Great South Road runs along the west of the site boundary. It is noted that the scope of this DSI is limited to the current development area and earthworks area (Investigation Area), confined to the north-western and central portions of the site, as shown in Figure 2.

### 2.1 ENVIRONMENTAL CONTEXT

#### 2.1.1 GEOLOGY & GEOHYDROLOGY

The online Geological Map of New Zealand dataset (1:250k) provided by GNS Science (2020) identifies the underlying geology of the site as 'Middle Pleistocene to Late Pleistocene River and hill slope deposits in the southern portion of the site, [comprising] pumiceous sand, silt, mud and clay, with interbedded gravel and peat'. The underlying geology in the northern extent is 'undifferentiated Kerikeri Volcanic Group tephra and tuff of South Auckland Volcanic Field [comprising] tephra and poorly consolidated to welded ash, lapilli, scoria splatter and lithic tuff'.

The site lies within the footprint of the Bombay Volcanic, Bombay Drury Sand, Bombay-Drury Kaawa and Bombay West Waitemata Aquifers as defined in the Auckland Council GEOMaps website groundwater overlay. The Bombay Volcanic, Drury Sand and Bombay-Drury Kaawa aquifers are listed as high-use aquifer management areas in Chapter D1 of the AUP(OP). The Drury Sand aquifer is listed as a quality-sensitive aquifer management area in Chapter D2.3 (1b) of the AUP(OP).

### 2.1.2 TOPOGRAPHY AND DRAINAGE

A review of data contained in the Auckland Council GEOMaps indicates that the site is relatively flat, gently sloping to the east and northeast. Site levels vary between 94.25 m above sea level (masl) north and 104 masl.

As the site is half permeable pasture and half asphalt, drainage is via overland flow paths and soakage. A review of GEOMaps data indicates that the site surface runoff would flow towards the north and into overland flow paths located in the western and eastern portions of the site. The western flow path directs surface flows northwest into an unnamed tributary and eventually the main body of the Ngakoroa stream. The eastern flow paths direct surface flows northward along Great South Road and eventually into Hingaia Stream. Both streams eventually discharging into the Pahurehure Inlet and Manukau Harbour.

The central and northern portions of the site are situated within a floodplain, with the northern portion also classified as a flood prone area. The site is not located within a flood sensitive area.

## 3 ABATEMENT NOTICE & RETROSPECTIVE RESOURCE CONSENT FOR EARTHWORKS

Vernon Developments received an abatement notice from Auckland Council on the 16<sup>th</sup> of June 2023 (ref: *ABT21680673*). The notice advised that earthworks associated with the hardstand areas had occurred onsite, across an estimated area of 10,000 m<sup>2</sup>, exceeding the permitted activity volumes under E12 of the AUP(OP). Therefore, council required a DSI be prepared to characterise the fill and any other materials that have been placed on the hardstand areas of the property, and any leachate (if present).

The client advised that the following areas ('Earthworks Areas') required assessment to address the abatement notice:

- Hardstand area that was formed using recycled and graded asphalt (processed offsite) and pit-run material in the north-western portion of the site.
- A grassed bund that extends along the north-western site boundary. The client advised that this material comprised site-won topsoil material that was relocated as a bund during development of the hardstand area of the site.

A copy of the request is included in Appendix A. It is further understood that the client has applied for retrospective resource consent for the industrial development at the site, inclusive of the aforementioned earthworks (*LUC60427692*). Item 16 of a Section 92 request issued by Council in February 2024 requested evidence that the aggregate was sourced from a certified quarry, or a DSI to characterise the aggregate / fill material present at the site.

## 4 STANDARDS AND REGULATIONS

As a result of the potential uncertified filling outlined above, it will be necessary to address the requirements of the following applicable standards and regulations for the site.

### 4.1 NATIONAL ENVIRONMENTAL STANDARD (NES)

The New Zealand *Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011* (NES), ensures that land affected by contaminants in soil is appropriately identified and assessed when soil disturbance and/or land development activities take place and, if necessary, remediated or the contaminants contained to make the land safe for human use.

Under the NES, land is considered to be actually or potentially contaminated if an activity or industry on the MfE Hazardous Activities and Industries List (HAIL) has been, is, or is more likely than not to have been, undertaken on the land. Consequently, a subdivision or development on HAIL land requires a detailed site investigation (DSI) of the piece of land to determine if there is a risk to human health as a result of the former activities.

The NES defines five standard landuse scenarios for which soil contaminant standards have been derived; the most applicable scenario for the Earthworks Areas is commercial / industrial, described as “commercial / industrial site with varying degrees of exposed soil”. The remaining areas of the property, while outside the scope of the abatement notice, would be classified as production land, and therefore not covered under the NES.

### 4.2 AUCKLAND UNITARY PLAN (OPERATIVE IN PART) (AUP(OP))

Section 30(1)(f) of the RMA provides the Auckland Council with a statutory duty to investigate land for the purposes of identifying and monitoring contaminated land and for the control of discharges of contaminants into or onto land or water and discharges of water into water.

The Auckland Unitary Plan (Operative in Part) (AUP(OP)), which was formally notified on 30 September 2013, is a combined regional policy statement, regional coastal plan, regional plan and district plan. Auckland Council notified an operative in part version of the plan on 15 November 2016.

Chapter E.30 of the AUP(OP) deals specifically with contaminated land and maintains that Council is required to manage both the use of land containing elevated levels of contaminants and the discharge of contaminants from land containing elevated levels of contaminants. As no appeals have been lodged on Chapter E.30, the provisions of that section can be considered operative under Section 87 of the Resource Management Act 1991. For all purposes of this investigation, the relevant provisions of the AUP(OP) relating to soil contamination have legal jurisdiction and those provision have been considered where they may have an impact on the proposed development.

Chapter J of the AUP(OP) defines cleanfill material as “*natural material such as clay, gravel, sand, soil and rock which has been excavated or quarried from areas that are not contaminated with manufactured chemicals or chemical residues as a result of industrial, commercial, mining or agricultural activities*”.

## 5 OBJECTIVES AND PROJECT DESIGN

The primary objective of this investigation is to provide an assessment of whether any actual or potential soil contamination exists within the Investigation Area used by CB Civil & Drainage Ltd and the requirements of the abatement notice pertaining to soil contamination. Consequently, this investigation also provides commentary on any risks associated with those findings and the resulting applicability of the NES and AUP(OP).

A secondary objective is to classify the soil to assist with the offsite disposal of unsuitable materials (if identified).

To achieve the primary objectives, SQN has undertaken a DSI comprising the following scope of work:

- Completed an historic appraisal of the property via a desktop review of the following:
  - Available historical aerial photographs.
  - Current and historic certificates of titles.
  - Council-held property files.
- Completed a site visit and walkover of the property.
- Developed a preliminary conceptual site model (CSM).
- Completed an intrusive site investigation within the Investigation Area, comprising the collection and analysis of representative soil samples, based on the preliminary CSM, to determine the soil quality and any associated risk to human health and / or the environment arising from actual or potential soil contamination on site.
- Completed a risk and regulatory assessments for the site, based on the findings of the investigation, and in the context of the NES and AUP (OP).
- Prepared this DSI report in accordance CLMG No.1 (MfE, 2021a) detailing the findings of this investigation, including recommendations and relevant consenting requirements under the NES and AUP (OP).

This investigation is limited to the area discussed in Section 3 above and does not include the area utilised for green waste processing by Aarons Contracting.

## 6 SITE HISTORY

A desktop study of publicly available files and photographs was undertaken to determine the history of the site with respect to any current or historic potentially contaminating land uses.

### 6.1 RECORDS OF TITLE

SQN has reviewed a copy of the current and historical search copies of the records of title for the site, including any instruments on the title which detail relevant property information (e.g. current ownership, registered interests, easements, covenants, lease restrictions and transmissions), to determine if pre-existing consent notices or other restrictions / notifications which may be relevant to historic uses or potential soil contamination are held against the property.

No notes of interest pertaining to actual or potential contamination were recorded on the titles. Copies of these documents are attached in Appendix B.

### 6.2 PROPERTY FILES

A review of the site's property files held by Auckland Council was conducted as part of this DSI. Relevant files are summarised below:

- November 2012: consent to establish a bore in the centre of the site for stock drinking water supply (*LUC60270932*). Drillers' notes indicate a static water level of 4.6m below ground level (recorded at 99m above sea level).
- September 2023: Building consent to construct a farm building (implement shed and haybarn) (*BCO10370791*). A geotechnical report by Tisley Engineering Ltd (Tisley) was completed as part of the development (ref: '*1799A Great South Road, Bombay, Geotechnical Assessment and Stormwater Management Report*', April 2023). The assessment comprised the advancement of five hand auger boreholes within the footprint of the proposed shed; no fill material was identified, and topsoil extended to an average depth of 0.25 mbgl. Groundwater was not encountered.
- November 2023: Site Aggregate Analysis letter report, prepared by Tisley and dated November 2023, was conducted to determine the age of aggregate placed onsite (ref: *DT23538*). The letter was submitted as part of the current resource consent (*LUC60427692*). The analysis comprised the excavation and visual inspection of four shallow test pits across the south-western portion of the site covered in aggregate. It was determined that two distinct ages of aggregate were present:
  - Aged aggregate comprising weathered silty aggregate associated with the turning bay established in at least 2009.
  - New aggregate comprising blue aggregate, crushed concrete, brown rock, and road millings.
- March 2024: Building consent to construct a second farm building (*BCO10378705*). An updated version of Tisley's geotechnical report was submitted as part of the resource consent, dated February 2024. The revision included three additional hand augers established in the footprint of the second proposed farm shed, and the findings were consistent with the initial assessment.

Copies of these documents can be provided upon request.

### 6.3 HISTORIC AERIAL PHOTOGRAPHS

A review of publicly available historical imagery sourced from Retrolens (1942 – 1988), Auckland Council GEOMaps (2003 – 2019) and Google Earth (2022 – 2023) were reviewed as part of this DSI. Key findings are summarised below. Historical aeriels (excluding Google Earth) are included as Appendix C with former (letters) and current (numbers) structures indicated on Figure 2.

**1942-1960** The site and surrounding land use is predominantly pasture with hedgerows separating field boundaries. A small stand of dense trees encroaches into the northern end of the site. A small shed (A) is visible in the centre of the site along the northern boundary, and two buildings (Sheds B & C) are located in the north-western corner of the site, with the milking shed (D) evident from 1960.

A small depression or gully is present in the northern portion of the site, extending to the east. Great South Road extends along the western site boundary. The surrounding land is predominantly agricultural in use.

**1974** Earthworks has started for the development of State Highway 1 along the eastern boundary encroaching into the eastern and northern ends of the site. A large stockpile of surplus topsoil from the motorway corridor is visible at the northern end of the site. Cattle can be seen grazing in the southern corner. Shed B has been removed and Shed C has been replaced with a smaller building (Shed E). An additional shed (Haybarn) has been added south of the Milking Shed.

The area north of the milking shed and the cattle run to the east are fenced and appear paved, and a vehicle turning bay is visible to immediately west of the Haybarn. A small shed (F) is present along the north-western boundary, and Shed A has been replaced with a smaller shed.

**1979-2022** State Highway 1 has now been completed and the surplus topsoil stockpile removed from site. Shed E and F are no longer visible from 1988 and 2010, respectively. The turning bay appears to have been widened with hardstand in the 2017 aerial image, and subsequently covered in grass in the 2019 aerial. No other changes appear on site.

**2023** An access track extends from Great South Road, through the centre and to the north-eastern end of the site, where stockpiling of timber and suspected mulch and / or soil is evident (Leased Mulching Business). Some minor vegetation clearance has occurred in this area to accommodate the commercial activity. Silage stockpiling is visible along the northern end of the access track.

The majority of the north-western portion of the site is now covered in hardstand, and soil disturbance is visible immediately southeast of the hardstand area. The cattle run and holding area have been removed, and the site appears to be in use for commercial / industrial storage (shipping containers, vehicles and construction materials). The north-eastern hardstand area is darker in colour, and asphalt / aggregate stockpiles are present in the south-eastern hardstand area.

A grassed bund extends along the northern site boundary. No further significant changes are noted.

Based on the above, the following pertinent information is noted:

- The current and former site structures were constructed between at least 1942 and 1974, and therefore may have contained hazardous building materials such as asbestos-containing materials and/ or lead based paint. The potential for deterioration or uncontrolled removal of these materials resulting in soil contamination should therefore be considered.
- Historic (circa. 1974) and recent (2017-2023) earthworks have occurred onsite, consisting of the construction of State Highway 1, the formation of a bund, and placement of asphalt / hardstand (and associated topsoil disturbance). As the source of these materials is not known, the potential for elevated levels of contaminants to be present should be considered.

## 7 SITE INSPECTION

SQN undertook a visual inspection of the site on the 27<sup>th</sup> of May 2024. The site layout has changed since the latest aerial imagery from Google Earth (2023), with the following key features noted during the inspection:

- An asphalt driveway extends from Great South Road, through the centre and towards the northern end of the site.
- The north-western portion of the site was occupied by a large area of hardstand, which extended to the centre of the site. At least two distinct types of asphalt could be observed, an older grey hardfill layer which was predominantly visible around the haybarn, and a newer black asphalt layer covered the remaining areas of the site. It appeared that the asphalt had been laid over the older layer in some areas.
- The haybarn was located in this area and was constructed of painted corrugated iron. The barn was being used for the storage of an earth moving vehicle. The exterior of the barn was surrounded by municipal refuse consisting of tyres, wood and farm gates.
- The milking shed had been removed.
- Various shipping containers and construction vehicles were stored in the hardstand area.
- Within the eastern hardfill extent, in the centre of the site, two large steel sheds were present, with the southern shed partially constructed.
- A vehicle refuelling area was located southwest of the northern shed. The refuelling area contained the following:
  - A large above-ground storage tank (AST) containing diesel and an adjacent smaller AST containing fuel additive ('Allied Blue' water and urea mixture) located on a concrete pad with crash barriers.
  - A small AST containing petrol, located on a concrete wall and surrounded by concrete walls.
  - Two small mobile diesel refuelling tanks.
  - A decommissioned underground storage tank (UST) of unknown origin (likely imported recently), which was partially covered in a bituminous mastic coating, which was identified as a potential asbestos-containing material (ACM). However, no visible signs of

bituminous debris or fuel staining were noted to the surrounding hardfill, and no signs of leaks or damage to the UST were observed.

- Several empty intermediate bulk containers (IBCs). No signs that they previously contained hazardous substances, or staining to the surrounding hardfill was noted.
- An earth bund (approximately two metres high) extended along the northern site boundary.
- Two soil stockpiles were located east of the refuelling area, similar in appearance to the earth bund.
- No signs of leachate generation or other discharges from the hardfill and soil bund were identified.

No visual or olfactory evidence of significant actual or potential contamination was identified during the site inspection. Site photographs are attached as Appendix D, and relevant site features are shown in Figure 2. It is noted that the remaining areas of the site, including the mulching business, were not inspected as part of this DSI.

## 8 SUBSURFACE AND STOCKPILE CONDITIONS

The following subsurface conditions were encountered during the investigation:

- 0.0-0.3 mbgl : Black hardfill comprising crushed asphalt and gravels
- 0.0-0.5 mbgl in : Grey-brown hardfill, comprising silt, angular gravels and crushed rock (in areas where present)
- From 0.5 mbgl: Orange-brown clay.

It is noted that while the Tisley aggregate report (2023) noted crushed concrete in some hardfill material, no significant quantities of crushed concrete or concrete fragments were identified during the investigation. No topsoil material was identified beneath the hardfill material in any test pit location.

Based on the visual inspection and discussions with the client, it is understood the two soil stockpiles comprise site-won topsoil stripped from the locations of the two new sheds (north and south sheds).

## 9 PRELIMINARY CONCEPTUAL SITE MODEL FOR POTENTIAL CONTAMINATION

Based on the findings of the desktop review and site inspection, SQN has developed the following preliminary conceptual site model (CSM) for potential contamination on the site, summarised in Table 2, and further discussed in the following sections.

**TABLE 2 PRELIMINARY CONCEPTUAL SITE MODEL**

Land Use / Activity	HAIL Item	Contaminants of Concern	Comment/ Description	Expected Distribution	Investigation Requirements
<p><b>Deteriorating &amp; Improper Demolition of Building Materials</b></p>	<p>HAIL I<sup>1</sup></p>	<p>Heavy metals &amp; asbestos</p>	<p>The haybarn and former sheds were constructed prior to 1980 and therefore may have contained hazardous substances, including lead-based paint and asbestos.</p> <p>As the nature of the removal of former structures is unknown, uncontrolled demolition resulting in soil contamination has been considered.</p>	<p>Due to low mobility of heavy metals and asbestos, contamination (if present) would be confined to surficial (&lt;75 mm) of soil in the vicinity of the building footprints. As these structures were constructed and/or removed prior to the installation of the hardfill, contaminants are expected to be present within the original topsoil material, which is understood to form the soil bund and topsoil stockpiles.</p> <p>Contaminant concentrations are expected to be negatively correlated with distance from each structure (vertically and laterally).</p>	<p>Targeted sampling of surface soils beneath hardfill material.</p> <p>Systematic sampling of relocated/ stockpiled topsoil material.</p>
<p><b>Fill Material</b></p>	<p>HAIL I</p>	<p>Heavy metals, OCPs, PAH, asbestos, pH</p>	<p>Old hardfill associated with the vehicle turning bay and milk shed, and recent hardfill (pit-run material and recycled asphalt) is present across the north-western and central portions of the site. As the sources of the hardfill cannot be verified, the potential for contamination is noted.</p> <p>Additionally, a soil bund extends across the northern site boundary.</p>	<p>The lateral distribution is shown in Figure 2. The depth is unknown; however, information contained in the Tisley aggregate report (2023) indicates that the hardfill is approximately 0.4 m with multiple aggregate layers in some areas.</p>	<p>Gridded sampling across the hardfill and soil bund areas.</p>

1. HAIL I: Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment.

The following is noted regarding the preliminary CSM:

- The two soil stockpiles comprise topsoil material sourced from an area where no HAIL activities were identified while former Shed F is located outside the development area. Therefore, soil sampling and analysis of these stockpiles and Former Shed F is not considered necessary under the current scope of works.
- While a vehicle refuelling area was identified onsite, it has been installed following placement of the hardfill material as part of the development covered under the respective resource consent, and is therefore outside the scope of this DSI. Additionally, it is noted that the ASTs were double walled and constructed on concrete pads, and no obvious signs of spills or leaks were observed.

## 10 SOIL SAMPLING AND ANALYSIS

Based on the preliminary CSM and investigation requirements noted in Section 9, SQN personnel collected a total of 22 discrete soil samples from ten test pits and eight hand auger boreholes. Of those,

- ten soil samples were collected from the hardfill - clay interface at the base of the hardfill layer,
- four were collected from the natural clay approximately 200mm below the base of the hardfill material, and
- eight were collected from random depths within the topsoil bund along the northern boundary,

Soil samples from test pit locations were collected directly from the exposed soil using a stainless-steel hand trowel. Samples from the soil bund were collected using a stainless-steel hand auger. Samples were placed directly into laboratory supplied sample containers labelled with the date, sample identification number, location, and initials of the sampler.

Soil sampling equipment was decontaminated in between samples using a soft soap solution in accordance with SQN internal quality control procedures. The soil sampling was conducted in accordance with the CLMG No. 5 *Site Investigation and Analysis of Soils* (MfE, 2021b).

Soil sample locations are shown in Figure 3, and the sample analytical schedule is summarised in Table 3.

**TABLE 3 SOIL SAMPLING AND ANALYTICAL SCHEDULE**

Location/Area	Soil Sample No.	Depth	Analytes
Hardfill (test pits)	SS1a, SS2a, SS3a, SS4a, SS6a, SS8a, SS9a, SS10a, SS12a, SS13a	Hardfill Base	Heavy metals / PAHs / Asbestos
	SS3 – SS5, S11	Clay 200mm below Interface	Heavy metals / OCPs / Asbestos
Soil Bund (hand augers)	SS14 - SS21	N/A	Heavy metals / OCPs / Asbestos

Notes:

1. PAHs = Polycyclic Aromatic Hydrocarbons; OCPs = Organochlorine Pesticides
2. N/A = Not Applicable

3. Asbestos (presence / absence)

## 11 LABORATORY ANALYSIS AND ACCREDITATION

The laboratory supplied sample containers were placed in a box with ice and a chain of custody document (COC) indicating the analysis to be performed, as summarised in Table 3, and were dispatched to Eurofins Environmental Testing in Auckland for analysis.

Eurofins Environmental Testing are accredited by International Accreditation New Zealand for the analysis conducted.

### 11.1 QUALITY ASSURANCE AND QUALITY CONTROL

SQN field staff are appropriately qualified, suitably trained and experienced in undertaking contaminated land assessments. Personnel are cognisant of the requirements for sample handling and storage, and equipment decontamination procedures alongside completion of field assessments, notes and record keeping and documentation.

During this assessment, appropriate sample handling and storage protocols were followed to ensure sample integrity was maintained during sampling and transport while laboratory analysis has been undertaken at an IANZ accredited laboratory.

It is noted that Eurofins' internal duplicate analysis for chromium reported a relative percentage difference (RPD) outside the acceptance limits (49% vs 30%); however, noted sample heterogeneity as the cause. As the percent spike recovery was within the acceptable limits and reported chromium concentrations were well within the applicable standards (environmental and human health), the failure is considered to have less than minor implications.

Consequently, it is considered that appropriate QA/QC has been met for this investigation.

### 11.2 ACCEPTANCE CRITERIA AND RELEVANT GUIDELINES

In accordance with CLMG No. 2 *Hierarchy and Application in New Zealand of Environmental Guideline Values* (Revised 2011), the guideline values summarised in Table 4 below have been adopted for the site.

**TABLE 4 ADOPTED GUIDELINE VALUES**

Assessment Category	Reference Document
<b>Human Health</b>	<ol style="list-style-type: none"> <li>1. NES, Soil Contaminant Standards for commercial / industrial land use.</li> <li>2. Australian National Environment Protection Council, <i>National Environment Protection (Assessment of Site Contamination) Measure (NEPM)</i>, Health Investigation Levels (HILs) for Commercial / Industrial land use.</li> <li>3. BRANZ, <i>New Zealand Guidelines for Assessing and Managing Asbestos in Soil</i>, asbestos thresholds for commercial / industrial land use.</li> </ol>
<b>Environmental Protection</b>	AUP(OP), Chapter E30, permitted activity soil acceptance criteria.
<b>Natural Background Concentrations</b>	Auckland Regional Council TP153 (2001) <i>Background Ranges of Trace Elements in Auckland Soils</i> , for non-volcanic soils.

## 12 ANALYTICAL RESULTS

A comparison of the analytical results with the relevant guideline criteria is provided in Tables 5 – 7 below. Copies of the laboratory chain of custody document (COC) and analytical transcripts are attached in Appendix D, while a discussion of the results is provided below.

### 12.1 ANALYTICAL RESULTS DISCUSSION

No contaminant concentrations were reported above the applicable human health or environmental protection criteria.

Reported concentrations of arsenic in nine samples and lead in two samples exceeded the expected natural background concentrations for the site, with one of those samples exhibiting both elevated arsenic and lead (ten samples in total). It is noted that only one of these samples was collected from the interface between the hardfill material and underlying clay (SS13a), with two from the underlying clay, and the remaining seven from the soil bund.

Additionally, total DDT concentrations in two samples from the soil bund were reported marginally above the laboratory limit of detection but within the recognised ambient concentrations for soils in the Auckland Region. No asbestos or PAHs were detected in any sample.

While concentrations of arsenic and lead were detected above the expected background concentration ranges, all were at or within even the most conservative soil contaminant standard of the NES (rural residential / lifestyle block land use). With the exception of one lead concentration (sample SS13a), the elevations of arsenic and lead were marginal relative to the background range upper limits. While concentrations of arsenic and lead are present above the expected background concentrations, there is insufficient data to infer a potential source of elevations (pesticide use vs building material degradation); however, as most elevations were within the scraped topsoil and not in material that may have been influenced by imported hardfill material, it is concluded that the elevations were present prior to hardfill importation and were not caused as a result of its placement.

**TABLE 5 ANALYTICAL RESULTS – HEAVY METALS<sup>1</sup>**

Sample ID	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
<b>Hardfill - Clay Interface</b>								
SS1a	10	0.08	25	24	18	0.11	19	88
SS2a	8.5	0.08	89	30	21	0.21	40	79
SS3a	3.6	0.06	26	27	15	0.04	41	65
SS4a	10	0.11	26	25	14	0.05	28	89
SS6a	3.4	0.05	13	14	5.6	< 0.01	16	40
SS8a	4.2	0.08	27	23	9.5	0.04	32	59
SS9a	9.1	0.12	34	31	14	0.06	41	90
SS10a	6.3	0.12	32	27	12	0.05	36	75
SS12a	6.8	0.11	29	29	57	0.07	42	74
SS13a	4.7	0.09	29	29	<b>120</b>	0.06	44	69
<b>Subgrade Clay</b>								
SS3	8.2	0.25		39	36			87
SS4	<b>17</b>	< 0.01		45	41			86
SS5	<b>14</b>	0.05		34	38			61
SS11	12	0.08	31	38	33	0.29	13	77
<b>Soil Bund</b>								
SS14	<b>16</b>	0.36		37	<b>66</b>			100
SS15	12	0.33		29	39			68
SS16	<b>17</b>	0.36		34	58			110
SS17	<b>13</b>	0.57		38	55			84
SS18	<b>14</b>	0.32		42	44			100
SS19	<b>14</b>	0.52		34	60			100
SS20	<b>13</b>	0.4		37	43			87
SS21	<b>16</b>	0.45		37	49			90
NES <sup>2</sup>	70	1,300	6,300	>10,000	3,300	4,200	4,000 <sup>5</sup>	400,000 <sup>5</sup>
AUP(OP) <sup>3</sup>	100	7.5	400	325	250	0.75	105	400
Background <sup>4</sup>	12	0.65	125	90	65	0.45	320	1,160

**Notes:**

- All metal concentrations measured in mg/kg, unless otherwise specified
- NES, Soil Contaminant Standards for commercial / industrial land use.
- AUP (OP), Chapter E30, permitted activity soil acceptance criteria (Table E30.6.1.4.1).
- Auckland Regional Council Technical Publication No.153 (2001), upper limits, volcanic soils.
- NEPM, HILs for commercial / Industrial land use (Table 1A(1))
- Total ΣDDT includes the sum of DDT, DDD and DDE isomers.
- Values in **RED** exceed the NES criteria, values **UNDERLINED BLUE** exceed the AUP(OP) criteria, Values in **BOLD** exceed the Background Ranges.

TABLE 6 ANALYTICAL RESULTS – PAHS AND OCPs<sup>1</sup>

Sample ID	B(a)P TEQ <sup>1</sup>	Sample ID	Total ΣDDT <sup>2</sup>
<u>Hardfill - Clay Interface</u>		<u>Subgrade Clay</u>	
SS1a	< 0.3	SS5	< 0.01
SS2a	< 0.3	SS3	< 0.01
SS4a	< 3	SS4	< 0.01
SS6a	< 0.3	SS11	< 0.03
SS8a	< 3	<u>Soil Bund</u>	
SS9a	< 3	SS14	< 0.01
SS10a	< 3	SS15	< 0.01
SS12a	< 3	SS16	< 0.01
SS13a	< 3	SS17	< 0.01
		SS18	0.03
		SS19	0.03
		SS20	< 0.01
		SS21	< 0.01
NES <sup>4</sup>	35	NES <sup>4</sup>	1,000
AUP(OP) <sup>5</sup>	20.0	AUP(OP) <sup>5</sup>	12.0
Background <sup>6</sup>	N/A	Background <sup>6</sup>	0.07 <sup>7</sup>

**Notes:**

- All samples measured in mg/kg.
- Laboratory limit of reporting (LOR) raised in select samples due to matrix interference.
- Total ΣDDT includes the sum of DDT, DDD and DDE isomers.
- NES, Soil Contaminant Standards for commercial / industrial land use.
- Auckland Council (2013), Auckland Unitary Plan (Operative in Part) (AUP (OP), Auckland, New Zealand.
- Auckland Regional Council Technical Publication No.153 (2001), *Background Concentrations of Trace Elements in Soils from the Auckland Region*, Table 3 (non-volcanic soils).
- MfE (1998) *Ambient concentrations of selected organochlorines in soils*, Table F4 max. ΣDDT detected in metropolitan Auckland soils (Tamaki/Maungakiekie (residential)
- Values in **RED** exceed the NES criteria, values UNDERLINED BLUE exceed the AUP (OP) criteria, Values in **BOLD** exceed the background ranges.
- NA = Not applicable / NL = No Limit / ND= not detected

TABLE 7 ANALYTICAL RESULTS – ASBESTOS

Sample ID	Asbestos (Presence/Absence) <sup>1</sup>
<u>Hardfill - Clay Interface</u>	
SS3a	ND
SS4a	ND
SS8a	ND
SS9a	ND
SS10a	ND
SS12a	ND
SS13a	ND
<u>Subgrade Clay</u>	
SS5	ND
<u>Soil Bund</u>	
SS15	ND
SS18	ND
SS20	ND
NES <sup>2</sup>	<0.01
AUP(OP) <sup>3</sup>	N/A
Background <sup>4</sup>	N/A

**Notes:**

1. Presence/absence analysis only. Measured in % w/w.
2. BRANZ (2017), *New Zealand Guidelines for Assessing and Managing Asbestos in Soils*,
3. Asbestos not considered an environmental contaminant of concern.
4. No naturally occurring asbestos expected on site.
5. Values in **RED** exceed the NES criteria, values UNDERLINED BLUE exceed the AUP (OP) criteria, Values in **BOLD** exceed the background ranges.
6. NA = Not applicable / NL = No Limit / ND= not detected

### 13 SOIL CONTAMINATION RISK ASSESSMENT & UPDATED CONCEPTUAL SITE MODEL

For actual or potential soil contamination to pose a risk to current or end land users, and/or the receiving environment, a source-pathway-receptor relationship pathway must exist. Following the completion of visual inspection of the site, intrusive investigation, and assessment of analytical results received, the CSM and risk associated with soil contamination has been revised, as detailed in Table 8 and Table 9. These tables outline the source-receptor pathways and their associated potential risks where controls are not in place.

**TABLE 8      UPDATED CONCEPTUAL SITE MODEL – ONSITE RECEPTORS**

Final Receptor	Source / Contaminants	Predominant Pathway(s)	Complete (Yes / No)	Risk
Site Workers	Heavy metals, OCPs, PAHs	Soil contact / dust inhalation / ingestion	No – Reported concentrations are below the human health guideline values	N/A
	Asbestos	Inhalation	No – No asbestos detected	N/A
Ecological Receptors	Heavy metals, OCPs, PAHs	Soil contact through incorrect disposal, entrainment in surface water	No – Reported concentrations are below the environmental guideline values	N/A

**Note:**

1. Risk calculated using a 5x5 risk matrix (likelihood of an effect occurring vs the severity of the consequence), with risk ratings of very low to critical, or not applicable (N/A) where no contaminant source is present. Risk matrix derived from <https://www.sitesafe.org.nz/guides--resources/practical-safety-advice/risk-control/>.

**TABLE 9**      **UPDATED CONCEPTUAL SITE MODEL – OFF-SITE RECEPTORS**

<b>Final Receptor</b>	<b>Source / Contaminants</b>	<b>Predominant Pathway(s)</b>	<b>Complete (Y/N)</b>	<b>Risk</b>
<b>Neighbouring residential occupants</b>	Heavy metals, OCPs, PAHs	Soil contact / dust inhalation / ingestion	No – Reported concentrations are below the human health guideline values	N/A
	Asbestos	Inhalation	No – No asbestos detected	N/A
<b>Ecological Receptors</b>	Heavy metals, OCPs, PAHs	Soil contact through incorrect disposal, entrainment in surface water	No – Reported concentrations are below the environmental guideline values	N/A

**Note:**

1. Risk calculated using a 5x5 risk matrix (likelihood of an effect occurring vs the severity of the consequence), with risk ratings of very low to critical, or not applicable (N/A) where no contaminant source is present. Risk matrix derived from <https://www.sitesafe.org.nz/guides--resources/practical-safety-advice/risk-control/>.

### 13.1 IMPORTED HARDFILL MATERIAL

Observations of the hardfill material on site made by SQN and Tilsley Engineering Ltd were consistent. A weathered aggregate hardfill material with silt fines was observed in the footprint of the pre-existing turning bay, with recently imported hardfill comprising blue aggregates, brown rock, and crushed concrete overlain by a thin layer (50mm - 200mm) of reclaimed asphalt pavement (RAP, 'road millings'). No refuse or building materials were noted.

The bulk of the hardfill material appeared to be crushed rock (brown or blue), with crushed concrete forming only a minor portion. Most material was medium to coarse gravel (6mm - 60mm), with some cobbles (60mm - 200mm) and minor boulders (> 200mm). The surface layer of RAP was consistent with road millings (10mm - 40mm) with a black bituminous appearance.

Numerous investigations have been undertaken internationally into the potential for RAP and crushed concrete to generate leachate capable of impacting the surrounding environment. Concrete crushing may increase the pH of water or soil, with the effects increasing as particle size decreases (increasing surface area). Given the limited volume of crushed concrete noted in the hardfill material and lack of on-site crushing, it is highly unlikely that the crushed concrete present in the hardfill material will influence the pH of the surrounding environment. Conversely, leachate generation from RAP increases under acidic conditions (pH < 5), with little to no leachate generated under normal rainfall conditions.

Based on site observations, analytical results, and expected environmental conditions, it is highly unlikely that the hardfill material imported to and placed on site has, or will, present a risk to environmental health. SQN therefore do not regard the importation of hardfill material to site as sufficient to trigger classification under the MfE HAIL and no removal of material from site is deemed necessary.

## 14 CONCLUSIONS

Based on the findings of the investigation, the following conclusions are made:

- The desktop review determined that the following potential HAIL I activities may have occurred within the north-western and central portions of the site (Investigation Area):
  - The deterioration building materials of the current and former site structures, and the potential for the uncontrolled demolition of the former site structures may have occurred. These activities have the potential to cause soil contamination.
  - The formation of a soil bund and placement of hardfill has occurred at the site, and the sources of the materials cannot be confirmed.
- Laboratory analysis of the site soils within the Investigation Area did not identify any contaminants at concentrations that would present a risk to human health or the environment, confirming that the importation of hardfill is not a HAIL activity (Items G.3 or I).
- Various contaminant concentrations were elevated above the expected natural background levels for the site; however, these elevations are not attributable to the importation of hardfill material.
- While the soil bund materials do not meet the cleanfill definition, based on the findings of this DSI it is considered likely that this material (and the two soil stockpiles) are site-sourced topsoil materials removed during the placement of the hardfill material, and construction of the north and south sheds. Therefore, removal of this material is not considered necessary.

- As no exceedances of the applicable human health and environmental guidelines were reported, no remediation or specific site management controls are required.
- Based on the findings of this DSI, no 'non-compliant' materials have been identified, and the hardfill and soil bund materials are considered suitable for retention onsite.

As potential HAIL activities were suspected at the site, the Regulations of the NES and contaminated land rules of the AUP(OP) must be addressed, as discussed below.

#### **14.1 THE NATIONAL ENVIRONMENTAL STANDARDS (NES)**

While analytical results indicate that the importation of hardfill material or degradation of former structures are not sufficient to trigger HAIL classification, the establishment of the commercial yard on site has introduced HAIL activities (Item F.8) without a preliminary site investigation being undertaken prior to its establishment. Therefore, at the time of this investigation, the site is considered 'land covered' under Regulation 5(7).

While this DSI has identified concentrations of contaminants above the expected natural ranges in soil disturbed during earthworks subject to the retrospective consent application, the reported contaminant concentrations do not exceed the applicable standard defined by Regulation 7(2). Therefore, retrospective resource consent will be required as a controlled activity under Regulation 9 of the NES due to the significant volume of soil disturbed.

As this DSI did not identify contaminant concentrations above the applicable human health guideline values under Regulation 7(2), remediation of the assessed materials is not required.

#### **14.2 THE AUCKLAND UNITARY PLAN (OPERATIVE IN PART) (AUP(OP))**

As no soil sample returned concentrations of any contaminant of concern in excess of the AUP(OP) permitted activity soil acceptance criteria, the piece of land does not meet the Auckland Council definition of "*land containing elevated levels of contaminants*", consequently, the contaminated land rules of Chapter E.30 of the AUP(OP) will not be applicable.

Based on the visual inspection and final analytical results for the imported hardfill material, this material is considered suitable for classification as 'cleanfill', as defined in Chapter J of the AUP(OP).

#### **14.3 OFF-SITE DISPOSAL**

Acceptance of any soil removed from site by a receiving facility will be at the facility's discretion, subject to their site-specific consent requirements. However, based on the findings of the DSI, topsoil material across the Investigation Area is likely suitable for classification as managed fill. This material is considered suitable for retention and reuse onsite.

## 15 REFERENCES

1. Auckland Council (2013) – *Auckland Unitary Plan (Operative in Part)*, Auckland, New Zealand.
2. Auckland Regional Council (2001) – *Background Concentrations of Inorganic Elements in Soils from the Auckland region (TP153)* – Auckland.
3. Auckland Council (2011) - *Auckland Council GEOMaps*. <http://geomapspublic.aucklandcouncil.govt.nz/viewer/index.html>
4. GNS Science (2020) – *Geological Map of New Zealand Online Database (1:250K)*.
5. Ministry for the Environment (2021a) – *Contaminated Land Management Guidelines No.1: Reporting on contaminated Sites in New Zealand*. Ministry for the Environment, Wellington, New Zealand.
6. Ministry for the Environment (2011a) – *Contaminated Land Management Guidelines No.2: Hierarchy and Application in New Zealand of Environmental Guideline Values*. Ministry for the Environment, Wellington, New Zealand.
7. Ministry for the Environment (2021b) – *Contaminated Land Management Guidelines No.5: Site Investigation and Analysis of Soils*. Ministry for the Environment, Wellington, New Zealand.
8. Ministry for the Environment (2011b) – *Hazardous Activities and Industries List (HAIL)*, Ministry for the Environment, Wellington, New Zealand, October.
9. Ministry for the Environment (2011c) – *Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand*. Ministry for the Environment, Wellington, New Zealand.
10. Ministry for the Environment (2011d) – *Methodology for Deriving Standards for contaminants in Soil to Protect Human Health*. Ministry for the Environment, Wellington, New Zealand.
11. Resource Management (*National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health*) Regulations 2011.
12. SiteSafe, Guides & Resources, Practical Safety Advice, Risk Control, <https://www.sitesafe.org.nz/guides--resources/practical-safety-advice/risk-control/>.
13. USEPA (2022) – *ProUCL: Statistical Software for Environmental Applications for Data Sets with and without Nondetect Observations*. Version 5.2. <https://www.epa.gov/land-research/proucl-software>.

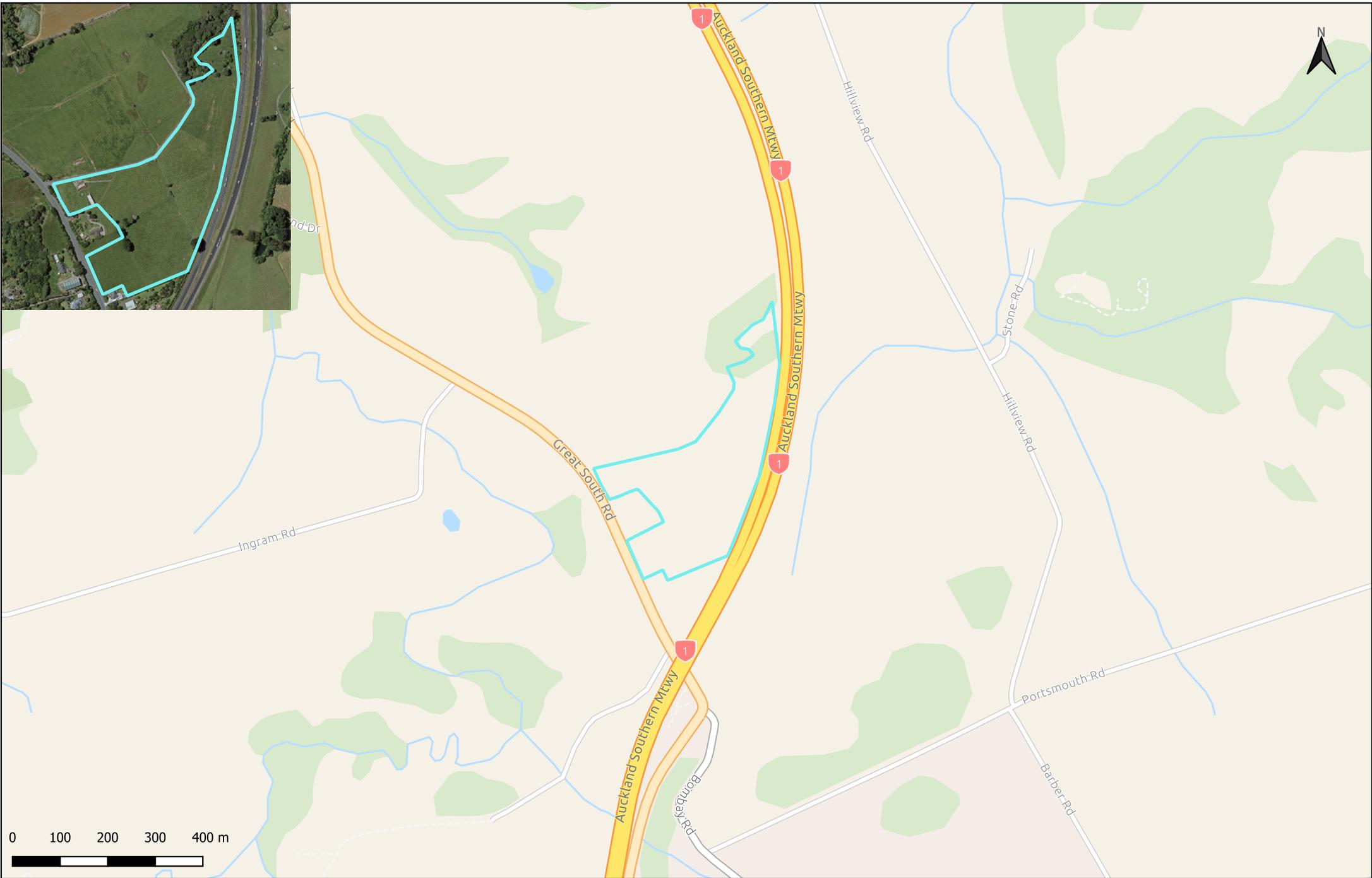
## 16 LIMITATIONS

The conclusions and all information in this Report are given strictly in accordance with and subject to the following limitations and recommendations:

1. The assessment undertaken to form this conclusion is limited to the scope of work agreed between SQN and the client, or the client's agent as outlined in this Report. This report has been prepared for the sole benefit of the client and neither the whole nor any part of this report may be used or relied upon by any other party except for Regional and Territorial authorities in their duties under the Resource Management Act 1991.
2. The investigations carried out for the purposes of the report have been undertaken, and the report has been prepared, in accordance with normal prudent practice and by reference to applicable environmental regulatory authority and industry standards, guidelines and assessment criteria in existence at the date of this report.
3. This report should be read in full and no excerpts are to be taken as representative of the findings. No responsibility is accepted by SQN for use of any part of this report in any other context.
4. This Report was prepared on the dates and times as referenced in the report and is based on the conditions encountered on the site and information reviewed during the time of preparation. SQN accepts no responsibility for any changes in site conditions or in the information reviewed that have occurred after this period of time.
5. Where this report indicates that information has been provided to SQN by third parties, SQN has made no independent verification of this information except as expressly stated in the report. SQN assumes no liability for any inaccuracies in or omissions to that information.
6. Given the limited Scope of Works, SQN has only assessed the potential for contamination resulting from past and current known uses of the site.
7. Environmental studies identify actual sub-surface conditions only at those points where samples are taken and when they are taken. Actual conditions between sampling locations or differ from those inferred. The actual interface between materials may be far more gradual or abrupt than an assessment indicates. Actual conditions in areas not sampled may differ from that predicted. Nothing can be done to prevent the unanticipated and SQN does not guarantee that contamination does not exist at the site.
8. Except as otherwise specifically stated in this report, SQN makes no warranty or representation as to the presence or otherwise of asbestos and/or asbestos containing materials ("ACM") on the site. If fill has been imported on to the site at any time, or if any buildings constructed prior to 1 January 2000 have been demolished on the site or materials from such buildings disposed of on the site, the site may contain asbestos or ACM .
9. No investigations have been undertaken into any off-site conditions, or whether any adjoining sites may have been impacted by contamination or other conditions originating from this site. The conclusion set out above is based solely on the information and findings contained in this report.
10. Except as specifically stated above, SQN makes no warranty, statement or representation of any kind concerning the suitability of the site for any purpose or the permissibility of any use, development or re-development of the site.
11. The investigation and remediation of contaminated sites is a field in which legislation and interpretation of legislation is changing rapidly. Our interpretation of the investigation findings should not be taken to be that of any other party. When approval from a statutory authority is required for a project, that approval should be directly sought by the client.
12. Use, development or re-development of the site for any purpose may require planning and other approvals and, in some cases, environmental regulatory authority and accredited site auditor approvals. SQN offers no opinion as to whether the current use has any or all approvals required, is operating in accordance with any approvals, the likelihood of obtaining any approvals, or the conditions and obligations which such approvals may impose, which may include the requirement for additional environmental works.
13. SQN makes no determination or recommendation regarding a decision to provide or not to provide financing with respect to the site. The on-going use of the site and/or use of the site for any different purpose may require the owner/user to manage and/or remediate site conditions, such as contamination and other conditions, including but not limited to conditions referred to in this report.
14. Except as required by law or for the purposes of Regional & Territorial Authorities discharging their duties under the Resource Management Act 1991, no third party may use, or rely on, this report unless otherwise agreed by SQN in writing. Where such agreement is provided, SQN will provide a letter of reliance to the agreed third party in the form required by SQN.
15. To the extent permitted by law, SQN expressly disclaims and excludes liability for any loss, damage, cost or expenses suffered by any third party relating to or resulting from the use of, or reliance on, any information contained in this Report. SQN does not admit that any action, liability or claim may exist or be available to any third party.
16. Except as specifically stated in this section regarding Regional and Territorial Authorities, SQN does not authorise the use of this report by any other third party.

## FIGURES

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**SQN**  
GeoSciences

Building 1, 1 William Pickering Drive,  
Rosedale, Auckland, 0632  
PO Box 45053, Waterloo, Lower Hutt, 5042  
Tel: 0800 333 287

**SITE LOCATION**

**1799A Great South Road, Bombay**

DRAWN LC      APPROVED CD

NOTES

JOB No. J240443      DATE 2024-07-03

SCALE 1:10,000 (A4) | Inset 1:10,000 (A4)

DWG No. Figure 1      REV 0

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# Legend

- Site Boundary
  - Site Buildings
  - Former Structures
  - Leased Mulching Business
- Earthworks Areas**
- Aggregate Hardstand
  - Topsoil Bund
  - Topsoil Stockpile
  - ◆ Refuelling Area

**Current Buildings:**

- 1: Haybarn (1974)
- 2: Demountable
- 3: North Shed
- 4: South Shed

**Former Structures:**

- A: Shed (1942-2023)
- B: Shed (1942-1960)
- C: Shed (1942-1960)
- D: Milking Shed (1960-2023)
- E: Shed (1974-1979)
- F: Shed (1974-1979)

0      25      50      75      100 m



Building 1, 1 William Pickering Drive,  
 Rosedale, Auckland, 0632  
 PO Box 45053, Waterloo, Lower Hutt, 5042  
 Tel: 0800 333 287

**SITE FEATURES**

**1799A Great South Road, Bombay**

DRAWN LC      APPROVED CD

NOTES

JOB No. J240443      DATE 2024-07-02

SCALE 1:1500 (A4)

DWG No. Figure 2      REV 0



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# Legend

- Site Boundary
- Investigation Area
- Site Buildings
- Former Structures
- Test Pit Locations
- Borehole Locations

## Earthworks Areas

- Aggregate Hardstand
- Topsoil Bund
- Topsoil Stockpile



**SQN**  
GeoSciences

Building 1, 1 William Pickering Drive,  
Rosedale, Auckland, 0632  
PO Box 45053, Waterloo, Lower Hutt, 5042  
Tel: 0800 333 287

<b>SAMPLE LOCATIONS</b>
<b>1799A Great South Road, Bombay</b>

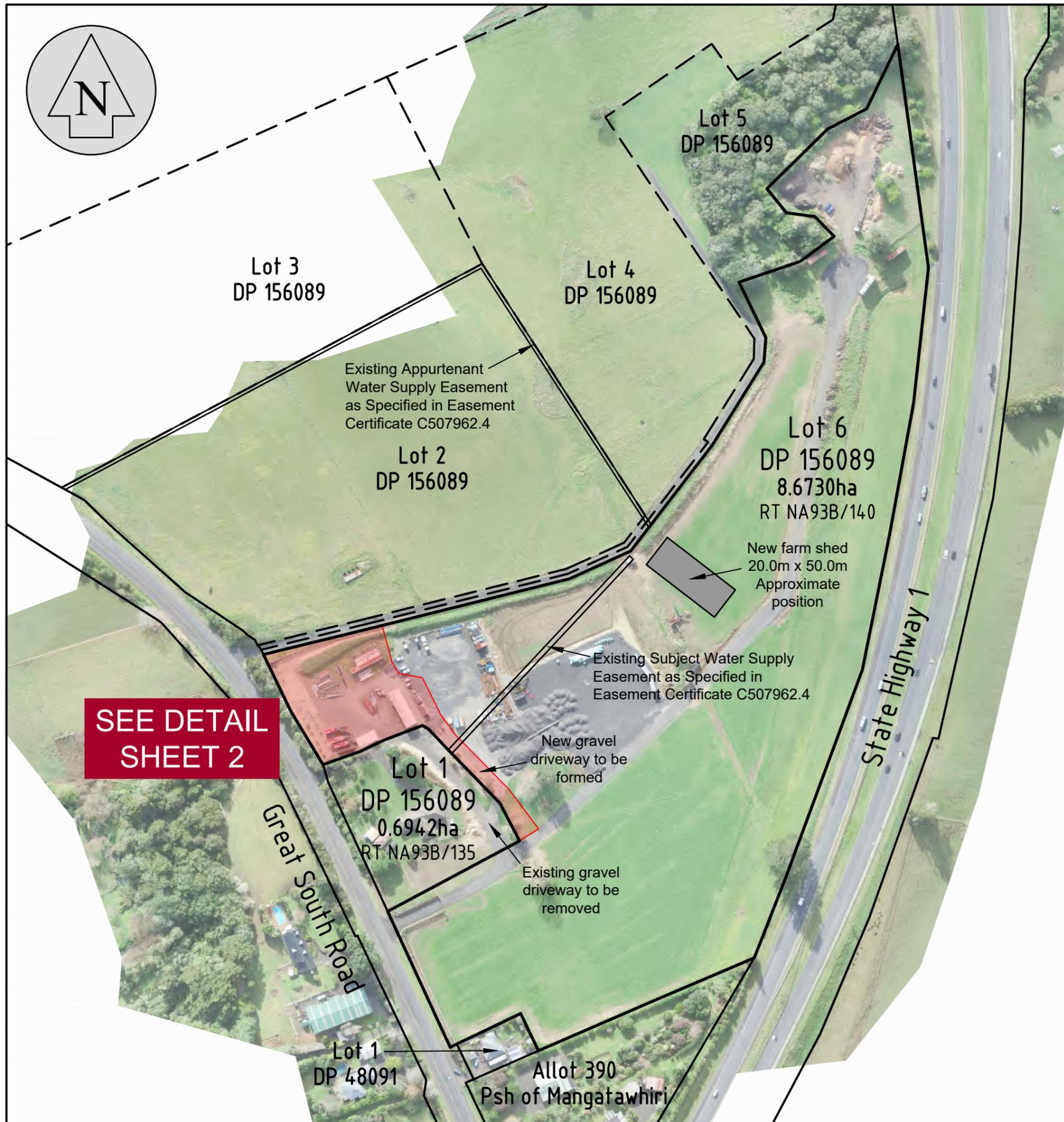
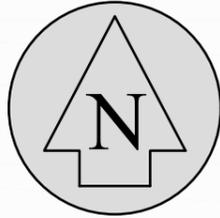
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NOTES	

JOB No.	J240443	DATE	2024-07-03
SCALE	1:1700 (A4)		
DWG No.	Figure 3	REV	0

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## APPENDIX A PROPOSED SCHEME PLAN

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**LOCAL AUTHORITY** : AUCKLAND COUNCIL  
**ZONING** : RURAL - MIXED RURAL ZONE  
**TOTAL AREA** : 8.6730ha  
**COMPRISED IN** : RT NA93B/140  
**REGISTERED OWNERS** : C.G. VERNON, R.K. VERNON & CG VERNON KW TRUSTEE LIMITED

**SHEET 1 OF 2**

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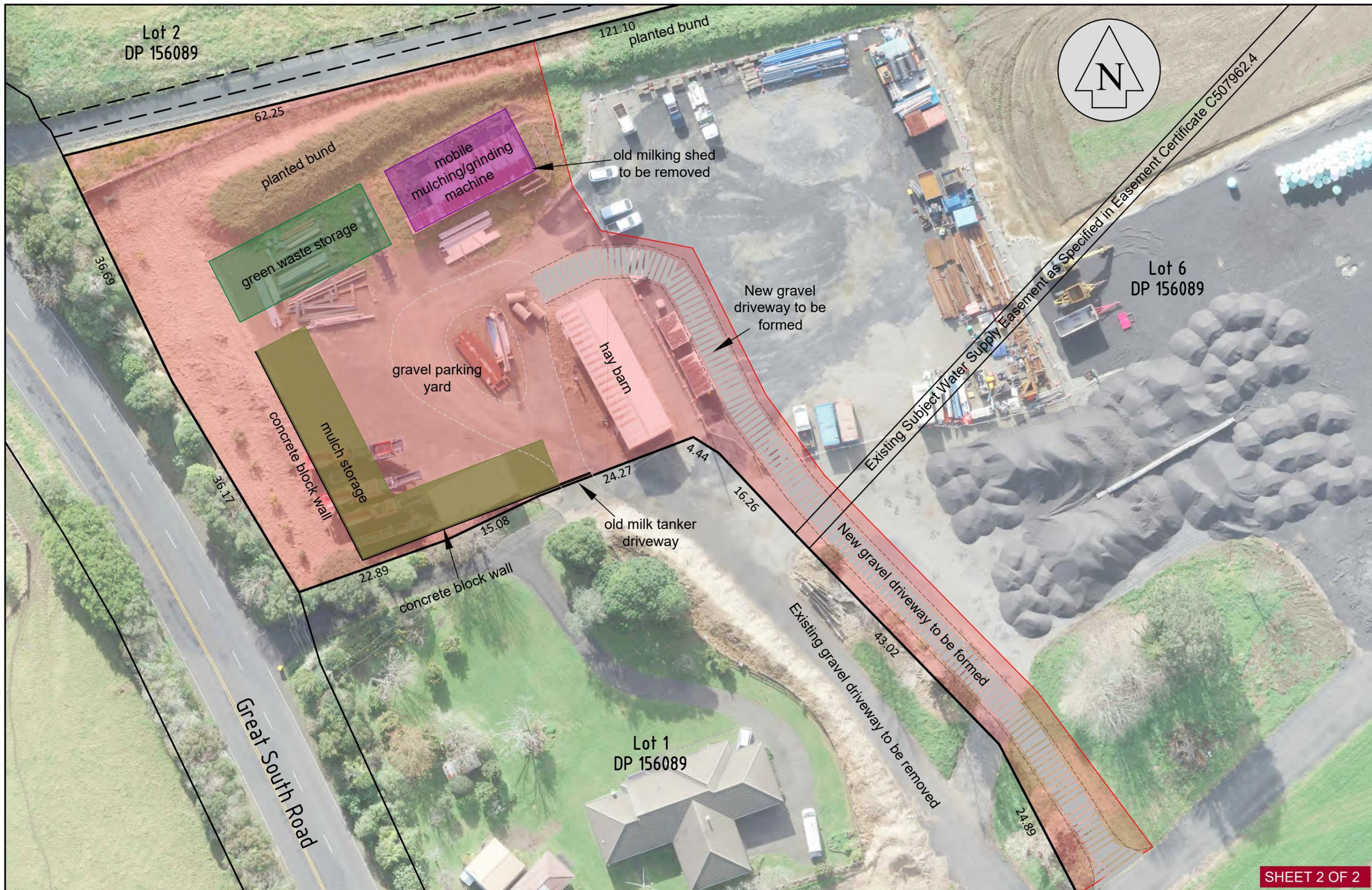
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**VERNON DEVELOPMENTS LIMITED**

**PROPOSED RURAL CONTRACTING BUSINESS AT  
 1799A GREAT SOUTH ROAD, BOMBAY.**

**PROPOSED DEVELOPMENT PLAN**

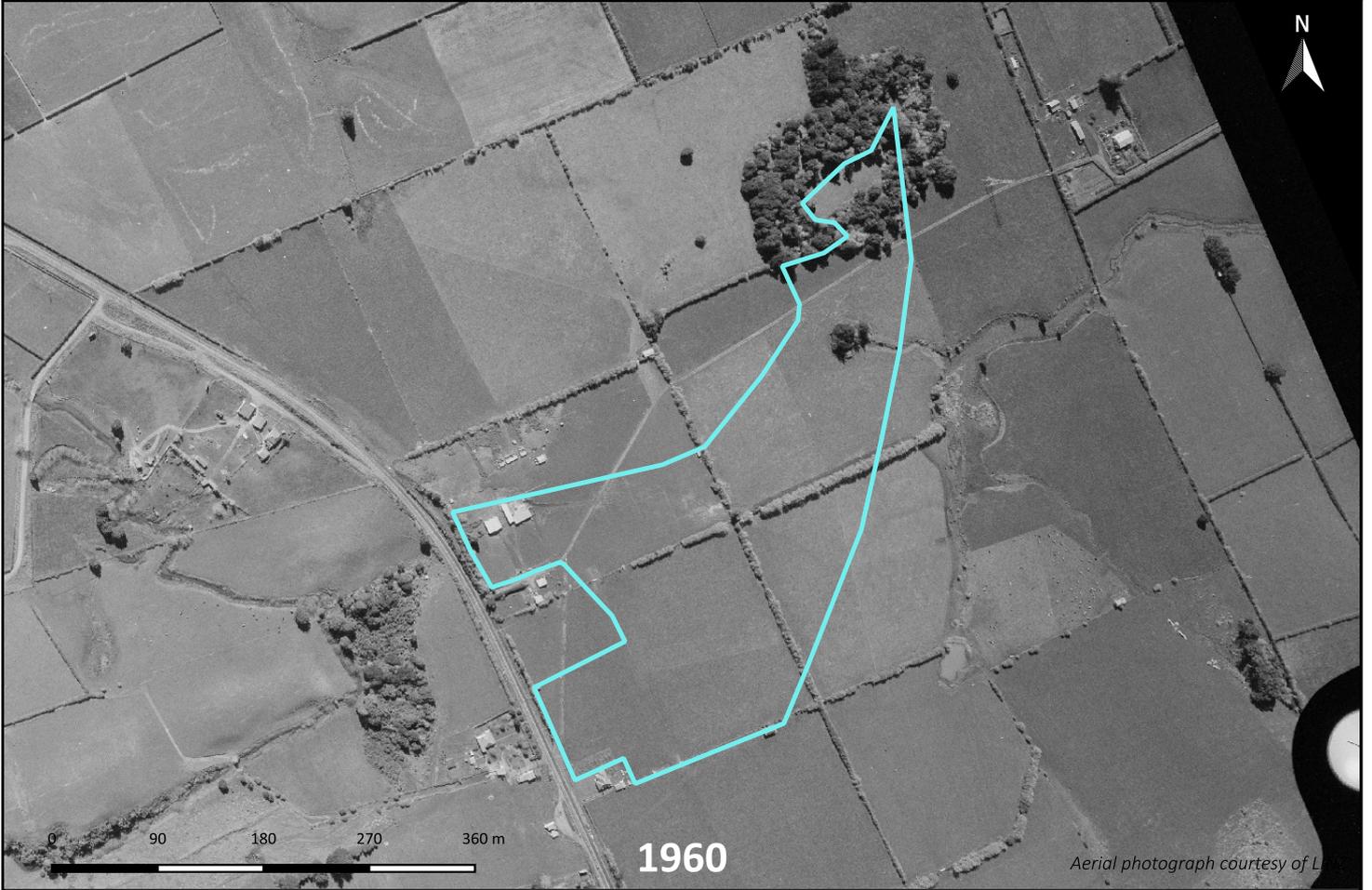
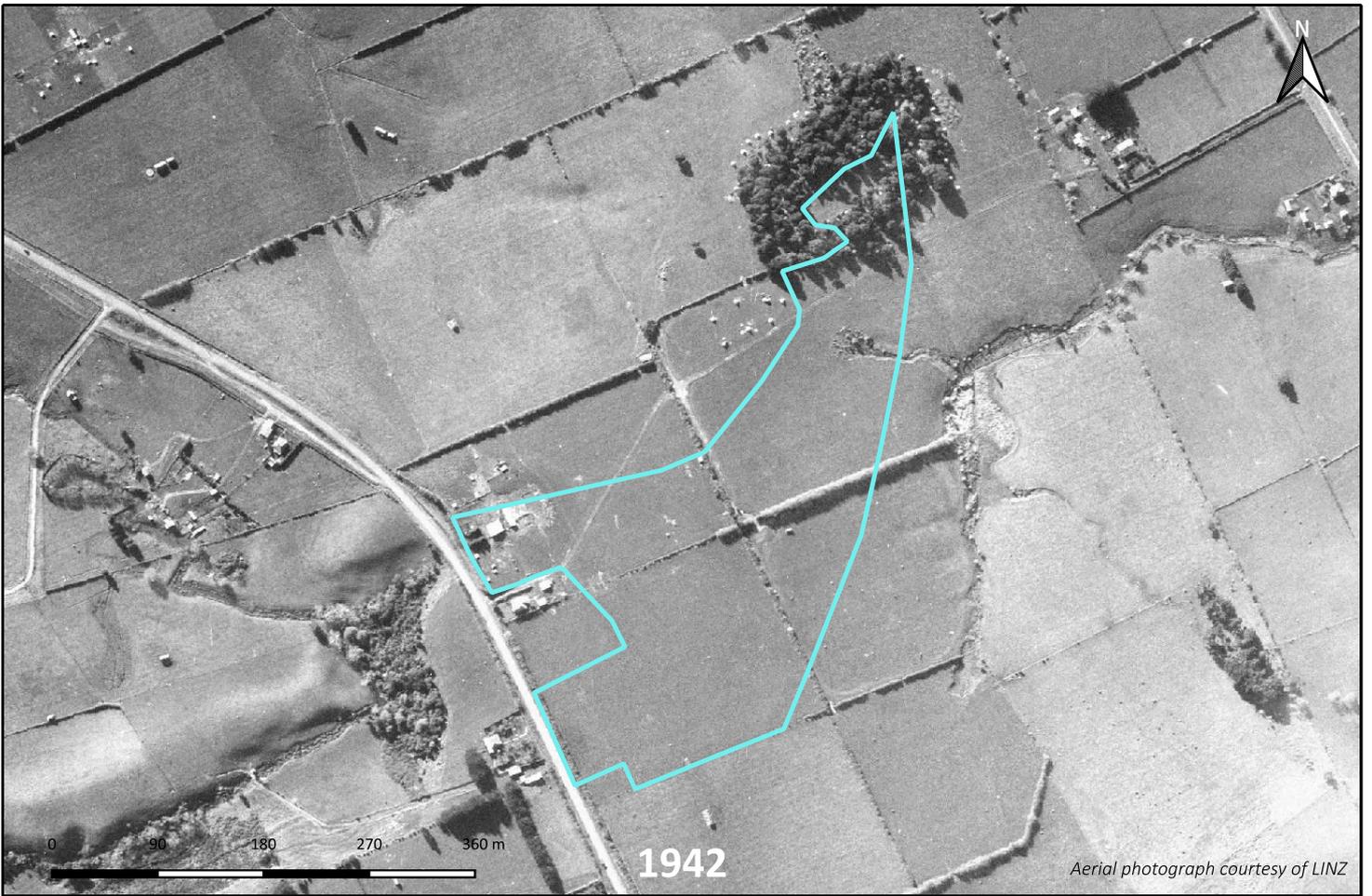
Drawn By MF	J1612 - PROPOSED DEVELOPMENT PLAN	
Scale @A3 1 : 2500	DEC 2023	J1612



SHEET 2 OF 2

## APPENDIX B HISTORICAL AERIAL PHOTOGRAPHS

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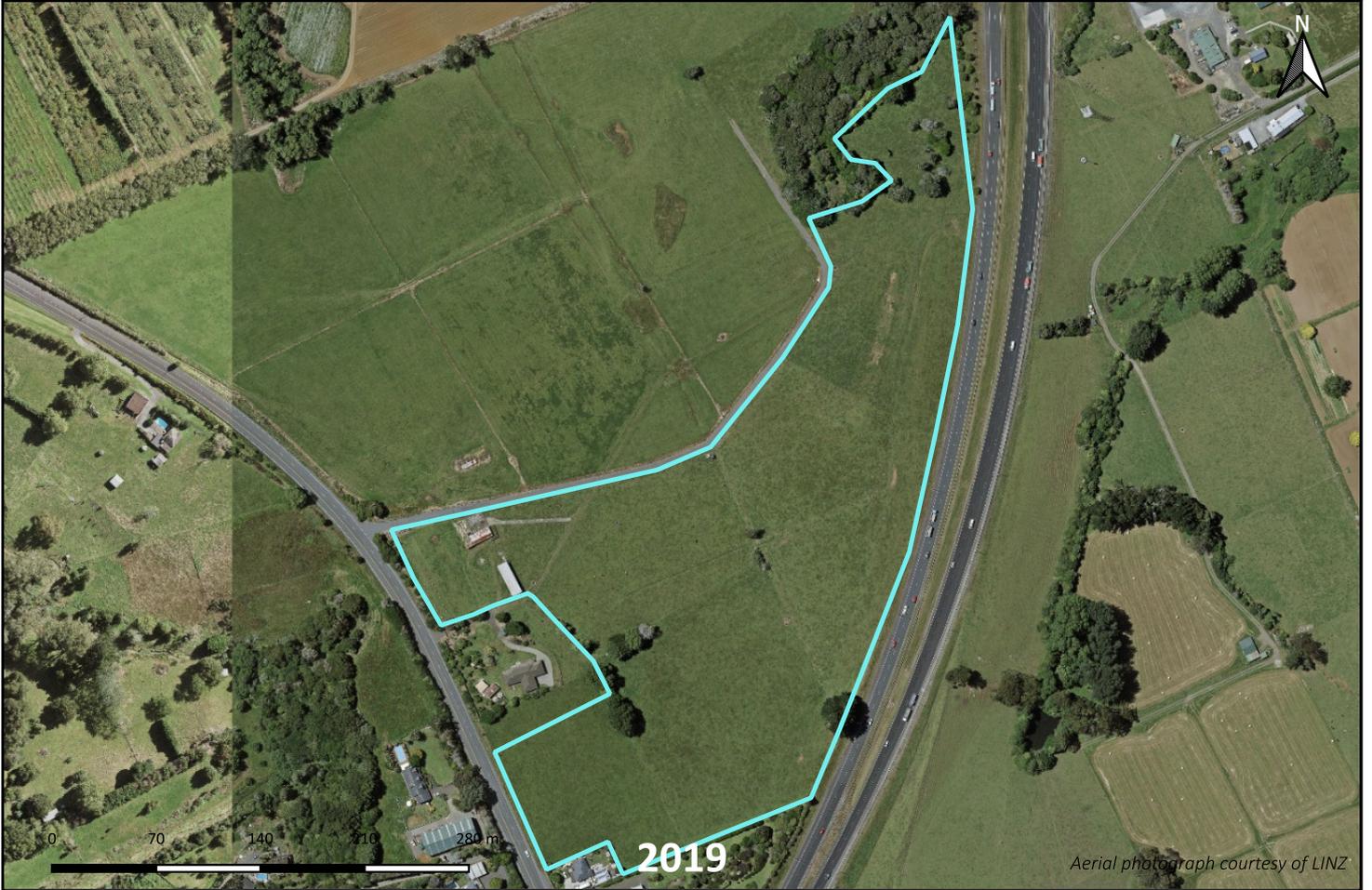
Aerial photograph courtesy of LINZ



Aerial photograph courtesy of LINZ



Aerial photograph courtesy of LINZ



Aerial photograph courtesy of LINZ



## APPENDIX C SITE PHOTOGRAPHS

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**PLATE 1:** View of the south-western extent of hardfill.



**PLATE 2:** View of the north-western extent of hardfill, showing the pit-run material overlain with recycled asphalt hardfill.



**PLATE 3:** View of the Haybarn and surrounding hardfill area, showing the pit-run material overlain with recycled asphalt hardfill.



**PLATE 4:** View of central portion of hardfill extent at the site.



**PLATE 5:** View of north-eastern hardfill extent and northern soil stockpile.



**PLATE 6:** View of AST, fuel additive tank and mobile tank within vehicle refuelling area



**PLATE 7:** View of second AST (concrete enclosed), decommissioned UST and empty IBCs in vehicle refuelling area.



**PLATE 8:** View of southern soil stockpile.



**PLATE 9:** View of hardfill area between the north and south sheds, with demountable building in the background.



**PLATE 10:** View of south shed under construction.



**PLATE 11:** View of central portion of the soil bund.



**PLATE 12:** View of the eastern portion of the soil bund.



**PLATE 13:** Photo of test pit SS1.



**PLATE 14:** Photo of test pit SS3.



**PLATE 15:** Photo of test pit SS9.



**PLATE 16:** Photo of test pit SS13.

## APPENDIX D LABORATORY TRANSCRIPTS

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SQN Consulting Limited  
 PO Box 45053  
 Waterloo  
 Wellington 5042



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

Attention: **RESULTS**

Report **1106325-S**  
 Project name **1799a GREAT SOUTH ROAD**  
 Project ID **J240443**  
 Received Date **Jun 11, 2024**

Client Sample ID			SS1a	SS2a	SS3a	SS4a
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			K24-Jn0022335	K24-Jn0022336	K24-Jn0022337	K24-Jn0022338
Date Sampled			May 27, 2024	May 27, 2024	May 27, 2024	May 27, 2024
Test/Reference	LOR	Unit				
<b>Polycyclic Aromatic Hydrocarbons (NZ MfE)</b>						
Comments			G01	G01		G01
Acenaphthene	0.03	mg/kg	< 0.3	< 0.3	-	< 3
Acenaphthylene	0.03	mg/kg	< 0.3	< 0.3	-	< 3
Anthracene	0.03	mg/kg	< 0.3	< 0.3	-	< 3
Benzo(a)anthracene	0.03	mg/kg	< 0.3	< 0.3	-	< 3
Benzo(a)pyrene	0.03	mg/kg	< 0.3	< 0.3	-	< 3
Benzo(a)pyrene TEQ (lower bound)*	0.03	mg/kg	< 0.3	< 0.3	-	< 3
Benzo(a)pyrene TEQ (medium bound)*	0.03	mg/kg	0.4	0.4	-	3.6
Benzo(a)pyrene TEQ (upper bound)*	0.03	mg/kg	0.8	0.8	-	7.5
Benzo(b&j)fluoranthene <sup>N07</sup>	0.03	mg/kg	< 0.3	< 0.3	-	< 3
Benzo(g,h,i)perylene	0.03	mg/kg	< 0.3	< 0.3	-	< 3
Benzo(k)fluoranthene	0.03	mg/kg	< 0.3	< 0.3	-	< 3
Chrysene	0.03	mg/kg	< 0.3	< 0.3	-	< 3
Dibenz(a,h)anthracene	0.03	mg/kg	< 0.3	< 0.3	-	< 3
Fluoranthene	0.03	mg/kg	< 0.3	< 0.3	-	< 3
Fluorene	0.03	mg/kg	< 0.3	< 0.3	-	< 3
Indeno(1.2.3-cd)pyrene	0.03	mg/kg	< 0.3	< 0.3	-	< 3
Naphthalene	0.1	mg/kg	< 0.3	< 0.3	-	< 3
Phenanthrene	0.03	mg/kg	< 0.3	< 0.3	-	< 3
Pyrene	0.03	mg/kg	< 0.3	< 0.3	-	< 3
Total PAH*	0.1	mg/kg	< 0.3	< 0.3	-	< 3
p-Terphenyl-d14 (surr.)	1	%	67	77	-	118
2-Fluorobiphenyl (surr.)	1	%	65	60	-	INT
<b>Metals M8 (NZ MfE)</b>						
Arsenic	0.1	mg/kg	10	8.5	3.6	10
Cadmium	0.01	mg/kg	0.08	0.08	0.06	0.11
Chromium	0.1	mg/kg	25	89	26	26
Copper	0.1	mg/kg	24	30	27	25
Lead	0.1	mg/kg	18	21	15	14
Mercury	0.01	mg/kg	0.11	0.21	0.04	0.05
Nickel	0.1	mg/kg	19	40	41	28
Zinc	5	mg/kg	88	79	65	89
<b>Sample Properties</b>						
% Moisture	1	%	9.9	21	6.0	13
Asbestos - AS4964			-	-	see attached	see attached

Client Sample ID			SS6a	SS8a	SS9a	SS10a
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			K24-Jn0022339	K24-Jn0022340	K24-Jn0022341	K24-Jn0022342
Date Sampled			May 27, 2024	May 27, 2024	May 27, 2024	May 27, 2024
Test/Reference	LOR	Unit				
<b>Polycyclic Aromatic Hydrocarbons (NZ MfE)</b>						
Comments			G01	G01	G01	G01
Acenaphthene	0.03	mg/kg	< 0.3	< 3	< 3	< 3
Acenaphthylene	0.03	mg/kg	< 0.3	< 3	< 3	< 3
Anthracene	0.03	mg/kg	< 0.3	< 3	< 3	< 3
Benz(a)anthracene	0.03	mg/kg	< 0.3	< 3	< 3	< 3
Benzo(a)pyrene	0.03	mg/kg	< 0.3	< 3	< 3	< 3
Benzo(a)pyrene TEQ (lower bound)*	0.03	mg/kg	< 0.3	< 3	< 3	< 3
Benzo(a)pyrene TEQ (medium bound)*	0.03	mg/kg	0.4	3.6	3.6	3.6
Benzo(a)pyrene TEQ (upper bound)*	0.03	mg/kg	0.8	7.5	7.5	7.5
Benzo(b&j)fluoranthene <sup>N07</sup>	0.03	mg/kg	< 0.3	< 3	< 3	< 3
Benzo(g,h,i)perylene	0.03	mg/kg	< 0.3	< 3	< 3	< 3
Benzo(k)fluoranthene	0.03	mg/kg	< 0.3	< 3	< 3	< 3
Chrysene	0.03	mg/kg	< 0.3	< 3	< 3	< 3
Dibenz(a,h)anthracene	0.03	mg/kg	< 0.3	< 3	< 3	< 3
Fluoranthene	0.03	mg/kg	< 0.3	< 3	< 3	< 3
Fluorene	0.03	mg/kg	< 0.3	< 3	< 3	< 3
Indeno(1.2.3-cd)pyrene	0.03	mg/kg	< 0.3	< 3	< 3	< 3
Naphthalene	0.1	mg/kg	< 0.3	< 3	< 3	< 3
Phenanthrene	0.03	mg/kg	< 0.3	< 3	< 3	< 3
Pyrene	0.03	mg/kg	< 0.3	< 3	< 3	< 3
Total PAH*	0.1	mg/kg	< 0.3	< 3	< 3	< 3
p-Terphenyl-d14 (surr.)	1	%	73	74	75	102
2-Fluorobiphenyl (surr.)	1	%	80	84	116	93
<b>Metals M8 (NZ MfE)</b>						
Arsenic	0.1	mg/kg	3.4	4.2	9.1	6.3
Cadmium	0.01	mg/kg	0.05	0.08	0.12	0.12
Chromium	0.1	mg/kg	13	27	34	32
Copper	0.1	mg/kg	14	23	31	27
Lead	0.1	mg/kg	5.6	9.5	14	12
Mercury	0.01	mg/kg	< 0.01	0.04	0.06	0.05
Nickel	0.1	mg/kg	16	32	41	36
Zinc	5	mg/kg	40	59	90	75
<b>Sample Properties</b>						
% Moisture	1	%	7.4	11	15	13
Asbestos - AS4964			-	see attached	see attached	see attached

Client Sample ID			SS12a	SS13a	SS14	SS15
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			K24-Jn0022343	K24-Jn0022344	K24-Jn0022345	K24-Jn0022346
Date Sampled			May 27, 2024	May 27, 2024	May 27, 2024	May 27, 2024
Test/Reference	LOR	Unit				
<b>Polycyclic Aromatic Hydrocarbons (NZ MfE)</b>						
Acenaphthene	0.03	mg/kg	< 3	< 3	-	-
Acenaphthylene	0.03	mg/kg	< 3	< 3	-	-
Anthracene	0.03	mg/kg	< 3	< 3	-	-
Benz(a)anthracene	0.03	mg/kg	< 3	< 3	-	-
Benzo(a)pyrene	0.03	mg/kg	< 3	< 3	-	-

Client Sample ID			SS12a	SS13a	SS14	SS15
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			K24-Jn0022343	K24-Jn0022344	K24-Jn0022345	K24-Jn0022346
Date Sampled			May 27, 2024	May 27, 2024	May 27, 2024	May 27, 2024
Test/Reference	LOR	Unit				
<b>Polycyclic Aromatic Hydrocarbons (NZ MfE)</b>						
Benzo(a)pyrene TEQ (lower bound)*	0.03	mg/kg	< 3	< 3	-	-
Benzo(a)pyrene TEQ (medium bound)*	0.03	mg/kg	3.6	3.6	-	-
Benzo(a)pyrene TEQ (upper bound)*	0.03	mg/kg	7.5	7.5	-	-
Benzo(b&j)fluoranthene <sup>N07</sup>	0.03	mg/kg	< 3	< 3	-	-
Benzo(g,h,i)perylene	0.03	mg/kg	< 3	< 3	-	-
Benzo(k)fluoranthene	0.03	mg/kg	< 3	< 3	-	-
Chrysene	0.03	mg/kg	< 3	< 3	-	-
Dibenz(a,h)anthracene	0.03	mg/kg	< 3	< 3	-	-
Fluoranthene	0.03	mg/kg	< 3	< 3	-	-
Fluorene	0.03	mg/kg	< 3	< 3	-	-
Indeno(1.2.3-cd)pyrene	0.03	mg/kg	< 3	< 3	-	-
Naphthalene	0.1	mg/kg	< 3	< 3	-	-
Phenanthrene	0.03	mg/kg	< 3	< 3	-	-
Pyrene	0.03	mg/kg	< 3	< 3	-	-
Total PAH*	0.1	mg/kg	< 3	< 3	-	-
p-Terphenyl-d14 (surr.)	1	%	107	138	-	-
2-Fluorobiphenyl (surr.)	1	%	116	112	-	-
<b>Metals M8 (NZ MfE)</b>						
Arsenic	0.1	mg/kg	6.8	4.7	-	-
Cadmium	0.01	mg/kg	0.11	0.09	-	-
Chromium	0.1	mg/kg	29	29	-	-
Copper	0.1	mg/kg	29	29	-	-
Lead	0.1	mg/kg	57	120	-	-
Mercury	0.01	mg/kg	0.07	0.06	-	-
Nickel	0.1	mg/kg	42	44	-	-
Zinc	5	mg/kg	74	69	-	-
Arsenic	0.1	mg/kg	-	-	16	12
Lead	0.1	mg/kg	-	-	66	39
Zinc	5	mg/kg	-	-	100	68
<b>Sample Properties</b>						
% Moisture	1	%	8.8	5.9	26	28
Asbestos - AS4964			see attached	see attached	-	see attached
<b>Organochlorine Pesticides (NZ MfE)</b>						
2,4'-DDD	0.01	mg/kg	-	-	< 0.01	< 0.01
2,4'-DDE	0.01	mg/kg	-	-	< 0.01	< 0.01
2,4'-DDT	0.01	mg/kg	-	-	< 0.01	< 0.01
4,4'-DDD	0.01	mg/kg	-	-	< 0.01	< 0.01
4,4'-DDE	0.01	mg/kg	-	-	< 0.01	< 0.01
4,4'-DDT	0.01	mg/kg	-	-	< 0.01	< 0.01
DDT + DDE + DDD (Total)*	0.01	mg/kg	-	-	< 0.01	< 0.01
a-HCH	0.01	mg/kg	-	-	< 0.01	< 0.01
Aldrin	0.01	mg/kg	-	-	< 0.01	< 0.01
b-HCH	0.01	mg/kg	-	-	< 0.01	< 0.01
Chlordanes - Total	0.01	mg/kg	-	-	< 0.01	< 0.01
cis-Chlordane	0.01	mg/kg	-	-	< 0.01	< 0.01
d-HCH	0.01	mg/kg	-	-	< 0.01	< 0.01
Dieldrin	0.01	mg/kg	-	-	< 0.01	< 0.01
Endosulfan I	0.01	mg/kg	-	-	< 0.01	< 0.01

Client Sample ID			SS12a	SS13a	SS14	SS15
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			K24-Jn0022343	K24-Jn0022344	K24-Jn0022345	K24-Jn0022346
Date Sampled			May 27, 2024	May 27, 2024	May 27, 2024	May 27, 2024
Test/Reference	LOR	Unit				
<b>Organochlorine Pesticides (NZ MfE)</b>						
Endosulfan II	0.01	mg/kg	-	-	< 0.01	< 0.01
Endosulfan sulphate	0.01	mg/kg	-	-	< 0.01	< 0.01
Endrin	0.01	mg/kg	-	-	< 0.01	< 0.01
Endrin aldehyde	0.01	mg/kg	-	-	< 0.01	< 0.01
Endrin ketone	0.01	mg/kg	-	-	< 0.01	< 0.01
g-HCH (Lindane)	0.01	mg/kg	-	-	< 0.01	< 0.01
Heptachlor	0.01	mg/kg	-	-	< 0.01	< 0.01
Heptachlor epoxide	0.01	mg/kg	-	-	< 0.01	< 0.01
Hexachlorobenzene	0.01	mg/kg	-	-	< 0.01	< 0.01
Methoxychlor	0.01	mg/kg	-	-	< 0.01	< 0.01
Toxaphene	0.5	mg/kg	-	-	< 5	< 5
trans-Chlordane	0.01	mg/kg	-	-	< 0.01	< 0.01
Dibutylchloroendate (surr.)	1	%	-	-	INT	93
Tetrachloro-m-xylene (surr.)	1	%	-	-	92	91
<b>Heavy Metals</b>						
Cadmium	0.01	mg/kg	-	-	0.36	0.33
Copper	0.1	mg/kg	-	-	37	29

Client Sample ID			SS16	SS17	SS18	SS19
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			K24-Jn0022347	K24-Jn0022348	K24-Jn0022349	K24-Jn0022350
Date Sampled			May 27, 2024	May 27, 2024	May 27, 2024	May 27, 2024
Test/Reference	LOR	Unit				
<b>Metals M8 (NZ MfE)</b>						
Arsenic	0.1	mg/kg	17	13	14	14
Lead	0.1	mg/kg	58	55	44	60
Zinc	5	mg/kg	110	84	100	100
<b>Sample Properties</b>						
% Moisture	1	%	33	37	35	36
<b>Asbestos - AS4964</b>						
			-	-	see attached	-
<b>Organochlorine Pesticides (NZ MfE)</b>						
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	0.03	0.03
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	0.03	0.03
a-HCH	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aldrin	0.01	mg/kg	< 0.01	< 0.01	0.03	0.03
b-HCH	0.01	mg/kg	< 0.01	< 0.01	< 0.01	0.03
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	0.02
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

Client Sample ID			SS16	SS17	SS18	SS19
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			K24-Jn0022347	K24-Jn0022348	K24-Jn0022349	K24-Jn0022350
Date Sampled			May 27, 2024	May 27, 2024	May 27, 2024	May 27, 2024
Test/Reference	LOR	Unit				
<b>Organochlorine Pesticides (NZ MfE)</b>						
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	0.02	0.02
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	< 5	< 5
trans-Chlordane	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Dibutylchloroendate (surr.)	1	%	132	143	113	73
Tetrachloro-m-xylene (surr.)	1	%	64	76	78	83
<b>Heavy Metals</b>						
Cadmium	0.01	mg/kg	0.36	0.57	0.32	0.52
Copper	0.1	mg/kg	34	38	42	34

Client Sample ID			SS20	SS21	SS3	SS4
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			K24-Jn0022351	K24-Jn0022352	K24-Jn0022353	K24-Jn0022354
Date Sampled			May 27, 2024	May 27, 2024	May 27, 2024	May 27, 2024
Test/Reference	LOR	Unit				
<b>Metals M8 (NZ MfE)</b>						
Arsenic	0.1	mg/kg	13	16	8.2	17
Lead	0.1	mg/kg	43	49	36	41
Zinc	5	mg/kg	87	90	87	86
<b>Sample Properties</b>						
% Moisture	1	%	35	38	22	35
<b>Asbestos - AS4964</b>						
			see attached	-	-	-
<b>Organochlorine Pesticides (NZ MfE)</b>						
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

Client Sample ID			SS20	SS21	SS3	SS4
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			K24-Jn0022351	K24-Jn0022352	K24-Jn0022353	K24-Jn0022354
Date Sampled			May 27, 2024	May 27, 2024	May 27, 2024	May 27, 2024
Test/Reference	LOR	Unit				
<b>Organochlorine Pesticides (NZ MfE)</b>						
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
Dibutylchlorodate (surr.)	1	%	96	96	89	88
Tetrachloro-m-xylene (surr.)	1	%	90	78	73	78
<b>Heavy Metals</b>						
Cadmium	0.01	mg/kg	0.40	0.45	0.25	< 0.01
Copper	0.1	mg/kg	37	37	39	45

Client Sample ID			SS5	SS11
Sample Matrix			Soil	Soil
Eurofins Sample No.			K24-Jn0022355	K24-Jn0022356
Date Sampled			May 27, 2024	May 27, 2024
Test/Reference	LOR	Unit		
<b>Polycyclic Aromatic Hydrocarbons (NZ MfE)</b>				
Acenaphthene	0.03	mg/kg	-	< 0.03
Acenaphthylene	0.03	mg/kg	-	< 0.03
Anthracene	0.03	mg/kg	-	< 0.03
Benz(a)anthracene	0.03	mg/kg	-	< 0.03
Benzo(a)pyrene	0.03	mg/kg	-	< 0.03
Benzo(a)pyrene TEQ (lower bound)*	0.03	mg/kg	-	< 0.03
Benzo(a)pyrene TEQ (medium bound)*	0.03	mg/kg	-	0.04
Benzo(a)pyrene TEQ (upper bound)*	0.03	mg/kg	-	0.08
Benzo(b&j)fluoranthene <sup>N07</sup>	0.03	mg/kg	-	< 0.03
Benzo(g,h,i)perylene	0.03	mg/kg	-	< 0.03
Benzo(k)fluoranthene	0.03	mg/kg	-	< 0.03
Chrysene	0.03	mg/kg	-	< 0.03
Dibenz(a,h)anthracene	0.03	mg/kg	-	< 0.03
Fluoranthene	0.03	mg/kg	-	< 0.03
Fluorene	0.03	mg/kg	-	< 0.03
Indeno(1.2.3-cd)pyrene	0.03	mg/kg	-	< 0.03
Naphthalene	0.1	mg/kg	-	< 0.1
Phenanthrene	0.03	mg/kg	-	< 0.03
Pyrene	0.03	mg/kg	-	< 0.03
Total PAH*	0.1	mg/kg	-	< 0.1
p-Terphenyl-d14 (surr.)	1	%	-	70
2-Fluorobiphenyl (surr.)	1	%	-	65

<b>Client Sample ID</b>			<b>SS5</b>	<b>SS11</b>
<b>Sample Matrix</b>			<b>Soil</b>	<b>Soil</b>
<b>Eurofins Sample No.</b>			<b>K24-Jn0022355</b>	<b>K24-Jn0022356</b>
<b>Date Sampled</b>			<b>May 27, 2024</b>	<b>May 27, 2024</b>
Test/Reference	LOR	Unit		
<b>Metals M8 (NZ MfE)</b>				
Arsenic	0.1	mg/kg	-	12
Cadmium	0.01	mg/kg	-	0.08
Chromium	0.1	mg/kg	-	31
Copper	0.1	mg/kg	-	38
Lead	0.1	mg/kg	-	33
Mercury	0.01	mg/kg	-	0.29
Nickel	0.1	mg/kg	-	13
Zinc	5	mg/kg	-	77
Arsenic	0.1	mg/kg	14	-
Lead	0.1	mg/kg	38	-
Zinc	5	mg/kg	61	-
<b>Sample Properties</b>				
% Moisture	1	%	30	28
Asbestos - AS4964			see attached	-
<b>Organochlorine Pesticides (NZ MfE)</b>				
2,4'-DDD	0.01	mg/kg	< 0.01	-
2,4'-DDE	0.01	mg/kg	< 0.01	-
2,4'-DDT	0.01	mg/kg	< 0.01	-
4,4'-DDD	0.01	mg/kg	< 0.01	-
4,4'-DDE	0.01	mg/kg	< 0.01	-
4,4'-DDT	0.01	mg/kg	< 0.01	-
DDT + DDE + DDD (Total)*	0.01	mg/kg	< 0.01	-
a-HCH	0.01	mg/kg	< 0.01	-
Aldrin	0.01	mg/kg	< 0.01	-
b-HCH	0.01	mg/kg	< 0.01	-
Chlordanes - Total	0.01	mg/kg	< 0.01	-
cis-Chlordane	0.01	mg/kg	< 0.01	-
d-HCH	0.01	mg/kg	< 0.01	-
Dieldrin	0.01	mg/kg	< 0.01	-
Endosulfan I	0.01	mg/kg	< 0.01	-
Endosulfan II	0.01	mg/kg	< 0.01	-
Endosulfan sulphate	0.01	mg/kg	< 0.01	-
Endrin	0.01	mg/kg	< 0.01	-
Endrin aldehyde	0.01	mg/kg	< 0.01	-
Endrin ketone	0.01	mg/kg	< 0.01	-
g-HCH (Lindane)	0.01	mg/kg	< 0.01	-
Heptachlor	0.01	mg/kg	< 0.01	-
Heptachlor epoxide	0.01	mg/kg	< 0.01	-
Hexachlorobenzene	0.01	mg/kg	< 0.01	-
Methoxychlor	0.01	mg/kg	< 0.01	-
Toxaphene	0.5	mg/kg	< 0.5	-
trans-Chlordane	0.01	mg/kg	< 0.01	-
Dibutylchlorendate (surr.)	1	%	101	-
Tetrachloro-m-xylene (surr.)	1	%	79	-
<b>Heavy Metals</b>				
Cadmium	0.01	mg/kg	0.05	-
Copper	0.1	mg/kg	34	-

**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.

<b>Description</b>	<b>Testing Site</b>	<b>Extracted</b>	<b>Holding Time</b>
Polycyclic Aromatic Hydrocarbons (NZ MfE) - Method: LTM-ORG-2130 PAH and Phenols in Soil and Water by GC MSMS	Auckland	Jun 12, 2024	14 Days
Metals M8 (NZ MfE) - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Auckland	Jun 12, 2024	28 Days
Heavy Metals - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Auckland	Jun 12, 2024	28 Days
Organochlorine Pesticides (NZ MfE) - Method: LTM-ORG-2220 OCP & PCB in Soil and Water by GCMSMS	Auckland	Jun 12, 2024	14 Days
% Moisture - Method: LTM-GEN-7080 Moisture Content in Soil by Gravimetry	Auckland	Jun 11, 2024	14 Days

<b>Auckland</b> 35 O'Rorke Road Penrose, Auckland 1061 +64 9 526 4551 IANZ# 1327	<b>Auckland (Focus)</b> Unit C1/4 Pacific Rise, Mount Wellington, Auckland 1061 +64 9 525 0568 IANZ# 1308	<b>Christchurch</b> 43 Detroit Drive Rolleston, Christchurch 7675 +64 3 343 5201 IANZ# 1290	<b>Tauranga</b> 1277 Cameron Road, Gate Pa, Tauranga 3112 +64 9 525 0568 IANZ# 1402
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<b>Melbourne</b> 6 Monterey Road Dandenong South VIC 3175 +61 3 8564 5000 NATA# 1261 Site# 1254	<b>Geelong</b> 19/8 Lewalan Street Grovedale VIC 3216 +61 3 8564 5000 NATA# 1261 Site# 25403	<b>Sydney</b> 179 Magowar Road Girraween NSW 2145 +61 2 9900 8400 NATA# 1261 Site# 18217	<b>Canberra</b> Unit 1,2 Dacre Street Mitchell ACT 2911 +61 2 6113 8091 NATA# 1261 Site# 25466	<b>Brisbane</b> 1/21 Smallwood Place Murarrie QLD 4172 T: +61 7 3902 4600 NATA# 1261 Site# 20794 & 2780	<b>Newcastle</b> 1/2 Frost Drive Mayfield West NSW 2304 +61 2 4968 8448 NATA# 1261 Site# 25079 & 25289
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<b>Perth</b> 46-48 Banksia Road Welshpool WA 6106 +61 8 6253 4444 NATA# 2377 Site# 2370
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<b>Perth ProMicro</b> 46-48 Banksia Road Welshpool WA 6106 +61 8 6253 4444 NATA# 2561 Site# 2554
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**Company Name:** SQN Consulting Limited-CL  
**Address:** PO Box 45053  
Waterloo  
Wellington 5042  
  
**Project Name:** 1799a GREAT SOUTH ROAD  
**Project ID:** J240443

**Order No.:**  
**Report #:** 1106325  
**Phone:** 0800 333 287  
**Fax:**

**Received:** Jun 11, 2024 4:05 PM  
**Due:** Jun 18, 2024  
**Priority:** 5 Day  
**Contact Name:** RESULTS

**Eurofins Analytical Services Manager : Katyana Gausel**

Sample Detail						Asbestos - AS4964	Cadmium	HOLD	Zinc	Moisture Set	Metals M8 (NZ MFE)	Polycyclic Aromatic Hydrocarbons (NZ MFE)	Eurofins Suite B22-NZ: OOP, Metals (As,Cu,Pb) (NZ MFE)
<b>Auckland Laboratory - IANZ# 1327</b>							X	X	X	X	X	X	X
<b>Auckland (Focus) Laboratory - IANZ# 1308</b>						X							
<b>Christchurch Laboratory - IANZ# 1290</b>													
<b>Tauranga Laboratory - IANZ# 1402</b>													
<b>External Laboratory</b>													
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID								
1	SS1a	May 27, 2024		Soil	K24-Jn0022335				X	X	X		
2	SS2a	May 27, 2024		Soil	K24-Jn0022336				X	X	X		
3	SS3a	May 27, 2024		Soil	K24-Jn0022337	X			X	X			
4	SS4a	May 27, 2024		Soil	K24-Jn0022338	X			X	X	X		
5	SS6a	May 27, 2024		Soil	K24-Jn0022339				X	X	X		
6	SS8a	May 27, 2024		Soil	K24-Jn0022340	X			X	X	X		
7	SS9a	May 27, 2024		Soil	K24-Jn0022341	X			X	X	X		
8	SS10a	May 27, 2024		Soil	K24-Jn0022342	X			X	X	X		
9	SS12a	May 27, 2024		Soil	K24-Jn0022343	X			X	X	X		
10	SS13a	May 27, 2024		Soil	K24-Jn0022344	X			X	X	X		
11	SS14	May 27, 2024		Soil	K24-Jn0022345		X		X				X

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Auckland	Auckland (Focus)	Christchurch	Tauranga
35 O'Rorke Road Penrose, Auckland 1061 +64 9 526 4551 IANZ# 1327	Unit C1/4 Pacific Rise, Mount Wellington, Auckland 1061 +64 9 525 0568 IANZ# 1308	43 Detroit Drive Rolleston, Christchurch 7675 +64 3 343 5201 IANZ# 1290	1277 Cameron Road, Gate Pa, Tauranga 3112 +64 9 525 0568 IANZ# 1402

Melbourne	Geelong	Sydney	Canberra	Brisbane	Newcastle
6 Monterey Road Dandenong South VIC 3175 +61 3 8564 5000 NATA# 1261 Site# 1254	19/8 Lewalan Street Grovedale VIC 3216 +61 3 8564 5000 NATA# 1261 Site# 25403	179 Magowar Road Girraween NSW 2145 +61 2 9900 8400 NATA# 1261 Site# 18217	Unit 1,2 Dacre Street Mitchell ACT 2911 +61 2 6113 8091 NATA# 1261 Site# 25466	1/21 Smallwood Place Murarrie QLD 4172 T: +61 7 3902 4600 NATA# 1261 Site# 20794 & 2780	1/2 Frost Drive Mayfield West NSW 2304 +61 2 4968 8448 NATA# 1261 Site# 25079 & 25289

Perth	Perth ProMicro
46-48 Banksia Road Welshpool WA 6106 +61 8 6253 4444 NATA# 2377 Site# 2370	46-48 Banksia Road Welshpool WA 6106 +61 8 6253 4444 NATA# 2561 Site# 2554

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**Address:** PO Box 45053  
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**Order No.:**  
**Report #:** 1106325  
**Phone:** 0800 333 287  
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**Received:** Jun 11, 2024 4:05 PM  
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**Contact Name:** RESULTS

**Eurofins Analytical Services Manager : Katyana Gausel**

Sample Detail						Asbestos - AS4964	Cadmium	HOLD	Zinc	Moisture Set	Metals M8 (NZ MFE)	Polycyclic Aromatic Hydrocarbons (NZ MFE)	Eurofins Suite B22-NZ: OOP, Metals (As,Cu,Pb) (NZ MFE)
<b>Auckland Laboratory - IANZ# 1327</b>							X	X	X	X	X	X	X
<b>Auckland (Focus) Laboratory - IANZ# 1308</b>						X							
<b>Christchurch Laboratory - IANZ# 1290</b>													
12	SS15	May 27, 2024		Soil	K24-Jn0022346	X	X	X	X				X
13	SS16	May 27, 2024		Soil	K24-Jn0022347		X	X	X				X
14	SS17	May 27, 2024		Soil	K24-Jn0022348		X	X	X				X
15	SS18	May 27, 2024		Soil	K24-Jn0022349	X	X	X	X				X
16	SS19	May 27, 2024		Soil	K24-Jn0022350		X	X	X				X
17	SS20	May 27, 2024		Soil	K24-Jn0022351	X	X	X	X				X
18	SS21	May 27, 2024		Soil	K24-Jn0022352		X	X	X				X
19	SS3	May 27, 2024		Soil	K24-Jn0022353		X	X	X				X
20	SS4	May 27, 2024		Soil	K24-Jn0022354		X	X	X				X
21	SS5	May 27, 2024		Soil	K24-Jn0022355	X	X	X	X				X
22	SS11	May 27, 2024		Soil	K24-Jn0022356				X	X	X		
23	SS5a	May 27, 2024		Soil	K24-Jn0022357			X					
24	SS11a	May 27, 2024		Soil	K24-Jn0022358			X					
<b>Test Counts</b>						11	11	2	11	22	11	10	11

## Internal Quality Control Review and Glossary

### General

- Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follow guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013. They are included in this QC report where applicable. Additional QC data may be available on request.
- Unless otherwise stated, all soil/sediment/solid results are reported on a dry weight basis.
- Unless otherwise stated, all biota/food results are reported on a wet weight basis on the edible portion.
- For CEC results where the sample's origin is unknown or environmentally contaminated, the results should be used advisedly.
- Actual LORs are matrix dependent. 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 where annotated.
- SVOC analysis on waters is performed on homogenised, unfiltered samples unless noted otherwise.
- Samples were analysed on an 'as received' basis.
- Information identified in this report with **blue** colour indicates data provided by customers that may have an impact on the results.
- This report replaces any interim results previously issued.

### Holding Times

Please refer to the '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 before sample receipt deadlines as stated on the SRA.

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

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

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

### Units

<b>mg/kg:</b> milligrams per kilogram	<b>mg/L:</b> milligrams per litre	<b>ppm:</b> parts per million
<b>µg/L:</b> micrograms per litre	<b>ppb:</b> parts per billion	<b>%:</b> Percentage
<b>org/100 mL:</b> Organisms per 100 millilitres	<b>NTU:</b> Nephelometric Turbidity Units	<b>MPN/100 mL:</b> Most Probable Number of organisms per 100 millilitres
<b>CFU:</b> Colony Forming Unit	<b>Colour:</b> Pt-Co Units (CU)	

### Terms

<b>APHA</b>	American Public Health Association
<b>CEC</b>	Cation Exchange Capacity
<b>COC</b>	Chain of Custody
<b>CP</b>	Client Parent - QC was performed on samples pertaining to this report
<b>CRM</b>	Certified Reference Material (ISO17034) - reported as percent recovery.
<b>Dry</b>	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
<b>Duplicate</b>	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
<b>LOR</b>	Limit of Reporting.
<b>LCS</b>	Laboratory Control Sample - reported as percent recovery.
<b>Method Blank</b>	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.
<b>NCP</b>	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
<b>RPD</b>	Relative Percent Difference between two Duplicate pieces of analysis.
<b>SPIKE</b>	Addition of the analyte to the sample and reported as percentage recovery.
<b>SRA</b>	Sample Receipt Advice
<b>Surr - Surrogate</b>	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
<b>TBTO</b>	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.
<b>TCLP</b>	Toxicity Characteristic Leaching Procedure
<b>TEQ</b>	Toxic Equivalency Quotient or Total Equivalence
<b>QSM</b>	US Department of Defense Quality Systems Manual Version 6.0
<b>US EPA</b>	United States Environmental Protection Agency
<b>WA DWER</b>	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

### QC - Acceptance Criteria

The acceptance criteria should only be used as a guide 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%, VOC recoveries 50 – 150%

PFAS field samples containing surrogate recoveries above the QC limit designated in QSM 6.0, where no positive PFAS results have been reported or reviewed, and no data was affected.

### QC Data General Comments

- Where a result is reported as 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 are 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
<b>Method Blank</b>							
<b>Polycyclic Aromatic Hydrocarbons (NZ MfE)</b>							
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	
<b>Method Blank</b>							
<b>Polycyclic Aromatic Hydrocarbons (NZ MfE)</b>							
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	
<b>Method Blank</b>							
<b>Organochlorine Pesticides (NZ MfE)</b>							
Chlordanes - Total	mg/kg	-			0.01	N/A	
<b>Method Blank</b>							
<b>Organochlorine Pesticides (NZ MfE)</b>							
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	
cis-Chlordane	mg/kg	< 0.01			0.01	Pass	
d-HCH	mg/kg	< 0.01			0.01	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
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	
<b>Method Blank</b>							
<b>Metals M8 (NZ MfE)</b>							
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	
<b>Method Blank</b>							
<b>Metals M8 (NZ MfE)</b>							
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	
<b>Method Blank</b>							
<b>Metals M8 (NZ MfE)</b>							
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	
<b>LCS - % Recovery</b>							
<b>Polycyclic Aromatic Hydrocarbons (NZ MfE)</b>							
Acenaphthylene	%	128			70-130	Pass	
Anthracene	%	119			70-130	Pass	
Benz(a)anthracene	%	101			70-130	Pass	
Benzo(a)pyrene	%	108			70-130	Pass	
Benzo(b&j)fluoranthene	%	102			70-130	Pass	
Benzo(k)fluoranthene	%	128			70-130	Pass	
Chrysene	%	81			70-130	Pass	
Dibenz(a,h)anthracene	%	108			70-130	Pass	
Fluoranthene	%	99			70-130	Pass	
Fluorene	%	120			70-130	Pass	

Test	Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
Indeno(1.2.3-cd)pyrene	%	110		70-130	Pass	
Naphthalene	%	121		70-130	Pass	
Phenanthrene	%	98		70-130	Pass	
Pyrene	%	91		70-130	Pass	
<b>LCS - % Recovery</b>						
<b>Polycyclic Aromatic Hydrocarbons (NZ MfE)</b>						
Acenaphthene	%	72		70-130	Pass	
Acenaphthylene	%	128		70-130	Pass	
Anthracene	%	115		70-130	Pass	
Benz(a)anthracene	%	90		70-130	Pass	
Benzo(a)pyrene	%	99		70-130	Pass	
Benzo(b&j)fluoranthene	%	93		70-130	Pass	
Benzo(g,h,i)perylene	%	87		70-130	Pass	
Benzo(k)fluoranthene	%	72		70-130	Pass	
Dibenz(a,h)anthracene	%	87		70-130	Pass	
Fluoranthene	%	126		70-130	Pass	
Fluorene	%	128		70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	103		70-130	Pass	
Naphthalene	%	124		70-130	Pass	
Phenanthrene	%	109		70-130	Pass	
Pyrene	%	116		70-130	Pass	
<b>LCS - % Recovery</b>						
<b>Organochlorine Pesticides (NZ MfE)</b>						
2,4'-DDE	%	72		70-130	Pass	
Endrin aldehyde	%	78		70-130	Pass	
Heptachlor epoxide	%	73		70-130	Pass	
<b>LCS - % Recovery</b>						
<b>Organochlorine Pesticides (NZ MfE)</b>						
2,4'-DDD	%	90		70-130	Pass	
4,4'-DDD	%	96		70-130	Pass	
4,4'-DDE	%	84		70-130	Pass	
a-HCH	%	78		70-130	Pass	
Aldrin	%	90		70-130	Pass	
b-HCH	%	85		70-130	Pass	
cis-Chlordane	%	128		70-130	Pass	
d-HCH	%	83		70-130	Pass	
Dieldrin	%	99		70-130	Pass	
Endosulfan I	%	78		70-130	Pass	
Endosulfan II	%	99		70-130	Pass	
Endosulfan sulphate	%	82		70-130	Pass	
Endrin	%	92		70-130	Pass	
g-HCH (Lindane)	%	86		70-130	Pass	
Hexachlorobenzene	%	104		70-130	Pass	
trans-Chlordane	%	128		70-130	Pass	
<b>LCS - % Recovery</b>						
<b>Metals M8 (NZ MfE)</b>						
Arsenic	%	119		80-120	Pass	
Cadmium	%	111		80-120	Pass	
Chromium	%	110		80-120	Pass	
Copper	%	109		80-120	Pass	
Lead	%	106		80-120	Pass	
Mercury	%	108		80-120	Pass	
Nickel	%	109		80-120	Pass	
Zinc	%	110		80-120	Pass	

Test		Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
<b>LCS - % Recovery</b>								
<b>Metals M8 (NZ MfE)</b>								
Cadmium		%	113			80-120	Pass	
Chromium		%	108			80-120	Pass	
Copper		%	108			80-120	Pass	
Lead		%	107			80-120	Pass	
Mercury		%	107			80-120	Pass	
Nickel		%	108			80-120	Pass	
Zinc		%	112			80-120	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
<b>Spike - % Recovery</b>								
<b>Metals M8 (NZ MfE)</b>								
Arsenic		K24-Jn0021409	NCP	%	114		75-125	Pass
<b>Spike - % Recovery</b>								
<b>Polycyclic Aromatic Hydrocarbons (NZ MfE)</b>								
Acenaphthene		K24-Jn0021592	NCP	%	110		70-130	Pass
Acenaphthylene		K24-Jn0022336	CP	%	125		70-130	Pass
Anthracene		K24-Jn0022336	CP	%	120		70-130	Pass
Benz(a)anthracene		K24-Jn0022336	CP	%	74		70-130	Pass
Benzo(a)pyrene		K24-Jn0022336	CP	%	87		70-130	Pass
Benzo(b&j)fluoranthene		K24-Jn0022336	CP	%	85		70-130	Pass
Benzo(g,h,i)perylene		K24-Jn0022336	CP	%	105		70-130	Pass
Benzo(k)fluoranthene		K24-Jn0022336	CP	%	110		70-130	Pass
Chrysene		K24-Jn0019701	NCP	%	74		70-130	Pass
Dibenz(a,h)anthracene		K24-Jn0022336	CP	%	73		70-130	Pass
Fluoranthene		K24-Jn0021592	NCP	%	96		70-130	Pass
Fluorene		K24-Jn0022336	CP	%	128		70-130	Pass
Indeno(1,2,3-cd)pyrene		K24-Jn0022336	CP	%	74		70-130	Pass
Naphthalene		K24-Jn0022336	CP	%	128		70-130	Pass
Phenanthrene		K24-Jn0022336	CP	%	122		70-130	Pass
Pyrene		K24-Jn0021592	NCP	%	92		70-130	Pass
<b>Spike - % Recovery</b>								
<b>Metals M8 (NZ MfE)</b>								
Cadmium		K24-Jn0022341	CP	%	114		75-125	Pass
Chromium		K24-Jn0022341	CP	%	111		75-125	Pass
Copper		K24-Jn0022341	CP	%	100		75-125	Pass
Lead		K24-Jn0022341	CP	%	108		75-125	Pass
Mercury		K24-Jn0022341	CP	%	119		75-125	Pass
Nickel		K24-Jn0022341	CP	%	99		75-125	Pass
Zinc		K24-Jn0022341	CP	%	114		75-125	Pass
<b>Spike - % Recovery</b>								
<b>Organochlorine Pesticides (NZ MfE)</b>								
2,4'-DDD		Z24-Jn0027974	NCP	%	113		70-130	Pass
2,4'-DDE		Z24-Jn0027974	NCP	%	76		70-130	Pass
4,4'-DDE		Z24-Jn0027974	NCP	%	97		70-130	Pass
d-HCH		Z24-Jn0027974	NCP	%	91		70-130	Pass
Endrin ketone		Z24-Jn0027974	NCP	%	88		70-130	Pass
g-HCH (Lindane)		Z24-Jn0027974	NCP	%	97		70-130	Pass
<b>Spike - % Recovery</b>								
<b>Organochlorine Pesticides (NZ MfE)</b>								
4,4'-DDD		K24-Jn0022347	CP	%	81		70-130	Pass
a-HCH		K24-Jn0022347	CP	%	71		70-130	Pass
b-HCH		K24-Jn0022347	CP	%	73		70-130	Pass
cis-Chlordane		K24-Jn0022347	CP	%	117		70-130	Pass

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Dieldrin	K24-Jn0022347	CP	%	87			70-130	Pass	
Endosulfan II	K24-Jn0022347	CP	%	83			70-130	Pass	
Endosulfan sulphate	K24-Jn0022347	CP	%	77			70-130	Pass	
Endrin	K24-Jn0022347	CP	%	84			70-130	Pass	
Heptachlor epoxide	K24-Jn0022347	CP	%	86			70-130	Pass	
Hexachlorobenzene	K24-Jn0022347	CP	%	84			70-130	Pass	
trans-Chlordane	K24-Jn0022347	CP	%	112			70-130	Pass	
<b>Spike - % Recovery</b>									
<b>Metals M8 (NZ MfE)</b>				Result 1					
Cadmium	K24-Jn0022352	CP	%	114			75-125	Pass	
Chromium	K24-Jn0022352	CP	%	112			75-125	Pass	
Copper	K24-Jn0022352	CP	%	111			75-125	Pass	
Lead	K24-Jn0022352	CP	%	104			75-125	Pass	
Mercury	K24-Jn0022352	CP	%	118			75-125	Pass	
Nickel	K24-Jn0022352	CP	%	109			75-125	Pass	
Zinc	K24-Jn0022352	CP	%	118			75-125	Pass	
<b>Spike - % Recovery</b>									
<b>Organochlorine Pesticides (NZ MfE)</b>				Result 1					
4,4'-DDD	K24-Jn0022352	CP	%	73			70-130	Pass	
a-HCH	K24-Jn0022352	CP	%	84			70-130	Pass	
Aldrin	K24-Jn0022352	CP	%	82			70-130	Pass	
b-HCH	K24-Jn0022352	CP	%	79			70-130	Pass	
cis-Chlordane	K24-Jn0022352	CP	%	114			70-130	Pass	
Dieldrin	K24-Jn0022352	CP	%	95			70-130	Pass	
Endosulfan I	K24-Jn0022352	CP	%	76			70-130	Pass	
Endosulfan II	K24-Jn0022352	CP	%	83			70-130	Pass	
Endosulfan sulphate	K24-Jn0022352	CP	%	76			70-130	Pass	
Endrin	K24-Jn0022352	CP	%	77			70-130	Pass	
Hexachlorobenzene	K24-Jn0022352	CP	%	93			70-130	Pass	
trans-Chlordane	K24-Jn0022352	CP	%	123			70-130	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
<b>Duplicate</b>									
<b>Polycyclic Aromatic Hydrocarbons (NZ MfE)</b>				Result 1	Result 2	RPD			
Acenaphthene	K24-Jn0021591	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Acenaphthylene	K24-Jn0021591	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Anthracene	K24-Jn0027883	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Benz(a)anthracene	K24-Jn0021591	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Benzo(a)pyrene	K24-Jn0027883	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Benzo(b&j)fluoranthene	K24-Jn0021591	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Benzo(g,h,i)perylene	K24-Jn0027883	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Benzo(k)fluoranthene	K24-Jn0027883	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Chrysene	K24-Jn0021591	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Dibenz(a,h)anthracene	K24-Jn0027883	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Fluoranthene	K24-Jn0021591	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Fluorene	K24-Jn0021591	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Indeno(1,2,3-cd)pyrene	K24-Jn0027883	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Naphthalene	K24-Jn0021591	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Phenanthrene	K24-Jn0027883	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Pyrene	K24-Jn0021591	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	

Duplicate								
Metals M8 (NZ MfE)				Result 1	Result 2	RPD		
Arsenic	K24-Jn0022340	CP	mg/kg	4.2	5.6	30	30%	Pass
Cadmium	K24-Jn0022340	CP	mg/kg	0.08	0.09	12	30%	Pass
Chromium	K24-Jn0022340	CP	mg/kg	27	45	49	30%	Fail Q02
Copper	K24-Jn0022340	CP	mg/kg	23	29	24	30%	Pass
Lead	K24-Jn0022340	CP	mg/kg	9.5	11	17	30%	Pass
Mercury	K24-Jn0022340	CP	mg/kg	0.04	0.03	12	30%	Pass
Nickel	K24-Jn0022340	CP	mg/kg	32	42	26	30%	Pass
Zinc	K24-Jn0022340	CP	mg/kg	59	69	17	30%	Pass
Duplicate								
Sample Properties				Result 1	Result 2	RPD		
% Moisture	K24-Jn0022340	CP	%	11	10	7.9	30%	Pass
Duplicate								
Organochlorine Pesticides (NZ MfE)				Result 1	Result 2	RPD		
2,4'-DDD	K24-Jn0022346	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
2,4'-DDE	K24-Jn0022346	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
2,4'-DDT	K24-Jn0022346	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
4,4'-DDD	K24-Jn0022346	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
4,4'-DDE	K24-Jn0022346	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
4,4'-DDT	K24-Jn0022346	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
a-HCH	K24-Jn0022346	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Aldrin	K24-Jn0022346	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
b-HCH	K24-Jn0022346	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
cis-Chlordane	K24-Jn0022346	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
d-HCH	K24-Jn0022346	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Dieldrin	K24-Jn0022346	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Endosulfan I	K24-Jn0022346	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Endosulfan II	K24-Jn0022346	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Endosulfan sulphate	K24-Jn0022346	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Endrin	K24-Jn0022346	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Endrin aldehyde	K24-Jn0022346	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Endrin ketone	K24-Jn0022346	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Heptachlor	K24-Jn0022346	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Heptachlor epoxide	K24-Jn0022346	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Hexachlorobenzene	K24-Jn0022346	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Methoxychlor	K24-Jn0022346	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
trans-Chlordane	K24-Jn0022346	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Duplicate								
Sample Properties				Result 1	Result 2	RPD		
% Moisture	K24-Jn0022350	CP	%	36	36	<1	30%	Pass
Duplicate								
Organochlorine Pesticides (NZ MfE)				Result 1	Result 2	RPD		
2,4'-DDD	K24-Jn0022351	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
2,4'-DDE	K24-Jn0022351	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
2,4'-DDT	K24-Jn0022351	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
4,4'-DDD	K24-Jn0022351	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
4,4'-DDE	K24-Jn0022351	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
4,4'-DDT	K24-Jn0022351	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
a-HCH	K24-Jn0022351	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Aldrin	K24-Jn0022351	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
b-HCH	K24-Jn0022351	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
cis-Chlordane	K24-Jn0022351	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
d-HCH	K24-Jn0022351	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Dieldrin	K24-Jn0022351	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Endosulfan I	K24-Jn0022351	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass

Duplicate								
Organochlorine Pesticides (NZ MfE)				Result 1	Result 2	RPD		
Endosulfan II	K24-Jn0022351	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Endosulfan sulphate	K24-Jn0022351	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Endrin	K24-Jn0022351	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Endrin aldehyde	K24-Jn0022351	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Endrin ketone	K24-Jn0022351	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
g-HCH (Lindane)	K24-Jn0022351	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Heptachlor	K24-Jn0022351	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Heptachlor epoxide	K24-Jn0022351	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Hexachlorobenzene	K24-Jn0022351	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Methoxychlor	K24-Jn0022351	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
trans-Chlordane	K24-Jn0022351	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass

**Comments**

Analysis of asbestos has been completed by Eurofins | Focus, report reference Q-00853.

**Sample Integrity**

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
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
G01	The LORs have been raised due to matrix interference
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
Q02	The duplicate %RPD is outside the recommended acceptance criteria. Further analysis indicates sample heterogeneity as the cause

**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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# Certificate of Analysis

**Client** Eurofins Environmental Testing New Zealand  
**Client Contact** Katyana Gausel  
**Phone Number** 095264551  
**Email** enviroreportsnz@eurofins.com  
**Address**



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

IANZ# 1308

Certificate ID	Q-00853	Date Sampled <sup>2</sup>	11/06/2024
Samples Taken By <sup>2</sup>	Client	Date Sample(s) Received	14/06/2024
Project Reference <sup>2</sup>	1106325 - J240443	Date Sample(s) Analysed & Issued	14/06/2024
Site Address <sup>2</sup>	1106325 - J240443		
Location Sample Analysed	Eurofins   Focus Unit C1, 4 Pacific Rise Mount Wellington Auckland 1060		

Lab ID	Sample ID <sup>2</sup>	Sample Details <sup>2</sup>	Sample type	Sample size(g)	Fibres Identified
1	SS3a		Soil	308.0	ORF, NAD
2	SS4a		Soil	258.4	ORF, NAD
3	SS8a		Soil	200.6	ORF, NAD
4	SS9a		Soil	255.6	ORF, NAD
5	SS10a		Soil	239.4	ORF, NAD
6	SS12a		Soil	255.7	ORF, NAD
7	SS13a		Soil	251.8	ORF, NAD
8	SS15		Soil	314.0	ORF, NAD
9	SS18		Soil	220.3	ORF, NAD
10	SS20		Soil	390.6	ORF, NAD
11	SS5		Soil	302.4	ORF, NAD

Opinions and interpretations expressed herein are outside the scope of Eurofins | Focus IANZ accreditation

Analytical Notes	-
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**Fibre Identification Key:**

*	See Analytical Notes	ORF	Organic Fibre
CHR	Chrysotile (White Asbestos)	SMF	Synthetic Mineral Fibre
AMO	Amosite (Brown / Grey Asbestos)	NFD	No Fibres Detected
CRO	Crocidolite – (Blue Asbestos)	NAD	No Asbestos Detected
UMF	Unknown Mineral Fibre		

**Sample Size Guide:**

Sufficient	Sample weight >1 g
Limited	Sample weight between 0.5 g -1 g
Insufficient	Sample weight <0.5 g; small size could misrepresent what is in sampled material. Suggest the client obtain a larger sample.

**Analysis Methods:**

- Samples submitted have been analysed to determine the presence of asbestos using stereo microscopy followed by polarised light microscopy (PLM) and dispersion staining (DS) techniques as documented in AS 4964–2004 and in-house method NPM-TP03 for Qualitative Identification of Asbestos in Bulk Samples.
- Eurofins | Focus did not carry out any sampling, and the data presented are based on the samples submitted. Data supplied by the client is indicated with superscript <sup>2</sup> and may impact the results.
- This certificate should be read in its entirety and shall not be reproduced except in full without written approval of the laboratory.

# Certificate of Analysis

## Methodology

Asbestos Fibre Identification	Conducted in accordance with the Australian Standard AS 4964 – 2004: <i>Method for the Qualitative Identification of Asbestos in Bulk Samples</i> and in-house Method NPM – TP03 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, AS 4964 – 2004 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 10 mm sieve followed by a 2 mm sieve. All fibrous matter greater than 10 mm greater than 2 mm and the material passing through the 2 mm sieve are retained and analysed for the presence of asbestos. If the sub 2 mm fraction is greater than approximately 30 g to 60g, then a subsampling 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 subsampled for trace analysis in accordance with AS 4964 - 2004.
Bonded asbestos containing material (ACM)	The material is first examined, and any fibres are 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 combined. 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 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 at the nominal reporting limit of 0.01% (w/w). The <i>National Environment Protection (Assessment of Site Contamination) Measure 1999</i> (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 Asbestos Fines (AF), to aid assessment against the NEPM criteria.

## Sample History

Where samples are submitted/analysed over several days, the last extraction date 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. Client samples are disposed of 3 months after analysis.

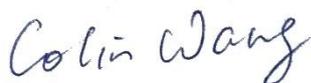
Description	Testing Site	Extracted	Holding Time
AS4964-2004 and in-house Method NPM – TP03	Auckland	14/06/2024	Indefinite

## Comments

### Asbestos Counter/Identifier:

Colin Wang

Senior Analyst-Asbestos

**Colin Wang****Senior Analyst-Asbestos (Key Technical Personnel)**

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

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**CHAIN OF CUSTODY RECORD**

Eurofins | mgt  
Auckland Office

Eurofins | mgt  
Wellington Office

Eurofins | mgt  
Melbourne Lab

Company		SQN Consulting Ltd (SQN GeoSciences)				Purchase Order		Project Manager		Project Name		1799a Great South Road					
Address		PO Box 45053, Waterloo, Lower Hutt, NZ 5010				Eurofins   mgt Quote No		Project No		J240443		Electronic Results Format					
Contact Name		Krysten				Analysis (Note: Where results are requested, please specify "Total" or "Filter")		MB-NZ		OCP-NZ		PAH		ACM/PIA		ASLP_PAH	
Contact Phone No		212294007															
Special Direction																	
Relinquished by (Signature)		KW										Email for Results		georeresults@sqn.co.nz			
(Time / Date)		28/05/2024										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			
												<input type="checkbox"/> Courier (# ) <input type="checkbox"/> Hand Delivered <input checked="" type="checkbox"/> Postal		Sample Comments / DG Hazard Warning			
No	Client Sample ID	Date	Matrix														
1	SS1a			X	X												
2	SS2a			X	X												
3	SS3a			X		X											
4	SS4a			X	X	X											
5	SS5a					X											
6	SS6a			X	X												
7	SS7a			X													
8	SS8a			X	X	X											
9	SS9a			X	X	X											
10	SS10a			X	X	X											
11	SS11a					X											
12	SS12a			X	X	X											
Laboratory Use Only		Received By	AUCK   WELL   MELB				Date	___/___/___	Time	___:___	Signature		Temperature				
		Received By	AUCK   WELL   MELB				Date	___/___/___	Time	___:___	Signature		Report No				

Submission of samples to the laboratory will be deemed as acceptance of Eurofins | mgt Standard Terms and Conditions unless agreed otherwise. A copy of Eurofins | mgt Standard Terms and Conditions is available on request.



Date/Time: 29/5/24 (7AM)  
 Chilled:  Yes / No  
 Temp: 9.7°C  
+2.8°C  
 Correction: 12.5°C  
 Final Temp:

**CHAIN OF CUSTODY RECORD**

Eurofins | mgt  
Auckland Office  
35 O'Rourke Road, Pearson, AUCKLAND 1001, New Zealand  
P: 0800 856450 (toll free dial)  
E: Scott.Carroll@eurofins.co.nz / Omer.Mehmet@eurofins.co.nz

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P: 0800 856450 (toll free dial)  
E: Scott.Carroll@eurofins.co.nz / Omer.Mehmet@eurofins.co.nz

Eurofins | mgt  
Melbourne Lab  
2 Kingflora Town Close, Oakleigh, VIC 3166, Australia  
P: 0800 856450 (toll free dial)  
E: Scott.Carroll@eurofins.co.nz / Omer.Mehmet@eurofins.co.nz

Company		SQN Consulting Ltd (SQN GeoSciences)				Purchase Order		Project Manager				Project Name		1799a Great South Road			
Address		PO Box 45053, Waterloo, Lower Hutt, NZ 5010				Eurofins   mgt Quote No		Project No				Electronic Results Format		J240443			
Contact Name		Krysten				Analytes (Note: Where results are requested, please specify "total" or "free")		MB-NZ OCP-NZ PAH ACM P/A ASLP_PAH BZ2_NZ + Cd + Zn						Email for Results		georesults@sqn.co.nz	
Contact Phone No		212294007												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																	
Relinquished by (Signature)		KW															
(Time / Date)		28/05/2024															
No	Client Sample ID	Date	Matrix	MB-NZ	OCP-NZ	PAH	ACM P/A	ASLP_PAH	BZ2_NZ + Cd + Zn								Sample Comments / DG Hazard Warning
1	SS13a	27/05/24		X		X	X										
2	SS14	27/05/24							X								
3	SS15	27/05/24					X		X								
4	SS16	27/05/24							X								
5	SS17	27/05/24							X								
6	SS18	27/05/24					X		X								
7	SS19	27/05/24							X								
8	SS20	27/05/24					X		X								
9	SS21	27/05/24							X								
10	SS3	27/05/24							X								
11	SS4	27/05/24							X								
12	SS5	27/05/24					X		X								
Laboratory Use Only		Received By	AUCK   WELL   MELB				Date	___/___/___	Time	___:___	Signature			Temperature			
		Received By	AUCK   WELL   MELB				Date	___/___/___	Time	___:___	Signature			Report No			

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**CHAIN OF CUSTODY RECORD**

Eurofins | mgt  
Auckland Office

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Wellington Office

85 Port Road, Seaview, Lower Hutt, WELLINGTON 5011, New Zealand  
P: 0800 856430 (free call)  
E: Scott.Carruth@eurofins.co.nz ; Gauri.Mehra@eurofins.co.nz

Eurofins | mgt  
Melbourne Lab

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P: 0800 856430 (free call)  
E: Scott.Carruth@eurofins.co.nz ; Gauri.Mehra@eurofins.co.nz

Company		SQN Consulting Ltd (SQN GeoSciences)				Purchase Order				Project Manager				Project Name		1799a Great South Road					
Address		PO Box 45053, Waterloo, Lower Hutt, NZ 5010				Eurofins   mgt Quote No				Project No				J240443		Electronic Results Format					
Contact Name		Krysten				Analysis (Note: Where multiple are requested, please specify "To test" or "To monitor")				MB-NZ OCP-NZ PAH ACM/PIA ASLP_PAH				Email for Results		georeresults@sqn.co.nz					
Contact Phone No		212294007												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														<input type="checkbox"/> Courier ( # ) <input type="checkbox"/> Hand Delivered <input checked="" type="checkbox"/> Postal		Sample Comments / DG Hazard Warning					
Relinquished by (Signature)		KW																			
(Time / Date)		28/05/2024																			
No	Client Sample ID	Date	Matrix	MB-NZ	OCP-NZ	PAH	ACM/PIA	ASLP_PAH													
1	SS11	27/05/24		X		X															
2																					
3																					
4																					
5																					
6																					
7																					
8																					
9																					
10																					
11																					
12																					
Laboratory Use Only		Received By	AUCK   WELL   MELB				Date	___/___/___	Time	___:___	Signature			Temperature							
		Received By	AUCK   WELL   MELB				Date	___/___/___	Time	___:___	Signature			Report No							

Submission of samples to the laboratory will be deemed as acceptance of Eurofins | mgt Standard Terms and Conditions unless agreed otherwise. A copy of Eurofins | mgt Standard Terms and Conditions is available on request.

## Somal Kaur

---

**From:** Katyana Gausel  
**Sent:** Tuesday, 11 June 2024 4:22 p.m.  
**To:** Somal Kaur  
**Subject:** FW: J240443 - TCLP/ASLP

**Verified Sender:** This email is from an internal and/or verified domain which passed security verifications. Remember to still be cautious with personal data and follow company policies.

**Katyana Gausel**  
Analytical Services Manager

**Phone:** +64 9 883 2869  
**E-mail:** [KatyanaGausel@eurofins.com](mailto:KatyanaGausel@eurofins.com)

---

**From:** krysten@sqn.co.nz <krysten@sqn.co.nz>  
**Sent:** Tuesday, June 11, 2024 4:05 PM  
**To:** Katyana Gausel <KatyanaGausel@eurofins.com>  
**Subject:** RE: J240443 - TCLP/ASLP

**Unverified Sender:** The sender of this email has not been verified. Review the content of the message carefully and verify the identity of the sender before acting on this email: replying, opening attachments or clicking links.

Hi Katyana,

Please hold off on TCLP testing. Do we have an ETA for the remaining ?

---

**From:** Katyana Gausel <[KatyanaGausel@eurofins.com](mailto:KatyanaGausel@eurofins.com)>  
**Sent:** Tuesday, June 4, 2024 12:09 PM  
**To:** [krysten@sqn.co.nz](mailto:krysten@sqn.co.nz); !NZ01\_CAU001\_EnviroSampleAKL <[EnviroSampleAKL@eurofins.com](mailto:EnviroSampleAKL@eurofins.com)>  
**Subject:** RE: J240443 - TCLP/ASLP

Hi Krysten,

Could you please confirm which testing you're after so we can get these underway?

**Katyana Gausel**  
Analytical Services Manager

**Phone:** +64 9 883 2869  
**E-mail:** [KatyanaGausel@eurofins.com](mailto:KatyanaGausel@eurofins.com)

---

**From:** Katyana Gausel <[KatyanaGausel@eurofins.com](mailto:KatyanaGausel@eurofins.com)>  
**Sent:** Thursday, May 30, 2024 12:45 PM  
**To:** [krysten@sqn.co.nz](mailto:krysten@sqn.co.nz); !NZ01\_CAU001\_EnviroSampleAKL <[EnviroSampleAKL@eurofins.com](mailto:EnviroSampleAKL@eurofins.com)>  
**Subject:** RE: J240443 - TCLP/ASLP

**Verified Sender:** This email is from an internal and/or verified domain which passed security verifications. Remember to still be cautious with personal data and follow company policies.

Hi Krysten,

ASLP would likely be 15 day TAT depending on the tests required on these samples, and has a cost of \$13.40 in addition to the tests requested. Please note, for Australian testing there is a minimum batch threshold of \$320 for only tests conducted in Australia, otherwise an \$160 sample transfer fee will be added to the invoice.

SPSLP/TCLP testing has a 5 day TAT with the same cost of \$13.40 per sample in addition to the testing required.

**Katyana Gausel**  
Analytical Services Manager

**Phone:** +64 9 883 2869

**E-mail:** [KatyanaGausel@eurofins.com](mailto:KatyanaGausel@eurofins.com)

---

**From:** [krysten@sqn.co.nz](mailto:krysten@sqn.co.nz) <[krysten@sqn.co.nz](mailto:krysten@sqn.co.nz)>  
**Sent:** Thursday, May 30, 2024 12:30 PM  
**To:** !NZ01\_CAU001\_EnviroSampleAKL <[EnviroSampleAKL@eurofins.com](mailto:EnviroSampleAKL@eurofins.com)>  
**Subject:** J240443 - TCLP/ASLP

**Unverified Sender:** The sender of this email has not been verified. Review the content of the message carefully and verify the identity of the sender before acting on this email: replying, opening attachments or clicking links.

Afternoon,

Can you please give me the costing and TAT for ASLP?

Many thanks,



**Krysten Walker.**  
*Operations Manager &  
Environmental Scientist*  
021 229 4007 | 0800 333 287  
[krysten@sqn.co.nz](mailto:krysten@sqn.co.nz)  
[www.sqn.co.nz](http://www.sqn.co.nz)

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